Level 1
Flora and Vegetation Survey of the Two Boys and Fairplay Project area, and Proposed Infrastructure Corridors Development Higginsville
(M15/348, M15/352, M15/375, M15/512, M15/528, M15/610, M15/642 and P15/5429)

Prepared for

WESTGOLD GROUP

Avoca Mining Pty Ltd

FINAL V2.2
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1 INTRODUCTION

West Gold Resources Pty Ltd is the owner of subsidiary Avoca Mining Pty Ltd, which operate the Higginsville Gold Operation (HGO). HGO proposes to expand their current Fairplay and Two Boys Project areas as well as develop new infrastructure corridors to the gold milling area. These proposed areas fall within tenements M15/348, M15/352, M15/375, M15/512, M15/528, M15/610, M15/642 and P15/5429. A mining proposal is currently being prepared, and will be submitted with the inclusion of this report.

The survey area within M15/348, M15/352, M15/375, M15/512, M15/528, M15/610, M15/642 and P15/5429 is located approximately 50.1 km north of Norseman in the Coolgardie region of Western Australia (Figure 1).

The total survey area received from HGO covers 258.78ha which envelopes current disturbances (haul road, railway corridor and related infrastructure) totalling 6.82ha (2.64% of survey area). Actual disturbance footprints are not yet defined; however, clearing required within the boundary of the survey area is anticipated to be less than the total survey area. This report will encompass results of the Level 1 flora and vegetation survey within the newly proposed infrastructure survey area.

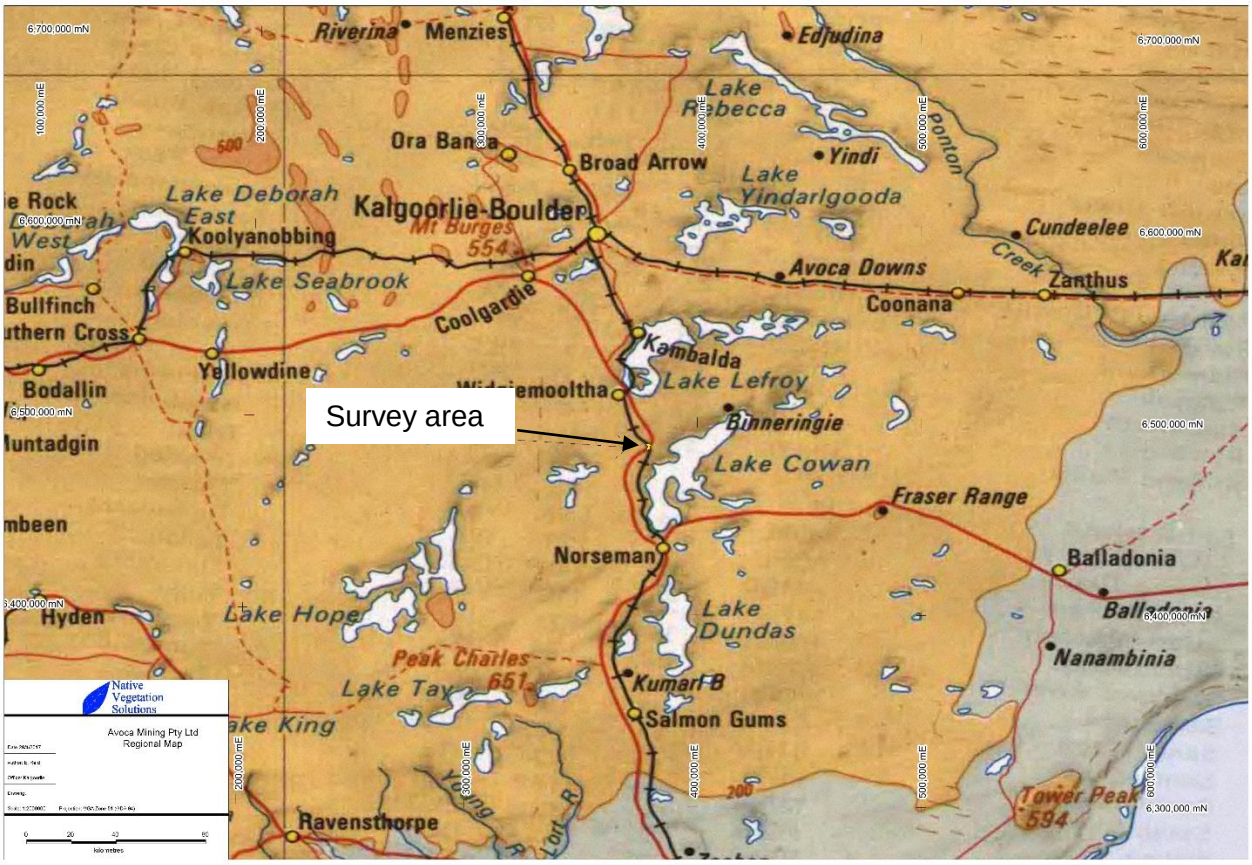


Figure 1: Regional map of survey location

HGO commissioned Native Vegetation Solutions (NVS) to complete a Level 1 Flora and Vegetation Survey of the survey area on the 4th and 5th of April 2017.

1.1 Objectives

The objective of this report is to document the results of the flora and vegetation component of a Level 1 assessment conducted in accordance with:

- Position Statement No 3- *Terrestrial Biological Surveys as an Element of Biodiversity Protection* (EPA, 2002);
- Guidance Statement No. 51- *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA, 2004); and
- Technical Guide- *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA & DPAW, 2015)

A Level 1 study has two components:

1). Desktop study which includes a literature review and a search of the relevant databases;
2). Reconnaissance survey of the survey area to verify the desktop survey, to define vegetation units present in the area, search for species of conservation significance and to determine potential sensitivity to impact.

As part of the reporting for the Level 1 assessment, NVS has conducted a Flora and Vegetation Survey which includes broad-scale vegetation mapping and vegetation condition mapping of the survey area.

The scope of work for the Level 1 flora and vegetation survey was:

- conduct a desktop study that includes a literature review and search of the relevant databases;
- describe the vegetation associations in the survey area;
- prepare an inventory of species occurring in the survey area;
- identify any vegetation communities or flora species of conservation significance;
- Map broad-scale vegetation groups found within the survey area, including vegetation condition; and
- provide recommendations, including the management of perceived impacts to flora and vegetation within the survey area.

1.2 Geology and Vegetation

The survey area lies in the Coolgardie (COO) bioregion within the Eastern Goldfields (COO3) subregion which totals over 5.1 million hectares (CALM, 2002). The COO3 subregion lies on the Yilgarn Craton's 'Eastern Goldfields Terrains'. The relief is subdued and comprises of gently undulating plains interrupted in the west with low hills and ridges of Archaean greenstones and in the east by a horst of Proterozoic basic granulite. The underlying geology is of gneisses and granites eroded into a flat plane covered with tertiary soils and with scattered exposures of bedrock. Calcareous earths are the dominant soil group and cover much of the plains and greenstone areas. A series of large playa lakes in the western half are the remnants of an ancient major drainage line. The vegetation is of Mallees, *Acacia* thickets and shrubheaths on sandplains. Diverse *Eucalyptus* woodlands occur around salt lakes, on ranges, and in valleys. Salt lakes support dwarf shrublands of samphire. Woodlands and *Dodonaea* shrubland occur on basic graninulites of the Fraser Range. (CALM, 2002).

1.3 Climate

The climate is Arid to Semi-arid with 200-300 mm of rainfall, sometimes in summer but usually in winter (CALM, 2002). The nearest official meteorological weather station with the most complete and up to date information is Norseman, which is located approximately 50.0 km south of the survey area.

1.3.1 Temperature

Mean annual minimum temperature at Norseman Aero is 9.9°C and mean annual maximum temperature is 25.1°C. The coldest temperatures are attained in July (mean minimum

temperature 4°C), the hottest is January (mean maximum temperature 32.4°C) and diurnal temperature variations are relatively consistent throughout the year (Figure 2).

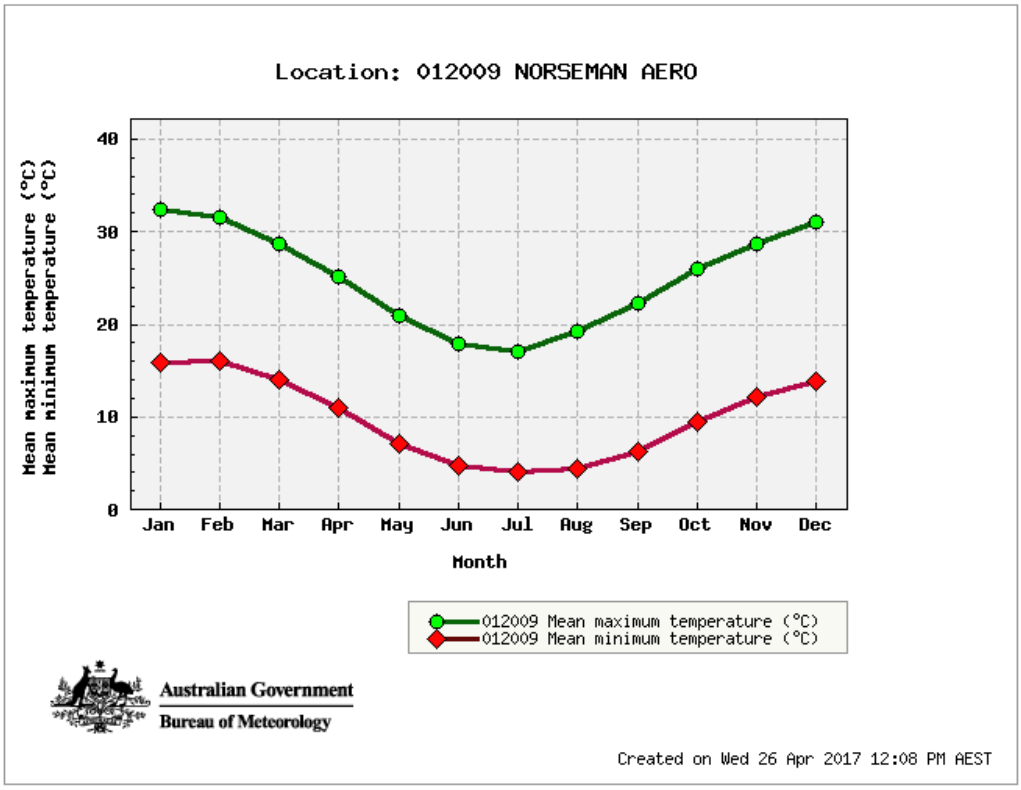


Figure 2: Mean temperature ranges for Norseman Aero weather station

1.3.2 Rainfall

The annual average rainfall at Norseman is 303.7 mm, which falls (>1 mm) on an average of 48 rain-days (BOM, 2017). Rainfall is relatively even throughout the year with slightly larger rainfall events falling between the months of November and March (Figure 3). In 2017 so far, rainfall only in February exceeded monthly averages, with January and March receiving below average rainfall events, and April only receiving 6.4 mm up to the 25th April (BOM, 2017). February rainfall exceeded the monthly average by over double.

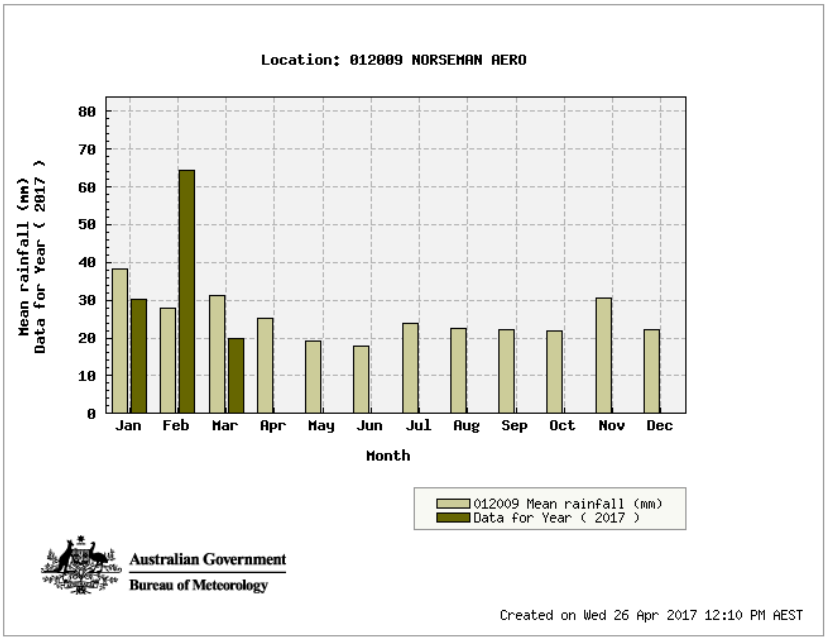


Figure 3: Monthly and mean rainfall for Norseman Aero weather station 2017

2. ASSESSMENT METHODOLOGY

2.1 Personnel and Reporting

The following personnel were involved in the Level 1 flora and vegetation survey:

- Mr Eren Reid (*BSc- Biological Science),* Principal Botanist, Native Vegetation Solutions, undertook the survey, vegetation mapping, data collation, field identification of flora, preparation and review of the report; and

2.2 Preliminary Desktop Study

A preliminary assessment of the survey area and its potential constraints was undertaken by reviewing relevant government agency managed databases (Sections 2.2.1 to 2.2.6, and Appendices 1 & 2) and consulting with government agencies where necessary. The following sections provide a summary of desktop searches undertaken for the project.

2.2.1 *Environment Protection and Biodiversity Conservation Act* Protected Matters

The *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* Protected Matters Search tool was utilised to provide results for matters of National Environmental Significance within the survey area using the survey area as the search criteria with a 2km buffer (DOTEE, 2017).
(http://www.environment.gov.au/arcgis-framework/apps/pmst/pmst-coordinate.jsf)

2.2.2 Threatened Flora and Communities

The Threatened and Priority Flora Database managed by the Department of Parks and Wildlife (DPAW) was searched for threatened and priority flora within a 30km radial area of a supplied shapefile (Reference: 15-0114FL).

The Threatened and Priority Ecological Communities (TECs and PECs) database was searched to determine the presence of PECs or TECs (Reference: 06-1111EC), with Geographic Information System (GIS) data supplied for assessment, within a 30km radial area of a supplied shapefile.

2.2.3 Environmentally Sensitive Areas (ESAs) and Conservation Reserves

The Department of Environment Regulation (DER) Clearing Permit System Native Map Viewer was used to determine the location of any ESAs and Conservation Reserves (https://cps.der.wa.gov.au/main.html).

2.2.4 Vegetation Type, Extent and Status

Vegetation extent and status data was sourced from the Department of Agriculture and Food (DAFWA) report “Land-Use and Vegetation in Western Australia- National Land and Water Resources Audit Report” and its associated GIS file (Shepherd *et al*, 2002). This data comprises Beard’s Pre-European vegetation groups.

DPaW's Statewide Vegetation Statistics (DPAW, 2017) was also referenced for the current extent of Beard's Vegetation Groups.

2.2.5 Wetlands

The potential of wetlands within the project area was determined by examining DER’s Clearing Permit System Native Map Viewer (DER, 2017).

2.2.6 Dieback

Dieback is only considered a potential issue for the project if both the mean annual rainfall of the area is >400mm, and if the project area resides south of the 26th parallel. Dieback is not considered an issue for the survey area as although it lies south of the 26th parallel it receives average annual rainfall of 303.7 mm, which is below the 400mm threshold mark. There are no records of *Phytophthora cinnamomi* establishing in natural ecosystems in regions receiving less than 400mm rainfall per annum (CALM, 2003).

2.3 Site Investigation

A site visit was carried out by Botanist Eren Reid from Native Vegetation Solutions on the 4th and 5th April 2017 to examine the flora and vegetation groups contained within the survey area. A total of 10 hours was spent on site traversing the survey area, by four-wheel-drive vehicle and on foot.
The survey was conducted in accordance with relevant EPA's Statements and Guidelines (Section 1.1).

EPA's *Position Statement No. 3* (EPA 2002) provides indicative levels of biological survey in relation to the scale and nature of the impact and the sensitivity of the receiving environment. The EPA uses the Interim Biogeographic Regionalisation of Australia (IBRA) as the largest unit for Environmental Impact Assessment decision making in relation to the conservation of biodiversity. Given the scale and nature of the proposed disturbance as well as the existing disturbance, and that the survey area is located within the Coolgardie IBRA region, a Level 1 flora and vegetation survey was required.

2.3.1 Field Methods

Prior to the field work, the aerial photography was examined and representative sample sites for relevés were chosen to provide coverage over all viable vegetation types.

In the field, these sites were visited and non-permanent 20 x 20m relevé sites established in appropriate locations, taking into account representativeness of the site to surrounding vegetation and vegetation boundaries.

Each relevé site was captured on a TwoNav Aventura GPS at ±4m accuracy, using Universal Transverse Mercator location on GDA94 datum. Digital photographs were taken of each representative vegetation group present in the survey area.

Data collected at each relevé included:

- Photograph of representative vegetation group:
- GPS Location:
- Species Present;
- Population Count/Estimate of Conservation Significant Flora (if present);
- Disturbance Level; and
- Vegetation Condition

Specimens of taxa not recognised by the Botanists were collected and pressed along with specimens of taxa recognised as, or thought to be, conservation-significant species.

The condition of each relevé was assessed using the method developed by Keighery (1994). Definitions of the condition scale are presented in Appendix 3.

Vegetation groups were mapped (section 2.3.3 below).

Opportunistic sampling of plant taxa and vegetation group mapping was also utilised in the survey area between relevé sampling points, via wandering traverses. Smaller singular relevé

sites were also utilised as opportunistic sample sites to collect flora specimens and assist in mapping vegetation groups.

All sample sites and GPS tracks are included in Appendix 4.

2.3.2 Post-Field Methods

Unknown specimens collected in the field were identified post field work by Eren Reid with reference to published keys, NVS' reference herbarium and information published on Florabase (WAHERB, 2017).

Species information was transferred into Microsoft Excel® worksheets representing presence/absence of species per vegetation group.

2.3.3 Mapping

Vegetation mapping was produced via GPS recorded information in the field, cross-referenced with vegetation descriptions made in the field, overlaid on aerial imagery of the survey area. The GPS utilized (TwoNav Aventura GPS) displayed aerial imagery, hence real time mapping of vegetation groups was available during field work.

Vegetation Health Condition was assessed in the field with reference to Keighery (1994).

GPS tracks and waypoints recorded during field work are presented in Appendix 4.

2.4 Limitations

Table 1 lists potential limitations that may have affected the survey. These are based on the listing given in the *Guidance Statement No. 51 Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA, 2004). As shown, this survey was not limited by any factors listed below.

Table 1: List of potential survey limitations

Potential Limitations	Constraint (Y/N)	Comment
Competency and experience of the consultants undertaking the survey	N	Mr Eren Reid is an experienced botanist who has conducted many flora and vegetation surveys in the Goldfields, Pilbara and South-west regions of WA.
Proportion of flora identified during survey	N	As the survey was planned to target species of conservation significance and flora within a small survey area a complete census of the species present was attempted (Approx. 95%). Sufficient identifications were made to allow vegetation descriptions to be made.
Sources of information	N	Threatened and Priority Flora GIS information was available from DPAW.
Proportion of the task achieved	N	All tasks completed
Timing/Season	N	The targeted survey was conducted in Autumn 2017. Due to the above average rainfall in February, many species were still in flower with emergent annuals.
Disturbance in survey area	N	Disturbance was present in the form of historic exploration and mining activities
Intensity of survey effort	N	Transects were walked through the survey area with all parts visited
Resources	N	Adequate resources were available
Access problems	N	No problems with access
Availability of contextual information on the region	N	Information on the Coolgardie Bioregion is readily available.

3. RESULTS

3.1 Preliminary Desktop Assessment

3.1.1 EPBC Act Protected Matters

The EPBC Protected Matters search tool revealed that the survey area could possibly be suitable habitat for the weed species *Carrichtera annua* (Wards Weed) (DOTEE, 2017).

3.1.2 Threatened Flora and Communities

The DPAW database searches revealed a potential for no Threatened and 25 Priority Flora species to occur within a 30km radius of the survey area (DPAW, 2014). No known locations of these Flora occur within the survey area, while the closest location occurs approximately 1.0 km west of the survey area.

Results of the threatened flora database search are included in Appendix 2.

The PEC/TEC search (DPAW, 2011) revealed that there are no TECs or PECs in the survey area.

3.1.3 Environmentally Sensitive Areas and Conservation Reserves

No ESA's are located within the survey area (DER, 2017).

3.1.4 Vegetation Type, Extent and Status

Information relating to known vegetation within the survey area has been summarised in Tables 2 and 3 below. This information has been compiled through both desktop assessments and the site visit.

Table 2: Summary of information regarding Pre-European and current vegetation extent of Vegetation Association 8 within the survey area

Factor	Value				
Beard Vegetation Association*	8				
Vegetation Association Description*	Medium woodland; salmon gum (*E. salmonophloia*) & gimlet (*E. salubris*)				
Pre-European Extent (ha)	Scale				
	By Association *(WA)*	***By Association*** *(WA)*	***By IBRA Region*** *(COO)*	***By IBRA Sub-region*** *(COO3)*	***By Shire*** *(Shire of Coolgardie)*
	1,096,450*	694,638**	280,248**	226,086**	160,584**
% Pre-European Extent Remaining	*57.63%**	*49.89%***	*98.34%***	*99.53%***	*99.34%***
Surrounding Land Use***	Mining, Exploration, Pastoral Lease, Nature Reserve				
Weed prevalence***	Low				

* Source: Shepherd *et al.* (2002) Appendix 2
**Source: DPAW, (2017)
***Source: Field Assessment

Table 3: Summary of information regarding Pre-European and current vegetation extent of Vegetation Association 522 within the survey area

Factor	Value				
Beard Vegetation Association*	522				
Vegetation Association Description*	Medium woodland; redwood (*E. transcontinentalis*) & merrit (*E. flocktoniae*)				
Pre-European Extent (ha)	Scale				
	***By Association** (WA)*	***By Association** (WA)*	***By IBRA Region** (COO)*	***By IBRA Sub-region** (COO3)*	***By Shire** (Shire of Coolgardie)*
	676,324*	709,715**	688,407**	208,175**	313,238**
% Pre-European Extent Remaining	*100.00%**	*99.93%***	*99.93%***	*99.78%***	*99.86%***
Surrounding Land Use***	Mining, Exploration, Pastoral Lease, Nature Reserve				
Weed prevalence***	Low				

* Source: Shepherd *et al.* (2002) Appendix 2
**Source: DPAW, (2017)
***Source: Field Assessment

3.1.5 Wetlands

No wetlands which are recorded on the DER Clearing Permit System Map Viewer occur within the survey area (DER, 2017).

3.1.6 Dieback

The survey area lies south of the 26th parallel, however receives average annual rainfall of 303.7 mm, below the 400mm threshold mark. There is no record of *Phytophthora cinnamomi* establishing in natural ecosystems in regions receiving <400mm rainfall per annum (CALM, 2003). Therefore, Dieback is not considered an issue for this survey area, however all measures should be taken to prevent any possible soil contamination (seeds of non-native species *etc*.) which poses a risk in the survey area during seasonally favourable conditions.

3.2 Field Assessment

3.2.1 Threatened Flora

No flora located in the survey area, are gazetted as Threatened pursuant to Section 5(1) of the *Biodiversity Conservation Act 2016*. No plant taxa listed as Threatened pursuant to Schedule 1 of the *Environment Protection and Biodiversity Conservation Act 1999* were located within the survey area.

Priority species *Diocirea acutifolia* (P3) and *Allocasuarina eriochlamys* subsp. *grossa* (P3) were recorded in the survey area, with a total of 451 and 30 plants recorded respectively (Table 4 and Appendix 4).

Diocirea acutifolia (P3) is both widespread and in large numbers throughout the local and regional area, and is well documented by previous flora surveys. DPAW known locations range from Coolgardie, Norseman, Kambalda, Widgiemooltha and Madoonia Downs.

Allocasuarina eriochlamys subsp. *grossa* (P3) was recorded in one location within vegetation group A.

Table 4: Priority Flora locations recorded during the survey

Species	Conservation Code	Vegetation Group Code	GDA94 Zone	Easting (m)	Northing (m)	No. Of Plants
Diocirea acutifolia	P3	D	51 J	378882	6487611	5
Diocirea acutifolia	P3	D	51 J	378896	6487588	2
Diocirea acutifolia	P3	D	51 J	378916	6487516	5
Diocirea acutifolia	P3	D	51 J	379011	6487484	60
Diocirea acutifolia	P3	D	51 J	379022	6487434	50
Diocirea acutifolia	P3	D	51 J	379059	6487511	30
Diocirea acutifolia	P3	D	51 J	379109	6487601	50
Diocirea acutifolia	P3	D	51 J	377955	6485571	15
Diocirea acutifolia	P3	D	51 J	377953	6485498	10
Diocirea acutifolia	P3	D	51 J	377940	6485470	60
Diocirea acutifolia	P3	D	51 J	377977	6485371	100
Diocirea acutifolia	P3	D	51 J	377952	6485285	60
Diocirea acutifolia	P3	D	51 J	377941	6485047	4
Allocasuarina eriochlamys subsp. *grossa*	P3	A	51 J	378361	6488036	30

3.2.2 Vegetation Type, Extent and Status

A total of 21 Families, 48 Genera and 106 Species were recorded within the survey area. Four major vegetation groups were recorded in the survey area, and are in Very Good, Good or Degraded condition (using the scale of Keighery 1994, see Appendix 3). Existing disturbance within the survey totalled 6.8ha (2.64% of survey area). The summary of Vegetation groups contained within the survey area is summarised in Table 5 below. Maps of the survey area can be seen in Appendix 4.

Table 5: Vegetation Group Summary

Vegetation Group Code	Vegetation Group	Families	Genera	Species	Area (ha)	Percentage of Survey Area (%)
A	*Eucalyptus griffithsii* over *Acacia acuminata* over sclerophyll shrubland	13	19	24	1.58	0.61
B	*Eucalyptus salmonophloia* woodland over sclerophyll shrubland	13	20	45	81.87	31.64
C	*Eucalyptus torquata* woodland over mixed sclerophyll shrubland	13	21	39	35.02	13.53
D	Mixed *Eucalyptus* woodland over mixed sclerophyll shrubland	17	37	75	133.49	51.58
E	Existing Disturbance	0	0	0	6.82	2.64
	Total	**21***	**48***	**106***	**258.78#**	**100.00#**

Note: * Within total survey area (not sum of column)
Sum of column

The vegetation groups are described in more detail below.

3.2.2.1 *Eucalyptus griffithsii* over *Acacia acuminata* over sclerophyll shrubland (A)

This vegetation group consisted of 13 Families,19 Genera and 24 Species. The vegetation group was approximately 1.58 ha which makes up 0.61% of the survey area.

Dominant species were *Eucalyptus griffithsii, Acacia acuminata, Allocasuarina eriochlamys* subsp*. grossa, Dodonaea microzyga* subsp*. acrolobata, Trymalium myrtillus* subsp*. myrtillus, Mirbelia granitica* and *Alyxia buxifolia.*

Figure 4: *Eucalyptus griffithsii* over *Acacia acuminata* over sclerophyll shrubland within the survey area

3.2.2.2 *Eucalyptus salmonophloia* woodland over sclerophyll shrubland (B)

This vegetation group consisted of 13 Families, 20 Genera and 45 Species. The vegetation group was approximately 81.87 ha which makes up 31.64% of the survey area.

Dominant species were *Eucalyptus salmonophloia, E. salubris, Melaleuca sheathiana, Atriplex nummularia* subsp. *spathulata, Eremophila interstans* subsp. *virgata, Maireana sedifolia, Cratystylis conocephala and Olearia muelleri.*

***Figure 5: Eucalyptus salmonophloia* woodland over sclerophyll shrubland within the survey area**

3.2.2.3 *Eucalyptus torquata* woodland over mixed sclerophyll shrubland (C)

This vegetation group consisted of 13 Families, 21 Genera and 39 Species. The vegetation group was approximately 35.02 ha which makes up 13.53% of the survey area.

Dominant species were *Eucalyptus torquata, Scaevola spinescens, Exocarpos aphyllus, Dodonaea lobulata, Dodonaea microzyga* subsp. *acrolobata, Eremophila interstans,* subsp. *virgata, Eremophila scoparia and Olearia muelleri.*

Figure 6: *Eucalyptus torquata* woodland over mixed sclerophyll shrubland within the survey area

3.2.2.4 Mixed *Eucalyptus* woodland over mixed sclerophyll shrubland (D)

This vegetation group consisted of 17 Families, 37 Genera and 75 Species. The vegetation group was approximately 133.49 ha which makes up 51.58% of the survey area.

Dominant species were *Eucalyptus lesouefii, Eucalyptus ravida, Eucalyptus salubris, Eucalyptus yilgarnensis, Eucalyptus campaspe*, *Eremophila scoparia, Alyxia buxifolia, Cratystylis conocephala, Olearia muelleri, Atriplex vesicaria, Acacia colletioides Acacia erinacea, Senna artemisioides,* subsp*. filifolia and Scaevola spinescens.*

Figure 7: Mixed *Eucalyptus* woodland over mixed sclerophyll shrubland within the survey area

3.2.2.5 Existing Disturbance (E)

This group was completely degraded, and mainly consisted of haul roads and rail corridors. Existing disturbance was approximately 6.82 ha which made up 2.64% of the survey area.

3.2.3 Weeds

Four weed species were recorded within the survey area; *Carrichtera annua* (Ward's Weed) *Centaurea melitensis* (Maltese Cockspur), *Salvia verbenaca* (Wild Sage) and *Cenchrus ciliaris* (Buffel Grass). *Carrichtera annua* was introduced into Australia from the eastern Mediterranean. *Centaurea melitensis* is another Mediterranean weed which occurs from Carnarvon through the arid zone and across the Nullarbor. First recorded in Port Pirie in South Australia in 1915, *C. annua* is now widespread throughout South Australia, the Interior, and Western Australia (Lamp & Collet, 1999). *Cenchrus ciliaris* is widely distributed over Western Australia, often occurring on roadsides creeklines and river edges in most vegetation types from Geraldton to the Pilbara and Murchison and Gascoyne regions (Hussey *et al*, 2007). *Salvia verbenaca* is native to Europe and Asia and is an occasional weed of roadsides and railway tracks, between Kalgoorlie and Esperance (Hussey *et al*, 2007).

None of these species are listed as declared plants by DAFWA (2017).

3.2.4 Vegetation Condition

Evidence of some grazing was observed during the field assessment.

Overall, the condition of the vegetation was determined to be "Very Good" with areas which were affected by historic exploration in "Good" condition, and other areas not affected by exploration in "Excellent" condition. Degraded areas included haul roads and railway corridors.

4. DISCUSSION

The field assessment established that the condition of the vegetation in the proposed disturbance area is overall “Very Good”, with certain areas affected by exploration in “Good” condition, and other areas not affected by exploration in “Excellent” condition. No areas of vegetation were assessed to be in “Pristine” condition.

No DRF, TECs or PECs were recorded in the survey area. Two confirmed Priority Species *Diocirea acutifolia* (P3) and *Allocasuarina eriochlamys* subsp. *grossa* (P3) were recorded within the survey area. *Diocirea acutifolia* (P3) is both widespread and in large numbers across the local area as well as regionally. *Allocasuarina eriochlamys* subsp. *grossa* (P3) is well documented within the broader region, within the closest known DPAW location 20km northwest of the survey area.

Any proposed disturbance/clearing of vegetation will result in a loss of species from the survey area. However, given the size of the area and the extent of the Beard (1990) vegetation associations elsewhere, the impact on the vegetation and its component flora will not affect the conservation values of either, or create fragmentation or patches of remnant vegetation.

The following recommendations arise from the Level 1 flora survey:

- Where possible, avoid areas of suspected/confirmed Priority Flora;
- Liaison with DPAW regarding the destruction of Priority Flora be sought; and
- Weed control measures should be implemented during and following earthworks.

5. REFERENCES

Beard, J.S., (1990), *Plant Life of Western Australia*, Kangaroo Press Pty Ltd, NSW

BOM, (2017), *Climate Data Online*, Bureau of Meteorology,
http://www.bom.gov.au/climate/averages/
Accessed: 26/04/2017)

CALM, (2002), *A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002- Coolgardie (COO3 – Eastern Goldfields synopsis)*, Department of Conservation and Land Management

CALM, (2003), *Phytophthora cinnamomi and Diseases Caused By It, Volume 1-Management Guidelines,* Department of Conservation and Land Management
http://www.dpaw.wa.gov.au/images/documents/conservation-management/pests-diseases/disease-risk-areas/Phytophthora_cinnamomi_and_disease_caused_by_it-_Vol._1_Management_Guidelines_.pdf
Accessed: 26/04/2017

DAFWA, (2017), *Declared Plants Database,* Department of Agriculture and Food, Western Australia
https://www.agric.wa.gov.au/pests-weeds-diseases/weeds/declared-plants
Accessed: 26/04/2017

DER, (2017), Clearing Permit System Map Viewer, Department of Environment Regulation
https://cps.der.wa.gov.au/main.html
Accessed: 26/04/2017

DOTEE (2017), *Protected Matters Search Tool*, Department of the Environment
http://www.environment.gov.au/epbc/protected-matters-search-tool
Accessed: 26/04/2017

DPAW, (2011), *TEC/PEC Database Results Ref:06-1111EC,* Department of Parks and Wildlife

DPAW, (2014), *Threatened Flora Database Results Ref: 15-0114FL*, Department of Parks and Wildlife

DPAW, (2016), *2016 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report)- Current as of October 2016,* WA Department of Parks and Wildlife, Perth,
https://www2.landgate.wa.gov.au/web/guest/downloader
Accessed: 30/11/2016

EPA & DPAW (2015), *Technical Guide- Flora and Vegetation Surveys for Environmental Impact Assessment,* Technical Report of the Environmental Protection Authority and the Department of Parks and Wildlife.

EPA, (2002)*, Terrestrial Biological Surveys as an Element of Biodiversity Protection: Position Statement No. 3.* Environmental Protection Authority, Perth, WA

EPA, (2004)*, Guidance for the Assessment of Environmental Factors, Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia No. 56,* Environmental Protection Authority, Perth, WA

Hussey, B M J, G J, Cousens, R D Dodd, J and Lloyd S G, (2007), *Western Weeds- A guide to the Weeds of Western Australia (Second Edition)*, The Weed Society of Western Australia, Perth WA

Keighery, B.J., (1994), *Bushland Plant Survey; A guide to plant community survey for the Community,* Wildflower Society of Western Australia (Inc.) Nedlands

Lamp, C., and Collet, F., (1999), *Field Guide to Weeds in Australia (Third edition)*, Inkata Press

Shepherd, D.P., Beeston, G.R., and A.J.M. Hopkins, (2002), *Land-Use and Vegetation in Western Australia- National Land and Water Resources Audit Report*, Technical Report 250, Department of Agriculture Western Australia

WAHERB, (2017), *Florabase- the Western Australian Flora*,
http://www.florabase.dpaw.wa.gov.au/
Accessed 26/04/2017

Appendix 1

Relevant Government Database Search Results

Australian Government
Department of the Environment and Energy

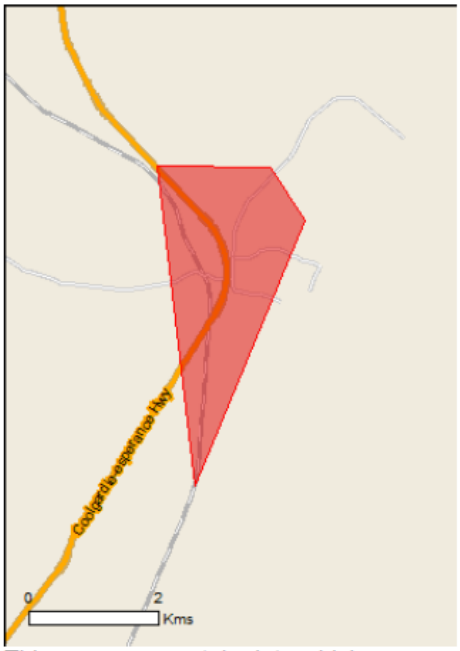
EPBC Act Protected Matters Report

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

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

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 26/04/17 13:58:06



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates
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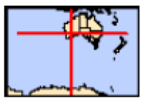


Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	4
Listed Migratory Species:	6

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	10
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	8
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area
Mammals		
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat may occur within area

Extra Information

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

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Mammals		
Camelus dromedarius Dromedary, Camel [7]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Carrichtera annua Ward's Weed [9511]		Species or species habitat likely to occur within area

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-31.7323 121.7046,-31.7698 121.7099,-31.7386 121.7252,-31.7324 121.7203,-31.7323 121.7046

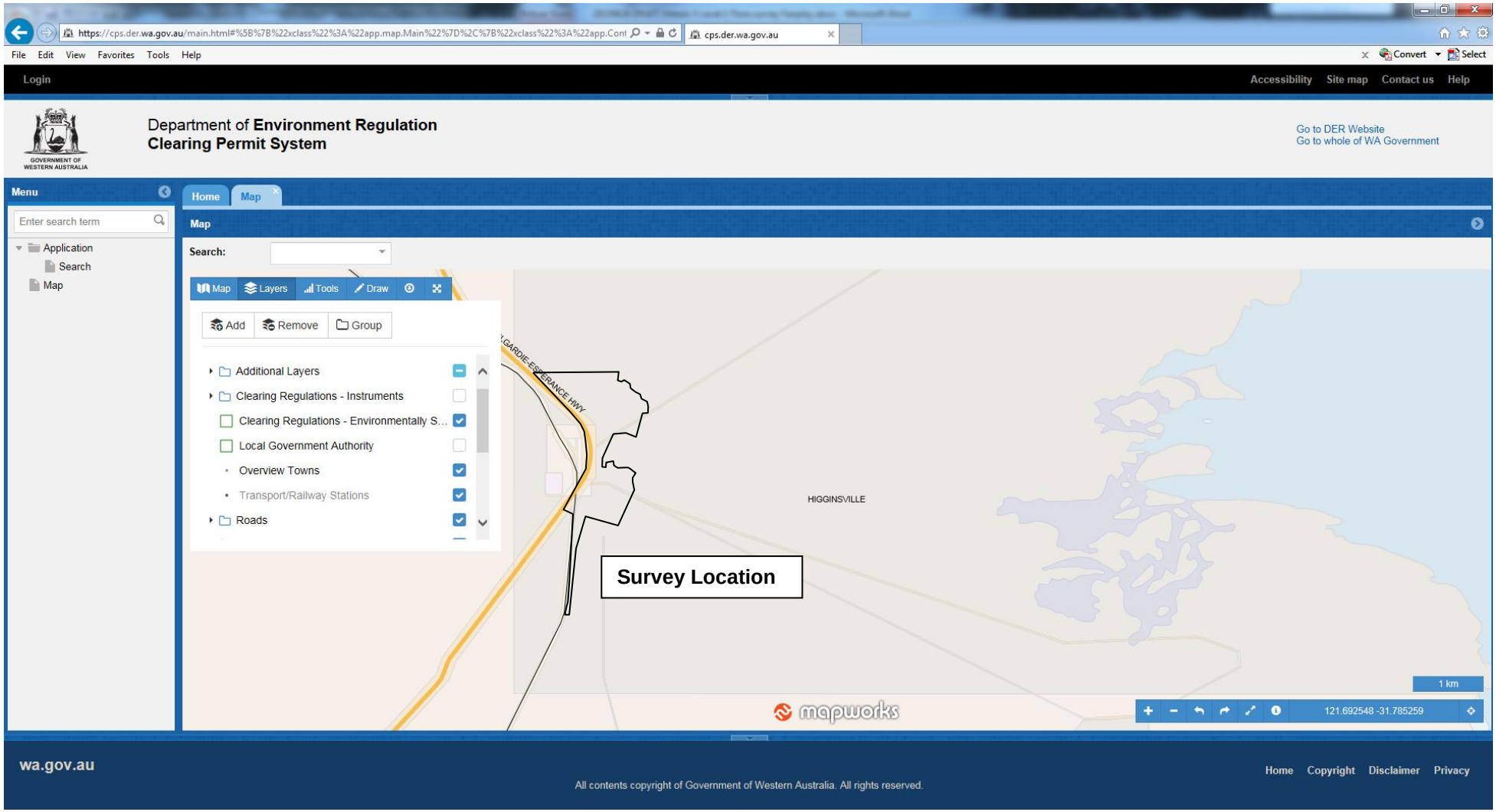
Acknowledgements

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

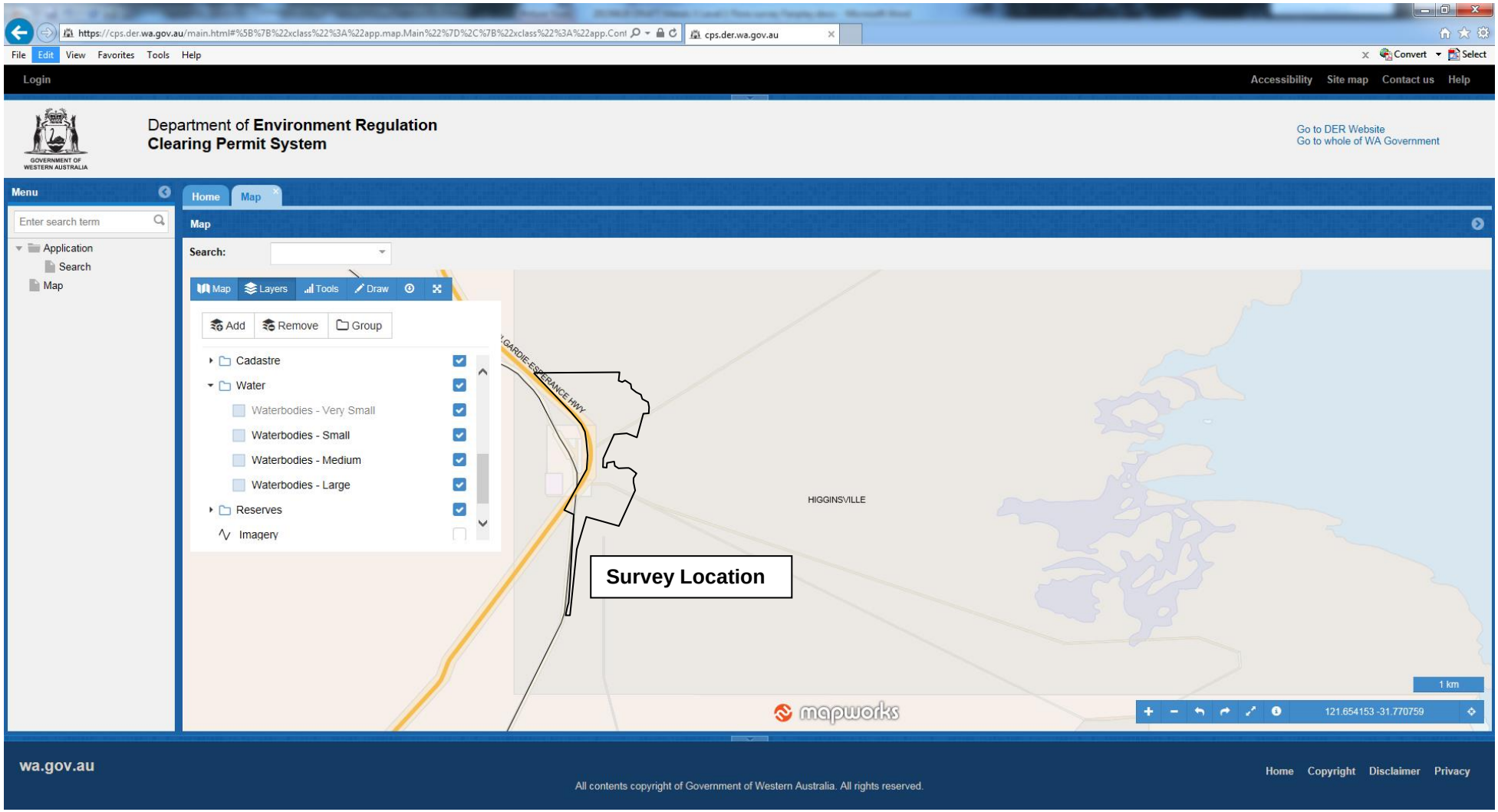
-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management,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

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

Please feel free to provide feedback via the Contact Us page.



DER's Clearing Permit System Map Viewer showing no ESA's (dark green shaded areas) within the survey area (DER, 2017)



DER Clearing Permit System Map Viewer showing no wetland areas within the survey area (DER, 2017).

Appendix 2

Threatened Flora Databases Search Results

GIS information provided in the Search results (Reference: 15-0114FL) listed the following species within a 30km radius of the survey area:

Species	Conservation Code
Acacia dissona var. *indoloria*	P3
Acacia dorsenna	P1
Allocasuarina eriochlamys subsp. *grossa*	P3
Austrostipa blackii	P3
Austrostipa sp. Carlingup Road (S. Kern & R. Jasper LCH 18459)	P1
Diocirea acutifolia	P3
Eremophila annosocaulis	P3
Eremophila lucida	P1
Eremophila perglandulosa	P1
Eremophila praecox	P1
Eucalyptus kruseana	P4
Eucalyptus x brachyphylla	P4
Grevillea phillipsiana	P1
Lepidosperma lyonsii	P3
Melaleuca coccinea	P3
Myriophyllum petraeum	P4
Newcastelia insignis	P2
Phebalium clavatum	P2
Philotheca apiculata	P2
Phlegmatospermum eremaeum	P3
Pityrodia scabra subsp. *dendrotricha*	P3
Prostanthera splendens	P1
Stylidium choreanthum	P3
Tecticornia flabelliformis	P1
Trachymene pyrophila	P2

Appendix 3

Vegetation Condition Scale (Keighery, 1994)

Pristine (1). Pristine or nearly so, no obvious signs of disturbance.

Excellent (2). Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.

Very Good (3). Vegetation structure altered, obvious signs of disturbance.
For example, disturbance to vegetation structure caused by repeating fires, the presence of some more aggressive weeds, dieback, logging and grazing.

Good (4). Vegetation structure significantly altered by very obvious signs of multiple disturbance.
Retains basic vegetation structure or ability to regenerate it.
For example, disturbance to vegetation structure caused by frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.

Degraded (5). Basic vegetation structure severely impacted by disturbance.
Scope for regeneration but not to a state approaching good condition without intensive management.
For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.

Completely Degraded (6). 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 compromising weed or crop species with isolated trees or shrubs.

Appendix 4

Vegetation Mapping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Native Vegetation Solutions
Avoca Mining Pty Ltd
Survey Area
Date: 27/4/2017
Author: E. Reid
Office: Kalgoorlie
Drawing:
Scale: 1:20000
Projection: MGA Zone 51 (GDA 94)
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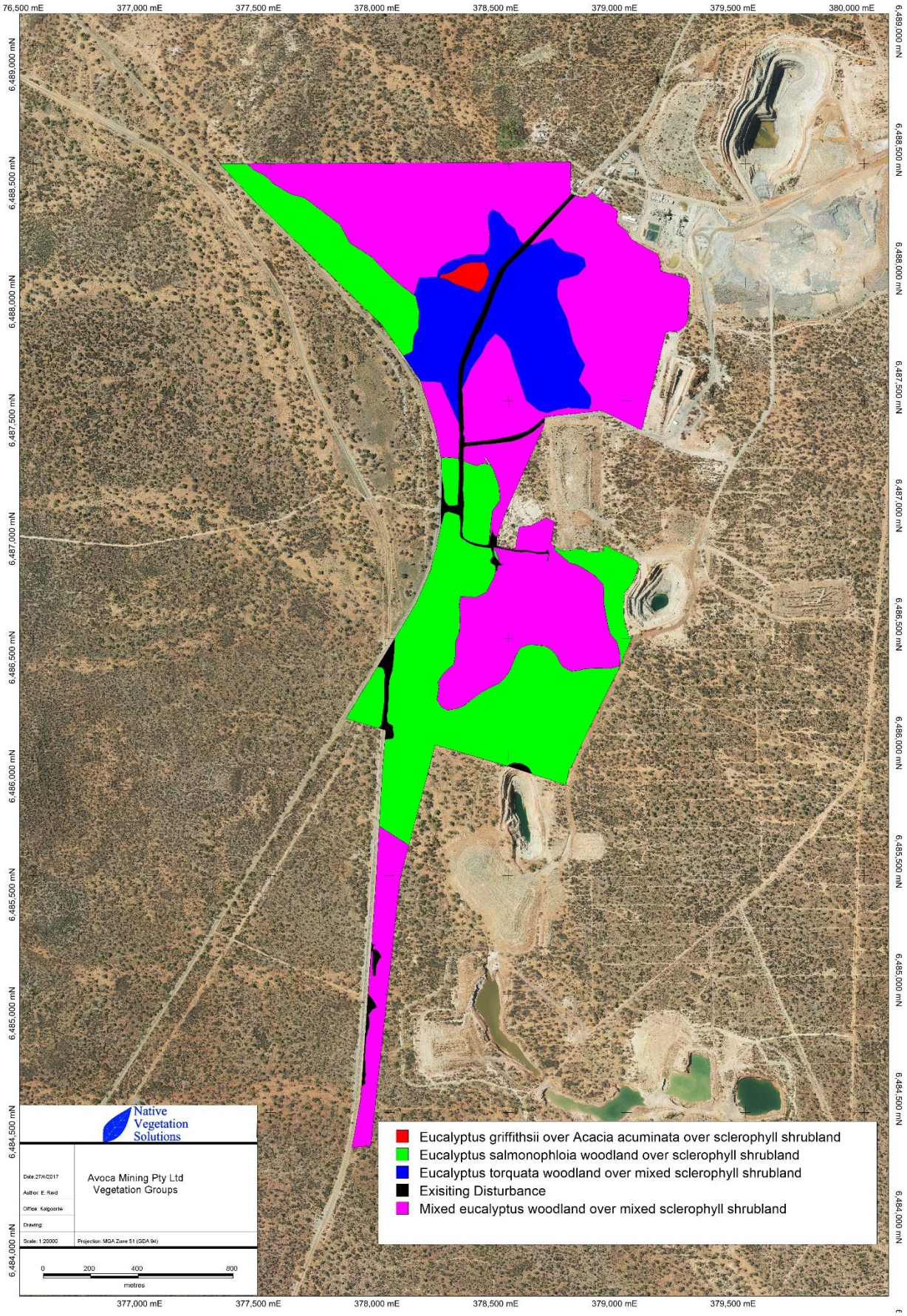
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Native Vegetation Solutions
Avoca Mining Pty Ltd
Vegetation Groups
Date: 27/4/2017
Author: E. Reid
Office: Kalgoorlie
Drawing:
Scale: 1:20000
Projection: MGA Zone 51 (GDA 94)
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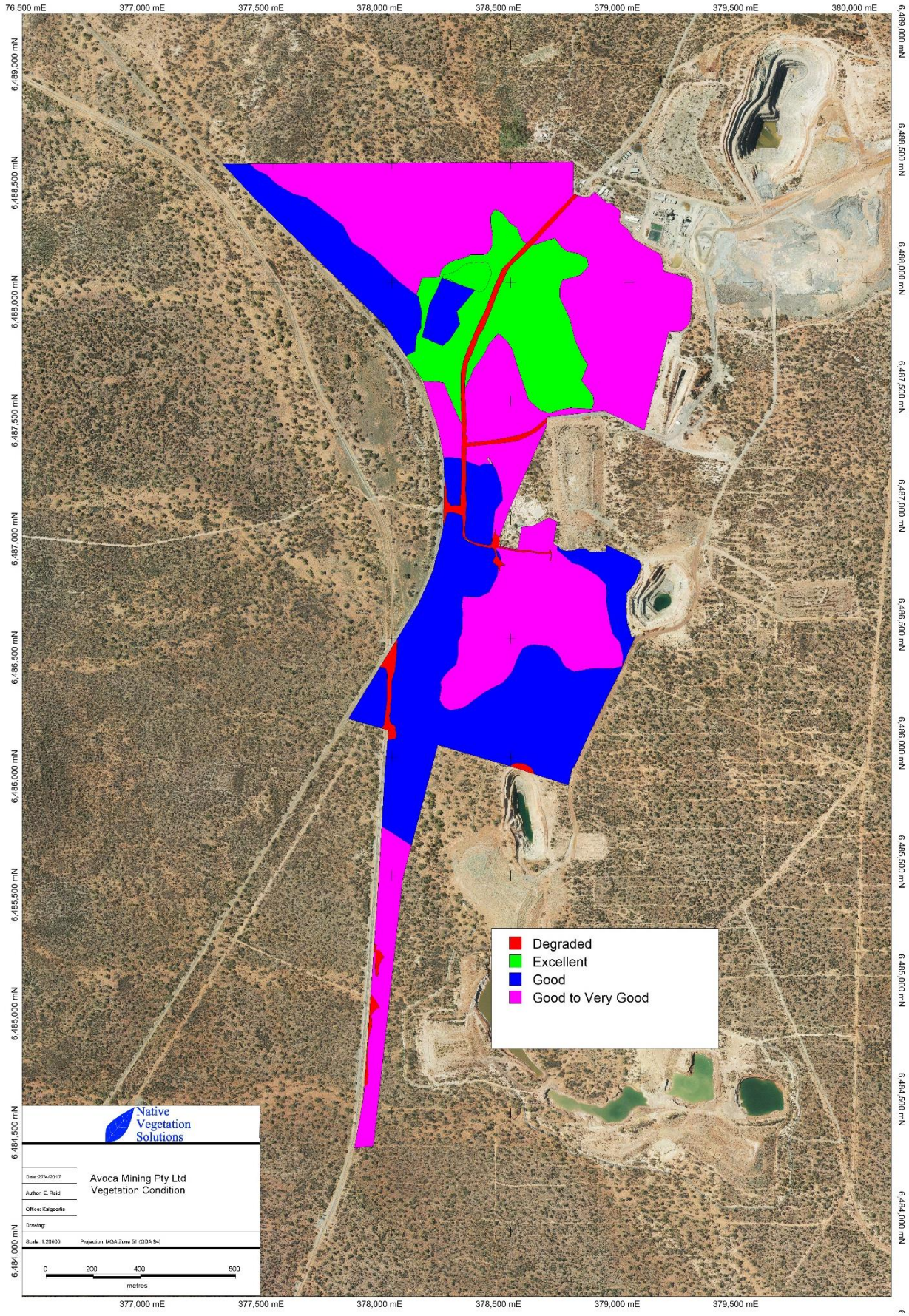
metres
Eucalyptus griffithsii over Acacia acuminata over sclerophyll shrubland
Eucalyptus salmonophloia woodland over sclerophyll shrubland
Eucalyptus torquata woodland over mixed sclerophyll shrubland
Exisiting Disturbance
Mixed eucalyptus woodland over mixed sclerophyll shrubland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Degraded
Excellent
Good
Good to Very Good
Native Vegetation Solutions
Avoca Mining Pty Ltd
Vegetation Condition
Date:27/4/2017
Author: E. Reid
Office: Kalgoorlie
Drawing:
Scale: 1:20000
Projection: MGA Zone 51 (GDA 94)
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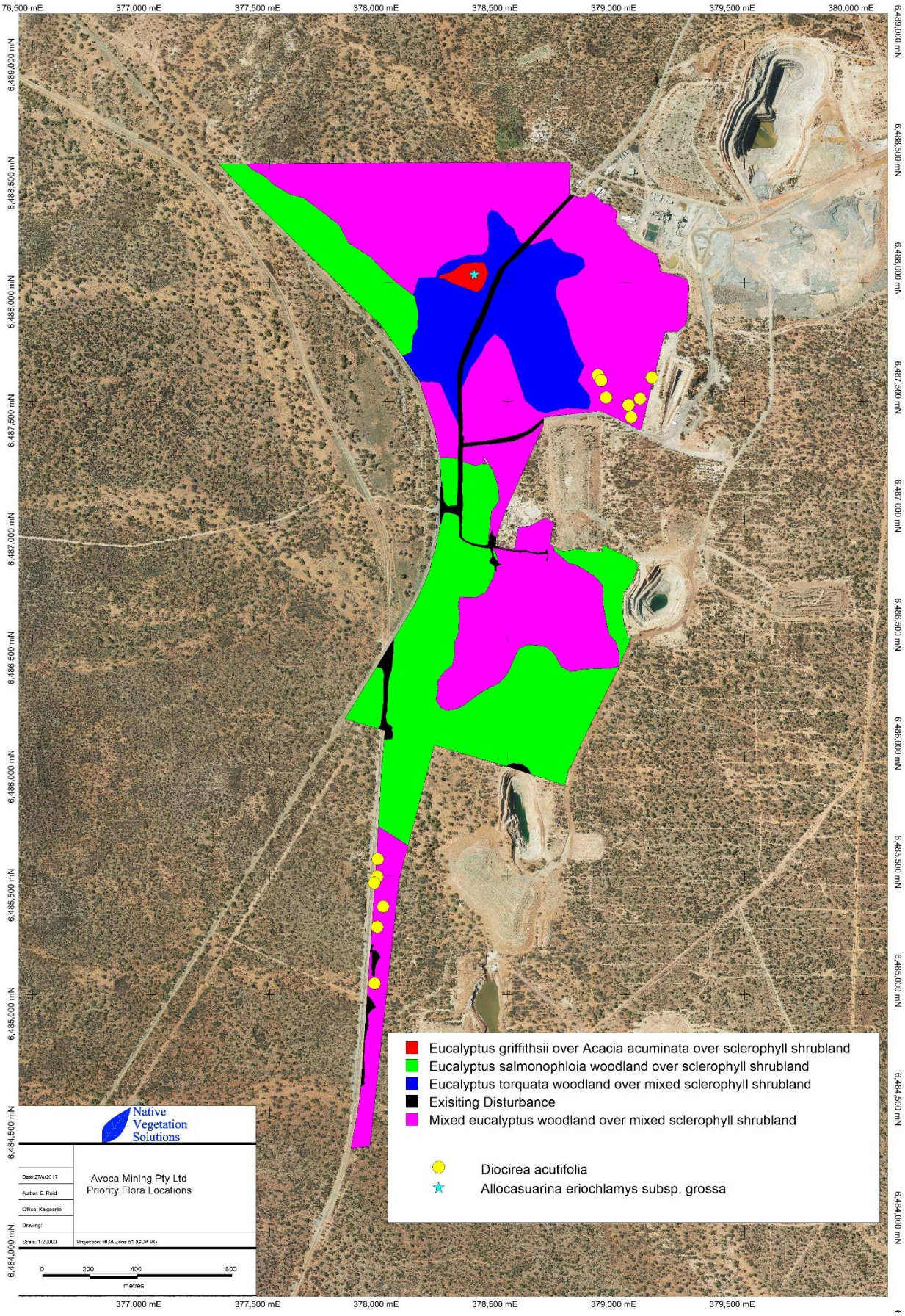
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Eucalyptus griffithsii over Acacia acuminata over sclerophyll shrubland
Eucalyptus salmonophloia woodland over sclerophyll shrubland
Eucalyptus torquata woodland over mixed sclerophyll shrubland
Exisiting Disturbance
Mixed eucalyptus woodland over mixed sclerophyll shrubland
Diocirea acutifolia
Allocasuarina eriochlamys subsp. grossa
Native Vegetation Solutions
Avoca Mining Pty Ltd
Priority Flora Locations
Date: 27/4/2017
Author: E. Reid
Office: Kalgoorlie
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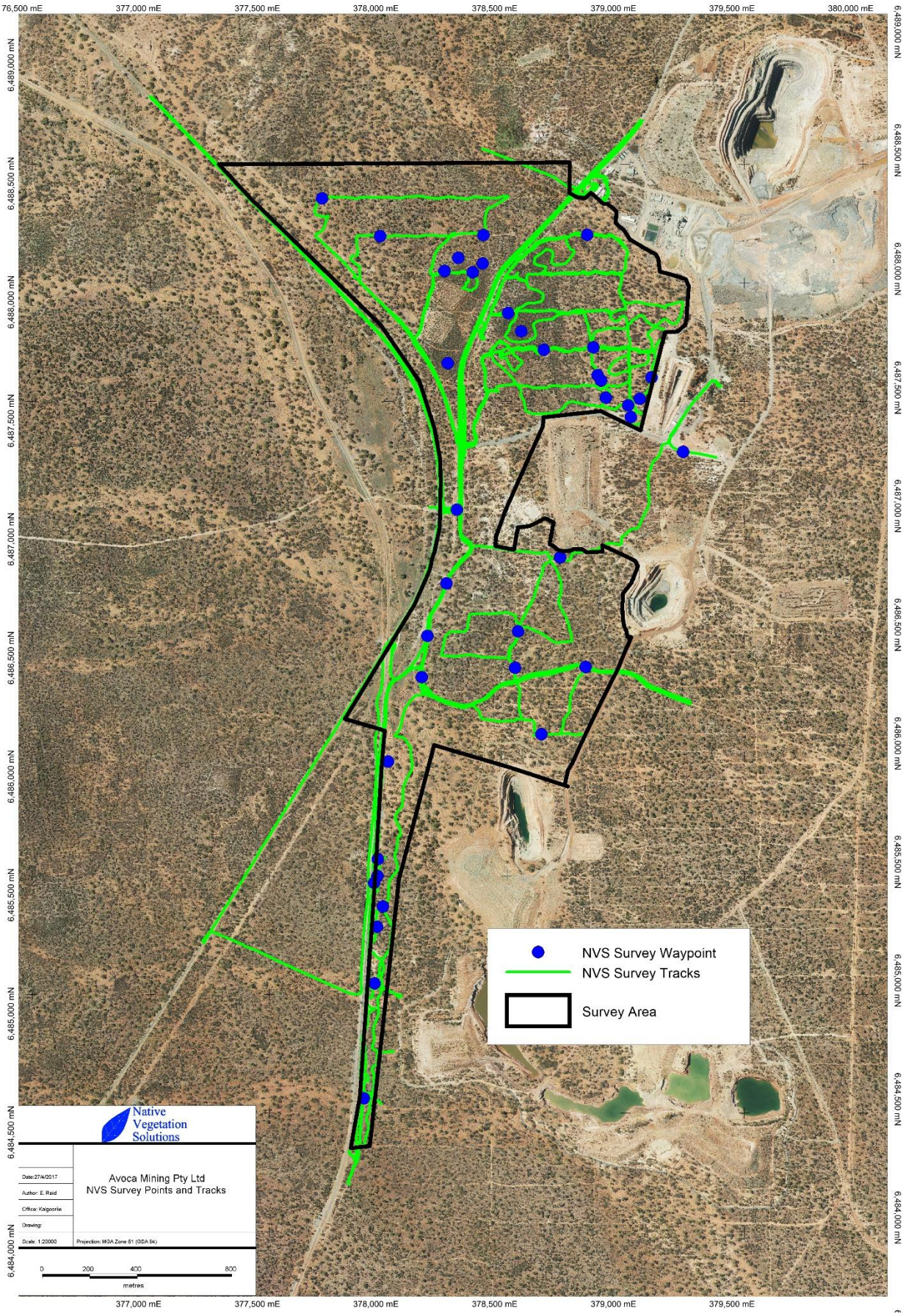
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NVS Survey Waypoint
NVS Survey Tracks
Survey Area
Native Vegetation Solutions
Avoca Mining Pty Ltd
NVS Survey Points and Tracks
Date: 27/4/2017
Author: E. Reid
Office: Kalgoorlie
Drawing:
Scale: 1:20000
Projection: MGA Zone 51 (GDA 94)
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metres

Appendix 5

Species List

Family	Genus	Species	Perennial (P) Annual (A) Non-Native (NN)	A	B	C	D
Amaranthaceae	*Ptilotus*	*nobilis*	A				*
Amaranthaceae	*Ptilotus*	*obovatus*	P		*	*	*
Apocynaceae	*Alyxia*	*buxifolia*	P	*		*	*
Apocynaceae	*Marsdenia*	*australis*	P			*	*
Asteraceae	*Centaurea*	*melitensis*	A, NN				*
Asteraceae	*Cratystylis*	*conocephala*	P		*		*
Asteraceae	*Cratystylis*	*subspinescens*	P				*
Asteraceae	*Olearia*	*muelleri*	P	*	*	*	*
Asteraceae	*Olearia*	*subspicata*	P			*	
Asteraceae	*Rhodanthe*	*charsleyae*	A				*
Asteraceae	*Rhodanthe*	*floribunda*	A				*
Boraginaceae	*Halgania*	*andromedifolia*	P				*
Brassicaceae	*Carrichtera*	*annua*	A, NN				*
Casuarinaceae	*Allocasuarina*	*eriochlamys* subsp. *grossa* (P3)	P	*			
Casuarinaceae	*Allocasuarina*	*helmsii*	P	*			
Chenopodiaceae	*Atriplex*	*bunburyana*	P				*
Chenopodiaceae	*Atriplex*	*nummularia* subsp. *spathulata*	P		*	*	*
Chenopodiaceae	*Atriplex*	*stipitata*	P		*	*	*
Chenopodiaceae	*Atriplex*	*vesicaria*	P		*	*	*
Chenopodiaceae	*Chenopodium*	*gaudichaudianum*	P			*	*
Chenopodiaceae	*Enchylaena*	*tomentosa*	P			*	*
Chenopodiaceae	*Eriochiton*	*sclerolaenoides*	P			*	*
Chenopodiaceae	*Maireana*	*georgei*	P			*	*
Chenopodiaceae	*Maireana*	*pentatropis*	P				*
Chenopodiaceae	*Maireana*	*platycarpa*	P		*		
Chenopodiaceae	*Maireana*	*pyramidata*	P		*		
Chenopodiaceae	*Maireana*	*sedifolia*	P		*		*
Chenopodiaceae	*Maireana*	*tomentosa*	P			*	*
Chenopodiaceae	*Maireana*	*triptera*	P		*		*
Chenopodiaceae	*Rhagodia*	*drummondii*	P				*
Chenopodiaceae	*Salsola*	*australis*	A		*		
Chenopodiaceae	*Sclerolaena*	*cuneata*	P			*	
Chenopodiaceae	*Sclerolaena*	*densiflora*	P			*	*
Chenopodiaceae	*Sclerolaena*	*diacantha*	P		*	*	*
Chenopodiaceae	*Sclerolaena*	*eriacantha*	P				*
Chenopodiaceae	*Sclerolaena*	*eurotioides*	P				*
Chenopodiaceae	*Sclerolaena*	*patenticuspis*	P				*

Family	Genus	Species	Perennial (P) Annual (A) Non-Native (NN)	A	B	C	D
Chenopodiaceae	*Tecticornia*	*disarticulata*	P				*
Fabaceae	*Acacia*	acuminata	P	*			
Fabaceae	*Acacia*	*colletioides*	P		*	*	*
Fabaceae	*Acacia*	*erinacea*	P				*
Fabaceae	*Acacia*	*kalgoorliensis*	P		*		
Fabaceae	*Acacia*	*ligulata*	P		*		*
Fabaceae	*Acacia*	*quadrimarginea*	P			*	
Fabaceae	*Acacia*	*tetragonophylla*	P			*	*
Fabaceae	*Mirbelia*	*graniticola*	P	*			
Fabaceae	*Senna*	*artemisioides* subsp. *filifolia*	P	*	*	*	*
Frankeniaceae	*Frankenia*	*interioris*	P				*
Frankeniaceae	*Frankenia*	*pauciflora*	P				*
Goodeniaceae	*Scaevola*	*spinescens*	P	*	*	*	*
Lamiaceae	*Hemigenia*	*brachyphylla*	P	*			
Lamiaceae	*Prostanthera*	*grylloana*	P	*			
Lamiaceae	*Salvia*	*verbenaca*	A, NN				*
Lamiaceae	*Westringia*	*rigida*	P	*	*		
Malvaceae	*Radyera*	*farragei*	P		*		
Myrtaceae	*Eucalyptus*	*calycogona*	P		*		
Myrtaceae	*Eucalyptus*	*campaspe*	P				*
Myrtaceae	*Eucalyptus*	*celastroides*	P				*
Myrtaceae	*Eucalyptus*	*cylindriflora*	P		*		
Myrtaceae	*Eucalyptus*	*dundasii*	P		*		
Myrtaceae	*Eucalyptus*	*flocktoniae* subsp. *hebes*	P		*		*
Myrtaceae	*Eucalyptus*	*griffithsii*	P	*			
Myrtaceae	*Eucalyptus*	*lesouefii*	P		*	*	*
Myrtaceae	*Eucalyptus*	*melanoxylon*	P		*		
Myrtaceae	*Eucalyptus*	*oleosa* subsp. *oleosa*	P		*	*	*
Myrtaceae	*Eucalyptus*	*ravida*	P				*
Myrtaceae	*Eucalyptus*	*salmonophloia*	P		*		*
Myrtaceae	*Eucalyptus*	*salubris*	P		*		*
Myrtaceae	*Eucalyptus*	*torquata*	P	*		*	
Myrtaceae	*Eucalyptus*	*transcontinentalis*	P		*		*
Myrtaceae	*Eucalyptus*	*yilgarnensis*	P				*
Myrtaceae	*Melaleuca*	*sheathiana*	P		*		*
Poaceae	*Aristida*	*contorta*	P	*			
Poaceae	*Austrostipa*	*elegantissima*	P	*	*	*	*
Poaceae	*Austrostipa*	*nitida*	P	*	*	*	*

Family	Genus	Species	Perennial (P) Annual (A) Non-Native (NN)	A	B	C	D
Poaceae	*Cenchrus*	*ciliaris*	A, NN				*
Poaceae	*Cymbopogon*	*obtectus*	P				*
Poaceae	*Monachather*	*paradoxus*	P				*
Rhamnaceae	*Cryptandra*	*graniticola*	P	*			
Rhamnaceae	*Trymalium*	*myrtillus* subsp. *myrtillus*	P	*			
Santalaceae	*Exocarpos*	*aphyllus*	P	*	*	*	*
Santalaceae	*Santalum*	*acuminatum*	P		*	*	*
Santalaceae	*Santalum*	*spicatum*	P			*	
Sapindaceae	*Dodonaea*	*lobulata*	P	*		*	*
Sapindaceae	*Dodonaea*	*microzyga* var. *acrolobata*	P	*		*	
Sapindaceae	*Dodonaea*	*stenozyga*	P				*
Scrophulariaceae	*Eremophila*	*alternifolia*	P			*	*
Scrophulariaceae	*Eremophila*	*clavata*	P		*		*
Scrophulariaceae	*Eremophila*	*decipiens* subsp. *decipiens*	P	*	*		*
Scrophulariaceae	*Eremophila*	*georgei*	P			*	
Scrophulariaceae	*Eremophila*	*glabra subsp. glabra*	P		*	*	*
Scrophulariaceae	*Eremophila*	*interstans* subsp. *interstans*	P				*
Scrophulariaceae	*Eremophila*	*interstans* subsp. *virgata*	P		*	*	*
Scrophulariaceae	*Eremophila*	*ionantha*	P	*	*		*
Scrophulariaceae	*Eremophila*	*longifolia*	P		*		*
Scrophulariaceae	*Eremophila*	*maculata* subsp. *brevifolia*	P		*		*
Scrophulariaceae	*Eremophila*	*scoparia*	P		*	*	*
Scrophulariaceae	*Myoporum*	*platycarpum* subsp. *platycarpum*	P				*
Solanaceae	*Duboisia*	*hopwoodii*	P				*
Solanaceae	*Lycium*	*australe*	P				*
Solanaceae	*Solanum*	*nummularium*	P		*	*	*
Solanaceae	*Solanum*	*orbiculatum*	P			*	
Solanaceae	*Solanum*	*petrophilum*	P	*			
Thymelaeaceae	*Pimelea*	*microcephala* subsp. *microcephala*	P			*	
Zygophyllaceae	*Zygophyllum*	*aurantiacum*	P		*		
Zygophyllaceae	*Zygophyllum*	*eremaeum*	A		*		*