KITCHENER CUTLINE ROAD

Reconnaissance Flora/Vegetation Survey and Basic Fauna Assessment

Prepared for City of Kalgoorlie-Boulder

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Prepared by

BOTANICA CONSULTING

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Cover Photo: Vegetation in the survey area. Taken 12 October 2023.

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EXECUTIVE SUMMARY

Botanica Consulting Pty Ltd (Botanica) was commissioned by the City of Kalgoorlie-Boulder (CKB) to undertake a reconnaissance flora and vegetation survey, and a basic fauna assessment of the Kitchener Cutline Road (referred to as the 'survey area') to support a native vegetation clearing permit application for a road realignment. The proposed road realignment is approximately 95 km in length and is located approximately 315 km east of Kalgoorlie-Boulder, Western Australia. The survey area was approximately 1532 ha.

The survey area lies across two IBRA regions but is predominately in the Carlisle (NUL1) subregion of the Nullarbor Bioregion, as defined by the Interim Biogeographic Regionalisation of Australia (IBRA). The survey area is within the City of Kalgoorlie-Boulder and the Shire of Menzies.

Botanica conducted a reconnaissance flora and vegetation survey of the survey area on the 11th and 12th of October 2023. The area was traversed using a four-wheel drive vehicle and on foot by Aiden Williams (Botanist (BSc Botany and Conservation Biology) and Matthew Coutts (Field technician).

Two vegetation types were identified within the survey area. These vegetation types were identified within one landform type and comprised of two major vegetation groups, which were represented by a total of 16 families and 27 taxa.

Based on the vegetation condition rating scale specified in the Environmental Protection Authority (EPA) *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment – December 2016* (EPA, 2016a), vegetation was rated as 'good'. Disturbances within the survey area include edge effects from the road in situ, and pastoral land use.

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

Two fauna habitats were identified within the survey area. Three Southern whiteface (*Aphelocephala leucopsis*) were observed in the survey area. These are listed as Vulnerable under the EPBC Act. No other conservation significant fauna was observed.

There are no Conservation Reserves within the survey area or within 40 km of the survey area. There are no wetlands of international importance (Ramsar Wetlands) or national importance (Australian Nature Conservation Agency Wetlands) within the survey area.

Based on the outcomes from the survey undertaken, Botanica assessed the results of the desktop and field survey with regards to the native vegetation clearing principles listed under Schedule 5 of the *Environmental Protection (EP Act) 1986*. The assessment found that any proposed vegetation clearing activities are unlikely to be at variance with any clearing principle.

1 INTRODUCTION

Botanica Consulting Pty Ltd (Botanica) was commissioned by the City of Kalgoorlie-Boulder (CKB) to undertake a reconnaissance flora and vegetation survey, and a basic fauna assessment of the Kitchener Cutline Road (referred to as the 'survey area') to support a native vegetation clearing permit application for a road realignment. The road realignment is approximately 95 km in length and is located approximately 315 km east of Kalgoorlie-Boulder, Western Australia (Figure 1-1). The survey area was approximately 1532 ha.

1.1 Objectives

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

- gather background information on flora and vegetation in the target area (literature review, database and map-based searches);
- identify significant flora, vegetation and ecological communities and assess the potential sensitivity to impact;
- conduct a field survey to verify / ground truth the desktop assessment findings;
- undertake floristic community mapping to a scale appropriate for the bioregion and described according to the National Vegetation Information System (NVIS) structure and floristics;
- undertake vegetation condition mapping;
- assess the project area's plant species diversity, density, composition, structure and weed cover, using NVIS classification system for vegetation description;
- assess Matters of National Environmental Significance (MNES) and indicate whether potential impacts on MNES as protected under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) are likely to require referral of the project to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW); and
- determine the State legislative context of environmental aspects required for the assessment.

The fauna assessment was conducted in accordance with the requirements of a basic terrestrial fauna survey as defined in *Technical Guidance - Terrestrial Fauna Surveys for Environmental Impact Assessment – June 2020* (EPA, 2020). The objectives of the assessment were to:

- Undertake a literature review, including map-based information searches of all current and relevant literature sources and databases relating to the survey area;
- Undertake a desktop investigation to identify any previously recorded occurrences of or potentially occurring Threatened and Priority listed fauna within the survey area;

- Undertake searches on available databases for details relating to any Threatened and Priority listed fauna previously identified as occurring or potentially occurring within the survey area;
- Conduct fauna habitat mapping and identify habitat types which are suitable for each significant fauna considered likely or possible to occur, or fauna recorded in the survey area;
- Compile an inventory of fauna species occurrences within the survey area;
- Undertake opportunistic, low intensity sampling of fauna; and
- Report on the conservation status of species present using the Western Australian Museum and EPBC Act databases for presence of Threatened and Priority listed fauna species within the survey area.

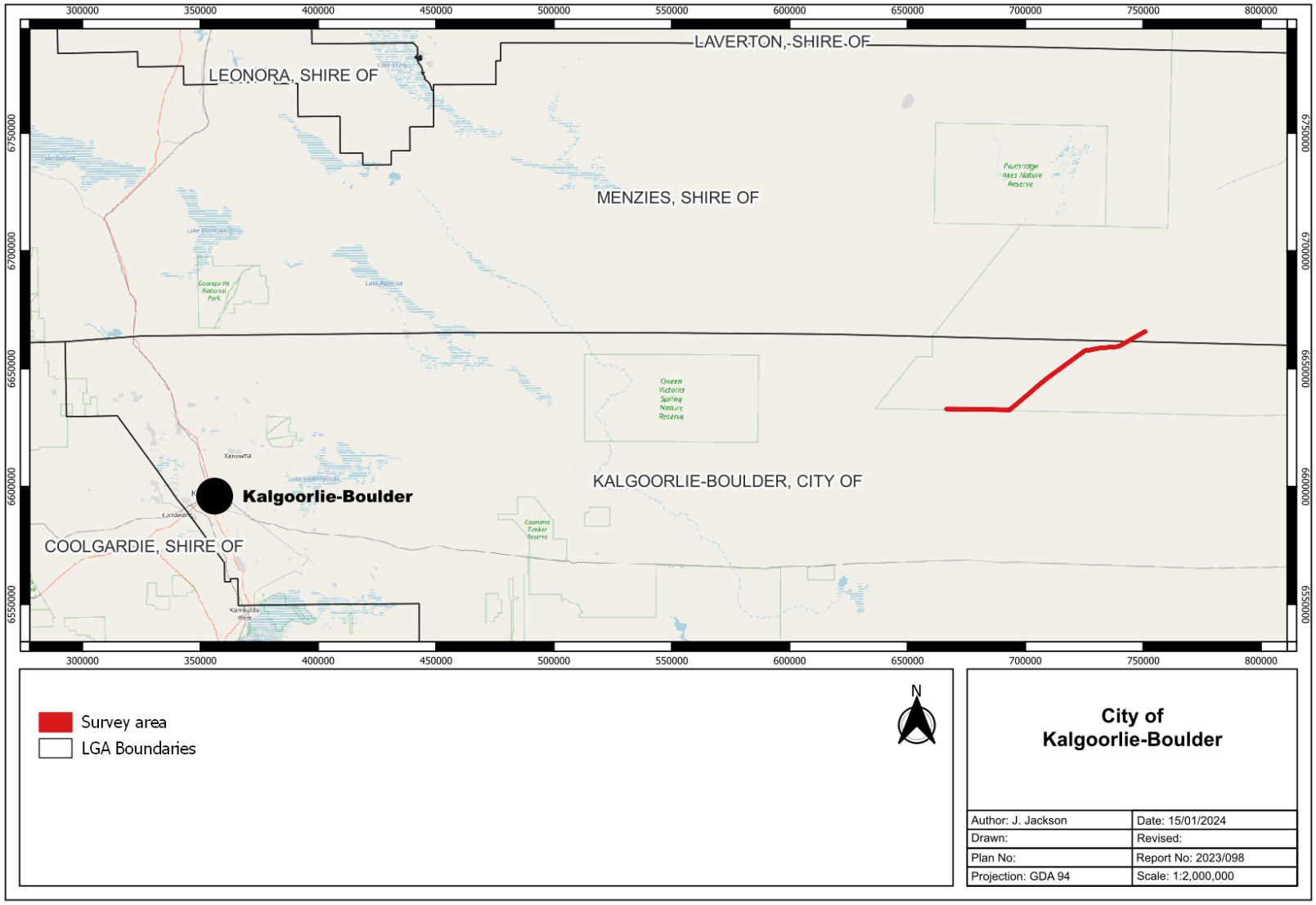


Figure 1-1: Regional map of the survey area

2 BIOPHYSICAL ENVIRONMENT

2.1 Regional Environment

The survey area lies across two IBRA regions (Nullarbor and Great Victoria Desert Bioregions), as defined by the Interim Biogeographic Regionalisation of Australia (IBRA). These bioregions are further split into subregions, with the survey area predominately in the Northern band, Carlisle (NUL1) subregion of the Nullarbor Bioregion (Figure 2-1).

2.1.1 Northern Band Carlisle, NUL1

The Northern Band, Carlisle subregion lies in the Nullarbor bioregion and is dominated by the Carlisle Plain. Soil profiles are well developed, with a high proportion of red quartz rich sand mixed with loams and calcareous clays, partly calcreted over calcareous sandstone. In the northern part of the subregion sandplains with extensive seif dunes support a tree steppe of *Eucalyptus gongylocarpa*, Mulga and *E. youngiana* over hummock grassland with occasional breakaways and quartzite hills. Salt lakes and saline drainage systems support samphire communities. Major valley floors with lake derived dunes are also present as part of an inactive paleodrainage system that flows to the Nullarbor karst. The central and southern areas of the subregion are dominated by low woodlands of Western Myall (*Acacia papyrocarpa)* over bluebush (*Maireana sedifolia)* (Barton and Cowan 2001a).

2.1.2 Shield, GVD1

The Shield subregion lies in the Great Victoria Desert bioregion with the western end on the Yilgarn Craton. This area is an active sand-ridge desert of deep Quaternary aeolian sands. Landforms consist of salt lakes and major valley floors with lake derived dunes. Sand plains with patches of seif dunes run east west. There are areas of moderate relief with out-cropping and breakaways. The subregion contains a major paleo-channel of Ponton Creek (Barton and Cowan 2001b). There is a higher proportion of sandplains in this subregion in comparison to the rest of the bioregion.

Spinifex with mallee (*Eucalyptus kingsmillii, E. youngiana*) over hummock grassland dominated by *Triodia basedowii* occur on the aeolian sand plain. Scattered marble gum (*E. gongylocarpa*) and native pine (*Callitris*) occur on the deeper sands of the sand plains. Mulga and acacia woodlands occur mainly on the colluvial and residual soils. On the edges of salt lakes and saline drainage areas are halophytes such as salt bush (*Atriplex*), blue bush (*Kochia*) and samphire (*Tecticornia*) (Barton and Cowan 2001b).

2.2 Land Use

The dominant land use in the two subregions is Unallocated Crown Land, Crown reserves and grazing. Both subregions have conservation reserves present. A proportion of land is used as aboriginal reserve in both subregions (Barton and Cowan 2001a, Barton and Cowan 2001b).

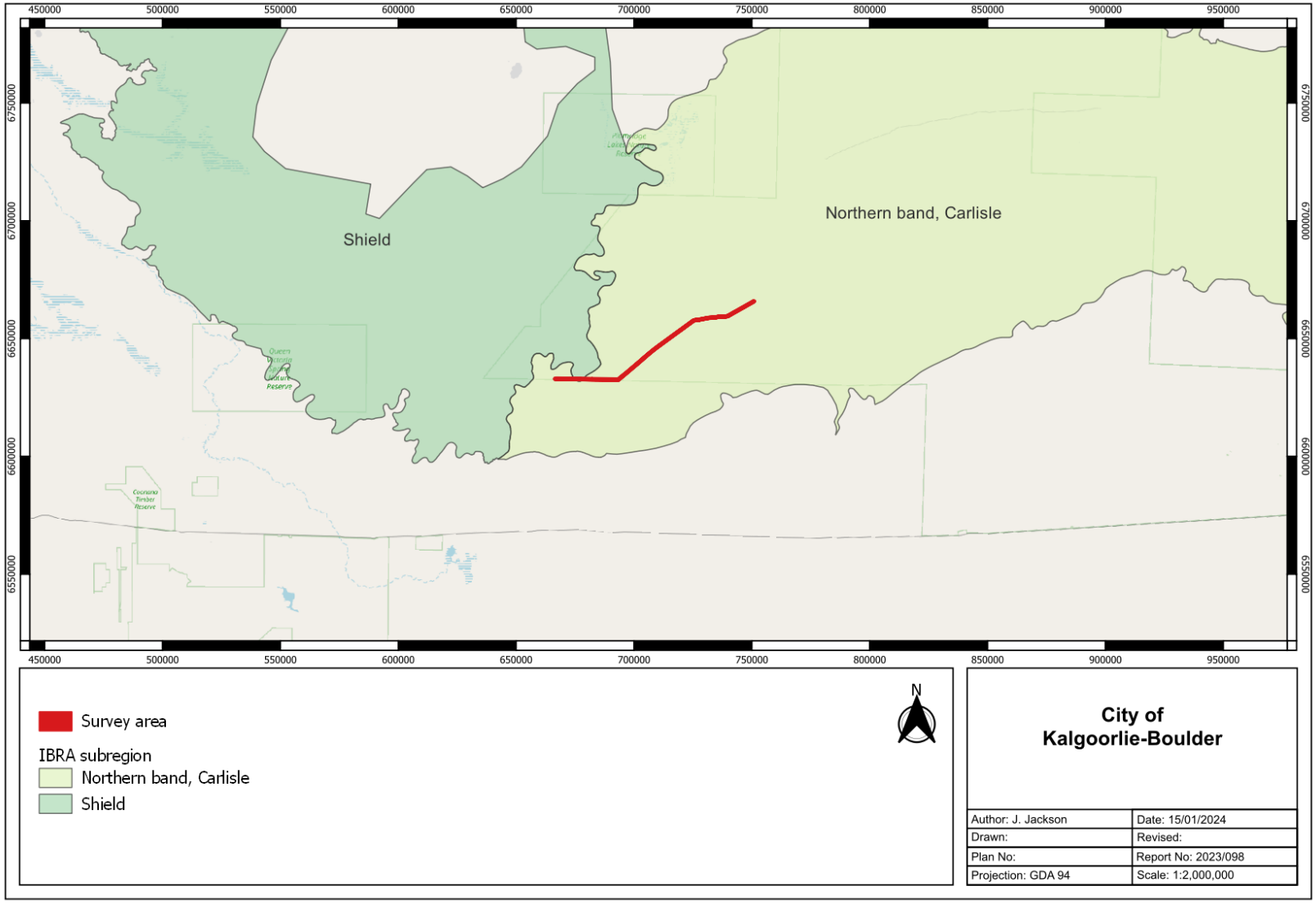


Figure 2-1: Map of IBRA Bioregions in relation to the survey area

2.3 Soil Landscape Systems

The survey area lies within the Central Southern Region (5) within two Provinces: the Nullarbor Province (55) and the Tarcoola-Quondong Province (58). Each province is further divided into soil-landscape zones. The soil-landscape zones relevant to the survey area is shown in Figure 2-2.

The Nullarbor Province of Western Australia is in the south-east of Western Australia between Mt Ragged, Balladonia, Plumridge Lakes, Deakin and Eucla. The landscape consists of limestone plains on the Oligocene marine limestone Eucla Basin. The Nullarbor Province is further divided into six soil-landscape zones, with the survey area in the Nyanga zone (555).

The Nyanga soil landscape zone is found between Balladonia, Kitcherner, Haig and Tjuntjuntarra (Carlisle Lake). The landscape is calcrete plains with residual clay on Oligocene marine limestone of the Eucla Basin. Soils are calcareous shallow earths and calcareous shallow loams with some calcareous stony soils. Vegetation communities consist of bluebush shrublands with some mulga, acacia, eucalypts and spinifex.

Tarcoola-Quondong Province is in the south-east of Western Australia between the Nullarbor Plain and Great Victoria Desert. It follows a chain of salt lakes beginning at Plumridge Lakes in the west and including Lakes Gidgi and Jubilee, the Carlisle and Shell Lakes and the Forest Lakes near the South Australian border. It is situated on marine limestone of the Sherrif Shelf on the northern edge of the Eucla Basin. The Tarcoola-Quondong Province has one recognised soil-landscape zone which is the Carlisle Plain zone (581) (Tille 2006).

The Carlisle Plain soil-landscape zone landscape consists of limestone plains with some salt lakes and sandplains on Oligocene marine limestone. Soils consist of calcareous loams earths, red deep sands, and calcareous shallow loams with red sand earths. There are also red shallow sands and bare rock. Vegetation communities consist of bluebush shrublands with mulga-acacia-sheoak-eucalypt woodlands. some mallee, spinifex and samphire are also present (Tille 2006).

The soil landscape zones are further divided into soil landscape systems, with the survey area located within two landscape systems, as described in Table 2-1 and shown in Figure 2-3, in accordance with soil landscape system mapping data (Government of Western Australia, 2019).

Table 2-1: Soil landscape systems within the survey area

Zone	Soil Landscape System	Description	Extent within Survey Area (%)
Nyanga Zone (555)	555DD34	Very gently to gently undulating plains with broad flats and low broad rises, the former being the prominent feature.	41
Carlisle Plain Zone (581)	581DD34	Very gently to gently undulating plains with broad flats and low broad rises, the former being the prominent feature.	7
	581Ny - Nyanga	Level loamy calcrete plains supporting myall or casuarina woodland over chenopod understorey.	52

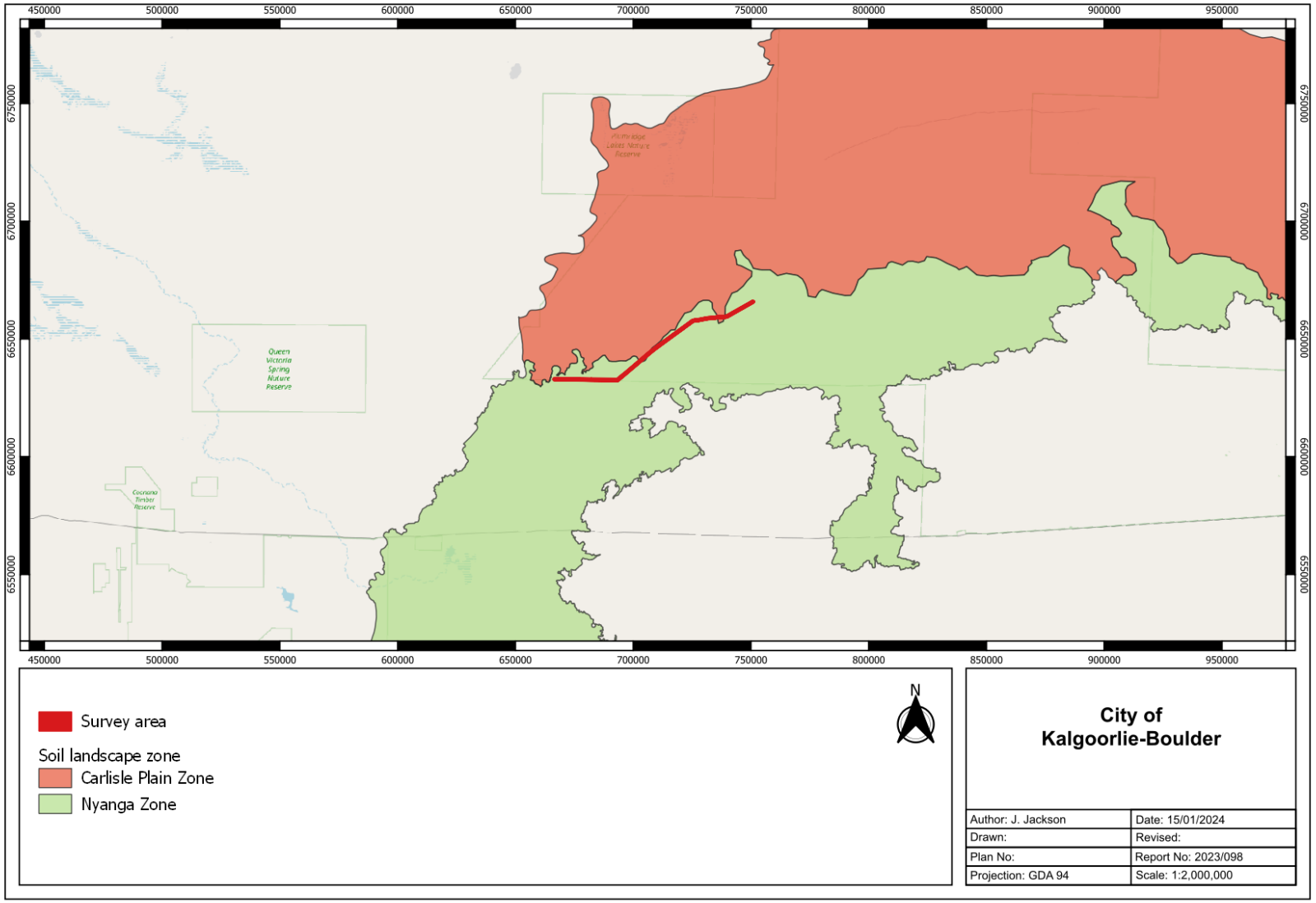


Figure 2-2: Map of soil landscape zones within the survey area

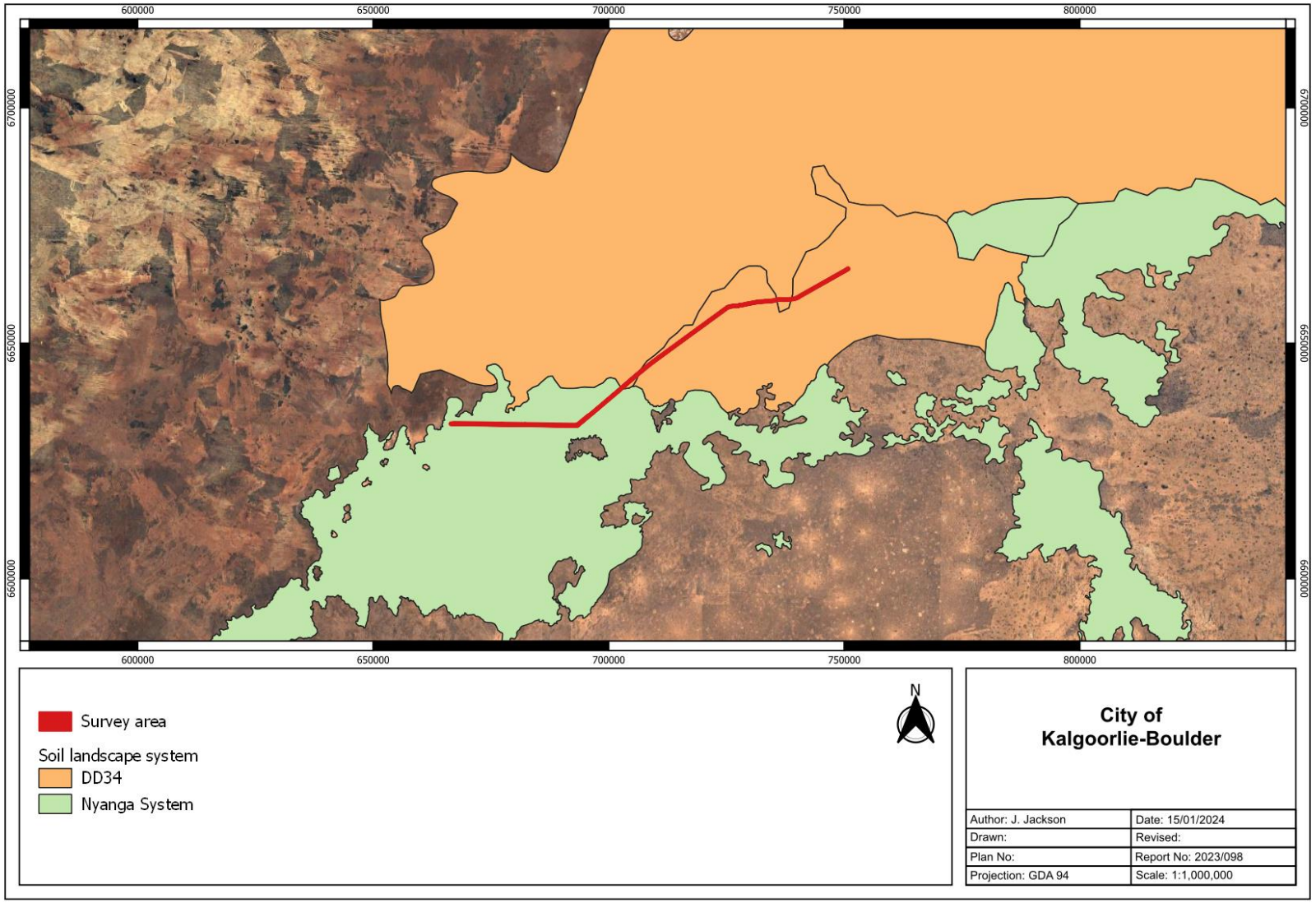


Figure 2-3: Map of soil landscape systems within the survey area

2.4 Regional Vegetation

2.4.1 Pre-European Vegetation

In accordance with Beard (1990) the survey area is located in the Coolgardie Botanical District of the Southwestern Interzone Province and the Great Victoria Desert and Nullarbor Regions of the Eremaean Province. The Pre-European vegetation association dataset (DPIRD, 2018) identified three vegetation associations occurring within the survey area (Figure 2-4). The association descriptions and their remaining extent, as specified in the 2018 Statewide Vegetation Statistics (DBCA, 2018) are provided in Table 2-2.

Saltbush and bluebush communities termed by Beard as sarcophyll types with fleshy leaves have been differentiated from halophytic samphire communities as they tend to occur on alkaline soils, such as those that occur on the Nullarbor. There are a few linear areas associated with salt lakes that are mapped as a mixture of samphire and saltbush and bluebush. These combination units have been assigned to a classification based on proximity to similar units. This vegetation type has saltbush and/or bluebush dominant in the ground layer *(*Beard *et al*, 2013*)*.

The hummock grassland of *Triodia* spp. has a low tree layer of scattered eucalypts such as *Eucalyptus gongylocarpa* (marble gum), and a shrub layer of Acacia spp. or mallee eucalypts such as *E. youngiana* (large-fruited mallee). It dominates the Great Victoria Desert Bioregion, with over 11.4 million ha of the bioregion's 22.7 million ha covered *(*Beard *et al*, 2013*)*.

Areas retaining less than 30% of their pre-European vegetation extent generally experience exponentially accelerated species loss, while areas with less than 10% are considered "endangered" (EPA, 2000).

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

Pre-European Vegetation	Description	Pre-European Extent Remaining (%)	Current Extent Reserved for Conservation (%)	Extent within Survey Area (Approx %)
Great Victoria Desert 85	Hummock grassland with scattered eucalypts over wattle scrub or mallee Triodia spp. Acacia spp. *Corymbia dichromophloia, Eucalyptus leucophloia, E. youngiana.*	100	8.56	4
Nyanga Plain 441	Saltbush and/or bluebush with scattered low trees, Mulga and other wattle, *Casuarina* spp., *Atriplex* spp. *Maireana* spp. with *Acacia aneura*, *A. papyrocarpa*, *Allocasuarina cristata.*	100	0	37
Nyanga Plain 461	Saltbush and/or bluebush with scattered low trees, Mulga and other wattle, *Casuarina* spp., *Atriplex* spp. *Maireana* spp. with *Acacia aneura*, *A. papyrocarpa*, *Allocasuarina cristata.*	100	1.19	60

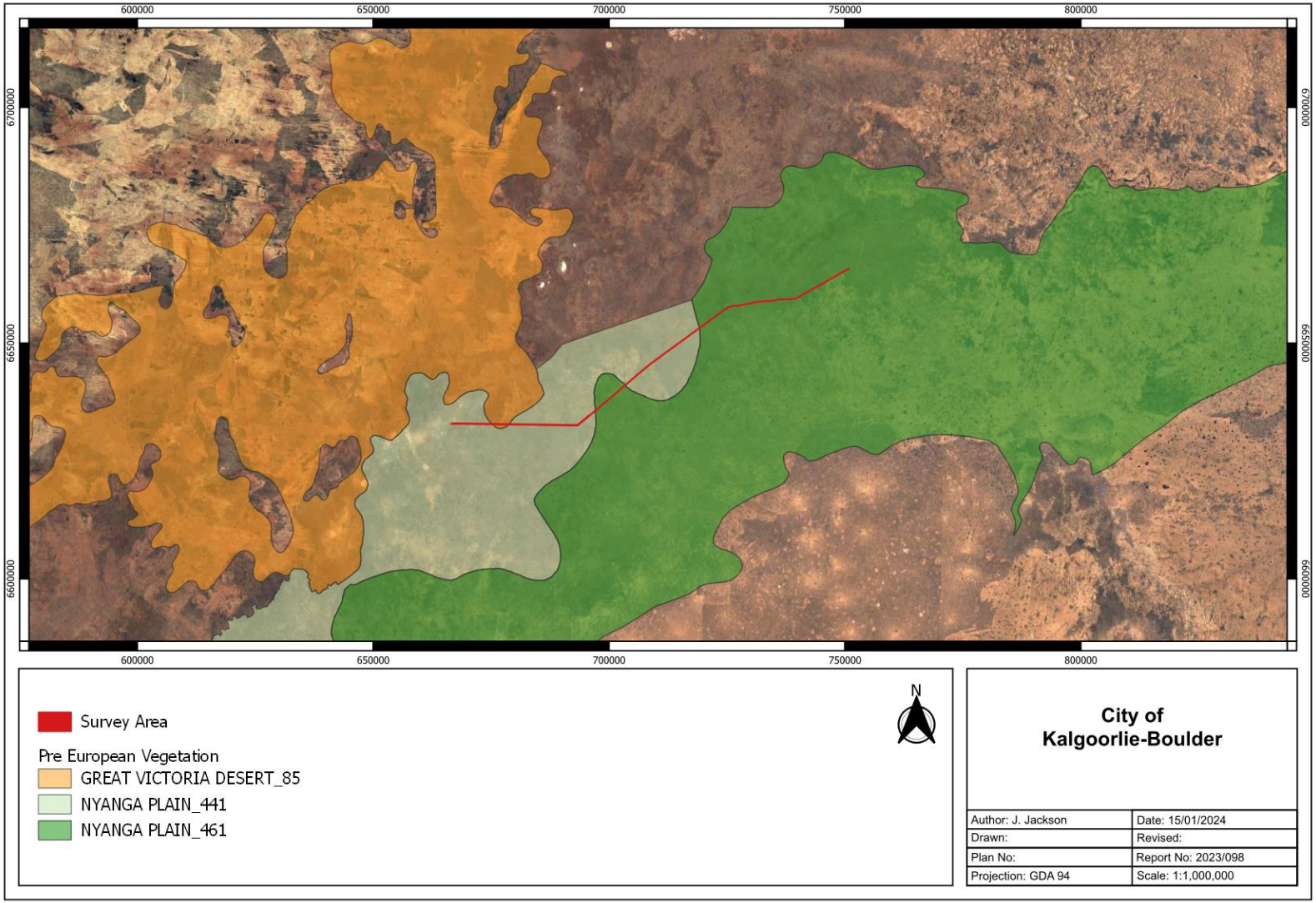
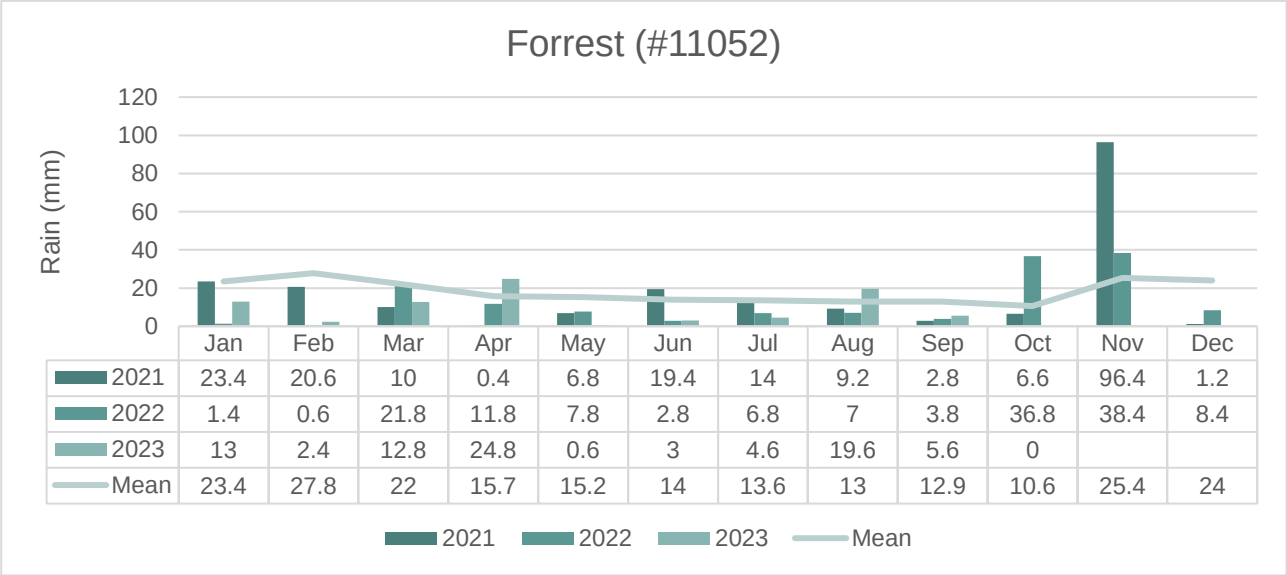


Figure 2-4: Pre-European vegetation within the survey area

2.5 Climate

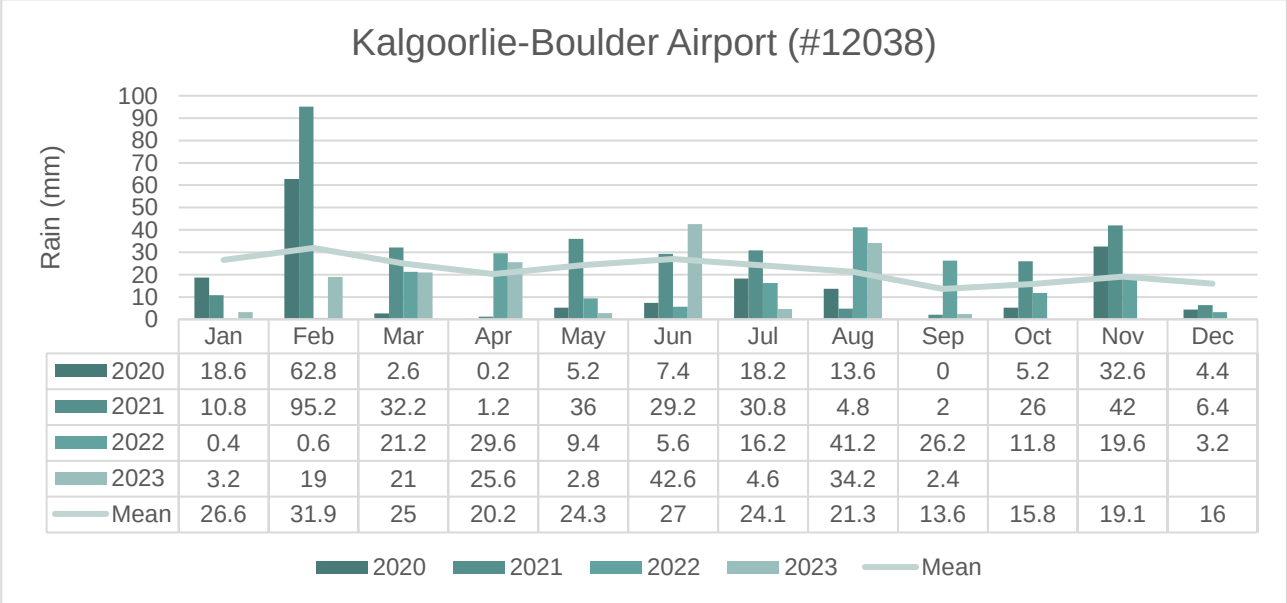
The survey area predominately lies in the Nullarbor Bioregion. Climate is described as arid and non-seasonal with an average rainfall of 150 -200 mm (Barton and Cowan 2002a). The climate in the Shield subregion of the Great Victoria Desert bioregion is described as arid with summer and winter rain approximately 190mm per year (Barton and Cowan 2002b).

Rainfall data for the Forrest weather station (#11052), located approximately 270 km east of the survey area, is shown in Figure 2-5. Rainfall data for the Kalgoorlie-Boulder Airport (#12038) weather station, located approximately 315 km west of the survey area, is shown in Figure 2-6. The survey was conducted in October 2023, with the preceding month of August receiving above-average rainfall at both stations.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2021	23.4	20.6	10	0.4	6.8	19.4	14	9.2	2.8	6.6	96.4	1.2
2022	1.4	0.6	21.8	11.8	7.8	2.8	6.8	7	3.8	36.8	38.4	8.4
2023	13	2.4	12.8	24.8	0.6	3	4.6	19.6	5.6	0		
Mean	23.4	27.8	22	15.7	15.2	14	13.6	13	12.9	10.6	25.4	24

Figure 2-5: Monthly rainfall of the Forrest Weather Station #11052 (BoM, 2023a)



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2020	18.6	62.8	2.6	0.2	5.2	7.4	18.2	13.6	0	5.2	32.6	4.4
2021	10.8	95.2	32.2	1.2	36	29.2	30.8	4.8	2	26	42	6.4
2022	0.4	0.6	21.2	29.6	9.4	5.6	16.2	41.2	26.2	11.8	19.6	3.2
2023	3.2	19	21	25.6	2.8	42.6	4.6	34.2	2.4			
Mean	26.6	31.9	25	20.2	24.3	27	24.1	21.3	13.6	15.8	19.1	16

Figure 2-6: Monthly rainfall of the Kalgoorlie-Boulder Weather Station #12038 (BoM, 2023a)

2.6 Conservation Values

No Threatened Ecological Communities (TEC) listed under the Commonwealth EPBC Act, or the Western Australian BC Act are known to occur within the survey area or within 40 km of the survey area. No DBCA listed Priority Ecological Communities (PEC) are known to occur within the survey area or within 40 km of the survey area (Figure 2-7).

There are no Ramsar wetlands of international importance or sites listed in the Directory of Important (DIWA) (i.e., wetlands of national importance) within the survey area or within 40 km of the survey area.

There are no Conservation Reserves within the survey area or within 40 km of the survey area. The closest reserve is the Plumridge Lakes Nature Reserve (R34605), which is approximately 50 km north of the survey area. This Reserve is also an Environmentally Sensitive Area (ESA). There are no ESAs within the survey area or within 40 km of the survey area.

A map showing conservation areas in relation to the survey area is provided in Figure 2-7.

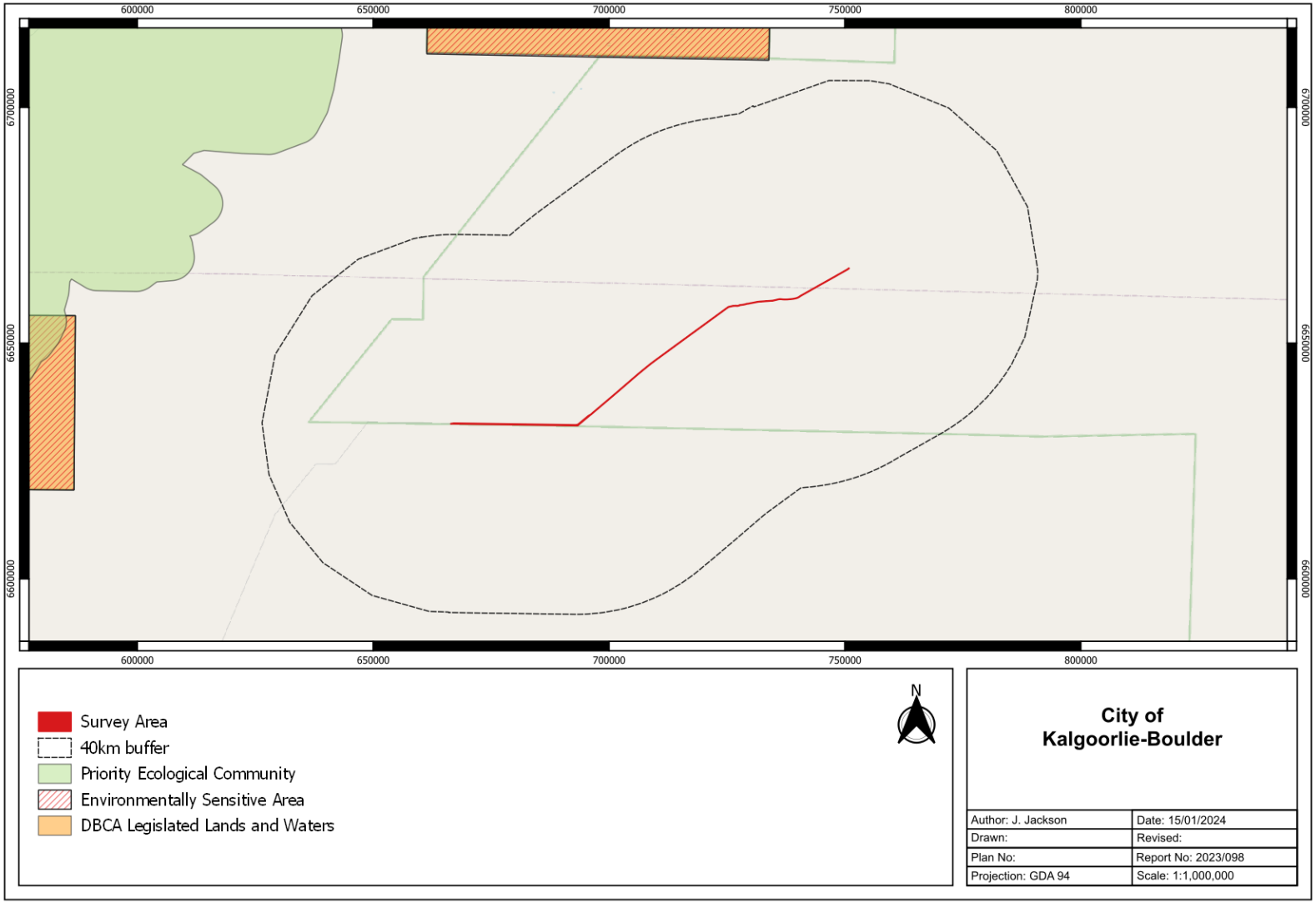


Figure 2-7: Conservation areas in relation to the survey area

2.7 Hydrology

According to the Geoscience Australia database (2015), there are no permanent/ perennial inland waters or drainage lines within the survey area. There are no ephemeral drainage lines occurring in the survey area (Figure 2-8).

Groundwater Dependent Ecosystems (GDE) includes biological assemblages of species such as wetlands or woodlands that use groundwater either opportunistically or as their primary water source. For the purposes of this report, a GDE is defined as any vegetation community that derives part of its water budget from groundwater and must be assumed to have some degree of groundwater dependency. According to the BoM *Atlas of Groundwater Dependent Ecosystems* database (BoM, 2023b), there are no known or potential aquatic GDEs in the survey area. The survey area intersects with two terrestrial GDEs, these are described in Table 2-3 and shown in Figure 2-8.

Table 2-3: Potential terrestrial groundwater dependent ecosystems (BoM, 2023b)

Geomorphology	Ecosystem Description	GDE Potential (BoM, 2023b)	Extent within Survey Area (Approx %)
Covered karst plain of flat lying limestone and calcrete with continuous cliff margin on south.	Succulent steppe with open low woodland; mulga and sheoak over bluebush.	Low	50
Limestone plain with some salt lakes and sandplains.	Hummock grasslands, open low tree & mallee steppe; marble gum & mallee (*Eucalyptus youngiana*) over hard spinifex on sandplain.	Low	4

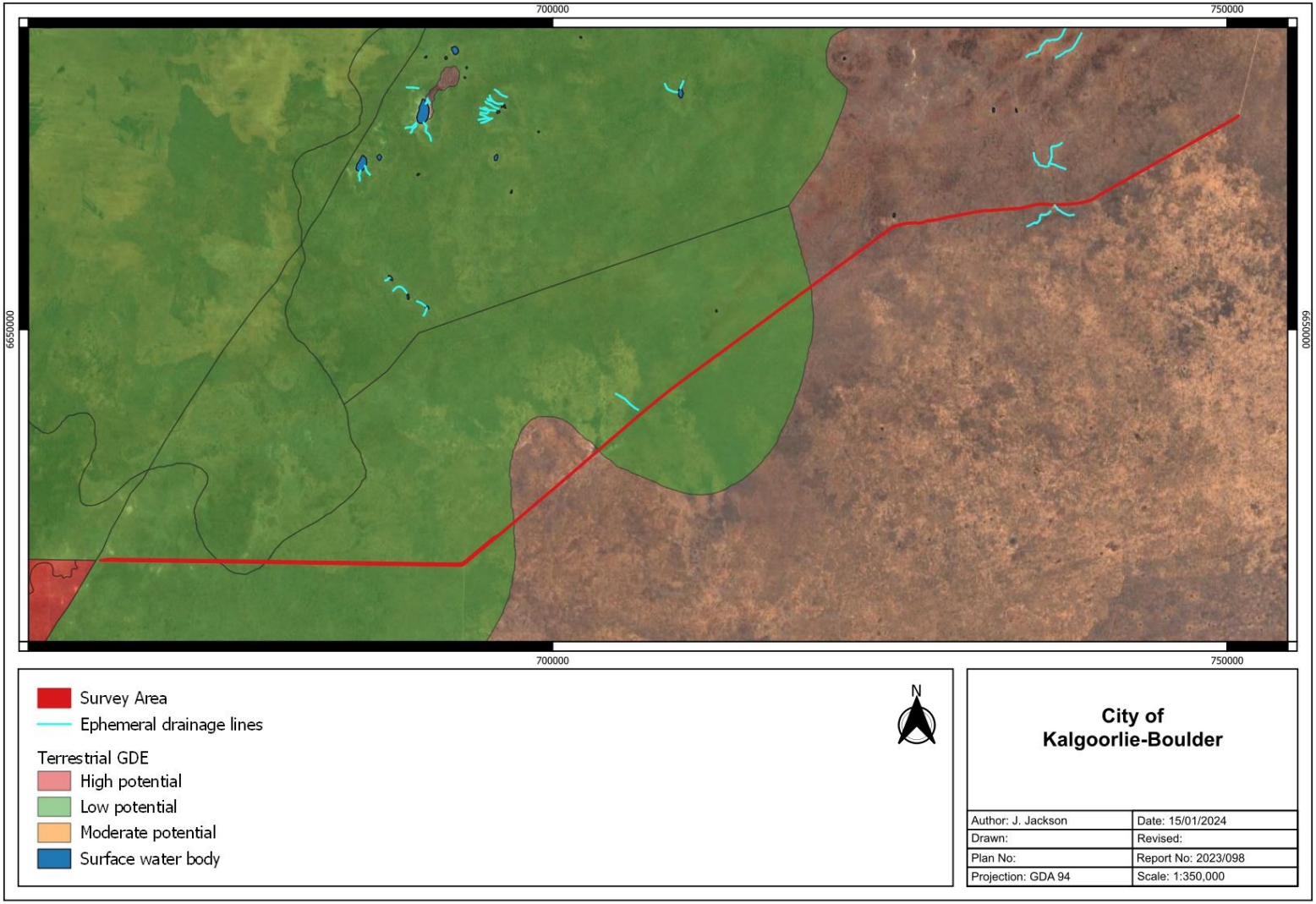


Figure 2-8: Regional hydrology of the survey area

3 SURVEY METHODOLOGY

3.1 Desktop Assessment

Prior to the field assessment a literature review was undertaken of previous flora and vegetation assessments conducted within the local region. Documents reviewed included:

- Botanica Consulting, (2009). *Tropicana Gold Project Minigwal Trough Water Supply Area and Pipeline Corridor Vegetation and Flora survey*. Prepared for AngloGold Ashanti, March 2009.
- Botanica Consulting, (2022). *Albany-Fraser Project: Reconnaissance Flora and Vegetation Assessment.* Prepared for Omnia Metals Group Ltd, December 2022.
- Burbidge, A. A., McKenzie, N. L., Chapman, A., and Lambert, P. M. (1976). *The Wildlife of Some Existing and Proposed Reserves in the Great Victoria and Gibson Deserts, Western Australia.* Wildlife Research Bulletin, Western Australia, 5, 1-16.
- Desert Discovery (2002). *Plumridge Lakes Project Report, September to October 2002.* Unpublished report prepared by Desert Discovery.
- Ecologia Environment Pty. Ltd, (2009). *Tropicana Gold Project, Tropicana Joint Venture, Tropicana -Transline Infrastructure Corridor: Vegetation and Flora Survey*. Prepared for AngloGold Ashanti, July, 2009.
- Western Australian Museum (1992). *The Biological Survey of the Eastern Goldfields of Western Australia, Part 8: Kurnalpi – Kalgoorlie Study Area.* Records of the Western Australian Museum, Supplement No. 41.

Database search requests were submitted to the DBCA for conservation significant flora (Ref: 48-0823FL) (DBCA, 2023a), fauna (Ref:7853) (DBCA, 2023b). and communities (Ref: 31-0823EC) (DBCA, 2023c) records, and NatureMap records (Ref: 21-0124NM) (DBCA, 2024) within the survey area, with a 40 km buffer applied.

In addition to the literature review and DBCA database search requests, a search of the EPBC Protected Matters search tool (PMST) (DCCEEW, 2024) was also undertaken (using a 40 km buffer as stated above) to aid in the compilation of a list of potential significant flora and fauna within the survey area.

Significant flora species identified by the desktop review were assessed with regards to their population extent and distribution and preferred habitat to determine their likelihood of occurrence within the survey area. The assessment categorised flora species as follows:

- **Unlikely:** Suitable habitat is not expected to occur and/or the survey area is outside the known range of the species.

- **Possible:** Suitable habitat may be present, and the area is within the known range of the species. This option is also used when there is insufficient information to determine the preferred habitat of a species.
- **Previously Recorded:** A record for this species is located within the survey area. Field survey will ground-truth currently occurring individuals and populations.

Significant fauna species identified by the desktop review were assessed with regards to their distribution and preferred habitat to determine their likelihood of occurrence within the survey area. The assessment categorised fauna species as follows:

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

It should be noted that these lists are based on observations from a broader area than the assessment area (40 km radius) and therefore may include taxa not present. The databases also often include very old records that may be incorrect or in some cases the taxa in question have become locally or regionally extinct. Information from these sources should therefore be taken as

indicative only and local knowledge and information also needs to be taken into consideration when determining what actual species may be present within the specific area being investigated.

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

- *Environment Protection and Biodiversity Conservation* (EPBC) *Act 1999*, administered by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW); *Biodiversity Conservation* (BC) *Act 2016*, administered by the WA Government (DBCA);
- Red List produced by the Species Survival Commission (SSC) of the World Conservation Union (also known as the IUCN Red List – the acronym derived from its former name of the International Union for Conservation of Nature and Natural Resources). The Red List has no legislative power in Australia but is used as a framework for State and Commonwealth categories and criteria; and
- Priority Flora/ Fauna list. A non-legislative list maintained by DBCA for management purposes (fauna list released 7th October 2022; flora list released 6th October 2022).

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

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

Most but not all migratory bird species listed in the annexes to these bilateral agreements are protected in Australia as Matters of National Environmental Significance (MNES) under the EPBC Act. Descriptions of conservation significant species and communities are provided in Appendix A.

3.2 Flora and Vegetation Field Assessment

Botanica conducted a reconnaissance flora/ vegetation and basic fauna survey of the survey area on the 11th and 12th October 2023. The area was traversed using a four-wheel drive vehicle and on foot by Aiden Williams (Botanist (BSc Botany and Conservation Biology) and Matthew Coutts (Field technician). The GPS track log of the survey effort is shown in Figure 3-1. Given the degree of

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

existing disturbance within the survey area (historical pastoral land use), the survey area is not located in a fragmented landscape, or high biodiversity region, and that the desktop assessment identified low potential for significant habitats (i.e. widespread/ common habitats), a reconnaissance survey was conducted.

Prior to the commencement of field work, aerial photography was inspected and obvious differences in the vegetation assemblages were identified. The different vegetation communities identified were then inspected during the field survey to assess their validity. A handheld GPS unit was used to record the coordinates of the boundaries between existing vegetation communities.

The survey was conducted using a series of survey sites (relevés) as shown in Figure 3-1. At each relevé site, the area was walked on foot to observe and record all flora species. The distance surveyed at each relevé varied dependent on the diversity/ variability of species and landforms/ vegetation types. At each relevé, the following information was recorded:

At each sample point, the following information was recorded:

- GPS location;
- Photograph of vegetation;
- Dominant taxa for each stratum;
- All vascular taxa (including annual taxa);
- Landform classification;
- Vegetation condition rating;
- Collection and documentation of unknown plant specimens; and
- GPS location, photograph and collection of flora of conservation significance (if encountered).

Vegetation types were classified in accordance with the NVIS Level V-Association classification.

Unknown specimens collected during the survey were identified with the aid of samples housed at the Botanica Herbarium and Western Australian Herbarium. Vouchering of the specimens with the Western Australian Herbarium was not required as none of the specimens were of significance (i.e., conservation flora, novel taxa, range extensions etc.).

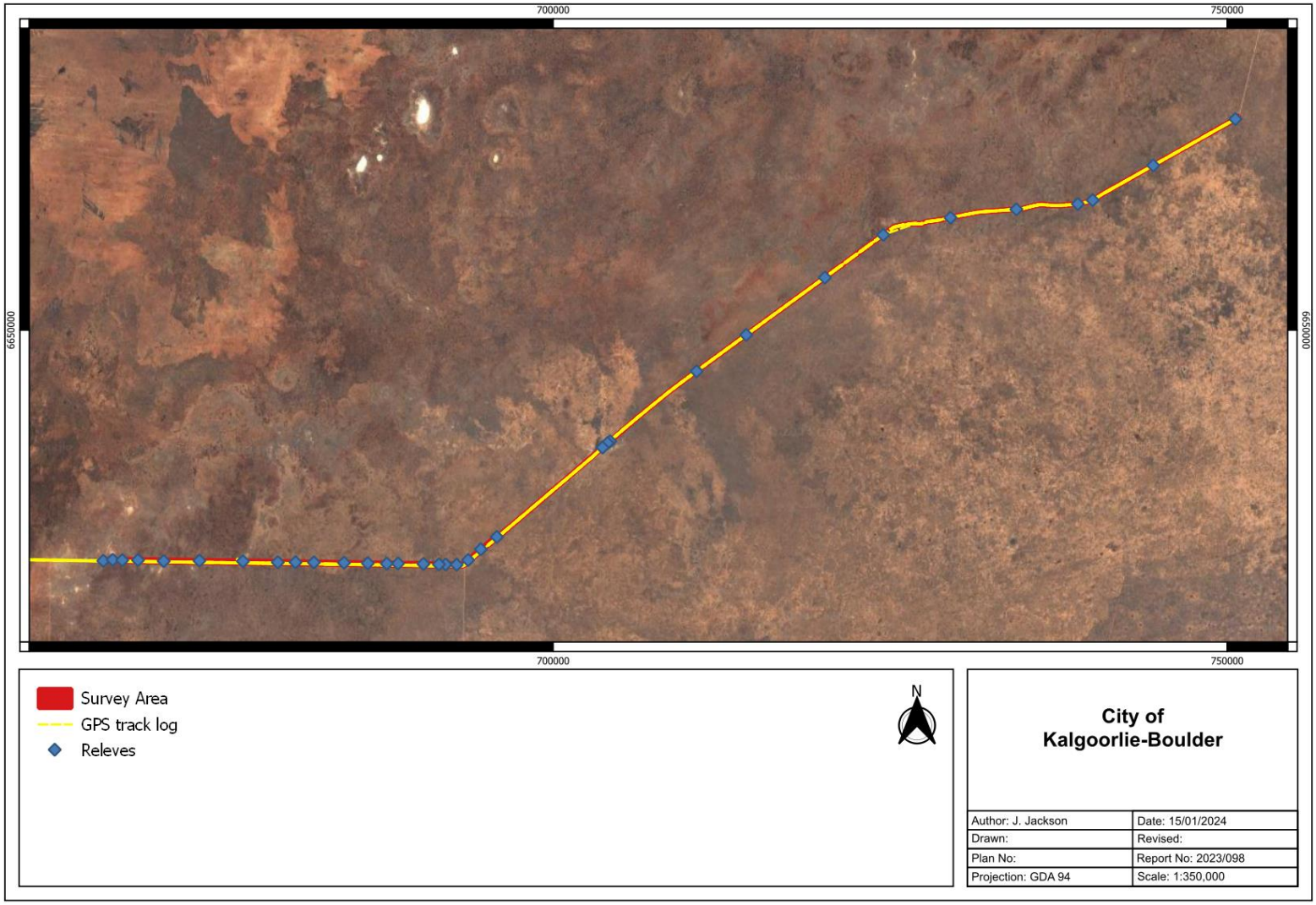


Figure 3-1: GPS track log of the survey effort and locations of relevés

3.3 Data Analysis Tools

Following field assessments, vegetation types and condition were mapped using the GIS program QGIS, and the hectare area/ percentage area of each vegetation type and condition within the survey area was calculated. Spatial maps illustrating the location of vegetation types and any significant flora and vegetation were generated using QGIS.

3.4 Terrestrial Fauna Field Assessment

Botanica conducted a basic fauna survey of the survey area in conjunction with the reconnaissance flora/ vegetation survey.

Fauna habitat types were identified across the survey area based on broad major vegetation groups and associated landform. A handheld GPS unit was used to record the coordinates of the boundaries between fauna habitats and each habitat was photographed.

The main aim of the fauna habitat assessment was to determine the likelihood of a species of conservation significance utilising habitat within the survey area. The habitat information obtained was also used to aid in finalising the overall potential fauna list.

Available information on the habitat requirements of the species of conservation significance listed as possibly occurring in the area (determined from the desktop assessment) was researched. During the field survey, the habitats within the survey area were assessed and specific elements identified, if present, to determine the likelihood of listed Threatened and Priority species utilising habitat within the survey area.

Opportunistic observations of fauna species were made during all field survey work.

3.5 Scientific Licences

Table 3-1: Scientific Licenses of Botanica Staff coordinating the survey

Licensed Staff	Permit Number	Date of Expiry
Aiden Williams	FB62000457(licence to take flora for scientific purposes)	04/08/2025

3.6 Survey Limitations and Constraints

It is important to note that flora surveys will entail limitations notwithstanding careful planning and design. Potential limitations are listed in Table 3-2.

The conclusions presented in this report are based upon field data and environmental assessments and/or testing carried out over a limited period of time and are therefore merely indicative of the environmental condition of the site at the time of the field assessments. Also, it should be recognised

that site conditions can change with time. Information not available at the time of this assessment which may subsequently become available may alter the conclusions presented.

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

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

Table 3-2: Limitations and constraints associated with the flora and vegetation survey

Variable	Potential Impact on Survey	Details
Access problems	Not a constraint	The survey was conducted using a four wheel drive vehicle and walking. There were no access problems.
Competency/ Experience	Not a constraint	The Botanica personnel that conducted the survey were regarded as suitably qualified and experienced. **Coordinating Staff**: Aiden Williams (BSc Botany and Conservation Biology) and Jim Williams **Data Interpretation**: Jennifer Jackson (BSc Env. Mgmt) and Jim Williams (Diploma Hort).
Timing of survey, weather & season	Minor constraint	Fieldwork was undertaken in October during the EPA's recommended primary survey time period for the Interzone (i.e., Spring, September to November), the survey was conducted following above average rainfall received in June and August 2023. However, no annual species were observed.
Area disturbance	Not a constraint	The area has been disturbed from cattle grazing and other human impacts; however, vegetation was mostly intact and comprised of native vegetation.
Survey Effort/ Extent	Not a constraint	Survey intensity was appropriate for the size/significance of the area with a reconnaissance flora and vegetation survey completed to identify vegetation types.
Availability of contextual information at a regional and local scale	Not a constraint	Conservation significant flora database searches provided by the DBCA were used to identify any potential locations of Threatened/Priority flora species. BoM, DWER, DPIRD, DBCA and DCCEEW databases were reviewed to obtain appropriate regional desktop information on the biophysical environment of the local region. Botanica has conducted numerous surveys within the bioregions present in the survey area and was also able to obtain information about the area from previous research conducted within the area. Results of previous assessments in the local area were reviewed to provide context on the local environment.

Variable	Potential Impact on Survey	Details
Completeness	Not a constraint	In the opinion of Botanica, the survey area was covered sufficiently to identify vegetation assemblages. Fieldwork was undertaken in October during the EPA's recommended primary survey time period for the Interzone (i.e., Spring, September to November), the survey was conducted following above average rainfall received in June and August 2023 As a result all taxa were able to be identified to species level, however only a few annual species were present. The vegetation associations for this study were based on visual descriptions of locations in the field. The distribution of these vegetation associations outside the study area is not known, however vegetation associations identified were categorised via comparison to vegetation distributions throughout WA given on NVIS (DotEE, 2017).

4 RESULTS

4.1 Desktop Assessment

4.1.1 Flora

The NatureMap database search (DBCA, 2024) identified 407 vascular flora species as occurring within 40 km of the survey area. The full list of vascular flora identified by the desktop search is provided in Appendix E.

4.1.1.1 Introduced Flora

The desktop review identified 14 introduced flora (weed) species as known to occur within 40 km of the survey area. None of the species are listed as a Declared Pest on the Western Australian Organism List (WAOL) under the *Biosecurity and Agriculture Management* (BAM) *Act 2007*, or as a Weed of National Significance (WoNS) (Table 4-1).

Table 4-1: Introduced flora known to occur within 40 km of the survey area

Scientific name	Common name	Declared	WONS
Brassica tournefortii	Mediterranean Turnip	N	N
Carrichtera annua	Ward's weed	N	N
Cenchrus ciliaris	Buffel grass	N	N
Lythrum hyssopifolia	Lesser loosestrife	N	N
Malva parviflora	Marshmallow	N	N
Oligocarpus calendulaceus	-	N	N
Rumex vesicarius	Ruby Dock	N	N
Salvia verbenaca	Wild Sage	N	N
Schismus barbatus	Mediterranean Grass	N	N
Sisymbrium orientale	London Rocket	N	N
Solanum nigrum	Black Berry Nightshade	N	N
Sonchus oleraceus	Common Sowthistle	N	N
Tamarix ramosissima	Salt cedar	N	N
Vicia sativa subsp. *nigra*	Narrow-leaved vetch	N	N

4.1.1.2 Significant Flora

Assessment of the DBCA's Threatened and Priority Flora database records, EPBC Protected Matters (DCCEEW, 2024), NatureMap database (DBCA, 2024) and previous relevant literature identified no Threatened Flora have previously recorded within the survey area or within 40 km of the survey. One Priority Flora has previously been recorded in the survey area, another eight Priority Flora were identified as occurring within a 40 km radius of the survey area. One of the Priority flora previously recorded within 40 km of the survey area, *Olearia arida* (P4), is likely to be an incorrect location, as the locality says it was collected from Tropicana mining lease, which is approximately 150 km to the north. The EPBC Protected Matters Search Tool identified *Hibbertia crispula* as

'species or species habitat likely to occur within the area', in Western Australia this is listed as Priority 1 flora and has not been recorded within 40 km of the survey area (WA Herbarium, 1998-) and has not been assessed here.

These Priority flora taxa were assessed for distribution and known habitat to determine their likelihood of occurrence within the survey area as shown in Table 4-2. The locations of DBCA database records for Significant Flora (DBCA, 2023a) in relation to the survey area is shown in Figure 4-1.

Table 4-2: Significant flora potentially occurring within the survey area.

Taxon	DBCA Priority	Habitat Description (WA Herbarium, 1998-)	Likelihood of Occurance
Comesperma viscidulum	4	Flat. Red sand loam.	Possible
Dicrastylis cundeeleensis	4	Yellow sand, red or reddish-yellow sand. Sandplains.	Unlikely, no habitat present in the survey area.
Eremophila attenuata	1	Swampy area.	Unlikely, no habitat present in the survey area.
Eremophila decussata	1	Skeletal, calcareous soils, orange-brown silty clay, brown sandy clay over limestone. Exposed rocky sites, sand hills, broad depressions, low plains.	Previously recorded in the survey area.
Eremophila sp. Great Victoria Desert (R. Davis 10621)	2	Brown sandy-clay soil.	Previously recorded in the survey area.
Grevillea secunda	4	Yellow or red sand. Sand dunes, sandplains.	Possible.
Isotropis canescens	2	Yellow clayey sand. Sandplains.	Possible
Olearia arida	4	Red or yellow sand. Undulating low rises.	Unlikely, no habitat present in the survey area. Possibly incorrect location.
Ptilotus blackii	3	Plain. Red brown sandy loam.	Previously recorded in the survey area.

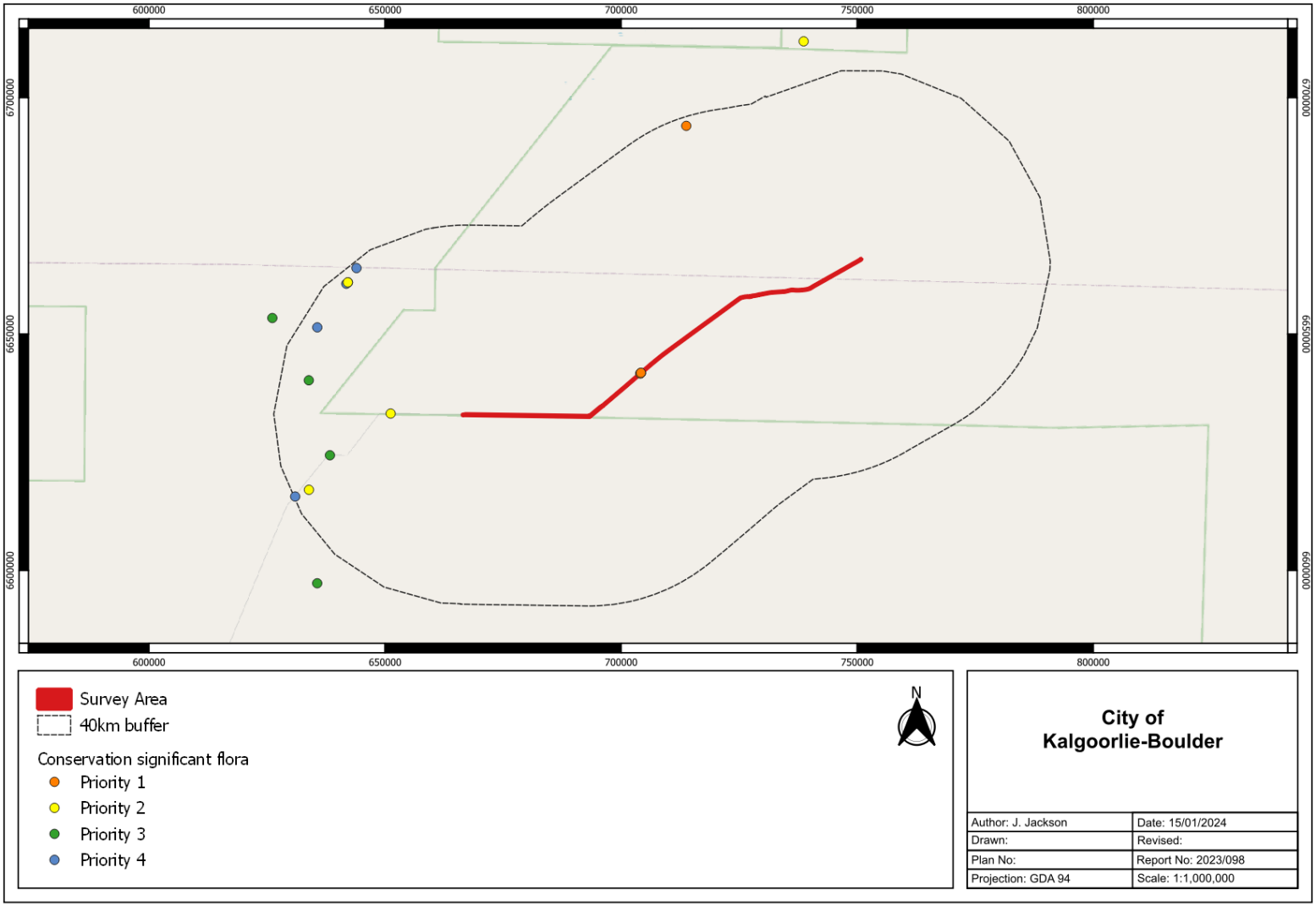


Figure 4-1: Significant flora records in relation to the survey area

4.1.2 Fauna

The desktop review identified a total 176 terrestrial vertebrate fauna taxa within 40 km of the survey area, consisting of 110 bird, seven mammal, 57 reptile and two amphibian taxa. Of these, three species are introduced (non-native) species:

- *Camelus dromedarius* (camel)
- *Mus musculus* (House mouse)
- *Oryctolagus cuniculus* (Rabbit)

The full list of vertebrate fauna identified by the NatureMap desktop search is contained in Appendix E.

4.1.2.1 Conservation Significant Fauna

The desktop review identified 17 terrestrial fauna species of conservation significance as previously being recorded within 40 km of the survey area, consisting of eight Threatened species, one Priority listed species and eight migratory terrestrial and wetland species. Two of these had previously been recorded within 40 km of the survey area. Habitat and distribution data was used to determine the likelihood of occurrence within the survey area (Table 4-3).

Table 4-3: Significant fauna potentially occurring within the survey area

Species	Conservation Status			Habitat Description	Assessment and likelihood
	EPBC	BC Act	DBCA		
Birds					
Aphelocephala leucopsis Southern Whiteface	VU	-	-	Occur across most of mainland Australia south of the tropics, Southern whitefaces live in a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs, or both (DCCEEW, 2024).	PMST records state that the species or species habitat may be in the area. Possible- area may form part of larger home range.
Calidris acuminata Sharp-tailed-Sandpiper	VU	-	MI	Intertidal mudflats, also freshwater swamps and saltwater lakes (ALA, 2024).	PMST records state that the species or species habitat may be in the area. Would not occur in the area. No habitat in the survey area.
Calidris ferruginea Curlew Sandpiper	CR and MI	CR	-	Inland, where they are rarely seen, around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand (DCCEEW, 2024).	PMST records state that the species or species habitat may be in the area. There are previous historical records within 40 km of the survey area. Would not occur in the area. No habitat in the survey area.
Falco hypoleucos Grey Falcon	VU	VU	-	Occurs at low densities across inland Australia. The species frequents timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined water courses. The species has been observed hunting in treeless areas and frequents tussock grassland and open woodland, especially in winter (DCCEEW, 2024).	PMST records state that the species or species habitat may be in the area. Possible. Survey area may form part of larger home range.
Leipoa ocellata Malleefowl	VU	VU	-	Scrublands and woodlands dominated by mallee and wattle species (DCCEEW, 2024).	Possible. Previously recorded >30km north and west of the survey area.
Northiella narethae Naretha blue bonnet	-	-	P4	Myall woodlands, woodland dominated by acacia species. Endemic to an area on the border of Western and South Australia (ALA, 2024).	Possible, numerous records within 40 km of the survey area.
Pezoporus occidentalis Night Parrot	EN	CR	-	Broad habitat requirements include areas of old-growth spinifex (Triodia) for roosting and nesting, together with foraging habitats that are likely to include various native grasses and herbs, that may or may not contain shrubs or low trees. (DPaW, 2017).	Would not occur in the area. PMST records state that the species or species habitat may be in the area. Considered to be locally extinct. Suitable habitat not present.

Species	Conservation Status			Habitat Description	Assessment and likelihood
	EPBC	BC Act	DBCA		
Polytelis alexandrae *Princess* Parrot	VU	-	P4	Dry inland areas of Spinifex with Eucalypts, desert oaks, Acacias, and sometimes amongst succulents around saltpans. Often far from water (ALA, 2024).	PMST records state that the species or species habitat may be in the area. Has not been recorded within 40 km of the survey area. Unlikely to occur.
Mammals					
Sminthopsis psammophila Sandhill dunnart	VU	VU	-	Spinifex grasslands on sandy soils usually with an overstorey of woodland trees (ALA, 2024)	PMST records state that the species or species habitat may be in the area. Has not been recorded within 40 km of the survey area. Would not occur.
Reptiles					
Liopholis kintorei Great desert skink	VU			Open Spinifex grassland (ALA, 2024).	PMST records state that the species or species habitat may be in the area. Would not occur, known to occur further north in the Gibson Desert.
Migratory					
Various wading/shorebird species	MI	MI	-	Inhabit muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline salt lakes inland (DCCEEW, 2024).	Would not occur in the area. No habitat in the survey area.

4.2 Field Assessment

4.2.1 Flora

The field survey identified 27 vascular flora taxa within the survey area from 16 families and 21 Genera as occurring in the survey area. Dominant families include Chenopodiaceae and Scrophulariaceae, dominant genera include *Eremophila.* No annual flora was observed in the survey area. The full field species inventory is listed in Appendix B.

4.2.1.1 Introduced Flora

No introduced flora species were observed in the survey area.

4.2.1.2 Significant Flora

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

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

No Threatened Flora taxa are previously known to occur or were identified within the survey area.

No Priority Flora taxa are previously known to occur or were identified within the survey area. The *Eremophila decussata* that had previously been recorded in the survey area was searched for but not found.

4.2.2 Vegetation

4.2.2.1 Vegetation Communities

A total of two broad-scale vegetation communities were identified within the survey area. These vegetation types were identified within one landform type and comprised of two major vegetation groups. Vegetation community descriptions and extent are listed below in Table 4-4 and illustrated spatially in Figure 4-2 to Figure 4-5. Vegetation community descriptions and extents were determined from field survey results, aerial imagery interpretation and extrapolation of the communities.

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

Landform	NVIS Vegetation Group	Veg Code	Vegetation Type	Area (ha)	Area (%)	Image
Plain	Acacia open woodlands (MVG 13)	SCLP-AOW1	Low open woodland of *Acacia papyrocarpa* over mid open shrubland of *Senna artemisioides* subsp. *filifolia* over low chenopod shrubland of *Maireana sedifolia* on sandy clay loam plain.	1313	86	
Plain	Chenopod Shrublands (MVG 22)	CLP-CS1	Mid open shrubland of *Senna artemisioides* subsp. *filifolia* and *Eremophila scoparia* over low chenopod shrubland of *Maireana sedifolia* on clay loam plain.	75	5	
Cleared areas				144	9	

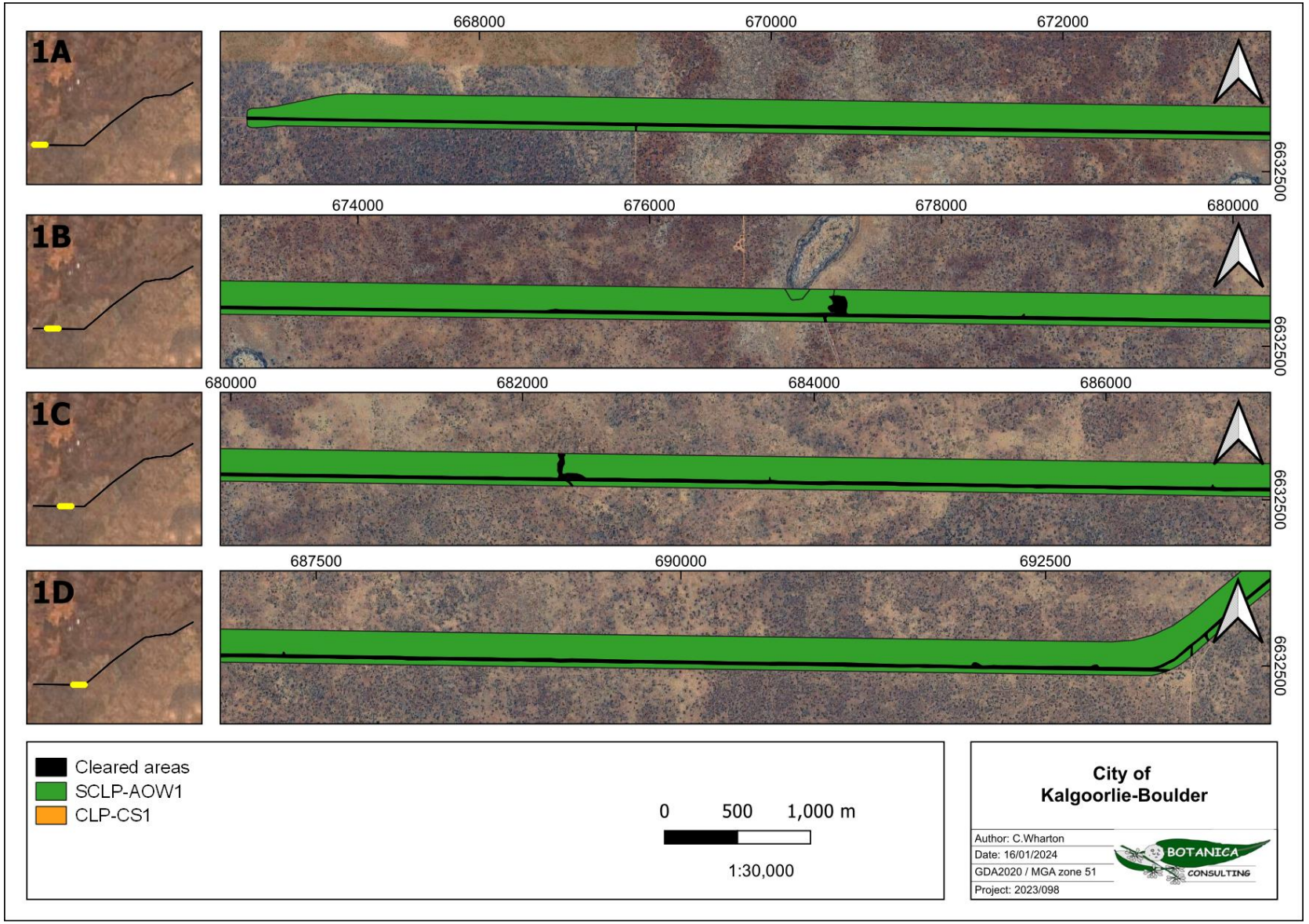


Figure 4-2: Vegetation types within the survey area (Map 1 of 4)

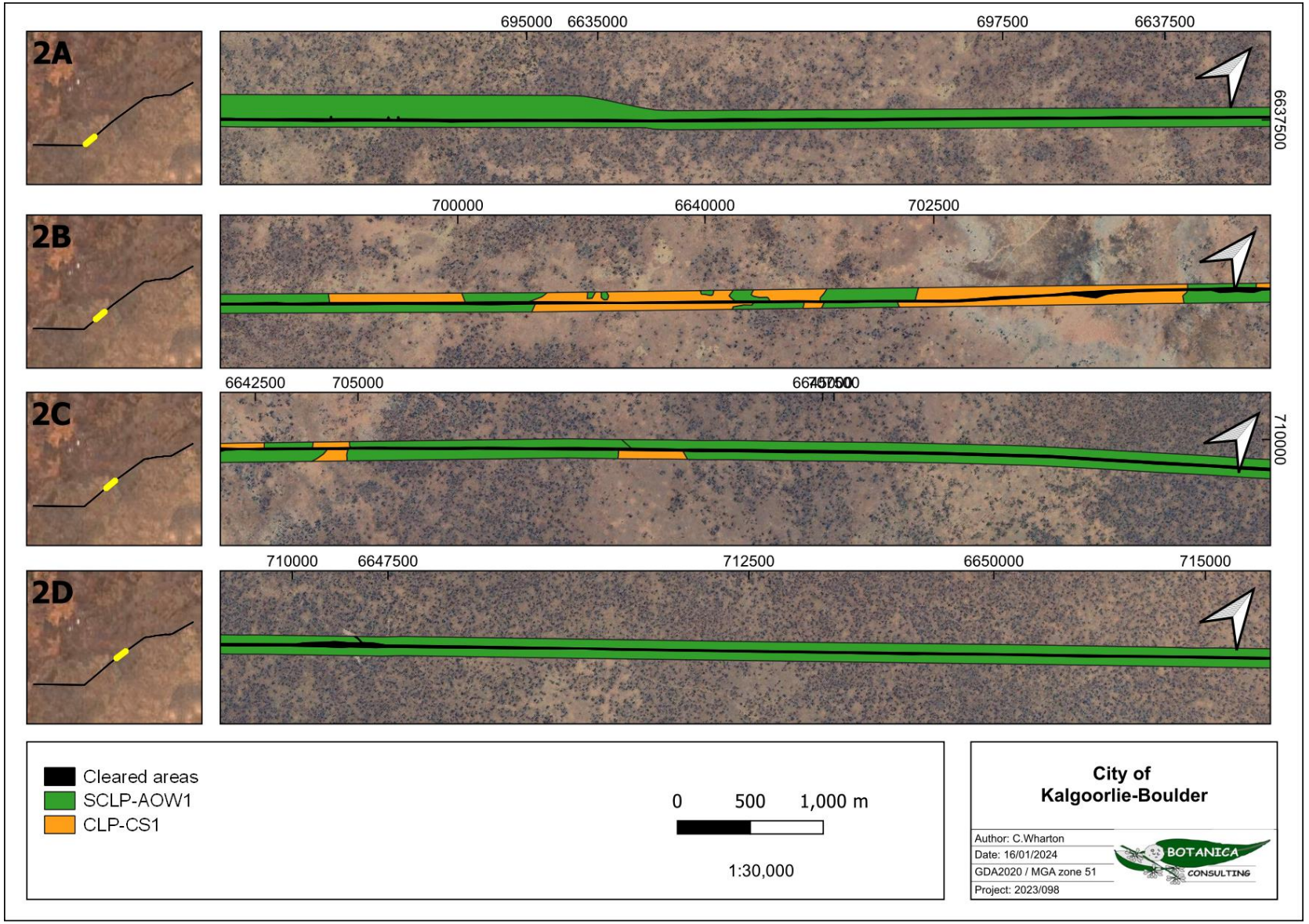


Figure 4-3: Vegetation types within the survey area (Map 2 of 4)

Figure 4-4: Vegetation types within the survey area (Map 3 of 4)

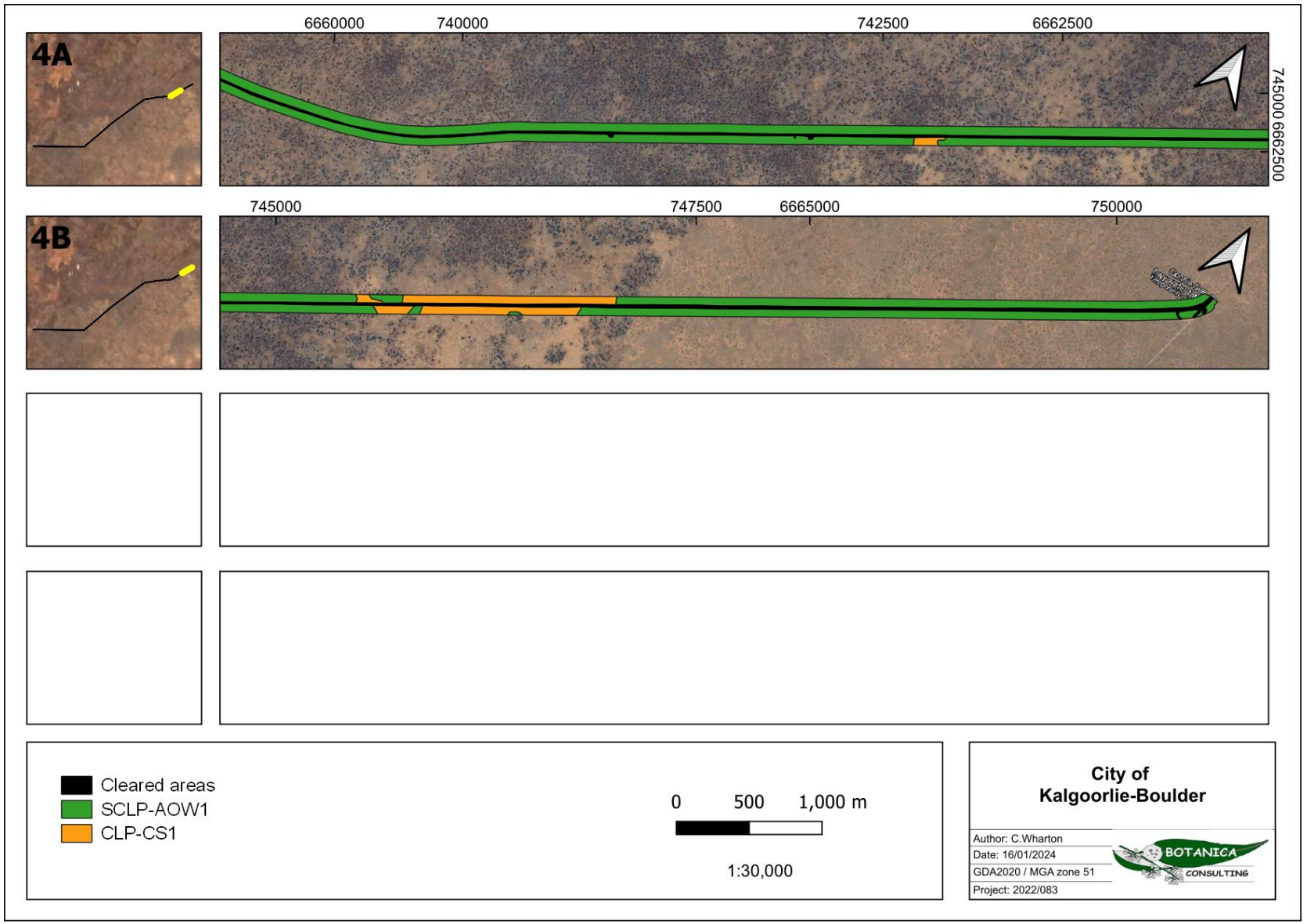


Figure 4-5: Vegetation types within the survey area (Map 4 of 4)

4.2.2.2 Vegetation Condition

Based on the vegetation condition rating scale adapted from Keighery (1994) and Trudgen, (1988), native vegetation within the survey area was rated as 'Good', with cleared areas considered 'Completely degraded' (Table 4-5). Vegetation condition rating descriptions are listed in Appendix C. Disturbances within the survey area include edge effects from the road in situ, and pastoral land use.

Table 4-5: Vegetation condition rating within the survey area

Condition rating	Description (EPA, 2016a)	Area (ha)	Area (%)
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impacts on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.	1,392	91
Completely Degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e., areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.	144	9

4.2.2.3 Significant Vegetation

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

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

No TECs listed under State or Commonwealth legislation were identified within the survey area.

No PECs or other significant vegetation (as described above) was identified within the survey area.

4.2.3 Fauna

4.2.3.1 Fauna Habitat

Based on vegetation and associated landforms identified during the flora and vegetation assessment, two broad scale terrestrial fauna habitats were identified as occurring within the survey area, these closely align with the vegetation types described in the survey area. Table 4-6 provides the area and a visual representation of fauna habitat types, and the extent of fauna habitats are shown spatially in Figure 4-6 to Figure 4-9.

Three Southern whiteface (*Aphelocephala leucopsis)* were observed in the survey area (Figure 4-10). These birds are listed as Vulnerable under the EPBC Act and are not listed as conservation significant in Western Australia.

4.2.3.2 Opportunistic Fauna Observations

During the field survey opportunistic observations of fauna species were made with 36 fauna species observed, this included 26 birds, six mammals (including five introduced fauna*) and two reptiles. These fauna species are listed in Appendix C.

Table 4-6: Main terrestrial fauna habitats within the survey area

Fauna Habitat	Description	Representative Fauna Attributes	Example Image
Open Acacia woodland on sandy clay loam plain Area= 1313 ha (86%)	Low open woodland of *Acacia papyrocarpa* over mid open shrubland of *Senna artemisioides* subsp. *filifolia* over low chenopod shrubland of *Maireana sedifolia* on sandy clay loam plain.	• Ground moderately suited to burrowing species. • Low to moderate diversity vegetation strata. • Low to moderate vegetation density and leaf litter. • Some taller trees may support nesting avifauna, however tree hollows would not be present.	
Chenopod shrubland on clay loam plain Area= 75 ha (5%)	Mid open shrubland of *Senna artemisioides* subsp. *filifolia* and *Eremophila scoparia* over low chenopod shrubland of *Maireana sedifolia* on clay loam plain.	• Ground has low to moderate suitability to burrowing species, • Low diversity vegetation strata and low vegetation density, • Low levels of leaf litter.	
Cleared areas Area= 144 ha (9%)			

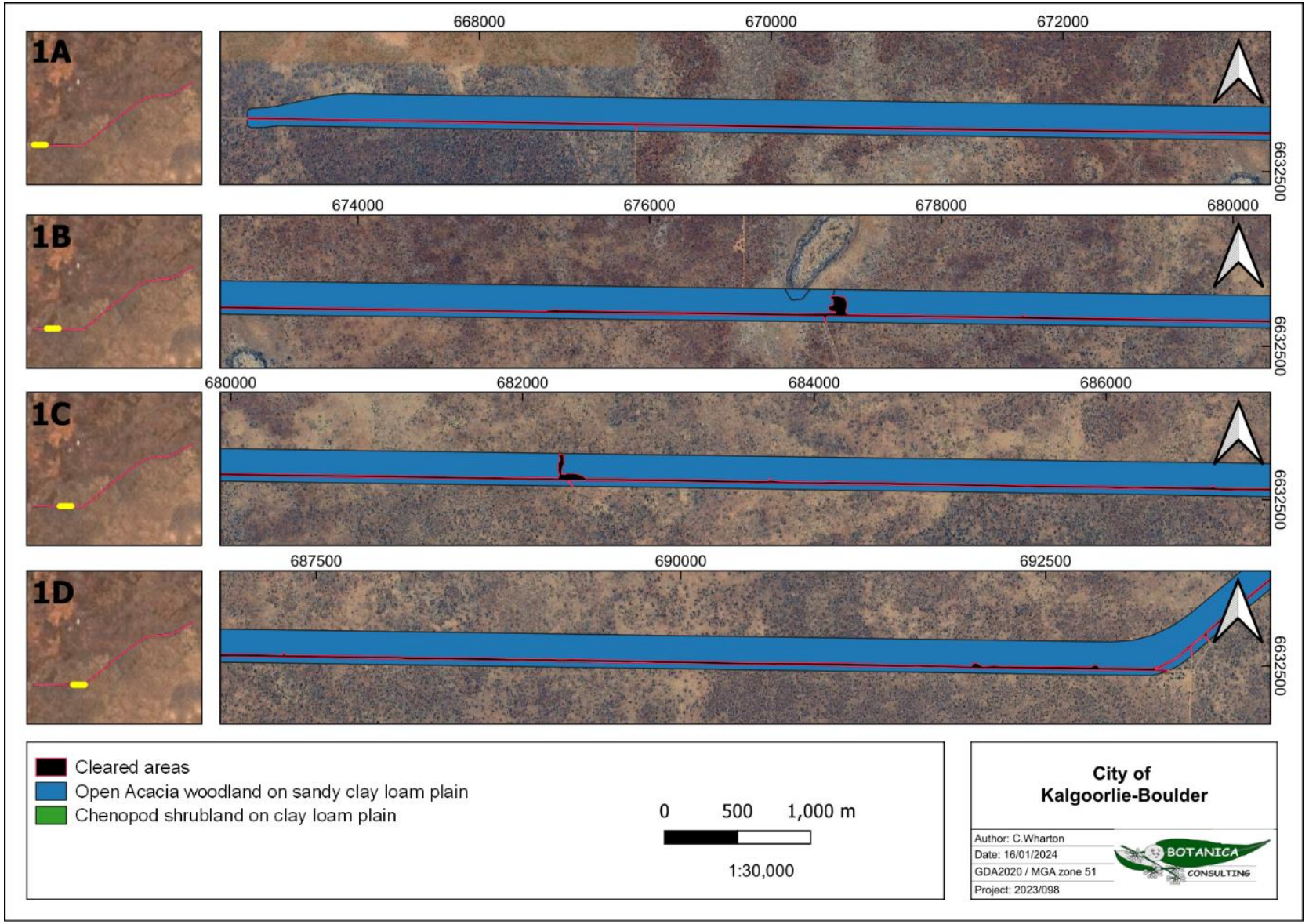


Figure 4-6: Fauna Habitats within the survey area (Map 1 of 4)

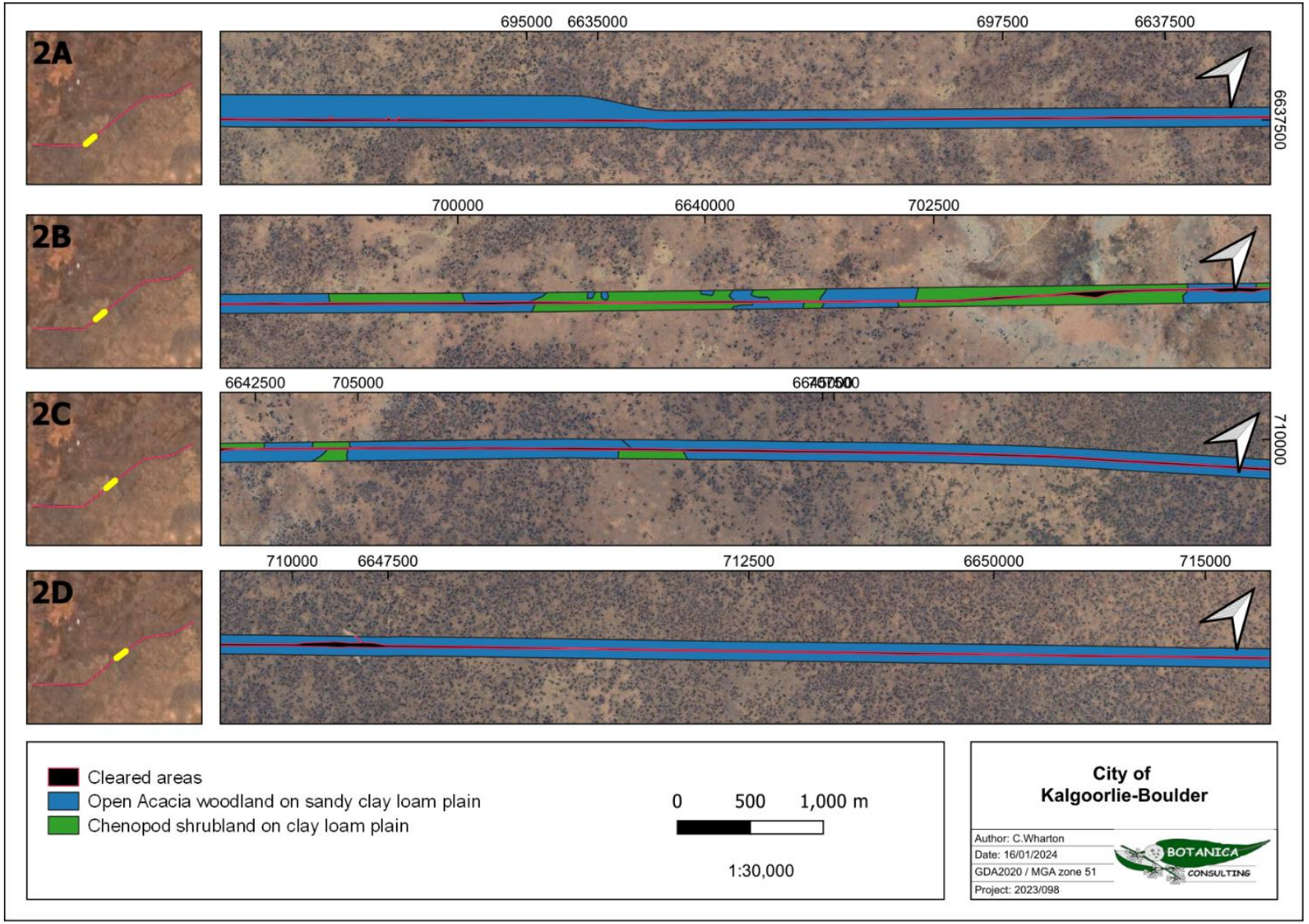


Figure 4-7: Fauna Habitats within the survey area (Map 2 of 4)

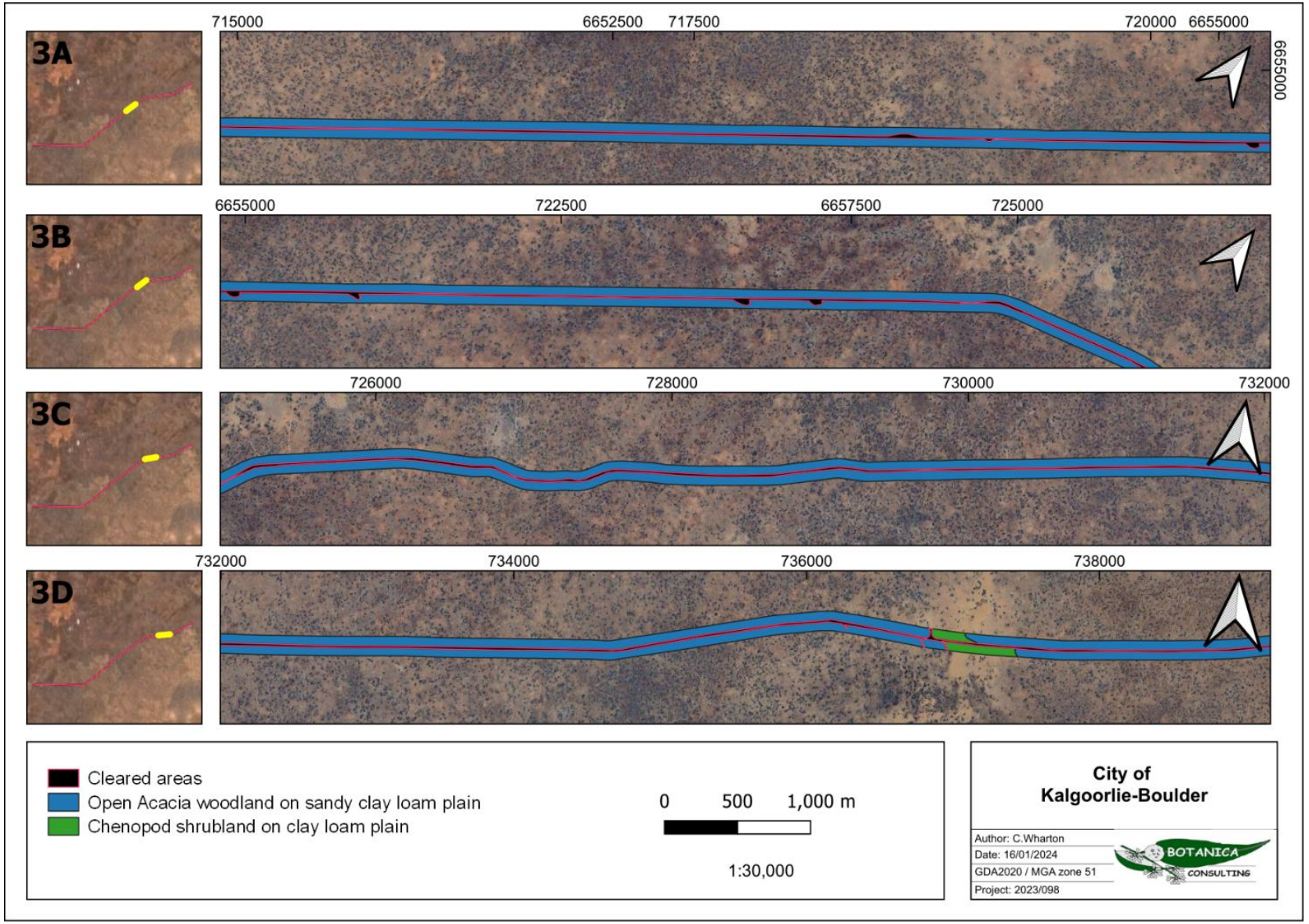


Figure 4-8: Fauna Habitats within the survey area (Map 3 of 4)

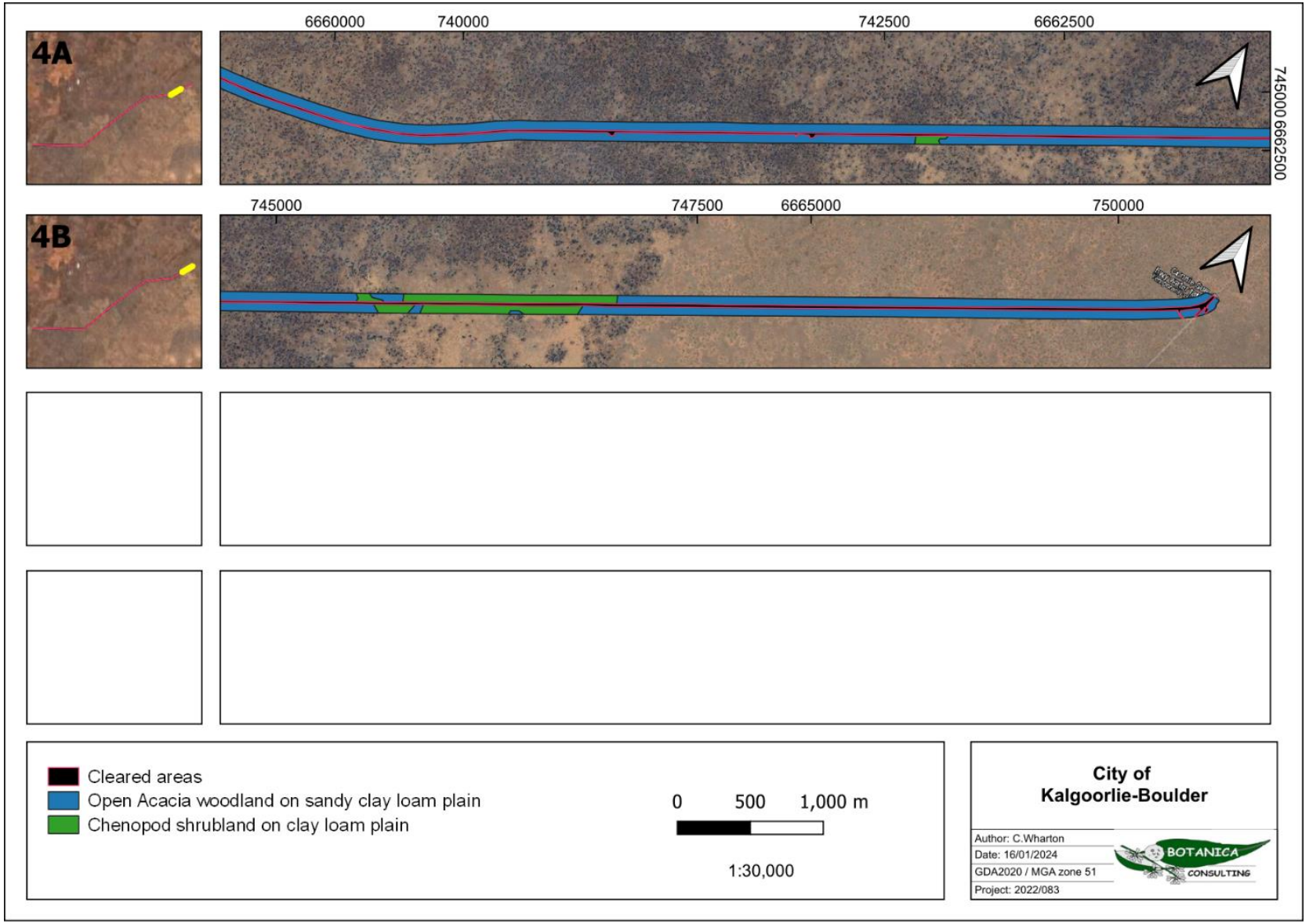


Figure 4-9: Fauna Habitats within the survey area (Map 4 of 4)

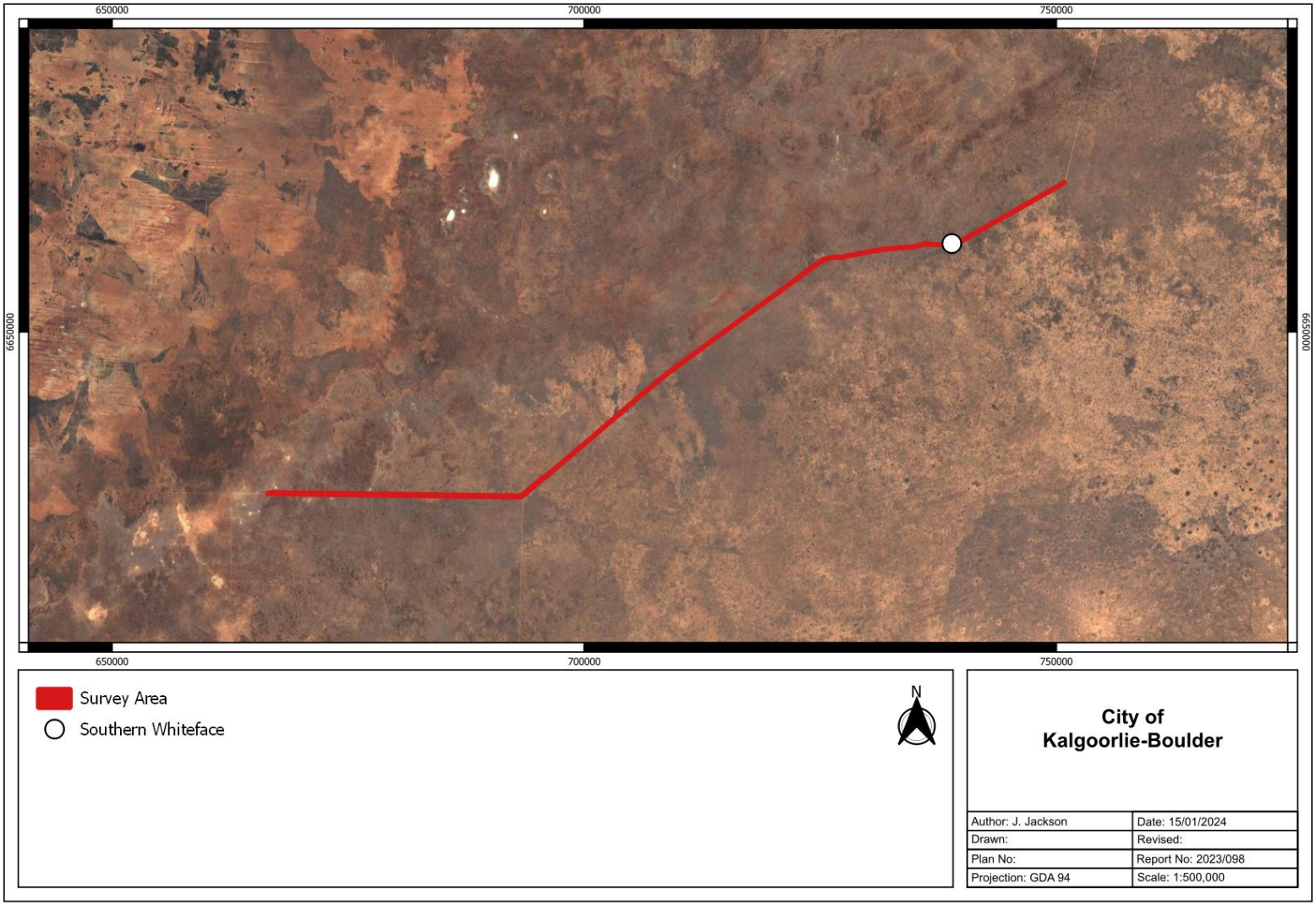


Figure 4-10: Location of Southern Whiteface observed in the survey area

4.2.3.3 Significant Fauna

According to the EPA *Environmental Factor Guideline for Terrestrial Fauna* (EPA, 2016c) significant fauna includes:

- Fauna being identified as a Threatened or Priority species;
- Fauna species with restricted distribution;
- Fauna subject to a high degree of historical impact from threatening processes; and
- Fauna providing an important function required to maintain the ecological integrity of a significant ecosystem.

The fauna species of conservation significance that were identified from the desktop review to possibly occur in the survey area were further assessed for the likelihood of them utilising the Survey area based on direct on ground observations.

- **Malleefowl (*Leipoa ocellata*) – Vulnerable (EPBC Act and BC Act)**

This species is occasionally recorded in the Eastern Goldfields subregion. The majority of habitat within the survey area appears unsuitable for breeding due to the moderately low density of the vegetation and sparse amounts of leaf litter observed.

- **Grey Falcon (*Falco hypoleucos*) – Vulnerable (EPBC Act and BC Act)**

This species is sparsely recorded throughout inland Australia. Suitable habitat may be present but is unlikely to represent critical habitat. Significant impact unlikely.

- **Southern Whiteface (*Aphelocephala leucopsis)* – Vulnerable (EPBC Act)**

Three birds were observed in the survey area. Suitable habitat may be present but is unlikely to represent critical habitat, and the survey area is at the extent of its range. Significant impact unlikely.

4.3 Matters of National Environmental Significance

4.3.1 Environment Protection and Biodiversity Conservation Act 1999

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

- Nationally threatened flora and fauna species;

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

Three Southern Whiteface (*Aphelocephala leucopsis)* were observed in the survey area. These are listed as Vulnerable under the EPBC Act.

No other MNES were identified within the survey area.

4.4 Matters of State Environmental Significance

4.4.1 *Environmental Protection Act 1986* (WA)

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

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

No Environmentally Sensitive Areas were identified within the survey area.

4.4.2 *Biodiversity Conservation Act 2016*

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

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

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

No threatened flora species or critical habitat listed under the BC Act were recorded within the survey area.

4.5 Other Areas of Conservation Significance

The DBCA lists 'Priority' species and communities which are under consideration for declaration as 'Threatened' under the BC Act. These Priority species/ communities have no formal legal protection until they are endorsed by the Minister as being Threatened. No Priority flora or PECs were identified in the survey area.

There are no wetlands of international importance (Ramsar Wetlands) or national importance (Australian Nature Conservation Agency Wetlands) within the survey area.

The closest reserve is the Plumridge Lakes Nature Reserve (R34605), which is approximately 50 km north of the survey area.

4.6 Native Vegetation Clearing Principles

Based on the outcomes from the survey undertaken, Botanica assessed the results of the desktop and field survey with regards to the native vegetation clearing principles listed under Schedule 5 of the EP Act (Table 4-7). The assessment found that any proposed vegetation clearing activities are unlikely to be at variance with any clearing principle.

Table 4-7: Assessment against native vegetation clearing principles

Letter	Principle Native vegetation should not be cleared if it:	Assessment	Outcome
(a)	comprises a high level of biological diversity.	Vegetation identified within the survey area is not considered to be of high biological diversity and is well represented outside of the survey area.	Clearing is not at variance with this principle.
(c)	includes, or is necessary for the continued existence of rare flora.	No Threatened Flora taxa, pursuant to the BC Act and the EPBC Act were identified within the survey area.	Clearing is not at variance with this principle.
(d)	comprises the whole or part of or is necessary for the maintenance of a threatened ecological community (TEC).	No TEC listed under the EPBC Act or by the BC Act occur within the survey area or within 40 km.	Clearing is not at variance with this principle
(e)	is significant as a remnant of native vegetation in an area that has been extensively cleared	The Vegetation associations within the survey area retain 100% of their pre-European extent, and development within the survey area will not significantly reduce the current extent of these vegetation associations.	Clearing is not at variance with this principle.
(f)	is growing, in, or in association with, an environment associated with a watercourse or wetland	There are no permanent/ perennial inland waters or drainage lines within the survey area. There are no minor ephemeral drainage lines occurring in the survey area.	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.	The survey area and surrounding region has not been extensively cleared. Clearing within the survey area is not considered likely to lead to land degradation issues such as salinity, water logging or acidic soils.	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.	The nearest reserve is the Plumridge Lakes Nature Reserve (R34605), which is approximately 50 km north of the survey area. Clearing in the survey area will not impact this reserve.	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 bodies are located within the survey area. There are no minor ephemeral drainage lines in the survey area. Clearing within the survey area is not likely to impact underground water.	Clearing is unlikely to be at variance with this principle.
(j)	Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.	The survey area predominately lies in the Nullarbor Bioregion, average rainfall is 150 -200 mm Rainfall events are unlikely to result in localised flooding. Clearing within the survey area is not likely to increase the incidence or intensity of flooding within the survey area or surrounds.	Clearing is unlikely to be at variance with this principle

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APPENDIX A:
CONSERVATION RATINGS BC ACT AND EPBC ACT

Definitions of Conservation Significant Species

Code	Category
State categories of Threatened and Priority species	
Threatened Species (T) Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as Threatened species under section 26(2) of the Biodiversity Conservation Act 2016 (BC Act).	
CR	**Critically Endangered** Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for critically endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for critically endangered flora.
EN	**Endangered** Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for endangered flora.
VU	**Vulnerable** Threatened species considered to be "facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.
Extinct species Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.	
EX	**Extinct** Species where "*there is no reasonable doubt that the last member of the species has died*", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act). Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.
EW	**Extinct in the Wild** Species that *"is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act). Currently there are no Threatened fauna or Threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.
Specially protected species Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection. Species that are listed as Threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.	

Code	Category
IA	**International Agreement/ Migratory** Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act). Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species. Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.
CD	**Species of special conservation interest** Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as Threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act). Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.
OS	**Other specially protected species** Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act). Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.
Priority species Possibly Threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of Priority for survey and evaluation of conservation status so that consideration can be given to their declaration as Threatened Fauna or Flora. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.	
P1	**Priority 1: Poorly-known species** Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
P2	**Priority 2: Poorly-known species** Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
P3	**Priority 3: Poorly-known species** Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
P4	**Priority 4: Rare, Near Threatened and other species in need of monitoring** (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.

Code	Category
	(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.
Commonwealth categories of Threatened species	
EX	**Extinct** Taxa where there is no reasonable doubt that the last member of the species has died.
EW	**Extinct in the Wild** Taxa where it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
CR	**Critically Endangered** Taxa that are facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
EN	**Endangered** Taxa which are not critically endangered and is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
VU	**Vulnerable** Taxa which are not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
CD	**Conservation Dependent** Taxa which are the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or (b) the following subparagraphs are satisfied: (i) the species is a species of fish; (ii) the species is the focus of a plan of management that provides for actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised; (iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory; (iv) cessation of the plan of management would adversely affect the conservation status of the species.

Definitions of Conservation Significant Communities

Category Code	Category
State categories of Threatened Ecological Communities (TEC)	
PD	**Presumed Totally Destroyed**
	An ecological community will be listed as Presumed Totally Destroyed if there are no recent records of the community being extant and either of the following applies:
	• records within the last 50 years have not been confirmed despite thorough searches or known likely habitats or;
	• all occurrences recorded within the last 50 years have since been destroyed.
CR	**Critically Endangered**
	An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future, meeting any one of the following criteria:
	The estimated geographic range and distribution has been reduced by at least 90% and is either continuing to decline with total destruction imminent, or is unlikely to be substantially rehabilitated in the immediate future due to modification;
	The current distribution is limited i.e. highly restricted, having very few small or isolated occurrences, or covering a small area;
	The ecological community is highly modified with potential of being rehabilitated in the immediate future.
EN	**Endangered**
	An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. The ecological community must meet any one of the following criteria:

Category Code	Category
	The estimated geographic range and distribution has been reduced by at least 70% and is either continuing to decline with total destruction imminent in the short-term future, or is unlikely to be substantially rehabilitated in the short-term future due to modification;
	The current distribution is limited i.e. highly restricted, having very few small or isolated occurrences, or covering a small area;
	The ecological community is highly modified with potential of being rehabilitated in the short-term future.
VU	**Vulnerable**
	An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing high risk of total destruction in the medium to long term future. The ecological community must meet any one of the following criteria:
	The ecological community exists largely as modified occurrences that are likely to be able to be substantially restored or rehabilitated;
	The ecological community may already be modified and would be vulnerable to threatening process, and restricted in range or distribution;
	The ecological community may be widespread but has potential to move to a higher threat category due to existing or impending threatening processes.
Commonwealth categories of Threatened Ecological Communities (TEC)	
CE	**Critically Endangered** If, at that time, an ecological community is facing an extremely high risk of extinction in the wild in the immediate future (indicative timeframe being the next 10 years).
EN	**Endangered** If, at that time, an ecological community is not critically endangered but is facing a very high risk of extinction in the wild in the near future (indicative timeframe being the next 20 years).
VU	**Vulnerable** If, at that time, an ecological community is not critically endangered or endangered, but is facing a high risk of extinction in the wild in the medium–term future (indicative timeframe being the next 50 years).
Priority Ecological Communities	
P1	**Poorly-known ecological communities**
	Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist.
P2	**Poorly-known ecological communities**
	Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, State forest, un-allocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation.
P3	**Poorly known ecological communities**
	Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or:
	Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or;
	Communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system but are under threat of modification across much of their range from processes such as grazing and inappropriate fire regimes.
P4	**Ecological communities that are adequately known, rare but not threatened** or meet criteria for near threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.
P5	**Conservation Dependent ecological communities**
	Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

APPENDIX B:
LIST OF FLORA SPECIES IDENTIFIED WITHIN THE SURVEY AREA

Family	Genus	Species	SCLP-AOW1	CLP-CS1
Amaranthaceae	*Ptilotus*	*obovatus*	*	*
Apocynaceae	*Leichhardtia*	*australis*	*	
Asteraceae	*Cratystylis*	*conocephala*	*	*
Casuarinaceae	*Casuarina*	*pauper*	*	
Chenopodiaceae	*Atriplex*	*nummularia*	*	*
Chenopodiaceae	*Atriplex*	*vesicaria*	*	*
Chenopodiaceae	*Enchylaena*	*tomentosa*	*	*
Chenopodiaceae	*Maireana*	*sedifolia*	*	*
Chenopodiaceae	*Sclerolaena*	*brevifolia*		*
Chenopodiaceae	*Sclerolaena*	*obliquicuspis*		*
Euphorbiaceae	*Euphorbia*	*drummondii*	*	*
Fabaceae	*Acacia*	*papyrocarpa*	*	*
Fabaceae	*Senna*	*artemisioides* subsp. *filifolia*	*	*
Fabaceae	*Senna*	*artemisioides* subsp. ×*artemisioides*	*	
Frankeniaceae	*Frankenia*	*interioris*		*
Goodeniaceae	*Scaevola*	*spinescens*	*	*
Loranthaceae	*Amyema*	*miquelii*	*	
Myrtaceae	*Eucalyptus*	*socialis*	*	
Proteaceae	*Hakea*	*kippistiana*	*	
Sapindaceae	*Alectryon*	*oleifolius*	*	
Scrophulariaceae	*Eremophila*	*caperata*	*	
Scrophulariaceae	*Eremophila*	*longifolia*	*	
Scrophulariaceae	*Eremophila*	*maculata* subsp. *brevifolia*	*	*
Scrophulariaceae	*Eremophila*	*scoparia*	*	*
Scrophulariaceae	*Myoporum*	*platycarpum*	*	*
Solanaceae	*Lycium*	*australe*	*	*
Thymelaeaceae	*Pimelea*	*microcephala*	*	

APPENDIX C: LIST OF VERTEBRATE FAUNA SPECIES IDENTIFIED WITHIN THE SURVEY AREA

Scientific Name	Common Name	Comment
Birds		
Acanthagenys rufogularis	Spiny-cheeked Honeyeater	Sighted
Acanthiza apicalis	inland thornbill	Sighted
Acanthiza chrysorrhoa	Yellow rumped Thornbill	Sighted
Acanthiza uropygialis	Chestnut-rumped Thornbill	Sighted
Aphelocephala leucopsis	Southern Whiteface	Sighted
Aquila audax	Wedge-tailed Eagle	Sighted
Artamus cinereus	Black faced woodswallow	Sighted
Colluricincla harmonica	Grey Shrike Thrush	Sighted
Coracina novaehollandiae	Black Faced Cuckoo Shrike	Sighted
Corvus bennetti	Little crow	Sighted
Cracticus nigrogularis	Pied Butcherbird	Sighted
Dromaius novaehollandiae	Emu	Tracks observed
Falco cenchroides	Nankeen Kestrel	Sighted
Gavicalis virescens	Singing Honeyeater	Sighted
Gymnorhina tibicen	Australian Magpie	Sighted
Lalage tricolor	White-winged triller	Sighted
Malurus leucopterus	White wing fairy wren	Sighted
Manorina flavigula	Yellow-throated Miner	Sighted
Ocyphaps lophotes	Crested Pigeon	Sighted
Oreoica gutturalis	Crested Bellbird	Sighted
Pachycephala rufiventris	Rufous Whistler	Sighted
Petroica goodenovii	Red-capped Robin	Sighted
Pomatostomus superciliosus	White-browed babblers	Sighted
Psephotellus varius	Mulga Parrot	Sighted
Purnella albifrons	White-fronted Honeyeater	Sighted
Rhipidura leucophrys	Willie Wagtail	Sighted
Mammals		
*Bos taurus**	Cattle	Scats observed
*Camelus dromedarius**	Camel	Tracks observed
*Canis lupus familiaris**	Wild dog	Scats observed
Equus asinus	Donkey	Scats observed
Oryctolagus cuniculus *	Rabbit	Scats observed
Osphranter rufus	Red Kangaroo	Sighted
Reptiles		
Gehyra Varigata	Tree dtella	Sighted
Tiliqua rugosa	Bobtail	Sighted

APPENDIX D:
VEGETATION CONDITION RATING

Vegetation Condition Rating	Southwest and Interzone Botanical Provinces	Eremaean and Northern Botanical Provinces
Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.	
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor		Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs.	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e., areas that are cleared or ‘parkland cleared’ with their flora comprising weed or crop species with isolated native trees or shrubs.

APPENDIX E:
NATUREMAP DESKTOP SEARCH (40KM)

Animalia
AMPHI
Neobatrachus aquilonius
Neobatrachus sutor
BIRD
Acanthagenys rufogularis
Acanthiza apicalis
Acanthiza chrysorrhoa
Acanthiza iredalei
Acanthiza robustirostris
Acanthiza uropygialis
Accipiter cirrocephalus
Accipiter fasciatus
Actitis hypoleucos
Aegotheles cristatus
Anas castanea
Anas gracilis
Anas superciliosa
Anthochaera carunculata
Aphelocephala leucopsis
Aphelocephala leucopsis subsp. leucopsis
Aquila audax
Ardeotis australis
Artamus cinereus
Aythya australis
Barnardius zonarius
Biziura lobata
Cacatua leadbeateri
Cacomantis pallidus
Calamanthus campestris
Cheramoeca leucosterna
Chroicocephalus novaehollandiae
Cincloramphus cruralis
Cinclosoma alisteri
Circus assimilis
Cladorhynchus leucocephalus
Climacteris affinis
Climacteris affinis subsp. superciliosa
Colluricincla harmonica
Colluricincla harmonica subsp. rufiventris
Coracina maxima
Coracina novaehollandiae
Corvus bennetti
Corvus coronoides
Cracticus nigrogularis
Cracticus tibicen
Cracticus torquatus
Cygnus atratus
Daphoenositta chrysoptera
Daphoenositta chrysoptera subsp. pileata
Dicaeum hirundinaceum
Dromaius novaehollandiae
Egretta novaehollandiae
Elanus axillaris
Elseyornis melanops
Eolophus roseicapillus
Epthianura tricolor
Eurostopodus argus
Falco berigora
Falco cenchroides
Falco longipennis
Falco peregrinus
Fulica atra
Gelochelidon nilotica
Glossopsitta porphyrocephala
Grallina cyanoleuca
Hamirostra isura
Himantopus himantopus
Hirundo neoxena
Leipoa ocellata
Lichenostomus leucotis
Lichenostomus ornatus
Lichenostomus plumulus
Lichenostomus virescens
Malacorhynchus membranaceus
Malurus leucopterus
Malurus splendens
Manorina flavigula
Melanodryas cucullata
Melithreptus brevirostris
Melopsittacus undulatus
Merops ornatus
Microeca fascinans
Microeca fascinans subsp. assimilis
Neophema splendida
Neopsephotus bourkii
Ninox novaeseelandiae
Northiella haematogaster
Northiella narethae
Nymphicus hollandicus
Ocyphaps lophotes
Oreoica gutturalis
Oreoica gutturalis subsp. gutturalis
Pachycephala inornata
Pachycephala rufiventris
Pardalotus punctatus
Pardalotus striatus
Petrochelidon nigricans
Petroica goodenovii
Phaps chalcoptera

Platycercus haematogaster subsp. narethae
Platycercus zonarius subsp. zonarius
Podargus strigoides
Poliocephalus poliocephalus
Polytelis anthopeplus subsp. westralis
Pomatostomus superciliosus
Ptilotula ornatus
Ptilotula plumulus
Purnella albifrons
Rhipidura leucophrys
Smicrornis brevirostris
Strepera versicolor
Tadorna tadornoides
Taeniopygia guttata
Turnix velox
Vanellus tricolor
INVERT
Eriophora biapicata
Hoggicosa castanea
Hoggicosa forresti
Holconia nigrigularis
Isometroides vescus
Pediana occidentalis
Scolopendra morsitans
Tasmanicosa ramosa
MAMMAL
Canis lupus subsp. dingo
Macropus fuliginosus
Mus musculus
Pseudomys bolami
Tadarida australis
REPTILE
Aspidites ramsayi
Aspidites ramsayi subsp. (southwest subpop.)
Brachyurophis semifasciatus
Cryptoblepharus plagiocephalus
Ctenophorus cristatus
Ctenophorus isolepis subsp. gularis
Ctenophorus pictus
Ctenophorus reticulatus
Ctenotus atlas
Ctenotus leonhardii
Ctenotus orientalis
Ctenotus regius
Ctenotus schomburgkii

Cyclodomorphus melanops subsp. elongatus
Diplodactylus calcicolus
Diplodactylus conspicillatus
Diplodactylus pulcher
Diporiphora reginae
Eremiascincus richardsonii
Gehyra purpurascens
Gehyra variegata
Hemiergis initialis subsp. initialis
Heteronotia binoei
Lerista bipes
Lerista desertorum
Lerista labialis
Lerista picturata
Lerista taeniata
Lerista timida
Liopholis inornata
Lucasium bungabinna
Lucasium maini
Menetia greyii
Moloch horridus
Morelia spilota subsp. imbricata
Morethia adelaidensis
Morethia boulengeri
Morethia butleri
Morethia obscura
Nephrurus laevissimus
Nephrurus levis subsp. levis
Parasuta monachus
Pogona minor subsp. minor
Pogona nullarbor
Pseudechis australis
Pseudonaja mengdeni
Pseudonaja modesta
Ramphotyphlops bituberculatus
Ramphotyphlops endoterus
Rhynchoedura ornata
Simoselaps bertholdi
Tiliqua multifasciata
Tiliqua occipitalis
Tiliqua rugosa
Tiliqua rugosa subsp. aspera
Tympanocryptis houstoni
Underwoodisaurus milii
Varanus gouldii

Plantae
DICOT
Abutilon cryptopetalum
Abutilon otocarpum
Abutilon oxycarpum subsp. Prostrate (A.A. Mitchell PRP 1266)
Acacia aneura group
Acacia aptaneura
Acacia burkittii
Acacia caesaneura
Acacia camptoclada
Acacia colletioides
Acacia donaldsonii
Acacia eremophila var. eremophila
Acacia erinacea

Acacia fragilis
Acacia helmsiana
Acacia hemiteles
Acacia inaequiloba
Acacia kempeana
Acacia ligulata
Acacia merrallii
Acacia nyssophylla
Acacia oswaldii
Acacia papyrocarpa
Acacia Plurinerves-Microneurae Phyllodes >8-nerved (densiflora group)
Acacia Plurinerves-Microneurae Phyllodes >8-nerved, terete (aff. sibilans)
Acacia pteraneura

Acacia ramulosa var. ramulosa
Acacia rendlei
Acacia rigens
Acacia sibina
Acacia sibirica
Acacia tetragonophylla
Acacia tysonii
Acacia xerophila var. xerophila
Alectryon oleifolius
Alectryon oleifolius subsp. canescens
Allocasuarina helmsii
Aluta maisonneuvei subsp. auriculata
Alyogyne pinoniana
Amyema miquelii
Amyema preissii
Amyema quandang
Amyema quandang var. quandang
Angianthus conocephalus
Angianthus tomentosus
Aotus sp. Tortile (G.J. Keighery 3767)
Arabidella trisecta
Asteridea athrixioides
Atriplex acutibractea
Atriplex acutibractea subsp. acutibractea
Atriplex holocarpa
Atriplex nummularia
Atriplex nummularia subsp. spathulata
Atriplex stipitata
Atriplex vesicaria
Brachyscome ciliaris
Brachyscome trachycarpa
Brassica tournefortii
Calandrinia eremaea
Calandrinia polyandra
Calandrinia ptychosperma
Calandrinia sp.
Calocephalus knappii
Calothamnus gilesii
Calotis breviradiata
Calotis hispidula
Calotis multicaulis
Calytrix gypsophila
Carrichtera annua
Carthamus lanatus
Casuarina pauper
Centipeda thespidioides
Cephalipterum drummondii
Chenopodium curvispicatum
Chenopodium desertorum subsp. rectum
Chrysocephalum apiculatum subsp. glandulosum
Chrysocephalum pterochaetum
Chrysocephalum puteale
Codonocarpus cotinifolius
Comesperma viscidulum
Commersonia craurophylla
Convolvulus clementii
Conyza bonariensis
Coopernookia strophiolata
Cratystylis conocephala
Cryptandra aridicola
Cullen cinereum
Cyphanthera odgersii subsp. odgersii

Dampiera incana var. fuscescens
Dampiera lavandulacea
Dampiera ramosa
Dampiera stenophylla
Daucus glochidiatus
Daviesia aphylla
Daviesia pachyloma
Daviesia ulicifolia subsp. aridicola
Dicrastylis brunnea
Dicrastylis costelloi
Dicrastylis cundeeleensis
Dicrastylis nicholasii
Dissocarpus paradoxus
Dodonaea adenophora
Dodonaea lobulata
Dodonaea rigida
Dodonaea stenozyga
Dodonaea viscosa subsp. angustissima
Duboisia hopwoodii
Duma florulenta
Dysphania cristata
Dysphania melanocarpa
Dysphania melanocarpa forma leucocarpa
Enchylaena tomentosa var. tomentosa
Eremophila alternifolia
Eremophila attenuata
Eremophila caperata
Eremophila clarkei
Eremophila decipiens subsp. decipiens
Eremophila decussata
Eremophila dempsteri
Eremophila dendritica
Eremophila deserti
Eremophila falcata
Eremophila fallax
Eremophila glabra
Eremophila glabra subsp. glabra
Eremophila glabra subsp. Rason Lake (R.D. Royce 5582)
Eremophila hygrophana
Eremophila latrobei subsp. glabra
Eremophila longifolia
Eremophila maculata subsp. brevifolia
Eremophila paisleyi subsp. paisleyi
Eremophila perglandulosa
Eremophila platythamnos subsp. platythamnos
Eremophila saligna
Eremophila scoparia
Eremophila serrulata
Eremophila sp. Great Victoria Desert (R. Davis 10621)
Eriochiton sclerolaenoides
Erodiophyllum elderi
Erodium aureum
Erodium carolinianum
Erodium cygnorum
Eucalyptus comitae-vallis
Eucalyptus concinna
Eucalyptus cyclostoma
Eucalyptus cylindrocarpa
Eucalyptus eremicola subsp. eremicola
Eucalyptus eremophila

Eucalyptus gongylocarpa
Eucalyptus gracilis
Eucalyptus gypsophila
Eucalyptus horistes
Eucalyptus hypolaena
Eucalyptus leptophylla
Eucalyptus lesouefii
Eucalyptus longissima
Eucalyptus mannensis subsp. mannensis
Eucalyptus melanoxylon
Eucalyptus oleosa
Eucalyptus oleosa subsp. oleosa
Eucalyptus optima subsp. hypolaena
Eucalyptus pimpiniana
Eucalyptus platycorys
Eucalyptus rigidula
Eucalyptus rosacea
Eucalyptus rugosa
Eucalyptus salmonophloia
Eucalyptus salubris
Eucalyptus socialis
Eucalyptus socialis subsp. victoriensis
Eucalyptus sp.
Eucalyptus sp. Fraser Range (D. Nicolle 2157)
Eucalyptus sp. Great Victoria Desert (D. Nicolle & M. French DN 3877)
Eucalyptus woodwardii
Euphorbia ferdinandi var. ferdinandi
Euphorbia multifaria
Euphorbia tannensis subsp. eremophila
Euphorbia verrucitesta
Exocarpos aphyllus
Exocarpos sparteus
Frankenia cinerea
Frankenia cordata
Frankenia desertorum
Frankenia interioris var. interioris
Frankenia pauciflora
Frankenia pauciflora var. pauciflora
Frankenia sp.
Geijera linearifolia
Glischrocaryon angustifolium
Glischrocaryon flavescens
Gnephosis angianthoides
Gompholobium simplicifolium
Goodenia elderi
Goodenia glandulosa
Goodenia gypsicola
Goodenia pinnatifida
Goodenia quasilibera
Goodenia triodiophila
Goodenia xanthosperma
Grevillea acuaria
Grevillea huegelii
Grevillea nematophylla subsp. planicosta
Grevillea nematophylla subsp. supraplana
Grevillea sarissa subsp. anfractifolia
Grevillea secunda
Grevillea zygoloba
Hakea francisiana
Hakea kippistiana
Hakea leucoptera subsp. sericipes

Halgania integerrima
Haloragis gossei
Haloragis trigonocarpa
Hannafordia bissillii subsp. bissillii
Heliotropium curassavicum
Hibiscus krichauffianus
Homalocalyx thryptomenoides
Indigofera georgei
Isoetopsis graminifolia
Isotropis canescens
Jacksonia arida
Lawrencia glomerata
Lechenaultia divaricata
Lepidium fasciculatum
Lepidium phlebopetalum
Leptosema chambersii
Lotus cruentus
Lycium australe
Lysiana exocarpi subsp. exocarpi
Lythrum hyssopifolia
Maireana amoena
Maireana georgei
Maireana lobiflora
Maireana pentatropis
Maireana pyramidata
Maireana radiata
Maireana sedifolia
Maireana trichoptera
Maireana turbinata
Malva parviflora
Malva weinmanniana
Malvastrum americanum
Marsdenia australis
Melaleuca eleuterostachya
Melaleuca sp.
Melaleuca zeteticorum
Minuria leptophylla
Minuria multiseta
Monotaxis luteiflora
Myoporum platycarpum
Myoporum platycarpum subsp. platycarpum
Newcastelia bracteosa
Nicotiana goodspeedii
Nicotiana occidentalis subsp. obliqua
Nicotiana rosulata subsp. ingulba
Olearia arida
Olearia calcarea
Olearia exiguifolia
Olearia incana
Olearia muelleri
Oligocarpus calendulaceus
Omphalolappula concava
Opercularia spermacocea
Oxalis perennans
Persoonia pertinax
Phlegmatospermum cochlearinum
Pimelea trichostachya
Pittosporum angustifolium
Plantago cunninghamii
Plantago drummondii
Podolepis capillaris
Podolepis rugata

Pomax sp. Sand dunes (P.G. Wilson 752)
Pseudognaphalium luteoalbum
Pterocaulon sphacelatum
Ptilotus blackii
Ptilotus drummondii
Ptilotus exaltatus
Ptilotus gaudichaudii
Ptilotus holosericeus
Ptilotus obovatus
Ptilotus polystachyus
Ptilotus sessilifolius
Pycnosorus pleiocephalus
Rhagodia preissii subsp. preissii
Rhagodia sp.
Rhagodia spinescens
Rhodanthe battii
Rhodanthe chlorocephala subsp. rosea
Rhodanthe chlorocephala subsp. splendida
Rhodanthe floribunda
Rhodanthe haigii
Rhodanthe nullarborensis
Roepera apiculata
Roepera eremaea
Roepera glauca
Roepera ovata
Roepera similis
Roepera sp.
Rumex vesicarius
Salsola australis
Salvia verbenaca
Santalum acuminatum
Santalum murrayanum
Scaevola collaris
Scaevola restiacea subsp. divaricata
Scaevola spinescens
Schenkia australis
Schenkia australis / clementii
Schoenia ayersii
Schoenia cassiniana
Sclerolaena brevifolia
Sclerolaena obliquicuspis
Sclerolaena parviflora
Sclerolaena patenticuspis
Senecio gregorii
Senna artemisioides
Senna artemisioides subsp. filifolia
Senna artemisioides subsp. petiolaris
Senna artemisioides subsp. quadrifolia
Senna artemisioides subsp. x artemisioides
Senna cardiosperma
Senna helmsii
Senna pleurocarpa var. pleurocarpa
Senna sp.
Senna sp. Meekatharra (E. Bailey 1-26)
Seringia velutina
Sisymbrium orientale
Solanum cleistogamum
Solanum coactiliferum
Solanum ellipticum
Solanum lasiophyllum
Solanum nigrum
Solanum nummularium

Solanum orbiculatum subsp. orbiculatum
Solanum plicatile
Sonchus oleraceus
Stackhousia megaloptera
Stackhousia muricata
Stenopetalum lineare var. lineare
Streptoglossa liatroides
Stylidium humphreysii
Stylidium induratum
Swainsona acuticarinata
Swainsona beasleyana
Swainsona formosa
Swainsona kingii
Swainsona tenuis
Tamarix ramosissima
Tecticornia doliiformis
Tecticornia pruinosa
Tecticornia undulata
Templetonia incrassata
Tetragonia eremaea
Trichanthodium skirrophorum
Trigonella suavissima
Vicia sativa subsp. nigra
Vincetoxicum lineare
Vittadinia dissecta
Vittadinia dissecta var. hirta
Vittadinia eremaea
Vittadinia sp.
Waitzia acuminata var. acuminata
Waitzia fitzgibbonii
Westringia rigida
Zygophyllum apiculatum
Zygophyllum eremaeum
Zygophyllum glaucum
Zygophyllum iodocarpum
Zygophyllum ovatum
FERN
Pleurosorus rutifolius
GYMNO
Callitris verrucosa
MONOCOT
Aristida contorta
Asphodelus fistulosus
Austrostipa dongicola
Austrostipa eremophila
Austrostipa nitida
Austrostipa platychaeta
Austrostipa plumigera
Cenchrus ciliaris
Cymbopogon ambiguus
Cyperus rigidellus
Eleocharis sp.
Enneapogon avenaceus
Enneapogon caerulescens
Enneapogon cylindricus
Enneapogon sp.
Eragrostis eriopoda
Eragrostis setifolia
Eragrostis sp.
Eragrostis xerophila
Eriachne helmsii
Eriachne pulchella subsp. pulchella

Lachnagrostis filiformis
Lomandra effusa
Lomandra leucocephala
Lomandra leucocephala subsp. robusta
Monachather paradoxus
Panicum effusum
Paspalidium clementii
Paspalidium constrictum
Rytidosperma caespitosum

Rytidosperma setaceum
Schismus barbatus
Stipa sp.
Themeda triandra
Thysanotus exiliflorus
Thysanotus manglesianus
Triodia irritans
Triodia scariosa
Triodia tomentosa

APPENDIX F:
EPBC PROTECTED MATTERS SEARCH (40KM BUFFER)

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. Please see the caveat for interpretation of information provided here.

Report created: 11-Jan-2024

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment 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 (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	10
Listed Migratory Species:	8

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 https://www.dcceew.gov.au/parks-heritage/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 Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	11
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	5
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	4
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Status of Conservation Dependent and Extinct are not MNES under the EPBC Act. Number is the current name ID.		
Scientific Name	Threatened Category	Presence Text
BIRD		
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to 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
Polytelis alexandrae Princess Parrot, Alexandra's Parrot [758]	Vulnerable	Species or species habitat likely to occur within area
MAMMAL		
Sminthopsis psammophila Sandhill Dunnart [291]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
PLANT		
Hibbertia crispula		
Ooldea Guinea-flower [15222]	Vulnerable	Species or species habitat may occur within area
REPTILE		
Liopholis kintorei		
Great Desert Skink, Tjakura, Warrarna, Mulyamiji, Tjalapa, Nampu [83160]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
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
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus		
Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Chalcites osculans as Chrysococcyx osculans		
Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area
Charadrius veredus		
Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area overfly marine area
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Motacilla cinerea		
Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area

Extra Information

State and Territory Reserves		[Resource Information]
Protected Area Name	Reserve Type	State
Anangu Tjutaku	Indigenous Protected Area	WA
Great Victoria Desert	Nature Reserve	WA
Ngadju	Indigenous Protected Area	WA
Plumridge Lakes	Nature Reserve	WA
Queen Victoria Spring	Nature Reserve	WA

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Nava-1 Cable System	2001/510	Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Tropicana Gold Project-Develop open cut gold mine, and associated infrastructure	2008/4270	Controlled Action	Post-Approval
Tropicana Joint Venture Gold Exploration Activites in the Group 2 and Group 3 T	2008/4463	Controlled Action	Post-Approval
Not controlled action			
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and 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

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

Where little information is available for a 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 detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

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.

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