Kingsley, WA 6026
T 0429 061 094
E shane@plantecology.com.au

ABN 18 849 210 133

16 December 2019

Peter Bennett
B & J Catalano Pty Ltd
South West Highway
Brunswick Junction, WA 6224

Dear Peter,

Plantecology Consulting was commissioned by B & J Catalano to undertake a reconnaissance vegetation survey at the Donnington Quarry, 4884 Gt Northern Highway, Chittering, which is bounded by Great Northern Highway, Maddern Rd and Blue Plains Rd (the site), in the Shire of Chittering (Figure 1). The site consisted of six separate areas for assessment, of which, Areas 3 – 6 (covering approximately 63 ha) are the subject of this report (Figure 2). Areas 1 and 2 required a detailed survey and will be discussed in a separate report. The purpose of the survey was to inform the proposed expansion of an active quarry and this letter outlines the results of that survey.

1 Introduction

The survey area is located on the west facing scarp and ridgetop at the interface between the Swan Coastal Plain and the Dandaragan Plateau. A search of the Department of Biodiversity, Conservation and Attractions (DBCA) databases of Threatened and Priority Ecological Communities (TECs and PECs) identified two conservation-coded community types and two sub-types with the potential to occur within the site. These were:

- *Banksia attenuata* woodlands over species rich dense shrublands (floristic community type SCP 20a), listed as an Endangered TEC; and
- Banksia-dominated woodlands of the Swan Coastal Plain IBRA region, listed as Endangered under Commonwealth legislation and includes the State-listed PECS:
    - Swan Coastal Plain *Banksia attenuata – Banksia menziesii* woodlands (FCT 23b); and
    - Banksia woodland of the Gingin area restricted to soils dominated by yellow to orange sands.

A search of the DBCA database of Threatened and Priority Flora returned a list of 29 taxa with the potential to occur within the site (Table 1).

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Table 1: Threatened and Priority Flora potentially occurring within the site.

Taxa	DEC Rating	EPBC Act Category
Acacia anomala	T	VU
Acacia cummingiana	3	
Acacia drummondii subsp. *affinis*	3	
Acacia pulchella var. *reflexa* acuminate bracteole variant (R.J. Cumming 882)	3	
Adenanthos cygnorum subsp. *chamaephyton*	3	
Anigozanthos humilis subsp. *chrysanthus*	4	
Caustis gigas	2	
Chamelaucium sp. Gingin (N.G. Marchant 6)	T	VU
Drosera sewelliae	1	
Eryngium pinnatifidum subsp. *palustre*	3	
Gastrolobium crispatum	1	
Gastrolobium nudum	2	
Grevillea althoferorum subsp. *fragilis*	T	CR
Grevillea candolleana	2	
Grevillea corrugata	T	EN
Hibbertia glomerata subsp. *ginginensis*	2	
Hypocalymma sylvestre	1	
Hypolaena robusta	4	
Millotia tenuifolia var. *laevis*	2	
Oxymyrrhine coronata	4	
Schoenus griffinianus	3	
Stylidium squamellosum	2	
Tetraria sp. Chandala (G.J. Keighery 17055)	2	
Tetratheca pilifera	3	
Thelymitra stellata	T	EN
Thysanotus sp. Badgingarra (E.A. Griffin 2511)	2	
Verticordia lindleyi subsp. *lindleyi*	4	
Verticordia rutilastra	3	
Verticordia serrata var. *linearis*	1	

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2 Methods

2.1 Field Survey

The field survey was conducted by a botanist from Plantecology Consulting over two days on the 20th September and the 1st October 2019. A search for priority flora was conducted by traversing native vegetation remnants, along with an assessment of vegetation condition and recording of the dominants and most common species.

3 Results

3.1 Flora

No Priority or Threatened Flora were recorded in the vegetation remnants within areas 3 - 6. A total of 98 taxa was recorded from 26 families and 76 genera, including 18 exotic taxa (weeds) (Appendix A).

3.2 Vegetation

The site has previously been largely cleared for pasture with some remnants of native vegetation. The remnants are mostly smaller than one hectare and range in condition from 'Completely Degraded' where only the native tree stratum remains to 'Excellent' where the original vegetation structure remains intact and few weeds have established (Figure 3).

3.2.1 Area 3

Area 3 contains the only Banksia woodland within the site at Plot 3-1 (Plate 1). The vegetation in this remnant is a very open *Eucalyptus marginata – Corymbia calophylla* woodland with *Banksia attenuata* and *Banksia menziesii* as sub-dominants on grey sands. *Eremaea pauciflora* and *Adenanthos cygnorum* are the most common shrub species in the midstorey. The vegetation structure has been altered from past disturbance/s and some introduced species such as **Gladiolus caryophyllaceus* are common in the understorey. The vegetation condition of this patch is rated as 'Good' to 'Very Good' and is approximately 2.2 ha in size. Given the condition and patch size, the vegetation at Plot 3-1 can be considered as part of the Commonwealth-listed "Banksia Woodlands of the Swan Coastal Plain Ecological Community" Threatened Ecological Community (TEC).

The vegetation remnant at Plot 3-2 is an open woodland of *Eucalyptus accedens – Corymbia calophylla* over *Xanthorrhoea preissii* (Plate 2) on a small lateritic breakaway. The vegetation is in 'Excellent' condition with a largely intact structure and the presence of minor weed species.

The vegetation at Plots 3-3, 3-4 and 3-5 are open woodlands of *Corymbia calophylla* with *Eucalyptus wandoo, Eucalyptus marginata* and *Eucalyptus accedens* variously as co-dominants (Plates 3-5). These patches may have been cleared previously as their original structure has been significantly altered. The understorey is sparse with aggressive weeds such as **Ehrharta calycina, *Briza maxima* and **Gladiolus caryophyllaceus* present. The condition is rated as either 'Good' or 'Degraded'.

3.2.2 Area 4

Both remnant patches within Area 4 have been highly disturbed and are rated as 'Degraded to Completely Degraded' (Plates 6 and 7). The vegetation is an open *Corymbia calophylla* woodland

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(with *Eucalyptus accedens* as a co-dominant at Plot 4-1) on brown loams, but the mid- and understories have been largely lost, with very few native species present.

3.2.3 Area 5

The remnant patches in Area 5 are 'Completely Degraded', with little to no native understorey (Plates 8-10). The vegetation consists of regenerating *Eucalyptus wandoo* over pasture grasses and other introduced taxa such as **Ehrharta longiflora, *Romulea rosea* and **Arctotheca calendula.*

3.2.4 Area 6

All the remnant patches within Area 6 are variants of *Corymbia calophylla - Eucalyptus marginata - Eucalyptus wandoo - Eucalyptus accedens* woodlands. All the remnant patches have previously been accessible to stock and have been affected by grazing impacts to at least some degree. The vegetation condition ranged from 'Completely Degraded', to 'Very Good' for Plots 6-2 and 6-4 (Plates 11-16). The latter sites have retained their basic structure and only a few exotic species are present in low abundance. The remaining remnant patches have completely or almost completely lost their native shrub and herb layers, which are now dominated by exotic species.

4 Discussion

The vegetation at Plot 3-1 is consistent with being part of the Commonwealth-listed TEC 'Banksia-dominated woodlands of the Swan Coastal Plain IBRA region'. The upper stratum contains *Banksia attenuata* and *Banksia menziesii* along with *Corymbia calophylla* and *Eucalyptus marginata.* The shrub layer is dominated by *Adenanthos cygnorum* and appears to have been disturbed previously and is regenerating. There are still many native species present in the ground layer and although there are exotic species such as **Ehrharta calycina* present, they are not dominant. The vegetation condition, therefore, has been rated as 'Very Good', and as the remnant patch is in excess of 1 ha (approximately 2.55 ha), it may be considered part of the Banksia woodland TEC.

The remaining remnant patches are variously dominated by combinations of *Eucalyptus marginata, Corymbia calophylla*, *Eucalyptus wandoo* and *Eucalyptus accedens.* Mapping of vegetation complexes for the Swan Coastal Plain places the majority of the site within the Mogumber Complex – South, which is described as open woodlands of *Corymbia calophylla* with various admixtures of *Eucalyptus marginata*, *Eucalyptus todtiana* and *Banksia* species (Webb *et al.* 2016). While this describes the vegetation observed at Plot 3-1, it does not accurately describe the vegetation for the majority of the site. Vegetation complex mapping for the southwest forests indicates the site is adjacent to, and likely a continuation of, the Yalanbee 6 vegetation complex. The South West Vegetation Complex Statistics Report (Webb *et al.* 2016) states that over 92 800 ha of the Yalanbee 6 complex remains, representing over 52% of its original pre-European extent. Therefore, the remnant vegetation within the site represents a vegetation type with more than 30% of its original extent remaining. Although the site is situated in a landscape fragmented by rural activity, the generally poor condition of the native vegetation remnants other than at Plot 3-1 means they are unlikely to be considered a critical asset.

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5 Conclusion

One vegetation remnant about 2.5 ha in size is likely to be part of the Commonwealth-listed TEC 'Banksia-dominated woodlands of the Swan Coastal Plain IBRA region'. The remaining vegetation remnants do not represent vegetation types of conservation concern and no Threatened or Priority Flora were recorded during the survey.

Should you require any further information or have any other queries, please feel free to contact me.

Sincerely yours,

Dr. Shane Chalwell

Plantecology Consulting

Kingsley, WA 6026
T 0429 061 094
E shane@plantecology.com.au

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5 References

Webb, A., Kinloch, J., Keighery, G. & Pitt, G. (2016) *The extension of vegetation complex mapping to landform boundaries within the Swan Coastal Plain landform and forested region of south-west Western Australia,* Department of Biodiversity, Conservation and Attractions, Kensington

Keighery, BJ (1994), *Bushland plant survey: A Guide to Plant Community Survey for the Community*, Wildflower Society of WA (inc), Nedlands, Western Australia.

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Plates

Kingsley, WA 6026
T 0429 061 094
E shane@plantecology.com.au

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Plate 1: Site 3-1. View of *Banksia* woodland

Plate 2: Site 3-2. View of *Eucalyptus accedens* – *Corymbia calophylla* woodland

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Plate 3: Site 3-3. View of *Corymbia calophylla* woodland in 'Good' condition.

Plate 4: Site 3-4. View of *Corymbia calophylla* woodland in 'Degraded' condition.

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T 0429 061 094
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Plate 5: Site 3-5. View of *Corymbia calophylla* woodland in 'Degraded' condition.

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T 0429 061 094
E shane@plantecology.com.au

ABN 18 849 210 133

Plate 6: Site 4-1. View of *Eucalyptus accedens - Corymbia calophylla* woodland in 'Completely Degraded' condition.

Plate 7: Site 4-2. View of *Corymbia calophylla* woodland in 'Completely Degraded' condition.

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Plate 8: Site 5-1. View of *Eucalyptus wandoo* woodland in 'Completely Degraded' condition.

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T 0429 061 094
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Plate 9: Site 5-2. View of *Eucalyptus wandoo* woodland in 'Completely Degraded' condition.

Plate 10: Site 5-3. View of *Eucalyptus wandoo* woodland in 'Completely Degraded' condition.

Kingsley, WA 6026
T 0429 061 094
E shane@plantecology.com.au

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Plate 11: Site 6-1. View of *Eucalyptus wandoo* – *Eucalyptus accedens* woodland in 'Completely Degraded' condition.

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T 0429 061 094
E shane@plantecology.com.au

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Plate 12: Site 6-2. View of *Eucalyptus marginata - Eucalyptus wandoo* woodland in 'Very Good' condition.

Plate 13: Site 6-3. View of *Eucalyptus marginata* – *Corymbia calophylla* woodland in 'Completely Degraded' condition.

Kingsley, WA 6026
T 0429 061 094
E shane@plantecology.com.au

ABN 18 849 210 133

Plate 14: Site 6-4. View of *Eucalyptus wandoo – Eucalyptus accedens* woodland in 'Very Good' condition.

Kingsley, WA 6026
T 0429 061 094
E shane@plantecology.com.au

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Plate 15: Site 6-5. View of *Corymbia calophylla – Eucalyptus wandoo* woodland in 'Completely Degraded' condition.

Plate 16: Site 6-6. View of *Corymbia calophylla – Eucalyptus wandoo* woodland in 'Completely Degraded' condition.

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Appendix A

Taxa recorded within the survey site (* = Exotic (introduced) taxon).

	Taxon
	Acacia applanata
	Adenanthos cygnorum subsp. *cygnorum*
	Alexgeorgia nitens
	Anigozanthos humilis subsp. *humilis*
*	*Arctotheca calendula*
	Austrostipa sp.
*	*Avena barbata*
	Babingtonia camphorosmae
	Banksia attenuata
	Banksia menziesii
*	*Briza maxima*
	Burchardia congesta
	Caesia micrantha
	Caladenia flava
	Calytrix sylvana
	Cassytha aurea var. *hirta*
*	*Chamaecytisus palmensis*
	Chamaescilla corymbosa
	Chordifex sinuosus
	Conostylis aculeata
	Conostylis setigera
	Conostylis setosa
	Corymbia calophylla
	Crassula colorata var. *colorata*
	Daviesia divaricata subsp. *divaricata*
	Daviesia physodes
	Desmocladus flexuosus
*	*Disa bracteata*
	Drosera bulbosa subsp. *bulbosa*
	Drosera macrantha subsp. *macrantha*
	Echium plantagineum
*	*Ehrharta calycina*
*	*Ehrharta longiflora*
	Eremaea pauciflora var. *pauciflora*
	Eucalyptus accedens
	Eucalyptus marginata

Kingsley, WA 6026
T 0429 061 094
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Eucalyptus wandoo subsp. *wandoo*

Taxon

Euchilopsis linearis
* *Gladiolus caryophyllaceus*
Gompholobium knightianum
Gompholobium marginatum
Gompholobium tomentosum
Haemodorum paniculatum
Hakea lissocarpha
Hakea ruscifolia
Hibbertia hypericoides
Hibbertia lasiopus
Hovea trisperma
* *Hypochaeris glabra*
Hypolaena exsulca
* *Ixia polystachya*
Jacksonia floribunda
Kennedia coccinea
Kennedia prostrata
Lagenophora huegelii
Laxmannia ramosa subsp. *ramosa*
Laxmannia squarrosa
Lechenaultia biloba
Lechenaultia floribunda
Lepidosperma nutans
Lepidosperma pubisquameum
Leucopogon conostephioides
Leucopogon propinquus
Lomandra caespitosa
Lomandra hermaphrodita
* *Lupinus cosentinii*
Lyginia imberbis
Mesomelaena pseudostygia
Mesomelaena tetragona
* *Moraea flaccida*
Neurachne alopecuroidea
Nuytsia floribunda
* *Ornithopus sativus*
Petrophile linearis
Philotheca spicata
Pimelea spectabilis
* *Poaceae sp.*
Podolepis lessonii
Podotheca angustifolia

Kingsley, WA 6026
T 0429 061 094
E shane@plantecology.com.au

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	Taxon
	Podotheca gnaphalioides
	Pterostylis recurva
	Pterostylis sanguinea
	Ptilotus polystachyus var. *polystachyus*
*	*Romulea rosea*
	Sowerbaea laxiflora
	Sphaerolobium medium
	Stylidium ciliatum
	Styphelia tenuiflora
	Synaphea spinulosa subsp. *spinulosa*
	Tetraria octandra
	Thelymitra macrophylla
	Thysanotus thyrsoideus
	Trichocline spathulata
*	*Trifolium campestre*
*	*Trifolium repens* var. *repens*
	Trymalium angustifolium
*	*Ursinia anthemoides*
	Xanthorrhoea preissii

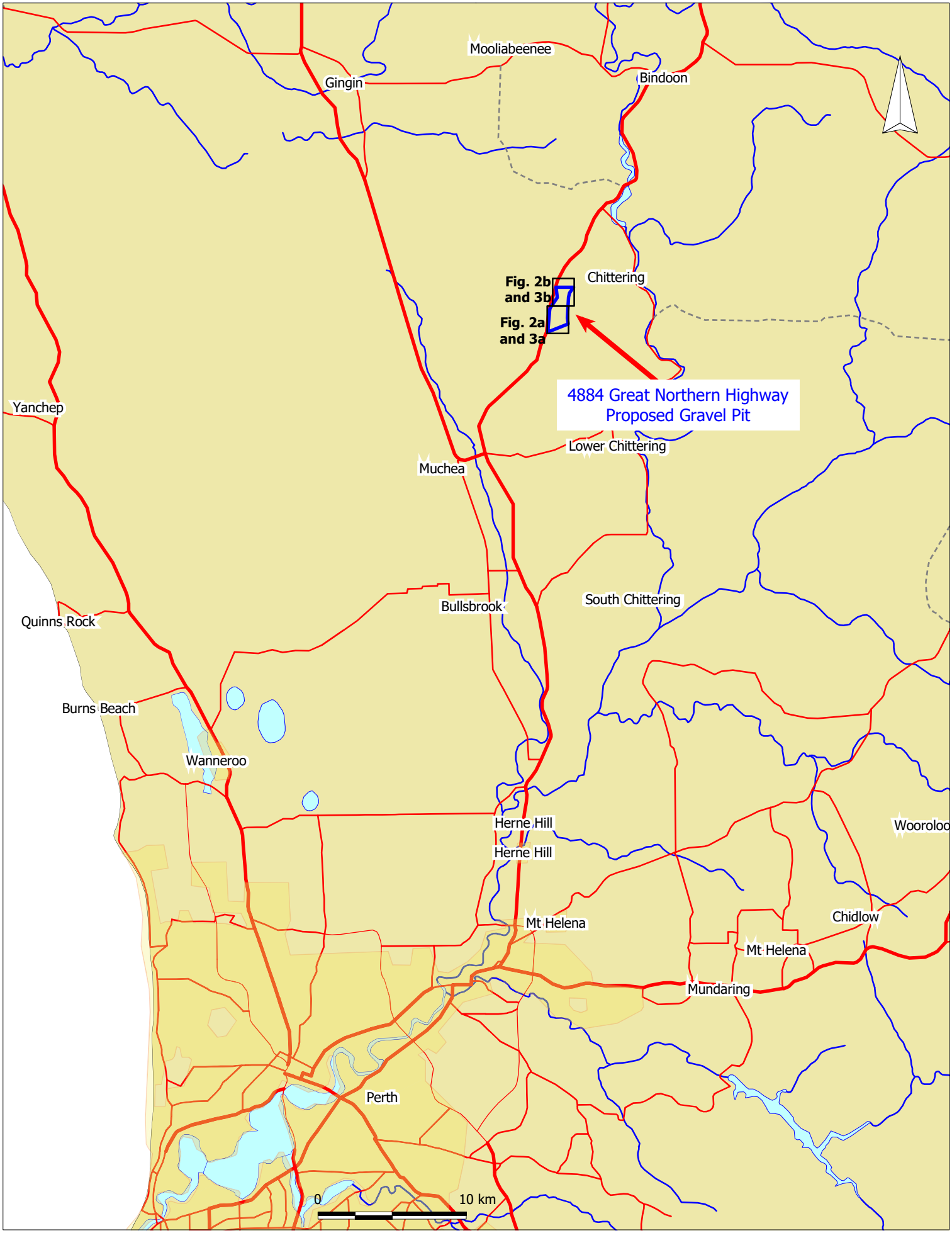
Kingsley, WA 6026
T 0429 061 094
E shane@plantecology.com.au

ABN 18 849 210 133

Appendix B

Vegetation Condition Scale (Keighery 1994)

Vegetation Condition	Definition
Pristine (1)	Pristine or nearly so, no obvious signs of disturbance.
Excellent (2)	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very Good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.



Lundstrom Environmental Consultants Pty Ltd

Leeming WA 6149
Mob: 0417934863
mikelund1@bigpond.com

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Datum: GDA94
Projection: Australia MGA94 (50)

Client: B & J Catalano
Project: Gravel Extraction
Location: 4884 Great Northern H Chittering

Figure 1:

Locality Plan

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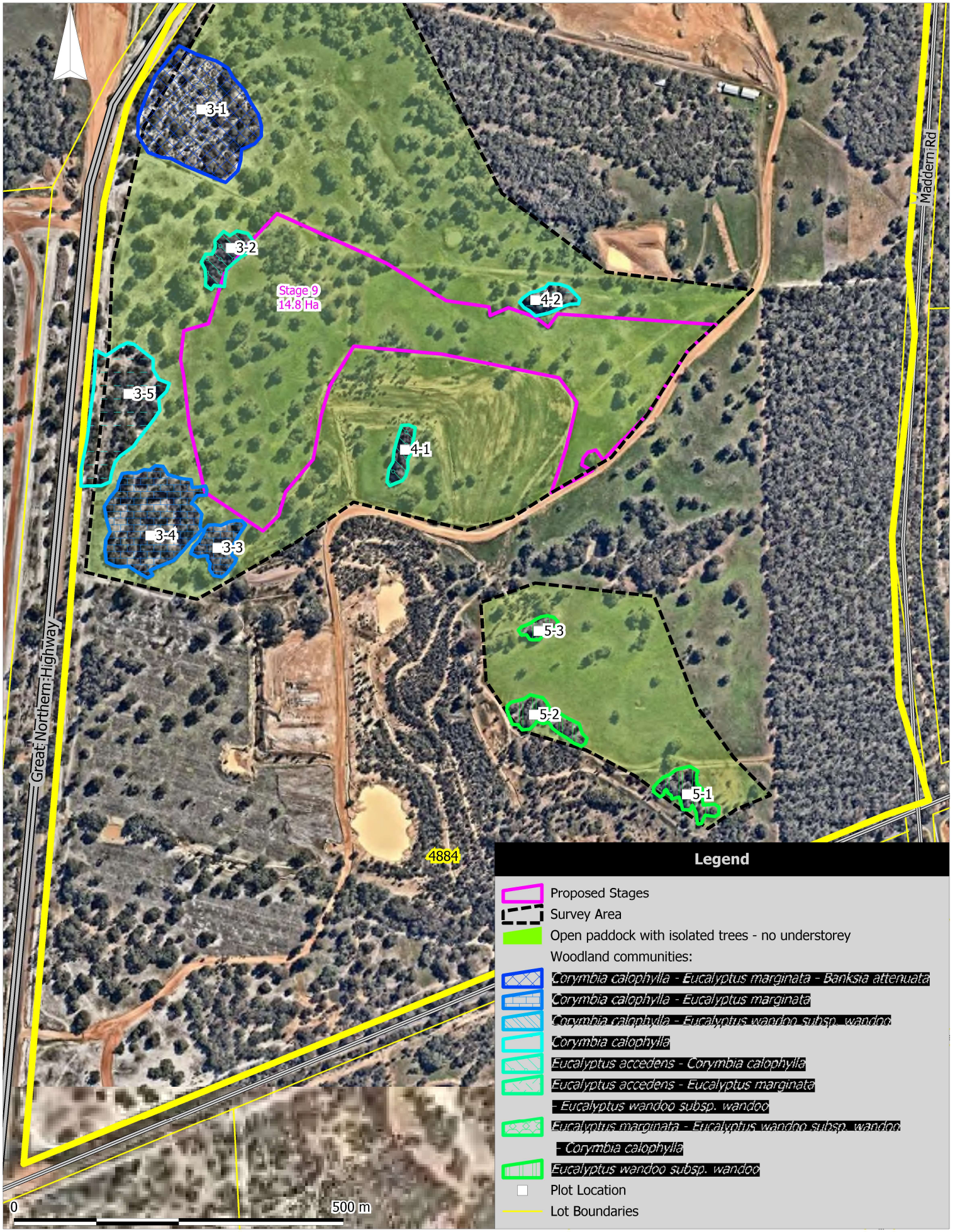

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Leeming WA 6149
Mob: 0417934863
mikelund1@bigpond.com

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Location: 4884 Great Northern Hwy Chittering

Figure 2a:

Plant Communities

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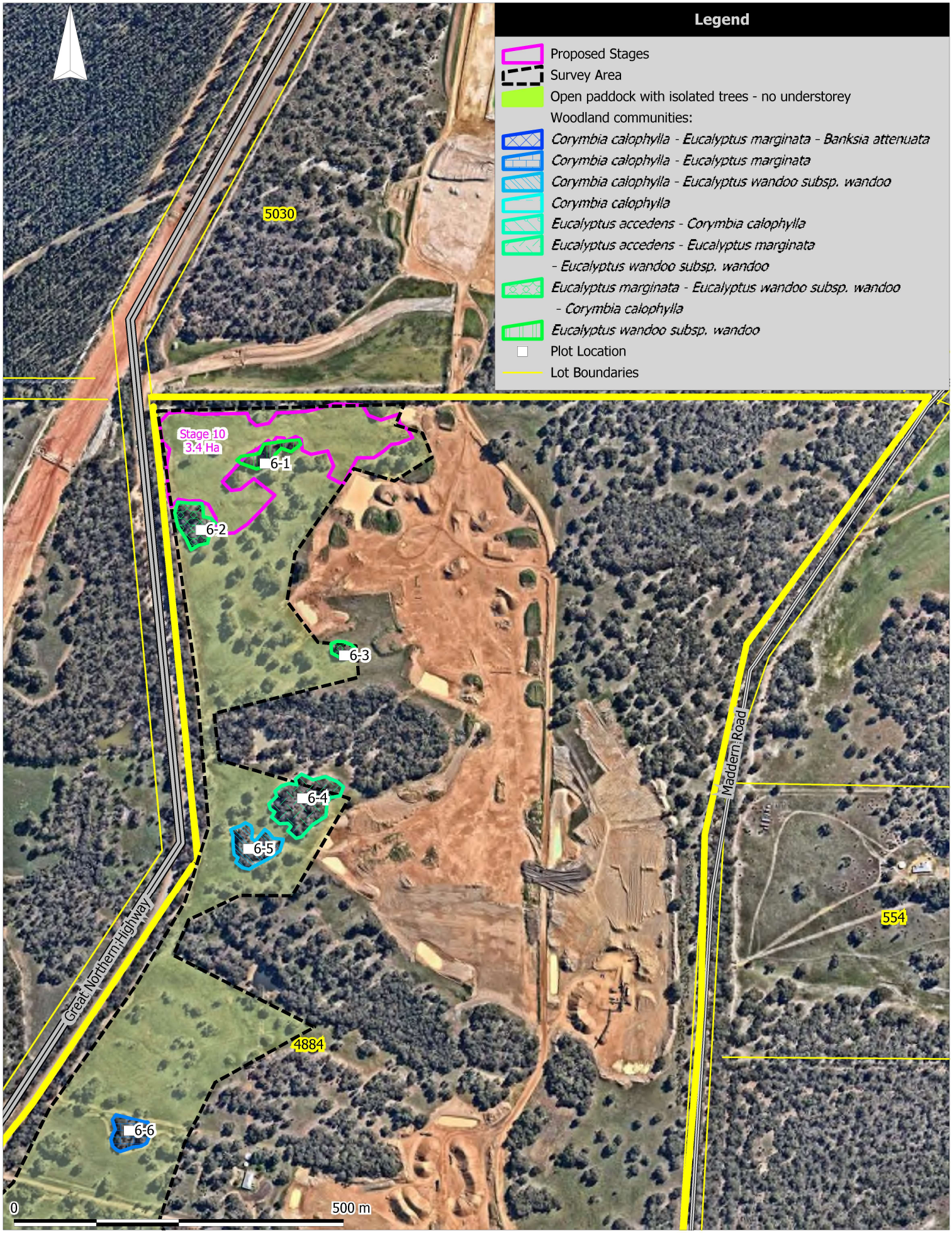

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Leeming WA 6149
Mob: 0417934863
mikelund1@bigpond.com

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Figure 2b:

Plant Communities

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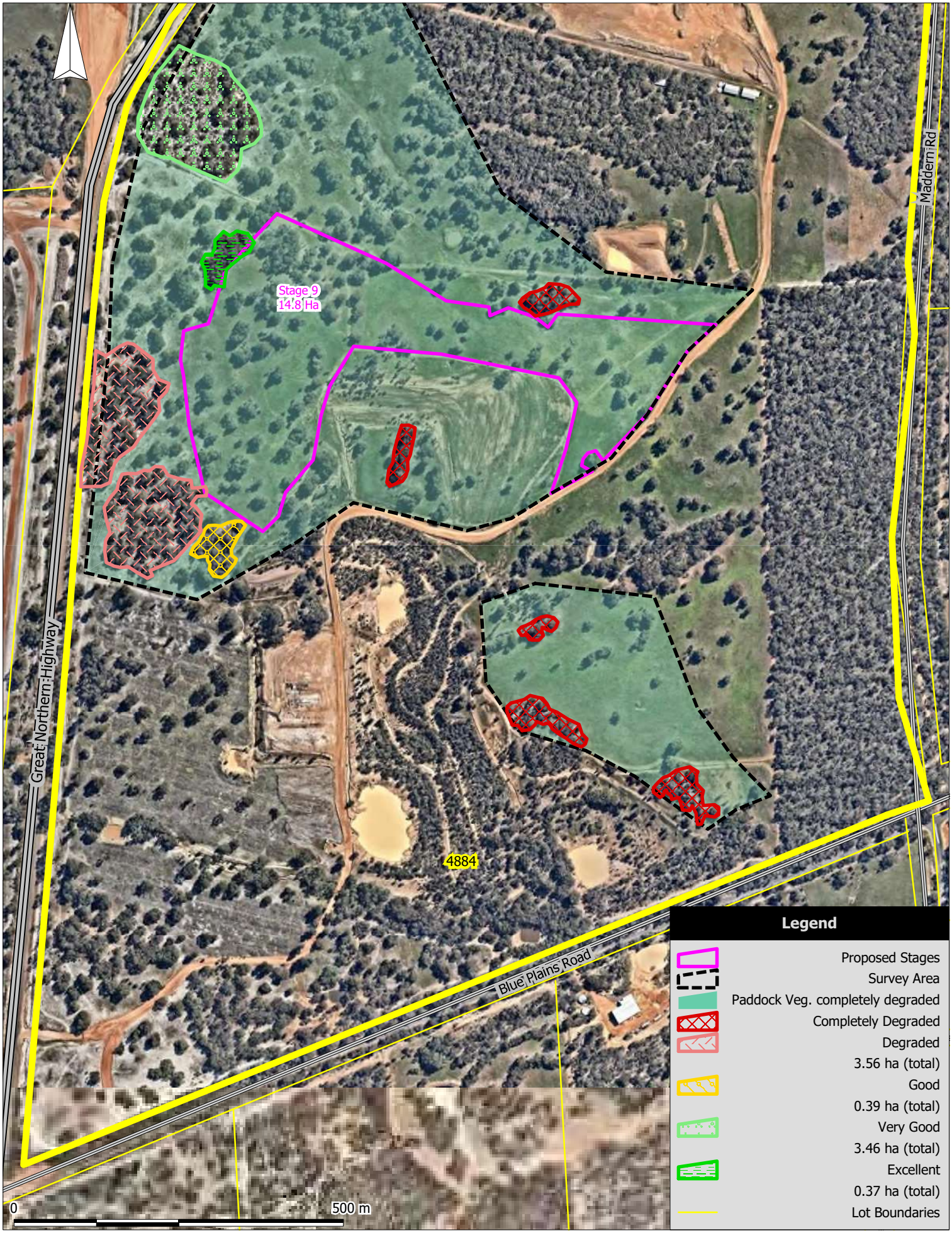

Lundstrom Environmental Consultants Pty Ltd
Leeming WA 6149
Mob: 0417934863
mikelund1@bigpond.com

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Figure 3a:
Vegetation Condition

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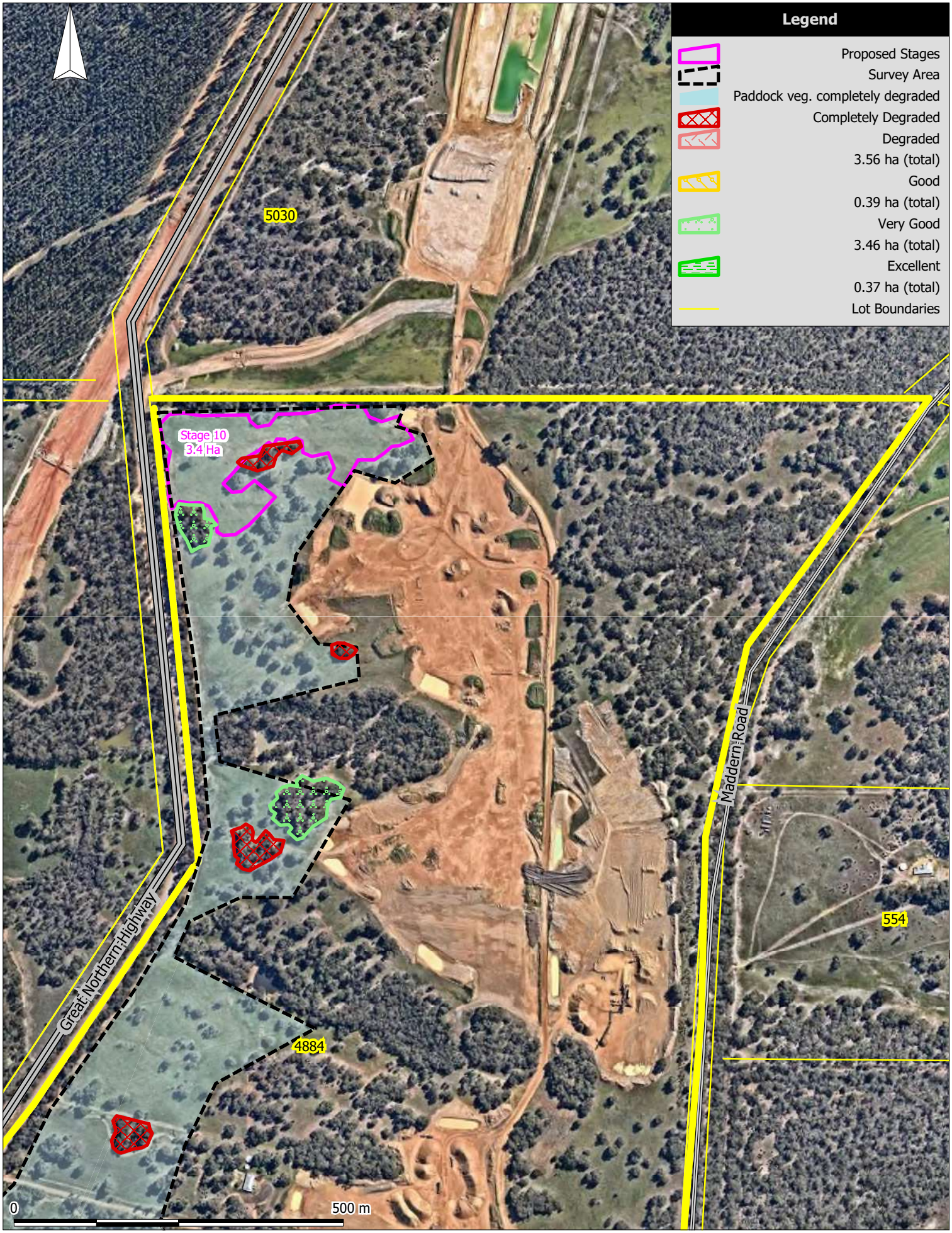

Lundstrom Environmental Consultants Pty Ltd
Leeming WA 6149
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mikelund1@bigpond.com

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Figure 3b:
Vegetation Condition

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