

GARDEN GULLY PROJECT

APPLICATION TO AMEND CPS 10902/1

May 2026

Prepared for:



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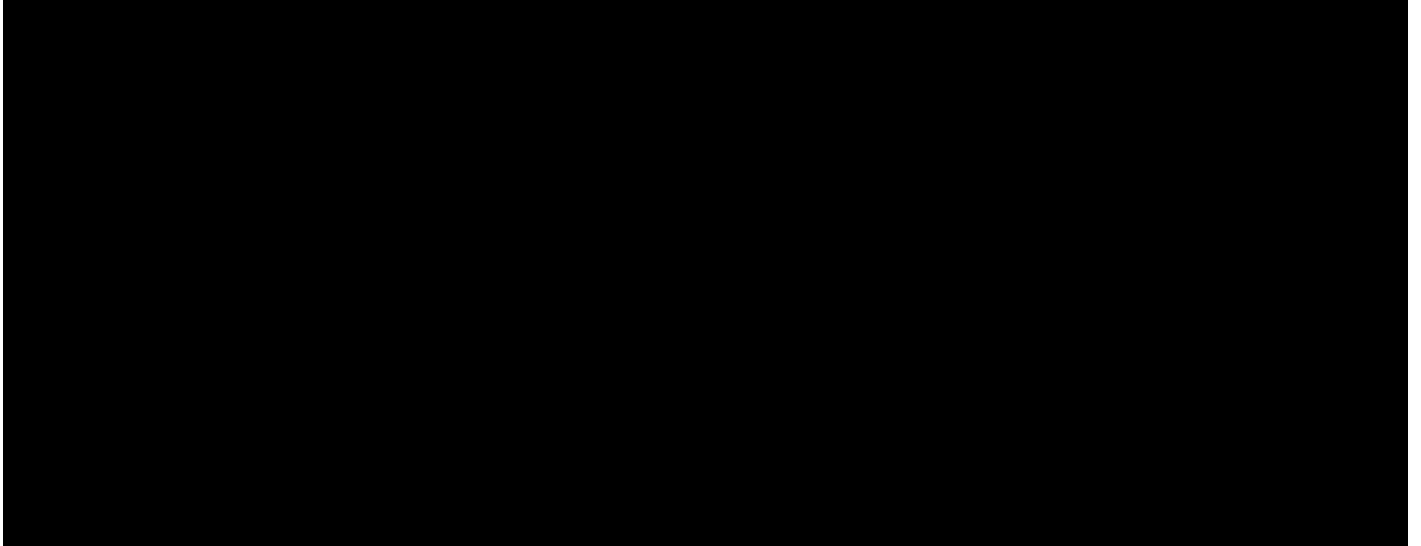
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Executive Summary

New Murchison Gold Limited proposes to amend the existing Purpose Permit Area from 204.52 ha to 317.68 ha, representing a total increase of 113.16 ha. This is required to accommodate the development of infrastructure to support mining of the Lydia deposit at the Garden Gully Project. Within this amended Purpose Permit Area, up to 70.39 ha of native vegetation is proposed to be cleared in addition to the 93.96 ha of clearing that has previously been approved. The total amended clearing allowance under CPS 10902 proposed is therefore 164.35 ha.

The Garden Gully Project is located 670 km northeast of Perth and approximately 20 km north of Meekatharra in the Murchison, Mid-West region of Western Australia. New Murchison Gold Limited is proposing to develop additional infrastructure including three open pits, a waste rock landform, flood bund and haul roads all located within tenement M 51/889.

Clearing Permit CPS 10902/1 was approved on 29 March 2025 for M 51/886 and part of M 51/889, authorising the clearing of up to 93.96 ha of native vegetation to facilitate the development of two open pits and associated infrastructure. This infrastructure includes a waste rock landform, low-grade ore stockpiles, a Run of Mine (RoM) pad, workshop facilities, dewatering infrastructure, offices, and internal access roads.

This amendment application seeks to expand the Purpose Permit Envelope further into M 51/889, increase the total area authorised for clearing, and update the name of the permit holder and expiry of the permit.

An assessment against the ten clearing principles was undertaken based on information collected from site specific flora and fauna surveys conducted for the Project. The indicative clearing footprint for the proposed infrastructure has been developed to ensure impacts to sensitive environmental values are avoided or minimised.

The assessment of the proposed clearing against the ten clearing principles determined that the proposed clearing of an additional 70.39 ha for the Project will not be or is unlikely to be at variance with the ten clearing principles. Appropriate environmental management measures will be implemented to ensure potential direct and indirect impacts associated with the clearing are avoided or minimised where practicable.

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- Appendix G** : Reconnaissance Flora and Vegetation Survey L 51/98 and M 51/322 (NVS 2019)
- Appendix H** : Targeted Flora Survey M 51/886, M 51/889 (Botanica 2025)
- Appendix I** : Hydrological and Hydrogeological Assessment (Rockwater 2024)
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1. Introduction

New Murchison Gold Limited (NMG) is developing the Garden Gully Project (the Project), an open pit gold mining operation located approximately 670 km northeast of Perth and 20 km north of Meekatharra in Western Australia. The Project involves the development of open pit mines, associated waste rock landforms (WRLs), and supporting infrastructure, with ore to be crushed and transported off-site for processing.

CPS 10902/1 was granted under Section 51E of the *Environmental Protection Act 1986* (EP Act) to authorise clearing of up to 93.96 ha of native vegetation within Mining Leases M 51/886 and M 51/889 for mineral production and associated infrastructure (Appendix A) The Permit is valid from 29 March 2025 to 28 March 2030.

Clearing Permit CPS 11300/1 was subsequently granted for the Project to authorise the clearing of up to 26.6 ha of native vegetation within Miscellaneous Licences L 51/138 and L 51/139 for dewatering infrastructure. CPS 11300/1 applies to linear and associated infrastructure required for dewatering activities and is separate to the clearing authorised under CPS 10902/1.

NMG are now proposing further mining operations within M 51/889 (Lydia) including three additional open pits, a WRL, haul roads, laydown areas and associated infrastructure required to support efficient extraction of the mineral resource and integration with the broader Garden Gully Project.

The revised disturbance footprint associated with the Lydia development extends beyond the area currently authorised for clearing under CPS 10902/1. The current permit is also currently held by Zeus Mining Pty Ltd. On 2 July 2025, Zeus Mining Pty Ltd changed its name to NM Gold Operations Pty Ltd. A certificate of name change is enclosed with this amendment application (Appendix B). Accordingly, NMG is applying to amend CPS 10902/1 under the EP Act to:

- Increase the total area of native vegetation authorised to be cleared.
- Modify the permit boundary to incorporate the additional disturbance areas within M 51/889.
- Update the permit holder name from Zeus Mining Pty Ltd to NM Gold Operations Pty Ltd.
- Extend the permit to 28 March 2033.

This report has been prepared to support the amendment to CPS 10902/1 and provides:

- A description of the proposed additional clearing and revised disturbance footprint.
- An assessment of the proposed amendment against the ten clearing principles.
- A summary of environmental management measures to avoid, minimise and mitigate potential impacts.

The assessment draws on environmental studies undertaken over M 51/886 and M 51/889, and for the larger Garden Gully Project.

2. Background

2.1 Location

The Project is situated approximately 670 km northeast of Perth and 20 km north of Meekatharra (Figure 1). It comprises the Crown Prince and Lydia deposit of the Abbots Greenstone Belt.

The Project is accessed by Meekatharra-Mount Clere Road (unsealed), approximately 13 km from the Great Northern Highway. Ore products will be transported from the Project via site access roads and the Great Northern Highway to Bluebird Gold Mine, located approximately 15 km south southwest of Meekatharra.

2.2 Tenure

The Project is currently situated within M 51/886, M 51/889, L 51/138 and L 51/139. All tenements are held by NM Gold Operations Pty Ltd (previously Zeus Mining Pty Ltd), a wholly owned subsidiary of Red Dragon Mines Pty Ltd. Red Dragon Mines Ltd is a wholly owned subsidiary of NMG. A certificate of registration of name change is provided in Appendix B.

Current mining operations and the majority of infrastructure are located on M 51/886. At present, only supporting infrastructure is located on M 51/889; however, the proposed activities requiring amendment to the clearing permit include the development of three open pits, a WRL, flood bund, and haul roads on M 51/889.

Miscellaneous Lease L 51/138 contains dewatering infrastructure to allow transfer of excess water to the Sabbath Pit. Miscellaneous Lease L 51/139 contains dewatering infrastructure to allow transfer of excess water to the Five Mile Well Pit. Required native vegetation clearing in these areas are covered by CPS 11300/1.

A summary of tenements relevant to this application is provided in Table 1 with a tenement plan presented in Figure 2 which also shows the proposed amended Purpose Permit Area (PPA). Evidence of tenure over these tenements is provided in Appendix C.

Table 1: Project Tenements for Amended PPA

Tenement	Area (Ha)	Holder	Granted	Expiry
M 51/886	205.9	NM Gold Operations Pty Ltd	21/02/2022	20/02/2043
M 51/889	189.2	NM Gold Operations Pty Ltd	21/02/2022	20/02/2043

The Project is located within the Shire of Meekatharra and is situated on Yoothapina Pastoral Station and Sherwood Pastoral Station. A portion of the Project (M 51/889 and portions of M 51/886 and L 51/138) is located over an old local recreation reserve No. 10633 associated with historic cultural events, mining, settlement, and water supply. NMG consulted with the Meekatharra Shire regarding the Project, including local heritage Site 25188. The Shire confirmed the Garden Gully site was largely absent and raised no objections to the Project.

The Meekatharra Water Reserve which includes the Sherwood Borefield that supplies water for the town is approximately 2 km northeast and upstream of the Project at its closest point, but about 9 km from the nearest production bore.

2.3 Existing Clearing Permit Records

In accordance with CPS 10902/1 conditions, NMG maintains records relating to clearing activities and associated environmental management requirements, including:

- Location (GDA, 2020 coordinates).
- The date on which clearing occurred.
- The total area cleared (ha).
- Actions undertaken to avoid, minimise and reduce impacts in accordance with Condition 6.
- Weed management measures (Condition 7).
- Actions undertaken in relation to directional clearing and vegetation and drainage management (Conditions 5 and 8).

Flora management records required under Condition 9 are also maintained, including:

- The location of any priority flora species.
- Demarcation and buffer implementation.
- Management actions undertaken to ensure compliance with permit requirements.

Consistent with Form C4 (part 7) for amendment applications, NMG have compiled records documenting the extent, location and timing of clearing, along with associated environmental management actions.

Clearing activities at the Project are managed through the NMG Ground Disturbance Permit (GDP) system. This system provides a structured framework for the planning, approval and implementation of clearing, ensuring activities are undertaken within approved disturbance limits and in accordance with permit conditions.

The GDP process includes:

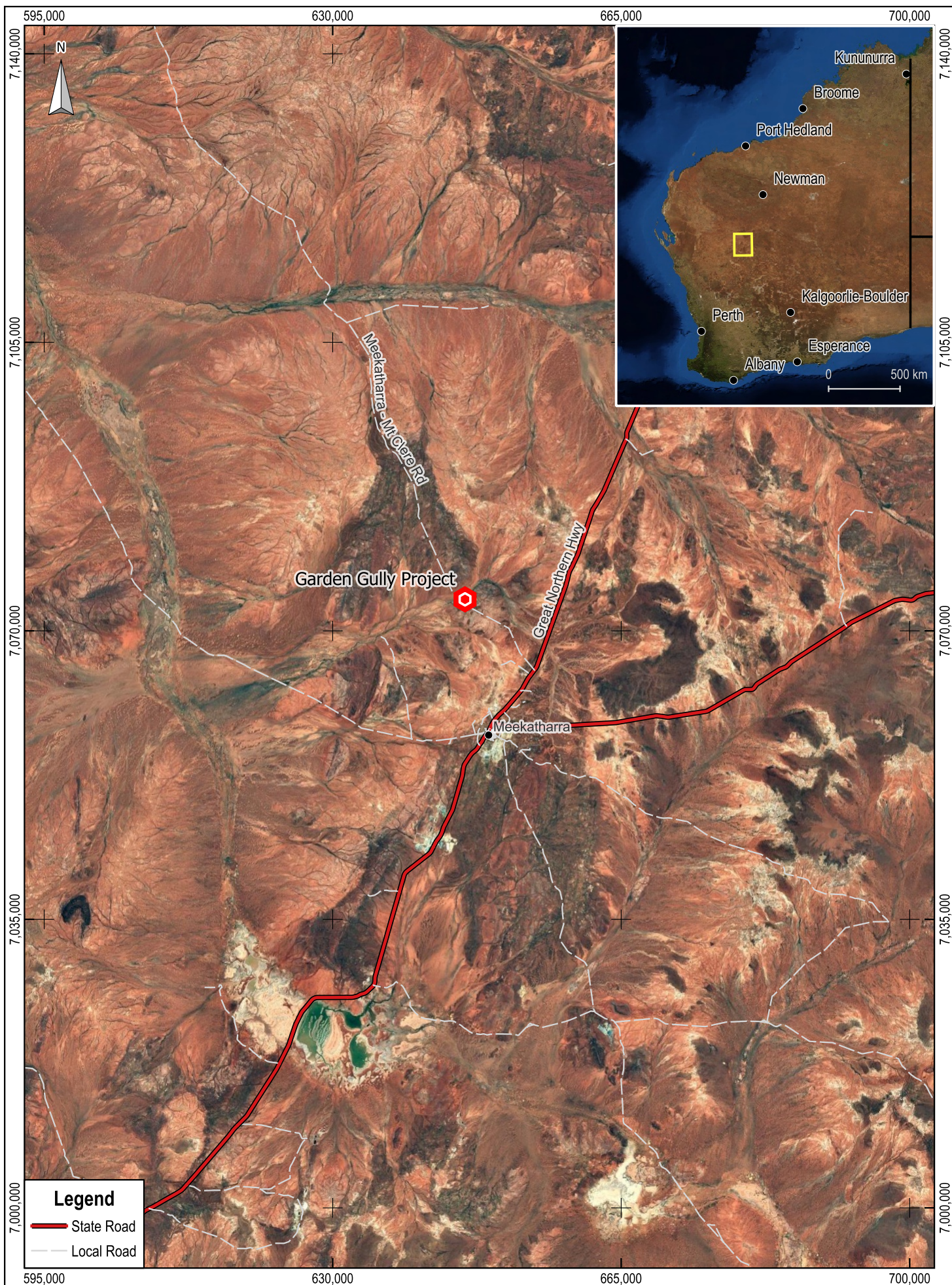
- Verification of approvals and disturbance boundaries.
- Identification of environmental constraints (including priority flora and drainage features).
- Application of avoidance and minimisation measures.
- Demarcation of disturbance and exclusion areas prior to clearing.
- Implementation of operational controls, including directional clearing, weed hygiene and flora protection.

Compliance with CPS 10902/1 conditions is embedded within the Garden Gully GDP procedure, including requirements for directional clearing, priority flora protection (including 10 m buffers), avoidance of riparian vegetation where practicable, and maintenance of natural drainage patterns (Appendix D).

A summary of GDP's issued for clearing activities undertaken to date is provided in Table 2. These records demonstrate that clearing has been undertaken in a controlled and authorised manner, with a total of 75.88 ha cleared to date of the 93.96 ha approved under CPS 10902/1.

Table 2: Garden Gully Ground Disturbance Permits

GDP No	Date of Issue & Clearing	Disturbance Location	Disturbance Area (ha)	Native Vegetation Clearing (ha)
GDP001	25/06/2025	Infrastructure (offices), fuel farm, and West Pit CWP	3.41	3.41
GDP002	2/07/2025	West Pit Stage 1	5.80	0.00
GDP003	3/07/2025	Low Grade Stockpile	6.18	6.18
GDP004	3/07/2025	Run of Mine (ROM)	4.29	4.29
GDP005	3/07/2025	Road train loop	8.70	8.70
GDP006	5/07/2025	Turkey's nest	0.40	0.40
GDP007	5/07/2025	Reload and magazine	1.17	1.17
GDP008	23/07/2025	West Pit Stage 2	1.06	0.00
GDP009	31/07/2025	West Pit Stage 2	1.97	1.06
GDP010	6/08/2025	West Pit Stage 2	0.90	0.32
GDP011	8/08/2025	Road train road to battery sands	0.25	0.14
GDP012	12/08/2025	Road train loading area	0.18	0.00
GDP013	16/08/2025	Crusher pad LV ramp	0.84	0.84
GDP014	27/08/2025	Clearing area for sheeting stockpile	0.49	0.00
GDP015	31/08/2025	Contaminated HG stockpile and black shale stockpile	2.34	2.34
GDP016	10/09/2025	Clay storage area	0.39	0.39
GDP017	10/09/2025	Sediment trap	0.07	0.07
GDP018	10/09/2025	Flood bund area	1.38	1.39
GDP019	16/09/2025	West Pit Stage 2	1.71	0.37
GDP020	20/09/2025	Battery sand screening area	0.27	0.27
GDP021	4/10/2025	West Pit Stage 2 remaining shot boundary	6.95	1.14
GDP022	9/10/2025	Pit development and WRL	40.55	39.65
GDP023	1/11/2025	East pit road	0.83	0.50
GDP024	4/01/2026	MW extension	0.35	0.26
GDP025	25/01/2026	Cloudkicker footprint	7.07	2.40
GDP026	13/02/2026	Clearing required to create a track to backfill CWP	0.90	0.49
GDP027	7/04/2026	Clearing LV track - OZL TMP	0.11	0.11
GDP028	28/04/2026	Waste dump track	1.94	1.94
Total			99.25	75.88



Scale: 1:600000
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 Aerial Imagery: Google Satellite
 Grid: GDA2020 / MGA zone 50

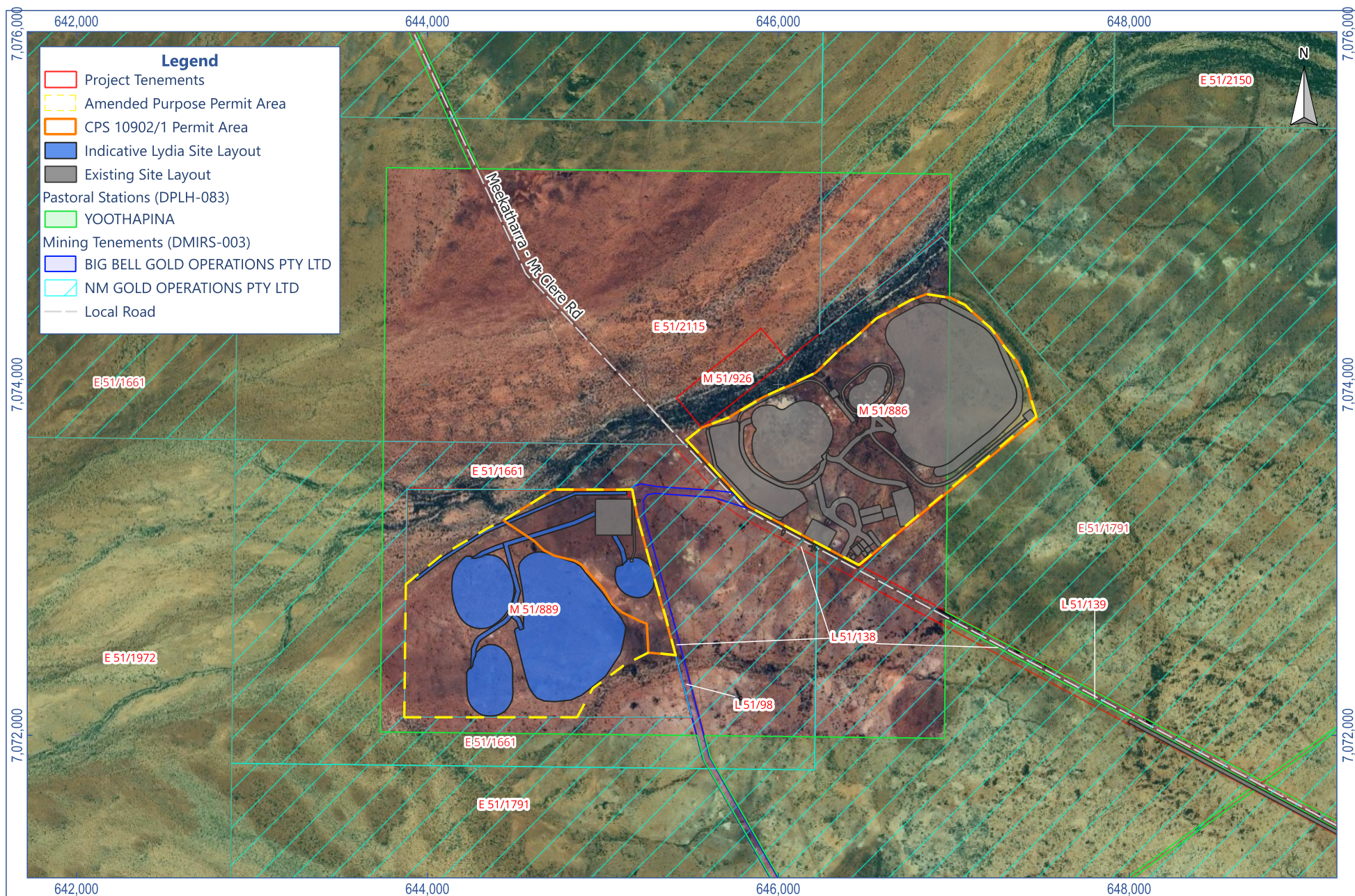
0 7.5 15 km

New Murchison Gold Limited
 Garden Gully Project

Location Plan

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Scale: 1: 30,000
 Original Size: A4
 Grid: GDA2020 / MGA zone 50
 (EPSG:7850)
 0 0.5 1 km

New Murchison Gold Limited Garden Gully Project

Figure 2

Tenement Plan

3. Environmental Setting

The Project is located in the Murchison, Mid West region which experiences a non-seasonal arid climate with hot and dry summers and cool winters. No month in a given year can be considered reliably wet, and zero rainfall can be recorded in any month.

Meekatharra Airport (ID: 007045) is the closest representative Bureau of Meteorology (BoM) weather station (20 km to the southeast). The mean maximum temperatures range from 19.3 to 38.5°C, with mean minimum temperatures ranging from 7.5 to 24.5°C (Chart 1).

Rainfall averages 231.5 mm per year with totals influenced by the remnants of tropical cyclones and local atmospheric depressions. The yearly rainfall statistics from Meekatharra Airport weather station are shown in Chart 1.

The lowest recorded annual rainfall since 1944 was 66.2 mm; with the highest recorded at 573.2 mm. The rainfall for November and December 2025 was above average. Rainfall for January and February was significantly lower than the average (BoM, 2026).

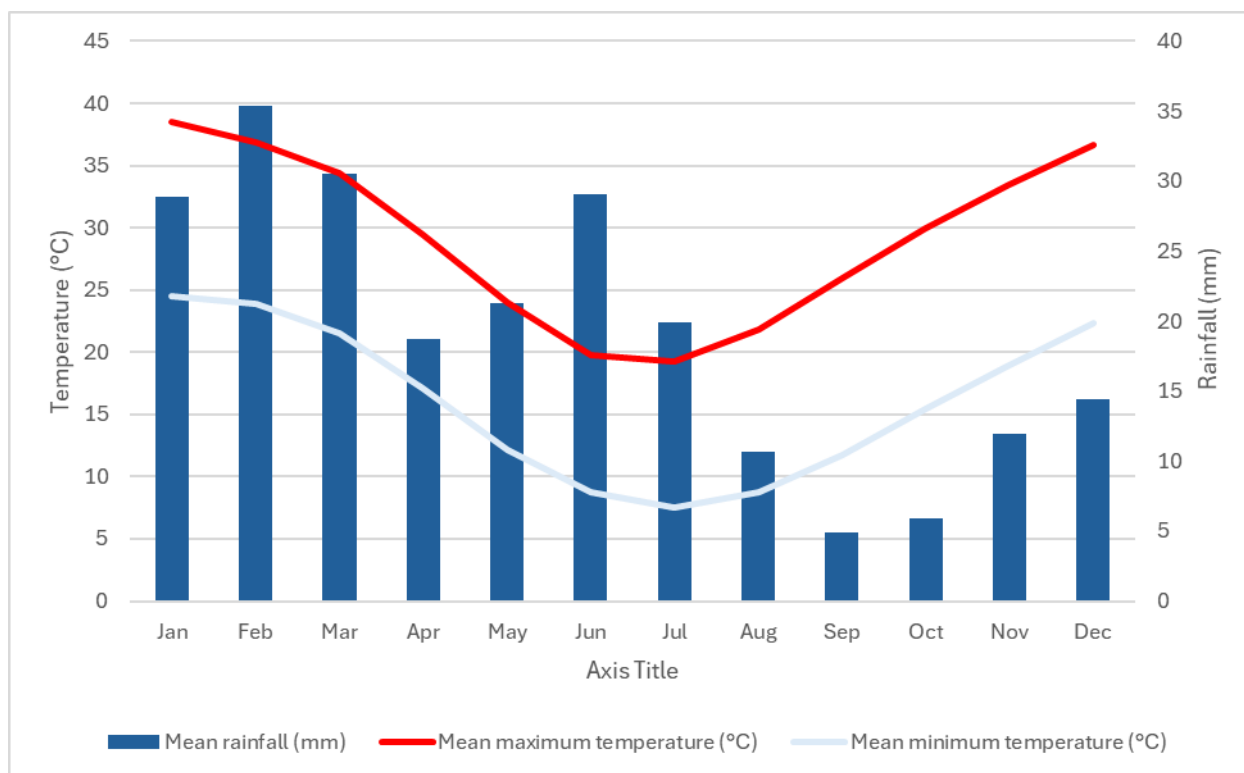


Chart 1: Climate Data for Meekatharra Airport (1950–2026) (BoM, 2026)

3.1 Soils and Landscape

A desktop review of land systems and soil types was performed using data from the Department of Primary Industries and Regional Development (DPIRD) (CSIRO, 2024).

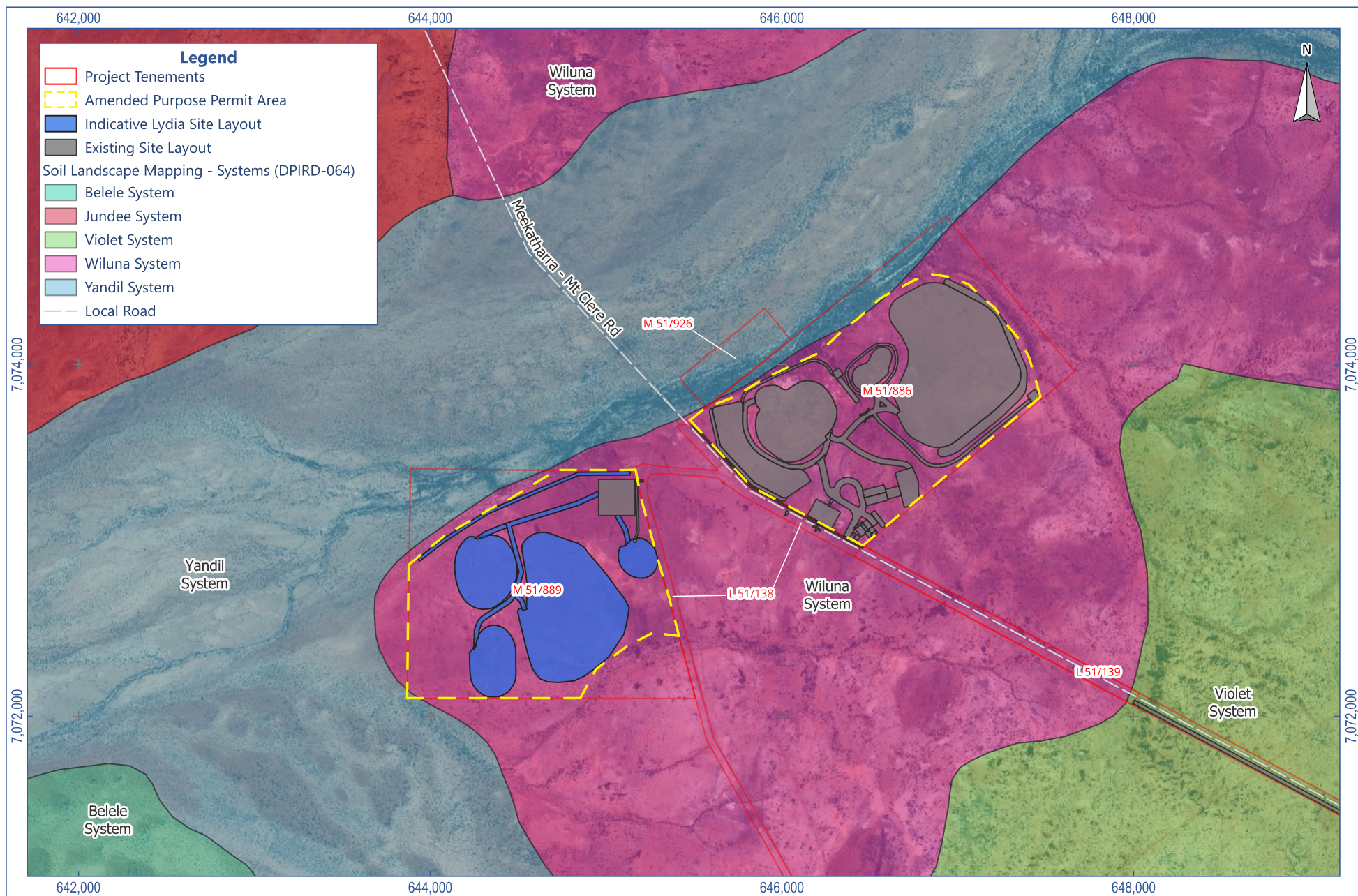
Characteristics of the land systems and soil types which intersect tenements M 51/886 and M 51/889 are described in Table 3 and mapped in Figure 3 (Pringle, Gilligan and van Vreeswyk, 1994).

Mapped soil types include red shallow loams and sandy duplexes, red-brown hardpans and stony soils.

Wiluna is the main land system unit and covers 99.9% of the amended PPA.

Table 3: Soil and Landform Units in M 51/886 and M 51/889

Land System	Geology	Landforms	Major Soil Types (DAFWA Soil Group)	Infrastructure Within Land System	Area within M 51/886 & M 51/889 (ha)
Wiluna (272Wi)	- Archaean amphibolite, basalt and schistose rocks with Tertiary laterite capping. - Quaternary colluvium on slopes and Quaternary alluvium on lowlands.	- Low greenstone hills with occasional lateritic breakaways and broad stony slopes. - Lower saline stony plains and broad drainage tracts. - Sparse mulga and other acacia shrublands with patches of halophytic shrubs.	- Red shallow loam. - Red shallow sandy duplex. - Red shallow sand. - Red-brown hardpan shallow loam. - Stony soil.	Main disturbance area including pit and WRL and some dewatering infrastructure.	363.11
Yandil (272Yn)	Quaternary cemented alluvium derived principally from gneiss and granite with minor aeolian deposits.	- Flat hardpan wash plains with mantles of small pebbles and gravels. - Groved mulga shrublands and occasional wanderrie grasses.	- Red-brown hardpan shallow loam. - Red loamy earth. - Red shallow sand.	Intersected by dewatering infrastructure (pipelines) only.	32.04



Scale: 1: 30,000
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 (EPSG:7850)

0 0.5 1 km

New Murchison Gold Limited Garden Gully Project

Figure 3
Land Systems and Soils

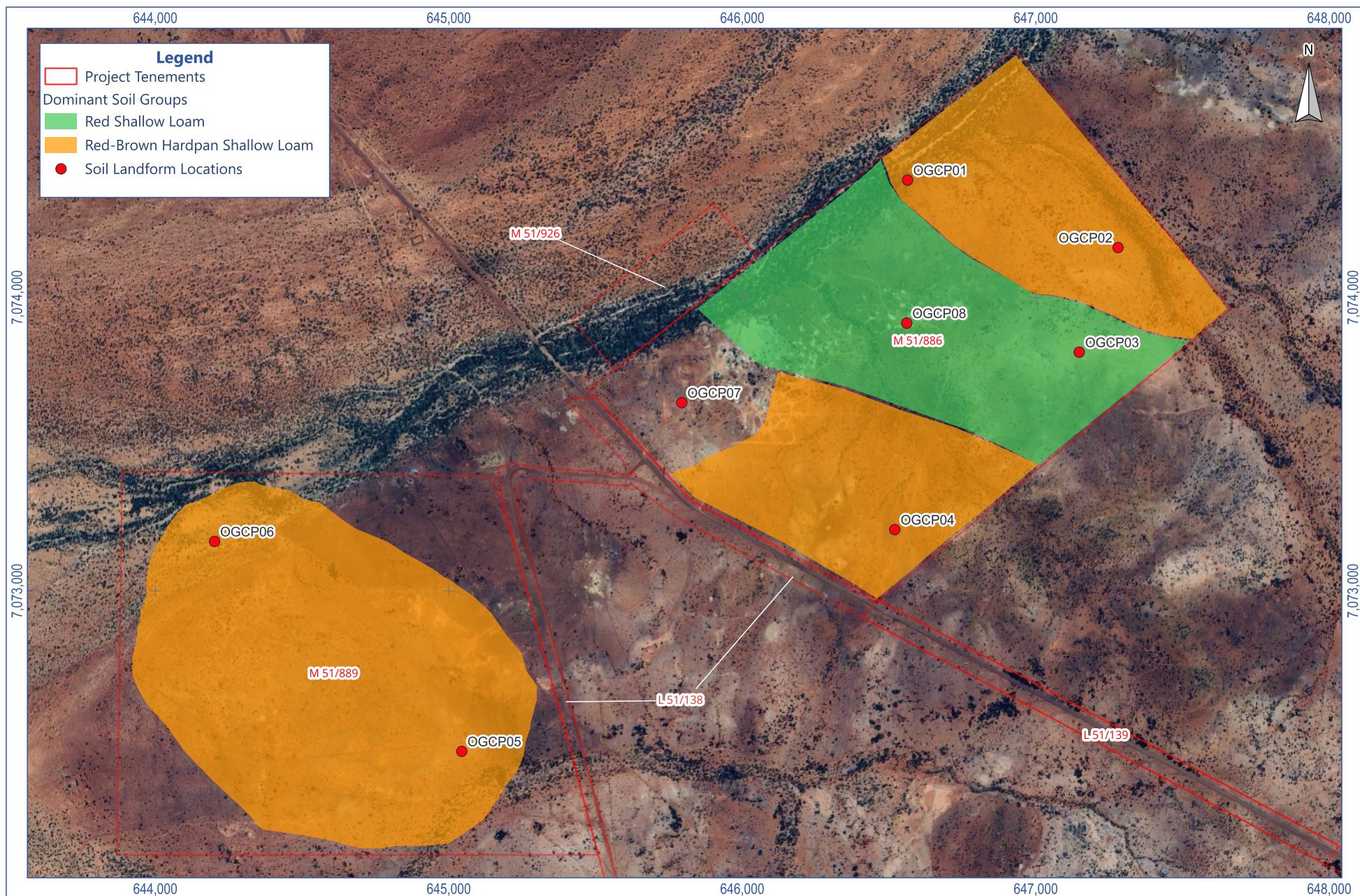
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MBS (2024) was engaged to complete a soil and landform assessment for the main tenements of the Project (M 51/889 and M 51/886). Soil and subsoil profiles from eight locations were sampled in this assessment, with dominant soil groups determined, as shown in Figure 4. Key findings from the soil assessment include:

- Two landform types were identified:
 - Stony plains.
 - Broad stony slopes/plains.
- Both identified landforms are not considered significant with respect to (EPA, 2018) criteria for the following reasons:
 - Landforms are widely represented locally and regionally.
 - Landforms have been subjected to geological exploration and pastoral land use and are thus not considered pristine.
 - Landforms are not of any known ecological, geological or cultural significance.
 - The proposed disturbance area is <400 ha, which represents a very minor area with respect to the distribution of these landforms regionally.
- Three soil groups were identified:
 - Red shallow loams (DAFWA Group 522).
 - Red-brown hardpan shallow loams (DAFWA Group 523).
 - Shallow gravels (DAFWA Group 304).
- Gravel contents were variable across soils and subsoils ranging from 2% to 40% in surface soils and 2% to 65% in subsoils.
- Texturally, surface soils were typically sandy loams, whilst subsoils generally contained more clay and were classified as sandy loams, sandy clay loams or clays.
- Subsoils from two locations (OGCP01 and OGCP05, Figure 4) are likely to be dispersive given they had an Emerson Class rating of 1 and clay contents of around 27% to 28%. Soils from other areas are unlikely to be dispersive given they contained Emerson Class ratings of ≥ 3 .
- Samples contained low exchangeable sodium percentages (ESP%) of <4.4%. This indicates that Project soils are non-sodic and thus unlikely to be erosion prone.
- Soils and subsoils had highly variable pH values ranging from 4.6 to 8.5.
- There was general trend in which soil pH increased with soil depth. A total of six samples contained pH values of ≤ 5.2 which are consistent with moderate to highly acidic soils.

- Most soils were of low salinity, with the notable exception of one location (OGCP03, Figure 4) which contained higher clay contents and very high EC values of 240 mS/m in surface soils and 460 to 480 mS/m in subsoils. Soils from this location were thus classified as extremely saline. OPGP03 is located in the previously approved portion of the PPA within M 51/886.
- Exchangeable cation concentrations were generally low across all tested soils and subsoils. Whilst most soils contained typical/moderate exchangeable aluminium concentrations, aluminium toxicity was not considered likely. All soils also contained low exchangeable sodium percentage (ESP) values and are thus non-sodic.
- Soils typically contained low organic carbon, total nitrogen concentrations plus plant available cobalt, molybdenum, nickel and sulphur concentrations. Potential metal(loid) contaminants such as arsenic, cadmium, lead and selenium were present in low plant-available concentrations across all samples.
- On an average basis, soils were unlikely to contain total metal(loid) concentrations that exceed the NEPM default environmental criteria used as a reference throughout this assessment.

Within the proposed Lydia development, the majority of soils and subsoils can be stripped, harvested, stockpiled and re-used as required. Some localised impediments to re-use include soils from the OGCP05 area (Figure 4) which were identified as potentially dispersive and may lead to increased erosion risk and reduced soil stability if used in rehabilitation efforts on slopes. OGCP05 is located within the amended PPA, specifically within the footprint of the proposed WRL on tenement M 51/889.



Scale: 1: 18,000
 Original Size: A4
 Grid: GDA2020 / MGA zone 50
 (EPSG:7850)
 0 250 500 m

New Murchison Gold Limited Garden Gully Project

Figure 4
Dominant Soil Groups

3.2 Flora and Vegetation

The Project lies within the Western Murchison (MUR2) sub-region of the Interim Biogeographical Regionalisation of Australia (IBRA) Murchison Bioregion Botanica (Appendix E). The subregion can be characterised by mulga low woodlands, often rich in ephemerals (usually with bunch grasses), on outcrop and fine textured Quaternary alluvial and eluvial surfaces (extensive hardpan washplains that dominate and characterise the subregion) mantling granitic and greenstone strata of the northern part of the Yilgarn Craton. Surfaces associated with the occluded drainage occur throughout with hummock grasslands on Quaternary sandplains, saltbush shrublands on calcareous soils and Tecticornia low shrublands on saline alluvia. The MUR2 sub-regional area is 6,985,514 ha.

There are no Department of Biodiversity Conservation and Attractions (DBCA) managed lands or other conservation areas within proximity to the amended PPA with the nearest being the Lakeside Conservation Park (R54420), approximately 130 km southwest of the Project (Appendix E).

Botanica (Appendix E) undertook a reconnaissance level flora and vegetation survey of tenements M 51/886 and M 51/889 covering a total area of 394 ha during June 2024 (Appendix E). Botanica also undertook a Reconnaissance Flora and Vegetation and Basic Fauna Survey in April 2025 covering tenements L 51/138 and L 51/139 covering a total area of approximately 340 ha (Appendix F). In addition, as part of the Sabbath Mining Project, Big Bell Gold Operations Pty Ltd commissioned Native Vegetation Solutions (NVS) to undertake flora and vegetation survey over L 51/98 and M 51/322 (which overlap L 51/138). This covered an area of 127 ha (Appendix G).

As part of both Botanica (2024 and 2025) studies, a desktop assessment for a 40 km buffer area was undertaken including a literature review of previous botanical assessments, database search requests for significant flora records, ecological communities as well as numerous publicly available database searches relevant to other biodiversity matters of conservation significance. Flora and vegetation surveys were undertaken in accordance with the Environmental Protection Authority (EPA) *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016a).

3.2.1 Vegetation Communities

The pre-European vegetation spatial mapping dataset (DPIRD, 2023) identified two vegetation associations as occurring within the Project tenements and amended PPA. The large majority of existing and proposed disturbance within the amended PPA is located within an area mapped as the Upper Murchison 18 association. The exception is the proposed Lydia South Pit and minor portions of the Lydia North Pit and flood bund.

The association descriptions are identical for both associations and their remaining extents, as specified in the 2018 Statewide Vegetation Statistics (DBCA, 2019) are provided in Table 4. 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' (Appendix E). Both vegetation associations retain greater than 99.73% of their pre-European extent, and development of the Project will not significantly reduce the current extent of these vegetation communities.

Table 4: Pre-European Vegetation Associations within the Amended PPA

Vegetation Association	Description	Pre-European Extent Remaining (%)
Upper Murchison 29	Low woodland, open low woodland or sparse woodland of Mulga (<i>Acacia aneura</i>) and associated species	99.97
Upper Murchison 18	Low woodland, open low woodland or sparse woodland of Mulga (<i>Acacia aneura</i>) and associated species	99.73

As part of both Botanica surveys (Appendix E and Appendix F), eight broad scale vegetation communities were identified and which aligned with the vegetation associations described in Table 5. Vegetation communities were identified within three landform types (rocky hillslope, plains and drainage depressions) and comprised of three major vegetation groups, dominated by *Acacia* and *Eucalypt* species. The majority of the vegetation condition within the survey area was categorised as 'good' (663.31 ha), with 69.17 ha considered 'completely degraded'.

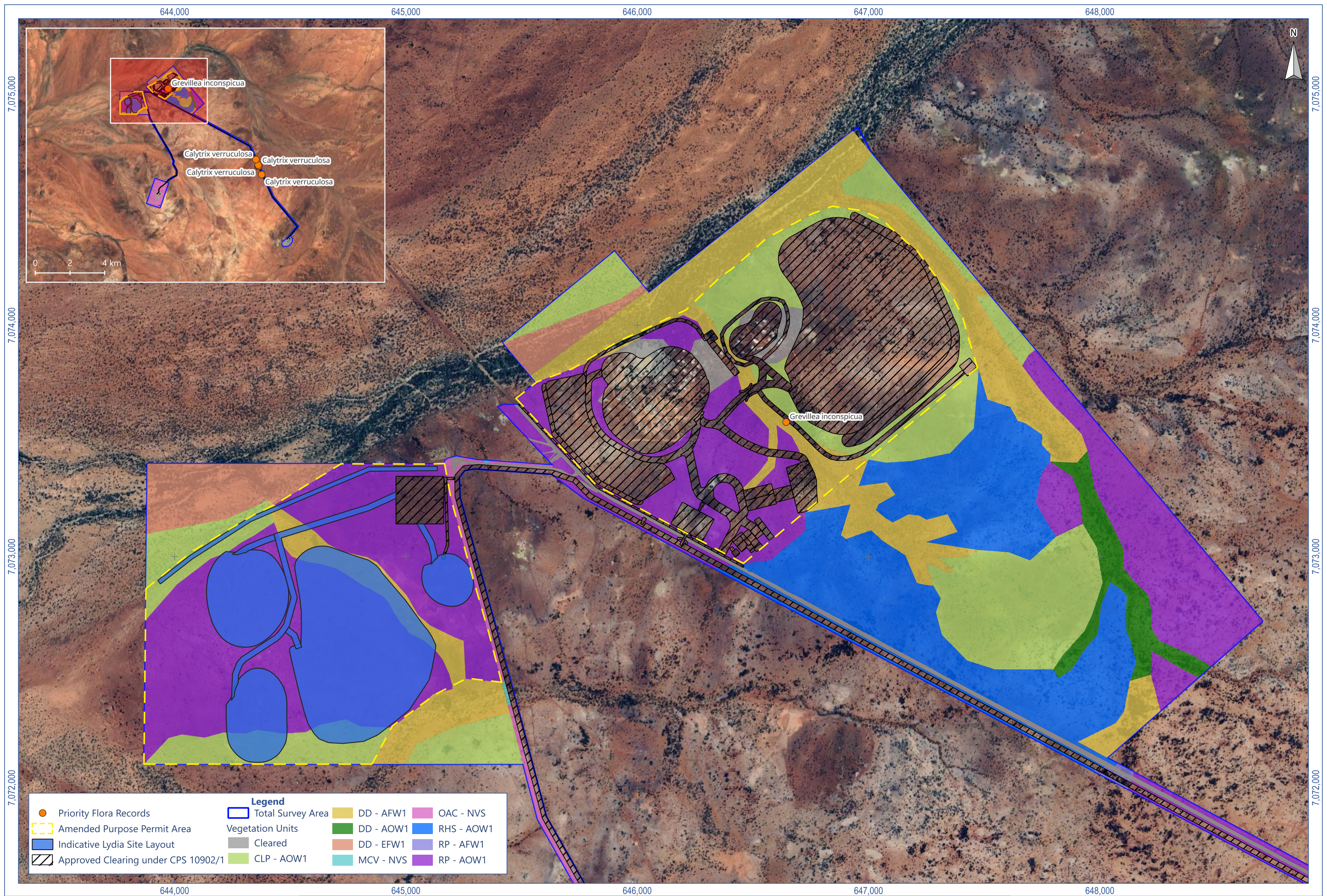
NVS mapped three broadscale vegetation communities, two of which intersect the Project's dewatering infrastructure. Similar to the Botanica survey findings, vegetation communities were considered to be of low biological diversity, ranging from 'good' to 'degraded' condition, and are well represented outside the survey area (Appendix G).

Vegetation communities that intersect the Project tenements and their surveyed extents are described in Table 5 and shown in Figure 5.

Table 5: Mapped Vegetation Communities

Vegetation Group	Vegetation Community/Code	Description	Surveyed/Mapped Extent (ha)*	Source
Acacia Open Woodland (MVG 13)	RHS - AOW1	Mid woodland of <i>Acacia pruinocarpa</i> and <i>A. incurvaneura</i> over mid open shrubland of <i>Eremophila latrobei</i> , <i>E. jucunda</i> and <i>Senna sp.</i> Meekatharra over low sparse shrubland of <i>Maireana triptera</i> on a rocky hillslope.	90.71	Appendix F
	RP - AOW1	Mid woodland of <i>Acacia pruinocarpa</i> and <i>A. incurvaneura</i> over mid open shrubland of <i>A. grasbyi</i> , <i>Eremophila galeata</i> and <i>Senna sp.</i> Meekatharra over low sparse shrubland of <i>Maireana triptera</i> and <i>Enchylaena tomentosa</i> on a quartz rocky plain.	242.96	Appendix E and Appendix F
	CLP - AOW1	Mid woodland of <i>Acacia incurvaneura</i> over mid shrubland of <i>Eremophila compacta</i> over low sparse shrubland of <i>Solanum lasiophyllum</i> and <i>Aristida contorta</i> on clay loam plain.	196.58	
	DD - AOW1	Mid woodland of <i>A. incurvaneura</i> over mid open shrubland of <i>Eremophila galeata</i> over low sparse shrubland of <i>Maireana triptera</i> and <i>Enchylaena tomentosa</i> in a drainage depression.	13.96	Appendix F
Acacia Forrest Woodland (MVG 6)	RP - AFW1	Mid open forest of <i>Acacia incurvaneura</i> over mid open shrubland of <i>A. tetragonophylla</i> and <i>Senna sp.</i> Meekatharra over low sparse shrubland of <i>Ptilotus obovatus</i> and <i>Solanum lasiophyllum</i> on a quartz rocky plain.	0.74	Appendix E and Appendix F
	DD - AFW1	Mid open forest of <i>Acacia incurvaneura</i> over mid open shrubland of <i>Acacia tetragonophylla</i> , and <i>Senna sp.</i> Meekatharra over low sparse shrubland of <i>Ptilotus obovatus</i> and <i>Solanum lasiophyllum</i> in drainage depression.	92.03	
	CLP - AFW1	Mid open forest of <i>Acacia incurvaneura</i> over mid open shrubland of <i>A. tetragonophylla</i> and <i>Senna sp.</i> Meekatharra over low sparse shrubland of <i>Ptilotus obovatus</i> and <i>Solanum lasiophyllum</i> on a clay loam plain.	1.64	Appendix F

Vegetation Group	Vegetation Community/Code	Description	Surveyed/Mapped Extent (ha)*	Source
Eucalypt Woodlands (MVG 5)	DD-EFW1	Mid open forest of <i>Eucalyptus camaldulensis</i> over mid open shrubland of <i>Acacia tetragonophylla</i> and <i>Senna sp.</i> Meekatharra over low sparse shrubland of <i>Ptilotus obovatus</i> and <i>Solanum lasiophyllum</i> in drainage depression.	22.10	Appendix E and Appendix F
Open Acacia Shrubland	OAC-NVS	Open Acacia shrubland. Dominant species were <i>Acacia aneura</i> , <i>Acacia grasbyi</i> , <i>Acacia prainii</i> and <i>Eremophila galeata</i> .	121.55	Appendix G
Mulga Creekline Vegetation	MCV-NVS	Dominant species were <i>Acacia aneura</i> , <i>Acacia craspedocarpa</i> , <i>Acacia pteraneura</i> , <i>Grevillea deflexa</i> , <i>Ptilotus obovatus</i> and <i>Exocarpos aphyllus</i> .	3.98	
Tecticornia Open Shrubland	TOS-NVS	Dominant species were <i>Tecticornia sp.</i> Yoothapina Station.	1.12	
SUB TOTAL	Native Vegetation		787.38	
Cleared	Cleared	Land cleared of native vegetation.	90.60	MBS Digitising (2024) Appendix E and Appendix F
TOTAL	Including Cleared Areas		877.98	



Scale: 1: 15,000
 Original Size: A3
 Grid: GDA2020 / MGA zone 50
 (EPSG:7850)

0 500 1,000 m

New Murchison Gold Limited Garden Gully Project

Figure 5
 Mapped Vegetation Communities
 and Priority Flora

3.2.2 Significant Flora Species

Botanica (Appendix E and Appendix F) identified 90 vascular flora taxa representing 48 genera across 28 families across their survey area. The most diverse families being *Fabaceae* (20 species), *Scrophulariaceae* (11 species) and *Chenopodiaceae* (11 species), followed by dominant genera including *Acacia* (14 species) and *Eremophila* (11 species). Seven annual species were observed during the surveys.

The desktop assessment identified one threatened flora species and 15 priority flora species as occurring within a 40 km radius of their survey area. These taxa were assessed for distribution and known habitat to determine their likelihood of occurrence within the survey area. The species identified in the desktop assessment are summarised in Table 6, with likelihood of occurrence provided based on surveys undertaken by Botanica (Appendix E and Appendix F), NVS (Appendix G) and additional analysis of species records and habitat preferences.

No threatened flora pursuant to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or *Biodiversity Conservation Act 2016* (BC Act) were identified in the field surveys conducted by Botanica or NVS.

One priority flora species was observed within the Botanica survey area of M 51/886 (Appendix E) - *Grevillea inconspicua* (P4). Approximately 30 plants were seen growing in a minor dry drainage line. Whilst this population is not directly impacted by approved clearing, given the close proximity to infrastructure and likely changes to this drainage line, indirect impacts were considered likely and this was noted in the DMPE Clearing Permit Decision Report for CPS 10902/1 (Figure 5). *Grevillea inconspicua* is known from more than 62 populations on Florabase and is known to occur in two IBRA subregions, the Eastern Murchison and Western Murchison. There are seven populations within approximately 100 km of the survey area (DBCA, 2024), and according to Florabase the species covers a range of more than 50,000 km². Within the 40 km desktop area there are over 10 recorded populations, the closest of which is approximately 600 m southwest of L 51/139.

One priority flora species was identified by Botanica (Appendix F) within the survey area on L 51/139. *Calytrix verruculosa* (P3) was observed growing along the Meekatharra Mount-Clere Road in four locations within the boundary of L 51/139, with an additional two locations found approximately 20 to 30 m outside of the survey area (Figure 5). A 10 m exclusion zone has been implemented around records for *Calytrix verruculosa* (P3) as per Condition 9b of CPS 11300/1. *Calytrix verruculosa* is known from 11 populations on Florabase and is known to occur in two IBRA subregions, the Eastern Murchison and Western Murchison. There are five populations within approximately 100 km of the survey area and the species has a range of more than 16,000 km² (Western Australian Herbarium, 2026).

NVS did not record other priority flora on L 51/138 (Appendix G).

Botanica (Appendix H) were commissioned by NMG to undertake a targeted survey for conservation significant flora including *Calytrix verruculosa* (P3) within M 51/886 and M 51/889 to satisfy Condition 9 of CPS 10902/1. No *Calytrix verruculosa* or any other conservation significant flora were identified within the survey area. The survey was undertaken on 21 and 22 April 2025 during the EPA's recommended primary survey time period for the Eremaean Province (i.e. 6-8 weeks following the wet season from March to June). Based on the survey effort and assessment to date, existing DBCA records and habitat available within the amended PPA, any further occurrence of priority flora is considered unlikely.

Table 6: Potential Significant Flora within 40 km

Significant Species	Conservation Status		Habitat Description	Likelihood of Occurrence within Amended PPA
	EPBC Act and BC Act	DBCA Listed		
<i>Acacia speckii</i>		P4	Rocky soils over granite, basalt or dolerite. Rocky hills or rises.	Unlikely - not recorded by Botanica (Appendix E, Appendix F and Appendix H) or NVS (Appendix G). No habitat fitting this description in amended PPA or wider Project area.
<i>Calytrix verruculosa</i>	-	P3	Sandy clay. Shallow hardpan plain.	Unlikely - recorded in broader surveys for the Project however based on the survey effort and assessment to date, any further occurrence within amended PPA is considered unlikely (Appendix E, Appendix F, Appendix G and Appendix H).
<i>Drummondita miniata</i>		P3	Laterite. Breakaways.	Unlikely - not recorded by Botanica (Appendix E, Appendix F and Appendix H) or NVS (Appendix G). No habitat fitting this description in amended PPA or wider Project area.
<i>Eremophila fasciata</i>		P3	Stony hill.	Unlikely - not recorded by Botanica (Appendix E, Appendix F and Appendix H) or NVS (Appendix G). No habitat fitting this description in amended PPA or wider Project area.
<i>Eremophila retropila</i>	-	P1	Gravelly loam. Stony flats.	Unlikely - DBCA records 6 km southwest of L 51/139 and 9 km southeast of L 51/138. Based on the survey effort and assessment to date, occurrence within amended PPA is considered unlikely (Appendix E, Appendix F, Appendix G and Appendix H).
<i>Euploca mitchellii</i>		P1	Rocky hills.	Unlikely - not recorded by Botanica (Appendix E, Appendix F and Appendix H) or NVS (Appendix G). No habitat fitting this description in amended PPA or wider Project area.
<i>Goodenia berringbinensis</i>		P4	Red sandy loam. Along watercourses.	Unlikely - DBCA records 37 km northeast of L 51/139 and 47 km northwest of L 51/138. Based on the survey effort and assessment to date, occurrence within amended PPA is considered unlikely (Appendix E, Appendix F, Appendix G and Appendix H).

Significant Species	Conservation Status		Habitat Description	Likelihood of Occurrence within Amended PPA
	EPBC Act and BC Act	DBC Listed		
<i>Grevillea inconspicua</i>	-	P4	Along drainage lines on rocky outcrops, creeklines.	Unlikely - recorded 600 m southwest of L 51/139. Also recorded on M 51/886 by (Appendix E). Based on the survey effort and assessment to date and habitat available within the existing and proposed PPA, any further occurrence within amended PPA is considered unlikely (Appendix E, Appendix F, Appendix G and Appendix H).
<i>Hemigenia virescens</i>		P3	Yellow-red sandy clay.	Unlikely - not recorded by Botanica (Appendix E, Appendix F and Appendix H) or NVS (Appendix G). No habitat fitting this description in amended PPA or wider Project area.
<i>Homalocalyx echinulatus</i>		P3	Laterite. Breakaways, sandstone hills.	Unlikely - not recorded by Botanica (Appendix E, Appendix F and Appendix H) or NVS (Appendix G). No habitat fitting this description in amended PPA or wider Project area.
<i>Indigofera rotula</i>		P3	Red loamy banks of watercourses.	Unlikely - recorded over 200 m southeast of Five Mile Well Pit and L 51/139. Based on the survey effort and assessment to date, occurrence within amended PPA is considered unlikely (Appendix E, Appendix F, Appendix G and Appendix H).
<i>Lepidium xylodes</i>	-	P1	Gravelly loam, clayey sand.	Unlikely - recorded 43 km northwest of L 51/138. Based on the survey effort and assessment to date, occurrence within amended PPA is considered unlikely (Appendix E, Appendix F, Appendix G and Appendix H).
<i>Menkea draboides</i>	-	P3	Red sand or clay, granite.	Unlikely - recorded over 3 km to the southwest of L 51/138. Based on the survey effort and assessment to date, occurrence within amended PPA is considered unlikely (Appendix E, Appendix F, Appendix G and Appendix H).
<i>Pityrodia augustensis</i>	VU		Amongst rocks on slopes or in drainage lines.	Unlikely - not recorded by Botanica (Appendix E, Appendix F and Appendix H) or NVS (Appendix G). Nearest record over 300 km from Project area.
<i>Ptilotus lazaridis</i>		P3	Clay loam. Floodplains.	Unlikely - recorded 36 km southwest of L 51/138
<i>Ptilotus luteolus</i>		P3	Hillslopes.	Unlikely - not recorded by Botanica (Appendix E, Appendix F and Appendix H) or NVS (Appendix G). No habitat fitting this description in amended PPA or wider Project area.

3.2.3 Weeds

Six introduced flora (weeds) species were observed. These were located in disturbed areas and along tracks. None of these species are listed as a Declared Pest on the Western Australian Organism List (WAOL) under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) or as a Weed of National Significance.

3.2.4 Threatened and Priority Ecological Communities

No threatened, priority or otherwise significant ecological communities were identified in surveys by Botanica (Appendix E and Appendix F) or NVS (Appendix G). In addition, the desktop assessment determined that the nearest potential Priority Ecological Community (PEC) is over 7.5 km to the west of the Project area.

3.2.5 Environmentally Sensitive Areas and Conservation Reserves

No Environmentally Sensitive Areas (ESA's) occur in the amended PPA with the nearest over 45 km to the south associated with Lake Annean.

There are no wetlands of international importance (Ramsar Wetlands) or national importance (Australian Nature Conservation Agency Wetlands) within or in proximity to the amended PPA.

There are no DBCA managed lands or other conservation areas in proximity to the amended PPA with the nearest being the Lakeside Conservation Park (R54420), approximately 130 km southwest and Kaluwiri National Park located approximately 117 km southeast.

3.2.6 Groundwater Dependant Ecosystems

In accordance with the BoM Atlas of Groundwater Dependent Ecosystems (GDEs) database, there are no known or potential aquatic GDEs within the Project area however two potential terrestrial GDEs occur. Botanica determined that vegetation types identified mostly aligned with the ecosystem descriptions provided in the BoM Atlas and although difficult to determine how dependent these communities are on groundwater, determined they are more likely to obtain their water requirements from surface water (Appendix D).

Dewatering will be required during development of the open pits as the water table is located approximately 10 m below ground level (475 m AHD) across the Project area. Rockwater (Appendix I) were engaged to undertake a hydrogeological study of the Crown Prince deposit and surrounding area to gain an understanding of the hydrogeological context, provide estimates of dewatering requirements and the potential for groundwater related impacts of mining. A 5C licence (GWL213551) and Groundwater Licence Operating Strategy (GLOS) under the *Rights in Water and Irrigation Act 1914* (RIWI Act) has been approved for dewatering on M 51/886. Further hydrogeological studies are underway to determine dewatering requirements for the proposed pits at Lydia and to ensure dewatering does not impact vegetation outside of proposed clearing areas. These studies will support the amendment to the current 5C licence prior to dewatering.

3.2.7 Fauna Habitat

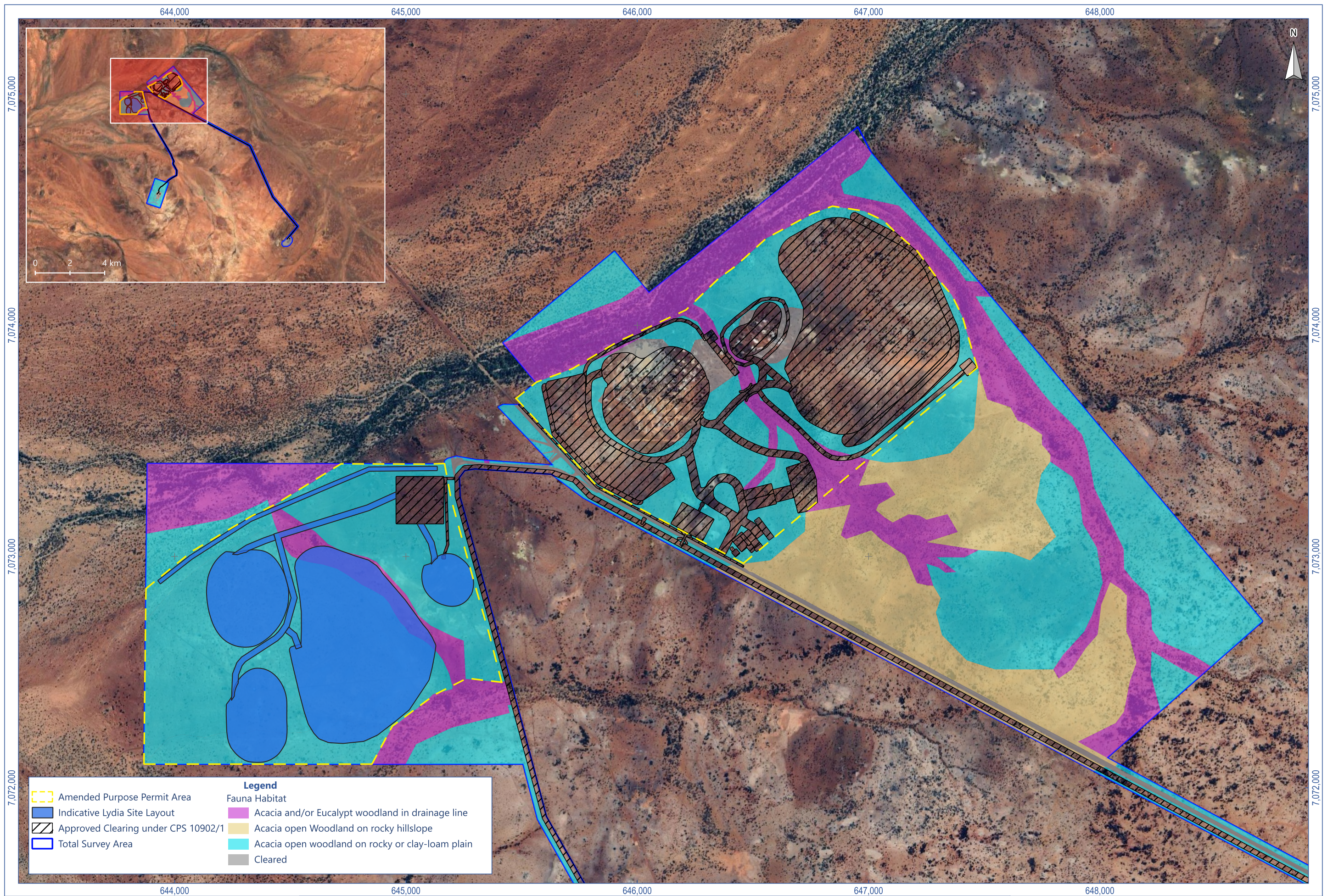
The following surveys relevant to fauna habitat have been undertaken within the project area:

- Botanica (2024): Level 1 (basic) fauna assessment of tenements M 51/886 and M 51/889 (562 ha) (Appendix E), including a desktop review over a 40 km buffer, incorporating previous fauna studies, database searches for conservation significant species, and publicly available biodiversity datasets. The survey was undertaken in accordance with the EPA Technical Guide – Terrestrial Fauna Surveys for Environmental Impact Assessment (EPA, 2020).
- Botanica (2025): Level 1 fauna assessment of tenements L 51/138 and L 51/139 (340 ha) (Appendix F).
- NVS (2019): Reconnaissance flora and vegetation survey of tenement L 51/138 (127 ha) (Appendix G).

Based on vegetation types and associated landforms identified during these surveys, three broad scale terrestrial fauna habitats have been defined - acacia open woodlands, acacia/eucalypt woodlands associated with drainage lines, and acacia open woodlands on rocky hillslopes. These are summarised in Table 7 and are shown in Figure 6.

Table 7: Mapped Fauna Habitats

Habitat Type	Description	Surveyed/ Mapped Extent (ha)	Source
Cleared	Land cleared of native vegetation.	90.61	Appendix E, Appendix F and Appendix G
Acacia Open Woodland on Rock or Clay-Loam Plain	- Open Acacia woodland over Eremophila shrubland. - Ground not particularly suited to burrowing species. - Low diversity vegetation strata supporting a reduced avifauna assemblage. - Low vegetation density and low leaf litter supporting some small reptiles.	564.65	
Acacia and/or Eucalypt Woodland in Drainage Line	- Closed Acacia and/or Eucalypt woodland over mixed Acacia and Eremophila shrubland. - Ground moderately suited to burrowing species in some areas. - Moderate diversity vegetation strata supporting a good avifauna assemblage. - Moderate vegetation density and moderate leaf litter supporting small reptiles.	132.07	
Acacia Woodland on a Rocky Hillslope	- Open Acacia woodland over Eremophila shrubland. - Ground not particularly suited to burrowing species. - Potential refuge for small fauna under rocks. - Low diversity vegetation strata supporting a reduced avifauna assemblage. - Low vegetation density and low leaf litter supporting some small reptiles.	90.76	
Total		878.08	



New Murchison Gold Limited Garden Gully Project

Figure 6
Fauna Habitat Types

3.2.8 Significant Fauna

Database searches (Dandjoo and Atlas of Living Australia) identified 204 terrestrial vertebrate fauna taxa within 40 km of the survey area, consisting of 154 bird, 10 mammal, 38 reptile and two amphibian taxa. The project specific basic fauna assessments identified 12 fauna species from opportunistic observations. No evidence of conservation significant fauna species was observed during the surveys by Botanica (Appendix E and Appendix F).

The desktop review identified 10 terrestrial vertebrate species and one invertebrate species of conservation significance as previously being recorded in the regional area, consisting of 10 Threatened and one otherwise specially protected species. In addition, several migratory wading/shorebird species were assessed collectively due to their similar habitat requirements. Habitat and distribution data was used to determine the likelihood of occurrence within the amended PPA. The assessment identified three significant fauna species as 'possibly occurring' (Table 8). Both bird species considered as possibly occurring are highly mobile avian species with large home ranges. No evidence of threatened or priority fauna species was observed by Botanica (Appendix E and Appendix F) during site surveys.

Table 8: Potential Significant Fauna within 40 km of Project

Class	Significant Species	Conservation Status			Likelihood of Occurrence
		EPBC Act	BC Act	Priority	
Reptile	Great Desert Skink (<i>Liopholis kintorei</i>)	VU	-	-	Would not occur
Bird	Southern Whiteface (<i>Aphelocephala leucopsis</i>)	VU	-	-	Unlikely
	Grey Falcon (<i>Falco hypoleucos</i>)	VU	VU	-	Possible
	Malleefowl (<i>Leipoa ocellata</i>)	VU	Vu	-	Unlikely
	Peregrine Falcon (<i>Falco peregrinus</i>)	-	OS	-	Possible
	Sharp-tailed Sandpiper (<i>Calidris acuminata</i>)	VU	MI	-	Would not occur
	Curlew Sandpiper (<i>Calidris ferruginea</i>)	CR and MI	CR	-	Would not occur
	Night Parrot (<i>Pezoporus occidentalis</i>)	EN	CR	-	Would not occur
	Migratory Shorebirds	MI	IA	-	Would not occur
Invertebrate	Shield-backed Trapdoor Spider (<i>Idiosoma nigrum</i>)	VU	EN	-	Would not occur
Mammal	Long-tailed Dunnart (<i>Sminthopsis Longicaudata</i>)	-	-	P4	Possible

3.3 Subterranean Fauna

Rockwater (Appendix J) undertook a basic stygofauna survey over the Crown Prince deposit at Garden Gully, in conjunction with a desktop subterranean fauna study. The study considered the EPA's guidance for assessment of subterranean fauna, including *Technical Guidance – Subterranean fauna surveys for environmental impact assessment* (EPA, 2021) and *Environmental Factor Guideline – Subterranean Fauna* (EPA, 2016b).

Results of the desktop study indicate that no suitable habitat for troglofauna is likely, and the aquifers of the immediate project area are unlikely to host a rich stygofauna community. Database searches undertaken for the study found that there are few records of subterranean fauna in the Murchison region of Western Australia, and no publicly available records that indicate surveys for stygofauna or troglofauna have been undertaken in the Garden Gully area. A search of DBCA's Threatened and Priority fauna database found no subterranean fauna species within a 100 km radius of the Project.

A database search for Threatened and Priority Ecological Communities (TECs/PECs) relating to subterranean fauna confirmed that there are no TECs relating to subterranean fauna within a 100 km radius of the Project. The search returned several PECs pertaining to stygofauna communities in calcrete habitats, with all five communities listed occurring (at least partially) within a 50 km radius of the Project. The nearest of these PECs is the Priority 1 Belele calcrete groundwater assemblage, with its spatial buffer being approximately 34 km to the west of the Project and 33 km from any modelled drawdown impacts associated with pit dewatering at the Project. There are no calcrete or karstic formations in the area that was studied; however, several bores located upstream of the Project intersected significant thicknesses of porous calcrete that have historically had moderately high groundwater yields (Rockwater, Appendix J).

Results of 24 samples from the project area included 12 possible stygofauna species, including copepods, ostracods, syncarids, and aquatic worms. Most of the stygofauna species from the project area were found to occur more widely. However, one cyclopoid copepod species (*Parastenocaris* 'BHA433') collected from a single site within the palaeochannel (Main Roads bore) is currently known only from the Garden Gully area.

Rockwater (Appendix J) identified potential direct, indirect and cumulative impacts associated with the Project as summarised in Table 9.

Table 9: Potential Direct and Indirect Impacts to Subterranean Fauna

Impact Type	Description
Direct Impacts (open pit and groundwater drawdown)	Direct impacts to subterranean fauna habitat due to mine development, excavation of open pit (stygo fauna and troglodytes) and groundwater drawdown (for stygo fauna) due to pit dewatering.
Indirect Impacts (open pit and other mining infrastructure)	Impacts that may modify subterranean habitats, such as clearing and/or modifying landform, and activities associated with construction of infrastructure where such activities cause siltation, void collapse, alteration to nutrient balance and contamination.
Cumulative Impacts	Impacts of the Project with consideration of other projects/users potentially impacting subterranean fauna. These include: 1. Pit Dewatering (nearby mines). 2. Other groundwater users.

During previous pumping tests, monitoring of the Main Roads bore showed no water level drawdown (Appendix I). This indicated poor connectivity between the fractured rock aquifer being dewatered and the palaeochannel meaning dewatering would be minimal in the palaeochannel as supported by drawdown modelling (Appendix I). The subterranean study (Appendix J) further concluded that modelled drawdown at the site the species was recorded at represents 2% of the aquifer thickness, which will not affect the conservation status of the species. Dewatering associated with the proposed Lydia pits is similarly not expected to result in a material impact on subterranean fauna, noting the comparable hydrogeological setting and nature of proposed activities. Further hydrogeological investigations are currently underway to refine dewatering requirements (including depth and drawdown extent) and will inform ongoing assessment of potential impacts.

Indirect impacts from clearing and related risks to subterranean habitats such as siltation, void collapse, alteration to nutrient balance and contamination were considered unlikely by Rockwater (Appendix J), given the local geology and small scale of the Project. There are no other significant groundwater users in the area that could impact the aquifers of the project area. The Meekatharra Water Reserve, which includes the Sherwood Borefield that provides water for the town, is about 2 km upstream from Crown Prince deposit at its closest point. However, the nearest Sherwood Borefield production bore is about 9 km from the Lydia deposits.

Given the similarities of the proposed operations at Lydia compared to those previously assessed for Crown Prince, the localised drawdown from pit dewatering as well as indirect impacts including clearing over the life of the Project are unlikely to impact any stygo fauna values at Garden Gully, or the persistence of any stygo fauna species recorded by the survey.

3.4 Surface Water and Groundwater

3.4.1 Local Groundwater

Rockwater (Appendix I) were engaged to undertake a hydrogeological study of the project area to gain an understanding of the hydrogeological context. Results of the study included:

- The groundwater level across the area studied is at about 475 m AHD (approximately 10 mbgl).
- Groundwater quality at the Project is fresh to brackish, with total dissolved solids (TDS) concentrations of 1,620 mg/L to 1,800 mg/L and slightly alkaline with a pH of 7.8 to 8.2. Metal concentrations were generally low or below reference levels, although arsenic was slightly elevated (0.128 mg/L), possibly due to arsenopyrite mineralisation associated with gold mineralisation and typical for the Gascoyne region. Nutrients were low – total nitrogen 2.1 mg/L, and total phosphorus 0.04 mg/L.
- Groundwater modelling results determined that dewatering flow rates could average up to 3,680 m³/d (low estimate 1,870 m³/d; high estimate 5,540 m³/d). While detailed modelling for the proposed Lydia pits is ongoing, dewatering requirements are expected to be of a similar order of magnitude, noting the comparable hydrogeological setting. Further investigations are currently underway to refine dewatering rates, depths and drawdown extents associated with the Lydia pits, WRL and associated infrastructure.
- Model-calculated groundwater-level drawdowns determined that the largest drawdowns would occur at the end of mining of the deep West Pit located on M 51/886. The Crown Prince deposit is within an old recreation reserve (No. 10633) that is very unlikely to be needed for public water supply. Drawdowns were estimated to extend to three pastoral bores and wells and possibly as far as the corner of the upstream Sherwood Borefield Water Reserve boundary, but not as far as the nearest bore in that borefield. Based on the current conceptual understanding, drawdown associated with the Lydia mining areas is not expected to materially alter this regional drawdown pattern; this will be confirmed through ongoing hydrogeological assessment.

3.4.2 Surface Water

The Project is located within the Upper Murchison River catchment, part of the Murchison River drainage basin which has low hills and mesas separated by flat colluvium and alluvial plains. The basin is primarily an open drainage system of lakes and rivers that drain west. Drainage systems also drain inwards to inland salt lakes.

All drainages are ephemeral. Major drainages have broad flood plains incised by narrow channels with some dissected sheets of calcrete along trunk drainages. Palaeodrainages are associated with saline drainages and salt lakes in the southeast. These are interlaid with gypsiferous mud flats and small parabolic banks of calcareous and gypsiferous sands.

The Garden Gully drainage line drains a moderately large catchment with an area of 546.5 km² which lies to the north, east and southeast of the Project. The Garden Gully drainage line flows southwest

towards Hope River, a palaeodrainage (35 km from the Project), which is a zone of groundwater (and surface water) discharge.

Surface water drainage is shown in Figure 7.

The Project is not located within a proclaimed Surface Water Area under the *Rights in Water and Irrigation Act 1991* (RIWI Act).

3.4.3 Flood Modelling

Rockwater was engaged to undertake a hydrological and hydrogeological assessment for the Project in 2024. This included estimation of design storm events and peak flows to predict flood flows in the main and local drainages. The report is provided as Appendix I.

The design storms for the larger Garden Gully catchment and smaller local catchments were estimated using the methodologies described in Australian Rainfall and Runoff (ARR) 1987 guidelines (ARR, 1987). Peak flows in the catchment for 100-year Average Recurrence Interval (ARI) and Probable Maximum Flood (PMF) events were analysed to assess whether they could adversely impact the Garden Gully pits and infrastructure.

The key relevant findings of the original assessment are summarised below, noting that they were based on an earlier mine layout and are being considered in the context of the proposed amendment, including additional pits at Lydia (M 51/889):

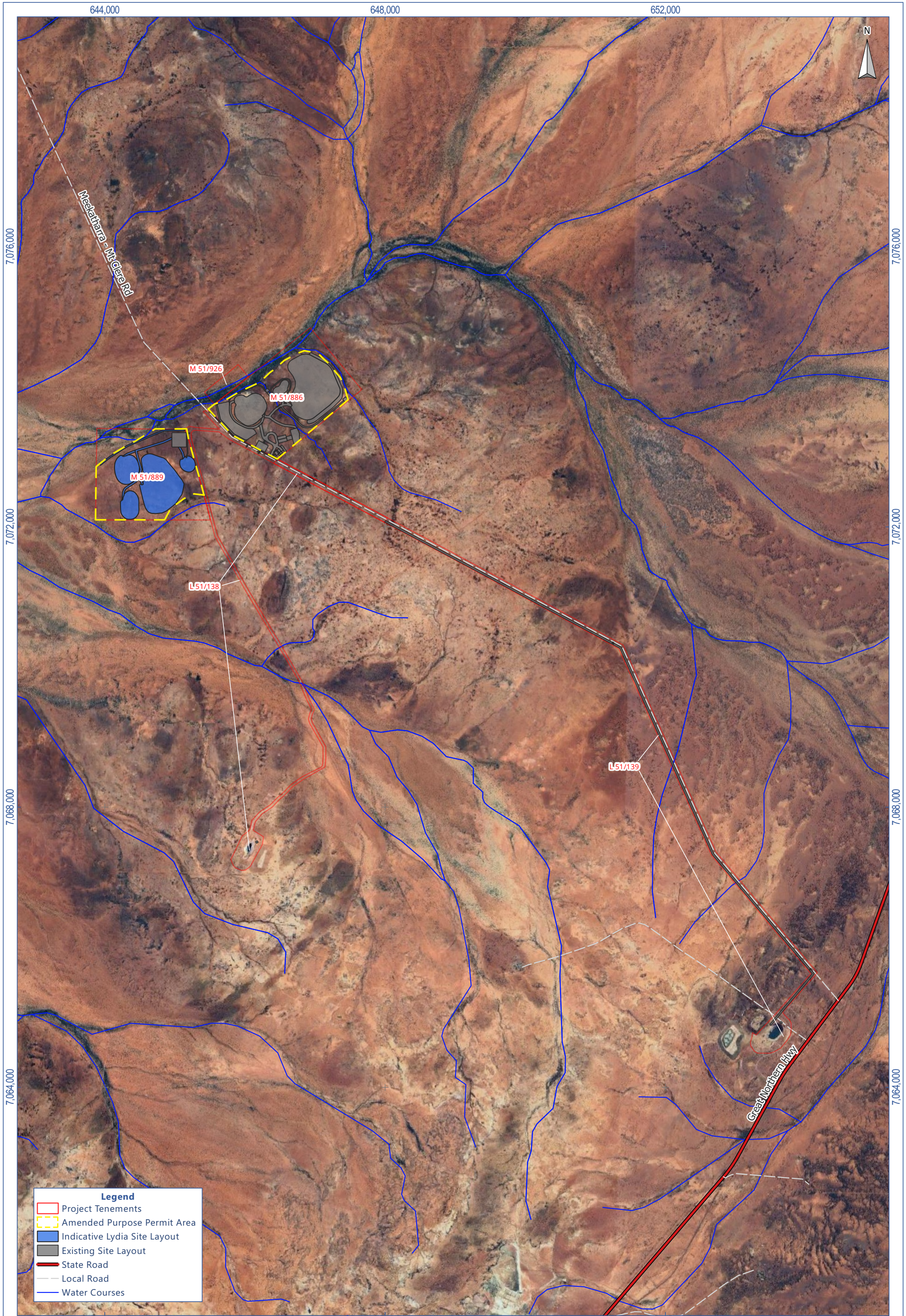
- Contours indicate the reach of the Garden Gully drainage line adjacent to the planned pits is relatively flat, resulting in high flood flows for the larger Garden Gully catchment.
 - During a 1-in-100-year flood event, with a protective bund on the northern side of West Pit, the flood levels would peak at 482.6 m AHD with a flow width of about 480 m. The level would be about 0.2 m higher in a PMF event. The calculated maximum depth of water would be about 2.2 m and the maximum velocity in the order of 0.51 m/s.
 - A protective bund has been constructed along the northern perimeter of West Pit to a height of 2.5 m as per recommendations from Rockwater (Appendix I).
 - Based on review of updated topographic data and the amended mine layout (Lydia), including the proposed Lydia North pit on M 51/889, flood levels associated with Garden Gully may extend into portions of the amended disturbance footprint.

A smaller catchment has a westerly trending drainage that flows through the south of M 51/889:

- During a 1-in-100-year flood event, the flood levels would peak at 483.7 m AHD with a flow width of about 304 m. The level would be about 0.07 m higher in a PMF event. The calculated maximum depth of water would be about 0.32 m and the maximum velocity in the order of 0.32 m/s.
- The footprint of Lydia South Pit and WRL may extend the flood extent of this catchment and therefore drainage and a diversion drain will be installed as per the recommendation of ongoing hydrological studies.

Based on review of updated topographic data and the amended mine layout (Lydia), including the proposed Lydia North pit on M 51/889, flood levels associated with Garden Gully may extend into portions of the amended disturbance footprint. To manage this risk, an additional flood protection bund is proposed to the north of Lydia North Pit to prevent inundation during design flood events. The final design, height and alignment of the proposed bund will be informed by ongoing detailed hydrological assessment to confirm that the amended layout can appropriately manage flood risk under both 100-year ARI and PMF conditions.

In addition to the flood bund, additional drainage management measures will be implemented to manage potential flooding risk from smaller catchments to maintain natural flow regimes and minimise off site impacts. These include maintaining existing flow paths where practicable, installation of diversion drains where required, appropriate siting of infrastructure and stockpiles outside of drainage lines, and progressive stabilisation of disturbed areas to reduce erosion and sediment transport. These measures are consistent with the requirements of Condition 8 of CPS 10902/1 and will be implemented through the GDP process to ensure that surface water flow is maintained or appropriately redirected into existing natural drainage lines.



Scale: 1: 50,000
Original Size: A3
Grid: GDA2020 / MGA zone 50
(EPSG:7850)
0 1 2 km

**New Murchison Gold Limited
Garden Gully Project**

**Figure 7
Surface Water Drainage**



4. Proposed Land Clearing

The revised disturbance footprint associated with the Lydia development extends beyond the area currently authorised for clearing under CPS 10902/1. The current permit is also currently held by Zeus Mining Pty Ltd. On 2 July 2025 Zeus Mining Pty Ltd changed its name to NM Gold Operations Pty Ltd. A certificate of name change is enclosed with this amendment application (Appendix B). Accordingly, NMG is applying to amend CPS 10902/1 under the EP Act to:

- Increase the total area of native vegetation authorised to be cleared.
- Modify the permit boundary to incorporate the additional disturbance areas within M 51/889.
- Update the permit holder name from Zeus Mining Pty Ltd to NM Gold Operations Pty Ltd.
- Extend the permit to 28 March 2033.

The PPA area will increase from 204.52 ha to 317.68 ha, representing a total increase of 113.16 ha. Within this amended PPA, up to 70.39 ha of native vegetation is proposed to be cleared in addition to the 93.96 ha of clearing that has previously been approved. The total amended clearing allowance under CPS 10902 proposed is therefore 164.35 ha. Additional disturbance proposed is located on M 51/889 and will require additional native vegetation clearing to establish:

- Three open pits and associated abandonment bunds (Lydia Main, Lydia South and Lydia East).
- WRL.
- Supporting infrastructure including flood bund and access roads.

Clearing is anticipated to commence in Q3 2026 to enable construction of proposed infrastructure. A shapefile is provided for the amended PPA.

5. Assessment of Clearing Principles

5.1 Native Vegetation Clearing Principles

Clearing applications are assessed against the 10 principles outlined in Schedule 5 of the *Environmental Protection Act 1986*. These principles aim to ensure that all potential impacts resulting from removal of native vegetation are assessed in an integrated method and consistently applied to all lands throughout Western Australia. The principles address the four environmental areas of biodiversity significance, land degradation, conservation estate and ground and surface water quality.

The following sections discuss the potential impacts associated with clearing for the Project. A summary of the outcomes of the assessment against the 10 Clearing Principles is provided in Table 10.

Table 10: Summary of Clearing Assessment Against Clearing Principles

Principle Number	Clearing Principle	Outcome
A	Native vegetation should not be cleared if it comprises a high level of biological diversity.	Unlikely to be at variance
B	Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	Unlikely to be at variance
C	Native vegetation should not be cleared if it includes or is necessary for the continued existence of threatened flora.	Unlikely to be at variance
D	Native vegetation should not be cleared if it comprises the whole or a part of or is necessary for the maintenance of a TEC.	Not at variance
E	Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	Not at variance
F	Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	Unlikely to be at variance
G	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	Unlikely to be at variance
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 areas.	Not at variance
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.	Unlikely to be at variance
J	Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.	Unlikely to be at variance

5.2 Biodiversity

Clearing Principle A: Native vegetation should not be cleared if it comprises a high level of biological diversity.

5.2.1 Potential Impacts

Impacts to the biological diversity of native vegetation associated with clearing for the Project are limited to localised flora/habitat loss from clearing in the PPA as well as the potential spread of existing weed species and the introduction of new weed species into the area.

No threatened flora or fauna species or TECs/PECs are known to occur within the proposed amended PPA.

The proposed new disturbance intersects three of the eleven broad-scale vegetation communities mapped across the Project tenements. The three broad-scale vegetation communities intersected (RP-AOW1, CLP-AOW1 and DD-AFW1) are considered to be of low biological diversity and are well represented outside the survey area (Appendix E).

The amended PPA occurs within the Upper Murchison 18 and Upper Murchison 29 vegetation associations, both of which have more than 99% of their pre-European vegetation extent remaining.

Potential impacts to vegetation communities within the proposed disturbance area are detailed in Table 11. Based on the extent of survey undertaken for the Project, no impacts related to the proposed new disturbance exceed 30%. However, the total cumulative impacts from the approved and proposed disturbance for both RP - AOW1 and CLP - AOW1 just exceed 30%. Appendix E determined that these vegetation communities are considered to be of low biological diversity and well represented on a local and regional scale.

Calytrix verruculosa (P3) was recorded by Botanica (Appendix F) in four locations within L 51/139, with an additional two locations found approximately 20 to 30 m outside of boundary of L 51/139. The targeted survey for *Calytrix verruculosa* conducted by Botanica (Appendix H) did not identify any additional individuals within the amended PPA.

One priority flora species (*Grevillea inconspicua*) (P4) was observed by Botanica within the existing approved disturbance area on M 51/886. Approximately 30 plants were seen growing in a minor dry drainage line. Given the close proximity to infrastructure and likely changes to this drainage line, indirect impacts were considered likely and this was noted in the DMPE Clearing Permit Decision Report for CPS 10902/1. No further records of *Grevillea inconspicua* have been identified within the proposed disturbance footprint despite targeted searches (Appendix H). The species has low distribution across two Murchison IBRA subregions. Florabase contains 63 records, with frequency varying from occasional to common.

Botanica (Appendix H) were commissioned by NMG to undertake a targeted survey for conservation significant flora including *Calytrix verruculosa* (P3) within M 51/886 and M 51/889 to satisfy Condition 9 of CPS 10902/1. No *Calytrix verruculosa* or any other conservation significant flora were identified within the survey area. The survey was undertaken on 21 and 22 April 2025 during the EPA's recommended primary survey time period for the Eremaean Province (i.e. 6-8 weeks following

the wet season from March to June). Based on the survey effort and assessment to date, existing DBCA records and habitat available within the amended PPA, any further occurrence of priority flora is considered unlikely (Table 6).

One vulnerable fauna species, Peregrine falcon (*Falco peregrinus*), and one Other Specially Protected fauna species (OS), Grey Falcon (*Falco hypoleucos*) may occur in the amended PPA, based on the presence of potentially suitable habitat. Impacts to these species from the Project are discussed further in Section 5.3.1.

The amended PPA and indicative clearing footprint were designed to minimise environmental impact to vegetation communities, and conservation significant flora and fauna species as much as practicable.

5.2.2 Management and Mitigation

Management and mitigation measures to reduce impacts on biological diversity comprise:

- Clearing of vegetation will be kept to the minimum required for the Project.
- Utilising existing disturbed areas where possible.
- A minimum buffer of 10 m around Priority flora species will be implemented, noting that no surveys have identified Priority flora within the proposed clearing areas for Lydia.
- Managing clearing via the GDP Procedure (Appendix D).
- Clearly delineating the clearing area to ensure only that required for a safe working area is cleared.
- Implement a procedure to record the amount of clearing undertaken and report the cumulative total in the Annual Environmental Report (AER) and Mine Rehabilitation Fund (MRF) reporting.
- Vehicle and equipment hygiene procedures will be implemented to minimise entry of weed and soil borne diseases.
- Dust control measures will be conducted as required.
- Stockpiling stripped topsoil and vegetation for use in future rehabilitation activities.
- Progressively rehabilitating disturbed areas on completion of Project activities.
- Implementing speed limits to minimise dust emissions and to minimise the risk of fauna injury or death due to vehicle traffic.
- All personnel will undertake a site induction which will include detail on the importance of flora and fauna management.

Given the widespread and common nature of vegetation communities in the region and absence of Threatened species or TECs/PECs in the amended PPA, the Project is not considered to comprise a high level of biological diversity. Therefore, the proposed clearing is unlikely to be at variance with Clearing Principle A.

Table 11: Potential Impacts to Vegetation Communities

Vegetation Community Code	Description	Total Mapped Area (ha)	Area within Amended PPA (ha)	Previously Approved Clearing Area (ha)	Proposed Clearing Area (ha)	Total Mapped Impacted by Proposed Clearing (%)	Total Mapped Impacted by Total Clearing Area (%)
RHS - AOW1	Mid woodland of <i>Acacia pruinocarpa</i> and <i>A. incurvaneura</i> over mid open shrubland of <i>Eremophila latrobei</i> , <i>E. jucunda</i> and <i>Senna sp. Meekatharra</i> over low sparse shrubland of <i>Maireana triptera</i> on a rocky hillslope.	90.71	0.00	0.00	0.00	0.00	0.00
RP - AOW1	Mid woodland of <i>Acacia pruinocarpa</i> and <i>A. incurvaneura</i> over mid open shrubland of <i>A. grasbyi</i> , <i>Eremophila galeata</i> and <i>Senna sp. Meekatharra</i> over low sparse shrubland of <i>Maireana triptera</i> and <i>Enchylaena tomentosa</i> on a quartz rocky plain.	242.96	175.35	32.66	58.76	24.19	37.63
CLP - AOW1	Mid woodland of <i>Acacia incurvaneura</i> over mid shrubland of <i>Eremophila compacta</i> over low sparse shrubland of <i>Solanum lasiophyllum</i> and <i>Aristida contorta</i> on clay loam plain.	196.58	95.09	57.62	5.91	3.01	32.32
DD - AOW1	Mid woodland of <i>A. incurvaneura</i> over mid open shrubland of <i>Eremophila galeata</i> over low sparse shrubland of <i>Maireana triptera</i> and <i>Enchylaena tomentosa</i> in a drainage depression.	13.96	0.00	0.00	0.00	0.00	0.00
DD - EFW1	Mid open forest of <i>Eucalyptus camaldulensis</i> over mid open shrubland of <i>Acacia tetragonophylla</i> and <i>Senna sp. Meekatharra</i> over low sparse shrubland of <i>Ptilotus obovatus</i> and <i>Solanum lasiophyllum</i> in drainage depression.	22.1	0.06	0.00	0.00	0.00	0.00
RP - AFW1	Mid open forest of <i>Acacia incurvaneura</i> over mid open shrubland of <i>A. tetragonophylla</i> and <i>Senna sp. Meekatharra</i> over low sparse shrubland of <i>Ptilotus obovatus</i> and <i>Solanum lasiophyllum</i> on a quartz rocky plain.	0.74	0.00	0.00	0.00	0.00	0.00
CLP - AFW1	Mid open forest of <i>Acacia incurvaneura</i> over mid open shrubland of <i>A. tetragonophylla</i> and <i>Senna sp. Meekatharra</i> over low sparse shrubland of <i>Ptilotus obovatus</i> and <i>Solanum lasiophyllum</i> on a clay loam plain.	1.64	0.00	0.00	0.00	0.00	0.00

Vegetation Community Code	Description	Total Mapped Area (ha)	Area within Amended PPA (ha)	Previously Approved Clearing Area (ha)	Proposed Clearing Area (ha)	Total Mapped Impacted by Proposed Clearing (%)	Total Mapped Impacted by Total Clearing Area (%)
DD - AFW1	Mid open forest of <i>Acacia incurvaneura</i> over mid open shrubland of <i>Acacia tetragonophylla</i> , and <i>Senna sp. Meekatharra</i> over low sparse shrubland of <i>Ptilotus obovatus</i> and <i>Solanum lasiophyllum</i> in drainage depression.	92.03	22.72	3.68	5.71	6.20	10.20
OAC-NVS	Open Acacia shrubland. Dominant species were <i>Acacia aneura</i> , <i>Acacia grasbyi</i> , <i>Acacia prainii</i> and <i>Eremophila galeata</i> .	121.55	0.00	0.00	0.00	0.00	0.00
MCV_NVS	Dominant species were <i>Acacia aneura</i> , <i>Acacia craspedocarpa</i> , <i>Acacia pteraneura</i> , <i>Grevillea deflexa</i> , <i>Ptilotus obovatus</i> and <i>Exocarpos aphyllus</i> .	3.98	0.00	0.00	0.00	0.00	0.00
TOS -NVS	Tecticornia open shrubland.	1.12	0.00	0.00	0.00	0.00	0.00
SUB TOTAL Native Vegetation		787.38	293.22	93.96	70.39	8.94	20.87
Cleared	Land cleared of native vegetation.	90.6	24.46	18.85	0.00	0.00	20.81
TOTAL Including Cleared Areas		877.98	317.68				

5.3 Significant Fauna Habitat

Clearing Principle B: Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

5.3.1 Potential Impacts

Botanica (Appendix E and Appendix F) surveys and the NVS (Appendix G) survey identified three broad scale terrestrial fauna habitats being acacia woodlands on rocky plains, acacia/eucalypt woodlands in drainage lines, and acacia woodlands on rocky hillslopes. All of the habitats are considered locally common and widespread. The proposed and cumulative extent of potential impacts to fauna habitats are detailed in Table 12. Neither the proposed nor total impact to the mapped fauna habitat exceeds 30%.

Table 12: Potential Impacts to Fauna Habitat

	Total Mapped Area (ha)	Area Within Amended PPA (ha)	Previously Approved Clearing Area (ha)	Proposed Clearing Area (ha)	Total Mapped Impacted by Proposed Clearing (%)	Total Mapped Impacted by Total Clearing (%)
Acacia and/or Eucalypt woodland in drainage line	132.07	22.78	3.68	5.71	4.33	7.11
Acacia open Woodland on rocky hillslope	90.76	0.00	0	0.00	0.00	0.00
Acacia open woodland on rocky or clay-loam plain	564.65	270.44	90.28	64.67	11.45	27.44
SUB TOTAL	787.47	293.22	93.96	70.39	8.94	20.87
Cleared	90.61	24.46	18.85	0.00	0.00	20.80
TOTAL	878.08	317.68				

No evidence of significant fauna species was observed during either (Appendix E and Appendix F) surveys and based on preferred habitat and distribution data, nine of the eleven conservation significant fauna species identified in the desktop assessment were assessed as 'unlikely to occur' or 'would not occur'.

Botanica (Appendix E and Appendix F) identified three fauna species of conservation significance which are regarded as possibly utilising the survey area which covers the amended PPA:

- Grey Falcon (*Falco hypoleucos*) – VU (EPBC Act and BC Act):
 - This species is sparsely recorded throughout inland Australia. Suitable foraging habitat may be present but is unlikely to represent critical habitat.
 - Breeding habitat usually consists of tall trees along watercourses, particularly River Red Gum (*Eucalyptus camaldulensis*) and Coolibah (*E. coolabah*), therefore, habitat within the Purpose Permit Area is not likely to be suitable for breeding (TSSC, 2022).

- Peregrine Falcon (*Falco peregrinus*) – OS (DBCA):
 - This species is sparsely recorded throughout inland Australia. Suitable foraging habitat may be present but is unlikely to represent critical habitat.
 - Breeding habitat usually consists of recesses within cliff faces or tree hollows, therefore, habitat within the survey area is not likely to be suitable for breeding (Birdlife Australia, 2025).
- Long-tailed Dunnart (*Sminthopsis Longicaudata*) - P4 (DBCA Listed and BC Act):
 - This species is sparsely recorded within Pilbara, northeast goldfields, Gibson desert (Young Ranges), central Northern Territory and western South Australia. Suitable foraging habitat may be present but is unlikely to represent critical habitat.

While the habitats for these fauna species are considered possibly suitable, some or all may be marginal in extent/quality and therefore the fauna species considered as possibly occurring may in fact only visit the area for short periods as infrequent vagrants. In addition, both bird species considered as possibly occurring are highly mobile avian species with large home ranges and therefore Project activities are not expected to impact individuals or populations of these species.

Previous DBCA records indicate that the Long-tailed Dunnart has been observed between 30-81 km from the survey area. In addition to the paucity of records within proximity to the Project, these records range from 1981 to 2018, with all but one record occurring after 2009. No evidence of the species was recorded during Botanica (Appendix E and Appendix F) surveys. Botanica also reported that suitable habitat may be present, but it is unlikely to represent critical habitat for the species. Some areas within the PPA may provide habitat for the species, such as low shrublands, spinifex grasslands, or open Acacia vegetation, which support insects and other small invertebrates. However, breeding habitat is unlikely to be present, as these areas lack the essential structural features required for nesting and refuge, including rocky outcrops, breakaways, boulder fields, and crevices (Biologic, 2021). Consequently, while the species may move through or feed within these habitats, they are unlikely to support reproduction or long-term shelter. Based on the scale of works and available habitat locally and regionally, the proposed vegetation clearing is to be a low risk to the species.

Indirect impacts from clearing and related risks to subterranean habitats such as siltation, void collapse, alteration to nutrient balance and contamination are considered unlikely, given the local geology and small scale of the Project (Appendix J).

5.3.2 Management and Mitigation

The main risk to fauna and habitat is loss or fragmentation of habitat through clearing activities. Management measures to reduce impacts on fauna and habitat comprise:

- Clearing of vegetation will be kept to the minimum required for the Project.
- Utilising existing disturbed areas and locating roads and infrastructure to avoid fauna habitat where possible.

- Managing clearing via the GDP Procedure (Appendix D).
- Clearly delineating the clearing area with to ensure only that required for a safe working area is cleared.
- Implement a procedure to record the amount of clearing undertaken and report the cumulative total in the Annual Environmental Report (AER) and Mine Rehabilitation Fund (MRF) reporting.
- Dust control measures will be conducted as required.
- Stockpiling stripped topsoil and vegetation for use in future rehabilitation activities.
- Progressively rehabilitating disturbed areas on completion of Project activities.
- Implementing speed limits to minimise dust emissions and to minimise the risk of fauna injury or death due to vehicle traffic.
- All personnel will undertake a site induction which will include detail on the importance of flora and fauna management.

Based on the assessment of potential impacts to fauna habitat, the two habitats that occur in the proposed disturbance footprint are not considered to contain significant fauna habitat. This conclusion was drawn from:

- The widespread and common nature of habitat in the region.
- Absence of conservation significant fauna and suitable habitat (excluding potential foraging habitat for Peregrine Falcon, Grey Falcon and Long-tailed Dunnart).
- Habitat for the Grey Falcon and Peregrine Falcon assessed as 'unlikely to represent critical habitat', with these species possibly visiting the area only for short periods as infrequent vagrants.

Based on these findings, the proposed clearing is unlikely to be at variance to Clearing Principle B.

5.4 Threatened Flora

Clearing Principle C: Native vegetation should not be cleared if it includes, or is necessary for the continued existence of rare (threatened) flora.

5.4.1 Potential Impacts

Existing impacts to vegetation within the amended PPA include access tracks, heavy grazing, historical mining, and exploration disturbances. Additional clearing will be required to support the proposed activities including three open pits, a WRL, flood bund and access tracks.

One species of threatened flora (*Pityrodia augustensis*) listed as 'vulnerable' was identified in the desktop study however based on a lack of suitable habitat in the amended PPA as well as the nearest known population being greater than 300 km from the Project, the species is considered unlikely to occur. No threatened flora as listed under the BC Act or EPBC Act were recorded within surveys undertaken by Botanica (Appendix E, Appendix F and Appendix H) or NVS (Appendix G).

5.4.2 Management and Mitigation

Management measures to reduce impacts to during clearing:

- Utilising existing disturbed areas where possible.
- Managing clearing via the GDP Procedure (Appendix D).
- Clearly delineating the clearing area with survey pegs and flagging tape to ensure only that required for a safe working area is cleared.
- Implement a procedure to record the amount of clearing undertaken and report the cumulative total in the AER and Mine Rehabilitation Fund (MRF) reporting.
- Weed hygiene practices will be implemented and site weed control will be conducted as required.
- All personnel will undertake a site induction which will include detail on the importance of flora and fauna management.

As the areas to be impacted do not contain threatened flora, the proposed clearing is considered unlikely to be at variance with Clearing Principle C.

5.5 Threatened Ecological Communities

Clearing Principle D: Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.

No TECs or PECs as listed under either the EPBC Act or BC Act have been identified within the amended PPA (Appendix E).

There are six PECs that occur within a 40 km radius of the amended PPA, two of which occur approximately 7 km from the survey area. The remaining four PECs occur more than 27 km from the amended PPA. No TECs are known within a 40 km radius of the amended PPA.

Based on the above, clearing for the Project is not at variance with Principle D.

5.6 Remnant Vegetation

Clearing Principle E: Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

The EPA uses a standard level of native vegetation retention of at least 30% of the pre-clearing extent of an ecological community as a benchmark. The levels of native vegetation retention have most recently been recognised in the National Objectives and Targets for Biodiversity Conservation 2001-2005, which recognised that the retention of 30%, or more, of the pre-clearing extent of an ecological community is necessary if Australia's biological diversity is to be protected (Environment Australia, 2001).

The pre-European vegetation types occurring in the amended PPA (Upper Murchison 18 and Upper Murchison 29) both have greater than 99% of their pre-European extent remaining at a state level and within the Shire of Meekatharra (Table 4).

Based on the above, the proposed clearing is not at variance with Clearing Principle E.

5.7 Watercourse or Wetland Environments

Clearing Principle F: Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

There are no Ramsar wetlands or wetlands of national importance (ANCA Wetlands) within the amended PPA or within a 40 km radius. Lake Annean (Lake Nannine) is a wetland of national importance but is located 50 km south of the Project.

There are no permanent water features within the amended PPA. Minor ephemeral drainage lines which are not regionally or locally significant intersect the amended PPA, however, suitable drains or culverts will be installed to transfer flow past infrastructure and return it to its natural flow path.

Garden Gully Creek is located directly north of the amended PPA. A flood bund is proposed to the north of the Project (Figure 2) to prevent floodwaters from Garden Gully Creek intersecting the Project area, thereby minimising interaction between the open pits, WRLs, associated infrastructure, and the natural drainage line.

As the clearing will not impact wetlands and only minor drainage lines are present within the amended PPA, the Project is considered unlikely to be at variance with Clearing Principle F.

5.8 Land Degradation

Clearing Principle G: Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

Vegetation communities within the amended PPA were assessed to range from 'good' to 'completely degraded' condition (Appendix E). Existing land degradation is mostly attributed to clearing for access tracks, historical mining and exploration activities, and grazing by large, introduced herbivores (Appendix E). The presence of weeds in disturbed areas and along tracks also contributes to existing land degradation.

Soils within the amended PPA are mapped as Red-Brown Hardpan Shallow Loams, Red Shallow Loam, and Shallow Gravel. The proposed disturbance occurs within Red-Brown Hardpan Shallow Loams. Generally, soil samples from the Project were described as having low exchangeable sodium percentages, indicating soils across the Project are unlikely to be erosion prone. Most soils and subsoils within the project area are suitable for stripping, stockpiling, and reuse as required (MBS, 2024).

Samples from the area of OGCP05 (Figure 4) were identified as potentially dispersive, which may lead to increased erosion risk and reduced soil stability. OGCP05 is located within the amended PPA, specifically within the footprint of the proposed WRL on tenement M 51/889 (MBS, 2024).

5.8.1 Potential Impacts

Potential sources of land degradation from clearing activities include:

- Wind and mechanical erosion during vegetation and topsoil stripping activities.
- Wind and water erosion of topsoil stockpiles and cleared areas.
- Water erosion due to changes in surface water flow.
- Soil compaction.
- Soil contamination i.e. spills or machinery failure.
- Introduction and/or spread of weeds.

5.8.2 Management and Mitigation

Minimisation of land degradation will be achieved by applying recognised clearing and rehabilitation methods.

Management and mitigation strategies to achieve this include:

- Minimising the area requiring vegetation clearing.
- Managing clearing via the GDP Procedure (Appendix D).
- Confining vehicle movements to defined roads and tracks.
- Conducting topsoil stripping activities during periods of low winds.
- Stockpiling topsoil and vegetation for later use in rehabilitation away from the path of drainage lines.
- Ensuring dispersive topsoils are stockpiled separately and not used in rehabilitation of sloped surfaces.
- Storing hydrocarbons and reagents in bunded areas and applying spill response procedures.
- Progressive rehabilitation of completed areas to minimise active areas exposed where possible.
- Scarifying or deep ripping (as appropriate) compacted tracks and roads as part of rehabilitation.
- Establishment of surface water management infrastructure to direct surface water flow to natural drainage channels.
- Monitoring of high-risk erosion events, such as extreme weather, to mitigate impacts as far as reasonably practicable.
- Dust suppression via water cart where practicable.

In the context of the local land systems, intact vegetation on a regional scale and existing level of localised land degradation, the scale of disturbance from the proposed clearing is not anticipated to

increase overall land degradation. As such, proposed clearing is considered unlikely to be at variance with Clearing Principle G.

5.9 Conservation Estate

Clearing 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 amended PPA is not associated with any conservation lands and is not located within a DBCA managed Conservation Reserve. The nearest legislated Reserve is the Lakeside Conservation Park (R54420), approximately 130 km southwest and Kaluwiri National Park located approximately 117 km southeast of the amended PPA (Appendix E).

Based on the above, clearing for the Project is not at variance with Clearing Principle H.

5.10 Surface and Groundwater Quality

Clearing 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.

There are no permanent water bodies or wetlands within the amended PPA with all drainage lines being ephemeral. Garden Gully Creek, located north of the amended PPA boundary, drains a moderately large catchment with an area of 546.5 km² which lies to the north and east of the Project and flows to the southwest towards Hope River, a palaeodrainage (35 km from the project site), which is a zone of groundwater (and surface water) discharge. Several smaller drainage lines are present across the project area, only flowing briefly immediately following significant rainfall events.

Surface water in the amended PPA is predominantly sheet flows given the flat terrain. Some localised concentration into minor ephemeral drainages that act as tributaries to Garden Gully will also occur. Groundwater is located circa 10 mbgl across the project area. Groundwater quality at the Project was described as fresh to brackish (Appendix I).

In accordance with the BoM Atlas of GDEs database, there are no known or potential aquatic GDEs within the project area however two potential terrestrial GDEs occur. Botanica (Appendix E) determined that vegetation types identified mostly aligned with the ecosystem descriptions provided in the BoM Atlas and although difficult to determine how dependent these communities are on groundwater. Botanica (Appendix E) and Rockwater (Appendix I) determined they are more likely to obtain their water requirements from surface water.

5.10.1 Potential Impacts

Surface water quality has the potential to be affected by increased sedimentation caused through clearing and soil disturbance and removal of vegetation that acts to bind soil, including riparian vegetation. This may result in a localised decrease in surface water quality. Garden Gully Creek passes just to the north of the proposed activities. The amended PPA has been designed to avoid disturbance to Garden Gully Creek. Construction and clearing will be scheduled outside of peak rainfall events to avoid times of high surface flows and reduce the risk of erosion and elevated turbidity to drainage lines from disturbed areas.

Land clearing is considered unlikely to adversely impact on groundwater quality. Hydrocarbon spills may occur from earth moving machinery used for land clearing activities. Uncontained spills may affect surface and/or groundwater quality.

A 5C licence (GWL213551) and GLOS under the RIWI Act has been approved for dewatering on M 51/886. Further hydrogeological studies are underway to determine dewatering requirements for proposed pits at Lydia and to ensure dewatering does not impact vegetation outside of proposed clearing areas. These studies will support the amendment to the current 5C licence prior to dewatering.

5.10.2 Management and Mitigation

Management measures to prevent impacts to surface and groundwater quality include:

- Amended PPA has been designed to avoid Garden Gully Creek.
- Existing disturbed areas will be used where possible.
- Managing clearing via the GDP Procedure (Appendix D).
- Clearing and construction will be scheduled outside of peak rainfall events to avoid times of high surface flows and reduce the risk of erosion and elevated turbidity to drainage lines from disturbed areas.
- Where necessary, suitable floodways, drains and culverts will be installed to transfer flow past infrastructure and return it to its natural flow path.
- Hydrocarbons will be stored in bunded areas. Spill kits will be maintained to allow containment and treatment of spillages of hydrocarbons from clearing equipment hose failures or leaks.
- Progressive rehabilitation of completed areas to minimise active areas exposed where possible.
- NMG will operate in compliance with their current and future obligations under RIWI Act 5C licence and GLOS to manage potential impacts to groundwater and surface water.

Impacts to surface water and groundwater quality from the proposed clearing are not anticipated to be significant. Localised, short term impacts on surface water quality during clearing works can be managed using standard erosion and sediment control mitigation measures.

Based on the above the proposed clearing is unlikely to be at variance with Clearing Principle I.

5.11 Flooding Potential

Clearing Principle J: Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.

The Project is within a non-seasonal arid region that experiences a mean total rainfall of 231.5 mm/year (BoM, 2026). Precipitation is often associated with sporadic summer cyclonic rainfall and thunderstorms. No month in a given year can be considered reliably wet, and zero rainfall can be recorded in any month.

The Project is located within the Garden Gully Catchment, with the ephemeral Garden Gully Creek running just north of the amended PPA. Smaller drainage lines are present within the amended PPA which are also ephemeral in nature, only flowing briefly immediately following significant rainfall events.

As defined by Rockwater (Appendix I), the majority of the proposed clearing footprint is located within the larger Garden Gully catchment however clearing in a more westerly trending catchment associated with a minor ephemeral drainage line is also likely (Figure 7). Contours for the larger Garden Gully catchment indicate the reach of the Garden Gully drainage line adjacent to the planned pits is relatively flat, resulting flood levels encroaching on some infrastructure. This catchment generally drains south to north toward Garden Gully Creek. The southeast portion of M 51/889, where portions of the proposed South Lydia Pit and WRL footprint is located, lies within a smaller catchment which is characterised by a westerly trending drainage system.

5.11.1 Potential Impacts

Removal of vegetation generally increases flooding whereby uptake, infiltration, moisture retention and physical barriers to reduce flow velocities provided by vegetation are also removed. As most of the vegetation cover within the amended PPA occurs at relatively high elevations on rocky or stony plains, or is adjacent to ephemeral watercourses, the overall vegetation density is low. Therefore, it is not expected that the proposed removal of vegetation would significantly increase the risk of flooding above natural levels.

Rockwater (Appendix I) was engaged to undertake a hydrological assessment for the Project including estimation of design storm events and peak flows to predict flood flows in the main and local drainages. The assessment confirmed that flooding impacts will be localised in extent and recommended surface water infrastructure in order to prevent adverse impacts on surface water drainages and Project infrastructure.

To manage flooding risk for Lydia infrastructure, an additional flood protection bund is proposed to the north of Lydia North Pit to prevent inundation during design flood events. The final design, height and alignment of the proposed bund will be informed by ongoing detailed hydrological assessment to confirm that the amended layout can appropriately manage flood risk under both 100-year ARI and PMF conditions.

In addition to the flood bund, additional drainage management measures will be implemented to maintain natural flow regimes and minimise off site impacts. These include maintaining existing flow paths where practicable, installation of diversion drains where required, appropriate siting of infrastructure and stockpiles outside of drainage lines, and progressive stabilisation of disturbed areas to reduce erosion and sediment transport. These measures are consistent with the requirements of Condition 8 of CPS 10902/1 and will be implemented through the GDP process to ensure that surface water flow is maintained or appropriately redirected into existing natural drainage lines.

5.11.2 Management and Mitigation

Management strategies to prevent flooding include:

- Clearing will be conducted to ensure no significant alteration the natural landscape, contours, or drains that could otherwise impact flooding potential.
- Managing clearing via the GDP Procedure (Appendix D).
- Project design has considered location of drainage lines and flood levels with the aim of minimising disturbance of these areas. Recommended surface water infrastructure to be installed in the event of a 1:100-year flood event will include a protective flood bund to the north of Lydia North pit to prevent inundation during design flood events.
- Diversions will be installed where necessary to direct surface flow away from cleared areas and return flows to natural paths.
- Culverts or floodways will be installed where the roads cross ephemeral drainages.
- Vegetation will be removed in stages with disturbance kept to a minimum to reduce runoff.

Overall, the additional proposed clearing footprint of 70.39 ha within the amended PPA, particularly given local vegetation density is low, is not expected to have an increased impact on flooding potential for the project area or its surrounds. In addition, management and mitigation measures will be implemented to prevent adverse impacts on surface water drainages and Project infrastructure from flooding.

Based on the above, the proposed clearing is unlikely to be at variance with Clearing Principle J.

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APPENDIX A:
CPS 10902/1

APPENDIX A





CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	10902/1
Duration of Permit:	From 29 March 2025 to 28 March 2030
Permit Holder:	Zeus Mining Pty Ltd

The Permit Holder is authorised to clear native vegetation subject to the following conditions of this Permit.

PART I - CLEARING AUTHORISED

1. Land on which clearing is to be done

Mining Lease 51/886
Mining Lease 51/889

2. Clearing authorised (purpose)

The Permit Holder is authorised to clear native vegetation for the purpose of mineral production and associated infrastructure.

3. Area of clearing

The Permit Holder must not clear more than 93.96 hectares of native vegetation within the areas cross-hatched yellow in Figure 1 of Schedule 1.

4. Type of clearing authorised

The Permit Holder shall not clear native vegetation unless the purpose for which the clearing is authorised is enacted within 3 months of the authorised clearing being undertaken.

5. Directional clearing

The Permit Holder shall:

- (a) conduct all clearing authorised under this permit in one direction towards adjacent vegetation; and
- (b) allow a reasonable time for fauna present within the area being cleared to move into that adjacent native vegetation ahead of the clearing activity.

PART II - MANAGEMENT CONDITIONS

6. Avoid, minimise and reduce the impacts and extent of clearing

In determining the amount of native vegetation to be cleared under this Permit, the Permit Holder must apply the following principles, set out in descending order of preference:

- (a) avoid the clearing of native vegetation;
- (b) minimise the amount of native vegetation to be cleared; and
- (c) reduce the impact of clearing on any environmental value.

7. Weed control

When undertaking any clearing or other activity authorised under this Permit, the Permit Holder must take the following steps to minimise the risk of the introduction and spread of *weeds*:

- (a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
- (b) ensure that no known *weed*-affected soil, *mulch*, *fill* or other material is brought into the area to be cleared; and
- (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

8. Vegetation management

- (a) where practicable the Permit Holder shall avoid clearing *riparian vegetation*; and
- (b) where a *watercourse* or *drainage line* is to be impacted by clearing, the Permit Holder shall ensure that the existing surface flow is maintained, or reinstated downstream into existing natural drainage lines.

9. Flora management

- (a) Prior to undertaking any clearing authorised under this Permit, the Permit Holder shall engage a *botanist* to conduct a targeted flora survey of the Permit Area for the presence of the following *priority flora*:
 - (i) *Calytrix verruculosa*.
- (b) Where *priority flora* are identified in relation to Condition 9(a) of this Permit, the Permit Holder shall ensure that:
 - (i) prior to undertaking any clearing authorised under this Permit, the Permit Holder shall provide the results of the *targeted flora survey* in a report to the *CEO*;
 - (ii) no clearing of identified *priority flora* occurs and no clearing occurs within 10 metres of identified *priority flora*, unless first approved by the *CEO*.

PART III - RECORD KEEPING AND REPORTING

10. Records to be kept

The Permit Holder must maintain records relating to the listed relevant matters in accordance with the specifications detailed in Table 1.

Table 1: Records that must be kept

No.	Relevant matter	Specifications
1.	In relation to the authorised clearing activities generally	(a) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 2020 (GDA2020), expressing the geographical coordinates in Eastings and Northings or decimal degrees; (b) the date that the area was cleared; (c) the size of the area cleared (in hectares); (d) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with Condition 6; (e) actions taken to minimise the risk of the introduction and spread of <i>weeds</i> in accordance with Condition 7; and

No.	Relevant matter	Specifications
		(f) actions taken in accordance with Condition 5, and 8.
2.	In relation to flora management pursuant to Condition 9	(a) the name and location of each priority flora species, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 2020 (GDA2020), expressing the geographical coordinates in Eastings and Northings or decimal degrees; (b) actions taken to demarcate each priority flora species recorded and their relevant buffers; and (c) actions taken to avoid the clearing of <i>priority flora</i> species.

11. Reporting

- (a) The Permit Holder shall provide a report to the *CEO* by 31 July each year for the life of this Permit, demonstrating adherence to all conditions of this Permit, and setting out the records required under Condition 7 of this Permit in relation to clearing carried out between 1 July and 30 June of the previous financial year.
- (b) If no clearing authorised under this Permit was undertaken between 1 July and 30 June of the previous financial year, a written report confirming that no clearing under this permit has been carried out, must be provided to the *CEO* by 31 July of each year.
- (c) Prior to 28 March 2030, the Permit Holder must provide to the *CEO* a written report of records required under Condition 10 of this Permit where these records have not already been provided under Condition 11(a) or 11(b) of this Permit.

DEFINITIONS

In this Permit, the terms in Table 2 have the meanings defined.

Table 2: Definitions

Term	Definition
botanist	means a person who holds a tertiary qualification in environmental science or equivalent, and has a minimum of 2 years work experience in identification and surveys of flora native to the bioregion being inspected or surveyed, or who is approved by the <i>CEO</i> as a suitable botanist for the bioregion.
CEO	the Chief Executive Officer of the Department responsible for administering the clearing provisions contained within the <i>Environmental Protection Act 1986</i> or an Officer with delegated authority under Section 20 of the <i>Environmental Protection Act 1986</i> .
clearing	has the meaning given under section 3(1) of the EP Act.
condition/s	a condition to which this clearing permit is subject under section 51H of the EP Act.
department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
drainage line/s	means a natural depression that carries surface water runoff.
EP Act	<i>Environmental Protection Act 1986</i> (WA)
fill	means material used to increase the ground level, or to fill a depression.
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.

Term	Definition
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
priority flora	means those plant taxa described as priority flora classes 1, 2, 3, or 4 in the Department of Biodiversity, Conservation and Attractions' Threatened and Priority Flora List for Western Australia (as amended).
riparian vegetation	has the meaning given to it in Regulation 3 of the Environmental Protection (Clearing of Native Vegetation) Regulation 2004.
targeted flora survey	means a field-based investigation, including a review of established literature, of the biodiversity of flora and vegetation of the Permit Area, focusing on habitat suitable for flora species that are being targeted and carried out during the optimal time to identify those species. Where target flora are identified in the Permit Area, the survey should also include sufficient surrounding areas to place the Permit Area into local context.
watercourse	has the meaning given to it in section 3 of the <i>Rights in Water and Irrigation Act 1914</i> .
weed/s	means any plant – (a) that is a declared pest under section 22 of the <i>Biosecurity and Agriculture Management Act 2007</i>; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned.

END OF CONDITIONS

Danielle Risbey

Danielle Risbey | General Manager Mine Closure and Environmental Services
Resource and Environmental Compliance Division
06 March 2025

Officer with delegated authority under Section 20
OF THE ENVIRONMENTAL PROTECTION ACT 1986

SCHEDULE 1

The boundary of the area authorised to be cleared is shown in the map below (Figure 1).

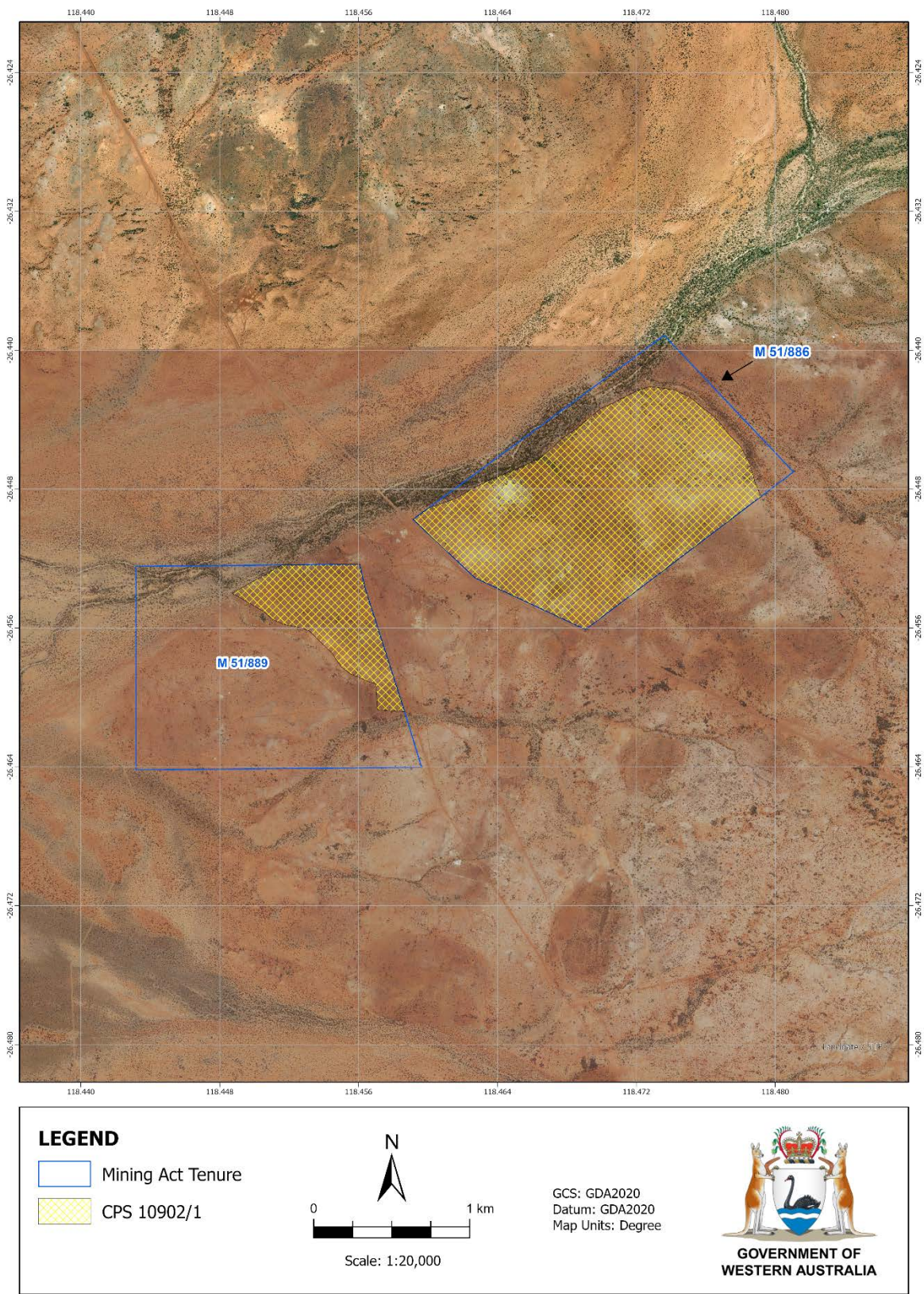


Figure 1: Map of the boundary of the area within which clearing may occur

APPENDIX B:
CERTIFICATE OF NAME CHANGE

APPENDIX B



ZEUS MINING PTY. LTD.
SUITE 8 LEVEL 2
5 ORD STREET
WEST PERTH WA 6005



Certificate of Registration on Change of Name

This is to certify that

ZEUS MINING PTY. LTD.

Australian Company Number 113 854 596

did on the second day of July 2025 change its name to

NM GOLD OPERATIONS PTY LTD

Australian Company Number 113 854 596

The company is a proprietary company.

The company is limited by shares.

The company is registered under the Corporations Act 2001 and is taken to be registered in Western Australia and the date of commencement of registration is the eighteenth day of April, 2005.

Issued by the
Australian Securities and Investments Commission
on this second day of July 2025.

A handwritten signature in black ink, appearing to read 'J Longo'.

Joseph Longo
Chair

CERTIFICATE

APPENDIX C: PROOF OF OCCUPIER STATUS

APPENDIX C

Register for Tenement M 51/886

Identifier: M 51/886 New Search Previous Next

Status: Live
Area: 205.97800 HA
Markout: 09/08/2019 15:57:00
Received: 12/08/2019 15:40:00
Term Granted: 21 Years
Commence: 21/02/2022
Expiry: 20/02/2043
Death:

Holders Description Relationships Survey General Shire Grant

Current Holders Holder Changes Applicants On Receival

Organisation NM GOLD OPERATIONS PTY LTD 100/100
ACN 113 854 596 **ABN**
Designated Tenement Contact (Correspondence Details)
Name MCMAHON MINING TITLE SERVICES PTY LTD
Address C/- MCMAHON MINING TITLE SERVICES PTY LTD, PO BOX 6301, EAST PERTH, WA, 6892
Email xxxx@mmts.net.au
Telephone xxxxxxxxxx997
Street Address Details
Address C/- MCMAHON MINING TITLE SERVICES PTY LTD, PO BOX 6301, EAST PERTH, WA, 6892
Email xxxx@mmts.net.au
Telephone xxxxxxxxxx997

Register for Tenement M 51/889

Identifier: M 51/889 New Search Previous Next

Status: Live
Area: 189.22900 HA
Markout: 25/06/2020 13:52:00
Received: 26/06/2020 10:01:23
Term Granted: 21 Years
Commence: 21/02/2022
Expiry: 20/02/2043
Death:

Holders Description Relationships Survey General Shire Grant

Current Holders Holder Changes Applicants On Receival

Organisation NM GOLD OPERATIONS PTY LTD 100/100
ACN 113 854 596 **ABN**
Designated Tenement Contact (Correspondence Details)
Name MCMAHON MINING TITLE SERVICES PTY LTD
Address C/- MCMAHON MINING TITLE SERVICES PTY LTD, PO BOX 6301, EAST PERTH, WA, 6892
Email xxxx@mmts.net.au
Telephone xxxxxx997
Street Address Details
Address C/- MCMAHON MINING TITLE SERVICES PTY LTD, PO BOX 6301, EAST PERTH, WA, 6892
Email xxxx@mmts.net.au
Telephone xxxxxx997

APPENDIX D:
GROUND DISTURBANCE
PROCEDURE

APPENDIX D



Garden Gully Project Ground Disturbance Procedure

Site:	Garden Gully Project	Department:	Environment
Procedure Title:	Garden Gully Project Ground Disturbance Procedure		
Authorised by:	NMG	Date:	21/11/2025

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1. Purpose

This procedure relates to the Garden Gully Project (the Project), owned by New Murchison Gold Limited (NMG). The purpose of this procedure is to ensure that all vegetation clearing, and ground disturbance undertaken for mining and associated infrastructure at the Project is conducted in accordance with statutory approvals, environmental management commitments, and best-practice land disturbance controls. The procedure provides a systematic process to confirm that areas have been properly surveyed, authorised, and prepared prior to clearing and ground disturbance.

2. Scope

This procedure applies to all NMG personnel, contractors, and activities involved in vegetation clearing, topsoil stripping, and surface disturbance within the project disturbance envelope. It covers pre-disturbance verification, environmental clearance, permitting and record keeping for all project phases.

3. Roles and Responsibilities

Table 1: Roles and Responsibilities

Role	Responsibility
Site Manager/Senior Environmental Advisor	Approve all ground disturbance work; ensure compliance with this procedure. Assess environmental impacts of proposed disturbance in line with existing approvals. Facilitate GDP process between those proposing disturbance and site management. Propose controls to manage impacts. Liaise with Corporate office and regulatory authorities where required.
Supervisor/Project Manager	Ensure ground disturbance activities follow controls specified in GDP.
Contractors/Workers	Conduct work according to GDP requirements; report hazards immediately.

4. Verification of Approvals

NMG are responsible for ensuring that all necessary statutory approvals and legal access is obtained prior to undertaking ground disturbance at the Project. The GDP permit process shall verify that proposed disturbance is in accordance with legal tenure and existing approvals for the clearing of native vegetation, ground disturbance and construction of infrastructure. Existing approvals for the Project include:

- Native Vegetation Clearing Permit (CPS 10902/1).
- Mining Proposal (Reg ID 500080).
- Works Approvals (W2945/2025/1).
- Native Title Heritage Agreement (ID 2021-NWA-GG-886-36) and agreed heritage exclusion areas.
- Tenure conditions and land access agreements.

Review of approvals including mapping and spatial data should be undertaken to verify approved disturbance limits. This procedure should be updated as pending or new approvals are secured for the Project.

5. Procedure

Step	Description
Project Manager/Supervisor	
1	Complete GDP Form It is the Project Manager's responsibility to ensure the GDP form (NMG-CPO-ENV-FRM-001-A) is completed correctly and clearly to ensure the application is not delayed or rejected. When creating the GDP boundary, consider and include as needed: • Access to the GDP area. • Temporary construction/laydown areas. • Allowance for topsoil and vegetation stockpiles. • Windrowing requirements (where permitted). • Locating all works within approval and site boundaries. • Avoiding known exclusion areas and sensitive environmental and/or heritage values. • Flexibility to allow minor design alterations without seeking GDP amendment.
2	Submit GDP Form GDP must be submitted to the Site Manager and Senior Environmental Advisor. • A map of the proposed area to be cleared and the corresponding dxf/shp files must be provided with the GDP form. • Calculated area of disturbance and topsoil to be stripped must also be provided in the GDP form. • Reason for disturbance and description of proposed activities. GDP applications should be submitted at least 7 days prior to proposed activity. Time should also be allowed for appropriate demarcation of disturbance areas.
Environment Department	
3	GDP Assessment The Senior Environment Advisor with assistance from others is responsible for assessing the GDP application form. It must be ensured that the proposed disturbance is in compliance with all relevant legal obligations. These include: • All regulatory permits and licences are applied for and approved relevant to the scope of works. • Any clearing on native vegetation is only located in the approved clearing permit (CP) area on M 51/886 and M 51/889 and does not exceed the permitted clearing area (ha). • Proposed ground disturbance does not exceed the maximum total allowable for each category shown in the approved Mining Proposal (MP). • Proposed area is located within the Disturbance Envelope (DE) of the approved Mining Proposal (MP) or subsequent Mining Develop and Closure (MDCP) approval area. • The reason for disturbance and proposed activities matches that of activities table of the most recent approved MP (or MDCP). • No clearing of identified priority flora occurs, and no clearing occurs within 10 m of identified priority flora. • The proposed area avoids, minimises and reduces the impacts and extent of clearing as much as reasonably practicable. Riparian vegetation specifically should be avoided as much as possible. • The purpose for which the clearing is authorised is enacted within 3 months of ground disturbance operations. • Ensure any requirement for Aboriginal Heritage Monitors during clearing is implemented in accordance with relevant agreements.

Step	Description
	If during the assessment process, it is determined the works cannot proceed as proposed, discussions shall be held with the Project Manager and Site Manager to provide reasoning, and to amend the GDP application to reduce environmental or heritage risks to the required level.
4	GDP Approval Following assessment of the proposed disturbance the GDP may be approved with standard and/or specific environmental controls. Approval can be granted by the Senior Environmental Advisor or Site Manager or other personnel with a robust understanding of the relevant environmental legal obligations. Once approved the GDP can be returned to the Project Manager or submitter and entered into the "NMG GDP Register". The Project Manager should review the conditions of the approved GDP together prior to and works commencing to confirm understanding.
Surveyor	
5	Site Demarcation Mark-out the approved GDP boundary and demarcate any avoidance/exclusion areas and/or significant sites in accordance with permit conditions and as directed by the Project Manager. Ensure the responsible surveyor has been provided relevant, accurate spatial data associated with the GDP (GDP boundary, design files, topsoil locations and significant site boundaries).
6	Environment Review Ensure demarcation of all avoidance/exclusion areas and/or significant sites relevant to the GDP has been completed in accordance with permit and approval conditions; and prior to ground disturbance occurring.
Project Manager	
7	Review GDP Conditions The Project Manager must review all conditions of the GDP with the responsible operators confirming understanding of what is required. A copy of the GDP is to be provided to the operator.
Operator	
8	Weed Hygiene When undertaking any ground disturbance, the Operator must take the following steps to minimise the risk of the introduction and spread of weeds: • Clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared. • Ensure that no known weed-affected soil, mulch, fill or other material is brought into the area to be cleared. • Restrict the movement of machines and other vehicles to the limits of the areas to be cleared.
9	Undertake Ground Disturbance in Accordance with Permit Conditions The Operator must conduct ground disturbance operations in accordance with all conditions of the GDP. The standard GDP conditions include: • Conduct all clearing authorised under this permit in one direction towards adjacent vegetation. • Allow a reasonable time for fauna present within the area being cleared to move into that adjacent native vegetation ahead of the clearing activity. • If required ensure Aboriginal Heritage Monitors are present during operations.

Step	Description
	• No clearing of identified priority flora occurs and no clearing occurs within 10 m of identified priority flora unless formal approval is given on the GDP. • No clearing of riparian vegetation near Garden Gully Creek unless formal approval is given on the GDP. • Water course management to prevent riparian vegetation from being impacted where possible, and to maintain natural surface water flows. • Topsoil Management: – Topsoil (0 mm - 200 mm) and vegetation to be removed and appropriately stockpiled in designated areas no greater than 2 m high. Topsoil locations must avoid areas likely to get waterlogged, eroded or contaminated by operational activities. – Stockpiles will be located at an appropriate distance from drainage lines. – Stockpiles will have a slope grade of 1 vertical (V): 4 horizontal (H) or less to limit erosion potential. – The surface of stockpiles will be left in a 'rough' condition to help promote infiltration and minimise erosion. – Stockpiles are signposted. The above controls are not exhaustive and additional controls within a GDP are likely dependant on the risks of the proposed activity. All specified conditions are required to be followed at all times. If any amendments are required or conditions change during operations during operations the Senior Environmental Advisor should be contacted immediately.
Surveyor	
10	Post-Clearing Following completion of ground disturbance operations survey pick up of the cleared area must be submitted to the Senior Environmental Advisor within 2 weeks. The Project Manager is responsible ensuring surveying has been conducted.
Environment Department	
12	Record-Keeping Following approval and completion of an activity, a GDP Register (or other applicable database) must be updated to record the following: • The location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 2020 (GDA2020), expressing the geographical coordinates in Eastings and Northings or decimal degrees. • The date that the area was cleared. • The size of the area cleared (in hectares to two decimal places). • Actions taken to avoid, minimise, and reduce the impacts and extent of clearing. • Actions taken to minimise the risk of the introduction and spread of weeds. • Actions taken to avoid clearing of riparian vegetation. • Actions taken to ensure that the existing surface flow is maintained or reinstated downstream into existing natural drainage lines. • Confirmation that clearing was undertaken slowly, progressively in one direction to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity. • As it pertains to flora management: – Actions taken to demarcate each priority flora species recorded and their relevant buffers.

Step	Description
	– Actions taken to avoid the clearing of priority flora species.
13	Reporting The Senior Environmental Advisor is responsible for reporting all ground disturbance and associated activities. Relevant reporting includes: • Clearing will be reported in the NMG internal monthly operation reports. • Vegetation clearing will be reported annually under the Project AER and MRF reporting by the 30th of June. • Annual NVCP (CPS/10902/1) report to be submitted to DWER by 31 July annually.

6. Internal Documents

Document Title	Document Number
Ground Disturbance Permit Form	NMG-CPO-ENV-FRM-001-A
Garden Gully GDP Register	TBC
Garden Gully Environmental Management Plan	TBC

APPENDIX E:
RECONNAISSANCE FLORA, AND
BASIC FAUNA SURVEY M 51/886,
M 51/889 (BOTANICA 2024)

CROWN PRINCE PROJECT

Reconnaissance Flora and Basic Fauna Assessment

Prepared for Ora Gold Ltd
August 2024



Prepared by



33 Brewer St PERTH WA 6000 | 0419 916 034

Document Information

Prepared for: Ora Gold Ltd.
Project Name: Crown Prince Project
Tenements: M51/886, M51/889
Job Reference: Reconnaissance Flora and Vegetation Survey and Basic Fauna Assessment
Job Number: 2024/071
Date: 23/08/2024
Version: Final

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Cover Photo: Vegetation within the Crown Prince project area (26/06/2024)

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EXECUTIVE SUMMARY

Botanica Consulting Pty Ltd (Botanica) was commissioned by Ora Gold Limited to undertake a reconnaissance flora/ vegetation survey and basic fauna survey of their Crown Prince project area (referred to as the 'survey area'). It is located approximately 15 km north-west of Meekatharra, Western Australia. The survey area is split into two blocks on either side of the Meekatharra-Mount Clere Road and is in total approximately 394 ha in extent. This assessment is intended to support approvals for the Ora Gold Ltd Crown Prince Project.

The survey area lies within the Western Murchison (MUR1) subregion of the Murchison Bioregion, as defined by the Interim Biogeographic Regionalisation of Australia (IBRA). The survey area is located within the Yoothapina Pastoral Lease in the Shire of Meekatharra.

Botanica conducted flora/ vegetation and basic fauna survey on the 26th of June 2024. The area was surveyed by Jennifer Jackson (Senior Botanist, BSc Environmental Management (Honours)). The area was traversed on foot and by 4WD.

The field survey identified 80 vascular flora taxa within the survey area. These taxa represented 44 genera across 26 families. Twenty annual species were observed during the survey. Six weed species were recorded within the survey. These species are not listed as Declared Pests on the Western Australian Organism List (WAOL) under the *Biosecurity and Agriculture Management (BAM) Act 2007* or as Weeds of National Significance.

One Priority flora species was identified in the survey area. *Grevillea inconspicua* (P4) was observed growing in a drainage line. No Threatened flora was identified within the survey area.

A total of four broad-scale vegetation communities were identified within the survey area. Native vegetation within the survey area was categorised as 'Good'. Impacts to vegetation within the survey area include access tracks, historical and current mining and exploration activities, and grazing by large feral herbivores.

No Threatened, Priority or otherwise significant ecological communities were identified within the survey area. No Environmentally Sensitive Areas were identified within 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 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. No evidence of significant fauna species were observed during the survey.

1 INTRODUCTION

Botanica Consulting Pty Ltd (Botanica) was commissioned by Ora Gold Ltd. to undertake a reconnaissance flora/vegetation survey and basic fauna assessment of their Crown Prince project area (referred to as the 'survey area'). The survey area was split into two blocks on either side of the Meekatharra-Mount Clere Road of approximately 189 ha (M51/889) and 204 ha (M51/886) in extent (total extent approximately 394 ha). The survey area is located approximately 15 km north-west of Meekatharra, Western Australia (Figure 1-1). This assessment is intended to support approvals for the Ora Gold Ltd Crown Prince Project.

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;
- 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;
- identify Matters of National Environmental Significance (MNES) protected under the EPBC Act; 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;
- Undertake opportunistic, low intensity sampling of fauna; and
- Report on the conservation status of species present using the Western Australian Museum and *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) databases for presence of Threatened and Priority listed fauna species within the survey area.

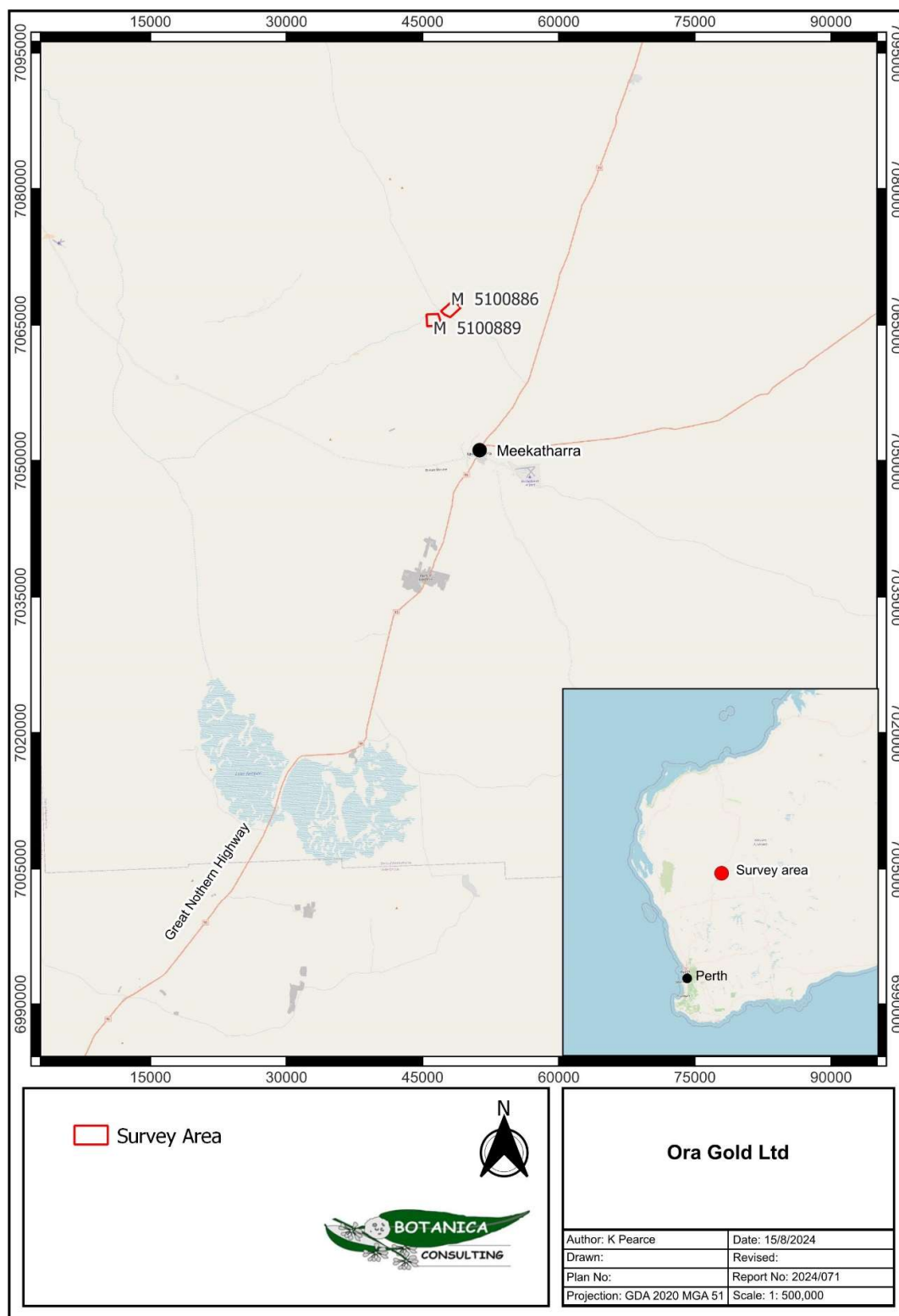


Figure 1-1: Regional map of the survey area

2 BIOPHYSICAL ENVIRONMENT

2.1 Regional Environment

The survey area lies within the Eremaean Province of Western Australia (WA). Based on the Interim Biogeographic Regionalisation of Australia (IBRA, Version 7) (DotEE, 2012) the survey area is located within the Murchison Bioregion of WA. This bioregion is further divided into subregions with the survey area located within the Western Murchison (MUR2) subregion of the Murchison Bioregion (Figure 2-1).

The landscape of the Murchison Bioregion comprises low hills, mesas of duricrust separated by flat colluvium and alluvial plains (Commonwealth Government, 2020). It is dominated by the Archaean (over 2500 million years ago) granite greenstone terrain of the Yilgarn Craton (Commonwealth Government, 2008). Alluvial soils and sands mantle the granitic and greenstone units of the Yilgarn Craton. These soils are shallow, sandy and infertile. Underlying the soils in low areas is a red-brown siliceous hard pan (Curry *et al.* 1994). The soils in the eastern half of the bioregion are typically red sands, calcareous red earth soil, duplex soil and clays. There are 41 vegetation associations (hummock grasslands, succulent steppe or low woodlands) that have at least 85 per cent of their total area in the bioregion. The bioregion is rich and diverse in both its flora and fauna, but most species are wide ranging and usually occur in adjoining regions (McKenzie, May and McKenna, 2002).

The Western Murchison comprises the northern part of the 'Murchison' Terrains of the Yilgarn Craton. It is characterised by mulga low woodlands, often rich in ephemerals (usually with bunch grasses), on outcrop and fine textured Quaternary alluvial and eluvial surfaces (extensive hardpan washplains that dominate and characterise the subregion) mantling granitic and greenstone strata of the northern part of the Yilgarn Craton. Surfaces associated with the occluded drainage occur throughout with hummock grasslands on Quaternary sandplains, saltbush shrublands on calcareous soils and Tecticornia low shrublands on saline alluvia (Desmond, Cowan and Chant, 2001).

2.2 Land Use

The dominant land uses of the Western Murchison subregion include grazing native pastures (96.2%), unallocated crown land and crown reserves (2.81%) and conservation (0.06%). Mining has not been scored as these still come under Pastoral leases (Desmond, Cowan and Chant, 2001). The survey area is located within the Yoothapina Pastoral Lease in the Shire of Meekatharra.

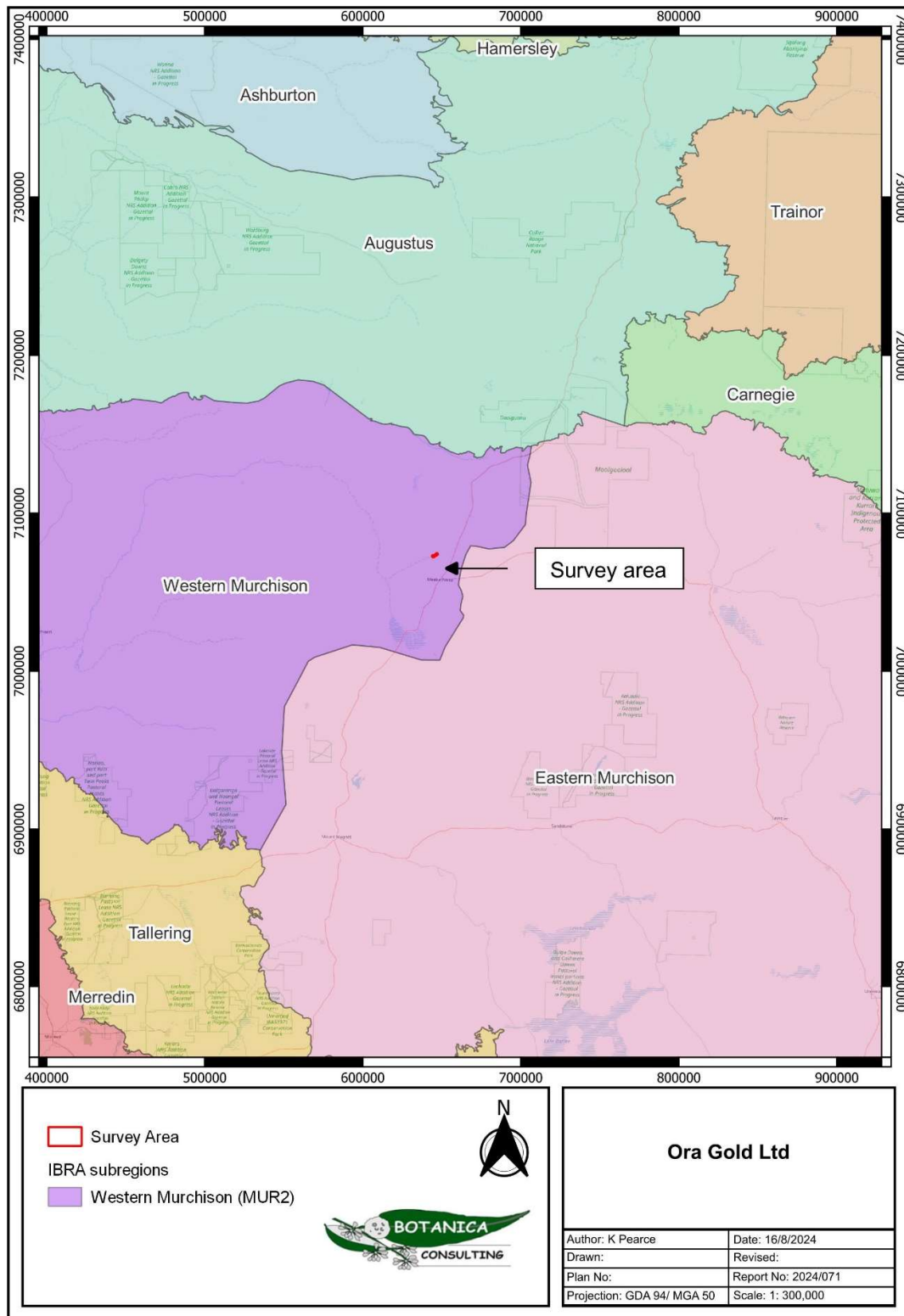


Figure 2-1: Map of IBRA Bioregions in relation to the survey area

2.3 Soil Landscape Systems

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

The Murchison Province is further divided into soil-landscape zones, with the survey area located within the Upper Murchison Zone (272). The Upper Murchison Zone comprises of hardpan wash plains (with stony plains, sandplains, hills and mesas) on granite and gneiss of the Yilgarn Craton with red-brown hardpan shallow loams, red shallow loams, red loamy earths and red sands. Soils include red sandy earths, red deep sands, red shallow loams and red loamy earths with some red-brown hardpan shallow loams, salt lake soils and red shallow sandy duplexes. Vegetation is dominated by Mulga shrublands, with some halophytic shrublands. This zone is located in the north-western Murchison between Lake Nerramyne, Meekatharra, Cue and the Gascoyne River. (Tille, 2006).

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

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

Soil Landscape System	Description	Extent within Survey Area
Wiluna System	Low greenstone hills with occasional lateritic breakaways and broad stony slopes, lower saline stony plains and broad drainage tracts; supporting sparse mulga and other acacia shrublands with patches of halophytic shrubs	363 ha (92.2%)
Yandil System	Flat hardpan wash plains with mantles of small pebbles and gravels; supporting groved mulga shrublands and occasional wanderrie grasses.	31 ha (7.8%)
Total		394 ha (100%)

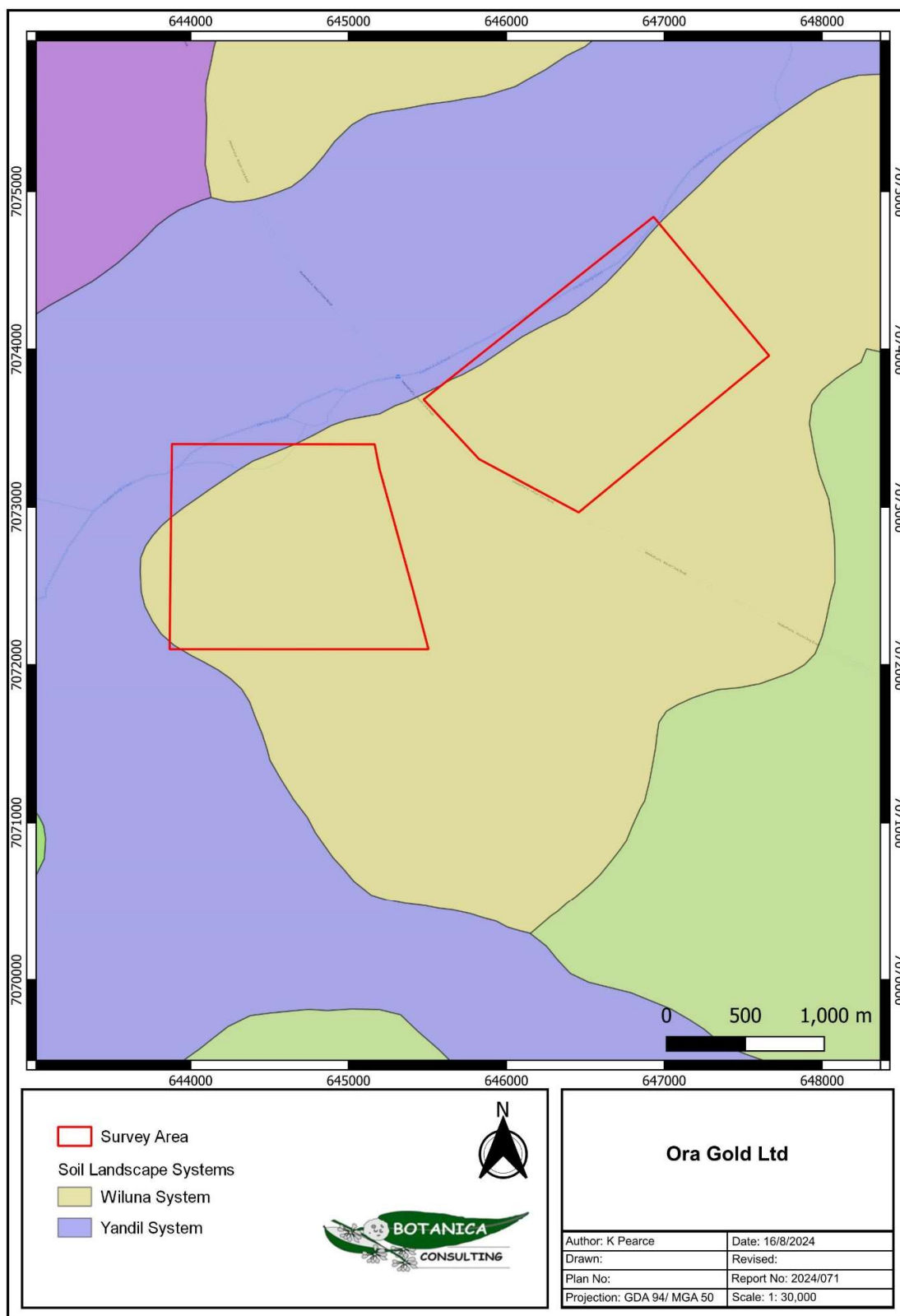


Figure 2-2: Map of soil landscape systems within the survey area

2.4 Regional Vegetation

Vegetation of the Murchison Bioregion is predominantly Mulga low woodlands on plains, often rich in ephemerals, which reduce to scrub on hills. It is also characterised by hummock grasslands, Saltbush shrublands and Samphire shrublands (Beard, 1990; McKenzie, May, and McKenna, 2002).

2.4.1 Pre-European Vegetation

The Pre-European vegetation association spatial mapping dataset (DPIRD, 2018) identified two vegetation associations as occurring within the survey area (Figure 2-3). The association description and their remaining extent, as specified in the 2018 Statewide Vegetation Statistics (DBCA, 2019) are provided in Table 2-2. 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). Both vegetation associations retain >99% of their pre-European extent, and development within the survey area will not significantly reduce the current extent of these vegetation associations.

The most extensive vegetation type in Western Australia is the *Acacia aneura* (mulga) low woodland, open low woodland and sparse woodland, covering over 36 million ha. These low woodlands of mulga and associated species (mainly *Acacias*) are distributed throughout the Murchison, Gascoyne, Great Victoria Desert, Central Ranges and Pilbara Bioregions and they also extend into the Gibson Desert, Little Sandy Desert, Nullarbor and Yalgoo Bioregions (Beard *et al*, 2013).

Table 2-2: Pre-European vegetation associations within the survey area

Vegetation Association	Pre-European extent remaining	% Protected for Conservation	Floristic Description	Extent within Survey Area
Upper Murchison 29	99.97%	0	Low woodland, open low woodland or sparse woodland of Mulga (<i>Acacia aneura</i>) and associated species.	45.4 ha (11.5%)
Upper Murchison 18	99.73%	0	Low woodland, open low woodland or sparse woodland of Mulga (<i>Acacia aneura</i>) and associated species.	348.6 ha (88.5%)
Total				394 ha (100%)

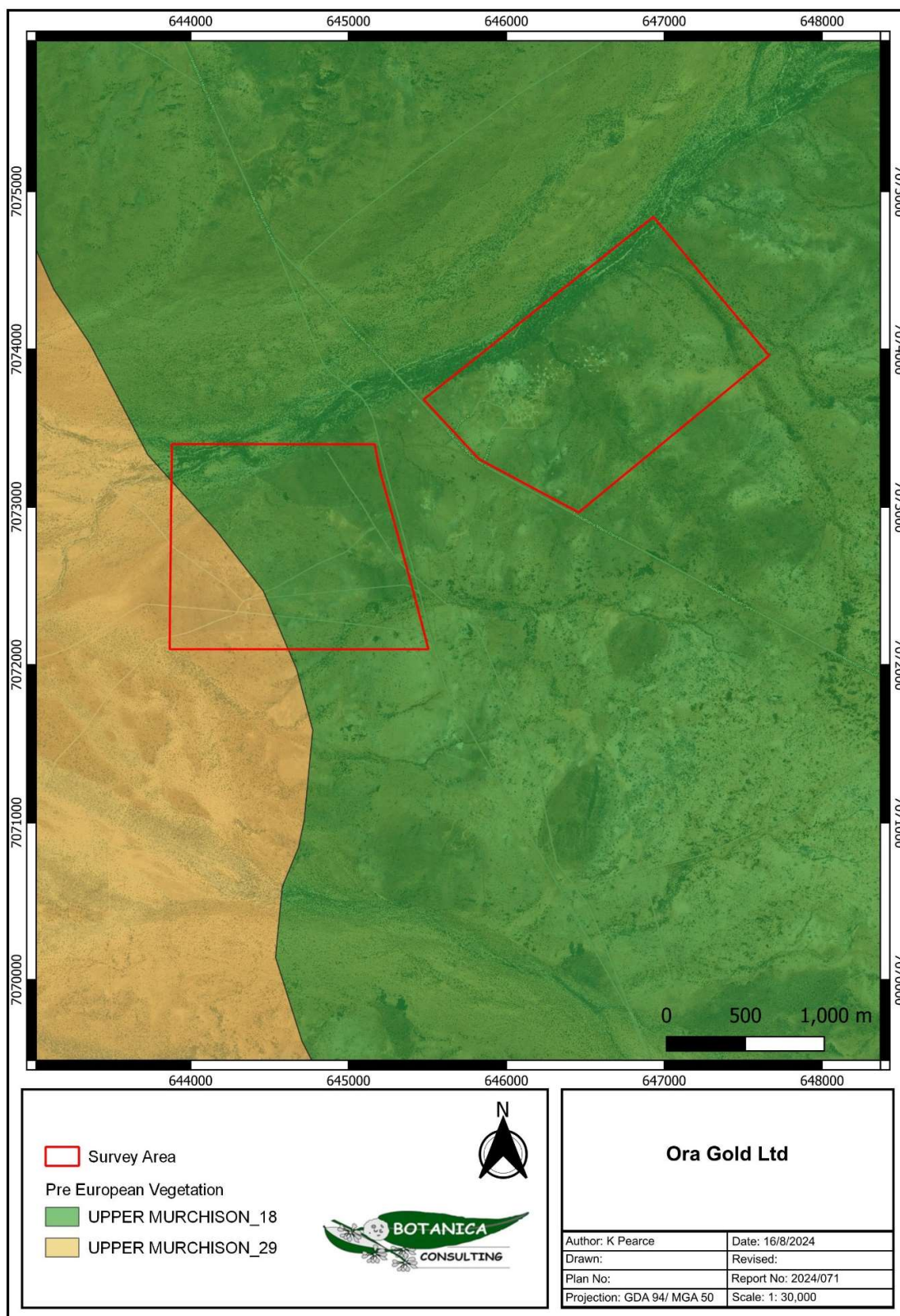


Figure 2-3: Pre-European vegetation systems within the survey area

2.5 Climate

The climate of the Western Murchison subregion is characterised as an arid climate with bimodal rainfall that usually falls in winter (Desmond, Cowan and Chant, 2001). Rainfall data for the Meekatharra Airport weather station (#7045), located approximately 20 km south-east of the survey area, is shown in Figure 2-4. The Meekatharra Airport weather station has an annual rainfall average of 233.8 mm. The rainfall for January and April 2024 was above average. Rainfall for June 2024 was significantly higher than the average, 46 mm of this fell prior to the survey being done (BoM, 2024a).

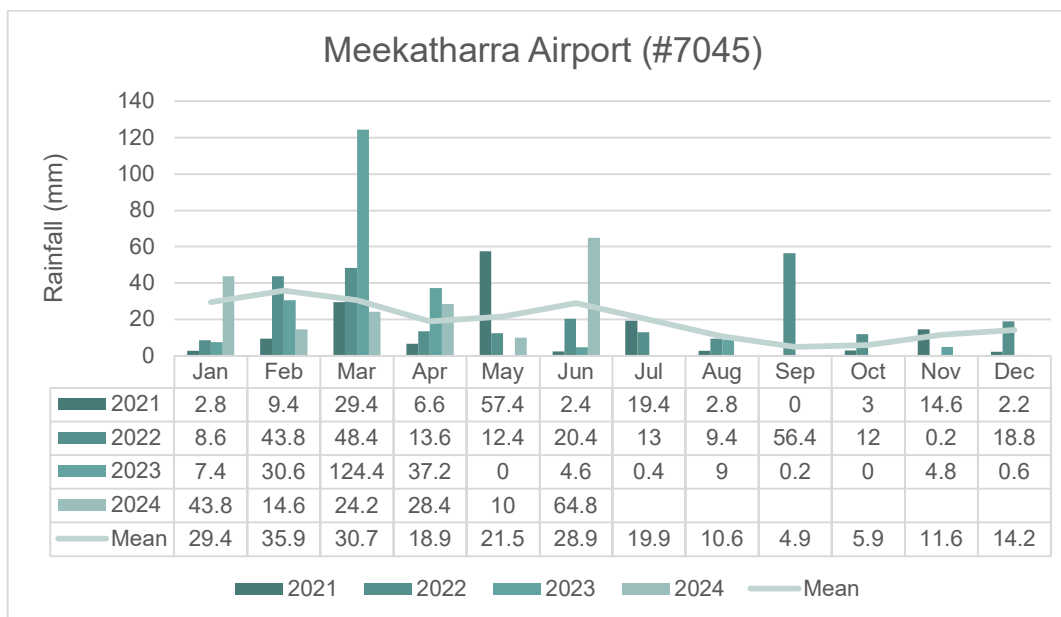


Figure 2-4: Climate data for Meekatharra Airport (#7045) (BoM, 2024)

2.6 Conservation Values

No Threatened Ecological Communities (TEC) or Priority Ecological Communities (PEC) listed under the Commonwealth EPBC Act, or the Western Australian BC Act are known to occur within the survey area. There are six PECs within 40 km of the survey area (Table 2-3, Figure 2-5).

Table 2-3: Priority Ecological Communities within a 40 km radius of the survey area

Community	Conservation Status	Description (DBCA, 2023)	Locality
Yagahong Land System	Priority 3	Rough greenstone ridges, hills and cobble-strewn footslopes supporting mulga shrublands.	Four occurrences within 40 km of the survey area, the nearest is approximately 7 km to the west of the survey area.
Austin Land System	Priority 3	Saline stony plains with low rises and drainage foci supporting low halophytic shrublands with scattered mulga; occurs mainly adjacent to lakes Austin and Annean below greenstone hill systems.	The nearest occurrence is approximately 7 km to the south of the survey area.

Community	Conservation Status	Description (DBCA, 2023)	Locality
Belele calcrete groundwater assemblage type on Murchison palaeodrainage on Belele Station	Priority 1	Unique assemblages of invertebrates have been identified in the groundwater calcretes.	Located approximately 32 km west of the survey area.
Trillbar Land System	Priority 3	Gently sloping stony plains with low rises of metamorphic rocks and gilgaied drainage foci; supports more or less saline shrublands of snakewood, mulga, bluebush and samphire with patches of tussock grassland.	Located approximately 28 km southeast of the survey area.
Karalundi calcrete groundwater assemblage type on Murchison palaeodrainage on Karalundi Station	Priority 1	Unique assemblages of invertebrates have been identified in the groundwater calcretes.	Located approximately 36 km northeast of the survey area.
Killara North calcrete groundwater assemblage types on Murchison palaeodrainage on Killara Station	Priority 1	Unique assemblages of invertebrates have been identified in the groundwater calcretes.	Located approximately 38 km northeast of the survey area.

There are no Ramsar wetlands or wetlands of national importance (ANCA Wetlands) within the survey area or within 40 km of the survey area. Lake Annean (Lake Nannine) is a wetland of national importance but is located 50 km south of the survey area. There are no Environmentally Sensitive Areas (ESA) as listed under the EP Act within the survey area, or within 40 km of the survey area (Figure 2-5).

There are no DBCA-managed lands, gazetted or proposed Reserves within the survey area, or within 40 km of the survey area. The nearest Legislated Reserve is the Lakeside Conservation Park (R54420), approximately 130 km south west of the survey area.

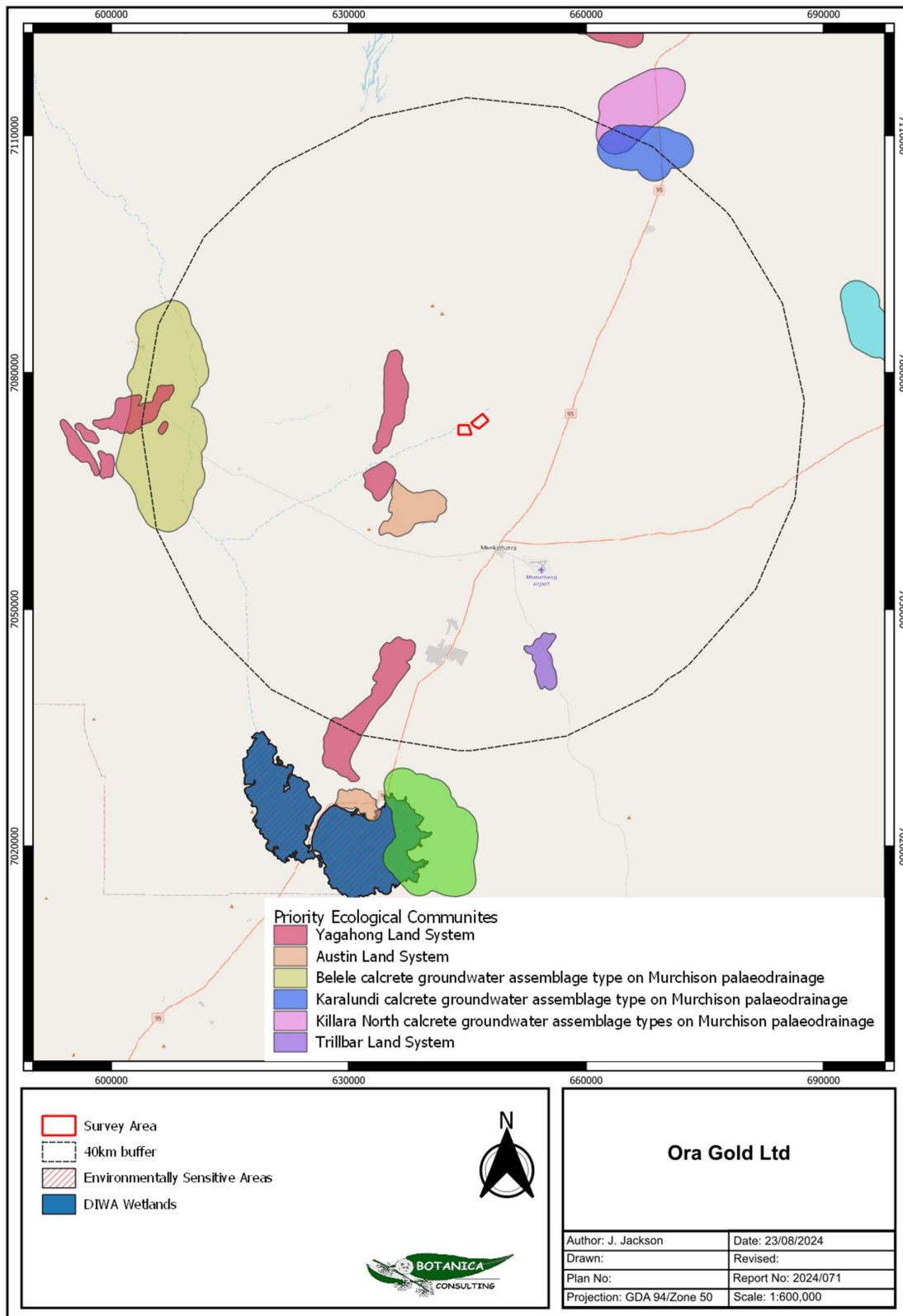


Figure 2-5: Conservation Values in relation to the survey area

2.7 Hydrology

The survey area is in the Murchison River Catchment. One Major and several minor ephemeral drainage lines intersect the survey area (Figure 2-6). The Garden Gully Creek is listed as a Major ephemeral drainage line and intersects the northern part of the survey area (Crossman and Li, 2015).

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. In accordance with the BoM *Atlas of Groundwater Dependent Ecosystems* (BoM, 2024b) database, there are no known or potential aquatic GDEs within the survey area. There are two potential terrestrial GDEs in the survey area (Table 2-4, Figure 2-6).

Table 2-4: Potential terrestrial groundwater dependent ecosystems (BoM, 2024b)

Ecosystem Description	GDE Potential based on national assessment (BoM, 2024b)
Low greenstone hills with occasional lateritic breakaways and broad stony slopes, lower saline stony plains and broad drainage tracts.	Low potential
Flat hardpan wash plains with mantles of small pebbles and gravels; supporting groved mulga shrublands and occasional wanderrie grasses.	Low potential

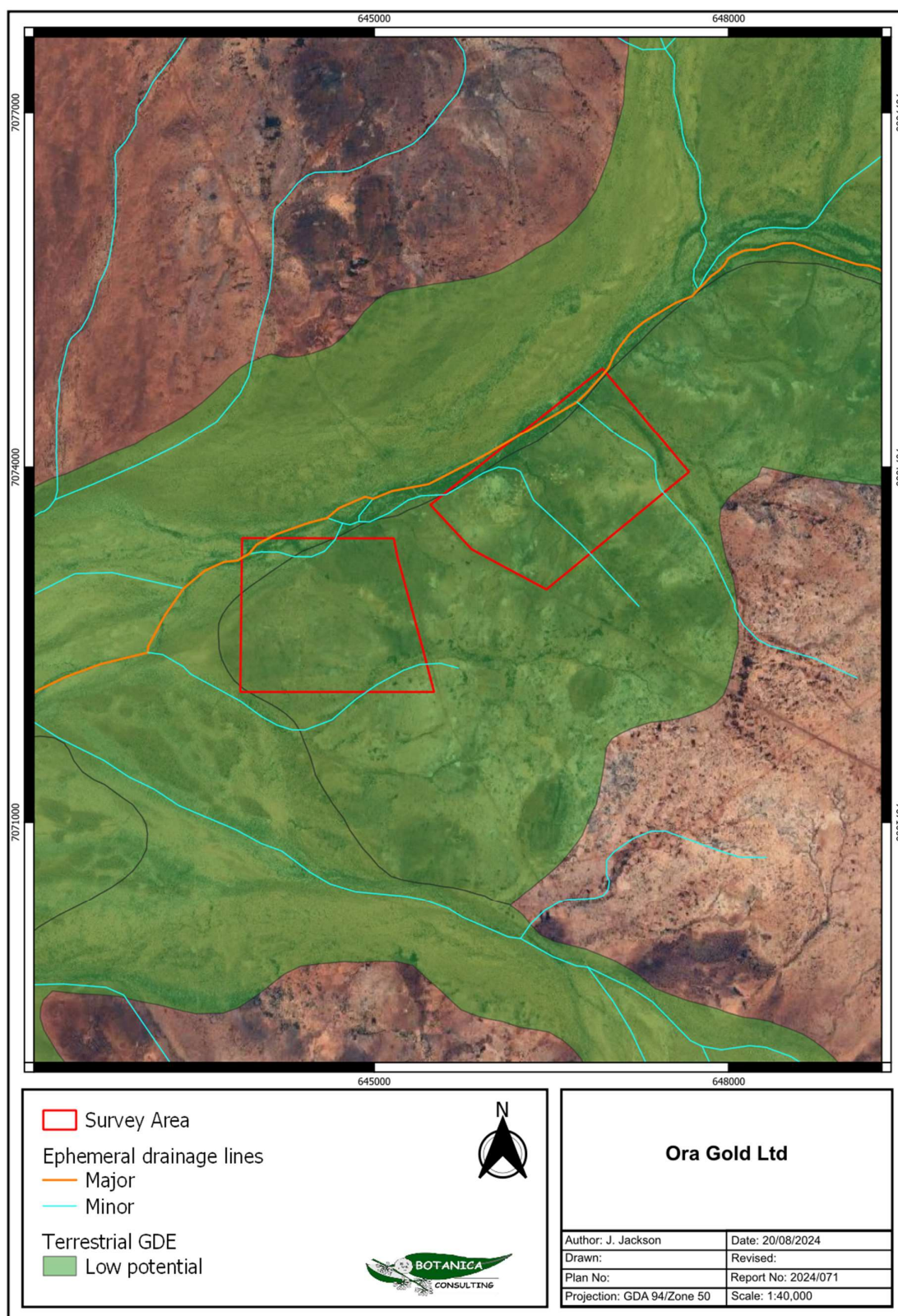


Figure 2-6: Regional hydrology of the survey area

3 SURVEY METHODOLOGY

3.1 Desktop Assessment

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

- Botanica (2021). *Desktop Flora and Fauna Assessment: Murchison Exploration Project*. Unpublished report prepared for Evolution Mining Group, April 2021.
- MWH (2015). *Lake Annean Flora and Fauna Assessment*. Unpublished report prepared for Metals X Ltd, September 2015.
- MWH (2017). *Aladdin Project: Reconnaissance Flora and Fauna Assessment*. Unpublished report prepared for Westgold Resources Ltd., March 2017.
- Native Vegetation Solutions (2018). *Reconnaissance Flora and Vegetation Survey, Golden Shamrock Prospect, Central Murchison Gold Project*. Unpublished Report for Westgold Resources Ltd., May 2018.

Database search requests for significant flora (ref: 62-0824FL) (DBCA, 2024b), fauna (ref: 44-0824FA) (DBCA, 2024c) and communities (ref: 40-0824EC) (DBCA, 2024d) were submitted to DBCA for records within the survey area, with a 40 km buffer applied.

In addition to the literature review and DBCA database search requests, searches of the following online databases were also undertaken (using the survey area and 40 km buffer as stated above) to aid in the compilation of a list of potential significant flora and fauna within the survey area:

- Atlas of Living Australia (ALA) database (ALA, 2024);
- Dandjoo database (DBCA, 2024a); and
- EPBC Protected Matters search tool (DCCEEW, 2024).

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.
- **Likely:** Suitable habitat is expected to occur and there are records within 10 km of the survey area.

- **Previously Recorded:** A record for this species is located within the survey area. Field survey will ground-truth currently occurring individuals and populations.

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 taxa was assessed using data from the following sources:

- Environment Protection and Biodiversity and Conservation (EPBC) Act 1999. Administered by the Australian Government (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 30th April 2024, flora list released 1st May 2024).

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.

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

3.2 Flora and Vegetation Field Assessment

Botanica conducted a reconnaissance flora/ vegetation and basic fauna surveys on the 26th June 2024. This was conducted by Jennifer Jackson (Senior Botanist, BSc Environmental Management (Honours)) and Kiefer Millet (Field Technician). The area was traversed on foot and by 4WD.

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:

- 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.

Unknown specimens collected during the survey were identified with the aid of samples housed at the Botanica Herbarium and Western Australian Herbarium. Vegetation was classified in accordance with NVIS classifications.

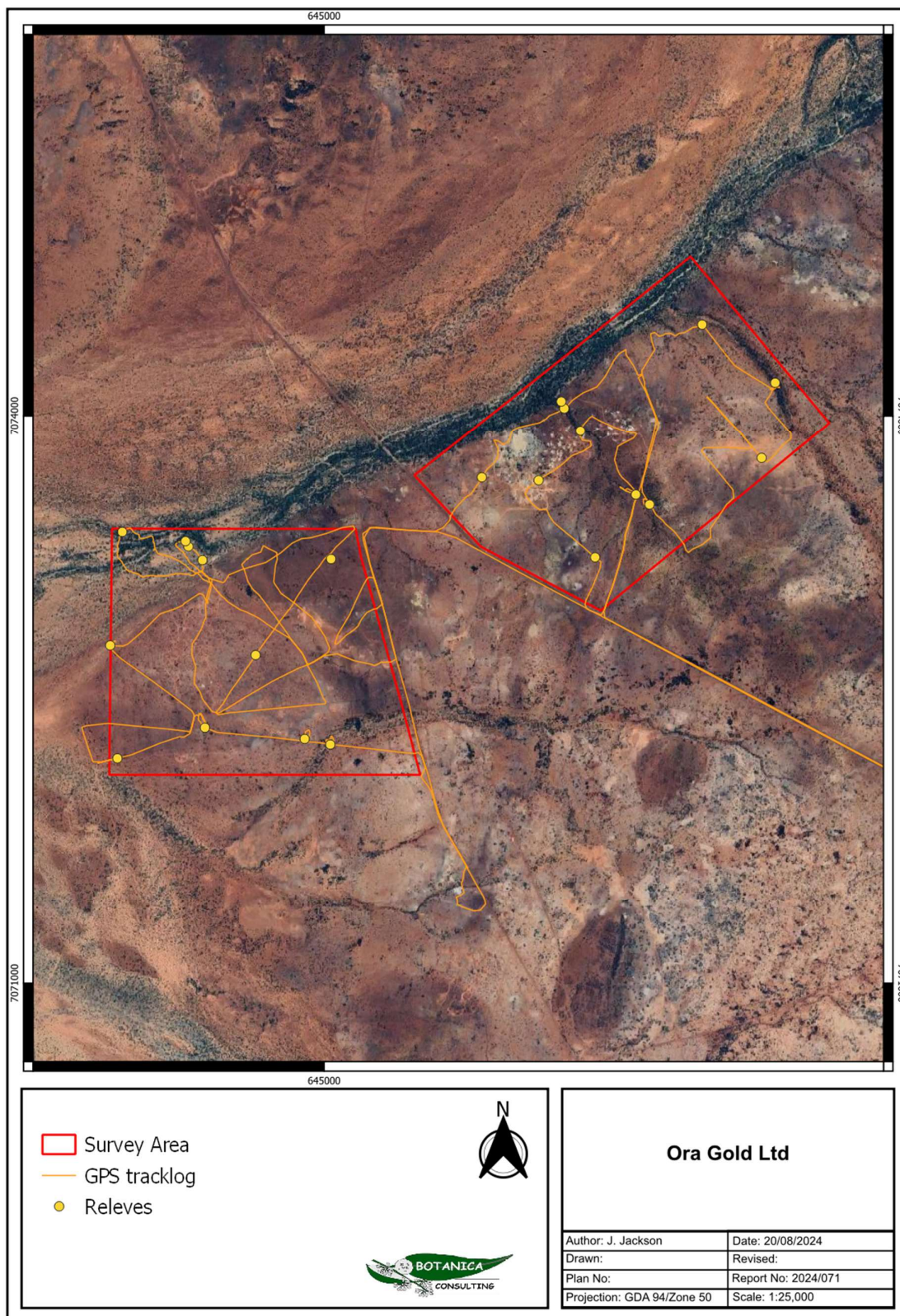


Figure 3-1 GPS tracklog of the 2024 survey effort

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/ vegetation and fauna were generated using QGIS.

3.4 Terrestrial Fauna Field Assessment

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.

Fauna of conservation significance identified during the literature review and database searches as previously being recorded in the general area were assessed and ranked for their likelihood of occurrence within the survey area. The rankings and criteria used were:

- **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).
- **Locally Extinct:** Populations no longer occur within a small part of the species natural range, in this case within 10 or 20 km of the survey area. Populations do however persist outside of this area.
- **Regionally Extinct:** Populations no longer occur in a large part of the species natural range, in this case within the Eastern Murchison subregion. Populations do however persist outside of this area.
- **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.

3.5 Scientific Licences

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

Licensed Staff	Permit Number	Date of Expiry
Jennifer Jackson	FB62000309-02 (Licence to take flora for scientific purposes)	11/01/2027

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, discussions with local experts/residents 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/ vegetation and fauna survey

Variable	Potential Impact on Survey	Details
Access problems	Not a constraint	The survey was conducted via 4WD and on foot. The survey area was accessible by numerous access tracks.
Competency/ Experience	Not a constraint	The Botanica personnel that conducted the survey were regarded as suitably qualified and experienced. Coordinating Staff: Jennifer Jackson (Senior Environmental Consultant). Data Interpretation: Jim Williams (Botanist), Kym Pearce and Jennifer Jackson.
Timing of survey, weather & season	Not a constraint	Fieldwork was undertaken outside the EPA's recommended primary survey time period for the Eremaean Province (i.e., 6-8 weeks following winter rainfall). Above average rainfall was received in April 2024, eight weeks prior to the survey and immediately prior to the survey in June.
Area disturbance	Not a constraint	The majority of native vegetation survey area was in completely degraded to good condition.
Survey Effort/ Extent	Not a constraint	Survey intensity was appropriate for the size/significance of the area with a reconnaissance survey completed to identify vegetation types/fauna habitats and conservation significant species/communities.
Availability of contextual information at a regional and local scale	Not a constraint	BoM, DWER, DPIRD, DBCA and DCCEE databases were reviewed to obtain appropriate regional desktop information on the biophysical environment of the local region. Botanica has conducted numerous surveys within the Murchison bioregion 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.
Completeness	Not a constraint	In the opinion of Botanica, the survey area was covered sufficiently in order to identify vegetation assemblages. All observed flora individuals were able to be identified to species level. The vegetation associations for this study were based on visual descriptions of locations in the field. The distribution of these vegetation associations outside the survey 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 Dandjoo database search (DBCA, 2024a) identified 640 vascular flora species as previously being recorded within 40 km of the survey area. The full list of vascular flora identified by the desktop search is contained in Appendix B.

4.1.2 Introduced Flora

The desktop review identified 19 introduced flora (weed) species as previously being recorded within 40 km of the survey area (DBCA, 2024a). Of these, one species is listed as a Declared Pest on the Western Australian Organism List (WAOL) under the *Biosecurity and Agriculture Management (BAM) Act 2007* and also 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

Taxon	Common Name	Declared Pest	WONS
<i>Brassica tournefortii</i>	Mediterranean Turnip	N	N
<i>Cenchrus ciliaris</i>	Buffel grass	N	N
<i>Cenchrus setiger</i>	Birdwood grass	N	N
<i>Chenopodium murale</i>	Nettle-leaf Goosefoot	N	N
<i>Cuscuta epithymum</i>	Lesser dodder	N	N
<i>Hordeum glaucum</i>	Northern Barley Grass	N	N
<i>Malva parviflora</i>	Marshmallow	N	N
<i>Opuntia stricta</i>	Common Prickly Pear	Y	Y
<i>Papaver hybridum</i>	Rough poppy	N	N
<i>Portulaca pilosa</i>	Djanggara	N	N
<i>Rostraria pumila</i>	Tiny bristle-grass	N	N
<i>Rumex vesicarius</i>	Ruby dock	N	N
<i>Schinus molle var. areira</i>	Peppercorn	N	N
<i>Schismus arabicus</i>	Araby grass	N	N
<i>Sisymbrium erysimoides</i>	Smooth mustard	N	N
<i>Sisymbrium irio</i>	London rocket	N	N
<i>Sisymbrium orientale</i>	Indian Hedge Mustard	N	N
<i>Solanum nigrum</i>	Black Berry Nightshade	N	N
<i>Sonchus oleraceus</i>	Common Sowthistle	N	N

4.1.3 Significant Flora

Assessment of the DBCA's Threatened and Priority Flora database records (Ref: 62-0824FL) (DBCA, 2024b), EPBC Protected Matters (DCCEEW, 2024), Dandjoo database (DBCA, 2024a) and previous relevant literature identified one Threatened Flora and 15 Priority Flora as occurring within a 40 km radius of the survey area.

These taxa were assessed for distribution and known habitat to determine their likelihood of occurrence within the survey area (Table 4-2). The locations of the DBCA database records are illustrated spatially in Figure 4-1.

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

Taxon	Rank			Habitat Description	Assessment
	EPBC	BC Act	DBCA		
<i>Acacia speckii</i>			P4	Rocky soils over granite, basalt or dolerite. Rocky hills or rises.	Unlikely, no habitat fitting this description in the survey area.
<i>Calytrix verruculosa</i>	-	-	P3	Sandy clay. Shallow hardpan plain.	Possible.
<i>Drummondita miniata</i>			P3	Laterite. Breakaways.	Unlikely, no breakaways in the survey area.
<i>Eremophila fasciata</i>			P3	Stony hill.	Unlikely, no habitat fitting this description in the survey area.
<i>Eremophila retropila</i>	-	-	P1	Gravelly loam. Stony flats.	Possible.
<i>Euploca mitchellii</i>			P1	Rocky hills.	Unlikely, no rocky hills in the survey area.
<i>Goodenia berringbinensis</i>			P4	Red sandy loam. Along watercourses.	Possible.
<i>Grevillea inconspicua</i>	-	-	P4	Along drainage lines on rocky outcrops, creeklines.	Possible.
<i>Hemigenia virescens</i>			P3	Yellow-red sandy clay.	Unlikely, no habitat fitting this description in the survey area.
<i>Homalocalyx echinulatus</i>			P3	Laterite. Breakaways, sandstone hills.	Unlikely, no habitat fitting this description in the survey area.
<i>Indigofera rotula</i>			P3	Red loamy banks of watercourses.	Possible.
<i>Lepidium xylodes</i>	-	-	P1	Gravelly loam, clayey sand.	Possible.
<i>Menkea draboides</i>	-	-	P3	Red sand or clay, granite.	Possible.
<i>Pityrodia augustensis</i>	VU	VU		Amongst rocks on slopes or in drainage lines.	Not likely, nearest known population is >300 km to the north west.
<i>Ptilotus lazaridis</i>			P3	Clay loam. Floodplains.	Possible.
<i>Ptilotus luteolus</i>			P3	Hillslopes.	Unlikely, no hillslopes in the survey area.

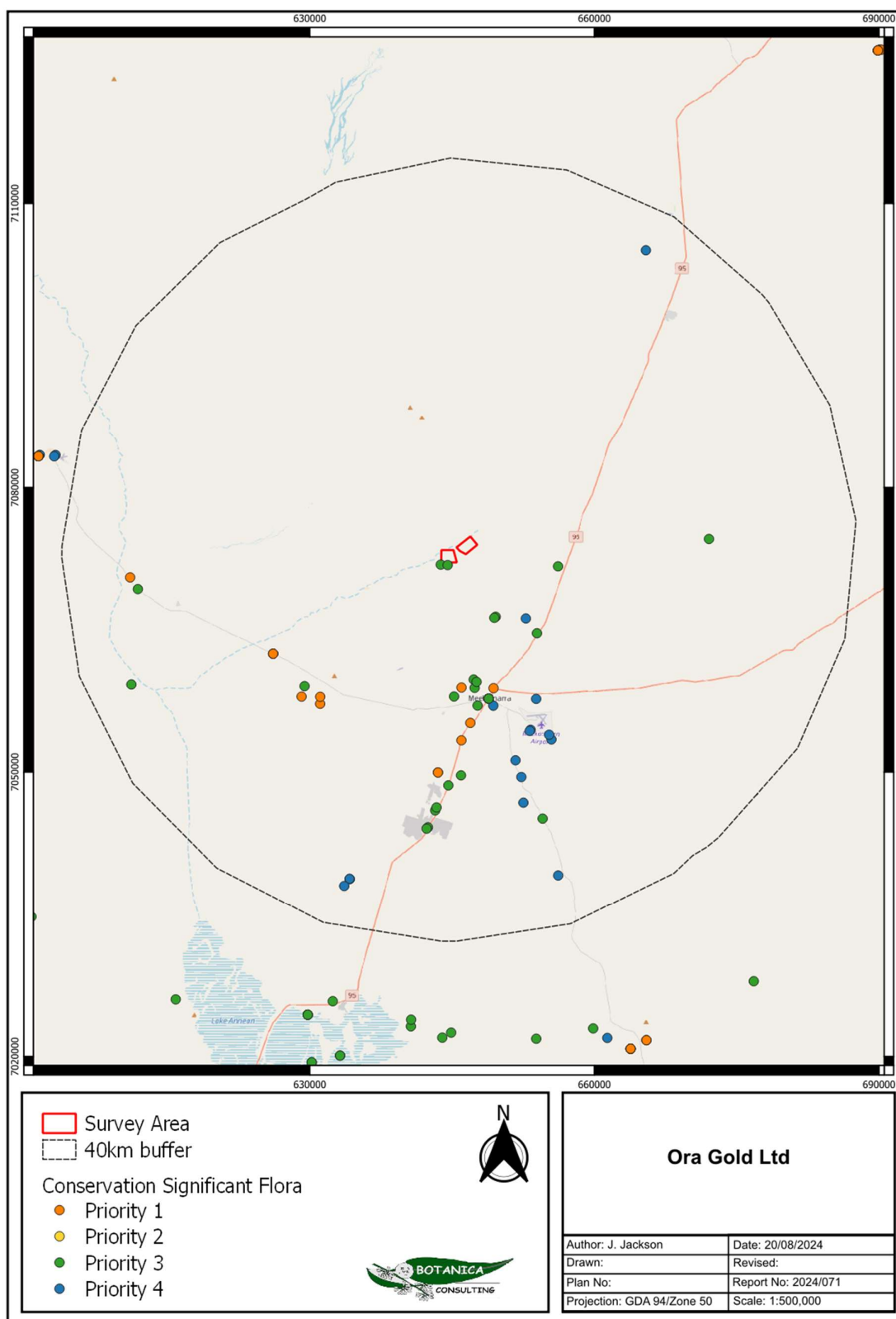


Figure 4-1: Significant flora within the desktop search area

4.1.4 Fauna

The combined Dandjoo database search (DBCA, 2024a) and ALA spatial portal results (ALA, 2024) identified a total of 204 terrestrial vertebrate fauna taxa within 40 km of the survey area, consisting of 154 bird, 10 mammal, 38 reptile and two amphibian taxa. The full list of vertebrate fauna identified by the desktop search is contained in Appendix B.

4.1.4.1 Conservation Significant Fauna

The desktop review (DBCA 2024b, DCCEEW 2024) identified nine terrestrial vertebrate species and one invertebrate species of conservation significance as previously being recorded in the regional area, consisting of eight Threatened and one otherwise specially protected species. In addition, several migratory wading/shorebird species were assessed collectively due to their similar habitat requirements.

Habitat and distribution data was used to determine the likelihood of occurrence within the survey area. The assessment identified two significant fauna species as possibly occurring in the survey area (Table 4-3).

Table 4-3: Conservation significant fauna previously recorded within 40 km of the survey area

Class	Taxon	Conservation Status			Habitat Description	Likelihood of Occurrence
		EPBC Act	BC Act	Priority		
Reptile	<i>Liopholis kintorei</i> Great desert skink	VU	-	-	Endemic to the Australian arid zone in the western deserts region (DCCEEW, 2024).	The PMST report suggests that the species or species habitat may occur in the buffer area. Would not occur. Nearest mainland population is >280 km to the northeast.
Bird	<i>Aphelocephala leucopsis</i> 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).	Unlikely, no DBCA records of any sightings within 40 km of the survey area. The PMST report suggests that the species or species habitat may occur in the area.
	<i>Falco hypoleucos</i> Grey falcon	VU	VU	-	occurs in arid and semi-arid Australia, including the Murray-Darling Basin, Eyre Basin, central Australia and Western Australia, frequents timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined water courses (DCCEEW, 2024).	Possible- area may form part of larger home range.
	<i>Leipoa ocellata</i> Mallee fowl	VU	VU	-	Scrublands and woodlands dominated by mallee and wattle species (DCCEEW, 2024).	Unlikely, no DBCA records of any sightings within 40 km of the survey area. The PMST report suggests that the species or species habitat may occur in the area.
	<i>Falco peregrinus</i> Peregrine falcon	-	OS	-	Known to inhabit open grasslands, wooded areas (ALA, 2024).	Possible- area may form part of larger home range.
	<i>Calidris acuminata</i> Sharp-tailed Sandpiper	VU	MI		Intertidal mudflats, also freshwater swamps and saltwater lakes (ALA, 2024).	Would not occur, no habitat in the survey area.
	<i>Calidris ferruginea</i> Curlew Sandpiper	CR	CR		Intertidal mudflats, also freshwater swamps and saltwater lakes (ALA, 2024).	Would not occur, no habitat in the survey area.
	<i>Pezoporus occidentalis</i> Night parrot	EN	CR	-	Broad habitat requirements include areas of old-growth spinifex (<i>Triodia</i>) for roosting and nesting, together with foraging habitats that are likely to include various native grasses and herbs and may or may not contain shrubs or low trees. (DPaW, 2017).	Would not occur. Considered to be regionally extinct.

Class	Taxon	Conservation Status			Habitat Description	Likelihood of Occurrence
		EPBC Act	BC Act	Priority		
	Migratory Shorebirds (inc Common sandpiper, Red necked stint)	MI	IA	-	Prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, salt pans and hypersaline salt lakes inland (DotEE, 2018).	No suitable habitat (wetlands) present within the survey area. Would not occur.
Invertebrate	<i>Idiosoma nigrum</i> Shield-backed trapdoor spider	VU	EN	-	Dry woodlands east of the Darling Scarp and north to Moore River (ALA, 2024).	The PMST report suggests that the species or species habitat may occur in the buffer area. Would not occur. Nearest mainland populations are >250 km to the southwest.

4.2 Field Assessment

4.2.1 Flora

The field survey identified 80 vascular flora taxa within the survey area. These taxa represented 44 genera across 26 families, with the most diverse families being Fabaceae (17 species), Chenopodiaceae (ten species) and Scrophulariaceae (nine species), followed by dominant genera include *Acacia* (12 species) and *Eremophila* (nine species). Twenty annual species were observed during the survey. The full field species inventory is listed in Appendix C.

4.2.1.1 Introduced Flora

Six introduced flora (weeds) species were observed within the survey area during the survey (Table 4-4). These were observed in disturbed areas and along tracks, and their locations were not marked. None of these 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.

Table 4-4: Introduced flora species within the survey area

Family	Taxon	Common Name
Aizoaceae	<i>Mesembryanthemum crystallinum</i>	Iceplant
Asteraceae	<i>Bidens bipinnata</i>	Bipinnate Beggartick
Brassicaceae	<i>Sisymbrium irio</i>	London rocket
Cucurbitaceae	<i>Cucumis myriocarpus</i>	Paddy Melon
Poaceae	<i>Cenchrus ciliaris</i>	Buffel grass
Zygophyllaceae	<i>Tribulus terrestris</i>	Caltrop

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.

One Priority flora species was observed within the survey area, *Grevillea inconspicua* (P4) (Table 4-5 and Figure 4-2). Approximately 30 plants were seen growing in a dry drainage line.

Grevillea inconspicua is known from more than 30 populations (WAHERB, 1998-) and is known to occur in two IBRA subregions, the Eastern Murchison and Western Murchison. There are seven populations within approximately 100 km of the survey area (DBCA, 2024a), and according to Florabase (WAHERB, 1998-) the species covers a range of more than 50,000 km².

No Threatened or otherwise significant flora species were identified within the survey area.

Table 4-5: Significant flora recorded within the survey area

Taxon	Conservation Code	Description	Image
<i>Grevillea inconspicua</i>	Priority 4	Intricately branched, spreading shrub, 0.6-2 m high. Flowers are white/pink-white, flowers from June to August (WAHERB, 1998-). Known from numerous populations in the Western and Eastern Murchison sub-regions. Approximately 30 plants were observed in a drainage line.	

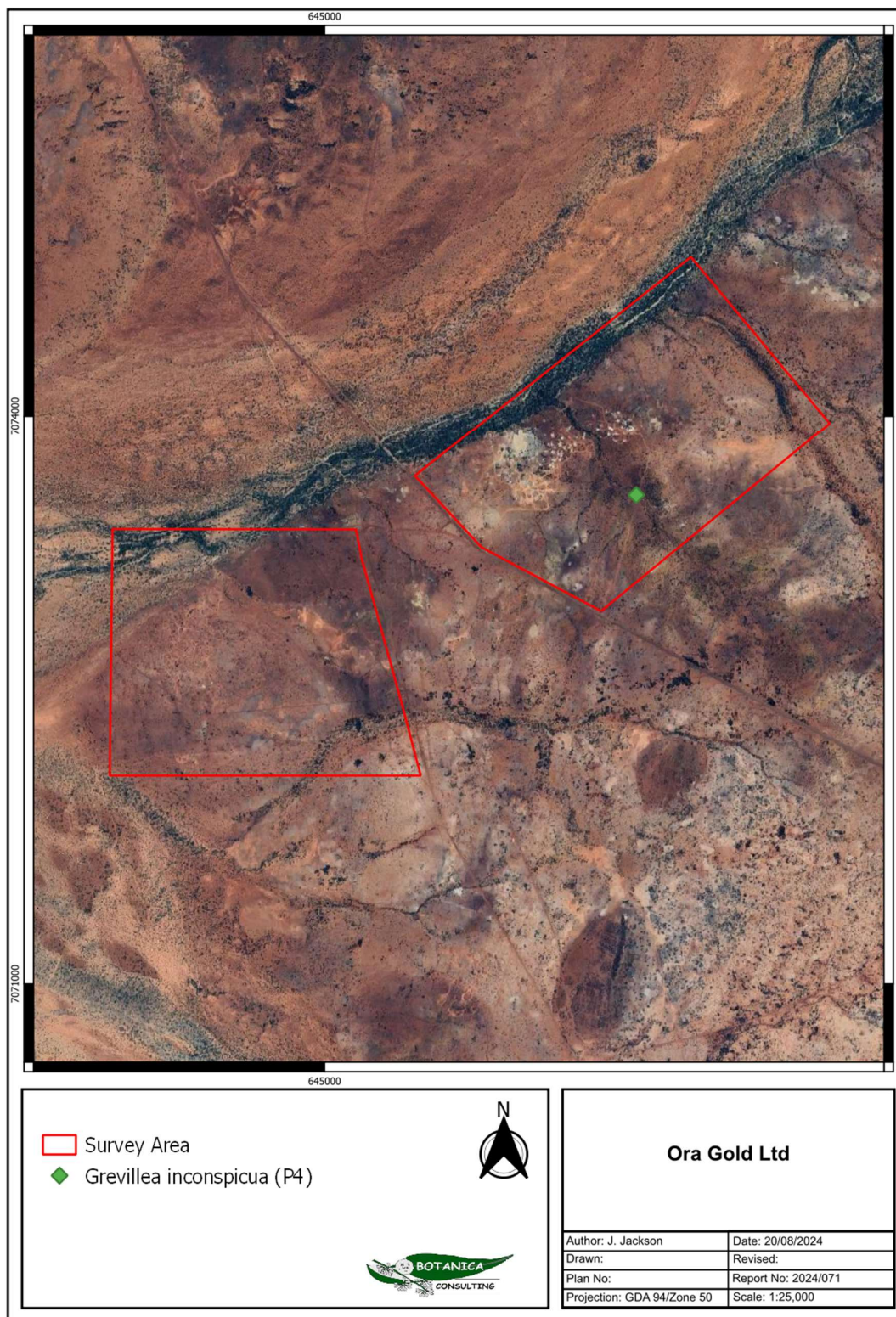


Figure 4-2: Location of Priority flora in the survey area

4.2.2 Vegetation Communities

A total of four broad-scale vegetation communities were identified within the survey area. Vegetation community descriptions and extent are listed below in Table 4-6 and illustrated spatially in Figure 4-3. These vegetation types were identified within two landform types and comprised of three major vegetation groups. Vegetation community descriptions and extents were determined from field survey results, aerial imagery interpretation and extrapolation of the communities.

The survey found RP-AOW1 was the most widespread community in the survey area, occupying 175 ha (44.4 %), while DD-EFW1 was the most restricted with 16 ha (4 %). The most diverse vegetation type was DD-AFW1 with 49 species (61%), while the least diverse was DD-EFW1 and CLP-AOW1 both with 14 species (17.5%).

Table 4-6: 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)	RP-AOW1	Mid woodland of <i>Acacia pruinocarpa</i> and <i>Acacia incurvaneura</i> over mid open shrubland of <i>Acacia grasbyi</i> , <i>Eremophila galeata</i> and <i>Senna</i> sp. Meekatharra over low sparse shrubland of <i>Maireana triptera</i> and <i>Enchylaena tomentosa</i> on rocky plain.	175	44.4	
	Acacia open woodlands (MVG 13)	CLP-AOW1	Mid woodland of <i>Acacia incurvaneura</i> over mid shrubland of <i>Eremophila compacta</i> over low sparse shrubland of <i>Solanum lasiophyllum</i> and <i>Aristida contorta</i> on clay loam plain.	115	29.3	

Landform	NVIS Vegetation Group	Veg Code	Vegetation Type	Area (ha)	Area (%)	Image
Drainage depression	Acacia forests and woodlands (MVG 6)	DD-AFW1	Mid open forest of <i>Acacia incurvaneura</i> over mid open shrubland of <i>Acacia tetragonophylla</i> , <i>Eremophila galeata</i> and <i>Senna</i> sp. Meekatharra over low sparse shrubland of <i>Ptilotus obovatus</i> and <i>Solanum lasiophyllum</i> in drainage depression.	63	16	
	Eucalypt woodlands (MVG 5)	DD-EFW1	Mid open forest of <i>Eucalyptus camaldulensis</i> over mid open shrubland of <i>Acacia tetragonophylla</i> , <i>Eremophila galeata</i> and <i>Senna</i> sp. Meekatharra over low sparse shrubland of <i>Ptilotus obovatus</i> and <i>Solanum lasiophyllum</i> in drainage depression.	16	4.0	
Cleared areas				25	6.3	
Total				394	100	

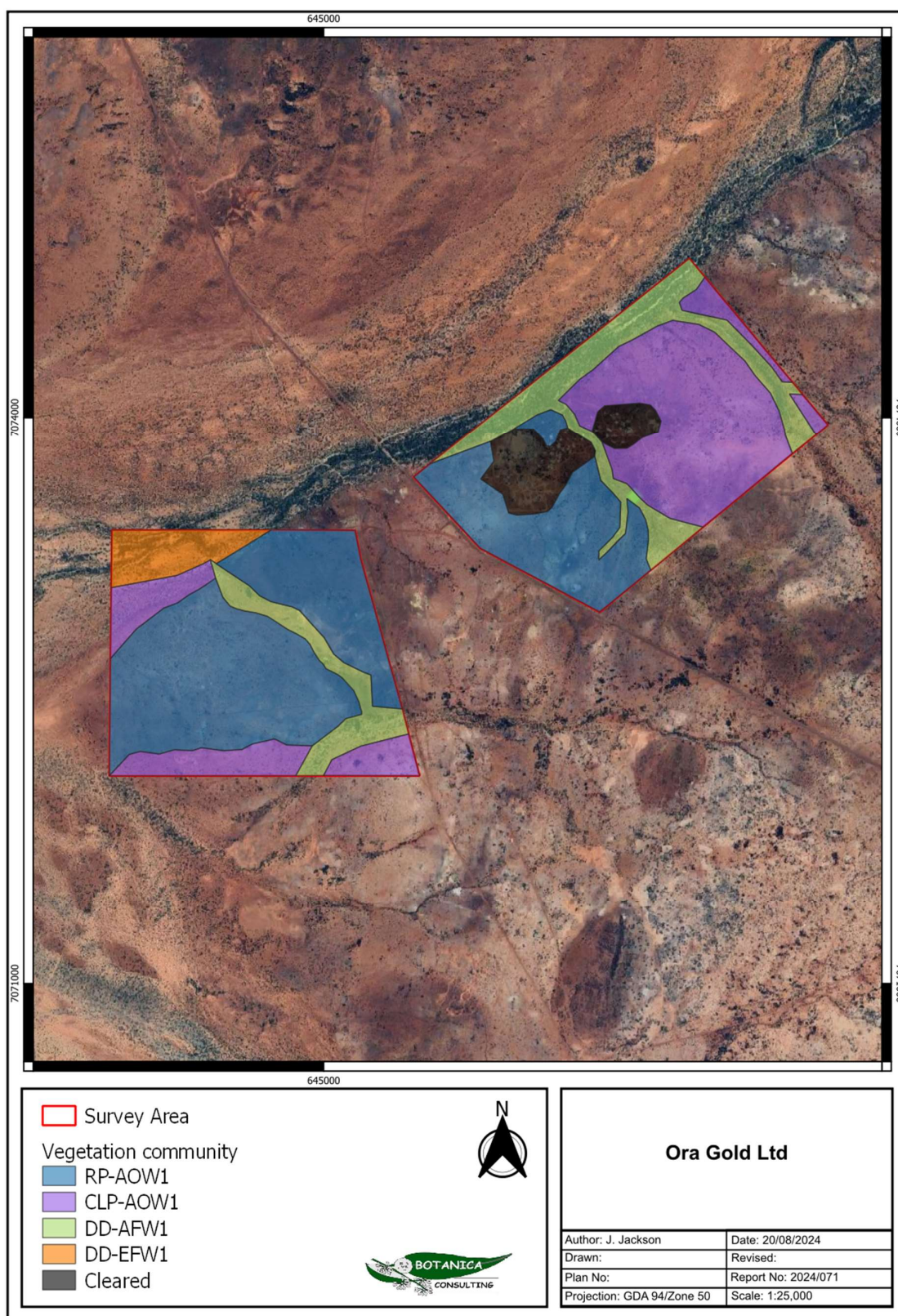


Figure 4-3: Vegetation types within the survey area

4.2.3 Vegetation Condition

Based on the vegetation condition rating scale adapted from Keighery (1994) and Trudgen, (1988), native vegetation within the survey area was categorized as 'good', with cleared areas considered completely degraded (Table 4-7, Figure 4-4). Vegetation condition rating descriptions are listed in Appendix B. Impacts to vegetation within the survey area include access tracks, historical and current mining and exploration disturbances and heavy grazing.

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

Condition rating	Description	Area (ha)	Area (%)
Good	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.	369	93.7%
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.	25	6.3%
TOTAL		394	100

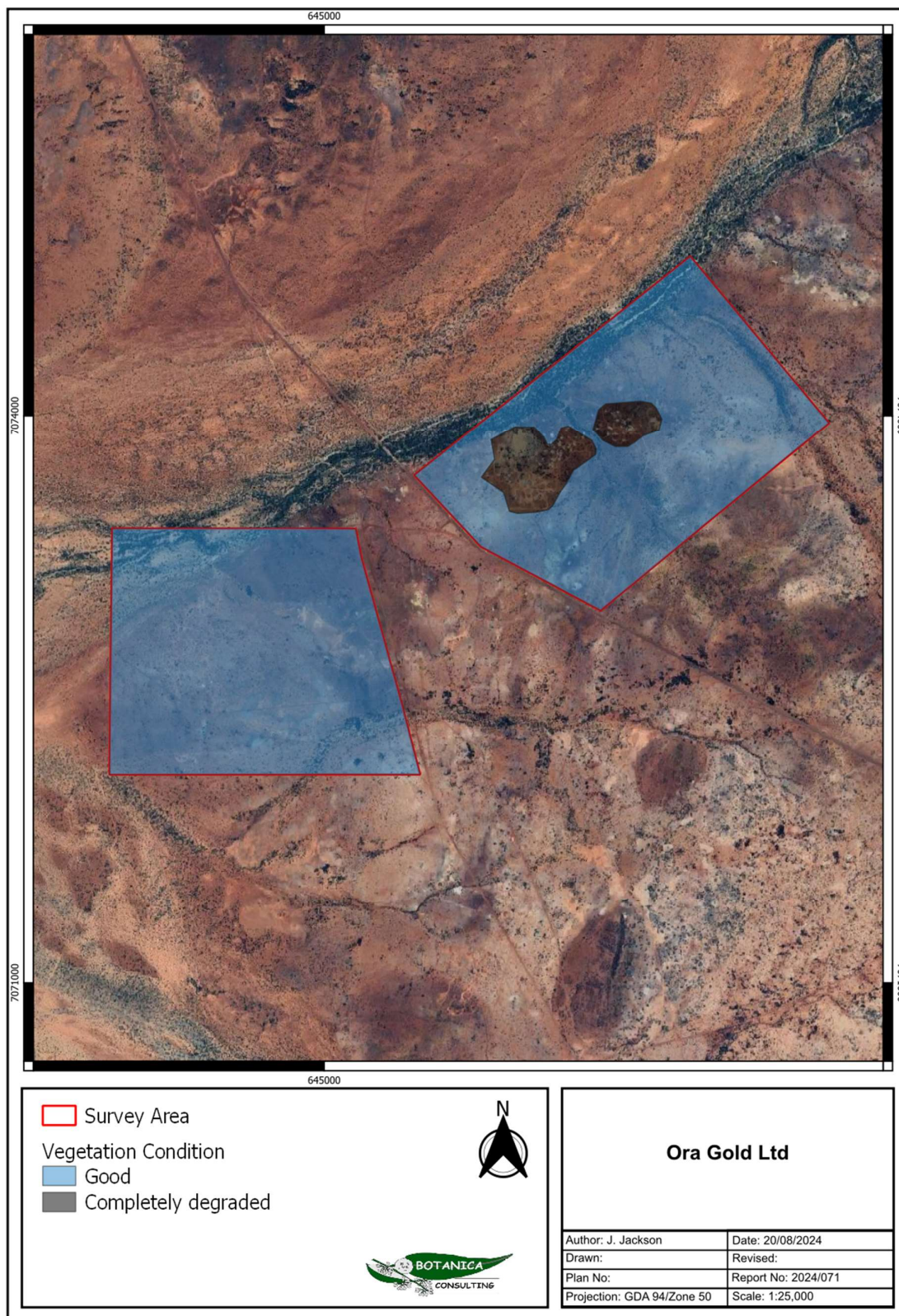


Figure 4-4: Vegetation condition within the survey area

4.2.4 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 Threatened, Priority or otherwise significant ecological communities were identified within the survey area.

4.2.5 Fauna

4.2.5.1 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. Table 4-9 provides the area and a visual representation of fauna habitat types, and the extent of fauna habitats is shown spatially in Figure 4-5.

Table 4-8 provides a list of opportunistic observations of fauna species were made during the field survey with a total of 12 fauna species observed.

Table 4-8: Fauna species observed during the field survey

Taxon	Common Name	Comments
Avifauna		
<i>Aquila audax</i>	Wedge-tailed eagle	Observed
<i>Barnardius zonarius</i>	Ringneck parrot	Observed
<i>Corvus orru</i>	Torresian crow	Heard
<i>Geopelia cuneata</i>	Diamond Dove	Observed
<i>Lichmera indistincta</i>	Brown honey eater	Observed
<i>Oreocia gutturalis</i>	Crested bellbird	Heard
<i>Phaps chalcoptera</i>	Common bronzewing	Observed
<i>Psephotellus varius</i>	Mulga Parrot	Observed
<i>Taeniopygia castanotis</i>	Zebra finch	Observed
Mammals		
<i>Bos taurus</i>	Cattle	Tracks and Scats Observed
<i>Oryctolagus cuniculus</i>	Rabbit	Scats Observed
<i>Macropus sp.</i>	Kangaroo and/or Euro	Tracks and Scats Observed

Table 4-9: Main terrestrial fauna habitats within the survey area

Fauna Habitat	Description	Representative Fauna Attributes	Example Image
<i>Acacia</i> open woodland on rocky or clay-loam plain Area= 290 ha (73.6%)	Open <i>Acacia</i> woodland over <i>Eremophila</i> shrubland	• Ground not particularly suited to burrowing species. • Low diversity vegetation strata supporting a reduced avifauna assemblage. • Low vegetation density and low leaf litter supporting some small reptiles.	

Fauna Habitat	Description	Representative Fauna Attributes	Example Image
<i>Acacia</i> and/or <i>Eucalypt</i> woodland in drainage line Area=79 ha (20%)	Closed <i>Acacia</i> and/or <i>Eucalypt</i> woodland over mixed <i>Acacia</i> and <i>Eremophila</i> shrubland	• Ground moderately suited to burrowing species in some areas. • Moderate diversity vegetation strata supporting a good avifauna assemblage. • Moderate vegetation density and moderate leaf litter supporting small reptiles.	

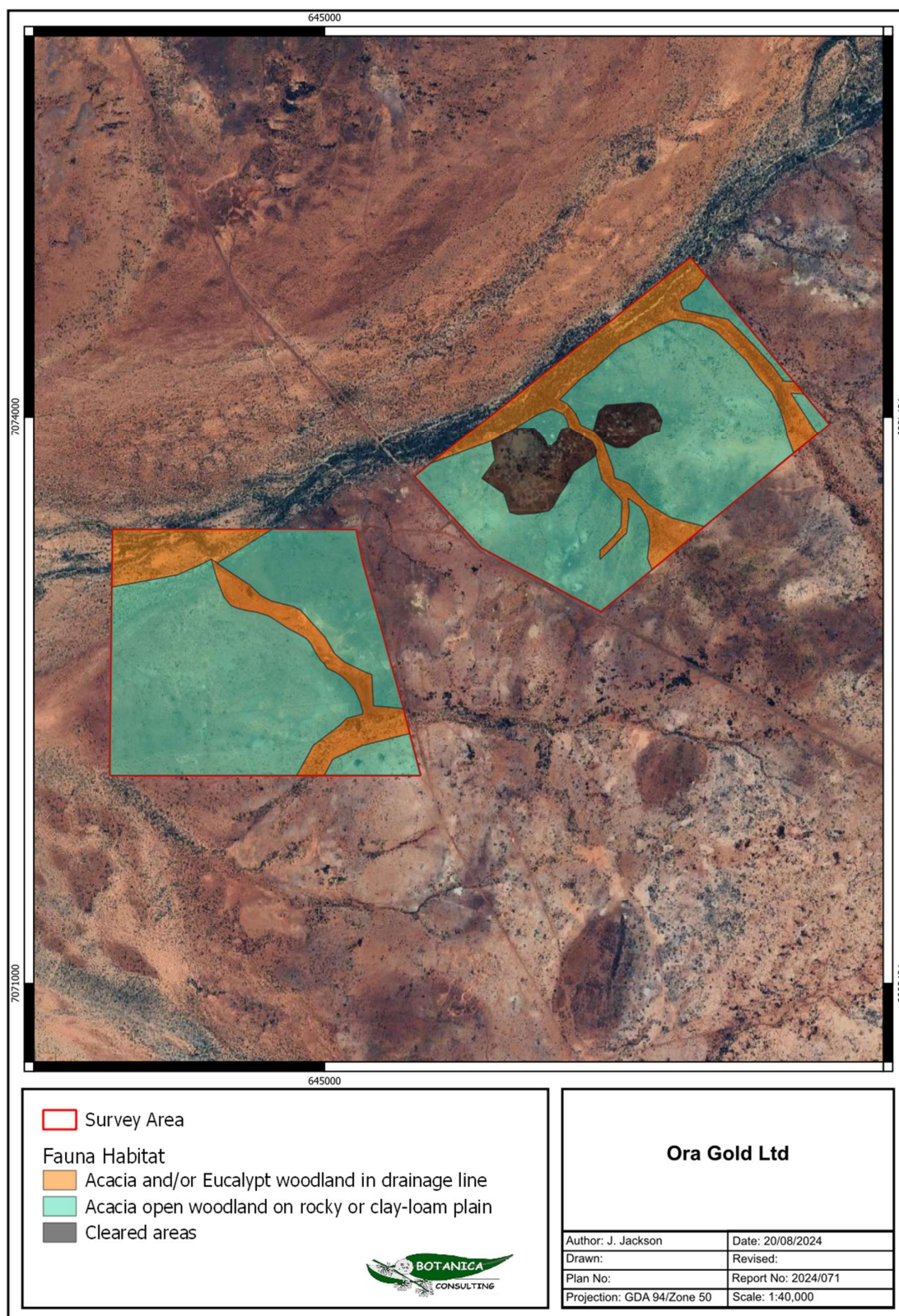


Figure 4-5: Fauna habitats within the survey area

4.2.5.2 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.

No evidence of significant fauna species was observed during the survey.

The current status of some species on site and/or in the general area is difficult to determine, however, based on the habitats present and, in some cases, direct observations or recent nearby records, the following species of conservation significance can be regarded as possibly utilising the survey area for some purpose at times, these being:

- **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.

- **Peregrine Falcon (*Falco peregrinus*) - OS (DBCA)**

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

It should be noted that while habitats onsite for one or more of the species listed above are considered possibly suitable, some or all may be marginal in extent/quality and therefore the fauna species considered as possibly occurring may in fact only visit the area for short periods as infrequent vagrants.

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

- Nationally threatened flora 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.

No Matters of National Environmental Significance were identified within the survey area.

4.4 Matters of State Environmental Significance

4.4.1 *Environmental Protection Act WA 1986*

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

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

No Matters of State Environmental Significance were identified within the survey area. No Environmentally Sensitive Areas were identified within the survey area.

4.4.2 Biodiversity Conservation Act 2016

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

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

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

No threatened species or critical habitat listed under the BC Act 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 PECs as listed by DBCA were identified within the survey area. One Priority Flora taxon was observed within the survey area: *Grevillea inconspicua* (P4).

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

There are no gazetted or proposed conservation reserves within the survey area. The nearest Legislated Reserve is the Lakeside Conservation Park (R54420), approximately 130 km south west of the survey area.

5 DISCUSSION AND CONCLUSIONS

The field survey identified 80 vascular flora taxa within the survey area. These taxa represented 44 genera across 26 families. Twenty annual species were observed during the survey. Six weed species were recorded within the survey. These species are not listed as Declared Pests on the Western Australian Organism List (WAOL) under the *Biosecurity and Agriculture Management (BAM) Act 2007* or as Weeds of National Significance.

One Priority flora species was identified in the survey area. *Grevillea inconspicua* (P4) was observed growing in a drainage line. This taxon is apparently widespread across the Murchison Bioregion. No other Priority flora, Threatened flora or otherwise significant flora species were identified within the survey area.

A total of four broad-scale vegetation communities were identified within the survey area. These vegetation communities are considered to be of low biological diversity and are well represented outside the survey area.

Native vegetation within the survey area was categorised as 'Good' with cleared areas considered completely degraded. Impacts to vegetation within the survey area include access tracks, historical and current mining and exploration activities, and grazing by large feral herbivores.

No Threatened, Priority or otherwise significant ecological communities were identified within the survey area. No Environmentally Sensitive Areas were identified within 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 vegetation types identified in the survey area mostly aligned with the Ecosystem descriptions provided by the BoM *Atlas of Groundwater Dependent Ecosystems (BoM, 2024b)*, however it is difficult to determine how dependant these communities are on groundwater, they are more likely to obtain their water requirements from surface water.

Two broad scale terrestrial fauna habitats were identified as occurring within the survey area. No evidence of significant fauna species were observed during the survey.

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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 “ <i>there is no reasonable doubt that the last member of the species has died</i> ”, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act). 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 “ <i>is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form</i> ”, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act). 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.	
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

Code	Category
	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 <i>Convention on the Conservation of Migratory Species of Wild Animals</i> (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species. Published as migratory birds protected under an international agreement under schedule 5 of the <i>Wildlife Conservation (Specially Protected Fauna) Notice 2018</i>.
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 <i>Wildlife Conservation (Specially Protected Fauna) Notice 2018</i>.
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 <i>Wildlife Conservation (Specially Protected Fauna) Notice 2018</i>.
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. (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

Code	Category
	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;
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:
	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.

Category Code	Category
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: VEGETATION CONDITION RATING

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

APPENDIX C: LIST OF SPECIES IDENTIFIED WITHIN THE SURVEY AREA

(A) denotes annual flora; (W) denotes weed species.

Family	Genus	Species	RP-AOW1	DD-AFW1	DD-EFW1	CLP-AOW1
Aizoaceae	<i>Mesembryanthemum</i>	<i>crystallinum</i> (A) (W)	*			
Amaranthaceae	<i>Ptilotus</i>	<i>exaltatus</i> (A)	*			
Amaranthaceae	<i>Ptilotus</i>	<i>obovatus</i>	*	*	*	*
Amaranthaceae	<i>Ptilotus</i>	<i>roei</i>	*	*		
Amaranthaceae	<i>Ptilotus</i>	<i>rotundifolius</i>	*			
Asteraceae	<i>Bidens</i>	<i>bipinnata</i> (W)		*		
Boraginaceae	<i>Trichodesma</i>	<i>zeylanicum</i> (A)		*		
Brassicaceae	<i>Sisymbrium</i>	<i>irio</i> (A) (W)	*			
Chenopodiaceae	<i>Atriplex</i>	<i>codonocarpa</i> (A)	*			
Chenopodiaceae	<i>Dysphania</i>	<i>kalpari</i> (A)	*	*	*	
Chenopodiaceae	<i>Dysphania</i>	<i>melanocarpa</i> (A)	*			
Chenopodiaceae	<i>Enchylaena</i>	<i>tomentosa</i>	*			*
Chenopodiaceae	<i>Maireana</i>	<i>georgei</i>	*			*
Chenopodiaceae	<i>Maireana</i>	<i>triptera</i>	*			*
Chenopodiaceae	<i>Rhagodia</i>	<i>eremaea</i>	*			*
Chenopodiaceae	<i>Salsola</i>	<i>australis</i> (A)	*			*
Chenopodiaceae	<i>Sclerolaena</i>	<i>cuneata</i>	*			
Chenopodiaceae	<i>Sclerolaena</i>	<i>diacantha</i>	*	*		*
Convolvulaceae	<i>Duperreya</i>	<i>commixta</i>	*	*		
Cucurbitaceae	<i>Cucumis</i>	<i>myriocarpus</i> (W)	*	*		
Cyperaceae	<i>Bulbostylis</i>	<i>barbata</i>		*	*	

Family	Genus	Species	RP-AOW1	DD-AFW1	DD-EFW1	CLP-AOW1
Cyperaceae	<i>Cyperus</i>	<i>iria</i>		*	*	
Euphorbiaceae	<i>Euphorbia</i>	<i>boophthona</i> (A)		*	*	
Euphorbiaceae	<i>Euphorbia</i>	<i>drummondii</i> (A)	*	*	*	*
Fabaceae	<i>Acacia</i>	<i>acuminata</i>		*		
Fabaceae	<i>Acacia</i>	<i>aptaneura</i>	*			
Fabaceae	<i>Acacia</i>	<i>caesaneura</i>	*			*
Fabaceae	<i>Acacia</i>	<i>exocarpoides</i>		*		
Fabaceae	<i>Acacia</i>	<i>grasbyi</i>	*			
Fabaceae	<i>Acacia</i>	<i>incurvaneura</i>	*	*	*	*
Fabaceae	<i>Acacia</i>	<i>murrayana</i>		*		
Fabaceae	<i>Acacia</i>	<i>pruinocarpa</i>	*			
Fabaceae	<i>Acacia</i>	<i>quadrimarginea</i>	*	*		
Fabaceae	<i>Acacia</i>	<i>ramulosa</i> var. <i>linophylla</i>				*
Fabaceae	<i>Acacia</i>	<i>tetragonophylla</i>	*	*	*	
Fabaceae	<i>Acacia</i>	<i>victoriae</i>	*			
Fabaceae	<i>Senna</i>	<i>artemisioides</i> subsp. <i>helmsii</i>		*		*
Fabaceae	<i>Senna</i>	<i>artemisioides</i> subsp. <i>×artemisioides</i>		*		
Fabaceae	<i>Senna</i>	<i>artemisioides</i> subsp. <i>×sturtii</i>	*			
Fabaceae	<i>Senna</i>	<i>glutinosa</i> subsp. <i>chatelainiana</i>	*			
Fabaceae	<i>Senna</i>	<i>sp.</i> Meekatharra (E. Bailey 1-26)	*	*	*	
Haloragaceae	<i>Haloragis</i>	<i>odontocarpa</i> (A)		*	*	
Lamiaceae	<i>Teucrium</i>	<i>teucriiflorum</i>	*	*		
Loranthaceae	<i>Amyema</i>	<i>fitzgeraldii</i>	*	*		*
Malvaceae	<i>Abutilon</i>	<i>cryptopetalum</i>		*	*	
Malvaceae	<i>Hibiscus</i>	<i>burtonii</i>		*		
Malvaceae	<i>Sida</i>	<i>calyxhymenia</i>		*	*	
Malvaceae	<i>Sida</i>	<i>spodochroma</i>		*		
Marsileaceae	<i>Marsilea</i>	<i>hirsuta</i>			*	
Montiaceae	<i>Calandrinia</i>	<i>eremaea</i> (A)		*		
Montiaceae	<i>Calandrinia</i>	<i>ptychosperma</i> (A)		*	*	

Family	Genus	Species	RP-AOW1	DD-AFW1	DD-EFW1	CLP-AOW1
Myrtaceae	<i>Calytrix</i>	<i>carinata</i>		*		
Myrtaceae	<i>Eucalyptus</i>	<i>camaldulensis</i> subsp. <i>obtus</i>		*	*	
Poaceae	<i>Aristida</i>	<i>contorta</i> (A)	*	*	*	*
Poaceae	<i>Cenchrus</i>	<i>ciliaris</i> (W)		*		
Poaceae	<i>Cymbopogon</i>	<i>ambiguus</i>			*	
Poaceae	<i>Enneapogon</i>	<i>caerulescens</i> (A)	*			*
Poaceae	<i>Enteropogon</i>	<i>ramosus</i>		*	*	
Poaceae	<i>Eragrostis</i>	<i>dielsii</i> (A)		*	*	
Poaceae	<i>Eragrostis</i>	<i>eriopoda</i>				*
Poaceae	<i>Eriachne</i>	<i>pulchella</i> (A)	*			*
Portulacaceae	<i>Portulaca</i>	<i>oleracea</i> (A)	*			
Proteaceae	<i>Grevillea</i>	<i>berryana</i>	*	*		*
Proteaceae	<i>Grevillea</i>	<i>inconspicua</i> (Priority 4)		*		
Proteaceae	<i>Hakea</i>	<i>lorea</i>		*	*	
Rubiaceae	<i>Psydrax</i>	<i>latifolia</i>	*	*	*	
Rubiaceae	<i>Psydrax</i>	<i>suaveolens</i>		*		
Santalaceae	<i>Santalum</i>	<i>spicatum</i>		*		
Scrophulariaceae	<i>Eremophila</i>	<i>compacta</i>				*
Scrophulariaceae	<i>Eremophila</i>	<i>exilifolia</i>	*	*		
Scrophulariaceae	<i>Eremophila</i>	<i>fraseri</i> subsp. <i>fraseri</i>	*	*	*	
Scrophulariaceae	<i>Eremophila</i>	<i>galeata</i>	*			*
Scrophulariaceae	<i>Eremophila</i>	<i>latrobei</i> subsp. <i>latrobei</i>	*	*		*
Scrophulariaceae	<i>Eremophila</i>	<i>linearis</i>	*			
Scrophulariaceae	<i>Eremophila</i>	<i>longifolia</i>	*	*	*	
Scrophulariaceae	<i>Eremophila</i>	<i>macmillaniana</i>	*			
Scrophulariaceae	<i>Eremophila</i>	<i>phyllopoda</i>	*	*		
Solanaceae	<i>Solanum</i>	<i>lasiophyllum</i>	*	*	*	*
Zygophyllaceae	<i>Tribulus</i>	<i>astrocarpus</i> (A)	*			*
Zygophyllaceae	<i>Tribulus</i>	<i>terrestris</i> (A) (W)	*			*

APPENDIX D: PRIORITY FLORA LOCATIONS (GDA 2020)

Taxon	Easting	Northing	Comments
<i>Grevillea inconspicua</i> (P4)	646644.1	7073581.5	Approximately 30 plants observed.

APPENDIX E: DANDJOO AND ALA SEARCH RESULTS(40KM)

Vascular Flora

Accepted Name
<i>Abutilon cryptopetalum</i> (F.Muell.) Benth.
<i>Abutilon fraseri</i> (Hook.) Walp.
<i>Acacia acuminata</i> Benth.
<i>Acacia aneura</i> Benth.
<i>Acacia aptaneura</i> Maslin & J.E.Reid
<i>Acacia ayersiana</i> Maconochie
<i>Acacia brachystachya</i> Benth.
<i>Acacia burkittii</i> Benth.
<i>Acacia caesaneura</i> Maslin & J.E.Reid
<i>Acacia citrinoviridis</i> Tindale & Maslin
<i>Acacia coolgardiensis</i> Maiden
<i>Acacia craspedocarpa</i> F.Muell.
<i>Acacia cuthbertsonii</i> Luehm.
<i>Acacia cuthbertsonii</i> Luehm. subsp. <i>cuthbertsonii</i>
<i>Acacia cuthbertsonii</i> subsp. <i>linearis</i> R.S.Cowan & Maslin
<i>Acacia cyperophylla</i> Benth. var. <i>cyperophylla</i>
<i>Acacia demissa</i> R.S.Cowan & Maslin
<i>Acacia effusifolia</i> Maslin & Buscumb
<i>Acacia exocarpoides</i> W.Fitzg.
<i>Acacia fuscaneura</i> Maslin & J.E.Reid
<i>Acacia grasbyi</i> Maiden
<i>Acacia incurvaneura</i> Maslin & J.E.Reid
<i>Acacia kempeana</i> F.Muell.
<i>Acacia ligulata</i> Benth.
<i>Acacia macraneura</i> Maslin & J.E.Reid
<i>Acacia mulganeura</i> Maslin & J.E.Reid
<i>Acacia murrayana</i> Benth.
<i>Acacia paraneura</i> Randell
<i>Acacia pruinocarpa</i> Tindale
<i>Acacia pteraneura</i> Maslin & J.E.Reid
<i>Acacia pyrifolia</i> DC.
<i>Acacia pyrifolia</i> DC. var. <i>pyrifolia</i>
<i>Acacia quadrimarginea</i> F.Muell.
<i>Acacia ramulosa</i> var. <i>linophylla</i> (W.Fitzg.) Pedley
<i>Acacia ramulosa</i> W.Fitzg. var. <i>ramulosa</i>
<i>Acacia rhodophloia</i> Maslin
<i>Acacia sclerosperma</i> F.Muell.
<i>Acacia sclerosperma</i> F.Muell. subsp. <i>sclerosperma</i>
<i>Acacia sclerosperma</i> subsp. <i>glaucescens</i> A.R.Chapm. & Maslin
<i>Acacia sibirica</i> S.Moore
<i>Acacia</i> sp. <i>Wiluna</i> (B.R. Maslin 7090)
<i>Acacia speckii</i> R.S.Cowan & Maslin
<i>Acacia subtessarogona</i> Tindale & Maslin
<i>Acacia synchronica</i> Maslin
<i>Acacia tetragonophylla</i> F.Muell.
<i>Acacia thomae</i> Maslin
<i>Acacia tysonii</i> Luehm.

Accepted Name
Acacia victoriae Benth.
Acacia victoriae Benth. subsp. victoriae
Acacia victoriae subsp. victoriae Benth.
Acacia wanyu Tindale
Acacia xanthocarpa R.S.Cowan & Maslin
Accepted name (dwc:acceptedNameUsage)
Actinobole oldfieldianum P.S.Short
Actinobole uliginosum (A.Gray) H.Eichler
Alternanthera angustifolia R.Br.
Alternanthera denticulata R.Br. var. denticulata
Aluta maisonneuvei (F.Muell.) Rye & Trudgen
Aluta maisonneuvei (F.Muell.) Rye & Trudgen subsp. maisonneuvei
Aluta maisonneuvei subsp. auriculata (F.Muell.) Rye & Trudgen
Amyema fitzgeraldii (Blakely) Danser
Amyema gibberula (Tate) Danser var. gibberula
Amyema nestor (S.Moore) Danser
Androcalva luteiflora (E.Pritz.) C.F.Wilkins & Whitlock
Angianthus cyathifer P.S.Short
Angianthus tomentosus J.C.Wendl.
Anthotroche pannosa Endl.
Areocleome oxalidea (F.Muell.) R.L.Barrett & Roalson
Argemone ochroleuca Sweet subsp. ochroleuca
Aristida contorta F.Muell.
Aristida holathera Domin var. holathera
Aristida inaequiglumis Domin
Aristida obscura Henrard
Asteridea chaetopoda (F.Muell.) Kroner
Atriplex amnicola Paul G.Wilson
Atriplex codonocarpa Paul G.Wilson
Atriplex lindleyi subsp. inflata (F.Muell.) Paul G.Wilson
Atriplex semilunaris Aellen
Atriplex vesicaria Benth.
Austrostipa elegantissima (Labill.) S.W.L.Jacobs & J.Everett
Austrostipa nitida (Summerh. & C.E.Hubb.) S.W.L.Jacobs & J.Everett
Austrostipa scabra (Lindl.) S.W.L.Jacobs & J.Everett
Boerhavia repleta Hewson
Brachyscome ciliaris (Labill.) Less.
Brachyscome simulans P.S.Short
Brassica tournefortii Gouan
Brunonia australis R.Br.
Bulbostylis barbata (Rottb.) C.B.Clarke
Calandrinia balonensis Lindl.
Calandrinia creethae Morrison
Calandrinia eremaea Ewart
Calandrinia lehmannii Endl.
Calandrinia monosperma Obbens
Calandrinia papillata Syeda
Calandrinia polyandra Benth.
Calandrinia Ptychosperma F.Muell.
Calandrinia pumila (Benth.) F.Muell.
Calandrinia reticulata Syeda
Calandrinia schistorhiza Morrison
Calandrinia sp. Bungalbin (G.J. Keighery & N. Gibson 1656)
Calandrinia stagnensis J.M.Black
Calandrinia translucens Obbens
Callitris columellaris F.Muell.
Calocephalus beardii P.S.Short
Calocephalus francisii (F.Muell.) Benth.
Calocephalus knappii (F.Muell.) Ewart & Jean White

Accepted Name
<i>Calocephalus multiflorus</i> (Turcz.) Benth.
<i>Calocephalus pilbarensis</i> P.S.Short
<i>Calotis hispidula</i> (F.Muell.) F.Muell.
<i>Calotis multicaulis</i> (Turcz.) Druce
<i>Calotis plumulifera</i> F.Muell.
<i>Calytrix amethystina</i> Craven
<i>Calytrix desolata</i> S.Moore
<i>Calytrix uncinata</i> Craven
<i>Calytrix verruculosa</i> Craven
<i>Cenchrus ciliaris</i> L.
<i>Cenchrus setiger</i> Vahl
<i>Centipeda thespidioides</i> F.Muell.
<i>Centrolepis cephaloformis</i> Reader subsp. <i>cephaloformis</i>
<i>Cephalopterum drummondii</i> A.Gray
<i>Chamelaucium gracile</i> F.Muell.
<i>Chara behriana</i> A.Braun
<i>Cheilanthes lasiophylla</i> Pic.Serm.
<i>Cheilanthes sieberi</i> Kunze subsp. <i>sieberi</i>
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> Kunze
<i>Chenopodium gaudichaudianum</i> (Moq.) Paul G.Wilson
<i>Chenopodium murale</i> L.
<i>Chrysocephalum gilesii</i> (F.Muell.) Paul G.Wilson
<i>Chrysocephalum puteale</i> (S.Moore) Paul G.Wilson
<i>Chthonocephalus pseudevax</i> Steetz
<i>Chthonocephalus viscosus</i> P.S.Short
<i>Codonocarpus cotinifolius</i> (Desf.) F.Muell.
<i>Convolvulus clementii</i> Domin
<i>Corymbia candida</i> K.D.Hill & L.A.S.Johnson
<i>Corymbia candida</i> K.D.Hill & L.A.S.Johnson subsp. <i>candida</i>
<i>Corymbia candida</i> subsp. <i>candida</i> K.D.Hill & L.A.S.Johnson
<i>Corymbia ferriticola</i> (Brooker & Edgecombe) K.D.Hill & L.A.S.Johnson
<i>Corymbia lenziana</i> (D.J.Carr & S.G.M.Carr) K.D.Hill & L.A.S.Johnson
<i>Cotula australis</i> (Spreng.) Hook.f.
<i>Crassula colorata</i> var. <i>acuminata</i> (Reader) Toelken
<i>Cullen cinereum</i> (Lindl.) J.W.Grimes
<i>Cuscuta epithymum</i> (L.) L.
<i>Cymbopogon ambiguus</i> (Hack.) A.Camus
<i>Cymbopogon obtectus</i> S.T.Blake
<i>Cynanchum floribundum</i> R.Br.
<i>Cynodon prostratus</i> (C.A.Gardner & C.E.Hubb.) P.M.Peterson
<i>Cyperus betchei</i> subsp. <i>commiscens</i> K.L.Wilson
<i>Cyperus bulbosus</i> Vahl
<i>Cyperus concinnus</i> R.Br.
<i>Cyperus dactyloides</i> Benth.
<i>Cyperus gymnocaulos</i> Steud.
<i>Cyperus iria</i> L.
<i>Cyperus squarrosus</i> L.
<i>Dactyloctenium radulans</i> (R.Br.) P.Beauv.
<i>Daucus glochidiatus</i> (Labill.) Fisch., C.A.Mey. & Ave-Lall.
<i>Dichanthium sericeum</i> (R.Br.) A.Camus subsp. <i>sericeum</i>
<i>Dichanthium sericeum</i> subsp. <i>humilius</i> (J.M.Black) B.K.Simon
<i>Dicrastylis sessilifolia</i> Munir
<i>Dielitzia tysonii</i> P.S.Short
<i>Digitaria brownii</i> (Roem. & Schult.) Hughes
<i>Diplachne fusca</i> subsp. <i>muelleri</i> (Benth.) P.M.Peterson & N.Snow
<i>Dissocarpus paradoxus</i> (R.Br.) Ulbr.
<i>Dodonaea pachyneura</i> F.Muell.
<i>Dodonaea petiolaris</i> F.Muell.
<i>Drosera finlaysoniana</i> Arn.

Accepted Name
Drummondita miniata (C.A.Gardner) Paul G.Wilson
Duboisia hopwoodii (F.Muell.) F.Muell.
Duperreya commixta (Staples) Staples
Duperreya sericea Gaudich.
Dysphania glandulosa Paul G.Wilson
Dysphania glomulifera subsp. eremaea Paul G.Wilson
Dysphania kalpari Paul G.Wilson
Dysphania melanocarpa (J.M.Black) Mosyakin & Clemants
Dysphania rhadinostachya (F.Muell.) A.J.Scott
Dysphania rhadinostachya subsp. inflata (Aellen) Paul G.Wilson
Dysphania saxatilis (Paul G.Wilson) Mosyakin & Clemants
Eleocharis pallens S.T.Blake
Enchylaena tomentosa R.Br. var. tomentosa
Enneapogon caeruleus (Gaudich.) N.T.Burb.
Enneapogon polyphyllus (Domin) N.T.Burb.
Eragrostis cumingii Steud.
Eragrostis dielsii Pilg.
Eragrostis eriopoda Benth.
Eragrostis falcata (Gaudich.) Steud.
Eragrostis filicaulis Lazarides
Eragrostis kennedyae F.Turner
Eragrostis lanipes C.E.Hubb.
Eragrostis leptocarpa Benth.
Eragrostis pergracilis S.T.Blake
Eragrostis setifolia Nees
Eragrostis sp. Erect spikelets (P.K. Latz 2122)
Eragrostis tenellula (Kunth) Steud.
Eremophea spinosa (Ewart & O.B.Davies) Paul G.Wilson
Eremophila clarkei A.F.Oldfield & F.Muell.
Eremophila compacta subsp. fecunda Chinnock
Eremophila enata Chinnock
Eremophila eriocalyx F.Muell.
Eremophila exilifolia F.Muell.
Eremophila fasciata Chinnock
Eremophila flabellata Chinnock
Eremophila foliosissima Kraenzl.
Eremophila forrestii F.Muell. subsp. forrestii
Eremophila forrestii subsp. forrestii F.Muell.
Eremophila forrestii subsp. hastieana (W.Fitzg.) Chinnock
Eremophila fraseri F.Muell.
Eremophila fraseri F.Muell. subsp. fraseri
Eremophila fraseri subsp. parva Chinnock
Eremophila freelingii F.Muell.
Eremophila galeata Chinnock
Eremophila georgei Diels
Eremophila gilesii F.Muell.
Eremophila gilesii F.Muell. subsp. gilesii
Eremophila gilesii subsp. variabilis Chinnock
Eremophila glabra (R.Br.) Ostenf. subsp. glabra
Eremophila glabra subsp. tomentosa Chinnock
Eremophila glutinosa Chinnock
Eremophila granitica S.Moore
Eremophila hygrophana Chinnock
Eremophila jucunda Chinnock subsp. jucunda
Eremophila jucunda subsp. jucunda Chinnock
Eremophila jucunda subsp. pulcherrima Chinnock
Eremophila lachnocalyx C.A.Gardner
Eremophila latrobei F.Muell.
Eremophila latrobei F.Muell. subsp. latrobei

Accepted Name
<i>Eremophila latrobei</i> subsp. <i>glabra</i> (L.S.Sm.) Chinnock
<i>Eremophila latrobei</i> subsp. <i>latrobei</i> F.Muell.
<i>Eremophila linearis</i> Chinnock
<i>Eremophila longifolia</i> (R.Br.) F.Muell.
<i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> Chinnock
<i>Eremophila macmillaniana</i> C.A.Gardner
<i>Eremophila maculata</i> subsp. <i>brevifolia</i> (Benth.) Chinnock
<i>Eremophila maitlandii</i> Benth.
<i>Eremophila malacoides</i> Chinnock
<i>Eremophila margarethae</i> S.Moore
<i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i> (S.Moore) Chinnock
<i>Eremophila pantonii</i> F.Muell.
<i>Eremophila phyllopoda</i> Chinnock
<i>Eremophila phyllopoda</i> Chinnock subsp. <i>phyllopoda</i>
<i>Eremophila phyllopoda</i> subsp. <i>phyllopoda</i> Chinnock
<i>Eremophila platycalyx</i> F.Muell.
<i>Eremophila platycalyx</i> F.Muell. subsp. <i>platycalyx</i>
<i>Eremophila platycalyx</i> subsp. <i>Granites</i> (D.J. Edinger & G. Marsh DJE 4782)
<i>Eremophila platycalyx</i> subsp. <i>platycalyx</i> F.Muell.
<i>Eremophila platycalyx</i> subsp. <i>Yalgoo</i> (A. Markey & S. Dillon 3337)
<i>Eremophila pterocarpa</i> W.Fitzg. subsp. <i>pterocarpa</i>
<i>Eremophila punctata</i> Chinnock
<i>Eremophila retropila</i> Chinnock
<i>Eremophila serrulata</i> (A.DC.) Druce
<i>Eremophila setacea</i> Chinnock
<i>Eremophila simulans</i> Chinnock subsp. <i>simulans</i>
<i>Eremophila simulans</i> subsp. <i>lapidensis</i> Chinnock
<i>Eremophila spathulata</i> W.Fitzg.
<i>Eremophila spectabilis</i> C.A.Gardner subsp. <i>spectabilis</i>
<i>Eremophila spectabilis</i> subsp. <i>brevis</i> Chinnock
<i>Eremophila spectabilis</i> subsp. <i>spectabilis</i> C.A.Gardner
<i>Eremophila spuria</i> Chinnock
<i>Eremophila strongylophylla</i> F.Muell.
<i>Eremophila youngii</i> F.Muell. subsp. <i>youngii</i>
<i>Eremophila youngii</i> subsp. <i>youngii</i> F.Muell.
<i>Eriachne aristidea</i> F.Muell.
<i>Eriachne benthamii</i> Hartley
<i>Eriachne flaccida</i> Hartley
<i>Eriachne helmsii</i> Hartley
<i>Eriachne ovata</i> Nees
<i>Eriachne pulchella</i> Domin
<i>Erodium cygnorum</i> Nees
<i>Erymophyllum compactum</i> Paul G.Wilson
<i>Erymophyllum ramosum</i> (A.Gray) Paul G.Wilson
<i>Erymophyllum ramosum</i> (A.Gray) Paul G.Wilson subsp. <i>ramosum</i>
<i>Erymophyllum ramosum</i> subsp. <i>ramosum</i> (A.Gray) Paul G.Wilson
<i>Erymophyllum tenellum</i> (Turcz.) Paul G.Wilson
<i>Eucalyptus brevifolia</i> F.Muell.
<i>Eucalyptus camaldulensis</i> subsp. <i>obtusa</i> (Blakely) Brooker & M.W.McDonald
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i> Brooker & M.W.McDonald
<i>Eucalyptus carnei</i> C.A.Gardner
<i>Eucalyptus kingsmillii</i> (Maiden) Maiden & Blakely
<i>Eucalyptus leptopoda</i> subsp. <i>elevata</i> L.A.S.Johnson & K.D.Hill
<i>Eucalyptus striatocalyx</i> W.Fitzg.
<i>Eucalyptus trivalva</i> Blakely
<i>Eucalyptus vitrix</i> L.A.S.Johnson & K.D.Hill
<i>Eulalia aurea</i> (Bory) Kunth
<i>Euphorbia boophthona</i> C.A.Gardner
<i>Euphorbia porcata</i> Halford & W.K.Harris

Accepted Name
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i> (A.Cunn.) Hassall
<i>Euploca heterantha</i> (F.Muell.) M.W.Frohl. & M.W.Chase
<i>Euploca inexplicita</i> (Craven) M.W.Frohl. & M.W.Chase
<i>Euploca mitchellii</i> (Craven) M.W.Frohl. & M.W.Chase
<i>Euploca ovalifolia</i> (Forssk.) Diane & Hilger
<i>Exocarpos aphyllus</i> R.Br.
<i>Frankenia pauciflora</i> DC.
<i>Frankenia setosa</i> W.Fitzg.
<i>Gilruthia osbornei</i> Ewart & Jean White
<i>Glycine canescens</i> F.J.Herm.
<i>Gnephosis arachnoidea</i> Turcz.
<i>Gnephosis brevifolia</i> (A.Gray) Benth.
<i>Gnephosis tenuissima</i> Cass.
<i>Gomphrena verecunda</i> R.W.Davis
<i>Gonocarpus nodulosus</i> Nees
<i>Goodenia berardiana</i> (Gaudich.) Carolin
<i>Goodenia berringbinensis</i> Carolin
<i>Goodenia collaris</i> (F.Muell.) K.A.Sheph.
<i>Goodenia cynopotamica</i> (F.Muell.) K.A.Sheph.
<i>Goodenia discophora</i> (F.Muell.) K.A.Sheph.
<i>Goodenia glabrata</i> (Carolin) K.A.Sheph.
<i>Goodenia havilandii</i> Maiden & Betche
<i>Goodenia kingiana</i> Carolin
<i>Goodenia macropectra</i> (F.Muell.) Carolin
<i>Goodenia maideniana</i> W.Fitzg.
<i>Goodenia mimuloides</i> S.Moore
<i>Goodenia occidentalis</i> Carolin
<i>Goodenia peacockiana</i> Carolin
<i>Goodenia quasilibera</i> Carolin
<i>Goodenia reinwardtii</i> (de Vriese) K.A.Sheph.
<i>Goodenia rosea</i> (S.Moore) K.A.Sheph.
<i>Goodenia</i> sp. Midwest (K.A. Shepherd & C.F. Wilkins KS 1609)
<i>Goodenia tenuiloba</i> F.Muell.
<i>Goodenia wilunensis</i> Carolin
<i>Grevillea deflexa</i> F.Muell.
<i>Grevillea inconspicua</i> Diels
<i>Grevillea nematophylla</i> subsp. <i>supraplana</i> Makinson
<i>Grevillea sarissa</i> S.Moore
<i>Grevillea sarissa</i> subsp. <i>succincta</i> McGill.
<i>Grevillea stenostachya</i> C.A.Gardner
<i>Grevillea striata</i> R.Br.
<i>Gunniopsis propinqua</i> Chinnock
<i>Gymnema graniticola</i> (P.I.Forst.) P.I.Forst.
<i>Hakea lorea</i> (R.Br.) R.Br.
<i>Hakea loreus</i> subsp. <i>loreus</i> (R.Br.) R.Br.
<i>Hakea preissii</i> Meisn.
<i>Hakea recurva</i> Meisn.
<i>Hakea recurva</i> subsp. <i>arida</i> (Diels) W.R.Barker & R.M.Barker
<i>Halgania cyanea</i> Lindl.
<i>Halgania cyanea</i> var. <i>Allambi</i> Stn (B.W. Strong 676)
<i>Halgania gustafsenii</i> F.Muell.
<i>Haloragis gossei</i> F.Muell.
<i>Haloragis gossei</i> F.Muell. var. <i>gossei</i>
<i>Haloragis odontocarpa</i> F.Muell.
<i>Haloragis odontocarpa</i> forma <i>pterocarpa</i> Orchard
<i>Haloragis trigonocarpa</i> F.Muell.
<i>Hamieria kempeana</i> (F.Muell.) R.M.Barker
<i>Hamieria kempeana</i> subsp. <i>muelleri</i> (R.M.Barker) R.M.Barker
<i>Helipterum craspedioides</i> W.Fitzg.

Accepted Name
Hemigenia tomentosa G.R.Guerin
Hemigenia virescens G.R.Guerin
Hibiscus burtonii F.M.Bailey
Hibiscus sp. Belele (D.W. Goodall 3417)
Hibiscus sp. Gardneri (A.L. Payne PRP 1435)
Hibiscus sturtii Hook.
Hibiscus sturtii var. forrestii F.Muell.
Hibiscus sturtii var. grandiflorus Benth.
Homalocalyx staminosus (F.Muell.) Craven
Hordeum glaucum Steud.
Hyalosperma glutinosum subsp. venustum (S.Moore) Paul G.Wilson
Indigofera brevidens Benth.
Indigofera chamaeclada Peter G.Wilson & Rowe subsp. chamaeclada
Indigofera georgei E.Pritz.
Indigofera kingiana Peter G.Wilson & Rowe
Indigofera monophylla DC.
Indigofera rotula Peter G.Wilson
Ipomoea calobra W.Hill & F.Muell.
Iseilema membranaceum (Lindl.) Domin
Isoetopsis graminifolia Turcz.
Isolepis australiensis (Maiden & Betcher) K.L.Wilson
Isolepis congrua Nees
Isotropis forrestii F.Muell.
Isotropis iophyta Wege & R.W.Davis
Lactuca serriola L.
Lactuca serriola L. forma serriola
Lawrencella davenportii (F.Muell.) Paul G.Wilson
Lawrencella rosea Lindl.
Lawrencia densiflora (Baker f.) Melville
Lawrencia helmsii (F.Muell. & Tate) Lander
Leichhardtia australis R.Br.
Lemooria burkittii (Benth.) P.S.Short
Lemphoria andreaana (F.Muell.) Al-Shehbaz & Lysak
Lepidium echinatum Hewson
Lepidium muelleri-ferdinandi Thell.
Lepidium oxytrichum Sprague
Lepidium phlebopetalum (F.Muell.) F.Muell.
Lepidium platypetalum Hewson
Lepidium xylodes Hewson
Leptosema chambersii F.Muell.
Levenhookia chippendalei F.L.Erickson & J.H.Willis
Levenhookia leptantha Benth.
Lobelia heterophylla Labill.
Lobelia heterophylla Labill. subsp. heterophylla
Lotus cruentus Court
Lysiana murrayi (F.Muell. & Tate) Tiegh.
Macgregoria racemigera F.Muell.
Maireana amoena (Diels) Paul G.Wilson
Maireana carnososa (Moq.) Paul G.Wilson
Maireana convexa Paul G.Wilson
Maireana georgei (Diels) Paul G.Wilson
Maireana melanocoma (F.Muell.) Paul G.Wilson
Maireana planifolia (F.Muell.) Paul G.Wilson
Maireana pyramidata (Benth.) Paul G.Wilson
Maireana thesioides (C.A.Gardner) Paul G.Wilson
Maireana tomentosa Moq.
Maireana tomentosa subsp. tomentosa Moq.
Maireana trichoptera (J.M.Black) Paul G.Wilson
Maireana triptera (Benth.) Paul G.Wilson

Accepted Name
Maireana villosa (Lindl.) Paul G.Wilson
Malva parviflora L.
Marsilea drummondii A.Braun
Marsilea hirsuta R.Br.
Menkea australis Lehm.
Menkea draboides (Hook.f.) Benth.
Menkea sphaerocarpa F.Muell.
Menkea villosula (F.Muell. & Tate) J.M.Black
Micromyrtus sulphurea W.Fitzg.
Millotia perpusilla (Turcz.) P.S.Short
Minuria leptophylla DC.
Mirbelia microphylla (Turcz.) Benth.
Mirbelia rhagodioides Crisp & J.M.Taylor
Monachather paradoxus Steud.
Muelleranthus trifoliolatus (F.Muell.) A.T.Lee
Myoporum montanum R.Br.
Myriocephalus gueriniae F.Muell.
Myriocephalus oldfieldii (F.Muell.) Paul G.Wilson
Myriocephalus pygmaeus (A.Gray) P.S.Short
Myriocephalus rudallii Benth.
Nelica maderaspatensis (L.) Raf.
Neurachne alopecuroidea R.Br.
Neurachne minor S.T.Blake
Nicotiana cavicola N.T.Burb.
Nicotiana gascoynica M.W.Chase & Christenh.
Nicotiana murchisonica M.W.Chase & Christenh.
Nicotiana obliqua (N.T.Burb.) M.W.Chase & Christenh.
Nicotiana pila M.W.Chase & Christenh.
Nicotiana rosulata (S.Moore) Domin
Nicotiana rotundifolia Lindl.
Nicotiana simulans N.T.Burb.
Nicotiana stenocarpa H.-M.Wheeler
Olearia stuartii (F.Muell.) Benth.
Ophioglossum lusitanicum L.
Opuntia stricta (Haw.) Haw.
Papaver hybridum L.
Parietaria cardiostegia Greuter
Paspalidium clementii (Domin) C.E.Hubb.
Paspalidium gracile (R.Br.) Hughes
Peplidium aithocheilum W.R.Barker
Peplidium sp. C Evol. Fl. Fauna Arid Aust. (N.T. Burbidge & A. Kanis 8158)
Pigea floribunda Lindl.
Pimelea microcephala R.Br.
Pimelea microcephala R.Br. subsp. microcephala
Pimelea microcephala subsp. microcephala R.Br.
Pimelea trichostachya Lindl.
Pittosporum angustifolium Lodd., G.Lodd. & W.Lodd.
Plantago drummondii Decne.
Pluchea dentex Benth.
Podolepis gardneri G.L.Davis
Pogonolepis stricta Steetz
Polycarpaea corymbosa (L.) Lam.
Portulaca cyclophylla F.Muell.
Portulaca oleracea L.
Portulaca pilosa L.
Prostanthera albiflora B.J.Conn
Prostanthera campbellii F.Muell.
Prostanthera wilkieana F.Muell.
Psyrax latifolia (Benth.) S.T.Reynolds & R.J.F.Hend.

Accepted Name
Psydrax rigidula S.T.Reynolds & R.J.F.Hend.
Psydrax suaveolens (S.Moore) S.T.Reynolds & R.J.F.Hend.
Ptilotus actinocladus T.Hammer & R.W.Davis
Ptilotus aervoides (F.Muell.) F.Muell.
Ptilotus albidus (C.A.Gardner) Benl
Ptilotus chamaecladus Diels
Ptilotus divaricatus (Gaudich.) F.Muell.
Ptilotus drummondii var. minor (Nees) Benl
Ptilotus exaltatus Nees
Ptilotus gaudichaudii (Steud.) J.M.Black
Ptilotus gomphrenoides Benth.
Ptilotus grandiflorus F.Muell.
Ptilotus helipteroides (F.Muell.) F.Muell.
Ptilotus lazaridis Benl
Ptilotus luteolus (Benl & H.Eichler) R.W.Davis
Ptilotus macrocephalus (R.Br.) Poir.
Ptilotus nobilis (Lindl.) F.Muell.
Ptilotus obovatus (Gaudich.) F.Muell.
Ptilotus obovatus (Gaudich.) F.Muell. var. obovatus
Ptilotus polystachyus (Gaudich.) F.Muell.
Ptilotus roei (Benth.) F.Muell.
Ptilotus rotundifolius (F.Muell.) F.Muell.
Ptilotus schwartzii (F.Muell.) Tate
Ptilotus schwartzii Tate var. schwartzii
Ptilotus xerophilus T.Hammer & R.W.Davis
Rhodanthe battii (F.Muell.) Paul G.Wilson
Rhodanthe charsleyae (F.Muell.) Paul G.Wilson
Rhodanthe chlorocephala subsp. rosea (Hook.) Paul G.Wilson
Rhodanthe chlorocephala subsp. splendida (Hemsl.) Paul G.Wilson
Rhodanthe citrina (Benth.) Paul G.Wilson
Rhodanthe floribunda (DC.) Paul G.Wilson
Rhodanthe humboldtiana (Gaudich.) Paul G.Wilson
Rhodanthe maryonii (S.Moore) Paul G.Wilson
Rhodanthe propinqua (W.Fitzg.) Paul G.Wilson
Rhodanthe sphaerocephala Paul G.Wilson
Rhodanthe sterilescens (F.Muell.) Paul G.Wilson
Rhodanthe stricta (Lindl.) Paul G.Wilson
Roebuckiella cheilocarpa (F.Muell.) P.S.Short var. cheilocarpa
Roebuckiella cilicarpa (W.Fitzg.) P.S.Short
Roebuckiella oncocarpa (Diels) P.S.Short
Roebuckiella similis (P.S.Short) P.S.Short
Roepera aurantiaca Lindl. subsp. aurantiaca
Roepera eichleri (R.M.Barker) Beier & Thulin
Roepera kochii (Tate) Beier & Thulin
Roepera tetraptera (R.M.Barker) Beier & Thulin
Rostraria pumila (Desf.) Tzvelev
Rumex vesicarius L.
Salsola australis R.Br.
Samolus repens (J.R.Forst. & G.Forst.) Pers.
Santalum lanceolatum R.Br.
Santalum spicatum (R.Br.) A.DC.
Scaevola spinescens R.Br.
Scaevola tomentosa Gaudich.
Schinus molle var. areira (L.) DC.
Schismus arabicus Nees
Schoenia ayersii (F.Muell.) J.M.Black
Schoenia cassiniana (Gaudich.) Steetz
Schoenoplectiella dissachantha (S.T.Blake) Lye
Sclerolaena burbridgeae (Ising) A.J.Scott

Accepted Name
<i>Sclerolaena cuneata</i> Paul G.Wilson
<i>Sclerolaena densiflora</i> (W.Fitzg.) A.J.Scott
<i>Sclerolaena deserticola</i> Paul G.Wilson
<i>Sclerolaena diacantha</i> (Nees) Benth.
<i>Sclerolaena divaricata</i> (R.Br.) Domin
<i>Sclerolaena eriacantha</i> (F.Muell.) Ulbr.
<i>Sclerolaena fimbriolata</i> (F.Muell.) A.J.Scott
<i>Sclerolaena gardneri</i> (Ising) A.J.Scott
<i>Sclerolaena glabra</i> (F.Muell.) Domin
<i>Sclerolaena lanicuspis</i> (F.Muell.) Benth.
<i>Sclerolaena patentiuspis</i> (R.H.Anderson) Ulbr.
<i>Sclerolaena tetragona</i> Paul G.Wilson
<i>Senecio glossanthus</i> (Sond.) Belcher
<i>Senna artemisioides</i> (DC.) Randell
<i>Senna artemisioides</i> subsp. <i>filifolia</i> Randell
<i>Senna artemisioides</i> subsp. <i>helmsii</i> (Symon) Randell
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (F.Muell.) Randell
<i>Senna artemisioides</i> subsp. <i>x artemisioides</i> (DC.) Randell
<i>Senna artemisioides</i> subsp. <i>x petiolaris</i> Randell
<i>Senna artemisioides</i> subsp. <i>x sturtii</i> (R.Br.) Randell
<i>Senna artemisioides</i> subsp. <i>zygophylla</i> (Benth.) Randell
<i>Senna charlesiana</i> (Symon) Randell
<i>Senna glaucifolia</i> (Randell) Randell
<i>Senna glutinosa</i> (DC.) Randell
<i>Senna glutinosa</i> subsp. <i>chatelainiana</i> (Gaudich.) Randell
<i>Senna glutinosa</i> subsp. <i>pruinosa</i> (F.Muell.) Randell
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i> (Domin) Randell
<i>Senna pleurocarpa</i> var. <i>pleurocarpa</i> (F.Muell.) Randell
<i>Senna</i> sp. Austin (A. Strid 20210)
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)
<i>Senna stricta</i> (Randell) Randell
<i>Seringia exastia</i> (C.F.Wilkins) C.F.Wilkins & Whitlock
<i>Setaria dielsii</i> R.A.W.Herm.
<i>Sida ammophila</i> J.H.Willis
<i>Sida calyxhymenia</i> DC.
<i>Sida ectogama</i> W.R.Barker & R.M.Barker
<i>Sida fibulifera</i> Lindl.
<i>Sida intricata</i> F.Muell.
<i>Sida petrophila</i> F.Muell.
<i>Sida platycalyx</i> Benth.
<i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)
<i>Siemssenia capillaris</i> Steetz
<i>Sisymbrium erysimoides</i> Desf.
<i>Sisymbrium irio</i> L.
<i>Sisymbrium orientale</i> L.
<i>Solanum austropiceum</i> A.R.Bean
<i>Solanum lachnophyllum</i> Symon
<i>Solanum lasiophyllum</i> Poir.
<i>Solanum nigrum</i> L.
<i>Solanum orbiculatum</i> Poir.
<i>Solanum orbiculatum</i> Poir. subsp. <i>orbiculatum</i>
<i>Solanum sturtianum</i> F.Muell.
<i>Sonchus oleraceus</i> L.
<i>Spergularia marina</i> (L.) Besser
<i>Sporobolus australasicus</i> Domin
<i>Stackhousia muricata</i> Lindl.
<i>Stenanthemum petraeum</i> Rye
<i>Stenopetalum anfractum</i> E.A.Shaw
<i>Stenopetalum filifolium</i> Benth.

Accepted Name
<i>Stenopetalum lineare</i> DC. var. <i>lineare</i>
<i>Stenopetalum nutans</i> F.Muell.
<i>Stenopetalum pedicellare</i> Benth.
<i>Stenopetalum sphaerocarpum</i> F.Muell.
<i>Streptoglossa cylindriceps</i> (J.M.Black) Dunlop
<i>Streptoglossa liatroides</i> (Turcz.) Dunlop
<i>Stylidium longibracteatum</i> Carlquist
<i>Stylobasium spathulatum</i> Desf.
<i>Swainsona affinis</i> (A.T.Lee) Joy Thomps.
<i>Swainsona canescens</i> (Lindl.) F.Muell.
<i>Swainsona elegans</i> A.T.Lee
<i>Swainsona elegantoides</i> (A.T.Lee) Joy Thomps.
<i>Swainsona formosa</i> (G.Don) Joy Thomps.
<i>Swainsona gracilis</i> Benth.
<i>Swainsona kingii</i> F.Muell.
<i>Swainsona leeana</i> J.Z.Weber
<i>Swainsona oroboides</i> Benth.
<i>Swainsona paucifoliolata</i> Joy Thomps.
<i>Swainsona pedunculata</i> A.T.Lee
<i>Swainsona pterostylis</i> (DC.) Bakh.f.
<i>Swainsona tenuis</i> E.Pritz.
<i>Synaptantha tillaeacea</i> (F.Muell.) Hook.f.
<i>Synaptantha tillaeacea</i> (F.Muell.) Hook.f. var. <i>tillaeacea</i>
<i>Taplinia saxatilis</i> Lander
<i>Tecticornia cymbiformis</i> K.A.Sheph. & Paul G.Wilson
<i>Tecticornia disarticulata</i> (Paul G.Wilson) K.A.Sheph. & Paul G.Wilson
<i>Tecticornia doliiformis</i> (Paul G.Wilson) K.A.Sheph. & Paul G.Wilson
<i>Tecticornia indica</i> subsp. <i>bidens</i> (Nees) K.A.Sheph. & Paul G.Wilson
<i>Tecticornia</i> sp. Yoothapina Station (A.A. Mitchell 883)
<i>Tetragonia cristata</i> A.M.Prescott
<i>Tetragonia moorei</i> M.Gray
<i>Teucrium teucriiflorum</i> (F.Muell.) Kattari & Salmaki
<i>Themeda avenacea</i> (F.Muell.) Maiden & Betcher
<i>Themeda triandra</i> Forssk.
<i>Thryptomene decussata</i> (W.Fitzg.) J.W.Green
<i>Thyridolepis multiculmis</i> (Pilg.) S.T.Blake
<i>Thysanotus manglesianus</i> Kunth
<i>Thysanotus</i> sp. Eremaean (S. van Leeuwen 1067)
<i>Thysanotus speckii</i> Brittan
<i>Trachymene ornata</i> (Endl.) Druce
<i>Tragus australianus</i> S.T.Blake
<i>Trianthema glossostigma</i> F.Muell.
<i>Trianthema triquetrum</i> Willd.
<i>Tribulus astrocarpus</i> F.Muell.
<i>Tribulus forrestii</i> F.Muell.
<i>Tribulus platypterus</i> Benth.
<i>Tribulus suberosus</i> R.M.Barker
<i>Trichanthodium skirrophorum</i> Sond.
<i>Trichodesma zeylanicum</i> (Burm.f.) R.Br.
<i>Trichodesma zeylanicum</i> (Burm.f.) R.Br. var. <i>zeylanicum</i>
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i> (Burm.f.) R.Br.
<i>Triglochin isingiana</i> (J.M.Black) Aston
<i>Triglochin mucronata</i> R.Br.
<i>Triodia melvillei</i> (C.E.Hubb.) Lazarides
<i>Tripogonella liliiformis</i> (F.Muell.) P.M.Peterson & Romasch.
<i>Verticordia interioris</i> A.S.George
<i>Vincetoxicum lineare</i> (Decne.) Meve & Liede
<i>Wahlenbergia tumidifructa</i> P.J.Sm.
<i>Waitzia acuminata</i> Steetz

Accepted Name
<i>Waitzia acuminata</i> Steetz var. <i>acuminata</i>
<i>Walshia kendallii</i> (F.Muell.) Jeanes
<i>Wurmbea densiflora</i> (Benth.) T.Macfarlane
<i>Wurmbea tenella</i> (Endl.) Benth.

Terrestrial Fauna

Accepted Name	Kingdom	Phylum	Class
<i>Cyclorana occidentalis</i>	Animalia	Chordata	Amphibia
<i>Litoria rubella</i>	Animalia	Chordata	Amphibia

Accepted Name	Kingdom	Phylum	Class	Common name
<i>Manorina (Myzantha) flavigula</i>	Animalia	Chordata	Aves	Yellow-throated Miner
<i>Taeniopygia guttata</i>	Animalia	Chordata	Aves	Zebra Finch
<i>Grallina cyanoleuca</i>	Animalia	Chordata	Aves	Magpie-lark
<i>Ptilotula penicillata</i>	Animalia	Chordata	Aves	White-plumed Honeyeater
<i>Gavicalis virescens</i>	Animalia	Chordata	Aves	Singing Honeyeater
<i>Acanthagenys rufogularis</i>	Animalia	Chordata	Aves	Spiny-cheeked Honeyeater
<i>Aquila (Uroaetus) audax</i>	Animalia	Chordata	Aves	Wedge-tailed Eagle
<i>Rhipidura (Sauloprocta) leucophrys</i>	Animalia	Chordata	Aves	Willie Wagtail
<i>Ocyphaps lophotes</i>	Animalia	Chordata	Aves	Crested Pigeon
<i>Haliastur spheurnus</i>	Animalia	Chordata	Aves	Whistling Kite
<i>Corvus bennetti</i>	Animalia	Chordata	Aves	Little Crow
<i>Oreocia gutturalis</i>	Animalia	Chordata	Aves	Crested Bellbird
<i>Artamus (Angroyan) cinereus</i>	Animalia	Chordata	Aves	Black-faced Woodswallow
<i>Corvus orru</i>	Animalia	Chordata	Aves	Torresian Crow
<i>Gymnorhina tibicen</i>	Animalia	Chordata	Aves	Australian Magpie
<i>Falco (Tinnunculus) cenchroides</i>	Animalia	Chordata	Aves	Nankeen Kestrel
<i>Cracticus nigrogularis</i>	Animalia	Chordata	Aves	Pied Butcherbird
<i>Hirundo (Hirundo) neoxena</i>	Animalia	Chordata	Aves	Welcome Swallow
<i>Anthus (Anthus) novaeseelandiae</i>	Animalia	Chordata	Aves	Australian Pipit
<i>Petrochelidon (Hylochelidon) nigricans</i>	Animalia	Chordata	Aves	Tree Martin
<i>Eolophus roseicapilla</i>	Animalia	Chordata	Aves	Galah
<i>Chlamydera guttata</i>	Animalia	Chordata	Aves	Western Bowerbird
<i>Petroica (Petroica) goodenovii</i>	Animalia	Chordata	Aves	Red-capped Robin
<i>Dromaius novaehollandiae</i>	Animalia	Chordata	Aves	Emu
<i>Acanthiza (Geobasileus) uropygialis</i>	Animalia	Chordata	Aves	Chestnut-rumped Thornbill
<i>Melopsittacus undulatus</i>	Animalia	Chordata	Aves	Budgerigar
<i>Cracticus torquatus</i>	Animalia	Chordata	Aves	Grey Butcherbird
<i>Falco (Ieracidea) berigora</i>	Animalia	Chordata	Aves	Brown Falcon
<i>Pachycephala (Alisterornis) rufiventris</i>	Animalia	Chordata	Aves	Rufous Whistler
<i>Colluricincla (Colluricincla) harmonica</i>	Animalia	Chordata	Aves	Grey Shrike-thrush
<i>Pomatostomus (Pomatostomus) temporalis</i>	Animalia	Chordata	Aves	Grey-crowned Babbler
<i>Barnardius zonarius</i>	Animalia	Chordata	Aves	Australian Ringneck
<i>Elseymornis melanops</i>	Animalia	Chordata	Aves	Black-fronted Dotterel
<i>Coracina (Coracina) novaehollandiae</i>	Animalia	Chordata	Aves	Black-faced Cuckoo-shrike
<i>Pomatostomus (Morganornis) superciliosus</i>	Animalia	Chordata	Aves	White-browed Babbler
<i>Cincloramphus (Maclellannia) mathewsi</i>	Animalia	Chordata	Aves	Rufous Songlark
<i>Aphelocephala leucopsis</i>	Animalia	Chordata	Aves	Southern Whiteface
<i>Falco (Falco) longipennis</i>	Animalia	Chordata	Aves	Australian Hobby
<i>Melanodryas (Melanodryas) cucullata</i>	Animalia	Chordata	Aves	Hooded Robin
<i>Anas gracilis</i>	Animalia	Chordata	Aves	Grey Teal
<i>Epthianura (Parepthianura) tricolor</i>	Animalia	Chordata	Aves	Crimson Chat
<i>Geopelia cuneata</i>	Animalia	Chordata	Aves	Diamond Dove
<i>Anas (Anas) superciliosa</i>	Animalia	Chordata	Aves	Pacific Black Duck
<i>Artamus (Campbellornis) personatus</i>	Animalia	Chordata	Aves	Masked Woodswallow
<i>Tadorna (Casarca) tadornoides</i>	Animalia	Chordata	Aves	Australian Shelduck
<i>Nymphicus hollandicus</i>	Animalia	Chordata	Aves	Cockatiel
<i>Dicaeum (Dicaeum) hirundinaceum</i>	Animalia	Chordata	Aves	Mistletoebird

Accepted Name	Kingdom	Phylum	Class	Common name
<i>Acanthiza (Milligania) robustirostris</i>	Animalia	Chordata	Aves	Slaty-backed Thornbill
<i>Egretta novaehollandiae</i>	Animalia	Chordata	Aves	White-faced Heron
<i>Acanthiza (Geobasileus) chrysorrhoa</i>	Animalia	Chordata	Aves	Yellow-rumped Thornbill
<i>Todiramphus (Cyanalcyon) pyrrhopygius</i>	Animalia	Chordata	Aves	Red-backed Kingfisher
<i>Cinchoramphus (Cinchoramphus) cruralis</i>	Animalia	Chordata	Aves	Brown Songlark
<i>Phaps (Phaps) chalcoptera</i>	Animalia	Chordata	Aves	Common Bronzewing
<i>Malurus (Leggeornis) assimilis</i>	Animalia	Chordata	Aves	Purple-backed Fairy-wren
<i>Psophodes (Sphenostoma) occidentalis</i>	Animalia	Chordata	Aves	Chiming Wedgebill
<i>Poliiocephalus poliocephalus</i>	Animalia	Chordata	Aves	Hoary-headed Grebe
<i>Malurus (Malurus) splendens</i>	Animalia	Chordata	Aves	Splendid Fairy-wren
<i>Cinclosoma (Samuela) marginatum</i>	Animalia	Chordata	Aves	Western Quail-thrush
<i>Milvus migrans</i>	Animalia	Chordata	Aves	Black Kite
<i>Cheramoeca leucosterna</i>	Animalia	Chordata	Aves	White-backed Swallow
<i>Psephotellus varius</i>	Animalia	Chordata	Aves	Mulga Parrot
<i>Fulica atra</i>	Animalia	Chordata	Aves	Eurasian Coot
<i>Ardea pacifica</i>	Animalia	Chordata	Aves	White-necked Heron
<i>Malacorhynchus membranaceus</i>	Animalia	Chordata	Aves	Pink-eared Duck
<i>Petrochelidon (Petrochelidon) ariel</i>	Animalia	Chordata	Aves	Fairy Martin
<i>Purnella albifrons</i>	Animalia	Chordata	Aves	White-fronted Honeyeater
<i>Todiramphus (Todiramphus) sanctus</i>	Animalia	Chordata	Aves	Sacred Kingfisher
<i>Malurus (Leggeornis) lamberti</i>	Animalia	Chordata	Aves	Variegated Fairy-wren
<i>Gelochelidon nilotica</i>	Animalia	Chordata	Aves	Gull-billed Tern
<i>Cinclosoma (Samuela) castaneothorax</i>	Animalia	Chordata	Aves	Chestnut-breasted Quail-thrush
<i>Certhionyx (Certhionyx) variegatus</i>	Animalia	Chordata	Aves	Pied Honeyeater
<i>Aythya (Nyroca) australis</i>	Animalia	Chordata	Aves	Hardhead
<i>Hieraaetus (Hieraaetus) morphnoides</i>	Animalia	Chordata	Aves	Little Eagle
<i>Cygnus atratus</i>	Animalia	Chordata	Aves	Black Swan
<i>Cladorhynchus leucocephalus</i>	Animalia	Chordata	Aves	Banded Stilt
<i>Neopsephotus bourkii</i>	Animalia	Chordata	Aves	Bourke's Parrot
<i>Chenonetta jubata</i>	Animalia	Chordata	Aves	Australian Wood Duck
<i>Malurus (Musciparus) leucopterus</i>	Animalia	Chordata	Aves	White-winged Fairy-wren
<i>Gerygone fusca</i>	Animalia	Chordata	Aves	Western Gerygone
<i>Podargus strigoides</i>	Animalia	Chordata	Aves	Tawny Frogmouth
<i>Merops (Merops) ornatus</i>	Animalia	Chordata	Aves	Rainbow Bee-eater
<i>Himantopus himantopus</i>	Animalia	Chordata	Aves	Black-winged Stilt
<i>Aphelocephala nigricincta</i>	Animalia	Chordata	Aves	Banded Whiteface
<i>Tachybaptus novaehollandiae</i>	Animalia	Chordata	Aves	Australasian Grebe
<i>Heteroscenes pallidus</i>	Animalia	Chordata	Aves	Pallid Cuckoo
<i>Accipiter (Paraspizias) cirrocephalus</i>	Animalia	Chordata	Aves	Collared Sparrowhawk
<i>Falco (Hierofalco) peregrinus</i>	Animalia	Chordata	Aves	Peregrine Falcon
<i>Cacatua (Licmetis) sanguinea</i>	Animalia	Chordata	Aves	Little Corella
<i>Circus assimilis</i>	Animalia	Chordata	Aves	Spotted Harrier
<i>Rhipidura (Rhipidura) albiscapa</i>	Animalia	Chordata	Aves	Grey Fantail
<i>Sugomel niger</i>	Animalia	Chordata	Aves	Black Honeyeater
<i>Columba (Columba) livia</i>	Animalia	Chordata	Aves	Rock Dove
<i>Coracina (Pteropodocys) maxima</i>	Animalia	Chordata	Aves	Ground Cuckoo-shrike
<i>Aegotheles (Aegotheles) cristatus</i>	Animalia	Chordata	Aves	Australian Owlet-nightjar
<i>Calidris (Erolia) acuminata</i>	Animalia	Chordata	Aves	Sharp-tailed Sandpiper
<i>Epthianura (Aurepthianura) aurifrons</i>	Animalia	Chordata	Aves	Orange Chat
<i>Microcarbo melanoleucos</i>	Animalia	Chordata	Aves	Little Pied Cormorant
<i>Ardeotis australis</i>	Animalia	Chordata	Aves	Australian Bustard
<i>Erythronyx cinctus</i>	Animalia	Chordata	Aves	Red-kneed Dotterel
<i>Acanthiza (Geobasileus) iredalei</i>	Animalia	Chordata	Aves	Slender-billed Thornbill
<i>Tringa (Rhyacophilus) glareola</i>	Animalia	Chordata	Aves	Wood Sandpiper
<i>Microeca (Microeca) fascians</i>	Animalia	Chordata	Aves	Jacky Winter
<i>Ptilotula plumula</i>	Animalia	Chordata	Aves	Grey-fronted Honeyeater
<i>Calidris (Ereunetes) ruficollis</i>	Animalia	Chordata	Aves	Red-necked Stint
<i>Platalea (Platibis) flavipes</i>	Animalia	Chordata	Aves	Yellow-billed Spoonbill
<i>Tribonyx ventralis</i>	Animalia	Chordata	Aves	Black-tailed Native-hen

Accepted Name	Kingdom	Phylum	Class	Common name
<i>Falco (Hierofalco) hypoleucos</i>	Animalia	Chordata	Aves	Grey Falcon
<i>Acanthiza (Acanthiza) apicalis</i>	Animalia	Chordata	Aves	Red-rumped Tit
<i>Chlidonias (Pelodes) hybrida</i>	Animalia	Chordata	Aves	Whiskered Tern
<i>Chalcites osculans</i>	Animalia	Chordata	Aves	Black-eared Cuckoo
<i>Corvus coronoides</i>	Animalia	Chordata	Aves	Australian Raven
<i>Ninox (Ninox) novaeseelandiae</i>	Animalia	Chordata	Aves	Southern Boobook
<i>Artamus (Angroyan) minor</i>	Animalia	Chordata	Aves	Little Woodswallow
<i>Daphoenositta (Neositta) chrysoptera</i>	Animalia	Chordata	Aves	Varied Sittella
<i>Hamirostra melanostemon</i>	Animalia	Chordata	Aves	Black-breasted Buzzard
<i>Turnix (Alphatumia) velox</i>	Animalia	Chordata	Aves	Little Button-quail
<i>Pyrrholaemus brunneus</i>	Animalia	Chordata	Aves	Redthroat
<i>Charadrius (Eupoda) veredus</i>	Animalia	Chordata	Aves	Oriental Plover
<i>Lichmera (Lichmera) indistincta</i>	Animalia	Chordata	Aves	Brown Honeyeater
<i>Porzana (Porzana) fluminea</i>	Animalia	Chordata	Aves	Australian Spotted Crane
<i>Burhinus (Burhinus) grallarius</i>	Animalia	Chordata	Aves	Bush Stone-curlew
<i>Chalcites basalis</i>	Animalia	Chordata	Aves	Horsfield's Bronze-cuckoo
<i>Tringa (Glottis) nebularia</i>	Animalia	Chordata	Aves	Common Greenshank
<i>Nycticorax caledonicus</i>	Animalia	Chordata	Aves	Nankeen Night-heron
<i>Chroicocephalus novaehollandiae</i>	Animalia	Chordata	Aves	Silver Gull
<i>Pardalotus (Pardalotinus) striatus</i>	Animalia	Chordata	Aves	Striated Pardalote
<i>Elanus axillaris</i>	Animalia	Chordata	Aves	Black-shouldered Kite
<i>Calidris (Erolia) ferruginea</i>	Animalia	Chordata	Aves	Curlew Sandpiper
<i>Vanellus (Lobivanellus) tricolor</i>	Animalia	Chordata	Aves	Banded Lapwing

Accepted Name	Kingdom	Phylum	Class
<i>Antechinomys laniger</i> (Gould, 1856)	Animalia	Chordata	Mammalia
<i>Antechinomys longicaudatus</i> (Spencer, 1909)	Animalia	Chordata	Mammalia
<i>Bettongia anhydra</i> Finlayson, 1957	Animalia	Chordata	Mammalia
<i>Felis catus</i> Linnaeus, 1758	Animalia	Chordata	Mammalia
<i>Notomys alexis</i> Thomas, 1922	Animalia	Chordata	Mammalia
<i>Osphranter rufus</i> Desmarest, 1822	Animalia	Chordata	Mammalia
<i>Nyctophilus geoffroyi</i> Leach, 1821	Animalia	Chordata	Mammalia
<i>Pseudantechinus woolleyae</i> Kitchener & Caputi, 1988	Animalia	Chordata	Mammalia
<i>Sminthopsis crassicaudata</i> (Gould, 1844)	Animalia	Chordata	Mammalia
<i>Vespadelus baverstocki</i> (Kitchener, Jones & Caputi, 1987)	Animalia	Chordata	Mammalia
<i>Vespadelus finlaysoni</i> (Kitchener, Jones & Caputi, 1987)	Animalia	Chordata	Mammalia
<i>Vulpes vulpes</i> Linnaeus, 1758	Animalia	Chordata	Mammalia

Accepted Name	Kingdom	Phylum	Class
<i>Anilius grypys</i> (Waite, 1918)	Animalia	Chordata	Reptilia
<i>Antaresia childreni</i> (Gray, 1842)	Animalia	Chordata	Reptilia
<i>Brachyuropsis approximans</i> (Glauert, 1954)	Animalia	Chordata	Reptilia
<i>Chelodina steindachneri</i> Siebenrock, 1901	Animalia	Chordata	Reptilia
<i>Ctenophorus caudicinctus</i> (Günther, 1875)	Animalia	Chordata	Reptilia
<i>Ctenophorus nuchalis</i> (De Vis, 1884)	Animalia	Chordata	Reptilia
<i>Ctenophorus reticulatus</i> (Gray, 1845)	Animalia	Chordata	Reptilia
<i>Ctenophorus scutulatus</i> (Stirling & Zietz, 1893)	Animalia	Chordata	Reptilia
<i>Ctenotus helenae</i> Storr, 1969	Animalia	Chordata	Reptilia
<i>Ctenotus leonhardii</i> (Sternfeld, 1919)	Animalia	Chordata	Reptilia
<i>Demansia reticulata</i> (Gray, 1842)	Animalia	Chordata	Reptilia
<i>Diplodactylus pulcher</i> Steindachner, 1870	Animalia	Chordata	Reptilia
<i>Egernia depressa</i> (Günther, 1875)	Animalia	Chordata	Reptilia
<i>Eremiascincus richardsonii</i> (Gray, 1845)	Animalia	Chordata	Reptilia
<i>Gehyra crypta</i> Kealley, Doughty, Pepper, Keogh, Hillyer & Huey, 2018	Animalia	Chordata	Reptilia
<i>Gehyra polka</i> Doughty, Bauer, Pepper, Keogh & Ellis, 2018	Animalia	Chordata	Reptilia
<i>Gehyra variegata</i> (Duméril & Bibron, 1836)	Animalia	Chordata	Reptilia
<i>Gowidon longirostris</i> (Boulenger, 1883)	Animalia	Chordata	Reptilia
<i>Heteronotia binoei</i> (Gray, 1845)	Animalia	Chordata	Reptilia
<i>Lerista eupoda</i> Smith, 1996	Animalia	Chordata	Reptilia

Accepted Name	Kingdom	Phylum	Class
<i>Lerista macropisthopus fusciceps</i> Storr, 1991	Animalia	Chordata	Reptilia
<i>Lerista timida</i> (de Vis, 1888)	Animalia	Chordata	Reptilia
<i>Lucasium squarrosum</i> (Kluge, 1962)	Animalia	Chordata	Reptilia
<i>Menetia greyii</i> Gray, 1845	Animalia	Chordata	Reptilia
<i>Nephrurus wheeleri</i> Loveridge, 1932	Animalia	Chordata	Reptilia
<i>Nephrurus wheeleri wheeleri</i> Loveridge, 1932	Animalia	Chordata	Reptilia
<i>Pseudonaja mengdeni</i> Wells & Wellington, 1985	Animalia	Chordata	Reptilia
<i>Pseudonaja modesta</i> (Günther, 1872)	Animalia	Chordata	Reptilia
<i>Strophurus wellingtonae</i> (Storr, 1988)	Animalia	Chordata	Reptilia
<i>Suta fasciata</i> Rosen, 1905	Animalia	Chordata	Reptilia
<i>Suta monachus</i> (Storr, 1964)	Animalia	Chordata	Reptilia
<i>Tympanocryptis pseudopsephos</i> Doughty, Kealley, Shoo & Melville, 2015	Animalia	Chordata	Reptilia
<i>Varanus caudolineatus</i> Boulenger, 1885	Animalia	Chordata	Reptilia
<i>Varanus panoptes rubidus</i> Storr, 1980	Animalia	Chordata	Reptilia
<i>Varanus panoptes</i> Storr, 1980	Animalia	Chordata	Reptilia

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



Australian Government

Department of Climate Change, Energy,
the Environment and Water

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: 16-Aug-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:	9
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:	10
Commonwealth Heritage Places:	None
Listed Marine Species:	10
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:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	2
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	Buffer Status
BIRD			
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area	In feature area
PLANT			
Pityrodia augustensis Mt Augustus Foxglove [4962]	Vulnerable	Species or species habitat may occur within area	In buffer area only
REPTILE			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Liopholis kintorei Great Desert Skink, Tjakura, Warrarna, Mulyamiji, Tjalapa, Nampu [83160]	Vulnerable	Species or species habitat may occur within area	In buffer area only

SPIDER			
Idiosoma nigrum Shield-backed Trapdoor Spider, Black Rugose Trapdoor Spider [66798]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only

Listed Migratory Species	[Resource Information]		
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In buffer area only

Migratory Terrestrial Species			
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area

Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Unknown		
Commonwealth Land - [51658]	WA	In buffer area only
Commonwealth Land - [51659]	WA	In buffer area only
Commonwealth Land - [51662]	WA	In buffer area only
Commonwealth Land - [51946]	WA	In buffer area only
Commonwealth Land - [51657]	WA	In buffer area only
Commonwealth Land - [51663]	WA	In buffer area only
Commonwealth Land - [51660]	WA	In buffer area only
Commonwealth Land - [51661]	WA	In buffer area only
Commonwealth Land - [51656]	WA	In buffer area only
Commonwealth Land - [51654]	WA	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area

Extra Information

Nationally Important Wetlands					[Resource Information]
Wetland Name			State		Buffer Status
Lake Annean (Lake Nannine)			WA		In buffer area only

EPBC Act Referrals					[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status		Buffer Status
Not controlled action					
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed		In feature area
Jack Hills Expansion Project	2011/5853	Not Controlled Action	Completed		In buffer area only

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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APPENDIX F:
RECONNAISSANCE FLORA/
VEGETATION AND BASIC FAUNA
SURVEY L 51/138, L 51/139
(BOTANICA 2025)

GARDEN GULLY PROJECT

Reconnaissance Flora/ Vegetation and Basic Fauna Survey

Prepared for New Murchison Gold Limited
June 2025



Prepared by



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Document Information

Prepared for: New Murchison Gold Limited.
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Tenements: L51/138, L51/139, P51/3009, E51/1791
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Quality Assurance

An internal quality review process has been implemented to each project task undertaken by BC. Each document and its contents are carefully reviewed by core members of the Consultancy team and signed off at Director Level prior to issue to the client. Draft documents are submitted to the client for comment and acceptance prior to final production.

Cover Photo: Acacia open woodland on a Clay Loam Plain within the Garden Gully Project (22nd April 2025).

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EXECUTIVE SUMMARY

Botanica Consulting Pty Ltd (Botanica) was commissioned by New Murchison Gold Limited (NMG) to undertake a reconnaissance flora/ vegetation survey and basic fauna survey of their Garden Gully Project (referred to as the 'survey area'). It is located approximately 15 km north-west of Meekatharra, Western Australia. The survey area extends along the Meekatharra-Mount Clere Road covering an area of approximately 340 ha. This assessment is intended to support approvals for the Garden Gully Project.

The survey area lies within the Western Murchison (MUR1) subregion of the Murchison Bioregion, as defined by the Interim Biogeographic Regionalisation of Australia (IBRA). The survey area is located within the Yoothapina Pastoral Lease in the Shire of Meekatharra.

Botanica conducted flora/ vegetation and basic fauna survey on the 21st and 22nd of April 2025. The area was surveyed by Jim Willaims (Senior Botanist) and Amy Johnston (Graduate Environmental Consultant). The area was traversed on foot and by 4WD.

The desktop review identified 640 vascular flora species as previously being recorded within 40 km of the survey area. Assessment of the DBCA's Threatened and Priority Flora database records, EPBC Protected Matters, Dandjoo database and previous relevant literature identified one Threatened Flora and 15 Priority Flora as occurring within a 40 km radius of the survey area. Of these, eight taxa were identified as possibly occurring and eight taxa unlikely to occur within the survey area.

The desktop review identified a total of 204 terrestrial vertebrate fauna taxa within 40 km of the survey area, consisting of 154 bird, 10 mammal, 38 reptile and two amphibian taxa. There were nine terrestrial vertebrate species and one invertebrate species of conservation significance as previously being recorded in the regional area, consisting of nine Threatened and one otherwise specially protected species. In addition, several migratory wading/shorebird species were assessed collectively due to their similar habitat requirements. Habitat and distribution data was used to determine the likelihood of occurrence within the survey area. The assessment identified two significant fauna species as possibly occurring in the survey area.

The field survey identified 90 vascular flora taxa within the survey area. These taxa represented 48 genera across 28 families, with the most diverse families being Fabaceae (20 species), Scrophulariaceae (11 species) and Chenopodiaceae (11 species), followed by dominant genera include *Acacia* (14 species) and *Eremophila* (11 species). Seven annual species were observed during the survey. Six weed species were recorded within the survey. These species are not listed as Declared Pests on the Western Australian Organism List (WAOL) under the *Biosecurity and Agriculture Management (BAM) Act 2007* or as Weeds of National Significance.

One Priority flora species was identified in the survey area. *Calytrix verruculosa* (P3) was observed growing in four locations along the Meekatharra-Mount Clere Road within the survey area, and in two locations ~20-30 m west of the survey area. Approximately 60 plants were identified. No Threatened flora were identified within the survey area.

A total of eight broad-scale vegetation communities were identified within the survey area. Native vegetation within the survey area was categorised as 'Good'. Impacts to vegetation within the survey area included access tracks, historical and current mining and exploration activities, and grazing by large feral herbivores.

No Threatened, Priority or otherwise significant ecological communities were identified within the survey area. No Environmentally Sensitive Areas were identified within 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 vegetation and associated landforms identified during the flora and vegetation assessment, four broad scale terrestrial fauna habitats were identified as occurring within the survey area. No evidence of significant fauna species were observed during the survey.

1 INTRODUCTION

Botanica Consulting Pty Ltd (Botanica) was commissioned by New Murchison Gold Limited (NMG) to undertake a reconnaissance flora/vegetation survey and basic fauna assessment of their Garden Gully Project area (referred to as the 'survey area'). The survey area extends along the Meekatharra-Mount Clere Road over tenements L 51/139, P51/3009, and portions of L51/138 and E51/1791, covering an area of approximately 340 ha. The survey area is located approximately 15 km north-west of Meekatharra, Western Australia (Figure 1-1). This assessment is intended to support approvals for the Garden Gully Project.

1.1 Objectives

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

- gather background information on flora and vegetation in the target area (literature review, database and map-based searches);
- identify significant flora, vegetation and ecological communities;
- 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;
- identify Matters of National Environmental Significance (MNES) protected under the EPBC Act; 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;
- Undertake opportunistic, low intensity sampling of fauna; and
- Report on the conservation status of species present using the Western Australian Museum and *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) databases for presence of Threatened and Priority listed fauna species within the survey area.

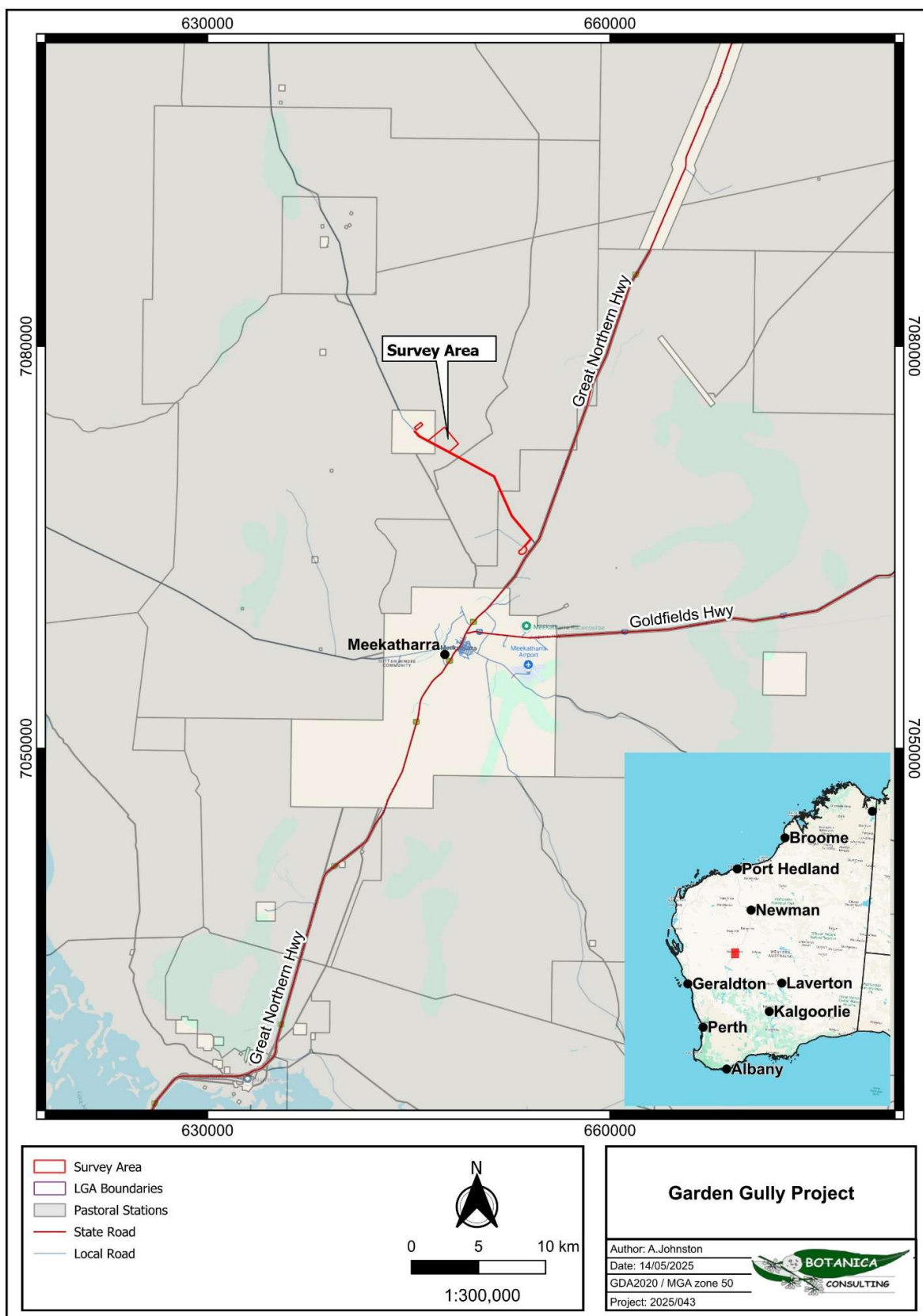


Figure 1-1: Regional map of the survey area

2 BIOPHYSICAL ENVIRONMENT

2.1 Regional Environment

The survey area lies within the Eremaean Province of Western Australia (WA). Based on the Interim Biogeographic Regionalisation of Australia (IBRA, Version 7) (DotEE, 2012) the survey area is located within the Murchison Bioregion of WA. This bioregion is further divided into subregions with the survey area located within the Western Murchison (MUR2) subregion of the Murchison Bioregion (Figure 2-1).

The landscape of the Murchison Bioregion comprises low hills, mesas of duricrust separated by flat colluvium and alluvial plains (Commonwealth Government, 2020). It is dominated by the Archaean (over 2500 million years ago) granite greenstone terrain of the Yilgarn Craton (Commonwealth Government, 2008). Alluvial soils and sands mantle the granitic and greenstone units of the Yilgarn Craton. These soils are shallow, sandy and infertile. Underlying the soils in low areas is a red-brown siliceous hard pan (Curry *et al.* 1994). The soils in the eastern half of the bioregion are typically red sands, calcareous red earth soil, duplex soil and clays. There are 41 vegetation associations (hummock grasslands, succulent steppe or low woodlands) that have at least 85 per cent of their total area in the bioregion. The bioregion is rich and diverse in both its flora and fauna, but most species are wide ranging and usually occur in adjoining regions (McKenzie, May and McKenna, 2002).

The Western Murchison comprises the northern part of the 'Murchison' Terrains of the Yilgarn Craton. It is characterised by mulga low woodlands, often rich in ephemerals (usually with bunch grasses), on outcrop and fine textured Quaternary alluvial and eluvial surfaces (extensive hardpan wash plains that dominate and characterise the subregion) mantling granitic and greenstone strata of the northern part of the Yilgarn Craton. Surfaces associated with the occluded drainage occur throughout with hummock grasslands on Quaternary sandplains, saltbush shrublands on calcareous soils and Tecticornia low shrublands on saline alluvia (Desmond, Cowan and Chant, 2001).

2.2 Land Use

The dominant land uses of the Western Murchison subregion include grazing native pastures (96.2%), unallocated crown land and crown reserves (2.81%) and conservation (0.06%). Mining has not been scored as these still come under Pastoral leases (Desmond, Cowan and Chant, 2001). The survey area is located within the Yoothapina and Sherwood Pastoral Leases in the Shire of Meekatharra.

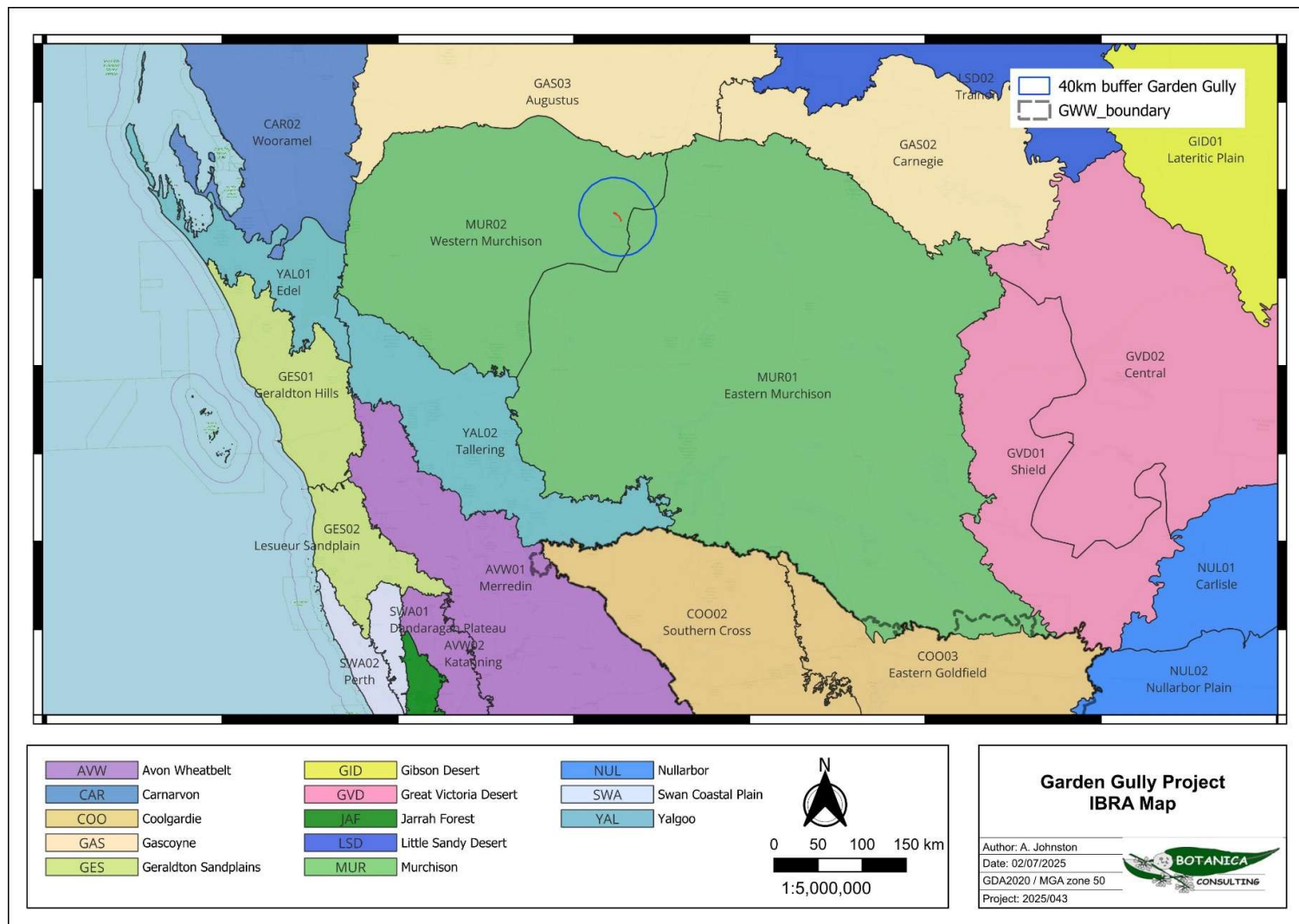


Figure 2-1: Map of IBRA Bioregions in relation to the survey area

2.3 Soil Landscape Systems

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

The Murchison Province is further divided into soil-landscape zones, with the survey area located within the Upper Murchison Zone (272). The Upper Murchinson Zone comprises of hardpan wash plains (with stony plains, sandplains, hills and mesas) on granite and gneiss of the Yilgarn Craton with red-brown hardpan shallow loams, red shallow loams, red loamy earths and red sands. Soils include red sandy earths, red deep sands, red shallow loams and red loamy earths with some red-brown hardpan shallow loams, salt lake soils and red shallow sandy duplexes. Vegetation is dominated by Mulga shrublands, with some halophytic shrublands. This zone is located in the north-western Murchison between Lake Nerramyne, Meekatharra, Cue and the Gascoyne River. (Tille, 2006).

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

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

Soil Landscape System	Description	Area (ha)	Area (%)
Sherwood System	Breakaways, kaolinised foot slopes and extensive gently sloping plains on granite supporting mulga shrublands and minor halophytic shrublands.	5.95	1.76
Belele System	Hardpan wash plains with acacia tall shrublands, and low sandy banks supporting shrublands with wanderrie grasses.	25.66	7.59
Yandil System	Flat hardpan wash plains with mantles of small pebbles and gravels; supporting groved mulga shrublands and occasional wanderrie grasses.	14.23	4.21
Violet System	Gently undulating gravelly plains on greenstone, laterite and hardpan, with low stony rises and minor saline plains; supporting groved mulga and bowgada shrublands and occasionally chenopod shrublands.	81.96	24.23
Wiluna System	Low greenstone hills with occasional lateritic breakaways and broad stony slopes, lower saline stony plains and broad drainage tracts; supporting sparse mulga and other acacia shrublands with patches of halophytic shrubs.	210.52	62.22

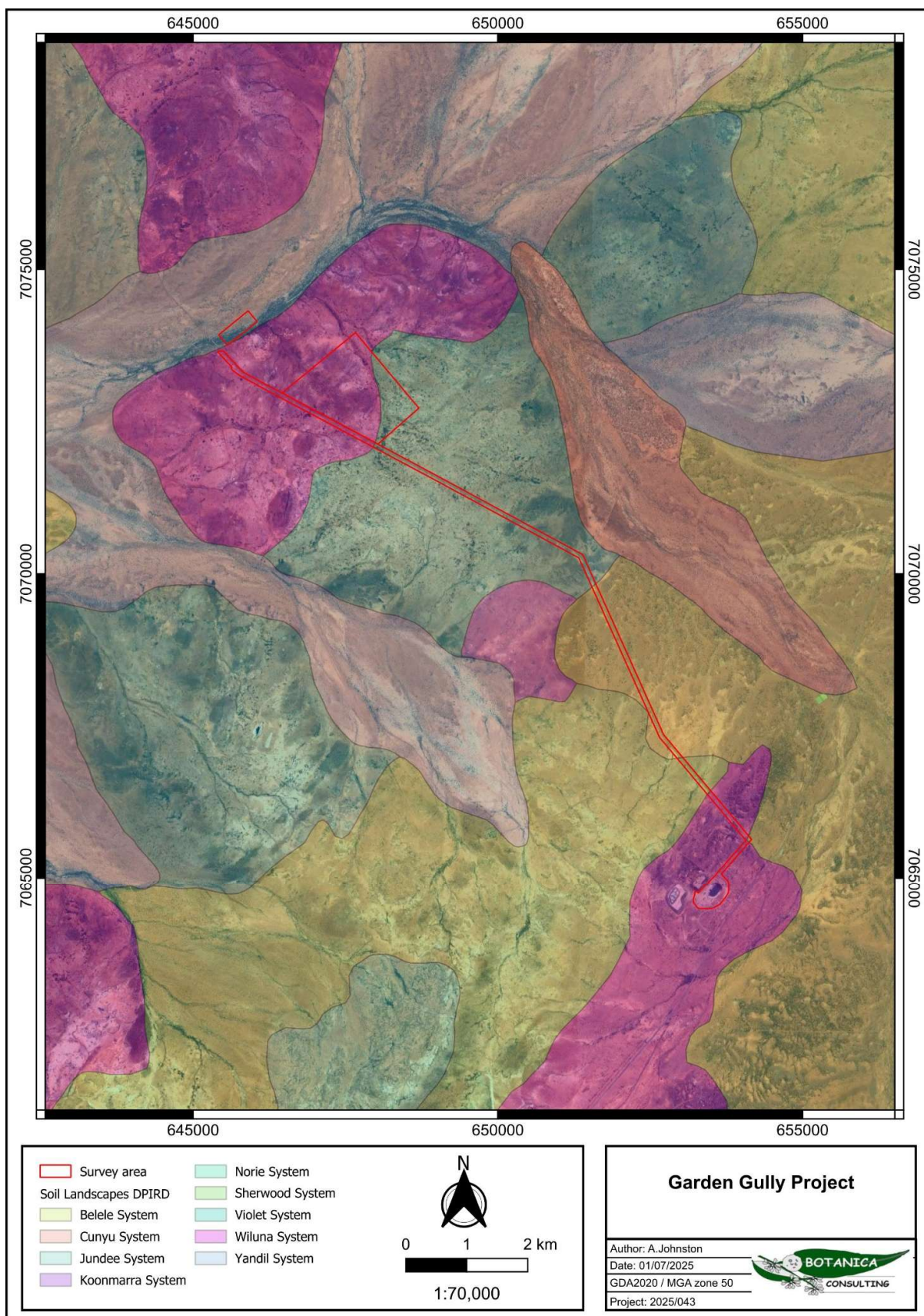


Figure 2-2: Map of soil landscape systems within the survey area

2.4 Regional Vegetation

Vegetation of the Murchison Bioregion is predominantly Mulga low woodlands on plains, often rich in ephemerals, which reduce to scrub on hills. It is also characterised by hummock grasslands, Saltbush shrublands and Samphire shrublands (Beard, 1990; McKenzie, May, and McKenna, 2002).

2.4.1 Pre-European Vegetation

The Pre-European vegetation association spatial mapping dataset (DPIRD, 2018) identified two vegetation associations as occurring within the survey area (Figure 2-3). The association description and their remaining extent, as specified in the 2018 Statewide Vegetation Statistics (DBCA, 2019) are provided in Table 2-2. 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). Both vegetation associations retain >99% of their pre-European extent, and development within the survey area will not significantly reduce the current extent of these vegetation associations.

The most extensive vegetation type in Western Australia is the *Acacia aneura* (mulga) low woodland, open low woodland and sparse woodland, covering over 36 million hectares. These low woodlands of mulga and associated species (mainly Acacias) are distributed throughout the Murchison, Gascoyne, Great Victoria Desert, Central Ranges and Pilbara Bioregions and they also extend into the Gibson Desert, Little Sandy Desert, Nullarbor and Yalgoo Bioregions (Beard *et al*, 2013).

Table 2-2: Pre-European vegetation associations within the survey area

Vegetation Association	Pre-European extent remaining	% Protected for Conservation	Floristic Description	Extent within Survey Area
Upper Murchison 29	99.97%	0	Low woodland, open low woodland or sparse woodland of Mulga (<i>Acacia aneura</i>) and associated species.	63.67 ha (18.82%)
Upper Murchison 18	99.73%	0	Low woodland, open low woodland or sparse woodland of Mulga (<i>Acacia aneura</i>) and associated species.	274.65 ha (81.18%)
Total				338.32 ha

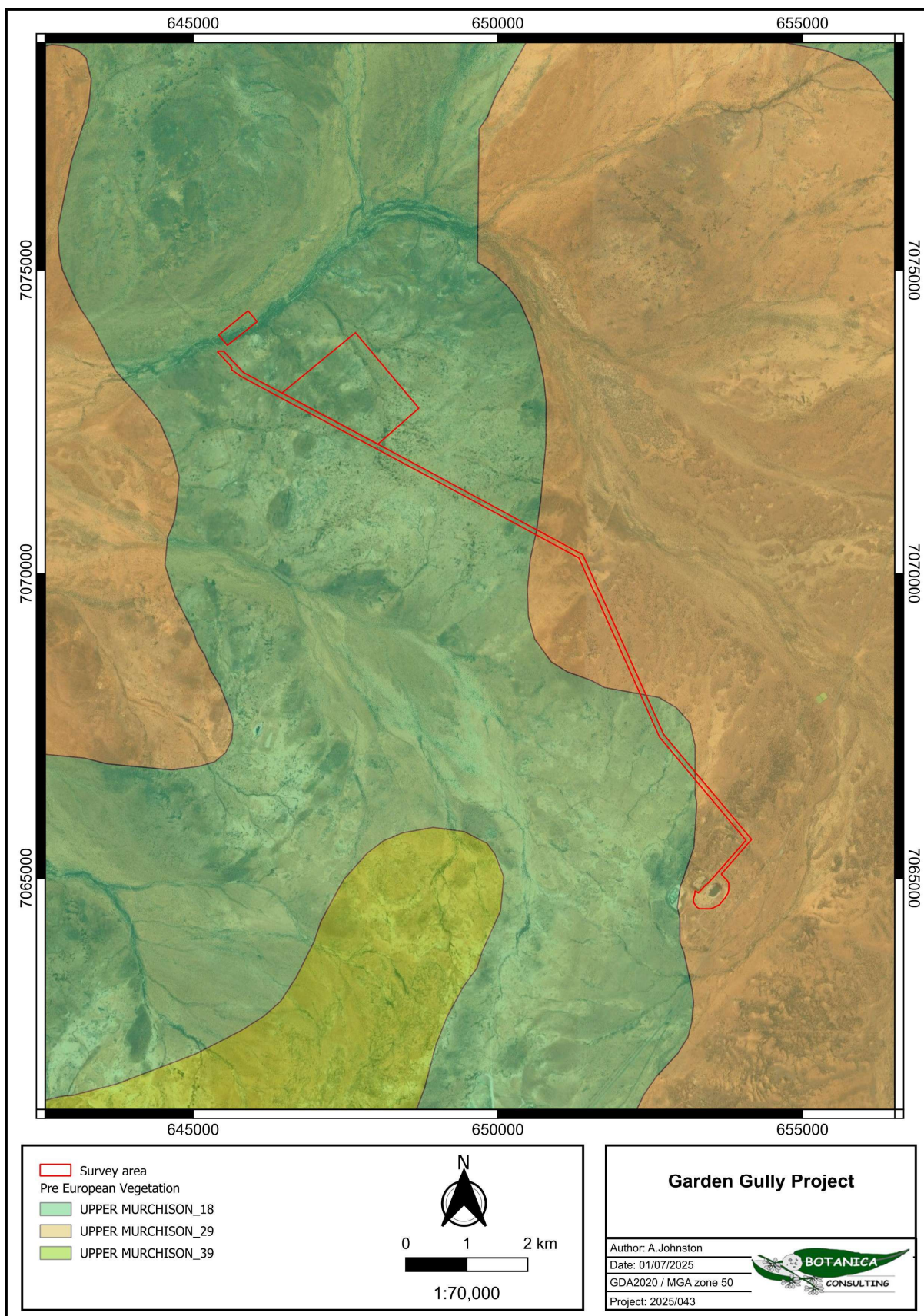


Figure 2-3: Pre-European vegetation systems within the survey area

2.5 Climate

The climate of the Western Murchison subregion is characterised as an arid climate with bimodal rainfall that usually falls in winter (Desmond, Cowan and Chant, 2001). Rainfall data for the Meekatharra Airport weather station (#7045), located approximately 20 km south-east of the survey area, is shown in Figure 2-4.

The Meekatharra Airport weather station has an annual rainfall average of 234.4 mm, with a bimodal rainfall pattern where peak falls in summer (February) and winter (June). The rainfall for January to April in 2024 was below the average. Rainfall for November and December 2024 were significantly higher than the average (BoM, 2025a).

The highest temperatures are recorded between November and March, when mean minimum and maximum temperatures are between 18.9°C and 38.4°C respectively. The lowest temperatures are recorded between June and August, when mean minimum and maximum temperatures are -0.2°C and 17.7°C respectively.

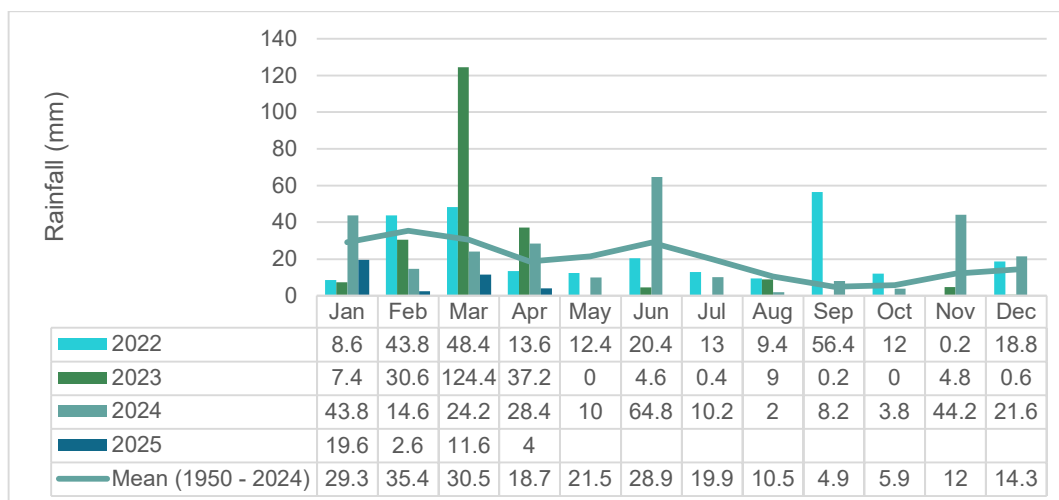


Figure 2-4: Rainfall data for Meekatharra Airport (#7045) (BoM, 2025a)

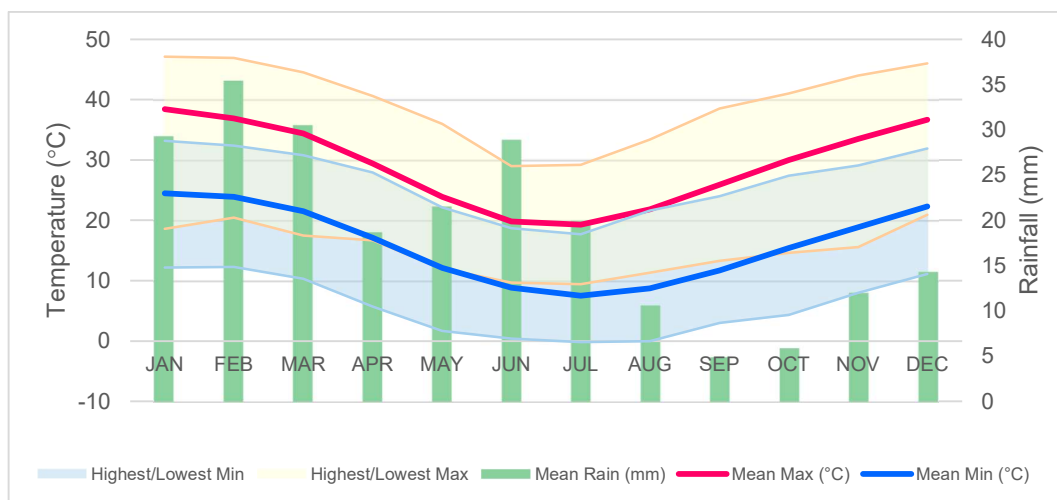


Figure 2-5: Climate data for Meekatharra Airport (#7045) (BoM, 2025a)

2.6 Conservation Values

No Threatened Ecological Communities (TEC) or Priority Ecological Communities (PEC) listed under the Commonwealth EPBC Act, or the Western Australian BC Act are known to occur within the survey area. There are seven PECs within 40 km of the survey area (Table 2-3, Figure 2-6).

Table 2-3: Priority Ecological Communities within a 40 km radius of the survey area

Community	Conservation Status	Description (DBCA, 2023)	Locality
Polelle calcrete groundwater assemblage type on Murchison palaeodrainage on Polelle Station	Priority 1	Unique assemblages of invertebrates have been identified in the groundwater calcretes	One occurrence approximately 38km southwest of the survey area.
Belele calcrete groundwater assemblage type on Murchison palaeodrainage on Belele Station	Priority 1	Unique assemblages of invertebrates have been identified in the groundwater calcretes.	One occurrence approximately 33km west of the survey area.
Killara North calcrete groundwater assemblage types on Murchison palaeodrainage on Killara Station	Priority 1	Unique assemblages of invertebrates have been identified in the groundwater calcretes.	One occurrence approximately 38km northeast of the survey area.
Karalundi calcrete groundwater assemblage type on Murchison palaeodrainage on Karalundi Station	Priority 1	Unique assemblages of invertebrates have been identified in the groundwater calcretes.	One occurrence approximately 38km northeast of the survey area.
Yagahong Land System	Priority 3	Rough greenstone ridges, hills and cobble-strewn footslopes supporting mulga shrublands	Five occurrences within the 40km buffer, the closest of which is 8km west of the survey area.
Trillbar Land System	Priority 3	Gently sloping stony plains with low rises of metamorphic rocks and gilgaied drainage foci; supports more or less saline shrublands of snakewood, mulga, bluebush and samphire with patches of tussock grassland	One occurrence approximately 17km south of the survey area.

Community	Conservation Status	Description (DBCA, 2023)	Locality
Austin Land System	Priority 3	Saline stony plains with low rises and drainage foci supporting low halophytic shrublands with scattered mulga; occurs mainly adjacent to lakes Austin and Annean below greenstone hill systems	One occurrence approximately 11km southwest of the survey area.

There are no Ramsar wetlands or wetlands of national importance (ANCA Wetlands) within the survey area or within 40 km of the survey area. Lake Annean (Lake Nannine) is a wetland of national importance but is located 50 km south of the survey area. There are no Environmentally Sensitive Areas (ESA's) as listed under the EP Act within the survey area, or within 40 km of the survey area (Figure 2-6).

There are no DBCA-managed lands, gazetted or proposed Reserves within the survey area, or within 40 km of the survey area. The nearest Legislated Reserve is the Lakeside Conservation Park (R54420), approximately 130 km southwest of the survey area and Kaluwiri National Park located approximately 117 km southeast of the survey area.

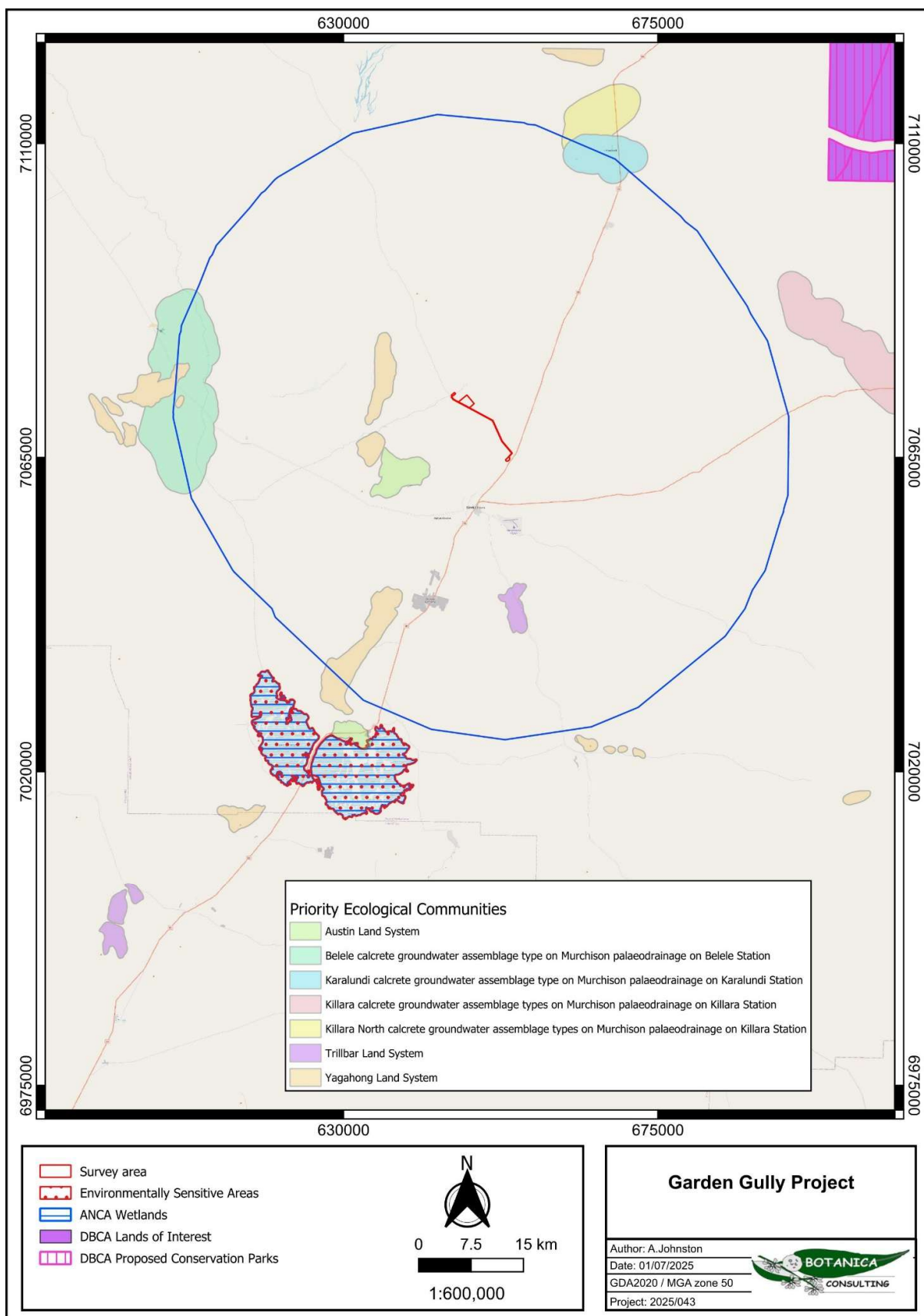


Figure 2-6: Conservation Values in relation to the survey area

2.7 Hydrology

The survey area is in the Murchison River Catchment. One Major and several minor ephemeral drainage lines intersect the survey area (Figure 2-7). The Garden Gully Creek is listed as a Major ephemeral drainage line and intersects the northern part of the survey area (Crossman and Li, 2015).

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. In accordance with the BoM *Atlas of Groundwater Dependent Ecosystems* (BoM, 2024b) database, there are no known or potential aquatic GDEs within the survey area. There are three potential terrestrial GDEs in the survey area (Table 2-4, Figure 2-7).

Table 2-4: Potential terrestrial groundwater dependent ecosystems (BoM, 2024b)

Ecosystem Description	GDE Potential based on national assessment (BoM, 2025b)
Low greenstone hills with occasional lateritic breakaways and broad stony slopes, lower saline stony plains and broad drainage tracts.	Low potential
Flat hardpan wash plains with mantles of small pebbles and gravels; supporting groved mulga shrublands and occasional wanderrie grasses.	Low potential
Hardpan wash plains interspersed by low sandy (wanderrie) banks supporting tall shrublands of mulga with understorey shrubs on the hardpan plains	Low potential

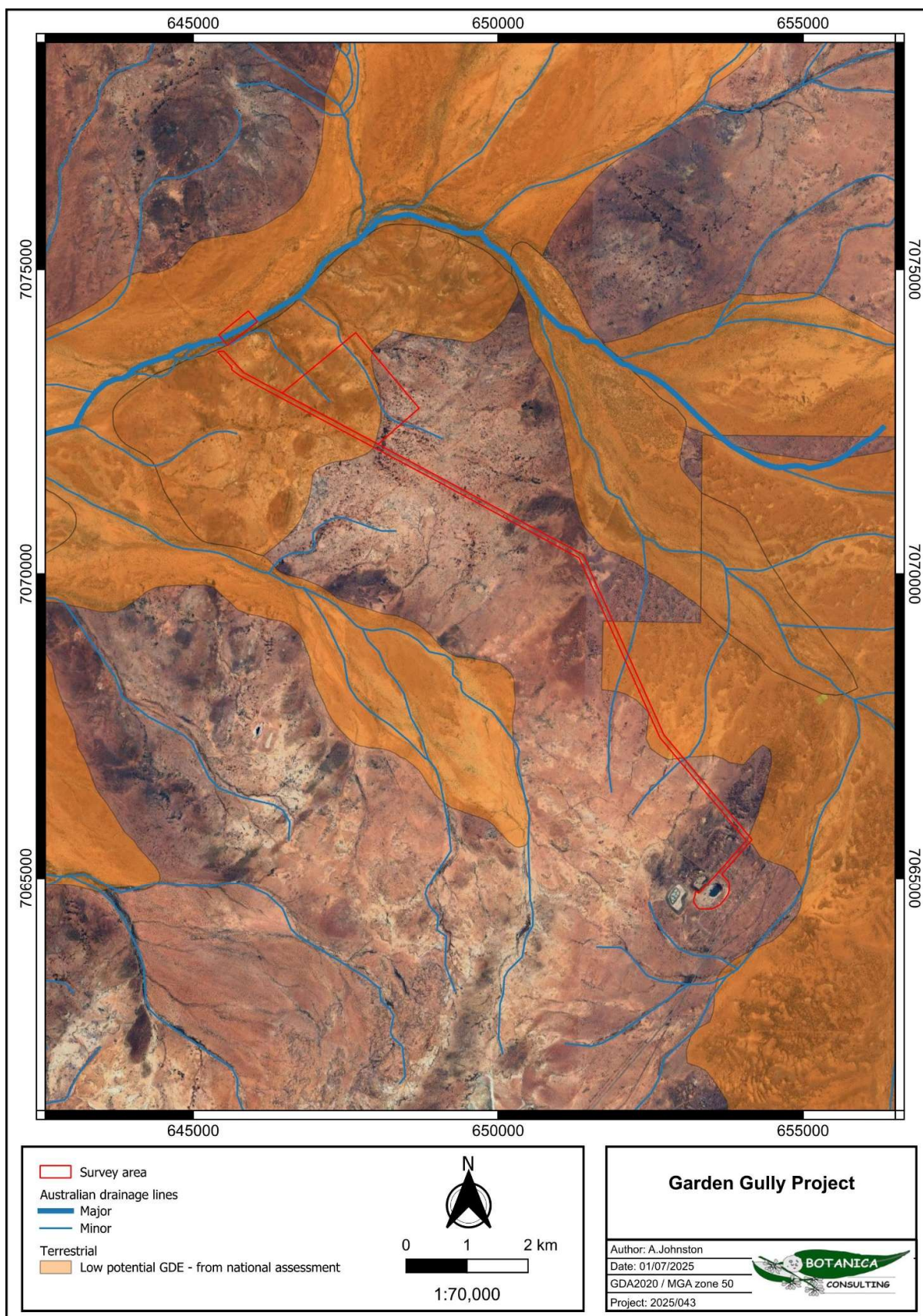


Figure 2-7: Regional hydrology of the survey area

3 SURVEY METHODOLOGY

3.1 Desktop Assessment

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

- Botanica (2021). *Desktop Flora and Fauna Assessment: Murchison Exploration Project*. Unpublished report prepared for Evolution Mining Group, April 2021.
- Botanica (2024) *Crown Prince Project: Reconnaissance Flora Survey and Basic Fauna Assessment*. Unpublished report for Ora Gold Ltd, August 2024.

Database search requests for significant flora (ref: 62-0824FL) (DBCA, 2024b), fauna (ref: 44-0824FA) (DBCA, 2024c) and communities (ref: 40-0824EC) (DBCA, 2024d) were submitted to DBCA for records within the survey area, with a 40 km buffer applied.

In addition to the literature review and DBCA database search requests, searches of the following online databases were also undertaken (using the survey area and 40 km buffer as stated above) to aid in the compilation of a list of potential significant flora and fauna within the survey area:

- Atlas of Living Australia (ALA) database (ALA, 2025);
- Dandjoo database (DBCA, 2024a); and
- EPBC Protected Matters search tool (DCCEEW, 2025).

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.
- **Likely:** Suitable habitat is expected to occur and there are records within 10 km of the survey area.
- **Previously Recorded:** A record for this species is located within the survey area. Field survey will ground-truth currently occurring individuals and populations.

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 taxa was assessed using data from the following sources:

- Environment Protection and Biodiversity and Conservation (EPBC) Act 1999. Administered by the Australian Government (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 30th April 2024, flora list released 1st May 2024).

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 surveys on the 21st and 22nd of April 2025. This was conducted by Jim Williams (Director/Senior Botanist) and Amy Johnston (Graduate Environmental Consultant). The area was traversed on foot and by 4WD.

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

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:

- 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.

Unknown specimens collected during the survey were identified with the aid of samples housed at the Botanica Herbarium and Western Australian Herbarium. Vegetation was classified in accordance with NVIS classifications.

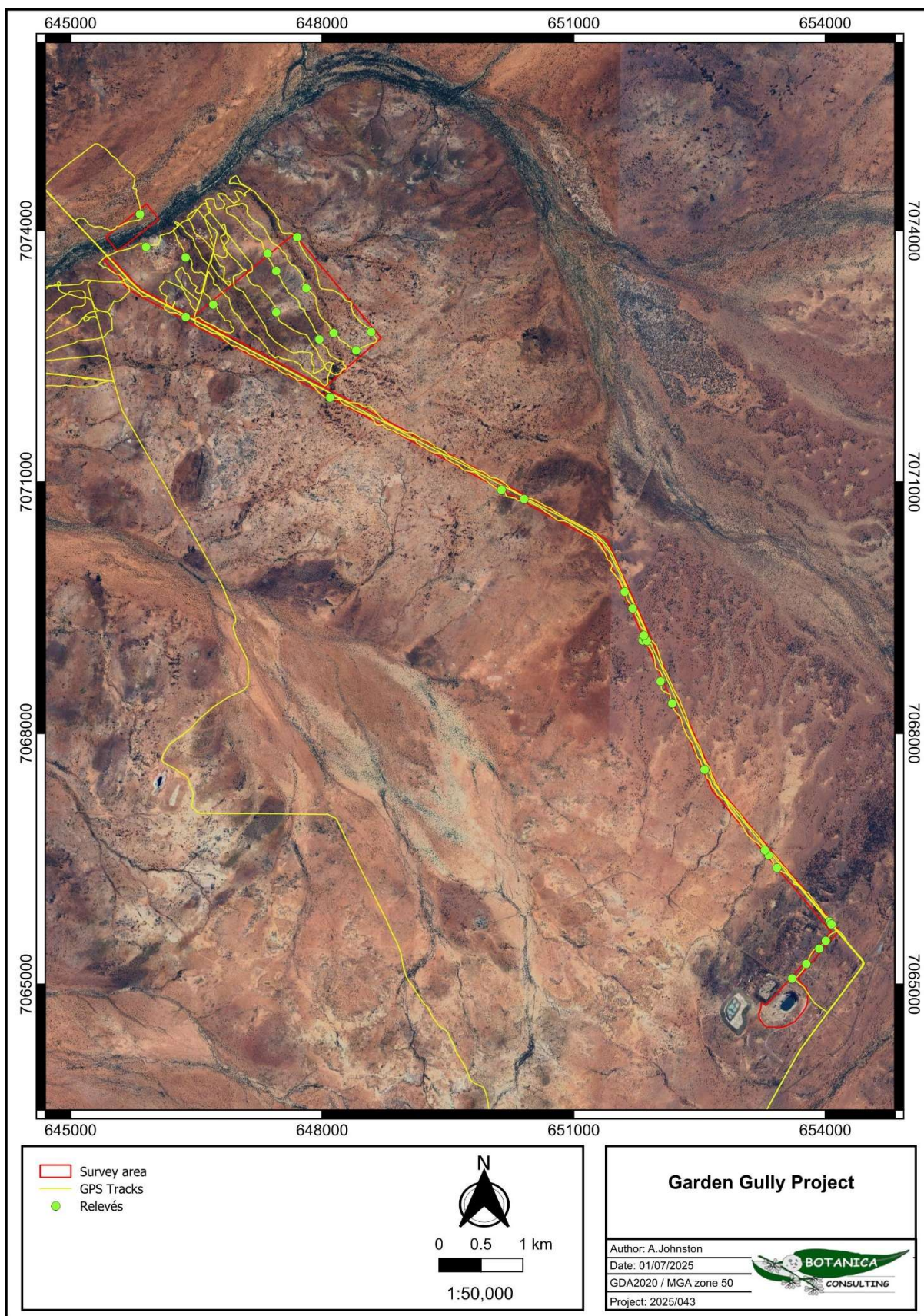


Figure 3-1 GPS tracklog of the 2025 survey effort

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/ vegetation and fauna were generated using QGIS.

3.4 Terrestrial Fauna Field Assessment

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.

Fauna of conservation significance identified during the literature review and database searches as previously being recorded in the general area were assessed and ranked for their likelihood of occurrence within the survey area. The rankings and criteria used were:

- **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).
- **Locally Extinct:** Populations no longer occur within a small part of the species natural range, in this case within 10 or 20 km of the survey area. Populations do however persist outside of this area.
- **Regionally Extinct:** Populations no longer occur in a large part of the species natural range, in this case within the Eastern Murchison subregion. Populations do however persist outside of this area.
- **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.

3.5 Scientific Licences

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

Licensed Staff	Permit Number	Date of Expiry
Jim Williams	FB62000457 – Flora Taking (Biological Assessment) Licence	04/08/2025
Amy Johnston	FB62000764 – Flora Taking (Biological Assessment) Licence	08/01/2026

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, discussions with local experts/residents 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/ vegetation and fauna survey

Variable	Potential Impact on Survey	Details
Access problems	Not a constraint	The survey was conducted via 4WD and on foot. The survey area was accessible by numerous access tracks.
Competency/ Experience	Not a constraint	The Botanica personnel that conducted the survey were regarded as suitably qualified and experienced. Coordinating Staff: Jim Williams (Director and Senior Botanist). Data Interpretation: Amy Johnston (Environmental Consultant)
Timing of survey, weather & season	Not a constraint	Fieldwork was undertaken within the EPA's recommended primary survey time period for the Eremaean Province (i.e., 6-8 weeks following wet season from March to June).
Area disturbance	Not a constraint	The majority of native vegetation survey area was in completely degraded to good condition.
Survey Effort/ Extent	Not a constraint	Survey intensity was appropriate for the size/significance of the area with a reconnaissance survey completed to identify vegetation types/fauna habitats and conservation significant species/communities.
Availability of contextual information at a regional and local scale	Not a constraint	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 Murchison bioregion 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.
Completeness	Not a constraint	In the opinion of Botanica, the survey area was covered sufficiently in order to identify vegetation assemblages. All observed flora individuals were able to be identified to species level. The vegetation associations for this study were based on visual descriptions of locations in the field. The distribution of these vegetation associations outside the survey 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 Dandjoo database search (DBCA, 2024a) identified 640 vascular flora species as previously being recorded within 40 km of the survey area. The full list of vascular flora identified by the desktop search is contained in Appendix B.

4.1.2 Introduced Flora

The desktop review identified 19 introduced flora (weed) species as previously being recorded within 40 km of the survey area (DBCA, 2024a). Of these, one species is listed as a Declared Pest on the Western Australian Organism List (WAOL) under the *Biosecurity and Agriculture Management (BAM) Act 2007* and also 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

Taxon	Common Name	Declared Pest	WONS
<i>Brassica tournefortii</i>	Mediterranean Turnip	N	N
<i>Cenchrus ciliaris</i>	Buffel grass	N	N
<i>Cenchrus setiger</i>	Birdwood grass	N	N
<i>Chenopodium murale</i>	Nettle-leaf Goosefoot	N	N
<i>Cuscuta epithymum</i>	Lesser dodder	N	N
<i>Hordeum glaucum</i>	Northern Barley Grass	N	N
<i>Malva parviflora</i>	Marshmallow	N	N
<i>Opuntia stricta</i>	Common Prickly Pear	Y	Y
<i>Papaver hybridum</i>	Rough poppy	N	N
<i>Portulaca pilosa</i>	Djanggara	N	N
<i>Rostraria pumila</i>	Tiny bristle-grass	N	N
<i>Rumex vesicarius</i>	Ruby dock	N	N
<i>Schinus molle var. areira</i>	Peppercorn	N	N
<i>Schismus arabicus</i>	Araby grass	N	N
<i>Sisymbrium erysimoides</i>	Smooth mustard	N	N
<i>Sisymbrium irio</i>	London rocket	N	N
<i>Sisymbrium orientale</i>	Indian Hedge Mustard	N	N
<i>Solanum nigrum</i>	Black Berry Nightshade	N	N
<i>Sonchus oleraceus</i>	Common Sowthistle	N	N

4.1.3 Significant Flora

Assessment of the DBCA's Threatened and Priority Flora database records (Ref: 62-0824FL) (DBCA, 2024b), EPBC Protected Matters (DCCEEW, 2025a), Dandjoo database (DBCA, 2024a) and previous relevant literature identified one Threatened Flora and 15 Priority Flora as occurring within a 40 km radius of the survey area.

These taxa were assessed for distribution and known habitat to determine their likelihood of occurrence within the survey area (Table 4-2). Eight species were assessed as possibly occurring and eight taxa would not occur within the survey area. The locations of the DBCA database records are illustrated spatially in Figure 4-1.

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

Taxon	Rank			Habitat Description	Assessment
	EPBC	BC Act	DBCA		
<i>Acacia speckii</i>			P4	Rocky soils over granite, basalt or dolerite. Rocky hills or rises.	Unlikely, no habitat fitting this description in the survey area.
<i>Calytrix verruculosa</i>	-	-	P3	Sandy clay. Shallow hardpan plain.	Possible.
<i>Drummondita miniata</i>			P3	Laterite. Breakaways.	Unlikely, no breakaways in the survey area.
<i>Eremophila fasciata</i>			P3	Stony hill.	Unlikely, no habitat fitting this description in the survey area.
<i>Eremophila retropila</i>	-	-	P1	Gravelly loam. Stony flats.	Possible.
<i>Euploca mitchellii</i>			P1	Rocky hills.	Unlikely, no rocky hills in the survey area.
<i>Goodenia berringbinensis</i>			P4	Red sandy loam. Along watercourses.	Possible.
<i>Grevillea inconspicua</i>	-	-	P4	Along drainage lines on rocky outcrops, creek lines.	Possible.
<i>Hemigenia virescens</i>			P3	Yellow-red sandy clay.	Unlikely, no habitat fitting this description in the survey area.
<i>Homalocalyx echinulatus</i>			P3	Laterite. Breakaways, sandstone hills.	Unlikely, no habitat fitting this description in the survey area.
<i>Indigofera rotula</i>			P3	Red loamy banks of watercourses.	Possible.
<i>Lepidium xylodes</i>	-	-	P1	Gravelly loam, clayey sand.	Possible.
<i>Menkea draboides</i>	-	-	P3	Red sand or clay, granite.	Possible.
<i>Pityrodia augustensis</i>	VU	VU		Amongst rocks on slopes or in drainage lines.	Unlikely, nearest known population is >300 km to the northwest.
<i>Ptilotus lazaridis</i>			P3	Clay loam. Floodplains.	Possible.
<i>Ptilotus luteolus</i>			P3	Hillslopes.	Unlikely, no hillslopes in the survey area.

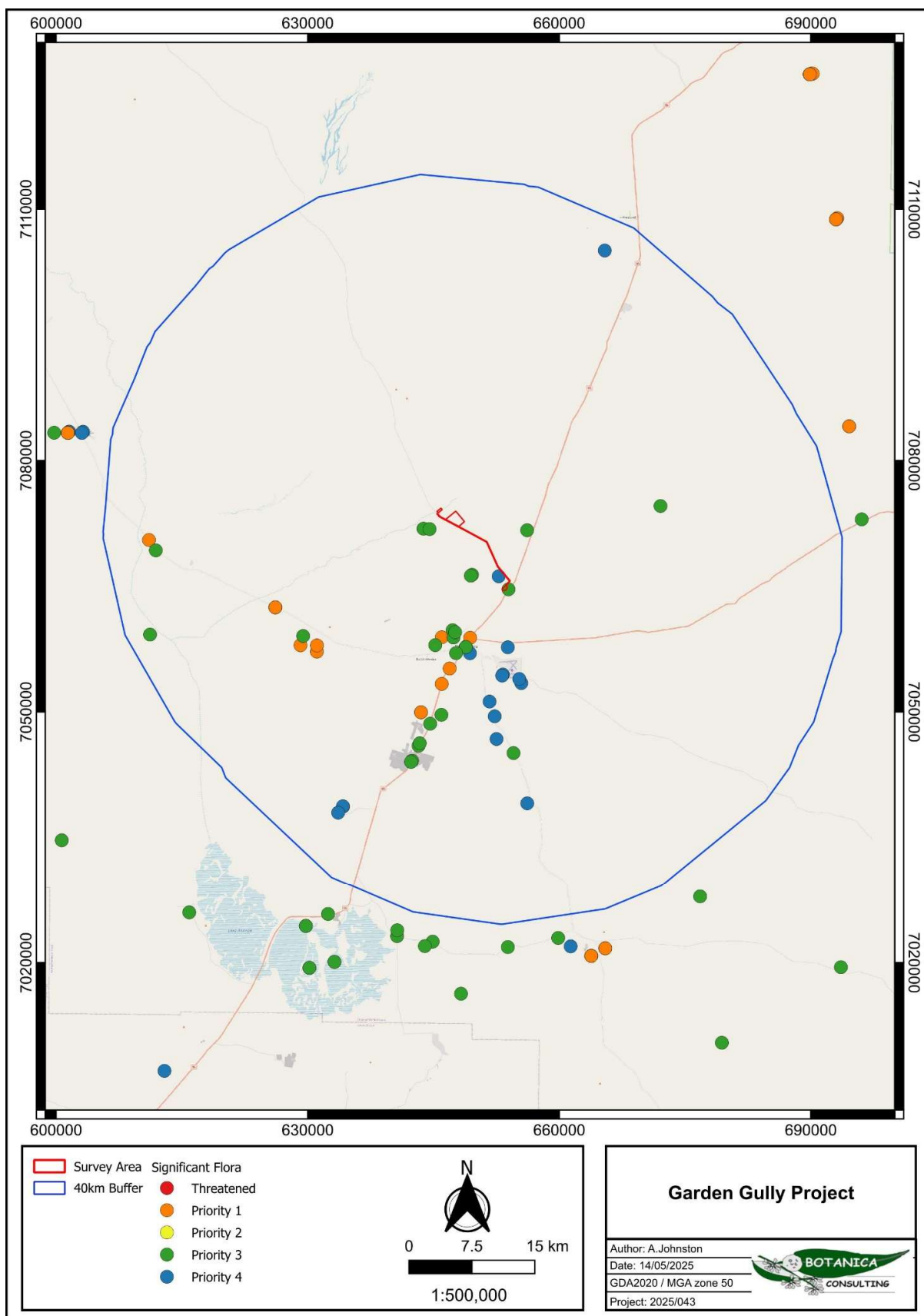


Figure 4-1: Significant flora within the desktop search area

4.1.4 Fauna

The combined Dandjoo database search (DBCA, 2024a) and ALA spatial portal results (ALA, 2025) identified a total of 204 terrestrial vertebrate fauna taxa within 40 km of the survey area, consisting of 154 bird, 10 mammal, 38 reptile and two amphibian taxa. The full list of vertebrate fauna identified by the desktop search is contained in Appendix B.

4.1.4.1 Conservation Significant Fauna

The desktop review (DBCA 2024b, DCCEEW 2025a) identified nine terrestrial vertebrate species and one invertebrate species of conservation significance as previously being recorded in the regional area, consisting of eight Threatened, one otherwise specially protected and one Priority species. In addition, several migratory wading/shorebird species were assessed collectively due to their similar habitat requirements.

Habitat and distribution data was used to determine the likelihood of occurrence within the survey area. The assessment identified three significant fauna species as possibly occurring in the survey area (Table 4-3).

Table 4-3: Conservation significant fauna previously recorded within 40 km of the survey area

Class	Taxon	Conservation Status			Habitat Description	Likelihood of Occurrence
		EPBC Act	BC Act	Priority		
Reptile	<i>Liopholis kintorei</i> Great desert skink	VU	-	-	Endemic to the Australian arid zone in the western deserts region (DCCEEW, 2024).	The PMST report suggests that the species or species habitat may occur in the buffer area. Would not occur. Nearest mainland population is >280 km to the northeast.
Bird	<i>Aphelocephala leucopsis</i> 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).	Unlikely, no DBCA records of any sightings within 40 km of the survey area. The PMST report suggests that the species or species habitat may occur in the area.
	<i>Falco hypoleucos</i> Grey falcon	VU	VU	-	Occurs in arid and semi-arid Australia, including the Murray-Darling Basin, Eyre Basin, central Australia and Western Australia, frequents timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined water courses (DCCEEW, 2024).	Possible- area may form part of larger home range.
	<i>Leipoa ocellata</i> Malleefowl	VU	VU	-	Scrublands and woodlands dominated by mallee and wattle species (DCCEEW, 2024).	Unlikely, no DBCA records of any sightings within 40 km of the survey area. The PMST report suggests that the species or species habitat may occur in the area.
	<i>Falco peregrinus</i> Peregrine falcon	-	OS	-	Known to inhabit open grasslands, wooded areas (ALA, 2024).	Possible- area may form part of larger home range.
	<i>Calidris acuminata</i> Sharp-tailed Sandpiper	VU	MI		Intertidal mudflats, also freshwater swamps and saltwater lakes (ALA, 2024).	Would not occur, no habitat in the survey area.
	<i>Calidris ferruginea</i> Curlew Sandpiper	CR & MI	CR		Intertidal mudflats, also freshwater swamps and saltwater lakes (ALA, 2024).	Would not occur, no habitat in the survey area.
	<i>Pezoporus occidentalis</i> Night parrot	EN	CR	-	Broad habitat requirements include areas of old-growth spinifex (<i>Triodia</i>) for roosting and nesting, together with foraging habitats that are likely to include various native grasses and herbs and may or may not contain shrubs or low trees. (DPaW, 2017).	Would not occur. Considered to be regionally extinct.

Class	Taxon	Conservation Status			Habitat Description	Likelihood of Occurrence
		EPBC Act	BC Act	Priority		
	Migratory Shorebirds	MI	IA	-	Prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline salt lakes inland (DotEE, 2018).	No suitable habitat (wetlands) present within the survey area. Would not occur.
Invertebrate	<i>Idiosoma nigrum</i> Shield-backed trapdoor spider	VU	EN	-	Dry woodlands east of the Darling Scarp and north to Moore River (ALA, 2024).	The PMST report suggests that the species or species habitat may occur in the buffer area. Would not occur. Nearest mainland populations are >250 km to the southwest.
Mammal	<i>Sminthopsis longicauda</i> Long-tailed Dunnart	-	-	P4	Rocky areas with hummock grasses and shrubs (ALA, 2025).	Possible - suitable habitat may be present.

4.2 Field Assessment

4.2.1 Flora

The field survey identified 90 vascular flora taxa within the survey area. These taxa represented 48 genera across 28 families, with the most diverse families being Fabaceae (20 species), Scrophulariaceae (11 species) and Chenopodiaceae (11 species), followed by dominant genera include *Acacia* (14 species) and *Eremophila* (11 species). Seven annual species were observed during the survey. The full field species inventory is listed in Appendix C.

4.2.1.1 Introduced Flora

Six introduced flora (weeds) species were observed within the survey area during the survey (Table 4-4). These were observed in disturbed areas and along tracks, and their locations were not marked. None of these 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.

Table 4-4: Introduced flora species within the survey area

Family	Taxon	Common Name
Aizoaceae	<i>Mesembryanthemum crystallinum</i>	Iceplant
Asteraceae	<i>Bidens bipinnata</i>	Bipinnate Beggartick
Brassicaceae	<i>Sisymbrium irio</i>	London rocket
Cucurbitaceae	<i>Cucumis myriocarpus</i>	Paddy Melon
Poaceae	<i>Cenchrus ciliaris</i>	Buffel grass
Zygophyllaceae	<i>Tribulus terrestris</i>	Caltrop

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.

One Priority flora species was observed within the survey area, *Calytrix verruculosa* (P3) (Table 4-5 and Figure 4-2). Approximately 60 plants were observed across six sites. The plants observed were sterile and a sample was collected and sent to the WA Herbarium.

Calytrix verruculosa is known from more than 11 populations (WAHERB, 1998-) and is known to occur in two IBRA subregions, the Eastern Murchison and Western Murchison. There are five populations within approximately 100 km of the survey area and the species covers a range of more than 16 000 km² (WAHERB, 1998-).

No Threatened or otherwise significant flora species were identified within the survey area.

Table 4-5: Significant flora recorded within the survey area

Taxon	Conservation Code	Description	Image
<i>Calytrix verruculosa</i>	Priority 3	Shrub growing approximately 0.4-0.75 m high with pink or white flowers which bloom in August to October and minutely rough branchlets (WAHERB, 1998-). Known from several populations in the Western and Eastern Murchison sub-regions. Approximately 60 plants were observed along Meekatharra-Mount Clere Road.	

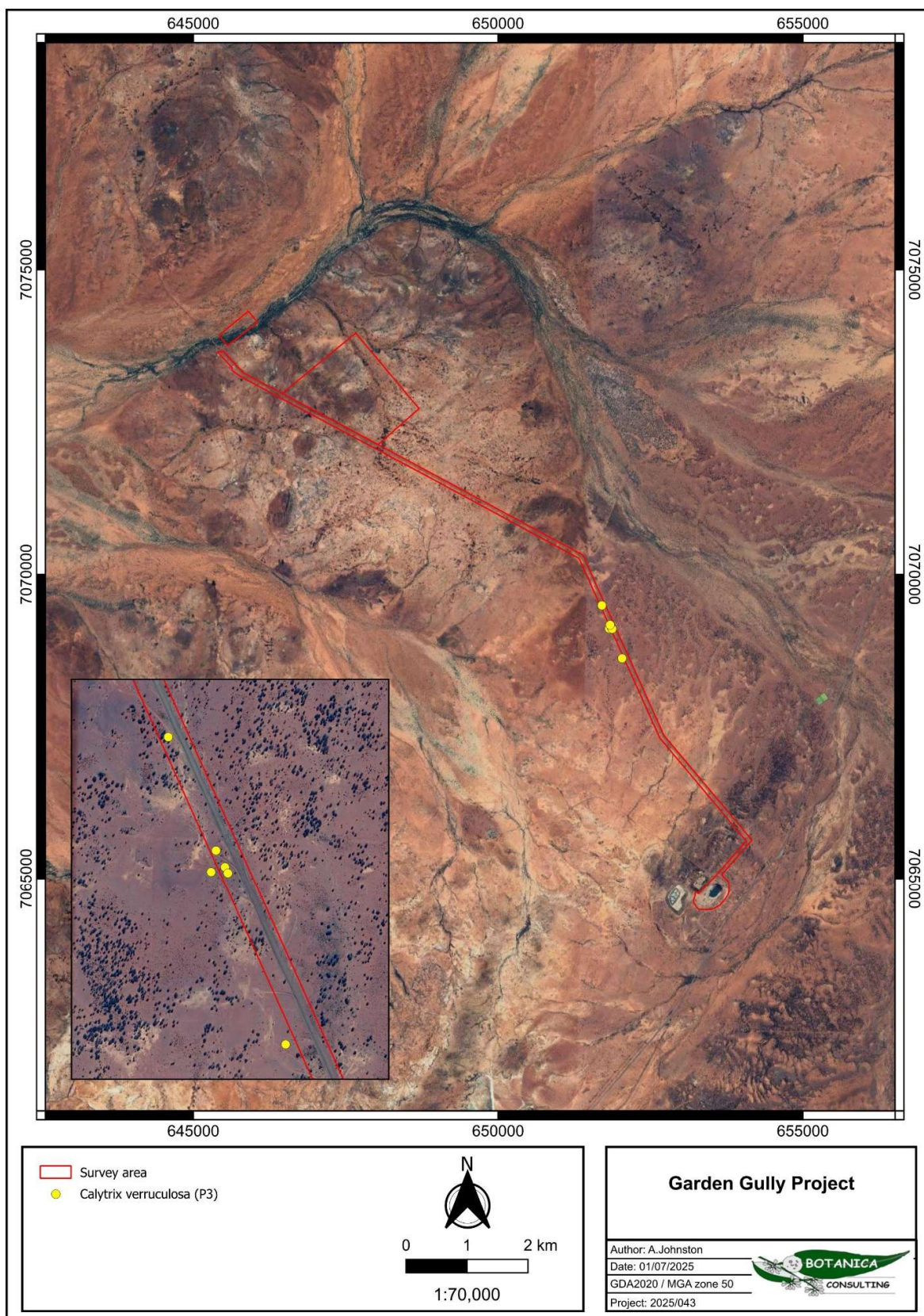


Figure 4-2: Location of Priority flora in the survey area

4.2.2 Vegetation Communities

A total of eight broad-scale vegetation communities were identified within the survey area. Vegetation community descriptions and extent are listed below in Table 4-6 and illustrated spatially in Figure 4-3. These vegetation types were identified within four landform types and comprised of three major vegetation groups. Vegetation community descriptions and extents were determined from field survey results, aerial imagery interpretation and extrapolation of the communities.

The survey found RHS-AOW1 was the most widespread community in the survey area, occupying 91.25 ha (26.96 %), while RP – AFW1 was the most restricted with 0.75 ha (0.22 %). The most diverse vegetation type was DD-AFW1 with 54 species (58.7%), while the least diverse was RHS – AOW1 with 22 species (23.91%).

Table 4-6: Summary of vegetation types within the survey area

Landform	NVIS Vegetation Group	Code	Vegetation Type	Area (ha)	Area (%)	Photo
Rocky Hillslope	Acacia Open Woodland (MVG 13)	RHS - AOW1	Mid woodland of <i>Acacia pruinocarpa</i> and <i>A. incurvaneura</i> over mid open shrubland of <i>Eremophila latrobei</i> , <i>E. jucunda</i> and <i>Senna</i> sp. Meekatharra over low sparse shrubland of <i>Maireana triptera</i> on a rocky hillslope.	91.25	26.96	
Rocky Plain	Acacia Open Woodland (MVG 13)	RP - AOW1	Mid woodland of <i>Acacia pruinocarpa</i> and <i>A. incurvaneura</i> over mid open shrubland of <i>A. grasbyi</i> , <i>Eremophila galeata</i> and <i>Senna</i> sp. Meekatharra over low sparse shrubland of <i>Maireana triptera</i> and <i>Enchylaena tomentosa</i> on a quartz rocky plain.	69.05	20.40	

Landform	NVIS Vegetation Group	Code	Vegetation Type	Area (ha)	Area (%)	Photo
	Acacia Forrest Woodland (MVG 6)	RP - AFW1	Mid open forest of <i>Acacia incurvaneura</i> over mid open shrubland of <i>A. tetragonophylla</i> and <i>Senna</i> sp. Meekatharra over low sparse shrubland of <i>Ptilotus obovatus</i> and <i>Solanum lasiophyllum</i> on a quartz rocky plain.	0.75	0.22	
Clay Loam Plain	Acacia Open Woodland (MVG 13)	CLP - AOW1	Mid woodland of <i>Acacia incurvaneura</i> over mid shrubland of <i>Eremophila compacta</i> over low sparse shrubland of <i>Solanum lasiophyllum</i> and <i>Aristida contorta</i> on clay loam plain.	82.8	24.46	

Landform	NVIS Vegetation Group	Code	Vegetation Type	Area (ha)	Area (%)	Photo
	Acacia Forrest Woodland (MVG 6)	CLP - AFW1	Mid open forest of <i>Acacia incurvaneura</i> over mid open shrubland of <i>A. tetragonophylla</i> and <i>Senna</i> sp. Meekatharra over low sparse shrubland of <i>Ptilotus obovatus</i> and <i>Solanum lasiophyllum</i> on a clay loam plain.	1.66	0.49	
Drainage Depression	Eucalypt Woodlands (MVG 5)	DD - EFW1	Mid open forest of <i>Eucalyptus camaldulensis</i> over mid open shrubland of <i>Acacia tetragonophylla</i> and <i>Senna</i> sp. Meekatharra over low sparse shrubland of <i>Ptilotus obovatus</i> and <i>Solanum lasiophyllum</i> in drainage depression.	6.15	1.82	

Landform	NVIS Vegetation Group	Code	Vegetation Type	Area (ha)	Area (%)	Photo
	Acacia Open Woodland (MVG 13)	DD - AOW1	Mid woodland of <i>A. incurvaneura</i> over mid open shrubland of <i>Eremophila galeata</i> over low sparse shrubland of <i>Maireana triptera</i> and <i>Enchylaena tomentosa</i> in a drainage depression.	14.00	4.13	
	Acacia Forrest Woodland (MVG 6)	DD - AFW1	Mid open forest of <i>Acacia incurvaneura</i> over mid open shrubland of <i>Acacia tetragonophylla</i> , and <i>Senna</i> sp. Meekatharra over low sparse shrubland of <i>Ptilotus obovatus</i> and <i>Solanum lasiophyllum</i> in drainage depression.	28.8	8.51	
Cleared Areas				44.02	13.01	
Total				338.48	100	

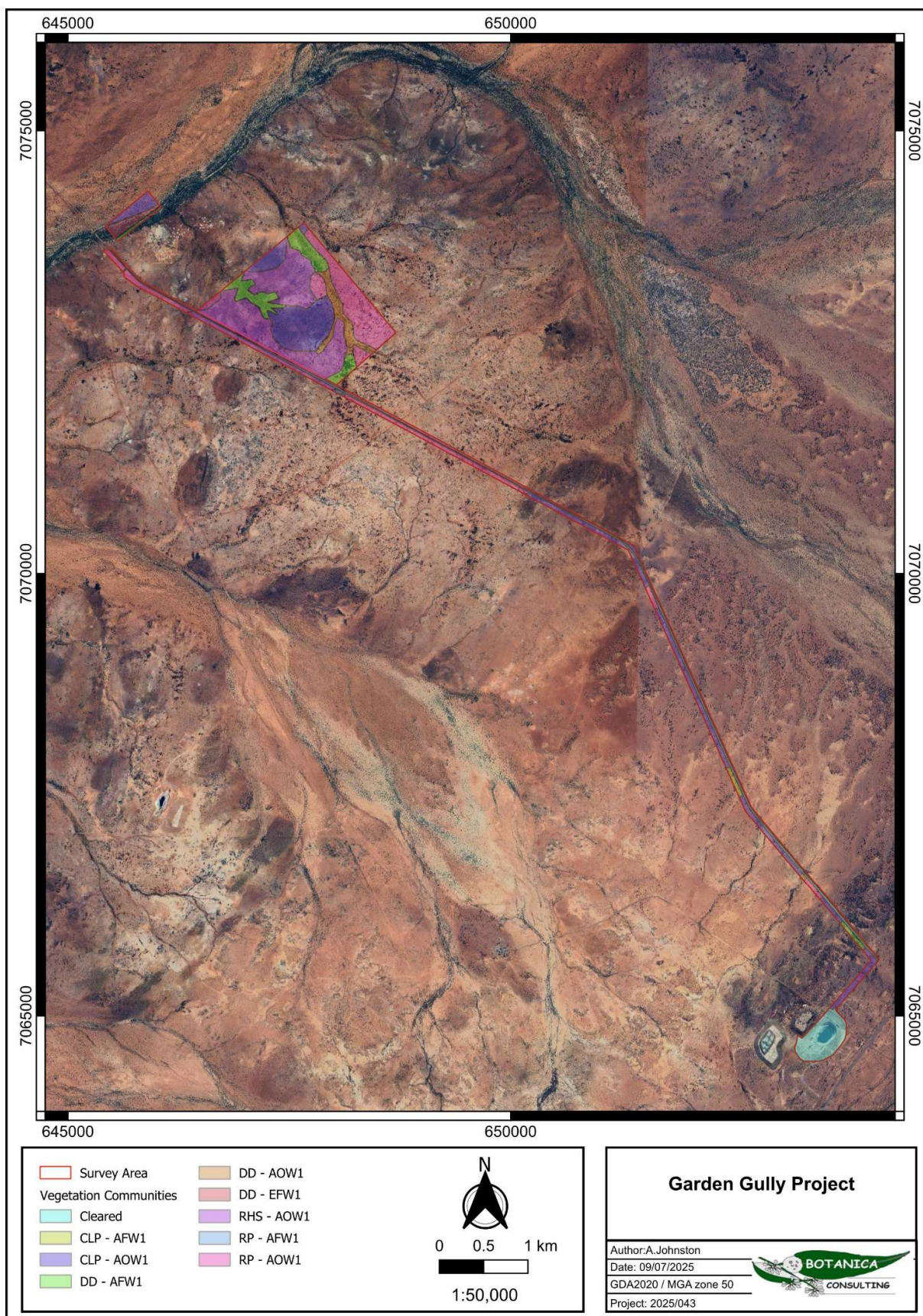


Figure 4-3: Vegetation types within the survey area

4.2.3 Vegetation Condition

Based on the vegetation condition rating scale adapted from Keighery (1994) and Trudgen, (1988), native vegetation within the survey area was categorized as 'Good', with cleared areas considered completely degraded (Table 4-7, Figure 4-4). Vegetation condition rating descriptions are listed in Appendix B. Impacts to vegetation within the survey area include access tracks, historical and current mining and exploration disturbances and heavy grazing.

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

Condition rating	Description	Area (ha)	Area (%)
Good	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.	294.31	86.95%
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.	44.17	13.05%
TOTAL		338.48	100

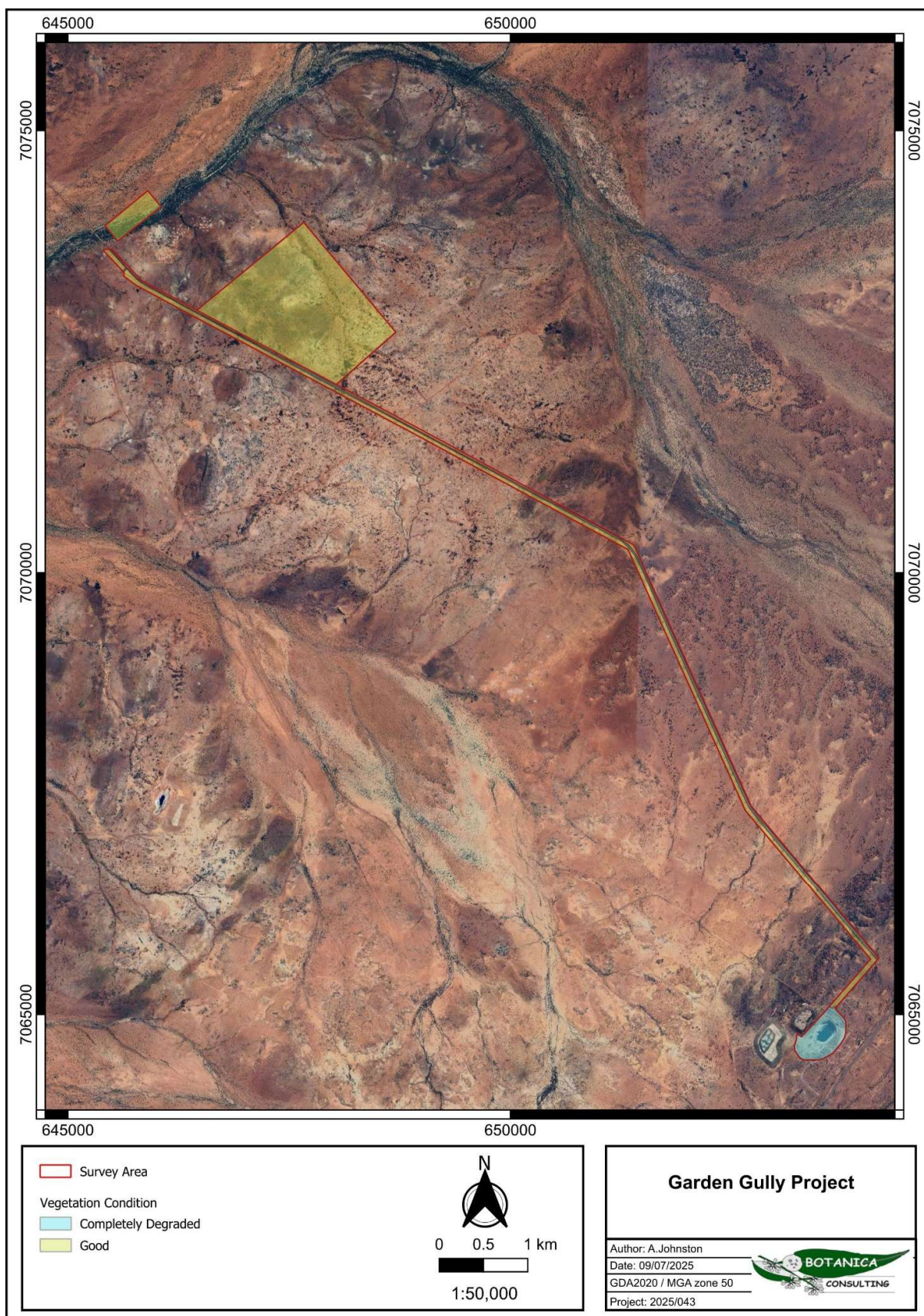


Figure 4-4: Vegetation condition within the survey area

4.2.4 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 priority or otherwise significant ecological communities were identified within the survey area.

4.2.5 Fauna

4.2.5.1 Fauna Habitat

Based on vegetation and associated landforms identified during the flora and vegetation assessment, four broad scale terrestrial fauna habitats were identified as occurring within the survey area. Table 4-9 provides the area and a visual representation of fauna habitat types, and the extent of fauna habitats is shown spatially in Figure 4-5.

Table 4-8 provides a list of opportunistic observations of fauna species were made during the field survey with a total of 12 fauna species observed.

Table 4-8: Fauna species observed during the field survey

Taxon	Common Name	Comments
Avifauna		
<i>Aquila audax</i>	Wedge-tailed eagle	Observed
<i>Barnardius zonarius</i>	Ringneck parrot	Observed
<i>Corvus orru</i>	Torresian crow	Heard
<i>Geopelia cuneata</i>	Diamond Dove	Observed
<i>Lichmera indistincta</i>	Brown honey eater	Observed
<i>Oreoica gutturalis</i>	Crested bellbird	Heard
<i>Phaps chalcoptera</i>	Common bronzewing	Observed
<i>Psephotellus varius</i>	Mulga Parrot	Observed
<i>Taeniopygia castanotis</i>	Zebra finch	Observed
Mammals		
<i>Bos taurus</i>	Cattle	Tracks and Scats Observed
<i>Oryctolagus cuniculus</i>	Rabbit	Scats Observed
<i>Macropus sp.</i>	Kangaroo and/or Euro	Tracks and Scats Observed

Table 4-9: Main terrestrial fauna habitats within the survey area

Fauna Habitat	Description	Representative Fauna Attributes	Example Image
Acacia woodland on rocky or clay-loam plain Area= 154.25ha (45.57%)	Open Acacia woodland over Eremophila shrubland	• Ground not particularly suited to burrowing species. • Low diversity vegetation strata supporting a reduced avifauna assemblage. • Low vegetation density and low leaf litter supporting some small reptiles.	
Acacia and/or Eucalypt woodland in drainage line Area=48.98ha (14.47%)	Closed Acacia and/or Eucalypt woodland over mixed Acacia and Eremophila shrubland	• Ground moderately suited to burrowing species in some areas. • Moderate diversity vegetation strata supporting a good avifauna assemblage. • Moderate vegetation density and moderate leaf litter supporting small reptiles.	

Fauna Habitat	Description	Representative Fauna Attributes	Example Image
Acacia woodland on a Rocky Hillslope Area= 91.23ha (26.95%)	Open Acacia woodland over Eremophila shrubland	• Ground not particularly suited to burrowing species. • Potential refuge for small fauna under rocks • Low diversity vegetation strata supporting a reduced avifauna assemblage. • Low vegetation density and low leaf litter supporting some small reptiles.	
Cleared Areas Area= 44.02ha (13.01%)		• Ground not well suited to burrowing species. • Low value foraging habitat for mammals and avifauna due to lack of native vegetation. • Man made structures (e.g., buildings) and remnant materials (e.g., old tin sheets) provide good refuge for reptiles.	

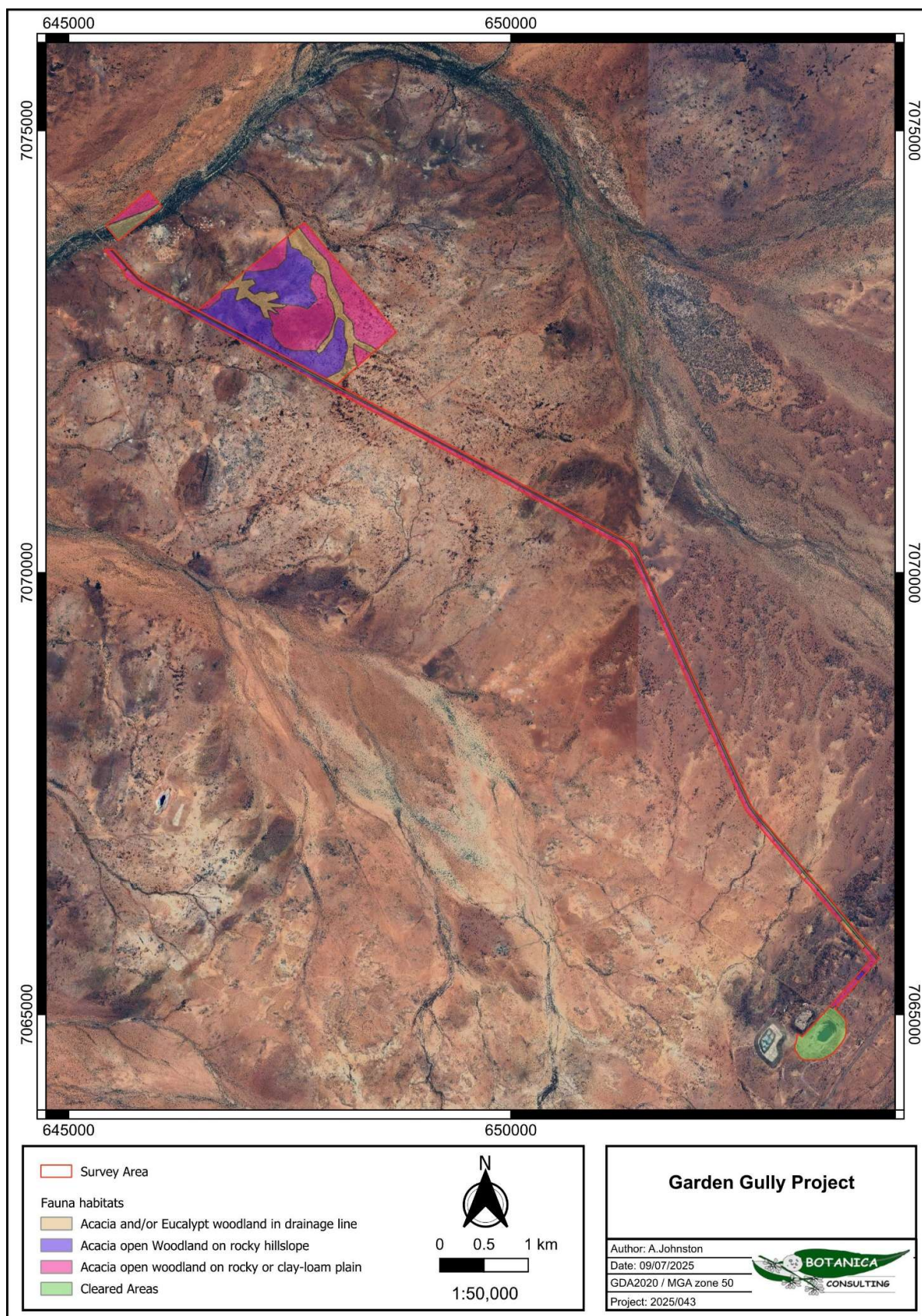


Figure 4-5: Fauna habitats within the survey area

4.2.5.2 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.

No evidence of significant fauna species was observed during the survey.

The current status of some species on site and/or in the general area is difficult to determine, however, based on the habitats present and, in some cases, direct observations or recent nearby records, the following species of conservation significance can be regarded as possibly utilising the survey area for some purpose at times, these being:

- **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.

- **Peregrine Falcon (*Falco peregrinus*) - OS (DBCA)**

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

- **Long-tailed Dunnart (*Sminthopsis longicaudata*) – Priority 4 (DBCA)**

This species is known to inhabit rocky areas of the Pilbara, Murchinson, Northeastern Goldfields, Ashburton, and Gibson Desert regions (Pavey, 2002). It is found in rocky scree and plateau areas, generally with little vegetation or of spinifex hummock grassland, shrubs, and open woodland (Burbidge et al., 2008). The surrounding regional landscape of the Murchison bioregion is characterised by acacia woodlands, stretching across low hills, mesas, flats, and plains, offering ample suitable habitat for *S. longicaudata*. Previous DBCA records indicate that the Long-tailed Dunnart has been observed between 30-81 km from the survey area. These records range from 1981 to 2018, with all but one record occurring after 2009. Suitable habitat may be present but is unlikely to represent critical habitat for the Long-tailed Dunnart.

It should be noted that while habitats onsite for one or more of the species listed above are considered possibly suitable, some or all may be marginal in extent/quality and therefore the fauna

species considered as possibly occurring may in fact only visit the area for short periods as infrequent vagrants.

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

- Nationally threatened flora 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.

No Matters of National Environmental Significance were identified within the survey area.

4.4 Matters of State Environmental Significance

4.4.1 *Environmental Protection Act WA 1986*

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

Under Section 51C of the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations (Regulations) WA 2004* any clearing of native vegetation in Western Australia that is not eligible for exemption under Schedule 6 of the *EP Act 1986* or under the Regulations 2004 requires a clearing permit from the DWER or DEMIRS. Under Section 51A of the *EP Act 1986* native

vegetation includes aquatic and terrestrial vegetation indigenous to Western Australia, and intentionally planted vegetation declared by regulation to be native vegetation, but not vegetation planted in a plantation or planted with commercial intent. Section 51A of the *EP Act 1986* defines clearing as “the killing or destruction of; the removal of; the severing or ringbarking of trunks or stems of; or the doing of substantial damage to some or all of the native vegetation in an area, including the flooding of land, the burning of vegetation, the grazing of stock or an act or activity that results in the above”. Exemptions under Schedule 6 of the EP Act and the EP Regulations do not apply in ESAs as declared under Section 51B of the EP Act or TEC listed under State and Commonwealth legislation.

No Matters of State Environmental Significance were identified within the survey area. No Environmentally Sensitive Areas were identified within the survey area.

4.4.2 *Biodiversity Conservation Act 2016*

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

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

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

No threatened species or critical habitat listed under the BC Act 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 PECs as listed by DBCA were identified within the survey area. One Priority Flora taxon was observed within the survey area: *Calytrix verruculosa* (P3).

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

The nearest Legislated Reserve is the Lakeside Conservation Park (R54420), approximately 130 km southwest of the survey area and Kaluwiri National Park (R54596) located approximately 117 km southeast of the survey area.

5 DISCUSSION AND CONCLUSIONS

The field survey identified 90 vascular flora taxa within the survey area. These taxa represented 48 genera across 28 families, with the most diverse families being Fabaceae (20 species), Scrophulariaceae (11 species) and Chenopodiaceae (11 species), followed by dominant genera include *Acacia* (14 species) and *Eremophila* (11 species). Seven annual species were observed during the survey. Six weed species were recorded within the survey. These species are not listed as Declared Pests on the Western Australian Organism List (WAOL) under the *Biosecurity and Agriculture Management (BAM) Act 2007* or as Weeds of National Significance.

One Priority flora species was identified in the survey area. *Calytrix verruculosa* (P3) was observed growing along the Meekatharra Mount-Clere Road in four locations, with an additional two locations found ~20-30 m outside of the survey area. No other Priority flora, Threatened flora or otherwise significant flora species were identified within the survey area.

A total of eight broad-scale vegetation communities were identified within the survey area. These vegetation communities are considered to be of low biological diversity and are well represented outside the survey area.

Native vegetation within the survey area was categorised as 'Good' with cleared areas considered completely degraded. Impacts to vegetation within the survey area include access tracks, historical and current mining and exploration activities, and grazing by large feral herbivores.

No Threatened, Priority or otherwise significant ecological communities were identified within the survey area. No Environmentally Sensitive Areas were identified within 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 vegetation types identified in the survey area mostly aligned with the Ecosystem descriptions provided by the BoM *Atlas of Groundwater Dependent Ecosystems (BoM, 2024b)*, however it is difficult to determine how dependant these communities are on groundwater, they are more likely to obtain their water requirements from surface water.

Four broad scale terrestrial fauna habitats were identified as occurring within the survey area. No evidence of significant fauna species were observed during the survey.

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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 2, Division 1 of the <i>Biodiversity Conservation (Listing of Native species) (Fauna) Order 2024</i> for critically endangered fauna or Schedule 1 Division 1 of the <i>Biodiversity Conservation (Listing of Native Species) (Flora) Order 2024</i> 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, Division 2 of the <i>Biodiversity Conservation (Listing of Native species) (Fauna) Order 2024</i> for endangered fauna or Schedule 1 Division 2 of the <i>Biodiversity Conservation (Listing of Native Species) (Flora) Order 2024</i> 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 2, Division 3 of the <i>Biodiversity Conservation (Listing of Native species) (Fauna) Order 2024</i> for vulnerable fauna or Schedule 1 Division 3 of the <i>Biodiversity Conservation (Listing of Native Species) (Flora) Order 2024</i> 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 “ <i>there is no reasonable doubt that the last member of the species has died</i> ”, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act). Published as presumed extinct under Schedule 3 of the <i>Biodiversity Conservation (Listing of Native species) (Fauna) Order 2024</i> for extinct fauna or Schedule 2 of the <i>Biodiversity Conservation (Listing of Native Species) (Flora) Order 2024</i> for extinct flora.
EW	Extinct in the Wild Species that “ <i>is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form</i> ”, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act). 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.	
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

Code	Category
	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 <i>Convention on the Conservation of Migratory Species of Wild Animals</i> (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species. Published as migratory birds protected under an international agreement under Schedule 1 Division 2 of the <i>Biodiversity Conservation (Listing of Native species) (Fauna) Order 2024</i>.
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 1 Division 1 of the <i>Biodiversity Conservation (Listing of Native species) (Fauna) Order 2024</i>.
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 1 Division 3 of the <i>Biodiversity Conservation (Listing of Native species) (Fauna) Order 2024</i>.
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. (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

Code	Category
	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: 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:

Category Code	Category
	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: VEGETATION CONDITION RATING

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

APPENDIX C: LIST OF SPECIES IDENTIFIED WITHIN THE SURVEY AREA

Family	Genus	Species	RHS - AOW1	QRP - AOW1	QRP - AFW1	CLP - AFW1	CLP - AOW1	DD- AOW1	DD - AFW1	DD- EFW1
Aizoaceae	<i>Mesembryanthemum</i>	<i>crystallinum</i> (W)		1						
Amaranthaceae	<i>Ptilotus</i>	<i>exaltatus</i> (A)		1						
Amaranthaceae	<i>Ptilotus</i>	<i>obovatus</i>	1	1	1	1	1	1	1	1
Amaranthaceae	<i>Ptilotus</i>	<i>roei</i>		1	1	1			1	
Amaranthaceae	<i>Ptilotus</i>	<i>rotundifolius</i>	1	1						
Amaranthaceae	<i>Ptilotus</i>	<i>schwartzii</i>	1							
Asteraceae	<i>Bidens</i>	<i>bipinnata</i> (W)			1	1			1	
Boraginaceae	<i>Trichodesma</i>	<i>zeylanicum</i> (A)			1	1			1	
Brassicaceae	<i>Sisymbrium</i>	<i>irio</i> (W)		1						
Chenopodiaceae	<i>Atriplex</i>	<i>codonocarpa</i>		1						
Chenopodiaceae	<i>Dysphania</i>	<i>kalpari</i> (A)		1	1	1			1	1
Chenopodiaceae	<i>Dysphania</i>	<i>melanocarpa</i>		1						
Chenopodiaceae	<i>Enchylaena</i>	<i>tomentosa</i>		1			1	1		
Chenopodiaceae	<i>Maireana</i>	<i>georgei</i>	1	1			1	1		
Chenopodiaceae	<i>Maireana</i>	<i>triptera</i>	1	1			1	1		
Chenopodiaceae	<i>Rhagodia</i>	<i>eremaea</i>		1			1	1	1	
Chenopodiaceae	<i>Salsola</i>	<i>australis</i> (A)		1			1	1		
Chenopodiaceae	<i>Sclerolaena</i>	<i>cuneata</i>		1						
Chenopodiaceae	<i>Sclerolaena</i>	<i>densiflora</i>	1							

Family	Genus	Species	RHS - AOW1	QRP - AOW1	QRP - AFW1	CLP - AFW1	CLP - AOW1	DD- AOW1	DD - AFW1	DD- EFW1
Chenopodiaceae	<i>Sclerolaena</i>	<i>diacantha</i>		1	1	1	1	1	1	
Convolvulaceae	<i>Duperreya</i>	<i>commixta</i>		1	1	1			1	
Cucurbitaceae	<i>Cucumis</i>	<i>myriocarpus (W)</i>		1	1	1			1	
Cyperaceae	<i>Bulbostylis</i>	<i>barbata</i>			1	1			1	1
Cyperaceae	<i>Cyperus</i>	<i>iria</i>			1	1			1	1
Euphorbiaceae	<i>Euphorbia</i>	<i>drummondii</i>		1	1	1	1	1	1	1
Euphorbiaceae	<i>Euphorbia</i>	<i>boophthona</i>			1	1			1	1
Fabaceae	<i>Acacia</i>	<i>acuminata</i>			1	1			1	
Fabaceae	<i>Acacia</i>	<i>aptaneura</i>		1						
Fabaceae	<i>Acacia</i>	<i>burkittii</i>							1	
Fabaceae	<i>Acacia</i>	<i>caesaneura</i>		1			1	1		
Fabaceae	<i>Acacia</i>	<i>exocarpoides</i>			1	1			1	
Fabaceae	<i>Acacia</i>	<i>grasbyi</i>		1					1	
Fabaceae	<i>Acacia</i>	<i>incurvaneura</i>	1	1	1	1	1	1	1	1
Fabaceae	<i>Acacia</i>	<i>mulganeura</i>	1							
Fabaceae	<i>Acacia</i>	<i>murrayana</i>			1	1			1	
Fabaceae	<i>Acacia</i>	<i>pruinocarpa</i>	1	1						
Fabaceae	<i>Acacia</i>	<i>quadrimarginea</i>		1	1	1			1	
Fabaceae	<i>Acacia</i>	<i>ramulosa</i> var. <i>linophylla</i>					1	1	1	
Fabaceae	<i>Acacia</i>	<i>tetragonophylla</i>	1	1	1	1			1	1
Fabaceae	<i>Acacia</i>	<i>victoriae</i>	1	1						
Fabaceae	<i>Senna</i>	<i>artemisioides</i> subsp. <i>*artemisioides</i>			1	1			1	
Fabaceae	<i>Senna</i>	<i>artemisioides</i> subsp. <i>*filifolia</i>							1	
Fabaceae	<i>Senna</i>	<i>artemisioides</i> subsp. <i>*sturtii</i>		1						
Fabaceae	<i>Senna</i>	<i>artemisioides</i> subsp. <i>helmsii</i>	1		1	1	1	1	1	
Fabaceae	<i>Senna</i>	<i>glutinosa</i> subsp. <i>chatelainiana</i>		1						

Family	Genus	Species	RHS - AOW1	QRP - AOW1	QRP - AFW1	CLP - AFW1	CLP - AOW1	DD- AOW1	DD - AFW1	DD- EFW1
Fabaceae	<i>Senna</i>	sp. Meekatharra (E. Bailey 1-26)	1	1	1	1			1	1
Frankeniaceae	<i>Frankenia</i>	<i>setosa</i>	1							
Goodeniaceae	<i>Scaevola</i>	<i>spinescens</i>	1							
Haloragaceae	<i>Haloragis</i>	<i>odontocarpa</i> (A)			1	1			1	1
Lamiaceae	<i>Teucrium</i>	<i>teucriiflorum</i>		1	1	1			1	
Loranthaceae	<i>Amyema</i>	<i>fitzgeraldii</i>		1	1	1	1	1	1	
Malvaceae	<i>Abutilon</i>	<i>cryptopetalum</i>			1	1			1	1
Malvaceae	<i>Hibiscus</i>	<i>burtonii</i>			1	1			1	
Malvaceae	<i>Sida</i>	<i>calyxhymenia</i>			1	1			1	1
Malvaceae	<i>Sida</i>	<i>spodochroma</i>			1	1			1	
Marsileaceae	<i>Marsilea</i>	<i>hirsuta</i>								1
Montiaceae	<i>Calandrinia</i>	<i>eremaea</i> (A)			1	1			1	
Montiaceae	<i>Calandrinia</i>	<i>ptychosperma</i> (A)			1	1			1	1
Myrtaceae	<i>Calytrix</i>	<i>carinata</i>			1	1			1	
Myrtaceae	<i>Corymbia</i>	<i>lenziana</i>	1							
Myrtaceae	<i>Eucalyptus</i>	<i>camaldulensis</i> subsp. <i>obtusata</i>								1
Poaceae	<i>Aristida</i>	<i>contorta</i>		1	1	1	1	1	1	1
Poaceae	<i>Cenchrus</i>	<i>ciliaris</i> (W)			1	1			1	
Poaceae	<i>Cymbopogon</i>	<i>ambiguus</i>								1
Poaceae	<i>Enneapogon</i>	<i>caerulescens</i>		1			1	1		
Poaceae	<i>Enteropogon</i>	<i>ramosus</i>			1	1			1	1
Poaceae	<i>Eragrostis</i>	<i>dielsii</i>			1	1			1	1
Poaceae	<i>Eragrostis</i>	<i>eriopoda</i>					1	1		
Poaceae	<i>Eriachne</i>	<i>pulchella</i>		1			1	1		
Portulacaceae	<i>Portulaca</i>	<i>oleracea</i>		1						
Proteaceae	<i>Grevillea</i>	<i>berryana</i>		1	1	1	1	1	1	

Family	Genus	Species	RHS - AOW1	QRP - AOW1	QRP - AFW1	CLP - AFW1	CLP - AOW1	DD- AOW1	DD - AFW1	DD- EFW1
Proteaceae	<i>Hakea</i>	<i>lorea</i>			1	1			1	1
Rubiaceae	<i>Psyrax</i>	<i>latifolia</i>		1	1	1			1	1
Rubiaceae	<i>Psyrax</i>	<i>suaveolens</i>			1	1			1	
Santalaceae	<i>Santalum</i>	<i>spicatum</i>			1	1			1	
Scrophulariaceae	<i>Eremophila</i>	<i>compacta</i>					1	1		
Scrophulariaceae	<i>Eremophila</i>	<i>exilifolia</i>		1	1	1			1	
Scrophulariaceae	<i>Eremophila</i>	<i>fraseri</i> subsp. <i>fraseri</i>		1	1	1			1	1
Scrophulariaceae	<i>Eremophila</i>	<i>galeata</i>		1			1	1		
Scrophulariaceae	<i>Eremophila</i>	<i>jucunda</i>	1							
Scrophulariaceae	<i>Eremophila</i>	<i>latrobei</i> subsp. <i>latrobei</i>	1	1	1	1	1	1	1	
Scrophulariaceae	<i>Eremophila</i>	<i>linearis</i>		1					1	
Scrophulariaceae	<i>Eremophila</i>	<i>longifolia</i>		1	1	1			1	1
Scrophulariaceae	<i>Eremophila</i>	<i>macmillaniana</i>		1					1	
Scrophulariaceae	<i>Eremophila</i>	<i>margarethae</i>	1						1	
Scrophulariaceae	<i>Eremophila</i>	<i>phyllopoda</i>		1	1	1			1	
Solanaceae	<i>Solanum</i>	<i>lasiophyllum</i>	1	1	1	1	1	1	1	1
Zygophyllaceae	<i>Tribulus</i>	<i>astrocarpus</i> (A)		1			1	1		
Zygophyllaceae	<i>Tribulus</i>	<i>terrestris</i> (W)		1			1	1		
Zygophyllaceae	<i>Tribulus</i>	<i>suberosus</i>	1							

(A) denotes annual flora; (W) denotes weed species.

APPENDIX D: PRIORITY FLORA LOCATIONS (GDA 2020)

Taxon	Easting	Northing	Comments	Waypoint
<i>Calytrix verruculosa</i>	652036.2	7068620	Approximately 20 plants observed	1075
<i>Calytrix verruculosa</i>	651825.5	7069108	Approximately 30 plants observed	1076
<i>Calytrix verruculosa</i>	651864.7	7069122	One plant observed	1077
<i>Calytrix verruculosa</i>	651872.9	7069105	Two plants observed	1078
<i>Calytrix verruculosa</i>	651839.3	7069169	Two plants observed	1079
<i>Calytrix verruculosa</i>	651704.5	7069490	One plant observed	1080

APPENDIX E: DANDJOO AND ALA SEARCH RESULTS(40KM)

Vascular Flora

Accepted Name
<i>Abutilon cryptopetalum</i> (F.Muell.) Benth.
<i>Abutilon fraseri</i> (Hook.) Walp.
<i>Acacia acuminata</i> Benth.
<i>Acacia aneura</i> Benth.
<i>Acacia aptaneura</i> Maslin & J.E.Reid
<i>Acacia ayersiana</i> Maconochie
<i>Acacia brachystachya</i> Benth.
<i>Acacia burkittii</i> Benth.
<i>Acacia caesaneura</i> Maslin & J.E.Reid
<i>Acacia citrinoviridis</i> Tindale & Maslin
<i>Acacia coolgardiensis</i> Maiden
<i>Acacia craspedocarpa</i> F.Muell.
<i>Acacia cuthbertsonii</i> Luehm.
<i>Acacia cuthbertsonii</i> Luehm. subsp. <i>cuthbertsonii</i>
<i>Acacia cuthbertsonii</i> subsp. <i>linearis</i> R.S.Cowan & Maslin
<i>Acacia cyperophylla</i> Benth. var. <i>cyperophylla</i>
<i>Acacia demissa</i> R.S.Cowan & Maslin
<i>Acacia effusifolia</i> Maslin & Buscumb
<i>Acacia exocarpoides</i> W.Fitzg.
<i>Acacia fuscaneura</i> Maslin & J.E.Reid
<i>Acacia grasbyi</i> Maiden
<i>Acacia incurvaneura</i> Maslin & J.E.Reid
<i>Acacia kempeana</i> F.Muell.
<i>Acacia ligulata</i> Benth.
<i>Acacia macraneura</i> Maslin & J.E.Reid
<i>Acacia mulganeura</i> Maslin & J.E.Reid
<i>Acacia murrayana</i> Benth.
<i>Acacia paraneura</i> Randell
<i>Acacia pruinocarpa</i> Tindale
<i>Acacia pteraneura</i> Maslin & J.E.Reid
<i>Acacia pyrifolia</i> DC.
<i>Acacia pyrifolia</i> DC. var. <i>pyrifolia</i>
<i>Acacia quadrimarginea</i> F.Muell.
<i>Acacia ramulosa</i> var. <i>linophylla</i> (W.Fitzg.) Pedley
<i>Acacia ramulosa</i> W.Fitzg. var. <i>ramulosa</i>
<i>Acacia rhodophloia</i> Maslin
<i>Acacia sclerosperma</i> F.Muell.
<i>Acacia sclerosperma</i> F.Muell. subsp. <i>sclerosperma</i>
<i>Acacia sclerosperma</i> subsp. <i>glaucescens</i> A.R.Chapm. & Maslin
<i>Acacia sibirica</i> S.Moore
<i>Acacia</i> sp. <i>Wiluna</i> (B.R. Maslin 7090)
<i>Acacia speckii</i> R.S.Cowan & Maslin
<i>Acacia subtessarogona</i> Tindale & Maslin
<i>Acacia synchronica</i> Maslin
<i>Acacia tetragonophylla</i> F.Muell.
<i>Acacia thomae</i> Maslin
<i>Acacia tysonii</i> Luehm.

Accepted Name
Acacia victoriae Benth.
Acacia victoriae Benth. subsp. victoriae
Acacia victoriae subsp. victoriae Benth.
Acacia wanyu Tindale
Acacia xanthocarpa R.S.Cowan & Maslin
Accepted name (dwc:acceptedNameUsage)
Actinobole oldfieldianum P.S.Short
Actinobole uliginosum (A.Gray) H.Eichler
Alternanthera angustifolia R.Br.
Alternanthera denticulata R.Br. var. denticulata
Aluta maisonneuvei (F.Muell.) Rye & Trudgen
Aluta maisonneuvei (F.Muell.) Rye & Trudgen subsp. maisonneuvei
Aluta maisonneuvei subsp. auriculata (F.Muell.) Rye & Trudgen
Amyema fitzgeraldii (Blakely) Danser
Amyema gibberula (Tate) Danser var. gibberula
Amyema nestor (S.Moore) Danser
Androcalva luteiflora (E.Pritz.) C.F.Wilkins & Whitlock
Angianthus cyathifer P.S.Short
Angianthus tomentosus J.C.Wendl.
Anthotroche pannosa Endl.
Areocleome oxalidea (F.Muell.) R.L.Barrett & Roalson
Argemone ochroleuca Sweet subsp. ochroleuca
Aristida contorta F.Muell.
Aristida holathera Domin var. holathera
Aristida inaequiglumis Domin
Aristida obscura Henrard
Asteridea chaetopoda (F.Muell.) Kroner
Atriplex amnicola Paul G.Wilson
Atriplex codonocarpa Paul G.Wilson
Atriplex lindleyi subsp. inflata (F.Muell.) Paul G.Wilson
Atriplex semilunaris Aellen
Atriplex vesicaria Benth.
Austrostipa elegantissima (Labill.) S.W.L.Jacobs & J.Everett
Austrostipa nitida (Summerh. & C.E.Hubb.) S.W.L.Jacobs & J.Everett
Austrostipa scabra (Lindl.) S.W.L.Jacobs & J.Everett
Boerhavia repleta Hewson
Brachyscome ciliaris (Labill.) Less.
Brachyscome simulans P.S.Short
Brassica tournefortii Gouan
Brunonia australis R.Br.
Bulbostylis barbata (Rottb.) C.B.Clarke
Calandrinia balonensis Lindl.
Calandrinia creethae Morrison
Calandrinia eremaea Ewart
Calandrinia lehmannii Endl.
Calandrinia monosperma Obbens
Calandrinia papillata Syeda
Calandrinia polyandra Benth.
Calandrinia Ptychosperma F.Muell.
Calandrinia pumila (Benth.) F.Muell.
Calandrinia reticulata Syeda
Calandrinia schistorhiza Morrison
Calandrinia sp. Bungalbin (G.J. Keighery & N. Gibson 1656)
Calandrinia stagnensis J.M.Black
Calandrinia translucens Obbens
Callitris columellaris F.Muell.
Calocephalus beardii P.S.Short
Calocephalus francisii (F.Muell.) Benth.
Calocephalus knappii (F.Muell.) Ewart & Jean White

Accepted Name
Calocephalus multiflorus (Turcz.) Benth.
Calocephalus pilbarensis P.S.Short
Calotis hispidula (F.Muell.) F.Muell.
Calotis multicaulis (Turcz.) Druce
Calotis plumulifera F.Muell.
Calytrix amethystina Craven
Calytrix desolata S.Moore
Calytrix uncinata Craven
Calytrix verruculosa Craven
Cenchrus ciliaris L.
Cenchrus setiger Vahl
Centipeda thespidioides F.Muell.
Centrolepis cephaloformis Reader subsp. cephaloformis
Cephalopterum drummondii A.Gray
Chamelaucium gracile F.Muell.
Chara behriana A.Braun
Cheilanthes lasiophylla Pic.Serm.
Cheilanthes sieberi Kunze subsp. sieberi
Cheilanthes sieberi subsp. sieberi Kunze
Chenopodium gaudichaudianum (Moq.) Paul G.Wilson
Chenopodium murale L.
Chrysocephalum gilesii (F.Muell.) Paul G.Wilson
Chrysocephalum puteale (S.Moore) Paul G.Wilson
Chthonocephalus pseudevax Steetz
Chthonocephalus viscosus P.S.Short
Codonocarpus cotinifolius (Desf.) F.Muell.
Convolvulus clementii Domin
Corymbia candida K.D.Hill & L.A.S.Johnson
Corymbia candida K.D.Hill & L.A.S.Johnson subsp. candida
Corymbia candida subsp. candida K.D.Hill & L.A.S.Johnson
Corymbia ferriticola (Brooker & Edgecombe) K.D.Hill & L.A.S.Johnson
Corymbia lenziana (D.J.Carr & S.G.M.Carr) K.D.Hill & L.A.S.Johnson
Cotula australis (Spreng.) Hook.f.
Crassula colorata var. acuminata (Reader) Toelken
Cullen cinereum (Lindl.) J.W.Grimes
Cuscuta epithymum (L.) L.
Cymbopogon ambiguus (Hack.) A.Camus
Cymbopogon obtectus S.T.Blake
Cynanchum floribundum R.Br.
Cynodon prostratus (C.A.Gardner & C.E.Hubb.) P.M.Peterson
Cyperus betchei subsp. commiscens K.L.Wilson
Cyperus bulbosus Vahl
Cyperus concinnus R.Br.
Cyperus dactyloides Benth.
Cyperus gymnocallos Steud.
Cyperus iria L.
Cyperus squarrosus L.
Dactyloctenium radulans (R.Br.) P.Beauv.
Daucus glochidiatus (Labill.) Fisch., C.A.Mey. & Ave-Lall.
Dichanthium sericeum (R.Br.) A.Camus subsp. sericeum
Dichanthium sericeum subsp. humilium (J.M.Black) B.K.Simon
Dicrastylis sessilifolia Munir
Dielitzia tysonii P.S.Short
Digitaria brownii (Roem. & Schult.) Hughes
Diplachne fusca subsp. muelleri (Benth.) P.M.Peterson & N.Snow
Dissocarpus paradoxus (R.Br.) Ulbr.
Dodonaea pachyneura F.Muell.
Dodonaea petiolaris F.Muell.
Drosera finlaysonianae Arn.

Accepted Name
Drummondita miniata (C.A.Gardner) Paul G.Wilson
Duboisia hopwoodii (F.Muell.) F.Muell.
Duperreya commixta (Staples) Staples
Duperreya sericea Gaudich.
Dysphania glandulosa Paul G.Wilson
Dysphania glomulifera subsp. eremaea Paul G.Wilson
Dysphania kalpari Paul G.Wilson
Dysphania melanocarpa (J.M.Black) Mosyakin & Clemants
Dysphania rhadinostachya (F.Muell.) A.J.Scott
Dysphania rhadinostachya subsp. inflata (Aellen) Paul G.Wilson
Dysphania saxatilis (Paul G.Wilson) Mosyakin & Clemants
Eleocharis pallens S.T.Blake
Enchylaena tomentosa R.Br. var. tomentosa
Enneapogon caeruleus (Gaudich.) N.T.Burb.
Enneapogon polyphyllus (Domin) N.T.Burb.
Eragrostis cumingii Steud.
Eragrostis dielsii Pilg.
Eragrostis eriopoda Benth.
Eragrostis falcata (Gaudich.) Steud.
Eragrostis filicaulis Lazarides
Eragrostis kennedyae F.Turner
Eragrostis lanipes C.E.Hubb.
Eragrostis leptocarpa Benth.
Eragrostis pergracilis S.T.Blake
Eragrostis setifolia Nees
Eragrostis sp. Erect spikelets (P.K. Latz 2122)
Eragrostis tenellula (Kunth) Steud.
Eremophea spinosa (Ewart & O.B.Davies) Paul G.Wilson
Eremophila clarkei A.F.Oldfield & F.Muell.
Eremophila compacta subsp. fecunda Chinnock
Eremophila enata Chinnock
Eremophila eriocalyx F.Muell.
Eremophila exilifolia F.Muell.
Eremophila fasciata Chinnock
Eremophila flabellata Chinnock
Eremophila foliosissima Kraenzl.
Eremophila forrestii F.Muell. subsp. forrestii
Eremophila forrestii subsp. forrestii F.Muell.
Eremophila forrestii subsp. hastieana (W.Fitzg.) Chinnock
Eremophila fraseri F.Muell.
Eremophila fraseri F.Muell. subsp. fraseri
Eremophila fraseri subsp. parva Chinnock
Eremophila freelingii F.Muell.
Eremophila galeata Chinnock
Eremophila georgei Diels
Eremophila gilesii F.Muell.
Eremophila gilesii F.Muell. subsp. gilesii
Eremophila gilesii subsp. variabilis Chinnock
Eremophila glabra (R.Br.) Ostenf. subsp. glabra
Eremophila glabra subsp. tomentosa Chinnock
Eremophila glutinosa Chinnock
Eremophila granitica S.Moore
Eremophila hygrophana Chinnock
Eremophila jucunda Chinnock subsp. jucunda
Eremophila jucunda subsp. jucunda Chinnock
Eremophila jucunda subsp. pulcherrima Chinnock
Eremophila lachnocalyx C.A.Gardner
Eremophila latrobei F.Muell.
Eremophila latrobei F.Muell. subsp. latrobei

Accepted Name
Eremophila latrobei subsp. glabra (L.S.Sm.) Chinnock
Eremophila latrobei subsp. latrobei F.Muell.
Eremophila linearis Chinnock
Eremophila longifolia (R.Br.) F.Muell.
Eremophila mackinlayi subsp. spathulata Chinnock
Eremophila macmillaniana C.A.Gardner
Eremophila maculata subsp. brevifolia (Benth.) Chinnock
Eremophila maitlandii Benth.
Eremophila malacoides Chinnock
Eremophila margarethae S.Moore
Eremophila oppositifolia subsp. angustifolia (S.Moore) Chinnock
Eremophila pantonii F.Muell.
Eremophila phyllopoda Chinnock
Eremophila phyllopoda Chinnock subsp. phyllopoda
Eremophila phyllopoda subsp. phyllopoda Chinnock
Eremophila platycalyx F.Muell.
Eremophila platycalyx F.Muell. subsp. platycalyx
Eremophila platycalyx subsp. Granites (D.J. Edinger & G. Marsh DJE 4782)
Eremophila platycalyx subsp. platycalyx F.Muell.
Eremophila platycalyx subsp. Yalgoo (A. Markey & S. Dillon 3337)
Eremophila pterocarpa W.Fitzg. subsp. pterocarpa
Eremophila punctata Chinnock
Eremophila retropila Chinnock
Eremophila serrulata (A.DC.) Druce
Eremophila setacea Chinnock
Eremophila simulans Chinnock subsp. simulans
Eremophila simulans subsp. lapidensis Chinnock
Eremophila spathulata W.Fitzg.
Eremophila spectabilis C.A.Gardner subsp. spectabilis
Eremophila spectabilis subsp. brevis Chinnock
Eremophila spectabilis subsp. spectabilis C.A.Gardner
Eremophila spuria Chinnock
Eremophila strongylophylla F.Muell.
Eremophila youngii F.Muell. subsp. youngii
Eremophila youngii subsp. youngii F.Muell.
Eriachne aristidea F.Muell.
Eriachne benthamii Hartley
Eriachne flaccida Hartley
Eriachne helmsii Hartley
Eriachne ovata Nees
Eriachne pulchella Domin
Erodium cygnorum Nees
Erymophyllum compactum Paul G.Wilson
Erymophyllum ramosum (A.Gray) Paul G.Wilson
Erymophyllum ramosum (A.Gray) Paul G.Wilson subsp. ramosum
Erymophyllum ramosum subsp. ramosum (A.Gray) Paul G.Wilson
Erymophyllum tenellum (Turcz.) Paul G.Wilson
Eucalyptus brevifolia F.Muell.
Eucalyptus camaldulensis subsp. obtusa (Blakely) Brooker & M.W.McDonald
Eucalyptus camaldulensis subsp. refulgens Brooker & M.W.McDonald
Eucalyptus carnei C.A.Gardner
Eucalyptus kingsmillii (Maiden) Maiden & Blakely
Eucalyptus leptopoda subsp. elevata L.A.S.Johnson & K.D.Hill
Eucalyptus striatocalyx W.Fitzg.
Eucalyptus trivalva Blakely
Eucalyptus vitrix L.A.S.Johnson & K.D.Hill
Eulalia aurea (Bory) Kunth
Euphorbia boophthona C.A.Gardner
Euphorbia porcata Halford & W.K.Harris

Accepted Name
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i> (A.Cunn.) Hassall
<i>Euploca heterantha</i> (F.Muell.) M.W.Frohl. & M.W.Chase
<i>Euploca inexplicita</i> (Craven) M.W.Frohl. & M.W.Chase
<i>Euploca mitchellii</i> (Craven) M.W.Frohl. & M.W.Chase
<i>Euploca ovalifolia</i> (Forssk.) Diane & Hilger
<i>Exocarpos aphyllus</i> R.Br.
<i>Frankenia pauciflora</i> DC.
<i>Frankenia setosa</i> W.Fitzg.
<i>Gilruthia osbornei</i> Ewart & Jean White
<i>Glycine canescens</i> F.J.Herm.
<i>Gnephosis arachnoidea</i> Turcz.
<i>Gnephosis brevifolia</i> (A.Gray) Benth.
<i>Gnephosis tenuissima</i> Cass.
<i>Gomphrena verecunda</i> R.W.Davis
<i>Gonocarpus nodulosus</i> Nees
<i>Goodenia berardiana</i> (Gaudich.) Carolin
<i>Goodenia berringbinensis</i> Carolin
<i>Goodenia collaris</i> (F.Muell.) K.A.Sheph.
<i>Goodenia cynopotamica</i> (F.Muell.) K.A.Sheph.
<i>Goodenia discophora</i> (F.Muell.) K.A.Sheph.
<i>Goodenia glabrata</i> (Carolin) K.A.Sheph.
<i>Goodenia havilandii</i> Maiden & Betche
<i>Goodenia kingiana</i> Carolin
<i>Goodenia macropectra</i> (F.Muell.) Carolin
<i>Goodenia maideniana</i> W.Fitzg.
<i>Goodenia mimuloides</i> S.Moore
<i>Goodenia occidentalis</i> Carolin
<i>Goodenia peacockiana</i> Carolin
<i>Goodenia quasilibera</i> Carolin
<i>Goodenia reinwardtii</i> (de Vriese) K.A.Sheph.
<i>Goodenia rosea</i> (S.Moore) K.A.Sheph.
<i>Goodenia</i> sp. Midwest (K.A. Shepherd & C.F. Wilkins KS 1609)
<i>Goodenia tenuiloba</i> F.Muell.
<i>Goodenia wilunensis</i> Carolin
<i>Grevillea deflexa</i> F.Muell.
<i>Grevillea inconspicua</i> Diels
<i>Grevillea nematophylla</i> subsp. <i>supraplana</i> Makinson
<i>Grevillea sarissa</i> S.Moore
<i>Grevillea sarissa</i> subsp. <i>succincta</i> McGill.
<i>Grevillea stenostachya</i> C.A.Gardner
<i>Grevillea striata</i> R.Br.
<i>Gunniopsis propinqua</i> Chinnock
<i>Gymnema graniticola</i> (P.I.Forst.) P.I.Forst.
<i>Hakea lorea</i> (R.Br.) R.Br.
<i>Hakea loreus</i> subsp. <i>loreus</i> (R.Br.) R.Br.
<i>Hakea preissii</i> Meisn.
<i>Hakea recurva</i> Meisn.
<i>Hakea recurva</i> subsp. <i>arida</i> (Diels) W.R.Barker & R.M.Barker
<i>Halgania cyanea</i> Lindl.
<i>Halgania cyanea</i> var. <i>Allambi</i> Stn (B.W. Strong 676)
<i>Halgania gustafsenii</i> F.Muell.
<i>Haloragis gossei</i> F.Muell.
<i>Haloragis gossei</i> F.Muell. var. <i>gossei</i>
<i>Haloragis odontocarpa</i> F.Muell.
<i>Haloragis odontocarpa</i> forma <i>pterocarpa</i> Orchard
<i>Haloragis trigonocarpa</i> F.Muell.
<i>Hamieria kempeana</i> (F.Muell.) R.M.Barker
<i>Hamieria kempeana</i> subsp. <i>muelleri</i> (R.M.Barker) R.M.Barker
<i>Helipterum craspedioides</i> W.Fitzg.

Accepted Name
Hemigenia tomentosa G.R.Guerin
Hemigenia virescens G.R.Guerin
Hibiscus burtonii F.M.Bailey
Hibiscus sp. Belele (D.W. Goodall 3417)
Hibiscus sp. Gardneri (A.L. Payne PRP 1435)
Hibiscus sturtii Hook.
Hibiscus sturtii var. forrestii F.Muell.
Hibiscus sturtii var. grandiflorus Benth.
Homalocalyx staminosus (F.Muell.) Craven
Hordeum glaucum Steud.
Hyalosperma glutinosum subsp. venustum (S.Moore) Paul G.Wilson
Indigofera brevidens Benth.
Indigofera chamaeclada Peter G.Wilson & Rowe subsp. chamaeclada
Indigofera georgei E.Pritz.
Indigofera kingiana Peter G.Wilson & Rowe
Indigofera monophylla DC.
Indigofera rotula Peter G.Wilson
Ipomoea calobra W.Hill & F.Muell.
Iseilema membranaceum (Lindl.) Domin
Isoetopsis graminifolia Turcz.
Isolepis australiensis (Maiden & Betcher) K.L.Wilson
Isolepis congrua Nees
Isotropis forrestii F.Muell.
Isotropis iophyta Wege & R.W.Davis
Lactuca serriola L.
Lactuca serriola L. forma serriola
Lawrencella davenportii (F.Muell.) Paul G.Wilson
Lawrencella rosea Lindl.
Lawrencia densiflora (Baker f.) Melville
Lawrencia helmsii (F.Muell. & Tate) Lander
Leichhardtia australis R.Br.
Lemooria burkittii (Benth.) P.S.Short
Lemphoria andreaana (F.Muell.) Al-Shehbaz & Lysak
Lepidium echinatum Hewson
Lepidium muelleri-ferdinandi Thell.
Lepidium oxytrichum Sprague
Lepidium phlebopetalum (F.Muell.) F.Muell.
Lepidium platypetalum Hewson
Lepidium xylodes Hewson
Leptosema chambersii F.Muell.
Levenhookia chippendalei F.L.Erickson & J.H.Willis
Levenhookia leptantha Benth.
Lobelia heterophylla Labill.
Lobelia heterophylla Labill. subsp. heterophylla
Lotus cruentus Court
Lysiana murrayi (F.Muell. & Tate) Tiegh.
Macgregoria racemigera F.Muell.
Maireana amoena (Diels) Paul G.Wilson
Maireana carnososa (Moq.) Paul G.Wilson
Maireana convexa Paul G.Wilson
Maireana georgei (Diels) Paul G.Wilson
Maireana melanocoma (F.Muell.) Paul G.Wilson
Maireana planifolia (F.Muell.) Paul G.Wilson
Maireana pyramidata (Benth.) Paul G.Wilson
Maireana thesioides (C.A.Gardner) Paul G.Wilson
Maireana tomentosa Moq.
Maireana tomentosa subsp. tomentosa Moq.
Maireana trichoptera (J.M.Black) Paul G.Wilson
Maireana triptera (Benth.) Paul G.Wilson

Accepted Name
Maireana villosa (Lindl.) Paul G.Wilson
Malva parviflora L.
Marsilea drummondii A.Braun
Marsilea hirsuta R.Br.
Menkea australis Lehm.
Menkea draboides (Hook.f.) Benth.
Menkea sphaerocarpa F.Muell.
Menkea villosula (F.Muell. & Tate) J.M.Black
Micromyrtus sulphurea W.Fitzg.
Millotia perpusilla (Turcz.) P.S.Short
Minuria leptophylla DC.
Mirbelia microphylla (Turcz.) Benth.
Mirbelia rhagodioides Crisp & J.M.Taylor
Monachather paradoxus Steud.
Muelleranthus trifoliolatus (F.Muell.) A.T.Lee
Myoporum montanum R.Br.
Myriocephalus gueriniae F.Muell.
Myriocephalus oldfieldii (F.Muell.) Paul G.Wilson
Myriocephalus pygmaeus (A.Gray) P.S.Short
Myriocephalus rudallii Benth.
Nelica maderaspatensis (L.) Raf.
Neurachne alopecuroidea R.Br.
Neurachne minor S.T.Blake
Nicotiana cavicola N.T.Burb.
Nicotiana gascoynica M.W.Chase & Christenh.
Nicotiana murchisonica M.W.Chase & Christenh.
Nicotiana obliqua (N.T.Burb.) M.W.Chase & Christenh.
Nicotiana pila M.W.Chase & Christenh.
Nicotiana rosulata (S.Moore) Domin
Nicotiana rotundifolia Lindl.
Nicotiana simulans N.T.Burb.
Nicotiana stenocarpa H.-M.Wheeler
Olearia stuartii (F.Muell.) Benth.
Ophioglossum lusitanicum L.
Opuntia stricta (Haw.) Haw.
Papaver hybridum L.
Parietaria cardiostegia Greuter
Paspalidium clementii (Domin) C.E.Hubb.
Paspalidium gracile (R.Br.) Hughes
Peplidium aithocheilum W.R.Barker
Peplidium sp. C Evol. Fl. Fauna Arid Aust. (N.T. Burbidge & A. Kanis 8158)
Pigea floribunda Lindl.
Pimelea microcephala R.Br.
Pimelea microcephala R.Br. subsp. microcephala
Pimelea microcephala subsp. microcephala R.Br.
Pimelea trichostachya Lindl.
Pittosporum angustifolium Lodd., G.Lodd. & W.Lodd.
Plantago drummondii Decne.
Pluchea dentex Benth.
Podolepis gardneri G.L.Davis
Pogonolepis stricta Steetz
Polycarpaea corymbosa (L.) Lam.
Portulaca cyclophylla F.Muell.
Portulaca oleracea L.
Portulaca pilosa L.
Prostanthera albiflora B.J.Conn
Prostanthera campbellii F.Muell.
Prostanthera wilkieana F.Muell.
Psyrax latifolia (Benth.) S.T.Reynolds & R.J.F.Hend.

Accepted Name
Psydrax rigidula S.T.Reynolds & R.J.F.Hend.
Psydrax suaveolens (S.Moore) S.T.Reynolds & R.J.F.Hend.
Ptilotus actinocladus T.Hammer & R.W.Davis
Ptilotus aervoides (F.Muell.) F.Muell.
Ptilotus albidus (C.A.Gardner) Benl
Ptilotus chamaecladus Diels
Ptilotus divaricatus (Gaudich.) F.Muell.
Ptilotus drummondii var. minor (Nees) Benl
Ptilotus exaltatus Nees
Ptilotus gaudichaudii (Steud.) J.M.Black
Ptilotus gomphrenoides Benth.
Ptilotus grandiflorus F.Muell.
Ptilotus helipteroides (F.Muell.) F.Muell.
Ptilotus lazaridis Benl
Ptilotus luteolus (Benl & H.Eichler) R.W.Davis
Ptilotus macrocephalus (R.Br.) Poir.
Ptilotus nobilis (Lindl.) F.Muell.
Ptilotus obovatus (Gaudich.) F.Muell.
Ptilotus obovatus (Gaudich.) F.Muell. var. obovatus
Ptilotus polystachyus (Gaudich.) F.Muell.
Ptilotus roei (Benth.) F.Muell.
Ptilotus rotundifolius (F.Muell.) F.Muell.
Ptilotus schwartzii (F.Muell.) Tate
Ptilotus schwartzii Tate var. schwartzii
Ptilotus xerophilus T.Hammer & R.W.Davis
Rhodanthe battii (F.Muell.) Paul G.Wilson
Rhodanthe charsleyae (F.Muell.) Paul G.Wilson
Rhodanthe chlorocephala subsp. rosea (Hook.) Paul G.Wilson
Rhodanthe chlorocephala subsp. splendida (Hemsl.) Paul G.Wilson
Rhodanthe citrina (Benth.) Paul G.Wilson
Rhodanthe floribunda (DC.) Paul G.Wilson
Rhodanthe humboldtiana (Gaudich.) Paul G.Wilson
Rhodanthe maryonii (S.Moore) Paul G.Wilson
Rhodanthe propinqua (W.Fitzg.) Paul G.Wilson
Rhodanthe sphaerocephala Paul G.Wilson
Rhodanthe sterilescens (F.Muell.) Paul G.Wilson
Rhodanthe stricta (Lindl.) Paul G.Wilson
Roebuckiella cheilocarpa (F.Muell.) P.S.Short var. cheilocarpa
Roebuckiella cilicarpa (W.Fitzg.) P.S.Short
Roebuckiella oncocarpa (Diels) P.S.Short
Roebuckiella similis (P.S.Short) P.S.Short
Roepera aurantiaca Lindl. subsp. aurantiaca
Roepera eichleri (R.M.Barker) Beier & Thulin
Roepera kochii (Tate) Beier & Thulin
Roepera tetraptera (R.M.Barker) Beier & Thulin
Rostraria pumila (Desf.) Tzvelev
Rumex vesicarius L.
Salsola australis R.Br.
Samolus repens (J.R.Forst. & G.Forst.) Pers.
Santalum lanceolatum R.Br.
Santalum spicatum (R.Br.) A.DC.
Scaevola spinescens R.Br.
Scaevola tomentosa Gaudich.
Schinus molle var. areira (L.) DC.
Schismus arabicus Nees
Schoenia ayersii (F.Muell.) J.M.Black
Schoenia cassiniana (Gaudich.) Steetz
Schoenoplectiella dissachantha (S.T.Blake) Lye
Sclerolaena burbridgeae (Ising) A.J.Scott

Accepted Name
<i>Sclerolaena cuneata</i> Paul G.Wilson
<i>Sclerolaena densiflora</i> (W.Fitzg.) A.J.Scott
<i>Sclerolaena deserticola</i> Paul G.Wilson
<i>Sclerolaena diacantha</i> (Nees) Benth.
<i>Sclerolaena divaricata</i> (R.Br.) Domin
<i>Sclerolaena eriacantha</i> (F.Muell.) Ulbr.
<i>Sclerolaena fimbriolata</i> (F.Muell.) A.J.Scott
<i>Sclerolaena gardneri</i> (Ising) A.J.Scott
<i>Sclerolaena glabra</i> (F.Muell.) Domin
<i>Sclerolaena lanicuspis</i> (F.Muell.) Benth.
<i>Sclerolaena patentispis</i> (R.H.Anderson) Ulbr.
<i>Sclerolaena tetragona</i> Paul G.Wilson
<i>Senecio glossanthus</i> (Sond.) Belcher
<i>Senna artemisioides</i> (DC.) Randell
<i>Senna artemisioides</i> subsp. <i>filifolia</i> Randell
<i>Senna artemisioides</i> subsp. <i>helmsii</i> (Symon) Randell
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> (F.Muell.) Randell
<i>Senna artemisioides</i> subsp. <i>x artemisioides</i> (DC.) Randell
<i>Senna artemisioides</i> subsp. <i>x petiolaris</i> Randell
<i>Senna artemisioides</i> subsp. <i>x sturtii</i> (R.Br.) Randell
<i>Senna artemisioides</i> subsp. <i>zygophylla</i> (Benth.) Randell
<i>Senna charlesiana</i> (Symon) Randell
<i>Senna glaucifolia</i> (Randell) Randell
<i>Senna glutinosa</i> (DC.) Randell
<i>Senna glutinosa</i> subsp. <i>chatelainiana</i> (Gaudich.) Randell
<i>Senna glutinosa</i> subsp. <i>pruinosa</i> (F.Muell.) Randell
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i> (Domin) Randell
<i>Senna pleurocarpa</i> var. <i>pleurocarpa</i> (F.Muell.) Randell
<i>Senna</i> sp. Austin (A. Strid 20210)
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)
<i>Senna stricta</i> (Randell) Randell
<i>Seringia exastia</i> (C.F.Wilkins) C.F.Wilkins & Whitlock
<i>Setaria dielsii</i> R.A.W.Herm.
<i>Sida ammophila</i> J.H.Willis
<i>Sida calyxhymenia</i> DC.
<i>Sida ectogama</i> W.R.Barker & R.M.Barker
<i>Sida fibulifera</i> Lindl.
<i>Sida intricata</i> F.Muell.
<i>Sida petrophila</i> F.Muell.
<i>Sida platycalyx</i> Benth.
<i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)
<i>Siemssenia capillaris</i> Steetz
<i>Sisymbrium erysimoides</i> Desf.
<i>Sisymbrium irio</i> L.
<i>Sisymbrium orientale</i> L.
<i>Solanum austropiceum</i> A.R.Bean
<i>Solanum lachnophyllum</i> Symon
<i>Solanum lasiophyllum</i> Poir.
<i>Solanum nigrum</i> L.
<i>Solanum orbiculatum</i> Poir.
<i>Solanum orbiculatum</i> Poir. subsp. <i>orbiculatum</i>
<i>Solanum sturtianum</i> F.Muell.
<i>Sonchus oleraceus</i> L.
<i>Spergularia marina</i> (L.) Besser
<i>Sporobolus australasicus</i> Domin
<i>Stackhousia muricata</i> Lindl.
<i>Stenanthemum petraeum</i> Rye
<i>Stenopetalum anfractum</i> E.A.Shaw
<i>Stenopetalum filifolium</i> Benth.

Accepted Name
<i>Stenopetalum lineare</i> DC. var. <i>lineare</i>
<i>Stenopetalum nutans</i> F.Muell.
<i>Stenopetalum pedicellare</i> Benth.
<i>Stenopetalum sphaerocarpum</i> F.Muell.
<i>Streptoglossa cylindriceps</i> (J.M.Black) Dunlop
<i>Streptoglossa liatroides</i> (Turcz.) Dunlop
<i>Stylidium longibracteatum</i> Carlquist
<i>Stylobasium spathulatum</i> Desf.
<i>Swainsona affinis</i> (A.T.Lee) Joy Thomps.
<i>Swainsona canescens</i> (Lindl.) F.Muell.
<i>Swainsona elegans</i> A.T.Lee
<i>Swainsona elegantoides</i> (A.T.Lee) Joy Thomps.
<i>Swainsona formosa</i> (G.Don) Joy Thomps.
<i>Swainsona gracilis</i> Benth.
<i>Swainsona kingii</i> F.Muell.
<i>Swainsona leeana</i> J.Z.Weber
<i>Swainsona oroboides</i> Benth.
<i>Swainsona paucifoliolata</i> Joy Thomps.
<i>Swainsona pedunculata</i> A.T.Lee
<i>Swainsona pterostylis</i> (DC.) Bakh.f.
<i>Swainsona tenuis</i> E.Pritz.
<i>Synaptantha tillaeacea</i> (F.Muell.) Hook.f.
<i>Synaptantha tillaeacea</i> (F.Muell.) Hook.f. var. <i>tillaeacea</i>
<i>Taplinia saxatilis</i> Lander
<i>Tecticornia cymbiformis</i> K.A.Sheph. & Paul G.Wilson
<i>Tecticornia disarticulata</i> (Paul G.Wilson) K.A.Sheph. & Paul G.Wilson
<i>Tecticornia doliiformis</i> (Paul G.Wilson) K.A.Sheph. & Paul G.Wilson
<i>Tecticornia indica</i> subsp. <i>bidens</i> (Nees) K.A.Sheph. & Paul G.Wilson
<i>Tecticornia</i> sp. Yoothapina Station (A.A. Mitchell 883)
<i>Tetragonia cristata</i> A.M.Prescott
<i>Tetragonia moorei</i> M.Gray
<i>Teucrium teucriiflorum</i> (F.Muell.) Kattari & Salmaki
<i>Themeda avenacea</i> (F.Muell.) Maiden & Betcher
<i>Themeda triandra</i> Forssk.
<i>Thryptomene decussata</i> (W.Fitzg.) J.W.Green
<i>Thyridolepis multiculmis</i> (Pilg.) S.T.Blake
<i>Thysanotus manglesianus</i> Kunth
<i>Thysanotus</i> sp. Eremaean (S. van Leeuwen 1067)
<i>Thysanotus speckii</i> Brittan
<i>Trachymene ornata</i> (Endl.) Druce
<i>Tragus australianus</i> S.T.Blake
<i>Trianthema glossostigma</i> F.Muell.
<i>Trianthema triquetrum</i> Willd.
<i>Tribulus astrocarpus</i> F.Muell.
<i>Tribulus forrestii</i> F.Muell.
<i>Tribulus platypterus</i> Benth.
<i>Tribulus suberosus</i> R.M.Barker
<i>Trichanthodium skirrophorum</i> Sond.
<i>Trichodesma zeylanicum</i> (Burm.f.) R.Br.
<i>Trichodesma zeylanicum</i> (Burm.f.) R.Br. var. <i>zeylanicum</i>
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i> (Burm.f.) R.Br.
<i>Triglochin isingiana</i> (J.M.Black) Aston
<i>Triglochin mucronata</i> R.Br.
<i>Triodia melvillei</i> (C.E.Hubb.) Lazarides
<i>Tripogonella liliiformis</i> (F.Muell.) P.M.Peterson & Romasch.
<i>Verticordia interioris</i> A.S.George
<i>Vincetoxicum lineare</i> (Decne.) Meve & Liede
<i>Wahlenbergia tumidiflora</i> P.J.Sm.
<i>Waitzia acuminata</i> Steetz

Accepted Name
<i>Waitzia acuminata</i> Steetz var. <i>acuminata</i>
<i>Walshia kendallii</i> (F.Muell.) Jeanes
<i>Wurmbea densiflora</i> (Benth.) T.Macfarlane
<i>Wurmbea tenella</i> (Endl.) Benth.

Terrestrial Fauna

Accepted Name	Kingdom	Phylum	Class
<i>Cyclorana occidentalis</i>	Animalia	Chordata	Amphibia
<i>Litoria rubella</i>	Animalia	Chordata	Amphibia

Accepted Name	Kingdom	Phylum	Class	Common name
<i>Manorina (Myzantha) flavigula</i>	Animalia	Chordata	Aves	Yellow-throated Miner
<i>Taeniopygia guttata</i>	Animalia	Chordata	Aves	Zebra Finch
<i>Grallina cyanoleuca</i>	Animalia	Chordata	Aves	Magpie-lark
<i>Ptilotula penicillata</i>	Animalia	Chordata	Aves	White-plumed Honeyeater
<i>Gavicalis virescens</i>	Animalia	Chordata	Aves	Singing Honeyeater
<i>Acanthagenys rufogularis</i>	Animalia	Chordata	Aves	Spiny-cheeked Honeyeater
<i>Aquila (Uroaetus) audax</i>	Animalia	Chordata	Aves	Wedge-tailed Eagle
<i>Rhipidura (Sauloprocta) leucophrys</i>	Animalia	Chordata	Aves	Willie Wagtail
<i>Ocyphaps lophotes</i>	Animalia	Chordata	Aves	Crested Pigeon
<i>Haliastur spheurnus</i>	Animalia	Chordata	Aves	Whistling Kite
<i>Corvus bennetti</i>	Animalia	Chordata	Aves	Little Crow
<i>Oreocia gutturalis</i>	Animalia	Chordata	Aves	Crested Bellbird
<i>Artamus (Angroyan) cinereus</i>	Animalia	Chordata	Aves	Black-faced Woodswallow
<i>Corvus orru</i>	Animalia	Chordata	Aves	Torresian Crow
<i>Gymnorhina tibicen</i>	Animalia	Chordata	Aves	Australian Magpie
<i>Falco (Tinnunculus) cenchroides</i>	Animalia	Chordata	Aves	Nankeen Kestrel
<i>Cracticus nigrogularis</i>	Animalia	Chordata	Aves	Pied Butcherbird
<i>Hirundo (Hirundo) neoxena</i>	Animalia	Chordata	Aves	Welcome Swallow
<i>Anthus (Anthus) novaeseelandiae</i>	Animalia	Chordata	Aves	Australian Pipit
<i>Petrochelidon (Hylochelidon) nigricans</i>	Animalia	Chordata	Aves	Tree Martin
<i>Eolophus roseicapilla</i>	Animalia	Chordata	Aves	Galah
<i>Chlamydera guttata</i>	Animalia	Chordata	Aves	Western Bowerbird
<i>Petroica (Petroica) goodenovii</i>	Animalia	Chordata	Aves	Red-capped Robin
<i>Dromaius novaehollandiae</i>	Animalia	Chordata	Aves	Emu
<i>Acanthiza (Geobasileus) uropygialis</i>	Animalia	Chordata	Aves	Chestnut-rumped Thornbill
<i>Melopsittacus undulatus</i>	Animalia	Chordata	Aves	Budgerigar
<i>Cracticus torquatus</i>	Animalia	Chordata	Aves	Grey Butcherbird
<i>Falco (Ieracidea) berigora</i>	Animalia	Chordata	Aves	Brown Falcon
<i>Pachycephala (Alisterornis) rufiventris</i>	Animalia	Chordata	Aves	Rufous Whistler
<i>Colluricincla (Colluricincla) harmonica</i>	Animalia	Chordata	Aves	Grey Shrike-thrush
<i>Pomatostomus (Pomatostomus) temporalis</i>	Animalia	Chordata	Aves	Grey-crowned Babbler
<i>Barnardius zonarius</i>	Animalia	Chordata	Aves	Australian Ringneck
<i>Elseymornis melanops</i>	Animalia	Chordata	Aves	Black-fronted Dotterel
<i>Coracina (Coracina) novaehollandiae</i>	Animalia	Chordata	Aves	Black-faced Cuckoo-shrike
<i>Pomatostomus (Morganornis) superciliosus</i>	Animalia	Chordata	Aves	White-browed Babbler
<i>Cincloramphus (MacLennania) mathewsi</i>	Animalia	Chordata	Aves	Rufous Songlark
<i>Aphelocephala leucopsis</i>	Animalia	Chordata	Aves	Southern Whiteface
<i>Falco (Falco) longipennis</i>	Animalia	Chordata	Aves	Australian Hobby
<i>Melanodryas (Melanodryas) cucullata</i>	Animalia	Chordata	Aves	Hooded Robin
<i>Anas gracilis</i>	Animalia	Chordata	Aves	Grey Teal
<i>Epthianura (Parepthianura) tricolor</i>	Animalia	Chordata	Aves	Crimson Chat
<i>Geopelia cuneata</i>	Animalia	Chordata	Aves	Diamond Dove
<i>Anas (Anas) superciliosa</i>	Animalia	Chordata	Aves	Pacific Black Duck
<i>Artamus (Campbellornis) personatus</i>	Animalia	Chordata	Aves	Masked Woodswallow
<i>Tadorna (Casarca) tadornoides</i>	Animalia	Chordata	Aves	Australian Shelduck
<i>Nymphicus hollandicus</i>	Animalia	Chordata	Aves	Cockatiel
<i>Dicaeum (Dicaeum) hirundinaceum</i>	Animalia	Chordata	Aves	Mistletoebird

Accepted Name	Kingdom	Phylum	Class	Common name
<i>Acanthiza (Milligania) robustirostris</i>	Animalia	Chordata	Aves	Slaty-backed Thornbill
<i>Egretta novaehollandiae</i>	Animalia	Chordata	Aves	White-faced Heron
<i>Acanthiza (Geobasileus) chrysorrhoa</i>	Animalia	Chordata	Aves	Yellow-rumped Thornbill
<i>Todiramphus (Cyanalcyon) pyrrhopygius</i>	Animalia	Chordata	Aves	Red-backed Kingfisher
<i>Cinchoramphus (Cinchoramphus) cruralis</i>	Animalia	Chordata	Aves	Brown Songlark
<i>Phaps (Phaps) chalcoptera</i>	Animalia	Chordata	Aves	Common Bronzewing
<i>Malurus (Leggeornis) assimilis</i>	Animalia	Chordata	Aves	Purple-backed Fairy-wren
<i>Psophodes (Sphenostoma) occidentalis</i>	Animalia	Chordata	Aves	Chiming Wedgebill
<i>Poliiocephalus poliocephalus</i>	Animalia	Chordata	Aves	Hoary-headed Grebe
<i>Malurus (Malurus) splendens</i>	Animalia	Chordata	Aves	Splendid Fairy-wren
<i>Cinclosoma (Samuela) marginatum</i>	Animalia	Chordata	Aves	Western Quail-thrush
<i>Milvus migrans</i>	Animalia	Chordata	Aves	Black Kite
<i>Cheramoeca leucosterna</i>	Animalia	Chordata	Aves	White-backed Swallow
<i>Psephotellus varius</i>	Animalia	Chordata	Aves	Mulga Parrot
<i>Fulica atra</i>	Animalia	Chordata	Aves	Eurasian Coot
<i>Ardea pacifica</i>	Animalia	Chordata	Aves	White-necked Heron
<i>Malacorhynchus membranaceus</i>	Animalia	Chordata	Aves	Pink-eared Duck
<i>Petrochelidon (Petrochelidon) ariel</i>	Animalia	Chordata	Aves	Fairy Martin
<i>Purnella albifrons</i>	Animalia	Chordata	Aves	White-fronted Honeyeater
<i>Todiramphus (Todiramphus) sanctus</i>	Animalia	Chordata	Aves	Sacred Kingfisher
<i>Malurus (Leggeornis) lamberti</i>	Animalia	Chordata	Aves	Variegated Fairy-wren
<i>Gelochelidon nilotica</i>	Animalia	Chordata	Aves	Gull-billed Tern
<i>Cinclosoma (Samuela) castaneothorax</i>	Animalia	Chordata	Aves	Chestnut-breasted Quail-thrush
<i>Certhionyx (Certhionyx) variegatus</i>	Animalia	Chordata	Aves	Pied Honeyeater
<i>Aythya (Nyroca) australis</i>	Animalia	Chordata	Aves	Hardhead
<i>Hieraaetus (Hieraaetus) morphnoides</i>	Animalia	Chordata	Aves	Little Eagle
<i>Cygnus atratus</i>	Animalia	Chordata	Aves	Black Swan
<i>Cladorhynchus leucocephalus</i>	Animalia	Chordata	Aves	Banded Stilt
<i>Neopsephotus bourkii</i>	Animalia	Chordata	Aves	Bourke's Parrot
<i>Chenonetta jubata</i>	Animalia	Chordata	Aves	Australian Wood Duck
<i>Malurus (Musciparus) leucopterus</i>	Animalia	Chordata	Aves	White-winged Fairy-wren
<i>Gerygone fusca</i>	Animalia	Chordata	Aves	Western Gerygone
<i>Podargus strigoides</i>	Animalia	Chordata	Aves	Tawny Frogmouth
<i>Merops (Merops) ornatus</i>	Animalia	Chordata	Aves	Rainbow Bee-eater
<i>Himantopus himantopus</i>	Animalia	Chordata	Aves	Black-winged Stilt
<i>Aphelocephala nigricincta</i>	Animalia	Chordata	Aves	Banded Whiteface
<i>Tachybaptus novaehollandiae</i>	Animalia	Chordata	Aves	Australasian Grebe
<i>Heteroscenes pallidus</i>	Animalia	Chordata	Aves	Pallid Cuckoo
<i>Accipiter (Paraspizias) cirrocephalus</i>	Animalia	Chordata	Aves	Collared Sparrowhawk
<i>Falco (Hierofalco) peregrinus</i>	Animalia	Chordata	Aves	Peregrine Falcon
<i>Cacatua (Licmetis) sanguinea</i>	Animalia	Chordata	Aves	Little Corella
<i>Circus assimilis</i>	Animalia	Chordata	Aves	Spotted Harrier
<i>Rhipidura (Rhipidura) albiscapa</i>	Animalia	Chordata	Aves	Grey Fantail
<i>Sugomel niger</i>	Animalia	Chordata	Aves	Black Honeyeater
<i>Columba (Columba) livia</i>	Animalia	Chordata	Aves	Rock Dove
<i>Coracina (Pteropodocys) maxima</i>	Animalia	Chordata	Aves	Ground Cuckoo-shrike
<i>Aegotheles (Aegotheles) cristatus</i>	Animalia	Chordata	Aves	Australian Owlet-nightjar
<i>Calidris (Erolia) acuminata</i>	Animalia	Chordata	Aves	Sharp-tailed Sandpiper
<i>Epthianura (Aurepthianura) aurifrons</i>	Animalia	Chordata	Aves	Orange Chat
<i>Microcarbo melanoleucos</i>	Animalia	Chordata	Aves	Little Pied Cormorant
<i>Ardeotis australis</i>	Animalia	Chordata	Aves	Australian Bustard
<i>Erythronyx cinctus</i>	Animalia	Chordata	Aves	Red-kneed Dotterel
<i>Acanthiza (Geobasileus) iredalei</i>	Animalia	Chordata	Aves	Slender-billed Thornbill
<i>Tringa (Rhyacophilus) glareola</i>	Animalia	Chordata	Aves	Wood Sandpiper
<i>Microeca (Microeca) fascians</i>	Animalia	Chordata	Aves	Jacky Winter
<i>Ptilotula plumula</i>	Animalia	Chordata	Aves	Grey-fronted Honeyeater
<i>Calidris (Ereunetes) ruficollis</i>	Animalia	Chordata	Aves	Red-necked Stint
<i>Platalea (Platibis) flavipes</i>	Animalia	Chordata	Aves	Yellow-billed Spoonbill
<i>Tribonyx ventralis</i>	Animalia	Chordata	Aves	Black-tailed Native-hen

Accepted Name	Kingdom	Phylum	Class	Common name
<i>Falco (Hierofalco) hypoleucos</i>	Animalia	Chordata	Aves	Grey Falcon
<i>Acanthiza (Acanthiza) apicalis</i>	Animalia	Chordata	Aves	Red-rumped Tit
<i>Chlidonias (Pelodes) hybrida</i>	Animalia	Chordata	Aves	Whiskered Tern
<i>Chalcites osculans</i>	Animalia	Chordata	Aves	Black-eared Cuckoo
<i>Corvus coronoides</i>	Animalia	Chordata	Aves	Australian Raven
<i>Ninox (Ninox) novaeseelandiae</i>	Animalia	Chordata	Aves	Southern Boobook
<i>Artamus (Angroyan) minor</i>	Animalia	Chordata	Aves	Little Woodswallow
<i>Daphoenositta (Neositta) chrysoptera</i>	Animalia	Chordata	Aves	Varied Sittella
<i>Hamirostra melanostemon</i>	Animalia	Chordata	Aves	Black-breasted Buzzard
<i>Turnix (Alphatumia) velox</i>	Animalia	Chordata	Aves	Little Button-quail
<i>Pyrrholaemus brunneus</i>	Animalia	Chordata	Aves	Redthroat
<i>Charadrius (Eupoda) veredus</i>	Animalia	Chordata	Aves	Oriental Plover
<i>Lichmera (Lichmera) indistincta</i>	Animalia	Chordata	Aves	Brown Honeyeater
<i>Porzana (Porzana) fluminea</i>	Animalia	Chordata	Aves	Australian Spotted Crane
<i>Burhinus (Burhinus) grallarius</i>	Animalia	Chordata	Aves	Bush Stone-curlew
<i>Chalcites basalis</i>	Animalia	Chordata	Aves	Horsfield's Bronze-cuckoo
<i>Tringa (Glottis) nebularia</i>	Animalia	Chordata	Aves	Common Greenshank
<i>Nycticorax caledonicus</i>	Animalia	Chordata	Aves	Nankeen Night-heron
<i>Chroicocephalus novaehollandiae</i>	Animalia	Chordata	Aves	Silver Gull
<i>Pardalotus (Pardalotinus) striatus</i>	Animalia	Chordata	Aves	Striated Pardalote
<i>Elanus axillaris</i>	Animalia	Chordata	Aves	Black-shouldered Kite
<i>Calidris (Erolia) ferruginea</i>	Animalia	Chordata	Aves	Curlew Sandpiper
<i>Vanellus (Lobivanellus) tricolor</i>	Animalia	Chordata	Aves	Banded Lapwing

Accepted Name	Kingdom	Phylum	Class
<i>Antechinomys laniger</i> (Gould, 1856)	Animalia	Chordata	Mammalia
<i>Antechinomys longicaudatus</i> (Spencer, 1909)	Animalia	Chordata	Mammalia
<i>Bettongia anhydra</i> Finlayson, 1957	Animalia	Chordata	Mammalia
<i>Felis catus</i> Linnaeus, 1758	Animalia	Chordata	Mammalia
<i>Notomys alexis</i> Thomas, 1922	Animalia	Chordata	Mammalia
<i>Osphranter rufus</i> Desmarest, 1822	Animalia	Chordata	Mammalia
<i>Nyctophilus geoffroyi</i> Leach, 1821	Animalia	Chordata	Mammalia
<i>Pseudantechinus woolleyae</i> Kitchener & Caputi, 1988	Animalia	Chordata	Mammalia
<i>Sminthopsis crassicaudata</i> (Gould, 1844)	Animalia	Chordata	Mammalia
<i>Vespadelus baverstocki</i> (Kitchener, Jones & Caputi, 1987)	Animalia	Chordata	Mammalia
<i>Vespadelus finlaysoni</i> (Kitchener, Jones & Caputi, 1987)	Animalia	Chordata	Mammalia
<i>Vulpes vulpes</i> Linnaeus, 1758	Animalia	Chordata	Mammalia

Accepted Name	Kingdom	Phylum	Class
<i>Anilius grypys</i> (Waite, 1918)	Animalia	Chordata	Reptilia
<i>Antaresia childreni</i> (Gray, 1842)	Animalia	Chordata	Reptilia
<i>Brachyurophis approximans</i> (Glauert, 1954)	Animalia	Chordata	Reptilia
<i>Chelodina steindachneri</i> Siebenrock, 1901	Animalia	Chordata	Reptilia
<i>Ctenophorus caudicinctus</i> (Günther, 1875)	Animalia	Chordata	Reptilia
<i>Ctenophorus nuchalis</i> (De Vis, 1884)	Animalia	Chordata	Reptilia
<i>Ctenophorus reticulatus</i> (Gray, 1845)	Animalia	Chordata	Reptilia
<i>Ctenophorus scutulatus</i> (Stirling & Zietz, 1893)	Animalia	Chordata	Reptilia
<i>Ctenotus helenae</i> Storr, 1969	Animalia	Chordata	Reptilia
<i>Ctenotus leonhardii</i> (Sternfeld, 1919)	Animalia	Chordata	Reptilia
<i>Demansia reticulata</i> (Gray, 1842)	Animalia	Chordata	Reptilia
<i>Diplodactylus pulcher</i> Steindachner, 1870	Animalia	Chordata	Reptilia
<i>Egernia depressa</i> (Günther, 1875)	Animalia	Chordata	Reptilia
<i>Eremiascincus richardsonii</i> (Gray, 1845)	Animalia	Chordata	Reptilia
<i>Gehyra crypta</i> Kealley, Doughty, Pepper, Keogh, Hillyer & Huey, 2018	Animalia	Chordata	Reptilia
<i>Gehyra polka</i> Doughty, Bauer, Pepper, Keogh & Ellis, 2018	Animalia	Chordata	Reptilia
<i>Gehyra variegata</i> (Duméril & Bibron, 1836)	Animalia	Chordata	Reptilia
<i>Gowidon longirostris</i> (Boulenger, 1883)	Animalia	Chordata	Reptilia
<i>Heteronotia binoei</i> (Gray, 1845)	Animalia	Chordata	Reptilia
<i>Lerista eupoda</i> Smith, 1996	Animalia	Chordata	Reptilia

Accepted Name	Kingdom	Phylum	Class
Lerista macropisthopus fusciceps Storr, 1991	Animalia	Chordata	Reptilia
Lerista timida (de Vis, 1888)	Animalia	Chordata	Reptilia
Lucasium squarrosum (Kluge, 1962)	Animalia	Chordata	Reptilia
Menetia greyii Gray, 1845	Animalia	Chordata	Reptilia
Nephrurus wheeleri Loveridge, 1932	Animalia	Chordata	Reptilia
Nephrurus wheeleri wheeleri Loveridge, 1932	Animalia	Chordata	Reptilia
Pseudonaja mengdeni Wells & Wellington, 1985	Animalia	Chordata	Reptilia
Pseudonaja modesta (Günther, 1872)	Animalia	Chordata	Reptilia
Strophurus wellingtonae (Storr, 1988)	Animalia	Chordata	Reptilia
Suta fasciata Rosen, 1905	Animalia	Chordata	Reptilia
Suta monachus (Storr, 1964)	Animalia	Chordata	Reptilia
Tympanocryptis pseudopsephos Doughty, Kealley, Shoo & Melville, 2015	Animalia	Chordata	Reptilia
Varanus caudolineatus Boulenger, 1885	Animalia	Chordata	Reptilia
Varanus panoptes rubidus Storr, 1980	Animalia	Chordata	Reptilia
Varanus panoptes Storr, 1980	Animalia	Chordata	Reptilia

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



Australian Government

Department of Climate Change, Energy,
the Environment and Water

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: 02-May-2025

[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:	6
Listed Migratory Species:	7

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:	9
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:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	1
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 likely 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 may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area

Listed Migratory Species

[Resource Information]

Scientific Name	Threatened Category	Presence Text
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
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 may 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 may 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 may 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 may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
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

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
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 is 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 on the contents of this report.

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 point locations and environmental data layers.

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 when time permits.

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 breeding sites; and
- 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.

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APPENDIX G:
RECONNAISSANCE FLORA AND
VEGETATION SURVEY L 51/98
AND M 51/322 (NVS 2019)



Reconnaissance
Flora and Vegetation Survey of the
Sabbath Mining Project- March 2019

Prepared for



FINAL V2.0
April 2019

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1 INTRODUCTION

Big Bell Gold Operations Pty Ltd (BBGO), a subsidiary of West Gold Resources Ltd (WGX), is planning to develop the Sabbath Project (Sabbath) as a component of the Central Murchison Gold Project (CMGP). The CMGP is located approximately 15 km southwest of Meekatharra, in the northern goldfields of Western Australia. The Sabbath deposit is located approximately 8.3km north of Meekatharra (Figure 1).

BBGO commissioned Native Vegetation Solutions (NVS) to complete a reconnaissance Flora and Vegetation survey of Sabbath Project area on the 28th March 2019. A survey area which contains the conceptual disturbance footprint and associated infrastructure was provided by BBGO to NVS, covering an area of approximately 146.86 hectares.

The survey area is shown in Figures 1 & 2 and Appendix 4.

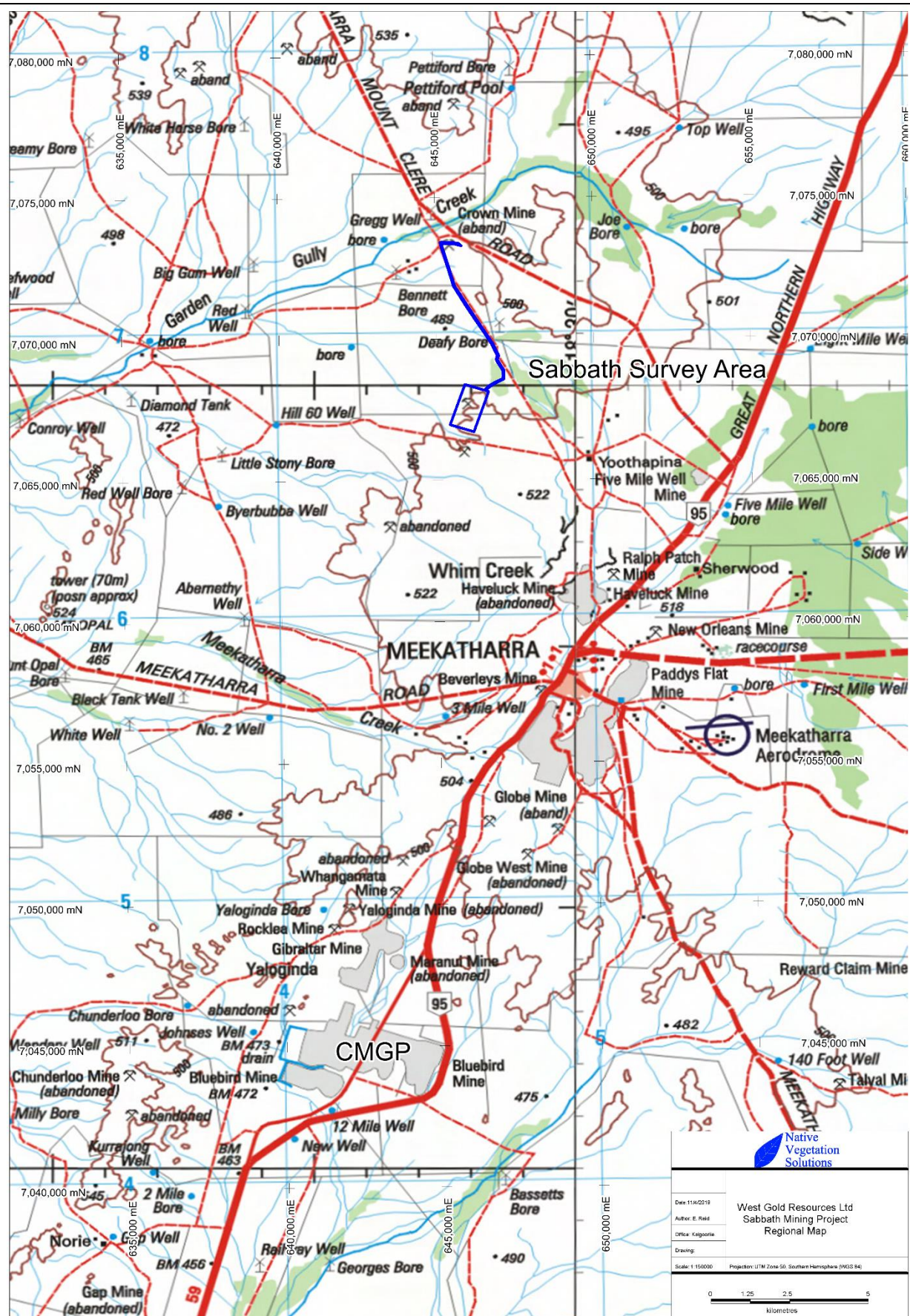


Figure 1: Regional map of survey location

1.1 Objectives

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

- *Environmental Factor Guideline- Flora and Vegetation* (EPA, 2016); and
- *Technical Guidance- Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016a).

A reconnaissance assessment has two components:

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

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

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

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

1.2 Geology and Vegetation

According to the Interim Biogeographic Regionalisation of Australia (IBRA, 2018), the survey area lies in the Murchison (MUR) bioregion within the Western Murchison (MUR02) subregion which totals over 7.8 million hectares (CALM, 2002). The MUR02 subregion comprises vegetation dominated by Mulga low woodlands, often rich in ephemerals (usually with bunch grasses), on outcrop and fine textured Quaternary alluvial and eluvial surfaces (extensive hardpan wash plains that dominate and characterise the subregion) mantling granitic and greenstone strata of the northern part of the Yilgarn Craton. Surfaces associated with the occluded drainage occur throughout with hummock grasslands on Quaternary sandplains, saltbush shrublands on calcareous soils and *Tecticornia* low shrublands occur on saline alluvia (CALM, 2002).

1.3 Climate

The arid climate of the MUR02 subregion generally relies on winter rainfall (CALM, 2002).

The nearest official meteorological station to the survey area is located at Meekatharra Airport, approximately 34 km northeast of the survey area. Recordings of the local climatic conditions commenced at Meekatharra in 1944 (BOM, 2019) and data collected at this station 007045 was used for this report.

1.3.1 Temperature

Mean annual minimum temperature is 15.9°C and mean annual maximum temperature is 29°C. The coldest month is July (mean minimum temperature 7.4°C), the hottest is January (mean maximum temperature 38.3°C) and diurnal temperature variations are relatively consistent throughout the year (Figure 3).

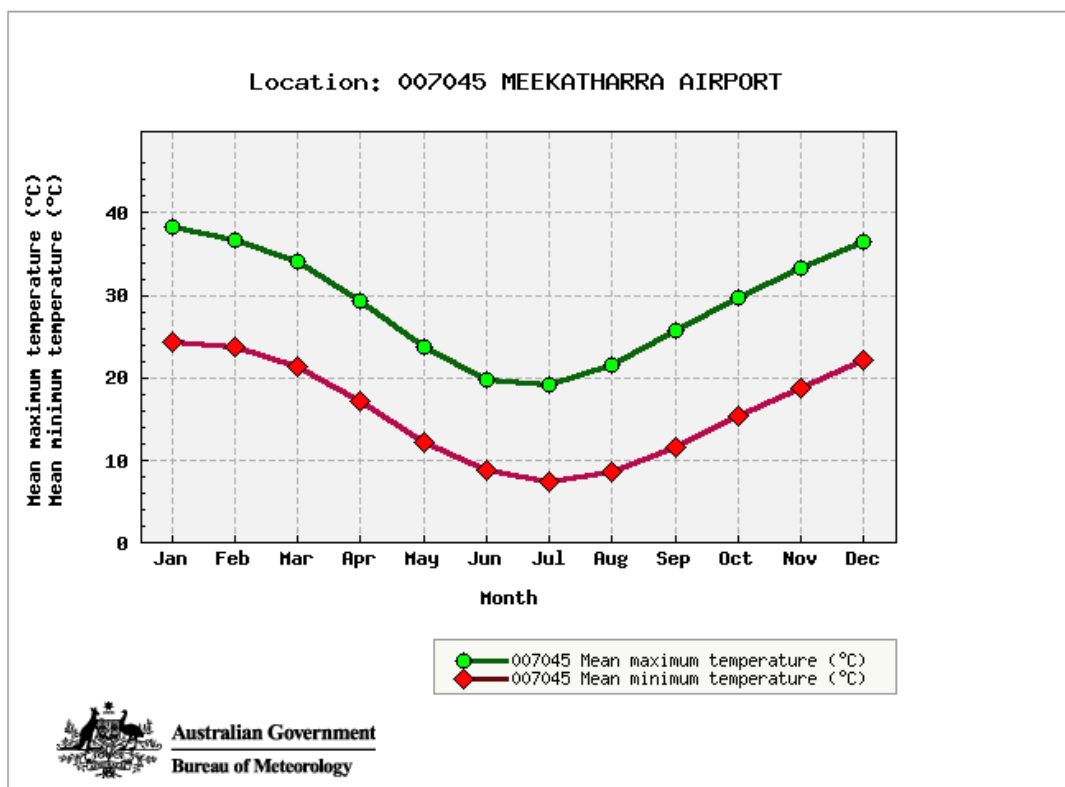


Figure 3: Mean temperature ranges for Meekatharra Airport weather station

1.3.2 Rainfall

The area is arid and the annual average rainfall at Meekatharra is 237.9 mm, which falls (>1 mm) on an average of 28.2 rain-days. Most of the rain usually falls between January and July and this amount varies greatly both seasonally and annually (Figure 4). Rainfall for January, February and March 2019 fell below monthly averages, prior to the survey period (BOM, 2019).

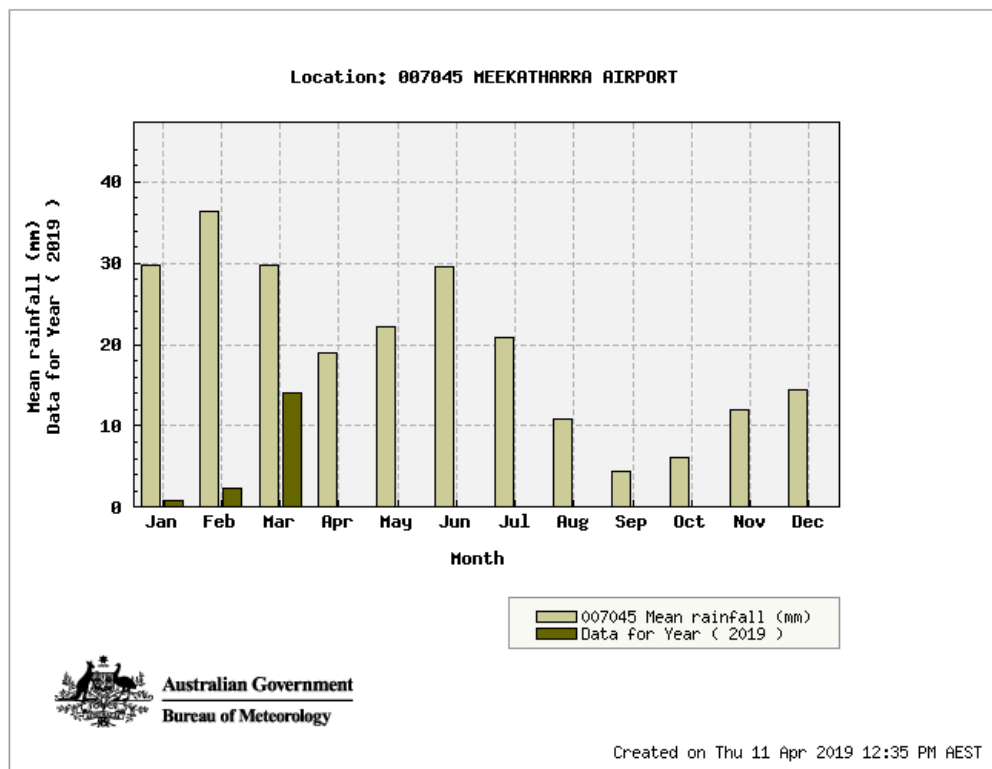


Figure 4: Monthly and mean rainfall for Meekatharra Airport weather station 2019

2. ASSESSMENT METHODOLOGY

2.1 Personnel and Reporting

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

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

2.2 Preliminary Desktop Study

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

2.2.1 *Environment Protection and Biodiversity Conservation Act* Protected Matters

The *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* Protected Matters Search tool was utilised to provide results for matters of National Environmental Significance within the survey area with a 2km buffer (DOTEE, 2019).

(<http://www.environment.gov.au/arcgis-framework/apps/pmst/pmst-coordinate.jsf>)

2.2.2 Threatened Flora and Communities

The Naturemap website of the Department of Biodiversity, Conservation and Attractions (DBCA, 2019) was utilised for a search of their databases containing known populations of threatened flora within a 20km buffer of the shapefile of the survey area. Threatened flora include Declared Rare Flora (DRF- extant, now redefined as 'Threatened') and Priority Flora.

The presence of Threatened and Priority Ecological Communities (TECs & PECs) was determined by examining Geographic Information System (GIS) data supplied by the DBCA upon request within a 30km buffer of the shapefile of the survey area (Reference: 17-0419EC).

2.2.3 Environmentally Sensitive Areas (ESAs) and Conservation Reserves

The Department of Water and Environmental Regulation (DWER, 2019) Clearing Permit System Map Viewer was used to determine the location of any ESAs and Conservation Reserves (<https://cps.der.wa.gov.au/main.html>).

2.2.4 Vegetation Type, Extent and Status

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

DBCA's Statewide Vegetation Statistics (DBCA, 2019b) was also referenced for the current extent of Beard's Vegetation Groups.

2.2.5 Wetlands

The potential of wetlands within the project area was determined by examining DWER's Clearing Permit System Map Viewer (DWER, 2019).

2.2.6 Dieback

Dieback is only considered a potential issue for the project if both the mean annual rainfall of the area is >400mm, and if the project area resides south of the 26th parallel.

2.3 Site Investigation

A site visit was carried out by Botanist Eren Reid from Native Vegetation Solutions, on the 28th March 2019 to examine the flora and vegetation groups contained within the survey area. A total of 8 hours was spent on site traversing the survey area, by four-wheel-drive vehicle and on foot.

The survey was conducted in accordance with relevant EPA's Statements and Guidelines (Section 1.1).

The EPA uses the Interim Biogeographic Regionalisation of Australia (IBRA) as the largest unit for Environmental Impact Assessment decision making in relation to the conservation of biodiversity. Given the scale and nature of the proposed disturbance as well as the existing disturbance, and that the survey area is located within the Murchison IBRA region, a reconnaissance flora and vegetation survey was deemed adequate.

2.3.1 Licenses

Field work was conducted under Scientific License SL012445, held by Mr ER Reid with expiry 18/09/2019.

2.3.2 Field Methods

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

In the field, these sites were visited and non-permanent 20 x 20m relevé sites were established in appropriate locations, considering representativeness of the site to surrounding vegetation and vegetation boundaries. Relevé sites are represented in Appendix 4.

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

Data collected at each relevé included:

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

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

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

Vegetation groups were mapped (section 2.3.4 below).

Opportunistic sampling of plant taxa and vegetation group mapping was also utilised in the survey area between relevé sampling points, via wandering traverses. Smaller singular relevé sites were also utilised as opportunistic sample sites to collect flora specimens and assist in mapping vegetation groups.

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

2.3.3 Post-Field Methods

Unknown specimens collected in the field were identified post field work by Eren Reid with reference to published keys, NVS' reference herbarium and information published on Florabase (WAHERB, 2018).

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

2.3.4 Mapping

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

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

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

2.3.5 IBSA Data Package

The Environmental Protection Authority (EPA), Department of Water and Environmental Regulation (DWER) and Department of Mines, Industry Regulation and Safety (DMIRS) require Index of Biodiversity Surveys for Assessments (IBSA) Data Packages to be submitted to support assessment and compliance under the *Environmental Protection Act 1986*.

An IBSA data package is a single file in .zip format, containing:

- one **Metadata and Licensing Statement** in .pdf format;
- one **survey report** in .pdf format;
- one **plain-text survey report** in .txt format; and
- a set of electronic data files, comprising:
 - one **survey details** spatial dataset in shapefile (.shp, etc.) or Mapinfo (.tab, etc.) format; and
 - one or more **survey data** spatial datasets, as required, in shapefile (.shp, etc.) or Mapinfo (.tab, etc.) format.

2.4 Limitations

Table 1 lists potential limitations that may have affected the survey. As shown, this survey was not limited by any factors listed below.

Table 1: List of potential survey limitations

Potential Limitations	Constraint (Y/N)	Comment
Competency and experience of the consultants undertaking the survey	N	Mr Eren Reid is an experienced botanist who has conducted many flora and vegetation surveys in the Goldfields, Pilbara and South-west regions of WA.
Proportion of flora identified during survey	N	As the survey was planned to target species of conservation significance and flora within a known survey area a complete census of the species present was attempted (Approx. 95%). Sufficient identifications were made to allow vegetation descriptions to be made.
Sources of information	N	Threatened and Priority Flora GIS information was available from DBCA.
Proportion of the task achieved	N	All tasks completed
Timing/Season	Y- Possible	The survey was conducted in March 2019. Due to the below average rainfall in January, February and March, with sporadic late showers in Spring and early summer, only some species were still in flower, and few emergent annuals present.
Disturbance in survey area	N	Disturbance was present with some minor access tracks present, as well as clearing associated with extensive exploration, in certain areas.
Intensity of survey effort	N	Transects were walked through the survey area with all parts visited
Resources	N	Adequate resources were available
Access problems	N	No problems with access
Availability of contextual information on the region	N	Information on the Murchison Bioregion is readily available.

3. RESULTS

3.1 Preliminary Desktop Assessment

3.1.1 EPBC Protected Matters

The EPBC Protected Matters search tool revealed that the survey area could possibly be suitable habitat for non-native plant species *Cenchrus ciliaris* (Buffel-grass) (DOTEE, 2019)

Buffel-grass is not listed as a declared plant by DPIRD (2019), however according to the EPBC search tool it can impact directly on biodiversity values, for example through competition, and indirectly through increasing the frequency and intensity of fires. Buffel-grass is a high-biomass tussock grass that is generally long-lived, deep-rooted and able to out-compete native vegetation. It can flower and fruit rapidly following rainfall for prolonged periods and produce a large amount of seed which disperses easily. Buffel-grass is tolerant to drought, fire and grazing and can naturalise on a wide range of soil types and landscapes. Hotter fires attributed to buffel-grass can affect groundcover vegetation (including bush foods important to Indigenous communities) and carry into the canopy of keystone arid zone trees such as river red gums (*Eucalyptus camaldulensis*), corkwoods (*Hakea* species) and beefwoods (*Grevillea striata*) with flow-on effects to other plants and animals. They can also increase the risk of damage to infrastructure and cultural sites (DOTEE, 2019).

The EPBC Protected Matters report indicated no TEC's or Commonwealth Reserves within a 1km buffer region of the survey area (DOTEE, 2019).

The results of the EPBC Protected Matters search are included in Appendix 1.

3.1.2 Threatened Flora and Communities

The Naturemap search revealed a potential for no Threatened and 11 Priority Flora species to occur within a 20km radius of the survey area (DBCA, 2019).

No known locations of these Priority Flora occur within the survey area (WAHERB, 2019). The closest location of Priority Flora occurs 1.3km west of the proposed Haul Road.

Results of the Naturemap search are included in Appendix 2.

The PEC/TEC search (DBCA, 2019a) revealed that the survey area does not contain any TEC/PECs or lie within any nearby TEC/PEC buffer regions.

3.1.3 Environmentally Sensitive Areas and Conservation Reserves

No ESA's are located within the survey area (DWER, 2019).

No Conservation Reserves were identified within the survey area (DOTEE, 2019).

3.1.4 Vegetation Type, Extent and Status

Two vegetation units defined by Beard (1990) were identified as part of the desktop assessment. These vegetation units identify the Pre-European extent of vegetation, as mapped by Beard (1990).

Information relating to known Beard (1990) vegetation units within the survey area has been summarised in Tables 2 and 3 below. This information has been compiled through both desktop assessments and the site visit.

Table 2: Summary of information regarding Pre-European and current vegetation extent of Vegetation Association 18 within the survey area

Factor	Value				
Beard Vegetation Association*	18				
Vegetation Association Description*	Low woodland; mulga (<i>Acacia aneura</i>)				
Pre-European Extent (ha)	Scale				
	By Association (WA)	By Association (WA)	By IBRA Region (MUR)	By IBRA Sub-region (MUR02)	By Shire (Shire of Meekatharra)
	22,029,557*	19,892,306**	12,403,172**	2,133,275**	3,117,900**
% Pre-European Extent Remaining	100.00%*	99.76%**	99.68%**	99.77%**	99.79%**
Surrounding Land Use***	Mining, Exploration, Pastoral Lease				
Weed prevalence***	Low				

* Source: Shepherd *et al.* (2002) Appendix 2

**Source: DBCA, (2019b)

***Source: Field Assessment

Table 3: Summary of information regarding Pre-European and current vegetation extent of Vegetation Association 29 within the survey area

Factor	Value				
Beard Vegetation Association*	29				
Vegetation Association Description*	Sparse low woodland; mulga, discontinuous in scattered groups				
Pre-European Extent (ha)	Scale				
	By Association (WA)	By Association (WA)	By IBRA Region (MUR)	By IBRA Sub-region (MUR02)	By Shire (Shire of Meekatharra)
	7,015,905*	7,903,991**	2,956,382**	2,160,146**	2,854,683**
% Pre-European Extent Remaining	100.00%*	99.95%**	99.98%**	99.98%**	99.89%**
Surrounding Land Use***	Mining, Exploration, Pastoral Lease				
Weed prevalence***	Low				

* Source: Shepherd *et al.* (2002) Appendix 2

**Source: DBCA, (2019b)

***Source: Field Assessment

3.1.5 Wetlands

No wetlands which are recorded on the DWER Clearing Permit System Map Viewer occur within the survey area (DWER, 2019).

3.1.6 Dieback

The survey area lies south of the 26th parallel, however receives average annual rainfall of 237.9 mm, below the 400mm threshold mark. There is no record of *Phytophthora cinnamomi* establishing in natural ecosystems in regions receiving <400mm rainfall per annum (CALM, 2003). Therefore, Dieback is not considered an issue for this survey area, however all measures should be taken to prevent any possible soil contamination (seeds of non-native species etc.) which poses a risk in the survey area during seasonally favourable conditions.

3.2 Field Assessment

3.2.1 Threatened Flora

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

No Priority Flora Species were recorded within the survey area.

3.2.2 Vegetation Type, Extent and Status

A total of 14 Families, 23 Genera and 52 Species were recorded within the survey area. Three major vegetation groups were recorded in the survey area, and are in “Good” to “Degraded” condition (using the scale of Keighery 1994, see Appendix 3). Disturbance occurring in the survey area included historic extensive exploration clearing. The summary of Vegetation groups contained within the survey area is summarised in Table 4 below. Maps of the survey area can be seen in Appendix 4.

Table 4: Vegetation Group Summary

Vegetation Group	Family	Genus	Species	Area (ha)	Percentage of Surey Area (%)
Open <i>Acacia</i> shrubland	12	16	40	141.40	96.28%
Mulga Creekline vegetation	9	13	19	4.35	2.96%
<i>Tecticornia</i> open shrubland	1	1	1	1.11	0.76%
Total	14*	23*	52*	146.86[#]	100%[#]

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

The vegetation groups are described in more detail below.

3.2.2.1 Open *Acacia* shrubland

This vegetation group consisted of 12 Families, 16 Genera and 40 Species. The vegetation group was approximately 141.4 ha which makes up 96.28% of the survey area.

Dominant species were *Acacia aneura*, *Acacia grasbyi*, *Acacia prairii* and *Eremophila galeata*.



Figure 5: Open *Acacia* shrubland within the survey area

3.2.2.2 Mulga creekline vegetation

This vegetation group consisted of 9 Families, 13 Genera and 19 Species. The vegetation group was approximately 4.35 ha which makes up 2.96% of the survey area.

Dominant species were *Acacia aneura*, *Acacia craspedocarpa*, *Acacia pteraneura*, *Grevillea deflexa*, *Ptilotus obovatus* and *Exocarpos aphyllus*.



Figure 6: Mulga creekline vegetation within the survey area

3.2.2.3 *Tecticornia* open shrubland

This vegetation group consisted of one species. The vegetation group was approximately 1.11 ha which makes up 0.76% of the survey area.

The dominant species was *Tecticornia* sp. Yoothapina Station.



Figure 7: *Tecticornia* open shrubland within the survey area

3.2.3 Weeds

No weed species were recorded in the survey area.

3.2.4 Vegetation Condition

Overall, the condition of the vegetation was determined to be “Good” to “Degraded”. No areas of vegetation were assessed to be in “Pristine” condition. Degraded areas were affected by extensive disturbance via historical exploration.

A map of the vegetation condition is included in Appendix 4.

4. DISCUSSION

A total of 14 Families, 23 Genera and 52 Species were recorded within the survey area. Three major vegetation groups were recorded in the survey area.

The field assessment established that the condition of the vegetation in the proposed disturbance area is overall “Good” to “Degraded”. No areas of vegetation were assessed to be in “Pristine” condition.

No Threatened Flora, TECs or PECs were recorded in the survey area.

No Priority Flora Species, were recorded within the survey area.

No weed species were recorded in the survey area.

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

The following recommendations arise from the Reconnaissance flora and vegetation survey:

- Where possible, clearing be aligned to existing roads, tracks and other barriers or follow the boundaries of broad-scale intact native vegetation; and
- Weed control measures to be implemented during and following clearing

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6. GLOSSARY

Acronyms:

BC Act	<i>Biodiversity Conservation Act 2016</i> , Western Australia
BOM	Bureau of Meteorology, Australian Government
BSc	Bachelor of Science
CALM	Department of Conservation and Land Management (now DBCA)
CPS	Clearing Permit System (DWER)
DBCA	Department of Biodiversity, Conservation and Attractions, Western Australia
DMIRS	Department of Mines, Industry Regulation and Safety, Western Australia
DOTEE	Department of the Environment and Energy, Australian Government
DPAW	Department of Parks and Wildlife, Western Australia (now DBCA)
DPIRD	Department of Primary Industries and Regional Development, Western Australia
DRF	Declared Rare Flora
DWER	Department of Water and Environmental Regulation, Western Australia
EPA	Environmental Protection Authority, Western Australia
EP Act	<i>Environmental Protection Act 1986</i> , Western Australia
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth Act)
ESA	Environmentally Sensitive Area
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
IBRA	Interim Biogeographic Regionalisation for Australia, DOTEE
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
km	Kilometres
m	Metres
MUR	Murchison Bioregion, IBRA
MUR02	Western Murchison Subregion, IBRA
NVS	Native Vegetation Solutions
PEC	Priority Ecological Community, Western Australia
Ramsar	A wetland site designated of international importance under the Ramsar Convention (UNESCO)
TEC	Threatened Ecological Community
UNESCO	United Nations Educational, Scientific and Cultural Organization
WA	Western Australia
WAHERB	Western Australian Herbarium, DBCA

Definitions:

{DBCA (2019) Conservation Codes for Western Australian Flora and Fauna. Department of Biodiversity, Conservation and Attractions, Western Australia, January 2019}: -

T Threatened species:

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).

Threatened fauna is that subset of ‘Specially Protected Fauna’ listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.

Threatened flora is that subset of ‘Rare Flora’ listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below..

CR Critically endangered species

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 species

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 species

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

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

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.

MI Migratory species

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 (conservation dependent fauna)

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*.

P 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.

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.

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.

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.

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.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Appendix 1

Relevant Government Database Search Results



EPBC Act Protected Matters Report

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

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

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 11/04/19 13:48:59

[Summary](#)

[Details](#)

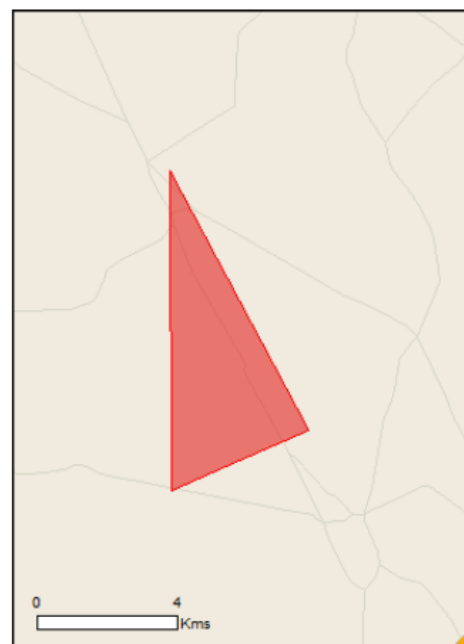
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

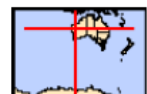
[Acknowledgements](#)



This map may contain data which are
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[Coordinates](#)

[Buffer: 1.0Km](#)



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	3
Listed Migratory Species:	7

Other Matters Protected by the EPBC Act

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

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

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

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

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	9
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

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

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory 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 may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
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]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area

Extra Information

Invasive Species [Resource Information]

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

Name	Status	Type of Presence
Birds		
<i>Columba livia</i> Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Mammals		
<i>Camelus dromedarius</i> Dromedary, Camel [7]		Species or species habitat likely to occur within area
<i>Canis lupus familiaris</i> Domestic Dog [82654]		Species or species

Name	Status	Type of Presence
Capra hircus Goat [2]		habitat likely to occur within area Species or species habitat likely to occur within area
Equus asinus Donkey, Ass [4]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat likely to occur within area

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-26.4433 118.4558,-26.5168 118.4561,-26.5031 118.4911,-26.4433 118.4558

Acknowledgements

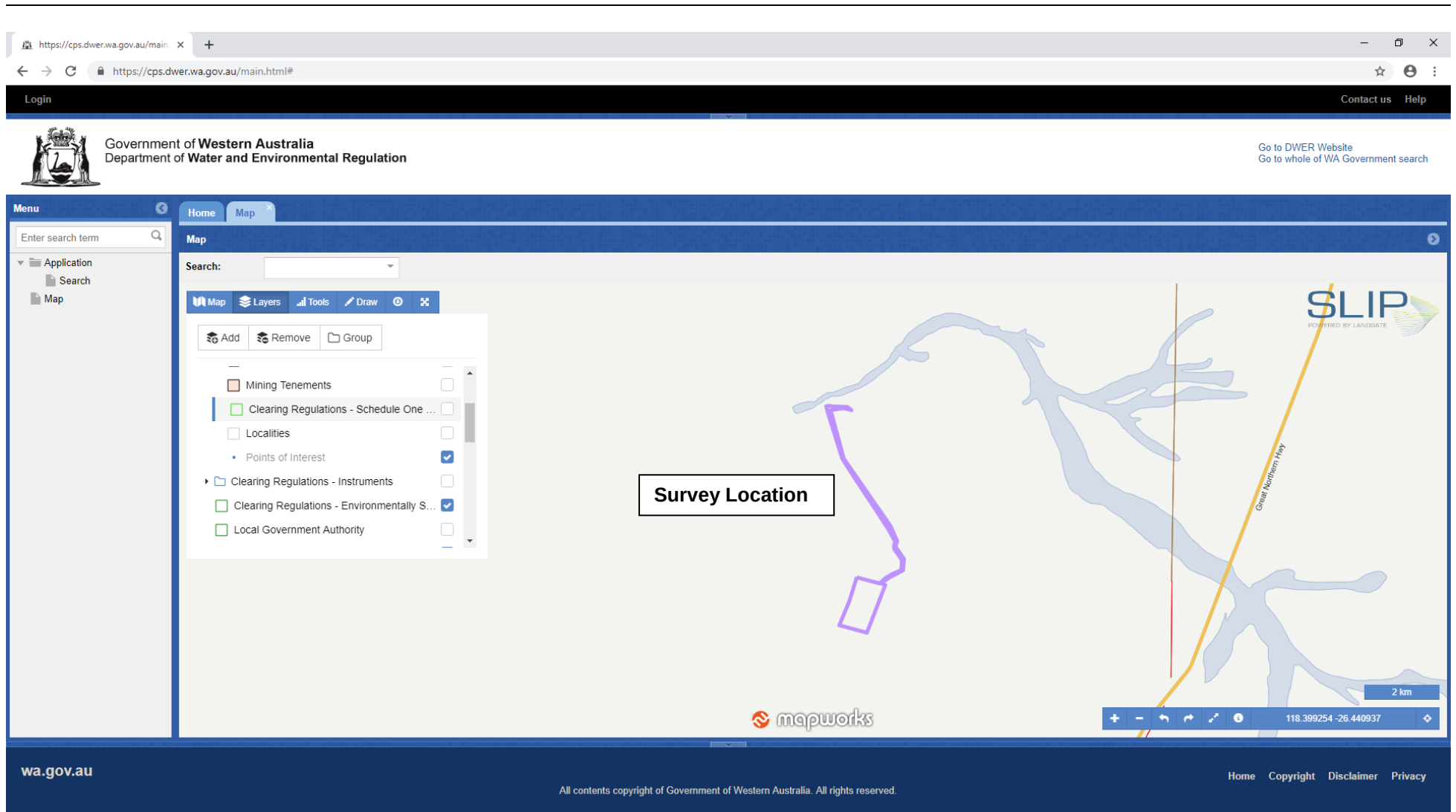
This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [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

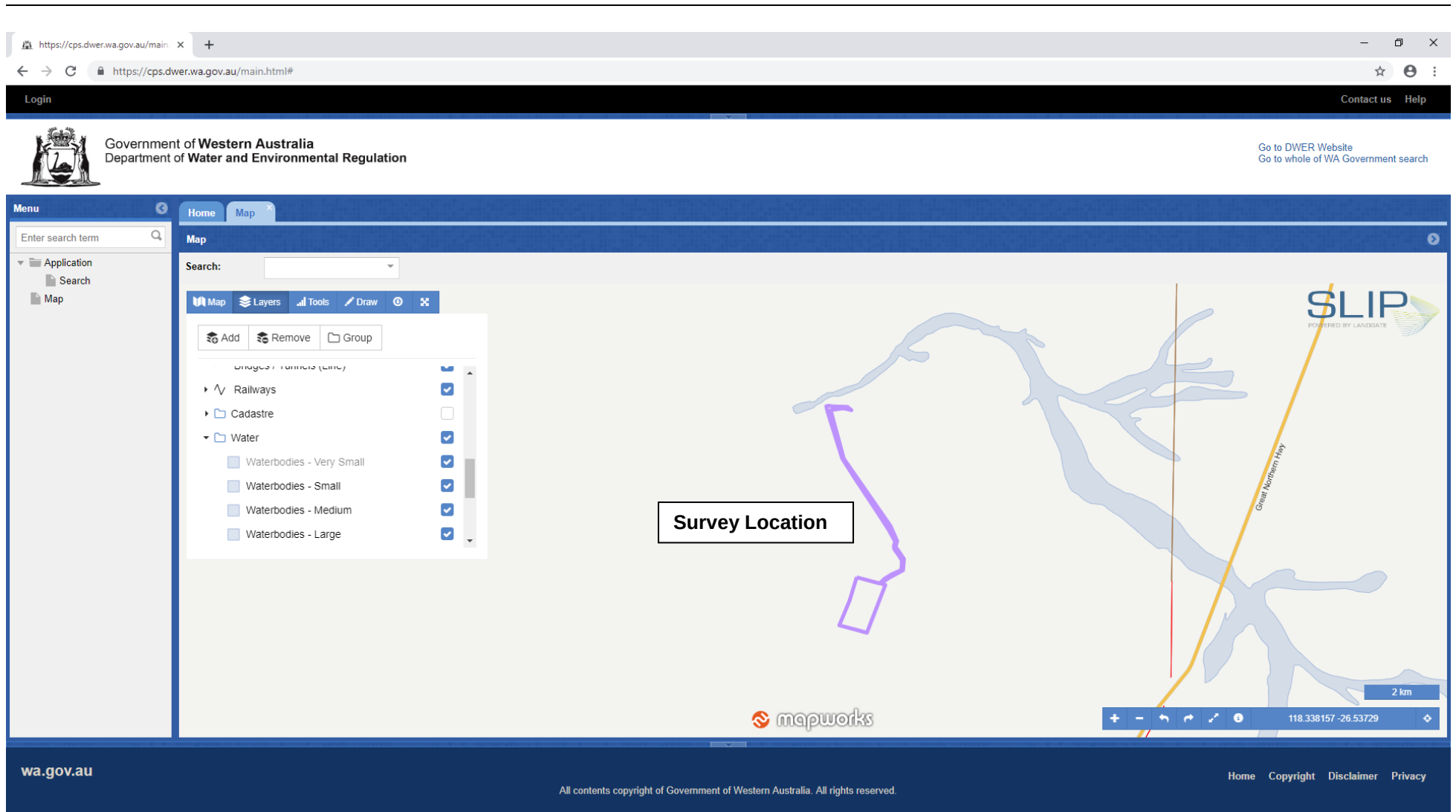
The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

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DWER's Clearing Permit System Map Viewer showing no ESA's (dark green shaded areas) within the survey area (DWER, 2019)



DWER Clearing Permit System Map Viewer showing no wetland areas within the survey area (DWER, 2019).

Appendix 2

Naturemap Search Results

NatureMap Species Report

Created By Guest user on 14/04/2019

Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 118° 27' 58" E, 26° 30' 08" S
Buffer 20km
Group By Conservation Status

Conservation Status	Species	Records
Non-conservation taxon	431	1308
Other specially protected fauna	1	2
Priority 1	1	7
Priority 3	8	16
Priority 4	3	11
Protected under international agreement	1	1
TOTAL	445	1343

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Protected under international agreement				
1.	24806 <i>Tringa glareola</i> (Wood Sandpiper)		IA	
Other specially protected fauna				
2.	25624 <i>Falco peregrinus</i> (Peregrine Falcon)		S	
Priority 1				
3.	15027 <i>Eremophila retropila</i>		P1	
Priority 3				
4.	5486 <i>Calytrix verruculosa</i>		P3	
5.	4460 <i>Drummondia miniata</i>		P3	
6.	14510 <i>Eremophila fasciata</i>		P3	
7.	48947 <i>Eremophila platycalyx</i> subsp. <i>Yalgoo</i> (A. Markey & S. Dillon 3337)		P3	
8.	33760 <i>Hemigenia virescens</i>		P3	
9.	5809 <i>Homalocalyx echinulatus</i>		P3	
10.	3051 <i>Menkea draboides</i>		P3	
11.	35576 <i>Ptilotus luteolus</i>		P3	
Priority 4				
12.	14615 <i>Acacia speckii</i>		P4	
13.	2019 <i>Grevillea inconspicua</i> (Cue Grevillea)		P4	
14.	24115 <i>Sminthopsis longicaudata</i> (Long-tailed Dunnart)		P4	

Appendix 3

Vegetation Condition Scale (Keighery, 1994)

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

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

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

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

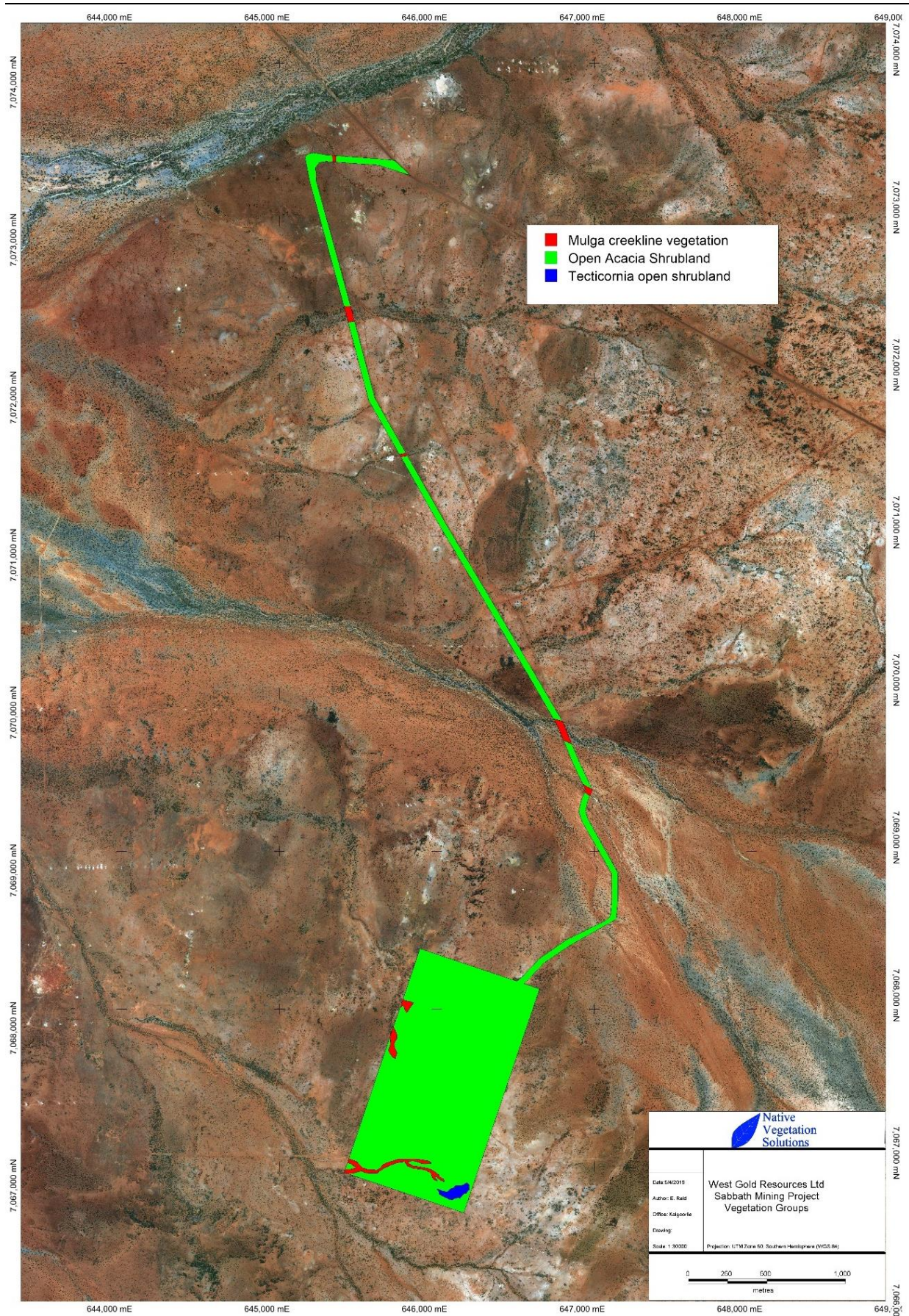
Degraded (5). Basic vegetation structure severely impacted by disturbance.
Scope for regeneration but not to a state approaching good condition without intensive management.
For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial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

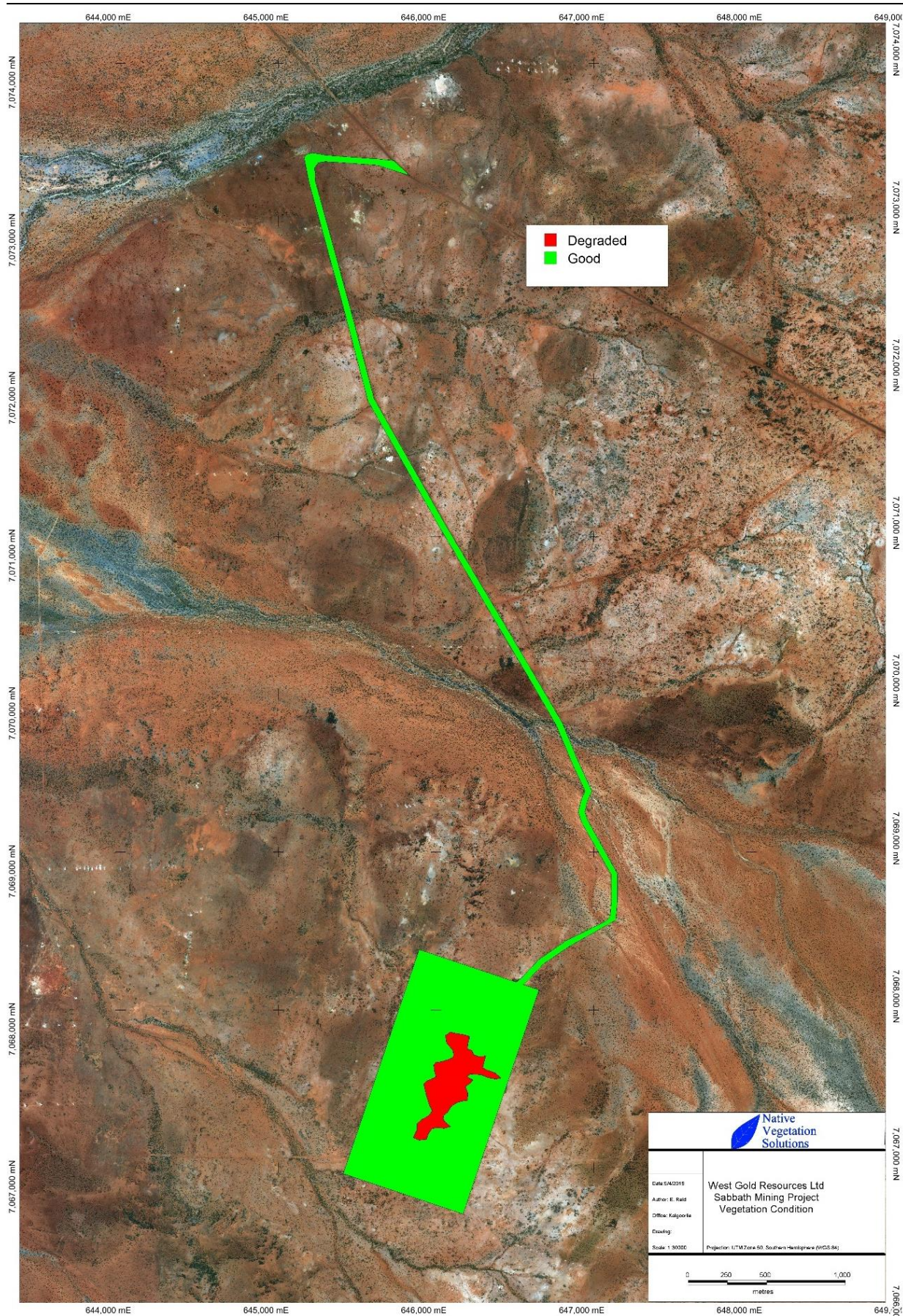
Completely Degraded (6). The structure of the vegetation is no longer intact and the area is completely or almost completely without native species.
These areas are often described as 'parkland cleared' with the flora compromising weed or crop species with isolated trees or shrubs.

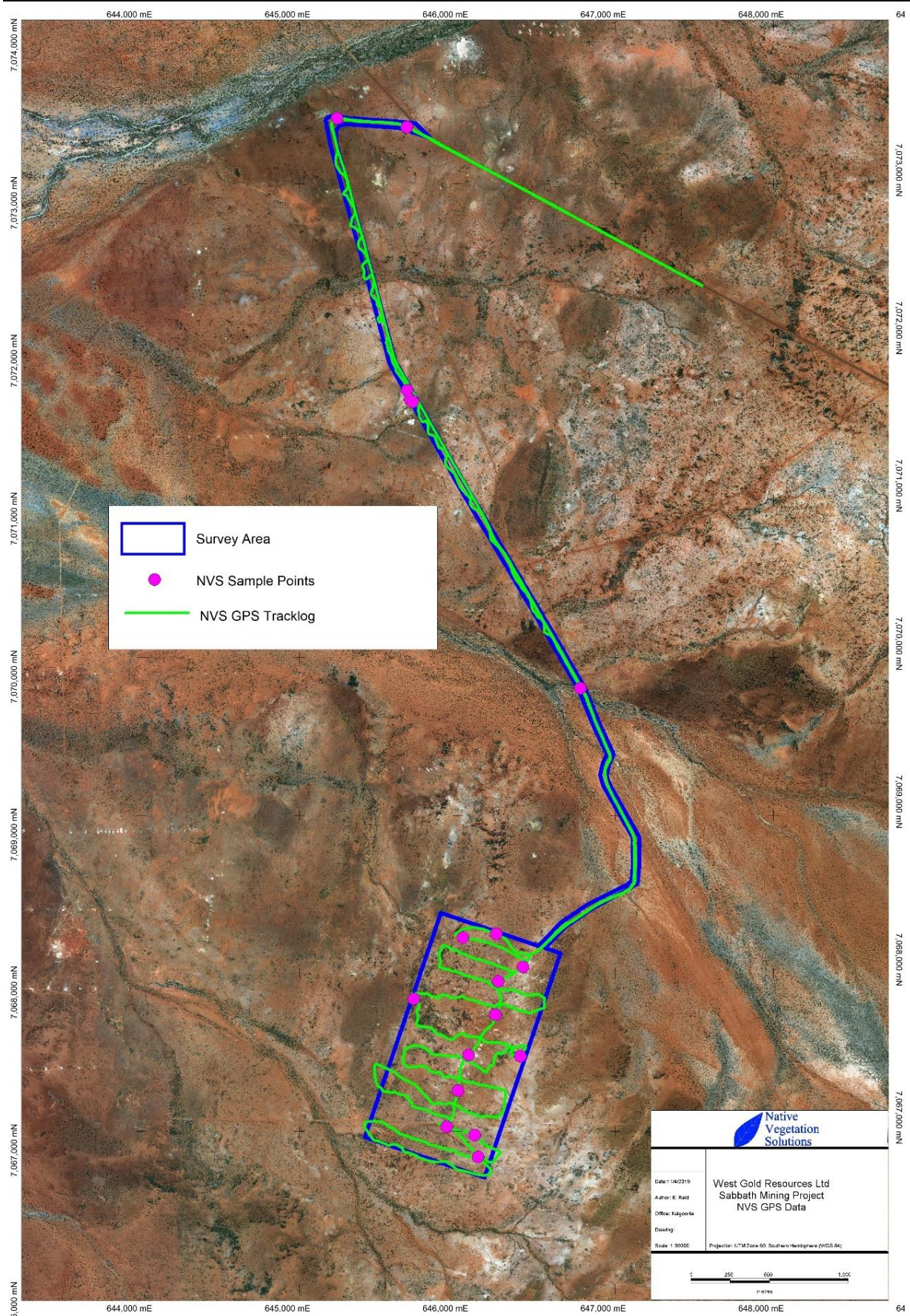
Appendix 4

Vegetation Mapping









Appendix 5

Species List

Family	Genus	Species	Annual, Perennial or Non-Native	Open <i>Acacia</i> shrubland	Mulga Creekline vegetation	<i>Tecticornia</i> open shrubland
Amaranthaceae	<i>Ptilotus</i>	<i>obovatus</i>	P	*	*	
Amaranthaceae	<i>Ptilotus</i>	<i>rotundifolius</i>	P	*		
Apocynaceae	<i>Marsdenia</i>	<i>australis</i>	P	*		
Brassicaceae	<i>Stenopetalum</i>	<i>filifolium</i>	A		*	
Chenopodiaceae	<i>Maireana</i>	<i>georgei</i>	P		*	
Chenopodiaceae	<i>Maireana</i>	<i>triptera</i>	P		*	
Chenopodiaceae	<i>Rhagodia</i>	<i>drummondii</i>	P		*	
Chenopodiaceae	<i>Sclerolaena</i>	<i>densiflora</i>	P		*	
Chenopodiaceae	<i>Sclerolaena</i>	<i>diacantha</i>	P		*	
Chenopodiaceae	<i>Sclerolaena</i>	<i>patenticuspis</i>	P		*	
Chenopodiaceae	<i>Tecticornia</i>	<i>sp.</i> Yoothapina Station	P	*		*
Fabaceae	<i>Acacia</i>	<i>aneura</i>	P	*	*	
Fabaceae	<i>Acacia</i>	<i>aptaneura</i>	P	*		
Fabaceae	<i>Acacia</i>	<i>craspedocarpa</i>	P		*	
Fabaceae	<i>Acacia</i>	<i>grasbyi</i>	P	*		
Fabaceae	<i>Acacia</i>	<i>kempeana</i>	P	*		
Fabaceae	<i>Acacia</i>	<i>mulganeura</i>	P	*	*	
Fabaceae	<i>Acacia</i>	<i>prainii</i>	P	*		
Fabaceae	<i>Acacia</i>	<i>pteraneura</i>	P	*	*	
Fabaceae	<i>Acacia</i>	<i>sclerosperma</i> subsp. <i>sclerosperma</i>	P	*		
Fabaceae	<i>Acacia</i>	<i>tetragonophylla</i>	P	*		
Fabaceae	<i>Acacia</i>	<i>victoriae</i>	P	*		
Fabaceae	<i>Senna</i>	<i>glutinosa</i> subsp. <i>chatelainiana</i>	P	*		
Fabaceae	<i>Senna</i>	<i>sp.</i> Meekatharra	P	*		
Goodeniaceae	<i>Goodenia</i>	<i>havilandii</i>	A	*		
Goodeniaceae	<i>Goodenia</i>	<i>tenuiloba</i>	A	*		
Goodeniaceae	<i>Scaevola</i>	<i>spinescens</i>	P	*		
Lamiaceae	<i>Teucrium</i>	<i>teucriiflorum</i>	P	*		
Loranthaceae	<i>Amyema</i>	<i>fitzgeraldii</i>	P	*		
Loranthaceae	<i>Amyema</i>	<i>nestor</i>	P	*		
Poaceae	<i>Austrostipa</i>	<i>elegantissima</i>	P		*	
Poaceae	<i>Cymbopogon</i>	<i>ambiguus</i>	P	*		
Poaceae	<i>Cymbopogon</i>	<i>obtectus</i>	P	*		
Poaceae	<i>Enteropogon</i>	<i>ramosus</i>	P		*	
Poaceae	<i>Eragrostis</i>	<i>eriopoda</i>	P	*		
Proteaceae	<i>Grevillea</i>	<i>berryana</i>	P	*		
Proteaceae	<i>Grevillea</i>	<i>deflexa</i>	P		*	
Proteaceae	<i>Hakea</i>	<i>preissii</i>	P	*	*	
Proteaceae	<i>Hakea</i>	<i>recurva</i> subsp. <i>arida</i>	P	*		
Rubiaceae	<i>Psydrax</i>	<i>latifolia</i>	P	*	*	
Rubiaceae	<i>Psydrax</i>	<i>suaveolens</i>	P	*		
Santalaceae	<i>Exocarpos</i>	<i>aphyllus</i>	P		*	
Scrophulariaceae	<i>Eremophila</i>	<i>exilifolia</i>	P	*		
Scrophulariaceae	<i>Eremophila</i>	<i>foliosissima</i>	P	*		
Scrophulariaceae	<i>Eremophila</i>	<i>galeata</i>	P	*		

Family	Genus	Species	Annual, Perennial or Non-Native	Open <i>Acacia</i> shrubland	Mulga Creekline vegetation	<i>Tecticornia</i> open shrubland
Scrophulariaceae	<i>Eremophila</i>	<i>lachnocalyx</i>	P	*	*	
Scrophulariaceae	<i>Eremophila</i>	<i>longifolia</i>	P	*		
Scrophulariaceae	<i>Eremophila</i>	<i>platycalyx</i> subsp. <i>platycalyx</i>	P	*		
Scrophulariaceae	<i>Eremophila</i>	<i>shonae</i> subsp. <i>shonae</i>	P	*		
Scrophulariaceae	<i>Eremophila</i>	<i>spectabilis</i> subsp. <i>spectabilis</i>	P	*		
Solanaceae	<i>Solanum</i>	<i>lachnophyllum</i>	P	*		
Solanaceae	<i>Solanum</i>	<i>lasiophyllum</i>	P	*		

Note:

A= Annual

P= Perennial

NN= Non Native

APPENDIX E: EPBC PROTECTED MATTERS SEARCH



EPBC Act Protected Matters Report

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

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

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 11/04/19 14:02:48

[Summary](#)

[Details](#)

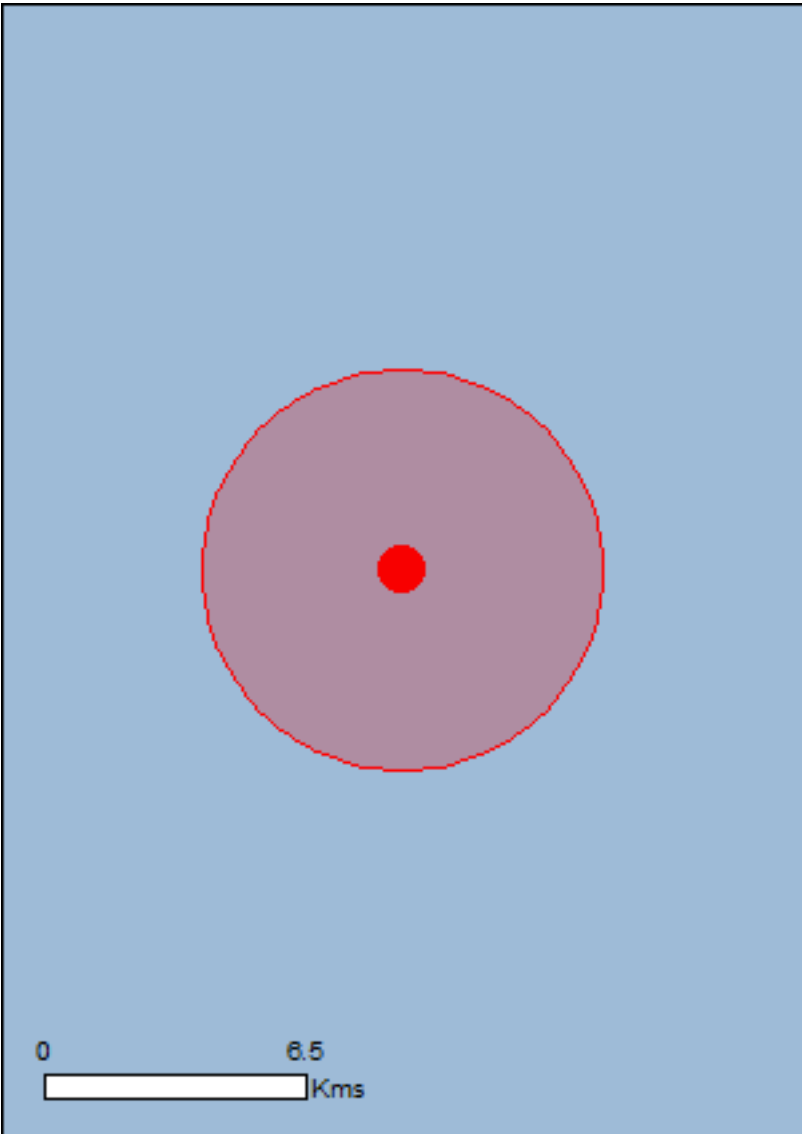
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are
©Commonwealth of Australia
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[Coordinates](#)

Buffer: 5.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	3
Listed Migratory Species:	7

Other Matters Protected by the EPBC Act

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

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

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

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

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	9
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory 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 may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
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]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area

Extra Information

Invasive Species		[Resource Information]
Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.		
Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Mammals		
Camelus dromedarius Dromedary, Camel [7]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Equus asinus Donkey, Ass [4]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat likely to occur within area

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-26.50611 118.46528

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](#)
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- [-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.

APPENDIX H:
TARGETED FLORA SURVEY
M 51/886, M 51/889 (BOTANICA
2025)

New Murchison Gold Ltd Garden Gully Project – Targeted Flora Survey

Prepared For: New Murchison Gold Limited
Project Name: Targeted Flora Survey
Job Number: 2025/043
Date: 30th April 2025

Attachment 1: Conservation Ratings, BC Act and EPBC Act
Attachment 2: Map showing GPS tracklog of the survey area

1. Introduction

Botanica Consulting Pty Ltd (Botanica) was commissioned by New Murchison Gold Limited (NMG) to undertake a targeted search for the conservation significant flora *Calytrix verruculosa* (P3) at the Garden Gully Project (referred to as the ‘target survey area’) to satisfy condition 9 of the Clearing Permit CPS 10902/1. Condition 9a stipulated that a targeted flora survey was to be conducted to search for the presence of the priority flora species *Calytrix verruculosa* (P3). The target survey area is located approximately 649 km northeast of Perth and 20 km north of Meekatharra, Western Australia. The targeted survey covers a total area of approximately 393 ha (Figure 1).

The targeted survey was conducted on the 22nd of April 2025 by two Botanica staff members: Jim Williams (Senior Botanist) and Amy Johnston (Graduate Environmental Consultant). Jim Williams has over 30 years’ experience conducting flora and fauna surveys in Western Australia, making him a suitably qualified and experienced Botanist to conduct the survey. The survey area was traversed on foot and four-wheel drive using a handheld GPS to record the locations of tracks traversed and locations of any conservation significant flora species (recorded in GDA 94 MGA Z51 format). The GPS track logs are shown in Attachment 2.

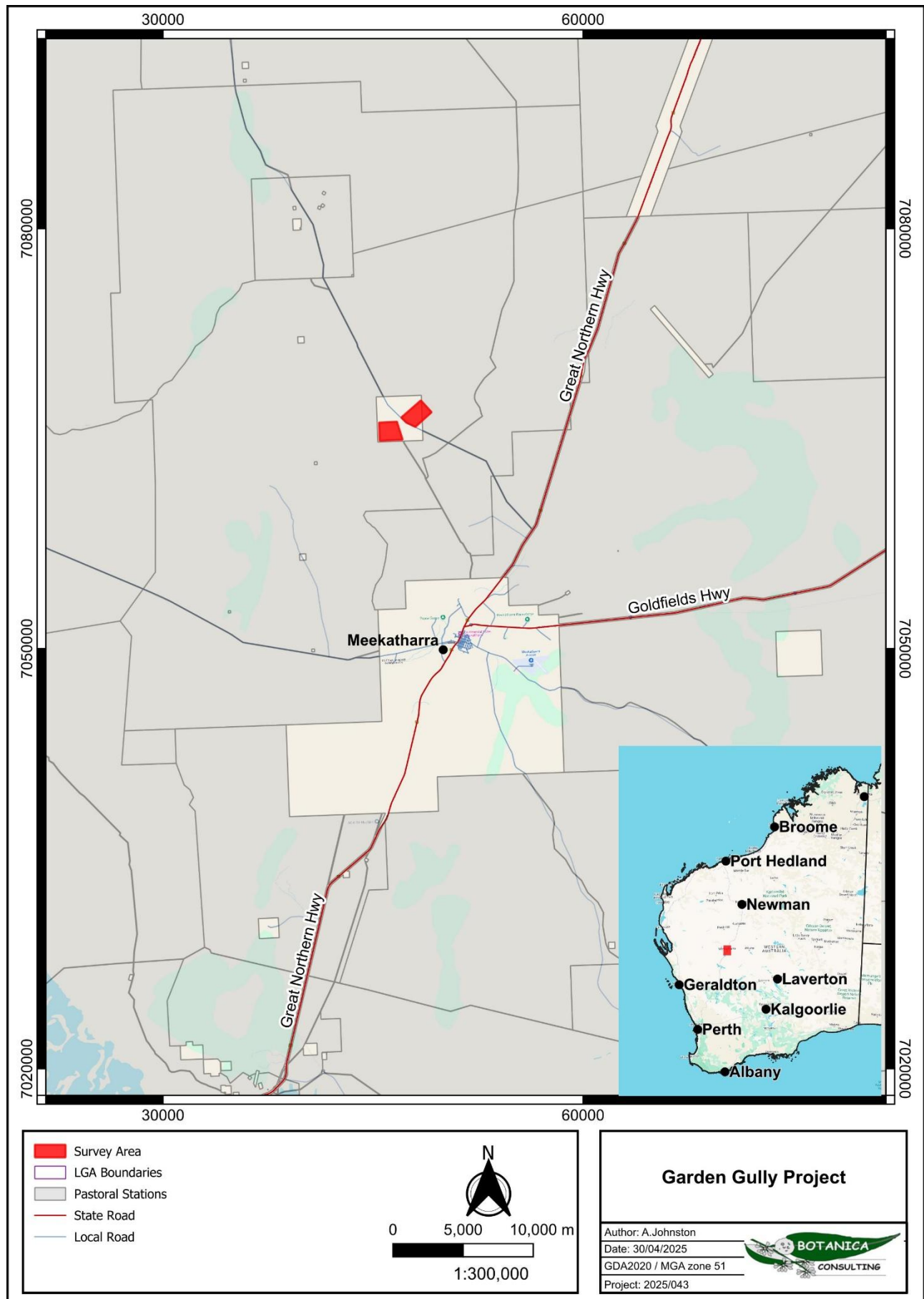


Figure 1: Garden Gully Project target survey area

2. Desktop Review

2.1. Conservation Significant Flora

Assessment of the DBCA's Threatened and Priority Flora database records (Ref: 62-0824FL) (DBCA, 2024a) and previous relevant literature identified 15 Priority flora as occurring within a 40 km radius of the survey area. Botanica observed the Priority 4 flora *Grevillea inconspicua* in the survey area during a survey in June 2024. No other Priority Flora have been recorded over the survey area (Table 2-1, Figure 2). The Priority 3 species *Calytrix verruculosa* was recorded twice in 1986, located approximately 240-280 m south of the survey area M51/889 (Figure 3).

Table 2-1: Priority Flora within 40 km of the target survey area

Taxon	Conservation Code	Habitat Description (WA Herbarium, 1998-)
<i>Acacia speckii</i>	P4	Rocky soils over granite, basalt or dolerite. Rocky hills or rises.
<i>Calytrix verruculosa</i>	P3	Sandy clay.
<i>Drummondita miniata</i>	P3	Laterite. Breakaways.
<i>Eremophila fasciata</i>	P3	Stony hills.
<i>Eremophila retropila</i>	P1	Gravelly loam. Stony flats.
<i>Euploca mitchellii</i>	P1	Rocky hills.
<i>Goodenia berringbinensis</i>	P4	Red sandy loam. Along watercourses.
<i>Grevillea inconspicua</i>	P4	Along drainage lines on rocky outcrops, creek lines.
<i>Hemigenia virescens</i>	P3	Yellow-red sandy clay.
<i>Homalocalyx echinulatus</i>	P3	Breakaways, sandstone hills.
<i>Indigofera rotula</i>	P3	Red sandy loam.
<i>Menkea draboides</i>	P3	Red sand or clay, granite.
<i>Lepidium xyloides</i>	P1	Gravelly loam, clayey sand.
<i>Ptilotus lazaridis</i>	P3	Clay loam. Floodplains.
<i>Ptilotus luteolus</i>	P3	Hillslopes.

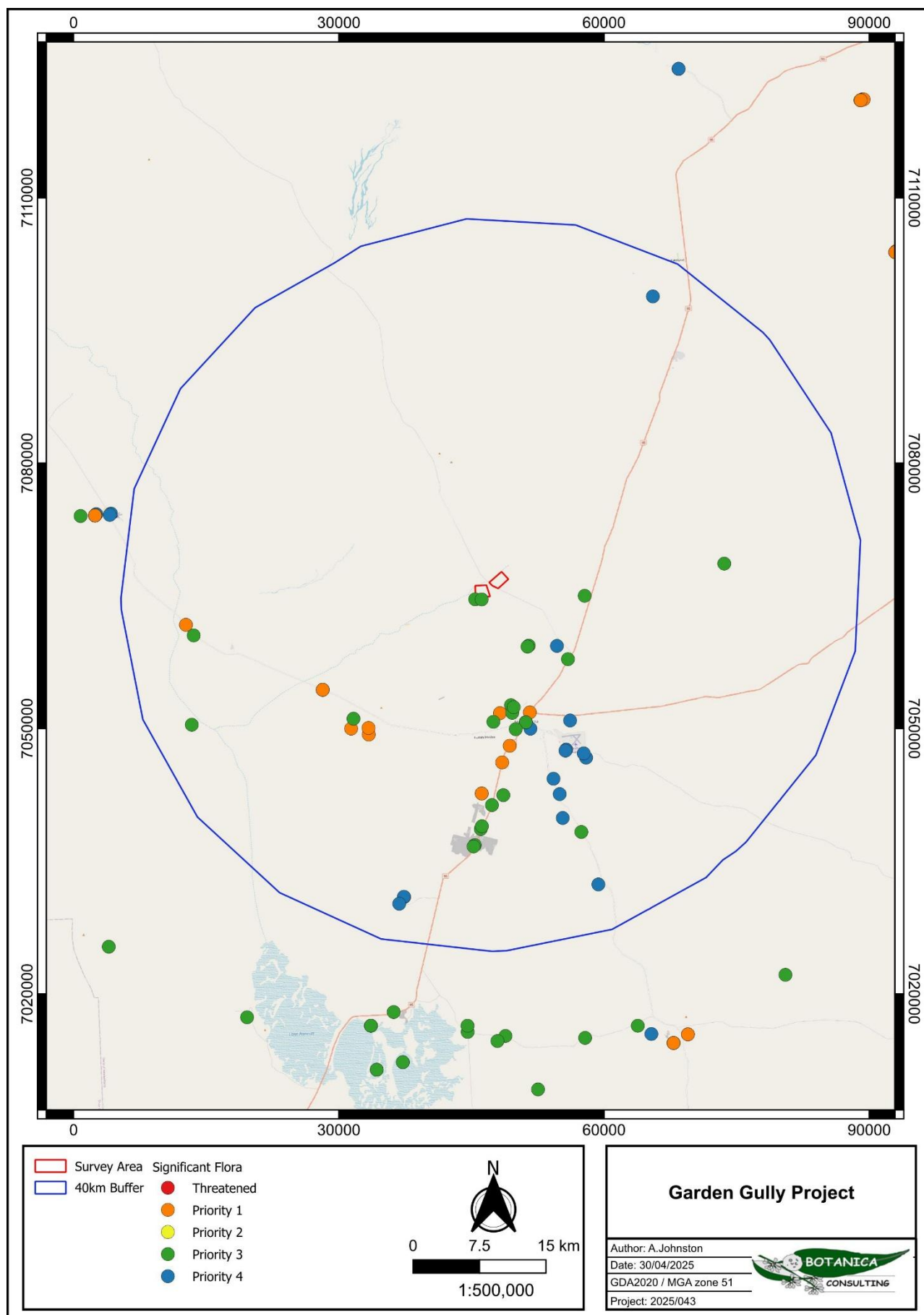


Figure 2: Locations of conservation significant flora within 40 km of the survey area

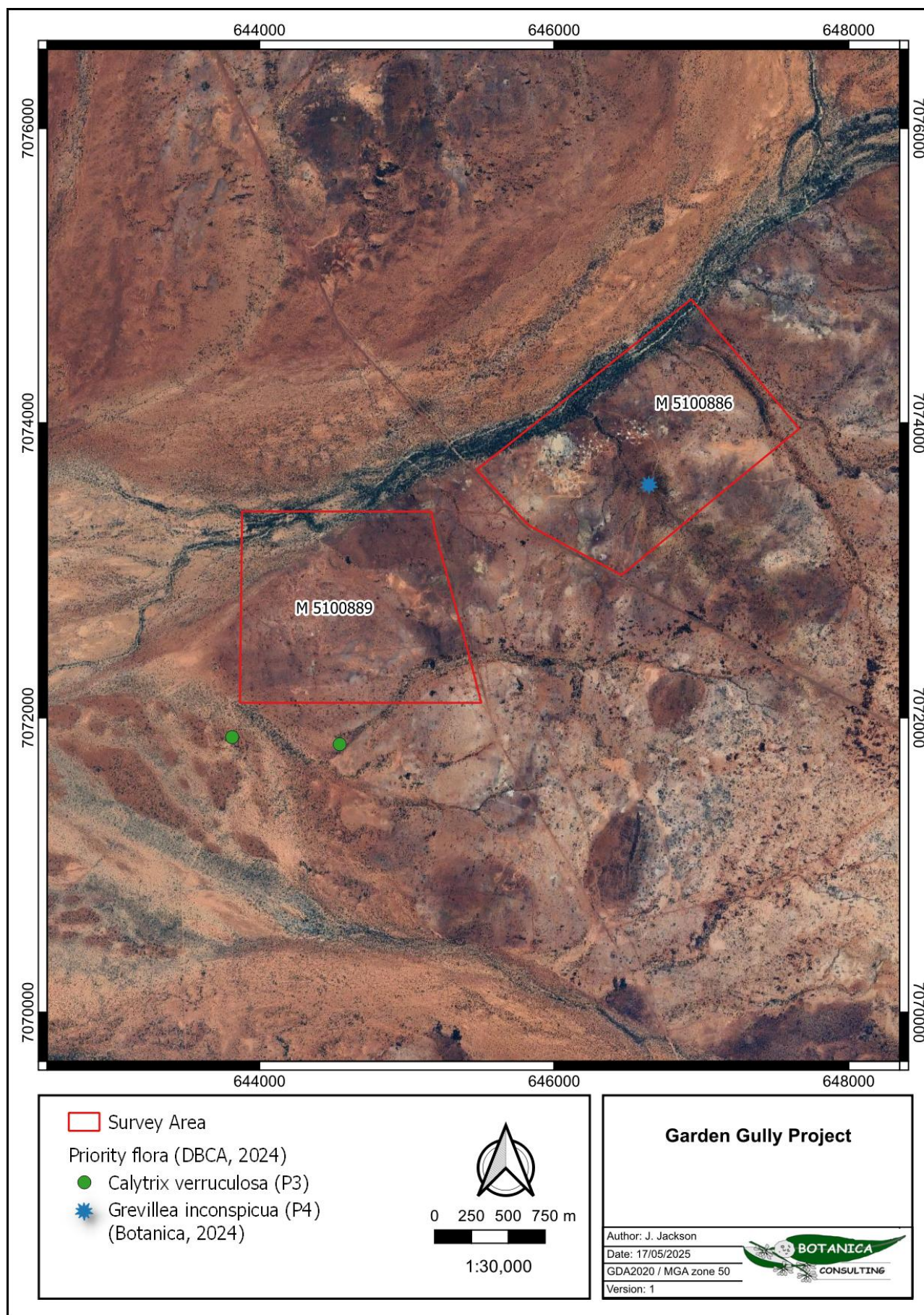


Figure 3: Previously recorded significant flora within and adjacent to the survey area

3. Background

3.1. *Calytrix verruculosa* (Priority Three)

Calytrix verruculosa is a shrub growing approximately 0.4-0.75m high (WA Herbarium, 1998-). *Calytrix verruculosa* has pink or white flowers which bloom in August to October and minutely rough branchlets (ALA, 2025). *C. verruculosa* is found in the Murchison bioregion and the Meekatharra district on mulga hardpan plains dominated by *Acacia aneura* (ALA, 2025). The species is listed as 'Priority Three' by the Department of Biodiversity, Conservation and Attractions (DBCA), with criteria outlined in Attachment 1.

4. Methods

4.1. Desktop assessment

A database search request for significant flora (ref: 62-0824FL) (DBCA, 2024a) was submitted to DBCA for records within the survey area, with a 40 km buffer applied.

4.2. Flora and Vegetation Field assessment

The targeted flora survey was conducted in accordance with the requirements of a targeted 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 of significance in the local area (literature review, database and map-based searches);
- Based on results of the desktop assessment, identify vegetation types within the survey area that have the potential to contain flora of conservation significance;
- Conduct a field survey to identify flora of conservation significance within the survey area; and
- Provide GPS records and spatial map showing the distribution of flora of conservation significance within the survey area.

Botanica conducted a targeted flora survey on the 21st and 22nd of April 2025. This was conducted by Jim Williams (Director/Senior Botanist) and Amy Johnston (Graduate Environmental Consultant). The area was traversed on foot and by 4WD. A handheld GPS unit was used to record the coordinates of significant flora observed. Unknown specimens collected during the survey were identified with the aid of samples housed at the Botanica Herbarium and Western Australian Herbarium.

4.3. Scientific licenses

Table 4-1: Scientific Licenses of Botanica Staff coordinating the survey

Licensed Staff	Permit Number	Date of Expiry
Jim Williams	FB62000457 – Flora Taking (Biological Assessment) Licence	04/08/2025
Amy Johnston	FB62000764 – Flora Taking (Biological Assessment) Licence	08/01/2026

4.4. 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 4-2.

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.

Table 4-2: Limitations and constraints associated with the targeted flora survey

Variable	Potential Impact on Survey	Details
Access problems	Not a constraint	The survey was conducted via 4WD and on foot. The survey area was accessible by numerous access tracks.
Competency/ Experience	Not a constraint	The Botanica personnel that conducted the survey were regarded as suitably qualified and experienced. Coordinating Staff: Jim Williams (Director and Senior Botanist) with over 20 years experience conducting flora surveys in the area. Data Interpretation: Amy Johnston (Environmental Consultant) and Jen Jackson (Senior botanist)
Timing of survey, weather & season	Not a constraint	Fieldwork was undertaken within the EPA's recommended primary survey time period for the Eremaean Province (i.e., 6-8 weeks following the wet season from March to June).
Area disturbance	Not a constraint	The majority of native vegetation survey area was in good condition.
Survey Effort/ Extent	Not a constraint	Survey intensity was appropriate for the size/significance of the area with a targeted survey completed to identify conservation significant flora.
Availability of contextual information at a regional and local scale	Not a constraint	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 Murchison bioregion 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.
Completeness	Not a constraint	In the opinion of Botanica, the survey area was covered sufficiently in order to identify conservation significant flora. All observed flora individuals were able to be identified to species level.

5. Results

5.1. Flora

No *Calytrix verruculosa* or any other Priority Flora taxa were identified within the target survey area. The GPS tracklog is provided in Attachment 2.

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DBCA (2024b). *Threatened and Priority fauna database search [Ref 44-0824FA]*. Obtained from the Department of Biodiversity, Conservation and Attractions, WA. February 2024.

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Disclaimer

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Quality Assurance

An internal quality review process has been implemented to each project task undertaken by BC. Each document and its contents are carefully reviewed by core members of the Consultancy team and signed off at Director Level prior to issue to the client. Draft documents are submitted to the client for comment and acceptance prior to final production.

Prepared by: Amy Johnston
Graduate Environmental Consultant
Botanica Consulting

Reviewed by: Andrea Williams
Director
Botanica Consulting

Approved by: Jim Williams
Director
Botanica Consulting

Attachment 1: 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 2, Division 1 of the <i>Biodiversity Conservation (Listing of Native species) (Fauna) Order 2024</i> for critically endangered fauna or Schedule 1 Division 1 of the <i>Biodiversity Conservation (Listing of Native Species) (Flora) Order 2024</i> 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, Division 2 of the <i>Biodiversity Conservation (Listing of Native species) (Fauna) Order 2024</i> for endangered fauna or Schedule 1 Division 2 of the <i>Biodiversity Conservation (Listing of Native Species) (Flora) Order 2024</i> 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 2, Division 3 of the <i>Biodiversity Conservation (Listing of Native species) (Fauna) Order 2024</i> for vulnerable fauna or Schedule 1 Division 3 of the <i>Biodiversity Conservation (Listing of Native Species) (Flora) Order 2024</i> 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 3 of the <i>Biodiversity Conservation (Listing of Native species) (Fauna) Order 2024</i> for extinct fauna or Schedule 2 of the <i>Biodiversity Conservation (Listing of Native Species) (Flora) Order 2024</i> 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.	
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).

Code	Category
	Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the <i>Convention on the Conservation of Migratory Species of Wild Animals</i> (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species. Published as migratory birds protected under an international agreement under Schedule 1 Division 2 of the <i>Biodiversity Conservation (Listing of Native species) (Fauna) Order 2024</i> .
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 1 Division 1 of the <i>Biodiversity Conservation (Listing of Native species) (Fauna) Order 2024</i> .
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 1 Division 3 of the <i>Biodiversity Conservation (Listing of Native species) (Fauna) Order 2024</i> .
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. (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	

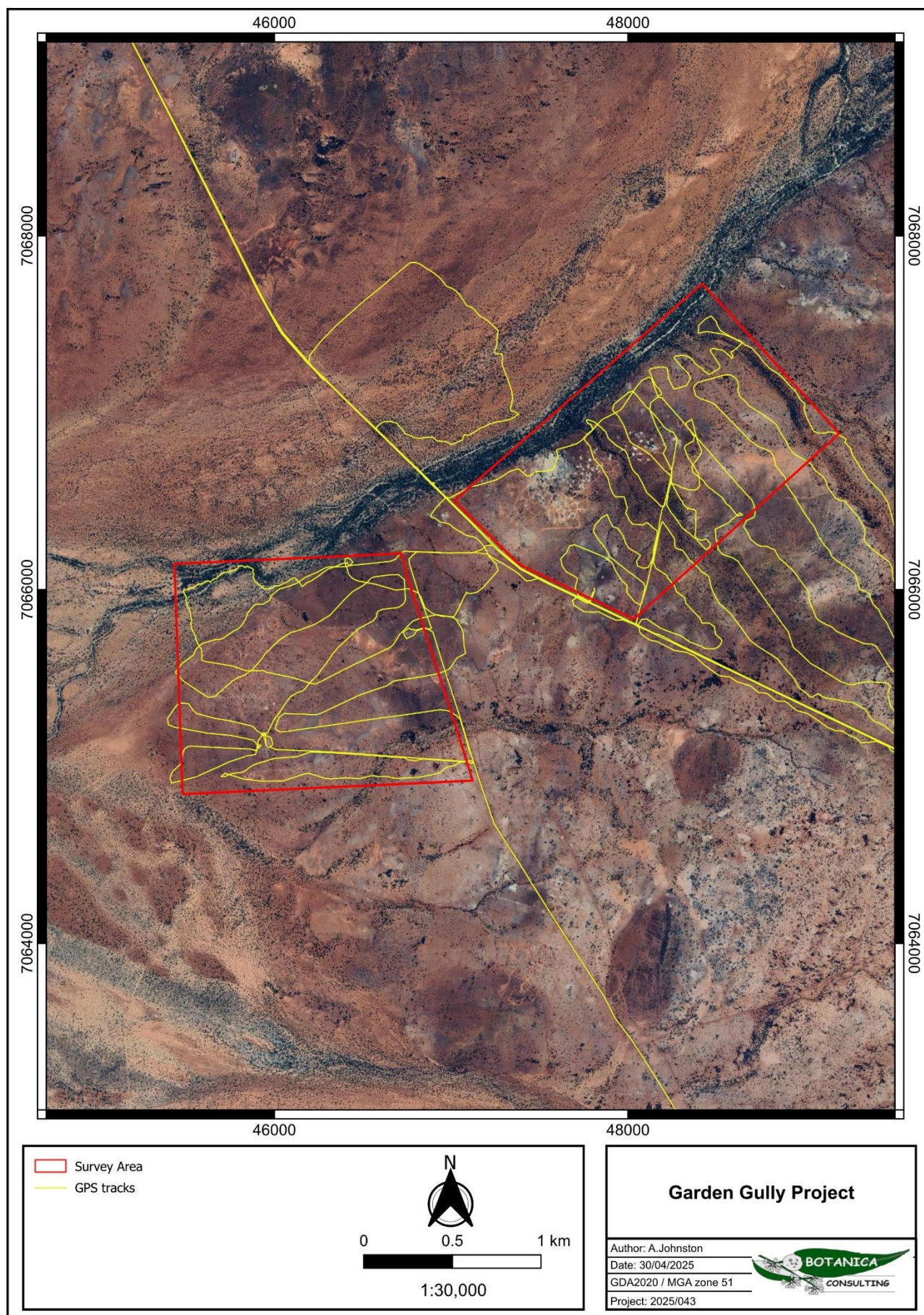
Code	Category
EX	Extinct Taxa where there is no reasonable doubt that the last member of the species has died.
EW	Extinct in the Wild Taxa where it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known 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;
EN	The ecological community is highly modified with potential of being rehabilitated in the immediate future.
	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.

Attachment 2: Map showing GPS tracklog of the survey area



APPENDIX I:
HYDROLOGICAL AND
HYDROGEOLOGICAL
ASSESSMENT (ROCKWATER 2024)

**GARDEN GULLY PROJECT
MEEKATHARRA**

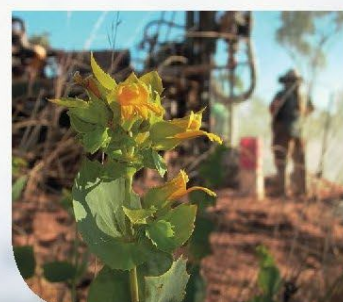
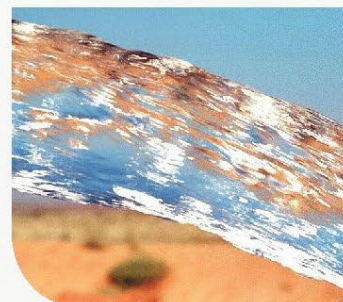
**HYDROLOGICAL &
HYDROGEOLOGICAL
ASSESSMENT**

**REPORT FOR
ORA GOLD LTD**

OCTOBER 2024



Rockwater
HYDROGEOLOGICAL AND ENVIRONMENTAL CONSULTANTS



Report No. 586.0/24/02b

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I	IFD Chart and Tables
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III	Pumping Test Analyses
IV	Water Quality Analyses Certificates

REVISION	AUTHOR	REVIEW	AUTHORISED	ISSUED
0	PHW	JRP	PHW	3/10/2024
1	PHW		PHW	7/10/2024
2	PHW		PHW	29/10/2024

1 INTRODUCTION

Ora Gold Limited is planning to mine gold at its Crown Prince deposit at Garden Gully, 15 km north of Meekatharra (Figure 1). This hydrogeological assessment of the deposit and surrounding area has been prepared to provide estimates of the mine dewatering requirements and the potential groundwater-related impacts of mining. In addition, a hydrological (surface water) study has been made of the Garden Gully catchment, in which the project is located. The study was conducted to estimate the extent of peak floods in the vicinity of the deposit.

This report presents the data collected and the results of the hydrological and hydrogeological assessment by Rockwater, to be used in mine planning and in obtaining approvals for the project. It is an update of an earlier report (Rockwater, March 2024) following the drilling and construction of monitoring bores, completion of a pumping test on the existing dewatering bore, passive seismic surveying to define a palaeochannel, and revision of the surface water assessment using accurate topographic data that are available following a LIDAR survey.

2 SURFACE WATER HYDROLOGY

2.1 TOPOGRAPHY AND DRAINAGE

Garden Gully drains a moderately-large catchment that lies to the north and east of Garden Gully (Fig. 2). It drains to the south-west, towards Hope River, a palaeodrainage (35 km from the project site) that is a zone of groundwater (and surface water) discharge. Topographic contours (10 m interval) derived from the DEM-H version of the one-second SRTM dataset (Geoscience Australia, 2011) are shown for the main catchment area (A), together with the project site layout, and three local catchments (B to D) with the potential to impact pits and mine infrastructure, in Figures 2 and 3.

2.2 CLIMATE

Garden Gully is located within the Arid Region as delineated in Australian Rainfall and Runoff 1987. The nearest Bureau of Meteorology (BoM) station with a long data record is at Meekatharra Airport (Stn. 007045), located 19 km south-east of the project site.

Rainfall at Meekatharra AP has been recorded since 1944. Annual rainfall is highly variable, ranging from 66 mm to 573 mm over the period of record. The long-term mean annual rainfall is 234 mm, with the month of February having the highest monthly average of 36.1 mm and September the lowest at 5.0 mm (Table 1). Rainfall over the winter months is generally associated with the passage of cold fronts from May through to August. Summer rainfall is highly erratic, and generally results from thunderstorms or cyclonic weather activity in the north.

Table 1: Average rainfalls and Dam Evaporation, Meekatharra (mm)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rainfall	29.2	36.1	30.8	18.8	21.6	28.5	20.0	10.6	5.0	6.0	11.7	14.4	234.0
Dam Evap.	380	314	267	190	131	87	92	121	170	259	293	333	2,637

Average dam evaporation (Luke, Burke, and O'Brien, 1988) is also given in Table 1. It exceeds average rainfall in all months, and by a factor of 11 overall.

Monthly mean maximum temperatures at Meekatharra range from 19.3 °C in July to 38.4 °C in January; and monthly mean minimum temperatures range from 7.5 °C in July to 24.4 °C in January.



2.3 RAINFALL ANALYSIS

The methods given in the Australian Rainfall and Runoff 1987 guidelines (Pilgrim et. al., 1987) were used for hydrologic analysis of the Garden Gully catchment A and local catchments B to D at the project site, to predict flood flows in the main and local drainages. It should be noted that a revision of the guidelines (ARR, 2019) was published to replace the 1987 version. However, the new publication uses the Regional Flood Frequency Estimation (RFFE) model, which is not applicable for the arid region of WA and so was not used in this assessment.

Intensity-Frequency-Duration (IFD) curves for the project area were obtained from the Bureau of Meteorology web-site, and are based on the statistical and meteorological analyses given in the ARR 1987 Guideline (Pilgrim et. al., 1987). The IFD tables and curves are included in Appendix I.

The Probable Maximum Precipitation (PMP) was taken to be a 1-in-2000-year event, with a 0.05 % probability of it occurring in any year. The Probable Maximum Flood (PMF) would result from a PMP event.

2.4 CATCHMENT CHARACTERISTICS

The catchments are shown in Fig. 2, and the local catchments in more detail with LIDAR contours in Fig. 3; their characteristics are summarised in Table 2.

Table 2: Catchment Characteristics

Catchment	Area (km ²)	Length (km)
A	546.5	31.2
B	6.1	3.68
C	2.5	2.54
D	0.96	1.42

2.5 TIME OF CONCENTRATION

The time of concentration is required in order to estimate the critical storm duration for peak flows in each catchment. This was estimated using Equation 1 for the Arid Interior Region of Western Australia as recommended by ARR 1987 and later editions:

$$t_c = 0.76 \cdot A^{0.38} \quad \text{Equation 1}$$

Where:

t_c is the time of concentration (hours)
 A is the catchment area (km²)

2.6 RATIONAL METHOD

The Statistical Rational Method, used in peak-flow estimation, is presented in Equation 2.

$$Q_y = 0.278 \cdot C_y \cdot I_{tcy} \cdot A \quad \text{Equation 2}$$

Where:

Q_y is the peak flow for return period of y years (m³/s)
0.278 is a dimensionless metric conversion factor
 C_y is the runoff coefficient for y years (dimensionless)
 I_{tcy} is rainfall intensity (mm/hr)
 A is catchment area (km²)



2.7 FLOOD INDEX METHOD

The Australian Rainfall and Runoff Guideline (1987) does not provide equations for peak flow estimation using the flood index method for the Arid Region. However, the Garden Gully area is similar to the Wheatbelt, with loamy soils, and so the Flood Index Method for that region, presented in Equation 3, was used for comparative purposes.

$$Q_5 = 2.77 \times 10^{-6} \cdot A^{0.52} \cdot p^{2.12} \quad \text{Equation 3}$$

Where:

Q_5 is the peak discharge for the 5-year ARI flow (m³/s)

A is the catchment area (km²)

p average annual rainfall (mm)

2.8 PEAK FLOWS

Design peak flows for the catchments, as estimated using the Rational and Flood Index Methods, are given in Table 3.

Table 3: Estimated Peak Flows

Catchment A:

ARI Years	2	5	10	20	50	100	PMF*
Rational	15.9	49.2	86.1	135.5	216.7	298.9	449.6
Index	9.0	18.0	31.7	54.9	101.7	179.0	
Adopted	15.9	49.2	86.1	135.5	216.7	299	450

Catchment B:

ARI Years	2	5	10	20	50	100	PMF*
Rational	1.4	4.2	7.2	11.0	17.1	23.2	34.8
Index	0.6	1.2	2.1	3.7	6.9	12.1	
Adopted	1.4	4.2	7.2	11.0	17.1	23.2	34.8

Catchment C:

ARI Years	2	5	10	20	50	100	PMF*
Rational	0.9	2.5	4.2	6.4	9.9	13.4	20.1
Index	0.4	0.7	1.2	2.1	4.0	7.0	
Adopted	0.9	2.5	4.2	6.4	9.9	13.4	20.1

Catchment D:

ARI Years	2	5	10	20	50	100	PMF*
Rational	0.5	1.5	2.6	4.0	6.1	8.3	12.4
Index	0.2	0.4	0.7	1.2	2.3	4.0	
Adopted	0.5	1.5	2.6	4.0	6.1	8.3	12.4

* PMF (probable maximum flood) taken to be a 1-in-2000-year event, estimated by multiplying factors from CRC-Forge results

3 HYDRAULIC ANALYSIS

3.1 IMPACT OF FLOOD FLOWS ON THE PROJECT AREA

Peak flows in the catchment for 100-year ARI and PMF events were analysed to assess whether they could adversely impact the Garden Gully pits and infrastructure.

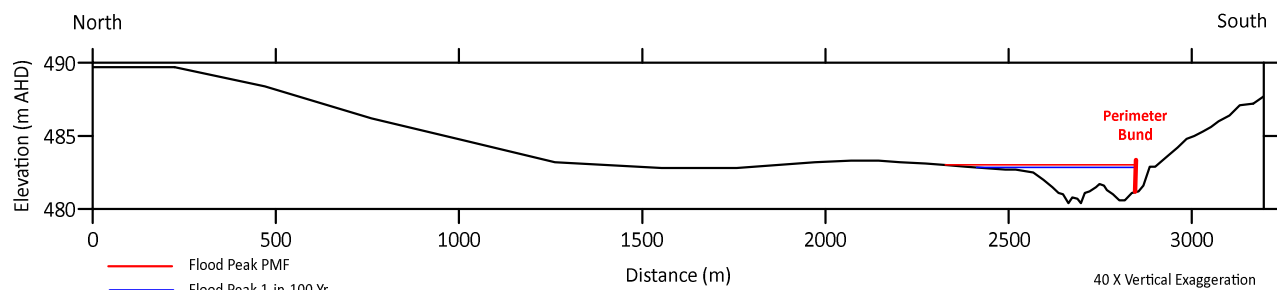
3.1.1 CATCHMENT A, GARDEN GULLY DRAINAGE

The width, depth and velocity of flows along the Garden Gully drainage were estimated at a cross-section (Cross-Section 1) trending north-westerly from the planned western pit (Fig. 3), from stage-discharge and stage-velocity relationships that were calculated using Manning's equation. The new LIDAR contours indicate the reach of the drainage adjacent to the planned pits is relatively flat and so would result in higher flood flows.

The results of the hydraulic analyses are presented below.

During a 1-in-100-year flood event, the flood levels from the catchment at the cross-section, with a protective bund on the northern side of the pit, would peak at a calculated 482.6 m AHD with a flow width of about 480 m (Text-Figure 1), and the level would be about 0.2 m higher in a Probable Maximum Flood (PMF).

Text-Figure 1: Section Across Garden Gully Drainage with 100-year ARI Flood Level and PMF



The approximate extent of the 1-in-100 Year flood without a protective bund is shown in Figure 4. The planned position of the bund is shown in Figure 3. The design of the bund, which would need to be about 2.5 m high, should be checked to ensure it can withstand low velocities of about 0.54 m/d during flood flows. The presence of the bund would not significantly impact flood levels.

The calculated maximum depth of water in the 1-in-100-year flood would be about 2.2 m and the maximum velocity in the order of 0.51 m/s (Table 4). At that velocity there should be minimal risk of erosion of the perimeter bund.

Table 4: Garden Gully Catchment Section, 100-year ARI Flood and PMF Summary

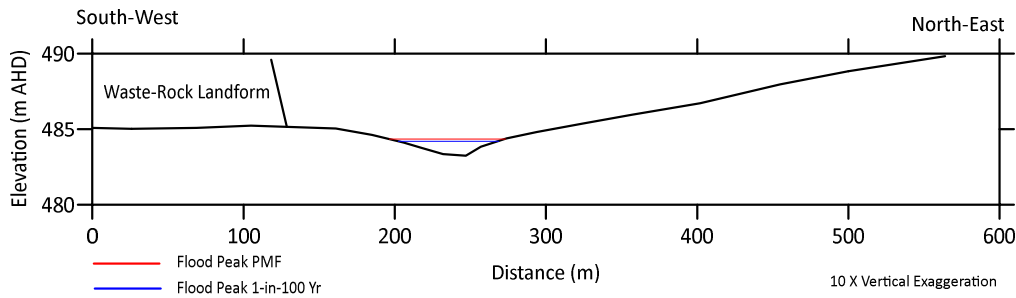
Flood Analysis	Peak Flow	Flood Level	Max. Depth	Velocity	Extent of Flood Level
	(m ³ /s)	(m AHD)	(m)	(m/s)	(m)
100-Year	299	482.6	2.2	0.51	480
PMF	450	482.8	2.4	0.54	512

3.1.2 CATCHMENT B, EASTERN SIDE OF PLANNED WRL

Catchment B has a northerly-trending drainage that flows into Garden Gully after passing near the eastern wall of the planned waste rock landform (WRL), as shown in Figure 3. Peak flood flows in the drainage were calculated on Cross-Section 2, which extends to the north-east from the WRL.

During a 1-in-100-year flood event, the flood levels from the catchment at the cross-section would peak at a calculated 484.2 m AHD with a flow width of about 67 m (Text-Figure 2), and the level would be about 0.14 m higher in a Probable Maximum Flood (PMF). Flood flows should not extend to the WRL wall.

Text-Figure 2: Cross-Section 2 across Drainage East of WRL



The calculated maximum depth of water in the 1-in-100-year flood would be about 0.95 m and the maximum velocity in the order of 0.76 m/s (Table 5).

Table 5: Cross-Section 2, 100-year ARI Flood and PMF Summary

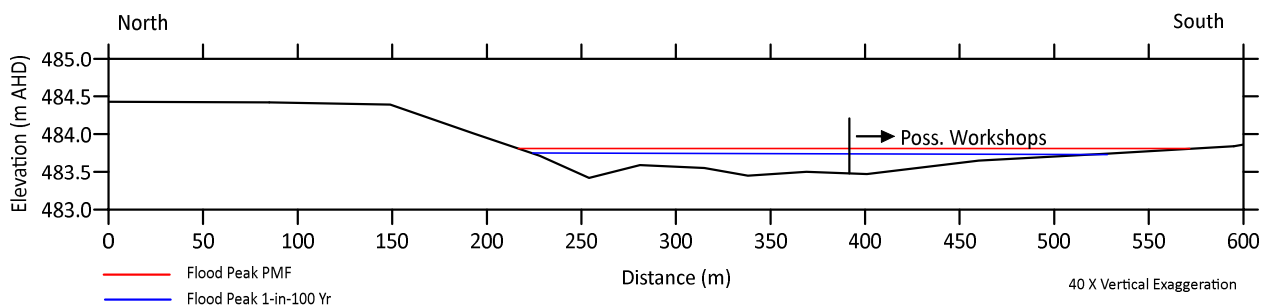
Flood Analysis	Peak Flow	Flood Level	Max. Depth	Velocity	Extent of Flood Level
	(m ³ /s)	(m AHD)	(m)	(m/s)	(m)
100-Year	23.2	484.18	0.95	0.76	67
PMF	34.8	484.32	1.09	0.83	77

3.1.3 CATCHMENT C, SOUTH OF PLANNED MINING AREA

Catchment C has a westerly-trending drainage that flows passes near to the southern potential workshop site, as shown in Figure 3. Peak flood flows in the drainage were calculated on Cross-Section 3, which extends from north to south at the workshop site.

During a 1-in-100-year flood event, the flood levels from the catchment at the cross-section would peak at a calculated 483.7 m AHD with a flow width of about 304 m (Text-Figure 3) extending at shallow depth over the planned workshops site. The level would be about 0.07 m higher in a Probable Maximum Flood (PMF).

Text-Figure 3: Cross-Section 3 across Drainage near Southern Workshop Site



The calculated maximum depth of water in the 1-in-100-year flood would be about 0.32 m and the maximum velocity in the order of 0.32 m/s (Table 6).

Table 6: Cross-Section 3, 100-year ARI Flood and PMF Summary

Flood Analysis	Peak Flow	Flood Level	Max. Depth	Velocity	Extent of Flood Level
	(m ³ /s)	(m AHD)	(m)	(m/s)	(m)
100-Year	16.5	483.7	0.32	0.32	304
PMF	25	483.8	0.39	0.36	355

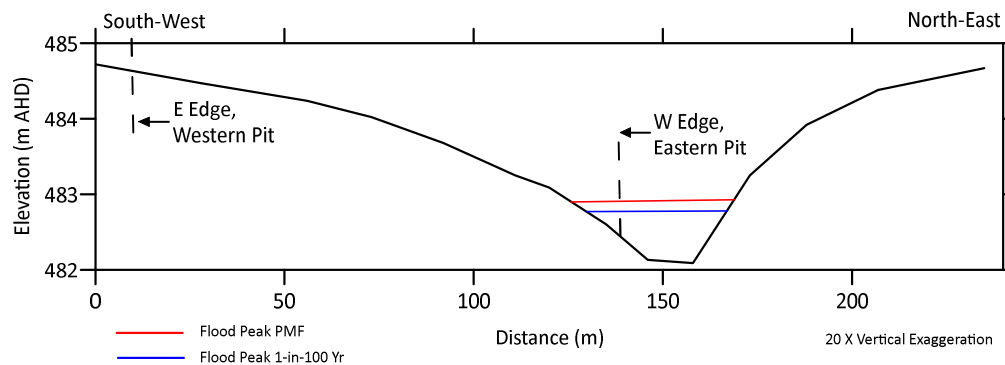
If workshops are to be built at the southern site, the ground level would need to be raised or a low bund constructed on the northern side of the site, to prevent flooding.

3.1.4 CATCHMENT D, DRAINAGE BETWEEN THE TWO PLANNED PITS

Catchment D is small, extends south-east of the planned pits, and drains between the pits to Garden Gully (Fig. 3). Peak flood flows in the drainage were calculated on Cross-Section 4, which extends between the pits.

During a 1-in-100-year flood event, the flood levels from the catchment at the cross-section would peak at a calculated 482.8 m AHD with a flow width of about 37 m (Text-Figure 4). The level would be about 0.13 m higher in a Probable Maximum Flood (PMF). The planned eastern pit extends into the drainage, and so a diversion drain would be need around the western side of the pit. The western pit would not be affected.

Text-Figure 4: Cross-Section 4 between the Planned Pits



The calculated maximum depth of water in the 1-in-100-year flood (without the pit) would be about 0.69 m and the maximum velocity in the order of 0.63 m/s (Table 7).

Table 7: Cross-Section 4, 100-year ARI Flood and PMF Summary

Flood Analysis	Peak Flow	Flood Level	Max. Depth	Velocity	Extent of Flood Level
	(m ³ /s)	(m AHD)	(m)	(m/s)	(m)
100-Year	8.3	482.8	0.69	0.63	37
PMF	12.4	482.9	0.82	0.71	43

A conceptual plan for the diversion drain is shown in Figure 3. The drain should have a cross-sectional area of about 17 m², and so could be about 20 m wide and 0.9 m deep; with excavated material used to form a bund on its eastern side for additional protection. Also, the pit bund should not extend around both pits as shown in the mine design, as the existing drainage and diversion drain will need to discharge to Garden Gully unimpeded.

4 HYDROGEOLOGICAL ASSESSMENT

4.1 MINING AND GENERAL HISTORY

Mining at Garden Gully commenced in 1897 to 1901 at the Crown/Old Battery workings (Department of Mines, 1954): the first battery at Meekatharra was located there, as was the first town well. This was followed by the Kyarra discovery (1909 to 1915). There were further minor workings in 1935-36 at Kyarra, and 1935 to 1942 (Sabbath).

Garden Gully was listed as a Heritage Site by the Shire of Meekatharra (Gray and Sauman, 2012) and the following information was included for the site. Gold was found there and a 10-head battery was installed in 1894 by Garden Gully G.M. Co., and crushed ore until 1901 when the State Battery commenced operation.

Around 1910, Bennett's Hotel was constructed on the main track between Meekatharra and Garden Gully and on to Abbots and Peak Hill. Wells were sunk along the edge of Garden Gully creek around 1905, and pumping stations were established to provide water for Meekatharra (Reserve A10633 was presumably proclaimed then to cover the wellfield). The water from Garden Gully was highly mineralised and found to be unsuitable for domestic use, but was used for at least one mine, the Fenian at Paddy's Flat.

4.2 GEOLOGY

The Tieraco 1:100,000 Geological map for the area (Chen and Ivanic, 2009) shows that the Garden Gully gold deposits are situated in an area of colluvial footslope (including ferruginous gravel and duricrust) with a northerly-trending, Proterozoic dolerite dyke.

A description of the Archaean geology in the area of the Kyarra workings at Garden Gully, close to the Meekatharra – Mount Clere Road is taken from St Barbara (1994). The mineralised area is underlain by undifferentiated felsic sedimentary rocks to the west, sheared felsic volcanic and volcanoclastic rocks to the east, with some local mafic to ultramafic units. Further east there is a thin unit of Stockyard Basalt, and then granitic intrusives. Geological interpretation by Boddington (2015) shows the host rock to be mainly a mafic volcanic (dolerite or basalt) with some ultramafic units (talc-chlorite and sericite schists).

Gold mineralization is associated with steeply dipping quartz veins within a series of anastomosing ductile shear zones. The linear drainage of Garden Gully is interpreted to follow a cross-cutting, north-easterly trending fault (Garden Gully Shear Zone) which truncates rock units to the south. Three other north-north-easterly trending faults are shown truncating mineralised zones on a plan in the Ora Gold October 2023 Investor Presentation. Aeromagnetic survey results for the area (MagSpec, 2016) show a complex structure for the area, including apparent northerly faults trending west of north, and east – west faults.

A tributary palaeochannel of Tertiary age follows the Garden Gully drainage on its northern side (Fig. 5) and has been defined by a passive-seismic survey (Resource Potentials, 2024). The survey results suggest that the palaeochannel is about 70 m deep. The palaeochannel is likely to contain basal sands (Werillup Formation). One drillhole north of the drainage is reported to have intersected about 100 m of sand; and the Main Roads bore probably intersects the southern edge of the channel.

4.3 FIELD INVESTIGATIONS

4.3.1 BORE REHABILITATION AND DOWNHOLE CAMERA SURVEY

The Crown Prince production bore (Bore CP, Fig. 5) was inspected using a downhole camera survey on 16 July 2024. The survey determined the downhole bore construction, including depths of blank PVC casing and slotted lengths, which were previously unknown. The slotted PVC lengths appear to be manually slotted from 38.13 m to the base of the bore at 73.13 m

The camera survey identified a raised lip at a depth of 49.78 m, restricting the internal diameter and preventing the lowering of a 4" submersible pump beyond this point for subsequent hydraulic testing (discussed in Section 4.3.3). Bore CP appears to be partially clogged at the time of the survey. Babylon Power and Pump contractors rehabilitated the bore using a downhole brush on 8 September 2024 prior to conducting pumping tests.

Whilst not anticipated as a requirement for this assessment, the nearby Main Roads Bore was also inspected with a downhole camera survey. A summary of the surveyed bore construction details is provided in Table 8, and a log of bore construction details are shown in Appendix II.



4.3.2 MONITORING BORES

Six monitoring bores were drilled and constructed from 27 to 30 August 2024 by Caswell, utilising a 660 Schramm drilling rig employing reverse-circulation (RC) drilling methods. At each site, a hole was drilled to 73 m depth with a 143 mm diameter hammer bit. Airlift water-yields, pH, and electrical conductivity (EC) generally were measured at each rod change. Initial (measurable) water-yields were obtained at around 13 to 25 m depths, within the weathered bedrock (saprolite). The highest groundwater air-lift rates (~ 1.5 L/s) were generally measured at the end of the holes, with notable increases at the interfaces between the weathered and fresh rock at about 50 depth (below ground level).

Monitoring bores were constructed at each drilled borehole to enable monitoring of groundwater drawdown during pumping tests. The bores have been designed to meet the Minimum Construction Requirements for Water Bores in Australia – Fourth Edition (NUDLC, 2020). Details of the monitoring bores are summarised in Table 8, and composite bore logs are included with completion data in Appendix II.

4.3.3 PUMPING TESTS

The Crown Prince production bore (Bore CP) was tested by Babylon Pump and Power from 4 to 8 September 2024, using a 7.5 kW Caprari E4XP60/25 submersible pump installed at 50 m depth. An initial step-rate test, comprising three steps at increasing rates of one-hour each, was conducted at rates of 3, 5, and 7 L/s.

The constant-rate test (CRT) was commenced at a discharge rate of 4 L/s, but the rate of groundwater drawdown quickly exceeded the estimated rates from around 90 minutes into the test. The pumping rate was reduced to 3.5 L/s at 280 minutes into the test, and it was planned to change to a constant head test method if the drawdown approached the pump inlet depth. A drawdown of 36.49 m (final water level of 44.94 m bgl) was measured at the end of the 48-hour test. The bore recovered to within one metre of the initial water level after 50 minutes from the cessation of pumping.

The drawdown data for Bore CP suggest that initially, the drawdown rate was small because much of the water was being pumped from storage in old workings. The rate of drawdown increased as water was then drawn from rocks of relatively low permeability.

Table 8: Summary of drilling and bore construction details at Crown Prince

Bore ID	Target ID	GPS Coordinates		Top of PVC Casing	Drilled Depth	Constructed Depth	Constructed Material	Slotted (open) interval	Bore Annulus			Standing Water Level	Electrical Conductivity (field)	pH	Final Airlift Yield
		GDA2020 Zone 50							Gravel Pack	Bentonite Seal	Cement Seal				
		mE	mN												
Bore CP#	Existing	645,918	7,073,789	0.2	-	-	150 mm ID PVC Vertical slotted	38.13 - 73.13	-	-	-	8.51	1,966	7.05	-
Main Roads bore#	Existing	644,884	7,074,214	0.2	74	63.63	125 mm ID PVC	22.13 - 34.13, 40.13 - 52.13, 58.13 - 63.63	-	-	-	5.76	-	-	-
OGGMB856	MB01	645,929	7,073,758	0.5	73	72	50 mm PVC CL9 (Blank), 50 mm PVC CL12 (Slotted)	54 - 72	6-47 & 49-73	5-6 & 47-48.5	0 – 5	9.92	4,300	8.18	0.7
OGGMB857	MB02	645,925	7,073,871	0.5	73	72		18 - 72	6-73	5-6	0 – 5	7.58	3,930	8.2	1
OGGMB858	MB03	645,946	7,073,788	0.5	73	72		18 - 72	6-73	5-6	0 – 5	9.6	3,460	8.01	2.5
OGGMB859	MB04	645,123	7,073,650	0.5	27	24		6 - 24	6-27	5-6	0 – 5	5.83	-	7.6	-

Existing bore with no prior lithology or bore construction log. Information derived from downhole camera survey on 16 July 2024

Table 9: Aquifer parameters from pumping test of Bore CP

Pumped bore	Monitoring points analysed	Transmissivity	Aquifer Thickness m	Hydraulic Conductivity	Storativity	Comment
		m ² /d		m/d		
Bore CP	MB01, MB03	48.15	64.62	0.74	0.069	Each located ~ 30 m from Bore CP, near the abandoned Kyarra Shaft workings
Bore CP	MB02	33.74	64.62	0.52	0.004	Located 83 m north of Bore CP, towards Garden Gully Creek

The results of the pumping test indicate that the pumping capacity of Bore CP is low, 2 L/s or less.

An assessment of the pumping test data was undertaken using AQTESOLV software to assess the aquifer parameters. Drawdown data from monitoring bores MB01, MB02 and MB03 were analysed using the Theis type-curve solution for an unconfined aquifer that allowed for variable pumping rates. The aquifer parameters determined from the analyses are provided in Table 9 and are given in Appendix III.

Maximum drawdowns measured at the end of the pumping test are given in Table 10.

Table 10: Maximum Drawdowns at end of Bore CP Pumping Test

Bore	Max. Drawdown
	(m)
CP (Prod.)	37.30
MB01	0.81
MB02	0.62
MB03	1.15
MB04	0.02
Main Roads	0.00

Electrical conductivity (EC) measurements of the discharge water throughout the constant-rate test varied from 1,762 to 1,966 $\mu\text{S}/\text{cm}$. Groundwater samples were collected by Babylon on completion of the pumping test and sent to ALS Environmental laboratory (a NATA-accredited laboratory) by courier. Water quality results are presented in Section 4.4.5 and certificates of laboratory analyses are included in Appendix IV.

4.4 HYDROGEOLOGY

4.4.1 GENERAL

There are a number of pastoral bores and wells in the Garden Gully area that are recorded in the Department of Water and Environmental Regulation (DWER) Water Information Reporting (WIR) database, and shown on the 1:100 000 Geological Sheets, in particular the Tieraco sheet referred to in Section 4.1 above (Table 11, and Fig. 6). Locations in the WIR database are inaccurate and often don't coincide with the positions shown on the geological map, as can be seen in the above figure.

There is also a series of Garden Gully bores that are all recorded at or near the same location. They were drilled for Whim Creek Consolidated, presumably in exploration for a mine water supply.

4.4.2 WATER INFORMATION REPORTING DATA

Hydrogeological data for the area that are available in the WIR database are summarised in Table 11.

Some of the Garden Gully bores, located upstream of the Ora Gold project, intersected significant thicknesses of porous calcrete and had moderately high yields (up to 790 m³/d). Pastoral bores and wells generally had low yields (sufficient for that needed for stock) except Hill 60 Well (250 m³/d).

The groundwater is fresh to slightly saline, with salinities ranging from 690 to 3,500 mg/L TDS.

4.4.3 AQUIFER CHARACTERISTICS, GARDEN GULLY

Photographs from four diamond-cored drillholes at Garden Gully, cored from ground surface, indicate that the main permeable broken zones are weathered, sheared mafics (generally dolerite) or ultramafics; or altered quartz mineralised zones. Locations of the strongly-jointed core zones are shown in Figure 7. Most of the rocks below 90 m downhole (at 60° dip) appear to be weakly jointed and of relatively low permeability, although locally some open fractures extend down to about 140 m depth (downhole).

Many drillholes were recorded as having intersected water, commonly from depths below about 12 to 30 m (downhole) in completely oxidised or transition-zone rocks (Fig. 7). Five drillhole logs recorded faults or shears along a north-north-easterly line (Fig. 7). A few holes intersected old stopes. A number of drillholes intersected high water flows from strongly fractured rocks or stopes, generally resulting in the cessation of drilling. The locations of the high-flow zones are shown by red symbols in Fig. 7. One of the holes, OGGRC541 was drilled through one of the northerly trending cross-cutting structures that offset the mineralised zones. It was airlifted with a water flow rate of 5 L/s with the rate probably limited by the small hole diameter (140 mm) and is said to be typical of the wet drillholes.

Two drillholes intersecting the eastern of the three faults (Fig. 5) that are within the envelope of the planned western pit are reported to have had high airlift water rates; these include hole SEB17, which air-lifted at 20 L/s.

There are few cored holes, but some of those in/near the southern orebody (planned western pit) had strongly-jointed zones.

The palaeochannel that has been delineated by the passive seismic survey is likely to contain basal sands of moderate permeability.

Overall, the rocks at Garden Gully are likely to be quite permeable, and would probably require moderate to high pumping rates for pit dewatering.

Table 11: Bores and Wells Recorded in WIR Database

Site Ref	Name	Easting	Northing	Depth	TDS	KL/d	SWL	Aquifer
70200131	GG25	650681	7075062	21.0				Calcrete
70211573	Hill 60 Mill W	639925	7067028	23.8	1060	251	16.76	
70211710	Bennett	644279	7073506	15.2		20	12.19	
70211711	Big Gum Mill W	639679	7072720	6.1		14	3.66	
70211712	Deafy	647360	7069234	41.2	700	22	21.95	
70211713	Little Downey W	649639	7077075	3.4		18	2.13	
70211714	Pettiford	647586	7078775	17.7	700	16	7.92	
70211715	White Horse W	639179	7077188	28.0	3500	6	26.82	
70211716	Well	641663	7076025	0.0				
70211717	Red W	640188	7071005	42.7	1000	6	5.58	
70211718	Outcamp	643841	7072856	0.0	1330			
70211719	D1-87	649489	7073021	66.5	690		10.9	
70211720	D1-88	647266	7071162	94.0			20	
70211721	D2-88	646266	7070320	87.0			21.1	
70211722	D3-88	644934	7068623	111.0			23	
70212006	Joe	651016	7074095	8.2	1315	36	3.35	
70212010	Garden Gully 1	650392	7075156	70.0	2325	138		fract basalt
70212011	Garden Gully 2	650392	7075156	81.0	2150	150		basalt
70212012	Garden Gully 3	650398	7075156	18.0	1070	786		Calcrete
70212013	Garden Gully 4	650385	7075156	22.0		346		Calcrete
70212014	Garden Gully 5	650385	7075156	18.0	1126	144		alluv., calc clay
70212015	Garden Gully 6	650385	7075156	24.0	780	144		Calcrete
70212016	Garden Gully 7	650385	7075156	18.0				gabbro
70212017	Garden Gully 8	650385	7075156	18.0				mafic tuff
70212018	Garden Gully 9	650385	7075156	24.0				mafic tuff
70212019	Garden Gully 10	650385	7075156	24.0	2150	<50		clayey alluv.
70212020	Garden Gully 11	650385	7075156	40.0				basalt
70212021	Garden Gully No 12	650385	7075156	34.0				basalt
70212022	Garden Gully 13	650385	7075156	45.0				basalt
70212023	Garden Gully 14	650392	7075156	16.0				Calcrete
70212024	Garden Gully 5	650392	7075156	20.0				calc. alluv.
70212025	Garden Gully 16	650392	7075156	40.0		101		basalt
70212026	Garden Gully 17	650404	7075149	39.0				basalt or tuff
70212027	Garden Gully 18	650405	7075162	42.0				mafic
70212028	Garden Gully 19	650392	7075162	51.0				basalt
70213061	No 2 W	649031	7074787	0.0			7.62	weath. Greenst.
70213273	Downey W	650048	7076450	4.3	1950		3.05	ferricrete
70219012	Garden Gully 2	645528	7073061	0.0			6.88	

4.4.4 GROUNDWATER LEVELS, FLOW DIRECTIONS

Water levels in bores around Garden Gully – that are recorded in the WIR database – were reduced to m AHD using the SRTM topographic contours described in Section 2.1 above, and together with water levels measured in project bores/drillholes; values are contoured in Fig. 8. The levels indicate that groundwater flows westerly from higher ground (in the east) towards the Garden Gully drainage, and then down the drainage to the south-west. The groundwater level at the Garden Gully project site is at about 475 m AHD.

A few of the water levels in the WIR database would have been impacted by pumping from the bores/wells themselves or others nearby, and there is some uncertainty in bore locations and the SRTM levels used to reduce the WIR water-level data to m AHD.

4.4.5 GROUNDWATER QUALITY

The distribution of salinities recorded in the WIR database are shown in Fig. 9. They indicate values of generally around 1,000 mg/L near the drainage, with some higher values of 2,000 to 2,300 mg/L TDS upstream in the deeper bores drilled for Whim Creek Consolidated.

A water sample from the Kyarra shaft was analysed by SGS for selected parameters in 2004 (Holly Mining, 2004). The results are given in Table 12.

Table 12: Results of Water Analysis, Kyarra Shaft

Parameter	Units	LOR	Value
pH	pH	0.1	8.2
Tot. Dissol. Solids (grav) @ 180°C	mg/L	10	1,800
Calcium	mg/L	0.5	110
Sulphate	mg/L	1	290
Carbonate	mg/L	1	<1
Nickel	mg/L	0.05	<0.05
Arsenic	mg/L	0.005	0.045

The results show that the water was brackish (1,800 mg/L TDS) and slightly alkaline (pH 8.2) with a low arsenic concentration.

The results of the analysis of the water sample collected from bore CP at the end of the pumping test, on 8 September 2024, are given in Appendix IV, and show the water to be very similar to that from the Kyarra shaft. The water is of sodium chloride type, slightly alkaline (pH 7.77), and is brackish with a salinity of 1,620 mg/L TDS. Metal concentrations are generally low or below reference levels, although arsenic is slightly elevated (0.128 mg/L). Nutrients are low – Total nitrogen 2.1 mg/L, and total phosphorus 0.04 mg/L.

Eight additional water samples were collected from bores and drillholes on 4 October 2024 and submitted for chemical analysis. The results for key parameters are given in Table 13, and the certificates of analyses (COA) are included in Appendix IV. Note that in the COA, bore CPMB004 should read CPMB003.

Table 13: Results of Chemical Analyses, Key Parameters, October 2024

Site	mE	mN	TDS	pH	As	TN	TP
			(mg/L)		(mg/L)	(mg/L)	(mg/L)
CPMB03	645925	7073871	1,340	7.71	0.002	5.7	0.04
Kyarra Shaft	645950	7073780	1,640	8.04	0.106	0.9	0.05
OGGDD842R	646179	7073847	2,640	7.89	0.012	9.3	0.04
OGGV1	646145	7073736	2,350	7.86	0.093	93.2	6.28
OGGDD927	646081	7073697	3,000	7.90	0.070	11.8	0.0
OGGDD847	645953	7073719	2,500	8.04	0.021	6.3	0.02
OGGDD846	645989	7073634	4,070	7.86	0.044	12.8	0.04
OGGDD844	646144	7073671	1,770	7.85	0.012	0.9	0.03
		Mean:	2,414	7.89	0.045	17.6	0.82

The nutrients in drillhole OGGV1 are unusually high and could indicate local contamination.

5 DEWATERING ASSESSMENT

5.1 MINE PLAN

The preliminary mine plan is for two pits (Fig. 5), called West and East pits in this report, to be mined to depths of about 136 m and 53 m, respectively, over a three-year period.

5.2 DEWATERING FLOWS

Approximately 295 KL/d were reported to have been pumped from the 95 m-deep Kyarra shaft to keep the shaft and drives dry during early 20th century mining (E. de C. Clarke, 2016, cited in Holly Mining, 2004); and a similar quantity was pumped from a bore alongside the shaft when the shaft was refurbished to a depth of 60 to 70 m in or before 2004.

It is likely that considerably higher dewatering pumping rates would be required during mining of the planned Crown Prince pits, based on the recorded high flows encountered in drillholes and the strong fracturing seen in core photos (see Section 4.3.3 above).

A numerical groundwater model was constructed and run to estimate dewatering flow rates, and groundwater flows to the final mine voids. The calculated flow rates are based on limited data, and should be regarded as approximate only.

5.2.1 MODEL DESCRIPTION

The model consists of a rectangular grid of 80 columns, 122 rows and one layer covering an area of 6 km east-west and 10.2 km north-south centred on the planned pits. The grid is aligned with the geological strike at Crown Prince, 10 degrees east of north. Model cells range in size from 25 m by 25 m at the planned pits, to 100 m by 100 m in peripheral areas.

The model layer extends down from ground level taken to be 484 m AHD, down to 344 m AHD (140 m depth).



The model utilises Processing Modflow Pro version 8.0.47 which incorporates Modflow, finite difference groundwater flow modelling software designed by the U.S. Geological Survey (McDonald and Harbaugh, 1988), and utilises subsequent modifications.

The model was set-up with low values of hydraulic conductivity and storativity for the wall (country) rocks, and low to moderate conductivity and storativity for the mineralised zones based on the values determined from the pumping test results. Relatively high hydraulic conductivity was assumed along the eastern fault where the high air-lift rates were measured. Low hydraulic conductivity of country rock was assumed on cross-cutting structures (Garden Gully shear, and a high-angle shear about 1,500 m south of Crown Prince) where the mineralised zones are offset and there would be restricted groundwater flow along the zones.

Recharge was assumed to be negligible. Constant hydraulic heads were assumed to apply at distances of about 5 km north-and south of Crown Prince, to simulate groundwater flows into the modelled area. The pre-mining water table was assumed to be flat at 480 m AHD.

Model parameters were adjusted in calibrating the model to groundwater-level drawdowns measured during the bore CP pumping test (Section 5.2.2). The adopted model parameters are summarised in Table 14.

Table 14: Summary of Adopted Aquifer Parameters

Horizontal Hyd. Conductivity (m/d)			Specific Yield (v/v)		
Country Rocks	Palaeochannel	Min. Zone	Country Rocks	Palaeochannel	Min. Zone
0.02	0.11	0.04 to 0.30	0.015	0.02	0.03, 0.04

5.2.2 MODEL CALIBRATION

The model was calibrated by using Modflow's Well package to simulate the bore CP pumping test over two days at an average pumping rate of 300 m³/d (3.5 L/s), and then adjusting parameters until the model-calculated drawdowns were close to those measured. The drawdown values are compared in Table 15.

Table 15: Comparison between Measured and Modelled Pumping Test Drawdowns

Bore	Distance From Pumped Bore (m)	Measured Drawdowns (m)				Modelled Drawdowns (m)			
		3 Mins	29 Mins	288 Mins	2 Days	3 Mins	29 Mins	288 Mins	2 Days
MB01	32	0.00	0.00	0.18	0.69	0.00	0.01	0.15	0.79
MB02	82	0.00	0.00	0.05	0.50	0.00	0.00	0.06	0.66
MB03	28	0.00	0.00	0.18	1.03	0.00	0.03	0.18	0.66
MB04	807	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

The calibration should be taken as very approximate, as the modelled drawdowns apply to only a small area of the aquifer.

5.2.3 DEWATERING FLOW RATES

To simulate dewatering, it was assumed that West pit would be mined over two years, and East pit in the third year, with a constant rate of vertical advance in each pit. The numerical model was run using Modflow's Drain package, to estimate dewatering flow rates during development of the two pits. Each model stress period covered a period of four months (122 days).

The estimated average dewatering flow rates calculated using the groundwater model are given in Table 16.

Table 16: Estimated Average Dewatering Flow Rates, Crown Prince Pits

Stress Period	No. Days	Av. m ³ /d	Pit
1	122	2790	West
2	122	3680	West
3	122	3680	West
4	122	2670	West
5	122	2280	West
6	122	1310	West
7	122	0	East
8	122	370	East
9	122	440	East

5.2.4 SENSITIVITY ANALYSIS

Model parameters could be higher or lower than the assumed values, and so there is uncertainty in the estimated dewatering flow rates. The most sensitive parameters are horizontal hydraulic conductivity (KH), and drainable porosity (specific yield, SY). A sensitivity analysis was carried out to assess the potential ranges of dewatering flow rates for two cases:

1. Low flows, if values of KH and SY were only half those assumed; and
2. High flows, if values of KH were double those assumed.

The results are given in Table 17. They indicate that the highest average flows in Months 5 to 12 (SP2 and SP3) could possibly range from 1,900 to 5,400 m³/d, compared to the best estimate of about 3,700 m³/d.

Table 17: Results of Sensitivity Analysis

Model	Calc. Av. Dewatering Flows (m ³ /d)	
Stress Period	Low Flow Case	High Flow Case
1	1,415	3,780
2	1,870	5,290
3	1,870	5,540
4	1,355	4,375
5	1,150	3,880
6	620	2,480
7	0	0
8	190	360
9	260	620

5.3 POTENTIAL IMPACTS OF MINING

The pit base is likely to be at least 100 m from the vegetation, but even so, there would be groundwater level drawdowns beneath the creek with the potential to impact vegetation. Trees along the creek are likely to be supported solely by soil moisture, but a vegetation survey should be conducted to see whether there are any trees that could be phreatophytic.

The Meekatharra Water Reserve, which includes the Sherwood Borefield that provides water for the town, is about 2.5 km from Crown Prince at its closest point (Fig. 2) but about 9 km from the nearest Sherwood Borefield bore. It is possible that drawdowns could extend as far as the closest edge of the reserve, but not as far as the nearest bore in that borefield. The Crown Prince deposit is also within an old water reserve, No. 10633, that was presumably to cover water that was to have been supplied to Meekatharra early in the 20th Century.

There are three pastoral bores or wells (shown on the Tieraco geological sheet) that could potentially be impacted by dewatering: No. 2 Bore, located about 800 m to the west, Gregg Well about 1 km to the north-north-west, and Bennett Bore, 2.5 km to the south-west (Fig. 6). The status of these watering points should be checked and details recorded (for example, water levels, salinity and aquifers intersected; and whether operational).

Model-calculated groundwater-level drawdowns are shown for the end of mining and dewatering of each pit in Figures 10 and 11. They suggest that the largest drawdowns will occur at the end of mining of the deep West Pit; and that at the end of mining of both pits, drawdowns could extend to Gregg Well, Bennett Well or Bore, No. 2 Bore, and Garden Gully 2 (if it exists); and possibly extend just as far as the corner of the Water Reserve.

5.4 WATER DISPOSAL

Water from pit dewatering will be used for dust suppression in the mining area and on the haul road. The project's mining engineer has estimated the water requirement to be about 854 m³/d. Surplus water is proposed to be pumped first to the mined-out 5-Mile pit, 12 km south-east of Crown Prince; and then to Sabbath Pit, located 6.2 km south of Crown Prince.

The pre-mining groundwater level at 5-Mile pit was about 512 m AHD, 9.3 m below ground level (Rockwater, 2017), and there was probably a component of groundwater flow to the north towards Sherwood Borefield, four kilometres to the north with a flow velocity of less than 1 m per year. Since completion of mining, the pit lake level has apparently stabilised at 476.1 m, and so the pit is a groundwater sink, with groundwater flowing towards the pit.

The volume in 5-Mile pit between the pit lake and ground level is about 1.2×10^6 m³. Filling the pit would again result in flow towards the above borefield, but a few years after cessation of mining, the pit lake level would be lowered again by evaporation so that all flow is again towards the pit. There would be no possibility of the discharged water reaching the borefield.

A summary of water quality data provided by Westgold Resources indicates that the pit lake increased in salinity from about 1,400 mg/L TDS initially, to 5,600 mg/L TDS in March 2019, before falling again during and immediately following the latest phase of mining. Arsenic concentrations have ranged from 0.06 to 0.14 mg/L.

No data are available for the as-constructed dimensions of Sabbath Pit, but based on data provided by Westgold, the volume of the pit above the current pit lake level (466.3 m AHD) is about 510,000 m³. A water sample collected from the pit by Westgold Resources in March 2024 had a salinity of 1300 mg/L TDS, pH 8.8, and arsenic 0.012 mg/L.

A water balance prepared by the project's mining engineer indicates that the two pits should be capable of storing water for about 700 days of mining, without considering seepage losses which would increase the storage capacity.

Other means of water disposal are being considered as a contingency, including the use of evaporators, and discharging excess water to Garden Gully.

5.5 NATURE OF FINAL VOIDS

Water-balance calculations for the planned pits are used to estimate the final, post-mining pit lake levels. The calculations assume the following: that 80 % of the average rainfall within each pit perimeter reaches the pit lake; evaporation from the lakes are at the average dam evaporation rate given in Luke, Burke and O'Brien (1988); and that groundwater inflows are as determined by the numerical model. The calculated pit water balance values are given in Table 18.

Table 18: Final Void Water Balances, Crown Prince Pits

West Pit

RL	GW Inflows	Rain Accum.	Evap.	Balance
(m AHD)	(m ³ /d)	(m ³ /d)	(m ³ /d)	(m ³ /d)
Perimeter	0	81	1,147	-1,066
475	160	81	935	-694
460	607	81	734	-46
450	866	81	606	341
425	1,380	81	327	1,134

East Pit

RL	GW Inflows	Rain Accum.	Evap.	Balance
(m AHD)	(m ³ /d)	(m ³ /d)	(m ³ /d)	(m ³ /d)
Perimeter	0	20	290	-270
476	93	20	181	-68
466	300	20	119	201
456	460	20	67	413

A zero value for the balance term – interpolated from values in the final columns of Table 18 – is indicated to occur at lake levels of 458.8 m AHD (West Pit) and 473.7 m AHD (East Pit). These represent equilibrium pit-lake levels and would be 16 m and 1 m, respectively, below the pre-mining (static) groundwater level.

The lower lake levels, compared to the pre-mining static groundwater levels indicate that the final voids should be permanent groundwater sinks. However, in the case of East Pit, the level are close and so it is possible the lake could be a flow-through feature, with flow from East Pit towards West Pit. Water in the pit lakes will gradually increase in salinity, but (as suggested by the modelling and water balances) there is predicted to be no seepage from the pit lakes back into the surrounding groundwater.

5.6 RECOMMENDED INVESTIGATION AND MONITORING PROGRAMME

It is recommended that a test-dewatering bore be constructed at the site of the high airlift water flows in the eastern fault, and that the bore be test-pumped to assess pumping capacity and groundwater-level drawdowns. The results can be used to refine the numerical groundwater model, which would be run to update dewatering requirements and impacts. The bore would form the basis of the dewatering system during mining.

A groundwater monitoring programme should be instituted prior to the commencement of mining, to include project monitoring bores MB03, MB04 and Main Roads bore; vegetation monitoring; and Yoothapina Station bores within six kilometres of Crown Prince including No. 2 Bore, Gregg Well and Bennett Bore.

Monitoring should also include monthly water volumes used for dust suppression and pumped to each disposal point; and pit lake levels in five-mile and Sabbath pits.

The monitoring programme would be a condition of a licence from DWER to extract water for dewatering and mining purposes, and would be described in a Groundwater Licence Operating Strategy (GLOS).

6 CONCLUSIONS

Two Crown Prince pits, in this report referred to as West and East Pits, are planned to be mined to depths of about 136 m and 53 m, respectively, on the southern side of the Garden Gully drainage, over a three-year period.

The results of hydrological and hydraulic analyses indicate that in a 1-in-100 year flood, the maximum depth of flow in the Garden Gully drainage would be about 2.2 m (in a channel within the creek) and the peak flow velocity 0.5 m/s. A perimeter bund south of the creek would be within the flood plain and should be about 2.5 m high and suitably constructed to withstand flood flows and to protect the West Pit.

Another small catchment drains between the two planned pits, and East Pit extends into the drainage line and the zone that would be impacted by flood flows. A diversion drain and bund are proposed to divert flows around East Pit. West Pit should not be affected but would be protected by a perimeter bund.

The southern of two proposed workshop sites would lie within another drainage, and in an area prone to flooding; and so the northern site has now been selected, as it is predicted to be above flood levels.

A tributary palaeochannel of Tertiary age has been defined by a passive-seismic survey on the northern side of Garden Gully. The survey results suggest that the palaeochannel is about 70 m deep.

Many exploration drillholes at the Crown Prince deposit intersected groundwater, and some reported high flows resulted in holes being unable to be completed. Some of the high flows could have been associated with open stopes in old workings, but some drillhole cores appear to be highly fractured and so quite permeable. Two drillholes intersecting the eastern fault of three northerly-trending faults that cut the planned West Pit are reported to have had high rates of water-airlift, including one at a rate of 20 L/s.

The old Kyarra shaft was reported to have been dewatered at a rate of 295 KL/d; and the pumping test on Bore CP near the shaft indicated a similar or lower pumping capacity, and rocks of moderately low permeability in the western part of West Pit.

A water sample collected from bore CP at the end of the pumping test was slightly alkaline (pH 7.77) and brackish with a salinity of 1,620 mg/L TDS. Metal concentrations were generally low or below reference



levels, although arsenic was slightly elevated (0.128 mg/L). Nutrients were low – Total nitrogen 2.1 mg/L, and total phosphorus 0.04 mg/L.

A numerical groundwater model was constructed and run to estimate dewatering flow rates. It was partially calibrated to groundwater-level drawdowns measured during the Bore CP pumping test. The modelling results suggest that dewatering flow rates could average up to 3,700 m³/d, with the peak rates in month's five to twelve of mining West Pit. There should be much lower rates of dewatering of East Pit.

Pit dewatering would result in groundwater-level drawdowns beneath the Garden Gully creek, with the potential to impact vegetation. Trees are probably supported by soil moisture rather than groundwater, but a vegetation survey should be conducted to see whether there are any trees in the creek that could be phreatophytic. Drawdowns could extend to three pastoral bores and wells (if the bores/wells still exist, and are in the positions recorded), and possibly as far as the corner of the Sherwood borefield Water Reserve.

The Crown Prince deposit is within an old water reserve, No. 10633 that is very unlikely to be needed for public water supply.

Water from pit dewatering will be used for dust suppression in the mining area and on the haul road. Surplus water is proposed to be pumped to the mined-out Five-Mile pit, and then to Sabbath Pit. Five-Mile pit has a capacity of about 1.2×10^6 m³, and Sabbath pit about 510,000 m³. The pits should have the capacity to store water for about the first 700 days of mining at the predicted dewatering rates, and probably longer with seepage losses from the pits.

The final mine voids should be permanent groundwater sinks, although in the case of East Pit it is possible the lake could be a flow-through feature, with flow towards West Pit. Water in the pit lakes will gradually increase in salinity, but there should be no seepage from the pit lakes back into the surrounding groundwater.

It is recommended that a test-dewatering bore be constructed at the site of the high airlift water flows in the eastern fault zone. Also, a groundwater monitoring programme should be instituted prior to the commencement of mining, to include Yoothapina Station bores within six kilometres of Crown Prince including No. 2 Bore, Gregg Well and Bennett Bore. The monitoring should also include monthly water volumes used for dust suppression and pumped to each disposal point; and pit lake levels in five-mile and Sabbath pits.

Dated: 29 October 2024

Rockwater Pty Ltd



P H Wharton
Principal

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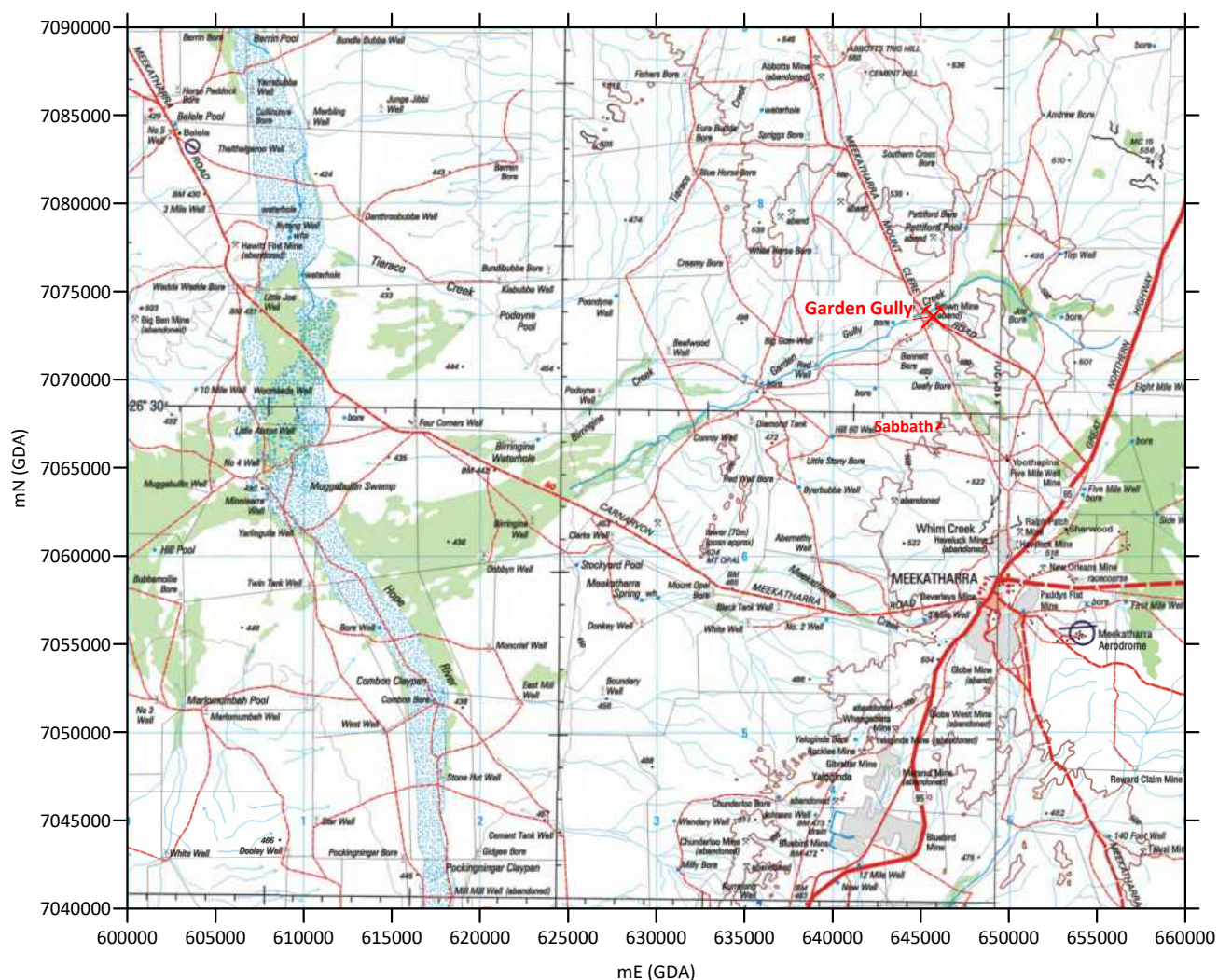
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FIGURES



FIGURE 1



location.srf

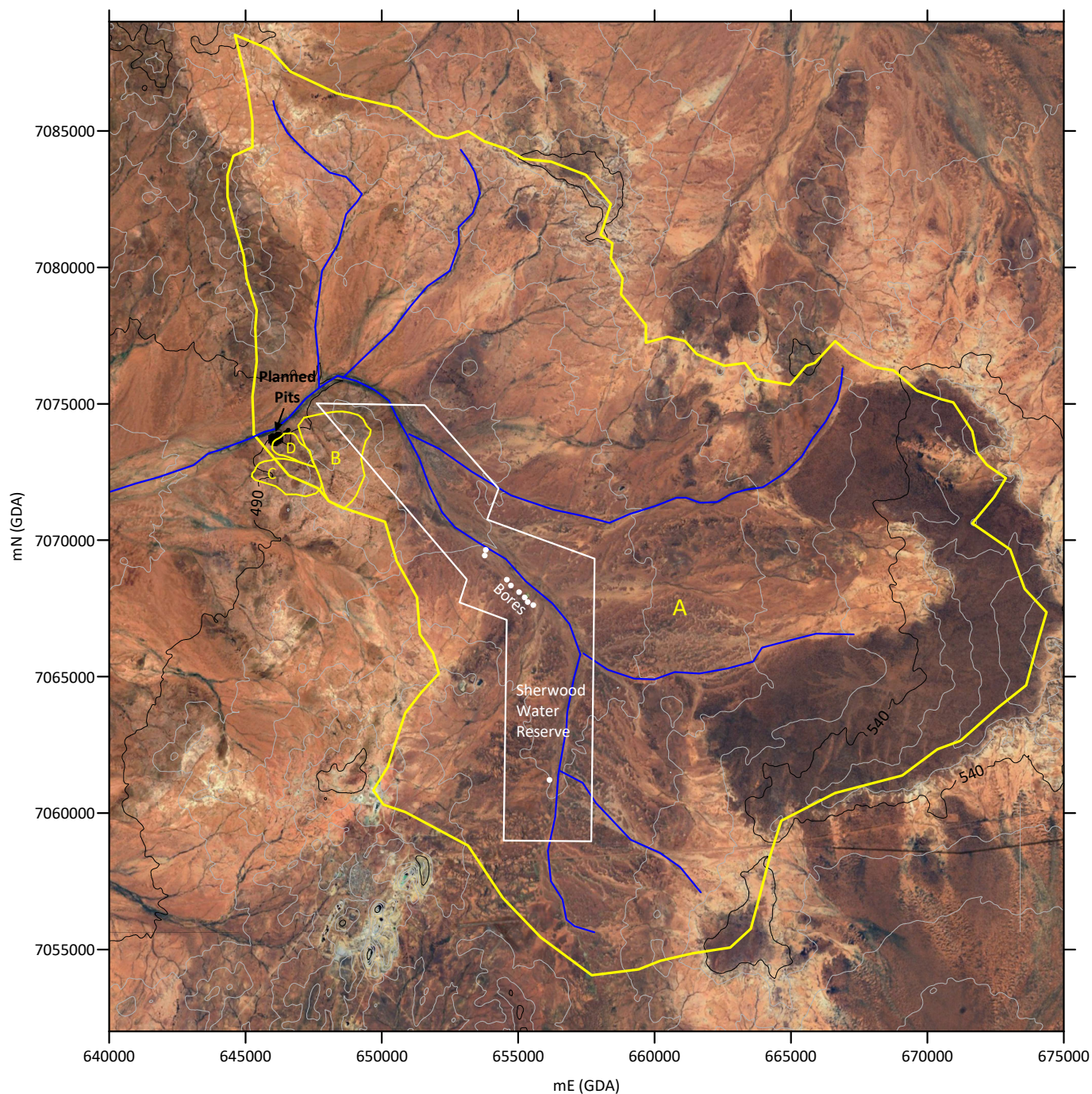
CLIENT: Ora Gold
 PROJECT: Garden Gully
 DATE: September 2024
 Dwg No: 586-0/24/2-1

LOCALITY MAP



Rockwater Pty Ltd

FIGURE 2

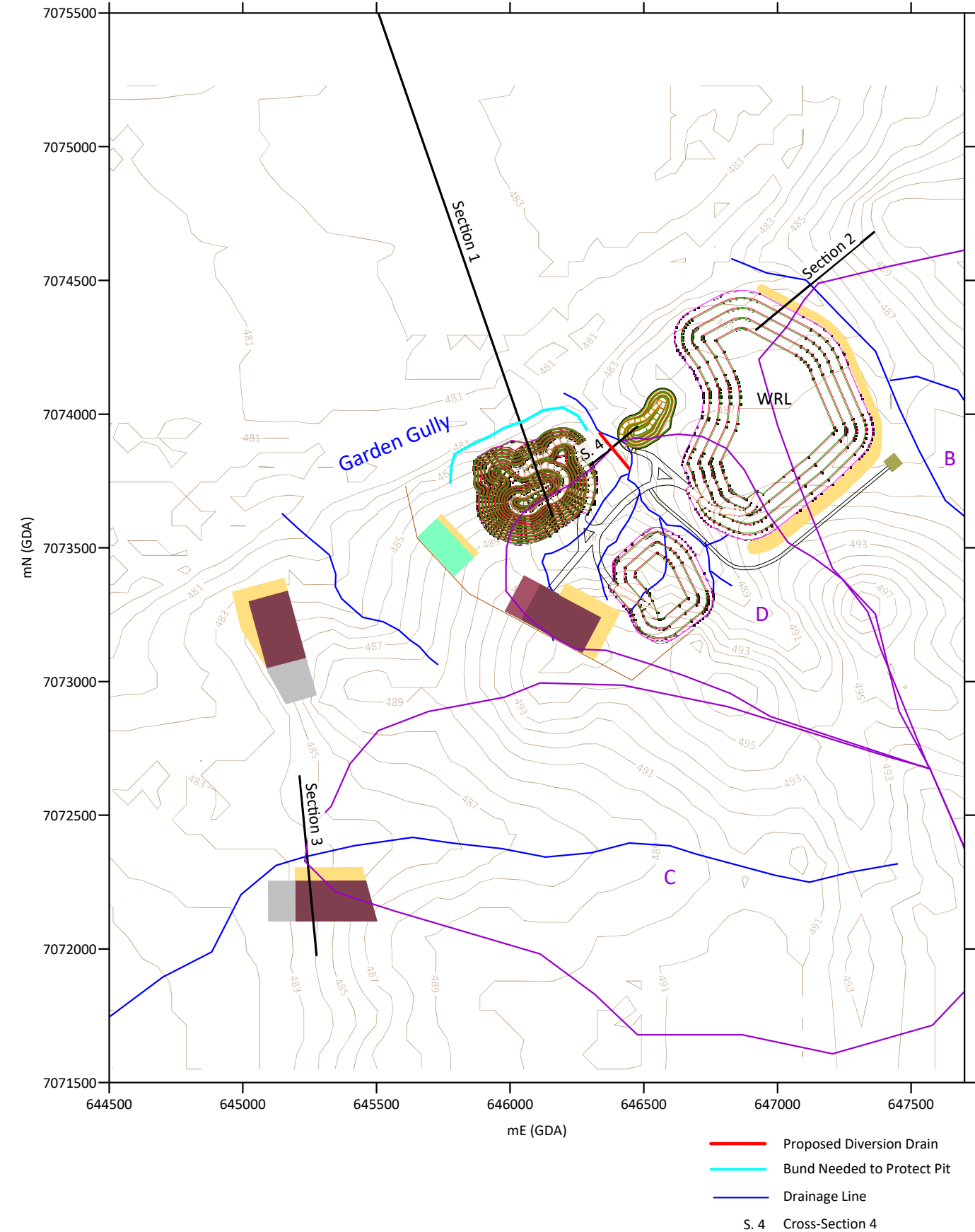


catchment and contours.srf

CLIENT: Ora Gold
 PROJECT: Garden Gully
 DATE: September 2024
 Dwg No: 586-0/23/2-2

GARDEN GULLY CATCHMENTS & WATER RESERVE

FIGURE 3

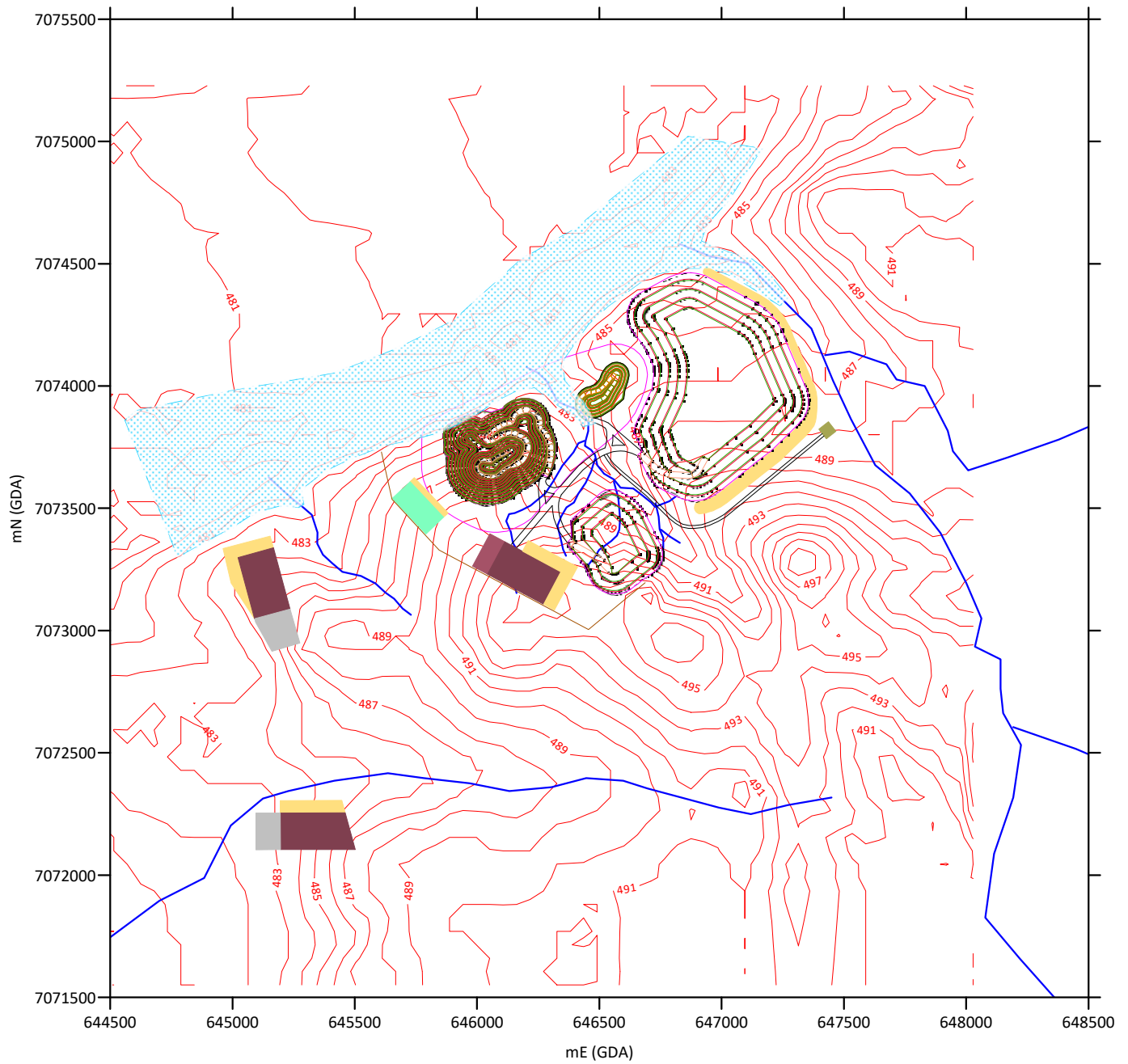


Site Layout Sept & contours.srf

CLIENT: Ora Gold
PROJECT: Garden Gully
DATE: October 2024
Dwg No: 586-0/23/2-3

SITE LAYOUT, SECTION LINES, LIDAR CONTOURS
& FLOOD PROTECTION

FIGURE 4

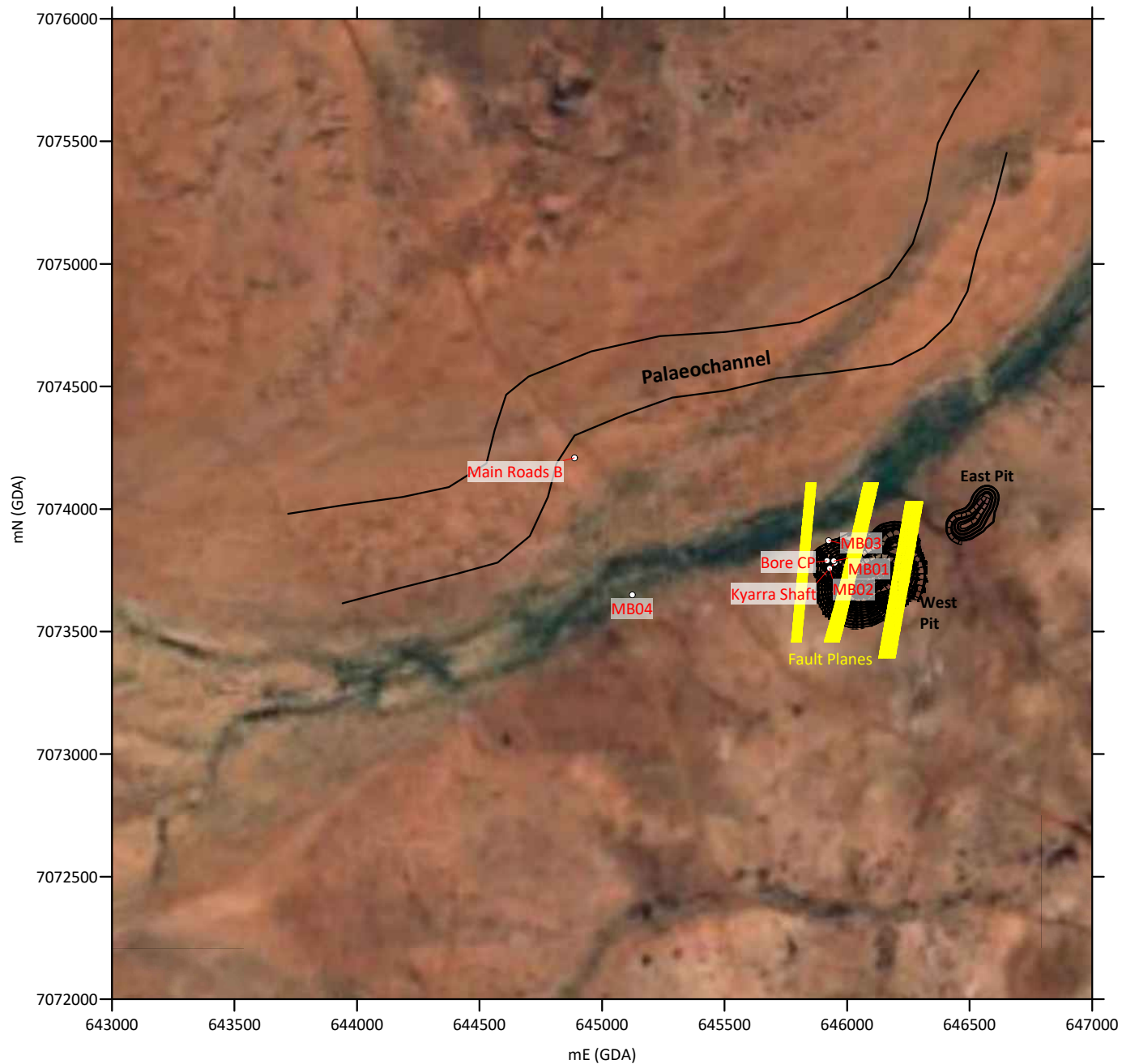


100-y flood extent.srf

CLIENT: Ora Gold
 PROJECT: Garden Gully
 DATE: September 2024
 Dwg No: 586-0/23/2-4

PREDICTED 1-IN-100 YEAR FLOOD EXTENT
 MAIN DRAINAGE, WITHOUT CONTROL STRUCTURES

FIGURE 5

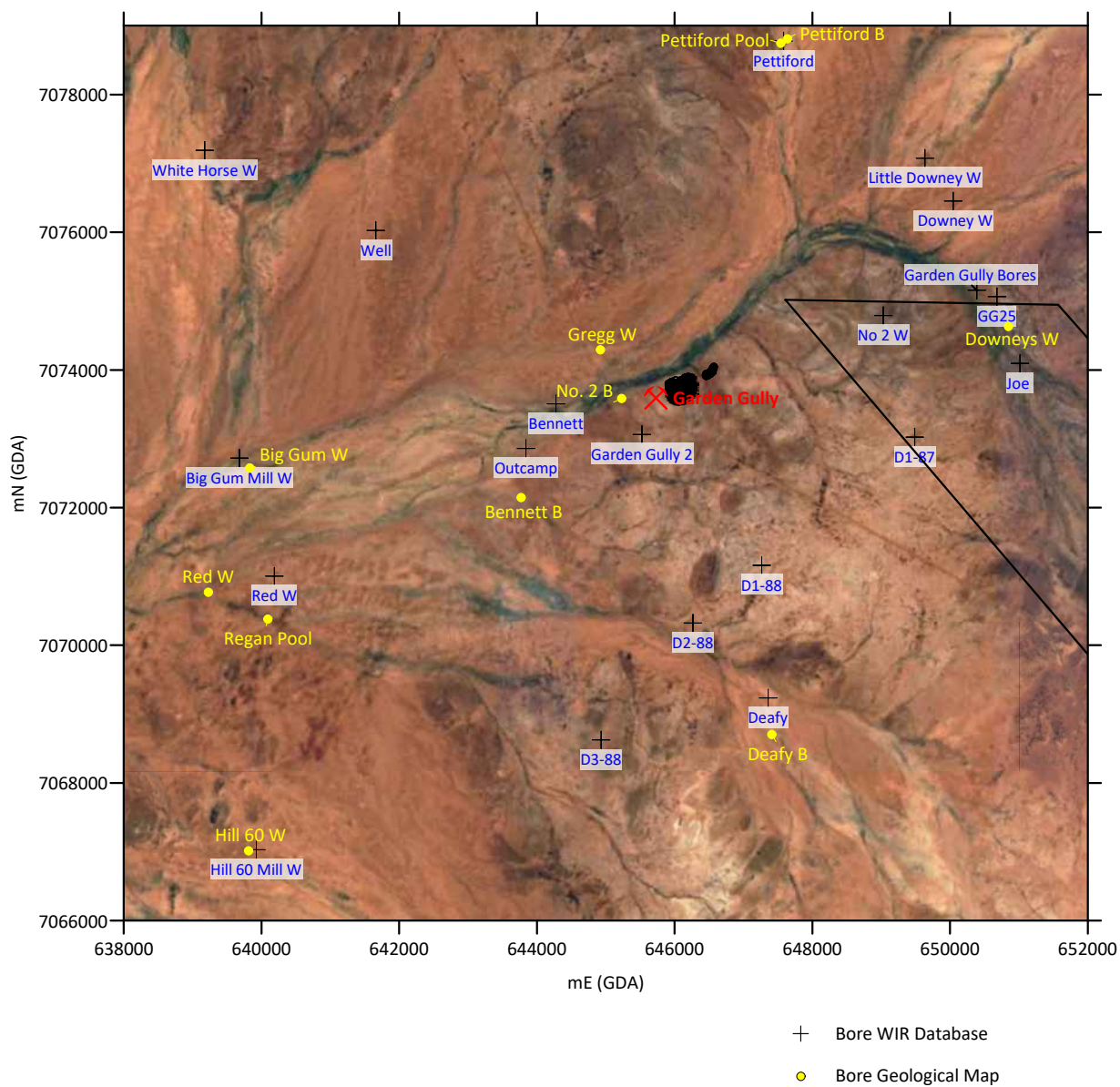


bore locations.srf

CLIENT: Ora Gold
 PROJECT: Garden Gully
 DATE: September 2024
 Dwg No: 586-0/24/2-5

BORE LOCATIONS, GARDEN GULLY

FIGURE 6

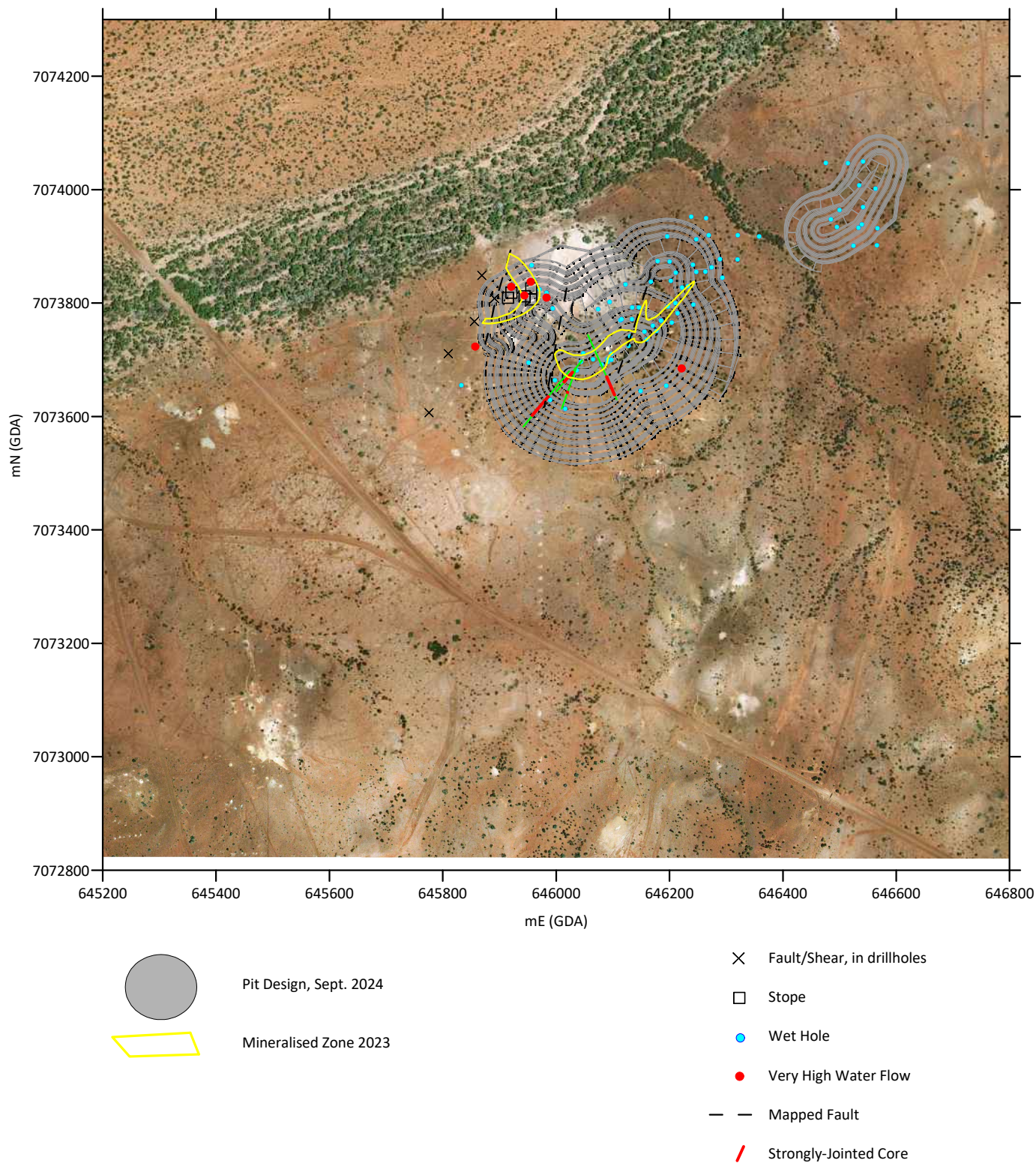


wir bores.srf

CLIENT: Ora Gold
 PROJECT: Garden Gully
 DATE: September 2024
 Dwg No: 586-0/24/2-6

BORES & WELLS, WIR DATABASE

FIGURE 7

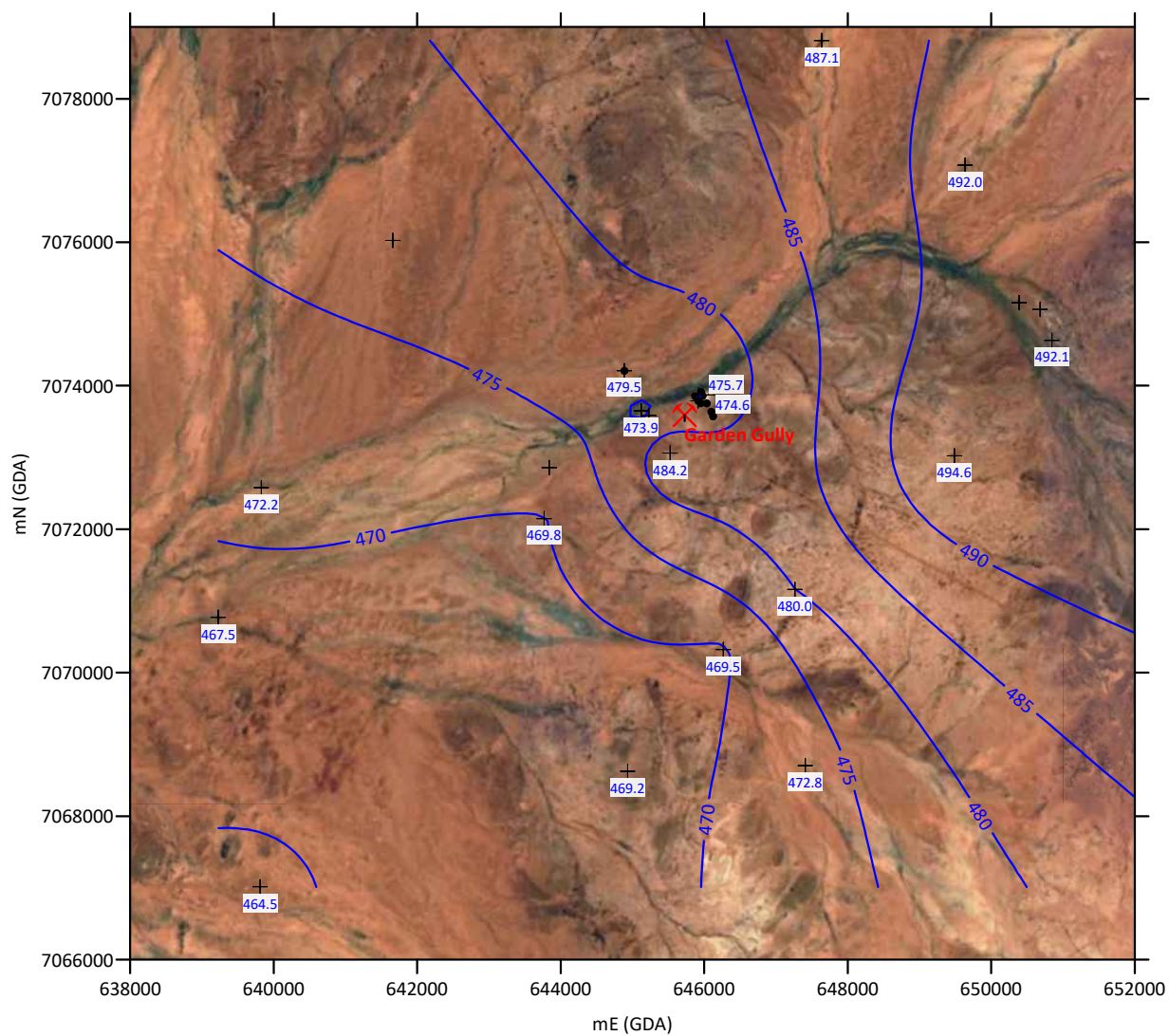


faults, stopes & water.srf

CLIENT: Ora Gold
PROJECT: Garden Gully
DATE: September 2024
Dwg No: 586-0/24/2-7

WET HOLES, STOPES, FAULTS &
STRONGLY JOINTED CORE

FIGURE 8

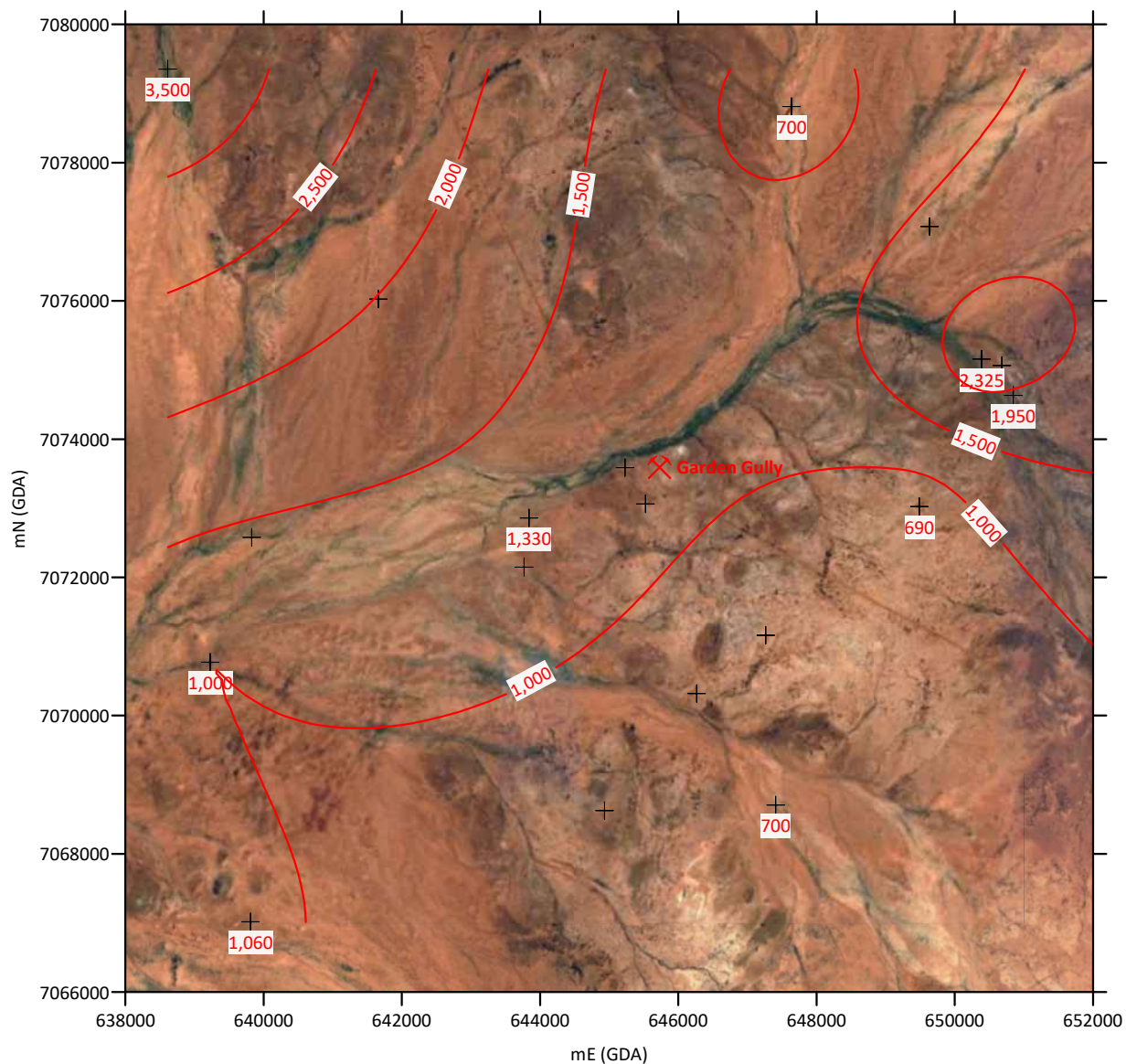


riwls.srf

CLIENT: Ora Gold
 PROJECT: Garden Gully
 DATE: September 2024
 Dwg No: 586-0/24/2-8

GROUNDWATER LEVELS (m AHD), WIR DATABASE
 AND GARDEN GULLY BORES

FIGURE 9

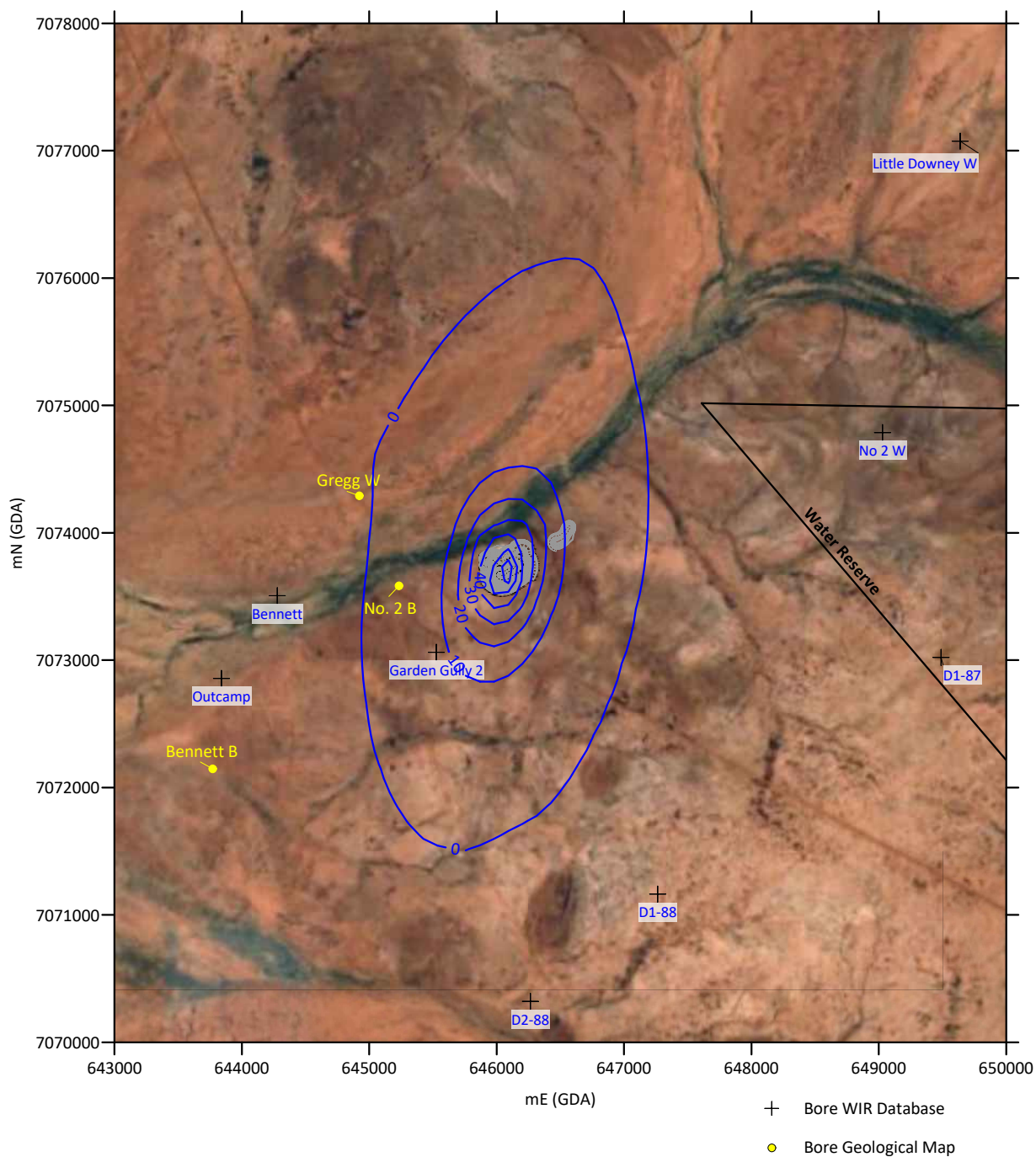


salinity.srf

CLIENT: Ora Gold
 PROJECT: Garden Gully
 DATE: September 2024
 Dwg No: 586-0/24/2-9

GROUNDWATER SALINITY (mg/L TDS), WIR DATABASE

FIGURE 10

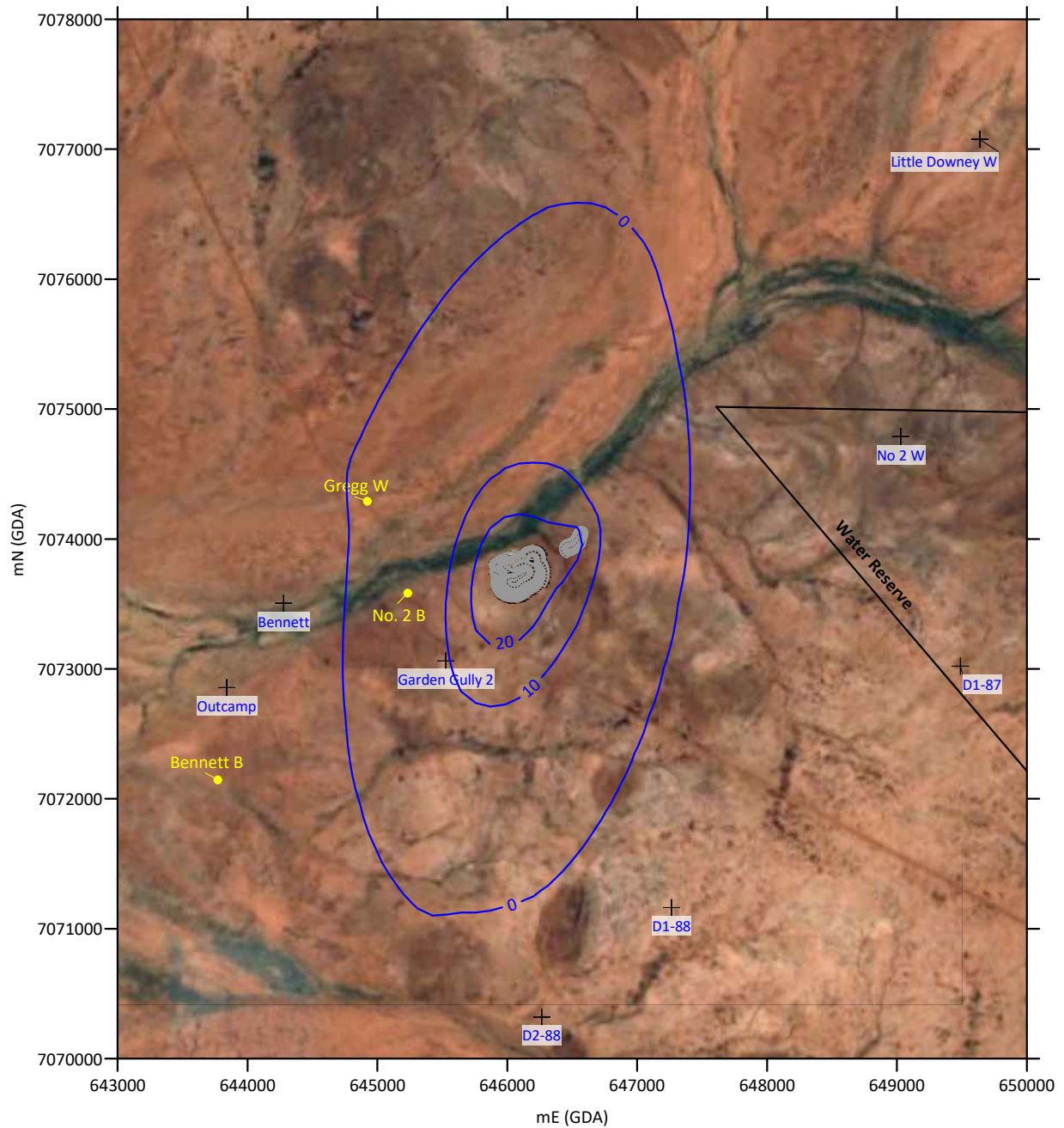


sp6dds.srf

CLIENT: Ora Gold
 PROJECT: Garden Gully
 DATE: September 2024
 Dwg No: 586-0/24/2-10

MODEL-PREDICTED DRAWDOWNS (m)
 AT END OF MINING OF WEST PIT

FIGURE 11



+ Bore WIR Database

● Bore Geological Map

sp9dds.srf

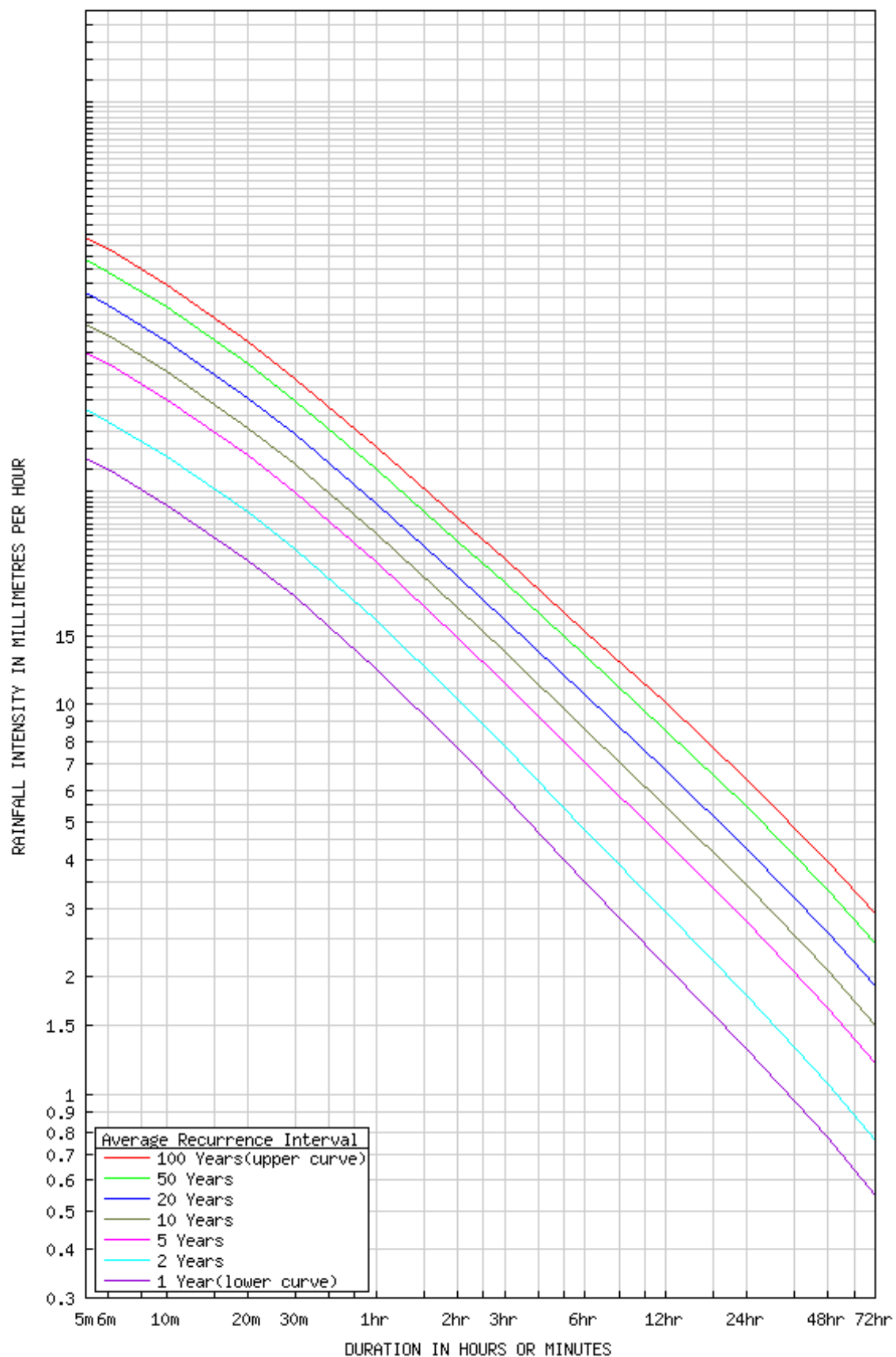
CLIENT: Ora Gold
PROJECT: Garden Gully
DATE: September 2024
Dwg No: 586-0/24/2-11

MODEL-PREDICTED DRAWDOWNS (m)
AT END OF MINING, BOTH PITS

APPENDIX I

IFD CURVES & TABLES





LOCATION 26.450 S 118.450 E * NEAR.. Garden Gully

LIST OF COEFFICIENTS TO EQUATIONS OF THE FORM

$$\ln(I) = A + B \times (\ln(T)) + C \times (\ln(T))^2 + D \times (\ln(T))^3 + E \times (\ln(T))^4 + F \times (\ln(T))^5 + G \times (\ln(T))^6$$

ARI in years	coefficient A	coefficient B	coefficient C	coefficient D	coefficient E	coefficient F	coefficient G
1	2.51233	-6.46E-01	-5.02E-02	9.58E-03	1.53E-03	-4.57E-04	-6.04E-06
2	2.797954	-6.41E-01	-4.61E-02	1.01E-02	1.13E-03	-5.16E-04	1.35E-05
5	3.139261	-6.24E-01	-3.56E-02	9.52E-03	2.95E-04	-4.38E-04	2.37E-05
10	3.307143	-6.15E-01	-2.99E-02	9.26E-03	-1.70E-04	-4.02E-04	3.01E-05
20	3.486369	-6.08E-01	-2.55E-02	8.93E-03	-5.06E-04	-3.61E-04	3.32E-05
50	3.687693	-6.00E-01	-2.00E-02	8.90E-03	-1.01E-03	-3.55E-04	4.67E-05
100	3.821895	-5.95E-01	-1.60E-02	8.82E-03	-1.38E-03	-3.38E-04	5.47E-05

IFD Chart.

Enter IFD, Time of Concentration (Tc) and Polynomial Coefficients to get time specific rainfall intensities

DURATION	1 Year	2 years	5 years	10 years	20 years	50 years	100 years
5 mins	42.9	57.2	80	94.4	113	138	157
6 mins	39.9	53.1	74.6	88	105	128	147
10 mins	32.4	43	60.4	71.3	85.2	104	119
20 mins	23.4	31	43.4	51.2	61	74.4	85
30 mins	18.8	25	34.9	41.1	49	59.8	68.2
1 hour	12.3	16.4	23.1	27.3	32.7	40	45.7
2 hours	7.72	10.3	14.8	17.6	21.2	26.2	30.1
3 hours	5.79	7.79	11.3	13.6	16.4	20.4	23.5
6 hours	3.51	4.77	7.08	8.62	10.6	13.3	15.4
12 hours	2.13	2.92	4.44	5.46	6.75	8.58	10.1
24 hours	1.3	1.79	2.76	3.42	4.26	5.45	6.42
48 hours	0.772	1.06	1.66	2.07	2.6	3.33	3.94
72 hours	0.55	0.759	1.2	1.5	1.89	2.44	2.9

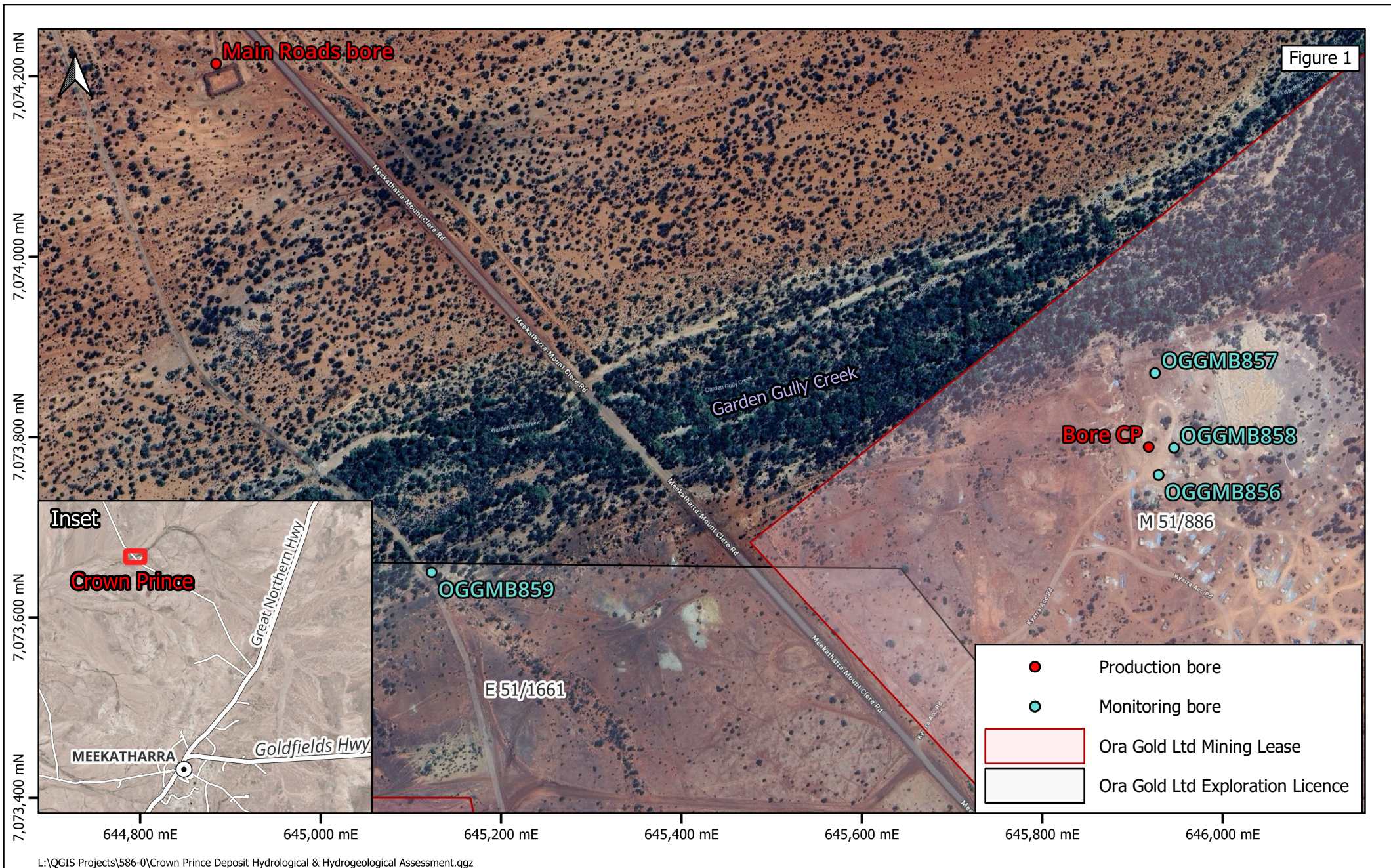
Tc	8.34	2.77	3.78	5.67	6.95	8.54	10.80	12.62
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APPENDIX II

MONITORING BORE COMPLETION DATA





L:\QGIS Projects\586-0\Crown Prince Deposit Hydrological & Hydrogeological Assessment.qgz



0 100 200 m

1:5,500

GDA2020 / MGA zone 50

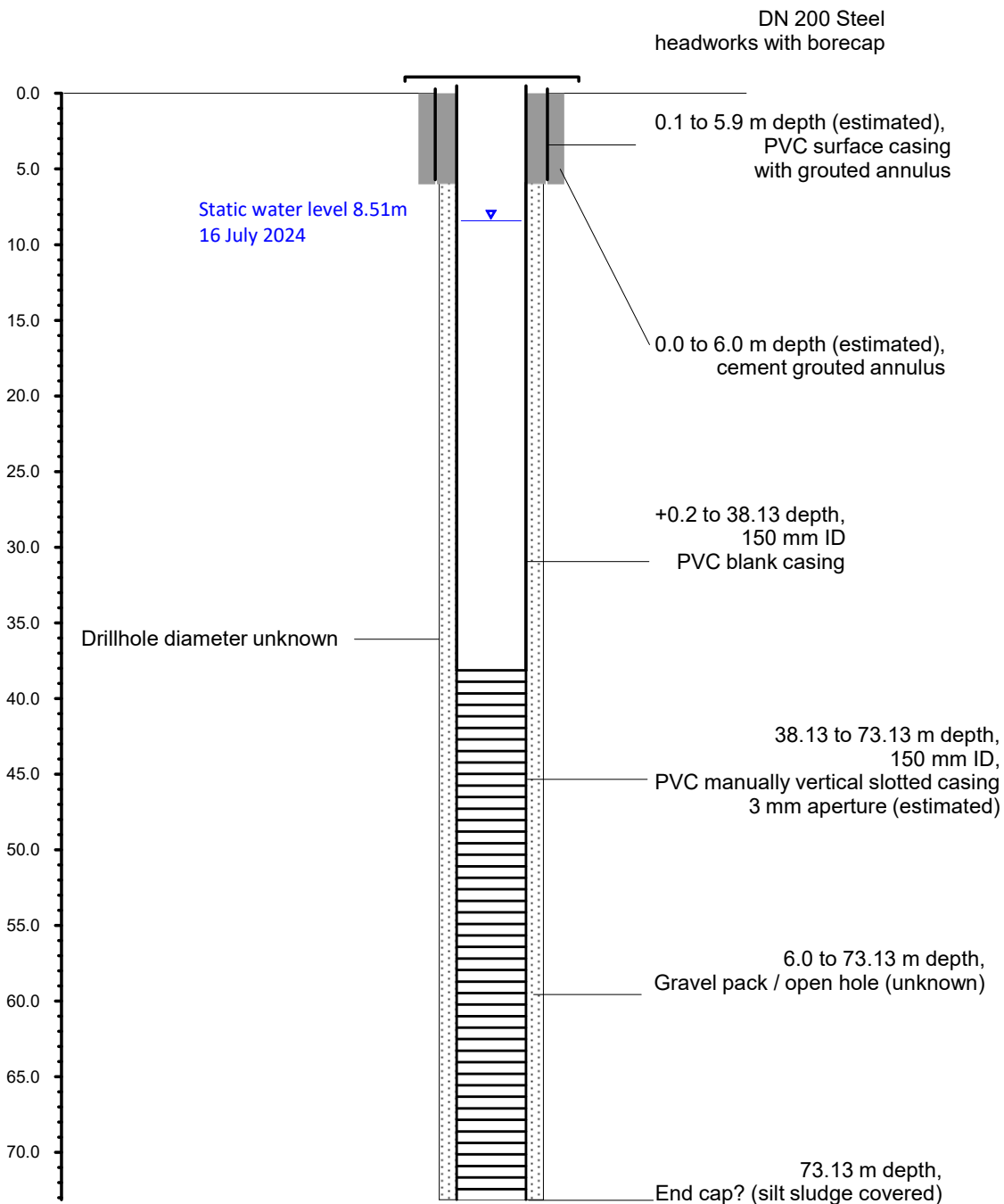
Project	Crown Prince Deposit Hydrological & Hydrogeological Assessment
Client	Ora Gold Limited
Date	September 2024
Figure Number	586-0/24-02/01

LOCATION PLAN



Bore Construction Details

Depth m bgl



CLIENT: Ora Gold Limited

PROJECT: Crown Prince Deposit Hydrological and Hydrogeological Assessment

DATE: October 2024

FIG No.: 586-0/24-02/02

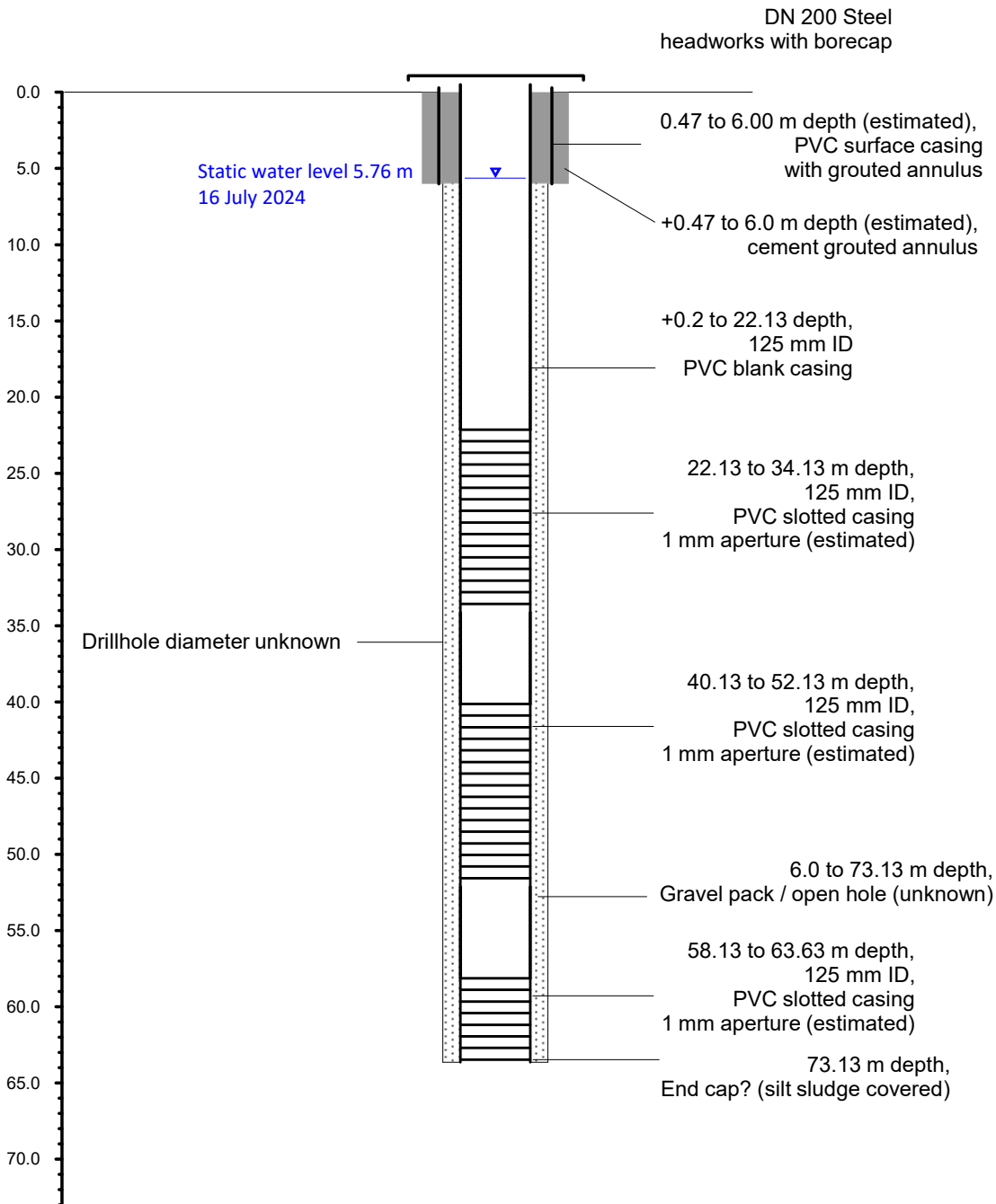
BORE CP
CAMERA AND FIELD
SURVEY DIAGRAM





Bore Construction Details

Depth m bgl



CLIENT: Ora Gold Limited

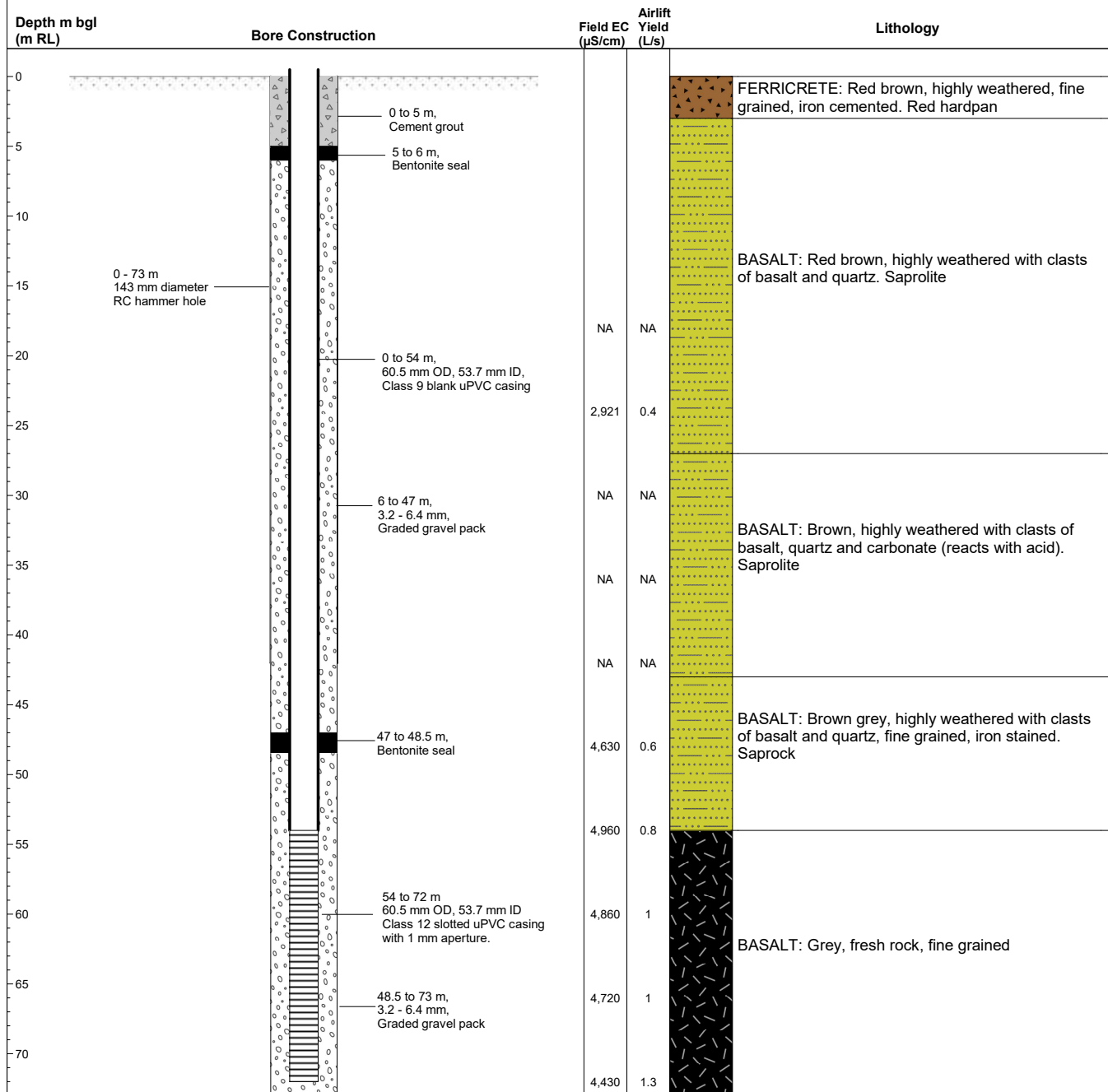
PROJECT: Crown Prince Deposit Hydrological and Hydrogeological Assessment

DATE: October 2024

FIG No.: 586-0/24-02/03

MAIN ROADS BORE
CAMERA AND FIELD
SURVEY DIAGRAM





Construction Date: 27-08-2024
Easting: 645,918
Northing: 7,073,758

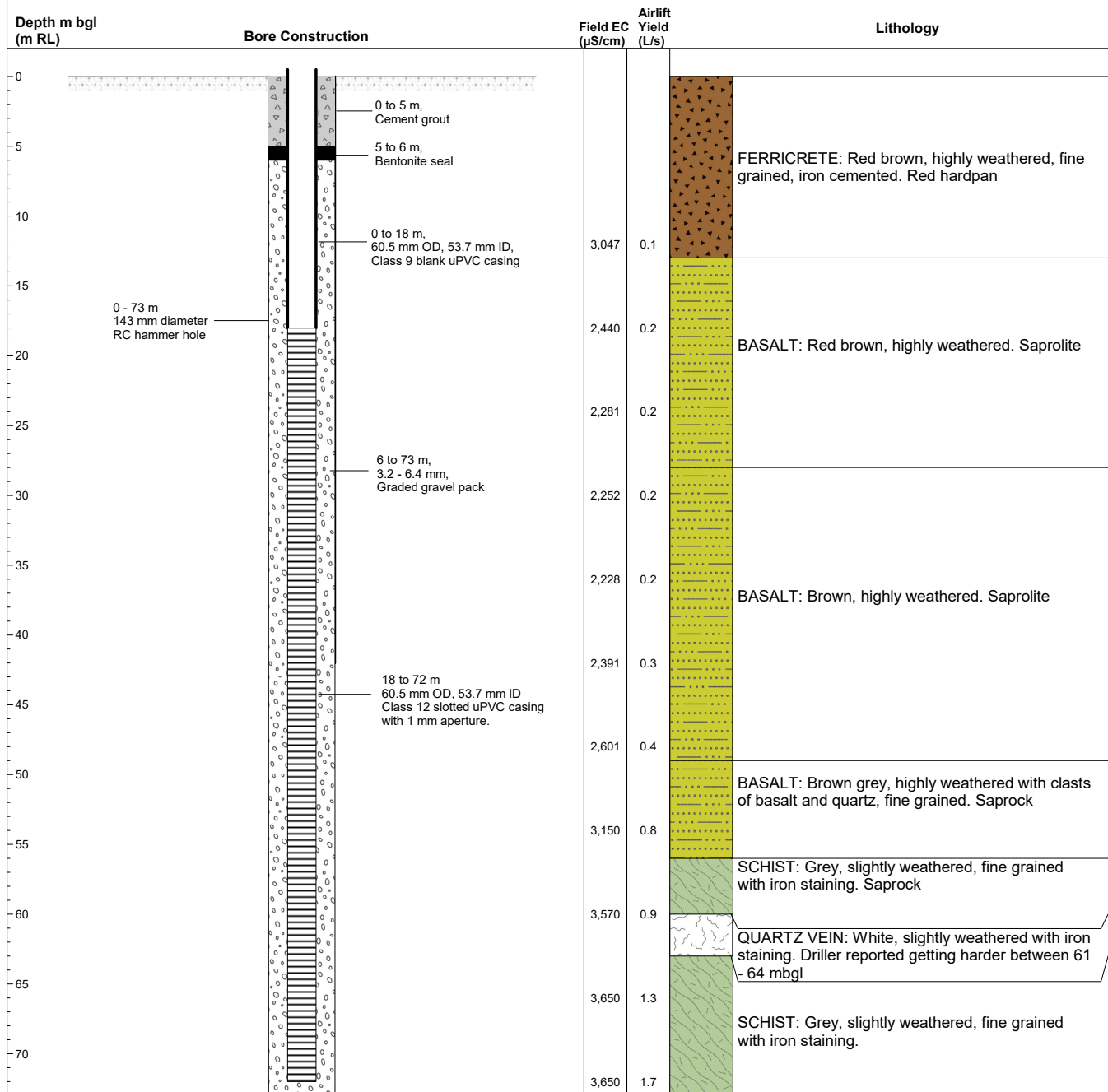
Depth Drilled (m bgl): 73.00
Top of Casing (m agl): +0.50
Cased Depth (m bgl): 72.00
Screened Interval (m bgl): 54.00 to 72.00

SWL m bgl: 9.92
Water Chemistry: 4,300 $\mu\text{S/cm}$, 8.18 pH
Final Airlift Yield (L/s): 0.7

Client: Ora Gold Limited
Project: Crown Prince Deposit Hydrological and Hydrogeological Assessment
Date: October 2024
Dwg. No: 586-0/24-02/04

OGGMB856
MONITORING BORE
CONSTRUCTION DIAGRAM





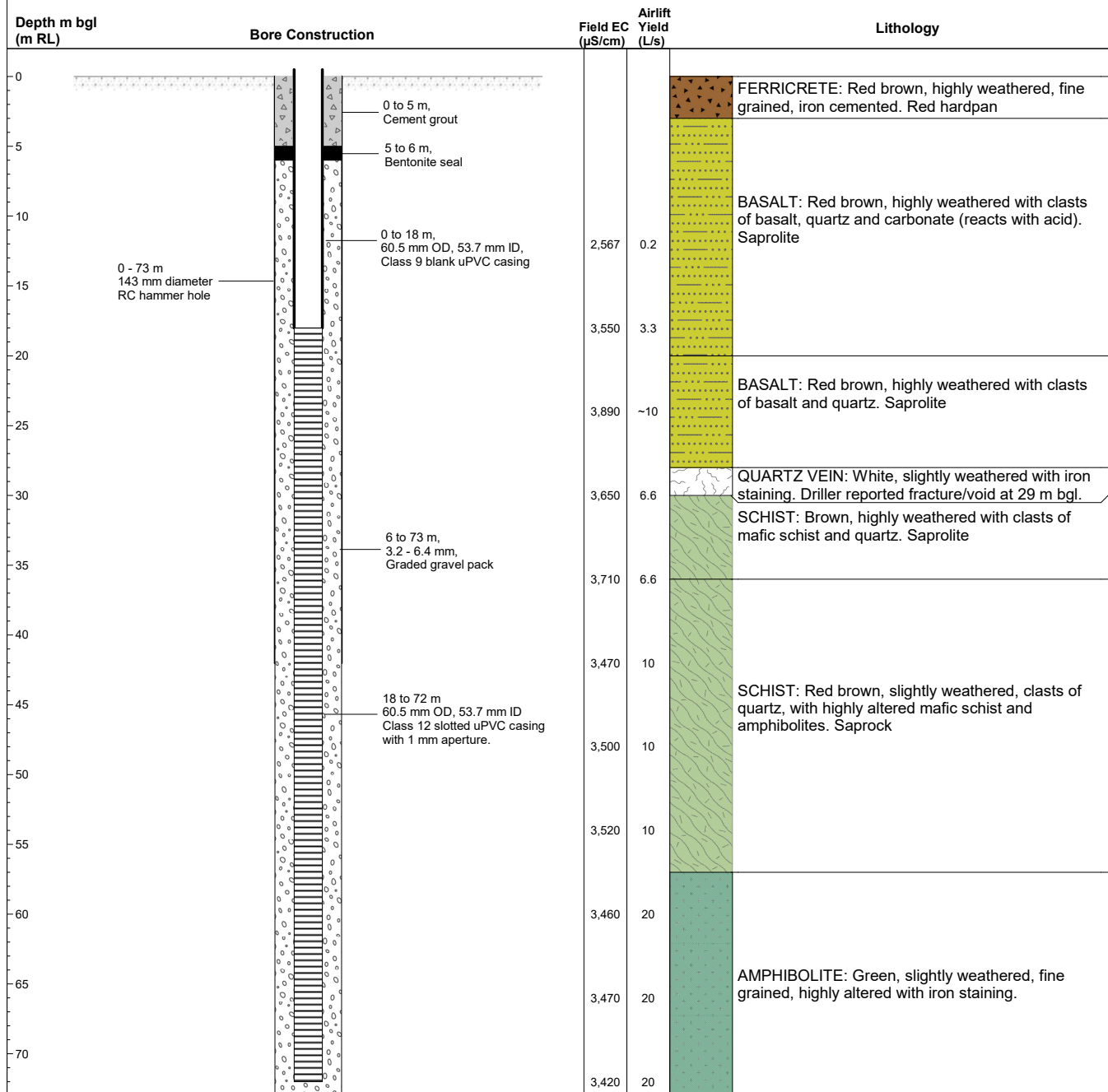
Construction Date: 28-08-2024
Easting: 645,925
Northing: 7,073,871

Depth Drilled (m bgl): 73.0
Top of Casing (m agl): +0.50
Cased Depth (m bgl): 72.00
Screened Interval (m bgl): 18.00 to 72.00

SWL m bgl: 7.58
Water Chemistry: 3,930 $\mu\text{S/cm}$, 8.20 pH
Final Airlift Yield (L/s): 1.0

Client: Ora Gold Limited
Project: Crown Prince Deposit Hydrological and Hydrogeological Assessment
Date: October 2024
Dwg. No: 586-0/24-02/05

**OGGMB857
MONITORING BORE
CONSTRUCTION DIAGRAM**



Water spurting from nearby RC hole during drilling (hear / feel air from second nearby RC hole).
Water disappearing in void/cavity beneath sump during drilling and development.

Airlift yields measured are will have surface seepage returns

Construction Date: 29-08-2024
Easting: 645,946
Northing: 7,073,788

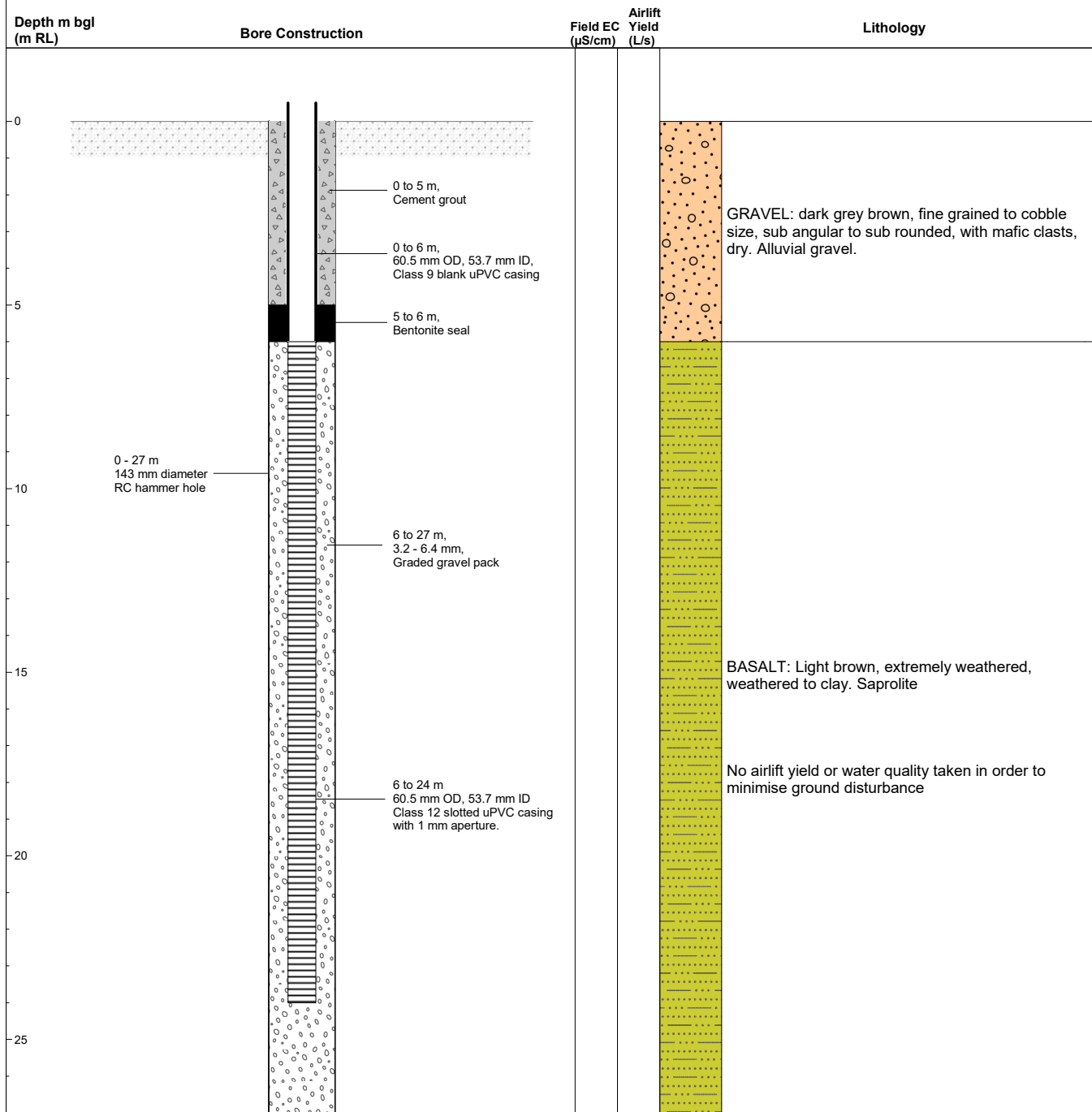
Depth Drilled (m bgl): 73.0
Top of Casing (m agl): +0.50
Cased Depth (m bgl): 72.00
Screened Interval (m bgl): 18.00 to 72.00

SWL m bgl: 9.6
Water Chemistry: 3,460 $\mu\text{S/cm}$, 8.01 pH
Final Airlift Yield (L/s): Unknown due to recycled surface seepage

Client: Ora Gold Limited
Project: Crown Prince Deposit Hydrological and Hydrogeological Assessment
Date: October 2024
Dwg. No: 586-0/24-02/06

**OGGMB858
MONITORING BORE
CONSTRUCTION DIAGRAM**





Construction Date: 30-08-2024
Easting: 645,123
Northing: 7,073,650

Depth Drilled (m bgl): 27.0
Top of Casing (m agl): +0.50
Cased Depth (m bgl): 24.00
Screened Interval (m bgl): 6.00 to 24.00

SWL m bgl: 5.83
Water Chemistry: 1,954 $\mu\text{S/cm}$, 7.60pH
Final Airlift Yield (L/s): 0.2

Client: Ora Gold Limited
Project: Crown Prince Deposit Hydrological and Hydrogeological Assessment
Date: October 2024
Dwg. No: 586-0/24-02/07

**OGGMB859
MONITORING BORE
CONSTRUCTION DIAGRAM**

**Rockwater****DRILLING, CONSTRUCTION DATA and
LITHOLOGICAL LOG****MONITORING BORE: OGGMB056**

STATUS:	Monitoring Bore MB01
MGA COORDINATES (GPS):	Zone 50, 645,919 mE 7,073,758 mN
DRILLING CONTRACTOR:	Caswell Drilling
DRILL RIG:	Rig 1
DATE CONSTRUCTED:	27 August 2024
DRILLING DETAILS:	0 to 73 m, 5 5/8" hammer bit
CASING:	+0.5 to 54 m, 50 mm ND, Class 9 blank uPVC casing
SLOTTED CASING:	54 to 72 m, 50 mm ND, slotted uPVC casing, 1 mm aperture, including uPVC end cap
GRAVEL PACK:	6 to 47 and 48.5 to 73 m, grade +1.6 – 3.2 mm (bentonite 47 to 48.5 m bgl)
BOREHEAD ANNULAR SEAL:	0 to 5 m cement grout, 5 to 6 m bentonite
HEADWORKS:	TBD
STATIC WATER LEVEL	9.92 mbgl
SALINITY/TEMPERATURE/pH:	4,300 µS/cm @ 30.7 °C, pH 8.18



LITHOLOGY:

Depth (m)		Lithology	Description
From	To		
0	2	Duricrust	Fine grained. Red brown.
2	27	Saprolite	Red brown. Clasts of mafic material and quartz. Highly weathered.
27	43	Saprolite	Brown. Clasts of mafic material, quartz and carbonate (reacts with HCL). Highly weathered.
43	54	Saprock	Fine grained. Brown grey. Clasts of basalt and quartz. Slightly weathered with iron staining present.
54	73	Basalt	Fine grained. Grey. Becoming fresher with depth.

Driller reported groundwater encountered at 14 m bgl

DRILLING AIRLIFT DATA:

Depth	Yield	EC	pH	Temperature	Comments
(m)	(L/s)	(μ S/cm)		(°C)	
25	0.4	2,921	7.34	21.3	Brown
31	NA	NA	NA	NA	NA
37	NA	NA	NA	NA	NA
43	NA	NA	NA	NA	NA
49	0.6	4,630	7.67	27	Brown
61	1	4,860	7.96	24.7	Brown
67	1	4,720	8.05	27.8	Brown
73	1.3	4,430	8.11	32.3	Cloudy

NA – Insufficient water encountered to sample

Yields estimated by bucket test



**Rockwater**

**DRILLING, CONSTRUCTION DATA and
LITHOLOGICAL LOG
MONITORING BORE: OGGMB857**

STATUS:	Monitoring Bore MB02
MGA COORDINATES (GPS):	Zone 50, 645,925 mE 7,073,871 mN
DRILLING CONTRACTOR:	Caswell Drilling
DRILL RIG:	Rig 1
DATE CONSTRUCTED:	28 August 2024
DRILLING DETAILS:	0 to 73 m, 5 5/8" hammer bit
CASING:	+0.5 to 18 m, 50 mm ND, Class 9 blank uPVC casing
SLOTTED CASING:	18 to 72 m, 50 mm ND, slotted uPVC casing, 1 mm aperture, including uPVC end cap
GRAVEL PACK:	6 to 73 m, grade +1.6 – 3.2 mm
BOREHEAD ANNULAR SEAL:	0 to 5 m cement grout, 5 to 6 m bentonite
HEADWORKS:	TBD
STATIC WATER LEVEL	7.58 mbgl
SALINITY/TEMPERATURE/pH:	3,930 µS/cm @ 30.9 °C, pH 8.20



LITHOLOGY:

Depth (m)		Lithology	Description
From	To		
0	13	Duricrust	Fine grained. Red brown.
13	28	Saprolite	Red brown clay.
28	49	Saprolite	Brown clay.
49	56	Saprock	Fine grained. Brown grey. Clasts of basalt and quartz. Highly weathered.
56	60	Mafic Schist	Fine grained. Grey. Slightly weathered with iron staining present.
60	63	Quartz vein	White. Slightly weathered with iron staining present. Driller reported getting harder 61 to 63 m bgl.
63	73	Mafic Schist	Fine grained. Grey. Slightly weathered with iron staining present. Driller reported getting harder 63 to 64 m bgl.

Driller reported groundwater encountered at 13 m bgl

DRILLING AIRLIFT DATA:

Depth	Yield	EC	pH	Temperature	Comments
(m)	(L/s)	(μ S/cm)		(°C)	
13	0.1	3,047	7.36	22	Brown
19	0.2	2,440	7.61	25.8	Brown
25	0.2	2,281	7.57	26	Brown
31	0.2	2,252	7.63	27.7	Brown
37	0.2	2,228	7.70	26.8	Brown
43	0.3	2,391	7.58	27.8	Brown
49	0.4	2,601	7.58	28.8	Brown
55	0.8	3,150	7.76	29.1	Brown
61	0.9	3,570	7.85	27.9	Brown
67	1.25	3,650	7.93	29.3	Brown
73	1.7	3,650	7.94	30.4	Cloudy

Yields estimated by bucket test





Rockwater

**DRILLING, CONSTRUCTION DATA and
LITHOLOGICAL LOG
MONITORING BORE: OGGMB858**

STATUS:	Monitoring Bore MB03
MGA COORDINATES (GPS):	Zone 50, 645,939 mE 7,073,788 mN
DRILLING CONTRACTOR:	Caswell Drilling
DRILL RIG:	Rig 1
DATE CONSTRUCTED:	29 August 2024
DRILLING DETAILS:	0 to 73 m, 5 5/8" hammer bit
CASING:	+0.5 to 18 m, 50 mm ND, Class 9 blank uPVC casing
SLOTTED CASING:	18 to 72 m, 50 mm ND, slotted uPVC casing, 1 mm aperture, including uPVC end cap
GRAVEL PACK:	6 to 73 m, grade +3.2 – 6.4 mm
BOREHEAD ANNULAR SEAL:	0 to 5 m cement grout, 5 to 6 m bentonite
HEADWORKS:	TBD
STATIC WATER LEVEL	9.60 mbgl
SALINITY/TEMPERATURE/pH:	3,460 µS/cm @ 31.3 °C, pH 8.01



LITHOLOGY:

Depth (m)		Lithology	Description
From	To		
0	3	Duricrust	Fine grained. Red brown.
3	20	Saprolite	Red brown. Clasts of mafic material, quartz and carbonate (reacts with HCL). Highly weathered.
20	28	Saprolite	Red brown. Clasts of mafic schist and quartz. Highly weathered.
28	30	Quartz vein	White. Slightly weathered with iron staining present. Driller reported fracture/void at 29 m bgl.
30	36	Saprolite	Brown. Clasts of quartz and schist. Highly weathered.
36	57	Saprock	Red brown. Clasts of quartz, highly altered mafic schist and amphibolite (highly altered). Slightly weathered with iron staining.
57	73	Amphibolite	Fine grained. Green. Highly altered. Slightly weathered with iron staining.

Driller reported groundwater encountered at 8 m bgl

40 m bgl water spouting out of nearby RC hole (hear/feel air from second nearby RC hole)

Water draining from sump into void/cavity during drilling

DRILLING AIRLIFT DATA:

Depth (m)	Yield (L/s)	EC (μ S/cm)	pH	Temperature (°C)	Comments
13	0.2	2,567	7.58	23.4	Brown
19	3.3	3,550	7.79	26.9	Brown
25	10	3,890	7.90	22.6	Brown
31	7	3,650	7.95	26.0	Brown
37	7	3,710	7.98	26.0	Cloudy
43	10	3,470	7.99	27.1	Cloudy
49	10	3,500	8.03	27.8	Cloudy
55	10	3,520	8.05	27.8	Cloudy
61	20	3,460	8.05	29.0	Cloudy
67	20	3,470	8.04	29.3	Cloudy
73	20	3,420	8.03	30.2	Cloudy

Water draining from sump into void/cavity during development

Yields estimated by bucket test



**Rockwater****DRILLING, CONSTRUCTION DATA and
LITHOLOGICAL LOG
MONITORING BORE: OGGMB859**

STATUS:	Monitoring Bore MB04
MGA COORDINATES (GPS):	Zone 50, 645,123 mE 7,073,650 mN
DRILLING CONTRACTOR:	Caswell Drilling
DRILL RIG:	Rig 1
DATE CONSTRUCTED:	30 August 2024
DRILLING DETAILS:	0 to 27 m, 5 5/8" hammer bit
CASING:	+0.5 to 6 m, 50 mm ND, Class 9 blank uPVC casing
SLOTTED CASING:	6 to 24 m, 50 mm ND, slotted uPVC casing, 1 mm aperture, including uPVC end cap
GRAVEL PACK:	6 to 27 m, grade +1.6 – 3.2 mm
BOREHEAD ANNULAR SEAL:	0 to 5 m cement grout, 5 to 6 m bentonite
HEADWORKS:	TBD
STATIC WATER LEVEL	5.83 mbgl
SALINITY/TEMPERATURE/pH:	NA

NA - Did not develop OGGMB859 due to concerns about impacting streamline



LITHOLOGY:

Depth (m)		Lithology	Description
From	To		
0	6	Conglomerate	Sand to conglomerate size, dark grey, stained brown, sub angular to sub rounded mafic clasts. Slightly weathered.
6	27	Saprolite	Light brown.

Driller reported groundwater encountered at 18 m bgl

DRILLING AIRLIFT DATA:

Depth	Yield	EC	pH	Temperature	Comments
(m)	(L/s)	($\mu\text{S}/\text{cm}$)		($^{\circ}\text{C}$)	
NA	NA	NA	NA	NA	NA

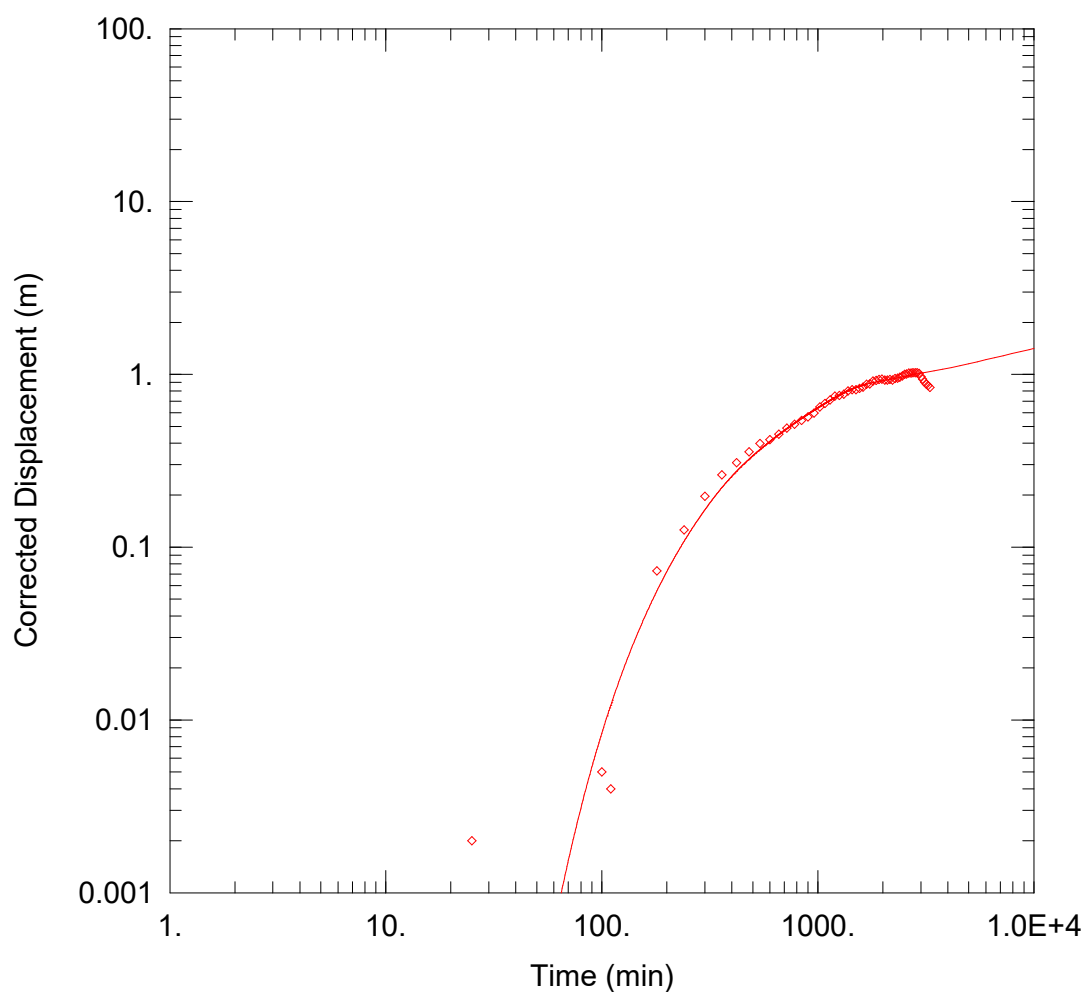
NA - Did not sample/measure yields at OGGMB859 due to concerns about impacting streamline



APPENDIX III

PUMPING TEST ANALYSES





WELL TEST ANALYSIS

Data Set: I:\586-0\Data\Pump test\Bore CP_MB02.aqt

Date: 09/19/24

Time: 11:05:50

PROJECT INFORMATION

Company: Rockwater

Client: Ora Gold Ltd

Project: 586-0

Location: Meekatharra

Test Well: Bore CP

Test Date: 6/9/2024

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
Bore CP	645918	7073789

Observation Wells

Well Name	X (m)	Y (m)
◇ MB02	645925	7073871

SOLUTION

Aquifer Model: Unconfined

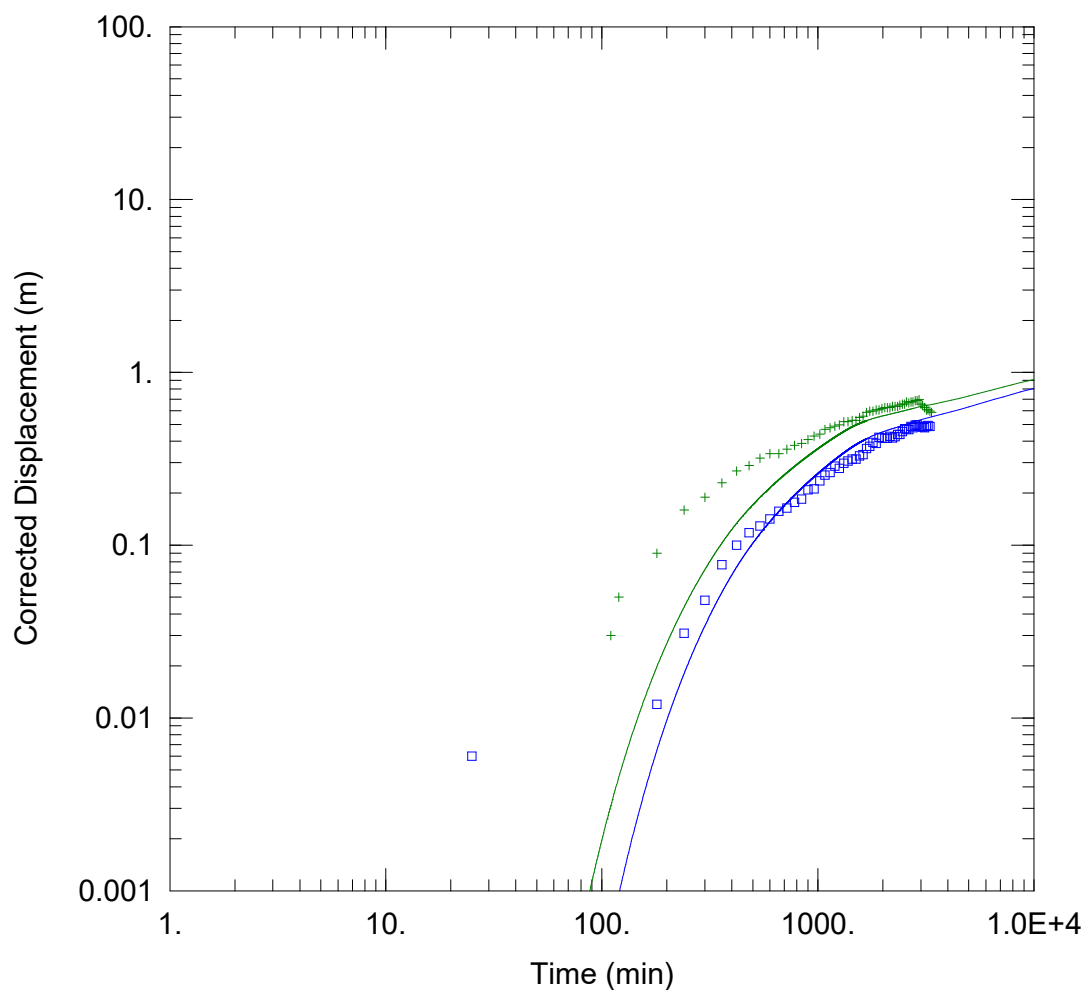
Solution Method: Theis

T = 33.74 m²/day

S = 0.004385

Kz/Kr = 1.

b = 64.62 m



WELL TEST ANALYSIS

Data Set: I:\586-0\Data\Pump test\Bore CP_MB01_MB02.aqt

Date: 09/19/24

Time: 11:02:45

PROJECT INFORMATION

Company: Rockwater

Client: Ora Gold Ltd

Project: 586-0

Location: Meekatharra

Test Well: Bore CP

Test Date: 6/9/2024

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
Bore CP	645918	7073789

Observation Wells

Well Name	X (m)	Y (m)
+ MB03	645946	7073788
□ MB01	645929	7073758

SOLUTION

Aquifer Model: Unconfined

Solution Method: Theis

$T = 48.15 \text{ m}^2/\text{day}$

$S = 0.06901$

$Kz/Kr = 1.$

$b = 64.62 \text{ m}$

APPENDIX IV
WATER QUALITY ANALYSES CERTIFICATES





CERTIFICATE OF ANALYSIS

Work Order	: EP2413125	Page	: 1 of 5
Client	: ROCKWATER PTY LTD	Laboratory	: Environmental Division Perth
Contact	: Peter Khor	Contact	: Customer Services EP
Address	: 1ST FLOOR, 76 JERSEY ST WEMBLEY WA, AUSTRALIA 6014	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: Garden Gully Dewatering Study	Date Samples Received	: 11-Sep-2024 12:30
Order number	: ----	Date Analysis Commenced	: 12-Sep-2024
C-O-C number	: ----	Issue Date	: 19-Sep-2024 15:17
Sampler	: Darren McMillan		
Site	:		
Quote number	: EP23ROCWAT0002_V3		
No. of samples received	: 1		
No. of samples analysed	: 1		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Chris Lemaitre	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
Daniel Fisher	Inorganics Analyst	Perth Inorganics, Wangara, WA



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H⁺ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				Crown Prince (Bore CP)	----	----	----	----
Sampling date / time				08-Sep-2024 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EP2413125-001	-----	-----	-----	-----
Result				----	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.77	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	2730	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	1620	----	----	----	----
EA065: Total Hardness as CaCO3								
Total Hardness as CaCO3	----	1	mg/L	680	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	399	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	399	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	189	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	647	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	104	----	----	----	----
Magnesium	7439-95-4	1	mg/L	102	----	----	----	----
Sodium	7440-23-5	1	mg/L	380	----	----	----	----
Potassium	7440-09-7	1	mg/L	29	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	0.128	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				Crown Prince (Bore CP)	----	----	----	----
Sampling date / time				08-Sep-2024 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EP2413125-001	-----	-----	-----	-----
Result				----	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued								
Manganese	7439-96-5	0.001	mg/L	0.050	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	0.012	----	----	----	----
Iron	7439-89-6	0.05	mg/L	<0.05	----	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----
EG052G: Silica by Discrete Analyser								
Reactive Silica	----	0.05	mg/L	55.2	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	1.83	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	1.83	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
[^] Total Nitrogen as N	----	0.1	mg/L	2.1	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.04	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.03	----	----	----	----
EN055: Ionic Balance								
∅ Total Anions	----	0.01	meq/L	30.2	----	----	----	----
∅ Total Cations	----	0.01	meq/L	30.8	----	----	----	----
∅ Ionic Balance	----	0.01	%	1.14	----	----	----	----



CERTIFICATE OF ANALYSIS

Work Order : EP2414636
Client : ROCKWATER PTY LTD
Contact : PHIL WHARTON
Address : 1ST FLOOR, 76 JERSEY ST
WEMBLEY WA, AUSTRALIA 6014
Telephone : +61 08 9284 0222
Project : Garden Gully
Order number : 586-0
C-O-C number : ----
Sampler : DAISY SCOTT
Site :
Quote number : EP23ROCWAT0002_V3
No. of samples received : 8
No. of samples analysed : 8

Page : 1 of 8
Laboratory : Environmental Division Perth
Contact : Customer Services EP
Address : 26 Rigali Way Wangara WA Australia 6065
Telephone : +61-8-9406 1301
Date Samples Received : 08-Oct-2024 12:30
Date Analysis Commenced : 08-Oct-2024
Issue Date : 16-Oct-2024 11:29



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Chris Lemaitre	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H⁺ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- It is recognised that Total Phosphorus (EK067G) is less than Reactive Phosphorus (EK071G) for sample #3. However, the difference is within experimental variation of the methods.
- Ionic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - ammonia as N, calcium, magnesium, potassium and sodium for sample #3.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				CPMB004	Kyarra shaft	OGGV1	OGGDD842R	OGGDD927
Sampling date / time				04-Oct-2024 14:30	04-Oct-2024 14:40	04-Oct-2024 15:45	04-Oct-2024 15:55	04-Oct-2024 15:15
Compound	CAS Number	LOR	Unit	EP2414636-001	EP2414636-002	EP2414636-003	EP2414636-004	EP2414636-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.71	8.04	7.86	7.89	7.90
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	2240	2790	4360	4160	4610
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	1340	1640	2350	2640	3000
EA065: Total Hardness as CaCO3								
Total Hardness as CaCO3	----	1	mg/L	595	630	852	834	1110
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	417	400	765	257	212
Total Alkalinity as CaCO3	----	1	mg/L	417	400	765	257	212
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	181	194	181	259	419
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	432	618	1000	1020	1180
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	98	94	117	131	161
Magnesium	7439-95-4	1	mg/L	85	96	136	123	171
Sodium	7440-23-5	1	mg/L	236	338	484	377	537
Potassium	7440-09-7	1	mg/L	19	26	47	230	44
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	7440-38-2	0.001	mg/L	0.002	0.106	0.093	0.012	0.070
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.001	<0.001	0.006
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				CPMB004	Kyarra shaft	OGGV1	OGGDD842R	OGGDD927
Sampling date / time				04-Oct-2024 14:30	04-Oct-2024 14:40	04-Oct-2024 15:45	04-Oct-2024 15:55	04-Oct-2024 15:15
Compound	CAS Number	LOR	Unit	EP2414636-001	EP2414636-002	EP2414636-003	EP2414636-004	EP2414636-005
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued								
Manganese	7439-96-5	0.001	mg/L	0.011	0.084	0.241	0.046	0.109
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.005	mg/L	0.006	<0.005	<0.005	0.129	0.023
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG052G: Silica by Discrete Analyser								
Reactive Silica	----	0.05	mg/L	82.5	47.5	41.7	50.4	47.2
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.12	81.8	1.95	0.10
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	0.07	<0.01	<0.01	0.04	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	5.07	0.66	0.05	7.04	10.7
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	5.14	0.66	0.05	7.08	10.7
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.6	0.2	93.2	2.2	1.1
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	5.7	0.9	93.2	9.3	11.8
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.04	0.05	6.28	0.04	0.03
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.04	0.02	6.85	0.03	0.01
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	24.3	29.5	47.3	39.3	46.2
ø Total Cations	----	0.01	meq/L	----	----	46.0	----	----
ø Total Cations	----	0.01	meq/L	22.6	28.0	----	38.9	46.6



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	CPMB004	Kyarra shaft	OGGV1	OGGDD842R	OGGDD927
Sampling date / time					04-Oct-2024 14:30	04-Oct-2024 14:40	04-Oct-2024 15:45	04-Oct-2024 15:55	04-Oct-2024 15:15
Compound	CAS Number	LOR	Unit		EP2414636-001	EP2414636-002	EP2414636-003	EP2414636-004	EP2414636-005
					Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued									
Ø Ionic Balance	----	0.01	%		----	----	1.34	----	----
Ø Ionic Balance	----	0.01	%		3.51	2.62	----	0.46	0.37



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	OGGDD846	OGGDD844	OGGDD847	----	----
Sampling date / time					04-Oct-2024 15:20	04-Oct-2024 15:35	04-Oct-2024 16:15	----	----
Compound	CAS Number	LOR	Unit		EP2414636-006	EP2414636-007	EP2414636-008	-----	-----
					Result	Result	Result	----	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		7.86	7.85	8.04	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		6120	2950	3900	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		4070	1770	2500	----	----
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		1320	618	896	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		209	339	320	----	----
Total Alkalinity as CaCO3	----	1	mg/L		209	339	320	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		394	166	514	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		1610	696	839	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		194	94	128	----	----
Magnesium	7439-95-4	1	mg/L		204	93	140	----	----
Sodium	7440-23-5	1	mg/L		585	341	481	----	----
Potassium	7440-09-7	1	mg/L		256	58	33	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		<0.01	<0.01	<0.01	----	----
Arsenic	7440-38-2	0.001	mg/L		0.044	0.012	0.021	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	OGGDD846	OGGDD844	OGGDD847	----	----
Sampling date / time					04-Oct-2024 15:20	04-Oct-2024 15:35	04-Oct-2024 16:15	----	----
Compound	CAS Number	LOR	Unit		EP2414636-006	EP2414636-007	EP2414636-008	-----	-----
					Result	Result	Result	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Manganese	7439-96-5	0.001	mg/L		0.104	0.271	0.103	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	----	----
Zinc	7440-66-6	0.005	mg/L		0.190	0.024	0.030	----	----
Iron	7439-89-6	0.05	mg/L		<0.05	0.69	<0.05	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	----	----
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L		55.2	38.4	46.6	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		0.19	0.82	0.05	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		0.02	<0.01	<0.01	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		11.8	0.04	5.58	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		11.8	0.04	5.58	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		1.0	0.9	0.7	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		12.8	0.9	6.3	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.04	0.03	0.02	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		0.01	<0.01	<0.01	----	----
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L		57.8	29.9	40.8	----	----
∅ Total Cations	----	0.01	meq/L		58.5	28.7	39.7	----	----
∅ Ionic Balance	----	0.01	%		0.58	2.05	1.35	----	----

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Work Order : EP24114636
Client : ROCKWATER PTY LTD
Project : Garden Gully



APPENDIX J:
SUBTERRANEAN FAUNA
ASSESSMENT (ROCKWATER 2024)

APPENDIX J



GARDEN GULLY PROJECT

**SUBTERRANEAN
FAUNA ASSESSMENT
CROWN PRINCE DEPOSIT**

**REPORT FOR
ORA GOLD LIMITED**

NOVEMBER 2024



Rockwater
HYDROGEOLOGICAL AND ENVIRONMENTAL CONSULTANTS



Report No. 586.1/24/01

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REVISION	AUTHOR	REVIEW	AUTHORISED	ISSUED
Rev 0	DS/NE	NE	NE	17/10/2024
Rev 1	DS/NE	PW	NE	26/11/2024

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1 INTRODUCTION

Ora Gold Limited is planning to mine gold at its Crown Prince deposit at Garden Gully, about 16 km north-north-west of Meekatharra (Figure 1). The Garden Gully Project (the Project), comprises a tenement package of several gold prospects covering the Abbots greenstone belt. There has been a long mining history at Garden Gully, with historical disturbance and groundwater extraction from several mining campaigns dating back to 1897.

Mining of the Crown Prince gold deposit has the potential to impact substrates that may provide habitat for subterranean fauna (stygo fauna and troglo fauna) in the vicinity of the Project. As such, Ora Gold engaged Rockwater to undertake a subterranean fauna investigation for the Project, to inform permitting applications and environmental approvals.

Subterranean fauna are defined as fauna which live their entire lives (obligate) below the surface of the earth (EPA 2016). Stygo fauna are aquatic and inhabit the groundwater environment, whereas troglo fauna are air-breathing and occur in suitable cavities of the unsaturated vadose zone (i.e. above the water table).

This report presents the findings of an initial subterranean fauna desktop study undertaken for the Project, to provide contextual information on the project setting, and to assess the potential for subterranean fauna in areas likely to be impacted by mining. The report also outlines the scope and findings of a basic stygo fauna survey at Garden Gully, undertaken in accordance with EPA guidelines following the desktop study.

1.1 SUBTERRANEAN FAUNA POLICY AND GUIDANCE

The EPA's framework for consideration of subterranean fauna during EIA is outlined in its *Technical Guidance - Subterranean fauna surveys for environmental impact assessment* (EPA 2021). The document provides guidance on the level of survey required for proponents and the information required to understand impacts. Also relevant is the EPA's *Environmental Factor Guideline – Subterranean Fauna* (EPA 2016). The following report considers relevant guidance for assessment of subterranean fauna.

2 EXISTING ENVIRONMENT

2.1 CLIMATE

Garden Gully is located within the Arid Region as delineated in Australian Rainfall and Runoff 1987. The nearest Bureau of Meteorology (BoM) station with a long data record is at Meekatharra Airport (Stn. 007045), located 19 km south-east of the project site.

Rainfall at Meekatharra Airport has been recorded since 1944. Annual rainfall is highly variable, ranging from 66 mm to 573 mm over the period of record. The long-term mean annual rainfall is 234 mm, with the month of February having the highest monthly average of 36.1 mm and September the lowest at 5.0 mm (Table 1). Rainfall over the winter months is generally associated with the passage of cold fronts from May through to August. Summer rainfall is highly erratic, and generally results from thunderstorms or cyclonic weather activity in the north.

Table 1: Average rainfalls and Dam Evaporation, Meekatharra (mm)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rainfall	29.2	36.1	30.8	18.8	21.6	28.5	20.0	10.6	5.0	6.0	11.7	14.4	234.0
Dam Evap.	380	314	267	190	131	87	92	121	170	259	293	333	2,637

Average dam evaporation (Luke, Burke, and O'Brien, 1988) is also given in Table 1. It exceeds average rainfall in all months, and by a factor of 11 overall.

Monthly mean maximum temperatures at Meekatharra range from 19.3 °C in July to 38.4 °C in January; and monthly mean minimum temperatures range from 7.5 °C in July to 24.4 °C in January.

2.2 TOPOGRAPHY AND DRAINAGE

The Murchison bioregion has low hills and mesas separated by flat colluvium and alluvial plains (DCCEEW 2024a). The land surface of the alluvial plain in the vicinity of Garden Gully is bisected by a minor drainage known as Garden Gully. Garden Gully drains a moderately-large catchment that lies to the north and east of Garden Gully (Rockwater 2024). It drains to the south-west, towards Hope River, a palaeodrainage (located 35 km from the project site) that is a zone of groundwater (and surface water) discharge.

2.3 IBRA SUBREGIONS

The Interim Biogeographic Regionalisation for Australia (IBRA) is a biogeographic regionalisation of Australia developed by the Australian government's Department of Climate Change, Energy, the Environment and Water. The bioregions and subregions are the reporting unit for assessing the status of native ecosystems and their level of protection in the National Reserve System.

The Garden Gully Project lies within the Murchison bioregion in the southern rangelands of Western Australia, and is described as:

Mulga low woodlands, often rich in ephemerals, on outcrop and fine-textured Quaternary alluvial and eluvial surfaces mantling granitic and greenstone strata of the northern part of the Yilgarn Craton. Surfaces associated with the occluded drainage occur throughout with hummock grasslands on Quaternary sandplains, saltbush shrublands on calcareous soils and Halosarcia low shrublands on saline alluvia. Areas of red sandplains with mallee-mulga parkland over hummock grasslands occur in the east (DCCEEW 2024b).

The Murchison IBRA area has a 6.9% protection level; that is less than 7 % of the area is represented in the National Reserve System.

2.4 GEOLOGY AND HYDROGEOLOGY

The Tieraco 1:100,000 Geological map for the area (Chen and Ivanic, 2009) shows that the Garden Gully gold deposits are situated in an area of colluvial footslope (including ferruginous gravel and duricrust) with a northerly-trending, Proterozoic dolerite dyke. The Project location and regional geology are shown in Figure 2.

A description of the Archaean geology in the area of the Kyarra workings at Garden Gully, close to the Meekatharra Mount Clere Road is taken from St Barbara (1994). The mineralised area is underlain by undifferentiated felsic sedimentary rocks to the west, sheared felsic volcanic and volcanoclastic rocks to the east, with some local mafic to ultramafic units. Further east there is a thin unit of Stockyard Basalt, and then granitic intrusives. Geological interpretation by Boddington (2015) shows the host rock to be mainly a mafic volcanic (dolerite or basalt) with some ultramafic units (talc-chlorite and sericite schists).

Gold mineralization is associated with steeply dipping quartz veins within a series of anastomosing ductile shear zones. The linear drainage of Garden Gully is interpreted to follow a cross-cutting, north-easterly trending fault (Garden Gully Shear Zone) which truncates rock units to the south. Three other north-north-easterly trending faults are shown truncating mineralised zones on a plan in the Ora Gold October 2023 Investor Presentation. Aeromagnetic survey results for the area (MagSpec, 2016) show a complex structure for the area, including apparent northerly faults trending west of north, and east – west faults.

Photographs from four diamond-cored drillholes at Garden Gully, cored from ground surface, indicate that the main permeable broken zones are weathered, sheared mafics (generally dolerite) or ultramafics; or altered quartz mineralised zones (Rockwater 2024). Locations of the strongly-jointed core zones are shown in Figure 3. Most of the rocks below 90 m downhole (at 60° dip) appear to be weakly jointed and of relatively low permeability, although locally some open fractures extend down to about 140 m depth (downhole).

Many drillholes were recorded as having intersected water during drilling, commonly from depths below about 12 to 30 m (downhole) in completely oxidised or transition-zone rocks. Five drillhole logs recorded faults or shears along a north-north-easterly line. A number of drillholes intersected high water flows from strongly fractured rocks or stopes. The locations of the high-flow zones, faults and shears are shown in Figure 3. Three faults that are within the envelope of the planned western pit are reported to have yielded high airlift water rates (up to 20 L/s in some drilled holes).

A tributary palaeochannel of Tertiary age follows the Garden Gully drainage on its northern side (Fig. 3) and has been defined by a passive-seismic survey (Resource Potentials, 2024). The survey results suggest that the palaeochannel is about 70 m deep. The palaeochannel is likely to contain basal sands (Werillup Formation). One drillhole north of the drainage is reported to have intersected about 100 m of sand; and the Main Roads bore probably intersects the southern edge of the channel. The palaeochannel that has been delineated by the passive seismic survey is likely to contain basal sands of moderate permeability.

3 SUBTERRANEAN FAUNA DESKTOP STUDY

3.1 PREVIOUS SURVEYS AT GARDEN GULLY

There are few records of subterranean fauna in the Murchison region of Western Australia, and no publicly available records that indicate surveys for stygofauna or troglafauna have been undertaken in the Garden Gully area.

3.2 SUBTERRANEAN FAUNA OF THE REGION

3.2.1 DATABASE SEARCHES

A number of database searches were undertaken to detail any stygofauna or troglafauna previously recorded near to the Project area, and to identify if any threatened/priority ecological communities (TEC's/PEC's) relating to subterranean fauna or threatened fauna species occur in the vicinity of the Project. The database search areas are specified in Table 2.

Database sources included:

- Dandjoo Database of Western Australia;
- Department of Biodiversity, Conservation and Attractions (DBCA) Threatened Fauna and TEC/PEC databases; and
- Atlas of Living Australia (ALA).

Table 2: Defined Search Parameters of Database and Internet Sources

Data Source	Search Area	No of records (un-screened)	No of records (screened for subterranean habitats)
DBCA TEC/PEC	100 km radius	9	4
DBCA Dandjoo Database		3,171	91
ALA	200 by 150 km rectangle	5,278	19

DBCA Threatened and Priority Ecological Community (TEC/PEC) database search

Results of a Threatened and Priority Ecological Community (TEC/PEC) database search confirmed that there are no TECs relating to subterranean fauna within a 100 km radius of the Project. The search returned several Priority Ecological Communities (PEC) pertaining to stygofauna communities in calcrete habitats, with all five communities listed occurring (at least partially) within a 50 km radius of the project (Figure 4). The nearest of these PECs is the (Priority 1) Belele calcrete groundwater assemblage, with its spatial buffer being approximately 34 km to the west of Garden Gully Project (Figure 4).

DBCA Threatened and Priority Fauna

A search of DBCA's Threatened and Priority Fauna database was screened for subterranean records within a 100 km radius of the Project. No subterranean fauna species were listed in the search results.

3.3 LITERATURE REVIEW

A literature review was conducted to gather existing information on subterranean fauna near to the Project area, using publicly available technical reports. The results of the closest of these reported studies are presented in Table 3, and locations of the projects are shown in Figure 1.

The closest record of subterranean fauna to Garden Gully is at Andy Well, 29 km to the north-north-east, within the Meekatharra-Wyldgee greenstone belt. Andy Well sits in the Murchison Mineral Field of the Yilgarn Craton, in a sequence of granite and granodiorite intrusions of basalt and porphyry rocks. Superficial cover includes degraded laterite profiles and ferruginised rubble and colluvium over areas of subdued relief. This grades into sheetwash deposits 5 to 8 metres thick, and alluvium in surrounding watercourses related to northwesterly flowing tributaries to the Yalgar drainage system. Alluvial cover over the Yalgar drainage system ranges up to 30 metres thick overlying channel clays up to 100 metres thick.

A subterranean fauna assessment for the Andy Well Project recorded 21 stygofauna species, including Nematoda, Rotifera, Aphanoneura, Oligochaeta, Ostracoda, Copepoda, Syncarida and Amphipoda (Bennelongia 2011). All but two species were recorded from both the mine footprint “impact area” and reference sites, which included nearby calcretes with known significant stygofauna assemblages (Karalundi and Killara North Calcretes). The two remaining species were known to be widespread species. Consequently, development of the Project was not considered to be a significant risk to conservation of stygofauna of detrital aquifers (alluvium and colluvium) at Andy Well. Two troglofauna species were also recorded; an isopod and a polyxenid. Neither species of troglofauna was restricted to the mine footprint “impact area”.

Results of a survey of the adjacent Gnaweeda gold project (Bennelongia 2017) demonstrated a depauperate stygofauna community and absence of troglofauna in subterranean habitats including fractured rock and overlying colluvium. Two stygofauna species were recorded, with both species found to be widespread across Australia. The survey, combined with results of a desktop review suggested that the Project would not significantly threaten species or communities of subterranean fauna.

Stygofauna has also been found from fractured rock habitats at three other projects within 100 km of Garden Gully (Table 3, Figure 1). In addition, sampling for subterranean fauna in granite and granodiorite habitats at the Yangibana Rare Earths Project in the Gascoyne region (~350 km northwest of Garden Gully) yielded several species of both stygofauna and troglofauna (Bennelongia 2018). All stygofauna species from the project area were found to be widespread, and also occurred in samples from nearby calcrete aquifers, which were considerably more diverse than habitats of the project area.

In other parts of the Yilgarn Craton, fractured rock aquifers have yielded few records of stygofauna, and where present, stygofauna communities have generally been found to be depauperate. Surveys in greenstone belts from Ravensthorpe to north of Southern Cross have recorded occasional records of stygofauna (e.g. Rockwater 2009 a, b, c, d; Bennelongia 2009a; GHD 2009). Where surveys of fractured rock aquifers have recorded stygofauna, cyclopoid and harpacticoid copepods appear to be the most common groups found in these habitats; however, these are typically in very low numbers.

Surveys of fractured rock habitats in the Yilgarn have also yielded occasional records of troglofauna. These studies have typically been associated with banded ironstone geology, or calcretes. Surveys of BIF habitats in the Yilgarn at Koolyanobbing, Mt Jackson, Mt Dimer, Lake Giles, Mt Caudan and the Watt and Yendilberin Hills have yielded depauperate to moderately rich troglofauna communities (Bennelongia 2008a, b, 2009a,b; Rockwater 2009a, 2010, 2011). Sampling of other fractured rock habitats comprising mafic units (amphibolites, basalt, dolerite and gabbro) have also yielded occasional records (e.g. Rockwater 2009d, 2010) indicating that troglofauna habitat is present across a range of geological units that are typically found in greenstones of the Yilgarn Craton.

Table 3: Subterranean Fauna Projects in the vicinity of Garden Gully

Site	Distance to GG	Reference / Year	Geological Setting	Studied for	Results
Andy Well	32 km north-north east	Bennelongia, 2011	Surface covering of colluvial deposits up to 11 m thick, which overlie basement rock (metabasalt) weathered to form saprolite and saprock, with the rock freshening with depth. All stygofauna recorded from sites with the surficial colluvium (and alluvium in reference sites)	Stygofauna	The survey recorded 21 stygofauna species from 71 samples in the Andy Well Project Survey; comprising Nematoda, Rotifera, Aphanoneura, Oligochaeta, Ostracoda, Copepoda, Syncarida and Amphipoda. Six of the 21 species were recorded from the impact footprint of the Andy Well Project. The study confirmed no stygofauna species were restricted to the detrital aquifers of the Andy Well Project, and the integrity of the nearby Priority 1 PECs at Karalundi and Killara North calcretes would not be threatened by the proposed mining. It was concluded that the proposed mining at Andy Well would not threaten stygofauna conservation values or the persistence of any stygofauna species.
				Troglofauna	A desktop assessment concluded that the risk to troglofauna from mining at Andy Well Project was low to very low. A field survey of 25 samples yielded a depauperate troglofauna community of two species (1 isopod and 1 polyxenid). Neither species was recorded within the Andy Well impact footprint and mining activities at the Project were not considered to be a threat to their persistence.
Gnaweeda	34 km north-east	Bennelongia, 2017	Alluvial and colluvial (detrital) deposits overlying deeply-weathered volcanic and sedimentary rocks	Stygofauna Desktop and Level 1 Sampling	A desktop assessment recorded three stygal specimens from three species within 10 km of the project. Targeted sampling of the mine impact areas (10 samples) recorded three specimens from two stygofauna species, the cyclopoid copepod <i>Mesocyclops notius</i> and the ostracod <i>Cypretta seurati</i> . Both species are widespread and have been recorded across Australia. Survey results were consistent with the desktop review and demonstrated a depauperate stygofauna community
				Troglofauna Desktop and Level 1 Sampling	A desktop assessment compiled nearby troglofauna records and revealed four troglofauna species collected within 10 km of the project (taken as part of the Andy Well sampling programme). These included at least two isopod species, a millipede and a symphylan. Targeted sampling of the Gnaweeda impact area returned no troglofauna. The study concluded that troglofauna at the Project will be depauperate.

Site	Distance to GG	Reference / Year	Geological Setting	Studied for	Results
Murchison Gold Project – St Annes	34 km north-east			Desktop Assessment and Baseline Level 1 Survey	Twelve sites were sampled and five stygofauna species were collected, with most species determined to be widespread. The exception being one Ostracod species, which has not been collected elsewhere.
					Twelve sites were sampled for troglofauna, yielding three species; two millipede (Diplopoda) species and a slater (Isopoda: Oniscridea). No species were restricted to the impact area and the study concluded that troglofauna at the Project is be depauperate.
Gabanintha Vanadium Project (Australian Vanadium Project)	52 km south-east	Biologic 2021	Alluvial and colluvial deposits, ferruginous duricrust and felsic volcanic rock overlaying magnetite banded gabbro units	Stygofauna Desktop and Level 2 Sampling	A total of 1,460 stygofaunal and amphibious specimens were collected representing 34 unique taxa belonging to Nematoda, Aphanoneura, Oligochaeta, Syncarida, Copepoda and Ostracoda. Of these, nine species comprised regionally widespread, cosmopolitan, and higher order taxa. The remaining twenty-five species were recorded for the first time during the surveys and are currently only known from the Study Area. Eleven of the 25 species unique to the Study Area are amphibious enchytraeid worms that are not regarded as SREs. The remaining species comprise stygobites and potential stygobites.
				Troglofauna Desktop and Level 2 Sampling	Eleven troglofauna species were recorded, belonging to nine taxonomic groups: Pseudoscorpiones, Isopoda, Diplura, Zygentoma, Geophilida, Scolopendrida, Polyxenida, Pauropoda and Symphyla. Seven taxa were recorded from the Mining Area, two from the Water Supply Area and two from regional sites.
Gidgee Gold Project	90 km south-east	MBS 2013	Fractured Rock	Stygofauna – Level 1	Sixteen stygofauna species were recorded from 10 of the 20 sites sampled. Nine of these are considered common and widespread within the region and Western Australia. One juvenile Anzyclops sp. was collected and could not be identified to species level but is likely to be Anzyclops sp. B04. The remaining six are new undescribed species based on morphological differences.
				Troglofauna – Desktop only	A desktop review of potential habitat determined that the geology and hydrogeology of Gidgee was not suitable to support significant or unique troglofaunal habitat

3.4 HABITAT AND DISTRIBUTION

The probability that a site contains a diverse subterranean fauna community is largely determined by the region in which a site occurs, and biophysical attributes such as local geology. Geological, topographical and hydrological features influence subterranean faunal assemblages by allowing, or restricting, dispersal between populations. For stygofauna, karstic limestone and calcrete aquifers, alluvial formations and fractured rock habitats have historically been shown to provide stygofauna habitat in other parts of the Yilgarn Craton.

For troglofauna, the EPA notes that the probability of rich troglofauna assemblages in the Gascoyne and Murchison regions of Western Australia is typically only high where local geology includes calcrete, alluvium or banded ironstone (EPA 2007).

In the vicinity of the Crown Prince deposit, there are three geological formations that may provide habitat for subterranean fauna. These are;

- Ferruginous gravel and duricrust in the colluvial footslope;
- Fractured rock; and
- Calcrete associated with a tributary palaeochannel to the north of Garden Gully drainage.

The suitability of local geological formations as habitat for subterranean fauna can further be assessed by the presence of suitable voids within the rock type, which provide habitat spaces, and conduits for infiltration of oxygen and nutrients from the surface. Features such as fractures, vugs, and other voids in suitable lithologies facilitate fauna dispersal and infiltration of nutrients and organic material. These characteristics are considered essential for subterranean fauna habitat. Other important features include depth to surface, adjacent strata, geomorphology, vegetation types and presence of tree roots.

Locally, Ora Gold geologists have not encountered any cavities or vuggy sections of the surface duricrust layer within any drill holes at Crown Prince. The specific lithologies of the Crown Prince gold deposit at Garden Gully, combined with very shallow groundwater levels, suggests that potential troglofauna habitat is not widespread in the Project area.

Measured groundwater levels in the vicinity of the planned Crown Prince open pits are typically <10 m below ground level (bgl), with measured water levels ranging between 5 and 11 m bgl in drill holes and bores across the Project area. Initial hydrogeological studies indicate that the groundwater has a salinity of 690-3,500 mg/L TDS, and is circumneutral to slightly alkaline (pH 7.05-8.20, Rockwater 2024). These groundwater conditions appear to be conducive to stygofauna habitat, based on measured water quality ranges for groundwaters containing stygofauna in other parts of Western Australia.

The potential for the presence of subterranean habitats at the Crown Prince deposit was assessed using photos of diamond drill core at 4 holes across the Project area. These were inspected in detail and cross-referenced with lithological codes. Drill core photos were reviewed for any characteristic features such as vugs, fractures, holes, or pore spaces, pre-existing fractures (those show staining from groundwater, rather than fresh mechanical fractures from drilling), coarse gravel layers, or areas of significant core loss, which might indicate a subterranean cavity. The data was also inspected for key lithologies which, when sufficiently weathered or porous, are known to provide habitat for subterranean fauna in other parts of the Yilgarn Craton. Results of the assessment of diamond drill core are presented in section 3.4.1 (for troglofauna) and section 3.4.2 (for stygofauna).

3.4.1 ASSESSMENT OF POTENTIAL TROGLOFAUNA HABITAT

Four diamond core holes drilled from or near surface at Garden Gully provide insitu profiles of the geological sequence above the water table. Groundwater occurs at approximately 5 to 11 metres below ground level (bgl) at the deposit, and the unsaturated overburden consists of clay-rich duricrust. No vugs or cavities have been observed in diamond drill cores, or noted by site geologists in other drilling. Any voids formed in the weathering process have been filled with clay and are unlikely to support troglofauna.

Core photographs for the unsaturated sections of four diamond holes are presented in Plates 1 to 4 and the locations of the diamond holes are shown in Figure 5. The clay-rich profiles associated with surface detritals above the shallow water table at Crown Prince deposit are unlikely to support troglofauna.



Plate 1: Unsaturated geological sequence at site OGGDD524 (0 to 10.3 m below ground level), located in the central part of the deposit.



Plate 2: Unsaturated geological sequence at site OGGDD536 (0 to 10.3 m below ground level), located in the central part of the deposit.



Plate 3: Unsaturated geological sequence at site OGGDD537 (3.8 to 14.1 m below ground level), located in the south-eastern part of the deposit.



Plate 4: Unsaturated geological sequence at site OGGDD538 (0 to 13.2 m below ground level), located in the south-western part of the deposit.

3.4.2 ASSESSMENT OF POTENTIAL STYGOFAUNA HABITAT

Selected diamond core photographs from the four holes shown in Figure 5 outline the geological sequences of saturated sections of the deposit within the planned Crown Prince pits. All holes were drilled at -60° and depths discussed herein have been converted to vertical depth below ground level (bgl). Groundwater occurs at approximately 5 to 11 m bgl at the deposit. A clay-rich duricrust extends to approximately 13 to 40 m vertical depth at the deposit, below which weathered dolerite occurs to about 30 to 100 m bgl. Broken and fractured sections of this unit may provide potential habitat for stygofauna. Plates 58 show sections of broken/fractured ground below the water table that indicates areas of higher permeability within the Crown Prince gold deposit. The most prospective areas appear to be at top of the weathered dolerite, and considerably more fracturing is noted for holes intersecting faults (as mapped on Figure 3).



Plate 5: Saturated geological sequence at site OGGDD524 (52.2 to 57 m below ground level), located in the central part of the deposit.



Plate 6: Representative core photograph at site OGGDD536 (31 to 38.7 m below ground level), located in the central part of the deposit.



Plate 7: Representative core photograph at site OGGDD537 (20 to 20.3 m below ground level), located in the south-eastern part of the deposit.



Plate 8: Saturated geological sequence at site OGGDD538 (57.3 to 67.7 m below ground level), located in the south-western part of the deposit.

3.5 POTENTIAL IMPACTS OF MINING AT CROWN PRINCE DEPOSIT

Impacts to subterranean fauna are defined by the EPA's *Environmental Factor Guideline: Subterranean Fauna* (EPA 2016). These impacts may be direct or indirect.

Direct impacts include the removal or destruction of habitat by drawdown of water levels, inundation, or water quality changes. The main threats include excavation of rock types/habitat known to support subterranean fauna; groundwater extraction for process or domestic purposes; dewatering to facilitate mining below the water table, and groundwater reinjection of waste or excess water.

Indirect impacts include changes to hydrology, siltation, void collapse, alteration to nutrient balance and contamination. The main threats include changed surface topography due to compaction or creation of hard surfaces resulting in altered groundwater flow paths, increased runoff, and reduced infiltration and aquifer recharge; clearing of surface vegetation leading to sedimentation and changed nutrient inputs;

potential leaks or leaching including tailings and waste water resulting in alterations to ground water chemistry and quality, and introduction of toxins or radiation; and salinisation due to intrusion of saline water into freshwater aquifers and leaching from pit voids.

The potential impacts to stygofauna and troglofauna associated with mining are summarised in Table 4.

Table 4: Potential Direct and Indirect Impacts to Subterranean Fauna

Impact Type	Description
Direct Impacts (open pit and groundwater drawdown)	Direct impacts to subterranean fauna habitat due to mine development, excavation of open pit (stygofauna and troglofauna) and groundwater drawdown (for stygofauna) due to pit dewatering.
Indirect Impacts (open pit and other mining infrastructure)	Impacts that may modify subterranean habitats, such as clearing and/or modifying landform, and activities associated with construction of infrastructure where such activities cause siltation, void collapse, alteration to nutrient balance and contamination.
Cumulative Impacts	Impacts of Mining Proposal with consideration of other projects/users potentially impacting subterranean fauna. These include: 1. Pit Dewatering (nearby mines) 2. Other groundwater users

Two pits are planned to be mined at Crown Prince, to depths of about 136 m and 53 m, respectively, on the southern side of the Garden Gully drainage (Figure 3), over a three-year period. Model-calculated groundwater-level drawdowns (Rockwater 2024) suggest that the largest drawdowns will occur at the end of mining of the deeper (western pit); and that at the end of mining of both pits, the 0.5 m drawdown contour could extend up to 6.4 km north-south by 3.1 km east-west. The modelled drawdown is shown for the end of mining and dewatering in Figure 5.

The post mining landscape will include pit lakes from the final mine voids, which will be groundwater sinks. Water-balance calculations for the planned pits show that the final, post-mining pit lake levels will be slightly lower than current groundwater levels (Rockwater 2024). In the case of the (shallower) eastern pit, the pre-mining groundwater level and predicted post-mining lake level are so close that it may be a flow through feature. The modelling and water balances also suggest that there will be no seepage from the pit lakes back into the surrounding groundwater.

There will be no direct impacts to troglofauna habitat as a result of the Garden Gully Proposal as the water level is shallow (typically < 10 m below ground surface) and there is limited prospective habitat in the clay-rich detrital profile between the ground surface and water table.

Indirect impacts from clearing and related risks to subterranean habitats such as siltation, void collapse, alteration to nutrient balance and contamination are considered unlikely, given the local geology and small scale of the project.

3.5.1 CUMULATIVE IMPACTS

Cumulative impacts of drawdown from the other mining operations are not considered relevant to the Crown Prince proposal, as there will be no interactions between mine pit dewatering and drawdown associated with any current projects. There are no other significant groundwater users in the area that could impact the aquifers of the Project Area. The Meekatharra Water Reserve, which includes the Sherwood Borefield that provides water for the town, is about 2.5 km from Crown Prince at its closest point (Rockwater 2024). However, the nearest Sherwood Borefield production bore is about 9 km from Crown Prince deposit.

4 SAMPLING METHODOLOGY

The stygofauna sampling methodology implemented for the Garden Gully Project was prepared in accordance with relevant EPA guidance statement (EPA 2021). The investigation constitutes a basic survey following on from the desktop study and the sampling effort complies with the requirements of the EPA.

Sampling was undertaken by Daisy Scott, Senior Environmental Scientist and Nick Eveleigh, Principal Environmental Scientist (both of Rockwater Pty Ltd) in October 2024 in accordance with Regulation 27 Permit No. BA 27 001 173 (Fauna Taking (Biological Assessment) Licence), issued by DBCA.

Prior to stygofauna sampling at each bore, water quality was measured on a bailed sample using a multi-parameter probe. Representative samples were also taken from a selection of open RC and diamond drill holes. Water quality parameter readings (including conductivity, pH, dissolved oxygen, and temperature) were recorded. Measurements of total depth, collar height, diameter and other bore details were also recorded.

Stygofauna sampling was undertaken using modified plankton nets. Each site was sampled using sampling nets with a diameter approximately two-thirds of the bore casing and filter mesh sizes 50 µm and 150 µm. Net samples were obtained by lowering sampling nets into each bore using a reel of braid until they reached the bottom of the bore where they were agitated to disturb sediment and any animals that may be present. Each biological sample was taken using three net-hauls of the 50 µm stygofauna sampling net and three net-hauls of the 150 µm sampling net, which were combined and stored in 120 mL polycarbonate vials. Samples from several reference sites and one impact site were pumped using existing installed pumps. Samples were preserved using 100% (absolute) ethanol.

To avoid contamination between sites, the sampling nets were thoroughly washed with a decontaminant solution (Decon 90) and then rinsed with distilled water. All samples were transported to Perth and forwarded to specialist stygofauna biologists for sorting and identification.

4.1 SITE SELECTION

The 2024 stygofauna sampling programme surveyed a combination of existing monitoring bores at the site, open reverse circulation (RC) exploration holes and diamond drill core holes across the proposed mine pit area and pastoral bores/wells in the immediate surrounds (Fig. 5). Table 5 outlines numbers of stygofauna samples collected by the Garden Gully stygofauna survey.

Eighteen stygofauna samples were collected from Project area impact sites, defined by the modelled 0.5 m drawdown contour of Rockwater (2024). Six additional reference sites were taken from regional bores and wells.

Table 5: Number of Stygofauna Samples Collected at the Garden Gully Project – October 2024

	Number of Samples			Total Samples
	Net	Pump	Total	
Project Area	17	1	18	24
Reference	3	3	6	

5 RESULTS AND DISCUSSION

Surveys of other fractured rock habitats in the Murchison, Gascoyne, and wider Yilgarn Craton have yielded few records of stygofauna or troglifauna, and where present, these subterranean fauna communities have generally been found to be depauperate. Based on previous surveys of similar habitats, there appears to be low potential for significant stygofauna or troglifauna at Crown Prince deposit.

Given the very clayey surface lithology of the Crown Prince deposit and the shallow water table (typically <10 m bgl) there is a low probability that suitable troglifauna habitat exists locally. Therefore, there is a low likelihood of any impacts to troglifauna habitat or troglifauna conservation values associated with the Project.

Stygofauna has generally been found to occur in alluvial or calcrete aquifers in the region. Stygofauna communities of alluvial aquifers have generally been shown to be widespread, and are unlikely to have restricted distribution ranges (at individual project scales).

There are no calcrete or karstic formations in the Project area; however, several bores located upstream of the Ora Gold project intersected significant thicknesses of porous calcrete that have historically had moderately high groundwater yields (Rockwater 2024). In addition, several regional calcretes have been shown to provide habitat for significant stygofauna assemblages (Figure 4). The nearest of these PECs is the (Priority 1) Belele calcrete groundwater assemblage, with its spatial buffer being approximately 34 km to the west of Garden Gully Project (Figure 4). Other Priority 1 calcrete PECs within 50 km of the Project including Killara North, Karalundi, Killara and Polelle are shown on Figure 4.

There were no subterranean fauna species listed in the results of a search of DBCA's Threatened and Priority Fauna database for the Project area. Results of other database searches (see section 3.2.1) identified subterranean fauna records from groups including Insecta, Malacostraca, Maxillopoda, Arachnida, Entognatha and Oligochaeta (Figure 4). The majority of these records are associated with a 2011 survey at the Andy Well Project, which recorded 2 troglifauna species and 21 stygofauna species from surficial colluvium and alluvial habitats of the project area (Bennelongia 2011). None of the stygofauna recorded by that survey were restricted to the weathered basement rock (metabasalt).

The October 2024 stygofauna survey at the Crown Prince deposit sampled a total of 24 sites, including six regional bores and wells; some of which are located in areas of calcrete upstream of the Project (Figure 5). Sampling results are presented in Table 6. Twelve possible stygofauna species were recorded, indicating a moderately diverse stygofauna community. The stygofauna recovered from samples included copepods, ostracods, syncarids, and aquatic worms. Seven stygofauna species were recorded within the Project impact area, which is defined by the 1,580 ha area of drawdown influence on groundwater levels. Stygofauna recorded by the survey, together with the extent of drawdown resulting from pit dewatering, are shown in Figure 6.

Only one of seven species recorded from the area of drawdown influence at Garden Gully has not been recorded from regional sites. The cyclopoid copepod, *Parastenocaris* `BHA433`, is a potential new species that is currently only known from a single site approximately 1.1 km west-north-west of the Project (Figure 6). Another *Parastenocaris* specimen was recorded from bore GG2, approximately 5 km east of the Project (Figure 6). The specimen was female (males are required for species level identification) and may represent another record of *Parastenocaris* `BHA433`.

Table 6: Results of stygofauna sampling at Garden Gully

	Order	Family	Taxon	n	Project Area	Reference
CRUSTACEA						
Copepoda	Cyclopoida	Cyclopidae	Dussartcyclops uniarticulatus s.l.	5	-	CP Bore, GG2
	Cyclopoida	Cyclopidae	<i>Mesocyclops brooksi</i>	12	OGGRC555	LP GG5
	Cyclopoida	Cyclopidae	<i>Paracyclops chiltoni</i>	1	CPMB001	Widespread species
	Cyclopoida	Parastenocarididae	<i>Parastenocaris</i> 'BHA433'	10	Main Roads Bore	-
	Cyclopoida	Parastenocarididae	<i>Parastenocaris</i> sp.	1		GG2
Ostracoda	Podocopida	Cyprididae	<i>Sarscypridopsis aculeata</i>	4	-	Pettiford Mill
	Podocopida	Cyprididae	<i>Sarscypridopsis</i> sp.	2	-	Joe Well
	Podocopida	Limnocytheridae	<i>Limnocythere</i>	1	-	Pettiford Mill
Syncarida	Bathynellacea	Parabathynellidae	<i>Atopobathynella</i> 'BSY387'	12	-	GG1, LP GG5, GG2
ANNELIDA						
Polychaeta		Aeolosomatidae	<i>Aeolosoma</i> sp.*	20	CPMB001	-
Oligochaeta	Tubificida	Enchytraeidae	Enchytraeidae '2 bundle' s.l. (long thin 2 per seg)	8	-	GG2
	Tubificida	Enchytraeidae	Enchytraeidae '3 bundle' s.l. (short sclero)	61	OGGRC555, OGGDD0S1	Joe Well, GG2
	Tubificida	Phreodrilidae	<i>Phreodrilidae</i> sp. AP DVC s.l.	15	-	Joe Well, LP GG5, GG2
	Tubificida	Naididae	<i>Tubificinae</i> 'BOL106'	2	CP Bore	GG2
			TOTAL	154		

* Denotes taxa not expected to be identified to species level (EPA, 2007)

Harpacticoid copepods of the Pilbara region have been shown to have variable ranges, with most showing at least catchment scale distributions (Halse *et al.* 2014). *Parastenocaris* 'BHA433' is expected to have a range extending well beyond the area of groundwater drawdown associated with the Project. The Garden Gully specimens of this taxon were recorded from a 74 m deep production bore, where the aquifer has a recorded saturated thickness of at least 68 m. The maximum modelled drawdown of approximately 1.5 m at this site will not affect the conservation status of the species.

Two cyclopoid copepods (*Mesocyclops brooksi* and *Paracyclops chiltoni*) recorded from impact sites are cosmopolitan species that are also known to occur more widely, including from freshwater habitats of the Pilbara region. Most of the remaining stygofauna species are known to occur more widely than the Project impact area. The exception is the aquatic annelid worm *Aeolosoma* sp., which cannot be assessed for EIA purposes due to the lack of a suitable taxonomic framework to further identify the species. All stygofauna

species recorded by the survey are expected to have distribution ranges at least an order of magnitude greater than the Project area of drawdown influence.

In the Pilbara and Murchison regions, stygofauna distributions are usually restricted by surface drainage catchments, aquifer discontinuity, geological barriers or habitat preference. There is no evidence to suggest that distribution ranges of any species are limited at the project-scale by any such factors. The habitats sampled at Garden Gully are not unique in a regional context, and there appear to be no real constraints of geological barriers or aquifer boundaries that would restrict dispersal of stygofauna more widely than the Project area. Sampling results indicate that continuous stygofauna habitat extends beyond the area of drawdown influence. Consequently, none of the recorded species are likely to have distribution ranges limited to the localised extent of dewatering impacts. Mining of the Crown Prince Prospect is unlikely to threaten the conservation of any individual stygofauna species recorded by the survey, or to impact any stygofauna conservation values of the wider Garden Gully area.

Results of groundwater sampling, undertaken in conjunction with the stygofauna field survey at Garden Gully, indicate a groundwater salinity range of 1,180 to 5,943 mg/L TDS and circumneutral to slightly alkaline pH (7.28 to 7.85) (Appendix I). Dissolved oxygen levels ranged from 1.51 to 8.25 mg/L (18.3 to 91.6 % saturation). The water quality results indicate that the groundwater conditions are within suitable ranges recorded for stygofauna habitat at other locations in Western Australia. Therefore, water quality is unlikely to be a limiting factor for stygofauna at Crown Prince deposit.

There will be no interactions between the Crown Prince mine pit dewatering and drawdown associated with groundwater extraction from the Meekatharra town water supply borefield, or from dewatering of other current mining operations in the region over the life of the mine. The Crown Prince deposit and the nearest Meekatharra borefield production bore are separated by a distance of at least 9 km. There are no other nearby developments or projects that could present a cumulative impact to stygofauna in the vicinity of the Project.

6 CONCLUSIONS

A basic stygofauna survey was undertaken over the Crown Prince deposit at Garden Gully, in conjunction with a desktop subterranean fauna study. Results of the desktop study indicate that there appears to be no suitable habitat for troglifauna, and the aquifers of the immediate Project area are unlikely to host a rich stygofauna community. Results of 24 samples from the Project area included 12 possible stygofauna species, including copepods, ostracods, syncarids, and aquatic worms. Most of the stygofauna species from the Project area were found to occur more widely. However, one cyclopoid copepod species (*Parastenocaris* 'BHA433') collected from the area of drawdown influence as a singleton record is currently known only from the Garden Gully area. The modelled drawdown at the site it was recorded at represents 2% of the aquifer thickness, which will not affect the conservation status of the species. Drawdown associated with the Project affects an area of approximately 1,580 ha and is unlikely to impact any stygofauna conservation values of the wider Garden Gully area.

The nearest calcrete groundwater assemblage with significant conservation values (Belele P1 Priority Ecological Community) has its spatial buffer approximately 34 km to the west of Garden Gully Project, and 33 km from any modelled drawdown impacts associated with pit dewatering at Crown Prince deposit. There appears to be no risk from the Project to any stygofauna conservation values associated with listed threatened or priority ecological communities. The localised drawdown from pit dewatering over the life

of the Project is unlikely to impact any stygofauna values at Garden Gully, or the persistence of any stygofauna species recorded by the survey.

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N C P Eveleigh
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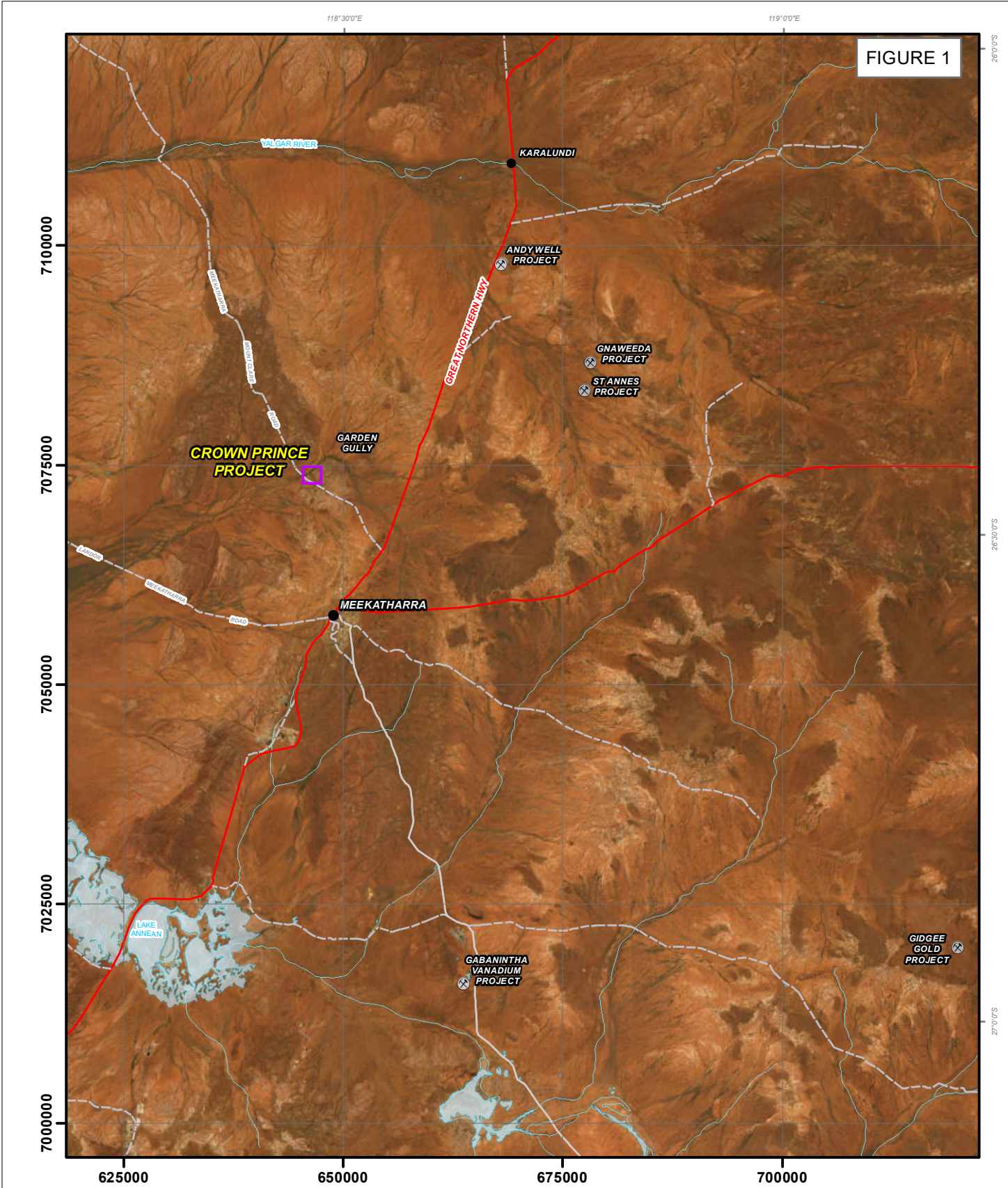
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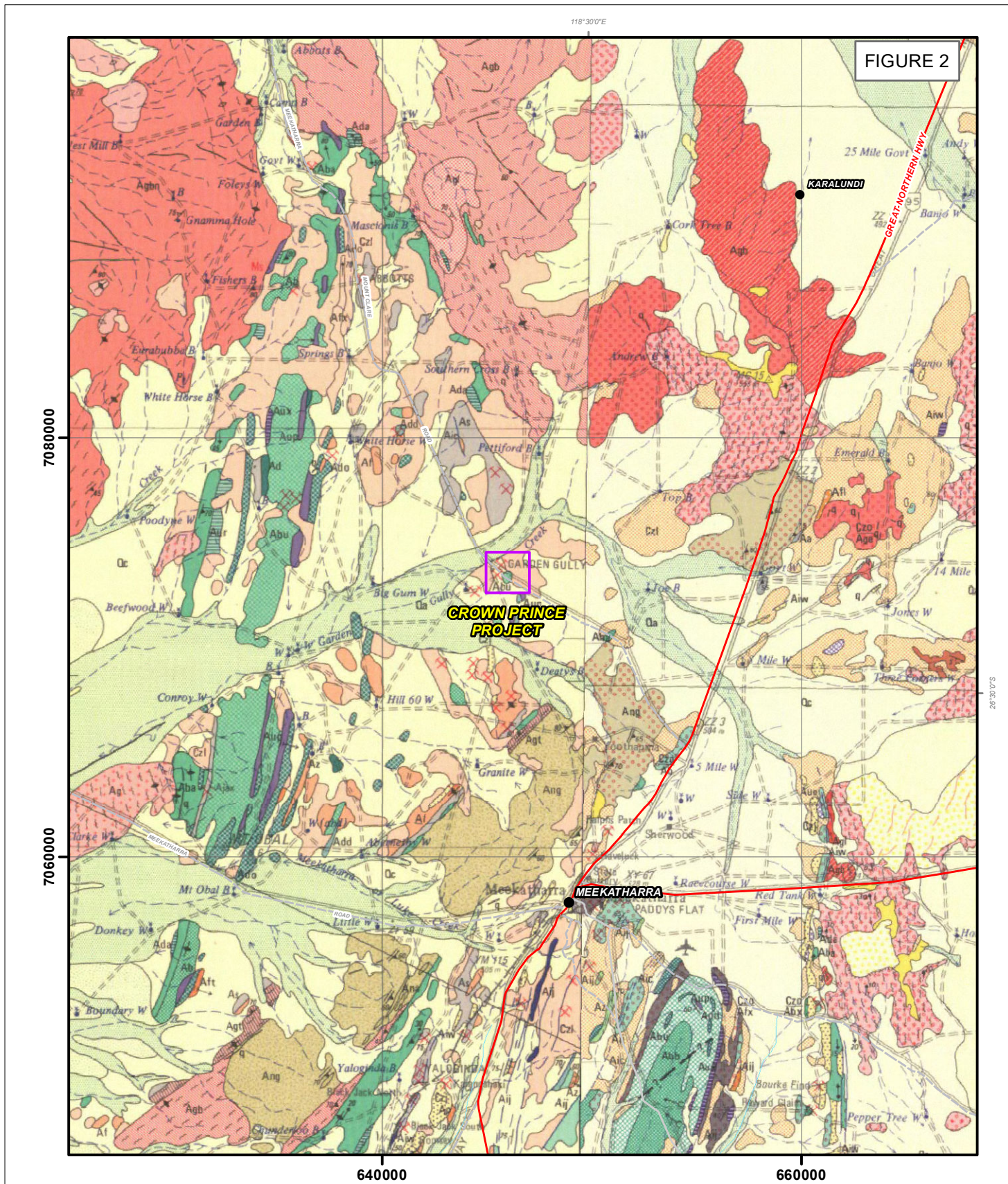
FIGURES





Data Source: Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community	● Populated place ■ Lakes — Rivers_DoW	Roads/Tracks — Principal Road — Secondary Road — Minor Road		1:600,000 A4		Grid: MGA 1994 Zone 50	
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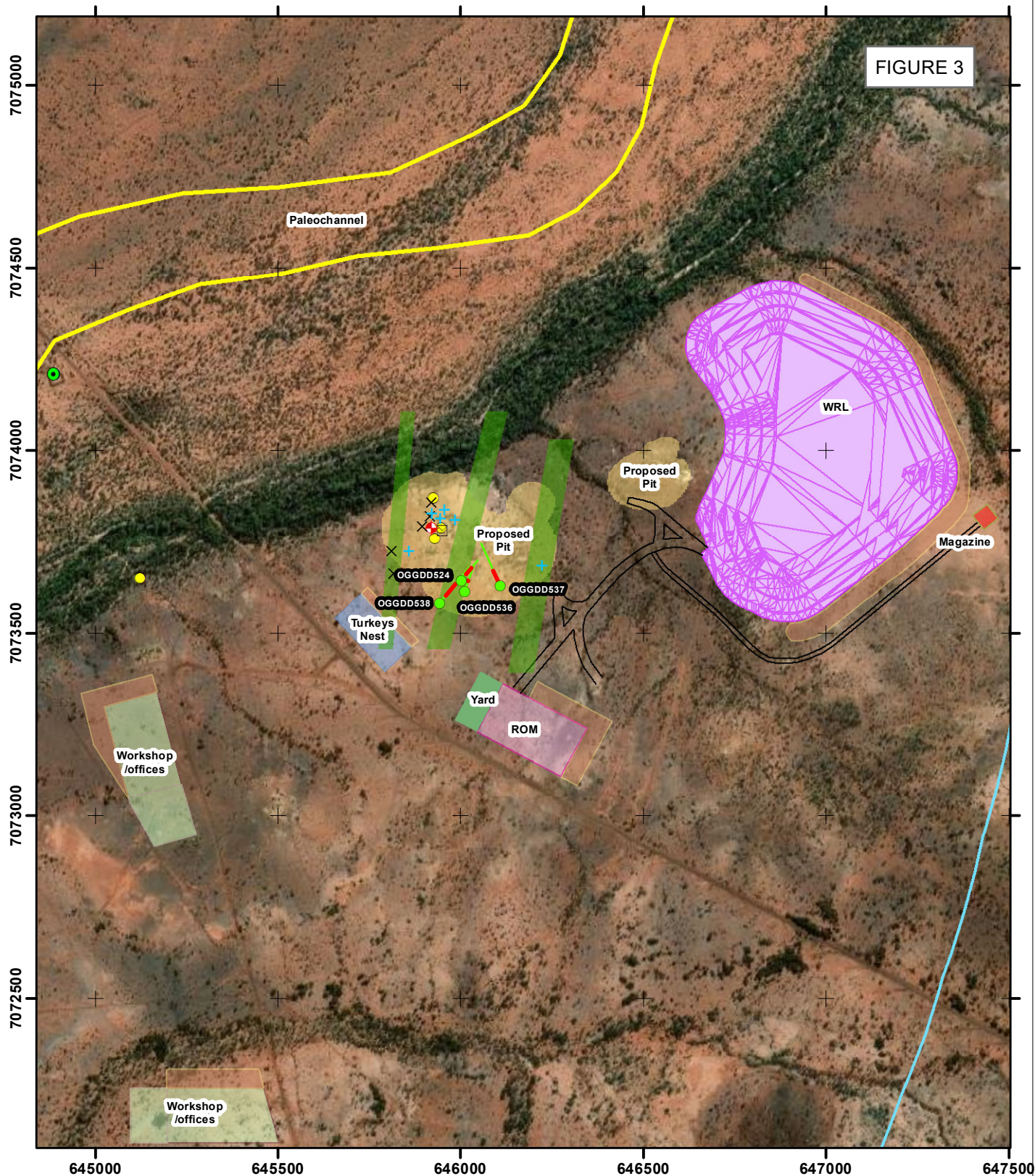
CLIENT: Ora Gold Ltd	SITE LOCALITY  Rockwater
PROJECT: Garden Gully Project Subterranean Fauna Assessment	
DATE: October 2024	
DWG NO: 586-1/24/01-4	



Data Source: Service Layer Credits: Geological Survey of Western Australia L:/GIS Projects/422-0 - Tappa Tappa/ Fig. 2024_1-1 - Locality.mxd	● Populated place — Roads/Tracks — Principal Road — Secondary Road — Minor Road — Lakes — Rivers_DoW		1:250,000 A4		Grid: MGA 1994 Zone 50	
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CLIENT: Ora Gold Ltd PROJECT: Garden Gully Project Subterranean Fauna Desktop Assessment DATE: October 2024 DWG NO: 586-1/24/01-2	REGIONAL GEOLOGY
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FIGURE 3



- | | |
|-------------------------|----------------------------|
| Inspected Diamond Core | CP Production Bore |
| 0.5 m Drawdown Extent | Kyarra Shaft |
| Drillhole jointed zones | Main Roads Bore |
| Drillhole traces | Monitoring Bore |
| Inferred Faults | High Yielding Holes |
| Palaeochannel | Fault/shear, in drillholes |



1:15,000
A4

Grid: MGA 1994
Zone 50



CLIENT: Ora Gold Ltd
PROJECT: Garden Gully Project
Subterranean Fauna Assessment
DATE: October 2024
DWG NO: 586-1/24/01-3

GARDEN GULLY PROJECT

SITE LAYOUT



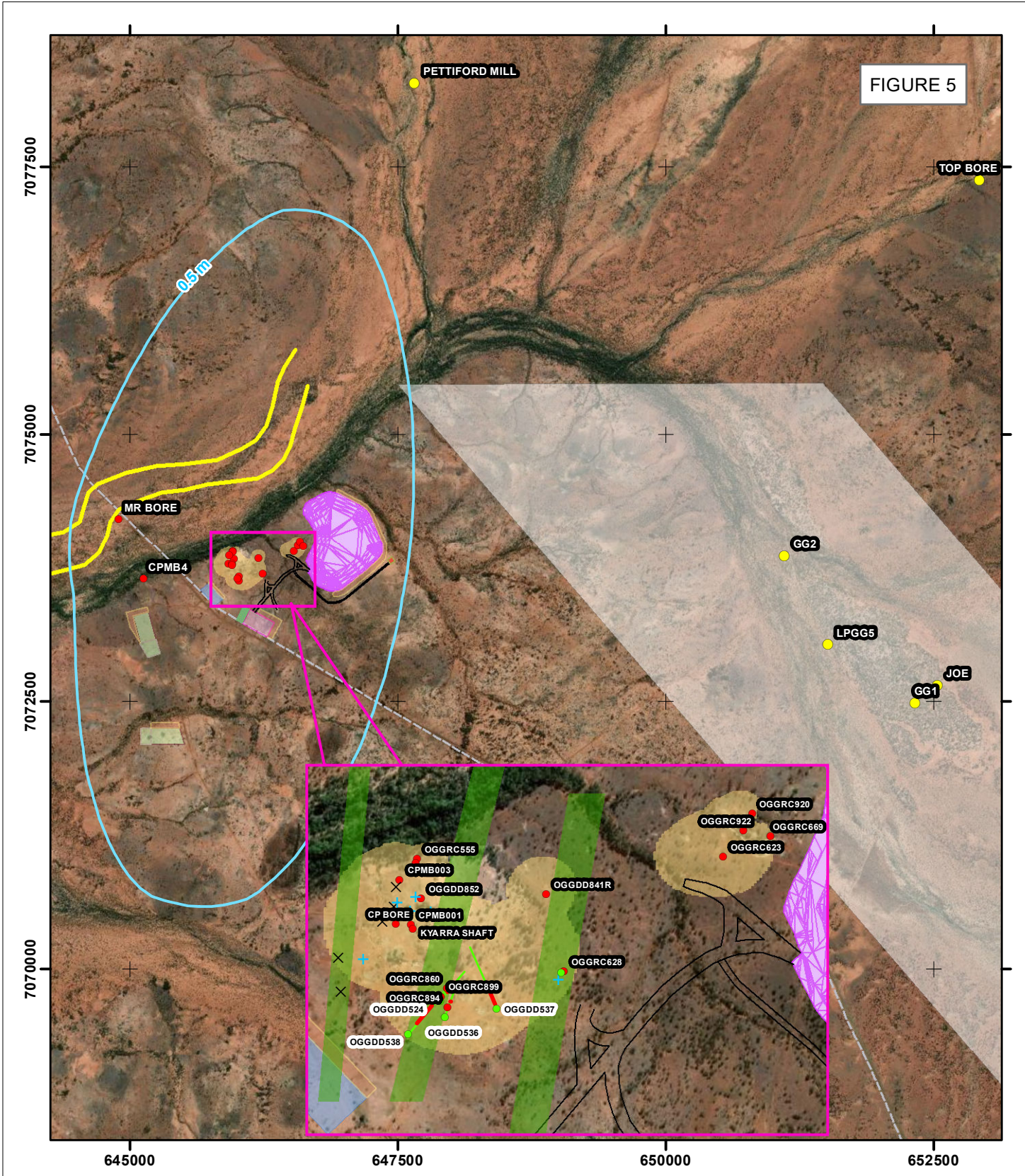
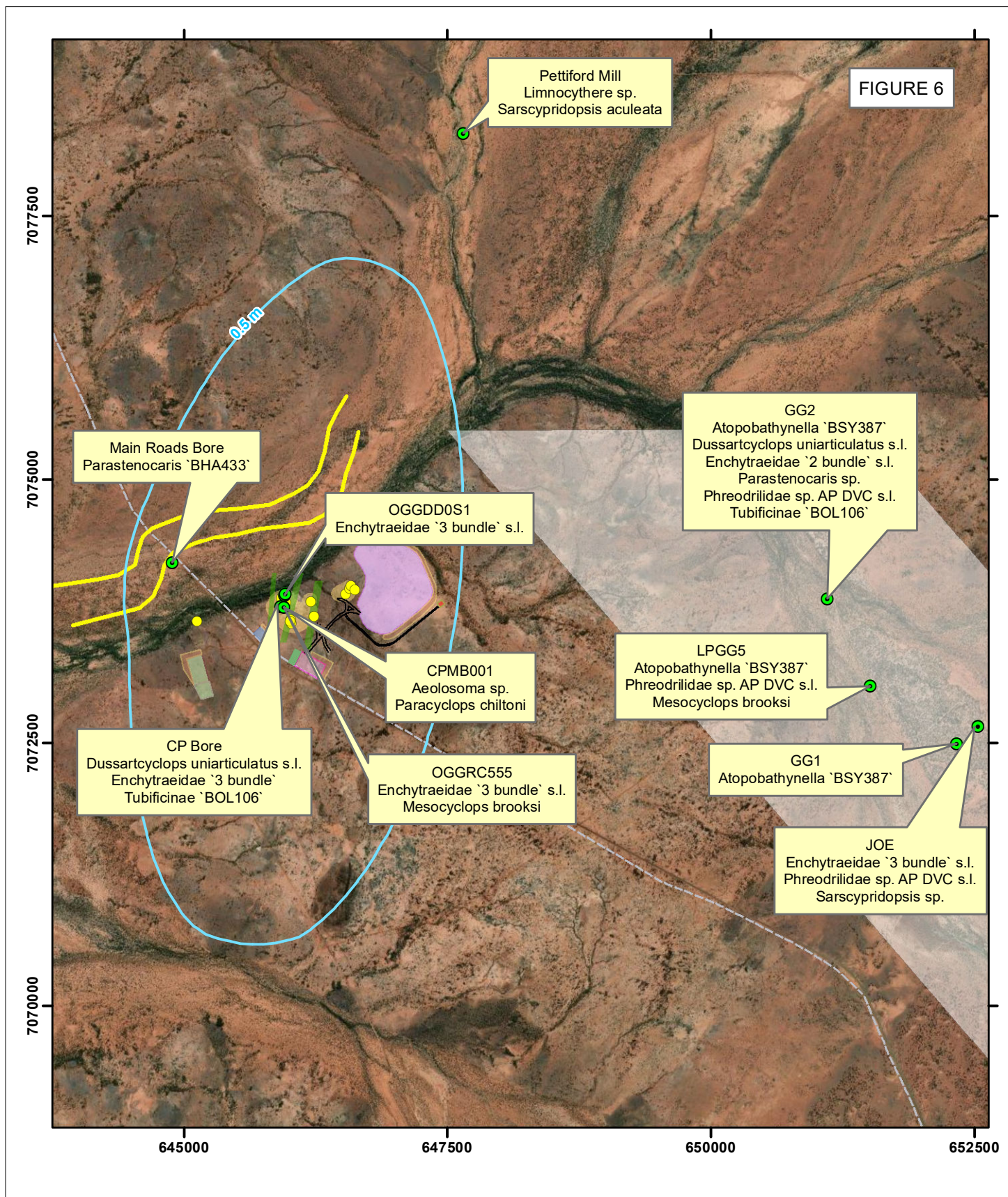


FIGURE 5

- Inferred Faults - Drillhole traces - Drillhole jointed zones 0.5 m Drawdown Extent - Water Reserve - Public Drinking Water P1 - Palaeochannel	- Inspected Diamond Core - High Yielding Holes - Fault/shear, in drillholes Stygofauna Sampled_Sites - Impact - Reference			1:50,000 A4	Grid: MGA 1994 Zone 50	
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Legend: - Inferred Faults 0.5 m Drawdown Extent (Rockwater, 2024) - Water Reserve - Public Drinking Water P1 - Palaeochannel (Rockwater, 2024)		Sampled_Sites - Sampled_Sites - Stygofauna Present			1:50,000 A4	Grid: MGA 1994 Zone 50	
CLIENT: Ora Gold Ltd PROJECT: Garden Gully Project Subterranean Fauna Assessment DATE: October 2024 DWG NO: 586-1/24/01-6		GARDEN GULLY PROJECT STYGOFAUNA SAMPLING RESULTS					

APPENDIX



APP I: Site and Sampling Details, Crown Prince deposit

Site Details												Bore Construction			Sampling Details			Water Quality						
Site id	Zone	Easting	Northing	RL	Type	Prelim Status	Depth	Measured WL (m)	Collar Height	Water Level (m RL)	Water Level (m RL)	Dip	Construction Date	Slotted Section	Diameter (mm)	Sampled Date	Sampled For	Method	Temperature (degrees)	TDS (mg/L)	EC (mS/cm)	pH	DO (mg/L)	DO (% Sat)
CP BORE	MGA94 50	645,918	7,073,789		Production Bore	Impact						-90	-	-	100	3/10/2024	S	Pumped	23.2	2036.8	3.04	7.85	5.86	68.3
CPMB001		645,946	7,073,788	490	Monitoring Bore	Impact	73	10.06	0.5	9.6	480.44	-90	2024	18-72	50	3/10/2024	S	Net	25.6	2559.4	3.82	7.35	1.83	22.2
CPMB003		645,925	7,073,871	489	Monitoring Bore	Impact	73	9.74	0.5	9.2	479.76	-90	2024	18-72	50	3/10/2024	S	Net	24.8	2056.9	3.07	7.28	7.07	85.3
GGMB4		645,123	7,073,650	486	Monitoring Bore	Impact	27	5.92	0.5	5.4	480.58	-90	2024	6-24	50	2/10/2024	S	Net	25.9	1721.9	2.57	7.25	1.51	18.3
KYARRA SHAFT		645,950	7,073,780	490	Old Shaft	Impact		9.3	0	9.3	480.7	-	-	-	-	3/10/2024	S	Net	22.9	2063.6	3.08	7.36	2.74	31.7
MAIN ROADS BORE		644,887	7,074,209	487	Production Bore	Impact		6.3		6.3	480.7	-90	-	-	-	3/10/2024	S	Net	26.4	1373.5	2.05	7.69	6.11	75.5
OGGDD0S1		645,955	7,073,902	488	Diamond Hole	Impact		5.88	0	5.9	482.12	-90	-	-	-	3/10/2024	S	Net	-	-	-	-	-	-
OGGDD841R		646,199	7,073,845	488	Diamond Hole	Impact	80	8.75	0.2	7.4	479.45	-60	-	-	-	3/10/2024	S	Net	-	-	-	-	-	-
OGGDD852		645,965	7,073,836	490	Diamond Hole	Impact	99.4	8.95	0.1	7.7	481.15	-65.1	-	-	-	2/10/2024	S	Net	25.8	5942.9	8.87	7.35	2.5	30.7
OGGRC555		645,957	7,073,910	488	RC Hole	Impact	126					-60	-	-	-	3/10/2024	S	Net	-	-	-	-	-	-
OGGRC623		646,529	7,073,914	489	RC Hole	Impact	120	9.27	0.2	7.8	479.93	-60	-	-	-	3/10/2024	S	Net	-	-	-	-	-	-
OGGRC628		646,232	7,073,700	490	RC Hole	Impact	94	10.43	0.2	8.8	479.77	-60	-	-	-	3/10/2024	S	Net	-	-	-	-	-	-
OGGRC669		646,618	7,073,953	490	RC Hole	Impact		9.52	0.45	7.8	480.93	-60	-	-	-	3/10/2024	S	Net	-	-	-	-	-	-
OGGRC860		646,013	7,073,668	490	RC Hole	Impact	71	12.3	0.3	10.4	478	-60	-	-	-	3/10/2024	S	Net	-	-	-	-	-	-
OGGRC894		646,015	7,073,632	491	RC Hole	Impact	126	13.4	0.3	11.3	477.9	-60	-	-	-	3/10/2024	S	Net	23.1	1943	2.9	7.45	6.54	78.8
OGGRC899		646,002	7,073,653	490	RC Hole	Impact	138	12.42	0.3	10.5	477.88	-60	-	-	-	3/10/2024	S	Net	-	-	-	-	-	-
OGGRC920		646,583	7,073,995	489	RC Hole	Impact	119	9.25	0.3	7.7	480.05	-60	-	-	-	3/10/2024	S	Net	-	-	-	-	-	-
OGGRC922		646,567	7,073,963	489	RC Hole	Impact		9.23	0.3	7.7	480.07	-60	-	-	-	3/10/2024	S	Net	-	-	-	-	-	-
GG1		652,326	7,072,487	498	Water Exploration Hole	Reference	17.9	6.19	0.4	5.8	492.21	-90	-	-	-	4/10/2024	S	Net	24.4	1283.05	1.915	7.53	6.05	72.5
GG2		651,105	7,073,869	495	Water Exploration Hole	Reference	19	3.9	0.25	3.7	491.35	-90	-	Uncased	-	4/10/2024	S	Net	25.9	1269.65	1.895	7.45	5.33	65.2
JOE		652,532	7,072,652	500	Stock Bore w Windmill	Reference	5.9	5.9	0.6	5.3	494.7	-90	-	-	-	4/10/2024	S	Pumped	25.1	1339.33	1.999	7.59	6.99	85.1
LPGG5		651,511	7,073,036	499	Water Exploration Hole	Reference	16.7	4.25	0.2	4.1	494.95	-90	-	-	-	4/10/2024	S	Net	25.4	1228.78	1.834	7.64	6.2	75.6
PETTIFORD MILL		647,648	7,078,284	497	Stock Bore w Windmill	Reference		-	-	-	-	-90	-	-	-	3/10/2024	S	Pumped	24.9	1179.87	1.761	7.28	8.25	91.6
TOP BORE		652,927	7,077,377	500	Stock Bore w Windmill	Reference	-	-	-	-	-	-90	-	-	-	125	4/10/2024	S	Pumped	27.1	1487.4	2.22	7.38	6.35

