

SKA-Low Eastern Spiral Arm Extension: Kalli Station Amendment to CPS 10114/2 - Supporting Report



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TABLE OF CONTENTS

DISCLAIMER	2
DISTRIBUTION	3
TABLE OF CONTENTS	4
ATTACHMENTS	6
1 INTRODUCTION	7
1.1 PROJECT BACKGROUND	7
1.2 PROJECT AREA	7
1.3 SCOPE OF WORK	8
1.4 LEGISLATIVE AND REGULATORY CONTEXT	8
1.5 APPROVALS SUMMARY	11
1.5.1 EPBC Act	11
1.5.2 EP Act – Part IV	11
1.5.3 EP Act – Part V Division 2 Clearing of Native Vegetation	11
1.6 KEY DEFINITIONS	11
2 ENVIRONMENTAL CONTEXT	13
2.1 PHYSICAL ENVIRONMENT	13
2.1.1 Land Systems	13
2.1.2 Surface Geology	13
2.1.3 Soils	14
2.1.4 Inland Waters	15
2.2 CONSERVATION AND CULTURAL AREAS	15
2.2.1 Conservation Reserves	15
2.2.2 Aboriginal Heritage	16
2.3 BIOLOGICAL VALUES	16
2.3.1 IBRA Sub-region	16
2.3.2 Pre-European Vegetation	17
2.3.3 Vegetation	18
2.3.4 Flora	20
2.3.5 Fauna	23
2.4 DISTURBANCES AND THREATENING PROCESSES	34

2.4.1	Fires	34
2.4.2	Other	34
3	ASSESSMENT AGAINST TEN PRINCIPLES FOR CLEARING NATIVE VEGETATION	35
4	AVOIDANCE, MINIMISATION AND MITIGATION	44
5	CONCLUSIONS	46
6	REFERENCES	47

TABLES IN TEXT

1. Legislation and Guidelines
2. Definitions of Significant Flora, Fauna and Vegetation (EPA, 2016a; 2016c)
3. Land Systems (DPIRD, 2022)
4. 1:1 Million Surface Geology (Raymond et al., 2012)
5. Soil Units - Atlas of Australian Soils (Bureau of Rural Sciences, 2009)
6. Aboriginal Heritage Sites
7. Vegetation System Associations
8. Vegetation Statistics – Upper Murchison (GoWA, 2019)
9. Vegetation Communities
10. Fauna Habitat
11. Assessment Against Ten Principles for Clearing Native Vegetation

ATTACHMENTS

LIST OF FIGURES

1. Project Location
2. Biological Surveys
3. Inland Waters
4. Vegetation
5. Fauna Habitat

1 INTRODUCTION

1.1 PROJECT BACKGROUND

The Square Kilometre Array (SKA) is a landmark international radio project (the Project) which aims to construct the world's most powerful radio astronomy observatory. The Project consists of two radio astronomy observatories, the SKA-Low hosted in Australia and the SKA-Mid in South Africa. The Australian Commonwealth Scientific and Industrial Research Organisation (CSIRO) is managing the development of the SKA-Low, which is currently being constructed. The final SKA-Low observatory will consist of an array of over 130,000 antennas grouped into 512 stations arranged into spiral arms 65 kilometres (km) across.

The SKA-Low project is located at *Ilyarrimanha Ilgari Bundara* (Sharing sky and stars) Murchison Radio-astronomy Observatory (MRO) formerly known as Boolardy Pastoral Station on Wajarri Yamaji Country in the Shire of Murchison, Western Australia (WA). The SKA-Low project is approximately 270 km northeast of Geraldton (**Figure 1**) and is managed by CSIRO Site Entity.

The CSIRO has acquired the adjacent pastoral lease (Kalli Station, Lease N049407) for the extension of the eastern spiral arm of the radio telescope. While the lease transfer progresses, a licence has been granted for the portion of Kalli Station required for the eastern spiral arm extension.

Approval for native vegetation clearing for the SKA-Low project has been granted under native vegetation clearing permit (NVCP) CPS 10114/2 which conditionally authorises the clearing of no more than 578.6 hectares (ha) of native vegetation for purpose of the construction of the SKA-Low project, including SKA low core, central processing facility, track and trench, cluster areas and AARNET fibre link. The extent of clearing authorised under this Permit is limited to land within *Ilyarrimanha Ilgari Bundara*.

The eastern spiral arm extension, not currently included in CPS 10114/2, will involve additional clearing up to 44.33 ha of native vegetation (proposed Clearing Footprint) within an Amendment Area that covers 474.88 ha. Specification of a larger Amendment Area provides flexibility during construction should deviations from the proposed alignment be required. Such deviations may be made to avoid environmental impacts or for other reasons relating to constructability.

The key definitions used in this report:

Amendment Area	The area proposed to be added to CPS 10114/2 in which all project works will be conducted. This covers 474.88 ha.
Clearing Footprint	The maximum predicted extent of native vegetation clearing to accommodate the construction of the eastern spiral arm extension and associated infrastructure. This covers 44.33 ha.

1.2 PROJECT AREA

The Project lies within the Western Murchison (MUR02) sub-region of the Murchison Interim Biogeographic Regionalisation of Australia (IBRA) region, which has a total area of 6,985,517 ha (Department of Climate Change, Energy, the Environment and Water [DCCEEW], 2020). A majority of this region, including the Project area, is within the Wajarri Yamatji Native Title Determination Area (Landgate, 2024).

Kalli Station is located approximately 220 km inland and northeast of Kalbarri, and 130 km west of Meekatharra (**Figure 1**). The extension of the eastern arm will be constructed mainly within Kalli Station within Lot 17 on Deposited Plan 194335 (Certificate of Crown land title Volume LR3064 Folio 478). A section of the extension originates within Lot 18 on Deposited Plan 220344 (Boolardy Station), and the associated clearing for this portion will be accommodated under existing approvals (CPS 10114/2).

The Amendment Area that is the subject of this report is located at the eastern extent of the MRO, extending north and south of the Boolardy – Kalli Road Station Access Road in a north-south orientation, before traversing east and intersecting the Kalli – Roderick Road (**Figure 1**).

1.3 SCOPE OF WORK

Aurora Environmental has been commissioned by the CSIRO to prepare an application to amend CPS 10114/2 to accommodate the eastern extension. The scope of work has included the preparation of this Supporting Report to accompany the application to amend CPS 10114/2.

The preparation of this Supporting Report has primarily relied on information sourced from the following reports:

- Square Kilometre Array Ecological Assessment prepared by AECOM (2021); and
- Square Kilometre Array Ecological Assessment – November 2022 prepared by AECOM (2023).

AECOM was commissioned by Wajarri Enterprises Ltd (WEL) on behalf of the CSIRO to conduct a flora, vegetation and fauna assessment (AECOM, 2021) for the SKA-Low Project. This involved detailed flora and vegetation assessments conducted in 2014 (64 quadrats and 28 observation points) and November 2020 (32 relevés) across Boolardy and Kalli Stations. Similarly, fauna assessments were also conducted in 2014 and 2020, with both assessments comprising a Level 1 (now called a basic fauna survey) survey. The 2020 survey was conducted to address changes to the design of the SKA-Low Project.

On behalf of the CSIRO WEL commissioned AECOM to conduct a flora, vegetation and fauna assessment (AECOM, 2023) for numerous discrete areas across Boolardy and Kalli Stations. As the flora and vegetation values are well understood from previous surveys, a reconnaissance level survey was conducted in November 2022 to assess the flora and vegetation values within the survey area. This included targeted searches for significant flora species and collecting floristic data from relevés. A basic fauna survey was also undertaken concurrently with the flora and vegetation survey.

The flora, vegetation and fauna assessments conducted by AECOM evaluated and defined the ecological values within a larger survey area which was inclusive of the Amendment Area. The findings from these ecological assessments are discussed in Section 2.3. The survey areas for AECOM (2021 & 2023) are shown in **Figure 2**.

1.4 LEGISLATIVE AND REGULATORY CONTEXT

Aurora Environmental conducts surveys and environmental impact assessments in accordance with relevant legislation, guidelines and other regulatory/statutory elements. A summary of these is provided in **Table 1**.

Section 51 and Schedule 5 of the *Environmental Protection Act 1986* (EP Act) and *A Guide to the Assessment of Applications to Clear Native Vegetation Under Part V of the Environmental Protection Act 1986* (Department of Environment and Regulation [DER], 2014) provide the framework for

assessing and issuing NVCPs in WA. CSIRO is a Commonwealth agency, and as such, the *Significant Impact Guidelines 1.2* (DSEWPaC, 2013b) require consideration to determine if the proposed clearing requires referral to the DCCEEW for assessment under the provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

TABLE 1: LEGISLATION AND GUIDELINES

ITEM	DESCRIPTION
FEDERAL	
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	The EPBC Act is the principal environmental legislation of the Commonwealth of Australia. It exists to provide an additional level of protection for matters of national environmental significance (MNES) as well as assessing the environmental impacts of Commonwealth agencies.
<i>Significant impact guidelines 1.1: Matters of National Environmental Significance</i> (Department of the Environment [DotE], 2013a)	The significant impact guidelines provide project proponents a framework to assess whether their actions may constitute a significant impact on MNES that would require assessment by the DCCEEW.
<i>Significant impact guidelines 1.2: Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth Agencies</i> (DSEWPaC, 2013b)	These guidelines apply to any person who proposes to take action on land which is either situated on Commonwealth land or which may impact on Commonwealth land, and/or representatives of Commonwealth agencies who propose to take an action on the environment anywhere in the world. These Guidelines are to assist proponents in either of these categories to determine whether there are grounds for referral to DCCEEW for assessment.
Weeds of National Significance (Centre for Invasive Species Solutions, 2021)	There are 32 Weeds of National Significance (WoNS) that have been selected based on their capacity for substantial ecological impacts.
STATE	
<i>Environmental Protection Act 1986</i> (EP Act)	The EP Act is an Act to provide for an Environmental Protection Authority (EPA), for the prevention, control and abatement of pollution and environmental harm, for the conservation, preservation, protection, enhancement and management of the environment and for matters incidental to or connected with the foregoing. Part V, Division 2 relates to the clearing of native vegetation, with the Principles for Clearing Native Vegetation contained in Schedule 5.
<i>Environmental Protection Act 1986</i> (EP Act) – Part V Clearing Regulations	The clearing regulations provide information on the types and scale of clearing of native vegetation for which a native vegetation clearing permit will not be required.

ITEM	DESCRIPTION
<i>Biodiversity Conservation Act 2016</i> (BC Act)	The BC Act provides for the conservation and protection of biodiversity and biodiversity components in WA; and the ecologically sustainable use of biodiversity components in WA, and the repeal of the <i>Wildlife Conservation Act 1950</i> and the <i>Sandalwood Act 1929</i> ; and consequential amendments to other Acts, and for related purposes. In the context of the clearing principles, of particular relevance are threatened species and communities, which are protected specifically under provision of this Act, in addition to the protections afforded by the EP Act.
<i>Biosecurity and Agriculture Management Act 2007</i> (BAM Act) and <i>Biosecurity and Agriculture Management Regulations 2013</i> (BAM Regulations)	The BAM Act is an Act to provide for the control of certain organisms; and the use of agricultural and veterinary chemicals; and the identification and attainment of standards of quality and safety for agricultural products, animal feeds, fertilisers and other substances and things; and the establishment of a Declared Pest Account, a Modified Penalties Revenue Account and accounts for industry funding schemes; and related matters. In the context of environmental impact assessment as they pertain to NVCPs, the key relevance of the BAM Act is Section 22, which provides for assigning the class Declared Pest to an organism. Methods of control that apply to Declared Pests are detailed in Regulation 7 of the BAM Regulations.
<i>Environmental Factor Guideline: Flora and Vegetation</i> (EPA, 2016a)	This guideline relates to the environmental factor Flora and Vegetation, with the objective of protecting flora and vegetation so that biological diversity and ecological integrity are maintained. This guideline states how flora and vegetation are considered by the EPA in the environmental impact assessment process.
<i>Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment</i> (EPA, 2016b)	This guidance provides broad instructions for ecologists and botanists undertaking surveys for environmental impact assessments, with the objective of ensuring that there is consistency across the industry and that data is collected in a methodological manner.
<i>Environmental Factor Guideline: Terrestrial Fauna</i> (EPA, 2016c)	This guideline relates to the environmental factor Terrestrial Fauna, with the objective of protecting terrestrial fauna so that biological diversity and ecological integrity are maintained. This guideline states how terrestrial fauna are considered by the EPA in the environmental impact assessment process.
<i>Technical Guidance: Terrestrial vertebrate fauna surveys for environmental impact assessment</i> (EPA, 2020)	This guidance provides broad instructions for ecologists and zoologist undertaking surveys for environmental impact assessments, with the objective of ensuring that there is consistency across the industry and that data is collected in a methodological manner.
<i>Environmental Factor Guideline: Inland Waters</i> (EPA, 2018)	This guideline defines what the EPA considers inland waters to be when assessing impacts to the environment. In the context of the applications to clear native vegetation, this information can be used to guide assessments of potential impacts to vegetation growing in association with a watercourse and local hydrological processes.

ITEM	DESCRIPTION
<i>A guide to the assessment of applications to clear native vegetation Under Part V of the Environmental Protection Act 1986 (DER, 2014)</i>	This guide has been developed to assist project proponents to assess proposed impacts to the environment in the context of Part V applications to clear native vegetation.

1.5 APPROVALS SUMMARY

1.5.1 EPBC Act

The SKA project was referred by the CSIRO to the Department of the Environment and Energy (now DCCEEW) in 2017 under referral number EPBC 2017/7874. The project was determined to have no significant impact to MNES and was therefore deemed not a controlled action.

Approval Outcome: Not a controlled action.

1.5.2 EP Act – Part IV

The SKA project was referred to the EPA under Section 38 of the EP Act in 2017. The project did not require assessment under Part IV of the EP Act. Instead clearing impacts related to the project were deemed manageable under Part V Division 2 (Clearing of native vegetation).

Approval Outcome: Not assessed.

1.5.3 EP Act – Part V Division 2 Clearing of Native Vegetation

Five current NVCPs have been applied for by CSIRO and granted under Part V Division 2 of the EP Act for the SKA-Low on Boolardy Station, including the following:

- CPS 7562/2 – Granted 17/03/2018 to clear 7.43 ha;
- CPS 9547/2 – Granted 09/01/2023 to clear 105.68 ha;
- CPS 10114/2 – Granted 24/07/2023 to clear 578.6 ha;
- CPS 10329/1 – Granted 22/07/2024 to clear 18.8 ha; and
- CSP 10795/1 – Granted 02/05/2025 to clear 61.68 ha.

These account for an approved total clearing area of 772.19 ha, or 0.22%, of the total extent of Boolardy Station which covers 343,308.2 ha. None of the above applications include land within Kalli Station.

1.6 KEY DEFINITIONS

To guide the assessment of significant values for flora, fauna and vegetation, the EPA provides broad definitions in the *Environmental Factor Guideline: Flora and Vegetation* (EPA, 2016a) and the *Environmental Factor Guideline: Terrestrial Fauna* (EPA, 2016c). A summary of these is provided in Table 2.

TABLE 2: DEFINITIONS OF SIGNIFICANT FLORA, FAUNA AND VEGETATION (EPA, 2016A; 2016C)

TERM	EXPLANATION
Significant flora (EPA, 2016a)	• Being identified as a threatened or priority species.

TERM	EXPLANATION
	• Locally endemic or 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. • Representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of main range). • Unusual species, including restricted subspecies, varieties or naturally occurring hybrids. • Relictual status, being representative of taxonomic groups that no longer occur widely in the broader landscape.
Significant fauna (EPA, 2016c)	• Being identified as a threatened or priority species. • Species with restricted distribution. • Degree of historical impact from threatening processes. • Providing an important function required to maintain the integrity of a significant ecosystem.
Significant vegetation (EPA, 2016a)	• Being identified as threatened or priority ecological communities. • Restricted distribution. • Degree of historical impact from threatening processes. • A role as a refuge. • Providing an important function required to maintain ecological integrity of a significant ecosystem.

2 ENVIRONMENTAL CONTEXT

2.1 PHYSICAL ENVIRONMENT

2.1.1 Land Systems

The Amendment Area (inclusive of the proposed Clearing Footprint) intersects seven soil land systems, traversing a range of landforms. The dominant systems within include the Challenge System, a sandy plain with occasional granite hills, and the Sherwood System, which includes breakaways, kaolinised footslopes and extensive gently sloping plains on granite (Department of Primary Industries and Regional Development [DPIRD], 2022). All intersected land systems are summarised in Table 3.

TABLE 3: LAND SYSTEMS (DPIRD, 2022)

UNIT NAME	DESCRIPTION	CLEARING FOOTPRINT	AMENDMENT AREA
Challenge system 272Ch	Gently undulating gritty and sandy surfaced plains, occasional granite hills, tors and low breakaways, supporting Acacia shrublands and occasional halophytic shrublands.	13.17 ha	165.90 ha
Ero system 272Er	Tributary floodplains with shallow, erodible duplex soils on red-brown hardpan, more or less saline and supporting Acacia shrublands with halophytic and non-halophytic undershrubs.	4.95 ha	38.90 ha
Kalli system 272Ka	Elevated gently undulating red sandplains edged by stripped surfaces on laterite and granite, supporting Acacia tall shrublands with wanderrie grass understoreys.	4.69 ha	52.10 ha
Millrose system 272MI	Level or very gently undulating stony plains on hardpan and granite with irregularly distributed sandy banks supporting mostly scattered mulga shrublands with minor grasses.	1.49 ha	17.51 ha
Norie system 272Nr	Granite hills with exfoliating domes and extensive tor fields, supporting acacia shrublands.	1.03 ha	3.73 ha
Sherwood system 272Sh	Breakaways, kaolinised footslopes and extensive gently sloping plains on granite supporting mulga shrublands and minor halophytic shrublands.	12.57 ha	133.41 ha
Yanganoo system 272Yg	Almost flat hardpan wash plains, with or without small wanderrie banks and weak growing; supporting mulga shrublands and wanderrie grasses on banks.	6.42 ha	63.33 ha
TOTAL		44.33 ha	474.88 ha

2.1.2 Surface Geology

The Amendment Area intersects eight surface geology units, with the dominant unit being colluvium (Raymond et al., 2012). Surface geology units identified are further detailed in Table 4.

TABLE 4: 1:1 MILLION SURFACE GEOLOGY (RAYMOND ET AL., 2012)

SYMBOL	NAME	DESCRIPTION	CLEARING FOOTPRINT	AMENDMENT AREA
Ag	felsic intrusives 74292	Undifferentiated felsic intrusive rocks, including monzogranite, granodiorite, granite, tonalite, quartz monzonite, syenogranite, diorite, monzodiorite, pegmatite. Locally metamorphosed, foliated, gneissic. Local abundant mafic and ultramafic inclusions.	4.66 ha	49.92 ha
Agh	hi-Ca granite 74296	Monzogranite, granodiorite, tonalite, quartz monzonite; in places recrystallised and foliated; some mixed granite and country rock assemblages; high-Ca granite.	8.31 ha	93.54 ha
Agtg	Tching Granite	Heterogeneous monzogranite with gneissic inclusions and 2965 Ma zircon xenocrysts; prograde amphibolite grade metamorphism.	2.30 ha	25.81 ha
Czl	ferruginous duricrust 38498	Ferruginous duricrust, laterite; pisolitic, nodular, vuggy; may include massive to pisolitic ferruginous subsoil, mottled clays, magnesite, reworked products of ferruginous and siliceous duricrusts, calcrete, gossan; residual ferruginous saprolite.	2.87 ha	30.75 ha
Czs	Sandplain 38499	Sand or gravel plains; may include some residual alluvium; quartz sand sheets commonly with ferruginous pisoliths or pebbles; local clay, calcrete, laterite, silcrete, silt, colluvium.	2.10 ha	15.42 ha
Czz	Silcrete 42026	Silcrete, silicified gravel, siliceous duricrust, siliceous breccia; opaline silica, jasperoidal chalcedony, local chrysoprase caprock over ultramafic rock.	3.83 ha	50.89 ha
Qa	Alluvium 38485	Channel and flood plain alluvium; gravel, sand, silt, clay; may be locally calcreted.	3.53 ha	38.56 ha
Qrc	Colluvium 38491	Colluvium and/or residual deposits, sheetwash, talus, scree; boulder, gravel, sand; may include minor alluvial or sand plain deposits, local calcrete and reworked laterite.	16.73 ha	169.98 ha
TOTAL			44.33 ha	474.88 ha

2.1.3 Soils

The Amendment Area traverses two soil type classifications: unit BE2 being the main unit present, with unit My50 also present. Both units are described in Table 5.

TABLE 5: SOIL UNITS - ATLAS OF AUSTRALIAN SOILS (BUREAU OF RURAL SCIENCES, 2009)

MAP SYMBOL	DESCRIPTION	CLEARING FOOTPRINT	AMENDMENT AREA
BE2	Generally undulating terrain on granites with rocky granitic hills, bosses, and tors, some breakaways, and a surface stone mantle: chief soils seem to be shallow earthy loams (Um5.3) underlain by a red-brown hardpan. Associated are shallow (Uc5.21, Uc5.22) soils both underlain by a red-brown hardpan; some (Gn2.1) soils underlain by a red-brown hardpan; and shallow (Uc1.43) and (Um5.41) soils on the hills (no hardpan). The red-brown hardpan is often exposed in eroded sites, and elsewhere is present between 8 and 40 in.	31.43 ha	355.82 ha
My50	Broad plains with a scatter of surface gravels: chief soils are shallow neutral red earths (Gn2.12) and shallow earthy loams (Um5.3), in intimate micro-association. They are underlain by a red-brown hardpan at depths of 6-30 in.	12.89 ha	119.06 ha
TOTAL		44.33 ha	474.88 ha

2.1.4 Inland Waters

Surface water features within and surrounding the Amendment Area (Figure 3) are characterised by non-perennial lakes and floodplains or 'Land Subject to Inundation' (Crossman and Li, 2015).

The Amendment Area is within the Roderick River sub-catchment, which is part of the greater Murchison River Catchment (Department of Water and Environmental Regulation [DWER], 2024a). The Amendment Area intersects Roderick River and three of its tributaries, and a tributary of Mudgianna Creek (which also eventually drains to Roderick River).

Roderick River flows towards Wooleen Lake, a listed wetland under the Directory of Important Wetlands in Australia (DIWA) (Department of Biodiversity, Conservation and Attractions [DBCA], 2018). Wooleen Lake is located more than 80 km west of the Amendment Area and is the closest significant water body. It consists of a collection of hardpans that, on average, receive water once every four years and fill once every ten (Shire of Murchison, 2024). The lake has cultural significance to the Wajarri Yamaji people and is a registered Aboriginal Cultural Heritage (ACH) site (Shire of Murchison, 2024; Department of Planning, Lands and Heritage [DPLH], 2024a). No Ramsar wetlands or Public Drinking Water Source Areas (PDWSAs) have been identified within 100 km of the Amendment Area (DotE, 2015; DWER, 2024b).

2.2 CONSERVATION AND CULTURAL AREAS

2.2.1 Conservation Reserves

The proximity of the Amendment Area to conservation reserves was assessed against the DBCA Legislated Lands and Waters dataset (DBCA-11) (DBCA, 2024) and the Collaborative Australian Protected Areas Database (CAPAD) (DCCEEW, 2022). The Amendment Area is approximately 70 km north of the nearest conservation areas which are Dalgarranga and Lakeside National Parks.

2.2.2 Aboriginal Heritage

DPLH records (DPLH, 2025a; 2025b; 2025c) were searched to identify Registered, Lodged and Historic ACH sites occurring within 10 km of the Amendment Area. No sites were identified as intersecting the Amendment Area or the proposed Clearing Footprint. Three registered ACH sites and seven lodged sites were identified within 10 km of the Amendment Area (Table 6).

TABLE 6: ABORIGINAL CULTURAL HERITAGE SITES

ID	STATUS	NAME	TYPE	DISTANCE TO AMENDMENT AREA
7216	Registered	Kalli West	Engraving	1.1 km
10858	Registered	Kalli Stone Arrangement	Sub-surface cultural material; Traditional Structure; Other; Painting	4.0 km
39532	Registered	CSIRO-20-007	Artefacts / Scatter	2 m
34469	Lodged	MEKA-A-1201	Sub-surface cultural material; Artefacts / Scatter; Rock Shelter	6.0 km
34470	Lodged	MEKA-Q-1202	Artefacts / Scatter	520 m
34471	Lodged	MEKA-ARH-1203	Artefacts / Scatter; Water Source	3.8 km
34472	Lodged	MEKA-A-1204	Artefacts / Scatter; Water Source	5.4 km
34473	Lodged	MEKA-RH-1205	Water Source	4.7 km
34474	Lodged	MEKA-A-1206	Sub-surface cultural material; Artefacts / Scatter; Painting; Repository / Storage Place; Rock Shelter	3.6 km
34476	Lodged	MEKA-A-1208	Artefacts / Scatter; Quarry; Water Source	6.8 km

2.3 BIOLOGICAL VALUES

2.3.1 IBRA Sub-region

The Amendment Area is within the MUR02 sub-region of the Murchison bio-region of the IBRA (DCCEEW, 2020). This sub-region covers an area of 7,847,966 ha and has an arid climate with bimodal rainfall, with most rain falling in winter (Desmond, Cowan and Chant, 2001). Vegetation is comprised of mulga low woodlands, often rich in ephemerals that occurs on outcrop and fine-textured Quaternary alluvial and eluvial surfaces; this vegetation type on extensive hardpans dominates and characterise the sub-region. Surfaces with occluded drainage occur throughout the sub-region, with hummock grasses on sandplains, saltbush on calcareous soils and *Halosarcia* (*Tecticornia*) low shrublands on saline alluvials (Desmond, Cowan and Chant, 2001). The Murchison and Wooramel Rivers are key surface hydrological features, draining through the sub-region westwards to the coast (Desmond, Cowan and Chant, 2001). The primary land use in the sub-region is associated with pastoral activities, accounting for over 96% of the land, with limited land in conservation reserves (Desmond, Cowan and Chant, 2001)

2.3.2 Pre-European Vegetation

An assessment of statewide pre-European vegetation mapping (DPIRD, 2019) was conducted to identify vegetation system associations (VSAs) within the Amendment Area. The Amendment Area is located within the Upper Murchison System, intersecting four VSAs: Upper Murchison 18, Upper Murchison 29, Upper Murchison 39 and Upper Murchison 2081 (Table 7). All four VSAs are *Acacia* dominated communities, with two of the VSAs being Mulga woodland, and the remaining two VSAs being Scrub dominated by *Acacia* species, teatree and other species.

TABLE 7: VEGETATION SYSTEM ASSOCIATIONS

VSA	STRUCTURAL DESCRIPTION	FLORA DESCRIPTION	CLEARING FOOTPRINT	AMENDMENT AREA
Upper Murchison 18	Low woodland, open low woodland or sparse woodland	Mulga <i>Acacia aneura</i> and associated species.	29.25 ha	303.97 ha
Upper Murchison 29	Low woodland, open low woodland or sparse woodland	Mulga <i>Acacia aneura</i> and associated species.	3.42 ha	35.03 ha
Upper Murchison 39	Scrub, open scrub or sparse scrub	Wattle, teatree & other species <i>Acacia</i> spp. <i>Melaleuca</i> spp.	10.39 ha	125.69 ha
Upper Murchison 2081	Scrub, open scrub or sparse scrub	Wattle, teatree & other species <i>Acacia</i> spp. <i>Melaleuca</i> spp.	1.27 ha	10.19 ha
TOTAL			44.33 ha	474.88 ha

Table 8 summarises the current extent of the VSAs mapped within the Amendment Area relative to the pre-European extent in WA, the IBRA region and sub-region, and the Shire of Murchison.

TABLE 8: VEGETATION STATISTICS - UPPER MURCHISON (GOWA, 2019)

VSA	SCALE	PRE-EUROPEAN EXTENT	CURRENT EXTENT	CURRENT EXTENT PROTECTED
Upper Murchison 18	Statewide	19,892,306.46 ha	19,843,148.07 ha (99.75 %)	2.13 %
	IBRA region	12,403,172.30 ha	12,363,252.47 ha (99.68 %)	0.36 %
	IBRA sub-region	2,133,275.86 ha	2,128,414.25 ha (99.77 %)	44.04 %
	Local Government	858,952.19 ha	858,952.19 ha (100 %)	0.01 %
Upper Murchison 29	Statewide	7,903,991.45 ha	7,898,973.24 ha (99.94 %)	0.29 %
	IBRA region	2,956,382.06 ha	2,955,695.34 ha (99.98 %)	Not specified
	IBRA sub-region	2,160,146.79 ha	2,159,669.31 ha (99.98 %)	Not specified

VSA	SCALE	PRE-EUROPEAN EXTENT	CURRENT EXTENT	CURRENT EXTENT PROTECTED
	Local Government	1,297,282.39 ha	1,297,265.74 ha (100 %)	Not specified
Upper Murchison 39	Statewide	6,613,567.48 ha	6,602,578.44 ha (99.83 %)	7.24 %
	IBRA region	1,148,400.30 ha	1,138,064.63 ha (99.10 %)	Not specified
	IBRA sub-region	437,071.46 ha	436,130.16 ha (99.78 %)	Not specified
	Local Government	187,713.34 ha	187,694.58 ha (99.99 %)	Not specified
Upper Murchison 2081	Statewide	1,331,683.57 ha	1,320,818.05 ha (99.18 %)	4.22 %
	IBRA region	390,399.44 ha	389,895.23 ha (99.87 %)	0.31 %
	IBRA sub-region	387,778.20 ha	287,778.20 ha (100 %)	0.31 %
	Local Government	373,528.55 ha	373,528.55 ha (100%)	0.26 %

Source: (Government of Western Australia, 2019)

2.3.3 Vegetation

2.3.3.1 Vegetation Communities

Biological values within the Amendment Area have been derived from two baseline surveys conducted by AECOM (AECOM, 2021 & 2023). AECOM (2021) assessed the ecological values for a reconfigured footprint of the SKA-Low project, building on the results from a detailed flora and vegetation assessment also undertaken by AECOM in 2014 over an extensive area. The surveys undertaken by AECOM during 2014 and 2020 mapped and described 10 vegetation communities. Three vegetation communities were mapped during the 2022 survey.

Seven vegetation communities (Table 9 and Figure 4) intersect the proposed Clearing Footprint and the broader Amendment Area.

Five vegetation communities comprise of *Acacia* dominated woodlands occur on plains and two communities comprise *Acacia* dominated shrublands that were mapped on granite.

The vegetation was considered largely homogenous, characterised by Mulga Open Woodlands on hard clay on flat terrain, sometimes with quartz on the surface (AECOM, 2021). Granite boulders and outcrops were noted to be statistically similar to adjacent Mulga Open Woodlands on plains, however they were described separately as the landform was considered significantly different (AECOM, 2021).

TABLE 9: VEGETATION COMMUNITIES

GROUPING	VEGETATION UNIT	DESCRIPTION	CLEARING FOOTPRINT	AMENDMENT AREA
Plains Acacia Woodland	AaEcPo	<i>Acacia aptaneura</i> , <i>Acacia aneura</i> and <i>Acacia incurvaneura</i> low open woodland over <i>Eremophila compacta</i> , <i>Eremophila simulans</i> and <i>Eremophila gilesii</i> mid open shrubland over <i>Ptilotus obovatus</i> , <i>Ptilotus drummondii</i> and <i>Aristida</i> sp. low mixed shrub and grassland.	7.12 ha	85.29 ha
	AfEfPo	<i>Acacia fuscanneura</i> , <i>Acacia incurvaneura</i> and <i>Acaciavictoriae</i> subsp. <i>victoriae</i> low open woodland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Acacia tetragonophylla</i> and <i>Eremophila phyllopoda</i> low to tall open shrubland over <i>Ptilotus obovatus</i> , <i>Solanum lasiophyllum</i> and <i>Maireana planifolia</i> low sparse shrubland.	22.96 ha	237.81 ha
	AfSa	<i>Acacia fuscanneura</i> , <i>Acacia incurvaneura</i> and occasional <i>Acacia pruinocarpa</i> low open woodland over <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Acacia tetragonophylla</i> and <i>Senna</i> sp. Meekatharra (E. Bailey 1-26) mid to tall sparse shrubland.	5.75 ha	54.46 ha
	AiAbSa	<i>Acacia incurvaneura</i> , <i>Hakea lorea</i> subsp. <i>lorea</i> and <i>Acacia aneura</i> low open woodland over <i>Acacia burkittii</i> , <i>Acacia tetragonophylla</i> and <i>Acacia victoriae</i> subsp. <i>victoriae</i> tall shrubland over <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Ptilotus obovatus</i> and <i>Senna artemisioides</i> subsp. <i>x sturtii</i> low to mid sparse shrubland.	0.38 ha	5.67 ha
	AiAtEf	<i>Acacia incurvaneura</i> , <i>Acacia craspedocarpa</i> and <i>Acacia fuscanneura</i> low open woodland over <i>Acacia tetragonophylla</i> , <i>Acacia kempeana</i> and <i>Acacia oswaldii</i> sparse tall shrubland over <i>Eremophila fraseri</i> subsp. <i>parva</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Eremophila macmillaniana</i> sparse mid shrubland.	3.78 ha	33.48 ha
Granite Acacia Shrubland	AiTdPb	<i>Acacia incurvaneura</i> , <i>Acacia fuscanneura</i> and <i>Acacia caesaneura</i> low isolated clumps of trees over <i>Thryptomene decussata</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> and <i>Acacia oswaldii</i> mid open shrubland over <i>Ptilotus drummondii</i> , <i>Eragrostis eriopoda</i> and <i>Solanum lasiophyllum</i> low sparse mixed shrub and grassland.	0.94 ha	5.50 ha
	ArCc	<i>Acacia rhodophloia</i> low open woodland over <i>Corchorus crozophorifolius</i> , <i>Cymbopogon ambiguus</i> and <i>Eremophila platycalyx</i> subsp. <i>platycalyx</i> mixed low to mid shrub and grassland.	3.21 ha	50.72 ha
	Cleared		0.18 ha	1.94 ha
TOTAL			44.33 ha	474.88 ha

2.3.3.2 Significant Vegetation

No Threatened Ecological Communities (TECs) or a Priority Ecological Communities (PECs) were anticipated to occur, and none were recorded during the biological surveys (AECOM, 2021 & 2023).

Only the desktop assessment conducted as part of the 2020 survey (AECOM, 2021) identified one occurrence of a PEC within the DBCA database search area. This PEC was *Meka calcrete groundwater assemblage type on Murchison paleo-drainage on Meka Station*. The buffered extent of this PEC is approximately 20 km south/south-west of the Amendment Area.

2.3.3.3 Vegetation Condition

Vegetation condition was assessed and mapped by AECOM (2021 & 2023) during their ecological assessments, with almost all of the proposed Clearing Footprint and Amendment Area being assessed as 'Very Good' condition; 44.14 ha¹ (99.6%) and 472.94 ha (99.6%) respectively (the percentage values represent proportion of native vegetation within the Clearing Footprint and Amendment Area). The remaining minor areas were mapped as Completely Degraded, corresponding to areas that were mapped as cleared and typically associated with tracks and roads.

2.3.4 Flora

2.3.4.1 Flora Inventory

During the AECOM (2021) survey a total of 91 native flora species from 41 genera and 23 families were recorded. The AECOM (2023) survey recorded 41 native flora species from 20 genera and 12 families.

During other flora and vegetation surveys completed for the SKA project, the census of the flora ranged from 41 taxa (56.44 ha; AECOM, 2023) to 454 taxa (1,520 ha; 360 Environmental, 2017). The comparatively high census of the flora in the 360 Environmental (2017) survey reflects the size and shape of the survey area, which consisted of a linear corridor 152 km in length along three sections of road.

2.3.4.2 Significant Flora

A search of the anonymised data contained in the Threatened and Priority Flora (DBCA-036) spatial dataset (DBCA, 2022) has no records of threatened species close to the Amendment Area, with the nearest record being approximately 85 km south-east. The absence of closer records may reflect a lack of survey work within the region; however, numerous surveys conducted for the SKA project have not found any threatened species in the surrounding landscape.

No records of threatened flora listed under the EPBC Act or BC Act were identified from the desktop assessment as occurring within the survey area (AECOM, 2021). A total of 66 priority listed taxa were identified from the desktop assessment as potentially occurring. Of these, nine taxa were deemed as likely to occur, nine taxa as may occur, and 48 taxa assessed as unlikely to occur (AECOM, 2021). Similar results were reported in AECOM (2023) with 65 priority listed taxa potentially occurring, with nine taxa considered likely to occur, six taxa that may occur and 50 taxa unlikely to occur.

No threatened flora protected under the BC Act or the EPBC Act were detected during the AECOM (2021 & 2023) field surveys.

¹ Rounding to two decimal places accounts for the minor discrepancy in the total extent of Very Good vegetation and Cleared areas (Completely Degraded).

AECOM (2021) recorded three Priority 3 species:

- *Petrophile pauciflora* (P3) – recorded in the Amendment Area;
- *Eremophila simulans* subsp. *magacalyx* (deemed as may have been recorded) (P3) – recorded in the Amendment Area; and
- *Sauropus* sp. Woolgorong (M. Officer s.n. 10/8/94) (P3).

AECOM (2023) recorded three Priority 3 flora species:

- *Eremophila muelleriana* (P3) – recorded in the Amendment Area;
- *Gunniopsis divisa* (P3); and
- *Hemigenia tysonii* (P3) – recorded in the Amendment Area.

Petrophile pauciflora

Petrophile pauciflora is an open shrub growing to approximately 1 m tall that is found on decaying and dissected granite breakaways (WA Herbarium, 1998- in Woodman Environmental, 2021). It is endemic to the southern Midwest region of WA in the Yalgoo, Murchison and Avon Wheatbelt IBRA sub-regions occurring over a relatively wide distribution of approximately 330 km from Woolgorong in the north-west to near Bimbijy Station Homestead in the south-east (DBCA, 2007- in Woodman Environmental, 2021). There are 32 records of this taxon in the DBCA's databases representing approximately 21 regional populations, 10 of which occur within UCL which is proposed for conservation (Woodman Environmental, 2021).

P. pauciflora was recorded on and near granite outcrops near the eastern boundary of Boolardy Station and on Kalli Station. A total of 163 individuals were recorded, of which 51 individuals (two locations) were recorded within the proposed Clearing Footprint and 160 individuals (eight locations) within the broader Amendment Area. AECOM (2021) considered the species locally common, noting that where granite outcrops extended beyond the survey area, so did the *P. pauciflora*. This observation suggests that the actual population size is likely to larger than reported.

Eremophila simulans* subsp. *magacalyx

Eremophila simulans subsp. *magacalyx* is a Priority 3 listed shrub that grows up to 2 m tall with violet flowers. It has been recorded within the Eastern and Western Murchison IBRA subregions and its habitat is described as rangeland plains road verge with red, sandy gravel laterite. The Australasian Virtual Herbarium (AVH) (AVH, 2025) lists 14 records for the species from nine locations, mostly concentrated around South Murchison, with an outlier record north of Leonora.

E. simulans subsp. *magacalyx* was previously recorded by Alexander Holms & Associates (2008) within Boolardy Station (AECOM, 2021). However, the species was not listed as a Priority taxa at the time.

All samples collected during the 2014/2020 AECOM surveys were vegetative (i.e. did not possess fruiting or flowering material) and therefore, could not be formally identified to a sub-species level. Accordingly, AECOM (2021) cautiously assumed that the occurrences of *Eremophila simulans* recorded may be the Priority 3 taxa. The species was mostly recorded within vegetation community AaEcPo, a mixed shrubland on plains with a sandy surface and recorded as locally common (AECOM, 2021).

The species was collected from two general locations (1,000+ individuals) during the 2020 survey. The 2014 survey also recorded this species at three locations (total of 8 individuals). The species was not

recorded within proposed Clearing Footprint and more than 1,171 individuals were recorded within the Amendment Area (*Eremophila simulans*).

***Sauropus* sp. Woolgorong**

Sauropus sp. Woolgorong is a shrub that grows up to 1 m tall with yellow flowers. It is known from sporadic records in the Western Murchison IBRA subregion.

In 2014 it was recorded at two locations with approximately 201 individuals identified, and at one location in 2020 (AECOM, 2021). At the time of the 2020 survey, it was not recognised as the Priority species (AECOM, 2021). The specimens observed were vegetative, generally in poor condition and formed a co-dominant understorey shrub species (AECOM, 2021).

This species was not recorded within the proposed Clearing Footprint or the broader Amendment Area. The closest record being approximately 40 km to the south-east from the Amendment Area.

Eremophila muelleriana

Eremophila muelleriana is a perennial upright shrub which grows to a height of between 0.3 and 1 m with branches and leaves covered by a layer of yellow or grey, branched hairs (ALA, 2025). The species has a range from east of Gascoyne Junction in the north, to north of Yalgoo in the south, with a concentration of regional records near the SKA project (WAH, 1998-). It has been recorded on clay-sand in Mulga woodland (ALA, 2025).

E. muelleriana has been recorded at nine locations within approximately 100 km of the Amendment Area. It has been recorded once by AECOM (2023) and more recently by Aurora Environmental (2025) during surveys conducted for the SKA project, both records occurring in Acacia woodland/shrubland vegetation on alluvial sands.

A total of two individuals at one location was recorded during 2020 within the proposed Clearing Footprint, and 15 individuals within the Amendment Area.

***Gunniopsis divisa* (P3)**

Gunniopsis divisa is a prostrate annual succulent herb that grows up to 10 cm high. The stems radiate from the base and are fleshy and hairless. The flowers are a pale yellow, fading to white and flowers occur in August. This species generally occurs in slightly saline clay soils on flats and plains (WA Herbarium, 1998-).

Originally classified as a Priority 1 taxon, the species was downgraded to the Priority 3 classification. *G. divisa* is endemic to the Midwest region of WA, occurring over a distribution of approximately 340 km. The total population size of the Priority 3 listed flora species *Gunniopsis divisa* is not known. According to the specimens lodged at the WA Herbarium, there are 29 known records of this taxon, potentially representing approximately 23 regional populations, seven of which occur within the UCL proposed for conservation (Umwelt, 2024).

G. divisa has consistently been recorded across multiple surveys conducted for the SKA project since 2013 (Aurora Environmental, 2025). To date, these surveys have recorded more than 1,100 plants from multiple locations within Boolardy Station. AECOM (2023) noted that where the species was observed, it was considered locally common as it was found in high concentrations with 305 individual plants recorded.

The closest record of *G. divisa* is 4 km to the east from the Amendment Area and was adjacent to the Boolardy-Kalli Road and was recorded during the 2022 survey. *G. divisa* was also recorded during the 2014 survey, but not in 2020. The absence of *G. divisa* from the 2020 survey may be attributed to survey timing, where no annual species were observed at the time. Its absence in the survey area cannot be confidently determined (AECOM, 2021).

***Hemigenia tysonii* (P3)**

Hemigenia tysonii is a low rounded shrub growing to 0.8 m tall with purple-blue-pink/white flowers. It occurs on a range of habitats including hills and slopes with banded iron formation, laterite or chert, or sand dunes or flats, typically on brown sandy clay or sand (WA Herbarium, 1998-).

The species is known to occur in the Carnarvon, Gascoyne and Murchison IBRA regions over a range of approximately 800 km. According to specimens lodged at the WA Herbarium, there are 22 known records of this taxon, potentially representing 18 regional populations, one of which occurs within UCL proposed for conservation WA Herbarium, 1998-).

H. tysonii was recorded at one location during the 2014 survey, comprising two individuals in Mulga open woodland on a sandy rise (AECOM, 2021). The taxon was also recorded in 2022 at two locations comprising 177 individuals (AECOM, 2023). One of the recorded locations (comprising five individuals) intersects the proposed Clearing Footprint and a total of 23 individuals within the Amendment Area.

2.3.4.3 Non-native Flora

No WoNS or Declared Pest (Plants) pursuant to Section 22 of the BAM Act were recorded during surveys by AECOM (2021 & 2023).

2.3.5 Fauna

2.3.5.1 Fauna Inventory

AECOM (2021 & 2023) recorded a total of 92 and 59 terrestrial vertebrate fauna species (inclusive of native and introduced species) respectively during the 2014/2020 and 2022 surveys. This comprised:

- **Birds:** 2014/2020 survey - 61 species; 2022 survey - 46 species;
- **Reptiles:** 2014/2020 survey - 15 species; 2022 survey - seven species;
- **Mammals:** 2014/2020 survey - 14 species; 2022 survey - two species;
- **Amphibians:** 2014/2020 survey – one species; 2022 survey – one species; and
- **Invertebrates:** 2014/2020 survey – one species; 2022 survey – three species.

The conditions during the 2020 survey were reported as dry with a lack of water and flowering plants which is suspected to have contributed to fewer fauna observations. The higher number of birds, reptiles and mammals reported in the 2014/2020 survey is attributed to a larger survey area and the inclusion of data from the 2014 survey.

2.3.5.2 Significant Fauna Species

A search of the anonymised data contained in the Threatened and Priority Fauna (DBCA-037) spatial dataset (DBCA, 2022), shows a single record of Threatened species (Vulnerable) approximately 2 km east of the southern extent of the Amendment Area. The record is listed as a reptile. No other records

occur within 10 km of the Amendment Area. Three additional records (all reptiles) are noted within 15 km of the Amendment Area.

Desktop searches by AECOM (2021 & 2023) identified 21 and 27 conservation significant species as potentially occurring within the survey area respectively. A likelihood of occurrence assessment by AECOM (2021) considered three species were likely to occur, eight species may occur, and 10 species were unlikely to occur. AECOM (2023) considered that three species were likely to occur, four species may occur, 18 species were unlikely to occur, and three species had negligible chance of occurring due to a lack of suitable habitat.

Following the AECOM surveys there have been changes to conservation listings under the EPBC Act and updates to the Protected Matters Search Tool (PMST) refining species distribution. Aurora Environmental conducted an updated search of the PMST using the Clearing Footprint with a 20 km buffer applied. The updated search identified nine threatened fauna species protected under the EPBC Act. The PMST indicates that two species are listed as known to occur, two species are likely to occur, and five species may occur. These were:

Known to Occur

- Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink (*Egernia stokesii badia*) – listed as Endangered under the EPBC Act and Vulnerable under the BC Act;
- Southern Whiteface (*Aphelocephala leucopsis*) – listed as Vulnerable under the EPBC Act and BC Act;

Likely to Occur

- Malleefowl (*Leipoa ocellata*) – listed as Vulnerable under the EPBC Act and BC Act;
- Shield-backed Trapdoor Spider (*Idiosoma nigrum*) – listed as Vulnerable under the EPBC Act and Endangered under the BC Act;

May Occur

- Curlew Sandpiper (*Calidris ferruginea*) – listed as Critically Endangered and Migratory Wetland under the EPBC Act and Critically Endangered under the BC Act;
- Night Parrot (*Pezoporus occidentalis*) – listed as Endangered under the EPBC Act and Critically Endangered under the BC Act;
- Australian Painted Snipe (*Rostratula australis*) – listed as Endangered under the EPBC Act and BC Act;
- Sharp-tailed Sandpiper (*Calidris acuminata*) – listed as Vulnerable and Migratory Wetland under the EPBC Act and Migratory under the BC Act; and
- Greater Stick-nest Rat, Wopilkara (*Leporillus conditor*) – listed as Vulnerable under the EPBC Act and Conservation Dependent under the BC Act.

AECOM (2021 & 2023) recorded four² conservation significant fauna species protected under the BC Act and/or EPBC Act during the 2014/2020 and 2022 surveys. One of those species recorded was

² A lower number is reported here than shown in AECOM (2021, 2023) due to changes in species listings.

not listed at the time of the surveys, and as such was not identified in AECOM (2023) as a conservation significant species. The species recorded were:

- Western Spiny-tailed Skink (*Egernia stokesii badia*) – listed as Vulnerable under BC Act and Endangered under the EPBC Act. Species (or evidence of its presence) recorded during the 2014 and 2020 surveys (suspected to be the record within DBCA-037).
- Grey Falcon (*Falco hypoleucos*) – listed as Vulnerable under BC Act and EPBC Act. Species recorded during the 2020 and 2022 surveys.
- Southern Whiteface (*Aphelocephala leucopsis*) – was not listed at the time of the survey but now listed as Vulnerable under BC Act and EPBC Act. Species was either directly observed and call heard (AECOM, 2023).
- Northern Shield-backed Trapdoor Spider (*Idiosoma clypeatum*) – listed as Priority 3 under the BC Act and not listed under the EPBC Act. The species (or evidence of its presence) was recorded during the AECOM surveys (2021 & 2023).

Of the species identified from the updated PMST search, AECOM (2021 & 2023) considered the following as having a low likelihood of occurrence, or were deemed unlikely to occur:

- **Malleefowl** – considered unlikely to occur due to a lack of records and no evidence of the species presence during the 2014 survey. No other surveys in the region, with the exception of Bamford (2016) have recorded evidence of the presence of Malleefowl within comparable vegetation to the survey area.
- **Northern Shield-backed Trapdoor Spider** – considered unlikely to occur due to a reclassification of the *Idiosoma* genus. *Idiosoma nigrum* was recorded during the AECOM (2014) survey. Following a systematic review and reclassification of the *Idiosoma* genus (Rix *et al.*, 2018) the previous classification of *I. nigrum* was shown to contain multiple species. The distribution of *I. nigrum* only included those populations within the central and central-western Wheatbelt bioregion (Rix *et al.*, 2018). The *Idiosoma* species recorded in the Murchison region is now considered *I. clypeatum*, a Priority 3 taxon (discussed further below).
- **Night Parrot** – considered highly unlikely to occur. The survey area is within a medium priority search area for the species, however suitable habitat is unlikely to occur, and the species was not recorded during the surveys.
- **Sharp-tailed Sandpiper** – considered unlikely to occur due to a lack of suitable habitat. The species prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation.

The conservation significant fauna species that were recorded during the survey (i.e. are known to occur), or considered as possibly occurring, or were not addressed by AECOM (2021 & 2023) are discussed below.

Western Spiny-tailed Skink (*Egernia stokesii badia*) – Known

The Western Spiny-tailed Skink is listed under the EPBC Act as Endangered and Vulnerable under the BC Act. It belongs to the cunninghamii group; a group of moderately large, rock-dwelling reptiles (Chapple, 2003). Two colour forms exist; the brown form and black form, the latter is delineated from

the former by its black colouration, lack of patterning in adults and differing head and scale morphology (DotE, 2014).

Western Spiny-tailed Skinks are saxicolous (rock dwelling), occupying rock crevices in large, isolated rocky outcrops, typically granite (Duffield & Bull, 2002). Occasionally, hollow logs or semi-arboreal habitats are utilised for shelter, with the brown form predominantly occupying York Gum woodland (Chapple, 2003). Crevices occupied by the black form of Western Spiny-tailed Skink are usually identifiable by a “latrine” or scat pile, resulting from regular defecation of all family members, in close proximity to the entrance (Chapple, 2003).

The Western Spiny-tailed Skink has previously been recorded within Boolardy Station. However, no observations of the Western Spiny-tailed Skink were made within the proposed Clearing Footprint or the Amendment Area (AECOM, 2021 & 2023).

The species generally prefers deep rock crevices in rocky outcrops, characterised by large boulders (AECOM, 2023). Granite boulders and heaps were considered potential suitable habitat for the Skink. However, the habitat assessed within the survey areas was generally considered unsuitable for the Skink due to the shallow depth of crevices found (AECOM, 2021 & 2023). A total of 0.41 ha of this habitat type intersects the proposed Clearing Footprint at three locations (two locations in close proximity to each other) and 3.78 ha within the Amendment Area.

Southern Whiteface (*Aphelocephala leucopsis*) – Known

The Southern Whiteface is listed as Vulnerable under both the EPBC Act and the BC Act. The species is a small stocky thornbill-like bird with a brown dorsum, white belly, dark brown wings and a black tail with narrow white tip (Schodde and Mason, 1999). Adult birds are approximately 11.5 cm in length with a cream-coloured eye, grey legs and a stubby dark grey bill of finch-like appearance (Schodde & Mason 1999).

The species occurs across most of mainland Australia, south of the tropics from the north-eastern edge of the WA Wheatbelt east to the Great Dividing Range (Schodde & Mason 1999). DCCEEW (2023a) define three broad habitats for this species which includes the following:

- Relatively undisturbed open woodlands and shrublands with an understory of grasses or shrubs, or both.
- Habitat with low tree densities and an herbaceous understory litter cover which provides essential foraging habitat.
- Living and dead trees with hollows and crevices which are essential for roosting and nesting.

No Critical Habitats as defined under the EPBC Act have been identified or included in the Register of Critical Habitats (DCCEEW, 2023a).

AECOM (2023) did not specify the location or the number of times the Southern Whiteface was recorded during the 2022 survey. The vegetation within the Amendment Area is likely to constitute foraging habitat, based on the habitats defined in DCCEEW (2023a).

Grey Falcon (*Falco hypoleucos*) – Known

The Grey Falcon (*Falco hypoleucos*) is listed as Vulnerable under both the EPBC Act and the BC Act. It is a medium-sized, compact falcon native to Australia, characterised by its light grey upperparts, white

underparts with faint barring, and black wingtips. Key features include a bright orange-yellow eye-ring, cere (skin around the nostrils), and feet, contrasting with a black bill tip.

The Grey Falcon are elusive, found in arid and semi-arid regions, favouring shrubland, grassland and wooded watercourses. It primarily preys on birds, small mammals and reptiles. It utilises stick nests, usually in tall trees along watercourses.

One individual was observed gliding over low, open *Acacia* shrublands and woodlands (AECOM, 2023) outside of the Amendment Area. It is likely that this individual was an uncommon visitor, taking advantage of optimal hunting conditions following high rainfall in the months preceding the survey (AECOM, 2023). This rainfall promoted prolific growth of seed-bearing annual plants and increased insect populations which in turn encouraged a large number of small bird species which are possible prey for the Grey Falcon (AECOM, 2023).

The species preferred habitat is consistent with the Channels and creek lines habitat mapped by AECOM (2021 & 2023). A total of 0.74 ha of this habitat type intersects the proposed Clearing Footprint at two locations and 11.46 ha within the Amendment Area, at the same two locations.

Northern Shield-backed Trapdoor Spider (*Idiosoma clypeatum*) – Known

The Northern Shield-back Trapdoor Spider is a Priority 3 listed taxon. It is approximately 14 mm long and has dark brown to black abdomen and appendages with a yellow to grey abdominal underside. Eyes are arranged in three rows with the two anterior rows possessing two eyes and the posterior row possessing four eyes in a transverse line.

I. clypeatum has a widespread distribution in the Yalgoo and Murchison bioregions of Western Australia's inland arid zone strongly correlated with annual rainfall of less than 250 mm (Invertebrate Solutions, 2020). The species has a known extent of occurrence of over 120,000 km² and thus is not considered to be a short-range endemic species by the definition of Harvey (2002), it does largely occur within areas prospective for mining and mineral resource development (Invertebrate Solutions, 2020).

Exact habitat requirements for *I. clypeatum* are not well defined, but the species is known to use *Acacia* and *Eucalyptus* vegetation for habitat (Invertebrate Solutions, 2020), relying on leaf-litter and twigs to build its burrow. The species was recorded during 2014 within Rocky breakaways, slopes and plateau edges that contain scattered *Acacia* and *Eremophila* species (AECOM, 2021) and during 2022 within Hardpan plain with intermittent sandplain habitat (AECOM, 2023). AECOM (2021 & 2023) considered other possible or marginally suitable habitats for the species included Channels and creek line, Granite boulders and heaps and Non-saline stony or gritty surface plains on the basis that the exact habitat requirements for the species is not well defined.

I. clypeatum was recorded twice during the 2014 survey (AECOM, 2021). These locations did not overlap with a refined survey area for the 2020 survey. AECOM (2023) recorded evidence of *I. clypeatum* from nine locations within the 2022 survey area, with all being within Hardpan plain with intermittent sandplain habitat. None of these records occur within the proposed Clearing Footprint, and two recorded from within the Amendment Area. Both records were noted as being an old burrows and have been pulled from the ground.

Australian Painted Snipe (*Rostratula australis*) – May occur

The Australian Painted Snipe is listed as Endangered under both the EPBC Act and the BC Act. The species is a stocky wading bird approximately 24 to 30 cm in length, with a wingspan of 50 to 54 cm

and weighing 125 to 130 grams (DoE, 2013). The adult female is more colourful and larger than the male (DoE, 2013).

The Australian Painted Snipe occurs in shallow freshwater (occasionally brackish) wetlands, both ephemeral and permanent, such as lakes, swamps, claypans, inundated or waterlogged grassland/saltmarsh, dams, rice crops, sewage farms and bore drains, generally with a good cover of grasses, rushes and reeds, low scrub, *Muehlenbeckia* spp. (lignum), open timber or samphire (DoE, 2013). It is most common in eastern Australia but has been recorded at wetlands in all states and territories (DoE, 2013).

AECOM (2023) considered the species may occur due to the presence of very limited and marginal habitat which included areas mapped as Channels and creek line. The proposed Clearing Footprint intersects 0.74 ha of this habitat, with 11.46 ha within in the Amendment Area.

Curlew Sandpiper (*Calidris ferruginea*) – Unlikely

The Curlew Sandpiper is listed as Critically Endangered and Migratory Wetland under the EPBC Act and Critically Endangered under the BC Act. The species are typically 18 – 23 cm long, have a wingspan of 38 – 41 cm, and weigh approximately 57 grams. The bill is long, black and decurved, with a finely pointed tip (DCCEEW, 2023b). It is migratory species that breeds in Siberia before migrating where it may be recorded in Australia. They are widespread but most common in the far south-east and north-west of Australia. They are found in many Australian coastal sites and may also be seen inland in suitable wetland habitats during favourable conditions. Key locations in WA include the Eyre Bird Observatory, Port Headland Saltworks, Eighty Mile Beach, Roebuck Bay, and Lake MacLeod (DCCEEW, 2023b). The species can be widespread around the coastal and subcoastal plains of WA and occasionally occurs inland within wetlands when conditions are suitable (DCCEEW, 2023b).

AECOM (2023) considered the species unlikely to occur due to the presence of very limited and marginal habitat which included areas mapped as Channels and creek line. The proposed Clearing Footprint intersects 0.74 ha of this habitat, with 11.46 ha within in the Amendment Area.

Greater Stick-nest Rat, Wopilkara (*Leporillus conditor*) – Unlikely

The Greater Stick-nest Rat, or Wopilkara, is listed as Vulnerable under the EPBC Act and Conservation Dependent under the BC Act. The species is a large native rodent weighing up to 450 grams, with a body length ranging between 17 to 26 cm. Their fluffy coat is a yellowish-brown to grey, and creamy white below. They have a blunt nose and large, rounded ears.

They are nocturnal and exclusively herbivorous, feeding on the fruit and leaves of succulent and semi-succulent plants. Groups of 10-20 individuals build and maintain communal nests made from sticks that can be 1 m high and 1.5 m wide. They drag branches and sticks to their nest site and chew them to size, using urine to bind building materials together.

Greater Stick-nest Rats inhabit semi-arid to arid scrubland with little or no freshwater. The species distribution declined rapidly after European settlement, disappearing from the mainland by the 1930's. A captive breeding program was undertaken resulting in the release of individuals on several offshore islands in WA. Due to its success, the species is slowly being reintroduced to several mainland predator-free fenced areas. While the Amendment Area may have once been within the distribution of this species, it is considered highly unlikely that it would occur given the very limited occurrence.

2.3.5.3 Non-native Fauna

AECOM (2021, 2023) recorded the following non-native fauna species during the 2014/2020 and 2022 surveys:

- *Acridotheres tristis* (Common Myna);
- *Camel dromedaries* (Camel);
- *Equus ferus* subsp. *caballus* (Horse);
- *Canis familiaris* (Dog) (either Dingo, *Canis familiaris dingo* or Feral Dog, *Canis familiaris familiaris*);
- *Vulpes vulpes* (Red Fox);
- *Capra aegagrus hircus* (Goat);
- *Oryctolagus cuniculus* (Rabbit);
- *Felis catus* (Cat); and
- *Bos taurus* (European cattle).

All of these species, except for European Cattle and the Dingo are Declared Pests under the BAM Act.

2.3.5.4 Fauna Habitat

Fauna habitat is generally homogenous within the areas surveyed, predominantly comprising sparse vegetation on hardpan and sandplains, with or without surface rocks (AECOM, 2021). Less common but more significant fauna habitats include granite (domes, heaps and boulders); drainage channels and rocky breakaways (AECOM, 2021). These less common habitats tend to have more structural complexity and microhabitats, support species of conservation significance, and have an associated higher fauna habitat quality (AECOM, 2021). Although the more common fauna habitats may also potentially provide habitat for conservation significant species, these are well represented in the region (AECOM, 2021).

The Amendment Area and proposed Clearing Footprint intersect seven fauna habitats (**Figure 5**). **Table 10** describes the fauna habitats present within the Amendment Area and proposed Clearing Footprint, as well as the conservation significant fauna species with potential to utilise these habitats as derived from AECOM (2021, 2023).

The most common habitat was the *Hardpan plain with intermittent sandplain* making up 27.25 ha (61.5%) of the proposed Clearing Footprint, and 273.63 ha (57.5%) of the Amendment Area. This habitat can persist for several kilometres, vegetation is generally sparse with no large trees or dense understorey, minimal leaf litter apart from at the base of trees and shrubs, and occasional smaller logs and fallen branches (AECOM, 2023). This habitat supports a diverse range of common bird species in the area and some reptiles and macropods (AECOM, 2023). The habitat is not considered significant and is extensive throughout the landscape (AECOM, 2023).

The second most common habitat within the proposed Clearing Footprint and Amendment Area is the *Non-saline stony or gritty surfaced plains* comprising 10.13 ha (22.8%) of the proposed Clearing Footprint and 112.51 ha (23.7%) of the Amendment Area. This fauna habitat supports the common species of the area as recorded during the field survey (AECOM, 2023).

TABLE 10: FAUNA HABITAT

HABITAT	HABITAT FOR CONSERVATION SIGNIFICANT FAUNA	CLEARING FOOTPRINT	AMENDMENT AREA
Hardpan plain with intermittent sandplain This habitat contains sparse <i>Acacia</i> over mixed native shrubs on hardpan plains with intermittent sandplains. It has abundant bare ground and lacks: • Dense understorey; • Large trees; • Significant hollows; • Logs > 300 mm diameter; • Surface rocks; and • Significant leaf litter. Microhabitats are scarce, and this habitat is generally more likely to be utilised by larger mammals, as well as some reptile and avian species. This is considered moderate to low quality habitat due to: • Minimal structural complexity; • Disturbance from grazing; and • Presence of introduced fauna. Some smaller areas of scattered granite may be present, especially near granite outcrops. However, these areas are generally not suitable habitat for the Western Spiny-tailed Skink.	Possible Habitat for the Northern Shield-backed Trapdoor Spider (<i>Idiosoma clypeatum</i>). The exact habitat requirements for this species are unknown. However, it is generally found near the bases of <i>Acacia</i> or <i>Eremophila</i> shrubs.	27.25 ha	273.21 ha
Non-saline Stony or Gritty Surfaced Plains This habitat is similar to hardpan plains, featuring occasional <i>Acacia</i> species over open mixed native shrubs, but distinguished by the presence of quartz and stones on orange clay soils. It lacks: • Dense understorey; • Large trees;	Possible Habitat for the Northern Shield-backed Trapdoor Spider (<i>Idiosoma clypeatum</i>). The exact habitat requirements for this species are unknown. However, it is generally found near the bases of <i>Acacia</i> or <i>Eremophila</i> shrubs.	10.13 ha	112.51 ha

TABLE 10: FAUNA HABITAT

HABITAT	HABITAT FOR CONSERVATION SIGNIFICANT FAUNA	CLEARING FOOTPRINT	AMENDMENT AREA
- Significant hollows; - Logs > 300 mm diameter; - Large rocks; and - Significant leaf litter. Microhabitats are scarce, and this habitat is generally more likely to be utilised by larger mammals, as well as some reptile and avian species. This is considered moderate to low quality habitat due to: - Minimal structural complexity; - Disturbance from grazing; and - Presence of introduced fauna.			
Sandplain This habitat consists of alluvial plains of orange to brown sands, often with a thin crust, and supports species such as <i>Acacia</i>, <i>Eremophila</i>, and <i>Ptilotus</i>. Key features include: - Significant bare ground; - Some leaf litter around the base of vegetation; and - Absence of dense understorey, large trees, significant hollows, logs > 300 mm diameter, and rocks. Microhabitats are scarce, and this habitat is generally more likely to be utilised by larger mammals, as well as some reptile and avian species. This is considered moderate to low quality habitat due to: - Minimal structural complexity; and - Disturbance from grazing and introduced fauna.	Possible Habitat for the Northern Shield-backed Trapdoor Spider (<i>Idiosoma clypeatum</i>). The exact habitat requirements for this species are unknown. However, it is generally found near the bases of <i>Acacia</i> or <i>Eremophila</i> shrubs.	3.14 ha	37.49 ha
Rocky breakaway and plateau edges	Possible Habitat for the Northern Shield-backed Trapdoor Spider (<i>Idiosoma clypeatum</i>). The exact habitat requirements for this species	1.81 ha	27.63 ha

TABLE 10: FAUNA HABITAT

HABITAT	HABITAT FOR CONSERVATION SIGNIFICANT FAUNA	CLEARING FOOTPRINT	AMENDMENT AREA
This habitat consists of ferruginised duricrust and weathered granite on white to orange to light brown sandy clayey soils. It includes steep breakaway faces and short rocky upper slopes (Alexander Holm & Associates, 2008), with scattered <i>Acacia</i> and <i>Eremophila</i> species. Key features include: • Moderate leaf litter at the base of vegetation; • Stones and rocks up to 2 m in size; and • Occasional rock crevices. It lacks: • Dense understorey; • Large trees; • Large hollows; • Logs > 300 mm diameter; and • Large boulders. This is considered moderate to high quality fauna habitat due to the presence of abundant microhabitats, including overhangs, fissures, and other structural features. <i>The Amendment Area has generally been aligned to avoid the significant breakaways of higher quality.</i>	are unknown. However, it is generally found near the bases of <i>Acacia</i> or <i>Eremophila</i> shrubs.		
Channels and creek line This habitat includes major and minor drainage lines that are subject to occasional flooding. • Minor drainage areas typically show little variation from hardpan plains when dry, except for: ○ Slightly higher vegetation cover; and ○ Sandier soils.	This habitat may seasonally support waterbird species. Other potential significant fauna species that may use this habitat include: • Peregrine Falcon (<i>Falco peregrinus</i>); and • Northern Shield-backed Trapdoor Spider (<i>Idiosoma clypeatum</i>).	0.74 ha	11.46 ha

TABLE 10: FAUNA HABITAT

HABITAT	HABITAT FOR CONSERVATION SIGNIFICANT FAUNA	CLEARING FOOTPRINT	AMENDMENT AREA
- Major drainage channels tend to feature: - Larger trees such as <i>Eucalypts</i> and <i>Allocasuarina</i> species; and - Steep channel formations.			
Saline lower footslopes below breakaways This habitat occurs on the saline lower footslopes found beneath breakaway formations. Vegetation cover is intermittent, with large sparse areas being common. It is considered moderate to low quality habitat due to minimal structural complexity.	None according to the desktop assessment and field survey results (AECOM, 2021 & 2023).	0.67 ha	6.86 ha
Granite boulders and heaps This habitat consists of low hills of emergent granite and rock piles of various sizes, with scattered <i>Acacia</i> and <i>Eremophila</i> species. Key features include: - Some leaf litter beneath vegetation; - Absence of dense understorey; and - No large trees, significant hollows, or logs > 300 mm diameter. This habitat provides: - Water catchment; and - Relatively high diversity of flora and fauna. <i>The larger, more significant areas of this habitat generally lie outside the Amendment Area, which has been designed to avoid these areas.</i>	The habitat within the Amendment Area / predicted Clearing footprint is generally considered unsuitable or very marginal for the Western Spiny-tailed Skink due to the absence of deep crevices. The Amendment Area has been aligned to avoid better quality granite habitat. Possible marginal habitat for the Northern Shield-backed Trapdoor Spider (<i>Idiosoma clypeatum</i>). Exact habitat requirements for this species are unknown. However, it generally occurs near the bases of <i>Acacia</i> or <i>Eremophila</i> .	0.41 ha	3.78 ha
Cleared		0.18 ha	1.94 ha
TOTAL		44.33 ha	474.88 ha

2.4 DISTURBANCES AND THREATENING PROCESSES

2.4.1 Fires

There are no mapped fire events for the Amendment Area and its surrounds (DBCA, 2024b).

2.4.2 Other

The Amendment Area is largely a linear corridor that extends from Boolardy Station across to Kalli Station, traversing pastoral country. Boolardy Station was a site of pastoral activities from 1890 – 2013, after which it was destocked. Kalli Station also began operating as a pastoral station around a similar time as Boolardy but has continued to be used for this purpose. Impacts of the historic pastoral activities include grazing, clearing and the spread of weeds which are evident in the landscape. Areas of disturbance within the Amendment Area are localised and generally associated with cleared tracks and roads.

3 ASSESSMENT AGAINST TEN PRINCIPLES FOR CLEARING NATIVE VEGETATION

An assessment of the proposed clearing associated with the project was completed based on the DER (2014) assessment against the *Ten Principles for Clearing Native Vegetation* as detailed in Schedule 5 of the EP Act and presented in Table 11.

The assessment was based on a proposed Clearing Footprint of 44.33 ha which includes 0.18 ha of cleared land, within an Amendment Area 474.88 ha.

TABLE 11: ASSESSMENT AGAINST TEN PRINCIPLES FOR CLEARING NATIVE VEGETATION

PRINCIPLE
a) <i>Native vegetation should not be cleared if it comprises a high level of biological diversity.</i> NOT AT VARIANCE TO THIS PRINCIPLE AECOM (2021 & 2023) recorded 91 and 41 native flora taxa, 92 and 59 terrestrial vertebrate fauna taxa (native and introduced), ten vegetation communities and eight fauna habitats during the 2014/2020 and 2022 surveys. The proposed Clearing Footprint and larger Amendment Area intersect seven vegetation communities and fauna habitats. No threatened flora was observed during the AECOM (2021 & 2023) surveys. Three P3 taxa, <i>Petrophile pauciflora</i>, <i>Eremophila muelleriana</i> and <i>Hemigenia tysonii</i> were recorded within the proposed Clearing Footprint and Amendment Area. It is noted that no additional targeted survey work was conducted for these species outside of the survey area, and as such, the distribution and abundance of these species outside of the proposed Clearing Footprint is unknown. However, these species have been recorded in previous surveys associated with the SKA project and have substantial ranges within the Murchison bioregion. The absence of information on other populations is likely to be an artifact of lack of survey effort in the region. Impacts to individuals of these species within the proposed Clearing Footprint is unlikely to significantly impact on the presence of these species in the surrounding landscape. The predicted impacts to P3 species are: • <i>Petrophile pauciflora</i> – 51 individuals, two locations both described as locally common and likely to extend beyond the Clearing Footprint; • <i>Eremophila muelleriana</i> – two individuals, one location; and • <i>Hemegenia tysonii</i> – five individuals, one location. The above impacts to P3 species are considered relatively small, localised and unlikely to impact upon the conservation status of these species. The balance of the census of the flora consisted of species that are common in the area. No novel taxa, range extensions or other flora that might meet the significance criteria in EPA (2016a) were recorded. There were no WoNS or Declared Pest (Plants) collected. AECOM (2021 & 2023) recorded 92 and 59 terrestrial vertebrate fauna tax during the 2014/2020 and 2022 surveys. This comprised: • Birds: 2014/2020 survey - 61 species; 2022 survey - 46 species; • Reptiles: 2014/2020 survey - 15 species; 2022 survey - seven species; • Mammals: 2014/2020 survey - 14 species; 2022 survey - two species; • Amphibians: 2014/2020 survey – one species; 2022 survey – one species; and

- **Invertebrates:** 2014/2020 survey – one species; 2022 survey – three species.

Four conservation significant fauna species were either observed or evidence of their presence was recorded during the 2014/2020 and 2022 surveys. Only one species was recorded within the Amendment Area, namely *Idiosoma clypeatum*, in the form of old burrows that had been pulled (recorded outside of the proposed Clearing Footprint but within the Amendment Area).

Seven vegetation communities intersect the proposed Clearing Footprint / Amendment Area. Although all communities were largely homogenous, they were divided into two broad categories distinguished by landform. Five vegetation communities were characterised by Mulga Open Woodlands on hard clay on flat terrain, sometimes with quartz on the surface (AECOM, 2021). The other two vegetation communities were characterised by granite boulders and outcrops which were noted to be statistically similar to adjacent Mulga Open Woodlands on plains (AECOM, 2021). All vegetation communities within the proposed Clearing Footprint are analogous to other vegetation recorded during surveys for the SKA development. These are widespread in the region and do not constitute a known TEC or PEC, nor meet any of the other criteria for significance in EPA (2016a). The recorded vegetation communities do not represent a significant fauna habitat, nor are they considered to be critical habitat for significant fauna.

Given the comparatively low census of the flora and fauna, the limited records of significant species, and the presence of widespread vegetation associations that have almost 100% of their pre-European extents remaining at Statewide, regional and local scales, the proposed clearing is considered to not be at variance to this principle.

Methods:

AECOM (2021) Square Kilometre Array Ecological Assessment.

AECOM (2023). Square Kilometre Array Ecological Assessment – November 2022.

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.

NOT AT VARIANCE TO THIS PRINCIPLE

AECOM (2021 & 2023) recorded 92 and 59 terrestrial vertebrate fauna taxa (native and introduced) during the 2014/2020 and 2022 surveys. This comprised:

- **Birds:** 2014/2020 survey - 61 species; 2022 survey - 46 species;
- **Reptiles:** 2014/2020 survey - 15 species; 2022 survey - seven species;
- **Mammals:** 2014/2020 survey - 14 species; 2022 survey - two species;
- **Amphibians:** 2014/2020 survey – one species; 2022 survey – one species; and
- **Invertebrates:** 2014/2020 survey – one species; 2022 survey – three species.

Nine introduced fauna species were recorded.

Four conservation significant fauna species were either observed or evidence of their presence was recorded during the AECOM (2021 & 2023) surveys. One taxon (*Aphelocephala leucopsis*) was not listed at the time of the AECOM surveys and therefore was not recognised as a conservation significant fauna species.

The conservation significant species are listed as Endangered under the EPBC Act and Vulnerable under the BC Act (*Egernia stokesii badia*), Vulnerable under the EPBC Act and BC Act (*Falco hypoleucos* and *Aphelocephala leucopsis*) and one is a Priority 3 taxon (*Idiosoma clypeatum*). The recorded locations of these conservation significant fauna species do not occur within the proposed Clearing Footprint. One species was recorded from within the Amendment Area, being secondary evidence of *Idiosoma clypeatum* in the form of

old burrows that had been pulled from the ground. AECOM (2023) did not specify the location or number of records of *Aphelocephala leucopsis* observed during the 2022 survey.

In addition to the above species, one other conservation significant taxon (*Rostratula australis*) was identified as potentially occurring due to the presence of marginal habitat (Channels and creek line).

Due to the long and linear characteristics of the eastern spiral arm extension, the proposed Clearing Footprint intersects seven fauna habitats. The habitats within the proposed Clearing Footprint are not considered unique, nor do they provide niche features or attributes, and they extend into adjacent areas surrounding the Amendment Area. More than 84% of the predicted clearing comprises two habitats: *Hardpan plain with intermittent sandplain* which comprises 61.5% (27.25 ha) of the potential clearing, and *Non-saline stony or gritty surfaced plains* representing 22.8% (10.13 ha).

The fauna habitat within the Amendment Area is homogenous with the areas surveyed and more broadly throughout the surrounding landscape. The vegetation comprises mulga woodlands or shrublands, or variants thereof, which are widespread within much of the Eremaean. The pre-European vegetation extent for the VSAs present within the Amendment Area have well over 99% of their pre-European extent remaining.

The scale of proposed clearing will not impact on the local, regional or Statewide extent of the vegetation within the Amendment Area and proposed Clearing Footprint. Based on this, the proposed clearing is within an area in which there are no defined VSAs that are considered critical habitat for significant fauna.

The conservation significant fauna species that were recorded during the survey 2014/2020 and 2022 AECOM surveys (i.e. are known to occur), or identified as potentially occurring in the Amendment Area (but not addressed by AECOM (2021 & 2023)) are discussed as follows:

Western Spiny-tailed Skink (*Egernia stokesii badia*)

Egernia stokesii badia (Western Spiny-tailed Skink) has two broad varieties – the “normal” and the “black form” (DEC, 2012). The Amendment Area is to the north of the known distribution for the “normal” form, which is associated with *Acacia*-dominated shrublands and is typically found in the Geraldton sandplains and the Yalgoo IBRA regions, the latter of which is to the south of the Amendment Area. While the “black form” is known to occur in the Murchison settlements, the area in which the Amendment Area is located.

A key part of the habitat requirement for both forms of this species is niche refugia such as old buildings and logs for the “normal” form and areas of outcropping granite and ironstone breakaways for the “black form” (DEC, 2012). While the vegetation within the Amendment Area may be consistent with the habitat for the “normal” form, there are no niche refugia being impacted by the clearing. A small portion of the proposed Clearing Footprint (0.41 ha) was mapped as Granite boulders and heaps which may provide habitat for the “black form” of the species. However, AECOM (2021) considered this habitat unsuitable or very marginal due to an absence of deep crevices.

Southern Whiteface (*Aphelocephala leucopsis*)

The Southern Whiteface across most of mainland Australia, south of the tropics from the north-eastern edge of the Western Australian Wheatbelt east to the Great Dividing Range (Schodde & Mason 1999). DCCEEW (2023a) define three broad habitats for this species which includes the following:

- Relatively undisturbed open woodlands and shrublands with an understory of grasses or shrubs, or both.
- Habitat with low tree densities and an herbaceous understory litter cover which provides essential foraging habitat.
- Living and dead trees with hollows and crevices which are essential for roosting and nesting.

AECOM (2023) did not specify the location or the number of times the Southern Whiteface was recorded during the 2022 survey. The vegetation within the Amendment Area is likely to constitute foraging habitat,

based on the habitats defined in DCCEEW (2023a). However, given fauna habitat within the Amendment Area is homogenous with the areas surveyed and more broadly throughout the surrounding landscape, is well represented with well above 99% of the pre-European extent remaining, and the characteristics of the proposed Clearing Footprint (i.e. long, linear and narrow clearing footprint), it is highly unlikely this species will be impacted.

Grey Falcon (*Falco hypoleucos*)

One individual was observed gliding over low, open *Acacia* shrublands and woodlands (AECOM, 2023) within the Amendment Area but outside of the Clearing Footprint. It is likely that this individual was an uncommon visitor, taking advantage of optimal hunting conditions following high rainfall in the months preceding the survey (AECOM, 2023). This rainfall promoted prolific growth of seed-bearing annual plants and increased insect populations which in turn encouraged a large number of small bird species which are possible prey for the Grey Falcon (AECOM, 2023).

The species preferred habitat is consistent with the Channels and creek lines habitat mapped by AECOM (2021 & 2023). A total of 0.74 ha of this habitat type intersects the proposed Clearing Footprint at two locations and 11.46 ha within the Amendment Area, at the same two locations. Given the minor impact to the species' preferred habitat, and the availability of similar habitat in the surrounding landscape it is unlikely this species will be significantly impacted by the proposed clearing.

Northern Shield-backed Trapdoor Spider (*Idiosoma clypeatum*)

The species was recorded twice in 2014 within Rocky breakaways, slopes and plateau edges that contain scattered *Acacia* and *Eremophila* species (AECOM, 2021) and in 2022 within Hardpan plain with intermittent sandplain habitat (AECOM, 2023).

As the exact habitat requirements for *Idiosoma clypeatum* are not well defined, AECOM (2021 & 2023) considered nearly all habitats mapped (excluding Saline lower footslopes below breakaways and Cleared areas) as possible or marginally suitable habitats for the species. Due to wide range of possible habitat, there is 43.47 ha of potentially suitable habitat within the proposed Clearing Footprint. Despite the abundance of potentially suitable habitat, AECOM (2023) recorded evidence of *Idiosoma clypeatum* from nine locations within the 2022 survey area, with all being within Hardpan plain with intermittent sandplain habitat, with none of these intersecting with the Clearing Footprint. However, two records, both being old burrows that had been pulled from the ground, were found within the Amendment Area but outside of the predicted Clearing Footprint.

Australian Painted Snipe (*Rostratula australis*)

The Australian Painted Snipe was not recorded during the fauna surveys by AECOM (2021 & 2023). The species was considered as possibly occurring due to the presence of very limited and marginal habitat which included areas mapped as Channels and creek line. The proposed Clearing Footprint intersects a total of 0.74 ha of this habitat, with 11.46 ha within in the Amendment Area. Given the limited clearing of the species' potential habitat and the extensive areas of suitable habitat remaining within the local region, it is considered highly unlikely this species will be impacted by the proposed clearing.

The Amendment Area contains seven fauna habitats that are widespread and intact within the local area and greater region. The proposed clearing will not remove critical habitat for significant fauna, nor will it comprise the whole, or a part of a significant habitat for native fauna, and as such, is not at variance to this principle.

Methods:

DEC (2012) Western Spiny-tailed Skink *Egernia stokesii* Recovery Plan.

AECOM (2021) Square Kilometre Array Ecological Assessment.

AECOM (2023) Square Kilometre Array Ecological Assessment – November 2022.

DCCEEW (2023a) Conservation Advice for Southern Whiteface.

Bamford Consulting Ecologists (Bamford) (2016) *Square Kilometre Array (SKA) Main Roads Upgrade Fauna Assessment*.

c) *Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.*

NOT AT VARIANCE TO THIS PRINCIPLE

No threatened flora have been recorded within the local area, and no threatened flora were recorded during the flora and vegetation surveys (AECOM, 2021 & 2023). Additionally, no collections of threatened flora been made in other surveys associated with the SKA project (Umwelt, 2024).

Given the absence of records of threatened flora within the Amendment Area or surrounding landscape, the proposed clearing will not impact on any populations or habitat necessary for the continued existence of rare flora. Therefore, the proposed clearing is not at variance to this principle.

Methods:

Threatened and Priority Flora (DBCA-036).

AECOM (2021) Square Kilometre Array Ecological Assessment.

AECOM (2023). Square Kilometre Array Ecological Assessment – November 2022.

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.*

NOT AT VARIANCE TO THIS PRINCIPLE

The desktop assessment conducted as part of the 2020 survey (AECOM, 2021) identified one occurrence of a PEC within the DBCA database search area and no TECs. The buffered extent of the PEC, *Meka calcrete groundwater assemblage type on Murchison paleo-drainage on Meka Station*, is approximately 20 km south/south-west of the Amendment Area.

No TECs or PECs were recorded by AECOM (2021 & 2023) during the biological surveys, nor was the vegetation considered to meet any of the significant criteria in EPA (2016b).

Given the absence of any vegetation that could be considered to have characteristics of any known TEC or PEC within the Proposed Clearing Footprint, the proposed clearing is not at variance to this principle.

Methods:

Threatened Ecological Communities (DBCA-038).

AECOM (2021) Square Kilometre Array Ecological Assessment.

AECOM (2023) Square Kilometre Array Ecological Assessment – November 2022.

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 TO THIS PRINCIPLE

The Amendment Area is located within the Upper Murchison System, intersecting four VSAs: Upper Murchison 18, Upper Murchison 29, Upper Murchison 39 and Upper Murchison 2081. All four VSAs are *Acacia* dominated communities, with two of the VSAs being Mulga woodland, and the remaining two VSAs being Scrub dominated by *Acacia* species, teatree and other species.

At State, IBRA region, IBRA sub-region and Local Government levels, all four VSAs have well above 99% of their pre-European extents remaining. The extent of clearing proposed will not significantly impact on the extent remaining of the VSAs.

The Amendment Area does not form a part of a significant ecological link within the local area.

The Amendment Area is within a region in which there has been limited clearing of native vegetation, reflected in the extent remaining, and as such, the proposed clearing is not at variance to this principle.

Methods:

Pre-European Vegetation (DPIRD-006).

Government of Western Australia (2019) *2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report)*. Current as of March 2019.

f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

AT VARIANCE TO THIS PRINCIPLE

Surface water features within and surrounding the Amendment Area are characterised by non-perennial lakes and floodplains or 'Land Subject to Inundation' (Crossman and Li, 2015). The Amendment Area does not intersect any perennial watercourses or wetlands, but does cross several ephemeral watercourses (tributaries to Mudgianna Creek and Roderick River) (**Figure 3**). Three vegetation communities were mapped across these ephemeral drainage systems (AECOM, 2021 & 2023):

- **AfSa:** *Acacia fuscaneura*, *Acacia incurvaneura* and occasional *Acacia pruinocarpa* low open woodland over *Senna artemisioides* subsp. *helmsii*, *Acacia tetragonophylla* and *Senna* sp. Meekatharra (E. Bailey 1-26) mid to tall sparse shrubland.
- **AfEfPo:** *Acacia fuscaneura*, *Acacia incurvaneura* and *Acaciavictoriae* subsp. *victoriae* low open woodland over *Eremophila forrestii* subsp. *forrestii*, *Acacia tetragonophylla* and *Eremophila phyllopoda* low to tall open shrubland over *Ptilotus obovatus*, *Solanum lasiophyllum* and *Maireana planifolia* low sparse shrubland.
- **AiAbSa:** *Acacia incurvaneura*, *Hakea lorea* subsp. *lorea* and *Acacia aneura* low open woodland over *Acacia burkittii*, *Acacia tetragonophylla* and *Acacia victoriae* subsp. *victoriae* tall shrubland over *Senna artemisioides* subsp. *helmsii*, *Ptilotus obovatus* and *Senna artemisioides* subsp. *x sturtii* low to mid sparse shrubland.

The proposed clearing is required for tracks and cable trench (buried cabling), approximately 10 m wide. Given the linear shape, the purpose and relatively small extent of the clearing across these vegetation communities within the ephemeral watercourses, the proposed clearing is not expected to impact the function or alter the hydrological flows of the drainage systems.

Given the proposed Clearing Footprint intersects several ephemeral watercourses, the proposed clearing is considered at variance to this principle.

Methods:

Hydrography, Linear (Hierarchy) (DWER-031).

Surface Hydrology Lines (National) dataset (Crossman and Li, 2015).

AECOM (2021) Square Kilometre Array Ecological Assessment.

AECOM (2023) Square Kilometre Array Ecological Assessment – November 2022.

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 TO THIS PRINCIPLE

The AECOM (2021 & 2023) vegetation condition assessment considered almost all of the Clearing Footprint (99.6%) and the Amendment Area (99.6%) to be in Very Good condition and the remaining areas in Completely Degraded condition according to the scale of Keighery (1994). Vegetation condition assessed as Completely Degraded was generally associated with existing cleared areas such as tracks and roads. AECOM (2021 & 2023) noted that historical pastoral activities have contributed to a reduction in vegetated biomass.

AECOM (2021 & 2023) noted evidence of erosion within the survey areas, which is likely to be associated with the combination of damage to surface cryptogamic crusts, where present, which removes the protection associated with these, and the loss of groves of *Acacia* spp., particularly mulga, which can result in a higher speed of surface flows, contributing to local erosion.

Noting the long, linear and narrow nature of the eastern spiral arm extension, the proposed clearing is unlikely to have an appreciable impact on land degradation. Clearing will be localised, with surrounding areas of vegetation remaining undisturbed. Additionally, de-stocking will see reduced grazing pressures on vegetation that will, over time, lead to an improvement in biomass cover within the Pastoral Lease. In turn, this will further reduce risks associated with land degradation.

Notwithstanding the above, the mapped soils within the Amendment Area are susceptible to wind or water erosion when exposed. Given rainfall is limited and evaporation rates are high, the risk from water erosion is restricted to high rainfall events. Wind erosion is relevant in areas where there is a lack of groundcover, loose surface soils and under dry, windy conditions. With the mitigation measures outlined below, it is considered that the proposed clearing is unlikely to be at variance with this principle. To mitigate the risk of wind and water erosion, the following measures will be implemented:

- Ensuring clearing does not take place more than three months prior to construction activities commencing.
- Limiting the extent of clearing to minimum area required.
- Reducing the impact of clearing by retaining vegetation where feasible.
- Prioritising the use of existing cleared areas for temporary activities.
- Ensuring construction minimises the channelling of overland flows to reduce risk of water erosion.
- Use extracted groundwater for dust suppression.

Methods:

Soil Landscape Mapping – System (DPIRD-027).

AECOM (2021) Square Kilometre Array Ecological Assessment.

AECOM (2023) Square Kilometre Array Ecological Assessment – November 2022.

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.

NOT AT VARIANCE TO THIS PRINCIPLE

The Amendment Area is more than 70 km north of Dalgarranga and Lakeside National Parks which are the nearest conservation areas (DBCA Legislated Lands and Waters, CAPAD).

The nearest registered offset area is approximately 25 km east of the Amendment Area and is associated with the Sinosteel Midwest Corporation Limited Weld Range Iron Ore Project.

There are no Ramsar wetlands near the amendment area. The nearest Directory of Important Wetlands of Australia is Wooleen Lake, which is located approximately 80 km west of the Amendment Area.

Given the distance to the nearest conservation areas, the proposed clearing will not have an impact on the environmental values of adjacent or nearby conservation areas.

Methods:

DBCA Legislated Lands and Waters (DBCA-011).

CAPAD (DCCEEW, 2022).

Offsets Register – Offsets (DWER-078).

Ramsar Sites (DBCA-010).

Directory of Important Wetlands of Australia – Western Australia (DBCA-045).

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.

NOT AT VARIANCE TO THIS PRINCIPLE

The proposed Clearing Footprint is almost entirely within the proclaimed East Murchison Groundwater Area, except for the northern most portion which is within the proclaimed Gascoyne Groundwater Area.

The proposed clearing does not intercept any permanent water courses, wetlands or Public Drinking Water Sources Areas. Groundwater will be abstracted for construction use, dust suppression and camp water supply. Taking into consideration the expected low abstraction volumes from a water resource that is not at high risk of depletion. The implementation of environmental management controls such as effective drainage to manage runoff, maintain natural surface water flows and hydrological connectivity will not cause deterioration in surface water quality.

Clearing within the Amendment Area will not cause deterioration in the quality of surface and/or underground water and is therefore not at variance to this principle.

Methods:

Proclaimed Groundwater Areas (DWER-034).

Hydrography, Linear (Hierarchy) (DWER-031).

Surface Hydrology Lines (National) (Crossman and Li, 2015).

j) Native vegetation should not be cleared if the clearing of vegetation is likely to cause, or exacerbate, the incidence of flooding.

NOT AT VARIANCE TO THIS PRINCIPLE

The Amendment Area is within a region in which there is a weakly bimodal rainfall pattern, with the bulk of the rainfall falling in winter. Rainfall variability is high, ranging from the lowest annual total of 22.1 mm in 1891 to the highest annual rainfall of 563 mm in 1975 (BoM, 2025). Flooding events typically occur in the region after high single rainfall events, where infiltration rates into soil are low. The landscape has evolved in response to this climatic variability.

The landscape within and surrounding Amendment Area is generally flat, dominated by flat plains with a series of anastomosing shallow drainage lines that feed into established minor and major creeks and rivers. The drainage lines are typically non-perennial systems.

Given the linear nature of the Amendment Area and that the spiral arm extension is low impact and will not involve constructing large impervious areas, the proposed clearing is unlikely to exacerbate the incidence or intensity of flooding.

Methods:

Soil Landscape Mapping – System (DPIRD-027).

Hydrography, Linear (Hierarchy) (DWER-031).

Surface Hydrology Lines (National) dataset (Crossman and Li, 2015).

Monthly Rainfall – Murgoo Weather Station (Bureau of Meteorology [BoM], 2025).

4 AVOIDANCE, MINIMISATION AND MITIGATION

The proposed clearing is required for the extension of the eastern spiral arm extension of the SKA. The project's location was selected due to its excellent radio-quiet environment and proximity to services and infrastructure.

The pre-construction design for the SKA has considered various factors, including avoiding geophysical, environmental and cultural constraints based on desktop analysis and consideration of the information available from heritage mapping survey and various environmental surveys.

The CSIRO has prepared and is implementing an Environmental Management Plan (EMP) detailing the mitigation and management measures for fauna and vegetation across the project area. Through this EMP the CSIRO has committed to the following management measures for the proposed development, which will also apply to the proposed extension:

- Vegetation clearing management:
 - demarcate approved clearing area using GPS coordinates and flagged star pickets.
 - demarcate any native vegetation within the site boundary that will be retained.
 - demarcate topsoil, weed and dieback management boundaries. Approved site boundary with flagging and temporary fencing during construction.
 - demarcate a 50-metre buffer around the location of any confirmed western spiny-tailed skink populations.
 - restrict access by personnel, vehicles and plant into vegetated areas adjacent to project boundary.
 - stockpile all cleared vegetation separately and mulch for use either on-site (for stabilisation) or for other rehabilitation projects.
 - ensure no new informal tracks arise and all vehicle and personnel movements are limited to the approved project boundary.
 - report all incidents relating to these Vegetation Clearing Management actions to CSIRO within 24 hours of incident.
- Vegetation monitoring:
 - inspect clearing area to ensure flagging is intact and no boundary breach has occurred.
 - inspect felled and cleared vegetation and identify those suitable for use in rehabilitation and revegetation works.
- Weed management:
 - conduct weed control if weeds are noted.
 - ensure all vehicles, equipment and plant are inspected prior to accessing the site.
 - ensure fill, if used, is uncontaminated, and free of weeds and disease.
 - control, with the aim to eradicate, any infestations of high to very high priority weeds.
 - locate topsoil and cleared vegetation stockpiles away from areas where runoff from rainfall may occur.

- Fauna mitigation for the Western Spiny-tailed Skink:
 - demarcating and temporarily fencing of skink populations and their known rocky habitat during construction and whenever possible apply a 50-metre buffer.
 - providing ramps at the ends of trenches open for more than 24 hours to enable fauna to escape before the heat of the day.
 - staff members and contractors working on the project participate in environmental management awareness and compliance sessions and are trained to identify the skink and their preferred habitat.
 - all sightings of the skink are to be reported by staff and contractors to the organisation they report to and then reported by that organisation to the Site Entity.
 - any injuries/deaths/disturbance to the skink will be reported including a detailed description of circumstances.
 - potential new sightings of the skink in previously unmarked locations in areas where construction or operational activities may disturb and displace the fauna will be inspected by a qualified zoologist. This will confirm whether realignment of the clearing footprint is required.
 - access to areas demarcated and being managed as skink habitat will require staff and contractors to obtain permission to access the areas prior to entry from the organisation they report to.
 - an annual internal report will summarise all incidents relating to the skink.
- Fauna monitoring for the Western Spiny-tailed Skink:
 - Pre-clearance surveys will be conducted prior to clearing or disturbing potential habitat for access tracks and antenna locations to confirm the presence or absence of the skink within demarcated clearing areas which contain potentially suitable habitat.

5 CONCLUSIONS

The proposed clearing of 44.33 ha is required for the extension of the eastern spiral arm of the SKA-Low project. Ecological values associated within the Clearing Footprint comprise species and vegetation that are common within the local and regional landscape.

The three Priority flora species recorded within the Clearing Footprint are known to have distributions over large geographic areas, with information on the extent and size of occurrences likely to be an artefact of sampling effort rather than reflecting a scattered and disjunct distribution. The predicted loss of individuals of these Priority taxa is not expected to result in changes to the conservation status for each species.

Four conservation significant fauna species, including three species which are listed as Threatened under the EPBC Act and BC Act, and one Priority 3 taxon were either directly observed during the survey, or secondary evidence of their presence recorded by AECOM (2021 & 2023). One of the species (Southern Whiteface) was not listed at the time of the surveys, and as such no information was provided in AECOM (2023) about where this species was recorded within the survey area. As a result it cannot be confirmed if this species was present in the Amendment Area. One conservation significant fauna species (Western Spiny-tailed Skink) was not recorded within the Amendment Area. Two conservation significant fauna species, or evidence of their presence, was recorded within the Amendment Area (Grey Falcon and *Idiosoma clypeatum*) but outside of the Clearing Footprint. Evidence of the Priority 3 listed Northern Shield-backed Trapdoor Spider, in the form of old burrows that had been pulled from the ground was recorded.

The proposed clearing was assessed against the Ten Clearing Principles and was considered to be:

- not at variance to Principles A to E, H, I and J;
- at variance with Principle F; and
- unlikely to be at variance with Principle G.

The proposed extent of clearing is considered relatively small within the context of remaining extent of vegetation (well in excess of 99% of pre-European extents remaining at Statewide, regional and local scales), and is within a narrow, linear corridor that has been designed to avoid areas of significant cultural and environmental values. Given the relatively small clearing footprint at a local and regional context, and the scale of ecological impacts, there are no residual significant impacts attached to the clearing.

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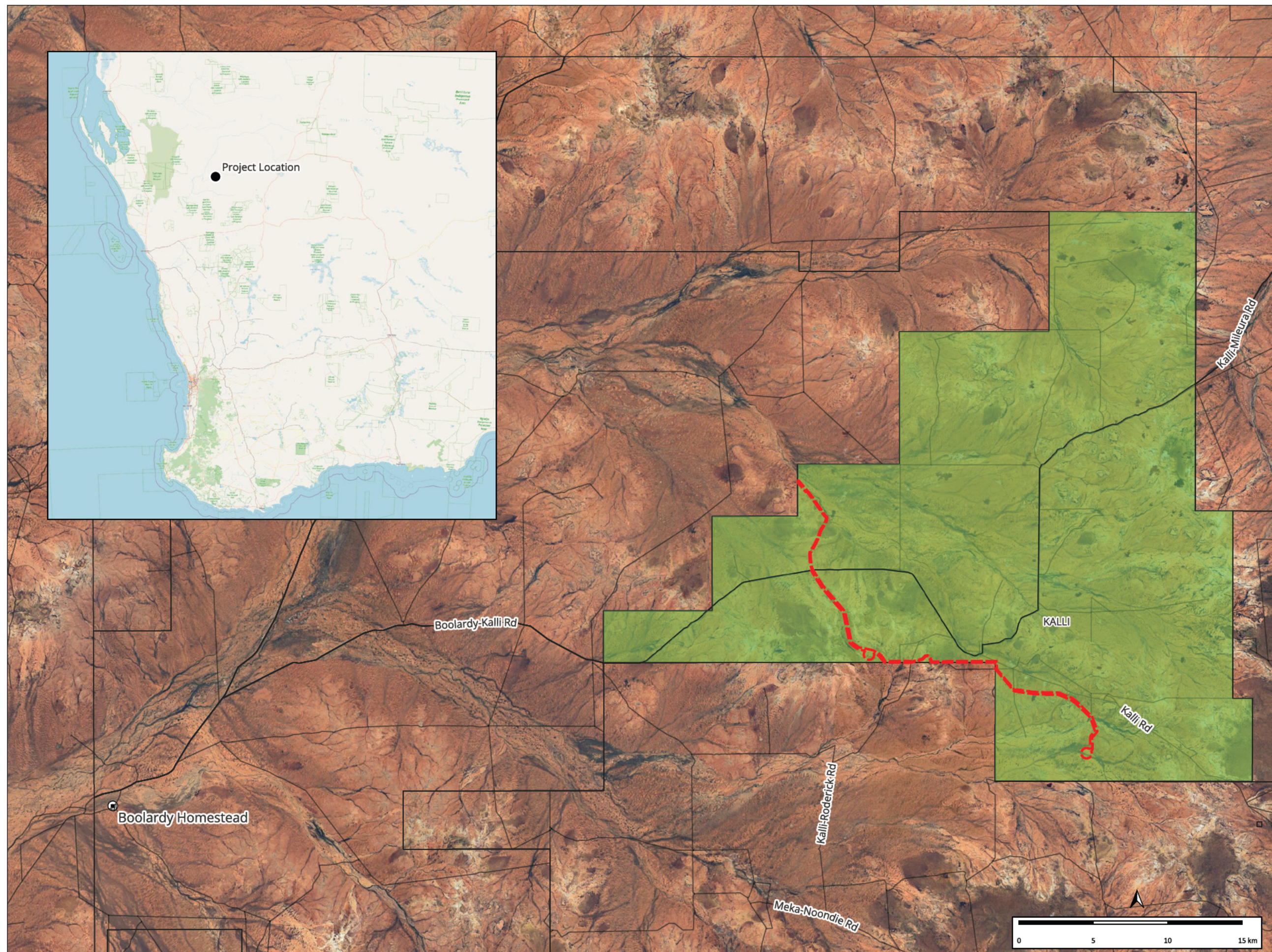
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FIGURES

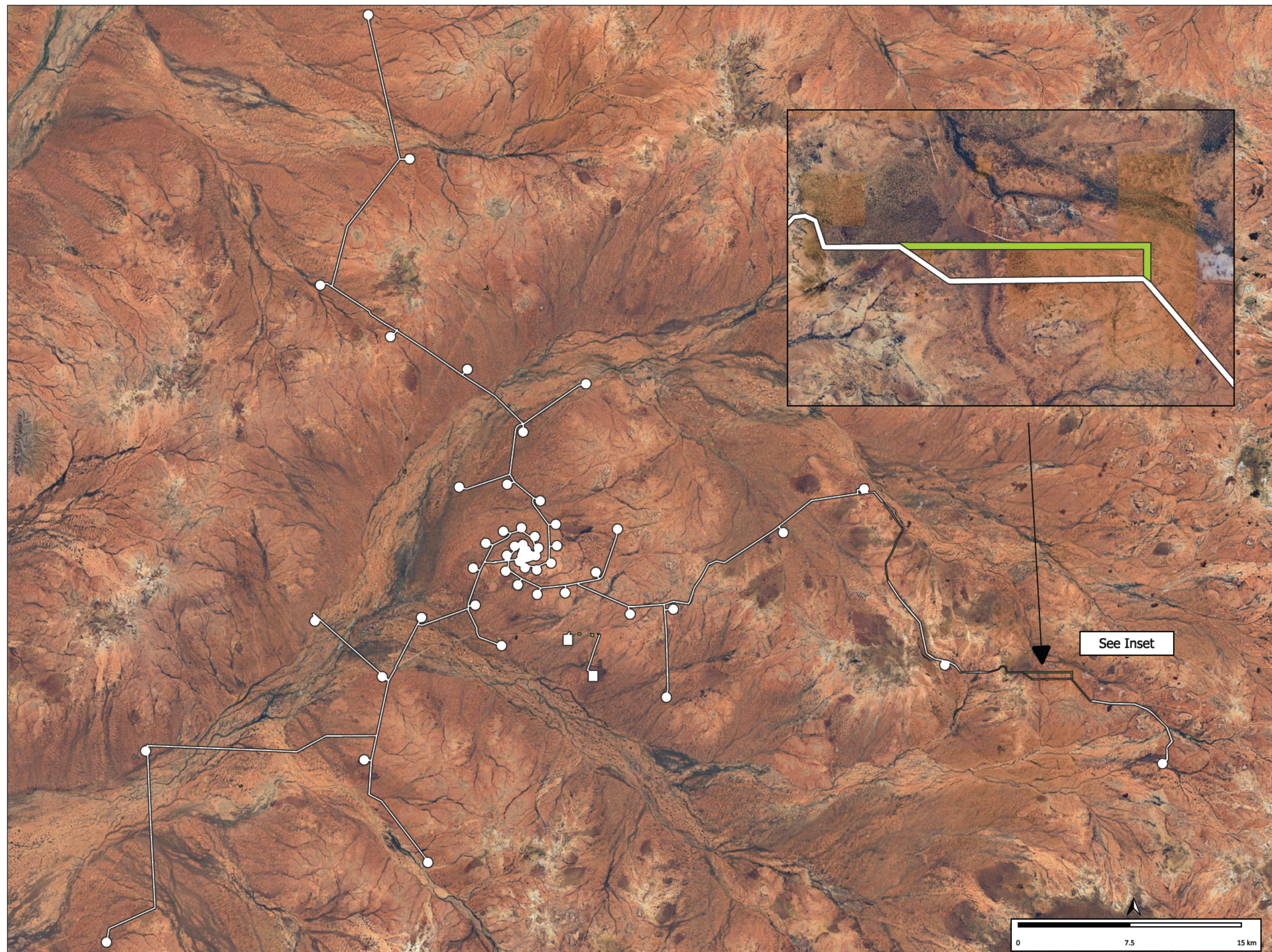


LEGEND

- Project Location
- ▬ Amendment Area
- Boolardy Homestead
- Kalli Pastoral Lease
- Cadastre
- Roads

FIGURE 1
Project Location

Project #: CLW-PP03935
 Author: PZ
 Date: 10/10/2025
 Ver: 01
 Doc. #: CLW-PP03935-NVCP-001_pz_V2
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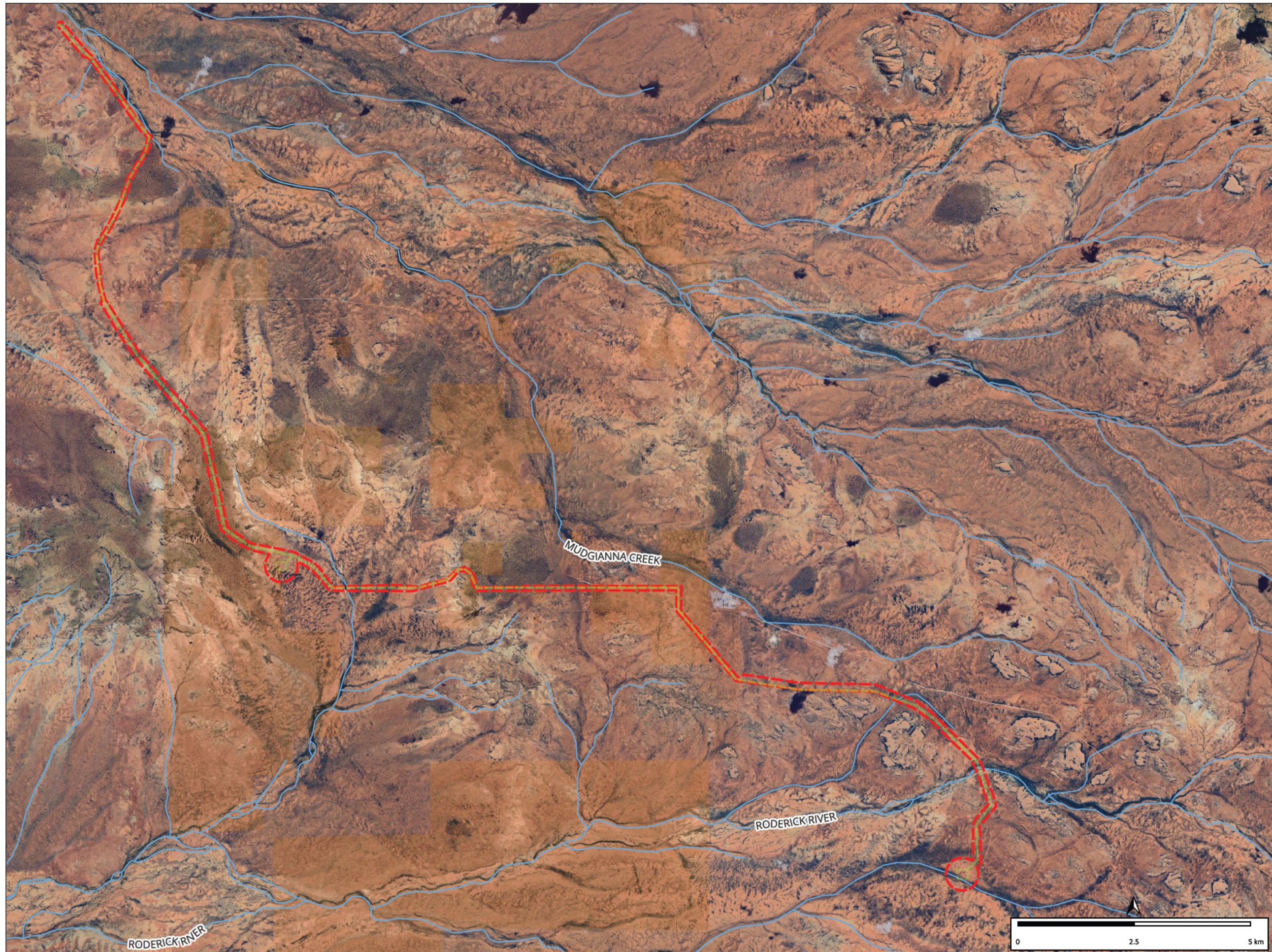


LEGEND

- 2014 & 2020 Survey - AECOM (2021)
- 2022 Survey - AECOM (2023)

FIGURE 2
Biological Surveys

Project #: CLW-PP03935
 Author: PZ
 Date: 10/10/2025
 Ver: 01
 Doc. #: CLW-PP03935-NVCP-001-pz
 Scale: 1:250000 @A3
 CRS: GDA2020 / MGA zone 50



LEGEND

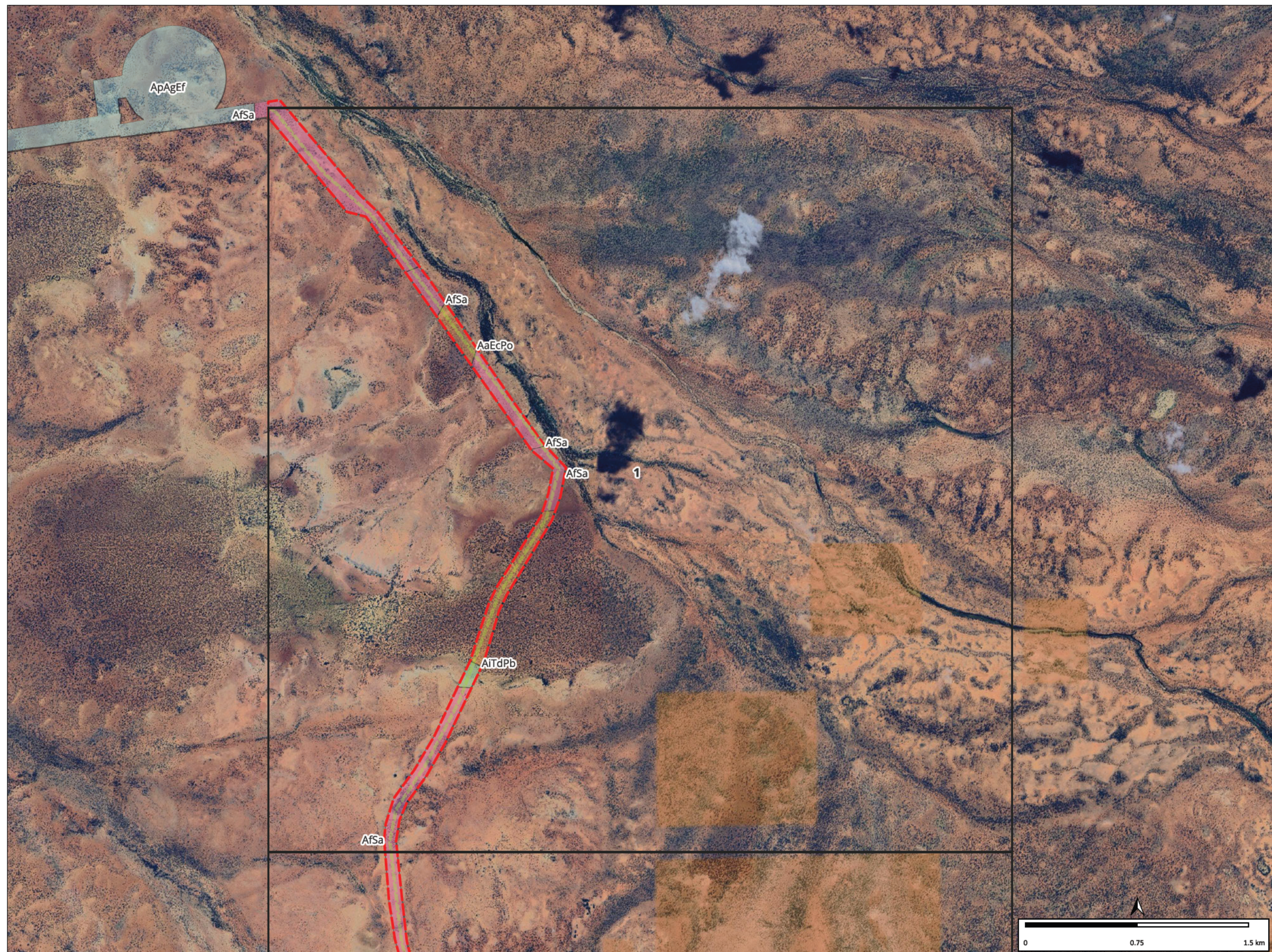
- ▬ Amendment Area
- ▬ Clearing Footprint

Hydrology

- National Hydro-Lines
- National Hydro-Polygons

FIGURE 3
Inland Waters

Project #: CLW-PP03935
 Author: PZ
 Date: 10/10/2025
 Ver: 01
 Doc. #: CLW-PP03935-NVCP-001-pz
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 CRS: GDA2020 / MGA zone 50



LEGEND

- ▬ Amendment Area
- ▬ Clearing Footprint
- Map Sheet

Vegetation Communities

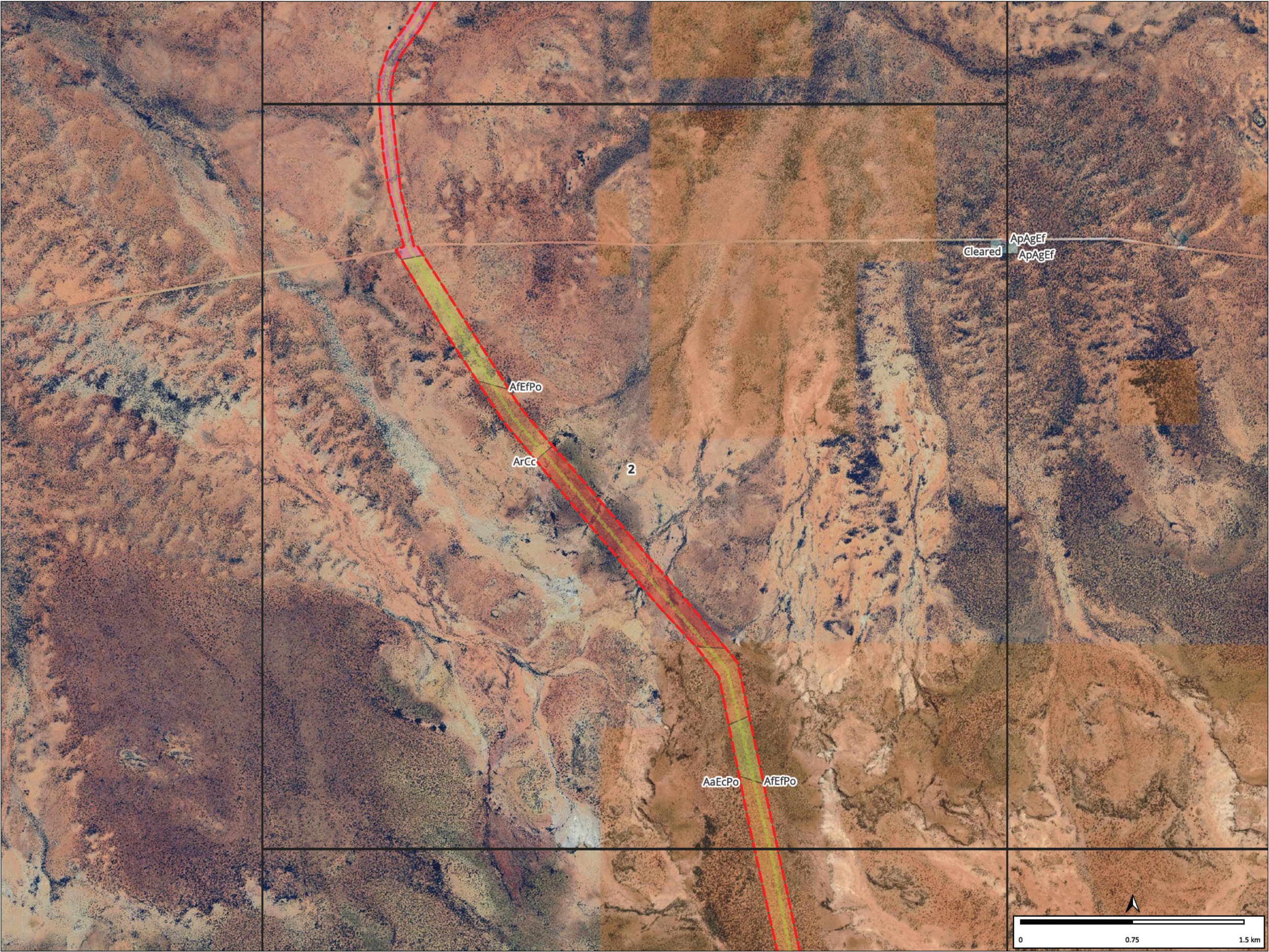
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- AfEfPo
- AfSa
- AiAbSa
- AiAtEf
- AiTdB
- ApAgEf
- ArCc
- AvEp
- MRO
- Cleared



FIGURE 4

Vegetation Types Map Sheet 1

Project #: CLW-PP03935
 Author: PZ
 Date: 10/10/2025
 Ver: 01
 Doc. #: CLW-PP03935-NVCP-001-pz
 Scale: 1:25000 @A3
 CRS: GDA2020 / MGA zone 50



LEGEND

- Amendment Area
- Clearing Footprint
- Map Sheet

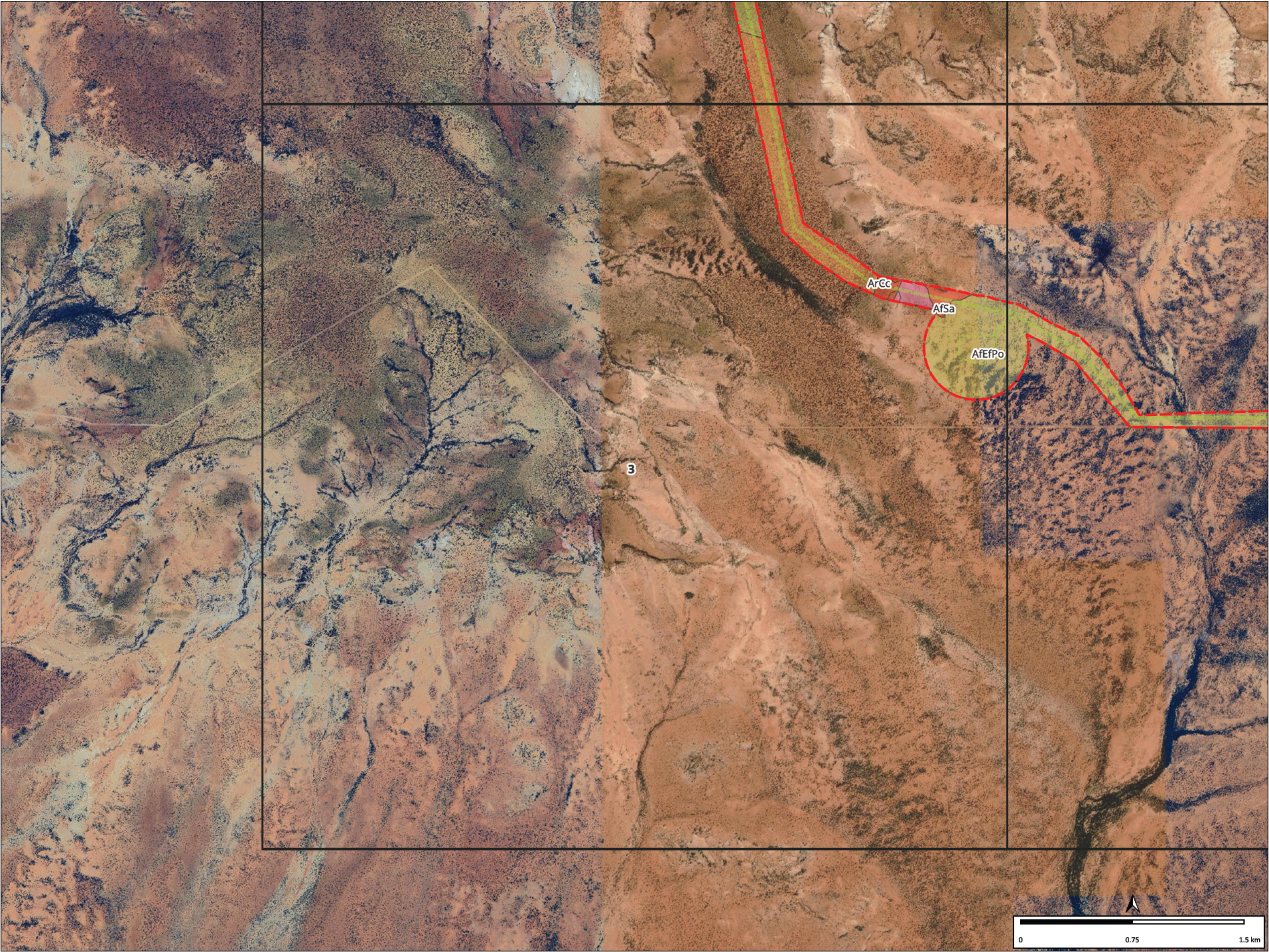
Vegetation Communities

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- AfEfPo
- AfSa
- AiAbSa
- AiAtEf
- AiTdPb
- ApAgEf
- ArCc
- AvEp
- MRO
- Cleared



FIGURE 4
Vegetation Types
Map Sheet 2

Project #: CLW-PP03935
Author: PZ
Date: 10/10/2025
Ver: 01
Doc. #: CLW-PP03935-NVCP-001-pz
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CRS: GDA2020 / MGA zone 50



LEGEND

- Amendment Area
- Clearing Footprint
- Map Sheet

Vegetation Communities

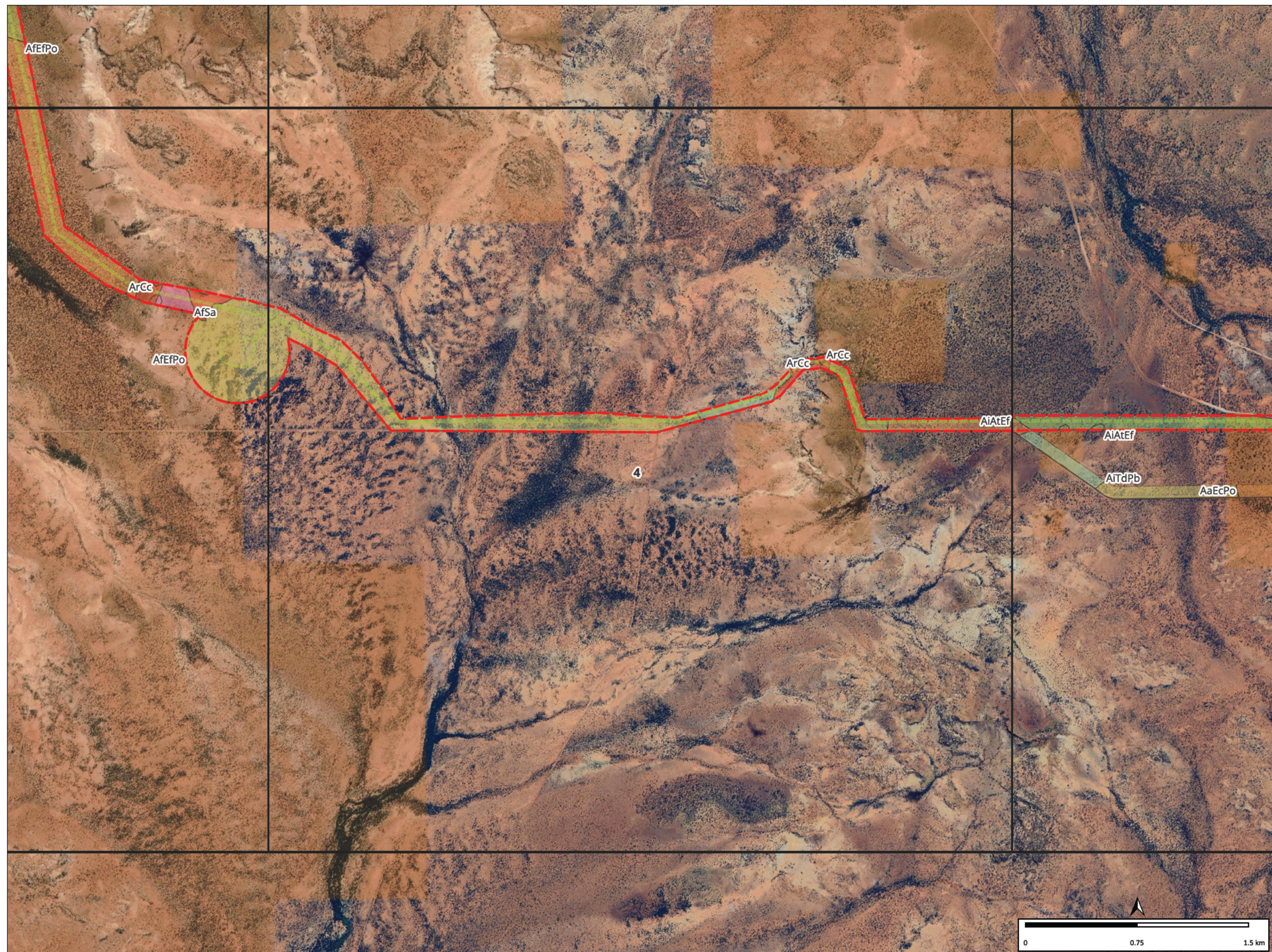
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- ApAgEf
- ArCc
- AvEp
- MRO
- Cleared



FIGURE 4

**Vegetation Types
Map Sheet 3**

Project #: CLW-PP03935
Author: PZ
Date: 10/10/2025
Ver: 01
Doc. #: CLW-PP03935-NVCP-001-pz
Scale: 1:25000 @A3
CRS: GDA2020 / MGA zone 50



LEGEND

- Amendment Area
- Clearing Footprint
- Map Sheet

Vegetation Communities

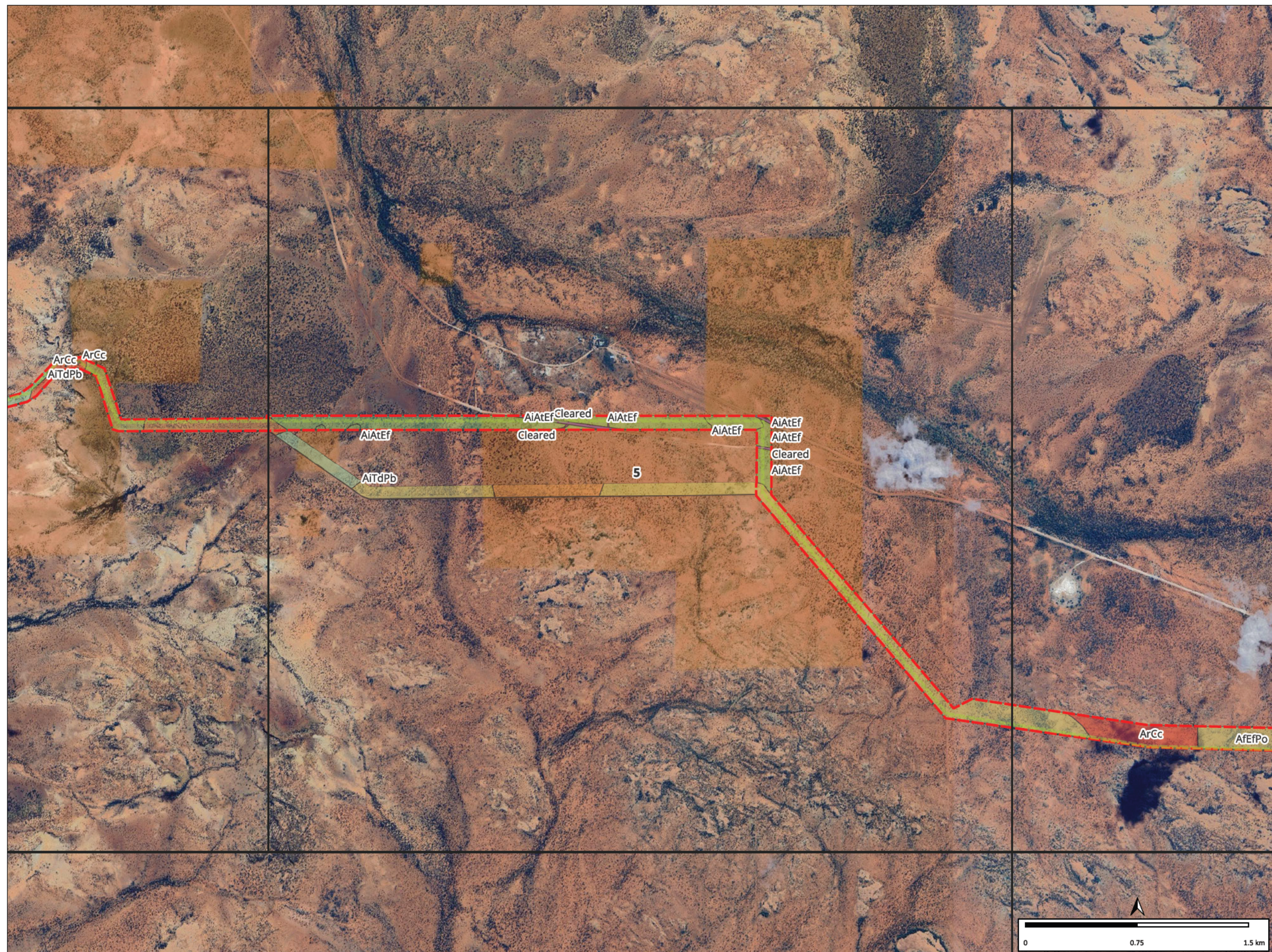
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- AfSa
- AiAbSa
- AiAtEf
- AiTdPb
- ApAgEf
- ArCc
- AvEp
- MRO
- Cleared



FIGURE 4

Vegetation Types Map Sheet 4

Project #: CLW-PP03935
 Author: PZ
 Date: 10/10/2025
 Ver: 01
 Doc. #: CLW-PP03935-NVCP-001-pz
 Scale: 1:25000 @A3
 CRS: GDA2020 / MGA zone 50



LEGEND

- ▬ Amendment Area
- ▬ Clearing Footprint
- Map Sheet

Vegetation Communities

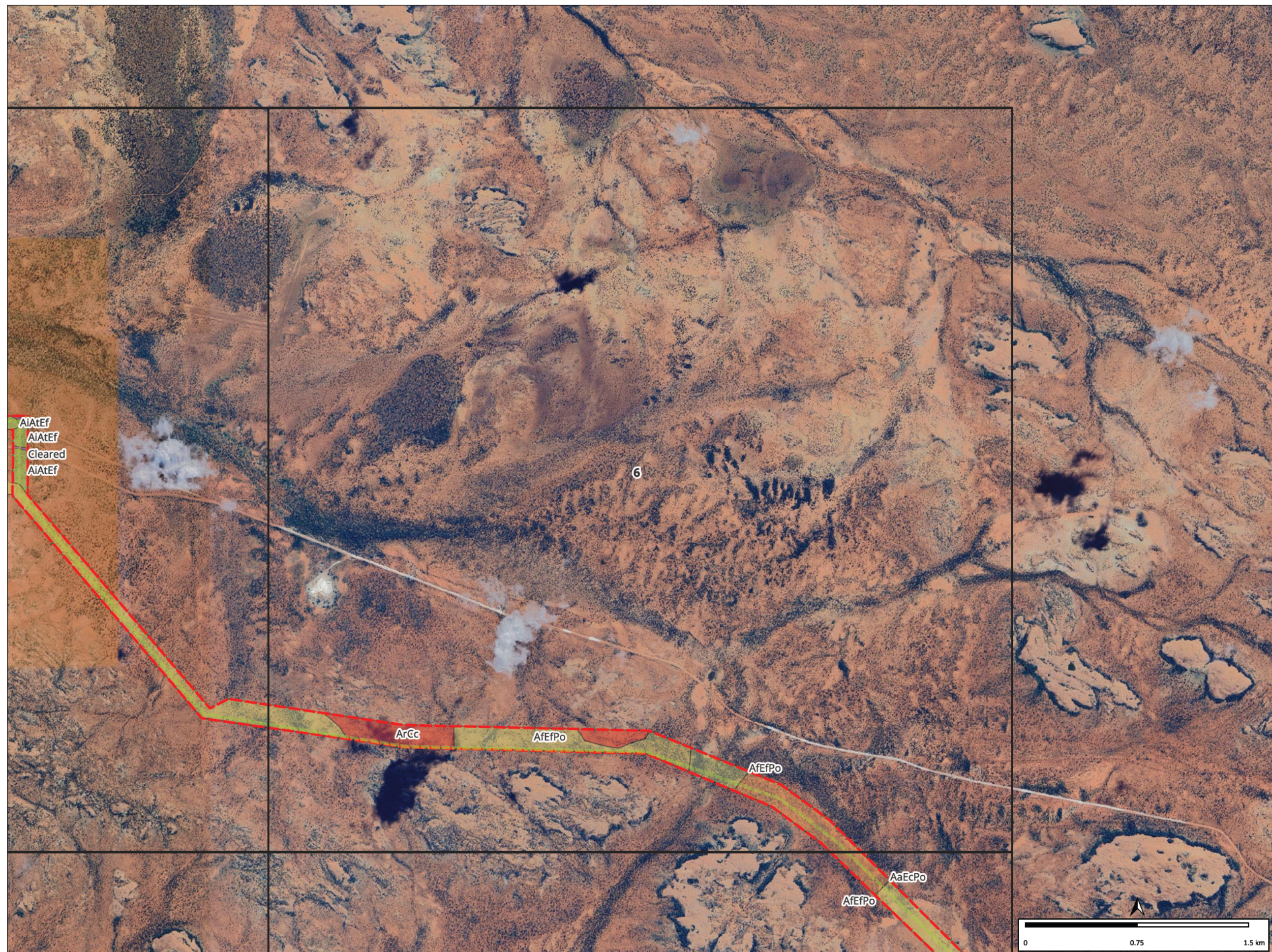
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- AfEfPo
- AfSa
- AiAbSa
- AiAtEf
- AiTdPb
- ApAgEf
- ArCc
- AvEp
- MRO
- Cleared



FIGURE 4

Vegetation Types Map Sheet 5

Project #: CLW-PP03935
 Author: PZ
 Date: 10/10/2025
 Ver: 01
 Doc. #: CLW-PP03935-NVCP-001-pz
 Scale: 1:25000 @A3
 CRS: GDA2020 / MGA zone 50



LEGEND

- ▬ Amendment Area
- ▬ Clearing Footprint
- Map Sheet

Vegetation Communities

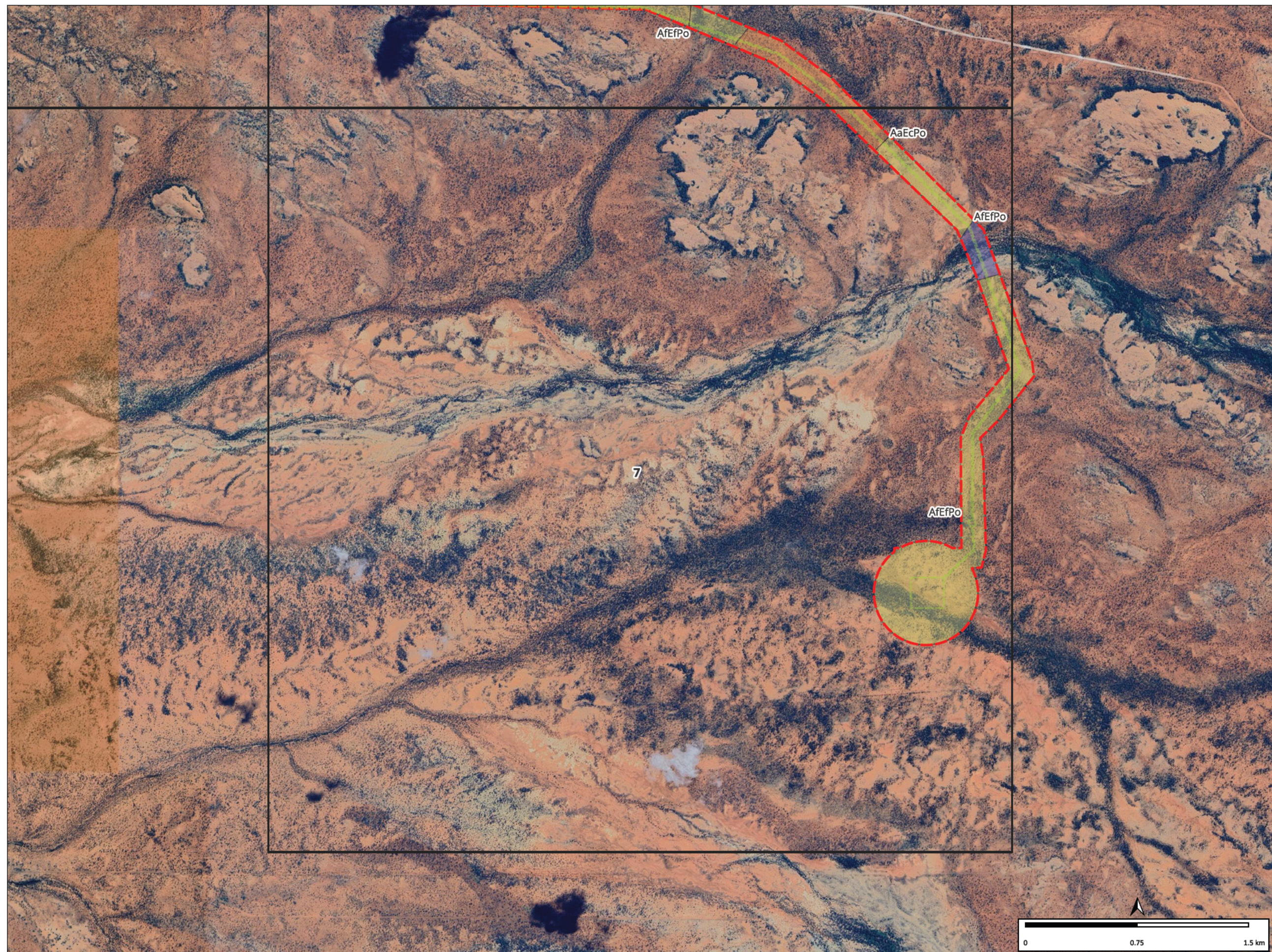
- AaEcPo
- AfEfPo
- AfSa
- AiAbSa
- AiAtEf
- AiTdPb
- ApAgEf
- ArCc
- AvEp
- MRO
- Cleared



FIGURE 4

Vegetation Types Map Sheet 6

Project #: CLW-PP03935
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 Date: 10/10/2025
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LEGEND

- ▬ Amendment Area
- ▬ Clearing Footprint
- Map Sheet

Vegetation Communities

- AaEcPo
- AfEfPo
- AfSa
- AiAbSa
- AiAtEf
- AiTdPb
- ApAgEf
- ArCc
- AvEp
- MRO
- Cleared

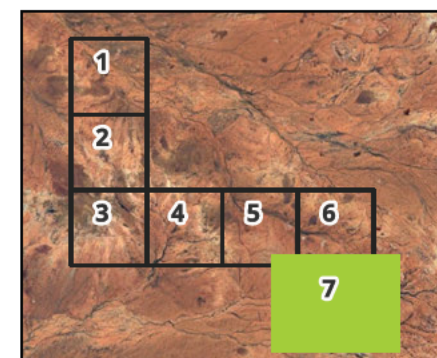
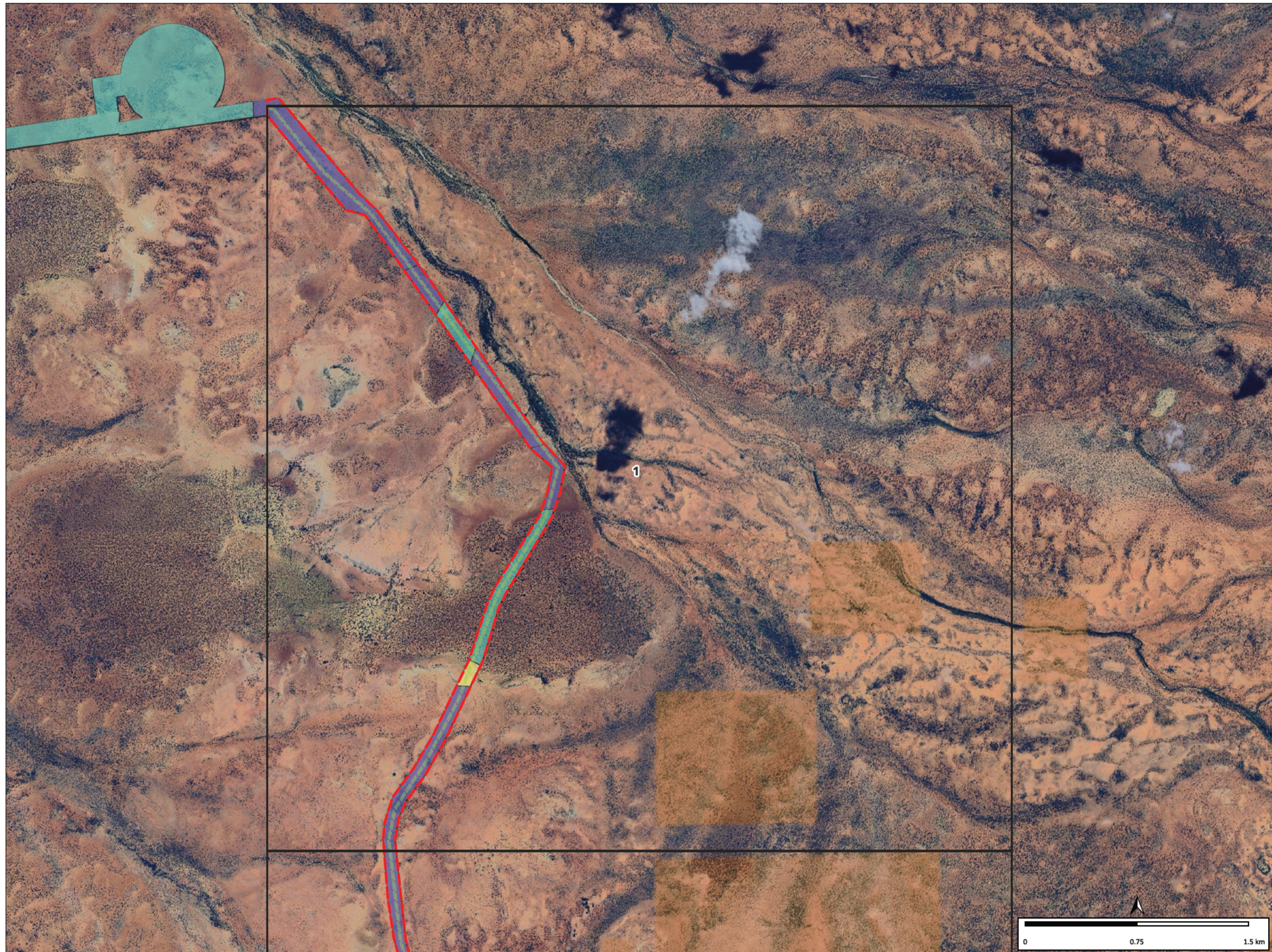


FIGURE 4

Vegetation Types Map Sheet 7

Project #: CLW-PP03935
 Author: PZ
 Date: 10/10/2025
 Ver: 01
 Doc. #: CLW-PP03935-NVCP-001-pz
 Scale: 1:25000 @A3
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LEGEND

- Amendment Area
- Clearing Footprint
- Map Sheet

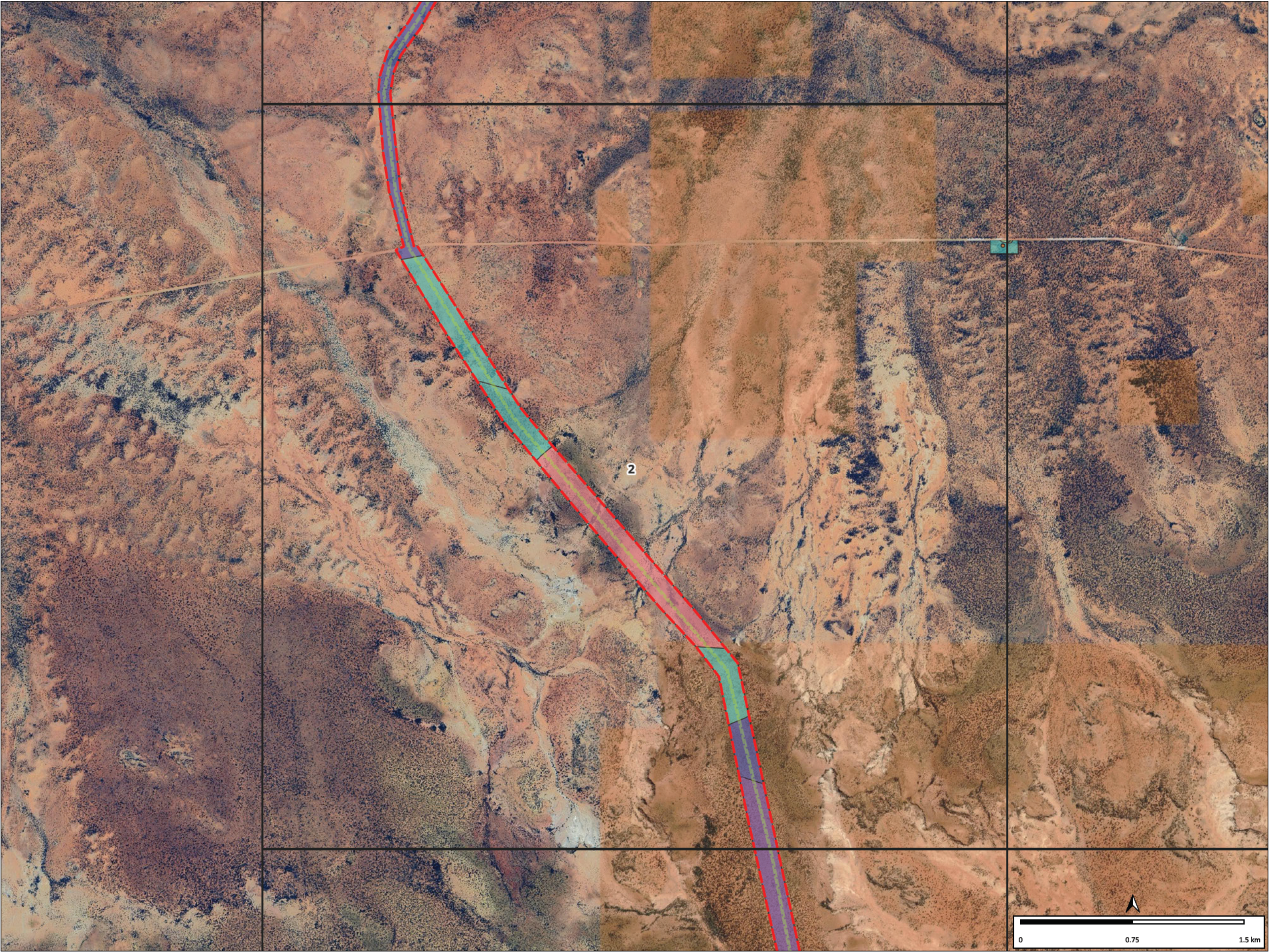
Fauna Habitat

- Sandplain
- Non saline stony or gritty surfaced plains
- Granite boulders and heaps
- Rocky breakaway and plateau edges
- Granite domes
- Hardpan plain with intermittent sandplain
- Saline lower footslopes below breakaways
- Channels and creek line
- MRO
- Cleared



FIGURE 5
Fauna Habitat
Map Sheet 1

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LEGEND

- Amendment Area
- Clearing Footprint
- Map Sheet

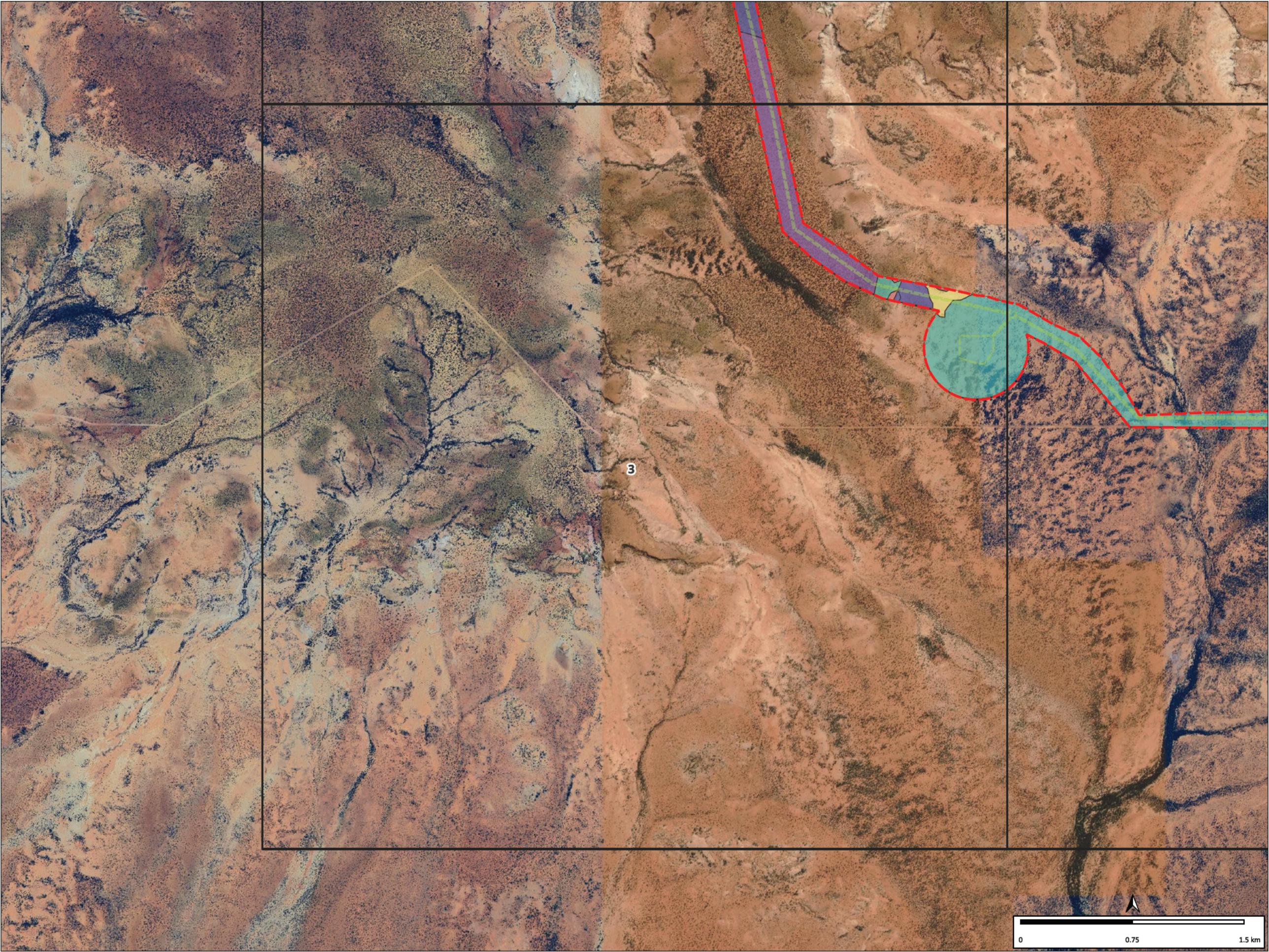
Fauna Habitat

- Sandplain
- Non saline stony or gritty surfaced plains
- Granite boulders and heaps
- Rocky breakaway and plateau edges
- Granite domes
- Hardpan plain with intermittent sandplain
- Saline lower footslopes below breakaways
- Channels and creek line
- MRO
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FIGURE 5
Fauna Habitat
Map Sheet 2

Project #: CLW-PP03935
Author: PZ
Date: 10/10/2025
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Scale: 1:25000 @A3
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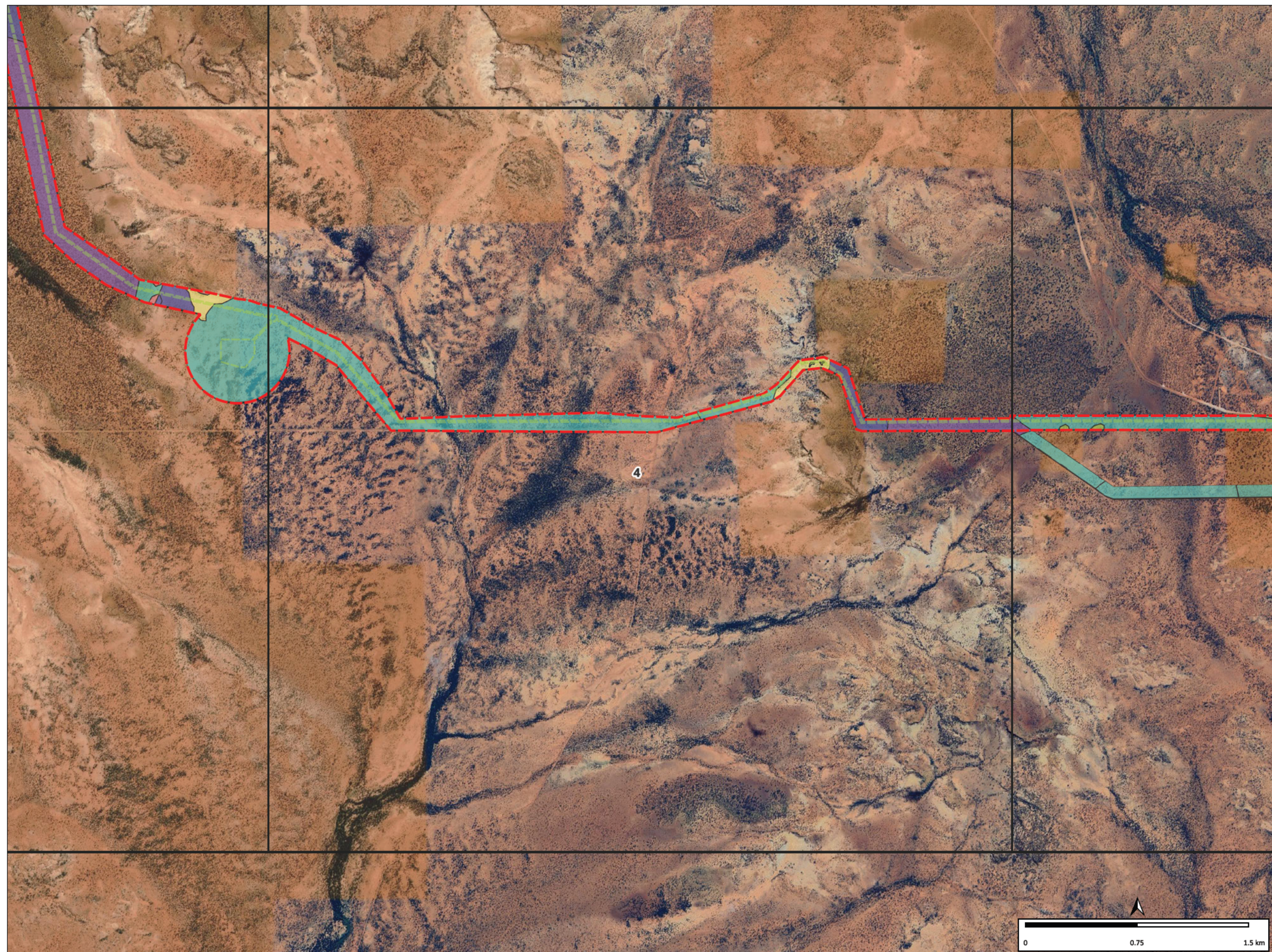
LEGEND

- Amendment Area
 - Clearing Footprint
 - Map Sheet
- Fauna Habitat**
- Sandplain
 - Non saline stony or gritty surfaced plains
 - Granite boulders and heaps
 - Rocky breakaway and plateau edges
 - Granite domes
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 - Saline lower footslopes below breakaways
 - Channels and creek line
 - MRO
 - Cleared



FIGURE 5
Fauna Habitat
Map Sheet 3

Project #: CLW-PP03935
Author: PZ
Date: 10/10/2025
Ver: 01
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Scale: 1:25000 @A3
CRS: GDA2020 / MGA zone 50



LEGEND

- ▬ Amendment Area
- ▬ Clearing Footprint
- Map Sheet

Fauna Habitat

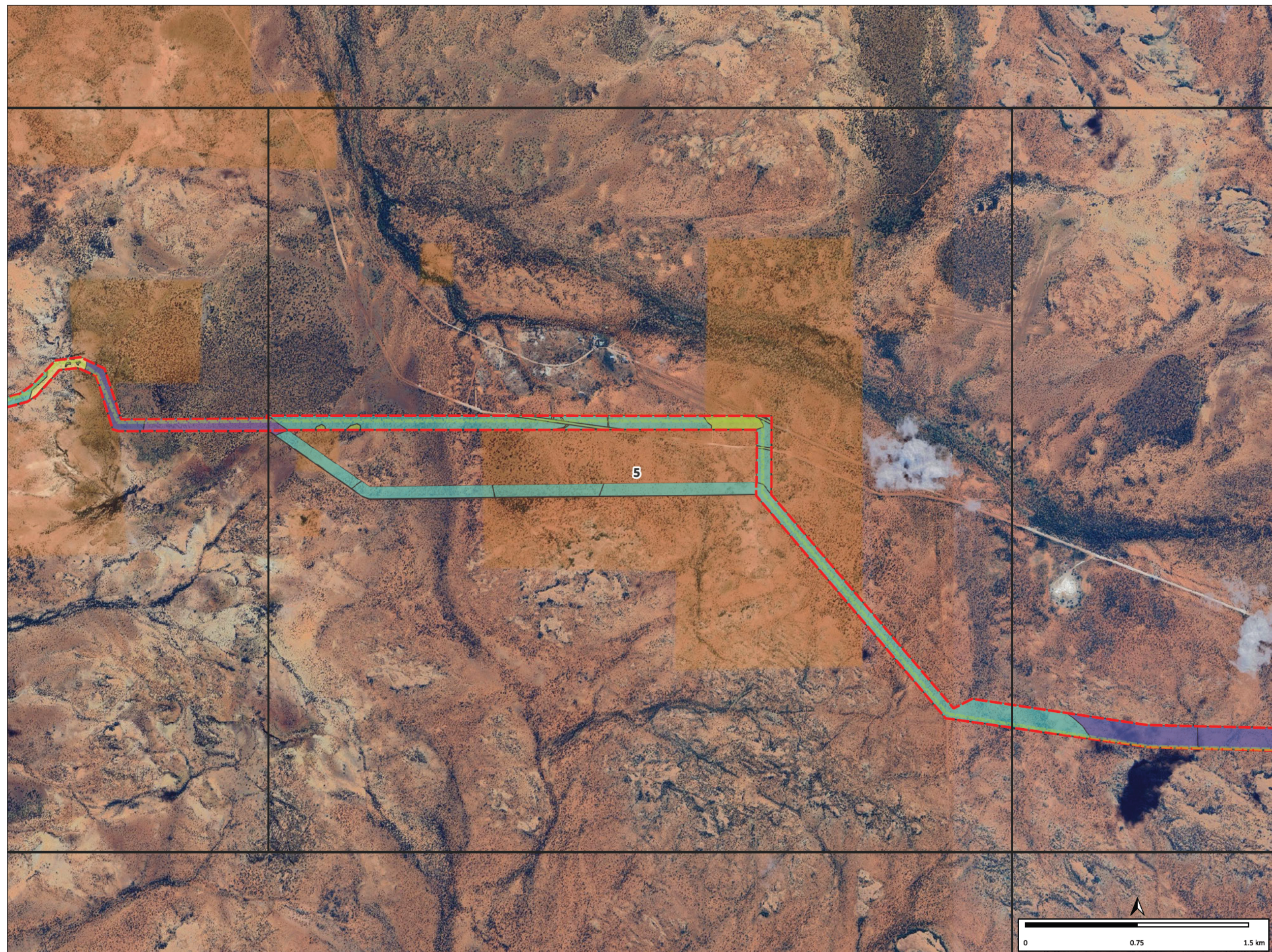
- ▬ Sandplain
- ▬ Non saline stony or gritty surfaced plains
- ▬ Granite boulders and heaps
- ▬ Rocky breakaway and plateau edges
- ▬ Granite domes
- ▬ Hardpan plain with intermittent sandplain
- ▬ Saline lower footslopes below breakaways
- ▬ Channels and creek line
- ▬ MRO
- ▬ Cleared



FIGURE 5

Fauna Habitat Map Sheet 4

Project #: CLW-PP03935
 Author: PZ
 Date: 10/10/2025
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 Scale: 1:25000 @A3
 CRS: GDA2020 / MGA zone 50



LEGEND

- ▬ Amendment Area
- ▬ Clearing Footprint
- Map Sheet

Fauna Habitat

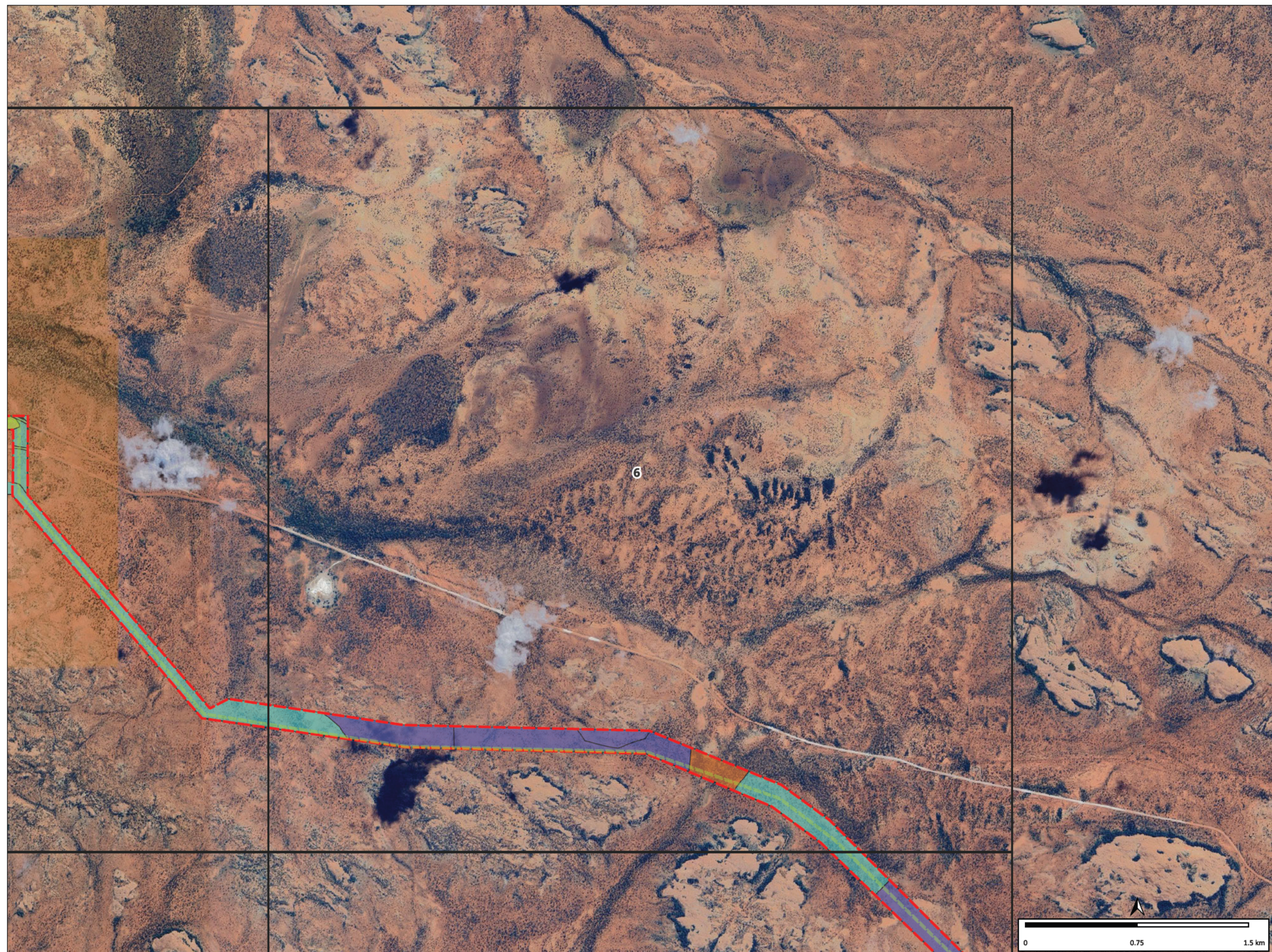
- ▬ Sandplain
- ▬ Non saline stony or gritty surfaced plains
- ▬ Granite boulders and heaps
- ▬ Rocky breakaway and plateau edges
- ▬ Granite domes
- ▬ Hardpan plain with intermittent sandplain
- ▬ Saline lower footslopes below breakaways
- ▬ Channels and creek line
- ▬ MRO
- ▬ Cleared



FIGURE 5

Fauna Habitat Map Sheet 5

Project #: CLW-PP03935
 Author: PZ
 Date: 10/10/2025
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 Scale: 1:25000 @A3
 CRS: GDA2020 / MGA zone 50



LEGEND

- ▬ Amendment Area
- ▬ Clearing Footprint
- Map Sheet

Fauna Habitat

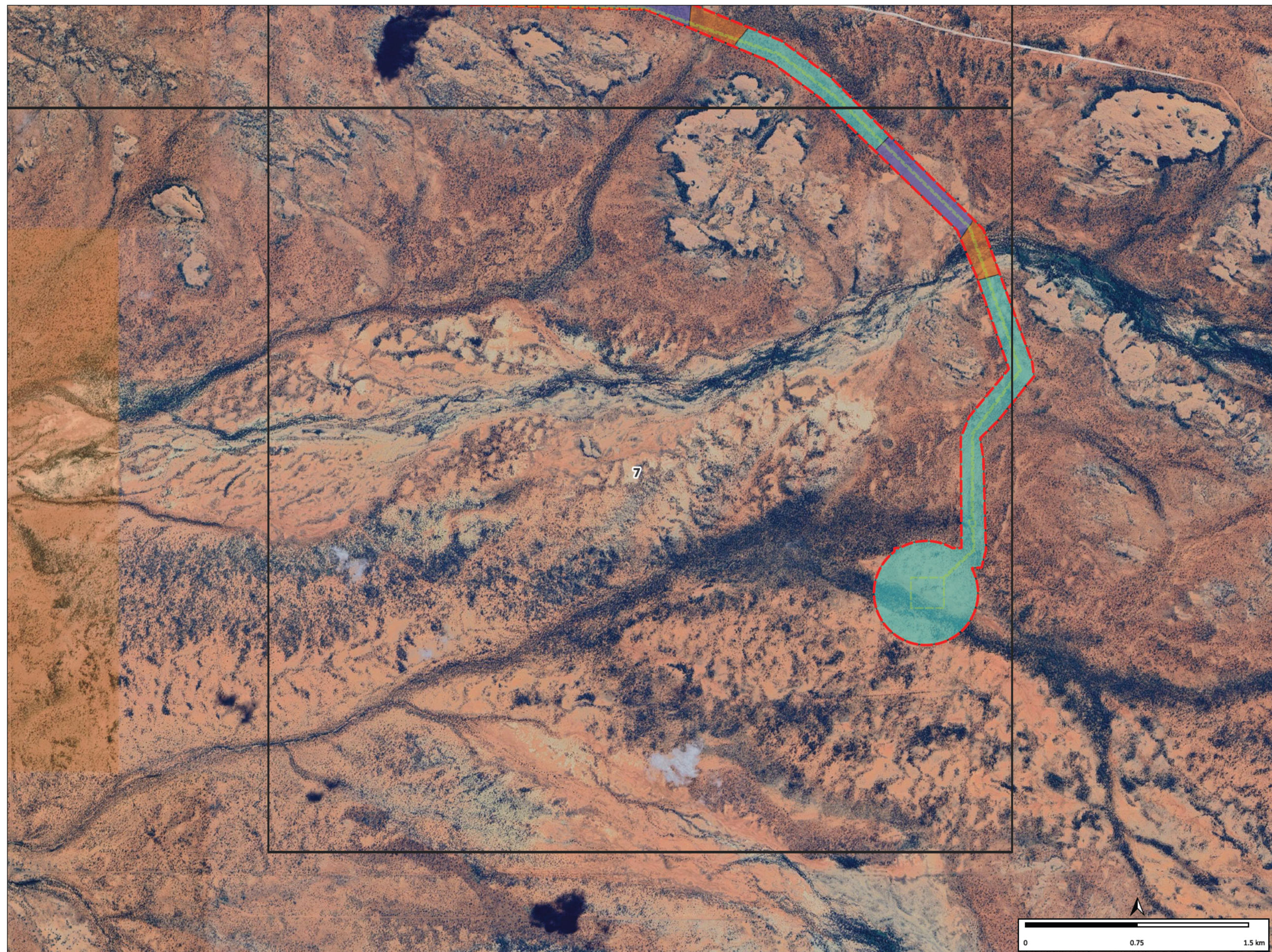
- ▬ Sandplain
- ▬ Non saline stony or gritty surfaced plains
- ▬ Granite boulders and heaps
- ▬ Rocky breakaway and plateau edges
- ▬ Granite domes
- ▬ Hardpan plain with intermittent sandplain
- ▬ Saline lower footslopes below breakaways
- ▬ Channels and creek line
- ▬ MRO
- ▬ Cleared



FIGURE 5

Fauna Habitat Map Sheet 6

Project #: CLW-PP03935
 Author: PZ
 Date: 10/10/2025
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LEGEND

- ▬ Amendment Area
- ▬ Clearing Footprint
- Map Sheet

Fauna Habitat

- ▬ Sandplain
- ▬ Non saline stony or gritty surfaced plains
- ▬ Granite boulders and heaps
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- ▬ Hardpan plain with intermittent sandplain
- ▬ Saline lower footslopes below breakaways
- ▬ Channels and creek line
- ▬ MRO
- ▬ Cleared

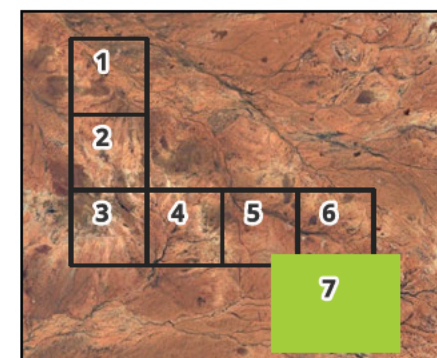


FIGURE 5
Fauna Habitat
Map Sheet 7

Project #: CLW-PP03935
Author: PZ
Date: 10/10/2025
Ver: 01
Doc. #: CLW-PP03935-NVCP-001-pz
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