



**Western  
Botanical**



Reconnaissance Vegetation Survey of portion of Lot  
366/DP203231 Morrison Road Shire of Westonia

Prepared for: Covalent Lithium Pty Ltd

Report Ref: WB1030



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## Contents

<b>1.</b>	<b>Introduction.....</b>	<b>1</b>
<b>2.</b>	<b>Methods.....</b>	<b>1</b>
<b>3.</b>	<b>Results and Discussion.....</b>	<b>2</b>
3.1.	Landforms and soils.....	2
3.2.	Vegetation.....	2
3.3.	Threatened Ecological Communities.....	13
<b>4.</b>	<b>Summary.....</b>	<b>14</b>
4.1.	References.....	15
<b>5.</b>	<b>List of Participants.....</b>	<b>15</b>

## Tables

Table 1.	Vegetation units of the potential offset package .....	12
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## Figures

Figure 1.	Surface geology of the potential offset package .....	4
Figure 2.	Survey track log and relevé sites of the February 2024 assessment.....	6
Figure 3.	Vegetation mapping within the potential offset package.....	8
Figure 4.	Vegetation condition.....	10





## 1. Introduction

Covalent Lithium Pty Ltd (Covalent) engaged Western Botanical to undertake a brief assessment of the conservation values of portion of Warralakin Lot 366 (the Study area) as a proposed offset package being considered for the Earl Grey Lithium Project at Mt Holland. The proposed offset package lies approximately 70 km north of Merredin, west of and adjacent to Chiddarcooping Nature Reserve (R 19210).

## 2. Methods

The Study area was assessed by Western Botanical senior botanists Geoff Cockerton and Linda Dalglish over two three-day periods (inclusive of travel to and from site), 15<sup>th</sup> to 17<sup>th</sup> and 26<sup>th</sup> to 28<sup>th</sup> February 2024, where the focus of the field surveys was to (i) inspect the landforms and vegetation associations of the Study area; and ii) identify areas of *Eucalypt woodlands of the Western Australian Wheatbelt Priority 3 Priority Ecological Community (PEC)*, equivalent to the Federally listed *Woodlands of the Avon Wheatbelt Threatened Ecological Community (TEC)* within the Study area.

Field surveys were undertaken in vehicle and on-foot over two days, 16<sup>th</sup> to 17<sup>th</sup> February 2024, and over one day, 27<sup>th</sup> February 2024.

Vegetation was assessed at eleven relevé sites with representative photos of vegetation taken and selected specimens collected for verification of identification. Field observations were entered directly into iPhones running proprietary Fulcrum applications with background satellite imagery available at all times.

Each Vegetation Unit (i.e. vegetation type as per ESCAVI 2003) was described, and records of significant flora were entered into Western Botanical proprietary Fulcrum databases with an accuracy of +/- 2.5m for point data.

An assessment of condition as per the Vegetation Condition Scale (Table 2) in the EPA Guidance (Environmental Protection Authority 2016), was recorded for each vegetation unit.

Note that the Study area had restricted access due to the intact perimeter fencing, lack of gates, few navigable tracks, and the presence of granite terraces or thick vegetation across much of the landscape. There was no vehicle access onto the Study area or to the eastern boundary of the Study area.

### 3. Results and Discussion

#### 3.1. Landforms and soils

Vegetation and significant flora are strongly correlated with landscape, surface geology and soils. Differences in these factors have a powerful influence on species composition and the vegetation present. Consequently, the landforms and soils present within the offset package are a useful indicator of likely vegetation correlations.

Four types of surface geology are present across the proposed offset package:

- (Agv) – variably textured medium- and coarse-grained, seriate granite and adamellite, locally porphyritic;
- (Ts) – remnant sandplain of yellow to white sand containing locally abundant limonitic pebbles;
- (Qc) – colluvium – silt, sand and gravel on slopes and adjoining rock and laterite outcrop;
- (Tl) – laterite – limonite-cemented duricrust overlaying deeply weathered bedrock.

Surface geology (from the Geological Survey of Western Australia, 1:250,000 map – Jackson SH50-12) is presented in Figure 1. Soils observed during the survey included yellow silty sand, pale yellow sandy clay, pale brown silty sand, and pale grey coarse sandy clay over weathered granite.

#### 3.2. Vegetation

Five eucalypt-dominated vegetation units (including four Mallee<sup>1</sup> Shrublands and one tall eucalypt woodland) and five non-eucalypt-dominated units were identified during the assessment. There was also one vegetation unit composed of mixed shrubs to 2.5m present on breakaways of weathered granite.

The tall eucalypt woodland is equivalent to *Eucalypt woodlands of the Western Australian Wheatbelt Priority 3 Priority Ecological Community (PEC)*, equivalent to the Federally listed *Woodlands of the Avon Wheatbelt Threatened Ecological Community (TEC)* and is discussed in further detail in Section 3.3. This unit was described as tall woodland dominated by *Eucalyptus capillosa* with a maximum height of 15m and Percentage Foliage Cover 15% over an intact understorey.

Vegetation condition across most of the Study area was assessed as Pristine or Excellent.

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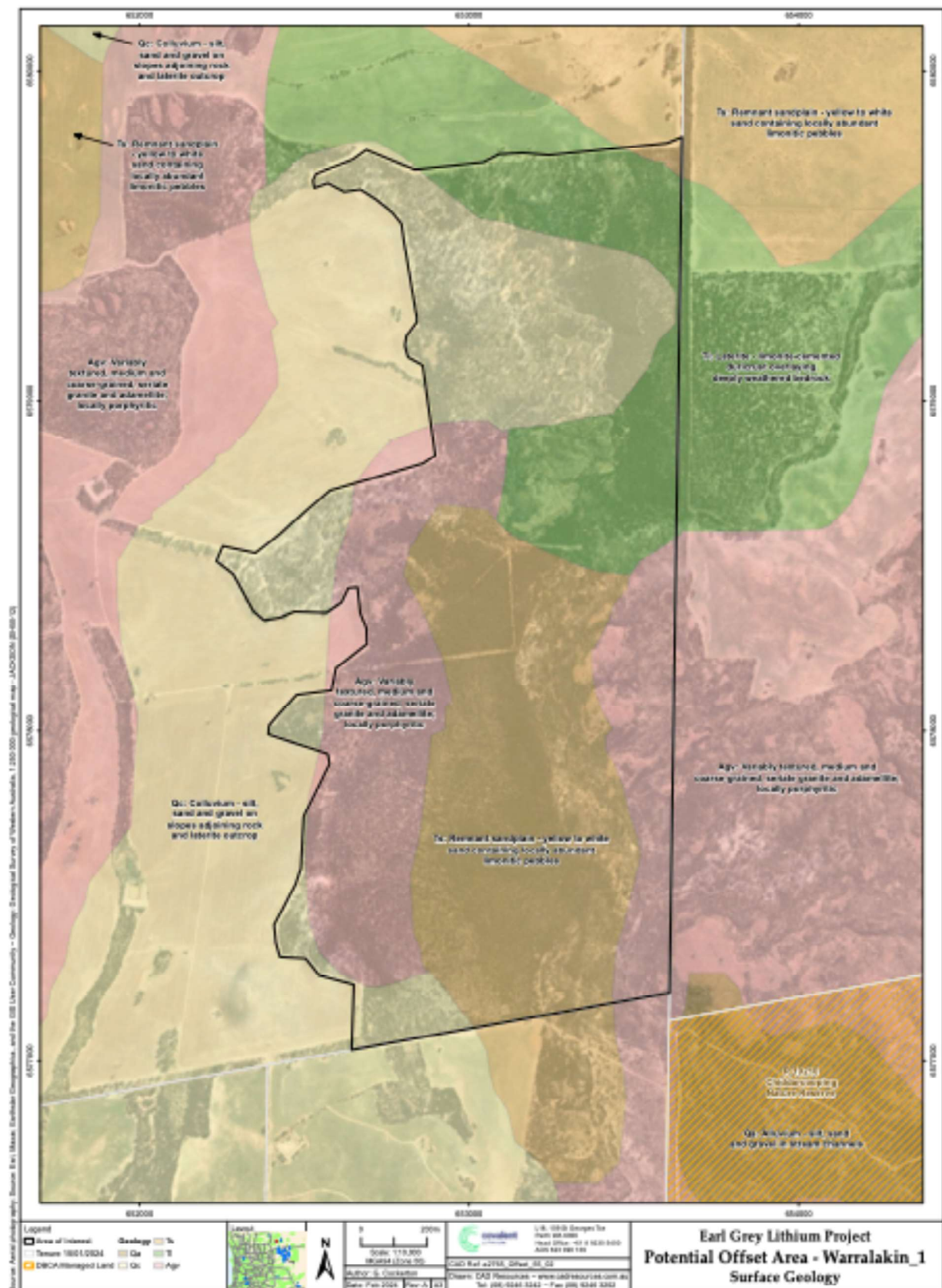
<sup>1</sup> Mallee is a collective term for any species of eucalypt that has multiple stems emerging from a lignotuber (an underground woody storage organ that can survive bushfires when the stems are burned away) (EUCLID 2019).

Minor sections of eucalypt woodland outside the fenced area of Lot 366 were assessed as being in Good condition due to the impact of stock grazing, and two narrow bands of shrubland and eucalypt woodland adjacent to fencelines were assessed as being in Degraded condition due to historic impacts such as clearing and stock grazing.

Survey tracks and relevé sites of the February 2024 survey are presented in Figure 2.

Vegetation mapping is presented in Figure 3, and vegetation condition in Figure 4. Vegetation unit descriptions and their condition are summarised in Table 1.

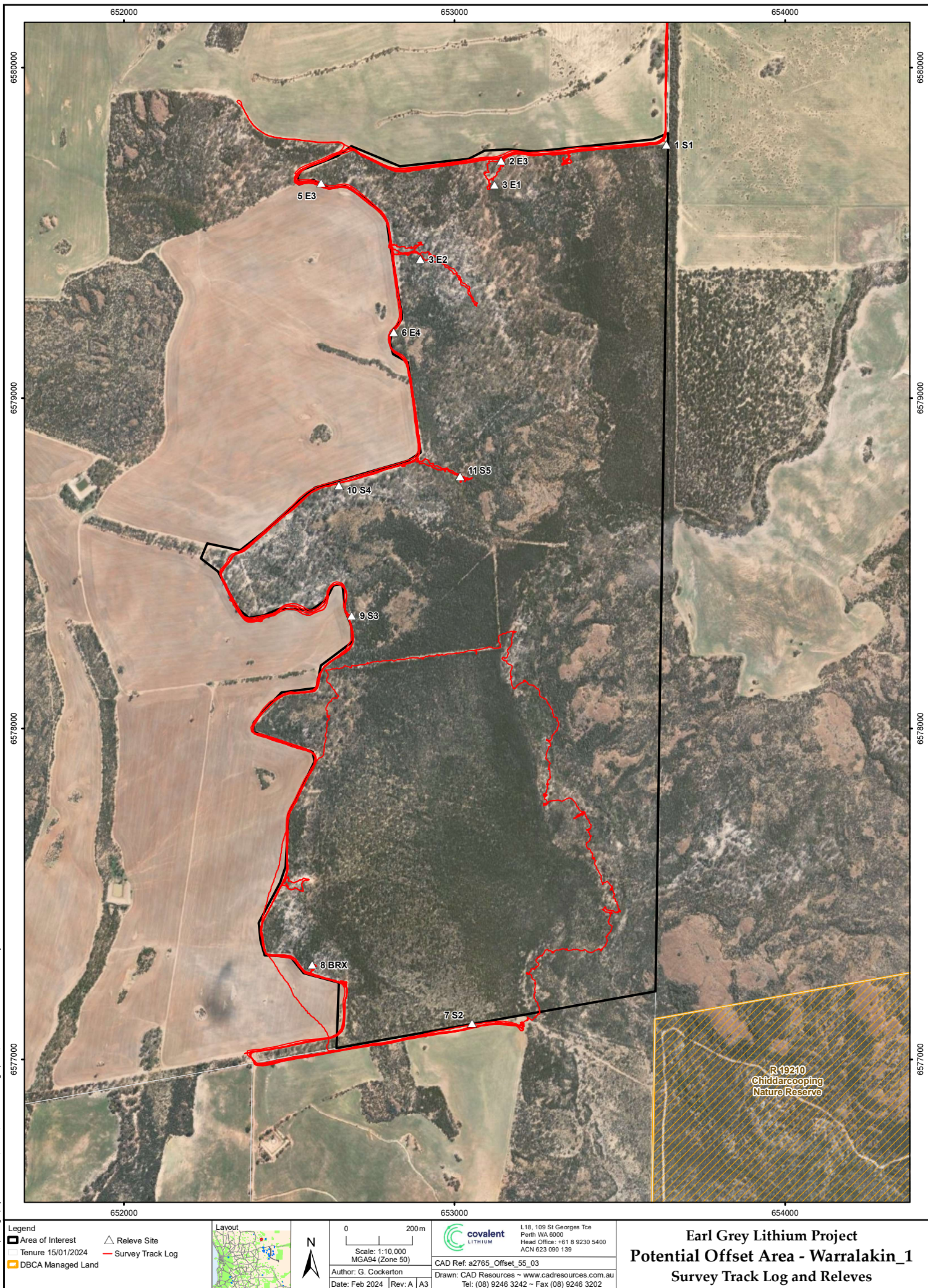
**Figure 1. Surface geology of the potential offset package**



**Figure 2. Survey track log and relevé sites of the February 2024 assessment**



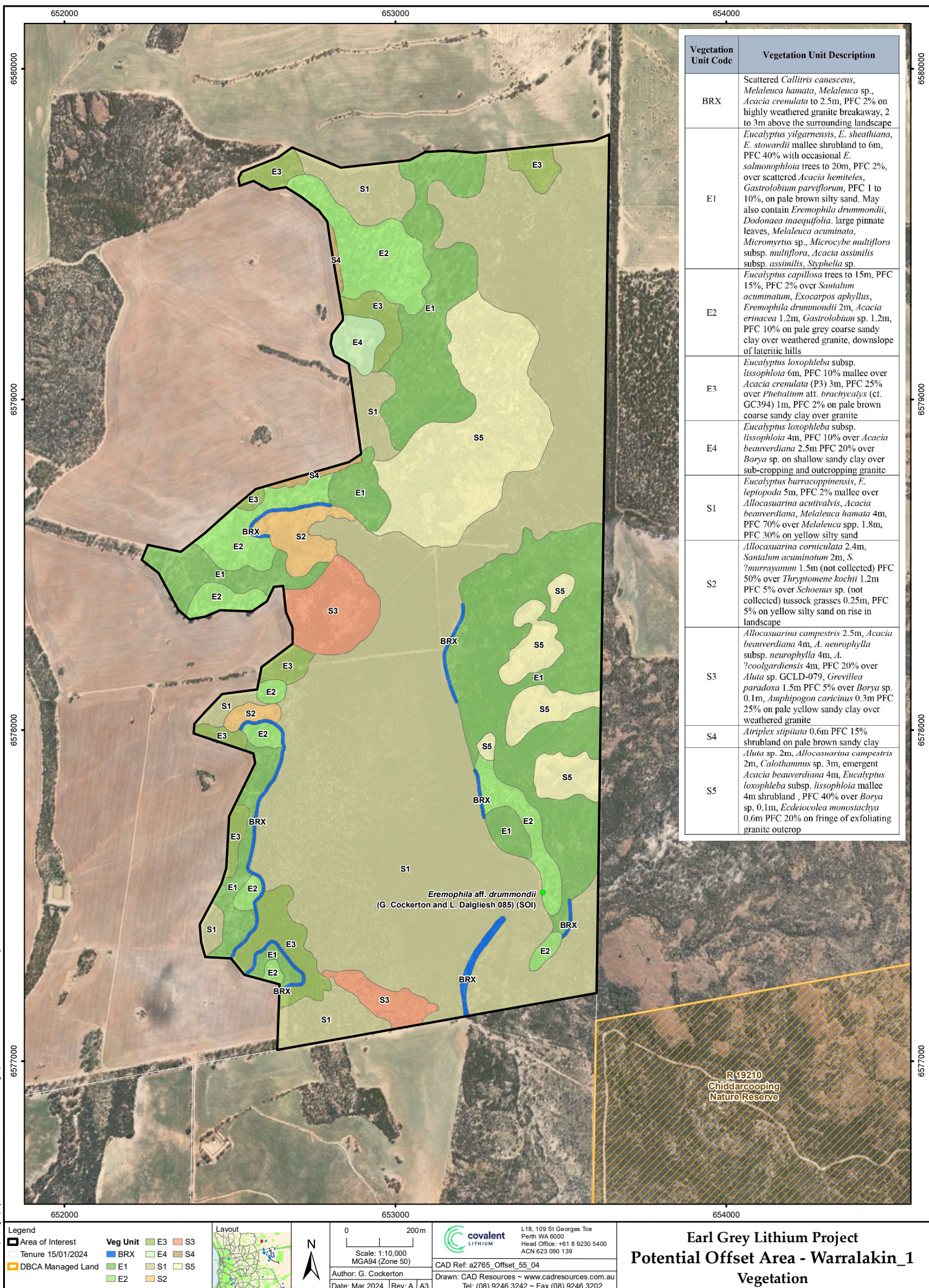
Source: Aerial photography. Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community





**Figure 3. Vegetation mapping within the potential offset package**

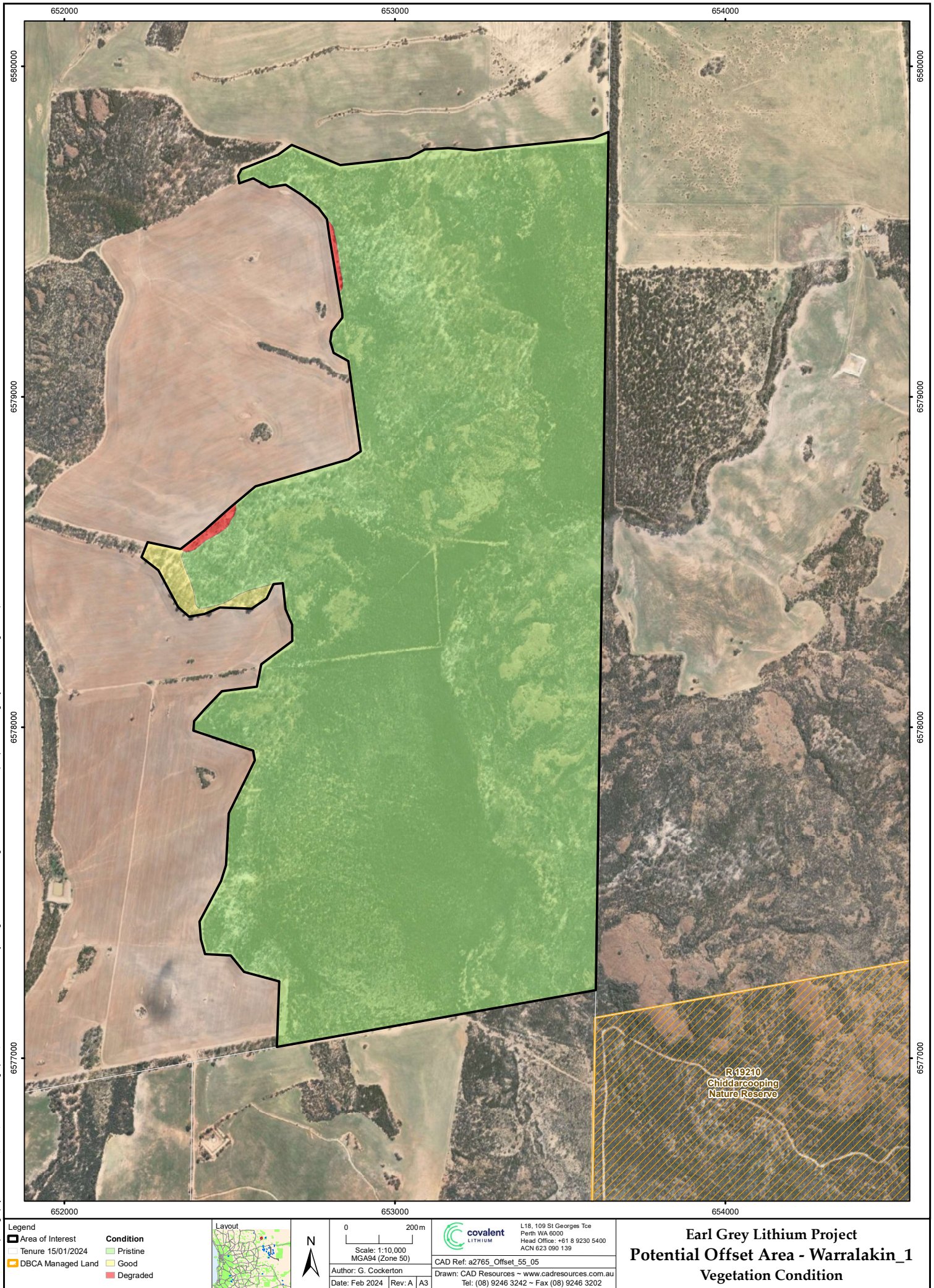




**Figure 4. Vegetation Condition**



Source: Aerial photography. Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community - Vegetation Condition. Scale (adapted from Veighery 1994 and Trudgen 1988)





**Table 1. Vegetation units of the potential offset package**

Relevé site	Vegetation Unit Code	Vegetation Unit Description	TEC	Condition
1	S1	<i>Eucalyptus burracoppinensis</i> , <i>E. leptopoda</i> 5m, PFC 2% mallee over <i>Allocasuarina acutivalvis</i> , <i>Acacia beauverdiana</i> , <i>Melaleuca hamata</i> 4m, PFC 70% over <i>Melaleuca</i> spp. 1.8m, PFC 30% on yellow silty sand	no	Pristine
2 and 3	E1	<i>Eucalyptus yilgarnensis</i> , <i>E. sheathiana</i> , <i>E. stowardii</i> and/or <i>E. subangusta</i> subsp. <i>cerina</i> mallee shrubland to 6m, PFC 40% with occasional <i>E. salmonophloia</i> trees to 20m, PFC 2%, over scattered <i>Acacia hemiteles</i> , <i>Gastrolobium parviflorum</i> , PFC 1 to 10%, on pale brown silty sand. May also contain <i>Eremophila</i> sp. (G. Cockerton & L. Dalgliesh-085) aff. <i>drummondii</i> , <i>Dodonaea inaequifolia</i> . large pinnate leaves, <i>Melaleuca acuminata</i> , <i>Micromyrtus</i> sp., <i>Microcybe multiflora</i> subsp. <i>multiflora</i> , <i>Acacia assimilis</i> subsp. <i>assimilis</i> , <i>Styphelia</i> sp.	no	Excellent, or Very Good (grazed by stock)
4	E2	<i>Eucalyptus capillosa</i> trees to 15m, PFC 15%, over <i>Santalum acuminatum</i> , <i>Exocarpos aphyllus</i> , <i>Eremophila</i> sp. (G. Cockerton & L. Dalgliesh-085) aff. <i>drummondii</i> 2m, <i>Acacia erinacea</i> 1.2m, <i>Gastrolobium parviflorum</i> 1.2m, PFC 10% on pale grey coarse sandy clay over weathered granite, downslope of lateritic hills	YES	Pristine, or Very Good (grazed by stock)
5	E3	<i>Eucalyptus loxophleba</i> subsp. <i>lissophloia</i> 6m, PFC 10% mallee over <i>Acacia crenulata</i> (P3) 3m, PFC 25% over <i>Phebalium</i> aff. <i>brachycalyx</i> (cf. GC394) 1m, PFC 2% on pale brown coarse sandy clay over granite	no	Excellent
6	E4	<i>Eucalyptus loxophleba</i> subsp. <i>lissophloia</i> 4m, PFC 10% over <i>Acacia beauverdiana</i> 2.5m PFC 20% over <i>Borya</i> sp. on shallow sandy clay over sub-cropping and outcropping granite	no	Excellent
7	S2	<i>Allocasuarina corniculata</i> 2.4m, <i>Santalum acuminatum</i> 2m, <i>S. ?murrayanum</i> 1.5m (not collected) PFC 50% over <i>Thryptomene kochii</i> 1.2m PFC 5% over <i>Schoenus</i> sp. (not collected) tussock grasses 0.25m, PFC 5% on yellow silty sand on rise in landscape	no	Excellent
8	BRX	Scattered <i>Callitris canescens</i> , <i>Melaleuca ?scalena</i> , <i>Melaleuca</i> sp. rough fruits, <i>Acacia crenulata</i> to 2.5m, PFC 2% on highly weathered granite breakaway, 2 to 3m above the surrounding landscape	no	Excellent
9	S3	<i>Allocasuarina campestris</i> 2.5m, <i>Acacia beauverdiana</i> 4m, <i>A. neurophylla</i> subsp. <i>neurophylla</i> 4m, <i>A. ?coolgardiensis</i> 4m, PFC 20% over <i>?Thryptomene</i> sp., <i>Grevillea paradoxa</i> 1.5m PFC 5% over <i>Borya</i> sp. 0.1m, <i>Amphipogon carcinus</i> 0.3m PFC 25% on pale yellow sandy clay over weathered granite	no	Excellent
10	S4	<i>Atriplex stipitata</i> 0.6m PFC 15% shrubland on pale brown sandy clay	no	Excellent
11	S5	<i>Thryptomene australis</i> subsp. <i>australis</i> 2m, <i>Allocasuarina campestris</i> 2m, <i>Calothamnus quadrifidus</i> subsp. <i>petraeus</i> 3m, emergent <i>Acacia beauverdiana</i> 4m, <i>Eucalyptus loxophleba</i> subsp. <i>lissophloia</i> mallee 4m shrubland, PFC 40% over <i>Borya</i> sp. 0.1m, <i>Ecdeiocolea monostachya</i> 0.6m PFC 20% on fringe of exfoliating granite outcrop	no	Excellent

Key: PFC = Percentage Foliage Cover

Condition as per Vegetation Condition Scale (Table 2) in Environmental Protection Authority (2016)

### 3.3. Threatened Ecological Communities

Vegetation of the offset package had previously been described and mapped by Ecoscape (Australia) Pty Ltd (2024) with an emphasis on fauna habitat descriptions “based on vegetation structure and composition e.g. Mallee Shrubland” (page 6, Ecoscape 2024). However, Mallee Shrubland was included along with “tall open woodlands of *Eucalyptus* species” in the “Woodland” tally of 78.12 ha, instead of in “Shrubland” (page 10-12, Ecoscape 2024), thus inflating the perceived area of TEC within the potential offset package.

During the February 2024 assessment, one eucalypt-dominated vegetation unit, designated Vegetation Unit E2, was observed within the Study area from tracks adjacent to the southern, western and eastern sides of the Study area, and from one relevé site (Site 4) within the Study area.

Vegetation Unit E2 is described as: *Eucalyptus capillosa* trees to 15m, PFC 15%, over *Santalum acuminatum*, *Exocarpos aphyllus*, *Eremophila* sp. (G. Cockerton & L. Dalglish-085) aff. *drummondii* 2m, *Acacia erinacea* 1.2m, *Gastrolobium parviflorum* 1.2m, PFC 10% on pale grey coarse sandy clay over weathered granite, downslope of lateritic hills.

Vegetation Unit E2 matches the requirements of *Eucalypt woodlands of the Western Australian Wheatbelt Priority 3 Priority Ecological Community (PEC)*, equivalent to the Federally listed *Woodlands of the Avon Wheatbelt Threatened Ecological Community (TEC)* as it has the following attributes:

- i. tall woodland dominated by a single-trunked *Eucalyptus* species; AND
- ii. above a minimum patch size of 2 to 5 ha; AND
- iii. in relatively good condition with mid- and understorey intact (i.e. low levels of disturbance from anthropogenic impacts such as stock grazing, weeds, vehicle tracks and rubbish); AND
- iv. occurring within the intensively managed agriculture zone within the Avon Wheatbelt biogeographic region under IBRA.

Other Vegetation Units in the Study area fail to satisfy the requirements for TEC because they are not tall woodland dominated by single-trunked *Eucalyptus* species. These are described as Mallee Shrublands which are specifically excluded from the TEC description.

The area of TEC (i.e. Vegetation Unit E2: *Eucalyptus capillosa* trees to 15m, PFC 15%) assessed during the survey was extrapolated across the Study area, giving an estimate of 19.22 ha.

### 3.4. Significant Flora

The only species encountered that represents a significant species is *Eremophila* sp. (G. Cockerton & L. Dalglish 085) aff. *drummondii*. This is a new species with affinities to *E. drummondii* and which at this stage remains poorly known. This species has been reviewed by Dr. Bevan Buirchell, however, has not been further investigated at the WA Herbarium's research collection. It is associated with the *Eucalyptus capillosa* woodland which represents the federally listed Threatened Ecological Community within this remnant vegetation.

## 4. Summary

The potential TEC area of Warralakin Lot 366 is estimated in this assessment to be around 19.22 ha, which is approximately 7% of the Study area. This estimate is much lower than the estimate of 78.12 ha for Woodland cover derived from the fauna assessment (Ecoscape 2024) which had included non-TEC Mallee Shrublands.

The condition of almost all vegetation units assessed across the Study area during the February survey was Pristine or Excellent. Minor sections of Vegetation Units E1 and E2 outside the fenced area of Lot 366 were assessed as Good due to the impact of stock grazing. Minor areas of Vegetation Units S4, E1 and E2 along fencelines on the western side of the Lot 366 were assessed as Degraded due to historic impacts such as clearing and stock grazing.

#### 4.1. References

Ecoscape (Australia) Pty Ltd (2024) *Offset Fauna Habitat Assessment 2024*. Prepared for Covalent Lithium.

Environmental Protection Authority (2016) *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment*, December 2016, The Government of Western Australia.  
[EPA Technical Guidance - Flora and Vegetation survey\\_Dec13.pdf](#)

ESCAVI (2003) *Australian Vegetation Attribute Manual: National Vegetation Information System, Version 6.0*. Executive Steering Committee for Australian Vegetation Information, Department of Environment and Heritage, Canberra.  
[https://www.epa.wa.gov.au/sites/default/files/Policies\\_and\\_Guidance/EPA%20Technical%20Guidance%20-%20Flora%20and%20Vegetation%20survey\\_Dec13.pdf](https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/EPA%20Technical%20Guidance%20-%20Flora%20and%20Vegetation%20survey_Dec13.pdf)

EUCLID (2019) *Eucalypts of Australia, Fourth Edition*. Centre for Australian National Biodiversity Research. <http://www.cpbr.gov.au/cpbr>

#### 5. List of Participants

Staff Member	Field Surveys	Specimen Identification	Data Analysis	Report Preparation
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