Shire of Coolgardie

Native Vegetation Clearing Permit

Coolgardie landfill
Great Eastern Highway, Coolgardie

9 October 2020

58097/129,548 (Rev 0)

JBS&G Australia Pty Ltd T/A Strategen-JBS&G

www.jbsg.com.au

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# 1. Introduction

## 1.1 Purpose

This Native Vegetation Clearing Permit application has been prepared to support the development of a landfill facility situated at the Coolgardie Waste Facility, approximately 2.4 km to the west of Coolgardie town, accessed via Coolgardie Tip Road off Great Eastern Highway (the Proposed Clearing Area, Figure 1.1).

The development is proposed to for the purposes of accepting waste streams within and external to the Shire of Coolgardie, concurrent with the phasing out of landfill at the Kambalda Waste Facility.

## 1.2 Project background and description

The Shire of Coolgardie (the Shire) operates two waste management facilities:

1. Kambalda Waste Facility, licensed (L7970/1997/6) as a category 64 prescribed premises (Class II putrescible landfill site).
2. Coolgardie Waste Facility, registered (R1550) as a category 89 prescribes premises (Putrescible landfill site).

The Kambalda Waste Facility received the majority of the Shire's waste stream but was subject to significant constraints due to its proximity to surface water and groundwater, requiring large volumes of imported fill for waste cover. The facility also has contaminated site management requirements relating to historic disposal of mining industry wastes. By comparison, the Coolgardie Waste Facility received a smaller waste stream, and is less constrained with respect to water resources and possess abundant material for waste cover.

The Shire is closing the main landfill operations at Kambalda Waste Facility and transitioning the facility to primarily a transfer station, with a corresponding expansion to landfill operations at Coolgardie Waste Facility to accept the Shire's combined waste streams. The Shire is also developing the Coolgardie Waste Facility to a Class III landfill standard to accept additional waste streams within or external to the Shire.

The size and location of the final Class III landfill footprint and access roads is still subject to investigation by the Shire. This application seeks permission to clear up to 24.7 ha of vegetation within the Proposed Clearing Area to facilitate the construction of new landfill facilities (cells) and associated infrastructure.

Areas within the 24.7 ha Proposed Clearing Area have previously been cleared for tracks, firebreaks and landfill activities but have been included in this application to accommodate any regrowth of native vegetation in these areas subsequent to the flora and vegetation survey conducted in December 2018.

The conceptual design of proposed expansion to the Coolgardie Waste Facility us shown in Figure 1.2. The development of the first new Class III landfill cell will be subject to a works approval application to be submitted to the Department of Water and Environmental Regulation.

## 1.3 Ownership and tenure

The Proposed Clearing Area lies on Crown Reserve 3497 (Lot 501, Plan 255090), vested with the Shire for waste disposal. The Proposed Clearing Area comprises approximately 24.7 ha of land and is bordered by Unallocated Crown Land (UCL) to the north, west and east and Crown Lease (GE M-446507) to the south and south-west.

Road reserve corridors lie on the west and south boundaries of the Proposed Clearing Area. The closest freehold properties lie at approximately 500 m to the south-west (occupied by buildings) and 500 m to the north-east (cleared agricultural land).

A rural residential area lies approximately 800 m to the south of the Proposed Clearing Area, south of Great Eastern Highway and the Goldfields Water Supply Scheme pipeline corridor.

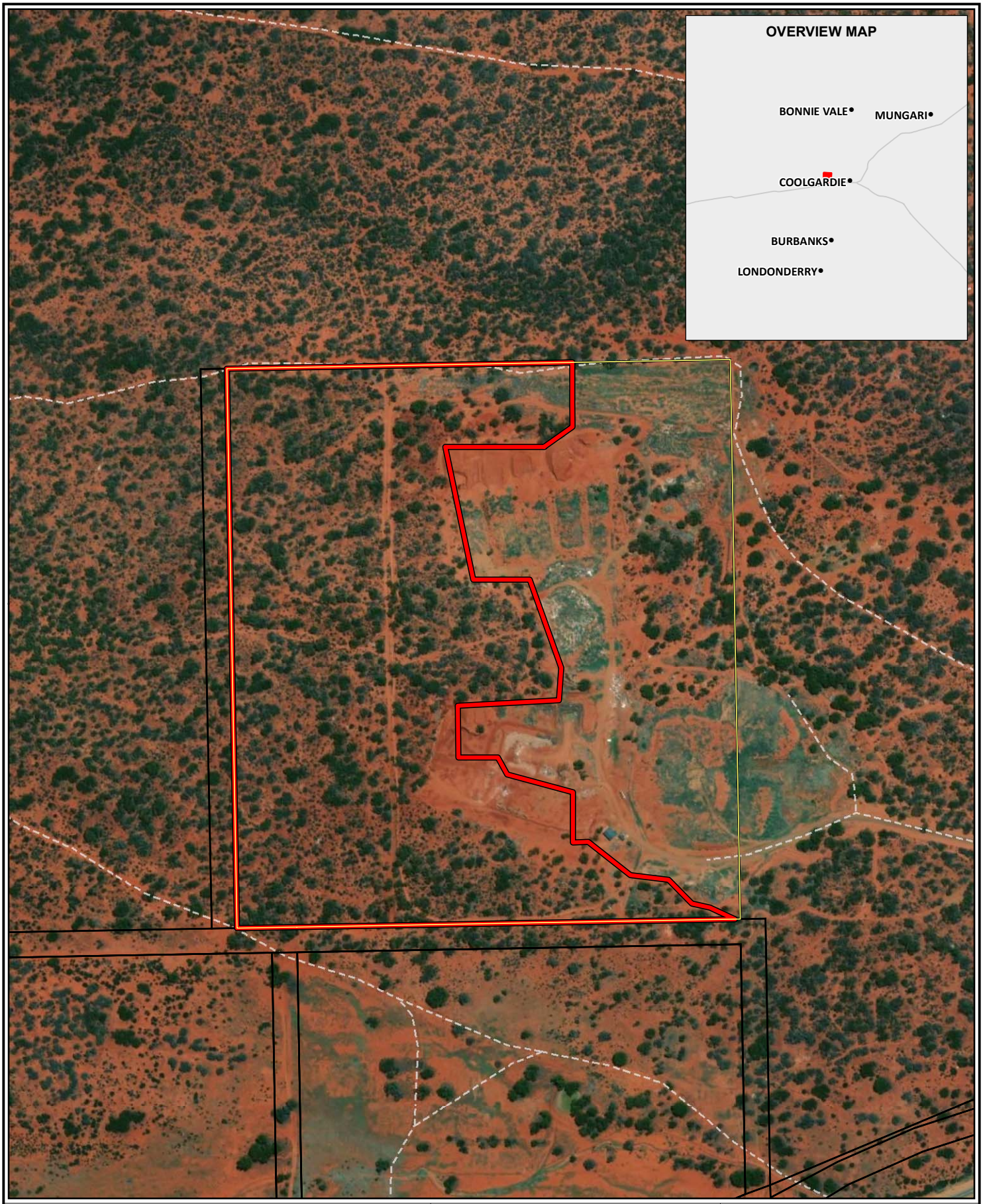
The Proposed Clearing Area is zoned for Public Purposes (Rubbish Tip) and has Special Control Area 1 (500 m buffer zone) established under Shire of Coolgardie Local Planning Scheme (LPS) No. 5. The surrounding land is zoned Rural, with the rural residential area to the south of Great Eastern Highway zoned Rural Residential.

### 1.4 Scope

This document provides supporting information for a Native Vegetation Clearing Permit (NVCP) application (purpose permit) to clear up to 24.7 ha of native vegetation.

This document has been prepared to support the NVCP application for the proposed clearing, for assessment under section 51E of the *Environmental Protection Act 1986* (EP Act), and includes the following information relating to clearing impacts:

- an overview of the existing environmental conditions of the proposed clearing footprint
- an evaluation of the proposed clearing against the '10 Clearing Principles' listed under Schedule 5 of the EP Act
- environmental approvals and management requirements.

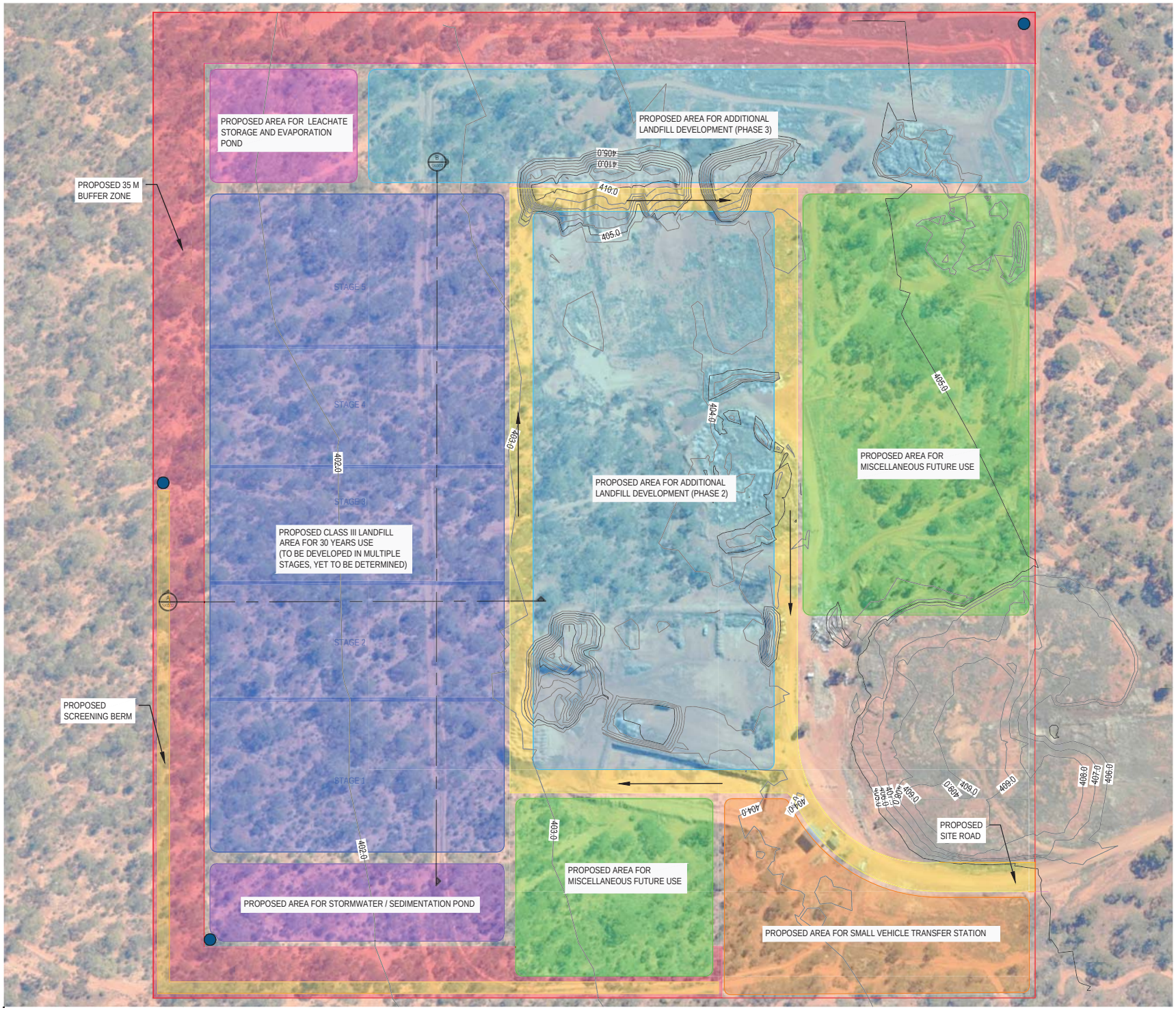



**Legend**

- Proposed clearing area
- Premises boundary
- Cadastral boundary
- Track

| | |
|---|---|
| Scale 1:6,000 at A4 (0 50 100 metres) | **Coolgardie, WA** |
| Coord. Sys. GDA 1994 MGA Zone 51 | **PROPOSED CLEARING AREA** |
| Job No: 58097 | |
| Client: Shire of Coolgardie | **FIGURE 1.1** |
| Version: A — Date: 11-Sep-2020 | strategen JBS&G |
| Drawn By: cthatcher — Checked By: HS | |

File Name: \\008PMPMR004V001.jbsg.aust\JBS Perth\Projects\1)Open\Shire of Coolgardie\58097 Coolgardie Landfill new cell\GIS\Maps\R01_Rev_A\NVCP\58097_01_1_ClearingFootprint.mxd
Image Reference: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community




LEGEND

- SITE BOUNDARY
- PROPOSED CLASS III LANDFILL
- PROPOSED STORMWATER / SEDIMENTATION POND
- PROPOSED LEACHATE POND
- PROPOSED FUTURE DEVELOPMENT LANDFILL AREA
- PROPOSED OTHER ADDITIONAL USE AREA
- PROPOSED SITE ROAD
- PROPOSED SMALL VEHICLE TRANSFER STATION AREA
- 35 M BUFFER
- PROPOSED BORE FOR GEOTECHNICAL INVESTIGATIONS AND MONITORING

N

0 25 50 75m

SCALE 1:2500 AT ORIGINAL SIZE

PRELIMINARY

| rev | description | app'd | date |
|---|---|---|---|
| | | | |
| A | INITIAL ISSUE | | |

THE SHIRE OF COOLGARDIE
COOLGARDIE WASTE FACILITY DESIGN

# COOLGARDIE WASTE FACILITY PROPOSED SITE LAYOUT PLAN

Figure 1.2

Level 8, 180 Lonsdale Street, Melbourne VIC 3000 Australia
**T** 61 3 8687 8000 **F** 61 3 8687 8111
**E** melmail@ghd.com.au **W** www.ghd.com

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| | | | |
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| scale | 1:2500 for A3 | job no. | 12532983 |
| date | AUGUST 2020 | rev no. | A |

approved (PD) . . . . . SK001

Plot Date: 12 August 2020 - 5:23 PM Plotted by: Jamie Wills Cad File No: C:\Users\jwills\Desktop\SITE LAYOUT.dwg

# 2. Existing environment

## 2.1 Climate

The Coolgardie locality experiences arid, non-seasonal to semi-arid Mediterranean climate (Beard 1990). The nearest Bureau of Meteorology (BoM) weather station at Southern Cross Airfield (Station No. 12320) provides average monthly climate statistics for the Coolgardie locality (Figure 2.1).

Average annual rainfall recorded at Southern Cross Airfield since 1996 is 308.2 mm. Rainfall may occur at any time of year but predominantly in winter. Highest temperatures occur in January, with an average monthly maximum of 34.7°C; and lowest temperatures occur in July, with an average monthly minimum of 16.6°C (BoM 2019).

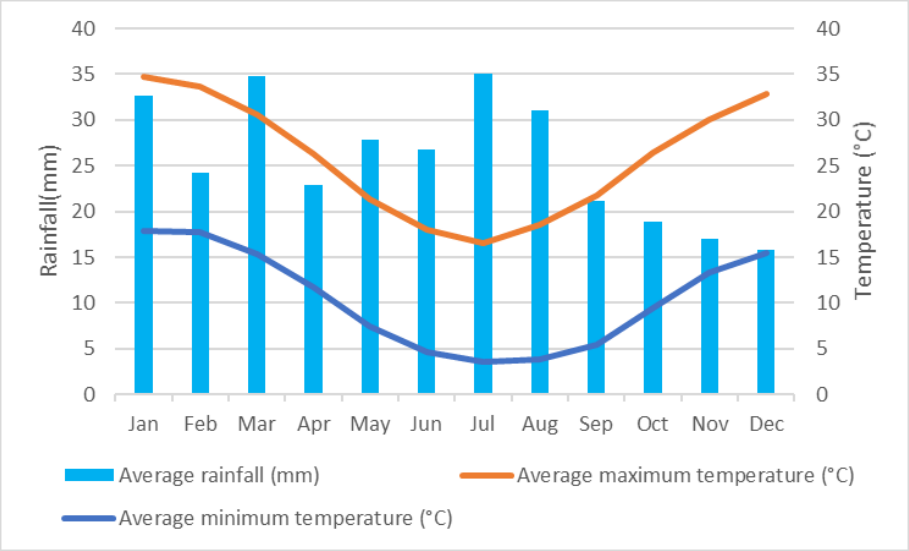



**Figure 2.1: Mean monthly climatic data (temperature and rainfall) for Southern Cross Airfield**

Figure 2.1 illustrates the actual monthly rainfall recorded in 2018. As detailed rainfall data was not available from Southern Cross Airfield, rainfall statistics were taken from the Koorarawalyee weather station (BoM 2019). The survey was conducted on 18 December 2018, approximately five weeks following a peak in rainfall occurring on 11 November 2018.

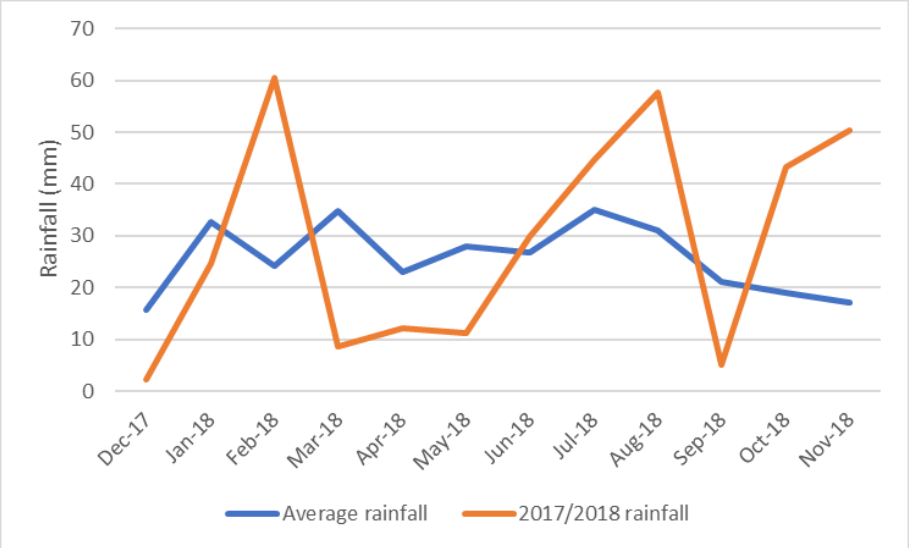



**Figure 2.2: Average vs. actual rainfall at Koorarawalyee weather station**

## 2.2 Vegetation

### 2.2.1 Regional vegetation

Vegetation occurring within the region was initially mapped at a broad scale (1:1,000,000) by Beard during the 1970s. This dataset has formed the basis of several regional mapping systems, including physiographic regions defined by Beard (1981) which led to the delineation of botanical districts as described in Beard (1990), and the biogeographical region dataset (Interim Biogeographic Regionalisation for Australia, IBRA) for Western Australia (DEE 2019a).

Approximately 32,548 ha of vegetation remains within a 10 km radius of the Proposed Clearing Area.

### 2.2.2 Beard (1990) Botanical District

The Proposed Clearing Area occurs within the Coolgardie Botanical District which is characterised predominantly by eucalypt woodlands with low salt-tolerant heath on the more calcareous soils. Patches of shrub-steppe are present where the district meets the Great Victoria Desert, and scrub-heath with *Casuarina* thickets occur on sandplains (Beard 1990).

### 2.2.3 IBRA subregion

IBRA describes a system of 85 'biogeographic regions' (bioregions) and 403 subregions covering the entirety of the Australian continent (Thackway & Cresswell 1995). Bioregions are defined on the basis of climate, geology, landforms, vegetation and fauna.

The Proposed Clearing Area occurs within the Coolgardie 3 (Eastern Goldfields) subregion which is dominated by mallee eucalypts, acacia thickets and shrub-heaths on sandplains. Diverse *Eucalyptus* woodlands occur around salt lakes, on ranges, and in valleys, while dwarf shrublands of samphire species occur on salt lakes (Cowan 2001).

### 2.2.4 Vegetation types

A field survey was conducted within the Proposed Clearing Area on 18 December 2018 (Strategen 2019). The Proposed Clearing Area was traversed on foot to record changes in vegetation structure and type. Four vegetation quadrats were surveyed to identify vegetation types. One native vegetation type (VT) was defined and mapped within the Proposed Clearing Area (Figure 2.4).

Areas containing vegetation in parkland cleared or highly degraded state have not been counted as unique native VTs but have been included in Table 2.1 for area calculation purposes.

**Table 2.1: Vegetation Types**

| Vegetation Type | Description |
|---|---|
| 1 | Open mallee woodland to mallee woodland of *Eucalyptus yilgarnensis*, *Eucalyptus oleosa* subsp. *oleosa* and sometimes *Eucalyptus celastroides* subsp. *celastroides* over open shrubland of *Scaevola spinescens*, *Acacia ?hemiteles*, *Eremophila ionantha* and *Eremophila scoparia* over isolated native shrubs and herbs, with emergent *Eucalyptus salmonophloia*. |
| C | Cleared areas |

The total area mapped within the Proposed Clearing Area was 24.7 ha, which includes cleared areas (Table 2.2).

**Table 2.2: Area (ha) covered by each VT within the Proposed Clearing Area**

| VT | Area (ha) | Percentage of the Proposed Clearing Area |
|---|---|---|
| 1 | 20.76 | 84.1 |
| C | 3.93 | 15.9 |
| **TOTAL** | **24.7** | **100** |

### 2.2.5 Threatened and Priority Ecological Communities

No Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs) were identified within a 10 km radius of the Proposed Clearing Area (Strategen 2019).

### 2.2.6 Vegetation condition

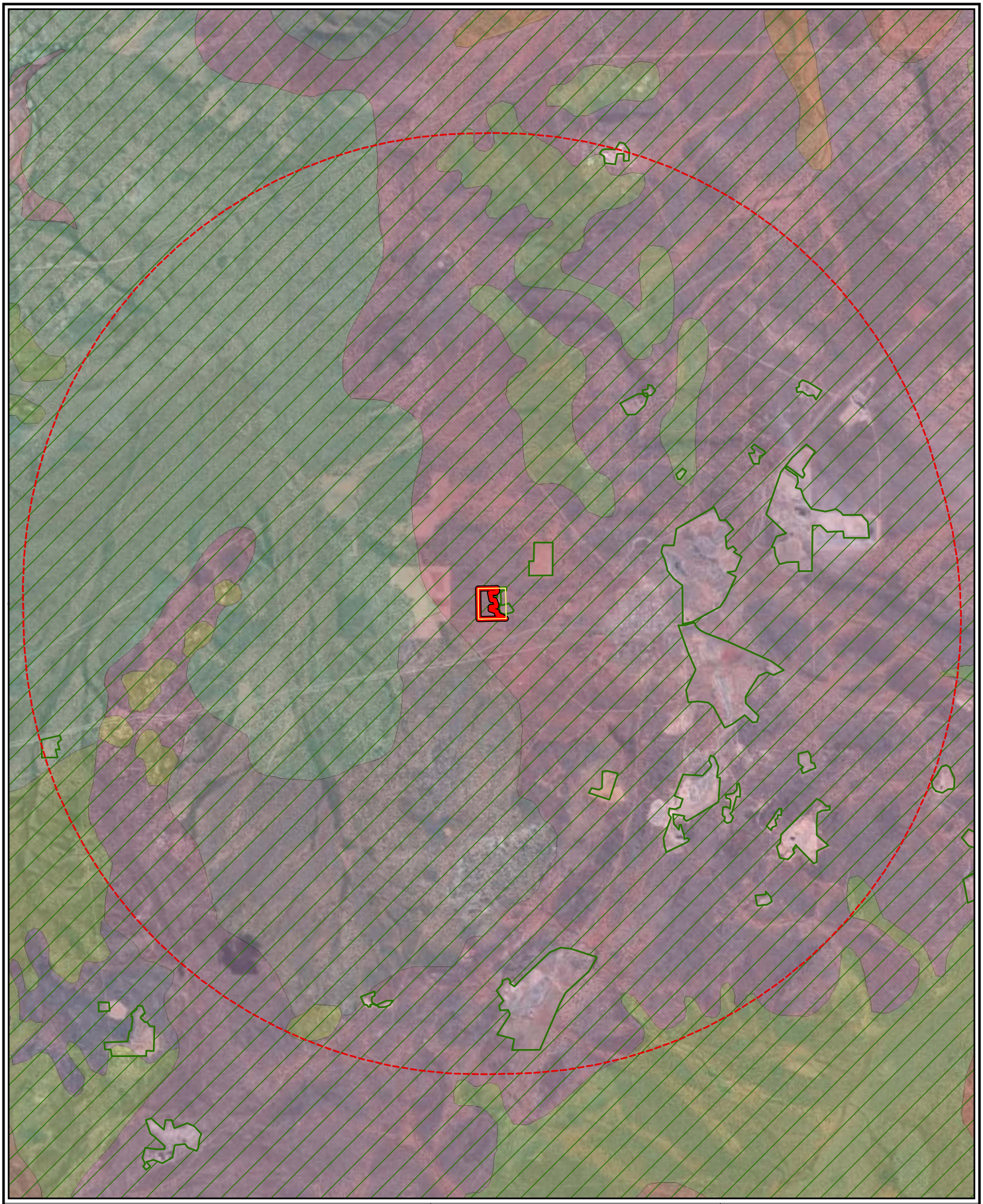
The majority of the Proposed Clearing Area has been subject to low-level disturbance including informal tracks, fencing and firebreaks. The eastern boundary at the interface of the landfill has been heavily disturbed by earthworks, rubbish dumping and other site activity.

As such, vegetation condition within the Proposed Clearing Area ranged from Completely Degraded (where vegetation had been completely cleared) to Very Good – Excellent (Strategen 2019; Figure 2.4).

Table 2.3 provides a numerical breakdown of the area occupied by each vegetation condition rating within the Proposed Clearing Area.

**Table 2.3: Area (ha) covered by each vegetation condition category in Proposed Clearing Area**

| Vegetation Condition | Area (ha) | Percentage of the Proposed Clearing Area |
|---|---|---|
| Completely Degraded | 3.93 | 15.9 |
| Very Good | 20.76 | 84.1 |
| **Total** | **24.7** | **100** |



**Legend**

- Proposed clearing area
- 10km buffer
- Premises boundary
- Native vegetation (DPIRD)

Pre-European vegetation (DPIRD)

- Boorabbin 125
- Boorabbin 128
- Boorabbin 8
- Boorabbin 9
- Coolgardie 128
- Coolgardie 1294
- Coolgardie 1413
- Coolgardie 2009
- Coolgardie 468
- Coolgardie 520
- Coolgardie 522
- Coolgardie 540
- Coolgardie 9
- Coolgardie 936

| | | |
|---|---|---|
| Scale 1:110,000 at A4 | 0 1 2 Kilometres | **Coolgardie, WA** |
| Coord. Sys. GDA 1994 MGA Zone 51 | | **REGIONAL VEGETATION MAPPING** |
| Job No: 58097 | | |
| Client: Shire of Coolgardie | | **FIGURE 2.3** |
| Version: A | Date: 11-Sep-2020 | strategen JBS&G |
| Drawn By: cthatcher | Checked By: HS | |

File Name: \\008PMPMR004V001.jbsg.aust\JBS Perth\Projects\1)Open\Shire of Coolgardie\58097 Coolgardie Landfill new cell\GIS\Maps\R01_Rev_A\NVCP\58097_02_3_RegVeg.mxd
Image Reference: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community .

**Legend**

- Proposed clearing area
- Premises boundary

Vegetation type

- Cleared - Completely degraded (3.934ha)
- VT1 - Very good condition (20.764ha)

| | | |
|---|---|---|
| Scale 1:3,500 at A4 (0 25 50 Meters) | | **Coolgardie, WA** |
| Coord. Sys. GDA 1994 MGA Zone 51 | | **VEGETATION TYPES AND CONDITION** |
| Job No: 58097 | | |
| Client: Shire of Coolgardie | | **FIGURE 2.4** |
| Version: A | Date: 11-Sep-2020 | strategen JBS&G |
| Drawn By: cthatcher | Checked By: HS | |

File Name: \\008PMPMR004V001.jbsg.aust\JBS Perth\Projects\1)Open\Shire of Coolgardie\58097 Coolgardie Landfill new cell\GIS\Maps\R01_Rev_A\NVCP\58097_02_4_VegTypeCond.mxd
Image Reference: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

### 2.2.7 Flora

A total of 25 native vascular plant taxa from 11 plant families were recorded from quadrats within the Proposed Clearing Area (Strategen 2019). The majority of taxa were recorded within the Fabaceae (eight taxa) and Myrtaceae (four taxa) families.

#### 2.2.7.1 Threatened and Priority flora

A desktop assessment using NatureMap (Parks and Wildlife 2007-) and the Protected Matters Search Tool (DAWE 2020) was conducted prior to the flora and vegetation survey to identify conservation significant species with the potential to occur in the Proposed Clearing Area (Strategen 2019). An updated assessment using both databases was conducted in May 2020.

The likelihood of each species was based on the following criteria:

- Possible: suitable habitat is present in the Proposed Clearing Area and the Proposed Clearing Area is in the species' known distribution, or habitat information for the species is not known
- Unlikely: no suitable habitat is present in Proposed Clearing Area, or suitable habitat is present, however the Proposed Clearing Area is outside of the species' known distribution.

Two Threatened flora and 31 Priority flora species have been recorded in the regional area (Table 2.4). Of these, based on specific habitat requirements, 14 Priority flora species were considered to have the potential to occur within the Proposed Clearing Area (Strategen 2019). As insufficient information was available regarding the habitat of a number of these species, a "possible" likelihood was given as their presence was unable to be definitively excluded based on habitat requirements alone (Strategen 2019).

No Threatened flora species as listed under section 178 of the *Environment Protection and Biodiversity Conservation Act 1999* ( EPBC Act) or pursuant to Schedule 1 of the *Biodiversity Conservation Act 2016* or Priority flora species as listed by Western Australian Herbarium (1998-) were recorded within the Proposed Clearing Area (Strategen 2019). Additionally, none of the Threatened flora species identified from the regional area were considered to have the potential to occur within the Proposed Clearing Area based on the lack of appropriate habitat or a restricted known distribution (Strategen 2019).

#### 2.2.7.2 Introduced (exotic) taxa

No introduced (exotic) taxa were recorded in quadrats within the Proposed Clearing Area (Strategen 2019). This is likely a result of surveying quadrats within remnant vegetation away from disturbance areas. It is expected that introduced species would be likely to occur at the interfaces of remnant vegetation with either the landfill site or major roads.

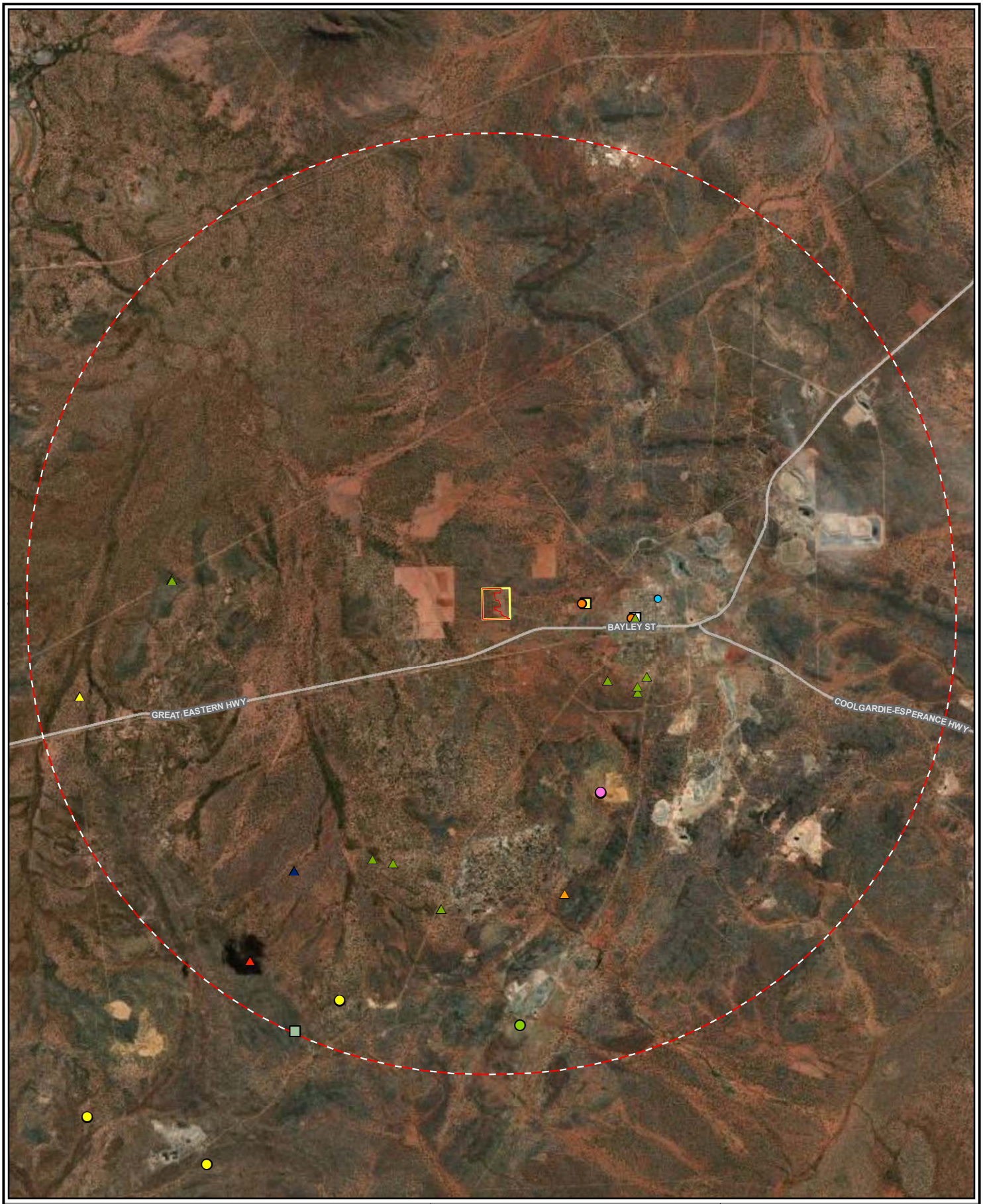
**Table 2.4: Threatened and Priority flora potentially occurring within the Proposed Clearing Area**

| Species | Conservation status | | Description | Potential to occur |
|---|---|---|---|---|
| | EPBC Act | BC Act | | |
| *Acacia coatesii* | NA | P1 | Low shrub up to 40 cm tall forming hemispherical cushions, growing in shallow, red sandy clay on flat or gently sloping ground towards the base of low greenstone ridges in open Eucalyptus woodland. Species flowers September – October (Maslin 2018). | **Unlikely** due to absence of preferred habitat. |
| *Acacia crenulata* | NA | P3 | Bushy shrub or tree, 0.7 - 3 m high, flowering yellow. Occurs on clay, sandy clay, or yellow sand on rocky rises, granite outcrops and breakaways (Western Australian Herbarium 1998-). | **Unlikely** due to absence of preferred habitat. |
| *Acacia epedunculata* | NA | P1 | Low spreading, rounded, multi-stemmed shrub, 0.5 - 0.65 m high. Flowers yellow in August. Occurs on yellow sandplains (Western Australian Herbarium 1998-). | **Unlikely** due to absence of preferred habitat. |
| *Acacia sclerophylla* var. *teretiuscula* | NA | P1 | Spreading, much-branched shrub, 0.25-2.5 m high, flowering yellow between September and October. Occurs on clay & loamy soils (Western Australian Herbarium 1998-). | **Possible** due to presence of preferred soil type. Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat. |
| *Acacia websteri* | NA | P1 | Shrub, 1.2-5 m high with fibrous bark, flowering yellow. Occurs on red sand, clay or loam on low-lying areas, flats (Western Australian Herbarium 1998-). | **Possible** due to presence of preferred habitat. |
| *Allocasuarina eriochlamys* subsp. *grossa* | NA | P3 | Dioecious or monoecious shrub, 1-3 m high occurring on stony loam or laterite clay, on granite outcrops (Western Australian Herbarium 1998-). | **Unlikely** due to absence of preferred habitat. |
| *Alyxia tetanifolia* | NA | P3 | Erect, rigid shrub, 1-2 m high to 2.5 m wide. Flowers white – cream between May and June or November. Occurs on sandy clay, loam and concretionary gravel on drainage lines and near lakes (Western Australian Herbarium 1998-). | **Unlikely** due to absence of preferred habitat. |
| *Austrostipa blackii* | NA | P3 | Tufted perennial herb to 1 m high, flowering September to November (Western Australian Herbarium 1998-). No habitat information available. | **Possible.** Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat. |
| *Austrostipa* sp. Carlingup Road (S. Kern & R. Jasper LCH 18459) | NA | P1 | No description or habitat information available. | **Possible.** Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat. |

| Species | Conservation status | | Description | Potential to occur |
|---|---|---|---|---|
| | EPBC Act | BC Act | | |
| *Austrostipa* sp. Dowerin (G. Wiehl F 8004) | NA | P2 | No description or habitat information available. | **Possible.** Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat. |
| *Chrysocephalum apiculatum* subsp. *norsemanense* | NA | P3 | No description or habitat information available. | **Possible.** Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat. |
| *Dampiera plumosa* | NA | P1 | Erect perennial herb, 0.15 - 0.2 m in height, flowering blue in October. Occurs on red sandy soils (Western Australian Herbarium 1998-). | **Possible** due to presence of preferred habitat. |
| *Diocirea microphylla* | NA | P3 | Rounded shrub reaching 0.45 - 0.9 m in height and 1 m in width. Flowers November to December. Occurs on red-brown clay loam (Western Australian Herbarium 1998-). | **Possible** due to presence of preferred soil type. Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat. |
| *Eremophila caerulea* subsp. *merrallii* | NA | P4 | Spreading or sprawling shrub to 0.35 m high and 0.8 m wide. Flowers blue-purple between October and December. Occurs on sand, clay or loam on undulating plains (Western Australian Herbarium 1998-). | **Unlikely** due to absence of preferred habitat. |
| *Eremophila praecox* | NA | P1 | Broom-like shrub, 1.5-3 m high. Flowers purple in October or December. Occurs on red / brown sandy loam on undulating plains. | **Unlikely** due to absence of preferred habitat. |
| *Eremophila veronica* | NA | P3 | Spreading, erect shrub, 0.5 - 1 m high, flowering purple between April and May. Occurs on stony clay or clay loam on lateritic breakaways (Western Australian Herbarium 1998-). | **Unlikely** due to absence of preferred habitat. |
| *Eucalyptus exigua* | NA | P3 | Mallee eucalypt, 2 - 5 m high. Flowers white-cream in March. Occurs on sandy loam and white sand on sandplains (Western Australian Herbarium 1998-). | **Unlikely** due to absence of preferred habitat. |
| *Eucalyptus websteriana* subsp. *norsemanica* | NA | P1 | Spreading mallee eucalypt to 3 m high, with 'minni-ritchi' bark. Flowers yellow between September and November. Occurs on rocky rises (Western Australian Herbarium 1998-). | **Unlikely** due to absence of preferred habitat. |
| *Gastrolobium graniticum* | Endangered | T | Erect, open shrub, to 2.5 m high. Flowers yellow, orange and red between August and September. Occurs on sand, sandy loam, and granite. Occurs on margins of rock outcrops and along drainage lines (Western Australian Herbarium 1998-). | **Unlikely** due to absence of preferred habitat. |

| Species | Conservation status | | Description | Potential to occur |
|---|---|---|---|---|
| | EPBC Act | BC Act | | |
| *Gompholobium cinereum* | NA | P3 | Shrub to 0.3 m high. Occurs on yellow sand, clayey sand, brown loam, sandy gravel or laterite in well-drained open sites, slopes or plains. Also known from roadsides (Western Australian Herbarium 1998-). | **Unlikely** due to absence of preferred habitat. |
| *Grevillea georgeana* | NA | P3 | Erect to widely spreading shrub, up to 3 m in height and 4 m wide. Flowers red / red, pink and cream, between January and March or September and November. Occurs on stony loam / clay on ironstone hilltops & slopes (Western Australian Herbarium 1998-). | **Unlikely** due to absence of preferred habitat. |
| *Hakea rigida* | NA | P2 | Shrub reaching 2.7 m in height. Flowers September to October. Occurs on sandy soils and yellow sand (Western Australian Herbarium 1998-). | **Unlikely** due to absence of preferred habitat. |
| *Lepidium merrallii* | NA | P2 | Erect to spreading annual (possibly ephemeral) herb, 0.03 - 0.15 m in height. Occurs on clay loam (Western Australian Herbarium 1998-). | **Possible** due to presence of preferred soil type. Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat. |
| *Lepidosperma* sp. Parker Range (N. Gibson & M. Lyons 2094) | NA | P1 | No description or habitat information available. | **Possible.** Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat. |
| *Leucopogon sp. Kambalda (J. Williams s.n. PERTH 07305028)* | NA | P3 | No description or habitat information available. | **Possible.** Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat. |
| *Myriophyllum petraeum* | NA | P4 | Aquatic annual herb with stems 0.15 - 0.3 m long. Flowers white between August and December. Strictly confined to ephemeral rock pools on granite outcrops (Western Australian Herbarium 1998-). | **Unlikely** due to absence of preferred habitat. |
| *Notisia intonsa* | NA | P3 | No description or habitat information available. | **Possible.** Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat. |
| *Phebalium appressum* | NA | P1 | Rounded shrub, approximately 1 m high. Flowers white in July. Occurs on yellow sandplains (Western Australian Herbarium 1998-). | **Unlikely** due to absence of preferred habitat. |
| *Phebalium clavatum* | NA | P2 | Upright shrub, 0.5-1.5 m high. Flowers white between August and September. Occurs on sandy soils on sandplains (Western Australian Herbarium 1998-). | **Unlikely** due to absence of preferred habitat. |

| Species | Conservation status | | Description | Potential to occur |
|---|---|---|---|---|
| | EPBC Act | BC Act | | |
| *Phlegmatospermum eremaeum* | NA | P3 | Prostrate to spreading annual herb, 0.02-0.1 m high. Flowers white-cream in Jun or August to October. Occurs on stony loam (Western Australian Herbarium 1998-). | **Unlikely** due to absence of preferred habitat. |
| *Thryptomene* sp. Coolgardie (E. Kelso s.n. 1902) | NA | P1 | No description or habitat information available. | **Possible.** Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat. |
| *Thryptomene* sp. Londonderry (R.H. Kuchel 1763) | NA | P1 | No description or habitat information available. | **Possible.** Species with no, or limited, habitat information available have been considered as possibly occurring, as they are unable to be definitively ruled out based on absence of habitat. |
| *Tetratheca spenceri* | NA | T | Clumped shrub, 0.5 – 0.6 m high and 0.8–1 m wide. Flowers pink between November and December. Only known from a single population occurring on low, lateritic outcrops c. 43 km south-east of Coolgardie where it occurs primarily on drainage channels (Butcher & Cockerton 2012). | **Unlikely** due to absence of preferred habitat. |




**Legend**

- Proposed clearing area
- Premises boundary
- 10km search buffer
- Major road

Priority flora species (DBCA)

- *Acacia coatesii*
- *Acacia websteri*
- *Allocasuarina eriochlamys* subsp. grossa
- *Austrostipa blackii*
- *Austrostipa* sp. Carlingup Road (S. Kern and R. Jasper LCH 18459)
- *Chrysocephalum apiculatum* subsp. *norsemanense*
- *Dampiera plumosa*
- *Eremophila veronica*
- *Gastrolobium graniticum*
- *Grevillea georgeana*
- *Lepidium merrallii*
- *Lepidosperma* sp. Parker Range (N. Gibson and M. Lyons 2094)
- *Phlegmatospermum eremaeum*
- *Thryptomene* sp. Coolgardie (E. Kelso s.n. 1902)
- *Thryptomene* sp. Londonderry (R.H. Kuchel 1763)

Scale 1:110,000 at A4

0 1 2 Kilometers

Coord. Sys. GDA 1994 MGA Zone 51

Job No: 58097

Client: Shire of Coolgardie

Version: A | Date: 11-Sep-2020

Drawn By: cthatcher | Checked By: HS

**Coolgardie, WA**

**THREATENED AND PRIORITY FLORA WITHIN 10KM OF THE DEVELOPMENT ENVELOPE**

**FIGURE 2.5**

strategen JBS&G

File Name: \\008PMPMR004V001.jbsg.aust\JBS Perth\Projects\1)Open\Shire of Coolgardie\58097 Coolgardie Landfill new cell\GIS\Maps\R01_Rev_A\NVCP\58097_02_6_TPFL.mxd
Image Reference: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

## 2.3 Fauna

Department of Biodiversity, Conservation and Attractions (DBCA) database searches indicated no Threatened or Priority fauna species had been recorded within the Proposed Clearing Area (DBCA 2019b).

A desktop assessment using Naturemap (Parks and Wildlife 2007-) and the Protected Matters Search Tool (DAWE 2020) was conducted prior to the flora and vegetation survey to identify conservation significant species with the potential to occur in the Proposed Clearing Area (Strategen 2019). An updated assessment using both databases was conducted in May 2020.

The likelihood of each species was based on the following criteria:

- Likely: Suitable habitat is present in the Proposed Clearing Area and the Proposed Clearing Area is in the species' known distribution
- Possible: Limited or no suitable habitat is present in Proposed Clearing Area, but is nearby. The species has good dispersal abilities and is known from the general area
- Unlikely: No suitable habitat is present in Proposed Clearing Area but is nearby, the species has poor dispersal abilities, but is known from the general area; or suitable habitat is present, however the Proposed Clearing Area is outside of the species' known distribution.

Based on habitat requirements of these species, the malleefowl (*Leipoa ocellata*) and Chuditch (*Dasyurus geoffroii*) were both considered to have the potential to occur within the Proposed Clearing Area (Table 2.5).

**Table 2.5: Threatened and Priority fauna potentially occurring within the Proposed Clearing Area**

| Species | Conservation status | | Description | Potential to occur |
|---|---|---|---|---|
| | EPBC Act | BC Act | | |
| *Actitis hypoleucos* (Common Sandpiper) | Migratory, Marine | International Agreement (CAMBA, JAMBA, ROKAMBA) [1] | Habitat includes a wide range of coastal wetlands and inland wetlands, with varying levels of salinity. Mostly found around muddy margins or rocky shores and sometimes on mudflats. Also recorded in estuaries and stream deltas, upstream banks, lakes and man-made water bodies including dams and reservoirs (DAWE 2020). | **Unlikely** due to absence of preferred habitat. |
| *Calidris ferruginea* (Curlew Sandpiper) | Critically Endangered | Threatened<br><br>International Agreement (CAMBA, JAMBA, ROKAMBA) [1] | *C. ferruginea* inhabits intertidal mudflats in sheltered coastal areas including estuaries bays and inlets as well as man-made water bodies including salt ponds, foraging among emergent vegetation (DAWE 2020). This species roosts on beaches, islets, sand spits and occasionally dunes (DAWE 2020). | **Unlikely** due to absence of preferred habitat. |
| *Dasyurus geoffroii* (Chuditch, Western Quoll) | Vulnerable | Threatened | The majority of the remaining natural population of this species occurs in the Jarrah Forest bioregion; however, it has occasionally been recorded from drier woodland and mallee shrubland in the Wheatbelt and Goldfields regions (DEC 2012). | **Possible** due to presence of potential habitat. |
| *Leipoa ocellata (*Malleefowl*)* | Vulnerable | Vulnerable | Mainly found in the semi-arid to arid zone in shrublands and low woodlands dominated by mallee, or other associated species including *Melaleuca 17uncinata* and *Callitris 17 verrucosa*, as well as *Eucalyptus sideroxylon* at the eastern limit of their distribution. Species requires a sandy substrate and abundance of leaf litter are clear requirements for nest construction (Benshemesh 2007). | **Possible** due to presence of preferred habitat. |
| *Pezoporus occidentalis (*Night parrot) | Endangered | Threatened | Species is known from *Triodia* (Spinifex) grasslands and/or chenopod shrublands in the arid and semi-arid zones (DAWE 2020). | **Unlikely** due to absence of preferred habitat. |
| *Tringa nebularia* (Common Greenshank, greenshank) | Migratory, Marine | International Agreement (CAMBA, JAMBA, ROKAMBA) [1] | Inhabits a wide variety of inland wetlands and sheltered coastal habitats of varying salinity including large mudflats and saltmarsh, mangroves or seagrass. May use permanent and ephemeral terrestrial wetlands, or artificial wetlands, including sewage farms, rice crops and bores (DAWE 2020) | **Unlikely** due to absence of preferred habitat. |

(1) CAMBA – China – Australia Migratory Bird Agreement
JAMBA – Japan – Australia Migratory Bird Agreement
ROKAMBA – Republic of Korea Migratory Bird Agreement

# 3. Assessment against the ten clearing principles

Table 3.1 presents an assessment against the ten clearing principles as set out in the EP Act.

**Table 3.1: Assessment against ten clearing principles**

| Principle | Assessment | Conclusion |
|---|---|---|
| (a) Native vegetation should not be cleared if it comprises a high level of biological diversity | The Proposed Clearing Area will comprise up to 24.7 ha of native vegetation which is unlikely to impact biological diversity across the clearing footprint and surrounding area.<br><br>The proposed clearing will not result in clearing of native vegetation representative of an area of high biodiversity, or that has a higher diversity than other examples of the vegetation in the region.<br><br>The following Priority flora were considered to have the potential to occur within the Proposed Clearing Area, based on an assessment of habitat occurring therein:<br><br>• *Acacia sclerophylla* var. *teretiuscula* (P1)<br>• *Acacia websteri* (P1)<br>• *Austrostipa blackii* (P3)<br>• *Austrostipa* sp. Carlingup Road (S. Kern & R. Jasper LCH 18459) (P1)<br>• *Austrostipa* sp. Dowerin (G. Wiehl F 8004) (P2)<br>• *Chrysocephalum apiculatum* subsp. *norsemanense* (P3)<br>• *Dampiera plumosa* (P1)<br>• *Diocirea microphylla* (P3)<br>• *Lepidium merrallii* (P2)<br>• *Lepidosperma* sp. Parker Range (N. Gibson & M. Lyons 2094) (P1)<br>• *Leucopogon* sp. Kambalda (J. Williams s.n. PERTH 07305028) (P3)<br>• *Notisia intonsa* (P3)<br>• *Thryptomene* sp. Coolgardie (E. Kelso s.n. 1902) (P1)<br>• *Thryptomene* sp. Londonderry (R.H. Kuchel 1763) (P1).<br><br>None of these flora species have been recorded within the Proposed Clearing Area (Strategen 2019). | The proposed clearing is unlikely to be at variance with this principle. |

| Principle | Assessment | Conclusion |
|---|---|---|
| (b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia | No Threatened or Priority fauna species have been recorded within the Proposed Clearing Area.<br><br>Based on habitat requirements of these species, the malleefowl (*Leipoa ocellata*) and chuditch (*Dasyurus geoffroii*) were considered to have the potential to occur within the Proposed Clearing Area.<br><br>While malleefowl may range up to several square kilometres, the nearest two records of the species were made approximately 6 km and 8 km to the northwest of the Proposed Clearing Area in 2016 (DBCA 2019b). Malleefowl appear to use corridors of relatively thick vegetation to disperse throughout their home ranges, requiring a sandy substrate and abundance of leaf litter for nest construction (Benshemesh 2007). Vegetation within and surrounding the Proposed Clearing Area is relatively open woodland, with localised patches of shrubs, with minimal accumulation of leaf litter (Strategen 2019). Given the distance of the closest records, the lack of dense vegetation and paucity of leaf litter within and adjacent to the Proposed Clearing Area, it is considered unlikely that malleefowl utilise the Proposed Clearing Area. Targeted surveys of the Proposed Clearing Area are scheduled for spring 2020. Any evidence of malleefowl activity including mounds and any other secondary evidence (scratching, tracks, feathers, egg remnants) will be searched for, photographed and locations recorded.<br><br>Chuditch have large home ranges and require adequate numbers of suitable den and refuge sites e.g. horizontal hollow logs or earth burrows) and sufficient prey to survive (DEC 2012). The majority of records of the species are known from contiguous areas of jarrah forest (DEC 2012). No records of chuditch are known from within a 40 km buffer of the Proposed Clearing Area. Targeted surveys of the Proposed Clearing Area scheduled for spring 2020 will include a search for any evidence of potential chuditch habitat features, which will be photographed, and locations recorded.<br><br>Clearing of up to 24.7 ha of native vegetation within the Proposed Clearing Area is considered unlikely to cause significant additional disturbance to fauna habitat in the immediate area or any further fragmentation of habitat additional to that which has already occurred for the construction and operation of the existing landfill.<br><br>The Proposed Clearing Area is not considered to represent habitat critical for fauna species, therefore the nature and scale of vegetation to be cleared is not considered to be significant at a local or regional scale in regard to indigenous fauna habitat. | The proposed clearing is unlikely to be at variance with this principle |
| (c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora | A total of 25 native vascular plant taxa from 11 plant families were recorded from quadrats within the Proposed Clearing Area, of which none were Threatened or Priority flora species (Strategen 2019).<br><br>Targeted surveys of the proposed Clearing Area will be conducted for any species identified as potentially occurring, prior to any clearing being undertaken.<br><br>Clearing and construction of the development will be guided by a Construction Environmental Management Plan which will include the following measures to minimise impacts to vegetation:<br>• clear demarcation of clearing boundary (inclusive of soil stockpiles and access tracks)<br>• seed and hygiene controls for equipment and personnel<br>• accurate and well-maintained clearing records during and post clearing. | The proposed clearing is unlikely to be at variance with this principle |

| Principle | Assessment | Conclusion |
|---|---|---|
| (d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community | No State or Commonwealth listed TECs have been identified within 10 km of the Proposed Clearing Area, nor were any recorded during the field survey. As such, the proposed clearing will not impact any State or Commonwealth listed PECs or TECs. | The proposed clearing is unlikely to be at variance with this principle |
| (e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared | The Proposed Clearing Area occurs within the Coolgardie 3 (Eastern Goldfields) IBRA subregion, comprising one pre-European vegetation association, Coolgardie 9, defined as medium woodland of redwood (*Eucalyptus transcontinentalis*) & merrit (*E. flocktoniae*).<br><br>The majority of this association is still intact, with 98.8% of its pre-European extent remaining (GoWA 2019).<br><br>The Proposed Clearing Area occurs within a large contiguous remnant patch of vegetation, with minimal clearing in the immediate vicinity. The proposed clearing of 24.7 ha represents the removal of 0.0007% of the remaining vegetation within the local area (i.e., in a 10 km radius of the Proposed Clearing Area). As such, the clearing of up to 24.7 ha of vegetation within the Proposed Clearing Area is not considered a significant impact to the native vegetation in the local area. | The proposed clearing is unlikely to be at variance with this principle |
| (f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland | The Proposed Clearing Area does not contain any wetlands or watercourses, as such, clearing of up to 24.7 ha will not disturb any vegetation associated with this type of environment. | The proposed clearing is unlikely to be at variance with this principle. |
| (g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation | Clearing within the Proposed Clearing Area will result in the removal of up to 24.7 ha of native vegetation, and is unlikely to cause any appreciable land degradation additional to that which has already occurred in relation to the construction and operation of the existing landfill facility.<br><br>The clearing is not likely to cause appreciable land degradation due to:<br>• the small area of total proposed clearing<br>• the large extent of vegetation that would remain within the local and regional areas<br>• cleared areas will stabilised through development. | The proposed clearing is unlikely to be at variance with 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 | No nature reserves or conservation areas are present within or adjacent to the Proposed Clearing Area. The nearest nature reserves are approximately 50 km from the Proposed Clearing Area (Rowles Lagoon Nature Reserve and Burra Rock Nature Reserve).<br><br>Clearing of up to 24.7 ha of vegetation within the Proposed Clearing Area will not impact any nature reserves or conservation areas; as such, clearing is not considered to be at variance to this principle. | The proposed clearing is not at variance with 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 | No surface water is present within or adjacent to the Proposed Clearing Area; as such, clearing will not impact surface water.<br><br>The small scale of clearing within the Proposed Clearing Area is not expected to result in increases to erosion, soil acidity, salinity, or any other processes that have the potential to affect groundwater quality.<br><br>Clearing and construction of the development will be guided by a Construction Environmental Management Plan which will include measures to minimise and mitigate the risk of erosion and associated impacts. | The proposed clearing is not at variance with this principle |

| Principle | Assessment | Conclusion |
|---|---|---|
| (j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding | The Proposed Clearing Area is not part of, or associated with, a drainage basin, creek line or salt pan. As a result, clearing of up to 24.7 ha is unlikely to have a substantial effect on flooding in the local area.<br><br>Clearing within the Proposed Clearing Area will affect a small amount of vegetation and is therefore unlikely to be at variance with this principle. | The proposed clearing is unlikely to be at variance with this principle. |

# 4. Environmental approval and management

In order to manage potential impacts associated with the proposed clearing of an area of vegetation within the Proposed Clearing Area, a range of environmental management measures have been identified, focussing on key aspects and potential impacts, including the following:

- establishing clearing boundaries through use of GPS and on-ground demarcation (inclusive of soil stockpiles and access tracks)
- targeted surveys for any flora species considered to have the potential to occur within the Proposed Clearing Area, conducted by experienced botanists at an appropriate time of year
- site inductions for any staff involved in the clearing, construction and operation of the new landfill facility
- ensuring vehicles are clean on entry
- hygiene controls for equipment and personnel
- accurate and well-maintained clearing records during and post clearing.

The above measures will be implemented through a Construction Environmental Management Plan.

# 5. Conclusion

An assessment of the impacts of the proposed native vegetation clearing against the ten clearing principles has determined that the clearing is not at variance, or is unlikely to be at variance, with these principles, particularly with consideration of the proposed mitigation and management measures outlined above.

# 6. Limitations

**Scope of services**

This report ("the report") has been prepared by Strategen-JBS&G in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and Strategen-JBS&G. In some circumstances, a range of factors such as time, budget, access and/or site disturbance constraints may have limited the scope of services. This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

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In preparing the report, Strategen-JBS&G has relied upon data and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise expressly stated in the report, Strategen-JBS&G has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Strategen-JBS&G has also not attempted to determine whether any material matter has been omitted from the data. Strategen-JBS&G will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to Strategen-JBS&G. The making of any assumption does not imply that Strategen-JBS&G has made any enquiry to verify the correctness of that assumption.

The report is based on conditions encountered and information received at the time of preparation of this report or the time that site investigations were carried out. Strategen-JBS&G disclaims responsibility for any changes that may have occurred after this time. This report and any legal issues arising from it are governed by and construed in accordance with the law of Western Australia as at the date of this report.

**Environmental conclusions**

Within the limitations imposed by the scope of services, the preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted environmental consulting practices. No other warranty, whether express or implied, is made.

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# Appendix A Photographs of vegetation within the Proposed Clearing Area

Plate 1: VT1 in the southern section of the Survey Area

Plate 2: VT1 in the northern section of the Survey Area

## Appendix B Vascular plant taxa recorded from quadrats within the Proposed Clearing Area

| Family | Species |
|---|---|
| Amaranthaceae | *Ptilotus exaltatus* |
| Apocynaceae | *Marsdenia australis* |
| Asteraceae | *Olearia muelleri* |
| Chenopodiaceae | *Atriplex nummularia* |
| | *Sclerolaena diacantha* |
| Fabaceae | *Acacia ?hemiteles* |
| | *Acacia colletioides* |
| | *Acacia enervia* subsp. *explicata* |
| | *Acacia merrallii* |
| | *Acacia resinistipulea* |
| | *Acacia tetragonophylla* |
| | *Senna artemisioides* subsp. *filifolia* |
| | *Templetonia ceracea* |
| Goodeniaceae | *Scaevola spinescens* |
| Lamiaceae | *Westringia rigida* |
| Myrtaceae | *Eucalyptus celastroides* subsp. *celastroides* |
| | *Eucalyptus oleosa subsp. oleosa* |
| | *Eucalyptus salmonophloia* |
| | *Eucalyptus yilgarnensis* |
| Poaceae | *Austrostipa platychaeta* |
| | *Paspalidium gracile* |
| Santalaceae | *Exocarpos aphyllus* |
| | *Santalum acuminatum* |
| Scrophulariaceae | *Eremophila ionantha* |
| | *Eremophila scoparia* |

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