

# Reconnaissance Flora/Vegetation Survey Daisy Milano Project

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Version 1

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## Glossary

Acronym	Description
ANCA	Australian Nature Conservation Agency.
BA	Birdlife Australia (Formerly RAOU, Birds Australia).
BAM Act	Biosecurity and Agriculture Management Act 2007, WA Government.
BC Act	Biodiversity Conservation Act 2016, WA Government.
Botanica	Botanica Consulting.
BoM	Bureau of Meteorology.
CAMBA	China Australia Migratory Bird Agreement 1998.
DAFWA	Department of Agriculture and Food (now DPIRD), WA Government.
DBCA	Department of Biodiversity, Conservation and Attractions (formerly DPaW), WA Government.
DEC	Department of Environment and Conservation (now DBCA), 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.
DotEE	Department of the Environment and Energy (formerly DSEWPaC), 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
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DotEE.), Australian Government.
DWER	Department of Water and Environmental Regulation (formerly OEPA, DER and DoW), WA Government
EP Act	Environmental Protection Act 1986, WA Government.

Acronym	Description
EP Regulations	Environmental Protection (Clearing of Native Vegetation) Regulations 2004, WA Government.
EPA	Environmental Protection Authority, WA Government.
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999, 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.
JAMBA	Japan Australia Migratory Bird Agreement 1981.
Km	Kilometre (1,000 metres).
MVG	Major Vegetation Groups.
NVIS	National Vegetation Information System.
OEPA	Office of the Environmental Protection Authority (now DWER), WA Government.
PEC	Priority Ecological Community.
RAOU	Royal Australia Ornithologist Union.
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement 2007.
Silverlake	Silverlake Resources.
SRE	Short Range Endemic.
SSC	Species Survival Commission, International.
Survey Area	Daisy Milano Project
TEC	Threatened Ecological Community.
WA	Western Australia.
WAHERB	Western Australian Herbarium.
WAM	Western Australian Museum, WA Government.
WC Act	Wildlife Conservation Act 1950, WA Government.

## **Executive Summary**

Botanica Consulting (Botanica) was commissioned by Silverlake Resources (Silverlake) in August 2019 to update the existing flora/vegetation survey report completed for the Daisy Milano Project (referred to as the 'survey area') by Dr Eddie Van Etten (2009) to comply with current Environmental Protection Authority Guidelines for flora/ vegetation surveys. The fieldwork was conducted on 5<sup>th</sup> November 2009, covering an area of 1,100 ha. The survey area is located approximately 50 km east of Kalgoorlie-Boulder, Western Australia.

Four vegetation types were identified within the survey area. These vegetation types were identified within three different landform types and comprised of three major vegetation groups, which were represented by a total of 13 families, 20 genera and 49 taxa (including three annual taxa). Based on the vegetation condition rating scale adapted from Keighery, 1994 and Trudgen, 1988 (ranging from 'pristine' to 'completely degraded'), vegetation was ranged from 'good' to 'degraded'.

No Threatened Flora or Threatened Ecological Communities (TEC) as listed under the Western Australian *Biodiversity Conservation (BC) Act 2016* or Commonwealth *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* were identified within the survey area.

No Priority Flora or Priority Ecological Communities (PEC) as listed by Department of Biodiversity, Conservation and Attractions (DBCA) were recorded within the survey area.

The survey area does not contain any world or national heritage places. There are no wetlands of international importance (Ramsar Wetlands), national importance (Australian Nature Conservation Agency (ANCA) Wetlands) or conservation category wetlands within the survey area. The survey area is not located within DBCA Managed Land and does not contain any Environmentally Sensitive Areas (ESA) listed under the *Environmental Protection (EP) Act 1986*.

## 1 **Introduction**

### 1.1 **Project Description**

Botanica Consulting (Botanica) was commissioned by Silverlake Resources (Silverlake) to update the existing flora/vegetation survey report completed for the Daisy Milano Project (referred to as the 'survey area') by Dr Eddie Van Etten (2009) to comply with current Environmental Protection Authority Guidelines for flora/vegetation surveys. The fieldwork was conducted on 5<sup>th</sup> November 2009, covering an area of 1,100 ha. The survey area is located approximately 50 km east of Kalgoorlie-Boulder, Western Australia (Figure 1-1).

### 1.2 **Objectives**

The flora/vegetation assessment was conducted in accordance with the requirements of a reconnaissance flora survey as defined in *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment – December 2016* (EPA, 2016a). The objectives of the assessment were to:

- gather background information on flora and vegetation in the target area (literature review, database and map-based searches);
- identify significant flora, vegetation/ecological communities and assess the potential sensitivity to impact;
- review and update existing field survey data to comply with current EPA guidelines/legislation;
- undertake vegetation mapping to a scale appropriate for the bioregion and described according to the National Vegetation Information System (NVIS) structure and floristics;
- undertake vegetation condition mapping;
- assess the project area's plant species diversity, density, composition, structure and weed cover, using NVIS classification system for vegetation description;
- assess Matters of National Environmental Significance (MNES) and indicate whether potential impacts on MNES as protected under the EPBC Act are likely to require referral of the project to the Commonwealth DoEE; and
- determine the State legislative context of environmental aspects required for the assessment.





Figure 1-1: Regional map of the survey area



## **2 Regional Biophysical Environment**

### **2.1 Regional Environment**

The survey area lies within the South-West Interzone of WA in a region known as the Coolgardie Botanical District. Based on the Interim Biogeographic Regionalisation of Australia (IBRA, Version 7) (DotEE, 2012) the survey area is located within the Coolgardie Bioregion of WA. The Coolgardie Bioregion is further divided into three subregions; Mardabilla (COO1), Southern Cross (COO2) and Eastern Goldfields (COO3) subregion with the survey area located within the Eastern Goldfields subregion (Figure 2-1).

The Coolgardie Bioregion is within the Yilgarn Craton. Its granite basement includes Archaean Greenstone intrusions in parallel belts. Drainage is occluded. The climate is arid to semi-arid warm Mediterranean with 250-300mm of mainly winter rainfall (McKenzie, May & McKenna, 2002). Diverse woodlands, rich in endemic eucalypts, occur on low greenstone hills, on alluvial soils on the valley floors, around the saline playas of the region's occluded drainage system, and on broad plains of calcareous earths (McKenzie, May & McKenna, 2002).

The Eastern Goldfields subregion comprises gently undulating plains interrupted in the west by low hills and ridges of Archaean greenstones and in the east by a horst of Proterozoic basic granulite. The underlying strata are eroded flat and covered with Tertiary sand and gravel soils, scattered exposures of bedrock, and plains of calcareous earths (Cowan, 2001).

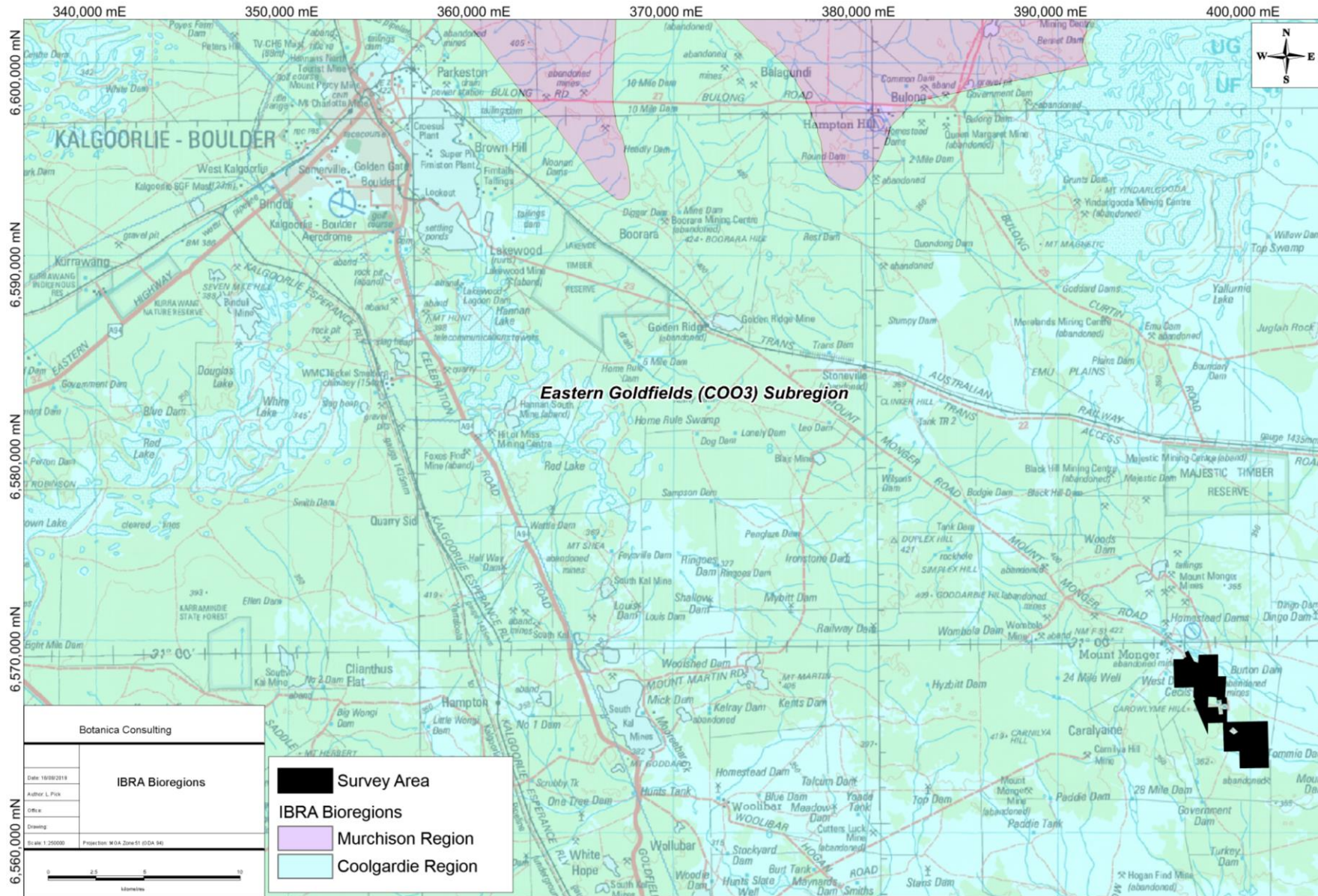


Figure 2-1: Map of IBRA subregions in relation to the survey area

## 2.2 Great Western Woodlands

The survey area lies within the Great Western Woodlands, located approximately 120 km from the northern boundary. The Great Western Woodlands is considered by The Wilderness Society of WA to be of global biological and conservation importance as one of the largest and healthiest temperate woodlands on Earth, containing many endemic taxa. The region covers almost 16 million hectares (160,000 square kilometres), from the southern edge of the Western Australian Wheatbelt to the pastoral lands of the Mulga country in the north, the inland deserts to the northeast, and the treeless Nullarbor Plain to the east (Figure 2-2).

The Great Western Woodlands provides a connection between southwest forests and inland deserts (Gondwana Link) as well as linking the north-west passage to Shark Bay. The majority of the Great Western Woodlands is unallocated crown land (61.1%) with other interests including pastoral leases (20.4%), conservation reserves (15.4%) unallocated crown land, ex pastoral (2%) managed by the Department of Biodiversity, Conservation and Attractions (DBCA) and private land (approximately 1%) (Watson *et. al.*, 2008).

No specific management strategy or formal conservation status applies to the Great Western Woodlands. The Great Western Woodlands currently includes towns, highways, roads, railways, private property, Crown Reserves, agricultural activities and mining tenements.



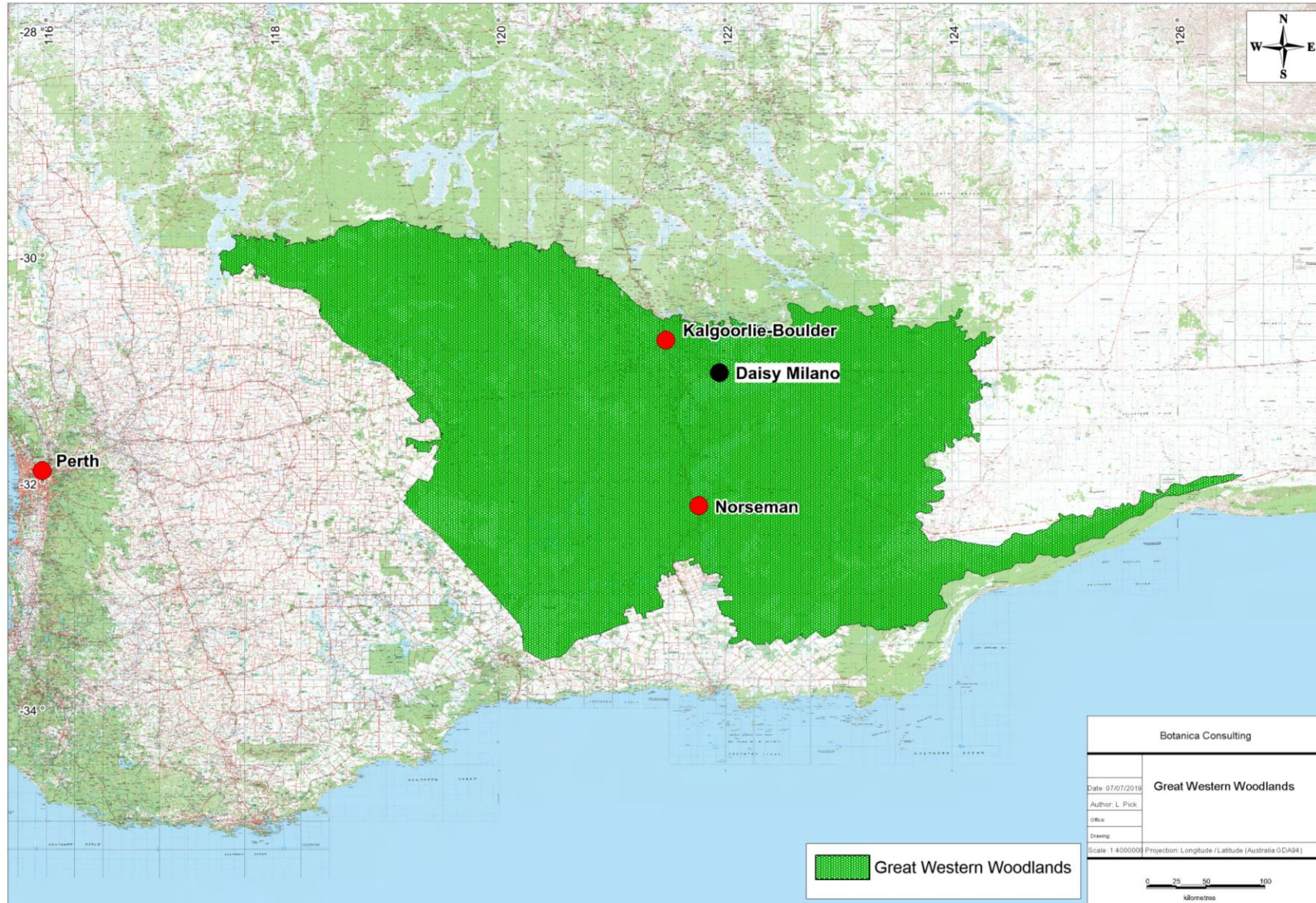


Figure 2-2: Location of survey area within the Great Western Woodlands (DBCA, 2011a)

Note-survey area not to scale

### 2.3 Soils and Landscape Systems

The survey area lies within the Kalgoorlie Province, which consists of undulating plains (with some sandplains, hills and salt lakes) on granitic rocks and greenstone of the Yilgarn Craton. Soils comprise of calcareous loamy earths and red loamy earths with some salt lake soils, red deep sands, yellow sandy earths, shallow loams and loamy duplexes. Vegetation includes Eucalypt woodlands with some Acacia-Casuarina thickets, mulga shrublands, halophytic shrublands and spinifex grasslands. This Province is located within the southern Goldfields between Payne's Find, Menzies, Southern Cross and Balladonia (Tille, 2006).

The Kalgoorlie Province is located on the central eastern portion of the Yilgarn Craton, mostly overlying Archaean rocks of the Southern Cross Domain and the Eastern Goldfields Superterrane. To the north-west is the Murchison Domain. The basement rocks are a mix of granite, gneiss and greenstone. Even-grained porphyritic granitic rocks (intruded by quartz veins and dolerite dykes) are most common across the north as well as in the western half and the north-east. The largest areas of migmatite and gneiss are found in the south-west (Tille, 2006).

The Kalgoorlie Province is further divided into seven soil-landscape zones, with the survey area located within the Kambalda Zone (265). This zone is characterised by flat to undulating plains (with hills, ranges and some salt lakes and stony plains) on greenstone and granitic rocks of the Yilgarn Craton. Soils include calcareous loamy earths and red loamy earths with salt lakes soils and some red-brown hardpan shallow loams and red sandy duplexes. Vegetation includes red mallee blackbutt- salmon gum-gimlet woodlands with mulga and halophytic shrublands (and some spinifex grasslands). This zone is located in the south-eastern Goldfields between Menzies, Norseman and the Fraser Range (Tille, 2006). The Kambalda Zone is further divided into soil landscape systems with the survey area located within the three landscape systems described in Table 2-1 below.

**Table 2-1: Soil Landscape Systems within the survey area**

Landscape System Mapping Unit	Description
Bunyip System	Gilgaied drainage tract, draining greenstone hills supporting mixed halophytic shrublands occasionally with a black oak overstorey.
Graves System	Basalt and greenstone rises and low hills supporting eucalypt woodlands with prominent saltbush and bluebush understoreys.
Gumland System	Extensive pedeplains supporting eucalypt woodlands with halophytic and non-halophytic shrub understoreys.



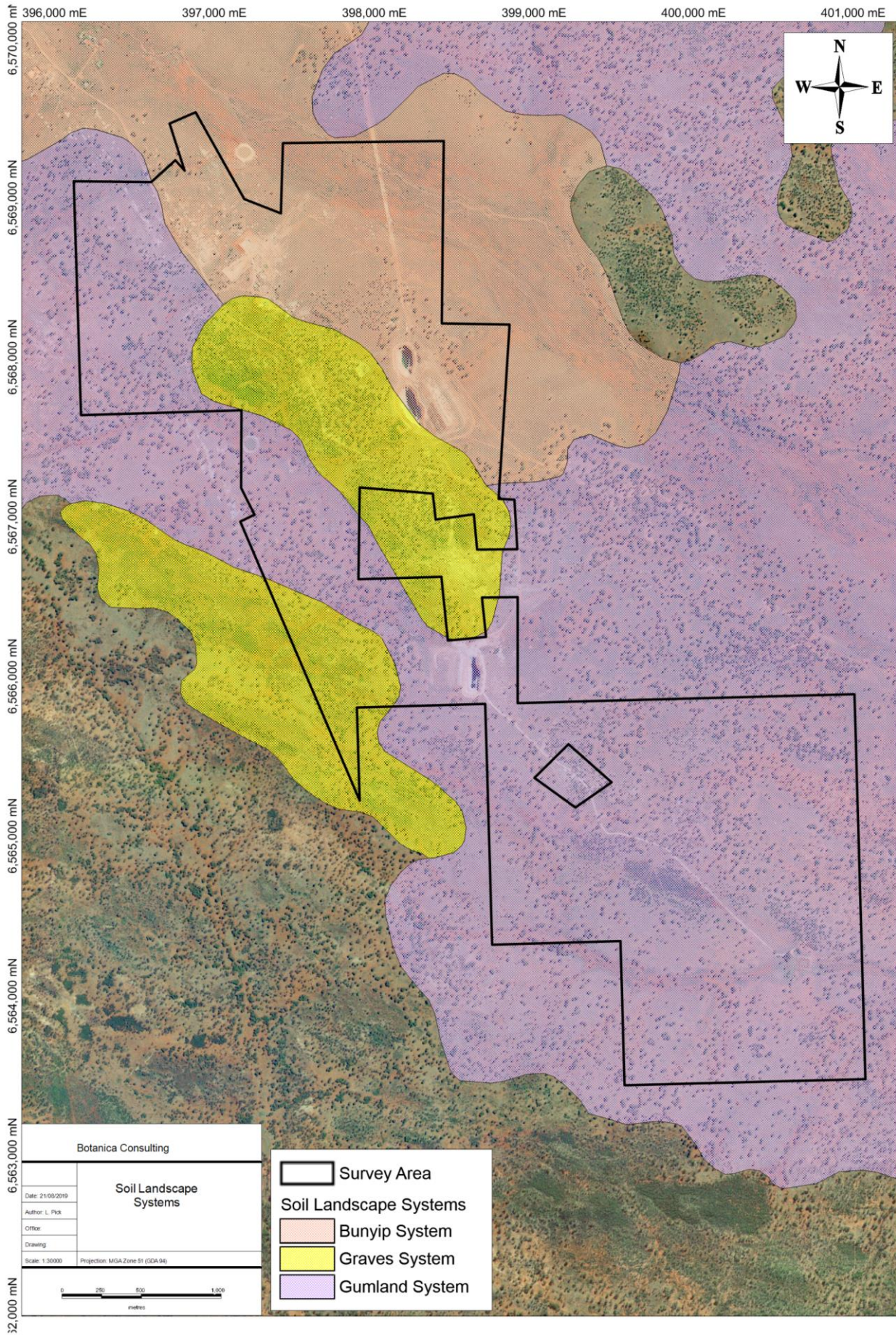


Figure 2-3: Soil Landscape Systems within the survey area



## 2.4 Vegetation

The vegetation of the Eastern Goldfields subregion consists of Mallees, *Acacia* thickets and shrub heaths on sandplains. Diverse *Eucalyptus* woodlands occur around salt lakes, on ranges, and in valleys (Cowan, 2001). The Department of Agriculture and Food Western Australia (DAFWA) GIS file (2011) indicates that the survey area is located within Pre-European Beard vegetation associations of the Randell system. The extent of these vegetation associations, as specified in the 2017 Statewide Vegetation Statistics (DBCA, 2017) is provided in Table 2-2 and Figure 2-4.

**Table 2-2: Pre-European Vegetation Associations within the survey area**

Vegetation association	Pre-European extent remaining (%)	% of Current extent within DBCA managed lands	Vegetation Description (Beard, 1990)
Randell 9	99.69	0	Medium woodland; coral gum ( <i>Eucalyptus torquata</i> ) & goldfields blackbutt ( <i>E. lesouefii</i> )
Randell 468	99.68	0	Medium woodland; salmon gum & goldfields blackbutt
Randell 1241	98.32	0	Succulent steppe; bluebush



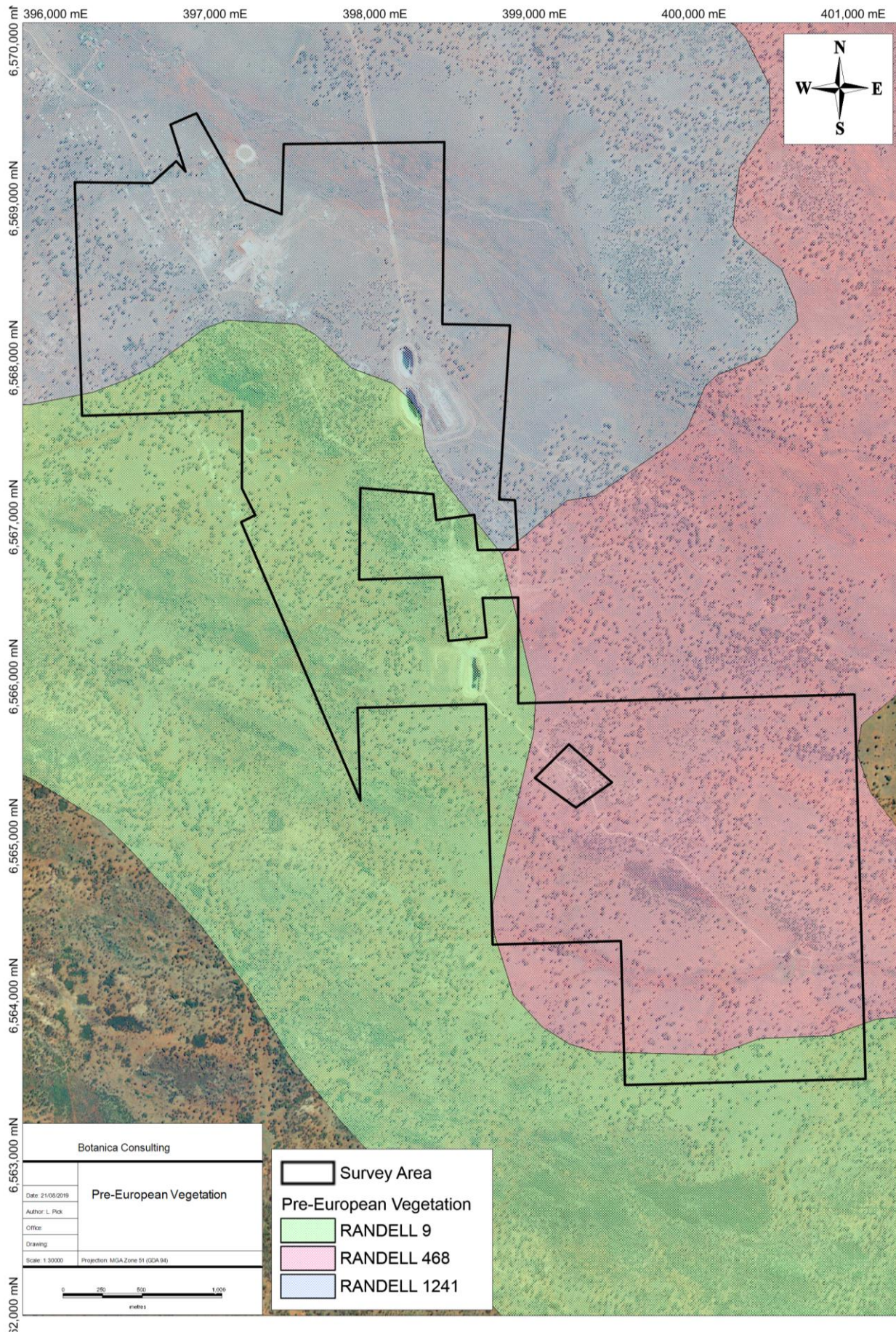


Figure 2-4: Pre-European Vegetation Associations within the survey area



## 2.5 Climate

The climate of the Eastern Goldfields subregion is characterised as an arid to semi-arid climate with annual rainfall of approximately 200-300 mm (Beard, 1990; Cowan, 2001). Average climate data for Kalgoorlie-Boulder is shown in Figure 2-5 (BoM, 2019).

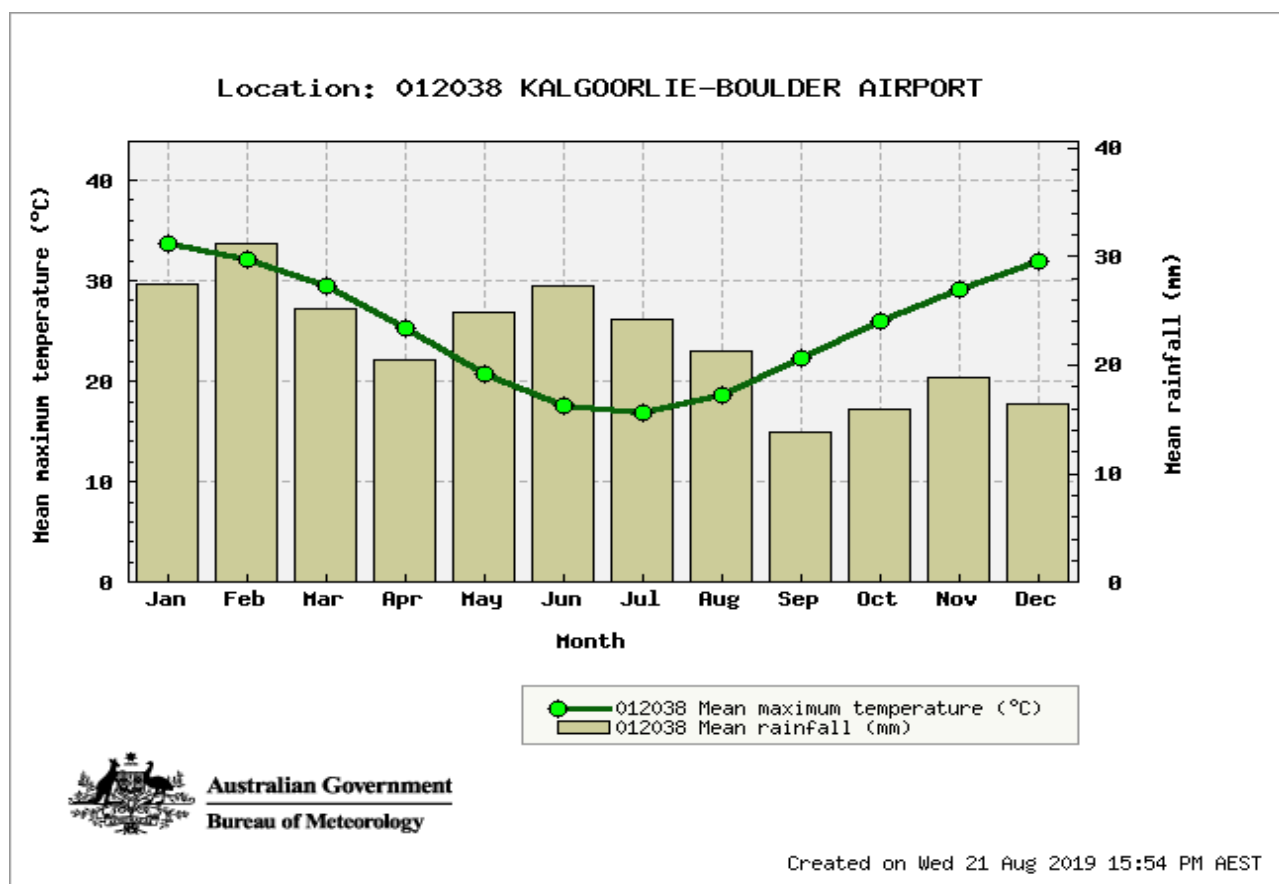


Figure 2-5: Average Climate Data for the Kalgoorlie-Boulder Airport weather station #12038 (BoM, 2019)

## 2.6 Hydrology

According to the Geoscience Australia database (2001), there is one ephemeral drainage line within the survey area which drains south towards an un-named salt lake. This salt lake is not listed as a wetland of international importance (Ramsar Wetlands), national importance (Australian Nature Conservation Agency (ANCA) Wetlands) or conservation category wetland. A map showing the drainage lines and inland waters in the local region is provided in Figure 2-6.

The Lefroy Paleochannel is located directly south of the survey area (Figure 2-6). The Lefroy Paleochannel is oriented north-east to south-west covering an area of approximately 881,400 ha. This Paleochannel was excavated into the Archaean Yilgarn Craton during the Jurassic period and historically drained from the southwest to the northeast (Clarke 1994). Groundwater flows eastwards in the direction of the original drainage. The groundwater outflow is ultimately towards the Eucla Basin (Magee, 2009).

According to the Department of Water and Environmental Regulation (DWER) groundwater salinity database (DWER, 2018), groundwater salinities in the survey area ranges from 14,000 mg/L to 35,000 mg/L with the Lake Lefroy Paleochannel recording a groundwater salinity >35,000 mg/L. Groundwater in the region is a local flow system in Precambrian Rocks. The survey area is located within the Yilgarn-Goldfields Groundwater Province.

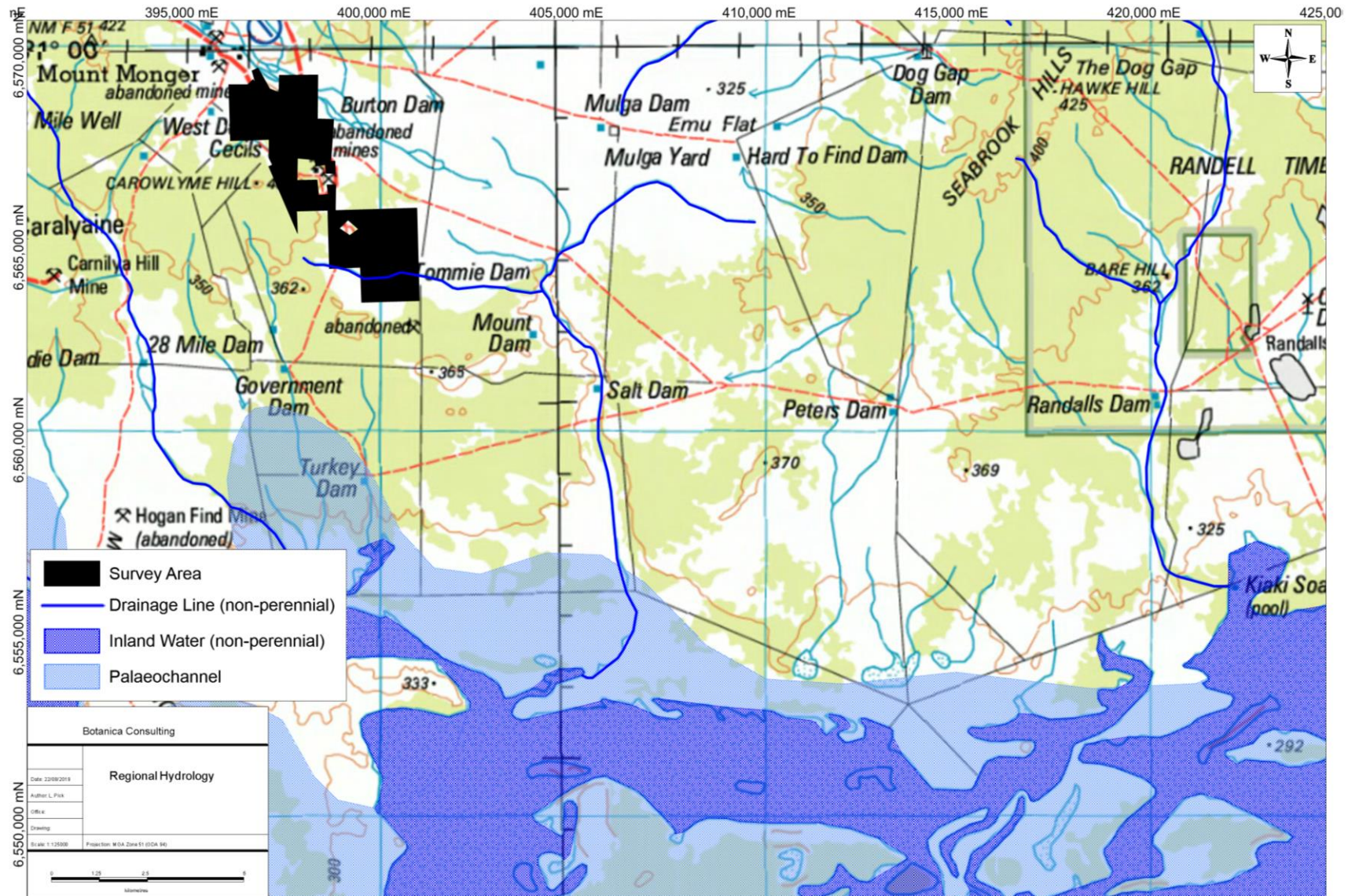


Figure 2-6: Hydrology of the survey area (data obtained from Geoscience Australia, 2001)



## **2.7 Land Use**

The dominant land uses of the Eastern Goldfields subregion include Unallocated Crown Land and Crown Reserves, grazing-native pastures-leasehold, freehold, conservation and mining leases (Cowan, 2001). The survey area is located within the Mt Monger Station Pastoral Lease.

### **3 Survey Methodology**

#### **3.1 Desktop Assessment**

A literature review was undertaken of previous flora assessments conducted within the local region. Documents reviewed included:

- Botanica Consulting, (2007), Vegetation Survey of Salt Creek within Tenements E25/162, E25/280, E25/307, E15/869, L25/24, E25/337 and M25/307.
- Botanica Consulting, (2010), Integra Mining Proposed Haul Road Level 1 Flora and Vegetation Survey
- Botanica Consulting (2012a), Integra Mining Majestic Haul Road Level 1 Flora and Vegetation Survey
- Botanica Consulting (2012b), Ramelius Resources Coogee Level 1 Flora and Vegetation Survey
- Botanica Consulting (2013), Crest Minerals Majestic North Project Level 1 Flora and Vegetation Survey
- Botanica Consulting (2014a), Silver Lake Resources Ltd Proposed High Voltage Power Line Route Level 1 Flora and Vegetation Survey
- Botanica Consulting (2014b), Flora and Vegetation survey, Silver Lake Resources Proposed Harry's Hill to Santa Haul Road.
- Botanica Consulting (2014c), Flora and Vegetation survey, Silver Lake Resources Imperial Majestic Project Haul Road.
- Botanica Consulting (2015), Flora and Vegetation survey, Silver Lake Resources Communication Tower Access Road and Pad.
- Botanica Consulting (2017), Reconnaissance Flora and Fauna Assessment: Mount Monger Road
- Eddie van Etten (2009), Flora & Vegetation of Silverlake Resource's Daisy Milano Project Area, near Kalgoorlie, Western Australia.
- Outback Ecology Services, (2009a), Integra Mining Salt Creek Level 2 and Maxwell's/Cock-Eyed Bob Level 1 Vegetation and Flora Surveys.
- Outback Ecology Services, (2009b), Integra Mining Distribution Line and Haul Road Vegetation and Flora Survey.
- Outback Ecology Services, (2009c), Integra Mining Borefield and pipeline targeted Declared Rare Flora and Priority Search.
- Outback Ecology Services (2011), Majestic Level 2 and Haul Road L1 Vegetation and Flora Surveys, Integra's Proposed Salt Creek Haul Road.
- Outback Ecology Services (2013), Integra Mining Limited Randall's Gold Project-Santa Deposit Level 2 Flora and Vegetation Survey.

Searches of the following databases were undertaken to aid in the compilation of a list of flora taxa within the survey area:

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

The NatureMap and Protected Matters Search were conducted for an area encompassing a 20 km radius of the centre coordinates -31.0227S 121.9302E. It should be noted that these lists are based on observations from a broader area than the assessment area (20 km 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/vegetation was assessed using data from the following sources:

- *Environment Protection and Biodiversity and Conservation (EPBC) Act 1999*. Administered by the Australian Government (DotEE);
- *Biodiversity Conservation (BC) Act 2016*<sup>1</sup>. Administered by the WA Government (DBCA);
- Priority Flora list. A non-legislative list maintained by DBCA for management purposes.

Descriptions of conservation significant species and communities are provided in Appendix 1.

### 3.2 Field Assessment

A reconnaissance flora/vegetation survey was conducted by Dr Eddie Van Etten on 5<sup>th</sup> November 2009, covering an area of 1,100 ha. The survey area is located approximately 50 km east of Kalgoorlie-Boulder, Western Australia.

The survey approach taken was to stratify (divide) the study area into distinct habitats/environments based on patterns observed on aerial photos and in the field, as well as the authors prior experience in vegetation surveys in the general region. Within each habitat type, a number of survey sites were positioned in representative vegetation of the habitat type. At each survey site, all plant species were either identified in the field or, where uncertain, collected for later identification. Each survey site was essentially plotless, but generally included a thorough search for all plant species within a 30 m radius of the middle of the site.

In addition, a general reconnaissance of the area was undertaken to find plant species not sampled at survey sites. Specifically, known Threatened and Priority flora were thoroughly searched for within and between survey sites.

### 3.3 Survey limitations and constraints

It is important to note that flora surveys will entail limitations notwithstanding careful planning and design. Potential limitations are listed in Table 3-5.

The conclusions presented in this report are based upon field data and environmental assessments and/or testing carried out over a limited period of time and are therefore merely indicative of the environmental condition of the site at the time of the field assessments. Also, it should be recognised that site conditions can change with time. Information not available at the time of this assessment which may subsequently become available may alter the conclusions presented.

Some species are reported as potentially occurring based on there being suitable habitat (quality and extent) within the survey area or immediately adjacent. The habitat requirements and ecology of many of the species known to occur in the wider area are however often not well understood or documented. It can therefore be difficult to exclude species from the potential list based on a lack of a specific habitats or microhabitats within the survey area. As a consequence of this limitation,

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<sup>1</sup> Prior to 1<sup>st</sup> January 2019, flora were protected under the *Wildlife Conservation Act 1950*

the potential species list produced is most likely an overestimation of those species that actually utilise the survey area for some purpose.

In recognition of survey limitations, a precautionary approach has been adopted for this assessment. Any flora species that would possibly occur within the survey area (or immediately adjacent), as identified through ecological databases, publications, discussions with local experts/residents and the habitat knowledge of the author, has been listed as having the potential to occur.

**Table 3-1: Limitations and constraints associated with the survey**

Variable	Potential Impact on Survey	Details
Access problems	Not a constraint	The survey was conducted via 4WD and on foot. Numerous tracks were located within the survey area, providing ease of access.
Competency/ Experience	Not a constraint	The personnel that conducted the field survey were regarded as suitably qualified and experienced. <b>Coordinating Botanist:</b> Dr Eddie van Etten <b>Data Interpretation:</b> Dr Eddie van Etten
Timing of survey, weather & season	Not a constraint	Fieldwork was conducted in November 2019, within the EPA's recommended primary survey time periods (i.e., September – November) for the South-West Interzone.
Area disturbance	Not a constraint	Area has been disturbed by existing pastoral activities. However, vegetation was mostly intact.
Survey Effort/ Extent	Not a constraint	Survey intensity was appropriate for the size/significance of the area with a reconnaissance survey completed to identify flora/ vegetation types and areas of Conservation Significance
Availability of contextual information at a regional and local scale	Not a constraint	Threatened flora database searches provided by the DBCA were used to identify any potential locations of Threatened/Priority taxa. BoM, DWER, DPIRD, DBCA and DotEE databases were reviewed to obtain appropriate regional desktop information on the biophysical environment of the local region.  BC were able to obtain information about the area from previous flora/ vegetation assessments conducted within the region and previous reconnaissance surveys conducted by BC which provided context on the local environment.
Completeness	Not a constraint	In the opinion of BC, the survey area was covered sufficiently in order to identify vegetation assemblages. The vegetation types for this study were based on visual descriptions/sampling sites in the field. The distribution of these vegetation communities outside the survey area is not known, however vegetation types identified were categorised via comparison to vegetation distributions throughout WA specified in the NVIS Major Vegetation Groups (DotEE, 2017b).

## 4 **Results**

### 4.1 **Desktop Assessment**

#### 4.1.1 **Flora/Vegetation**

According to the results of the NatureMap search (DBCA, 2019a), a total of 84 flora taxa have been recorded within a 20 km radius of the survey area. Dominant genera include *Eucalyptus* and *Eremophila*. Results of database searches identified thirteen introduced taxa as potentially occurring within a 20 km radius of the survey area:

1. *Carduus tenuiflorus* (Slender Thistle, Winged Slender Thistle, Sheep Thistle)
2. *Carrichtera annua* (Ward's Weed)
3. *Citrullus colocynthis*
4. *Erodium cicutarium* (Common Storksbill)
5. *Leontodon rhagadioloides*
6. *Lysimachia arvensis* (Pimpernel)
7. *Oncosiphon suffruticosum* (Calomba Daisy)
8. *Reseda luteola* (Wild Mingnonette)
9. *Rumex vesicarius* (Ruby Dock)
10. *Salvia verbenaca* (Wild Sage)
11. *Sisymbrium erysimoides* (Smooth Mustard)
12. *Sisymbrium irio* (London Rocket)
13. *Sonchus oleraceus* (Common Sowthistle)

According to the DPIRD, none of these taxa are listed as a Declared Plant under the BAM Act.

The results of the literature review, combined search of the DBCA's Flora of Conservation Significance databases (DBCA, 2019b), NatureMap search and DotEE protected matters search recorded no Threatened Flora within the survey area. One Priority Flora taxon is listed on the DBCA database as occurring within the survey area. A total of two Threatened Flora and three Priority Flora were listed on the databases as occurring within a 20km radius of the survey area (map of flora locations provided in Appendix 2). These taxa were assessed and ranked for their likelihood of occurrence within the survey 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 field/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 field/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.

One Priority Flora taxon was ranked as 'known to occur' within the survey area (Table 4-1). All remaining flora were ranked 'unlikely' to occur within the survey area (Table 4-1).



**Table 4-1: Likelihood of occurrence for Threatened and Priority Flora within the survey area**

Taxon	EPBC Act	BC Act	DBCAs Priority	Description (WAHERB, 2019)	Likelihood of Occurrence
<i>Eremophila arachnoides</i> subsp. <i>tenera</i>			P1	Broom-like shrub, to 3 m high, branches with tubercles often elongated & coalescing. Fl. white/blue-purple.	Known to occur
<i>Eucalyptus kruseana</i>			P4	(Straggly mallee), 2-3.5 m high, bark smooth. Fl. yellow, Jun to Sep. Sandy loam. Granite outcrops & hills.	Unlikely
<i>Eucalyptus websteriana</i> subsp. <i>norsemanica</i>			P1	(Spreading mallee), to 3 m high, bark 'minniritchi'. Fl. yellow, Sep to Nov. Rocky rises.	Unlikely
<i>Gastrolobium graniticum</i>	EN	EN		Erect, open shrub, to 2.5 m high. Fl. yellow & orange & red, Aug to Sep. Sand, sandy loam, granite. Margins of rock outcrops, along drainage lines.	Unlikely
<i>Tecticornia flabelliformis</i>	VU		P1	Erect shrub, to 0.2 m high. Clay. Saline flats.	Unlikely

## 4.2 Field Assessment

### 4.2.1 Vegetation Types

Four broad vegetation types were identified within the survey area (Table 4-2). These vegetation types were identified within three different landform types and comprised of three major vegetation groups, which were represented by a total of 13 families, 20 genera and 49 taxa (including three annual taxa) (Appendix 3). A map showing the vegetation types present in the survey area is provided in Figure 4-1.

**Table 4-2: Summary of vegetation types within the survey area**

Landform	NVIS Vegetation Group	Code	Vegetation Type	Area (ha)	Area (%)
Clay-Loam Plain	Eucalyptus Woodlands (MVG5)	CLP-EW1	Mid open woodland of <i>Eucalyptus salmonophloia</i> over mid chenopod shrubland of <i>Atriplex nummularia</i> / <i>Maireana sedifolia</i> on clay-loam plain/ broad valley systems	660	60.0
Open Depression	Chenopod Shrublands, Samphire Shrublands and Forblands (MVG22)	OD-CSSSF1	Low chenopod shrubland of <i>Atriplex nummularia</i> / <i>Maireana sedifolia</i> in open depression/ broad drainage systems	102	9.3
Hillslope	Eucalyptus Woodlands (MVG5)	HS-EW1	Low open woodland of <i>Eucalyptus torquata</i> / <i>E. lesouefii</i> over open mid shrubland of <i>Eremophila oldfieldii</i> subsp. <i>angustifolia</i> / <i>Dodonaea lobulata</i> and low open chenopod shrubland of <i>Atriplex vesicaria</i> on greenstone hills	181	16.5
	Mallee Woodlands and Shrublands (MVG14)	HS-MWS1	Low mallee woodland of <i>Eucalyptus griffithsii</i> over low chenopod shrubland of <i>Atriplex nummularia</i> / <i>Maireana sedifolia</i> and low open shrubland of <i>Eremophila interstans</i> on greenstone rises	84	7.6
N/A	N/A	CV	Cleared Vegetation	73	6.6
<b>Total</b>				<b>1100</b>	<b>100</b>



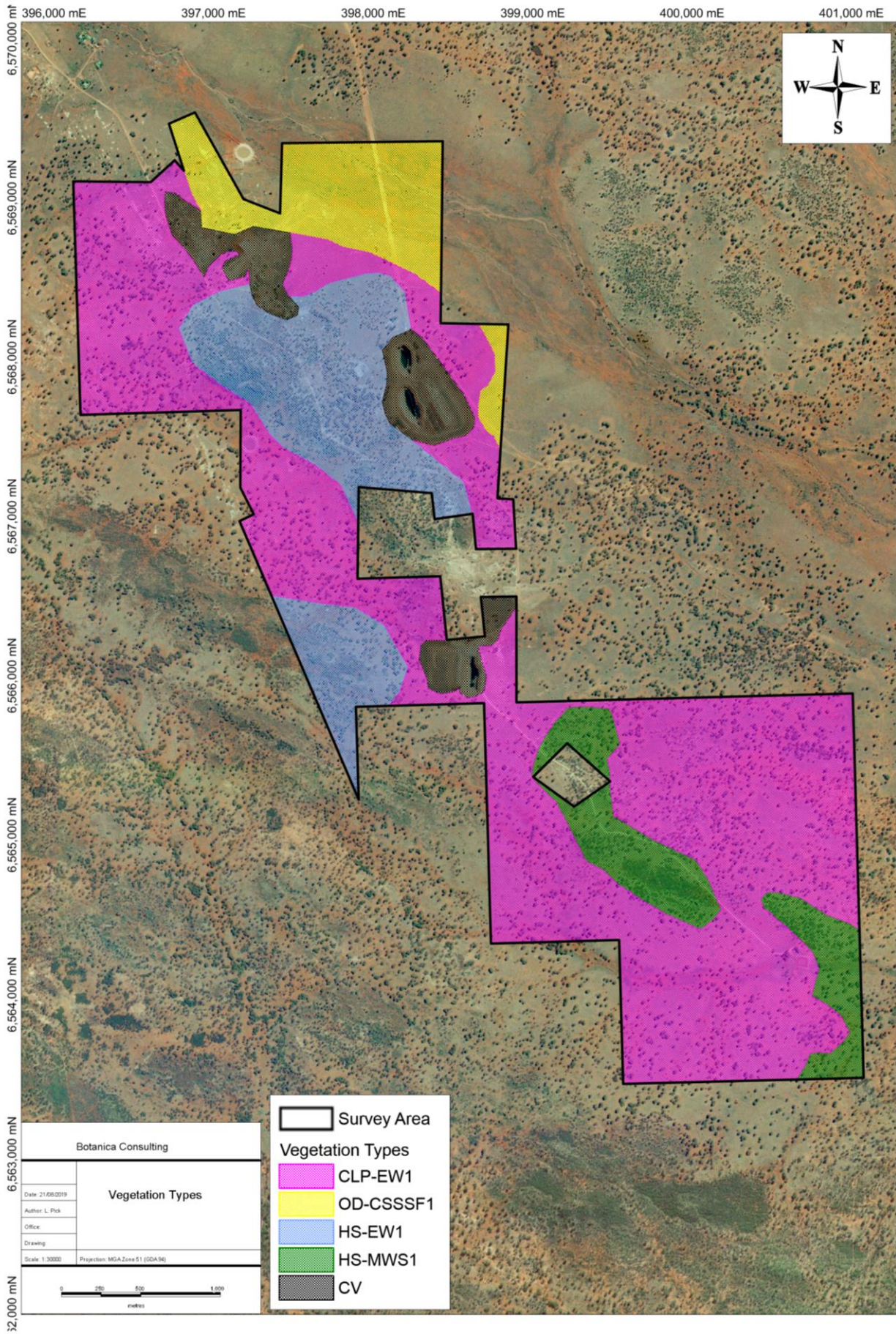


Figure 4-1: Vegetation types within the survey area



## Clay-Loam Plain: Eucalypt Woodlands

### 4.2.1.1 Mid open woodland of *Eucalyptus salmonophloia* over mid chenopod shrubland of *Atriplex nummularia*/ *Maireana sedifolia* on clay-loam plain/ broad valley systems (CLP-EW1)

The total flora recorded within this vegetation type was represented by a total of 12 Families, 18 Genera and 38 Taxa (Plate 4-1). Dominant taxa are shown in Table 4-3. According to the NVIS, this vegetation type is best represented by the MVG 5 -Eucalyptus Woodland (DotEE, 2017b).

**Table 4-3: Mid open woodland of *Eucalyptus salmonophloia* over mid chenopod shrubland of *Atriplex nummularia*/ *Maireana sedifolia* on clay-loam plain/ broad valley systems**

Life Form/Height Class	Canopy Cover	Dominant taxa present
Tree >10m	10-30%	<i>Eucalyptus salmonophloia</i>
Chenopod Shrub 1-2m	30-70%	<i>Atriplex nummularia</i> subsp. <i>spathulata</i> <i>Maireana sedifolia</i>



**Plate 4-1: Mid open woodland of *Eucalyptus salmonophloia* over mid chenopod shrubland of *Atriplex nummularia*/ *Maireana sedifolia* on clay-loam plain/ broad valley systems**

## **Open Depression-Chenopod Shrublands, Samphire Shrublands and Forblands**

### **4.2.1.2 Low chenopod shrubland of *Atriplex nummularia*/ *Maireana sedifolia* in open depression/ broad drainage systems (OD-CSSSF1)**

The total flora recorded within this vegetation type was represented by a total of 7 Families, 10 Genera and 20 Taxa (Plate 4-2). Dominant taxa are shown in Table 4-4. According to the NVIS, this vegetation type is best represented by the MVG 22 - Chenopod Shrublands, Samphire Shrublands and Forbland (DotEE, 2017b).

**Table 4-4: Low chenopod shrubland of *Atriplex nummularia*/ *Maireana sedifolia* in open depression/ broad drainage systems**

Life Form/Height Class	Canopy Cover	Dominant taxa present
Chenopod Shrub 1-2m	30-70%	<i>Atriplex nummularia</i> subsp. <i>spathulata</i> <i>Maireana sedifolia</i>
Chenopod Shrub <1m	10-30%	<i>Atriplex vesicaria</i>



**Plate 4-2: Low chenopod shrubland of *Atriplex nummularia*/ *Maireana sedifolia* in open depression/ broad drainage systems**



## Hillslope: Eucalypt Woodlands

### 4.2.1.3 Low open woodland of *Eucalyptus torquata*/ *E. lesouefii* over open mid shrubland of *Eremophila oldfieldii* subsp. *angustifolia*/ *Dodonaea lobulata* and low open chenopod shrubland of *Atriplex vesicaria* on greenstone hills (HS-EW1)

The total flora recorded within this vegetation type was represented by a total of 8 Families, 9 Genera and 15 Taxa (Plate 4-3). Dominant taxa are shown in Table 4-5. According to the NVIS, this vegetation type is best represented by the MVG 5 – Eucalypt Woodlands (DotEE, 2017b).

**Table 4-5: Low open woodland of *Eucalyptus torquata*/ *E. lesouefii* over open mid shrubland of *Eremophila oldfieldii* subsp. *angustifolia*/ *Dodonaea lobulata* and low open chenopod shrubland of *Atriplex vesicaria* on greenstone hills**

Life Form/Height Class	Canopy Cover	Dominant taxa present
Tree >10m	10-30%	<i>Eucalyptus lesouefii</i> <i>Eucalyptus torquata</i>
Shrub 1-2m	10-30%	<i>Eremophila oldfieldii</i> subsp. <i>angustifolia</i> <i>Dodonaea lobulata</i>
Chenopod Shrub <1m	10-30%	<i>Atriplex vesicaria</i>



**Plate 4-3: Low open woodland of *Eucalyptus torquata*/ *E. lesouefii* over open mid shrubland of *Eremophila oldfieldii* subsp. *angustifolia*/ *Dodonaea lobulata* and low open chenopod shrubland of *Atriplex vesicaria* on greenstone hills**



## **Hillslope: Mallee Woodlands and Shrublands**

### **4.2.1.4 Low mallee woodland of *Eucalyptus griffithsii* over low chenopod shrubland of *Atriplex nummularia*/ *Maireana sedifolia* and low open shrubland of *Eremophila interstans* on greenstone rises (HS-MWS1)**

The total flora recorded within this vegetation type was represented by a total of 9 Families, 10 Genera and 13 Taxa (Plate 4-4). Dominant taxa are shown in Table 4-6. According to the NVIS, this vegetation type is best represented by the MVG 14 – Mallee Woodlands and Shrublands (DotEE, 2017b).

**Table 4-6: Low mallee woodland of *Eucalyptus griffithsii* over low chenopod shrubland of *Atriplex nummularia*/ *Maireana sedifolia* and low open shrubland of *Eremophila interstans* on greenstone rises**

Life Form/Height Class	Canopy Cover	Dominant taxa present
Tree Mallee <10m	10-30%	<i>Eucalyptus griffithsii</i>
Chenopod Shrub 1-2m	30-70%	<i>Atriplex nummularia</i> subsp. <i>spathulata</i> <i>Maireana sedifolia</i>
Shrub <1m	10-30%	<i>Eremophila interstans</i>



**Plate 4-4: Low mallee woodland of *Eucalyptus griffithsii* over low chenopod shrubland of *Atriplex nummularia*/ *Maireana sedifolia* and low open shrubland of *Eremophila interstans* on greenstone rises**

#### 4.2.2 Vegetation Condition

Based on the vegetation condition rating scale adapted from Keighery, 1994 and Trudgen, 1988 (Appendix 4), the vegetation ranged from good to degraded (Table 4-7). 'Good' condition depicts that vegetation structure has been significantly altered by very obvious signs of multiple disturbances; However, it retains its 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' condition depicts the basic vegetation structure is severely impacted by disturbance. There is 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.

A map showing the vegetation condition within the survey area is provided in Figure 4-2.

**Table 4-7: Vegetation condition within the survey area**

Landform	NVIS Vegetation Group	Code	Vegetation Type	Condition Rating
Clay-Loam Plain	Eucalyptus Woodlands (MVG5)	CLP-EW1	Mid open woodland of <i>Eucalyptus salmonophloia</i> over mid chenopod shrubland of <i>Atriplex nummularia</i> / <i>Maireana sedifolia</i> on clay-loam plain/ broad valley systems	Good
Open Depression	Chenopod Shrublands, Samphire Shrublands and Forblands (MVG22)	OD-CSSSF1	Low chenopod shrubland of <i>Atriplex nummularia</i> / <i>Maireana sedifolia</i> in open depression/ broad drainage systems	Good
Hillslope	Eucalyptus Woodlands (MVG5)	HS-EW1	Low open woodland of <i>Eucalyptus torquata</i> / <i>E. lesouefii</i> over open mid shrubland of <i>Eremophila oldfieldii</i> subsp. <i>angustifolia</i> / <i>Dodonaea lobulata</i> and low open chenopod shrubland of <i>Atriplex vesicaria</i> on greenstone hills	Degraded
	Mallee Woodlands and Shrublands (MVG14)	HS-MWS1	Low mallee woodland of <i>Eucalyptus griffithsii</i> over low chenopod shrubland of <i>Atriplex nummularia</i> / <i>Maireana sedifolia</i> and low open shrubland of <i>Eremophila interstans</i> on greenstone rises	Good
N/A	N/A	CV	Cleared Vegetation	N/A





Figure 4-2: Vegetation condition within the survey area



### 4.2.3 Introduced Flora

No weeds were recorded at the time of survey, but are likely to be more substantial following wet periods as many of them expected in the area are ephemeral or short-lived herbs.

### 4.2.4 Significant Flora

According to the EPA *Environmental Factor Guideline for Flora and Vegetation* (EPA, 2016b) significant flora includes:

- flora being identified as threatened or priority species
- locally endemic flora or flora associated with a restricted habitat type (e.g. surface water or groundwater dependent ecosystems)
- new species or anomalous features that indicate a potential new species
- flora representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range)
- unusual species, including restricted subspecies, varieties or naturally occurring hybrids
- flora with relictual status, being representative of taxonomic groups that no longer occur widely in the broader landscape.

No Threatened Flora taxa listed under Commonwealth or State legislation were identified within the survey area. A DBCA record of one Priority 1 Flora taxon; *Eremophila arachnoides* subsp. *tenera* is located within the survey area. Despite specific searching for this taxon, it was not found in the survey area. The reported collection locality for this taxon wasn't precisely delineated (e.g. via GPS), but is likely to be in the vicinity of the western boundary of the survey area near the existing mine pits. This and the fact that it seemingly prefers salmon gum woodlands (most common vegetation type in the survey area) suggests there is a reasonable chance it occurs within the survey area. A map of the DBCA record for this taxon within the survey area is provided in Figure 4-3. A map showing regional Priority Flora known records in relation to the survey area is provided in Appendix 2.

No other significant flora (i.e. endemic, new or anomalous species, range extension, relictual or unusual species) were identified within the survey area.



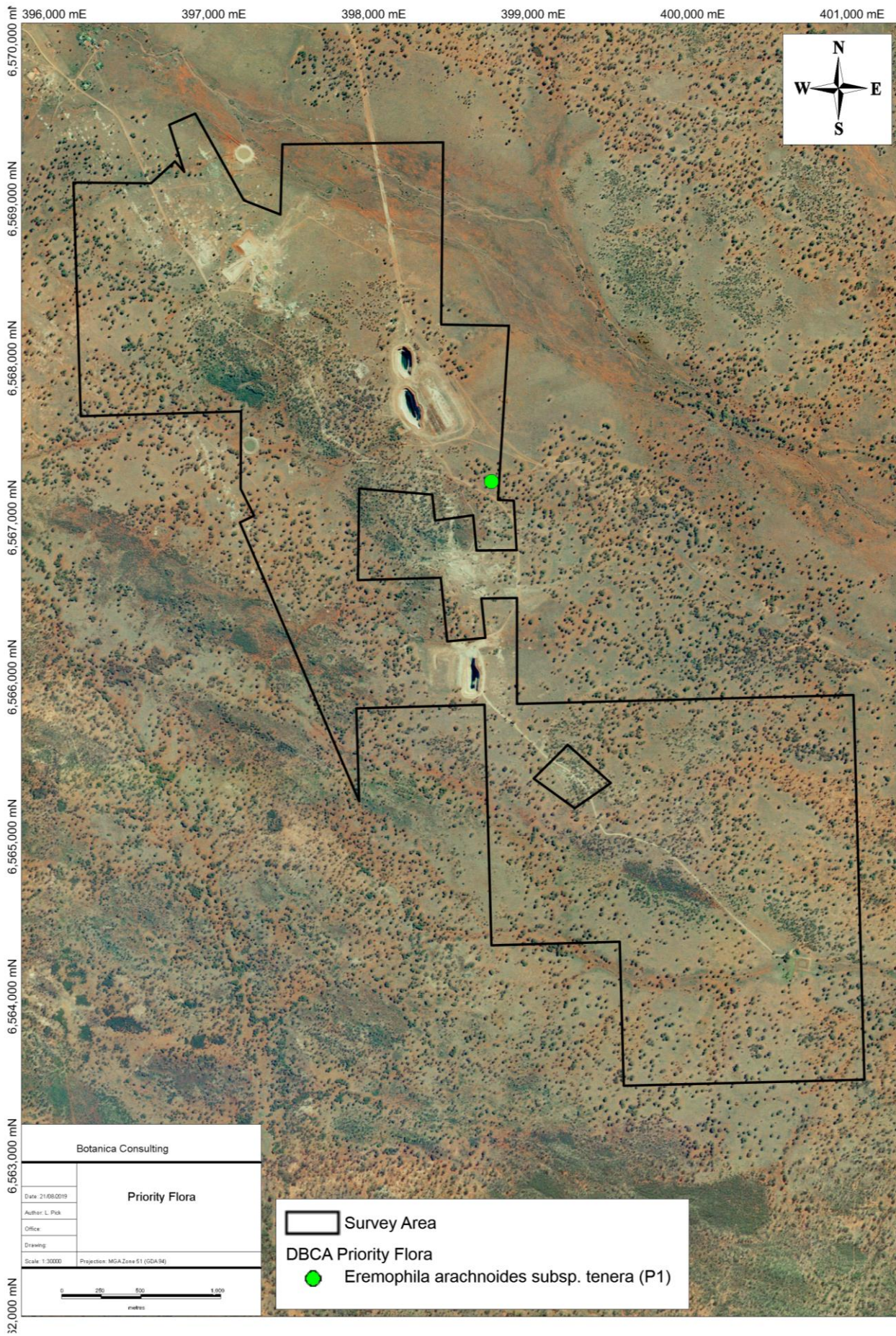


Figure 4-3: DBCA Priority Flora record within the survey area



#### **4.2.5 Significant Vegetation**

According to the EPA *Environmental Factor Guideline for Flora and Vegetation* (EPA, 2016b) significant vegetation includes:

- vegetation being identified as threatened or priority ecological communities
- vegetation with restricted distribution
- vegetation subject to a high degree of historical impact from threatening processes
- vegetation which provides a role as a refuge
- vegetation providing an important function required to maintain ecological integrity of a significant ecosystem.

No significant vegetation was identified within the survey area. Vegetation types identified are well represented outside of the survey area and are not considered endemic/ restricted to the survey area.

#### **4.3 Matters of National Environmental Significance**

None of the following matters of national environmental significance as defined by the Commonwealth EPBC Act were identified within the survey area:

- 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 species and ecological communities
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mining) a water resource, in relation to coal seam gas development and large coal mining development.

#### **4.4 Matters of State Environmental Significance**

There are no wetlands of national importance (ANCA Wetlands) or conservation category wetlands within the survey area. The survey area does not contain any TEC as listed under the BC Act or EP Act. No Threatened Flora taxon listed under the BC Act were recorded within the survey area. The survey area is not located within DBCA managed land and does not contain any ESA as listed under the EP Act.

A map showing areas of conservation significance in relation to the survey area is provided in Appendix 2.



## 5 Native Vegetation Principles

Based on the outcomes from the flora/vegetation survey presented in this report, the native vegetation clearing principles, listed under Schedule 5 of the EP Act have been assessed (Table 5-1).

**Table 5-1: Assessment of clearing against native vegetation clearing principles**

Letter	Principle	Assessment	Outcome
	Native vegetation should not be cleared if it:		
(a)	comprises a high level of biological diversity.	<p>The survey area is located within the Eastern Goldfields subregion of the Coolgardie Bioregion. The Eastern Goldfields subregion comprises gently undulating plains interrupted in the west by low hills and ridges of Archaean greenstones and in the east by a horst of Proterozoic basic granulite. The underlying strata are eroded flat and covered with Tertiary sand and gravel soils, scattered exposures of bedrock, and plains of calcareous earths (Cowan, 2001). The region has an arid to semi-arid Warm Mediterranean climate (Cowan, 2001).</p> <p>The vegetation within the survey area is mapped as belonging to Beard vegetation associations Randell 9, 468 and 1241 which retain over 98% of the original vegetation extent within Western Australia and the Eastern Goldfields subregion. A total of four vegetation types were identified within the area. Vegetation identified within the survey area is not considered to be of high biological diversity and is well represented outside of the survey area.</p> <p>The survey area does not occur within any mapped Priority Ecological Communities (PECs), Threatened Ecological Communities (TECs) or associated buffer zones and does not contain any Banded Ironstone Formations.</p> <p>No Threatened Flora taxa listed under the BC Act and EPBC Act are located within the survey area. A DBCA record of one Priority 1 Flora taxon; <i>Eremophila arachnoides</i> subsp. <i>tenera</i> is located within the survey area. Despite specific searching for this taxon, it was not found in the survey area, however given the vegetation present, there is a reasonable chance it occurs within the survey area.</p>	Clearing is not likely to be at variance to this principle
(b)	comprises the whole or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to WA.	The vegetation within the survey area is mapped as belonging to Beard vegetation associations Randell 9, 468 and 1241 which retain over 98% of the original vegetation extent within Western Australia and the Eastern Goldfields subregion. No unique fauna habitats (i.e. caves, rock outcrops overhangs or crevices) occur within the survey area.	Clearing is not likely to be at variance to this principle
(c)	includes, or is necessary for the continued existence of rare flora.	No Threatened Flora taxa, pursuant to the BC Act and the EPBC Act are located within the survey area (none identified during previous flora/vegetation surveys or listed on DBCA database as occurring within the survey area).	Clearing is not at variance to this principle
(d)	comprises the whole or part of or is necessary for the maintenance of a threatened ecological community (TEC).	No Threatened Ecological Communities, pursuant to the BC Act and the EPBC Act are located within the survey area (none identified during previous flora/vegetation surveys or listed on DBCA database as occurring within the survey area).	Clearing is not at variance to this principle
(e)	is significant as a remnant of native vegetation in an area that has been	The vegetation within the survey area is mapped as belonging to Beard vegetation associations Randell 9, 468 and 1241 which retain over 98% of the original vegetation extent within Western Australia and the Eastern Goldfields subregion. Development	Clearing is not at variance to this principle

Letter	Principle	Assessment	Outcome
	Native vegetation should not be cleared if it: extensively cleared	within the survey area will not reduce the extent of these vegetation associations below the 30% threshold.  Vegetation within the survey area does not represent a significant remnant of native vegetation within an area that has been extensively cleared.	
(f)	is growing, in, or in association with, an environment associated with a watercourse or wetland	According to the Geoscience Australia database (2001), there is one ephemeral drainage line within the survey area which drains south towards an un-named salt lake. This salt lake is not listed as a wetland of international importance (Ramsar Wetlands), national importance (Australian Nature Conservation Agency (ANCA) Wetlands) or conservation category wetland.  One vegetation type (OD-CSSSF1) was associated with a broad floodplain, which accounts for approximately 9.3% of the total survey area.	Clearing may be at variance to this principle
(g)	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	The vegetation within the survey area is mapped as belonging to Beard vegetation associations Randell 9, 468 and 1241 which retain over 98% of the original vegetation extent within Western Australia and the Eastern Goldfields subregion and have not been subject to extensive clearing. Clearing within these vegetation associations is not likely to lead to land degradation issues such as salinity, water logging or acidic soils.	Clearing is not likely to be at variance to this principle
(h)	Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	The survey area is not located within or in close proximity to any conservation areas.	Clearing is not at variance to this principle
(i)	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.	According to the Geoscience Australia database (2001), there is one ephemeral drainage line within the survey area which drains south towards an un-named salt lake. This salt lake is not listed as a wetland of international importance (Ramsar Wetlands), national importance (Australian Nature Conservation Agency (ANCA) Wetlands) or conservation category wetland. One vegetation type (OD-CSSSF1) was associated with a broad floodplain, which accounts for approximately 9.3% of the total survey area.  The survey area is located in an arid to semi-arid environment with most rainfall lost by evaporation or surface runoff. Only a small portion infiltrates the soil and recharges the groundwater.  Groundwater salinity in the local area is estimated to be between 14,000 mg/L to 35,000 mg/L Total Dissolved Solids (TDS), which is considered saline to hypersaline. The proposed clearing activity is not likely to significantly alter groundwater salinity levels within the survey area.	Clearing is not likely to be at variance to this principle
(j)	Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the	Rainfall of the eastern Goldfields subregion has an average rainfall of 200-300mm and an evaporation rate of 2400 mm. The Coolgardie region has an arid to semi-arid warm Mediterranean climate, receiving a majority of its rainfall during winter months. Rainfall data for Kalgoorlie-Boulder indicates that rainfall is spread throughout the year and rainfall events are unlikely to result in	Clearing is not likely to be at variance to this principle



Letter	Principle	Assessment	Outcome
Native vegetation should not be cleared if it:			
	incidence of flooding	localised flooding. There are no permanent drainage lines within the survey area. Clearing within the survey area is not likely to increase the incidence or intensity of flooding within the survey area or surrounds.	

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**Appendix 1: Conservation Significant Species/ Communities Categories (BC Act and EPBC Act)  
Definitions of Conservation Significant Species**

Code	Category
<b>State categories of Threatened and Priority species</b>	
<b>Threatened Species (T)</b> Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as Threatened species under section 26(2) of the Biodiversity Conservation Act 2016 (BC Act).	
CR	<p><b>Critically Endangered</b> Threatened species considered to be “facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines”.</p> <p>Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for critically endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for critically endangered flora.</p>
EN	<p><b>Endangered</b> Threatened species considered to be “facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines”.</p> <p>Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for endangered flora.</p>
VU	<p><b>Vulnerable</b> Threatened species considered to be “facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines”.</p> <p>Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.</p>
<b>Extinct species</b> Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.	
EX	<p><b>Extinct</b> Species where “<i>there is no reasonable doubt that the last member of the species has died</i>”, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).</p> <p>Published as presumed extinct under schedule 4 of the <i>Wildlife Conservation (Specially Protected Fauna) Notice 2018</i> for extinct fauna or the <i>Wildlife Conservation (Rare Flora) Notice 2018</i> for extinct flora.</p>
EW	<p><b>Extinct in the Wild</b> Species that “<i>is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form</i>”, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).</p> <p>Currently there are no Threatened fauna or Threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.</p>
<b>Specially protected species</b> Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection. Species that are listed as Threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.	
IA	<p><b>International Agreement/ Migratory</b> Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).</p> <p>Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the <i>Convention on the Conservation of Migratory Species of Wild Animals</i> (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.</p> <p>Published as migratory birds protected under an international agreement under schedule 5 of the <i>Wildlife Conservation (Specially Protected Fauna) Notice 2018</i>.</p>



Code	Category
CD	<p><b>Species of special conservation interest</b> Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as Threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act). Published as conservation dependent fauna under schedule 6 of the <i>Wildlife Conservation (Specially Protected Fauna) Notice 2018</i>.</p>
OS	<p><b>Other specially protected species</b> Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act). Published as other specially protected fauna under schedule 7 of the <i>Wildlife Conservation (Specially Protected Fauna) Notice 2018</i>.</p>
<p><b>Priority species</b> Possibly Threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of Priority for survey and evaluation of conservation status so that consideration can be given to their declaration as Threatened Fauna or Flora. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.</p>	
P1	<p><b>Priority 1: Poorly-known species</b> Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.</p>
P2	<p><b>Priority 2: Poorly-known species</b> Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.</p>
P3	<p><b>Priority 3: Poorly-known species</b> Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.</p>
P4	<p><b>Priority 4: Rare, Near Threatened and other species in need of monitoring</b> (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</p>
<p><b>Commonwealth categories of Threatened species</b></p>	
EX	<p><b>Extinct</b> Taxa where there is no reasonable doubt that the last member of the species has died.</p>
EW	<p><b>Extinct in the Wild</b> Taxa where it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.</p>
CR	<p><b>Critically Endangered</b> Taxa that are facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.</p>
EN	<p><b>Endangered</b> Taxa which are not critically endangered and is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.</p>

Code	Category
VU	<p><b>Vulnerable</b></p> <p>Taxa which are not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.</p>
CD	<p><b>Conservation Dependent</b></p> <p>Taxa which are the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or (b) the following subparagraphs are satisfied:</p> <p>(i) the species is a species of fish;</p> <p>(ii) the species is the focus of a plan of management that provides for actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised;</p> <p>(iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory;</p> <p>(iv) cessation of the plan of management would adversely affect the conservation status of the species.</p>

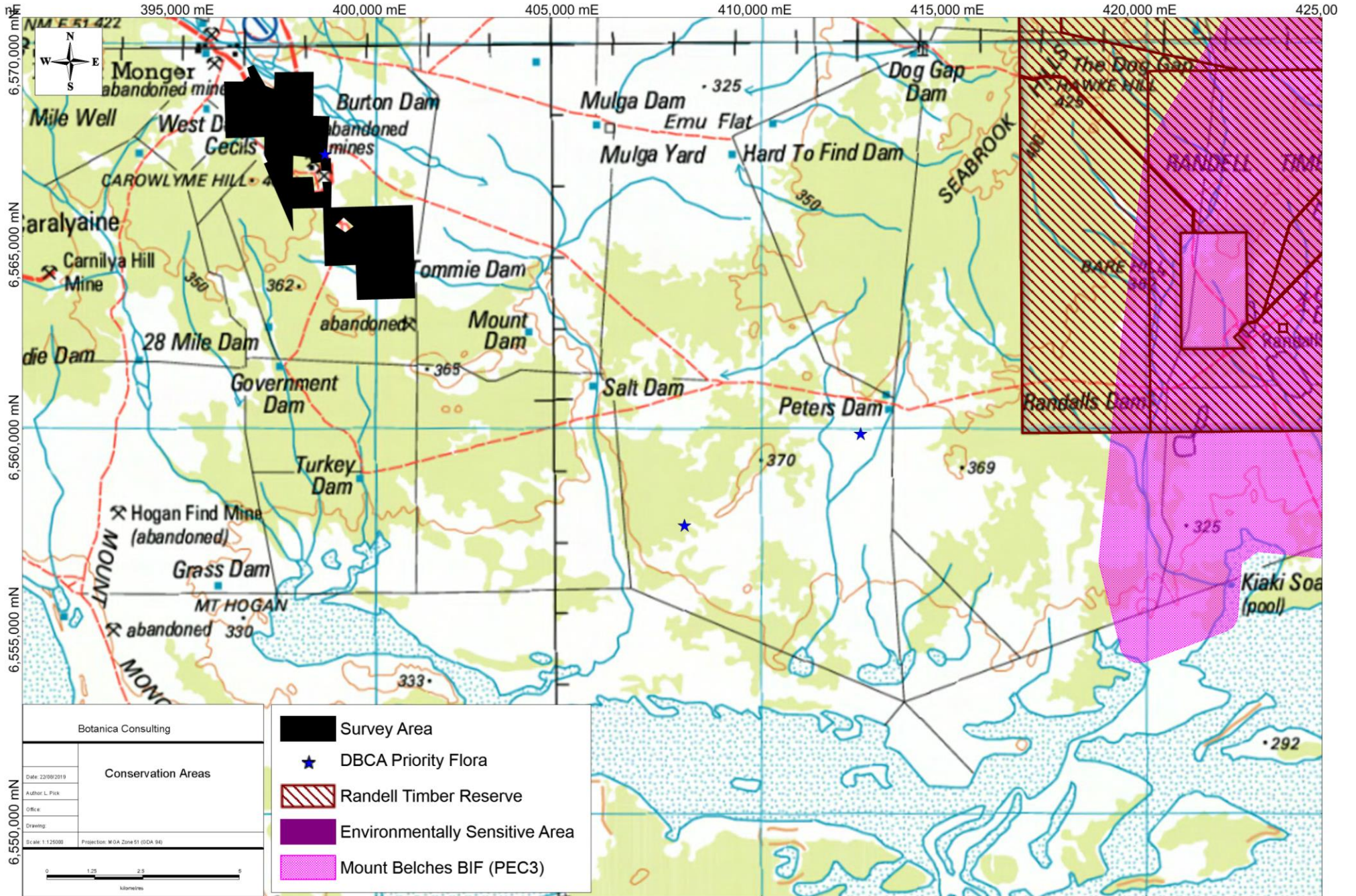
### Definitions of conservation significant communities

Category Code	Category
<b>State categories of Threatened Ecological Communities (TEC)</b>	
PD	<p><b>Presumed Totally Destroyed</b></p> <p>An ecological community will be listed as Presumed Totally Destroyed if there are no recent records of the community being extant and either of the following applies:</p> <ul style="list-style-type: none"> <li>records within the last 50 years have not been confirmed despite thorough searches or known likely habitats or;</li> <li>all occurrences recorded within the last 50 years have since been destroyed.</li> </ul>
CR	<p><b>Critically Endangered</b></p> <p>An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future, meeting any one of the following criteria:</p> <p>The estimated geographic range and distribution has been reduced by at least 90% and is either continuing to decline with total destruction imminent, or is unlikely to be substantially rehabilitated in the immediate future due to modification;</p> <p>The current distribution is limited i.e. highly restricted, having very few small or isolated occurrences, or covering a small area;</p> <p>The ecological community is highly modified with potential of being rehabilitated in the immediate future.</p>
EN	<p><b>Endangered</b></p> <p>An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. The ecological community must meet any one of the following criteria:</p> <p>The estimated geographic range and distribution has been reduced by at least 70% and is either continuing to decline with total destruction imminent in the short-term future, or is unlikely to be substantially rehabilitated in the short-term future due to modification;</p> <p>The current distribution is limited i.e. highly restricted, having very few small or isolated occurrences, or covering a small area;</p> <p>The ecological community is highly modified with potential of being rehabilitated in the short-term future.</p>
VU	<p><b>Vulnerable</b></p> <p>An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing high risk of total destruction in the medium to long term future. The ecological community must meet any one of the following criteria:</p> <p>The ecological community exists largely as modified occurrences that are likely to be able to be substantially restored or rehabilitated;</p> <p>The ecological community may already be modified and would be vulnerable to threatening process, and restricted in range or distribution;</p>



Category Code	Category
	The ecological community may be widespread but has potential to move to a higher threat category due to existing or impending threatening processes.
<b>Commonwealth categories of Threatened Ecological Communities (TEC)</b>	
CE	<b>Critically Endangered</b> If, at that time, an ecological community is facing an extremely high risk of extinction in the wild in the immediate future (indicative timeframe being the next 10 years).
EN	<b>Endangered</b> If, at that time, an ecological community is not critically endangered but is facing a very high risk of extinction in the wild in the near future (indicative timeframe being the next 20 years).
VU	<b>Vulnerable</b> If, at that time, an ecological community is not critically endangered or endangered, but is facing a high risk of extinction in the wild in the medium-term future (indicative timeframe being the next 50 years).
<b>Priority Ecological Communities (PEC)</b>	
P1	<b>Poorly-known ecological communities</b> Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist.
P2	<b>Poorly-known ecological communities</b> Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, State forest, un-allocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation.
P3	<b>Poorly known ecological communities</b> Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or; Communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing and inappropriate fire regimes.
P4	<b>Ecological communities that are adequately known, rare but not threatened</b> or meet criteria for near threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.
P5	<b>Conservation Dependent ecological communities</b> Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

# Appendix 2: Regional map of conservation areas





### Appendix 3: Species List

Family	Genus	Taxon	CLP-EW1	OD-CSSSF1	HS-EW1	HS-MWS1
Amaranthaceae	<i>Ptilotus</i>	<i>nobilis</i> (A)	*			
Amaranthaceae	<i>Ptilotus</i>	<i>obovatus</i>	*			*
Casuarinaceae	<i>Casuarina</i>	<i>obesa</i>	*			
Casuarinaceae	<i>Casuarina</i>	<i>pauper</i>			*	*
Chenopodiaceae	<i>Atriplex</i>	<i>codonocarpa</i> (A)	*			
Chenopodiaceae	<i>Atriplex</i>	<i>nummularia</i> subsp. <i>spathulata</i>	*	*	*	*
Chenopodiaceae	<i>Chenopodium</i>	sp. (sterile)		*		
Chenopodiaceae	<i>Maireana</i>	<i>tomentosa</i>	*	*	*	*
Chenopodiaceae	<i>Maireana</i>	<i>georgei</i>	*			
Chenopodiaceae	<i>Maireana</i>	<i>platycarpa</i>	*			
Chenopodiaceae	<i>Maireana</i>	<i>pyramidata</i>	*	*		
Chenopodiaceae	<i>Maireana</i>	<i>sedifolia</i>	*	*	*	*
Chenopodiaceae	<i>Maireana</i>	<i>tomentosa</i>	*	*		
Chenopodiaceae	<i>Maireana</i>	<i>trichoptera</i>	*	*		
Chenopodiaceae	<i>Maireana</i>	<i>triptera</i>	*	*		
Chenopodiaceae	<i>Rhagodia</i>	<i>drummondii</i>	*			
Chenopodiaceae	<i>Sclerolaena</i>	<i>diacantha</i>	*			
Chenopodiaceae	<i>Tecticornia</i>	<i>halocnemoides</i>	*			
Fabaceae	<i>Acacia</i>	<i>burkittii</i>				*
Fabaceae	<i>Acacia</i>	<i>collettioides</i>	*	*	*	
Fabaceae	<i>Acacia</i>	<i>enervia</i> subsp. <i>explicata</i>			*	
Fabaceae	<i>Acacia</i>	<i>jennerae</i>		*		
Fabaceae	<i>Acacia</i>	<i>quadrifolia</i>	*			
Fabaceae	<i>Acacia</i>	<i>tetragonophylla</i>	*	*	*	
Goodeniaceae	<i>Scaevola</i>	<i>spinescens</i>	*		*	
Malvaceae	<i>Sida</i>	<i>spodochroma</i>	*	*		
Myrtaceae	<i>Eucalyptus</i>	<i>griffithsii</i>				*
Myrtaceae	<i>Eucalyptus</i>	<i>lesouefii</i>	*		*	*
Myrtaceae	<i>Eucalyptus</i>	<i>salmonophloia</i>	*			
Myrtaceae	<i>Eucalyptus</i>	<i>torquata</i>	*		*	
Myrtaceae	<i>Eucalyptus</i>	<i>transcontinentalis</i>	*			
Myrtaceae	<i>Eucalyptus</i>	<i>websteriana</i> subsp. <i>websteriana</i>	*			
Myrtaceae	<i>Melaleuca</i>	<i>pauperiflora</i>	*			
Pittosporaceae	<i>Pittosporum</i>	<i>angustifolium</i>		*		
Pittosporaceae	<i>Pittosporum</i>	<i>phylliraeoides</i>	*			*
Poaceae	<i>Aristida</i>	<i>contorta</i> (A)	*	*		
Santalaceae	<i>Santalum</i>	<i>spicatum</i>			*	
Sapindaceae	<i>Dodonaea</i>	<i>lobulata</i>	*		*	*
Sapindaceae	<i>Dodonaea</i>	<i>microzyga</i>	*		*	
Scrophulariaceae	<i>Eremophila</i>	<i>alternifolia</i>		*		
Scrophulariaceae	<i>Eremophila</i>	<i>interstans</i> subsp. <i>interstans</i>	*		*	*
Scrophulariaceae	<i>Eremophila</i>	<i>latrobei</i> subsp. <i>latrobei</i>	*			
Scrophulariaceae	<i>Eremophila</i>	<i>longifolia</i>		*		
Scrophulariaceae	<i>Eremophila</i>	<i>oldfieldii</i> subsp. <i>angustifolia</i>	*	*	*	*
Scrophulariaceae	<i>Eremophila</i>	<i>pantonii</i>	*			
Scrophulariaceae	<i>Eremophila</i>	<i>scoparia</i>		*		
Solanaceae	<i>Lycium</i>	<i>australe</i>	*	*		*
Solanaceae	<i>Solanum</i>	<i>lasiophyllum</i>	*	*		
Solanaceae	<i>Solanum</i>	<i>nummularium</i>	*			

### Appendix 4: Vegetation Condition Rating

Vegetation Condition Rating	South West and Interzone Botanical Provinces	Eremaean and Northern Botanical Provinces
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.	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
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.	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
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.	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	/	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
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.	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
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.	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.