

**FLORA AND VEGETATION IMPACT
ASSESSMENT**

MEDCALF PROJECT

Prepared For

Audalia Resources Limited

November 2020

Version 2

**Prepared by:
Botanica Consulting
PO Box 2027
Boulder WA 6432**

Disclaimer

This document and its contents are to be treated as confidential and are published in accordance with and subject to an agreement between Botanica Consulting (BC) and the client for whom it has been prepared and is restricted to those issues that have been raised by the client in its engagement of BC. Neither this document nor its contents may be referred to or quoted in any manner (report or other document) nor reproduced in part or whole by electronic, mechanical or chemical means, including photocopying, recording or any information storage system, without the express written approval of the client and/or BC.

This document and its contents have been prepared utilising the standard of care and skill ordinarily exercised by Environmental Scientists in the preparation of such documents. All material presented in this document is published in good faith and is believed to be accurate at the time of writing. Any person or organization who relies on or uses the document and its contents for purposes or reasons other than those agreed by BC and the client without primarily obtaining the prior written consent of BC, does so entirely at their own risk. BC denies all liability in tort, contract or otherwise for any loss, damage or injury of any kind whatsoever (whether in negligence or otherwise) that may be endured as a consequence of relying on this document and its contents for any purpose other than that agreed with the client.

Quality Assurance

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

Prepared by: Lauren Pick
Senior Environmental Consultant
Botanica Consulting

Reviewed by: Andrea Williams
Director
Botanica Consulting

Approved by: Jim Williams
Director
Botanica Consulting

Contents

1	Introduction and Project Overview	1
2	Objectives.....	4
2.1	Impact Assessment Methods	4
2.1.1	Impact Definitions	4
2.1.2	Significant Flora population estimates.....	4
3	Flora and Vegetation Medcalf Project	5
4	Conservation Areas	13
5	Significant Flora and Vegetation	15
5.1	Significant Flora.....	15
5.1.1	Threatened Flora.....	15
5.1.2	Priority Flora	18
5.2	Significant Vegetation.....	27
6	Direct Impacts.....	33
6.1	Conservation Areas	33
6.2	Vegetation	33
6.3	Significant Flora.....	38
7	Cumulative Direct Impacts	43
8	Bibliography.....	46

Appendices

Appendix 1: <i>E. rhomboidea</i> / <i>S. bremerense</i> Critical Habitat Memo.....	48
--	----

Tables

Table 1-1: Medcalf Project Indicative Disturbance Footprint	1
Table 3-1: Flora/ Vegetation Surveys.....	5
Table 3-2: Floristic Communities within the development envelopes and indicative disturbance footprint	6
Table 5-1: Threatened Flora recorded within the local area	16
Table 5-2: Priority Flora recorded within the local area	19
Table 5-3: Significant vegetation recorded within the local area.....	28
Table 6-1: Area of Direct Impact to Conservation Areas	33
Table 6-2: Area of Direct Impact to Vegetation-Local and Regional Scale.....	35
Table 6-3: Area of Direct Impact to Pre-European Vegetation Associations	36
Table 6-4: Area of Direct Impact to Significant Vegetation	37
Table 6-5: Direct Impacts to <i>Marianthus aquilonaris</i> habitat.....	38
Table 6-6: Direct Impacts to Significant Flora	39
Table 6-7: Direct Impacts to <i>Eucalyptus rhomboidea</i> and <i>Stenanthemum bremerense</i> population area	39
Table 6-8: Direct Impacts to <i>Eucalyptus rhomboidea</i> and <i>Stenanthemum bremerense</i> habitat	39
Table 7-1: Direct Cumulative Impacts to Bremer Range PEC.....	43
Table 7-2: Direct Cumulative Impact on Pre-European Vegetation Associations.....	44
Table 7-3: Direct Cumulative Impacts to Significant Flora	45

Figures

Figure 1-1: Medcalf Project Indicative Disturbance Footprint and Development Envelopes	2
Figure 1-2: Medcalf Project Site Plan.....	3
Figure 3-1: Indicative Disturbance Footprint/ Development Envelopes and Floristic Communities	12
Figure 4-1: Regional map of the conservation areas in relation to the Indicative Disturbance Footprint/ Development Envelopes	14
Figure 5-1: Threatened Flora in relation to the Indicative Disturbance Footprint/ Development Envelopes	17
Figure 5-2: Priority Flora in relation to the Indicative Disturbance Footprint/ Development Envelopes.....	26
Figure 5-3: Significant vegetation in relation to the Indicative Disturbance Footprint/ Development Envelope	32
Figure 6-1: Location Map of <i>Marianthus aquilonaris</i> populations and habitat in relation to the development envelopes/ indicative disturbance footprint	40
Figure 6-2: Location Map of <i>Eucalyptus rhomboidea</i> populations and habitat in relation to the development envelopes/ indicative disturbance footprint	41
Figure 6-3: Location Map of <i>Stenanthemum bremerense</i> populations and habitat in relation to the development envelopes/ indicative disturbance footprint	42

Glossary

Acronym	Description
ANCA	Australian Nature Conservation Agency.
Audalia	Audalia Resources Limited.
BAM Act	<i>Biosecurity and Agriculture Management Act 2007</i> , WA Government.
Botanica	Botanica Consulting.
BC Act	<i>Biodiversity Conservation Act (2016)</i> . WA Government.
BoM	Bureau of Meteorology.
DAFWA	Department of Agriculture and Food (now DPIRD), WA Government.
DAWE	Department of Agriculture, Water and the Environment (formerly DotEE), Australian Government.
DBCA	Department of Biodiversity, Conservation and Attractions (formerly DPaW), WA Government.
DER	Department of Environment Regulation (now DWER), WA Government.
DMIRS	Department of Mines, Industry Regulation and Safety (formerly DMP), WA Government
DMP	Department of Mines and Petroleum (now DMIRS), WA Government.
DotEE	Department of the Environment and Energy (now DAWE), Australian Government.
DoW	Department of Water (now DWER), WA Government.
DPaW	Department of Parks and Wildlife (now DBCA), WA Government.
DPIRD	Department of Primary Industries and Regional Development, WA Government
DWER	Department of Water and Environmental Regulation (formerly EPA, DER and DoW), WA Government
EP Act	<i>Environmental Protection Act 1986</i> , WA Government.
EP Regulations	Environmental Protection (Clearing of Native Vegetation) Regulations 2004, WA Government.
EPA	Environmental Protection Authority (now DWER), WA Government.
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999, Australian Government.
ESA	Environmentally Sensitive Area.
GDE	Groundwater Dependent Ecosystem.
Ha	Hectare (10,000 square metres).
IBRA	Interim Biogeographic Regionalisation for Australia.
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union.
Km	Kilometre (1,000 metres).
Medcalf	Medcalf Project.
MNES	Matters of National Environmental Significance (as listed under the EPBC Act).
MVG	Major Vegetation Groups.
NVIS	National Vegetation Information System.
OEPA	Office of the Environmental Protection Authority, WA Government.
PEC	Priority Ecological Community.
TEC	Threatened Ecological Community.
WA	Western Australia.
WAHERB	Western Australian Herbarium.
WC Act	<i>Wildlife Conservation Act 1950</i> , WA Government.

1 Introduction and Project Overview

Audalia Resources Limited (Audalia) propose to develop a vanadium, titanium and iron mining operation, approximately 100 km west of Norseman, WA. The proposal includes the development of three open mine pits, beneficiation plant, tailings storage facility, waste rock landform, private haul road, road train transfer area and associated infrastructure such as laydown areas, borrow and gravel pits, groundwater bores, workshops and accommodation camp. The Project comprises two development envelopes:

1. Mine and associated infrastructure-clearing of no more than 300 ha within the 898 ha development envelope; and
2. Haul Road and associated infrastructure-clearing of no more than 350 ha within the 1,630 ha development envelope.

Details on the proposed indicative disturbance footprint of each development envelope are provided in Table 1-1. Maps of the indicative disturbance footprint and development envelopes are provided in Figure 1-1 and Figure 1-2.

Table 1-1: Medcalf Project Indicative Disturbance Footprint

Development Envelope	Feature	Area (ha)
Mine and associated infrastructure Development Envelope	Mine Pits	42
	Tailings Storage Facility	65
	Evaporation Pond	75
	Supporting Infrastructure	118
Total-Mine Disturbance Footprint		300
Haul road and associated infrastructure Development Envelope	Haul Road (including transfer yard, borrow pits and spoon drains)	350
Total-Haul Road Disturbance Footprint		350
Total-Medcalf Project		650

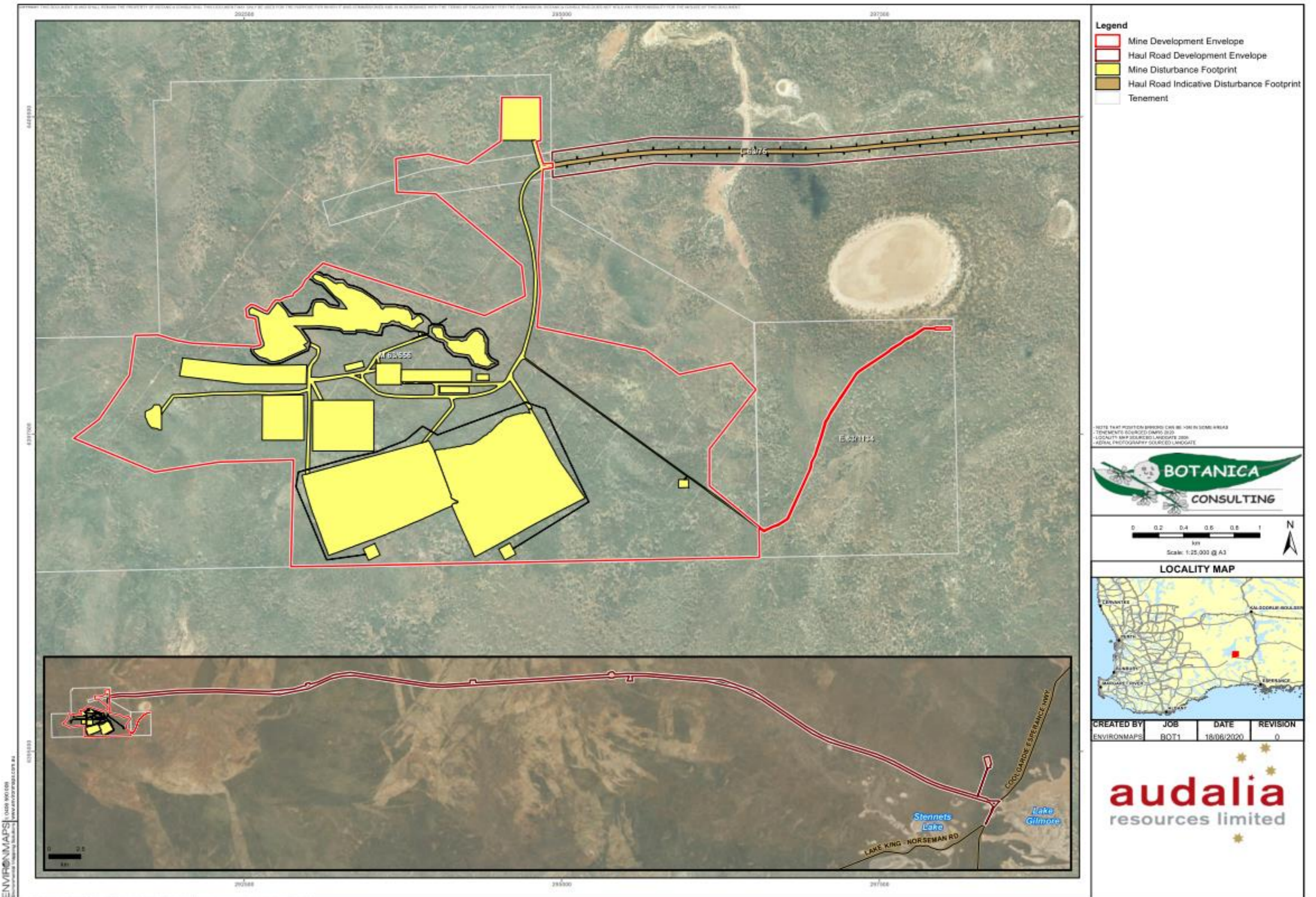


Figure 1-1: Medcalf Project Indicative Disturbance Footprint and Development Envelopes

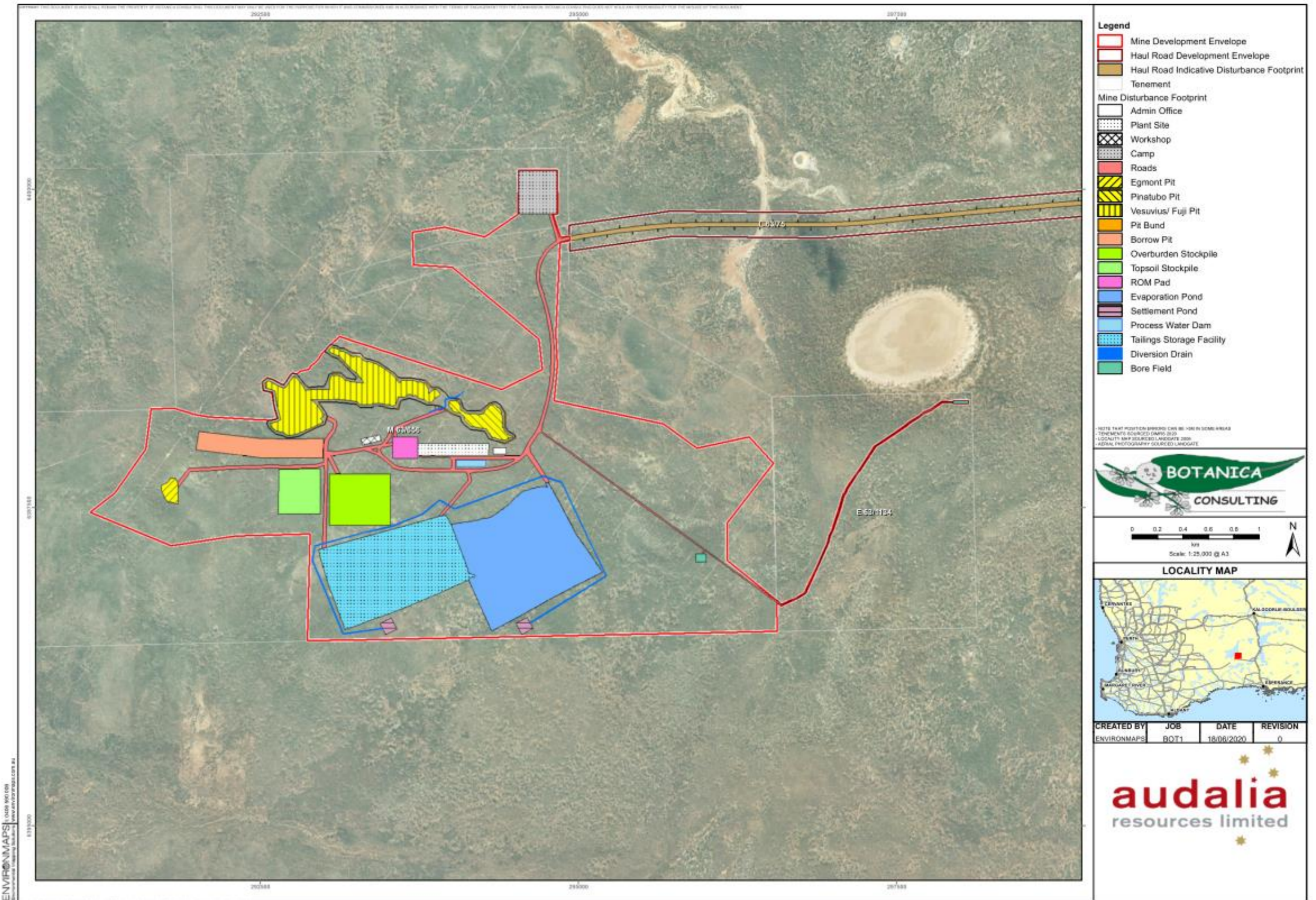


Figure 1-2: Medcalf Project Site Plan

2 Objectives

The objectives of the flora and vegetation impact assessment were to:

- Describe the existing flora and vegetation within the indicative disturbance footprint/ development envelopes.
- Provide comprehensive mapping of vegetation types and significant flora in relation to the proposed indicative disturbance footprint/ development envelopes including maps depicting vegetation boundaries overlying aerial photography.
- Assess the potential direct impacts associated with the proposal on the flora and vegetation within the indicative disturbance footprint/ development envelopes using a quantitative assessment that addresses numbers and proportions of individuals, populations and associations in the local and regional context; especially significant vegetation and flora.
- Assess the cumulative direct impacts on vegetation and significant flora from existing mining operations within the Bremer Range Priority Ecological Community and the proposed Medcalf Project.

2.1 Impact Assessment Methods

2.1.1 Impact Definitions

In this assessment, direct impacts are defined as areas to be cleared within the indicative 'disturbance footprint' (Figure 1-1 and Figure 1-2) and include:

- Mine developments including three open pits, processing infrastructure and miscellaneous mine features
- Haul road developments including haul road, borrow pits and spoon drains.

Direct impact has been calculated using the numbers of individuals or area of vegetation that occur within the indicative disturbance footprint that is going to be directly impacted. Impacts within the development envelopes are also included to allow for assessment of areas located outside the indicative disturbance footprint.

Cumulative direct impacts have been assessed from publicly available data obtained from the only known mining operations within the Bremer Range Vegetation Complexes Priority 1 Ecological Community; Emily Ann and Maggie Hayes Nickel operation.

2.1.2 Significant Flora population estimates

Prior to conducting the impact assessment, paid searches from the DBCA Threatened and Priority Flora database were conducted to obtain DBCA records of Threatened and Priority Flora identified during flora and vegetation surveys. These searches were used to obtain records within the local region (up to 150km of the Medcalf Project). DBCA database records vary considerably in the amount of detail regarding abundance that is available ranging from accurate counts or general abundance descriptions to no detail at all and only reflect the records currently entered into the database. Where databases provided no estimate of species abundance or numbers, it was assumed only a single individual plant was present. In most instances these assumptions are likely to result in a significant underestimate, and hence the final estimates of total individuals of each species are likely to be extremely conservative.

3 Flora and Vegetation Medcalf Project

Flora and vegetation surveys conducted within the Medcalf Project development envelopes and greater Bremer Range area which were used to source information presented in this impact assessment are summarized in Table 3-1.

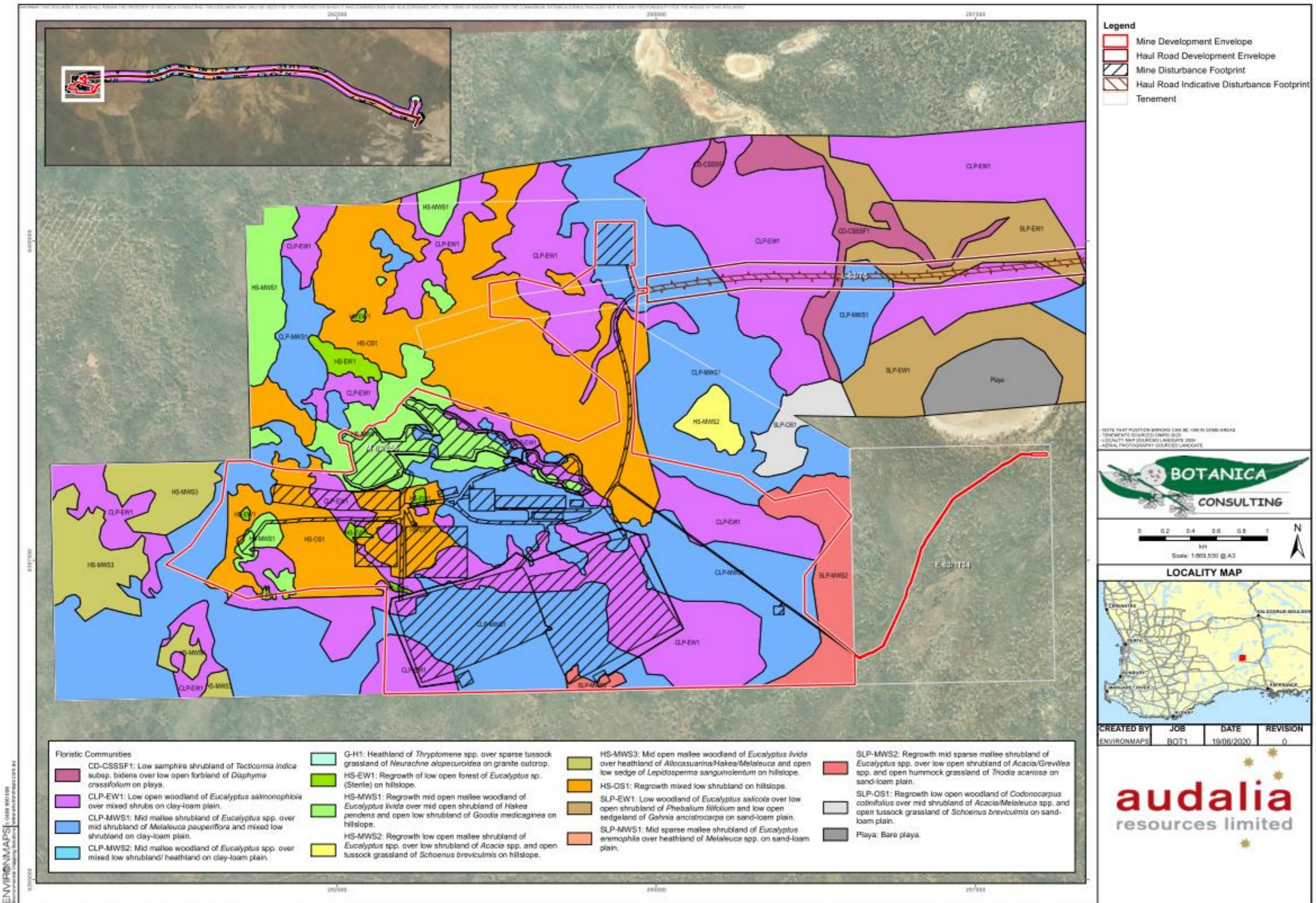
Table 3-1: Flora/ Vegetation Surveys

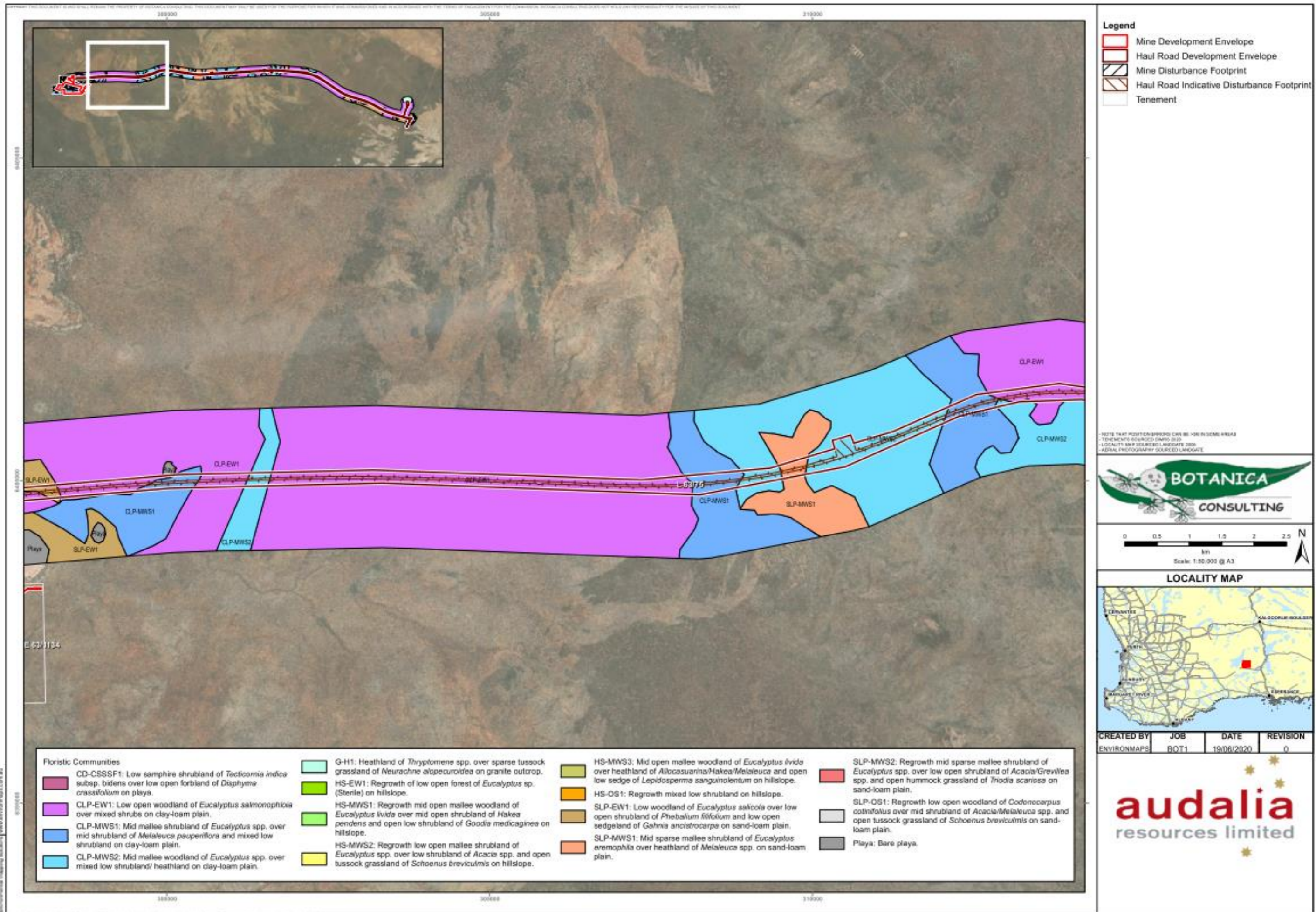
Assessment
The Biological Survey of the Eastern Goldfields of Western Australia: Part 4 lake Johnston-Hyden study area (How <i>et al</i> , 1988)
Biological Survey and Environmental Assessment of the Emily Ann Project Area (Curtin University, 1998)
Flora and vegetation of the Eastern Goldfields Ranges: Part 2. Bremer Range (Gibson & Lyons, 1998)
Vegetation survey and rare flora search of Maggie Hays Nickel Mine and adjacent areas (Armstrong and Associates, 2002)
Vegetation survey and rare flora search of Maggie Hays and Emily Ann Nickel Mines and adjacent areas (Armstrong and Associates, 2005)
Impact of proposed haul road from Maggie Hays to Emily Ann Plant (Armstrong and Associates, 2011)
Level 1 Flora and Vegetation survey of the Vesuvius Prospect Medcalf Project (Paul Armstrong and Associates, 2012)
Medcalf Exploration Project Targeted Flora search (Botanica Consulting, 2013)
Level 2 Flora & Vegetation Survey for Medcalf Vanadium Mining Project, Spring 2013 to Autumn 2015 (Botanica Consulting, 2015)
Detailed Flora & Vegetation Survey Medcalf Vanadium Mining Project & Proposed Haul Road (Botanica Consulting, 2020)

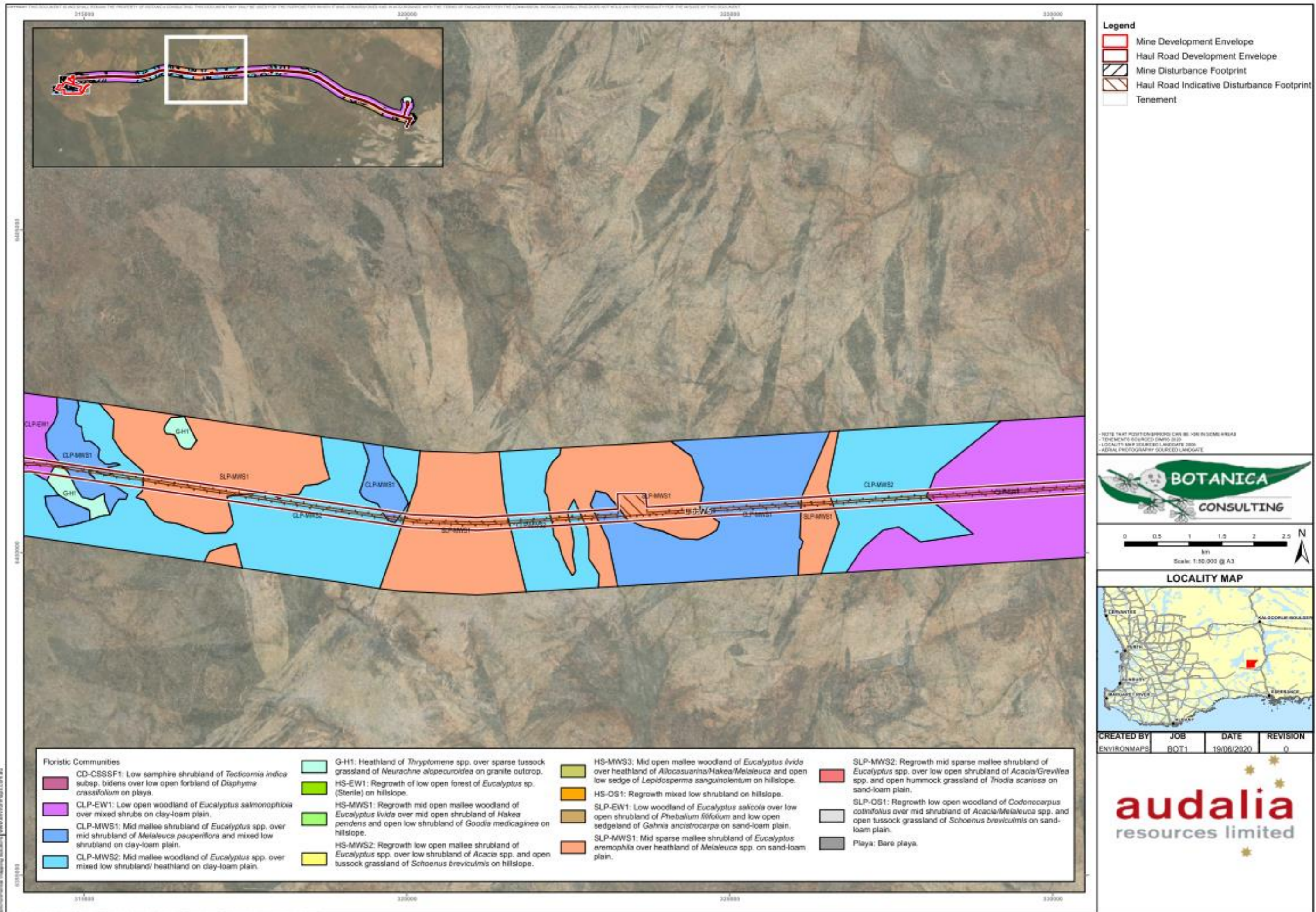
The detailed flora and vegetation survey conducted by Botanica Consulting (Botanica, 2020) covered a total area of 18,770 ha, encompassing the development envelopes and indicative disturbance footprint. Fourteen floristic communities were identified during the flora/ vegetation survey, eleven of which occur within the indicative disturbance footprint and development envelopes. The total area of each vegetation type within the indicative disturbance footprint and development envelopes is listed in Table 3-2 below. Maps showing the indicative disturbance footprint and development envelopes in relation to floristic communities identified in the flora and vegetation survey conducted by Botanica are provided in Figure 3-1.

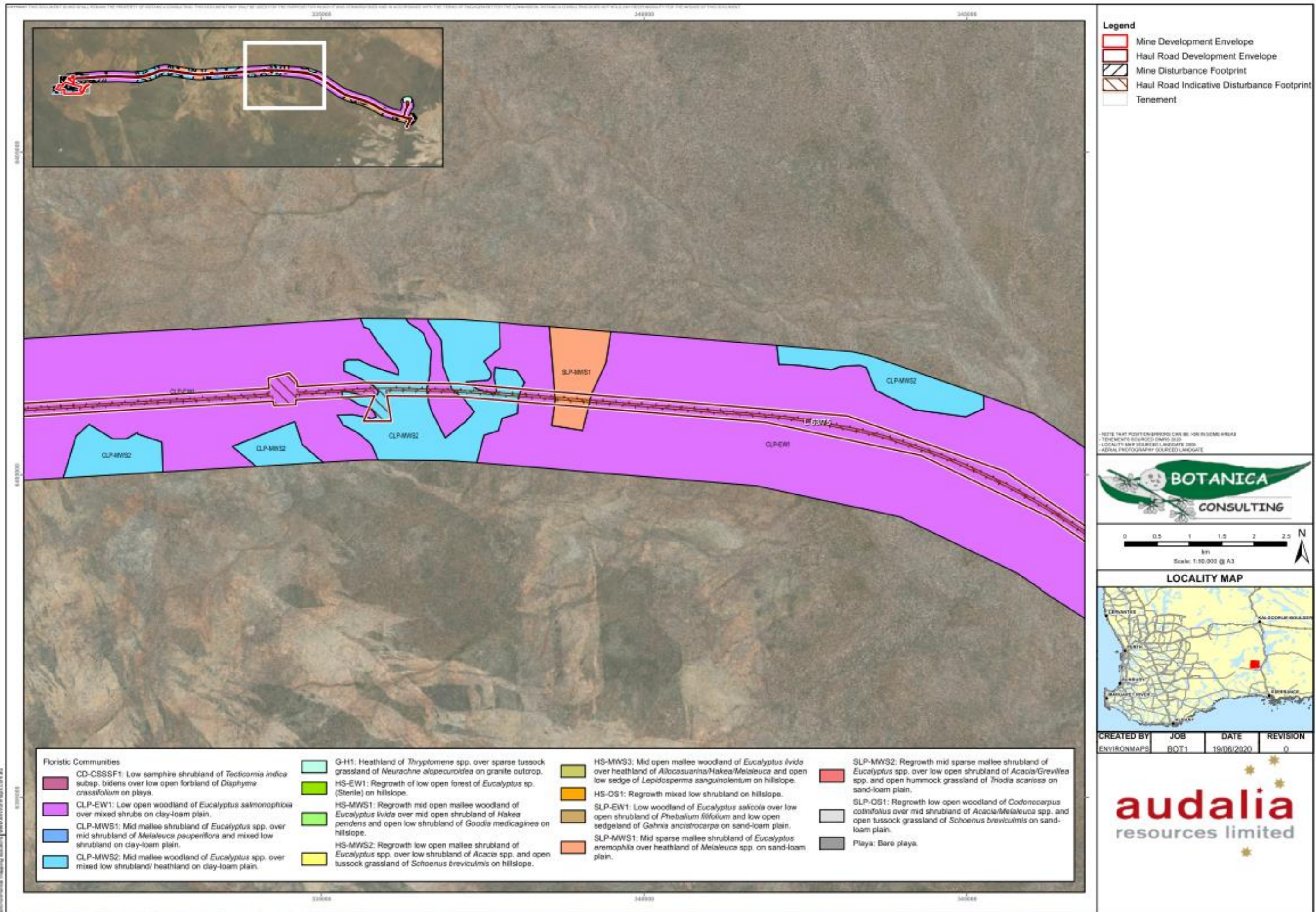
Table 3-2: Floristic Communities within the development envelopes and indicative disturbance footprint

Floristic Community	Vegetation Code	Total Mapped Extent (ha)	Mine and associated infrastructure		Haul road and associated infrastructure		Total Project			
			Indicative Disturbance Footprint (ha)	Development Envelope (ha)	Indicative Disturbance Footprint (ha)	Development Envelope (ha)	Indicative Disturbance Footprint		Development Envelope	
							Total Area (ha)	Total Area (%)	Total Area (ha)	Total Area (%)
Low samphire shrubland of <i>Tecticornia indica</i> subsp. <i>bidens</i> over low open forbland of <i>Disphyma crassifolium</i> on playa	CD-CSSSF1	67			0.2	2	0.2	0.03	2	0.1
Low open woodland of <i>Eucalyptus salmonophloia</i> over mixed shrubs on clay-loam plain	CLP-EW1	10,022	79	271	200	965	279	43.2	1237	48.9
Mid mallee shrubland of <i>Eucalyptus</i> spp. over mid shrubland of <i>Melaleuca pauperiflora</i> and mixed low shrubland on clay-loam plain	CLP-MWS1	1,975	124	341	20	123	144	22.4	464	18.3
Mid mallee woodland of <i>Eucalyptus</i> spp. over mixed low shrubland/ heathland on clay-loam plain	CLP-MWS2	2,561			54	234	54	8.3	234	9.3
Heathland of <i>Thryptomene</i> spp. over sparse tussock grassland of <i>Neurachne alopecuroidea</i> on granite outcrop	G-H1	265			14	17	14	2.2	17	0.7
Regrowth of low open forest of <i>Eucalyptus</i> sp. (Sterile) on hillslope	HS-EW1	15	1	5			1	0.2	5	0.2
Regrowth mid open mallee woodland of <i>Eucalyptus livida</i> over mid open shrubland of <i>Hakea pendens</i> and open low shrubland of <i>Goodia medicaginea</i> on hillslope	HS-MWS1	150	30	63			30	4.6	63	2.5
Regrowth low open mallee shrubland of <i>Eucalyptus</i> spp. over low shrubland of <i>Acacia</i> spp. and open tussock grassland of <i>Schoenus breviculmis</i> on hillslope	HS-MWS2	16								
Mid open mallee woodland of <i>Eucalyptus livida</i> over heathland of <i>Allocasuarina/ Hakea/ Melaleuca</i> and open low sedge of <i>Lepidosperma sanguinolentum</i> on hillslope	HS-MWS3	96								
Regrowth mixed low shrubland on hillslope	HS-OS1	412	36	167			36	5.5	167	6.6
Low woodland of <i>Eucalyptus salicola</i> over low open shrubland of <i>Phebalium filifolium</i> and low open sedgeland of <i>Gahnia ancistrocarpa</i> on sand-loam plain	SLP-EW1	1,520	0.2	1	17	127	17	2.7	128	5.1
Mid sparse mallee shrubland of <i>Eucalyptus eremophila</i> over heathland of <i>Melaleuca</i> spp. on sand-loam plain	SLP-MWS1	1,436			34	135	34	5.3	135	5.3
Regrowth mid sparse mallee shrubland of <i>Eucalyptus</i> spp. over low open shrubland of <i>Acacia / Grevillea</i> spp. and open hummock grassland of <i>Triodia scariosa</i> on sand-loam plain	SLP-MWS2	67	2	36			2	0.3	36	1.4
Regrowth low open woodland of <i>Codonocarpus cotinifolius</i> over mid shrubland of <i>Acacia/ Melaleuca</i> spp. and open tussock grassland of <i>Schoenus breviculmis</i> on sand-loam plain	SLP-OS1	27								
TOTAL (Vegetation)		18,630	272	884	340	1,604	612	95	2,488	98
Cleared Vegetation	CV	59	8	14	26	26	33	5.1	39	1.6
Bare Playa	Playa	142				0.2			0.2	0.0
TOTAL (Cleared Vegetation/ Playa)		201	8	14	26	26	33	5	39	2
TOTAL PROJECT		18,830	280	898	365	1630	645	100	2,528	100









Legend

- Mine Development Envelope
- Haul Road Development Envelope
- Mine Disturbance Footprint
- Haul Road Indicative Disturbance Footprint
- Tenement

NOTE THAT POSITION BOUNDARY CAN BE 10M IN SCALE AREAS
 * TENEMENTS SOURCED OMRD 2020
 * LOCALITY MAP SOURCED LANDGATE 2009
 * AERIAL PHOTOGRAPHY SOURCED LANDGATE



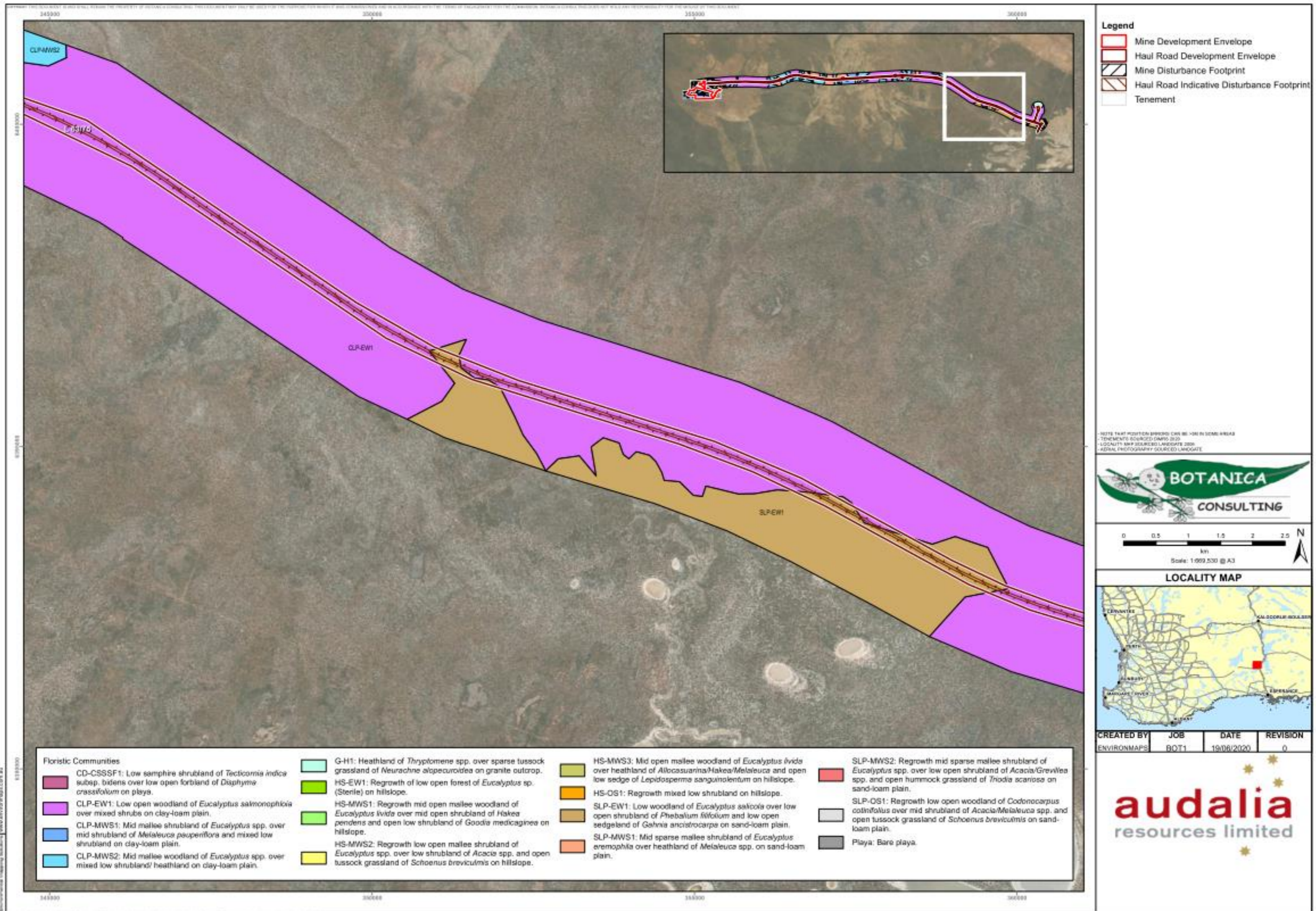
LOCALITY MAP



CREATED BY	JOB	DATE	REVISION
ENVIRONMAPS	BOT1	19/06/2020	0



Floristic Communities		
CD-CSSSF1: Low samphire shrubland of <i>Tecticornia indica</i> subsp. <i>batens</i> over low open forbland of <i>Daphnys crassifolium</i> on plays.	G-H1: Heathland of <i>Thryptomene</i> spp. over sparse tussock grassland of <i>Neurachne alopecuroides</i> on granite outcrop.	HS-MWS3: Mid open mallee woodland of <i>Eucalyptus livida</i> over heathland of <i>Allocasuarina/Hakea/Melaieuca</i> and open low sedge of <i>Lepidosperme sanguinolentum</i> on hillslope.
CLP-EW1: Low open woodland of <i>Eucalyptus salmonophila</i> over mixed shrubs on clay-loam plain.	HS-EW1: Regrowth of low open forest of <i>Eucalyptus</i> sp. (Sterile) on hillslope.	HS-OS1: Regrowth mixed low shrubland on hillslope.
CLP-MWS1: Mid mallee shrubland of <i>Eucalyptus</i> spp. over mid shrubland of <i>Melaieuca peupliflora</i> and mixed low shrubland on clay-loam plain.	HS-MWS1: Regrowth mid open mallee woodland of <i>Eucalyptus livida</i> over mid open shrubland of <i>Hakea pendens</i> and open low shrubland of <i>Goodia medicaginea</i> on hillslope.	SLP-EW1: Low woodland of <i>Eucalyptus aalioia</i> over low open shrubland of <i>Phebalium filiforme</i> and low open sedge/land of <i>Gahnia anctirocarpa</i> on sand-loam plain.
CLP-MWS2: Mid mallee woodland of <i>Eucalyptus</i> spp. over mixed low shrubland/ heathland on clay-loam plain.	HS-MWS2: Regrowth low open mallee shrubland of <i>Eucalyptus</i> spp. over low shrubland of <i>Acacia</i> spp. and open tussock grassland of <i>Schoenus breviculmis</i> on hillslope.	SLP-MWS1: Mid sparse mallee shrubland of <i>Eucalyptus aremophila</i> over heathland of <i>Melaieuca</i> spp. on sand-loam plain.
		SLP-MWS2: Regrowth mid sparse mallee shrubland of <i>Eucalyptus</i> spp. over low open shrubland of <i>Acacia/Grevillea</i> spp. and open hummock grassland of <i>Triodia scariosa</i> on sand-loam plain.
		SLP-OS1: Regrowth low open woodland of <i>Codonocarpus cotinifolius</i> over mid shrubland of <i>Acacia/Melaieuca</i> spp. and open tussock grassland of <i>Schoenus breviculmis</i> on sand-loam plain.
		Playa: Bare plays.



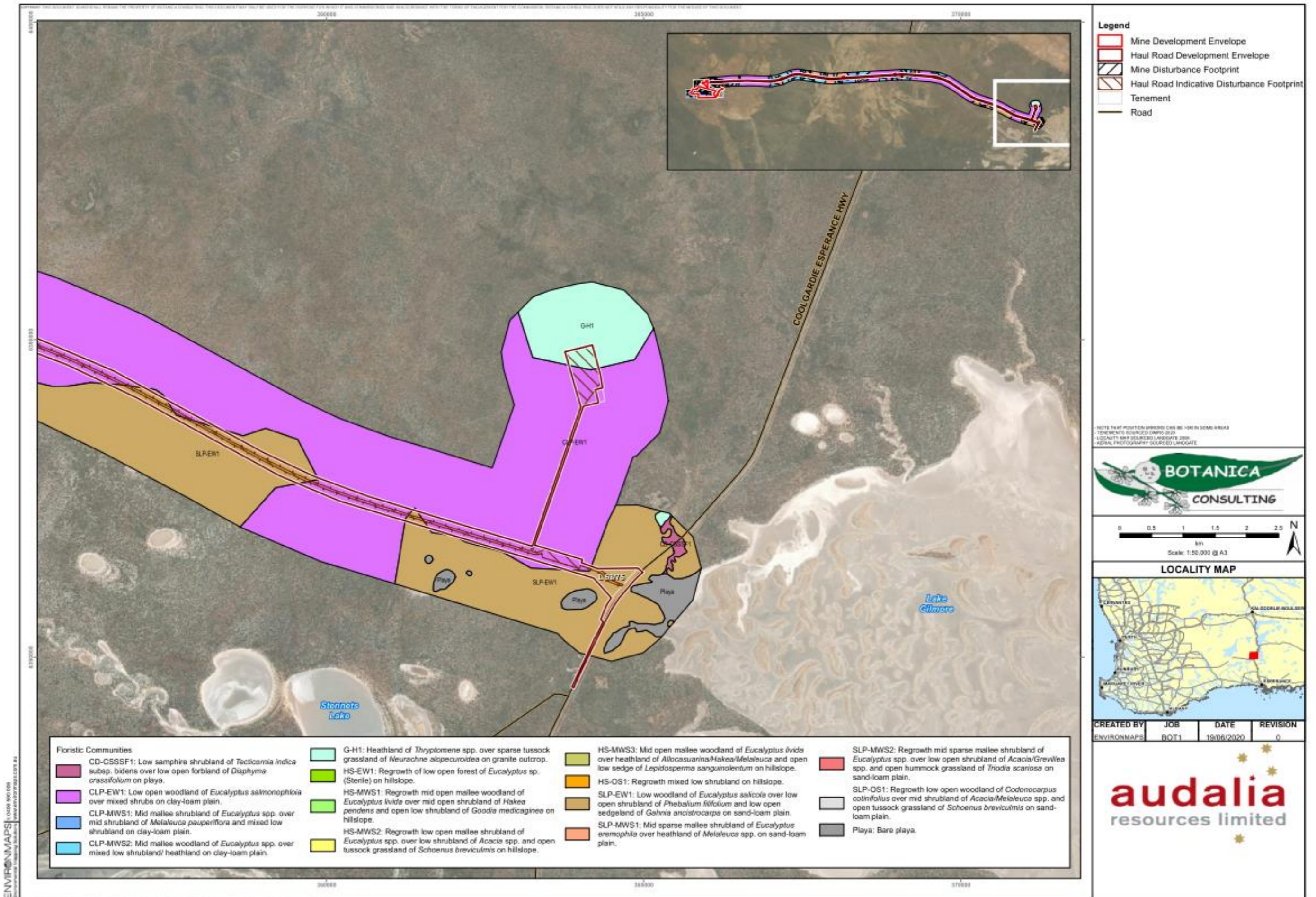


Figure 3-1: Indicative Disturbance Footprint/ Development Envelopes and Floristic Communities

4 Conservation Areas

The Medcalf Project is located within the Bremer Range vegetation complexes Priority 1 Ecological Community (Bremer Range PEC) and the proposed Bremer Range Nature Reserve. Details on these conservation areas are summarised below. A map showing conservation areas (Bremer Range PEC and proposed Bremer Range Nature Reserve) in relation to the development envelopes/ indicative disturbance footprint is provided in Figure 4-1. Details on direct impacts to these conservation areas are described in **Section 6.1**.

Bremer Range Vegetation Complexes Priority 1 Ecological Community

The Bremer Range PEC is listed by DBCA as a Priority 1 Ecological Community. The Bremer Range PEC (including the 500m buffer zone) encompasses an area of 88,150ha and is centred on Mt Day, Round Top Hill and Honman Ridge. The Bremer Range has potentially been listed as a PEC based on studies conducted by How *et. al.* (1988) and Gibson & Lyons (1998) which identified specialised vegetation mosaics associated within the Banded Ironstone Formation of Bremer Range. A description of the Bremer Range vegetation complexes PEC provided by DBCA is provided below:

Eucalyptus rhomboidea ms and *E. eremophila* woodland on the side slopes of low ridges; *E. flocktoniae* woodland (with *E. salubris*, *E. salmonophloia*, *E. dundasii* and *E. tenuis*) on broad flat ridges and side slopes; *E. flocktoniae* and/or *E. longicornis* woodland on saline soils on ridges and flats adjacent to large salt lake systems; *E. longicornis* and/or *E. salmonophloia* or, *E. georgei* subsp. *georgei* or, *E. dundasii* woodland, on low areas; *E. livida* woodland on lateritic tops or *Allocasuarina* thickets on greenstone ridges of lateritic breakaways; *Acacia duriuscula*, *Allocasuarina globosa*, *E. georgei* subsp. *georgei* and *E. oleosa* thickets on greenstone ridges with skeletal soils.

As specified in the flora/ vegetation report prepared by Botanica (2020), the lateritic hillslopes of the Medcalf deposit and lateritic hillslopes within the greater Bremer Range studied by Gibson & Lyons (Community 5) were grouped together, indicating the lateritic hillslopes of the Medcalf area have a similar species composition of lateritic hillslopes within the greater Bremer Range PEC. The Eucalypt woodland and Mallee woodland vegetation types within the Bremer Range region were also representative of the Bremer Range PEC. The haul road development envelope/ indicative disturbance footprint is not located within a PEC and none of the vegetation communities of the haul road development envelope are representative of vegetation within the Bremer Range PEC.

Proposed Bremer Range Nature Reserve

The proposed Bremer Range Nature Reserve covers a total area of 50,920ha, centred on the Bremer Range. In 1992 it was proposed that the Bremer Range be managed by DBCA as a Nature Reserve in the DBCA South Coast Region Regional Management Plan, however, to date this proposed reserve has not yet been approved, primarily due to the presence of mineralisation. It is also not listed under the EPA Red Book recommendations for Conservation Reserves 1975-1993.



Figure 4-1: Regional map of the conservation areas in relation to the Indicative Disturbance Footprint/ Development Envelopes

5 Significant Flora and Vegetation

5.1 Significant Flora

As defined in the *Technical Guidance Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016), flora and vegetation may be considered significant for a range of reasons, including, but not limited to the following criteria:

Flora

- identified as threatened or priority species
- locally endemic or association 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 the 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.

Flora and vegetation surveys of the local area identified one Threatened Flora and ten Priority Flora within the local area. No other significant flora were identified. Each category of significant flora identified (Threatened and Priority Flora) are summarized in the following sections.

5.1.1 Threatened Flora

One Threatened Flora taxon pursuant to the BC Act was identified within the local area; *Marianthus aquilonaris* (Table 5-1). This taxon is not listed as Threatened under the EPBC Act. All current sub-populations of this taxon are located outside of the mine and haul road development envelopes/ indicative disturbance footprint. A map showing Threatened Flora records in relation to the development envelopes/ indicative disturbance footprint is provided in Figure 5-1.

. Further details on the ecology of this taxon, including assessments on the critical, optimal and sub-optimal habitat for this taxon are provided in *Updated Summary on ecology of Marianthus aquilonaris* (Botanica, 2020b).

Table 5-1: Threatened Flora recorded within the local area

Taxon	Location and population description	Associated Habitat/ Vegetation	Identified within Development Envelope	Distribution (WAHERB, 2019)	Image
<p><i>Marianthus aquilonaris</i> (T)</p>	<p>Currently known from one population, including five subpopulations (population 1a-1e) all of which occur within the Bremer Range.</p>	<p>Found in the Bremer Range, growing in orange to grey-brown sandy loam, rocky red-orange clay loam, laterite and quartzite, on rock outcrops and slopes (WAHERB, 2020).</p> <p>Grows in gravelly, shallow loamy soils with an indurated, mottled zone layer that occurs within 30 cm of the soil surface ('Shallow gravel over indurated mottled zone' soil). These soils are almost always located on a low ridge that typically have outcrops of limonite (Western Horticultural Consulting, 2019).</p> <p>Identified within Regrowth mid open mallee woodland of <i>Eucalyptus livida</i> over mid open shrubland of <i>Hakea pendens</i> and open low shrubland of <i>Goodia medicaginea</i> on hillslope (HS-MWS1).</p>	<p>No</p>	<p><i>Marianthus aquilonaris</i></p>	

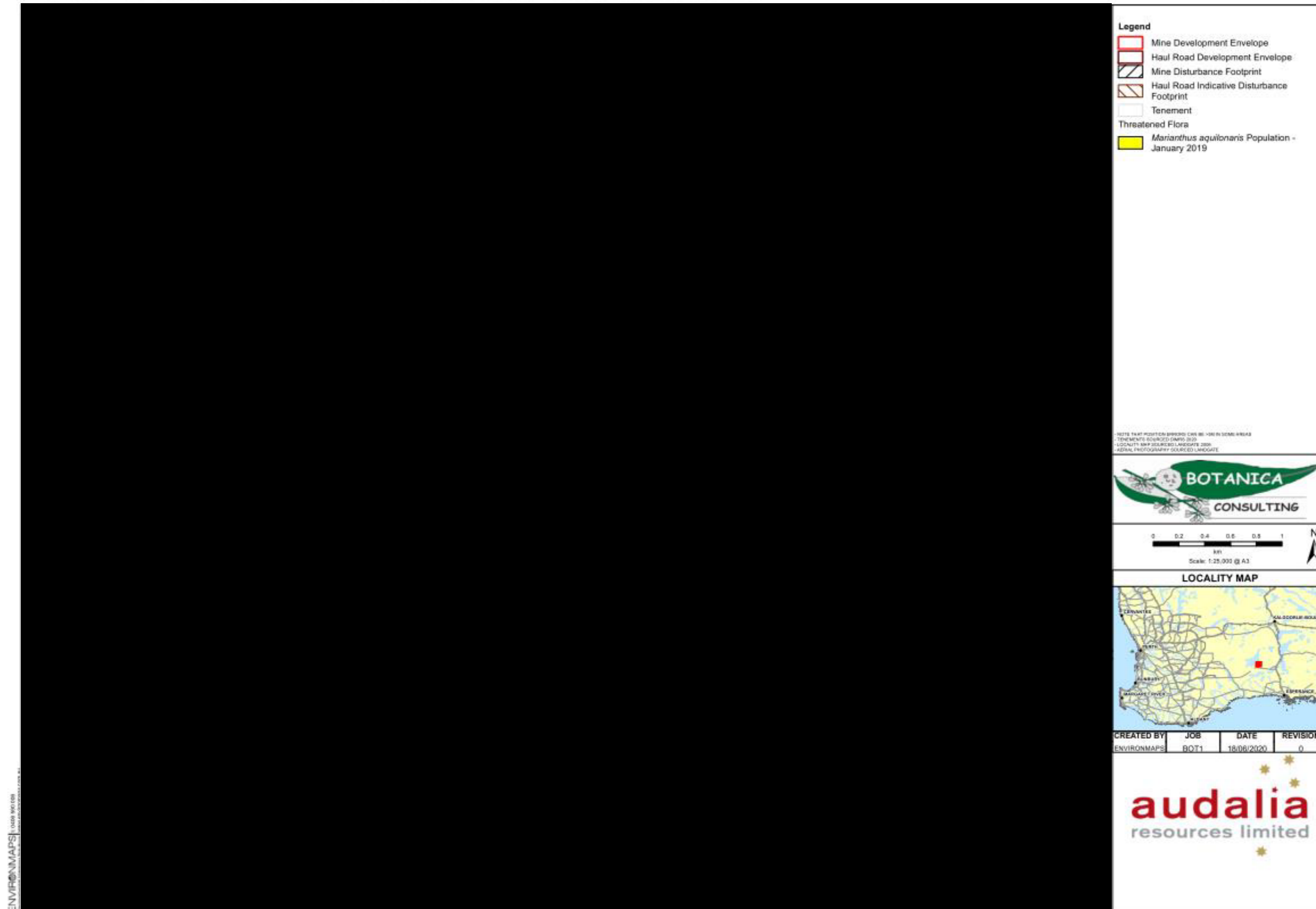


Figure 5-1: Threatened Flora in relation to the Indicative Disturbance Footprint/ Development Envelopes

5.1.2 Priority Flora

Ten Priority Flora taxa as listed by DBCA were identified within the local area (Table 5-2):

1. *Acacia hystrix* subsp. *continua* (P1);
2. *Acacia mutabilis* subsp. *stipulifera* (P3);
3. *Bossiaea flexuosa* (P3);
4. *Brachyloma stenolobum* (P1);
5. *Eucalyptus pterocarpa* (P3);
6. *Eucalyptus rhomboidea* (P4);
7. *Hakea pendens* (P3);
8. *Microcybe* sp. Windy Hill (G.F. Craig 6583) (P3);
9. *Stenanthemum bremerense* (P4); and
10. *Teucrium* sp. dwarf (R. Davis 8813) (P3).¹

Six of the ten Priority Flora recorded within the local area occur within the development envelopes. A map showing Priority Flora records in relation to the development envelopes/ indicative disturbance footprint is provided in Figure 5-2. One of the Priority Flora taxa identified; *Eucalyptus rhomboidea* (P4) is currently being nominated by DBCA for Threatened status under the BC Act. A second Priority Flora taxon; *Stenanthemum bremerense* (P4) is being considered by DBCA for nomination to Threatened status under the BC Act.

¹ This taxon has been recently formally named as *Teucrium diabolicum* however for the purpose of this report, the original phrase name which was current at the time of the flora and vegetation assessments will be used within this report.

Table 5-2: Priority Flora recorded within the local area

Taxon	Location and population description	Associated Habitat/ Vegetation	Identified within Development Envelope	Distribution (WAHERB, 2019)	Image
<i>Acacia hystrix</i> subsp. <i>continua</i> (P1)	A total of four locations of this taxon recorded at one DBCA recorded location from one population (122 individuals including Botanica and DBCA records) located approximately 3km west of the Coolgardie-Esperance Highway. No other records on the DBCA database of this taxon within a 50km radius of the Medcalf Project.	Grows in clay-loam soils of Eucalypt woodlands (WAHERB, 2020). Identified within Low open woodland of <i>Eucalyptus salmonophloia</i> over mixed shrubs on clay-loam plain (CLP-EW1).	No	<p><i>Acacia hystrix</i> subsp. <i>continua</i></p> <p>04/Nov/2019 © WA Herbarium</p>	
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i> (P3)	A total of seventy-three locations of this taxon have been recorded from multiple populations (348,332 individuals) extending from Bremer Range to approximately 50km east of Bremer Range. 34 records of this taxon are listed on the DBCA database (120 individuals) extending 250km south-west of the Medcalf Project including records within the Lake Magenta Nature Reserve, Breakaway Ridge Nature Reserve and Lakeland Nature Reserve.	Grows in loam or clay, usually in slightly saline soils (WAHERB, 2020). Identified within: 1. Low open woodland of <i>Eucalyptus salmonophloia</i> over mixed shrubs on clay-loam plain (CLP-EW1). 2. Mid mallee shrubland of <i>Eucalyptus</i> spp. over mid shrubland of <i>Melaleuca pauperiflora</i> and mixed low shrubland on clay-loam plain (CLP-MWS1). 3. Mid mallee woodland of <i>Eucalyptus</i> spp. over mixed low shrubland/ heathland on clay-loam plain (CLP-MWS2). 4. Mid sparse mallee shrubland of <i>Eucalyptus eremophila</i> over heathland of <i>Melaleuca</i> spp. on sand-loam plain (SLP-MWS1). 5. Regrowth mid sparse mallee shrubland of <i>Eucalyptus</i> spp. over low open shrubland of <i>Acacia</i> / <i>Grevillea</i> spp. and open hummock grassland of <i>Triodia scariosa</i> on sand-loam plain (SLP-MWS2).	Yes	<p><i>Acacia mutabilis</i> subsp. <i>stipulifera</i></p> <p>04/Nov/2019 © WA Herbarium</p>	

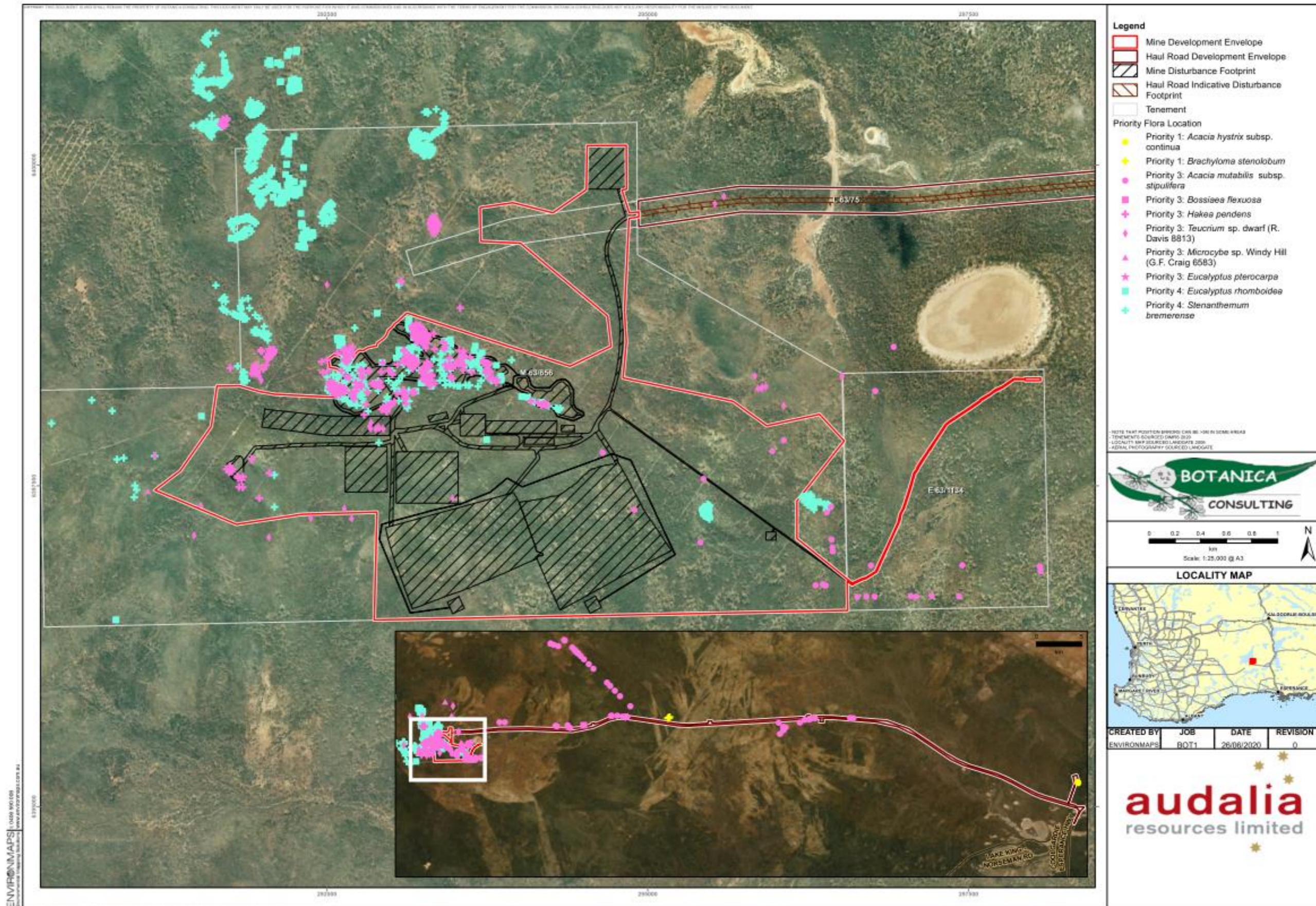
Taxon	Location and population description	Associated Habitat/ Vegetation	Identified within Development Envelope	Distribution (WAHERB, 2019)	Image
<p><i>Bossiaea flexuosa</i> (P3)</p>	<p>One location of this taxon (100 individuals) recorded at Bremer Range. 26 records of this taxon are listed on the DBCA database (117 individuals) extending 220km to the south/ east and south-west of the Medcalf Project including records within the Frank Hann National Park and Dundas Nature Reserve.</p>	<p>Grows in deep sandy soil (WAHERB, 2020). Identified within Mid sparse mallee shrubland of <i>Eucalyptus eremophila</i> over heathland of <i>Melaleuca</i> spp. on sand-loam plain (SLP-MWS1).</p>	<p>No</p>	<p><i>Bossiaea flexuosa</i></p>	
<p><i>Brachyloma stenolobum</i> (P1)</p>	<p>Two locations of this taxon were recorded from one population (500 individuals) located approximately 25km east of Bremer Range. This record represents a range extension for this taxon, having previously only been recorded on the DBCA database (60 individuals) within the Forrestania region (south of the Jilbadji Nature Reserve), approximately 100km west of the Medcalf Project.</p>	<p>Grows in yellow sandplain as a component of heath. Associated species include <i>Allocasuarina spinosissima</i>, <i>Acacia heteroneura</i>, <i>Melaleuca cordata</i> and <i>M. calyptroides</i> (Hislop & Cranfield, 2014). Identified within Mid mallee woodland of <i>Eucalyptus</i> spp. over mixed low shrubland/ heathland on clay-loam plain (CLP-MWS2).</p>	<p>No</p>	<p><i>Brachyloma stenolobum</i></p>	

Taxon	Location and population description	Associated Habitat/ Vegetation	Identified within Development Envelope	Distribution (WAHERB, 2019)	Image
<p><i>Eucalyptus pterocarpa</i> (P3)</p>	<p>One location of this taxon recorded from one population (100 individuals) located approximately 20km east of Bremer Range. No records on the DBCA database of this taxon within a 50km radius of the Medcalfe Project.</p>	<p>Grows in red-brown sandy loam, yellow-brown silty loam soils of creek edges and rocky slopes (WAHERB, 2020).</p> <p>Identified within Low open woodland of <i>Eucalyptus salmonophloia</i> over mixed shrubs on clay-loam plain (CLP-EW1).</p>	<p>Yes</p>	<p><i>Eucalyptus pterocarpa</i></p> <p>04/Nov/2019 © WA Herbarium</p>	
<p><i>Eucalyptus rhomboidea</i> (P4)</p>	<p>A total of 268 locations of this taxon have been recorded from six sub-populations (15,606 individuals including Botanica and DBCA records). This taxon is endemic to the Bremer Range area. This taxon is currently being nominated for Threatened Status under the BC Act.</p>	<p>Grows in gravelly sand, and is found on slight rises (WAHERB, 2020).</p> <p>Grows on a range of soil groups at a range of positions in the landscape. This species was found growing on 'Alkaline red shallow loamy duplex' soils that occur on the lower, mid and upper slopes. It was found growing on 'Loamy gravel' soils on the lateritic plateau at the top of the landscape and on the mid slopes. It was also found growing on 'Shallow gravel' soils, below a breakaway (Western Horticultural Consulting, 2019).</p> <p>Found in a variety of habitats including within creeklines and low to mid gravelly rises and lateritic slopes (Botanica pers. comms).</p> <p>Identified within:</p> <ol style="list-style-type: none"> 1. Low open woodland of <i>Eucalyptus salmonophloia</i> over mixed shrubs on clay-loam plain (CLP-EW1). 2. Mid mallee shrubland of <i>Eucalyptus</i> spp. over mid shrubland of <i>Melaleuca pauperiflora</i> and mixed low shrubland on clay-loam plain (CLP-MWS1). 	<p>Yes</p>	<p><i>Eucalyptus rhomboidea</i></p> <p>04/Nov/2019 © WA Herbarium</p>	

Taxon	Location and population description	Associated Habitat/ Vegetation	Identified within Development Envelope	Distribution (WAHERB, 2019)	Image
		3. Regrowth mid open mallee woodland of <i>Eucalyptus livida</i> over mid open shrubland of <i>Hakea pendens</i> and open low shrubland of <i>Goodia medicaginea</i> on hillslope (HS-MWS1). 4. Mid open mallee woodland of <i>Eucalyptus livida</i> over heathland of <i>Allocasuarina/Hakea/ Melaleuca</i> and open low sedge of <i>Lepidosperma sanguinolentum</i> on hillslope (HS-MWS3).			
<p><i>Hakea pendens</i> (P3)</p>	<p>A total of 592 locations of this taxon were recorded from one population (2435 individuals) at Bremer Range. 64 records of this taxon listed on the DBCA database (4348 individuals) extending 200km north-west of the Medcalf Project including records within the Parker Range region and Jilbadji Nature Reserve.</p>	<p>Grows in stony loam and is found on ironstone ridges (WAHERB, 2020).</p> <p>Identified within:</p> <ol style="list-style-type: none"> 1. Low open woodland of <i>Eucalyptus salmonophloia</i> over mixed shrubs on clay-loam plain (CLP-EW1). 2. Mid mallee shrubland of <i>Eucalyptus</i> spp. over mid shrubland of <i>Melaleuca pauperiflora</i> and mixed low shrubland on clay-loam plain (CLP-MWS1). 3. Regrowth mid open mallee woodland of <i>Eucalyptus livida</i> over mid open shrubland of <i>Hakea pendens</i> and open low shrubland of <i>Goodia medicaginea</i> on hillslope (HS-MWS1). 4. Regrowth mixed low shrubland on hillslope (HS-OS1). 	<p>Yes</p>	<p><i>Hakea pendens</i></p>	

Taxon	Location and population description	Associated Habitat/ Vegetation	Identified within Development Envelope	Distribution (WAHERB, 2019)	Image
<p><i>Microcybe</i> sp. Windy Hill (G.F. Craig 6583) (P3)</p>	<p>A total of four locations of this taxon were recorded from two populations (682 individuals) within the Bremer Range. 25 records of this taxon listed on the DBCA database (26,280 individuals) extending 60km north-west the Medcalf Project.</p>	<p>No description available (WAHERB, 2020).</p> <p>Found in clay-loam/ sandy-loam soils on plains and low slopes (Botanica pers. comms).</p> <p>Identified within:</p> <ol style="list-style-type: none"> 1. Mid mallee shrubland of <i>Eucalyptus</i> spp. over mid shrubland of <i>Melaleuca pauperiflora</i> and mixed low shrubland on clay-loam plain (CLP-MWS1). 2. Regrowth mixed low shrubland on hillslope (HS-OS1). 	<p>Yes</p>	<p><i>Microcybe</i> sp. Windy Hill (G.F. Craig 6583)</p>	
<p><i>Stenanthemum bremerense</i> (P4)</p>	<p>A total of 1315 locations of this taxon were recorded from multiple populations (35,823 individuals) within the Bremer Range. 34 records of this taxon are listed on the DBCA database (4303 individuals) extending 100km north/ north-west of the Medcalf Project. This taxon is currently being considered for nomination for Threatened Status under the BC Act.</p>	<p>Grows in orange-brown sandy loam, orange-red gravelly loam, skeletal red loam, laterite and ironstone. It is found on the top or sides of outcrops and breakaways (WAHERB, 2020).</p> <p>Grows in loamy gravel soils and is found on the lateritic plateau at the top of the landscape and on areas of gravelly rises on the mid to lower slopes (Western Horticultural Consulting, 2019).</p> <p>Found in a variety of habitats including sandy/ gravelly plains to low rise and lateritic slopes/ ridges (Botanica pers. comms).</p> <p>Identified within:</p> <ol style="list-style-type: none"> 1. Low open woodland of <i>Eucalyptus salmonophloia</i> over mixed shrubs on clay-loam plain (CLP-EW1). 2. Mid mallee shrubland of <i>Eucalyptus</i> spp. over mid shrubland of <i>Melaleuca pauperiflora</i> and mixed low shrubland on clay-loam plain (CLP-MWS1). 3. Regrowth mid open mallee woodland of <i>Eucalyptus livida</i> over mid open shrubland of <i>Hakea pendens</i> and open low shrubland of <i>Goodia medicaginea</i> on hillslope (HS-MWS1). 	<p>Yes</p>	<p><i>Stenanthemum bremerense</i></p>	

Taxon	Location and population description	Associated Habitat/ Vegetation	Identified within Development Envelope	Distribution (WAHERB, 2019)	Image
		4. Mid open mallee woodland of <i>Eucalyptus livida</i> over heathland of <i>Allocasuarina/Hakea/Melaleuca</i> and open low sedge of <i>Lepidosperma sanguinolentum</i> on hillslope (HS-MWS3). 5. Regrowth mixed low shrubland on hillslope (HS-OS1).			
<p><i>Teucrium</i> sp. dwarf (R. Davis 8813) (P3)</p>	<p>A total of 39 locations of this taxon were recorded from multiple populations (12,700 individuals) within the Bremer Range. 15 records of this taxon are listed on the DBCA database (3453 individuals) extending 190km north/ north-west of the Medcalfe Project. This taxon was previously listed as a Priority 1 taxon, however in 2018 was reduced to Priority 3.</p>	<p>Found on hills and road verges (WAHERB, 2020).</p> <p>Grows in self-mulching/ heavy clay soils in low-lying plains (Botanica pers. comms).</p> <p>Identified within:</p> <ol style="list-style-type: none"> 1. Low open woodland of <i>Eucalyptus salmonophloia</i> over mixed shrubs on clay-loam plain (CLP-EW1). 2. Mid mallee shrubland of <i>Eucalyptus</i> spp. over mid shrubland of <i>Melaleuca pauperiflora</i> and mixed low shrubland on clay-loam plain (CLP-MWS1). 3. Mid open mallee woodland of <i>Eucalyptus livida</i> over heathland of <i>Allocasuarina/Hakea/Melaleuca</i> and open low sedge of <i>Lepidosperma sanguinolentum</i> on hillslope (HS-MWS3). 4. Regrowth mixed low shrubland on hillslope (HS-OS1). 5. Regrowth low open woodland of <i>Codonocarpus cotinifolius</i> over mid shrubland of <i>Acacia/Melaleuca</i> spp. and open tussock grassland of <i>Schoenus breviculmis</i> on sand-loam plain (SLP-OS1). 	<p>Yes</p>	<p><i>Teucrium</i> sp. dwarf (R. Davis 8813)</p>	



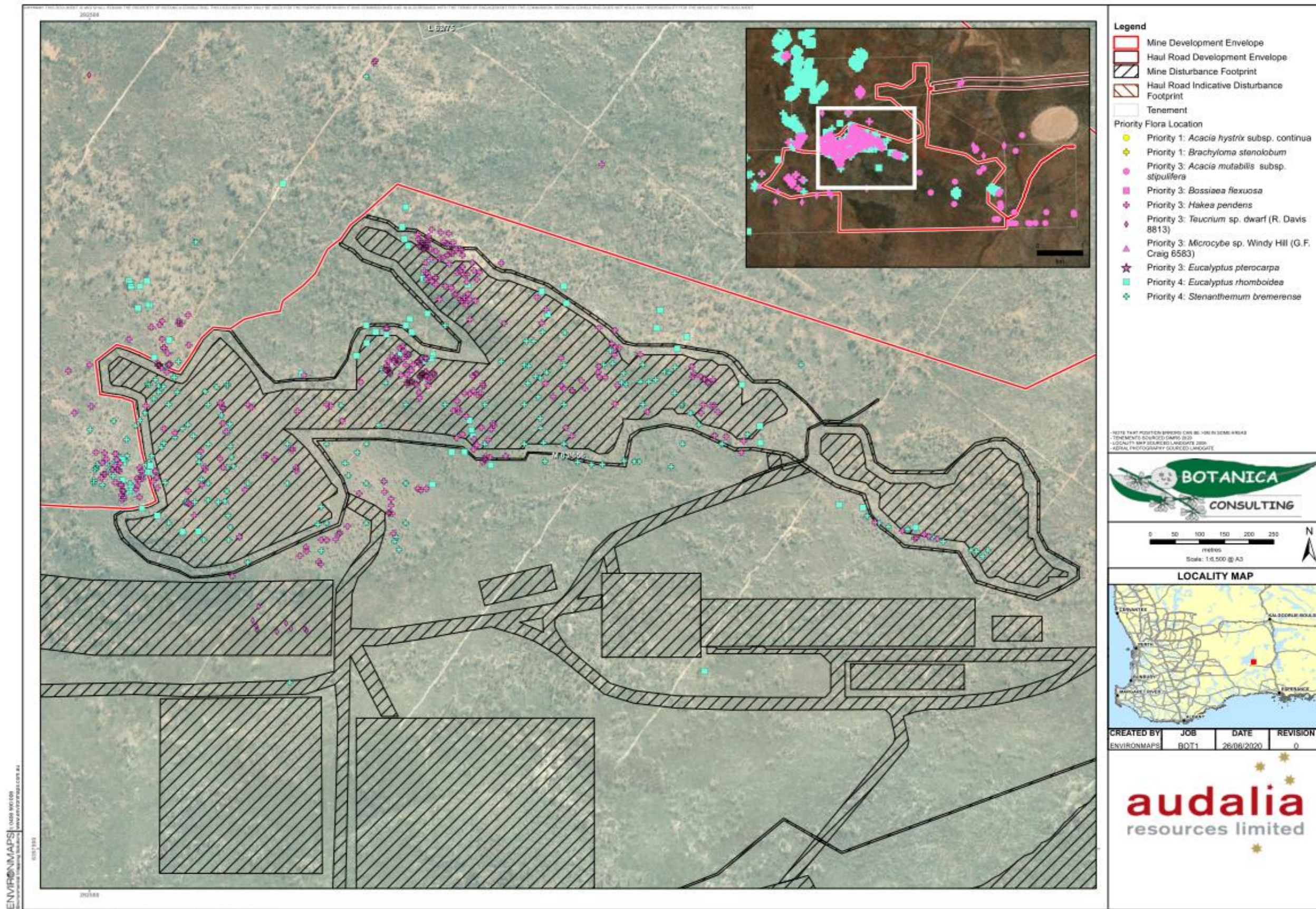


Figure 5-2: Priority Flora in relation to the Indicative Disturbance Footprint/ Development Envelopes

5.2 Significant Vegetation



Vegetation



- identified as threatened or priority ecological communities
- restricted distribution
- large 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.



According to the BoM *Atlas of Groundwater Dependent Ecosystems* (BoM, 2019) database, vegetation of the Medcalf Project has low to moderate potential for terrestrial GDEs which are classified by BoM as: *Terrestrial ecosystems that rely on the subsurface presence of groundwater—this includes all vegetation ecosystems*. Results of hydrological studies conducted by GRM (2020) identified that the groundwater is hypersaline (ranging from 54,000 to 170,000 mg/L TDS) with a standing water level (m below top of bore casing) ranging between 6.3-9.5m near playas/ within clay-loam landscape and 17.4m to 45m depth within the sand-loam plain to hillslope landscape. Given the hypersaline water quality, depth to the water table and no known phreatophyte vegetation identified within the local area, none of the floristic communities within the Medcalf Project area are considered to be groundwater dependent.



Eight floristic communities occur within the Bremer Range PEC and are considered to be significant vegetation (Table 5-3). One of these eight communities (HS-MWS1) also provides habitat for the Threatened Flora taxon, *Marianthus aquilonaris*. A map showing significant vegetation in relation to the development envelopes/ indicative disturbance footprint is provided in Figure 5-4.

Table 5-3: Significant vegetation recorded within the local area

Floristic Community	Vegetation Code	Identified within Development Envelope	Vegetation Significance	Image
<p>Low open woodland of <i>Eucalyptus salmonophloia</i> over mixed shrubs on clay-loam plain</p>	<p>CLP-EW1</p>	<p>Yes</p>	<p>Representative of Bremer Range PEC</p>	
<p>Mid mallee shrubland of <i>Eucalyptus</i> spp. over mid shrubland of <i>Melaleuca pauperiflora</i> and mixed low shrubland on clay-loam plain</p>	<p>CLP-MWS1</p>	<p>Yes</p>	<p>Representative of Bremer Range PEC</p>	

Floristic Community	Vegetation Code	Identified within Development Envelope	Vegetation Significance	Image
<p>Mid mallee woodland of <i>Eucalyptus</i> spp. over mixed low shrubland/ heathland on clay-loam plain</p>	<p>CLP-MWS2</p>	<p>Yes</p>	<p>Representative of Bremer Range PEC</p>	
<p>Regrowth of low open forest of <i>Eucalyptus</i> sp. (Sterile) on hillslope</p>	<p>HS-EW1</p>	<p>Yes</p>	<p>Representative of Bremer Range PEC</p>	

Floristic Community	Vegetation Code	Identified within Development Envelope	Vegetation Significance	Image
<p>Regrowth mid open mallee woodland of <i>Eucalyptus livida</i> over mid open shrubland of <i>Hakea pendens</i> and open low shrubland of <i>Goodia medicaginea</i> on hillslope</p>	<p>HS-MWS1</p>	<p>Yes</p>	<p>Representative of Bremer Range PEC/ known habitat for Threatened Flora</p>	
<p>Regrowth low open mallee shrubland of <i>Eucalyptus</i> spp. over low shrubland of <i>Acacia</i> spp. and open tussock grassland of <i>Schoenus breviculmis</i> on hillslope</p>	<p>HS-MWS2</p>	<p>No</p>	<p>Representative of Bremer Range PEC</p>	

Floristic Community	Vegetation Code	Identified within Development Envelope	Vegetation Significance	Image
<p>Mid open mallee woodland of <i>Eucalyptus livida</i> over heathland of <i>Allocasuarina/ Hakea/ Melaleuca</i> and open low sedge of <i>Lepidosperma sanguinolentum</i> on hillslope</p>	<p>HS-MWS3</p>	<p>No</p>	<p>Representative of Bremer Range PEC</p>	
<p>Regrowth mixed low shrubland on hillslope</p>	<p>HS-OS1</p>	<p>Yes</p>	<p>Representative of Bremer Range PEC</p>	

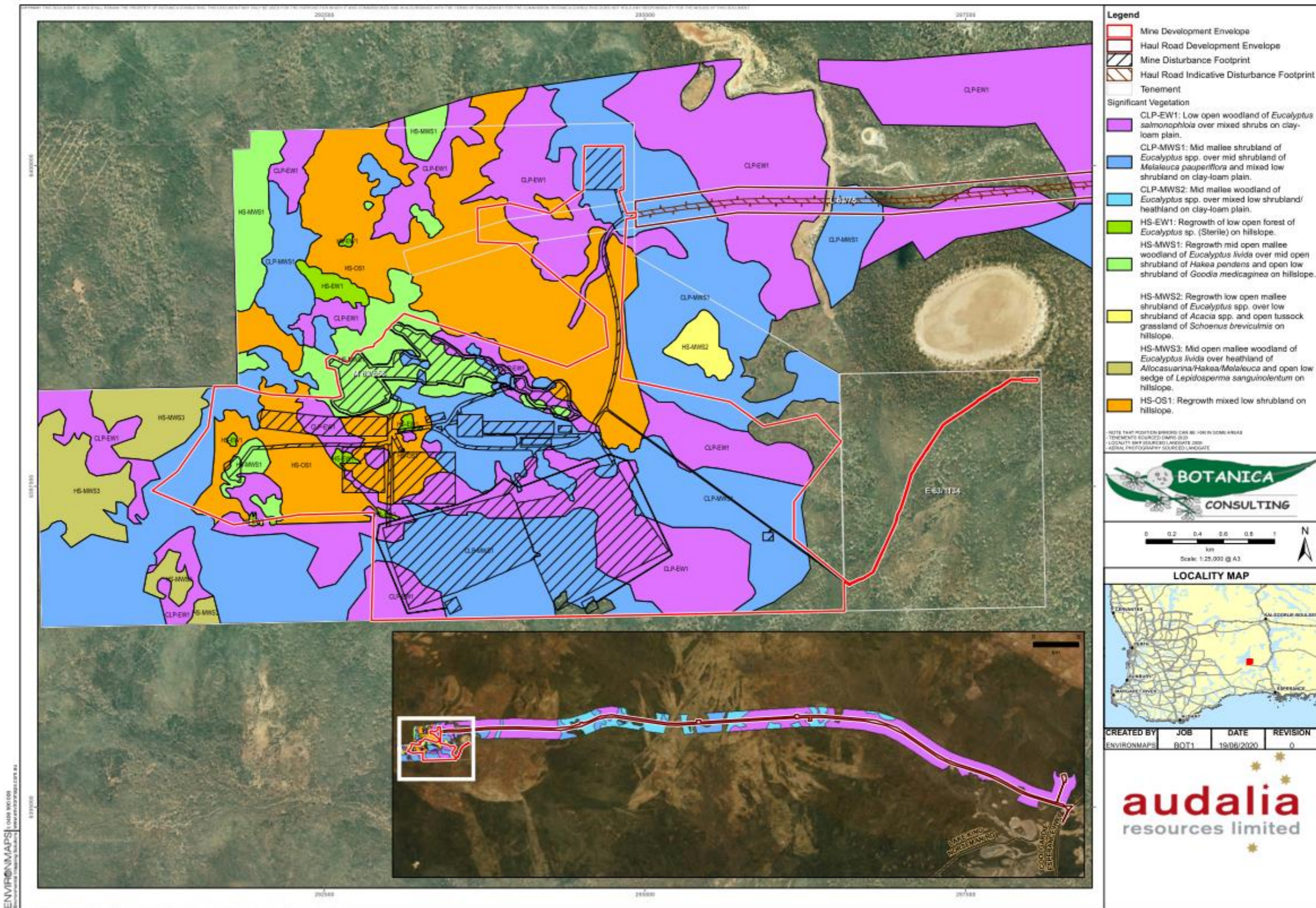


Figure 5-3: Significant vegetation in relation to the Indicative Disturbance Footprint/ Development Envelope

6 Direct Impacts

6.1 Conservation Areas

An assessment of the direct impacts of the Medcalf Project on the Bremer Range PEC and proposed Bremer Range Nature Reserve is provided in Table 6-1. The mine and haul road development envelopes represent 1.01% and 2.09% of the total extent of the Bremer Range PEC and proposed Bremer Range Nature Reserve respectively. The total indicative disturbance footprint represents a 0.32% and 0.61% impact on total extent of the Bremer Range PEC and proposed Bremer Range Nature Reserve respectively.

Table 6-1: Area of Direct Impact to Conservation Areas

Conservation Area	Total Mapped Extent (ha)	Mine and associated infrastructure		Haul road and associated infrastructure		Total Project			
		indicative Disturbance Footprint (ha)	Development Envelope (ha)	indicative Disturbance Footprint (ha)	Development Envelope (ha)	Indicative Disturbance Footprint		Development Envelope	
						Total Area (ha)	Total Area (%)	Total Area (ha)	Total Area (%)
Bremer Range PEC	88,150	277	841	8	45	285	0.32	886	1.01
Proposed Bremer Range Nature Reserve	50,920	280	898	30	167	309	0.61	1,065	2.09

6.2 Vegetation

An assessment of the direct impacts of the Medcalf Project on each vegetation type at a local scale (based on total area surveyed by Botanica, 2020a) and regional scale (based on *2018 Statewide Vegetation Statistics* (DBCA, 2019) is provided in Table 6-2 and Table 6-3. An assessment of the direct impacts of the Medcalf Project on significant vegetation identified is provided in Table 6-4. It is important to note, the total mapped extent of vegetation reported relates only to the area of vegetation surveyed/ mapped by Botanica and is not a true reflection of the entire extent of the vegetation within the local area. Therefore, the percentage impacts reported are an overestimate of the actual impacts and represent the maximum possible impact.

A total of 612 ha of vegetation is proposed to be directly impacted within the indicative disturbance footprint; 272 ha and 340 ha of vegetation within the indicative mine disturbance footprint and haul road disturbance footprint respectively. The remaining total indicative disturbance footprint area (33 ha) comprises existing disturbance.

Eleven of the fourteen floristic communities identified at the Medcalf Project are located within the proposed indicative disturbance footprint and will be directly impacted by the Medcalf Project. Six floristic communities identified as significant vegetation are located within the proposed indicative disturbance footprint and will be directly impacted by the Medcalf Project. Direct impacts to significant vegetation ranges from 2.8% (CLP-EW1) to 20% (HS-MWS1).

Thirteen pre-European vegetation associations identified at the Medcalf Project are located within the proposed indicative disturbance footprint and will be directly impacted by the Medcalf Project. The direct impacts to these vegetation associations is low ranging from 0.001% (Cave Hill 522) to 1.66% impact (Dundas 551) on the remaining extent of these vegetation associations within the Southern Cross and Eastern Goldfields subregions. No significant direct impacts to pre-European vegetation are proposed from development of the Medcalf Project, with all pre-European vegetation retaining $\geq 97\%$ of their pre-European vegetation extent within the Southern Cross and Eastern Goldfields subregions.

Table 6-2: Area of Direct Impact to Vegetation-Local and Regional Scale

Local Floristic Communities	Local Impacts							Regional Floristic Communities	Pre-European Extent Remaining		Regional Impacts				
	Mine and associated infrastructure		Haul road and associated infrastructure		Total Project		Total Area-Mapped Extent (ha)		% local habitat (survey area) predicted to be impacted- Indicative Disturbance Footprint	% local habitat (survey area) within Development Envelopes	Pre-European Vegetation	Total Area in COO2 subregion (ha)	Total Area in COO3 subregion (ha)	% regional habitat proposed to be impacted (Indicative Disturbance Footprint)	% regional habitat intersected by Development Envelopes
	Indicative Disturbance Footprint (ha)	Development Envelope (ha)	Indicative Disturbance Footprint (ha)	Development Envelope (ha)	Indicative Disturbance Footprint (ha)	Development Envelope (ha)									
CD-CSSSF1	0.0	0.0	0.2	2.2	0.2	2.2	67	0.28	3.29	Cave Hill 125	46,346		0.00	0.00	
										Dundas 125		56,750	0.00	0.00	
CLP-EW1	79	271	200	965	279	1,237	10,022	2.78	12.34	Cave Hill 936	157,639		0.18	0.78	
CLP-MWS1	124	341	20	123	144	464	1,975	7.30	23.49	Dundas 486	1	22,349	0.65	2.08	
CLP-MWS2	0	0	54	234	54	234	2,561	2.10	9.15	Cave Hill 1148	21,464		0.25	1.09	
										Cave Hill 1413	81,472	6,463	0.06	0.27	
G-H1	0	0	14	17	14	17	265	5.41	6.59	Cave Hill 128	35,266		0.04	0.05	
										Dundas 128		3,516	0.41	0.50	
										Dundas 551		844	1.66	1.66	
HS-EW1	1	5	0	0	1	5	15	9.18	32.21	Cave Hill 522	160,644	14,856	0.00	0.00	
										Binneringe 522	95,964	166,395	0.00	0.00	
HS-MWS1	30	63	0	0	30	63	150	19.97	42.32	Bremer Range 491	67,021		0.04	0.09	
HS-MWS2	0	0	0	0	0	0	16	0.00	0.00	Bremer Range 491	67,021		0.00	0.00	
HS-MWS3	0	0	0	0	0	0	96	0.00	0.00	Bremer Range 491	67,021		0.00	0.00	
HS-OS1	36	167	0	0	36	167	412	8.69	40.48	Cave Hill 1413	81,472	6,463	0.04	0.19	
SLP-EW1	0.2	1	17	127	17	128	1,520	1.13	8.41	Cave Hill 936	157,639		0.01	0.08	
										Dundas 3106		51,602	0.03	0.25	
SLP-MWS1	0	0	34	135	34	135	1,436	2.36	9.41	Cave Hill 1148	21,464		0.16	0.63	
										Cave Hill 1413	81,472	6,463	0.04	0.15	
SLP-MWS2	2	36	0	0	2	36	67	2.72	53.12	Cave Hill 1148	21,464		0.01	0.17	
										Cave Hill 1413	81,472	6,463	0.00	0.04	
SLP-OS1	0	0	0	0	0	0	27	0.00	0.00	Cave Hill 1148	21,464		0.00	0.00	
										Cave Hill 1413	81,472	6,463	0.00	0.00	
TOTAL VEGETATION	272	884	340	1,604	612	2,488	18,630	N/A	N/A	N/A					
CV	8	14	26	26	33	39	59	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Playa	0	0	0	0	0	0.2	142	0.00	0.15	Cave Hill 125	46,346		0.00	0.00	
										Dundas 125		56,750	0.00	0.00	
TOTAL CLEARED VEGETATION/PLAYA	8	14	26	26	33	39	201	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
TOTAL PROJECT	280	898	365	1,630	645	2,528	18,830	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Table 6-3: Area of Direct Impact to Pre-European Vegetation Associations

Pre-European Vegetation	Pre-European Extent Remaining (ha)		Pre-European extent remaining (%)		area of regional habitat predicted to be impacted (Indicative Disturbance Footprint) (ha)	% regional habitat predicted to be impacted (Indicative Disturbance Footprint)	area of regional habitat intersected by Development Envelope (ha)	% regional habitat intersected by Development Envelope	Pre-European Extent Remaining following Direct Impacts (%)	
	COO2 subregion	COO3 subregion	COO2 subregion	COO3 subregion					COO2 subregion	COO3 subregion
Bremer Range 491	67,021		99.85	100	30	0.04	63	0.09	99.81	99.96
Cave Hill 125	46,346	1,555	100	100	0.2	0.00	2	0.00	100.00	100.00
Cave Hill 128	35,266	529	99.97	100	14	0.04	17	0.05	99.93	99.96
Cave Hill 522	160,644	14,856	99.99	100	1	0.001	5	0.003	99.99	100.00
Cave Hill 936	157,639		100		296	0.19	1,365	0.87	99.81	
Cave Hill 1148	21,464		100		90	0.42	405	1.89	99.58	
Cave Hill 1413	81,472	6,463	100	100	126	0.14	572	0.65	99.86	99.86
Binneringe 522	95,964	166,395	100	99.87	1	0.00	5	0.00	100.00	99.87
Dundas 125		56,750		100	0.2	0.00	2	0.00		100.00
Dundas 128		3,516		99.99	14	0.40	17	0.48		99.59
Dundas 486	0.74	22,349	100	100	144	0.64	464	2.08	99.36	99.36
Dundas 551		844		100	14	1.66	17	2.01		98.34
Dundas 3106		51,602		97.99	17	0.03	128	0.25		97.96

Table 6-4: Area of Direct Impact to Significant Vegetation

Floristic Community	Veg Code	Total Mapped Extent (ha)	Mine and associated infrastructure		Haul road and associated infrastructure		Total Project		% Direct Impact
			Indicative Disturbance Footprint (ha)	Development Envelope (ha)	Indicative Disturbance Footprint (ha)	Development Envelope (ha)	Indicative Disturbance Footprint (ha)	Development Envelope (ha)	
Low open woodland of <i>Eucalyptus salmonophloia</i> over mixed shrubs on clay-loam plain	CLP-EW1	10,022	79	271	200	965	279	1,237	2.8
Mid mallee shrubland of <i>Eucalyptus</i> spp. over mid shrubland of <i>Melaleuca pauperiflora</i> and mixed low shrubland on clay-loam plain	CLP-MWS1	1,975	124	341	20	123	144	464	7.3
Mid mallee woodland of <i>Eucalyptus</i> spp. over mixed low shrubland/ heathland on clay-loam plain	CLP-MWS2	2,561	0	0	54	234	54	234	2.1
Regrowth of low open forest of <i>Eucalyptus</i> sp. (Sterile) on hillslope	HS-EW1	15	1	5	0	0	1	5	9.2
Regrowth mid open mallee woodland of <i>Eucalyptus livida</i> over mid open shrubland of <i>Hakea pendens</i> and open low shrubland of <i>Goodia medicaginea</i> on hillslope	HS-MWS1	150	30	63	0	0	30	63	20.0
Regrowth low open mallee shrubland of <i>Eucalyptus</i> spp. over low shrubland of <i>Acacia</i> spp. and open tussock grassland of <i>Schoenus breviculmis</i> on hillslope	HS-MWS2	16	0	0	0	0	0	0	0.0
Mid open mallee woodland of <i>Eucalyptus livida</i> over heathland of <i>Allocasuarina/ Hakea/ Melaleuca</i> and open low sedge of <i>Lepidosperma sanguinolentum</i> on hillslope	HS-MWS3	96	0	0	0	0	0	0	0.0
Regrowth mixed low shrubland on hillslope	HS-OS1	412	36	167	0	0	36	167	8.7

6.3 Significant Flora

One Threatened Flora taxon pursuant to the BC Act was identified within the local area; *Marianthus aquilonaris*. This taxon is not listed as Threatened under the EPBC Act. All current sub-populations of this taxon are located outside of the mine and haul road development envelopes/ indicative disturbance footprint. Further details on the ecology of this taxon, including assessments conducted to determine critical, optimal and sub-optimal habitat for this taxon are provided in *Updated Summary on ecology of Marianthus aquilonaris* (Botanica, 2020b).

The haul road development envelope is not located within the critical, optimal or sub-optimal habitat of *Marianthus aquilonaris* and is not located within the Environmentally Sensitive Area (ESA) which encompasses a 50m radius of the area of occupancy of *Marianthus aquilonaris*.

The mine development envelope and indicative disturbance footprint intersects with the critical habitat, sub-optimal habitat and ESA boundary of *Marianthus aquilonaris*. No optimal habitat is located within the mine development envelope and indicative disturbance footprint. Approximately 2.34% and 2.87% of the total extent of critical habitat and sub-optimal habitat is proposed to be directly impacted by the Medcalf Project development (Table 6-5 and Figure 6-1).

Table 6-5: Direct Impacts to *Marianthus aquilonaris* habitat

<i>Marianthus aquilonaris</i> Habitat	Total Mapped Extent (ha)	Mine and associated infrastructure		Haul road and associated infrastructure		Total Project			
		Indicative Disturbance Footprint (ha)	Development Envelope (ha)	Indicative Disturbance Footprint (ha)	Development Envelope (ha)	Indicative Disturbance Footprint		Development Envelope	
						Total Area (ha)	Total Area (%)	Total Area (ha)	Total Area (%)
Area of Occupancy	4.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Critical Habitat	64.50	1.51	2.48	0.00	0.00	1.51	2.34	2.48	3.84
Optimal Habitat	16.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-optimal Habitat	52.57	1.51	2.48	0.00	0.00	1.51	2.87	2.48	4.72

Seven Priority Flora are located within the mine and haul road development envelopes, five of which are located within the indicative disturbance footprint and are proposed to be directly impacted (Table 6-6). Direct impacts on Priority Flora ranges from 2.9% (*Acacia mutabilis* subsp. *stipulifera* (P3)) to 12.9% (*Hakea pendens* (P3)).

One of the Priority Flora taxa proposed to be directly impacted; *Eucalyptus rhomboidea* (P4) is currently being nominated by DBCA for Threatened status under the BC Act. A second Priority Flora taxon proposed to be directly impacted; *Stenanthemum bremerense* (P4) is being considered by DBCA for nomination to Threatened status under the BC Act. As part of targeted surveys conducted which are detailed in the Medcalf Project flora/ vegetation report (Botanica, 2020a), the population extent of these taxa were assessed and mapped by Botanica. A map showing the population extent of *Eucalyptus rhomboidea* (P4) and *Stenanthemum bremerense* (P4) in relation to the development envelopes/ indicative disturbance footprint is provided in Figure 6-2. Direct impacts to the local population extent of *E. rhomboidea* and *S. bremerense* (excluding populations that were in recent fire affected regions and could not be surveyed) are 3.3% and 37.3% respectively. Further details on the ecology of these taxa, including assessments conducted to determine critical, optimal and sub-optimal habitat for *E. rhomboidea* and *S. bremerense* are provided in Appendix 1.

Table 6-6: Direct Impacts to Significant Flora

Taxon	Category	Mine and associated infrastructure		Haul road and associated infrastructure		Total Project				No. plants in local region ²	No. populations in local region	Indicative Disturbance Footprint % impact on local population extent	Indicative Disturbance Footprint % impact on local populations	Development Envelope % impact on local population extent	Development Envelope % impact on local populations
		No. plants within indicative disturbance footprint	No. plants within development envelope	No. plants within indicative disturbance footprint	No. plants within development envelope	No. plants within indicative disturbance footprint	No. populations within disturbance footprint	No. plants within development envelope	No. populations within development envelope						
<i>Marianthus aquilonaris</i>	Threatened									14,627	6				
<i>Acacia hystrix</i> subsp. <i>continua</i>	Priority 1									122	1				
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	Priority 3	1	1,107	10,000	10,108	10,001	1	11,215	3	348,452	20	2.9	5.0	3.2	15.0
<i>Bossiaea flexuosa</i>	Priority 3									217	2				
<i>Brachyloma stenolobum</i>	Priority 1									560	2				
<i>Eucalyptus pterocarpa</i>	Priority 3				100			100	1	100	1	0.0	0.0	100.0	100.0
<i>Eucalyptus rhomboidea</i>	Priority 4	768	1,198			768	2	1,198	2	15,606	6	4.9	33.3	7.7	33.3
<i>Hakea pendens</i>	Priority 3	876	1,246			876	2	1,246	2	6,783	6	12.9	33.3	18.4	33.3
<i>Microcybe</i> sp. Windy Hill (G.F. Craig 6583)	Priority 3		20					20	1	26,962	15			0.1	6.7
<i>Stenanthemum bremerense</i>	Priority 4	2049	3,455			2049	2	3,455	3	40,126	25	5.1	8.0	8.6	12.0
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	Priority 3	950	1,050	200	400	1,150	3	1,450	4	16,153	12	7.1	25.0	9.0	33.3

Table 6-7: Direct Impacts to *Eucalyptus rhomboidea* and *Stenanthemum bremerense* population area

Taxon	Total No. Unburnt Populations/ Sub-populations ³	No. Populations/ Sub-populations within Development Envelope	Total Population Area (ha)	Mine and associated infrastructure		Haul road and associated infrastructure		Total Project	
				Population area within indicative disturbance footprint (ha)	Population area within development envelope (ha)	Population area within indicative disturbance footprint (ha)	Population area within development envelope (ha)	Indicative Disturbance Footprint % impact on local populations	Development Envelope % impact on local populations
<i>Eucalyptus rhomboidea</i> (P4)	6	2	12	0.4	1	0	0	3.3	8.2
<i>Stenanthemum bremerense</i> (P4)	25	3	56	21	27	0	0	37.3	47.8

Table 6-8: Direct Impacts to *Eucalyptus rhomboidea* and *Stenanthemum bremerense* habitat

Habitat	Total Mapped Extent (ha)	Mine and associated infrastructure		Haul road and associated infrastructure		Total Project			
		Indicative Disturbance Footprint (ha)	Development Envelope (ha)	Indicative Disturbance Footprint (ha)	Development Envelope (ha)	Indicative Disturbance Footprint		Development Envelope	
						Total Area (ha)	Total Area (%)	Total Area (ha)	Total Area (%)
<i>Eucalyptus rhomboidea</i>									
Area of Occupancy	5,200	0.4	1	0	0	0.4	0.008	1.0	0.02
Critical Habitat	42,775	279	896	3	16	282	0.7	912	2.1
Optimal Habitat	2481	77	227	0	0	77	3.1	227	9.1
Sub-optimal Habitat	40,294	202	669	3	16	205	0.5	685	1.7
<i>Stenanthemum bremerense</i>									
Area of Occupancy	10,000	21	27	0	0	21	0.2	27	0.3
Critical Habitat	221,008	279	896	5	28	284	0.1	924	0.4
Optimal Habitat	23,554	263	806	0	12	263	1.1	818	3.5
Sub-optimal Habitat	197,454	16	89	3	17	19	0.0	106	0.1

² Based on total number of plants recorded within 150km of the Medcalf Project

³ Excludes individual plant records/ bushfire affected areas where survey could not be conducted

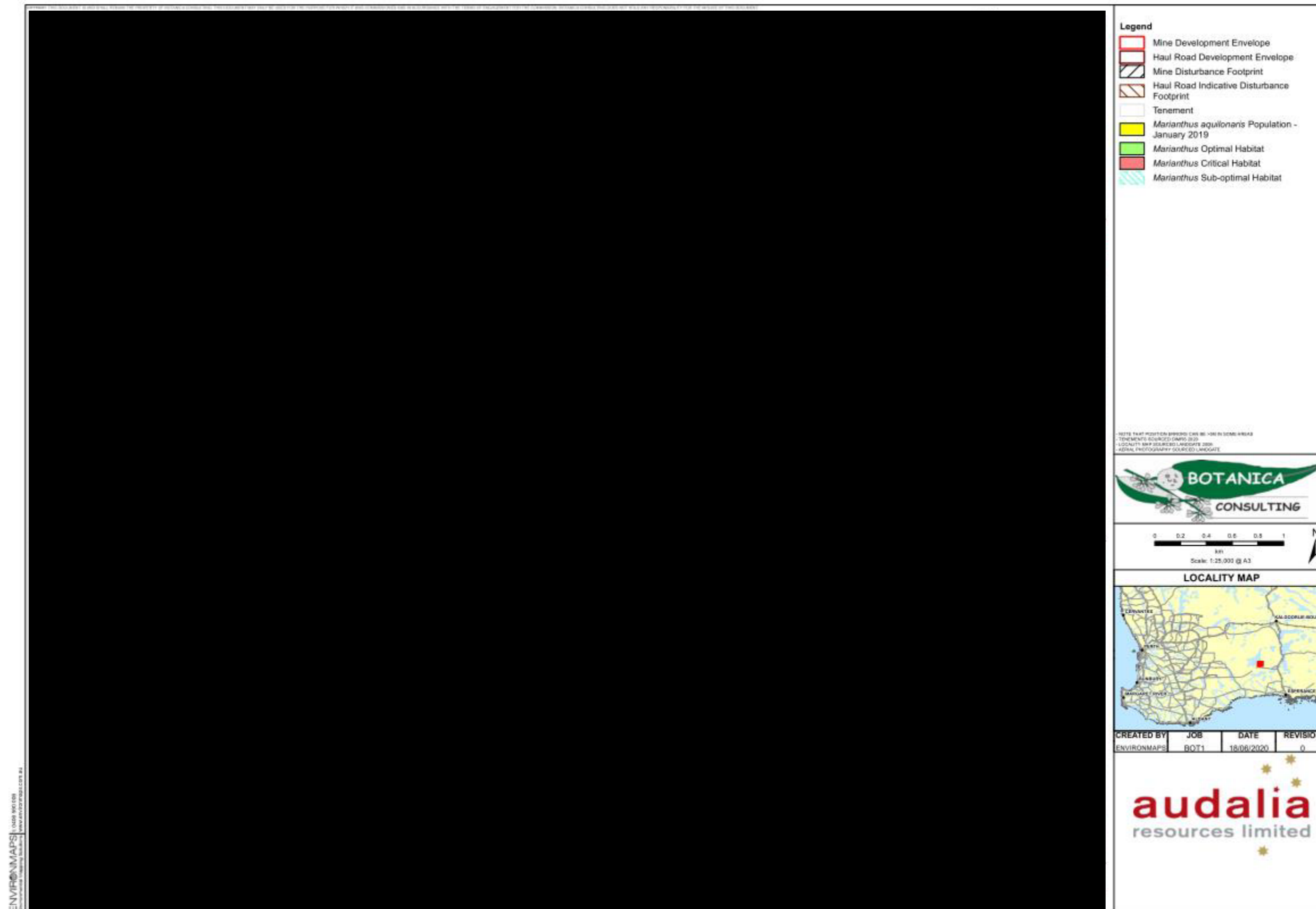


Figure 6-1: Location Map of *Marianthus aquilonaris* populations and habitat in relation to the development envelopes/ indicative disturbance footprint

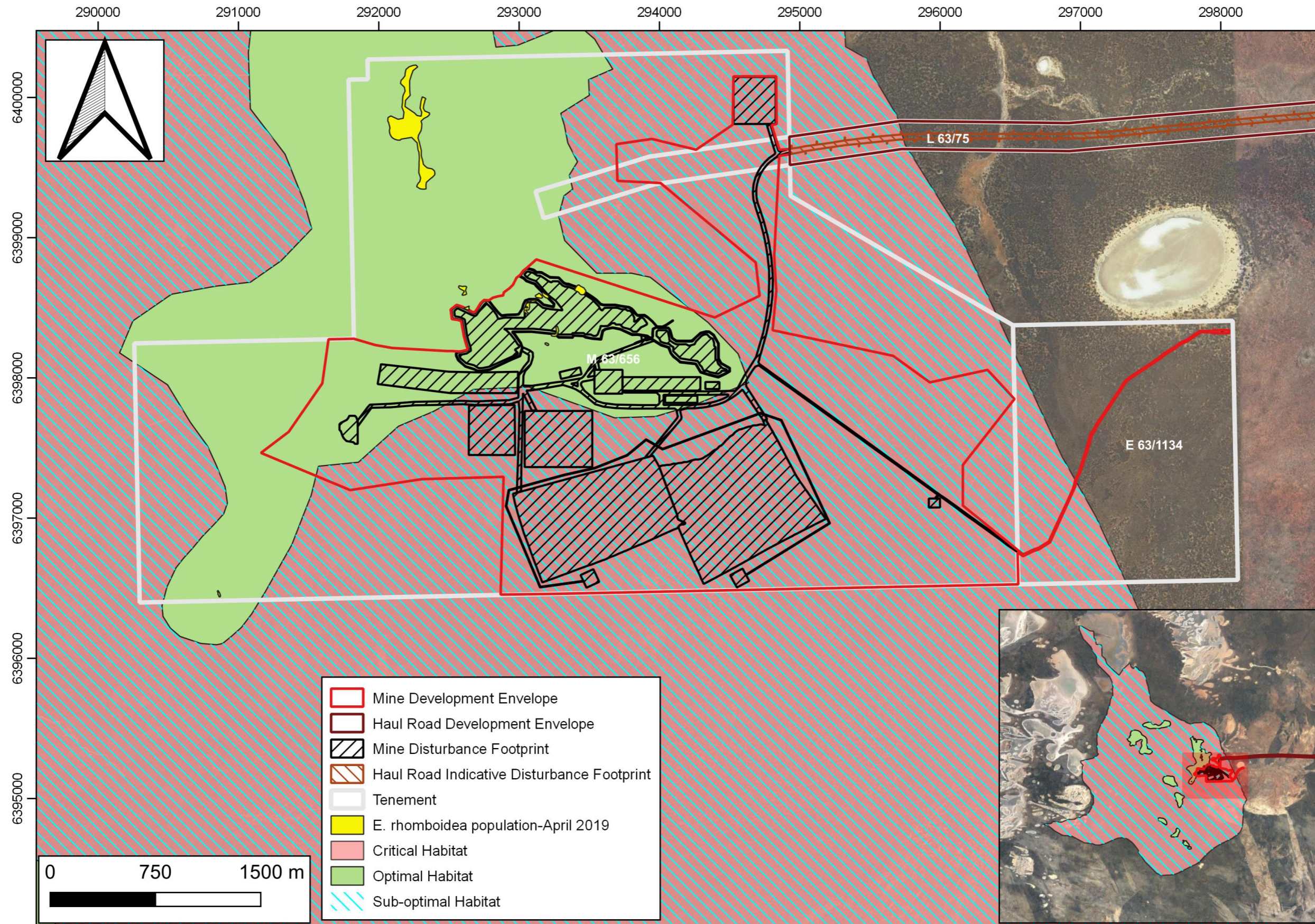


Figure 6-2: Location Map of *Eucalyptus rhomboidea* populations and habitat in relation to the development envelopes/ indicative disturbance footprint

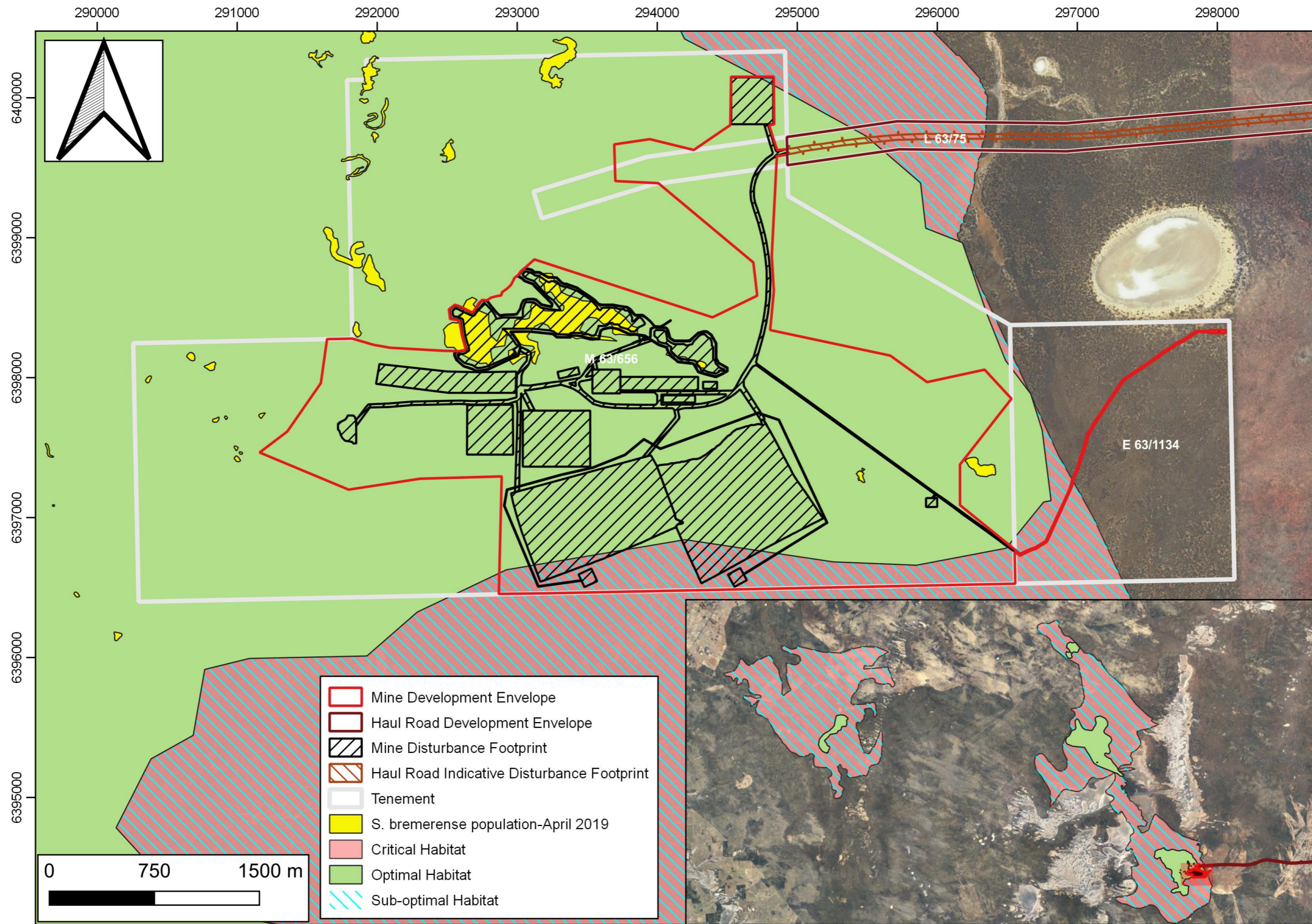


Figure 6-3: Location Map of *Stenanthemum bremerense* populations and habitat in relation to the development envelopes/ indicative disturbance footprint

7 Cumulative Direct Impacts

Mining within the Bremer Range region has been limited with only one other mining operation (Emily Ann/ Maggie Hayes) developed within the Bremer Range PEC. The Emily Ann/ Maggie Hayes Project is located outside of the proposed Bremer Range Nature Reserve.

Despite both the Emily Ann/ Maggie Hayes Project and Medcalf Project occurring within the Bremer Range PEC, vegetation identified within the Emily Ann/ Maggie Hayes Project is not representative of the vegetation communities identified at the Medcalf Project, therefore cumulative impacts on vegetation of the Medcalf Project are not relevant to this assessment.

Direct cumulative impacts of native vegetation clearing within the Bremer Range PEC from the previously constructed Emily Ann/ Maggie Hayes Project and the proposed Medcalf Project are summarized in Table 7-1. Cumulative impacts from the previous clearing conducted for the Emily Ann/ Maggie Hayes Project and the proposed clearing of the Medcalf Project represents a direct impact on 0.55% of the total extent of the Bremer Range PEC.

Table 7-1: Direct Cumulative Impacts to Bremer Range PEC

Priority Ecological Community	Total Mapped Extent (ha)	Area to be cleared (ha)			Cumulative Total (%)
		Emily Ann/ Maggie Hayes Disturbance Footprint	Medcalf Project Indicative Disturbance Footprint	Cumulative Total	
Bremer Range PEC	88,150	202	285	487	0.55

Direct cumulative impacts on pre-European vegetation associations from the previously constructed Emily Ann/ Maggie Hayes Project and the proposed Medcalf Project are summarized in Table 7-2. Only one of the thirteen pre-European vegetation associations proposed to be directly impacted by the Medcalf Project is also present at the Emily Ann/ Maggie Hayes Project; Bremer Range 491. The cumulative impacts to this vegetation association is low representing 0.25% impact on the remaining extent of this vegetation association within the Southern Cross and Eastern Goldfields subregions. No significant cumulative impacts to pre-European vegetation are proposed, with all pre-European vegetation retaining $\geq 97\%$ of their pre-European vegetation extent with development of both the Emily Ann/ Maggie Hayes Project and Medcalf Project.

Direct cumulative impacts of clearing significant flora (Threatened and Priority Flora) from the previously constructed Emily Ann/ Maggie Hayes Project and the proposed Medcalf Project are summarized in Table 7-3. No cumulative impacts to Threatened Flora are proposed. Three Priority Flora which are proposed to be directly impacted for the Medcalf Project have been previously impacted by the Emily Ann/ Maggie Hayes Project (Table 7-3). The cumulative impacts to these Priority Flora is low ranging from 2.9% to 13.2% impact on the known local population extent (within 150km of the Medcalf Project).

Table 7-2: Direct Cumulative Impact on Pre-European Vegetation Associations

Pre-European Vegetation	Pre-European Extent Remaining (ha)		Pre-European extent remaining (%)		Area to be cleared (ha)			Cumulative Total (%)	Pre-European Extent Remaining following Direct Impacts (%)	
	COO2 subregion	COO3 subregion	COO2 subregion	COO3 subregion	Emily Ann/Maggie Hayes Disturbance Footprint	Medcalf Project Indicative Disturbance Footprint	Cumulative Total (ha)		COO2 subregion	COO3 subregion
Bremer Range 491	67,021		99.85	100	135	30	165	0.25	99.60	99.75
Cave Hill 125	46,346	1,555	100	100		0.2	0.2	0.00	100.00	100.00
Cave Hill 128	35,266	529	99.97	100		14	14	0.04	99.93	99.96
Cave Hill 522	160,644	14,856	99.99	100		1	1	0.00	99.99	100.00
Cave Hill 936	157,639		100			296	296	0.19	99.81	
Cave Hill 1148	21,464		100			90	90	0.42	99.58	
Cave Hill 1413	81,472	6,463	100	100		126	126	0.14	99.86	99.86
Binneringe 522	95,964	166,395	100	99.87		1	1	0.00	100.00	99.87
Dundas 125		56,750		100		0.2	0.2	0.00		100.00
Dundas 128		3,516		99.99		14	14	0.40		99.59
Dundas 486	0.74	22,349	100	100		144	144	0.64	99.36	99.36
Dundas 551		844		100		14	14	1.66		98.34
Dundas 3106		51,602		97.99		17	17	0.03		97.96

Table 7-3: Direct Cumulative Impacts to Significant Flora

Taxon	Category	No. Plants proposed to be directly Impacted			No. plants in local region	% Cumulative Impact
		Emily Ann/Maggie Hayes Disturbance Footprint	Medcalf Project Indicative Disturbance Footprint	Cumulative Total		
<i>Marianthus aquilonaris</i>	Threatened				14,627	0.0
<i>Acacia hystrix</i> subsp. <i>continua</i>	Priority 1				122	0.0
<i>Acacia mutabilis</i> subsp. <i>stipulifera</i>	Priority 3	20	10,001	10,021	348,452	2.9
<i>Bossiaea flexuosa</i>	Priority 3				217	0.0
<i>Brachyloma stenolobum</i>	Priority 1				560	0.0
<i>Eucalyptus pterocarpa</i>	Priority 3				100	0.0
<i>Eucalyptus rhomboidea</i>	Priority 4		768	768	15,606	4.9
<i>Hakea pendens</i>	Priority 3	20	876	896	6,783	13.2
<i>Microcybe</i> sp. Windy Hill (G.F. Craig 6583)	Priority 3	100		100	26,962	0.4
<i>Stenanthemum bremerense</i>	Priority 4	300	2,049	2,349	40,126	5.9
<i>Teucrium</i> sp. dwarf (R. Davis 8813)	Priority 3		1,150	1,150	16,153	7.1

8 Bibliography

Armstrong, (2002), Vegetation survey and rare flora search of Maggie Hays Nickel Mine and adjacent areas. Prepared by Paul Armstrong and Associates for Lionore Australia Nickel.

Armstrong, (2005), Vegetation survey and rare flora search of Maggie Hays and Emily Ann Nickel Mines and adjacent areas. Prepared by Paul Armstrong and Associates for Lionore Australia Nickel.

Armstrong, (2011), Vegetation survey and rare flora search of Maggie Hays and Emily Ann Nickel Mines and adjacent areas. Prepared by Paul Armstrong and Associates for Lionore Australia Nickel.

Armstrong, (2012), Impact of proposed haul road from Maggie Hays to Emily Ann Plant Prepared by Paul Armstrong and Associates for Audalia Resources Limited.

Australian Government, (2012), Atlas of Groundwater Dependent Ecosystems (GDE Atlas), Phase 2 Task 5 Report: Identifying and mapping GDEs. Australian Government National Water Commission. Sinclair Knight Merz.

Barron, O.V., Emelyanova, I., Van Niel, T.G., Pollock, D., & Hodgson, G., (2012) Mapping groundwater-dependent ecosystems using remote sensing measures of vegetation and moisture dynamics. *Hydrological Process.* **28**: 372–385

Botanica (2013), Flora of Conservation Significance search of the Medcalf Exploration Project, May 2013. Prepared by Botanica Consulting for Audalia Resources Limited.

Botanica (2015), Level 2 Flora & Vegetation Survey for the Medcalf Vanadium Mining Project Spring 2013 to Autumn 2015. Prepared by Botanica Consulting for Audalia Resources Limited.

Botanica (2020a), Detailed Flora & Vegetation Survey Medcalf Project. Prepared by Botanica Consulting for Audalia Resources Limited.

Botanica (2020b), Updated Summary on ecology of *Marianthus aquilonaris*. Prepared by Botanica Consulting for Audalia Resources Limited.

BoM, (2019b), Groundwater Dependent Ecosystem Atlas, Bureau of Meteorology.

Available: <http://www.bom.gov.au/water/groundwater/gde/map.shtml>

Accessed: 3rd November 2019

Brearley, D.R, Dunlop, N.J and Osborne, J.M, (1998) Biological Survey and Environmental Assessment of the Emily Ann Project Area. School of Environmental Biology Curtin University of Technology.

DBCA (2019), 2018 Statewide Vegetation Statistics (formerly the CAR Reserve Analysis). Department of Biodiversity, Conservation and Attractions.

DPaW, (2017a), *Threatened and Priority Flora Database search results*, Department of Parks and Wildlife

DPaW, (2017b), *Threatened Ecological Community and Priority Ecological Community database search*, Department of Parks and Wildlife

DPIRD (2019), *Declared Organism-database search*, Department of Primary Industries and Regional Development, Western Australia.

<http://www.biosecurity.wa.gov.au/>

Accessed: 20/10/2019

EPA (2016), Technical Guide - Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment – December 2016. Department of Parks and Wildlife & Environmental Protection Authority.

Gibson, N. & Lyons, M.N (1998), Flora and Vegetation of the Eastern Goldfields Ranges: Part 2. Bremer Range, Journal of the Royal Society of Western Australia, 81:107-117.

GRM (2020), Groundwater Supply Investigation Audalia Resources Limited Medcalf Vanadium Project. Prepared by Groundwater Resource Management for Audalia Resources Limited.

How, R.A, Newbey, K.R, Dell, J., Muir, B.G & Hnatiuk, R.J, (1988), The Biological survey of the Eastern Goldfields of Western Australia: Part 4. Lake Johnston-Hyden Study Area Western Australian Museum Supplement No. 30.

Landgate, (2017), Landgate fire watch database. Landgate Western Australian Government
http://firewatch.landgate.wa.gov.au/landgate_firewatch_public.asp
Accessed: 29/06/2017

Western Horticultural Consulting (2019), Soils of the Audalia Medcalf area. Investigations into the soils on which *Marianthus aquilonaris*, *Eucalyptus rhomboidea* and *Stenanthemum bremerense* grow - for use in defining critical habitats. Prepared by Neil Lantzke for Audalia Resources Limited.

Norilsk (2014), Lake Johnston Operations Mine Closure Plan. Prepared by Norilsk Nickel Australia.

Ramboll (2020a), Audalia Resources Limited Medcalf Project – Dust Deposition Study. Prepared by Ramboll Australia Pty Ltd for Audalia Resources Limited.

Ramboll (2020b), Audalia Resources Medcalf Project – Haul Road Dust Deposition Study. Prepared by Ramboll Australia Pty Ltd for Audalia Resources Limited.

WAHERB, (2020), Florabase – Information on the Western Australian Flora, Department of Biodiversity, Conservation and Attractions
<https://florabase.dpaw.wa.gov.au/>
Accessed: 13/03/2020

Appendix 1: *E. rhomboidea*/ *S. bremerense* Critical Habitat Memo