APPENDIX A

FLORA SPECIES LIST AND QUADRAT DATA

A1 FLORA SPECIES LIST

STATUS	SCIENTIFIC NAME	COMMON NAME	VICTORIAN ADVISORY LIST	COUNT OF SIGHTINGS IN GHCMA	LAST RECORD IN GHCMA	CALP ACT	PLANTED?	HERBARIUM SPECIMENS?	VBA COUNT (WITHIN STUDY ONLY)[1]	WSP 2016	GHD 2015	COUNT WSP 2016–2018
	Acacia acinacea s.l.	Gold-dust Wattle		35	9/01/2015	–			6		x	2
	Acacia aculeatissima	Thin-leaf Wattle		154	9/01/2015	–			4	x	x	0
r	*Acacia aspera subsp. parviceps*	Rough Wattle	Rare	10	23/08/2000	–			1			0
*	*Acacia baileyana*	Cootamundra Wattle		48	4/04/2013	–			4		x	2
	Acacia dealbata	Silver Wattle		60	9/01/2015	–			1	x	x	0
*	*Acacia decurrens*	Early Black-wattle		20	4/04/2013	–			4			1
	Acacia genistifolia	Spreading Wattle		53	9/01/2015	–			12	x	x	5
	Acacia gunnii	Ploughshare Wattle		36	24/06/2010	–			1			0
	Acacia mearnsii	Black Wattle		519	22/02/2015	–			5		x	1
	Acacia melanoxylon	Blackwood		783	22/02/2015	–			20	x	x	5
	Acacia paradoxa	Hedge Wattle		295	22/02/2015	–			13	x	x	2
	Acacia pycnantha	Golden Wattle		188	9/01/2015	–			6	x		3
	Acacia spp.	Wattle		27	25/05/2011	–					x	
	Acacia stricta	Hop Wattle		122	22/09/2016	–			1			0

[1] Count data within the study area is the number of sites recorded not numbers of individual plants. Refer to Results – Flora (section 4.3) for specific numbers.

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	Acacia suaveolens	Sweet Wattle		36	1/10/2002	–					x	
	Acacia verticillata	Prickly Moses		411	12/11/2013	–			1			0
	Acaena echinata	Sheep's Burr		865	9/01/2015	–			4		x	6
	Acaena novae-zelandiae	Bidgee-widgee		595	27/11/2014	–			10	x	x	5
	Acaena ovina	Australian Sheep's Burr		72	6/12/2013	–			1		X	0
	Acaena spp.	Sheep's Burr		55	22/11/2014	–			1			0
*	*Acetosella vulgaris*	Sheep Sorrel		544	27/11/2014	–			8	x	x	0
	Acrotriche serrulata	Honey-pots		675	22/02/2015	–			10	x	x	3
*	*Agapanthus praecox subsp. orientalis*	Agapanthus		4	10/03/2011	–					x	
*	*Agrostis capillaris*	Brown-top Bent		226	22/02/2015	–			16		x	4
*	*Aira caryophyllea subsp. caryophyllea*	Silvery Hair-grass		393	22/11/2014	–			2			0
*	*Aira cupaniana*	Quicksilver Grass		287	15/10/2015	–			1	x		0
*	*Aira elegantissima*	Delicate Hair-grass		216	25/11/2014	–						5
*	*Aira spp.*	Hair Grass		302	12/11/2015	–					x	
	Allittia cardiocarpa	Swamp Daisy		75	20/11/2014	–						1
*	*Allium triquetrum*	Angled Onion		17	12/11/2008	R			1			0
*	*Allium vineale*	Crow Garlic		51	25/11/2008	R			4			0

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	Allocasuarina verticillata	Drooping Sheoak		138	23/10/2013	–						1
*	*Alopecurus pratensis*	Meadow Fox-tail		14	3/12/2013	–						2
VU X	*Amphibromus fluitans*	River Swamp Wallaby-grass		8	25/01/2002	–		Y		x		9
	Amphibromus macrorhinus	Long-nosed Swamp Wallaby-grass		24	7/11/2003	–			1			0
	Amphibromus neesii	Southern Swamp Wallaby-grass		153	7/01/2016	–				x		0
	Amphibromus nervosus	Common Swamp Wallaby-grass		67	20/11/2014	–				x		5
	Amyema pendula	Drooping Mistletoe		203	22/02/2015	–			8		x	1
	Anthosachne scabra s.l.	Common Wheat-grass		556	22/02/2015	–			8		x	1
*	*Anthoxanthum odoratum*	Sweet Vernal-grass		579	12/11/2015	–			6	x	x	7
	Aphelia pumilio	Dwarf Aphelia		138	19/10/2010	–						1
*	*Arctotheca calendula*	Cape weed		620	25/11/2014	–			4		x	3
	Arthropodium milleflorum s.l.	Pale Vanilla-lily		28	1/04/2009	–			1			0
	Arthropodium minus	Small Vanilla-lily		73	24/06/2013	–					x	
	Arthropodium strictum s.l.	Chocolate Lily		335	12/11/2015	–			8	x	x	4
*	*Asparagus asparagoides*	Bridal Creeper		137	10/03/2011	R				x		0

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	Asperula conferta	Common Woodruff		349	22/11/2014	–			1			0
*	*Asphodelus fistulosus*	Onion Weed		3	1/06/1999	C						1
	Asteraceae spp.	Composite		11	29/05/2007	–					x	
	Astroloma humifusum	Cranberry Heath		728	27/11/2014	–			7			1
*	*Atriplex prostrata*	Hastate Orache		77	13/04/2012	–						1
	Austrostipa mollis	Supple Spear-grass		287	20/11/2014	–			1	x	x	0
	Austrostipa oligostachya	Fine-head Spear-grass		103	21/11/2014	–				x		0
	Austrostipa pubinodis	Tall Spear-grass		173	16/11/2010	–			2	x		0
	Austrostipa rudis subsp. rudis	Veined Spear-grass		12	21/05/2012	–			1			2
	Austrostipa scabra	Rough Spear-grass		53	26/04/2013	–			1			0
	Austrostipa semibarbata	Fibrous Spear-grass		135	27/11/2014	–			2	x		1
	Austrostipa spp.	Spear Grass		392	12/11/2015	–			12	x	x	1
*	*Avena barbata*	Bearded Oat		114	25/11/2014	–			1		x	0
*	*Avena fatua*	Wild Oat		195	3/12/2013	–			1			0
*	*Avena spp.*	Oat		40	22/11/2013	–						1
	Azolla pinnata	Ferny Azolla		1	1/01/1993	–			1			0
	Banksia marginata	Silver Banksia		841	12/11/2013	–					x	
	Batrachium trichophyllum	Water Fennel		25	7/11/2012	–						1

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	Bossiaea prostrata	Creeping Bossiaea		382	22/02/2015	–			7	x	x	3
	Brachyloma ericoides subsp. ericoides	Brush Heath		29	8/02/2000	–			1			0
	Brachyscome perpusilla	Rayless Daisy		32	20/10/2010	–						1
*	*Briza maxima*	Large Quaking-grass		485	12/11/2015	–			16	x	x	6
*	*Briza minor*	Lesser Quaking-grass		952	12/11/2015	–			4	x	x	3
*	*Bromus catharticus*	Prairie Grass		79	4/04/2013	–			1			0
*	*Bromus diandrus*	Great Brome		387	27/11/2014	–			6	x		1
*	*Bromus hordeaceus*	Soft Brome		535	27/11/2014	–			2	x		0
*	*Bromus rubens*	Red Brome		37	24/11/2004	–			1		x	0
	Brunonia australis	Blue Pincushion		401	12/11/2015	–			4		x	2
	Bulbine bulbosa	Bulbine Lily		190	14/10/2015	–			3		x	5
	Burchardia umbellata	Milkmaids		686	12/11/2015	–			9		x	7
	Caesia calliantha	Blue Grass-lily		180	14/10/2015	–			1			4
	Caesia parviflora	Pale Grass-lily		38	14/12/2004	–				x		0
	Caladenia carnea s.s.	Pink Fingers		27	29/09/2011	–						4
	Caladenia carnea sensu Willis (1970)	Pink Fingers		93	19/09/2004	–			1			0

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	Caladenia catenata s.l.	Pink Fingers/White Fingers		47	1/11/1998	–			1			0
	Caladenia clavigera	Plain-lip Spider-orchid		27	3/10/2005	–			1			0
	Caladenia iridescens	Western Bronzehood Orchid		29	10/10/2007	–						2
	Caladenia moschata	Musk Hood-orchid		75	26/10/2003	–						2
VU vu L	*Caladenia ornata*	Ornate Pink-fingers	Vulnerable	10	25/10/2003	–		Y				2
	Caladenia pusilla	Tiny Pink-fingers		7	22/08/2003	–						1
	Caladenia spp.	Caladenia		39	26/10/2003	–					x	
	Caladenia tentaculata	Mantis Orchid		26	15/10/2015	–						1
*	*Callitriche brutia subsp. brutia*	Thread Water-starwort		27	15/10/2015	–				x		3
*	*Callitriche stagnalis*	Common Water-starwort		23	17/07/2009	–						1
#	*Callitris rhomboidea*	Oyster Bay Pine		185	29/09/2011	–			1			0
	Calocephalus lacteus	Milky Beauty-heads		115	20/04/2015	–			4			1
*	*Carduus spp.*	Slender Thistle		13	3/11/2011	–			1			0
	Carex appressa	Tall Sedge		290	8/05/2013	–			8	x	x	4
	Carex breviculmis	Common Grass-sedge		251	12/11/2013	–			1	x		1
*	*Carex divisa*	Divided Sedge		16	29/05/2007	–						1

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	Carex tereticaulis	Poong'ort		100	3/12/2013	–			3	x		4
#N/A	*Carpobrotus edulis*	#N/A	#N/A	####	#N/A	–	P					1
	Carpobrotus modestus	Inland Pigface		14	2/05/1989	–					x	
	Cassinia aculeata subsp. aculeata	Common Cassinia		44	4/04/2013	–			1			0
	Cassinia sp. aff. arcuata (Midlands)	Drooping Cassinia		36	28/08/2014	–			3		x	0
	Cassytha glabella	Slender Dodder-laurel		315	28/08/2014	–			3			0
	Cassytha pubescens s.s.	Downy Dodder-laurel		417	2/09/2009	–			1			1
*	*Centaurium erythraea*	Common Centaury		432	27/11/2014	–			3			2
*	*Centaurium tenuiflorum*	Slender Centaury		232	20/11/2014	–			1			1
	Centella cordifolia	Centella		157	22/02/2015	–				x		2
	Centipeda cunninghamii	Common Sneezeweed		113	30/01/2013	–			1	x		1
	Centrolepis aristata	Pointed Centrolepis		365	14/10/2015	–						1
	Centrolepis strigosa subsp. strigosa	Hairy Centrolepis		427	12/11/2013	–						2
*	*Cerastium glomeratum s.l.*	Common Mouse-ear Chickweed		314	20/11/2014	–			3			3
*	*Chamaecytisus palmensis*	Tree Lucerne		27	26/04/2013	–			4			0

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	Chamaescilla corymbosa var. corymbosa	Blue Stars		339	13/10/2015	–			1			0
	Chiloglottis valida	Common Bird-orchid		17	25/10/2003	–						1
*	*Chondrilla juncea*	Skeleton Weed		5	1/01/1993	C			1			0
	Chrysocephalum apiculatum s.l.	Common Everlasting		339	12/11/2015	–			5	x		0
	Chrysocephalum semipapposum	Clustered Everlasting		69	15/10/2015	–			2		x	0
*	*Cirsium vulgare*	Spear Thistle		917	22/02/2015	R			10	x	x	3
	Comesperma ericinum	Heath Milkwort		10	1/01/1994	–			2	x	x	1
	Convolvulus angustissimus subsp. angustissimus	Blushing Bindweed		48	14/10/2015	–				x		0
	Coronidium scorpioides s.s.	Button Everlasting		407	9/01/2015	–			7	x		3
	Correa reflexa	Common Correa		472	28/08/2014	–			6			2
	Corybas spp.	Helmet Orchid		76	21/10/2005	–						2
	Cotula australis	Common Cotula		63	13/11/2012	–				x		1
*	*Cotula coronopifolia*	Water Buttons		206	14/03/2013	–			2	x		3

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	Craspedia paludicola	Swamp Billy-buttons		32	27/11/2015	–			9			0
	Crassula decumbens var. decumbens	Spreading Crassula		185	12/11/2012	–			1			5
	Crassula helmsii	Swamp Crassula		207	1/05/2013	–			1	x		0
	Crassula sieberiana s.l.	Sieber Crassula		188	21/11/2014	–						2
*	*Crataegus monogyna*	Hawthorn		129	3/12/2013	R				x	x	0
	Cycnogeton procerum s.s.	Common Water-ribbons		34	13/11/2012	–						2
	Cycnogeton spp.	Water Ribbons		288	3/11/2011	–			1			0
	Cymbonotus preissianus	Austral Bear's-ear		108	29/10/2014	–						1
*	*Cynosurus echinatus*	Rough Dog's-tail		501	27/11/2014	–			10	x		1
	Cyperus gunnii subsp. gunnii	Flecked Flat-sedge		38	15/10/2015	–						2
	Cyperus spp.	Flat Sedge		9	13/12/2010	–				x		0
*	*Cytisus scoparius*	English Broom		32	28/08/2014	R			16			1
*	*Dactylis glomerata*	Cocksfoot		294	12/11/2015	–				x	x	1
	Daucus glochidiatus	Australian Carrot		255	15/10/2015	–			1		x	2
	Daviesia leptophylla	Narrow-leaf Bitter-pea		102	22/02/2015	–			15	x	x	5
	Daviesia mimosoides s.l.	Blunt-leaf Bitter-pea		23	1/01/1993	–			1			0

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	Daviesia ulicifolia	Gorse Bitter-pea		106	9/01/2015	–			15	x	x	2
	Daviesia ulicifolia subsp. ruscifolia	Gorse Bitter-pea		4	14/10/1950	–			1			0
	Deyeuxia quadriseta	Reed Bent-grass		395	7/01/2016	–			1			3
	Dianella admixta	Black-anther Flax-lily		1	29/09/2011	–				x		10
EN en L	*Dianella amoena*	Matted Flax-lily	Endangered	5	15/10/2012	–		Y		x		2
	Dianella revoluta s.l.	Black-anther Flax-lily		642	22/09/2016	–			8		x	0
	Dianella revoluta var. revoluta s.l.	Black-anther Flax-lily		220	12/11/2013	–			19			0
	Dichelachne crinita	Long-hair Plume-grass		313	22/11/2014	–			1			0
	Dichelachne rara	Common Plume-grass		64	26/11/2012	–			1			0
	Dichondra repens	Kidney-weed		582	22/02/2015	–			2			0
	Dillwynia cinerascens s.l.	Grey Parrot-pea		55	20/10/2010	–			12	x	x	4
	Dillwynia hispida	Red Parrot-pea		156	12/11/2013	–			2			1
	Dillwynia sericea	Showy Parrot-pea		286	15/10/2015	–			2			0
	Dillwynia spp.	Parrot Pea		8	13/09/2012	–					x	
	Dipodium punctatum s.l.	Hyacinth Orchid		76	13/03/2013	–						1
	Diuris chryseopsis	Golden Moths		30	21/10/2013	–						1
	Diuris pardina	Leopard Orchid		54	29/09/2011	–						1

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	Diuris sulphurea	Tiger Orchid		38	29/09/2011	–					x	
#	*Dodonaea viscosa*	Sticky Hop-bush		23	20/10/2010	–						1
	Dodonaea viscosa subsp. cuneata	Wedge-leaf Hop-bush		82	19/09/2006	–				x		0
	Drosera aberrans	Scented Sundew		368	22/11/2014	–			7			6
	Drosera auriculata	Tall Sundew		393	22/11/2014	–			3			0
	Drosera peltata s.l.	Pale Sundew		159	22/09/2016	–			1		x	3
	Drosera peltata subsp. peltata spp. agg.	Pale Sundew		410	30/10/2014	–			2			0
*	*Ehrharta longiflora*	Annual Veldt-grass		19	22/11/2013	–						1
	Elatine gratioloides	Waterwort		26	25/01/2002	–						1
	Eleocharis acuta	Common Spike-sedge		372	28/10/2014	–			1	x	x	7
	Eleocharis pusilla	Small Spike-sedge		43	13/11/2012	–						1
	Eleocharis sphacelata	Tall Spike-sedge		86	30/01/2013	–			1	x	x	2
	Epacris impressa	Common Heath		627	28/08/2014	–			8		x	1
	Epilobium billardierianum	Variable Willow-herb		96	20/11/2014	–			1			1
	Epilobium billardierianum subsp. cinereum	Grey Willow-herb		185	19/11/2014	–			1			0
	Epilobium hirtigerum	Hairy Willow-herb		76	30/01/2013	–			1		x	2

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	Epilobium spp.	Willow Herb		43	22/11/2013	–					x	
	Eragrostis brownii	Common Love-grass		196	26/04/2013	–			1			0
*	*Erica lusitanica*	Spanish Heath		22	26/04/2013	–			5	x	x	0
	Eryngium ovinum	Blue Devil		437	12/11/2015	–				x		2
	Eryngium vesiculosum	Prickfoot		144	25/11/2014	–				x		1
	Eucalyptus aromaphloia	Scentbark		172	22/02/2015	–			15	x	x	0
	Eucalyptus baxteri s.l.	Brown Stringybark		390	12/11/2013	–				x		0
X	*Eucalyptus camaldulensis*	River Red-gum		420	23/10/2013	–			1	x	x	1
	Eucalyptus dives	Broad-leaf Peppermint		93	28/08/2014	–			13	x	x	0
#	*Eucalyptus globulus*	Southern Blue-gum		9	17/10/2007	–	P					0
	Eucalyptus goniocalyx s.l.	Bundy		91	20/10/2010	–			3			4
	Eucalyptus goniocalyx s.s.	Bundy		78	21/05/2012	–			7	x	x	0
#	*Eucalyptus leucoxylon*	Yellow Gum		91	29/09/2011	–			2			0
	Eucalyptus macrorhyncha	Red Stringybark		102	22/02/2015	–			16	x	x	5
	Eucalyptus melliodora	Yellow Box		183	28/08/2014	–			20	x	x	4
	Eucalyptus obliqua	Messmate Stringybark		500	22/09/2016	–			9	x	x	4
	Eucalyptus ovata	Swamp Gum		374	22/09/2016	–					x	
	Eucalyptus pauciflora	Snow Gum		20	14/03/2004	–			2	x		0

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	Eucalyptus polyanthemos	Red Box		9	13/09/2012	–					x	
	Eucalyptus radiata s.l.	Narrow-leaf Peppermint		31	16/09/2009	–			3	x	x	2
	Eucalyptus radiata subsp. radiata	Narrow-leaf Peppermint		15	24/06/2010	–			3			0
	Eucalyptus rubida	Candlebark		53	28/08/2014	–			18	x	x	5
	Eucalyptus viminalis subsp. viminalis	Manna Gum		75	5/06/2012	–			1	x		0
r X	*Eucalyptus yarraensis*	Yarra Gum	Rare	65	14/02/2011	–			6	x		2
	Euchiton involucratus s.l.	Common Cudweed		38	19/11/2014	–			1			1
	Euchiton japonicus s.l.	Clustered/Creeping Cudweed		153	20/09/2009	–			1			2
	Eutaxia microphylla	Common Eutaxia		44	23/08/2014	–			1			0
	Exocarpos cupressiformis	Cherry Ballart		363	28/08/2014	–			8		x	4
*	*Festuca arundinacea*	Tall Fescue		49	14/11/2012	–				x	x	1
*	*Foeniculum vulgare*	Fennel		77	8/12/2010	R			3			1
*	*Fumaria bastardii*	Bastard's Fumitory		13	10/03/2011	–						1
	Galenia pubescens					–						1
*	*Galinsoga parviflora*	Gallant Soldier		1	22/05/1990	–			1			0
*	*Galium aparine*	Cleavers		81	23/10/2013	–					x	1

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	Galium gaudichaudii	Rough Bedstraw		101	13/11/2012	–					x	2
*	*Genista monspessulana*	Montpellier Broom		197	22/09/2016	R			5	x	x	2
	Geranium potentilloides	Soft Crane's-bill		153	20/03/2013	–			1			0
	Geranium retrorsum s.l.	Grassland Crane's-bill		152	20/11/2014	–			1			2
	Geranium solanderi s.l.	Austral Crane's-bill		194	23/10/2013	–			2			0
	Geranium sp. 2	Variable Crane's-bill		40	29/09/2011	–						3
r	*Geranium sp. 3*	Pale-flower Crane's-bill	Rare	6	13/11/2012	–		Y				3
	Geranium sp. 5	Naked Crane's-bill		5	7/12/2006	–						1
	Geranium spp.	Crane's Bill		149	27/11/2014	–			1	x	x	0
*	*Gladiolus undulatus*	Wild Gladiolus		13	7/12/2006	–						1
	Glossodia major	Wax-lip Orchid		114	29/09/2011	–			1			2
	Glossostigma elatinoides	Small Mud-mat		4	14/03/1992	–				x		0
	Glyceria australis	Australian Sweet-grass		177	24/06/2013	–				x		6
	Gompholobium huegelii	Common Wedge-pea		112	12/11/2013	–			2	x		1
	Gonocarpus tetragynus	Common Raspwort		937	9/01/2015	–			12	x		6
	Goodenia geniculata	Bent Goodenia		412	12/11/2013	–						2
	Goodenia lanata	Trailing Goodenia		87	22/02/2015	–			6			2
	Goodenia spp.	Goodenia		47	7/01/2016	–			2			2

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	Gratiola peruviana	Austral Brooklime		158	7/01/2016	–				x		1
VU vu L	*Grevillea floripendula*	Ben Major Grevillea	Vulnerable	148	25/02/2015	–			22	x		2
P # r	*Grevillea rosmarinifolia*	Rosemary Grevillea	All infraspecific taxa included in Advisory List	7	15/09/2006	–						1
	Haloragis heterophylla	Varied Raspwort		240	22/11/2014	–			1			0
	Hardenbergia violacea	Purple Coral-pea		46	28/08/2014	–			5	x	x	1
	Hemarthria uncinata var. uncinata	Mat Grass		193	29/09/2011	–						1
*	*Holcus lanatus*	Yorkshire Fog		1282	12/11/2015	–			5	x	x	7
*	*Hordeum leporinum*	Barley-grass		91	12/11/2012	–			1			0
*	*Hordeum murinum s.l.*	Barley-grass		58	24/01/2011	–					x	
*	*Hordeum spp.*	Barley Grass		35	22/10/2014	–				x		1
	Hovea heterophylla	Common Hovea		275	22/02/2015	–			5			1
	Hydrocotyle foveolata	Yellow Pennywort		216	27/10/2003	–						2
	Hydrocotyle hirta	Hairy Pennywort		154	3/11/2010	–					x	

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	Hydrocotyle laxiflora	Stinking Pennywort		468	22/09/2016	–			5			2
	Hydrocotyle sibthorpioides	Shining Pennywort		150	26/02/2011	–						2
	Hypericum gramineum s.l.	Small St John's Wort		685	22/02/2015	–			5			0
*	*Hypericum perforatum subsp. veronense*	St John's Wort		272	16/12/2010	–			4	x	x	0
*	*Hypochaeris glabra*	Smooth Cat's-ear		366	25/11/2014	–			1		x	0
*	*Hypochaeris radicata*	Flatweed		1747	22/02/2015	–			9	x	x	8
	Indigofera australis subsp. australis	Austral Indigo		78	24/09/2010	–					x	
	Isolepis cernua	Nodding Club-sedge		13	20/11/2014	–						3
	Isolepis cernua var. platycarpa	Broad-fruit Club-sedge		72	12/11/2012	–				x		0
	Isolepis fluitans	Floating Club-sedge		176	20/11/2012	–						1
*	*Isolepis hystrix*	Awned Club-sedge		79	14/10/2015	–						1
	Isolepis inundata	Swamp Club-sedge		143	8/01/2011	–				x		1
*	*Isolepis levynsiana*	Tiny Flat-sedge		332	14/10/2015	–			1			0
	Isolepis marginata	Little Club-sedge		164	21/10/2010	–						5
*	*Ixia maculata*	Yellow Ixia		1	1/01/1993	–			1			0

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*	*Juncus acutus subsp. acutus*	Spiny Rush		92	20/10/2010	–			3			0
	Juncus amabilis	Hollow Rush		158	3/12/2013	–			6			5
*	*Juncus articulatus subsp. articulatus*	Jointed Rush		93	22/03/2011	–						1
*	*Juncus capitatus*	Capitate Rush		355	22/11/2014	–			2			3
	Juncus flavidus	Gold Rush		47	14/11/2012	–			2			0
	Juncus holoschoenus	Joint-leaf Rush		297	23/10/2013	–			3	x		4
	Juncus pallidus	Pale Rush		407	28/08/2014	–			5			0
	Juncus sarophorus	Broom Rush		24	30/04/2004	–			4			2
	Juncus semisolidus	Plains Rush		4	19/10/2010	–			2			0
	Juncus sp. (subgenus Genuini)	Rush		2	12/01/1996	–						1
	Juncus spp.	Rush		257	27/11/2014	–			4	x	x	0
	Juncus subsecundus	Finger Rush		365	25/11/2014	–			2			0
	Kennedia prostrata	Running Postman		381	22/09/2016	–			4	x		0
	Lachnagrostis aemula s.l.	Leafy Blown-grass		48	17/11/2009	–			2			0
	Lachnagrostis filiformis s.l.	Common Blown-grass		437	21/11/2014	–			2	x	x	4
*	*Lactuca saligna*	Willow-leaf Lettuce		12	13/12/2010	–						1

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	Lagenophora spp.	Bottle Daisy		11	6/11/1998	–					x	
	Lagenophora stipitata	Common Bottle-daisy		286	12/11/2013	–						1
*	*Leontodon saxatilis subsp. saxatilis*	Hairy Hawkbit		558	25/11/2014	–			1			2
	Lepidium spp.	Peppercress		5	17/11/2013	–					x	
	Lepidosperma filiforme	Common Rapier-sedge		107	15/10/2015	–			3		x	2
	Lepidosperma semiteres	Wire Rapier-sedge		277	28/08/2014	–			1			0
	Leptorhynchos squamatus	Scaly Buttons		364	22/02/2015	–			4	x		1
	Leptorhynchos tenuifolius	Wiry Buttons		77	29/09/2011	–			1			0
	Leptospermum myrsinoides	Heath Tea-tree		645	12/11/2013	–			4			0
	Leptospermum spp.	Tea Tree		1	7/02/2000	–					x	
	Leucopogon ericoides	Pink Beard-heath		195	6/06/2012	–						1
	Leucopogon spp.	Beard Heath		8	4/06/2009	–					x	
	Leucopogon virgatus	Common Beard-heath		490	14/10/2015	–			7		x	3
#N/A	*Limonium sinuatum*	#N/A	#N/A	####	#N/A	–					x	
	Lissanthe strigosa subsp. subulata	Peach Heath		127	17/11/2013	–			15	x		4
	Lobelia pratioides	Poison Lobelia		310	14/10/2015	–			1			2

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	Lobelia spp.	Lobelia		22	4/04/2008	–						1
*	*Lolium perenne*	Perennial Rye-grass		325	25/11/2014	–					x	1
*	*Lolium perenne var. perenne*	Perennial Rye-grass		1	4/06/2009	–						1
*	*Lolium rigidum*	Wimmera Rye-grass		146	21/11/2014	–				x		0
	Lomandra filiformis	Wattle Mat-rush		563	22/02/2015	–			11	x	x	5
	Lomandra filiformis subsp. coriacea	Wattle Mat-rush		103	29/09/2011	–			7			3
	Lomandra micrantha s.l.	Small-flower Mat-rush		50	13/05/2009	–						4
	Lomandra nana	Dwarf Mat-rush		416	27/11/2014	–				x		0
	Lomandra sororia	Small Mat-rush		319	16/10/2015	–			9			0
	Lomandra spp.	Mat-rush		94	22/09/2016	–			3			0
*	*Lophopyrum ponticum*	Tall Wheat-grass		13	23/01/2009	–						1
	Luzula meridionalis	Common Woodrush		168	22/02/2015	–					x	1
	Luzula meridionalis var. densiflora	Common Woodrush		81	22/09/2006	–			1			0
	Luzula spp.	Woodrush		33	24/06/2010	–			2			1
*	*Lycium ferocissimum*	African Box-thorn		117	22/11/2013	C						1
*	*Lysimachia arvensis*	Pimpernel		419	15/10/2015	–			2			1

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	Lythrum hyssopifolia	Small Loosestrife		325	20/11/2014	–			1		x	4
	Lythrum salicaria	Purple Loosestrife		23	3/11/2006	–			1			0
*	*Malus spp.*	Apple		6	26/04/2013	–			1			0
*	*Matricaria matricarioides*	Rounded Chamomile		2	26/11/1975	–						1
	Melicytus dentatus s.s.	Tree Violet		33	24/03/2011	–				x		0
*	*Melilotus albus*	Bokhara Clover		1	18/01/1961	–			1			0
*	*Mentha pulegium*	Pennyroyal		76	8/01/2011	–						1
	Microlaena stipoides var. stipoides	Weeping Grass		888	20/11/2014	–			3	x	x	4
	Microseris scapigera s.l.	Yam Daisy		243	6/11/2012	–			2			0
	Microseris walteri	Yam Daisy		32	14/10/2015	–						3
	Microtis parviflora	Slender Onion-orchid		92	6/11/2011	–						1
	Microtis spp.	Onion Orchid		108	22/11/2014	–			1			2
*	*Moenchia erecta*	Erect Chickweed		178	20/11/2014	–			3			1
	Monotoca scoparia	Prickly Broom-heath		257	29/09/2011	–			2		x	0
	Montia australasica	White Purslane		192	24/06/2013	–			1			3
	Montia fontana subsp. chondrosperma	Water Blinks		7	19/09/2006	–						1
	Muellerina eucalyptoides	Creeping Mistletoe		29	6/02/2009	–						1

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*	*Muscari armeniacum*	Grape Hyacinth		4	20/09/2006	–						1
	Myriophyllum crispatum	Upright Water-milfoil		43	15/10/2012	–			2	x		4
	Myriophyllum pedunculatum	Mat Water-milfoil		14	18/11/1999	–						4
	Myriophyllum simulans	Amphibious Water-milfoil		116	5/11/2012	–			1			0
	Myriophyllum spp.	Water Milfoil		69	4/04/2008	–				x		0
	Myriophyllum verrucosum	Red Water-milfoil		33	7/11/2011	–						1
	Olearia myrsinoides	Silky Daisy-bush		20	2/04/1999	–						1
	Opercularia ovata	Broad-leaf Stinkweed		153	22/02/2015	–			1			1
	Opercularia varia	Variable Stinkweed		366	13/09/2012	–			7		x	3
	Ornduffia reniformis	Running Marsh-flower		254	14/10/2015	–			2	x		1
	Oxalis perennans	Grassland Wood-sorrel		566	25/11/2014	–			2		x	1
*	*Oxalis purpurea*	Large-flower Wood-sorrel		11	20/10/2010	–			1			0
	Oxalis spp.	Wood Sorrel		190	27/11/2014	–			1		x	1
	Ozothamnus ferrugineus	Tree Everlasting		201	20/03/2013	–			1			0
	Ozothamnus obcordatus	Grey Everlasting		131	9/01/2015	–			5	x	x	2
*	*Parapholis incurva*	Coast Barb-grass		43	13/11/2012	–						1

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*	*Parentucellia latifolia*	Red Bartsia		197	30/10/2014	–			1			0
*	*Paspalum dilatatum*	Paspalum		156	27/11/2014	–			6	x		1
*	*Paspalum distichum*	Water Couch		42	24/03/2011	–				x		0
	Pauridia glabella var. glabella	Tiny Star		45	28/10/2014	–						1
	Pauridia glabella/vaginata spp. agg.	Tiny/Yellow Star species aggregate		20	17/09/2011	–			1			0
	Pauridia spp.	Yellow Star		1	5/11/2011	–						1
	Pelargonium australe	Austral Stork's-bill		94	13/03/2013	–				x		0
	Pelargonium rodneyanum	Magenta Stork's-bill		275	23/08/2014	–			7			2
	Pentapogon quadrifidus var. quadrifidus	Five-awned Spear-grass		326	22/11/2014	–			2			2
	Persicaria prostrata	Creeping Knotweed		100	30/01/2013	–				x		1
*	*Phalaris aquatica*	Toowoomba Canary-grass		681	27/11/2014	–			6	x	x	3
	Phragmites australis	Common Reed		198	10/10/2012	–						1
	Pimelea axiflora	Bootlace Bush		5	1/03/2000	–			1			0
	Pimelea curviflora s.l.	Curved Rice-flower		131	27/11/2014	–			3	x	x	1
	Pimelea curviflora s.s.	Curved Rice-flower		37	14/10/2015	–			2	x		0

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	Pimelea glauca	Smooth Rice-flower		126	23/10/2013	–			1			0
	Pimelea humilis	Common Rice-flower		649	27/11/2014	–			6		x	7
	Pimelea linifolia	Slender Rice-flower		111	28/08/2014	–			1		x	0
	Pimelea spp.	Rice Flower		34	22/10/2010	–					x	
*	*Pinus radiata*	Radiata Pine		294	22/02/2015	–			6	x	x	1
*	*Plantago coronopus*	Buck's-horn Plantain		392	27/11/2014	–			2	x	x	4
*	*Plantago lanceolata*	Ribwort		433	14/10/2015	–			3		x	2
	Plantago varia	Variable Plantain		175	9/01/2015	–			8		x	2
	Platylobium formosum s.l.	Handsome Flat-pea		7	12/10/1989	–						1
*	*Poa annua*	Annual Meadow-grass		200	20/03/2013	–			1			1
*	*Poa bulbosa*	Bulbous Meadow-grass		30	21/11/2014	–						1
	Poa labillardierei	Common Tussock-grass		392	2/09/2013	–			4	x	x	3
	Poa sieberiana	Grey Tussock-grass		321	14/10/2015	–			12	x	x	7
	Poa sieberiana var. sieberiana	Grey Tussock-grass		183	22/11/2014	–			13			0
	Poa spp.	Tussock Grass		161	20/11/2014	–			1		x	0
	Podolepis decipiens	Common Podolepis		1	15/10/2015	–				x		0

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	Podolepis jaceoides s.l.	Showy/Basalt Podolepis		55	26/11/2007	–			1			0
	Podolobium procumbens	Trailing Podolobium		16	15/12/1998	–			2			1
*	*Polypogon monspeliensis*	Annual Beard-grass		143	4/12/2012	–				x		1
	Potamogeton cheesemanii	Red Pondweed		17	8/01/2011	–						3
*	*Prunus spp.*	Prunus		9	26/04/2013	–			2			0
	Pteridium esculentum	Austral Bracken		736	22/09/2016	–			1		x	1
	Pterostylis longifolia s.l.	Tall Greenhood		91	13/03/2013	–			1	x		0
	Pterostylis melagramma	Tall Greenhood		12	12/12/1996	–						4
	Pterostylis nana	Dwarf Greenhood		68	29/09/2011	–			2			2
	Pterostylis nutans	Nodding Greenhood		87	29/09/2011	–			1			3
	Pultenaea gunnii	Golden Bush-pea		17	22/02/2015	–			1			0
	Pultenaea humilis	Dwarf Bush-pea		176	16/10/2015	–			2			0
	Pultenaea pedunculata	Matted Bush-pea		112	28/08/2014	–			6	x		2
	Pultenaea scabra	Rough Bush-pea		148	15/10/2015	–			1			0
	Pultenaea spp.	Bush-pea		32	20/03/2007	–				x		0
	Ranunculus amphitrichus	Small River Buttercup		115	13/11/2012	–				x		1
	Ranunculus inundatus	River Buttercup		91	30/01/2013	–			1	x		3

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	Ranunculus lappaceus	Australian Buttercup		56	12/11/2013	–						2
*	*Ranunculus ophioglossifolius*	Snake-tongue Buttercup		8	2/11/2006	–						1
*	*Ranunculus repens*	Creeping Buttercup		8	29/04/2004	–						1
*	*Ranunculus sceleratus subsp. sceleratus*	Celery Buttercup		6	2/11/2006	–						1
	Ranunculus sessiliflorus	Annual Buttercup		50	15/11/1996	–			1			0
*	*Romulea minutiflora*	Small-flower Onion-grass		6	13/10/2008	–						1
*	*Romulea rosea*	Onion Grass		983	27/11/2014	–			6	x	x	3
*	*Rosa rubiginosa*	Sweet Briar		500	27/11/2014	C			14	x	x	2
*	*Rubus fruticosus spp. agg.*	Blackberry		1811	14/12/2010	C			13	x	x	3
	Rubus spp.	Bramble		24	8/07/2003	–			1			0
	Rumex brownii	Slender Dock		328	12/11/2015	–			3			1
*	*Rumex conglomeratus*	Clustered Dock		118	13/11/2012	–						1
*	*Rumex crispus*	Curled Dock		220	3/12/2013	–			3		x	2
	Rumex spp.	Dock		57	19/11/2014	–				x		0
	Rytidosperma caespitosum	Common Wallaby-grass		458	12/11/2015	–			3		x	2

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	Rytidosperma duttonianum	Brown-back Wallaby-grass		171	25/11/2014	–				x	x	5
	Rytidosperma erianthum	Hill Wallaby-grass		172	22/11/2014	–			2			2
	Rytidosperma fulvum	Copper-awned Wallaby-grass		19	20/11/2014	–						2
	Rytidosperma geniculatum	Kneed Wallaby-grass		431	13/11/2012	–			4	x		2
	Rytidosperma indutum	Shiny Wallaby-grass		25	15/04/2004	–			2			0
	Rytidosperma laeve	Smooth Wallaby-grass		100	22/11/2014	–			2			0
	Rytidosperma pallidum	Silvertop Wallaby-grass		110	22/02/2015	–			19	x	x	8
	Rytidosperma penicillatum	Weeping Wallaby-grass		72	9/03/2011	–						1
	Rytidosperma pilosum	Velvet Wallaby-grass		264	10/03/2011	–			2			0
	Rytidosperma procerum	Tall Wallaby-grass		6	7/12/1999	–			1			0
	Rytidosperma racemosum var. racemosum	Slender Wallaby-grass		210	3/12/2013	–			1			0
	Rytidosperma semiannulare	Wetland Wallaby-grass		130	8/01/2011	–						1
	Rytidosperma setaceum	Bristly Wallaby-grass		410	27/11/2014	–			2	x		0
	Rytidosperma spp.	Wallaby Grass		356	26/02/2011	–			1			2

STATUS	SCIENTIFIC NAME	COMMON NAME	VICTORIAN ADVISORY LIST	COUNT OF SIGHTINGS IN GHCMA	LAST RECORD IN GHCMA	CALP ACT	PLANTED?	HERBARIUM SPECIMENS?	VBA COUNT (WITHIN STUDY ONLY)[1]	WSP 2016	GHD 2015	COUNT WSP 2016–2018
	Rytidosperma spp.	Wallaby Grass		356	26/02/2011	–					x	
	Rytidosperma tenuius	Purplish Wallaby-grass		28	7/12/1999	–			3			0
*	*Salix babylonica s.l.*	Weeping Willow		2	1/06/1999	–			1			0
*	*Schinus molle*	Pepper Tree		6	6/04/2008	–					x	
	Schoenus apogon	Common Bog-sedge		1000	25/11/2014	–			3	x		2
	Senecio campylocarpus	Floodplain Fireweed	r	####	#N/A	–		Y				3
	Senecio glomeratus	Annual Fireweed		278	22/02/2015	–			1	x		2
	Senecio hispidulus s.l.	Rough Fireweed		115	17/11/2009	–					x	2
	Senecio minimus	Shrubby Fireweed		171	4/06/2009	–			1	x		1
	Senecio phelleus	Stony Fireweed		12	3/12/1983	–						2
	Senecio prenanthoides	Beaked Fireweed		22	30/10/2010	–			2			0
	Senecio quadridentatus	Cotton Fireweed		304	28/08/2014	–			4		x	1
	Senecio spp.	Groundsel		106	22/09/2016	–			1		x	1
	Senecio tenuiflorus s.l.	Slender Fireweed		224	20/03/2013	–					x	2
	Siloxerus multiflorus	Small Wrinklewort		120	15/10/2015	–						1
	Solenogyne dominii	Smooth Solenogyne		244	22/11/2014	–						2
*	*Sonchus asper s.l.*	Rough Sow-thistle		396	25/11/2014	–			4		x	0
*	*Sonchus oleraceus*	Common Sow-thistle		560	21/11/2014	–					x	1

STATUS	SCIENTIFIC NAME	COMMON NAME	VICTORIAN ADVISORY LIST	COUNT OF SIGHTINGS IN GHCMA	LAST RECORD IN GHCMA	CALP ACT	PLANTED?	HERBARIUM SPECIMENS?	VBA COUNT (WITHIN STUDY ONLY)[1]	WSP 2016	GHD 2015	COUNT WSP 2016–2018
	Spergularia spp.	Sand Spurrey		2	6/02/2004	–				x		0
	Spergularia tasmanica	Native Sea-spurrey		13	3/04/2008	–						1
	Stackhousia monogyna s.l.	Creamy Stackhousia		207	14/11/2012	–			1			3
	Stackhousia viminea	Slender Stackhousia		29	16/10/2015	–					x	
	Stellaria angustifolia subsp. angustifolia	Swamp Starwort		90	14/11/2012	–			1			1
*	*Stellaria pallida*	Lesser Chickweed		22	7/06/2010	–			2			0
	Stuartina muelleri	Spoon Cudweed		103	25/10/2003	–			1			1
	Stylidium graminifolium s.l.	Grass Triggerplant		310	22/02/2015	–			2			2
	Stylidium spp.	Trigger Plant		9	3/10/2003	–					x	
*	*Taraxacum officinale spp. agg.*	Garden Dandelion		100	13/11/2012	–						2
	Tetratheca ciliata	Pink-bells		593	22/09/2016	–			5			1
	Tetratheca spp.	Pink Bells		5	29/10/1999	–					x	
	Thelymitra antennifera	Rabbit Ears		111	29/09/2011	–			1			0
	Thelymitra ixioides s.l.	Spotted Sun-orchid		92	12/11/2013	–			1			0
	Thelymitra pauciflora s.l.	Slender Sun-orchid		204	13/03/2013	–			2			1
	Thelymitra spp.	Sun Orchid		289	27/11/2014	–				x	x	3

STATUS	SCIENTIFIC NAME	COMMON NAME	VICTORIAN ADVISORY LIST	COUNT OF SIGHTINGS IN GHCMA	LAST RECORD IN GHCMA	CALP ACT	PLANTED?	HERBARIUM SPECIMENS?	VBA COUNT (WITHIN STUDY ONLY)[1]	WSP 2016	GHD 2015	COUNT WSP 2016–2018
	Themeda triandra	Kangaroo Grass		1076	12/11/2015	–			11	x	x	0
	Thysanotus patersonii	Twining Fringe-lily		299	13/10/2015	–			3			1
	Tricoryne elatior	Yellow Rush-lily		374	12/11/2015	–			6	x	x	0
*	*Trifolium angustifolium var. angustifolium*	Narrow-leaf Clover		117	20/11/2014	–				x		0
*	*Trifolium arvense var. arvense*	Hare's-foot Clover		57	23/10/2013	–					x	
*	*Trifolium campestre var. campestre*	Hop Clover		264	21/11/2014	–					x	1
*	*Trifolium dubium*	Suckling Clover		431	22/11/2014	–			2	x		0
*	*Trifolium repens var. repens*	White Clover		187	3/12/2013	–			1		x	1
*	*Trifolium spp.*	Clover		87	20/11/2014	–					x	
*	*Trifolium subterraneum*	Subterranean Clover		687	22/11/2014	–			2	x		0
*	*Trifolium tomentosum var. tomentosum*	Woolly Clover		14	1/06/1999	–			1			0
	Triglochin striata	Streaked Arrowgrass		277	14/11/2012	–				x		1
*	*Triticum aestivum*	Wheat		9	12/11/2012	–					x	
*	*Ulex europaeus*	Gorse		3997	22/02/2015	C			33	x	x	1
*	*Veronica persica*	Persian Speedwell		24	24/11/2010	–			1			0

STATUS	SCIENTIFIC NAME	COMMON NAME	VICTORIAN ADVISORY LIST	COUNT OF SIGHTINGS IN GHCMA	LAST RECORD IN GHCMA	CALP ACT	PLANTED?	HERBARIUM SPECIMENS?	VBA COUNT (WITHIN STUDY ONLY)[1]	WSP 2016	GHD 2015	COUNT WSP 2016–2018
*	*Vinca major*	Blue Periwinkle		20	13/04/2012	–			2			0
	Viola betonicifolia	Showy Violet		24	22/09/2016	–			1			0
*	*Vulpia bromoides*	Squirrel-tail Fescue		715	25/11/2014	–			1	x		6
*	*Vulpia muralis*	Wall Fescue		29	8/12/2006	–						1
*	*Vulpia spp.*	Fescue		279	23/10/2014	–				x	x	0
	Wahlenbergia communis s.l.	Tufted Bluebell		12	6/11/2012	–						2
	Wahlenbergia spp.	Bluebell		135	27/11/2014	–					x	
	Wahlenbergia stricta subsp. stricta	Tall Bluebell		165	12/11/2013	–					x	1
	Wurmbea dioica	Common Early Nancy		218	28/08/2014	–			5			6
	Xerochrysum viscosum	Shiny Everlasting		6	10/12/1998	–					x	1

Table Legend

Conservation Status in Australia (EPBC Act 1999)

EN = Endangered, VU = Vulnerable.

Conservation Status in Victoria (FFG 1988)
L = Listed as threatened, X = Rejected for listing as threatened; taxon ineligible

Conservation Status in Victoria (Victorian Advisory List)
en = Endangered, vu = Vulnerable, r = Rare, P = All infraspecific taxa included in Advisory List, # = native but some strands may be alien

* Introduced species

A2 QUADRAT DATA

See Figure 4.3 in main report for quadrat locations.

Quadrat Name: WYBGW Quadrat 1
Date: 20/10/2016
Collector: NM GM
EVC: Valley Grassy Forest
EPBC/FFG Matters: White Box -Yellow Box – Blakely’s Red Gum Grassy Woodland

SCIENTIFIC NAME	COMMON NAME	STATUS	COVER/ ABUNDANCE	IMPORTANT SP
Acacia paradoxa	Hedge Wattle		2	
Acaena echinata	Sheep's Burr		+	
Acaena novae-zelandiae	Bidgee-widgee		+	
Aira elegantissima	Delicate Hair-grass	*	1	
Arctotheca calendula	Cape weed	*	1	
Arthropodium strictum s.l.	Chocolate Lily		2	
Austrostipa spp.	Spear Grass		+	
Bossiaea prostrata	Creeping Bossiaea		1	X
Briza maxima	Large Quaking-grass	*	2	
Briza minor	Lesser Quaking-grass	*	1	
Bulbine bulbosa	Bulbine Lily		1	
Caesia calliantha	Blue Grass-lily		1	
Caladenia ornata	Ornate Pink-fingers	VU vu L	+	
Centrolepis strigosa subsp. strigosa	Hairy Centrolepis		+	
Cerastium glomeratum s.l.	Common Mouse-ear Chickweed	*	+	
Coronidium scorpioides s.s.	Button Everlasting		+	
Crassula decumbens var. decumbens	Spreading Crassula		+	
Crassula sieberiana s.l.	Sieber Crassula		+	
Dianella admixta	Black-anther Flax-lily		+	X
Drosera aberrans	Scented Sundew		1	
Eucalyptus melliodora	Yellow Box		2	
Eucalyptus obliqua	Messmate Stringybark		+	
Eucalyptus rubida	Candlebark		+	
Geranium retrorsum s.l.	Grassland Crane's-bill		+	
Gonocarpus tetragynus	Common Raspwort		1	

SCIENTIFIC NAME	COMMON NAME	STATUS	COVER/ ABUNDANCE	IMPORTANT SP
Goodenia geniculata	Bent Goodenia		1	
Hydrocotyle foveolata	Yellow Pennywort		1	
Hydrocotyle laxiflora	Stinking Pennywort		+	
Hypochaeris radicata	Flatweed	*	1	
Isolepis marginata	Little Club-sedge		1	
Juncus capitatus	Capitate Rush	*	+	
Lissanthe strigosa subsp. subulata	Peach Heath		+	
Lomandra filiformis	Wattle Mat-rush		1	
Luzula meridionalis	Common Woodrush		+	
Lysimachia arvensis	Pimpernel	*	1	
Microtis spp.	Onion Orchid		+	
Pauridia spp.	Yellow Star		1	
Pelargonium rodneyanum	Magenta Stork's-bill		+	
Pentapogon quadrifidus var. quadrifidus	Five-awned Spear-grass		+	
Pimelea humilis	Common Rice-flower		1	
Plantago varia	Variable Plantain		1	X
Poa sieberiana	Grey Tussock-grass		+	
Ranunculus lappaceus	Australian Buttercup		1	
Romulea minutiflora	Small-flower Onion-grass	*	+	
Romulea rosea	Onion Grass	*	1	
Rubus fruticosus spp. agg.	Blackberry	*	+	
Rytidosperma pallidum	Silvertop Wallaby-grass		1	
Rytidosperma spp.	Wallaby Grass		+	
Thelymitra spp.	Sun Orchid		+	
Vulpia bromoides	Squirrel-tail Fescue	*	1	
Wurmbea dioica	Common Early Nancy		1	

Quadrat name: WYBGW Quadrat 2
Date: 21/10/2016
Collector: NM GM
EVC: Valley Grassy Forest
EPBC/FFG matters: White Box -Yellow Box – Blakely's Red Gum Grassy Woodland

SCIENTIFIC NAME	COMMON NAME	STATUS	COVER/ ABUNDANCE	IMPORTANT SPECIES
Acacia melanoxylon	Blackwood		2	
Acaena echinata	Sheep's Burr		1	
Amyema pendula	Drooping Mistletoe		+	
Anthoxanthum odoratum	Sweet Vernal-grass	*	1	
Arthropodium strictum s.l.	Chocolate Lily		2	
Bossiaea prostrata	Creeping Bossiaea		+	X
Briza maxima	Large Quaking-grass	*	2	
Bromus diandrus	Great Brome	*	1	
Bulbine bulbosa	Bulbine Lily		1	
Crassula decumbens var. decumbens	Spreading Crassula		+	
Dianella admixta	Black-anther Flax-lily		+	X
Dianella amoena	Matted Flax-lily	EN en L	1	
Dillwynia cinerascens s.l.	Grey Parrot-pea		+	
Eucalyptus melliodora	Yellow Box		2	
Eucalyptus rubida	Candlebark		2	
Genista monspessulana	Montpellier Broom	*	2	
Hypochaeris radicata	Flatweed	*	+	
Lachnagrostis filiformis s.l.	Common Blown-grass		1	
Lissanthe strigosa subsp. subulata	Peach Heath		1	
Microlaena stipoides var. stipoides	Weeping Grass		+	
Pelargonium rodneyanum	Magenta Stork's-bill		+	
Pimelea curviflora s.l.	Curved Rice-flower		+	X
Pimelea humilis	Common Rice-flower		1	
Poa bulbosa	Bulbous Meadow-grass	*	+	
Romulea rosea	Onion Grass	*	1	
Rosa rubiginosa	Sweet Briar	*	+	
Rytidosperma spp.	Wallaby Grass		+	

Quadrat name: WYBGW Quadrat 3
Date: 16/02/2017
Collector: NM ZS
EVC: Alluvial Terraces Herb-rick Woodland
EPBC/FFG matters: White Box -Yellow Box – Blakely's Red Gum Grassy Woodland

SCIENTIFIC NAME	COMMON NAME	STATUS	COVER/ ABUNDANCE	IMPORTANT SPECIES
Acacia melanoxylon	Blackwood		+	
Acaena echinata	Sheep's Burr		+	
Acaena novae-zelandiae	Bidgee-widgee		+	
Agrostis capillaris	Brown-top Bent	*	+	
Anthosachne scabra s.l.	Common Wheat-grass		1	
Anthoxanthum odoratum	Sweet Vernal-grass	*	2	
Astroloma humifusum	Cranberry Heath		+	
Austrostipa rudis subsp. rudis	Veined Spear-grass		1	
Briza maxima	Large Quaking-grass	*	+	
Briza minor	Lesser Quaking-grass	*	+	
Carex tereticaulis	Poong'ort		1	
Centaurium erythraea	Common Centaury	*	+	
Cirsium vulgare	Spear Thistle	*	+	
Daucus glochidiatus	Australian Carrot		1	
Dianella admixta	Black-anther Flax-lily		1	X
Eucalyptus goniocalyx s.l.	Bundy		1	
Eucalyptus melliodora	Yellow Box		2	
Eucalyptus rubida	Candlebark		1	
Euchiton japonicus s.l.	Clustered/Creeping Cudweed		+	
Galium gaudichaudii	Rough Bedstraw		+	
Geranium sp. 2	Variable Crane's-bill		+	
Gonocarpus tetragynus	Common Raspwort		1	
Hydrocotyle laxiflora	Stinking Pennywort		1	
Hypochaeris radicata	Flatweed	*	1	
Juncus amabilis	Hollow Rush		1	
Juncus sp. (subgenus Genuini)	Rush		1	
Lagenophora stipitata	Common Bottle-daisy		1	
Lissanthe strigosa subsp. subulata	Peach Heath		+	
Lomandra filiformis subsp. coriacea	Wattle Mat-rush		2	

SCIENTIFIC NAME	COMMON NAME	STATUS	COVER/ ABUNDANCE	IMPORTANT SPECIES
Lythrum hyssopifolia	Small Loosestrife		+	
Microlaena stipoides var. stipoides	Weeping Grass		1	
Opercularia ovata	Broad-leaf Stinkweed		1	
Oxalis perennans	Grassland Wood-sorrel		+	
Poa sieberiana	Grey Tussock-grass		+	
Rytidosperma caespitosum	Common Wallaby-grass		+	
Rytidosperma erianthum	Hill Wallaby-grass		1	
Rytidosperma penicillatum	Weeping Wallaby-grass		1	
Senecio hispidulus s.l.	Rough Fireweed		+	
Senecio phelleus	Stony Fireweed		1	
Senecio quadridentatus	Cotton Fireweed		+	
Senecio spp.	Groundsel		+	
Solenogyne dominii	Smooth Solenogyne		+	
Vulpia bromoides	Squirrel-tail Fescue	*	+	

Quadrat name: SHW Quadrat 1
Date: 30/11/2016
Collector: NM TB
EVC: Aquatic Grassy Wetland
EPBC/FFG matters: Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

SCIENTIFIC NAME	COMMON NAME	STATUS	COVER/ ABUNDANCE	IMPORTANT SP
Amphibromus fluitans	River Swamp Wallaby-grass	VU X	3	
Callitriche brutia subsp. brutia	Thread Water-starwort	*	+	
Cotula coronopifolia	Water Buttons	*	1	
Cycnogeton procerum s.s.	Common Water-ribbons		+	
Eleocharis acuta	Common Spike-sedge		1	
Glyceria australis	Australian Sweet-grass		+	
Isolepis marginata	Little Club-sedge		+	
Juncus holoschoenus	Joint-leaf Rush		+	
Lobelia pratioides	Poison Lobelia		+	X
Montia australasica	White Purslane		1	X
Myriophyllum crispatum	Upright Water-milfoil		1	
Potamogeton cheesemanii	Red Pondweed		1	X

Quadrat name: SHW Quadrat 2
Date: 17/02/2017
Collector: NM ZS
EVC: Plains Grassy Wetland
EPBC/FFG matters: Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

SCIENTIFIC NAME	COMMON NAME	STATUS	COVER/ ABUNDANCE
Agrostis capillaris	Brown-top Bent	*	1
Amphibromus fluitans	River Swamp Wallaby-grass	VU X	1
Amphibromus nervosus	Common Swamp Wallaby-grass		1
Anthoxanthum odoratum	Sweet Vernal-grass	*	2
Carex appressa	Tall Sedge		2
Centaurium erythraea	Common Centaury	*	1
Centaurium tenuiflorum	Slender Centaury	*	+
Centella cordifolia	Centella		+
Deyeuxia quadriseta	Reed Bent-grass		1
Eleocharis acuta	Common Spike-sedge		1
Epilobium hirtigerum	Hairy Willow-herb		1
Euchiton involucratus s.l.	Common Cudweed		+
Gladiolus undulatus	Wild Gladiolus	*	+
Glyceria australis	Australian Sweet-grass		2
Hemarthria uncinata var. uncinata	Mat Grass		+
Holcus lanatus	Yorkshire Fog	*	2
Hypochaeris radicata	Flatweed	*	1
Isolepis fluitans	Floating Club-sedge		+
Juncus amabilis	Hollow Rush		1
Juncus holoschoenus	Joint-leaf Rush		1
Juncus sarophorus	Broom Rush		2
Lachnagrostis filiformis s.l.	Common Blown-grass		1
Lythrum hyssopifolia	Small Loosestrife		1
Oxalis spp.	Wood Sorrel		1
Persicaria prostrata	Creeping Knotweed		+
Plantago coronopus	Buck's-horn Plantain	*	1
Romulea rosea	Onion Grass	*	1
Rosa rubiginosa	Sweet Briar	*	+
Rumex crispus	Curled Dock	*	+

SCIENTIFIC NAME	COMMON NAME	STATUS	COVER/ ABUNDANCE
Rytidosperma duttonianum	Brown-back Wallaby-grass		1
Senecio campylocarpus	Floodplain Fireweed	r	+
Trifolium repens var. repens	White Clover	*	1
Vulpia bromoides	Squirrel-tail Fescue	*	+

Quadrat name: SHW Quadrat 3
Date: 17/02/2017
Collector: NM ZS
EVC: Plains Grassy Wetland
EPBC/FFG matters: Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

SCIENTIFIC NAME	COMMON NAME	STATUS	COVER/ ABUNDANCE	IMPORTANT SP
Agrostis capillaris	Brown-top Bent	*	1	
Amphibromus fluitans	River Swamp Wallaby-grass	VU X	1	
Amphibromus nervosus	Common Swamp Wallaby-grass		2	
Anthoxanthum odoratum	Sweet Vernal-grass	*	1	
Eleocharis acuta	Common Spike-sedge		1	
Epilobium hirtigerum	Hairy Willow-herb		+	
Holcus lanatus	Yorkshire Fog	*	1	
Hydrocotyle sibthorpioides	Shining Pennywort		1	
Juncus amabilis	Hollow Rush		1	
Juncus holoschoenus	Joint-leaf Rush		+	
Juncus sarophorus	Broom Rush		1	
Lobelia spp.	Lobelia		1	X
Lythrum hyssopifolia	Small Loosestrife		1	
Mentha pulegium	Pennyroyal	*	1	
Myriophyllum crispatum	Upright Water-milfoil		2	
Ranunculus inundatus	River Buttercup		1	X
Rumex conglomeratus	Clustered Dock	*	+	
Rytidosperma duttonianum	Brown-back Wallaby-grass		1	

Assessment of Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

SCIENTIFIC DETERMINATION CRITERIA	AQUATIC GRASSY WETLAND (PLOT 1)	PLAINS GRASSY WETLAND (PLOT 2)	PLAINS GRASSY WETLAND (PLOT 3)
Key Diagnostic Characteristics			
Landscape			
Limited to the temperate zone of mainland south-eastern Australia.	Yes	Yes	Yes
The ecological community occurs in south-east SA, Victoria and southern NSW.	Yes	Yes	Yes
On flat plains grading into slopes, below 500 m asl.	Yes	Yes	Yes
Associated soils are generally fertile but poorly draining clays derived from a range of geologies.	Yes	Yes	Yes
Typically in rainfall zones with a Winter seasonal rainfall pattern, extending into a Uniform seasonal rainfall pattern at the edge of its range.	Yes	Yes	Yes
Hydrology			
On isolated drainage lines or depressions which are seasonally inundated (typically during winter-spring) and subsequently dry (typically by late summer).	Yes	Yes	Yes
Rainfall is the main water source. These wetlands are not dependent on overbank flooding from riverine systems.	Yes	Yes	Yes
Salinity of the water is fresh to slightly brackish.	Yes	Yes	Yes
Biota			
Trees and shrubs are sparse to absent. When present, they mostly occur as fringing or scattered individuals. The cover of woody species accounts for no more than 10% projective foliage cover across the wetland.	Trees and shrubs are absent – see Plot 1 data above	Trees and shrubs are absent – see Plot 2 data above	Trees and shrubs are absent – see Plot 3 data above
The vegetative cover of the ecological community is dominated by a ground layer of native wetland graminoids and/or native wetland forbs.	Yes. *Amphibromus fluitans*	Yes. Dominated by *Carex appressa* and *Juncus sarophorus*.	Yes. Dominated by *Amphibromus nervosus* and *Myriophyllum crispatum*

SCIENTIFIC DETERMINATION CRITERIA	AQUATIC GRASSY WETLAND (PLOT 1)	PLAINS GRASSY WETLAND (PLOT 2)	PLAINS GRASSY WETLAND (PLOT 3)
A range of graminoids is often present and typically includes one or more of the following taxa: Amphibromus spp., Carex tereticaulis, Deyeuxia spp., Glyceria spp., Lachnagrostis spp., Poa labillardieri, and Rytidosperma duttonianum. Note that other graminoid taxa may also occur, though are not necessarily common.	Typical species include *Amphibromus fluitans* and *Eleocharis acuta*.	Typical species include *Carex appressa* and *Glyceria australis*	Species include *Rytidosperma duttonianum* and *Amphibromus nervosus*
At least one native wetland forb species must be present (preferably more) after the ecological community is inundated. The suite of forbs that may occur within the ecological community's range is variable and potentially large. Refer to Appendix B for a plant species list.	Several herbs are present including *Potamogeton cheesemanii* and *Myriophyllum crispatum*	Several herbs are present including *Epilobium hirtigerum* and *Senecio campylocarpus*	Several herbs are present including *Epilobium hirtigerum* and *Myriophyllum crispatum*
Freshwater algae often are present when the wetland is, or recently has been, wet. The most evident representatives are green algae from the groups Charales (stoneworts) and Zygnematales (pond scums).	None observed	None observed	None observed
Condition Thresholds			
<u>Part A) Condition during 'typical' wet cycles</u>			
Step A1) Is the wetland consistent with the key diagnostic characteristics, noted above? — If yes, go to Step A2. — If no, the wetland is of a different type to the Seasonal Herbaceous Wetlands	Yes	Yes	Yes
Step A2) Is 50% or more of the total cover of plants in the ground layer of the wetland dominated by native species characteristic of the Seasonal Herbaceous Wetlands ecological community? — If the answer is yes, the wetland retains sufficient native cover. Go to Part C Minimum wetland size. — If the answer is no, the wetland no longer retains sufficient natural values to be considered part of the national ecological community.	Yes. Overall native plant cover >50% native.	Yes. Overall native plant cover >50% native.	Yes. Overall native plant cover >50% native.

SCIENTIFIC DETERMINATION CRITERIA	AQUATIC GRASSY WETLAND (PLOT 1)	PLAINS GRASSY WETLAND (PLOT 2)	PLAINS GRASSY WETLAND (PLOT 3)
Part B) For dry conditions (e.g. drought):			
Step B1. Determine landscape position, including any modifications of the surrounds. — If the landscape does not, or is no longer able to, support a seasonal wetland, then the ecological community is unlikely to be present. to its hydrology. — If the landscape is consistent with the formation of a functional seasonal wetland, then go to Step B2.	n/a – wetland adequate to assess under Part A 'wet cycle'	n/a – wetland adequate to assess under Part A 'wet cycle'	n/a – wetland adequate to assess under Part A 'wet cycle'
Step B2. Investigate the known or inferred history of the likely wetland. — If yes, and the information on plant species composition is sufficiently detailed, then the site may be assessed according to Parts C and D, below, using the existing information. — If no, or not as above, then go to Step B3.	n/a – wetland adequate to assess under Part A 'wet cycle'	n/a – wetland adequate to assess under Part A 'wet cycle'	n/a – wetland adequate to assess under Part A 'wet cycle'
Step B3. Determine the nature of the vegetation surrounding the wetland. Is the wetland surrounded by or adjoining a native vegetation remnant? — If yes, the wetland ecological community is likely to be present. Go to Part C Minimum wetland size, below. — If no, and the area immediately around and within the wetland is cropped, then the wetland ecological community is unlikely to be present.	n/a – wetland adequate to assess under Part A 'wet cycle'	n/a – wetland adequate to assess under Part A 'wet cycle'	n/a – wetland adequate to assess under Part A 'wet cycle'

SCIENTIFIC DETERMINATION CRITERIA	AQUATIC GRASSY WETLAND (PLOT 1)	PLAINS GRASSY WETLAND (PLOT 2)	PLAINS GRASSY WETLAND (PLOT 3)
<u>Part C) Minimum wetland size</u>			
If the wetland occurs as a single isolated wetland, then it must be 0.5 ha or larger in size; OR If the wetland occurs as a cluster of many small wetlands in reasonably close proximity, then the cluster effectively functions as a single unit. The wetlands within the cluster must total at least 0.5 ha and this area of wetland must lie across a polygon (i.e. total area of wetland plus non-wetland in the cluster site) of at least 5ha. This means the area of wetland proper accounts for 10% or more of the total cluster area;	Yes – individual wetland >0.5ha	Yes – three wetlands >0.5 ha within 5 ha	Yes – individual wetland >0.5ha
<u>Part D. Very high quality wetlands</u>			
Are three or more native plant taxa listed in Table 1 of (TSSC 2012) present within the wetland? — If yes, the wetland is considered to be of very high quality. — If no, the ecological community is still present if the criteria under Parts A to C are met but is not considered to be of very high quality. A wetland may merit further consideration for protection as outlined in the Additional considerations: surrounding environmental and landscape context in (TSSC 2012).	Yes – the following three taxa recorded in the wetland are all included in Table 1: *Lobelia pratioides*, *Montia australasica*, *Potamogeton cheesemanii*	No – No important species are present. Sample site is not a very high quality wetland	No – Only 2 important species are present. Sample site is not a very high quality wetland
FINAL DETERMINATION	Very High Quality SHW Present	SHW Present	SHW Present

Quadrat name: BMG Quadrat 1
Date: 15/02/2017
Collector: NM
EVC: Grassy Dry Forest/Heathy Dry Forest Complex
EPBC/FFG matters: Ben Major Grevillea

SCIENTIFIC NAME	COMMON NAME	STATUS	COVER/ ABUNDANCE
Acacia genistifolia	Spreading Wattle		1
Acacia paradoxa	Hedge Wattle		+
Aira elegantissima	Delicate Hair-grass	*	1
Austrostipa rudis subsp. rudis	Veined Spear-grass		1
Briza maxima	Large Quaking-grass	*	1
Burchardia umbellata	Milkmaids		1
Coronidium scorpioides s.s.	Button Everlasting		1
Correa reflexa	Common Correa		1
Daviesia leptophylla	Narrow-leaf Bitter-pea		1
Daviesia ulicifolia	Gorse Bitter-pea		1
Dianella admixta	Black-anther Flax-lily		1
Dillwynia cinerascens s.l.	Grey Parrot-pea		+
Drosera peltata s.l.	Pale Sundew		1
Eucalyptus goniocalyx s.l.	Bundy		2
Eucalyptus macrorhyncha	Red Stringybark		+
Gonocarpus tetragynus	Common Raspwort		+
Goodenia spp.	Goodenia		+
Grevillea floripendula	Ben Major Grevillea	VU vu L	+ (5 plants)
Lepidosperma filiforme	Common Rapier-sedge		+
Leucopogon virgatus	Common Beard-heath		1
Lomandra filiformis subsp. coriacea	Wattle Mat-rush		1
Lomandra micrantha s.l.	Small-flower Mat-rush		+
Opercularia varia	Variable Stinkweed		+
Pimelea humilis	Common Rice-flower		+
Poa sieberiana	Grey Tussock-grass		2
Pultenaea pedunculata	Matted Bush-pea		+
Rytidosperma erianthum	Hill Wallaby-grass		+
Rytidosperma fulvum	Copper-awned Wallaby-grass		1
Rytidosperma pallidum	Silvertop Wallaby-grass		3

SCIENTIFIC NAME	COMMON NAME	STATUS	COVER/ ABUNDANCE
Senecio phelleus	Stony Fireweed		+
Stylidium graminifolium s.l.	Grass Triggerplant		+
Wahlenbergia communis s.l.	Tufted Bluebell		+

Quadrat name: BMG Quadrat 2
Date: 16/02/2017
Collector: NM
EVC: Grassy Dry Forest/Heathy Dry Forest Complex
EPBC/FFG matters: Ben Major Grevillea

SCIENTIFIC NAME	COMMON NAME	STATUS	COVER/ ABUNDANCE
Bossiaea prostrata	Creeping Bossiaea		1
Burchardia umbellata	Milkmaids		+
Comesperma ericinum	Heath Milkwort		+
Daviesia leptophylla	Narrow-leaf Bitter-pea		1
Deyeuxia quadriseta	Reed Bent-grass		+
Dianella admixta	Black-anther Flax-lily		1
Dillwynia cinerascens s.l.	Grey Parrot-pea		+
Dillwynia hispida	Red Parrot-pea		+
Eucalyptus goniocalyx s.l.	Bundy		1
Eucalyptus macrorhyncha	Red Stringybark		3
Eucalyptus obliqua	Messmate Stringybark		+
Gonocarpus tetragynus	Common Raspwort		1
Goodenia lanata	Trailing Goodenia		1
Grevillea floripendula	Ben Major Grevillea	VU vu L	1
Lepidosperma filiforme	Common Rapier-sedge		1
Leucopogon virgatus	Common Beard-heath		1
Lomandra filiformis subsp. coriacea	Wattle Mat-rush		+
Opercularia varia	Variable Stinkweed		+
Pentapogon quadrifidus var. quadrifidus	Five-awned Spear-grass		+
Pimelea humilis	Common Rice-flower		1
Poa sieberiana	Grey Tussock-grass		2
Rytidosperma fulvum	Copper-awned Wallaby-grass		+
Rytidosperma pallidum	Silvertop Wallaby-grass		3
Tetratheca ciliata	Pink-bells		+

APPENDIX B

FAUNA SPECIES LIST

B1 FAUNA SPECIES LIST

STATUS	COMMON NAME	SCIENTIFIC NAME	VICTORIAN ADVISORY LIST	COUNT OF SIGHTINGS (GHCMA REGION)	LAST RECORD (GHCMA REGION)	VBA COUNT IN STUDY AREA	GHD 2015	WSP 2016	WSP 2016-2017	WSP 2020-2021
	Australasian Grebe	*Tachybaptus novaehollandiae*		1251	28/10/2013	1				
	Australasian Pipit	*Anthus novaeseelandiae*		1141	27/11/2013	3				
vu	Australasian Shoveler	*Anas rhynchotis*	Vulnerable	1331	27/11/2013	3	X			
	Australian Magpie	*Cracticus tibicen*		4090	16/04/2014	26	X	X		
	Australian Raven	*Corvus coronoides*		984	13/11/2012	9	X	X		
	Australian Shelduck	*Tadorna tadornoides*		4309	16/04/2014	3				
	Australian White Ibis	*Threskiornis molucca*		2092	27/11/2013	6		X		
	Australian Wood Duck	*Chenonetta jubata*		1038	16/04/2014	4	X	X		
	Black Kite	*Milvus migrans*		30	29/09/2011		X			
	Black Swan	*Cygnus atratus*		5146	16/04/2014	7				
	Black Wallaby	*Wallabia bicolor*		644	16/05/2013	2	X	X		
	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*		979	16/04/2014	5		X		
	Black-fronted Dotterel	*Elseyornis melanops*		535	24/11/2013	1		X		
	Black-winged Stilt	*Himantopus himantopus*		816	27/11/2013	2				
en L	Blue-billed Duck	*Oxyura australis*	Endangered	591	26/11/2013	1				
vu L	Brolga	*Grus rubicunda*	Vulnerable	3107	23/09/2016	4		X	x	
	Brown Falcon	*Falco berigora*		1181	29/10/2013	5				

STATUS	COMMON NAME	SCIENTIFIC NAME	VICTORIAN ADVISORY LIST	COUNT OF SIGHTINGS (GHCMA REGION)	LAST RECORD (GHCMA REGION)	VBA COUNT IN STUDY AREA	GHD 2015	WSP 2016	WSP 2016-2017	WSP 2020-2021
	Brown Thornbill	*Acanthiza pusilla*		2114	30/07/2013	7	X			
en L	Brown Toadlet	*Pseudophryne bibronii*	Endangered	225	21/11/2015	2		X		
nt	Brown Treecreeper (south-eastern ssp.)	*Climacteris picumnus victoriae*	Near threatened	492	28/03/2016	8		X		
	Brown-headed Honeyeater	*Melithreptus brevirostris*		441	7/04/2012	2				
vu L	Brush-tailed Phascogale	*Phascogale tapoatafa*	Vulnerable	42	15/01/2016	2		X		
	Buff-rumped Thornbill	*Acanthiza reguloides*		416	13/03/2014	4		X		
	Cattle Egret	*Ardea ibis*		346	30/10/2009	1				
	Collared Sparrowhawk	*Accipiter cirrhocephalus*		141	28/11/2011		X			
*	Common Blackbird	*Turdus merula*		1543	16/04/2014	3				
	Common Brushtail Possum	*Trichosurus vulpecula*		1147	16/05/2013	2			x	
	Common Froglet	*Crinia signifera*		1171	20/05/2014	16			x	x
	Common Spadefoot Toad	*Neobatrachus sudellae*								x
*	Common Starling	*Sturnus vulgaris*		2169	16/04/2014	8	X			
	Common Wombat	*Vombatus ursinus*		44	3/11/2012	1				
	Crested Pigeon	*Ocyphaps lophotes*		76	16/04/2014	1		X		
	Crested Shrike-tit	*Falcunculus frontatus*		500	16/04/2014	2		X		
	Crimson Rosella	*Platycercus elegans*		2647	22/02/2015	16	X	X		
nt L	Diamond Firetail	*Stagonopleura guttata*	Near threatened	75	28/11/2009	1		X		
	Dusky Woodswallow	*Artamus cyanopterus*		746	16/04/2014	7	X	X		

STATUS	COMMON NAME	SCIENTIFIC NAME	VICTORIAN ADVISORY LIST	COUNT OF SIGHTINGS (GHCMA REGION)	LAST RECORD (GHCMA REGION)	VBA COUNT IN STUDY AREA	GHD 2015	WSP 2016	WSP 2016-2017	WSP 2020-2021
	Eastern Brown Snake	*Pseudonaja textilis*		33	27/12/2011			X		
*	Eastern Gambusia	*Gambusia holbrooki*		127	5/02/2016				x	
vu L	Eastern Great Egret	*Ardea modesta*	Vulnerable	1071	30/07/2013	1				
	Eastern Grey Kangaroo	*Macropus giganteus*		720	6/06/2013	3	X	X	x	
	Eastern Rosella	*Platycercus eximius*		1032	16/04/2014	6		X		
	Eastern Spinebill	*Acanthorhynchus tenuirostris*		1012	10/01/2013	5		X		
	Eastern Three-lined Skink	*Acritoscincus duperreyi*		620	27/12/2011				x	
	Eastern Yellow Robin	*Eopsaltria australis*		1328	6/06/2013	6	X	X		
nt	Emu	*Dromaius novaehollandiae*	Near threatened	1036	1/12/2015	1	X			
	Eurasian Coot	*Fulica atra*		2387	28/11/2011	4	X			
*	European Goldfinch	*Carduelis carduelis*		1878	2/03/2011	6		X		
*	European Hare	*Lepus europeaus*		99	1/10/2012		X			
*	European Rabbit	*Oryctolagus cuniculus*		306	15/04/2010	2	X			
*	European Skylark	*Alauda arvensis*		909	27/11/2013	1				
	Fairy Martin	*Petrochelidon ariel*		259	1/10/2012	3				
	Feathertail Glider	*Acrobates pygmaeus*		38	20/05/2011	2				
	Flame Robin	*Petroica phoenicea*		304	27/12/2011	1				
	Fuscous Honeyeater	*Lichenostomus fuscus*		192	15/06/2010	10		X		
	Galah	*Eolophus roseicapillus*		1291	25/11/2013	5	X	X		

STATUS	COMMON NAME	SCIENTIFIC NAME	VICTORIAN ADVISORY LIST	COUNT OF SIGHTINGS (GHCMA REGION)	LAST RECORD (GHCMA REGION)	VBA COUNT IN STUDY AREA	GHD 2015	WSP 2016	WSP 2016-2017	WSP 2020-2021
	Garden Skink	*Lampropholis guichenoti*		319	6/04/2012			X	x	
CR cr L	Golden Sun Moth	*Synemon plana*	Critically endangered	207	30/11/2015			X	x	
	Golden Whistler	*Pachycephala pectoralis*		1083	30/07/2013	5				
	Golden-headed Cisticola	*Cisticola exilis*		320	27/11/2013	1	X			
*	Goldfish	*Carassius auratus*		56	6/05/2011				x	
	Great Cormorant	*Phalacrocorax carbo*		1007	30/10/2013	1				
	Great Crested Grebe	*Podiceps cristatus*		438	31/10/2013	1				
	Grey Currawong	*Strepera versicolor*		944	19/03/2014	7	X	X		
	Grey Fantail	*Rhipidura albiscapa*		2472	22/02/2015	6	X	X		
	Grey Shrike-thrush	*Colluricincla harmonica*		2542	16/04/2014	13	X	X		
	Grey Teal	*Anas gracilis*		2807	16/04/2014	8	X			
VU en L	Growling Grass Frog	*Litoria raniformis*	Endangered	308	27/11/2013	5				x
vu	Hardhead	*Aythya australis*	Vulnerable	1048	27/11/2013	2	X			
	Hoary-headed Grebe	*Poliocephalus poliocephalus*		2172	27/11/2013	4	X			
	Horsfield's Bronze-Cuckoo	*Chrysococcyx basalis*		385	9/11/2011	1		X		
*	House Sparrow	*Passer domesticus*		1569	16/04/2014	8				
	Jacky Winter	*Microeca fascinans*		725	28/12/2009	6	X			
	Laughing Kookaburra	*Dacelo novaeguineae*		2122	30/07/2013	11	X	X		
	Little Black Cormorant	*Phalacrocorax sulcirostris*		745	28/11/2011	1		X		

STATUS	COMMON NAME	SCIENTIFIC NAME	VICTORIAN ADVISORY LIST	COUNT OF SIGHTINGS (GHCMA REGION)	LAST RECORD (GHCMA REGION)	VBA COUNT IN STUDY AREA	GHD 2015	WSP 2016	WSP 2016-2017	WSP 2020-2021
	Little Corella	*Cacatua sanguinea*		26	8/12/2011	1				
	Little Eagle	*Hieraaetus morphnoides*		204	19/01/2011	1				
	Little Grassbird	*Megalurus gramineus*		338	25/11/2013	1				
	Little Pied Cormorant	*Microcarbo melanoleucos*		1760	26/11/2013	4				
	Little Raven	*Corvus mellori*		1361	27/11/2013	8		X		
	Little Whip Snake	*Parasuta flagellum*		339	18/11/2011				x	
	Long-billed Corella	*Cacatua tenuirostris*		1820	16/04/2014	3	X	X		
	Magpie-lark	*Grallina cyanoleuca*		2342	16/04/2014	9		X		
	Masked Lapwing	*Vanellus miles*		4515	16/04/2014	8	X			
	Mistletoebird	*Dicaeum hirundinaceum*		299	6/04/2012	1		X		
	Musk Lorikeet	*Glossopsitta concinna*		357	7/04/2012			X		
	Nankeen Kestrel	*Falco cenchroides*		752	25/11/2013	1		X		
	New Holland Honeyeater	*Phylidonyris novaehollandiae*		2376	30/07/2013	3				
	Noisy Miner	*Manorina melanocephala*		495	1/10/2012	2				
	Olive-backed Oriole	*Oriolus sagittatus*		104	27/08/2012	3		X		
	Pacific Black Duck	*Anas superciliosa*		4232	13/11/2012	7	X	X		
	Painted Button-quail	*Turnix varia*		76	2/03/2011	1				
VU vu L	Painted Honeyeater	*Grantiella picta*	Vulnerable	7	17/02/2001			X		
	Pallid Cuckoo	*Cacomantis pallidus*		251	17/11/2010	4				

STATUS	COMMON NAME	SCIENTIFIC NAME	VICTORIAN ADVISORY LIST	COUNT OF SIGHTINGS (GHCMA REGION)	LAST RECORD (GHCMA REGION)	VBA COUNT IN STUDY AREA	GHD 2015	WSP 2016	WSP 2016-2017	WSP 2020-2021
	Pied Currawong	*Strepera graculina*		595	30/07/2013		X			
	Pink-eared Duck	*Malacorhynchus membranaceus*		541	28/11/2011		X			
	Plains Froglet	*Crinia parinsignifera*		56	25/11/2013	15			x	x
vu L	Powerful Owl	*Ninox strenua*	Vulnerable	174	14/03/2014	4				
	Purple Swamphen	*Porphyrio porphyrio*		3040	16/04/2014	5				
	Rainbow Bee-eater	*Merops ornatus*		80	28/01/2010	1	X			
*	Red Fox	*Vulpes vulpes*		424	1/10/2012	3		X		
	Red Wattlebird	*Anthochaera carunculata*		1887	27/11/2013	13	X	X		
	Red-browed Finch	*Neochmia temporalis*		1115	16/04/2014	5		X		
	Red-rumped Parrot	*Psephotus haematonotus*		931	16/04/2014	1				
	Restless Flycatcher	*Myiagra inquieta*		959	8/07/2013	7		X		
	Rufous Whistler	*Pachycephala rufiventris*		836	27/12/2011	5	X	X		
	Sacred Kingfisher	*Todiramphus sanctus*		429	27/12/2011			X		
	Scarlet Robin	*Petroica boodang*		867	16/04/2014	9				
	Sharp-tailed Sandpiper	*Calidris acuminata*		297	27/11/2013	1				
	Shining Bronze-Cuckoo	*Chrysococcyx lucidus*		343	27/12/2011	1				
	Short-beaked Echidna	*Tachyglossus aculeatus*		414	16/05/2013	1		X		
	Silver Gull	*Chroicocephalus novaehollandiae*		2622	27/11/2013	1				
	Silvereye	*Zosterops lateralis*		1340	30/07/2013	2				

STATUS	COMMON NAME	SCIENTIFIC NAME	VICTORIAN ADVISORY LIST	COUNT OF SIGHTINGS (GHCMA REGION)	LAST RECORD (GHCMA REGION)	VBA COUNT IN STUDY AREA	GHD 2015	WSP 2016	WSP 2016-2017	WSP 2020-2021
	Singing Honeyeater	*Lichenostomus virescens*		448	9/11/2011	1				
	Slow Water Mussel	*Velesunio ambiguus*		20	5/02/2016	1				
	Southern Boobook			612	20/11/2015			X		
	Southern Brown Tree Frog	*Litoria ewingii*		788	6/06/2013	15		X	x	x
	Southern Bullfrog / Eastern Banjo Frog	*Limnodynastes dumerilii*		274	1/11/2013	18				x
	Southern Pygmy Perch	*Nannoperca australis*		536	7/06/2016				x	
	Southern Whiteface	*Aphelocephala leucopsis*		53	16/01/2008	1				
	Spencer's Skink	*Pseudemoia spenceri*		7	1/10/1986	1				
	Spotted Marsh Frog SCR	*Limnodynastes tasmaniensis SCR*		83	24/10/2011	20				x
	Spotted Pardalote	*Pardalotus punctatus punctatus*		842	6/04/2012	7		X		
en L	Squirrel Glider	*Petaurus norfolcensis*	Endangered	2	21/03/2006			X		
	Straw-necked Ibis	*Threskiornis spinicollis*		1957	27/11/2013	6				
	Straw-necked Ibis	*Threskiornis spinicollis*		1957	27/11/2013		X			
	Striated Pardalote	*Pardalotus striatus*		1016	6/06/2013	10	X	X		
	Striated Thornbill	*Acanthiza lineata*		1119	13/03/2014	9		X		
	Striped Marsh Frog	*Limnodynastes peronii*		284	20/05/2014	1		X	x	x
	Stubble Quail	*Coturnix pectoralis*		235	10/07/2014	1				
	Stumpy-tailed Lizard	*Tiliqua rugosa*		239	5/04/2012		X			

STATUS	COMMON NAME	SCIENTIFIC NAME	VICTORIAN ADVISORY LIST	COUNT OF SIGHTINGS (GHCMA REGION)	LAST RECORD (GHCMA REGION)	VBA COUNT IN STUDY AREA	GHD 2015	WSP 2016	WSP 2016-2017	WSP 2020-2021
	Sugar Glider	*Petaurus breviceps*		227	21/05/2013				x	
	Sulphur-crested Cockatoo	*Cacatua galerita*		1811	27/06/2014	9	X	X		
	Superb Fairy-wren	*Malurus cyaneus*		3083	16/04/2014	17	X	X		
	Swamp Harrier	*Circus approximans*		1231	26/11/2013	2				
	Tawny Frogmouth	*Podargus strigoides*		230	29/07/2015	1		X	x	
	Tree Martin	*Petrochelidon nigricans*		774	29/10/2013	2	X	X		
	Varied Sittella	*Daphoenositta chrysoptera*		397	21/10/2010	5				
	Victorian Smooth Froglet	*Geocrinia victoriana*		45	17/05/2011	1			x	
	Wedge-tailed Eagle	*Aquila audax*		997	25/11/2015	2		X		
	Weebill	*Smicrornis brevirostris*		157	27/12/2011	1				
	Welcome Swallow	*Hirundo neoxena*		2824	16/04/2014	12	X			
	Whistling Kite	*Haliastur sphenurus*		659	27/11/2013			X		
	White-bellied Cuckoo-shrike	*Coracina papuensis*		71	12/04/2001	3				
	White-browed Scrubwren	*Sericornis frontalis*		1593	16/04/2014	1				
	White-browed Woodswallow	*Artamus superciliosus*		161	15/01/2008	2				
	White-eared Honeyeater	*Lichenostomus leucotis*		1167	30/07/2013	4	X	X		
	White-faced Heron	*Egretta novaehollandiae*		3651	16/04/2014	9	X	X		
	White-fronted Chat	*Epthianura albifrons*		910	16/04/2014	3				
	White-naped Honeyeater	*Melithreptus lunatus*		1322	27/12/2011	6	X	X		

STATUS	COMMON NAME	SCIENTIFIC NAME	VICTORIAN ADVISORY LIST	COUNT OF SIGHTINGS (GHCMA REGION)	LAST RECORD (GHCMA REGION)	VBA COUNT IN STUDY AREA	GHD 2015	WSP 2016	WSP 2016-2017	WSP 2020-2021
	White-necked Heron	*Ardea pacifica*		1382	27/11/2013	9	X	X		
	White-plumed Honeyeater	*Lichenostomus penicillatus*		1119	15/06/2015	2				
	White-throated Treecreeper	*Cormobates leucophaeus*		1652	30/07/2013	11	X	X		
	White-winged Chough	*Corcorax melanorhamphos*		399	27/03/2014	9	X	X		
	White-winged Triller	*Lalage sueurii*		171	9/11/2009	2				
	Willie Wagtail	*Rhipidura leucophrys*		2458	16/04/2014	11		X		
	Yellow Thornbill	*Acanthiza nana*		90	14/10/2013	1		X		
	Yellow-billed Spoonbill	*Platalea flavipes*		1208	24/11/2013	2		X		
	Yellow-faced Honeyeater	*Lichenostomus chrysops*		1515	6/06/2013	8		X		
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*		1744	16/04/2014	9		X		
	Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*		1311	25/11/2015	3		X		

Table Legend

Conservation Status in Australia (EPBC Act 1999)

CR = Critically Endangered, EN = Endangered, VU = Vulnerable.

Conservation Status in Victoria (FFG 1988)
L = Listed as threatened

Conservation Status in Victoria (Victorian Advisory List)
cr = critically endangered, en = Endangered, vu = Vulnerable, r = Rare, nt = near threatened

* Introduced species

APPENDIX C

LIKELIHOOD OF OCCURRENCE OF THREATENED SPECIES

C1 FLORA

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC	VICADV/ FFG					
Acacia aspera subsp. parviceps	Rough Wattle		Rare	2000	10	VBA	Restricted in Victoria, mainly known from sites west of Melbourne (Brisbane Ranges, Werribee Gorge area, Beaufort) with disjunct records from near Wedderburn. Plants grow in shallow soil in dry to moist open Eucalyptus forest.	HIGH – one record from 1993 in Snow Gum Bushland Reserve from a defined area list. Not found during searches of alignments but further searches outside of alignments may find this species. A number of records from Trawalla State Forest.
Amphibromus fluitans	River Swamp Wallaby-grass	Vulnerable				PMST	Largely confined to permanent swamps, principally along the Murray River between Wodonga and Echuca, uncommon to rare in the south (e.g. Casterton, Moe, Yarram), probably due to historic drainage of wetlands.	RECORDED – new records for the area located during site assessments.
Boronia nana var. pubescens	Dwarf Boronia		Rare	2016	1	VBA	Occurring between the Grampians and Ben Major near Lexton. Grows in open-forest, woodland and heath on rocky substrates.	LOW – only a single record within 10 km, in Mount Buangor State Park, not detected during site assessments.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC	VICADV/ FFG					
Caladenia ornata	Ornate Pink Fingers	Vulnerable	Vulnerable/ Listed			PMST	In Victoria known only from the south-west in heathy forest on seasonally moist sandy loam. In some areas Caladenia ornata is intermixed with C. carnea and some specimens are difficult to assign to one or the other.	RECORDED – multiple new records for the area were discovered during site assessments in Camp Hill Recreation Reserve.
Caladenia tensa	Rigid Spider-orchid	Endangered	Vulnerable			PMST	In Victoria found mainly in the Little Desert area (also with an isolated record for near Wood Wood) in Eucalyptus/Callitris woodland on well-drained sandy soil.	LOW – only known in Victoria from the Nhill area (GHD 2015).
Caladenia versicolor	Candy Spider-orchid	Vulnerable	Rare/ Presumed extinct			PMST	Restricted to the western part of the Midlands region in the vicinity of Stawell, in woodland on winter-wet sandy loam.	LOW – Preferred habitat is Yellow Box woodland on seasonally wet soils, (Backhouse & Jeanes 1995), which is limited in the study area.
Calotis anthemoides	Cut-leaf Burr-daisy		Nominated	1991	1	VBA	Scattered north and west of Melbourne (e.g. Sunshine, Camperdown, Moyston, Dunkeld, Numurkah regions) on heavy soils prone to waterlogging, but now rather rare due to habitat depletion.	LOW – One record near Eurambeen, within 3 km's of the western edge of the study area.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC	VICADV/ FFG					
Comesperma polygaloides	Small Milkwort		Vulnerable/ Listed	2011	14	VBA	Occasional on heavier soils (clays, alluvium) supporting grassland and grassy woodland communities in central and south-western areas.	LOW – multiple records within 10km however very limited habitat within study area.
Coronidium gunnianum	Pale Swamp Everlasting		Vulnerable	2014	5	VBA	Widespread throughout the state except for the north-west and the alpine and adjacent mountainous areas, and usually at low elevations (under c. 100 m) where mostly in grasslands and riverine Eucalyptus camaldulensis woodland on soils that are prone to inundation.	LOW – no records for greater than 7 km east and not seen during surveys.
Daviesia laevis	Grampians Bitter-pea	Vulnerable	Vulnerable/ Listed	2008	1	PMST	Apparently confined to the Grampians and Mt Cole areas where found mostly in montane gullies on poor sandy or skeletal soils. A collection labelled 'Nowa Nowa, 1900' is of very doubtful provenance.	LOW – only one nearby records and not seen during surveys; no suitable habitat.
Dianella amoena	Matted Flax-lily	Endangered	Endangered /Listed	2015	12	PMST, VBA	Occurs mainly in lowland grasslands, grassy woodlands, valley grassy forest and creeklines of herb-rich woodland.	RECORDED - several new records for area located in this study.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC	VICADV/ FFG					
Diuris behrii	Golden Cowslips		Vulnerable	2013	4	VBA	Locally common in grassland and open woodland mostly in western Victoria.	LOW – 1 record near Eurambeen, within 3 km's of the western edge of the study area.
Dodonaea procumbens	Trailing Hop-bush	Vulnerable	Vulnerable			PMST	Largely confined in Victoria to the south-west (Penola-Dergholm area, Grampians, Lake Fyans) with outlying occurrences near Castlemaine, Avoca, Skipton, Camperdown. Grows in low-lying, often winter-wet areas in woodland, low open-forest and grasslands on sands and clays.	LOW – no records for >30 km west and not seen during surveys, however may exist in small areas not detected.
Eucalyptus crenulata	Buxton Gum	Endangered	Endangered /Listed	1982	1	VBA	Confined to swampy sites in foothills just north and south of the Great Dividing Range, near Buxton, Narbethong and Yarra Glen where it forms hybrids at points of contact with the far more widespread Swamp Gum, E. ovata.	N/A – A widely planted ornamental tree which is only native to the Acheron River valley and at Yering near Yarra Glen. One herbarium record from 1982 of a planted individual in the Beaufort township (AVH 2017).
Eucalyptus diversifolia subsp. megacarpa	Coast Gum		Vulnerable	1997	1	VBA	Apparently restricted to the Cape Nelson area in Victoria.	LOW – lack of suitable habitat and one record.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC	VICADV/ FFG					
Eucalyptus yarraensis	Yarra Gum		Rare/ Rejected	2015	67	VBA	Extending west from Glengarry (near Traralgon) to Melbourne and north-west to Daylesford and Ararat.	RECORDED – A number of new records found during surveys in 2015, 2016 and 2017.
Glycine latrobeana	Clover Glycine	Vulnerable	Vulnerable/ Listed			PMST	Widespread but of sporadic occurrence and rarely encountered. Grows mainly in grasslands and grassy woodlands.	LOW – limited habitat in grassland and grassy woodland areas and very few records from the surrounding area. Nearest record is 16 km north.
Grevillea floripendula	Ben Major Grevillea	Vulnerable	Vulnerable/ Listed	2016	147	PMST, VBA	Restricted to a small area north of Beaufort, from Waterloo to Ben Major Forest. Grows in dry open-forest, on shallow quartzitic soils.	RECORDED – Several individuals in the VBA from previous surveys. A number of new locations found during studies in 2015 to 2017.
Grevillea rosmarinifolia	Rosemary Grevillea		Rare	2008	4	VBA	In western Victoria on sandy soils in mallee or shrub associations, or occasionally on basaltic soils. Frequently planted species.	RECORDED – One recorded location appears to be non-planted.
Lachnagrostis adamsonii	Adamson's Blown-grass	Endangered	Vulnerable/ Listed			PMST	Occurs in and around saline depressions on the Volcanic Plain where recorded from Portalington west almost to the South Australian border.	LOW – no records within 10 km, species main habitat is south of the Western Highway.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC	VICADV/ FFG					
Lachnagrostis punicea subsp punicea	Purple Blown Grass		Rare	2005	1	VBA	Mainly in grassy wetlands, occasionally woodland communities in somewhat saline depressions of the volcanic plain, but also known from seasonal, slightly brackish swampy sites east of Melbourne.	LOW – only 1 record in 10 km search area.
Leucochrysum albicans subsp. albicans var. tricolor	White Sunray	Endangered	Endangered /Listed	2012	1114	PMST, VBA	Very rare in Victoria, the only recent collections from roadside verges near Wickliffe, Willaura, Streatham, Inverleigh and Creswick. All other collections at MEL were gathered last century, from Mt Cole, the Grampians and the Port Fairy district.	LOW – limited habitat in study area; likely would have seen during surveys in 2015–2018 if present. Easy to detect when present.
Olearia speciosa	Netted Daisy-bush		Poorly known	1893	1		Scattered in cool, well-watered areas from near sea-level in the far south-west to montane forest in western and central ranges.	LOW – only a single record within 10 km, and is very old. Closest records are in Mount Buangor State Park, not detected during site assessments.
Pimelea spinescens subsp. spinescens	Spiny Rice-flower	Critically Endangered	Endangered /Listed	2007	9	VBA	Grows in grassland, open shrubland and occasionally woodland, often on basalt-derived soils. Mostly west of Melbourne (to near Horsham), but extending as far north as Echuca.	LOW – limited suitable habitat of Plains Grassland available in study area.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC	VICADV/ FFG					
Poa sallacustris	Salt-lake Tussock-grass	Vulnerable	Vulnerable/ Listed			PMST	Known only from margins of brackish to salt lakes in the western district (Lakes Corangamite and Terangpom near Cressy, Black Lake near Skipton, Lake Linlithgow near Hamilton) although generally occurring above the level of significant saline influence.	LOW – lack of suitable habitat as it typically grows on the margins of salt lakes.
Podolepis linearifolia	Basalt Podolepis		Endangered	1990	1	VBA	Usually grows on heavy clay soils in grasslands but also recorded for grassy woodlands, open forests and around swamps. Two old collections from the Mornington Peninsula and the Wimmera are of doubtful provenance.	LOW – lack of suitable habitat.
Prasophyllum validum	Sturdy Leek-orchid	Vulnerable				PMST	Apparently endemic to Victoria where scattered across northern and western open forest and woodland communities on stony and sandy soils.	LOW – no nearby records.
Ruppia maritima	Water Tassel		Poorly Known	1978	1	VBA	Occurs in freshwater, brackish or saline dams and lakes in the north and north-west, and apparently rare.	LOW – lack of recent nearby records and no suitable habitat.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC	VICADV/ FFG					
Rutidosis leptorhynchoides	Button Wrinklewort	Endangered	Endangered /Listed	2007	34	PMST, VBA	In Victoria confined to basaltic grasslands between Rokewood and Melbourne where endangered due to loss of habitat (formerly occurring as far west as Casterton, and on the Gippsland Plain near Newry).	LOW – lack of suitable habitat of Plains Grassland and Plains Grassy Woodland available in study area.
Senecio linearfolius var. *intermedius*	Fireweed Groundsel		Rare	1893	1	VBA	In Victoria restricted to the north-east around Suggan Buggan and Mount Wheeler in forest and woodland, with historic collections from Eurambeen in western Victoria, and 'Hume River'.	LOW – only a single, very old record within the locality.
Senecio psilocarpus	Swamp Fireweed	Vulnerable	Vulnerable			PMST	Rare, restricted in Victoria to a few herb-rich winter-wet swamps throughout the south of the state, west from Sale, growing on volcanic clays or peaty soils.	LOW – Can be overlooked due to similarity with other *Senecio spp*. however searches in wetlands failed to detect this plant.
Thelymitra gregaria	Basalt Sun-orchid		Endangered /Listed	2013	3	VBA	Endemic to Victoria where found in tussock grassland on red-brown loams derived from basalt.	LOW – possible habitat present within study area.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC	VICADV/ FFG					
Thelymitra matthewsii	Spiral Sun-orchid	Vulnerable	Vulnerable			PMST	Widely distributed but rare, in coastal sandy flats or slightly elevated sites (to 400 m) in well-drained soils (sandy loams to gravelly limestone soils) in open forest. Plants colonise disturbed sites and slowly disappear as these sites stabilise.	LOW – some suitable habitat (GHD 2015) however failed to detect. Identification is simple as it has a distinct spiral leaf.
Xerochrysum palustre	Swamp Everlasting	Vulnerable	Vulnerable/ Listed	1991	1	PMST, VBA	Occurs in lowland swamps, usually on black cracking clay soils, scattered from near the South Australian border north-west of Portland to Bairnsdale district, but rare due to habitat depletion.	LOW – There is an unconfirmed record of this species from the confluence of Yam Holes and Mt. Emu Creeks, not found on the Victorian Biodiversity Atlas or other database. Surveys in wetlands failed to detect this species.

C2 FAUNA

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC ACT	VICADV/ FFG ACT					
Amphibians								
Litoria raniformis	Growling Grass Frog	Vulnerable	Endangered/ Listed	2013	35	PMST, VBA	The Growling Grass Frog is usually found amongst emergent vegetation such as Typha, Phragmites and Eleocharis within or at the edges of still or slow-flowing water bodies such as lagoons, swamps, lakes, ponds, and farm dams (Robinson, 1993). It also in occurs in irrigation channels and crops, lignum shrublands, black box and river red gum woodlands and at the periphery of rivers.	HIGH – Recent records in study area, suitable habitat available.
Pseudophryne bibronii	Brown Toadlet		Endangered/ Listed	2015	18	VBA	Usually found singly under rocks and logs on slopes in grasslands or beside ditches. Found both in wet and dry sclerophyll forest. Breeding congregations usually occur in inundated grassy areas beside gutters, small creeks etc.	RECORDED – Recent records in study area, suitable habitat available.
Pseudophryne semimarmorata	Southern Toadlet		Vulnerable	1885	4	VBA	Found in a variety of damp habitats in sclerophyll forests under logs and leaf-litter where it lives in small tunnels during breeding season (March-May) (Cogger 2000).	LOW – No recent records.
Birds								
Actitis hypoleucos	Common Sandpiper	Migratory				PMST	The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats.	LOW – no nearby records or appropriate habitat in study area.
Anas rhynchotis	Australasian Shoveler		Vulnerable	2004	11	VBA	Uses a wide variety of wetlands; prefers large permanent lakes or swamps that have abundant cover. A semi-nocturnal feeder; during the day floats with other ducks far out on open water. Usually breeds August – November or after rain in semi-arid interior.	MODERATE – A number of nearby records and suitable wetland habitat in study area.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC ACT	VICADV/ FFG ACT					
Anthochaera phrygia (syn. Xanthomyza phrygia)	Regent Honeyeater	Endangered, Migratory	Critically Endangered/ Listed	1971	3	VBA	Occurs mostly in box-ironbark forests and woodland and prefers wet, fertile sites such as along creek flats, broad river valleys and foothills. Important food trees include Mugga Ironbark *Eucalyptus sideroxylon*, *E. albens* (White Box), *E. melliodora* (Yellow Box) and *E. leucoxylon* (Yellow Gum) (Garnett & Crowley 2000).	LOW – most recent record in 1971.
Apus pacificus	Fork-tailed Swift	Migratory				PMST	Breeds in the northern hemisphere, wintering south to Australia. It is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground. It mostly occurs over inland plains but sometimes above foothills or in coastal areas over cliffs, beaches, islands and well out to sea. It probably roosts aerially, but has occasionally been observed to land (Higgins, P.J. 1999).	LOW – No local records in the Victorian Biodiversity Atlas.
Ardea (Bulbulcus) ibis	Cattle Egret	Migratory		1981	1	PMST, VBA	Occurs in tropical and temperate grasslands, wooded lands and terrestrial wetlands and very rarely in arid and semi-arid regions. High numbers may occur in moist, poorly drained pastures with high grass; it avoids low grass pastures but has been recorded on earthen dam walls and ploughed fields. It uses predominately shallow, open and fresh wetlands including meadows and swamps with low emergent vegetation and abundant aquatic flora (Marchant & Higgins 1990),(Morton, Brennan & Armstrong 1989)).	LOW – No recent records, only one record within 10 km.
Ardea intermedia	Intermediate Egret		Endangered/ Listed	2000	1	VBA	Found in freshwater wetlands, especially lake margins, billabongs and swamps with abundant emergent vegetation; also occasionally mangrove swamps, tidal mudflats.	LOW – No recent records, only one record within 10 km.
Ardea albamodesta	Eastern Great Egret		Vulnerable / Listed	2019	11	VBA	Great Egrets are common throughout Australia, they prefer shallow water, particularly when flowing, but may be seen on any watered area, including damp grasslands. Great Egrets can be seen alone or in small flocks, often with other egret species, and roost at night in groups.	MODERATE – Most recent record 2019.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC ACT	VICADV/ FFG ACT					
Aythya australis	Hardhead		Vulnerable	2018	12	VBA	On terrestrial wetlands and occasionally sheltered estuarine and inshore waters. Almost entirely aquatic, preferring large deep fresh waters with abundant aquatic vegetation; particularly deep swamps, lakes, creeks, billabongs and alluvial plains (Marchant & Higgins 1990).	HIGH – Recorded by GHD 2015.
Biziura lobata	Musk Duck		Vulnerable	2018	9	VBA	Widespread in SE and SW parts of continent, on terrestrial wetlands, estuarine habitats and sheltered inshore waters. Almost entirely aquatic; preferring deep water of large permanent swamps, lakes and estuaries, where conditions stable and aquatic flora abundant. Open water needed for feeding and display, but nesting birds secretive and remain within or beside vegetation. Wetlands with both dense marginal vegetation and large expanses of water suitable all year (Marchant & Higgins 1990).	MODERATE – last record 2018.
Botaurus poiciloptilus	Australasian Bittern	Endangered	Endangered/ Listed			PMST	Occurs in shallow, vegetated freshwater or brackish swamps. Requires permanent wetlands with tall dense vegetation, particularly bulrushes and spike rushes. When breeding, pairs are found in areas with a mixture of tall and short sedges but will also feed in more open territory. (Garnett & Crowley 2000).	LOW – Limited habitat available and no records in the Victorian Biodiversity Atlas.
Calidris acuminata	Sharp-tailed Sandpiper	Migratory		1980	1	PMST, VBA	Prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland.	LOW – Limited habitat available and no recent records in the Victorian Biodiversity Atlas.
Calidris ferrunginea	Curlew Sandpiper	Critically Endangered, Migratory	Endangered	2004	1	PMST, VBA	Occurs in inter-tidal mudflats of estuaries, lagoons, mangrove channels and also around lakes, dams, floodwaters and flooded saltbush surrounding inland lakes.	LOW – No habitat in study area.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC ACT	VICADV/ FFG ACT					
Calidris melanotos	Pectoral Sandpiper	Migratory				PMST	Prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.	LOW – No habitat in study area.
Childonias hybridus javanicus	Whiskered Tern		Near Threatened	2004	3	VBA	Prefer shallow terrestrial freshwater wetlands, either permanent or ephemeral, including lakes swamps, billabongs, river pools, reservoirs, large dams, sewage ponds, flooded saltmarsh and farmland; often round floodwaters. Usually in wetlands with much submerged and emergent vegetation, such as grass, sedges, reeds and rushes, occasionally also in swamps of lignum, bluebush, canegrass or saltmarsh.	LOW – Limited habitat available and no recent records in the Victorian Biodiversity Atlas.
Chrysococcyx osculans	Black-eared Cuckoo		Near threatened	1971	4	VBA	Mainly open vegetation associations, especially open woodlands and open shrublands. Often in open woodlands dominated by Eucalyptus, particularly stunted mallee communities; Open woodlands of River Red Gum along rivers or round other wetlands in otherwise open grasslands; or open acacia woodlands, dominated by Mulga, Myall or Boree. Also often in saltbush or bluebush shrubland on sandhills or sandy flats; and in heathland, spinifex grassland or samphire shrubland (Higgins, P.J. 1999).	LOW – Limited habitat available and no recent records in the Victorian Biodiversity Atlas.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC ACT	VICADV/ FFG ACT					
Chthonicola sagittata (syn. Pyrrholaemus sagittatus)	Speckled Warbler		Vulnerable/ Listed	2004	6	VBA	Occurs in a wide range of eucalypt dominated vegetation with a grassy understorey and is often found on rocky ridges or in gullies. It feeds on seeds and insects and builds domed nests on the ground (Garnett & Crowley 2000)). The species has been shown to decrease in abundance as woodland area decreased, and it appears to be extinct in districts where no fragments larger than 100ha remain (Barrett, Ford & Recher 1994)). Isolation of Speckled Warbler populations in small remnants increases their vulnerability to local extinction as a result of stochastic events and decreases their genetic viability in the long term (NSW Scientific Committee 2001).	MODERATE – Potential habitat available in study area.
Cinclosoma punctatum	Spotted Quail-thrush		Near Threatened	1901	1	VBA	This is species is known to inhabit dry forest/woodland and scrubs that contain leaf litter, leaves, rocks and tussocks. Within these habitats this species prefers the sunny side along ridges (Pizzey & Knight 2012).	LOW – No recent records.
Circus assimilis	Spotted Harrier		Near threatened	1982	1	VBA	The Spotted Harrier occurs throughout the Australian mainland in grassy open woodland including acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe (e.g. chenopods) (Marchant & Higgins 1993). It is found mostly commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. The diet of the Spotted Harrier includes terrestrial mammals, birds and reptiles, occasionally large insects and rarely carrion (Department of Environment Climate Change and Water 2010).	LOW – No recent records.
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)		Near Threatened/ Nominated	2018	22	VBA	Found in eucalypt woodlands and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts. Nesting occurs in tree hollows (Department of Environment and Conservation 2005).	RECORDED – Recorded during current survey.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC ACT	VICADV/ FFG ACT					
Dromaius novaehollandiae	Emu		Near Threatened	1991	2	VBA	Widespread throughout Aust. mainland in a variety of habitats from timbered areas to open country. Mostly found in flat undulating lands but also on timbered ridges, tablelands and moderately hilly terrain, also recorded on ocean beaches, wading in shallow estuarine inlets, mudflats, and saltmarshes. Other coastal habitats include sandplains, sand-dunes, heathlands and low foothills. Tends to nest in areas of extensive cover where disturbance is infrequent and tend to avoid areas frequently disturbed by human activity (Marchant & Higgins 1990).	MODERATE – Potential habitat in study area, however low number of records.
Gallinago hardwickii	Latham's Snipe	Migratory	Near Threatened/ Nominated	2017	4	PMST, VBA	Occurs in freshwater or brackish wetlands generally near protective vegetation cover. This species feeds on small invertebrates, seeds and vegetation. It migrates to the northern hemisphere to breed (Garnett & Crowley 2000).	MODERATE – Most recent record 2017. Possibly occasional visitor to wetlands in study area.
Gelochelidon nilotica	Gull-billed Tern		Endangered/ Listed	1992	4	VBA	Prefer shallow, often ephemeral, terrestrial wetlands, either fresh or saline, especially lakes, swamps and lagoons, particularly those with mudflats; sometimes on inundated ground, including saltpans, claypans and saltmarsh or watercourses and associated floodplains. Also occur in sheltered coastal embayments, estuaries and river deltas with tidal sandflats, mudflats or beaches. Inland, often occur well away from water, on dry samphire, grassy plains or even gibber. (Higgins, P.J. & Davies 1997).	LOW – Limited habitat available and no recent records in the Victorian Biodiversity Atlas.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC ACT	VICADV/ FFG ACT					
Grantiella picta	Painted Honeyeater	Vulnerable	Vulnerable/ Listed	1972	1	PMST, VBA	Lives in dry forests and woodlands. Primary food is the mistletoes in the genus Amyema, though it will take some nectar and insects. Its breeding distribution is dictated by presence of mistletoes which are largely restricted to older trees. Less likely to be found in strips of remnant box-ironbark woodlands, such as occur along roadsides and in windbreaks, than in wider blocks (Garnett & Crowley 2000).	HIGH – Based on land owner observation on their property.
Grus rubicunda	Brolga		Vulnerable/ Listed	2015	270	VBA	Occurs in well vegetated shallow freshwater wetlands, small isolated swamps in eucalypt forests, floodplains, grasslands, paddocks, ploughed fields, irrigated pastures, stubbles, crops, desert claypans, bore drains, tidal areas, mangroves, beach wastes. Roosts in shallow, bare swamps and nests on small islands in wetland or standing in shallow water, eggs are occasionally laid on bare ground	RECORDED – Recorded during current survey.
Haliaeetus leucogaster	White-bellied Sea-Eagle	Migratory	Vulnerable/ Listed			PMST	Occurs in coastal areas including islands, estuaries, inlets, large rivers, inland lakes and reservoirs. Builds a huge nest of sticks in tall trees near water, on the ground on islands or on remote coastal cliffs (Pizzey & Knight 2007).	LOW – No local records in the Victorian Biodiversity Atlas.
Hirundapus caudacutus	White-throated Needletail	Migratory Vulnerable				PMST	Occurs in airspace over forests, woodlands, farmlands, plains, lakes, coasts and towns. Breeds in the northern hemisphere and migrates to Australia in October-April (Pizzey & Knight 2007).	LOW – No local records in the Victorian Biodiversity Atlas.
Lathamus discolor	Swift Parrot	Critically Endangered	Endangered/ Listed			PMST	Breeding occurs in Tasmania, majority migrates to mainland Australia in autumn, over-wintering, . In mainland Australia is semi-nomadic, foraging in flowering eucalypts in eucalypt associations, particularly box-ironbark forests and woodlands. Preference for sites with highly fertile soils where large trees have high nectar production, and for sites with flowering Acacia pycnantha, is indicated. Sites used vary from year to year (Garnett & Crowley 2000).	LOW – No local records in the Victorian Biodiversity Atlas.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC ACT	VICADV/ FFG ACT					
Melanodryas cucullata cucullata	Hooded Robin (South-Eastern)		Near Threatened/ Listed	1975	2	VBA	Found in south-eastern Australia, generally east of the Great Dividing Range. Found in eucalypt woodland and mallee and acacia shrubland. The species appears unable to survive in remnants smaller than 100-200ha (NSW Scientific Committee, 2001).	LOW – No recent records.
Merops ornatus	Rainbow Bee-eater	Migratory		1978	1	PMST, VBA	Usually occur in open or lightly timbered areas, often near water. Breed in open areas with friable, often sandy soil, good visibility, often near wetlands. Nests in embankments including creeks, rivers and sand dunes (Higgins, P.J. 1999).	LOW – no recent records in the Victorian Biodiversity Atlas.
Monarcha melanopsis	Black-faced Monarch	Migratory				PMST	Occurs in rainforests, eucalypt woodlands, coastal scrubs, damp gullies in rainforest, eucalypt forest and in more open woodland when migrating (Pizzey & Knight 2007).	LOW – No records in the Victorian Biodiversity Atlas.
Motacilla flava	Yellow Wagtail	Migratory				PMST	This species occurs in a range of habitats including estuarine habitats such as sand dunes, mangrove forests and coastal saltmarshes. This species also occurs in open grassy areas and edges of wetlands, swamps, lakes and farm dams. (Higgins, P.J. , Peter & Cowling 2006).	LOW – No records in the Victorian Biodiversity Atlas.
Myiagra cyanoleuca	Satin Flycatcher	Migratory		1976	1	PMST, VBA	Occurs in heavily vegetated gullies, in forests and taller woodlands. During migration it is found in coastal forests, woodlands, mangroves, trees in open country and gardens (Pizzey & Knight 2007).	LOW – No recent records in the Victorian Biodiversity Atlas.
Ninox strenua	Powerful Owl		Vulnerable/ Listed	2011	11	VBA	Powerful Owl are endemic to eastern and south-eastern Australia, predominately on the eastern side of the Great Dividing Range. They are typically found in open forests and woodlands, sheltered gullies in wet forests with dense understoreys along watercourses. Will sometimes be found in open areas near forests such as farmland, parks and suburban areas, as well as in remnant bushland patches. They need hollow bearing trees to nest. (Morcombe 2003).	HIGH – Suitable habitat available in study area.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC ACT	VICADV/ FFG ACT					
Numenius madagascariensis	Eastern Curlew	Critically Endangered/ migratory				PMST	Primarily coastal in distribution, commonly associated with sheltered coasts, estuaries, harbours and lagoons. Breeds in the northern hemisphere, returning to Australia for the non-breeding season.	LOW – Not within species normal distribution.
Nycticorax caledonicus	Nankeen Night Heron		Near Threatened	1976	1	VBA	This species prefers shallow margins along rivers, creek lines and wetlands. The species is also known to inhabit mangrove lines estuaries, offshore islands and perch in garden trees (Pizzey & Knight 2007).	LOW – No recent records in the Victorian Biodiversity Atlas.
Oreoica gutturalis	Crested Bellbird		Near Threatened/ Listed	1903	1	VBA	This species prefers to inhabit arid scrublands that include acacia (including mulga), saltbush, belah, mallee-spinifex species and also occurs in eucalypt woodlands (Pizzey & Knight 2012).	LOW – No recent records.
Oxyura australis	Blue-billed Duck		Endangered/ Listed	2018	3	VBA	Relatively sparse throughout species range. Found on temperate, fresh to saline, terrestrial wetlands, and occupies artificial wetlands. Prefers deep permanent open water, within or near dense vegetation. Nest in rushes, sedge, Lignum, (*Muehlenbeckia cunninghami)* and paperbark Melaleuca (Garnett & Crowley 2000).	MODERATE – most recent VBA record 2018.
Pedionomus torquatus	Plains-wanderer	Vulnerable	Critically Endangered/ Listed	1922	1	PMST, VBA	Sparse grasslands that have 50 percent bare ground, widely spaced plants up to 10 cm high and remaining standing vegetation less than 5 centimetres in height. Occasionally uses cereal stubble but cannot persist in agricultural landscape. Suitable habitat tends to be restricted to small (50–300 ha) patches that do not support dense pasture growth under any seasonal conditions.	LOW – No recent records.
Phalacrocorax varius	Pied Cormorant		Near Threatened	2019	2	VBA	The Pied Cormorant is found in marine habitats including estuaries, harbours and bays. It is also found in mangroves and on large inland wetlands in eastern Australia.	MODERATE – recent records, suitable habitat present in study area.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC ACT	VICADV/ FFG ACT					
Plegadis falcinellus	Glossy Ibis	Migratory	Near Threatened	1980	1	VBA	It feeds in very shallow water and nests in freshwater or brackish wetlands with tall dense stands of emergent vegetation and low trees or bushes. Roosting sites are often large trees that may be far from water. (BirdLife International 2009).	LOW – No recent records.
Polytelis anthopeplus	Regent Parrot	Vulnerable	Vulnerable/ Listed	1898	1	VBA	Primarily inhabits riparian or littoral River Red Gum (Eucalyptus camaldulensis) forests or woodlands and adjacent Black Box (E. largiflorens) woodlands. They often occur in farmland, especially if the farmland supports remnant patches of woodland along roadsides or in paddocks. The subspecies seldom occurs in more extensively cleared areas.	LOW – No recent records.
Pomatostomus temporalis temporalis	Grey-Crowned Babbler (Eastern subspecies)		Endangered/ Listed	1901	2	VBA	Grey-crowned Babblers occupy open woodlands dominated by mature eucalypts, with regenerating trees, tall shrubs, and an intact ground cover of grass and forbs. The species builds conspicuous dome-shaped nests and breeds co-operatively in sedentary family groups of 2-13 birds (Davidson & Robinson 1992).	LOW – No recent records.
Porzana pusilla	Baillon's Crake		Vulnerable/ Listed	2018	2	VBA	Baillon's Crakes inhabit vegetated wetlands, usually with fresh or brackish water, including swamps, billabongs, lakes and reservoirs and temporarily inundated areas. They often prefer wetlands with floating aquatic vegetation.	MODERATE – recent records, suitable habitat present in study area.
Rhipidura rufifrons	Rufous Fantail	Migratory		1976	1	PMST, VBA	Occurs in a range of habitats including the undergrowth of rainforests/wetter eucalypt forests/gullies, monsoon forests paperbarks, sub-inland and coastal scrubs, mangroves, watercourses, parks and gardens. When migrating they may also be recorded on farms, streets and buildings. Migrates to SE Australia in October-April to breed, mostly in or on the coastal side of the Great Dividing Range (Pizzey & Knight 2007).	LOW – most recent VBA record 1976.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC ACT	VICADV/ FFG ACT					
Rostratula australis (syn. R. benghalensis)	Australian Painted Snipe (Painted Snipe)	Endangered/ Migratory	Critically Endangered/ Listed			PMST	Inhabits shallow, vegetated, temporary or infrequently filled wetlands, including where there are trees such as *Eucalyptus camaldulensis* (River Red Gum), *E. populnea* (Poplar Box) or shrubs such as *Muehlenbeckia florulenta* (Lignum) or *Sarcocornia quinqueflora* (Samphire).	LOW – No local records in the Victorian Biodiversity Atlas.
Stagonopleura guttata	Diamond Firetail		Near Threatened/ Listed	1977	1	VBA	Distributed through central and eastern NSW, extending north into southern and central Queensland and south through Victoria to the Eyre Peninsula, South Australia. Occurs in a range of eucalypt dominated communities with a grassy understorey including woodland, forest and Mallee. Firetails nest in trees and bushes, and forage on the ground, largely for grass seeds and other plant material, but also for insects (Blakers, Davies & Reilly 1984; Read 1994).	HIGH – Based on land owner observation on their property.
Tringa glareola	Wood Sandpiper		Vulnerable	2018	1	VBA	Found in well-vegetated, shallow, freshwater wetlands such as swamps, billabongs, lakes, pools and waterholes with emergent aquatic plants and taller fringing vegetation.	LOW – only a single nearby record.
Tringa nebularia	Common Greenshank	Migratory				PMST	Occurs in a range of inland and coastal environments. Inland, it occurs in both permanent and temporary wetlands, billabongs, swamps, lakes floodplains, sewage farms, saltworks ponds, flooded irrigated crops. It generally prefers wet and flooded mud and clay rather than sand (Morcombe 2003).	LOW – No local records in the Victorian Biodiversity Atlas.
Turnix velox	Little Button Quail		Near Threatened	2003	1	VBA	This species is known to inhabit grassy plains, creekflats, woodlands, burned areas, areas containing saltbush, spinifex, mulga and mallee species. It is also known to occur along the margins of wetlands and within crops, pastures, stubble.	LOW – Lack of recent records in the area and there is limited high quality potential habitat present in the study area.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC ACT	VICADV/ FFG ACT					
Fish								
Galaxiella pusilla (PMST) *Galaxiella toourtkoourt (VBA)*	Dwarf Galaxias (PMST) Little Galaxias (VBA)	Vulnerable	Endangered/ Listed		11	PMST, VBA	Occurs in low flowing and still, shallow, permanent and temporary freshwater habitats such as swamps, drains, and the backwaters of streams and creeks.	HIGH – Species has been recorded in Yam Holes Creek in 2011 immediately downstream of the study area. There is suitable habitat in the study area in Yam Holes Creek and its associated wetland areas however subsequent surveys failed to detect this species.
Invertebrates								
Synemon plana	Golden Sun Moth	Critically Endangered	Critically Endangered/ Listed	2015	38	PMST, VBA	This species occurs where wallaby grasses Rytiosperma spp. dominate the understory, such as grassy Box-Gum Woodlands or Natural Temperate Grasslands, as larvae feed exclusively on the roots of wallaby grass. Bare ground separating low tussocks of wallaby grass are key microhabitat features for the Golden Sun Moth, as courting behaviour occurs here (DEWHA 2009b).	RECORDED – Recorded during current surveys.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC ACT	VICADV/ FFG ACT					
Mammals								
Dasyurus maculatus maculatus	Spotted-tailed Quoll (Southern Subspecies)	Endangered	Endangered/ Listed			PMST	Occurs in wide range of forest types, although appears to prefer moist sclerophyll and rainforest forest types, and riparian habitat. Most common in large unfragmented patches of forest. It has also been recorded from dry sclerophyll forest, open woodland and coastal heathland, and despite its occurrence in riparian areas, it also ranges over dry ridges. Nests in rock caves and hollow logs or trees (Threatened Species Scientific Committee 2004).	LOW – Regularly sighted 25 to 30 km north of site, no records in Victorian Biodiversity Atlas.
Isoodon obesulus obesulus	Southern Brown Bandicoot	Endangered				PMST	Inhabit a variety of habitats including heathland, shrubland, sedgeland, heathy open forest and woodland and are usually associated with infertile, sandy and well drained soils, but can be found in a range of soil types Within these vegetation communities they typically inhabit areas of dense ground cover.	LOW – limited habitat available and no records within 10 km.
Perameles gunnii	Eastern Barred Bandicoot	Endangered	Extinct in Wild/Listed	1967	25	PMST, VBA	The mainland population is classified as extinct in the wild. It occurs in three introduced populations in Victoria, Hamilton Community Parklands, Mt Rothwell and Woodlands Historic Park.	LOW – Extinct in the wild.
Phascogale tapoatafa	Brush-tailed Phascogale		Vulnerable/ Listed	2015	9	VBA	Largely arboreal it occurs in a range of habitats which have reliable rainfall (500–2000 mm), but has preference for open dry sclerophyll forest on ridges (up to 600 m alt) with little/sparse ground cover. It nests in tree hollows and feeds at dusk on arthropods and small vertebrates (Strahan, 1995).	RECORDED – Recorded during 2015 surveys.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC ACT	VICADV/ FFG ACT					
Pseudomys fumeus	Smoky Mouse	Endangered	Critically Endangered/ Listed			PMST	The Smoky Mouse is currently limited to a small number of sites in Victoria, south-east NSW and the ACT. The Smoky Mouse occurs in a variety of vegetation communities, ranging from coastal heath to dry ridgeline forest, sub-alpine heath and, occasionally, wetter gullies. Except for the wetter sites, a consistent feature of Smoky Mouse habitats is the diversity of heath and bush-pea species present, combined with potential shelter sites in the form of woody debris or rocks. The vegetation at capture sites varies widely in age post-fire (Menkhorst, P & Knight 2004).	LOW – No local records in the Victorian Biodiversity Atlas.
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Vulnerable/ Listed			PMST	Occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps. Urban gardens and cultivated fruit crops also provide habitat for this species. Feeds on the flowers and nectar of eucalypts and native fruits including lily pillies. It roosts in the branches of large trees in forests or mangroves (Department for Environment & Heritage 2016).	LOW – No local records in the Victorian Biodiversity Atlas.
Sminthopsis crassicaudata	Fat-tailed Dunnart		Near Threatened/ Nominated	1992	2	VBA	Occurs widely in southern Aust. in a variety of open vegetation habitats including open woodland, low shrublands of saltbush and bluebush, tussock grasslands on clay or sandy soils, glibber plain and, in southern parts of its range, farmlands. Their range extends from relatively moist regions near southern coast through the arid inland, and into the plains of Lake Eyre basin.	LOW – most recent record in study area 1963.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC ACT	VICADV/ FFG ACT					
Reptiles								
Aprasia parapulchella	Pink-tailed Worm Lizard (syn. Pink-tailed Legless Lizard)	Vulnerable	Endangered/ Listed			PMST	In general, lizards occur in open grassland habitats that have a substantial cover of small rocks (Osbourne, 1995 1326). Lizards also show a preference for sunny aspects, avoiding S facing slopes. Some specimens have been collected from grassland sites that appear not to support any native grasses and several animals have been found on the edge of *Callitris enlicheri* woodland and *Eucalyptus macrorhyncha* woodland (Barrer 1992).	LOW – No local records in the Victorian Biodiversity Atlas.
Chelodina longicollis	Eastern Snake-necked Tortoise		Data Deficient	2012	3	VBA	Widespread through Coastal and inland waterways, typically inhabiting swamps, lagoons and slow-moving rivers and creeks, but often seen wandering overland far from any apparent water (Swan, Shea & Sadlier 2004).	RECORDED – shell found in study area in 2018.
Delma impar	Striped Legless Lizard	Vulnerable	Endangered/ Listed	2012	1	PMST, VBA	Inhabit both native and exotic dominant grasslands including secondary/derived grasslands.	LOW – based on the lack of Plains Grassland vegetation, lack of basalt-derived geology, only one record in the 10km search area and absence of surface rocks. Furthermore, species was not recorded during targeted surveys conducted by WSP or Cardno.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST RECORD	RECORD COUNT	SOURCE	HABITAT	LIKELIHOOD OF OCCURRENCE
		EPBC ACT	VICADV/ FFG ACT					
Pseudemoia pagenstecheri	Tussock Skink		Vulnerable	2014	2	VBA	Disjunct through highlands of NSW and north-east VIC to low-altitude basalt plains of southern VIC from the Grampians in the west, through the basalt plains west of Melbourne. Preferred habitat of subalpine to alpine grassland and heathland and tussock grasslands with few or no trees (Cogger 2000; Swan; 2003).	LOW – Limited habitat available in study area.

APPENDIX D

HABITAT HECTARE DATA

D1 HABITAT HECTARE DATA

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	AH	AH_2	na	na	5	6	1	5	na	1.36	23.12	1	2	1	4	27
CVU	AH	AH_10	na	na	15	13	10	5	na	1.36	58.48	8	5	4	17	75
CVU	AH	AH_18	na	na	5	9	1	4	na	1.36	25.84	8	4	3	15	41
CVU	AH	AH_19	na	na	5	9	1	4	na	1.36	25.84	8	4	3	15	41
CVU	AH	AH_20	na	na	5	9	5	5	na	1.36	32.64	1	1	1	3	36
CVU	AH	AH_21	na	na	5	9	5	5	na	1.36	32.64	1	1	1	3	36
CVU	AH	AH_24	na	na	5	9	5	5	na	1.36	32.64	8	4	3	15	48
CVU	AH	AH_26	na	na	5	9	1	4	na	1.36	25.84	8	4	3	15	41
CVU	AH	AH_31	na	na	5	9	5	5	na	1.36	32.64	1	2	1	4	37
CVU	AH	AH_34	na	na	15	9	10	5	na	1.36	53.04	8	4	3	15	68
CVU	AH	AH_35	na	na	5	0	1	4	na	1.36	13.6	8	4	3	15	29
CVU	AH	AH_37	na	na	15	11	5	2	na	1.36	44.88	1	2	3	6	51
CVU	AH	AH_38	na	na	5	9	3	5	na	1.36	29.92	2	5	3	10	40
CVU	AH	AH_39	na	na	5	9	3	5	na	1.36	29.92	2	5	3	10	40
CVU	AH	AH_41	na	na	5	9	5	5	na	1.36	32.64	1	3	3	7	40

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	AH	AH_42	na	na	5	9	5	5	na	1.36	32.64	1	1	3	5	38
CVU	AH	AH_43	na	na	5	9	5	5	na	1.36	32.64	1	3	3	7	40
CVU	AH	AH_44	na	na	5	6	5	0	na	1.36	21.76	1	3	3	7	29
CVU	AH	AH_45	na	na	5	9	5	5	na	1.36	32.64	8	5	4	17	50
CVU	AH	AH_46	na	na	5	9	5	5	na	1.36	32.64	8	4	4	16	49
CVU	AH	AH_47	na	na	5	6	5	0	na	1.36	21.76	1	3	3	7	29
CVU	AH	AH_50	na	na	5	0	0	0	na	1.36	6.8	1	3	3	7	14
CVU	AH	AH_51	na	na	15	9	5	0	na	1.36	39.44	1	3	3	7	46
CVU	AH	AH_52	na	na	5	0	0	0	na	1.36	6.8	2	5	3	10	17
CVU	AH	AH_53	na	na	5	0	0	0	na	1.36	6.8	2	5	3	10	17
CVU	AH	AH_54	na	na	15	9	5	0	na	1.36	39.44	1	3	3	7	46
CVU	AH	AH_55	na	na	15	9	10	5	na	1.36	53.04	8	5	4	17	70
CVU	AH	AH_56	na	na	15	9	10	5	na	1.36	53.04	8	5	4	17	70
CVU	AH	AH_57	na	na	15	6	10	5	na	1.36	48.96	1	3	3	7	56
CVU	AH	AH_58	na	na	5	6	5	0	na	1.36	21.76	1	3	3	7	29
CVU	AH	AH_60	na	na	5	9	5	5	na	1.36	32.64	1	4	3	8	41
CVU	AH	AH_61	na	na	15	9	10	5	na	1.36	53.04	8	5	4	17	70
CVU	AH	AH_62	na	na	15	9	10	5	na	1.36	53.04	8	5	4	17	70

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	AH	AH_63	na	na	15	9	10	5	na	1.36	53.04	8	5	4	17	70
CVU	AH	AH_64	na	na	15	9	10	5	na	1.36	53.04	8	5	4	17	70
CVU	AH	AH_65	na	na	15	6	10	5	na	1.36	48.96	1	4	3	8	57
CVU	AH	AH_66	na	na	5	6	5	0	na	1.36	21.76	8	4	4	16	38
CVU	AH	AH_67	na	na	5	6	5	0	na	1.36	21.76	8	4	4	16	38
CVU	AH	AH_68	na	na	5	6	5	5	na	1.36	28.56	2	3	3	8	37
CVU	AH	AH_69	na	na	5	6	5	0	na	1.36	21.76	1	3	3	7	29
CVU	AH	AH_70	na	na	5	6	5	0	na	1.36	21.76	8	4	4	16	38
CVU	AH	AH_71	na	na	5	6	5	0	na	1.36	21.76	8	4	4	16	38
CVU	AH	AH_72	na	na	5	6	5	0	na	1.36	21.76	8	4	4	16	38
CVU	AH	AH_73	na	na	5	6	5	0	na	1.36	21.76	8	4	4	16	38
CVU	AH	AH_74	na	na	5	4	5	4	na	1.36	24.48	8	7	4	19	43
CVU	AH	AH_75	na	na	5	4	5	4	na	1.36	24.48	8	7	4	19	43
CVU	AH	AH_76	na	na	5	2	5	4	na	1.36	21.76	8	4	4	16	38
CVU	AH	AH_77	na	na	15	7	6	0	na	1.36	38.08	8	4	4	16	54
CVU	AH	AH_78	na	na	5	9	5	5	na	1.36	32.64	1	3	3	7	40
CVU	AH	AH_79	na	na	5	9	5	5	na	1.36	32.64	8	5	4	17	50
CVU	AH	AH_80	na	na	5	2	5	4	na	1.36	21.76	8	4	4	16	38

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	AH	AH_81	na	na	5	4	5	4	na	1.36	24.48	8	7	4	19	43
CVU	AH	AH_82	na	na	5	4	5	4	na	1.36	24.48	8	7	4	19	43
CVU	AH	AH_83	na	na	15	7	6	0	na	1.36	38.08	8	4	4	16	54
CVU	AH	AH_84	na	na	15	7	6	0	na	1.36	38.08	8	4	4	16	54
CVU	AH	AH_85	na	na	5	4	5	4	na	1.36	24.48	8	7	4	19	43
CVU	AH	AH_86	na	na	5	9	5	5	na	1.36	32.64	8	7	4	19	52
CVU	AH	AH_87	na	na	5	9	5	5	na	1.36	32.64	1	3	3	8	41
CVU	AH	AH_88	na	na	5	9	5	5	na	1.36	32.64	8	7	4	19	52
CVU	AH	AH_89	na	na	15	9	10	5	na	1.36	53.04	8	7	4	19	72
CVU	AH	AH_90	na	na	5	6	5	0	na	1.36	21.76	8	4	4	16	38
CVU	AH	AH_91	na	na	15	13	6	0	na	1.36	46.24	8	4	4	16	62
CVU	AH	AH_92	na	na	5	6	5	0	na	1.36	21.76	8	4	4	16	38
CVU	AH	AH_93	na	na	5	6	5	0	na	1.36	21.76	8	4	4	16	38
CVU	AH	AH_94	na	na	5	6	5	0	na	1.36	21.76	8	4	4	16	38
CVU	AH	AH_95	na	na	5	9	5	5	na	1.36	32.64	8	7	4	19	52
CVU	AH	AH_96	na	na	5	9	5	5	na	1.36	32.64	8	7	4	19	52
CVU	AH	AH_97	na	na	10	0	6	5	na	1.36	28.56	8	4	3	15	44
CVU	AH	AH_99	na	na	5	9	5	5	na	1.36	32.64	8	7	4	19	52

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	AH	AH_100	na	na	10	0	6	5	na	1.36	28.56	2	2	1	5	34
CVU	AH	AH_101	na	na	5	9	5	5	na	1.36	32.64	8	5	4	17	50
CVU	AH	AH_102	na	na	5	0	3	5	na	1.36	17.68	8	4	4	16	34
CVU	AH	AH_103	na	na	15	9	5	5	na	1.36	46.24	2	5	3	10	56
CVU	AH	AH_104	na	na	15	9	5	5	na	1.36	46.24	2	5	3	10	56
CVU	AH	AH_105	na	na	5	9	5	5	na	1.36	32.64	8	7	4	19	52
CVU	AH	AH_106	na	na	15	9	5	5	na	1.36	46.24	8	7	4	19	65
CVU	AH	AH_107	na	na	15	7	6	0	na	1.36	38.08	2	2	1	5	43
CVU	AH	AH_108	na	na	5	9	5	5	na	1.36	32.64	8	5	4	17	50
CVU	AH	AH_109	na	na	5	9	5	5	na	1.36	32.64	8	5	4	17	50
CVU	AH	AH_110	na	na	15	7	6	0	na	1.36	38.08	8	4	4	16	54
CVU	AS	AS_5	na	na	15	9	5	5	na	1.36	46.24	8	4	4	16	62
CVU	AS	AS_6	na	na	15	13	6	0	na	1.36	46.24	1	4	3	8	54
CVU	AS	AS_7	na	na	15	13	10	5	na	1.36	58.48	8	4	4	16	74
CVU	AS	AS_8	na	na	15	6	5	5	na	1.36	42.16	8	5	4	17	59
CVU	AS	AS_9	na	na	15	9	6	5	na	1.36	47.6	8	7	4	19	67
CVU	ATHrW	ATHrW_2	5	4	15	9	3	5	0	1	41	8	4	3	15	56
CVU	ATHrW	ATHrW_3	10	5	15	0	10	5	5	1	50	2	5	3	10	60

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	ATHrW	ATHrW_5	10	5	15	0	5	4	4	1	43	8	5	4	17	60
CVU	ATHrW	ATHrW_6	4	5	5	0	1	5	0	1	20	2	3	3	8	28
CVU	ATHrW	ATHrW_7	4	5	5	0	1	5	0	1	20	2	3	3	8	28
CVU	ATHrW	ATHrW_8	9	4	20	4	10	5	5	1	57	8	5	4	17	74
CVU	ATHrW	ATHrW_9	5	4	5	0	0	2	0	1	16	2	5	3	10	26
CVU	ATHrW	ATHrW_10	5	4	5	0	0	2	0	1	16	2	5	3	10	26
CVU	ATHrW	ATHrW_11	5	4	15	6	3	5	2	1	40	8	5	4	17	57
CVU	ATHrW	ATHrW_12	0	0	0	0	0	0	0	1	0	1	3	3	7	7
CVU	ATHrW	ATHrW_13	0	0	0	0	0	0	0	1	0	1	3	3	7	7
CVU	ATHrW	ATHrW_14	9	4	20	4	10	5	5	1	57	8	5	4	17	74
CVU	ATHrW	ATHrW_15	9	4	20	4	10	5	5	1	57	8	5	4	17	74
CVU	ATHrW	ATHrW_16	9	4	20	4	10	5	5	1	57	8	5	4	17	74
CVU	ATHrW	ATHrW_17	9	4	15	6	3	5	2	1	44	1	4	3	8	52
CVU	ATHrW	ATHrW_18	5	4	15	6	5	5	5	1	45	8	4	4	16	61
CVU	ATHrW	ATHrW_19	5	4	15	6	5	5	5	1	45	8	4	4	16	61
CVU	ATHrW	ATHrW_20	5	4	15	6	5	5	5	1	45	8	4	4	16	61
CVU	ATHrW	ATHrW_21	5	4	15	6	5	5	5	1	45	8	4	4	16	61
CVU	ATHrW	ATHrW_22	5	4	15	6	3	5	2	1	40	8	5	4	17	57

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	ATHrW	ATHrW_23	5	4	15	6	3	5	2	1	40	8	5	4	17	57
CVU	ATHrW	ATHrW_24	9	4	0	0	0	2	2	1	17	1	3	3	7	24
CVU	ATHrW	ATHrW_25	9	4	0	0	0	2	2	1	17	1	3	3	7	24
CVU	ATHrW	ATHrW_26	10	5	15	0	6	5	3	1	44	8	7	4	19	63
CVU	ATHrW	ATHrW_27	9	4	5	6	3	5	2	1	34	8	5	4	17	51
CVU	ATHrW	ATHrW_28	9	4	5	6	3	5	2	1	34	8	5	4	17	51
CVU	ATHrW	ATHrW_29	9	4	5	6	3	5	2	1	34	8	5	4	17	51
CVU	ATHrW	ATHrW_30	5	4	15	6	3	5	2	1	40	8	5	4	17	57
CVU	ATHrW	ATHrW_31	9	4	5	6	3	5	2	1	34	8	5	4	17	51
CVU	ATHrW	ATHrW_32	9	4	5	6	3	5	2	1	34	8	5	4	17	51
CVU	ATHrW	ATHrW_33	9	4	5	6	3	5	2	1	34	8	5	4	17	51
CVU	ATHrW	ATHrW_34	8	5	15	0	6	5	3	1	42	8	7	4	19	61
CVU	ATHrW	ATHrW_35	10	5	15	0	6	5	3	1	44	8	7	4	19	63
CVU	ATHrW	ATHrW_36	2	4	10	0	5	5	4	1	30	2	3	3	8	38
CVU	ATHrW	ATHrW_37	9	4	5	6	3	5	2	1	34	8	5	4	17	51
CVU	ATHrW	ATHrW_38	9	4	5	7	0	5	3	1	33	8	7	4	19	52
CVU	ATHrW	ATHrW_39	9	4	5	6	3	5	2	1	34	8	5	4	17	51
CVU	ATHrW	ATHrW_40	2	4	10	0	5	5	4	1	30	2	3	3	8	38

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	ATHrW	ATHrW_41	2	4	10	0	5	5	4	1	30	2	3	3	8	38
CVU	ATHrW	ATHrW_42	9	4	5	6	3	5	2	1	34	8	5	4	17	51
CVU	ATHrW	ATHrW_43	0	4	5	0	0	2	5	1	16	1	2	3	6	22
CVU	ATHrW	ATHrW_44	0	4	5	7	0	5	3	1	24	1	4	3	8	32
CVU	ATHrW	ATHrW_45	10	5	15	0	6	5	3	1	44	8	7	4	19	63
CVU	ATHrW	ATHrW_46	5	4	15	6	3	5	2	1	40	8	5	4	17	57
CVU	ATHrW	ATHrW_47	10	5	15	0	6	5	3	1	44	8	7	4	19	63
CVU	ATHrW	ATHrW_48	9	4	5	6	3	5	2	1	34	8	5	4	17	51
CVU	ATHrW	ATHrW_49	2	4	10	0	5	5	4	1	30	4	5	3	12	42
CVU	ATHrW	ATHrW_50	0	4	0	0	0	2	5	1	11	1	4	3	8	19
CVU	ATHrW	ATHrW_51	8	5	15	0	6	5	3	1	42	2	4	3	9	51
CVU	ATHrW	ATHrW_52	8	5	15	0	6	5	3	1	42	2	4	3	9	51
CVU	ATHrW	ATHrW_53	2	4	10	0	5	5	4	1	30	4	5	3	12	42
CVU	ATHrW	ATHrW_54	10	5	15	0	6	5	3	1	44	8	7	4	19	63
CVU	ATHrW	ATHrW_55	7	4	20	7	10	5	5	1	58	8	7	4	19	77
CVU	ATHrW	ATHrW_56	5	4	20	6	5	5	5	1	50	8	4	4	16	66
CVU	ATHrW	ATHrW_57	10	5	15	0	6	5	3	1	44	8	7	4	19	63
CVU	ATHrW	ATHrW_58	5	4	20	6	5	5	5	1	50	8	4	4	16	66

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	ATHrW	ATHrW_59	5	4	15	6	3	5	2	1	40	8	5	4	17	57
CVU	ATHrW	ATHrW_60	5	4	15	6	3	5	2	1	40	8	5	4	17	57
CVU	ATHrW	ATHrW_61	5	4	15	6	3	5	2	1	40	8	5	4	17	57
CVU	ATHrW	ATHrW_62	10	5	15	6	0	2	2	1	40	8	5	4	17	57
CVU	ATHrW	ATHrW_63	10	5	15	6	0	2	2	1	40	8	5	4	17	57
CVU	ATHrW	ATHrW_64	5	4	20	6	5	5	5	1	50	8	4	4	16	66
CVU	ATHrW	ATHrW_65	0	0	0	0	0	0	0	1	0	8	4	4	16	16
CVU	ATHrW	ATHrW_66	4	3	5	4	5	5	0	1	26	8	4	4	16	42
CVU	ATHrW	ATHrW_67	5	4	20	0	5	5	5	1	44	8	4	4	16	60
CVU	ATHrW	ATHrW_68	5	4	20	0	5	5	5	1	44	8	4	4	16	60
CVU	ATHrW	ATHrW_69	5	4	20	0	5	5	5	1	44	8	4	4	16	60
CVU	ATHrW	ATHrW_70	9	4	20	4	10	5	5	1	57	8	5	4	17	74
CVU	ATHrW	ATHrW_71	9	4	15	6	3	5	2	1	44	8	5	4	17	61
CVU	ATHrW	ATHrW_72	9	4	15	6	3	5	2	1	44	8	5	4	17	61
CVU	ATHrW	ATHrW_73	4	3	5	4	5	5	0	1	26	8	4	4	16	42
CVU	ATHrW	ATHrW_74	5	4	20	0	5	5	5	1	44	8	4	4	16	60
CVU	ATHrW	ATHrW_75	4	3	5	4	5	5	0	1	26	8	4	4	16	42
CVU	ATHrW	ATHrW_76	10	5	15	0	6	5	3	1	44	8	7	4	19	63

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	BH	BH_1	na	na	15	2	5	4	na	1.36	35.36	8	4	4	16	51
CVU	BH	BH_2	na	na	15	2	5	4	na	1.36	35.36	8	4	4	16	51
CVU	BH	BH_3	na	na	15	6	5	5	na	1.36	42.16	8	4	4	16	58
CVU	BH	BH_4	na	na	15	6	5	5	na	1.36	42.16	8	4	4	16	58
CVU	BH	BH_5	na	na	15	2	5	4	na	1.36	35.36	8	4	4	16	51
CVU	CGW	CGW_3	0	0	15	0	0	2	0	1	17	8	5	4	17	34
CVU	CGW	CGW_4	0	0	15	0	0	2	0	1	17	8	5	4	17	34
CVU	CGW	CGW_5	0	0	15	0	0	2	0	1	17	8	5	4	17	34
CVU	CGW	CGW_6	0	0	15	0	0	2	0	1	17	8	5	4	17	34
CVU	CGW	CGW_7	0	0	15	0	0	2	0	1	17	8	5	4	17	34
CVU	CGW	CGW_8	0	0	15	0	0	2	0	1	17	8	5	4	17	34
CVU	CGW	CGW_9	0	0	15	0	0	2	0	1	17	8	5	4	17	34
CVU	CGW	CGW_10	0	0	15	0	0	2	0	1	17	8	5	4	17	34
CVU	CGW	CGW_11	0	0	15	0	0	2	0	1	17	8	5	4	17	34
CVU	CGW	CGW_12	0	0	15	0	0	2	0	1	17	8	5	4	17	34
CVU	CGW	CGW_13	0	0	15	0	0	2	0	1	17	8	5	4	17	34
CVU	CGW	CGW_14	0	0	15	0	0	2	0	1	17	8	5	4	17	34
CVU	CGW	CGW_15	0	0	15	0	0	2	0	1	17	8	5	4	17	34

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	CGW	CGW_16	0	0	15	0	0	2	0	1	17	8	5	4	17	34
CVU	CGW	CGW_17	0	0	15	0	0	2	0	1	17	8	5	4	17	34
CVU	CGW	CGW_18	0	0	15	0	0	2	0	1	17	8	5	4	17	34
CVU	CGW	CGW_19	0	0	15	0	0	2	0	1	17	8	5	4	17	34
CVU	CGW	CGW_20	0	0	15	0	0	2	0	1	17	8	5	4	17	34
CVU	CGW	CGW_21	0	0	15	0	0	2	0	1	17	8	5	4	17	34
CVU	CGW	CGW_22	0	0	15	0	0	2	0	1	17	8	5	4	17	34
CVU	CGW	CGW_23	0	0	15	0	0	2	0	1	17	8	5	4	17	34
CVU	CGW	CGW_24	0	0	15	0	0	2	0	1	17	8	5	4	17	34
CVU	GDF	GDF_1	6	5	15	6	5	4	2	1	43	8	4	3	15	58
CVU	GDF	GDF_2	7	4	5	2	0	2	0	1	20	8	4	3	15	35
CVU	GDF	GDF_3	3	5	15	6	5	4	2	1	40	8	4	3	15	55
CVU	GDF	GDF_4	9	4	5	0	0	2	5	1	25	2	5	3	10	35
CVU	GDF	GDF_5	10	5	0	0	0	0	0	1	15	1	2	3	6	21
CVU	GDF	GDF_6	9	4	5	0	0	2	5	1	25	2	5	3	10	35
CVU	GDF	GDF_7	3	2	15	6	0	2	0	1	28	8	4	3	15	43
CVU	GDF	GDF_8	9	4	5	0	0	2	5	1	25	2	5	3	10	35
CVU	GDF	GDF_12	0	0	0	0	0	0	0	1	0	1	2	3	6	6

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	GDF	GDF_13	6	3	5	6	5	5	0	1	30	8	7	4	19	49
CVU	GDF	GDF_14	0	5	5	6	0	5	0	1	21	1	4	3	8	29
CVU	GDF	GDF_15	10	5	5	2	5	4	3	1	34	1	2	3	6	40
CVU	GDF	GDF_16	0	5	5	6	0	5	0	1	21	1	4	3	8	29
CVU	GDF	GDF_17	5	2	5	2	1	5	2	1	22	1	2	3	6	28
CVU	GDF	GDF_18	7	4	5	6	5	4	3	1	34	8	5	4	17	51
CVU	GDF	GDF_19	6	5	15	13	10	3	2	1	54	8	5	4	17	71
CVU	GDF	GDF_20	6	5	15	13	10	3	2	1	54	8	5	4	17	71
CVU	GDF	GDF_21	6	3	5	6	5	5	0	1	30	8	7	4	19	49
CVU	GDF	GDF_22	9	4	5	0	0	2	5	1	25	1	3	3	7	32
CVU	GDF	GDF_23	4	3	15	13	5	5	0	1	45	8	5	4	17	62
CVU	GDF	GDF_24	7	4	5	6	5	4	3	1	34	8	5	4	17	51
CVU	GDF	GDF_25	6	3	5	6	5	5	0	1	30	8	7	4	19	49
CVU	GDF	GDF_26	3	4	20	9	3	5	2	1	46	8	5	4	17	63
CVU	GDF	GDF_27	0	0	0	0	0	0	0	1	0	8	5	4	17	17
CVU	GDF	GDF_28	3	5	15	9	3	5	3	1	43	8	7	4	19	62
CVU	GDF	GDF_29	3	5	15	9	3	5	3	1	43	8	7	4	19	62
CVU	GDF	GDF_30	4	5	15	13	10	3	2	1	52	8	5	4	17	69

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	GDF	GDF_31	9	4	15	9	6	3	2	1	48	8	4	4	16	64
CVU	GDF	GDF_32	2	4	10	0	5	5	4	1	30	4	5	3	12	42
CVU	GDF	GDF_33	2	4	10	0	5	5	4	1	30	4	5	3	12	42
CVU	GDF	GDF_34	0	4	20	9	3	5	2	1	43	8	5	4	17	60
CVU	GDF	GDF_35	2	4	10	0	5	5	4	1	30	4	5	3	12	42
CVU	GDF	GDF_36	6	5	15	13	10	3	2	1	54	8	5	4	17	71
CVU	GDF	GDF_37	2	4	15	9	3	5	3	1	41	8	7	4	19	60
CVU	GDF	GDF_38	4	3	15	13	5	5	0	1	45	8	5	4	17	62
CVU	GDF	GDF_39	6	5	15	6	3	3	2	1	40	8	5	4	17	57
CVU	GDF	GDF_40	4	5	15	4	6	3	5	1	42	8	7	4	19	61
CVU	GDF	GDF_41	8	5	15	9	3	5	3	1	48	8	7	4	19	67
CVU	GDF	GDF_42	3	5	15	9	3	5	3	1	43	8	7	4	19	62
CVU	GDF	GDF_43	4	5	15	4	6	3	5	1	42	8	7	4	19	61
CVU	GDF	GDF_44	5	4	15	6	5	5	0	1	40	8	5	4	17	57
CVU	GDF	GDF_45	3	5	15	9	3	5	3	1	43	8	7	4	19	62
CVU	GDF	GDF_46	2	4	15	15	3	5	3	1	47	8	7	4	19	66
CVU	GDF	GDF_47	4	5	15	4	6	3	5	1	42	8	7	4	19	61
CVU	GDF	GDF_48	3	4	20	9	3	5	2	1	46	8	5	4	17	63

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	GDF	GDF_49	8	5	10	0	3	5	2	1	33	8	5	4	17	50
CVU	GDF	GDF_50	6	5	15	9	10	5	2	1	52	8	5	4	17	69
CVU	GDF	GDF_51	9	4	15	9	6	3	2	1	48	8	4	4	16	64
CVU	GDF	GDF_52	4	5	15	4	6	3	5	1	42	8	7	4	19	61
CVU	GDF	GDF_53	5	2	5	2	1	5	2	1	22	8	5	4	17	39
CVU	GDF	GDF_55	4	5	15	4	6	3	5	1	42	8	7	4	19	61
CVU	GDF	GDF_56	4	5	15	9	10	5	5	1	53	8	5	4	17	70
CVU	GDF	GDF_57	6	5	15	13	10	3	2	1	54	8	5	4	17	71
CVU	GDF	GDF_58	4	5	10	6	5	5	0	1	35	8	7	4	19	54
CVU	GDF	GDF_59	4	5	10	6	5	5	0	1	35	8	7	4	19	54
CVU	GDF	GDF_60	6	5	15	13	10	3	2	1	54	8	5	4	17	71
CVU	GDF	GDF_61	8	5	5	4	1	5	2	1	30	8	7	4	19	49
CVU	GDF	GDF_62	6	5	15	9	10	5	2	1	52	8	5	4	17	69
CVU	GDF	GDF_63	8	5	10	0	3	5	2	1	33	8	5	4	17	50
CVU	GDF	GDF_64	3	4	20	9	3	5	2	1	46	8	5	4	17	63
CVU	GDF	GDF_65	4	5	15	4	6	3	5	1	42	8	7	4	19	61
CVU	GDF	GDF_66	4	5	15	13	10	3	2	1	52	8	5	4	17	69
CVU	GDF	GDF_67	7	4	0	0	0	5	4	1	20	1	3	3	7	27

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	GDF	GDF_68	6	5	15	9	5	5	4	1	49	8	4	4	16	65
CVU	GDF	GDF_69	6	5	15	13	10	3	2	1	54	8	5	4	17	71
CVU	GDF	GDF_70	7	4	5	0	0	5	4	1	25	8	5	4	17	42
CVU	GDF	GDF_71	7	4	0	0	0	5	4	1	20	1	3	3	7	27
CVU	GDF	GDF_72	5	4	15	6	5	5	0	1	40	8	5	4	17	57
CVU	GDF	GDF_73	4	5	10	6	5	5	0	1	35	8	7	4	19	54
CVU	GDF	GDF_74	5	2	15	6	3	5	2	1	38	8	5	4	17	55
CVU	GDF	GDF_75	3	4	15	9	10	5	4	1	50	8	5	4	17	67
CVU	GDF	GDF_76	9	4	15	9	6	3	2	1	48	8	4	4	16	64
CVU	GDF	GDF_77	7	4	15	9	6	3	2	1	46	8	4	4	16	62
CVU	GDF	GDF_78	7	4	15	9	6	3	2	1	46	8	4	4	16	62
CVU	GDF	GDF_79	2	4	10	0	5	5	0	1	26	1	4	3	8	34
CVU	GDF	GDF_80	2	4	20	13	3	5	4	1	51	8	5	4	17	68
CVU	GDF	GDF_81	3	4	15	9	10	5	4	1	50	8	5	4	17	67
CVU	GDF	GDF_82	3	4	15	9	10	5	4	1	50	8	5	4	17	67
CVU	GDF	GDF_83	3	4	15	9	10	5	4	1	50	1	4	3	8	58
CVU	GDF	GDF_84	3	4	20	6	3	5	2	1	43	8	5	4	17	60
CVU	GDF	GDF_85	3	4	15	9	10	5	4	1	50	8	5	4	17	67

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	GDF	GDF_86	9	4	15	9	6	3	2	1	48	8	4	4	16	64
CVU	GDF	GDF_87	3	4	15	9	10	5	4	1	50	8	5	4	17	67
CVU	GDF	GDF_88	3	2	15	0	10	2	0	1	32	8	7	4	19	51
CVU	GDF	GDF_89	4	5	15	4	6	3	5	1	42	8	7	4	19	61
CVU	GDF	GDF_90	3	2	15	0	10	2	0	1	32	8	7	4	19	51
CVU	GDF	GDF_91	3	4	20	6	3	5	2	1	43	8	5	4	17	60
CVU	GDF	GDF_92	7	2	15	4	10	2	0	1	40	8	7	4	19	59
CVU	GDF	GDF_93	8	5	15	9	3	5	3	1	48	8	7	4	19	67
CVU	GDF	GDF_94	3	2	15	0	10	2	0	1	32	8	7	4	19	51
CVU	GDF	GDF_95	7	2	15	4	10	2	0	1	40	8	7	4	19	59
CVU	GDF	GDF_96	7	5	15	4	6	3	5	1	45	8	7	4	19	64
CVU	GDF	GDF_97	8	5	5	4	1	5	2	1	30	8	7	4	19	49
CVU	GDF	GDF_98	2	4	20	13	3	5	4	1	51	8	5	4	17	68
CVU	GDF	GDF_99	5	2	5	2	1	5	2	1	22	8	5	4	17	39
CVU	GDF	GDF_100	2	2	15	9	6	3	4	1	41	8	5	4	17	58
CVU	GDF	GDF_101	2	2	15	9	6	3	4	1	41	8	5	4	17	58
CVU	GDF	GDF_102	2	4	20	13	3	5	4	1	51	8	5	4	17	68
CVU	GDF	GDF_103	3	4	20	9	3	5	2	1	46	8	5	4	17	63

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	GDF	GDF_104	8	5	10	0	3	5	2	1	33	8	5	4	17	50
CVU	GDF	GDF_105	5	2	15	6	3	5	2	1	38	8	5	4	17	55
CVU	GDF	GDF_106	8	5	10	0	3	5	2	1	33	8	5	4	17	50
CVU	GDF	GDF_107	5	2	5	2	1	5	2	1	22	8	5	4	17	39
CVU	GDF	GDF_108	3	4	20	6	3	5	2	1	43	8	5	4	17	60
CVU	GDF	GDF_109	3	4	20	6	3	5	2	1	43	8	5	4	17	60
CVU	GDF	GDF_110	3	4	15	9	10	5	4	1	50	8	5	4	17	67
CVU	GDF	GDF_111	3	4	15	9	10	5	4	1	50	8	5	4	17	67
CVU	GDF	GDF_112	3	4	15	6	3	5	2	1	38	1	4	3	8	46
CVU	GDF	GDF_113	9	4	15	9	10	5	4	0	0	4	5	4	13	13
CVU	GW	GW_10	0	3	0	2	0	5	0	1	10	1	1	1	3	13
CVU	GW	GW_14	0	5	5	0	3	3	5	1	21	1	2	1	4	25
CVU	GW	GW_15	0	3	0	2	0	5	0	1	10	1	1	1	3	13
CVU	GW	GW_17	0	5	5	0	3	3	5	1	21	1	2	1	4	25
CVU	GW	GW_23	0	3	15	5	0	0	0	1	23	1	1	1	3	26
CVU	GW	GW_25	7	4	15	11	0	3	0	1	40	8	4	3	15	55
CVU	GW	GW_29	10	3	15	4	5	3	0	1	40	1	1	1	3	43
CVU	GW	GW_32	8	5	15	0	5	4	4	1	41	8	5	4	17	58

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	GW	GW_33	8	5	15	0	5	4	4	1	41	8	5	4	17	58
CVU	GW	GW_34	10	5	5	0	1	5	0	1	26	4	5	3	12	38
CVU	GW	GW_35	10	5	5	0	6	4	0	1	30	2	5	3	10	40
CVU	GW	GW_36	10	5	5	0	1	5	0	1	26	4	5	3	12	38
CVU	GW	GW_37	10	5	5	0	6	4	0	1	30	2	5	3	10	40
CVU	GW	GW_38	10	5	5	0	6	4	0	1	30	2	5	3	10	40
CVU	GW	GW_40	0	0	5	6	0	0	0	1	11	1	3	3	7	18
CVU	GW	GW_41	10	5	5	0	5	5	5	1	35	1	3	3	7	42
CVU	GW	GW_42	10	5	15	4	5	5	0	1	44	8	4	3	15	59
CVU	GW	GW_43	10	5	15	4	5	5	0	1	44	8	4	3	15	59
CVU	GW	GW_44	0	0	5	6	0	0	0	1	11	1	1	3	5	16
CVU	GW	GW_45	10	5	5	0	0	4	0	1	24	1	3	3	7	31
CVU	GW	GW_47	10	5	0	0	0	4	0	1	19	1	2	3	6	25
CVU	GW	GW_48	0	0	0	0	0	0	0	1	0	1	3	3	7	7
CVU	GW	GW_49	6	5	15	9	10	5	2	1	52	8	5	4	17	69
CVU	GW	GW_51	10	5	5	0	5	5	5	1	35	1	3	3	7	42
CVU	GW	GW_52	10	5	5	0	5	5	5	1	35	1	3	3	7	42
CVU	GW	GW_54	10	5	5	0	0	5	4	1	29	1	3	3	7	36

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	GW	GW_55	10	5	0	0	0	0	0	1	15	1	3	3	7	22
CVU	GW	GW_56	0	0	5	0	5	5	5	1	20	4	3	3	10	30
CVU	GW	GW_57	0	0	5	0	5	5	5	1	20	1	3	3	7	27
CVU	GW	GW_58	10	5	5	0	5	5	5	1	35	1	2	3	6	41
CVU	GW	GW_59	8	5	5	6	5	5	5	1	39	1	2	3	6	45
CVU	GW	GW_60	10	5	5	0	5	5	4	1	34	1	2	3	6	40
CVU	GW	GW_61	10	5	0	0	0	5	4	1	24	1	1	3	5	29
CVU	GW	GW_62	10	5	5	2	0	5	5	1	32	1	3	3	7	39
CVU	GW	GW_63	10	5	5	2	0	5	5	1	32	1	3	3	7	39
CVU	GW	GW_64	0	5	15	6	6	5	0	1	37	1	2	3	6	43
CVU	GW	GW_65	9	4	20	9	10	5	5	1	62	8	5	4	17	79
CVU	GW	GW_66	0	5	15	6	6	5	0	1	37	1	2	3	6	43
CVU	GW	GW_67	3	4	5	0	5	5	2	1	24	2	3	3	8	32
CVU	GW	GW_68	9	4	20	9	10	5	5	1	62	8	5	4	17	79
CVU	GW	GW_71	3	4	15	0	5	5	2	1	34	1	3	3	7	41
CVU	GW	GW_72	3	4	15	0	5	5	2	1	34	1	3	3	7	41
CVU	GW	GW_73	0	0	0	0	0	0	0	1	0	4	5	3	12	12
CVU	GW	GW_74	7	4	5	2	3	4	0	1	25	1	2	3	6	31

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	GW	GW_76	9	4	20	9	10	5	5	1	62	8	5	4	17	79
CVU	GW	GW_77	9	4	15	0	10	5	5	1	48	8	5	4	17	65
CVU	GW	GW_78	3	4	15	0	5	5	2	1	34	8	4	4	16	50
CVU	GW	GW_79	3	4	15	0	5	5	2	1	34	8	4	4	16	50
CVU	GW	GW_80	7	4	5	2	3	0	0	1	21	1	2	3	6	27
CVU	GW	GW_81	8	5	15	4	5	5	0	1	42	1	1	1	3	45
CVU	GW	GW_82	4	5	15	13	3	5	3	1	48	8	5	4	17	65
CVU	GW	GW_83	8	5	5	2	5	5	5	1	35	1	3	3	7	42
CVU	GW	GW_84	10	3	0	0	0	2	5	1	20	1	2	3	6	26
CVU	GW	GW_85	10	5	15	4	5	5	0	1	44	1	1	3	5	49
CVU	GW	GW_86	8	5	15	4	5	3	5	1	45	8	5	4	17	62
CVU	GW	GW_87	7	5	15	4	5	3	5	1	44	8	5	4	17	61
CVU	GW	GW_88	10	5	15	4	5	5	0	1	44	1	1	3	5	49
CVU	GW	GW_89	7	4	5	2	3	4	0	1	25	1	2	3	6	31
CVU	GW	GW_90	8	5	15	4	5	3	5	1	45	8	5	4	17	62
CVU	GW	GW_91	7	5	15	4	5	3	5	1	44	8	5	4	17	61
CVU	GW	GW_92	10	5	15	4	5	5	0	1	44	1	1	1	3	47
CVU	GW	GW_93	7	4	5	2	3	5	0	1	26	1	2	3	6	32

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	GW	GW_94	10	5	15	6	5	4	3	1	48	1	3	3	7	55
CVU	GW	GW_95	10	5	15	4	5	5	0	1	44	1	1	3	5	49
CVU	GW	GW_96	10	5	15	4	5	5	0	1	44	1	1	3	5	49
CVU	GW	GW_97	3	4	5	0	5	5	2	1	24	2	3	3	8	32
CVU	GW	GW_98	8	5	15	4	5	3	5	1	45	8	5	4	17	62
CVU	GW	GW_99	10	5	15	4	5	5	0	1	44	1	1	1	3	47
CVU	GW	GW_101	3	4	5	0	5	5	2	1	24	1	3	3	7	31
CVU	GW	GW_102	9	4	20	9	10	5	5	1	62	8	5	4	17	79
CVU	GW	GW_103	8	5	15	4	5	3	5	1	45	8	5	4	17	62
CVU	GW	GW_105	0	0	5	2	0	2	0	1	9	1	1	1	3	12
CVU	GW	GW_106	10	3	5	2	0	4	0	1	24	1	2	1	4	28
CVU	GW	GW_107	8	5	15	4	5	3	5	1	45	8	5	4	17	62
CVU	GW	GW_108	0	0	5	2	0	2	0	1	9	1	1	1	3	12
CVU	GW	GW_109	10	5	15	4	5	5	0	1	44	1	1	1	3	47
CVU	GW	GW_113	3	4	5	0	5	5	2	1	24	2	3	3	8	32
CVU	GW	GW_114	10	3	5	2	0	4	0	1	24	1	1	1	3	27
CVU	GW	GW_117	3	5	15	9	10	5	4	1	51	8	5	4	17	68
CVU	GW	GW_118	3	5	15	9	10	5	4	1	51	8	5	4	17	68

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	GW	GW_119	7	5	5	2	3	4	3	1	29	1	3	3	7	36
CVU	HDF	HDF_1	9	2	5	0	0	2	2	1	20	2	5	3	10	30
CVU	HDF	HDF_2	9	2	5	0	0	2	2	1	20	2	5	3	10	30
CVU	HDF	HDF_3	9	4	5	2	0	4	0	1	24	1	3	3	7	31
CVU	HDF	HDF_4	3	2	10	9	3	5	2	1	34	8	5	4	17	51
CVU	HDF	HDF_5	10	5	15	6	5	5	4	1	50	8	5	4	17	67
CVU	HDF	HDF_6	6	5	15	6	5	5	2	1	44	8	7	4	19	63
CVU	HDF	HDF_7	9	4	5	2	0	4	0	1	24	1	3	3	7	31
CVU	HDF	HDF_8	6	5	0	0	0	0	0	1	11	8	7	4	19	30
CVU	HDF	HDF_9	3	5	15	9	3	5	3	1	43	8	7	4	19	62
CVU	HDF	HDF_10	3	5	15	9	3	5	3	1	43	8	7	4	19	62
CVU	HDF	HDF_11	9	2	5	0	0	2	2	1	20	2	5	3	10	30
CVU	HDF	HDF_12	9	4	5	2	0	4	0	1	24	1	3	3	7	31
CVU	HDF	HDF_13	6	5	15	6	5	5	2	1	44	8	7	4	19	63
CVU	HDF	HDF_14	7	4	15	9	6	3	2	1	46	8	4	4	16	62
CVU	HDF	HDF_15	9	4	15	4	5	3	3	1	43	8	7	4	19	62
CVU	HDF	HDF_16	9	5	15	6	5	5	2	1	47	8	7	4	19	66
CVU	HDF	HDF_17	7	4	15	9	6	3	2	1	46	8	4	4	16	62

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	HDF	HDF_18	9	2	5	0	0	2	2	1	20	2	5	3	10	30
CVU	HDF	HDF_19	7	4	15	9	6	3	2	1	46	8	4	4	16	62
CVU	HDF	HDF_20	9	2	5	0	0	2	2	1	20	2	5	3	10	30
CVU	HDF	HDF_21	7	4	15	9	6	3	2	1	46	8	4	4	16	62
CVU	HDF	HDF_22	3	4	15	0	5	4	4	1	35	4	5	3	12	47
CVU	HDF	HDF_23	10	5	15	6	5	5	4	1	50	8	5	4	17	67
CVU	HDF	HDF_24	3	4	15	0	5	5	2	1	34	8	4	4	16	50
CVU	HDF	HDF_25	7	4	15	4	5	3	3	1	41	8	7	4	19	60
CVU	HDF	HDF_26	9	2	5	0	0	2	2	1	20	2	5	3	10	30
CVU	HDF	HDF_27	6	5	15	13	10	3	2	1	54	8	5	4	17	71
CVU	HDF	HDF_28	3	4	15	0	5	4	4	1	35	8	4	4	16	51
CVU	HDF	HDF_29	5	4	15	6	0	3	2	1	35	8	4	4	16	51
CVU	HDF	HDF_30	3	4	15	9	6	3	2	1	42	1	3	3	7	49
CVU	HDF	HDF_31	7	4	15	6	0	3	2	1	37	8	4	4	16	53
CVU	HDF	HDF_32	7	4	15	9	6	3	2	1	46	8	4	4	16	62
CVU	HDF	HDF_33	7	4	15	9	6	3	2	1	46	8	4	4	16	62
CVU	HDF	HDF_34	3	4	15	0	5	4	4	1	35	8	4	4	16	51
CVU	HDF	HDF_35	7	4	15	9	6	3	2	1	46	8	4	4	16	62

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	HDF	HDF_36	7	4	15	9	6	3	2	1	46	8	4	4	16	62
CVU	HDF	HDF_37	7	4	15	9	6	3	2	1	46	8	4	4	16	62
CVU	HDF	HDF_38	2	4	10	0	5	5	4	1	30	2	5	3	10	40
CVU	HDF	HDF_39	0	3	5	6	5	4	0	1	23	8	4	4	16	39
CVU	HDF	HDF_40	7	4	15	9	6	3	2	1	46	8	4	4	16	62
CVU	HDF	HDF_41	7	4	15	9	6	3	2	1	46	8	4	4	16	62
CVU	HDF	HDF_42	7	4	15	6	0	3	2	1	37	8	4	4	16	53
CVU	HDF	HDF_43	7	4	15	4	5	3	3	1	41	8	7	4	19	60
CVU	HDF	HDF_44	6	5	15	6	5	5	2	1	44	8	7	4	19	63
CVU	HDF	HDF_45	9	4	15	4	5	3	3	1	43	8	7	4	19	62
CVU	HDF	HDF_46	9	5	15	6	5	5	2	1	47	8	7	4	19	66
CVU	HDF	HDF_47	6	5	15	6	5	5	2	1	44	8	7	4	19	63
CVU	HDF	HDF_48	3	4	5	0	0	2	0	1	14	8	4	4	16	30
CVU	HDF/GDF	HDF/GDF_1	3	5	15	9	3	5	3	1	43	8	7	4	19	62
CVU	HDF/GDF	HDF/GDF_2	3	5	15	9	3	5	3	1	43	8	7	4	19	62
CVU	HDF/GDF	HDF/GDF_3	3	5	15	9	3	5	3	1	43	8	7	4	19	62
CVU	HDF/GDF	HDF/GDF_4	3	5	15	9	3	5	3	1	43	8	7	4	19	62
CVU	HDF/GDF	HDF/GDF_5	2	4	15	13	3	5	3	1	45	8	7	4	19	64

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	HDF/GDF	HDF/GDF_6	3	0	15	9	10	5	3	1	45	8	7	4	19	64
CVU	HDF/GDF	HDF/GDF_7	3	0	15	9	10	5	3	1	45	8	7	4	19	64
CVU	HDF/GDF	HDF/GDF_8	3	0	15	9	10	5	3	1	45	8	7	4	19	64
CVU	HDF/GDF	HDF/GDF_9	3	0	15	9	10	5	3	1	45	8	7	4	19	64
CVU	HDF/GDF	HDF/GDF_10	2	4	15	9	3	5	3	1	41	8	7	4	19	60
CVU	HDF/GDF	HDF/GDF_11	2	4	15	9	3	5	3	1	41	8	7	4	19	60
CVU	HDF/GDF	HDF/GDF_12	2	4	15	13	3	5	3	1	45	8	7	4	19	64
CVU	HDF/GDF	HDF/GDF_13	3	5	15	9	3	5	3	1	43	8	7	4	19	62
CVU	HDF/GDF	HDF/GDF_14	3	5	15	9	3	5	3	1	43	8	7	4	19	62
CVU	HDF/GDF	HDF/GDF_15	2	4	15	9	3	5	3	1	41	8	7	4	19	60
CVU	HDF/GDF	HDF/GDF_16	3	5	15	9	10	5	3	1	50	8	7	4	19	69
CVU	HDF/GDF	HDF/GDF_17	2	4	15	13	3	5	3	1	45	8	7	4	19	64
CVU	HDF/GDF	HDF/GDF_18	2	4	15	15	3	5	3	1	47	8	7	4	19	66
CVU	HDF/GDF	HDF/GDF_19	2	4	15	13	3	5	3	1	45	8	7	4	19	64
CVU	HDF/GDF	HDF/GDF_20	2	4	15	13	3	5	3	1	45	8	7	4	19	64
CVU	HDF/GDF	HDF/GDF_21	2	4	15	9	3	5	3	1	41	8	7	4	19	60
CVU	HDF/GDF	HDF/GDF_22	2	4	15	13	3	5	3	1	45	8	7	4	19	64
CVU	HDF/GDF	HDF/GDF_23	2	4	15	9	3	5	3	1	41	8	7	4	19	60

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	HDF/GDF	HDF/GDF_24	3	5	15	9	3	5	3	1	43	8	7	4	19	62
CVU	HDF/GDF	HDF/GDF_25	3	5	15	9	10	5	3	1	50	8	7	4	19	69
CVU	HDF/GDF	HDF/GDF_26	2	4	15	13	3	5	3	1	45	8	7	4	19	64
CVU	HDF/GDF	HDF/GDF_27	3	5	15	9	3	5	3	1	43	8	7	4	19	62
CVU	HDF/GDF	HDF/GDF_28	2	4	15	13	3	5	3	1	45	8	7	4	19	64
CVU	HDF/GDF	HDF/GDF_29	4	5	15	13	10	3	2	1	52	8	5	4	17	69
CVU	HDF/GDF	HDF/GDF_30	6	5	15	13	10	3	2	1	54	8	5	4	17	71
CVU	HDF/GDF	HDF/GDF_31	4	5	15	13	10	3	2	1	52	8	5	4	17	69
CVU	HDF/GDF	HDF/GDF_32	3	0	15	9	10	5	3	1	45	8	7	4	19	64
CVU	HDF/GDF	HDF/GDF_33	2	4	15	9	3	5	3	1	41	8	7	4	19	60
CVU	HDF/GDF	HDF/GDF_34	3	5	15	9	10	5	3	1	50	8	7	4	19	69
CVU	HDF/GDF	HDF/GDF_35	3	5	15	9	3	5	3	1	43	8	7	4	19	62
CVU	HDF/GDF	HDF/GDF_36	3	5	15	9	3	5	3	1	43	8	7	4	19	62
CVU	HDF/GDF	HDF/GDF_37	2	4	15	13	3	5	3	1	45	8	7	4	19	64
CVU	HDF/GDF	HDF/GDF_38	2	4	15	13	3	5	3	1	45	8	7	4	19	64
CVU	HDF/GDF	HDF/GDF_39	2	4	15	13	3	5	3	1	45	8	7	4	19	64
CVU	MW	MW_9	na	na	na	na	na	na	na	0	0	1	2	1	4	4
CVU	MW	MW_22	na	na	na	na	na	na	na	0	0	8	4	3	15	15

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	MW	MW_24	na	na	na	na	na	na	na	0	0	8	4	3	15	15
CVU	MW	MW_26	na	na	na	na	na	na	na	0	0	8	4	3	15	15
CVU	MW	MW_28	na	na	na	na	na	na	na	0	0	8	4	3	15	15
CVU	MW	MW_30	na	na	na	na	na	na	na	0	0	8	4	3	15	15
CVU	MW	MW_38	na	na	na	na	na	na	na	0	0	6	5	3	14	14
CVU	MW	MW_39	na	na	na	na	na	na	na	0	0	6	5	3	14	14
CVU	MW	MW_43	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_45	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_46	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_47	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_48	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_49	na	na	na	na	na	na	na	0	0	6	5	3	14	14
CVU	MW	MW_51	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_52	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_53	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_54	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_55	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_56	na	na	na	na	na	na	na	0	0	8	4	4	16	16

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	MW	MW_57	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_58	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_59	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_60	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_61	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_63	na	na	na	na	na	na	na	0	0	8	7	4	19	19
CVU	MW	MW_64	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_65	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_66	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_67	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_68	na	na	na	na	na	na	na	0	0	8	7	4	19	19
CVU	MW	MW_69	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_70	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_71	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_72	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_73	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_74	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_75	na	na	na	na	na	na	na	0	0	8	4	4	16	16

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	MW	MW_76	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_77	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_78	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_79	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_80	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_81	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_82	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_83	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_84	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_85	na	na	na	na	na	na	na	0	0	2	4	3	9	9
CVU	MW	MW_86	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_87	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_89	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_90	na	na	na	na	na	na	na	0	0	4	5	3	12	12
CVU	MW	MW_91	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_92	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_93	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_94	na	na	na	na	na	na	na	0	0	8	5	4	17	17

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	MW	MW_95	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_96	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_97	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_98	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_100	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_101	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_102	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_103	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_104	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_105	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	MW	MW_106	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_107	na	na	na	na	na	na	na	0	0	8	7	4	19	19
CVU	MW	MW_108	na	na	na	na	na	na	na	0	0	8	5	4	17	17
CVU	MW	MW_114	na	na	na	na	na	na	na	0	0	8	7	4	19	19
CVU	MW	MW_115	na	na	na	na	na	na	na	0	0	8	7	4	19	19
CVU	MW	MW_121	na	na	na	na	na	na	na	0	0	8	4	4	16	16
CVU	PGW/BH	PGW/BH_3	na	na	15	2	5	4	na	1.36	35.36	8	4	4	16	51
CVU	PGW/BH	PGW/BH_4	na	na	15	2	5	4	na	1.36	35.36	8	4	4	16	51

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	PGW/BH	PGW/BH_5	na	na	15	2	5	4	na	1.36	35.36	8	4	4	16	51
CVU	PGW/BH	PGW/BH_6	na	na	15	2	5	4	na	1.36	35.36	8	4	4	16	51
CVU	PGW/BH	PGW/BH_7	na	na	15	6	5	4	na	1.36	40.8	8	4	4	16	57
CVU	PGW/BH	PGW/BH_8	na	na	15	2	5	4	na	1.36	35.36	8	4	4	16	51
CVU	PGW/BH	PGW/BH_9	na	na	15	2	5	4	na	1.36	35.36	8	4	4	16	51
CVU	PGW/BH	PGW/BH_10	na	na	15	6	5	4	na	1.36	40.8	8	4	4	16	57
CVU	PGW/BH	PGW/BH_11	na	na	15	2	5	4	na	1.36	35.36	8	4	4	16	51
CVU	PGW/BH	PGW/BH_12	na	na	15	2	5	4	na	1.36	35.36	8	4	4	16	51
CVU	PGW/BH	PGW/BH_13	na	na	15	2	5	4	na	1.36	35.36	8	4	4	16	51
CVU	PGW/BH	PGW/BH_14	na	na	15	2	5	4	na	1.36	35.36	8	4	4	16	51
CVU	PGW/BH	PGW/BH_15	na	na	15	2	5	4	na	1.36	35.36	8	4	4	16	51
CVU	PGWe	PGWe_9	na	na	5	6	1	5	na	1.36	23.12	1	2	1	4	27
CVU	PGWe	PGWe_11	na	na	5	0	1	4	na	1.36	13.6	1	1	1	3	17
CVU	PGWe	PGWe_22	na	na	5	0	1	4	na	1.36	13.6	8	4	3	15	29
CVU	PGWe	PGWe_23	na	na	5	0	1	4	na	1.36	13.6	8	4	3	15	29
CVU	PGWe	PGWe_24	na	na	5	6	1	5	na	1.36	23.12	1	1	1	3	26
CVU	PGWe	PGWe_25	na	na	5	0	1	4	na	1.36	13.6	8	4	3	15	29
CVU	PGWe	PGWe_26	na	na	5	0	1	4	na	1.36	13.6	6	4	3	13	27

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	PGWe	PGWe_27	na	na	15	9	10	5	na	1.36	53.04	8	4	3	15	68
CVU	PGWe	PGWe_28	na	na	15	9	10	5	na	1.36	53.04	8	4	3	15	68
CVU	PGWe	PGWe_29	na	na	15	9	10	5	na	1.36	53.04	8	4	3	15	68
CVU	PGWe	PGWe_30	na	na	15	9	10	5	na	1.36	53.04	8	4	3	15	68
CVU	PGWe	PGWe_31	na	na	5	0	1	4	na	1.36	13.6	1	2	3	6	20
CVU	PGWe	PGWe_32	na	na	5	0	1	4	na	1.36	13.6	1	2	3	6	20
CVU	PGWe	PGWe_33	na	na	5	0	1	4	na	1.36	13.6	1	1	3	5	19
CVU	PGWe	PGWe_34	na	na	5	0	1	4	na	1.36	13.6	1	1	3	5	19
CVU	PGWe	PGWe_35	na	na	15	6	5	3	na	1.36	39.44	1	1	3	5	44
CVU	PGWe	PGWe_36	na	na	15	6	5	3	na	1.36	39.44	1	1	3	5	44
CVU	PGWe	PGWe_37	na	na	15	6	10	5	na	1.36	48.96	1	3	3	7	56
CVU	PGWe	PGWe_38	na	na	15	6	10	5	na	1.36	48.96	1	3	3	7	56
CVU	PGWe	PGWe_39	na	na	15	6	10	5	na	1.36	48.96	1	3	3	7	56
CVU	PGWe	PGWe_40	na	na	15	6	10	5	na	1.36	48.96	1	3	3	7	56
CVU	PGWe	PGWe_41	na	na	15	7	6	0	na	1.36	38.08	8	4	4	16	54
CVU	PGWe	PGWe_42	na	na	15	7	6	0	na	1.36	38.08	8	4	4	16	54
CVU	PGWe	PGWe_43	na	na	5	7	6	0	na	1.36	24.48	2	3	3	8	32
CVU	PGWe	PGWe_44	na	na	15	4	5	5	na	1.36	39.44	8	4	4	16	55

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	PGWe	PGWe_45	na	na	15	4	5	5	na	1.36	39.44	8	4	4	16	55
CVU	PSW	PSW_6	na	na	15	6	10	5	na	1.36	48.96	1	3	3	7	56
CVU	PSW	PSW_7	na	na	15	6	0	5	na	1.36	35.36	1	3	3	7	42
CVU	PSW	PSW_8	na	na	15	6	0	5	na	1.36	35.36	1	3	3	7	42
CVU	PSW	PSW_9	na	na	15	6	10	5	na	1.36	48.96	1	3	3	7	56
CVU	PSW	PSW_10	na	na	15	6	10	5	na	1.36	48.96	1	4	3	8	57
CVU	PSW	PSW_11	na	na	5	7	5	5	na	1.36	29.92	8	4	4	16	46
CVU	PSW	PSW_13	na	na	5	7	5	5	na	1.36	29.92	8	4	4	16	46
CVU	PSW	PSW_14	na	na	5	7	5	5	na	1.36	29.92	8	4	4	16	46
CVU	PSW	PSW_15	na	na	5	7	5	5	na	1.36	29.92	8	4	4	16	46
CVU	PSW	PSW_16	na	na	15	9	10	5	na	1.36	53.04	8	5	4	17	70
CVU	PSW	PSW_17	na	na	15	9	10	5	na	1.36	53.04	8	5	4	17	70
CVU	PSW	PSW_18	na	na	15	9	10	5	na	1.36	53.04	8	5	4	17	70
CVU	PSW	PSW_19	na	na	15	9	10	5	na	1.36	53.04	8	5	4	17	70
CVU	PSW	PSW_20	na	na	0	0	0	0	na	1.36	0	1	4	3	8	8
CVU	PSW	PSW_21	na	na	0	0	0	0	na	1.36	0	1	4	3	8	8
CVU	PSW	PSW_22	na	na	0	0	0	0	na	1.36	0	8	5	4	17	17
CVU	PSW	PSW_23	na	na	0	0	0	0	na	1.36	0	1	4	3	8	8

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	PSW	PSW_24	na	na	0	0	0	0	na	1.36	0	1	4	3	8	8
CVU	PSW	PSW_27	na	na	5	7	5	0	na	1.36	23.12	8	4	4	16	39
CVU	PSW	PSW_36	na	na	5	7	5	5	na	1.36	29.92	8	4	4	16	46
CVU	PSW	PSW_37	na	na	5	7	5	5	na	1.36	29.92	8	4	4	16	46
CVU	PSW	PSW_38	na	na	5	7	5	5	na	1.36	29.92	8	4	4	16	46
CVU	TL - ATHrW	TL - ATHrW_1	0	0	5	2	0	0	0	1	7	1	3	3	7	14
CVU	TL - ATHrW	TL - ATHrW_2	0	0	15	6	1	5	0	1	27	2	5	3	10	37
CVU	TL - ATHrW	TL - ATHrW_3	0	0	15	6	10	5	0	1	36	1	3	3	7	43
CVU	TL - ATHrW	TL - ATHrW_4	2	0	10	7	0	3	0	1	22	8	5	4	17	39
CVU	TL - ATHrW	TL - ATHrW_5	0	0	5	7	0	3	0	1	15	8	5	4	17	32
CVU	TL - ATHrW	TL - ATHrW_6	2	0	10	7	0	3	0	1	22	8	5	4	17	39
CVU	TL - ATHrW	TL - ATHrW_7	0	0	5	6	5	4	0	1	20	8	4	4	16	36
CVU	TL - ATHrW	TL - ATHrW_8	0	0	5	6	5	4	0	1	20	8	4	4	16	36
CVU	TL - ATHrW	TL - ATHrW_9	0	0	10	7	0	3	0	1	20	8	5	4	17	37
CVU	TL - ATHrW	TL - ATHrW_10	0	0	10	7	0	3	0	1	20	8	5	4	17	37
CVU	TL - ATHrW	TL - ATHrW_11	0	0	10	7	0	3	0	1	20	8	5	4	17	37
CVU	TL - ATHrW	TL - ATHrW_12	0	0	10	7	0	3	0	1	20	8	5	4	17	37
CVU	TL - ATHrW	TL - ATHrW_13	0	0	10	7	0	3	0	1	20	8	5	4	17	37

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	TL - ATHrW	TL - ATHrW_14	0	0	15	9	5	3	0	1	32	8	4	4	16	48
CVU	TL - ATHrW	TL - ATHrW_15	0	0	5	6	5	4	0	1	20	8	4	4	16	36
CVU	TL - ATHrW	TL - ATHrW_16	0	0	5	6	5	4	0	1	20	8	4	4	16	36
CVU	TL - GDF	TL - GDF_1	0	0	5	9	0	0	0	1	14	8	4	3	15	29
CVU	TL - GDF	TL - GDF_2	0	0	5	9	0	0	0	1	14	8	4	3	15	29
CVU	TL - GDF	TL - GDF_3	0	0	5	9	0	0	0	1	14	8	4	3	15	29
CVU	TL - GDF	TL - GDF_4	0	0	5	9	0	0	0	1	14	8	4	3	15	29
CVU	TL - GDF	TL - GDF_5	0	0	5	9	0	0	0	1	14	8	4	3	15	29
CVU	TL - GDF	TL - GDF_6	0	0	5	9	0	3	0	1	17	8	4	3	15	32
CVU	TL - GDF	TL - GDF_7	0	0	5	0	0	0	0	1	5	1	3	3	7	12
CVU	TL - GDF	TL - GDF_8	0	0	5	6	0	0	0	1	11	2	4	3	9	20
CVU	TL - GDF	TL - GDF_9	0	0	5	6	0	0	0	1	11	2	4	3	9	20
CVU	TL - GDF	TL - GDF_10	0	0	5	0	0	0	0	1	5	8	5	4	17	22
CVU	TL - GDF	TL - GDF_11	0	0	5	2	1	0	0	1	8	8	5	4	17	25
CVU	TL - GDF	TL - GDF_12	0	0	5	0	0	0	0	1	5	8	5	4	17	22
CVU	TL - GDF	TL - GDF_13	0	0	5	0	0	0	0	1	5	8	5	4	17	22
CVU	TL - GDF	TL - GDF_14	0	0	5	0	0	0	0	1	5	8	5	4	17	22
CVU	TL - GDF	TL - GDF_15	0	0	5	0	0	0	0	1	5	8	5	4	17	22

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	TL - GDF	TL - GDF_16	0	0	5	2	0	2	0	1	9	1	1	3	5	14
CVU	TL - GDF	TL - GDF_17	0	0	5	0	0	0	0	1	5	8	5	4	17	22
CVU	TL - GDF	TL - GDF_18	0	0	5	0	0	0	0	1	5	8	5	4	17	22
CVU	TL - GDF	TL - GDF_19	0	0	5	2	1	0	0	1	8	8	5	4	17	25
CVU	TL - GDF	TL - GDF_20	0	0	5	2	1	0	0	1	8	8	5	4	17	25
CVU	TL - GDF	TL - GDF_21	0	0	5	2	1	0	0	1	8	8	5	4	17	25
CVU	TL - GDF	TL - GDF_22	0	0	5	2	1	0	0	1	8	8	5	4	17	25
CVU	TL - GDF	TL - GDF_23	0	0	5	0	0	0	0	1	5	8	5	4	17	22
CVU	TL - GDF	TL - GDF_24	0	0	5	0	0	0	0	1	5	8	5	4	17	22
CVU	TL - GDF	TL - GDF_25	0	0	5	2	1	0	0	1	8	8	5	4	17	25
CVU	TL - GDF	TL - GDF_26	0	0	15	6	5	3	0	1	29	8	7	4	19	48
CVU	TL - GDF	TL - GDF_27	0	0	5	2	1	0	0	1	8	8	5	4	17	25
CVU	TL - GDF	TL - GDF_28	0	0	5	2	1	0	0	1	8	8	5	4	17	25
CVU	TL - GDF	TL - GDF_29	0	0	5	2	1	0	0	1	8	8	5	4	17	25
CVU	TL - GDF	TL - GDF_30	0	0	5	2	1	0	0	1	8	8	5	4	17	25
CVU	TL - GDF	TL - GDF_31	0	0	5	2	1	0	0	1	8	8	5	4	17	25
CVU	TL - GW	TL - GW_6	0	0	15	0	0	0	0	1	15	1	1	1	3	18
CVU	TL - GW	TL - GW_8	0	0	15	6	5	3	0	1	29	1	1	1	3	32

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	TL - GW	TL - GW_16	0	0	5	2	0	2	0	1	9	1	1	1	3	12
CVU	TL - GW	TL - GW_21	0	0	15	6	5	3	0	1	29	1	2	3	6	35
CVU	TL - GW	TL - GW_23	0	0	5	9	0	3	0	1	17	8	4	3	15	32
CVU	TL - GW	TL - GW_24	0	0	15	6	5	3	0	1	29	1	2	3	6	35
CVU	TL - GW	TL - GW_25	0	0	15	6	5	3	0	1	29	1	2	3	6	35
CVU	TL - GW	TL - GW_26	0	0	15	6	5	3	0	1	29	1	2	3	6	35
CVU	TL - GW	TL - GW_27	0	0	5	2	0	2	0	1	9	8	5	4	17	26
CVU	TL - GW	TL - GW_28	0	0	5	2	3	2	0	1	12	8	5	4	17	29
CVU	TL - GW	TL - GW_29	0	0	15	6	5	3	0	1	29	1	2	3	6	35
CVU	TL - GW	TL - GW_30	0	0	5	6	3	0	0	1	14	1	3	3	7	21
CVU	TL - GW	TL - GW_31	0	0	15	6	5	3	0	1	29	1	2	3	6	35
CVU	TL - GW	TL - GW_32	0	0	5	6	0	0	0	1	11	1	3	3	7	18
CVU	TL - GW	TL - GW_33	0	0	15	6	5	3	0	1	29	1	2	3	6	35
CVU	TL - GW	TL - GW_34	0	0	5	0	3	0	0	1	8	8	4	4	16	24
CVU	TL - GW	TL - GW_35	0	0	5	0	3	0	0	1	8	8	4	4	16	24
CVU	TL - GW	TL - GW_36	0	0	5	6	1	4	0	1	16	1	3	3	7	23
CVU	TL - GW	TL - GW_37	0	0	5	6	1	4	0	1	16	1	3	3	7	23
CVU	TL - GW	TL - GW_38	0	0	5	6	1	4	0	1	16	1	3	3	7	23

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	TL - GW	TL - GW_39	0	0	5	6	1	4	0	1	16	1	3	3	7	23
CVU	TL - GW	TL - GW_40	0	0	5	2	0	2	0	1	9	8	5	4	17	26
CVU	TL - GW	TL - GW_41	0	0	5	6	1	4	0	1	16	8	4	4	16	32
CVU	TL - GW	TL - GW_42	0	0	5	2	0	2	0	1	9	1	1	3	5	14
CVU	TL - GW	TL - GW_44	0	0	15	6	3	5	0	1	29	2	3	3	8	37
CVU	TL - GW	TL - GW_45	0	0	5	2	0	2	0	1	9	8	4	3	15	24
CVU	TL - GW	TL - GW_46	0	0	5	2	0	2	0	1	9	1	1	1	3	12
CVU	TL - GW	TL - GW_47	0	0	5	2	0	2	0	1	9	8	4	3	15	24
CVU	TL - GW	TL - GW_48	0	0	15	6	3	5	0	1	29	2	3	3	8	37
CVU	TL - GW	TL - GW_49	0	0	15	6	3	5	0	1	29	1	4	3	8	37
CVU	TL - GW	TL - GW_50	0	0	15	6	3	5	0	1	29	2	3	3	8	37
CVU	TL - GW	TL - GW_51	0	0	15	6	3	5	0	1	29	2	3	3	8	37
CVU	TL - GW	TL - GW_52	0	0	15	6	3	5	0	1	29	2	3	3	8	37
CVU	TL - HDF	TL - HDF_1	2	0	5	0	0	2	0	1	9	8	4	4	16	25
CVU	TL - HDF	TL - HDF_2	2	0	5	0	0	2	0	1	9	8	4	4	16	25
CVU	TL - HDF	TL - HDF_3	2	0	5	0	0	2	0	1	9	8	4	4	16	25
CVU	TL - HDF	TL - HDF_4	2	0	5	0	0	2	0	1	9	8	4	4	16	25
CVU	TL - HDF	TL - HDF_5	0	0	5	0	0	2	0	1	7	8	4	4	16	23

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	TL - HDF	TL - HDF_6	2	0	5	0	0	2	0	1	9	8	4	4	16	25
CVU	TL - HDF	TL - HDF_7	0	0	5	0	0	2	0	1	7	8	4	4	16	23
CVU	TL - HDF	TL - HDF_8	2	0	5	0	0	2	0	1	9	8	4	4	16	25
CVU	TL - HDF	TL - HDF_9	2	0	5	0	0	2	0	1	9	8	4	4	16	25
CVU	TL - HDF	TL - HDF_10	0	0	5	0	0	2	0	1	7	8	4	4	16	23
CVU	TL - HDF	TL - HDF_11	0	0	5	0	0	2	0	1	7	8	4	4	16	23
CVU	TL - HDF	TL - HDF_12	0	0	5	0	0	2	0	1	7	8	4	4	16	23
CVU	TL - HDF	TL - HDF_13	0	0	5	0	0	2	0	1	7	8	4	4	16	23
CVU	TL - HDF	TL - HDF_14	2	0	5	0	0	2	0	1	9	8	4	4	16	25
CVU	TL - HDF	TL - HDF_15	2	0	5	0	0	2	0	1	9	8	4	4	16	25
CVU	TL - HDF	TL - HDF_16	0	0	5	0	0	2	0	1	7	8	4	4	16	23
CVU	TL - VGF	TL - VGF_2	0	0	5	2	1	0	0	1	8	8	5	4	17	25
CVU	TL - VGF	TL - VGF_3	0	0	5	2	1	0	0	1	8	8	5	4	17	25
CVU	TL - VGF	TL - VGF_4	0	0	15	6	5	5	2	1	33	2	3	3	8	41
CVU	TL - VGF	TL - VGF_5	0	0	15	6	5	5	2	1	33	2	3	3	8	41
CVU	TL - VGF	TL - VGF_6	0	0	5	9	1	0	0	1	15	8	5	4	17	32
CVU	TL - VGF	TL - VGF_7	0	0	5	6	0	0	0	1	11	8	5	4	17	28
CVU	TL - VGF	TL - VGF_8	0	0	5	9	1	0	0	1	15	8	5	4	17	32

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	TL - VGF	TL - VGF_9	0	0	5	2	1	0	0	1	8	8	5	4	17	25
CVU	TL - VGF	TL - VGF_10	0	0	5	6	0	0	0	1	11	8	5	4	17	28
CVU	TM	TM_4	na	na	10	2	6	4	na	1.36	29.92	8	4	4	16	46
CVU	VGF	VGF_6	5	4	15	9	3	5	0	1	41	8	4	3	15	56
CVU	VGF	VGF_8	4	3	15	6	5	0	0	1	33	2	3	3	8	41
CVU	VGF	VGF_11	10	5	15	0	10	5	5	1	50	2	5	3	10	60
CVU	VGF	VGF_12	9	4	15	4	5	3	3	1	43	1	5	3	9	52
CVU	VGF	VGF_13	9	4	15	4	5	3	3	1	43	1	5	3	9	52
CVU	VGF	VGF_15	0	5	15	6	0	5	0	1	31	1	2	3	6	37
CVU	VGF	VGF_17	3	3	15	6	5	0	0	1	32	2	3	3	8	40
CVU	VGF	VGF_18	0	0	15	6	5	3	0	1	29	1	1	3	5	34
CVU	VGF	VGF_19	0	0	15	6	5	3	0	1	29	1	1	3	5	34
CVU	VGF	VGF_20	10	5	15	6	6	5	0	1	47	1	2	3	6	53
CVU	VGF	VGF_21	10	5	15	6	6	5	0	1	47	1	2	3	6	53
CVU	VGF	VGF_22	9	4	15	4	5	3	3	1	43	1	5	3	9	52
CVU	VGF	VGF_23	4	5	15	6	10	5	2	1	47	2	3	3	8	55
CVU	VGF	VGF_24	10	5	5	0	6	4	0	1	30	2	5	3	10	40
CVU	VGF	VGF_25	9	4	20	9	10	5	5	1	62	8	5	4	17	79

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	VGF	VGF_26	4	5	15	6	10	5	2	1	47	2	3	3	8	55
CVU	VGF	VGF_27	0	0	0	0	0	0	0	1	0	8	5	4	17	17
CVU	VGF	VGF_28	4	5	15	6	10	5	2	1	47	2	3	3	8	55
CVU	VGF	VGF_29	4	5	15	6	10	5	2	1	47	2	3	3	8	55
CVU	VGF	VGF_30	0	0	15	6	5	5	2	1	33	2	3	3	8	41
CVU	VGF	VGF_31	9	4	15	4	5	3	3	1	43	1	5	3	9	52
CVU	VGF	VGF_32	3	2	15	9	5	5	2	1	41	8	5	4	17	58
CVU	VGF	VGF_33	10	5	15	0	6	5	3	1	44	8	7	4	19	63
CVU	VGF	VGF_34	8	5	15	9	10	5	2	1	54	4	3	3	10	64
CVU	VGF	VGF_35	4	5	15	13	3	5	3	1	48	8	5	4	17	65
CVU	VGF	VGF_36	0	0	5	0	5	5	5	1	20	4	3	3	10	30
CVU	VGF	VGF_38	0	0	15	6	5	5	2	1	33	2	3	3	8	41
CVU	VGF	VGF_39	9	4	15	4	5	3	3	1	43	1	5	3	9	52
CVU	VGF	VGF_40	6	5	15	9	10	5	2	1	52	8	5	4	17	69
CVU	VGF	VGF_41	9	4	15	6	3	5	2	1	44	1	3	3	7	51
CVU	VGF	VGF_42	9	4	15	6	3	5	2	1	44	1	3	3	7	51
CVU	VGF	VGF_43	0	3	15	6	1	5	0	1	30	1	3	3	7	37
CVU	VGF	VGF_44	6	5	15	9	10	5	2	1	52	4	3	3	10	62

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	VGF	VGF_45	3	4	15	0	5	5	2	1	34	8	4	4	16	50
CVU	VGF	VGF_46	4	5	15	13	3	5	3	1	48	8	5	4	17	65
CVU	VGF	VGF_47	6	5	15	9	10	5	2	1	52	8	5	4	17	69
CVU	VGF	VGF_48	3	4	15	0	5	5	2	1	34	8	4	4	16	50
CVU	VGF	VGF_49	3	4	15	0	5	5	2	1	34	8	4	4	16	50
CVU	VGF	VGF_50	0	3	5	6	1	5	0	1	20	1	3	3	7	27
CVU	VGF	VGF_51	4	5	15	13	3	5	3	1	48	8	5	4	17	65
CVU	VGF	VGF_52	5	4	15	6	3	5	2	1	40	8	5	4	17	57
CVU	VGF	VGF_53	3	4	15	0	5	5	2	1	34	8	4	4	16	50
CVU	VGF	VGF_54	6	5	5	2	3	5	0	1	26	8	5	4	17	43
CVU	VGF	VGF_55	8	5	5	0	1	5	0	1	24	8	7	4	19	43
CVU	VGF	VGF_56	8	5	5	0	1	5	0	1	24	8	7	4	19	43
CVU	VGF	VGF_57	4	5	15	13	3	5	3	1	48	8	5	4	17	65
CVU	VGF	VGF_58	10	5	15	0	6	5	3	1	44	8	7	4	19	63
CVU	VGF	VGF_59	3	4	15	0	5	5	2	1	34	8	4	4	16	50
CVU	VGF	VGF_60	10	5	15	0	6	5	3	1	44	8	7	4	19	63
CVU	VGF	VGF_61	9	4	5	6	3	5	2	1	34	8	5	4	17	51
CVU	VGF	VGF_62	9	4	5	6	3	5	2	1	34	8	5	4	17	51

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	VGF	VGF_63	8	5	15	4	5	3	5	1	45	8	5	4	17	62
CVU	VGF	VGF_64	4	5	15	13	10	3	2	1	52	8	5	4	17	69
CVU	VGF	VGF_65	10	5	15	0	6	5	3	1	44	8	7	4	19	63
CVU	VGF	VGF_66	9	4	5	7	0	5	3	1	33	8	7	4	19	52
CVU	VGF	VGF_67	6	5	5	2	3	5	0	1	26	8	5	4	17	43
CVU	VGF	VGF_68	5	4	15	6	3	5	2	1	40	8	5	4	17	57
CVU	VGF	VGF_69	10	5	15	0	6	5	3	1	44	8	7	4	19	63
CVU	VGF	VGF_70	8	5	15	4	5	3	5	1	45	8	5	4	17	62
CVU	VGF	VGF_71	4	5	15	6	3	5	3	1	41	8	7	4	19	60
CVU	VGF	VGF_72	8	5	15	4	5	3	5	1	45	8	5	4	17	62
CVU	VGF	VGF_73	6	5	5	0	0	3	2	1	21	8	5	4	17	38
CVU	VGF	VGF_74	5	4	15	6	3	5	2	1	40	8	5	4	17	57
CVU	VGF	VGF_75	6	5	5	0	0	3	2	1	21	8	5	4	17	38
CVU	VGF	VGF_76	6	5	5	2	3	5	0	1	26	8	5	4	17	43
CVU	VGF	VGF_77	6	5	5	0	0	3	2	1	21	8	5	4	17	38
CVU	VGF	VGF_78	9	4	5	6	3	5	2	1	34	8	5	4	17	51
CVU	VGF	VGF_79	5	4	15	6	3	5	2	1	40	8	5	4	17	57
CVU	VGF	VGF_80	8	5	15	4	5	3	5	1	45	8	5	4	17	62

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	VGF	VGF_81	6	5	5	2	3	5	0	1	26	8	5	4	17	43
CVU	VGF	VGF_82	6	5	5	2	3	5	0	1	26	8	5	4	17	43
CVU	VGF	VGF_83	5	4	15	6	3	5	2	1	40	8	5	4	17	57
CVU	VGF	VGF_84	8	5	15	4	5	3	5	1	45	8	5	4	17	62
CVU	VGF	VGF_85	8	5	5	2	3	5	0	1	28	8	5	4	17	45
CVU	VGF	VGF_86	5	4	15	6	3	5	2	1	40	8	5	4	17	57
CVU	VGF	VGF_87	8	5	10	2	5	5	2	1	37	2	3	3	8	45
CVU	VGF	VGF_88	5	4	15	6	3	5	2	1	40	8	5	4	17	57
CVU	VGF	VGF_89	5	4	5	0	5	3	3	1	25	8	7	4	19	44
CVU	VGF	VGF_90	5	4	15	6	3	5	2	1	40	8	5	4	17	57
CVU	VGF	VGF_91	5	4	15	6	3	5	2	1	40	8	5	4	17	57
CVU	VGF	VGF_92	5	4	15	6	3	5	2	1	40	8	5	4	17	57
CVU	VGF	VGF_93	5	4	15	6	3	5	2	1	40	8	5	4	17	57
CVU	VGF	VGF_94	8	5	10	2	5	5	2	1	37	2	3	3	8	45
CVU	VGF	VGF_95	10	5	15	0	6	5	3	1	44	8	7	4	19	63
CVU	VGF	VGF_96	6	5	15	9	10	5	2	1	52	8	5	4	17	69
CVU	VGF	VGF_97	8	5	15	2	6	5	2	1	43	2	3	3	8	51
CVU	VGF	VGF_98	10	5	15	6	0	2	2	1	40	8	5	4	17	57

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	VGF	VGF_99	10	5	15	6	0	2	2	1	40	8	5	4	17	57
CVU	VGF	VGF_100	10	5	15	6	0	2	2	1	40	8	5	4	17	57
CVU	VGF	VGF_101	10	5	15	6	0	2	2	1	40	8	5	4	17	57
CVU	VGF	VGF_102	7	4	20	7	10	5	5	1	58	8	7	4	19	77
CVU	VGF	VGF_103	5	4	15	6	3	5	2	1	40	8	5	4	17	57
CVU	VGF	VGF_105	8	5	10	2	5	5	2	1	37	2	3	3	8	45
CVU	VGF	VGF_106	5	4	15	6	3	5	2	1	40	8	5	4	17	57
CVU	VGF	VGF_107	5	4	15	4	5	3	3	1	39	8	4	4	16	55
CVU	VGF	VGF_109	6	5	15	9	10	5	2	1	52	4	3	3	10	62
CVU	VGF	VGF_110	6	5	15	9	10	5	2	1	52	8	5	4	17	69
CVU	VGF	VGF_111	5	4	5	0	5	3	3	1	25	8	7	4	19	44
CVU	VGF	VGF_112	9	4	20	7	10	5	5	1	60	8	7	4	19	79
CVU	VGF	VGF_113	5	4	15	4	5	3	3	1	39	8	4	4	16	55
CVU	VGF	VGF_114	0	5	20	2	6	5	2	1	40	8	5	4	17	57
CVU	VGF	VGF_116	5	4	15	6	3	5	2	1	40	8	5	4	17	57
CVU	VGF	VGF_117	7	4	20	7	10	5	5	1	58	8	7	4	19	77
CVU	VGF	VGF_120	0	0	0	0	0	0	0	1	0	8	4	4	16	16
CVU	VGF	VGF_121	6	5	15	9	10	5	2	1	52	8	5	4	17	69

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
CVU	VGF	VGF_122	5	4	5	0	5	3	3	1	25	8	7	4	19	44
CVU	VGF	VGF_123	8	5	20	2	6	5	2	1	48	8	5	4	17	65
CVU	VGF	VGF_124	9	4	15	6	5	5	2	1	46	1	3	3	7	53
VVP	AGW	AGW_1	na	na	15	9	10	5	na	1.36	53.04	2	3	3	8	61
VVP	AGW	AGW_2	na	na	15	9	10	5	na	1.36	53.04	2	3	3	8	61
VVP	AGW	AGW_3	na	na	15	9	10	5	na	1.36	53.04	2	3	3	8	61
VVP	AGW	AGW_4	na	na	15	9	10	5	na	1.36	53.04	2	3	3	8	61
VVP	AGW	AGW_5	na	na	15	9	10	5	na	1.36	53.04	2	3	3	8	61
VVP	AGW	AGW_6	na	na	15	9	10	5	na	1.36	53.04	2	3	3	8	61
VVP	AGW	AGW_7	na	na	15	9	10	5	na	1.36	53.04	2	3	3	8	61
VVP	AGW	AGW_8	na	na	15	9	10	5	na	1.36	53.04	2	3	3	8	61
VVP	AGW	AGW_9	na	na	15	7	10	0	na	1.36	43.52	4	5	3	12	56
VVP	AGW	AGW_10	na	na	15	7	10	0	na	1.36	43.52	4	5	3	12	56
VVP	AGW	AGW_11	na	na	15	7	6	0	na	1.36	38.08	2	2	1	5	43
VVP	AH	AH_1	na	na	5	9	5	5	na	1.36	32.64	1	2	3	6	39
VVP	AH	AH_3	na	na	15	11	10	0	na	1.36	48.96	2	4	3	9	58
VVP	AH	AH_4	na	na	5	9	5	5	na	1.36	32.64	8	5	3	16	49
VVP	AH	AH_5	na	na	5	4	5	5	na	1.36	25.84	1	2	3	6	32

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
VVP	AH	AH_6	na	na	15	11	10	5	na	1.36	55.76	2	4	3	9	65
VVP	AH	AH_7	na	na	15	11	10	0	na	1.36	48.96	2	4	3	9	58
VVP	AH	AH_8	na	na	15	11	10	0	na	1.36	48.96	2	4	3	9	58
VVP	AH	AH_9	na	na	15	11	10	0	na	1.36	48.96	2	4	3	9	58
VVP	AH	AH_10	na	na	15	11	10	0	na	1.36	48.96	1	1	3	5	54
VVP	AH	AH_11	na	na	15	4	5	5	na	1.36	39.44	1	3	3	7	46
VVP	AH	AH_12	na	na	5	9	5	5	na	1.36	32.64	8	5	3	16	49
VVP	AH	AH_13	na	na	15	11	10	5	na	1.36	55.76	1	2	3	6	62
VVP	AH	AH_14	na	na	15	4	5	5	na	1.36	39.44	1	3	3	7	46
VVP	AH	AH_15	na	na	15	4	5	5	na	1.36	39.44	1	3	3	7	46
VVP	AH	AH_16	na	na	5	4	5	5	na	1.36	25.84	1	2	3	6	32
VVP	AH	AH_17	na	na	5	4	5	5	na	1.36	25.84	1	2	3	6	32
VVP	AH	AH_22	na	na	5	4	5	5	na	1.36	25.84	1	2	3	6	32
VVP	AH	AH_23	na	na	5	4	5	5	na	1.36	25.84	1	2	3	6	32
VVP	AH	AH_25	na	na	15	4	5	5	na	1.36	39.44	1	3	3	7	46
VVP	AH	AH_27	na	na	5	4	5	5	na	1.36	25.84	8	4	4	16	42
VVP	AH	AH_28	na	na	5	4	5	5	na	1.36	25.84	8	4	4	16	42
VVP	AH	AH_29	na	na	5	4	5	5	na	1.36	25.84	8	4	4	16	42

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
VVP	AH	AH_30	na	na	5	4	5	5	na	1.36	25.84	8	4	4	16	42
VVP	AH	AH_32	na	na	5	4	5	5	na	1.36	25.84	1	3	3	7	33
VVP	AH	AH_33	na	na	5	4	5	5	na	1.36	25.84	8	4	4	16	42
VVP	AH	AH_36	na	na	5	9	5	5	na	1.36	32.64	1	1	1	3	36
VVP	AH	AH_40	na	na	5	4	5	5	na	1.36	25.84	8	4	4	16	42
VVP	AH	AH_48	na	na	5	4	5	5	na	1.36	25.84	8	4	4	16	42
VVP	AH	AH_49	na	na	5	4	5	5	na	1.36	25.84	8	4	4	16	42
VVP	AH	AH_59	na	na	5	4	5	5	na	1.36	25.84	8	4	4	16	42
VVP	AH	AH_98	na	na	5	9	5	5	na	1.36	32.64	1	1	1	3	36
VVP	AS	AS_1	na	na	20	15	10	5	na	1.36	68	2	4	3	9	77
VVP	AS	AS_2	na	na	15	9	10	5	na	1.36	53.04	2	3	3	8	61
VVP	AS	AS_3	na	na	15	9	10	5	na	1.36	53.04	2	3	3	8	61
VVP	AS	AS_4	na	na	15	9	10	5	na	1.36	53.04	2	3	3	8	61
VVP	ATHrW	ATHrW_1	10	5	15	0	10	5	5	1	50	2	4	3	9	59
VVP	ATHrW	ATHrW_4	10	5	15	0	10	5	5	1	50	2	4	3	9	59
VVP	CGW	CGW_1	0	3	5	0	3	0	0	1	11	8	5	3	16	27
VVP	CGW	CGW_2	0	3	10	0	3	0	0	1	16	8	5	3	16	32
VVP	GDF	GDF_9	6	3	15	0	5	5	2	1	36	2	4	3	9	45

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
VVP	GDF	GDF_10	6	3	15	0	5	5	2	1	36	2	4	3	9	45
VVP	GDF	GDF_11	6	3	15	0	5	5	2	1	36	2	4	3	9	45
VVP	GDF	GDF_54	6	3	15	0	5	5	2	1	36	8	4	4	16	52
VVP	GW	GW_1	10	5	5	2	3	5	2	1	32	1	2	1	4	36
VVP	GW	GW_2	5	5	5	2	3	5	2	1	27	1	1	1	3	30
VVP	GW	GW_3	10	5	15	4	5	5	0	1	44	1	2	3	6	50
VVP	GW	GW_4	10	5	15	4	5	5	0	1	44	1	2	3	6	50
VVP	GW	GW_5	10	5	0	0	0	0	0	1	15	1	2	3	6	21
VVP	GW	GW_6	0	0	5	0	0	2	0	1	7	8	5	3	16	23
VVP	GW	GW_7	0	0	5	0	0	2	0	1	7	8	5	3	16	23
VVP	GW	GW_8	10	5	15	4	5	5	0	1	44	1	3	3	7	51
VVP	GW	GW_9	10	5	0	0	0	0	0	1	15	1	2	3	6	21
VVP	GW	GW_11	10	5	0	0	0	0	0	1	15	1	2	3	6	21
VVP	GW	GW_12	10	5	15	4	5	5	0	1	44	1	2	3	6	50
VVP	GW	GW_13	8	5	15	4	5	5	0	1	42	1	3	3	7	49
VVP	GW	GW_16	0	0	5	6	0		0	1	11	1	3	3	7	18
VVP	GW	GW_18	10	5	15	4	5	5	0	1	44	8	4	3	15	59
VVP	GW	GW_19	4	5	15	4	5	5	0	1	38	1	3	3	7	45

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
VVP	GW	GW_20	10	5	15	4	5	5	0	1	44	1	3	1	5	49
VVP	GW	GW_21	10	5	15	4	5	5	0	1	44	1	3	1	5	49
VVP	GW	GW_22	10	5	5	2	0	2	0	1	24	1	3	1	5	29
VVP	GW	GW_24	10	5	15	4	5	5	0	1	44	1	3	1	5	49
VVP	GW	GW_26	10	5	15	4	5	5	0	1	44	1	3	3	7	51
VVP	GW	GW_27	4	5	15	4	5	5	0	1	38	8	5	4	17	55
VVP	GW	GW_28	10	5	15	4	5	5	0	1	44	8	5	4	17	61
VVP	GW	GW_30	10	5	5	0	1	5	0	1	26	1	3	3	7	33
VVP	GW	GW_31	6	5	15	11	5	3	3	1	48	8	5	4	17	65
VVP	GW	GW_39	4	5	15	6	3	4	0	1	37	1	3	3	7	44
VVP	GW	GW_46	10	5	5	0	1	5	0	1	26	4	5	3	12	38
VVP	GW	GW_50	10	5	5	0	1	5	0	1	26	4	5	3	12	38
VVP	GW	GW_53	7	4	15	4	5	3	3	1	41	2	4	3	9	50
VVP	GW	GW_69	8	5	5	0	1	5	4	1	28	1	3	3	7	35
VVP	GW	GW_70	4	5	15	2	0	4	0	1	30	1	3	3	7	37
VVP	GW	GW_75	0	0	0	0	0	0	0	1	0	8	4	4	16	16
VVP	GW	GW_100	9	2	5	7	0	5	4	1	32	1	3	3	7	39
VVP	GW	GW_104	8	5	0	0	0	0	0	1	13	1	3	3	7	20

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
VVP	GW	GW_110	8	5	15	9	5	5	0	1	47	8	4	4	16	63
VVP	GW	GW_111	8	5	5	9	5	3	4	1	39	8	4	4	16	55
VVP	GW	GW_112	8	5	5	9	5	3	4	1	39	8	4	4	16	55
VVP	GW	GW_115	8	5	5	9	5	3	4	1	39	8	4	4	16	55
VVP	GW	GW_116	8	5	5	9	5	3	4	1	39	8	4	4	16	55
VVP	MW	MW_1	na	na	na	na	na	na	na	0	0	8	5	3	16	16
VVP	MW	MW_2	na	na	na	na	na	na	na	0	0	8	5	3	16	16
VVP	MW	MW_3	na	na	na	na	na	na	na	0	0	8	5	3	16	16
VVP	MW	MW_4	na	na	na	na	na	na	na	0	0	8	5	3	16	16
VVP	MW	MW_5	na	na	na	na	na	na	na	0	0	2	4	3	9	9
VVP	MW	MW_6	na	na	na	na	na	na	na	0	0	8	5	3	16	16
VVP	MW	MW_7	na	na	na	na	na	na	na	0	0	2	4	3	9	9
VVP	MW	MW_8	na	na	na	na	na	na	na	0	0	2	4	3	9	9
VVP	MW	MW_10	na	na	na	na	na	na	na	0	0	2	4	3	9	9
VVP	MW	MW_11	na	na	na	na	na	na	na	0	0	2	4	3	9	9
VVP	MW	MW_12	na	na	na	na	na	na	na	0	0	2	4	3	9	9
VVP	MW	MW_13	na	na	na	na	na	na	na	0	0	2	4	3	9	9
VVP	MW	MW_14	na	na	na	na	na	na	na	0	0	2	4	3	9	9

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
VVP	MW	MW_15	na	na	na	na	na	na	na	0	0	2	4	3	9	9
VVP	MW	MW_16	na	na	na	na	na	na	na	0	0	8	5	3	16	16
VVP	MW	MW_17	na	na	na	na	na	na	na	0	0	8	5	3	16	16
VVP	MW	MW_18	na	na	na	na	na	na	na	0	0	2	5	1	8	8
VVP	MW	MW_19	na	na	na	na	na	na	na	0	0	8	4	4	16	16
VVP	MW	MW_20	na	na	na	na	na	na	na	0	0	8	4	4	16	16
VVP	MW	MW_21	na	na	na	na	na	na	na	0	0	8	4	4	16	16
VVP	MW	MW_23	na	na	na	na	na	na	na	0	0	8	4	4	16	16
VVP	MW	MW_25	na	na	na	na	na	na	na	0	0	8	4	4	16	16
VVP	MW	MW_27	na	na	na	na	na	na	na	0	0	8	4	4	16	16
VVP	MW	MW_29	na	na	na	na	na	na	na	0	0	8	4	4	16	16
VVP	MW	MW_31	na	na	na	na	na	na	na	0	0	2	3	3	8	8
VVP	MW	MW_32	na	na	na	na	na	na	na	0	0	2	3	3	8	8
VVP	MW	MW_33	na	na	na	na	na	na	na	0	0	2	3	3	8	8
VVP	MW	MW_34	na	na	na	na	na	na	na	0	0	2	3	3	8	8
VVP	MW	MW_35	na	na	na	na	na	na	na	0	0	2	3	3	8	8
VVP	MW	MW_36	na	na	na	na	na	na	na	0	0	2	3	3	8	8
VVP	MW	MW_37	na	na	na	na	na	na	na	0	0	2	3	3	8	8

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
VVP	MW	MW_40	na	na	na	na	na	na	na	0	0	8	4	4	16	16
VVP	MW	MW_41	na	na	na	na	na	na	na	0	0	4	5	3	12	12
VVP	MW	MW_42	na	na	na	na	na	na	na	0	0	8	4	4	16	16
VVP	MW	MW_44	na	na	na	na	na	na	na	0	0	8	4	4	16	16
VVP	MW	MW_50	na	na	na	na	na	na	na	0	0	8	4	4	16	16
VVP	MW	MW_62	na	na	na	na	na	na	na	0	0	8	5	3	16	16
VVP	MW	MW_88	na	na	na	na	na	na	na	0	0	8	4	4	16	16
VVP	MW	MW_99	na	na	na	na	na	na	na	0	0	8	4	4	16	16
VVP	MW	MW_109	na	na	na	na	na	na	na	0	0	8	4	4	16	16
VVP	MW	MW_110	na	na	na	na	na	na	na	0	0	8	4	4	16	16
VVP	MW	MW_111	na	na	na	na	na	na	na	0	0	8	4	4	16	16
VVP	MW	MW_112	na	na	na	na	na	na	na	0	0	8	4	4	16	16
VVP	MW	MW_113	na	na	na	na	na	na	na	0	0	8	5	3	16	16
VVP	MW	MW_116	na	na	na	na	na	na	na	0	0	8	5	3	16	16
VVP	MW	MW_117	na	na	na	na	na	na	na	0	0	8	5	3	16	16
VVP	MW	MW_118	na	na	na	na	na	na	na	0	0	8	5	3	16	16
VVP	MW	MW_119	na	na	na	na	na	na	na	0	0	8	5	3	16	16
VVP	MW	MW_120	na	na	na	na	na	na	na	0	0	8	5	3	16	16

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
VVP	PGW	PGW_1	0	5	5	0	6	3	0	1	19	1	3	3	7	26
VVP	PGW	PGW_2	0	5	5	0	6	3	0	1	19	1	3	3	7	26
VVP	PGW	PGW_3	0	5	5	0	6	3	0	1	19	1	3	3	7	26
VVP	PGW/AH	PGW/AH_1	na	na	15	9	10	5	na	1.36	53.04	2	3	3	8	61
VVP	PGW/AH	PGW/AH_2	na	na	15	9	10	5	na	1.36	53.04	2	3	3	8	61
VVP	PGW/AH	PGW/AH_3	na	na	15	9	10	5	na	1.36	53.04	2	3	3	8	61
VVP	PGW/AH	PGW/AH_4	na	na	15	9	10	5	na	1.36	53.04	2	3	3	8	61
VVP	PGW/AH	PGW/AH_5	na	na	15	9	10	5	na	1.36	53.04	2	3	3	8	61
VVP	PGW/AH	PGW/AH_6	na	na	15	9	10	5	na	1.36	53.04	2	3	3	8	61
VVP	PGW/AH	PGW/AH_7	na	na	15	9	10	5	na	1.36	53.04	2	3	3	8	61
VVP	PGW/AH	PGW/AH_8	na	na	15	9	10	5	na	1.36	53.04	2	3	3	8	61
VVP	PGW/AH	PGW/AH_9	na	na	15	9	10	5	na	1.36	53.04	2	3	3	8	61
VVP	PGW/AH	PGW/AH_10	na	na	15	9	10	5	na	1.36	53.04	2	3	3	8	61
VVP	PGW/BH	PGW/BH_1	na	na	10	0	6	4	na	1.36	27.2	4	5	3	12	39
VVP	PGW/BH	PGW/BH_2	na	na	10	0	6	4	na	1.36	27.2	4	5	3	12	39
VVP	PGWe	PGWe_1	na	na	5	0	0	0	na	1.36	6.8	1	2	1	4	11
VVP	PGWe	PGWe_2	na	na	15	11	10	0	na	1.36	48.96	8	5	3	16	65
VVP	PGWe	PGWe_3	na	na	15	7	6	0	na	1.36	38.08	1	3	3	7	45

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
VVP	PGWe	PGWe_4	na	na	15	7	6	0	na	1.36	38.08	8	5	3	16	54
VVP	PGWe	PGWe_5	na	na	15	7	6	0	na	1.36	38.08	2	4	3	9	47
VVP	PGWe	PGWe_6	na	na	15	7	6	0	na	1.36	38.08	1	3	3	7	45
VVP	PGWe	PGWe_7	na	na	15	7	6	0	na	1.36	38.08	1	3	3	7	45
VVP	PGWe	PGWe_8	na	na	15	7	6	0	na	1.36	38.08	1	2	3	6	44
VVP	PGWe	PGWe_10	na	na	15	7	6	0	na	1.36	38.08	2	4	3	9	47
VVP	PGWe	PGWe_12	na	na	15	7	6	0	na	1.36	38.08	1	3	3	7	45
VVP	PGWe	PGWe_13	na	na	15	11	10	0	na	1.36	48.96	1	3	3	0	49
VVP	PGWe	PGWe_14	na	na	15	7	6	0	na	1.36	38.08	2	4	3	9	47
VVP	PGWe	PGWe_15	na	na	15	7	6	0	na	1.36	38.08	2	4	3	9	47
VVP	PGWe	PGWe_16	na	na	15	7	6	0	na	1.36	38.08	1	3	3	0	38
VVP	PGWe	PGWe_17	na	na	15	7	6	0	na	1.36	38.08	2	4	3	9	47
VVP	PGWe	PGWe_18	na	na	15	11	10	0	na	1.36	48.96	8	5	3	16	65
VVP	PGWe	PGWe_19	na	na	15	7	6	0	na	1.36	38.08	8	5	3	16	54
VVP	PGWe	PGWe_20	na	na	15	7	6	0	na	1.36	38.08	8	5	3	16	54
VVP	PGWe	PGWe_21	na	na	15	7	6	0	na	1.36	38.08	1	3	3	0	38
VVP	PGWe	PGWe_46	na	na	15	4	6	0	na	1.36	34	8	5	3	16	50
VVP	PSW	PSW_1	na	na	15	4	6	0	na	1.36	34	8	5	3	16	50

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
VVP	PSW	PSW_2	na	na	10	6	5	5	na	1.36	35.36	8	4	4	16	51
VVP	PSW	PSW_3	na	na	5	4	5	5	na	1.36	25.84	8	4	4	16	42
VVP	PSW	PSW_4	na	na	10	0	5	0	na	1.36	20.4	8	5	4	17	37
VVP	PSW	PSW_5	na	na	15	4	6	0	na	1.36	34	8	5	3	16	50
VVP	PSW	PSW_12	na	na	5	7	5	5	na	1.36	29.92	8	4	4	16	46
VVP	PSW	PSW_25	na	na	5	4	5	5	na	1.36	25.84	8	4	4	16	42
VVP	PSW	PSW_26	na	na	10	6	5	5	na	1.36	35.36	8	4	4	16	51
VVP	PSW	PSW_28	na	na	5	7	5	5	na	1.36	29.92	8	4	4	16	46
VVP	PSW	PSW_29	na	na	5	4	5	5	na	1.36	25.84	8	4	4	16	42
VVP	PSW	PSW_30	na	na	5	7	5	5	na	1.36	29.92	8	4	4	16	46
VVP	PSW	PSW_31	na	na	5	7	5	5	na	1.36	29.92	8	4	4	16	46
VVP	PSW	PSW_32	na	na	5	7	5	5	na	1.36	29.92	8	4	4	16	46
VVP	PSW	PSW_33	na	na	5	4	5	5	na	1.36	25.84	8	4	4	16	42
VVP	PSW	PSW_34	na	na	5	7	5	5	na	1.36	29.92	8	4	4	16	46
VVP	PSW	PSW_35	na	na	5	4	5	5	na	1.36	25.84	8	4	4	16	42
VVP	PSW	PSW_39	na	na	5	4	5	5	na	1.36	25.84	8	4	4	16	42
VVP	TL - GW	TL - GW_1	0	0	5	2	0	2	0	1	9	1	3	3	7	16
VVP	TL - GW	TL - GW_2	0	0	5	6	0	2	0	1	13	1	3	3	7	20

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
VVP	TL - GW	TL - GW_3	0	0	5	2	0	2	0	1	9	1	2	3	6	15
VVP	TL - GW	TL - GW_4	0	0	5	2	0	2	0	1	9	1	3	3	7	16
VVP	TL - GW	TL - GW_5	0	0	5	2	0	2	0	1	9	1	2	3	6	15
VVP	TL - GW	TL - GW_7	0	0	5	2	0	2	0	1	9	1	3	3	7	16
VVP	TL - GW	TL - GW_9	0	0	5	2	0	2	0	1	9	1	3	1	5	14
VVP	TL - GW	TL - GW_10	0	0	5	2	0	2	0	1	9	1	3	1	5	14
VVP	TL - GW	TL - GW_11	0	0	5	9	0	0	0	1	14	8	4	3	15	29
VVP	TL - GW	TL - GW_12	0	0	5	2	0	2	0	1	9	1	3	1	5	14
VVP	TL - GW	TL - GW_13	0	0	5	9	0	0	0	1	14	8	4	3	15	29
VVP	TL - GW	TL - GW_14	0	0	5	2	0	2	0	1	9	1	3	1	5	14
VVP	TL - GW	TL - GW_15	0	0	15	6	0	2	0	1	23	8	5	4	17	40
VVP	TL - GW	TL - GW_17	0	0	5	2	0	2	0	1	9	1	1	1	3	12
VVP	TL - GW	TL - GW_18	0	0	5	6	0	0	0	1	11	8	4	4	16	27
VVP	TL - GW	TL - GW_19	0	0	5	6	0	0	0	1	11	8	4	4	16	27
VVP	TL - GW	TL - GW_20	0	0	5	6	0	0	0	1	11	8	4	4	16	27
VVP	TL - GW	TL - GW_22	0	0	15	6	0	2	0	1	23	8	5	4	17	40
VVP	TL - GW	TL - GW_43	0	0	5	6	0	0	0	1	11	8	4	4	16	27
VVP	TL - HDF	TL - HDF_1	0	0	15	6	0	2	0	1	23	8	5	4	17	40

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
VVP	TM	TM_1	na	na	15	7	6	0	na	1.36	38.08	4	5	3	12	50
VVP	TM	TM_2	na	na	15	7	6	0	na	1.36	38.08	4	5	3	12	50
VVP	TM	TM_3	na	na	10	2	6	4	na	1.36	29.92	8	4	4	16	46
VVP	VGF	VGF_1	3	5	15	4	5	5	0	1	37	8	5	3	16	53
VVP	VGF	VGF_2	0	5	15	4	5	5	0	1	34	1	4	3	8	42
VVP	VGF	VGF_3	3	5	15	4	5	5	0	1	37	8	5	3	16	53
VVP	VGF	VGF_4	0	5	15	4	5	5	0	1	34	8	5	4	17	51
VVP	VGF	VGF_5	0	5	15	4	5	5	0	1	34	1	4	3	8	42
VVP	VGF	VGF_7	6	5	15	11	5	3	3	1	48	8	5	4	17	65
VVP	VGF	VGF_9	7	4	15	4	5	3	3	1	41	2	4	3	9	50
VVP	VGF	VGF_10	7	4	15	4	5	3	3	1	41	2	4	3	9	50
VVP	VGF	VGF_14	8	5	0	0	0	3	4	1	20	1	1	3	5	25
VVP	VGF	VGF_16	7	4	15	4	5	3	3	1	41	2	4	3	9	50
VVP	VGF	VGF_37	8	5	5	9	5	3	4	1	39	8	4	4	16	55
VVP	VGF	VGF_104	8	5	15	9	5	5	0	1	47	8	4	4	16	63
VVP	VGF	VGF_108	8	5	5	9	5	3	4	1	39	8	4	4	16	55
VVP	VGF	VGF_115	5	4	15	4	5	3	3	1	39	8	4	4	16	55

HABITAT ZONE			SITE CONDITION									LANDSCAPE VALUE				FINAL SCORE
Bio-region	EVC Name	Habitat zone	LOTs	Canopy Cover	Understorey	Lack of Weeds	Recruitment	Organic Litter	Logs	EVC Standardiser	Site Score	Patch Size	Neighbour-hood	Distance to Core	Landscape context	
VVP	VGF	VGF_118	8	5	5	9	5	3	4	1	39	8	4	4	16	55
VVP	VGF	VGF_119	5	4	15	4	5	3	3	1	39	8	4	4	16	55

Codes used in table above

CODE	DESCRIPTION
Ecological Vegetation Class (EVC)	
AGW	Aquatic Grassy Wetland
AH	Aquatic Herbland
AS	Aquatic Sedgeland
ATHrW	Alluvial Terraces Herb-rich Woodland
CGW	Creekline Grassy Woodland
GDF	Grassy Dry Forest
GW	Grassy Woodland
HDF	Heathy Dry Forest
HDF/GDF	Heathy Dry Forest/Grassy Dry Forest Complex
PGW	Plains Grassy Woodland
PGW/AH	Plains Grassy Wetland/Aquatic Herbland Complex
PGW/BH	Plains Grassy Wetland/Brackish Herbland Complex
PGWe	Plains Grassy Wetland
PSW	Plains Sedgy Wetland
TL - ATHrW	'Treeless' Alluvial Terraces Herb-rich Woodland
TL - GDF	'Treeless' Grassy Dry Forest
TL - GW	'Treeless' Grassy Woodland
TL - HDF	'Treeless' Heathy Dry Forest
TL - VGF	'Treeless' Valley Grassy Forest
TM	Tall Marsh
VGF	Valley Grassy Forest
CW*	Current Wetland DELWP layer
Bioregions	
CVU	Central Victorian Uplands
VVP	Victorian Volcanic Plain
Other	
EVC	Ecological Vegetation Class
LOTs	Large Old Trees

APPENDIX E

TREE DATA

E1 TREE DATA

See List of Codes at the end of the table.

List of scattered tress and large trees in patches (See Appendix K for maps showing locations of tree)

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1	Dead		80	251.33	Large	ST	HBT	Estimated in field	Handheld GPS
2	Dead		60	188.50	Large	RP		Estimated in field	Handheld GPS
3	Dead		70	219.91	Large	ST		Estimated in field	Handheld GPS
4	Dead		120	376.99	Large	ST		Estimated in field	Handheld GPS
5	Dead		71	223.05	Large	RP	HBT	Measured in field	Handheld GPS
6	Dead		79	248.19	Large	RP	HBT	Measured in field	Handheld GPS
7	Dead		63	197.92	Large	RP	HBT	Measured in field	Handheld GPS
8	Dead		61	191.64	Large	RP	HBT	Measured in field	Handheld GPS
9	Dead		66	207.35	Large	RP	HBT	Measured in field	Handheld GPS
10	Dead		68	213.63	Large	RP	HBT	Measured in field	Handheld GPS
11	Dead		105	329.87	Large	RP	HBT	Measured in field	Handheld GPS
12	Dead		71	223.05	Large	RP	HBT	Measured in field	Handheld GPS
13	Dead		79	248.19	Large	RP	HBT	Measured in field	Handheld GPS
14	Dead		102	320.44	Large	RP	HBT	Measured in field	Handheld GPS
15	Dead		73	229.34	Large	RP	HBT	Measured in field	Handheld GPS
16	Dead		78	245.04	Large	RP	HBT	Measured in field	Handheld GPS
17	Dead		140	439.82	Large	RP	HBT	Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
18	Dead		89	279.60	Large	RP	HBT	Measured in field	Handheld GPS
19	Dead		79	248.19	Large	RP	HBT	Measured in field	Handheld GPS
20	Dead		70	219.91	Large	RP	HBT	Measured in field	Handheld GPS
21	Dead		65	204.20	Large	RP	HBT	Measured in field	Handheld GPS
22	Dead		54	169.65	Small	ST	HBT	Measured in field	Handheld GPS
23	Dead		129	405.27	Large	RP	HBT	Measured in field	Handheld GPS
24	Dead		83	260.75	Large	RP	HBT	Measured in field	Handheld GPS
25	Dead		77	241.90	Large	RP		Measured in field	Handheld GPS
26	Dead		73	229.34	Large	RP		Measured in field	Handheld GPS
27	Dead		73	229.34	Large	RP		Measured in field	Handheld GPS
28	Dead		41	128.81	Small	RP		Measured in field	Handheld GPS
29	Dead		33	103.67	Small	RP		Measured in field	Handheld GPS
30	Dead		27	84.82	Small	RP		Measured in field	Handheld GPS
31	Dead		20	62.83	Small	RP		Measured in field	Handheld GPS
32	Dead		31	97.39	Small	RP		Measured in field	Handheld GPS
33	Dead		130	408.41	Large	RP		Measured in field	Handheld GPS
34	Dead		65	204.20	Large	RP		Measured in field	Handheld GPS
35	Dead		83	260.75	Large	RP		Measured in field	Handheld GPS
36	Dead		50	157.08	Large	RP		Measured in field	Handheld GPS
37	Dead		82	257.61	Large	RP		Measured in field	Handheld GPS
38	Dead		82	257.61	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
39	Dead		84	263.89	Large	RP		Measured in field	Handheld GPS
40	Dead		105	329.87	Large	RP		Measured in field	Handheld GPS
41	Dead		71	223.05	Large	RP		Measured in field	Handheld GPS
42	Dead		95	298.45	Large	RP		Measured in field	Handheld GPS
43	Dead		78	245.04	Large	RP		Measured in field	Handheld GPS
44	Dead		81	254.47	Large	RP		Measured in field	Handheld GPS
45	Dead		66	207.35	Large	RP		Measured in field	Handheld GPS
46	Dead		66	207.35	Large	RP		Measured in field	Handheld GPS
47	Dead		77	241.90	Large	RP		Measured in field	Handheld GPS
48	Dead		70	219.91	Large	RP		Measured in field	Handheld GPS
49	Dead		70	219.91	Large	RP		Measured in field	Handheld GPS
50	Dead		99	311.02	Large	RP		Measured in field	Handheld GPS
51	Dead		43	135.09	Small	ST		Measured in field	Handheld GPS
52	Dead		67	210.49	Small	ST		Measured in field	Handheld GPS
53	Dead		39	122.52	Small	ST		Measured in field	Handheld GPS
54	Dead		32	100.53	Small	ST		Measured in field	Handheld GPS
55	Dead		102	320.44	Large	ST		Measured in field	Handheld GPS
56	Dead		136	427.26	Large	ST		Measured in field	Handheld GPS
57	Dead		27	84.82	Small	ST		Measured in field	Handheld GPS
58	Dead		37	116.24	Small	ST		Measured in field	Handheld GPS
59	Dead		117	367.57	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
60	Dead		78	245.04	Large	RP		Measured in field	Handheld GPS
61	Dead		68	213.63	Large	RP		Measured in field	Handheld GPS
62	Dead		119	373.85	Large	RP	HBT	Measured in field	Handheld GPS
63	Dead		76	238.76	Large	RP	HBT	Measured in field	Handheld GPS
64	Dead		102	320.44	Large	ST	HBT	Measured in field	Handheld GPS
65	Dead		65	204.20	Small	ST	HBT	Measured in field	Handheld GPS
66	Dead		96	301.59	Large	RP		Measured in field	Handheld GPS
67	Dead		40	125.66	Small	ST		Measured in field	Handheld GPS
68	Dead		117	367.57	Large	RP		Measured in field	Handheld GPS
69	Dead		120	376.99	Large	RP	HBT	Measured in field	Handheld GPS
70	Dead		121	380.13	Large	RP	HBT	Measured in field	Handheld GPS
71	Dead		102	320.44	Large	RP		Measured in field	Handheld GPS
72	Dead		75	235.62	Large	RP		Measured in field	Handheld GPS
73	Dead		95	298.45	Large	RP		Measured in field	Handheld GPS
74	Dead		77	241.90	Large	RP		Measured in field	Handheld GPS
75	Dead		83	260.75	Large	RP		Measured in field	Handheld GPS
76	Dead		102	320.44	Large	RP		Measured in field	Handheld GPS
77	Dead		74	232.48	Large	RP		Measured in field	Handheld GPS
78	Dead		69	216.77	Small	RP		Measured in field	Handheld GPS
79	Dead		65	204.20	Small	RP		Measured in field	Handheld GPS
80	Dead		117	367.57	Large	RP	HBT	Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
81	Dead		70	219.91	Large	RP	HBT	Measured in field	Handheld GPS
82	Dead		114	358.14	Large	RP	HBT	Measured in field	Handheld GPS
83	Dead		71	223.05	Large	RP		Measured in field	Handheld GPS
84	Dead		75	235.62	Large	ST		Measured in field	Handheld GPS
85	*Eucalyptus aromaphloia*	Scentbark	110	345.58	Large	RP		Estimated in field	Handheld GPS
86	*Eucalyptus aromaphloia*	Scentbark	114	358.14	Large	ST		Measured in field	Handheld GPS
87	*Eucalyptus aromaphloia*	Scentbark	74	232.48	Large	RP		Measured in field	Handheld GPS
88	*Eucalyptus aromaphloia*	Scentbark	98	307.88	Large	RP		Measured in field	Handheld GPS
89	*Eucalyptus aromaphloia*	Scentbark	96	301.59	Large	RP		Measured in field	Handheld GPS
90	*Eucalyptus aromaphloia*	Scentbark	103	323.58	Large	RP		Measured in field	Handheld GPS
91	*Eucalyptus aromaphloia*	Scentbark	67	210.49	Small	RP		Measured in field	Handheld GPS
92	*Eucalyptus aromaphloia*	Scentbark	77	241.90	Large	RP		Measured in field	Handheld GPS
93	*Eucalyptus aromaphloia*	Scentbark	99	311.02	Large	RP		Measured in field	Handheld GPS
94	*Eucalyptus aromaphloia*	Scentbark	72	226.19	Large	RP		Measured in field	Handheld GPS
95	*Eucalyptus aromaphloia*	Scentbark	84	263.89	Large	RP		Measured in field	Handheld GPS
96	*Eucalyptus aromaphloia*	Scentbark	90	282.74	Large	RP		Measured in field	Handheld GPS
97	*Eucalyptus aromaphloia*	Scentbark	80	251.33	Large	RP		Measured in field	Handheld GPS
98	*Eucalyptus aromaphloia*	Scentbark	120	376.99	Large	RP		Measured in field	Handheld GPS
99	*Eucalyptus aromaphloia*	Scentbark	77	241.90	Large	RP		Measured in field	Handheld GPS
100	*Eucalyptus aromaphloia*	Scentbark	74	232.48	Large	RP		Measured in field	Handheld GPS
101	*Eucalyptus aromaphloia*	Scentbark	73	229.34	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
102	*Eucalyptus aromaphloia*	Scentbark	89	279.60	Large	RP		Measured in field	Handheld GPS
103	*Eucalyptus aromaphloia*	Scentbark	107	336.15	Large	RP		Measured in field	Handheld GPS
104	*Eucalyptus aromaphloia*	Scentbark	80	251.33	Large	RP		Measured in field	Handheld GPS
105	*Eucalyptus aromaphloia*	Scentbark	89	279.60	Large	RP		Measured in field	Handheld GPS
106	*Eucalyptus aromaphloia*	Scentbark	73	229.34	Large	RP		Measured in field	Handheld GPS
107	*Eucalyptus aromaphloia*	Scentbark	76	238.76	Large	RP		Measured in field	Handheld GPS
108	*Eucalyptus aromaphloia*	Scentbark	71	223.05	Large	RP		Measured in field	Handheld GPS
109	*Eucalyptus aromaphloia*	Scentbark	88	276.46	Large	RP		Measured in field	Handheld GPS
110	*Eucalyptus aromaphloia*	Scentbark	112	351.86	Large	RP		Measured in field	Handheld GPS
111	*Eucalyptus aromaphloia*	Scentbark	141	442.96	Large	RP		Measured in field	Handheld GPS
112	*Eucalyptus aromaphloia*	Scentbark	124	389.56	Large	RP		Measured in field	Handheld GPS
113	*Eucalyptus aromaphloia*	Scentbark	94	295.31	Large	RP		Measured in field	Handheld GPS
114	*Eucalyptus aromaphloia*	Scentbark	73	229.34	Large	RP		Measured in field	Handheld GPS
115	*Eucalyptus aromaphloia*	Scentbark	77	241.90	Large	RP		Measured in field	Handheld GPS
116	*Eucalyptus aromaphloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
117	*Eucalyptus aromaphloia*	Scentbark	94	295.31	Large	RP		Measured in field	Handheld GPS
118	*Eucalyptus aromaphloia*	Scentbark	77	241.90	Large	RP		Measured in field	Handheld GPS
119	*Eucalyptus aromaphloia*	Scentbark	80	251.33	Large	RP		Measured in field	Handheld GPS
120	*Eucalyptus aromaphloia*	Scentbark	82	257.61	Large	RP		Measured in field	Handheld GPS
121	*Eucalyptus aromaphloia*	Scentbark	80	251.33	Large	RP		Measured in field	Handheld GPS
122	*Eucalyptus aromaphloia*	Scentbark	102	320.44	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
123	*Eucalyptus aromaphloia*	Scentbark	107	336.15	Large	ST		Measured in field	Handheld GPS
124	*Eucalyptus aromaphloia*	Scentbark	45	141.37	Small	ST		Measured in field	Handheld GPS
125	*Eucalyptus aromaphloia*	Scentbark	78	245.04	Large	ST		Measured in field	Handheld GPS
126	*Eucalyptus aromaphloia*	Scentbark	141	442.96	Large	RP		Measured in field	Handheld GPS
127	*Eucalyptus aromaphloia*	Scentbark	82	257.61	Large	RP		Measured in field	Handheld GPS
128	*Eucalyptus aromaphloia*	Scentbark	80	251.33	Large	RP		Measured in field	Handheld GPS
129	*Eucalyptus aromaphloia*	Scentbark	123	386.42	Large	RP		Measured in field	Handheld GPS
130	*Eucalyptus aromaphloia*	Scentbark	82	257.61	Large	ST		Measured in field	Handheld GPS
131	*Eucalyptus aromaphloia*	Scentbark	187	587.48	Large	RP		Measured in field	Handheld GPS
132	*Eucalyptus aromaphloia*	Scentbark	89	279.60	Large	RP		Measured in field	Handheld GPS
133	*Eucalyptus aromaphloia*	Scentbark	90	282.74	Large	RP		Measured in field	Handheld GPS
134	*Eucalyptus aromaphloia*	Scentbark	89	279.60	Large	RP		Measured in field	Handheld GPS
135	*Eucalyptus aromaphloia*	Scentbark	147	461.81	Large	RP		Measured in field	Handheld GPS
136	*Eucalyptus aromaphloia*	Scentbark	105	329.87	Large	RP		Measured in field	Handheld GPS
137	*Eucalyptus aromaphloia*	Scentbark	122	383.27	Large	RP		Measured in field	Handheld GPS
138	*Eucalyptus aromaphloia*	Scentbark	75	235.62	Large	RP		Measured in field	Handheld GPS
139	*Eucalyptus aromaphloia*	Scentbark	97	304.73	Large	RP		Measured in field	Handheld GPS
140	*Eucalyptus aromaphloia*	Scentbark	91	285.88	Large	RP		Measured in field	Handheld GPS
141	*Eucalyptus aromaphloia*	Scentbark	89	279.60	Large	RP		Measured in field	Handheld GPS
142	*Eucalyptus aromaphloia*	Scentbark	112	351.86	Large	RP		Measured in field	Handheld GPS
143	*Eucalyptus aromaphloia*	Scentbark	89	279.60	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
144	*Eucalyptus aromaphloia*	Scentbark	129	405.27	Large	RP		Measured in field	Handheld GPS
145	*Eucalyptus aromaphloia*	Scentbark	88	276.46	Large	RP		Measured in field	Handheld GPS
146	*Eucalyptus aromaphloia*	Scentbark	108	339.29	Large	RP	HBT	Measured in field	Handheld GPS
147	*Eucalyptus aromaphloia*	Scentbark	84	263.89	Large	RP	HBT	Measured in field	Handheld GPS
148	*Eucalyptus aromaphloia*	Scentbark	107	336.15	Large	RP	HBT	Measured in field	Handheld GPS
149	*Eucalyptus aromaphloia*	Scentbark	106	333.01	Large	RP	HBT	Measured in field	Handheld GPS
150	*Eucalyptus aromaphloia*	Scentbark	126	395.84	Large	RP	HBT	Measured in field	Handheld GPS
151	*Eucalyptus aromaphloia*	Scentbark	96	301.59	Large	RP	HBT	Measured in field	Handheld GPS
152	*Eucalyptus aromaphloia*	Scentbark	126	395.84	Large	RP	HBT	Measured in field	Handheld GPS
153	*Eucalyptus aromaphloia*	Scentbark	76	238.76	Large	RP	HBT	Measured in field	Handheld GPS
154	*Eucalyptus aromaphloia*	Scentbark	122	383.27	Large	RP	HBT	Measured in field	Handheld GPS
155	*Eucalyptus aromaphloia*	Scentbark	104	326.73	Large	RP	HBT	Measured in field	Handheld GPS
156	*Eucalyptus aromaphloia*	Scentbark	102	320.44	Large	RP	HBT	Measured in field	Handheld GPS
157	*Eucalyptus aromaphloia*	Scentbark	151	474.38	Large	RP	HBT	Measured in field	Handheld GPS
158	*Eucalyptus aromaphloia*	Scentbark	82	257.61	Large	RP	HBT	Measured in field	Handheld GPS
159	*Eucalyptus aromaphloia*	Scentbark	90	282.74	Large	RP	HBT	Measured in field	Handheld GPS
160	*Eucalyptus aromaphloia*	Scentbark	77	241.90	Large	RP	HBT	Measured in field	Handheld GPS
161	*Eucalyptus aromaphloia*	Scentbark	72	226.19	Large	RP	HBT	Measured in field	Handheld GPS
162	*Eucalyptus aromaphloia*	Scentbark	96	301.59	Large	RP	HBT	Measured in field	Handheld GPS
163	*Eucalyptus aromaphloia*	Scentbark	172	540.35	Large	RP	HBT	Measured in field	Handheld GPS
164	*Eucalyptus aromaphloia*	Scentbark	75	235.62	Large	RP	HBT	Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
165	*Eucalyptus aromaphloia*	Scentbark	134	420.97	Large	RP	HBT	Measured in field	Handheld GPS
166	*Eucalyptus aromaphloia*	Scentbark	120	376.99	Large	RP	HBT	Measured in field	Handheld GPS
167	*Eucalyptus aromaphloia*	Scentbark	79	248.19	Large	RP	HBT	Measured in field	Handheld GPS
168	*Eucalyptus aromaphloia*	Scentbark	125	392.70	Large	RP	HBT	Measured in field	Handheld GPS
169	*Eucalyptus aromaphloia*	Scentbark	79	248.19	Large	RP	HBT	Measured in field	Handheld GPS
170	*Eucalyptus aromaphloia*	Scentbark	103	323.58	Large	RP	HBT	Measured in field	Handheld GPS
171	*Eucalyptus aromaphloia*	Scentbark	107	336.15	Large	RP	HBT	Measured in field	Handheld GPS
172	*Eucalyptus aromaphloia*	Scentbark	92	289.03	Large	RP	HBT	Measured in field	Handheld GPS
173	*Eucalyptus aromaphloia*	Scentbark	106	333.01	Large	RP	HBT	Measured in field	Handheld GPS
174	*Eucalyptus aromaphloia*	Scentbark	98	307.88	Large	RP	HBT	Measured in field	Handheld GPS
175	*Eucalyptus aromaphloia*	Scentbark	94	295.31	Large	RP	HBT	Measured in field	Handheld GPS
176	*Eucalyptus aromaphloia*	Scentbark	95	298.45	Large	RP	HBT	Measured in field	Handheld GPS
177	*Eucalyptus aromaphloia*	Scentbark	86	270.18	Large	RP	HBT	Measured in field	Handheld GPS
178	*Eucalyptus aromaphloia*	Scentbark	104	326.73	Large	RP	HBT	Measured in field	Handheld GPS
179	*Eucalyptus aromaphloia*	Scentbark	117	367.57	Large	RP	HBT	Measured in field	Handheld GPS
180	*Eucalyptus aromaphloia*	Scentbark	109	342.43	Large	RP	HBT	Measured in field	Handheld GPS
181	*Eucalyptus aromaphloia*	Scentbark	93	292.17	Large	RP	HBT	Measured in field	Handheld GPS
182	*Eucalyptus aromaphloia*	Scentbark	63	197.92	Large	RP	HBT	Measured in field	Handheld GPS
183	*Eucalyptus aromaphloia*	Scentbark	133	417.83	Large	RP	HBT	Measured in field	Handheld GPS
184	*Eucalyptus aromaphloia*	Scentbark	98	307.88	Large	RP	HBT	Measured in field	Handheld GPS
185	*Eucalyptus aromaphloia*	Scentbark	127	398.98	Large	RP	HBT	Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
186	*Eucalyptus aromaphloia*	Scentbark	159	499.51	Large	ST	HBT	Measured in field	Handheld GPS
187	*Eucalyptus aromaphloia*	Scentbark	122	383.27	Large	ST	HBT	Measured in field	Handheld GPS
188	*Eucalyptus aromaphloia*	Scentbark	121	380.13	Large	ST	HBT	Measured in field	Handheld GPS
189	*Eucalyptus aromaphloia*	Scentbark	71	223.05	Large	ST	HBT	Measured in field	Handheld GPS
190	*Eucalyptus aromaphloia*	Scentbark	105	329.87	Large	ST	HBT	Measured in field	Handheld GPS
191	*Eucalyptus aromaphloia*	Scentbark	109	342.43	Large	ST	HBT	Measured in field	Handheld GPS
192	*Eucalyptus aromaphloia*	Scentbark	151	474.38	Large	ST	HBT	Measured in field	Handheld GPS
193	*Eucalyptus aromaphloia*	Scentbark	86	270.18	Large	ST	HBT	Measured in field	Handheld GPS
194	*Eucalyptus aromaphloia*	Scentbark	136	427.26	Large	RP	HBT	Measured in field	Handheld GPS
195	*Eucalyptus aromaphloia*	Scentbark	156	490.09	Large	RP	HBT	Measured in field	Handheld GPS
196	*Eucalyptus aromaphloia*	Scentbark	131	411.55	Large	RP	HBT	Measured in field	Handheld GPS
197	*Eucalyptus aromaphloia*	Scentbark	115	361.28	Large	RP	HBT	Measured in field	Handheld GPS
198	*Eucalyptus aromaphloia*	Scentbark	122	383.27	Large	RP	HBT	Measured in field	Handheld GPS
199	*Eucalyptus aromaphloia*	Scentbark	79	248.19	Large	RP	HBT	Measured in field	Handheld GPS
200	*Eucalyptus aromaphloia*	Scentbark	117	367.57	Large	RP	HBT	Measured in field	Handheld GPS
201	*Eucalyptus aromaphloia*	Scentbark	174	546.64	Large	RP	HBT	Measured in field	Handheld GPS
202	*Eucalyptus aromaphloia*	Scentbark	71	223.05	Large	RP		Measured in field	Handheld GPS
203	*Eucalyptus aromaphloia*	Scentbark	86	270.18	Large	RP		Measured in field	Handheld GPS
204	*Eucalyptus aromaphloia*	Scentbark	103	323.58	Large	RP	HBT	Measured in field	Handheld GPS
205	*Eucalyptus aromaphloia*	Scentbark	157	493.23	Large	ST	HBT	Measured in field	Handheld GPS
206	*Eucalyptus aromaphloia*	Scentbark	83	260.75	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
207	*Eucalyptus aromaphloia*	Scentbark	113	355.00	Large	RP		Measured in field	Handheld GPS
208	*Eucalyptus aromaphloia*	Scentbark	104	326.73	Large	RP		Measured in field	Handheld GPS
209	*Eucalyptus aromaphloia*	Scentbark	63	197.92	Small	RP		Measured in field	Handheld GPS
210	*Eucalyptus aromaphloia*	Scentbark	82	257.61	Large	RP		Measured in field	Handheld GPS
211	*Eucalyptus aromaphloia*	Scentbark	89	279.60	Large	RP		Measured in field	Handheld GPS
212	*Eucalyptus aromaphloia*	Scentbark	82	257.61	Large	RP		Measured in field	Handheld GPS
213	*Eucalyptus aromaphloia*	Scentbark	105	329.87	Large	RP		Measured in field	Handheld GPS
214	*Eucalyptus aromaphloia*	Scentbark	95	298.45	Large	RP		Measured in field	Handheld GPS
215	*Eucalyptus aromaphloia*	Scentbark	89	279.60	Large	RP		Measured in field	Handheld GPS
216	*Eucalyptus aromaphloia*	Scentbark	80	251.33	Large	RP		Measured in field	Handheld GPS
217	*Eucalyptus aromaphloia*	Scentbark	79	248.19	Large	RP		Measured in field	Handheld GPS
218	*Eucalyptus aromaphloia*	Scentbark	113	355.00	Large	RP		Measured in field	Handheld GPS
219	*Eucalyptus aromaphloia*	Scentbark	126	395.84	Large	RP		Measured in field	Handheld GPS
220	*Eucalyptus aromaphloia*	Scentbark	126	395.84	Large	RP		Measured in field	Handheld GPS
221	*Eucalyptus aromaphloia*	Scentbark	136	427.26	Large	RP		Measured in field	Handheld GPS
222	*Eucalyptus aromaphloia*	Scentbark	83	260.75	Large	RP		Measured in field	Handheld GPS
223	*Eucalyptus aromaphloia*	Scentbark	74	232.48	Large	RP		Measured in field	Handheld GPS
224	*Eucalyptus aromaphloia*	Scentbark	75	235.62	Large	RP		Measured in field	Handheld GPS
225	*Eucalyptus aromaphloia*	Scentbark	87	273.32	Large	RP		Measured in field	Handheld GPS
226	*Eucalyptus aromaphloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
227	*Eucalyptus aromaphloia*	Scentbark	80	251.33	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
228	*Eucalyptus aromaphloia*	Scentbark	120	376.99	Large	RP		Measured in field	Handheld GPS
229	*Eucalyptus aromaphloia*	Scentbark	93	292.17	Large	RP		Measured in field	Handheld GPS
230	*Eucalyptus aromaphloia*	Scentbark	122	383.27	Large	RP		Measured in field	Handheld GPS
231	*Eucalyptus aromaphloia*	Scentbark	97	304.73	Large	RP		Measured in field	Handheld GPS
232	*Eucalyptus aromaphloia*	Scentbark	106	333.01	Large	RP		Measured in field	Handheld GPS
233	*Eucalyptus aromaphloia*	Scentbark	85	267.04	Large	RP		Measured in field	Handheld GPS
234	*Eucalyptus aromaphloia*	Scentbark	84	263.89	Large	RP		Measured in field	Handheld GPS
235	*Eucalyptus aromaphloia*	Scentbark	101	317.30	Large	RP		Measured in field	Handheld GPS
236	*Eucalyptus aromaphloia*	Scentbark	74	232.48	Large	RP		Measured in field	Handheld GPS
237	*Eucalyptus aromaphloia*	Scentbark	95	298.45	Large	RP		Measured in field	Handheld GPS
238	*Eucalyptus aromaphloia*	Scentbark	81	254.47	Large	RP		Measured in field	Handheld GPS
239	*Eucalyptus aromaphloia*	Scentbark	156	490.09	Large	RP		Measured in field	Handheld GPS
240	*Eucalyptus aromaphloia*	Scentbark	112	351.86	Large	RP		Measured in field	Handheld GPS
241	*Eucalyptus aromaphloia*	Scentbark	91	285.88	Large	RP		Measured in field	Handheld GPS
242	*Eucalyptus aromaphloia*	Scentbark	100	314.16	Large	RP		Measured in field	Handheld GPS
243	*Eucalyptus aromaphloia*	Scentbark	98	307.88	Large	RP		Measured in field	Handheld GPS
244	*Eucalyptus aromaphloia*	Scentbark	92	289.03	Large	RP		Measured in field	Handheld GPS
245	*Eucalyptus aromaphloia*	Scentbark	147	461.81	Large	RP		Measured in field	Handheld GPS
246	*Eucalyptus aromaphloia*	Scentbark	74	232.48	Large	RP		Measured in field	Handheld GPS
247	*Eucalyptus aromaphloia*	Scentbark	71	223.05	Large	RP		Measured in field	Handheld GPS
248	*Eucalyptus aromaphloia*	Scentbark	94	295.31	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
249	*Eucalyptus aromaphloia*	Scentbark	76	238.76	Large	RP		Measured in field	Handheld GPS
250	*Eucalyptus aromaphloia*	Scentbark	90	282.74	Large	RP		Measured in field	Handheld GPS
251	*Eucalyptus aromaphloia*	Scentbark	158	496.37	Large	RP		Measured in field	Handheld GPS
252	*Eucalyptus aromaphloia*	Scentbark	75	235.62	Large	RP		Measured in field	Handheld GPS
253	*Eucalyptus aromaphloia*	Scentbark	81	254.47	Large	RP		Measured in field	Handheld GPS
254	*Eucalyptus aromaphloia*	Scentbark	108	339.29	Large	RP		Measured in field	Handheld GPS
255	*Eucalyptus aromaphloia*	Scentbark	79	248.19	Large	RP		Measured in field	Handheld GPS
256	*Eucalyptus aromaphloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
257	*Eucalyptus aromaphloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
258	*Eucalyptus aromaphloia*	Scentbark	108	339.29	Large	RP		Measured in field	Handheld GPS
259	*Eucalyptus aromaphloia*	Scentbark	102	320.44	Large	RP		Measured in field	Handheld GPS
260	*Eucalyptus aromaphloia*	Scentbark	124	389.56	Large	RP		Measured in field	Handheld GPS
261	*Eucalyptus aromaphloia*	Scentbark	78	245.04	Large	RP		Measured in field	Handheld GPS
262	*Eucalyptus aromaphloia*	Scentbark	82	257.61	Large	RP		Measured in field	Handheld GPS
263	*Eucalyptus aromaphloia*	Scentbark	137	430.40	Large	RP		Measured in field	Handheld GPS
264	*Eucalyptus aromaphloia*	Scentbark	72	226.19	Large	RP		Measured in field	Handheld GPS
265	*Eucalyptus aromaphloia*	Scentbark	106	333.01	Large	RP		Measured in field	Handheld GPS
266	*Eucalyptus aromaphloia*	Scentbark	76	238.76	Large	RP		Measured in field	Handheld GPS
267	*Eucalyptus aromaphloia*	Scentbark	115	361.28	Large	RP		Measured in field	Handheld GPS
268	*Eucalyptus aromaphloia*	Scentbark	72	226.19	Large	RP		Measured in field	Handheld GPS
269	*Eucalyptus aromaphloia*	Scentbark	75	235.62	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
270	*Eucalyptus aromaphloia*	Scentbark	90	282.74	Large	RP		Measured in field	Handheld GPS
271	*Eucalyptus aromaphloia*	Scentbark	125	392.70	Large	RP		Measured in field	Handheld GPS
272	*Eucalyptus aromaphloia*	Scentbark	95	298.45	Large	RP		Measured in field	Handheld GPS
273	*Eucalyptus aromaphloia*	Scentbark	121	380.13	Large	RP		Measured in field	Handheld GPS
274	*Eucalyptus aromaphloia*	Scentbark	103	323.58	Large	RP		Measured in field	Handheld GPS
275	*Eucalyptus aromaphloia*	Scentbark	104	326.73	Large	RP		Measured in field	Handheld GPS
276	*Eucalyptus aromaphloia*	Scentbark	80	251.33	Large	RP		Measured in field	Handheld GPS
277	*Eucalyptus aromaphloia*	Scentbark	105	329.87	Large	RP		Measured in field	Handheld GPS
278	*Eucalyptus aromaphloia*	Scentbark	87	273.32	Large	RP		Measured in field	Handheld GPS
279	*Eucalyptus aromaphloia*	Scentbark	113	355.00	Large	RP		Measured in field	Handheld GPS
280	*Eucalyptus aromaphloia*	Scentbark	99	311.02	Large	RP		Measured in field	Handheld GPS
281	*Eucalyptus aromaphloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
282	*Eucalyptus aromaphloia*	Scentbark	142	446.11	Large	RP		Measured in field	Handheld GPS
283	*Eucalyptus aromaphloia*	Scentbark	66	207.35	Large	RP		Measured in field	Handheld GPS
284	*Eucalyptus aromaphloia*	Scentbark	77	241.90	Large	RP		Measured in field	Handheld GPS
285	*Eucalyptus aromaphloia*	Scentbark	63	197.92	Large	RP		Measured in field	Handheld GPS
286	*Eucalyptus aromaphloia*	Scentbark	87	273.32	Large	RP		Measured in field	Handheld GPS
287	*Eucalyptus aromaphloia*	Scentbark	81	254.47	Large	RP		Measured in field	Handheld GPS
288	*Eucalyptus aromaphloia*	Scentbark	104	326.73	Large	RP		Measured in field	Handheld GPS
289	*Eucalyptus aromaphloia*	Scentbark	64	201.06	Large	RP		Measured in field	Handheld GPS
290	*Eucalyptus aromaphloia*	Scentbark	73	229.34	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
291	*Eucalyptus aromaphloia*	Scentbark	102	320.44	Large	RP		Measured in field	Handheld GPS
292	*Eucalyptus aromaphloia*	Scentbark	65	204.20	Large	RP		Measured in field	Handheld GPS
293	*Eucalyptus aromaphloia*	Scentbark	95	298.45	Large	RP		Measured in field	Handheld GPS
294	*Eucalyptus aromaphloia*	Scentbark	60	188.50	Large	RP		Measured in field	Handheld GPS
295	*Eucalyptus aromaphloia*	Scentbark	67	210.49	Large	RP		Measured in field	Handheld GPS
296	*Eucalyptus aromaphloia*	Scentbark	64	201.06	Large	RP		Measured in field	Handheld GPS
297	*Eucalyptus aromaphloia*	Scentbark	60	188.50	Large	RP		Measured in field	Handheld GPS
298	*Eucalyptus aromaphloia*	Scentbark	65	204.20	Large	RP		Measured in field	Handheld GPS
299	*Eucalyptus aromaphloia*	Scentbark	86	270.18	Large	RP		Measured in field	Handheld GPS
300	*Eucalyptus aromaphloia*	Scentbark	77	241.90	Large	RP		Measured in field	Handheld GPS
301	*Eucalyptus aromaphloia*	Scentbark	61	191.64	Large	RP		Measured in field	Handheld GPS
302	*Eucalyptus aromaphloia*	Scentbark	80	251.33	Large	RP		Measured in field	Handheld GPS
303	*Eucalyptus aromaphloia*	Scentbark	66	207.35	Large	RP		Measured in field	Handheld GPS
304	*Eucalyptus aromaphloia*	Scentbark	73	229.34	Large	RP		Measured in field	Handheld GPS
305	*Eucalyptus aromaphloia*	Scentbark	85	267.04	Large	RP		Measured in field	Handheld GPS
306	*Eucalyptus aromaphloia*	Scentbark	119	373.85	Large	RP		Measured in field	Handheld GPS
307	*Eucalyptus aromaphloia*	Scentbark	76	238.76	Large	RP		Measured in field	Handheld GPS
308	*Eucalyptus aromaphloia*	Scentbark	62	194.78	Large	RP		Measured in field	Handheld GPS
309	*Eucalyptus aromaphloia*	Scentbark	95	298.45	Large	RP		Measured in field	Handheld GPS
310	*Eucalyptus aromaphloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
311	*Eucalyptus aromaphloia*	Scentbark	69	216.77	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
312	*Eucalyptus aromaphloia*	Scentbark	62	194.78	Large	RP		Measured in field	Handheld GPS
313	*Eucalyptus aromaphloia*	Scentbark	91	285.88	Large	RP		Measured in field	Handheld GPS
314	*Eucalyptus aromaphloia*	Scentbark	61	191.64	Large	RP		Measured in field	Handheld GPS
315	*Eucalyptus aromaphloia*	Scentbark	62	194.78	Large	RP		Measured in field	Handheld GPS
316	*Eucalyptus aromaphloia*	Scentbark	64	201.06	Large	RP		Measured in field	Handheld GPS
317	*Eucalyptus aromaphloia*	Scentbark	74	232.48	Large	RP		Measured in field	Handheld GPS
318	*Eucalyptus aromaphloia*	Scentbark	63	197.92	Large	RP		Measured in field	Handheld GPS
319	*Eucalyptus aromaphloia*	Scentbark	107	336.15	Large	RP		Measured in field	Handheld GPS
320	*Eucalyptus aromaphloia*	Scentbark	62	194.78	Large	RP		Measured in field	Handheld GPS
321	*Eucalyptus aromaphloia*	Scentbark	60	188.50	Large	RP		Measured in field	Handheld GPS
322	*Eucalyptus aromaphloia*	Scentbark	64	201.06	Large	RP		Measured in field	Handheld GPS
323	*Eucalyptus aromaphloia*	Scentbark	61	191.64	Large	RP		Measured in field	Handheld GPS
324	*Eucalyptus aromaphloia*	Scentbark	113	355.00	Large	RP		Measured in field	Handheld GPS
325	*Eucalyptus aromaphloia*	Scentbark	115	361.28	Large	RP		Measured in field	Handheld GPS
326	*Eucalyptus aromaphloia*	Scentbark	85	267.04	Large	RP		Measured in field	Handheld GPS
327	*Eucalyptus aromaphloia*	Scentbark	97	304.73	Large	RP		Measured in field	Handheld GPS
328	*Eucalyptus aromaphloia*	Scentbark	120	376.99	Large	RP		Measured in field	Handheld GPS
329	*Eucalyptus aromaphloia*	Scentbark	81	254.47	Large	RP		Measured in field	Handheld GPS
330	*Eucalyptus aromaphloia*	Scentbark	84	263.89	Large	RP		Measured in field	Handheld GPS
331	*Eucalyptus aromaphloia*	Scentbark	94	295.31	Large	RP		Measured in field	Handheld GPS
332	*Eucalyptus aromaphloia*	Scentbark	91	285.88	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
333	*Eucalyptus aromaphloia*	Scentbark	86	270.18	Large	RP		Measured in field	Handheld GPS
334	*Eucalyptus aromaphloia*	Scentbark	83	260.75	Large	RP		Measured in field	Handheld GPS
335	*Eucalyptus aromaphloia*	Scentbark	124	389.56	Large	RP		Measured in field	Handheld GPS
336	*Eucalyptus aromaphloia*	Scentbark	81	254.47	Large	RP		Measured in field	Handheld GPS
337	*Eucalyptus aromaphloia*	Scentbark	74	232.48	Large	RP		Measured in field	Handheld GPS
338	*Eucalyptus aromaphloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
339	*Eucalyptus aromaphloia*	Scentbark	71	223.05	Large	RP		Measured in field	Handheld GPS
340	*Eucalyptus aromaphloia*	Scentbark	86	270.18	Large	RP		Measured in field	Handheld GPS
341	*Eucalyptus aromaphloia*	Scentbark	60	188.50	Small	RP		Measured in field	Handheld GPS
342	*Eucalyptus aromaphloia*	Scentbark	66	207.35	Small	RP		Measured in field	Handheld GPS
343	*Eucalyptus aromaphloia*	Scentbark	61	191.64	Small	RP		Measured in field	Handheld GPS
344	*Eucalyptus aromaphloia*	Scentbark	66	207.35	Small	RP		Measured in field	Handheld GPS
345	*Eucalyptus aromaphloia*	Scentbark	68	213.63	Small	RP		Measured in field	Handheld GPS
346	*Eucalyptus aromaphloia*	Scentbark	61	191.64	Small	RP		Measured in field	Handheld GPS
347	*Eucalyptus aromaphloia*	Scentbark	95	298.45	Large	RP		Measured in field	Handheld GPS
348	*Eucalyptus aromaphloia*	Scentbark	113	355.00	Large	RP		Measured in field	Handheld GPS
349	*Eucalyptus aromaphloia*	Scentbark	89	279.60	Large	RP		Measured in field	Handheld GPS
350	*Eucalyptus aromaphloia*	Scentbark	84	263.89	Large	RP		Measured in field	Handheld GPS
351	*Eucalyptus aromaphloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
352	*Eucalyptus aromaphloia*	Scentbark	84	263.89	Large	RP		Measured in field	Handheld GPS
353	*Eucalyptus aromaphloia*	Scentbark	85	267.04	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
354	*Eucalyptus aromaphloia*	Scentbark	78	245.04	Large	RP		Measured in field	Handheld GPS
355	*Eucalyptus aromaphloia*	Scentbark	90	282.74	Large	RP		Measured in field	Handheld GPS
356	*Eucalyptus aromaphloia*	Scentbark	74	232.48	Large	RP		Measured in field	Handheld GPS
357	*Eucalyptus aromaphloia*	Scentbark	71	223.05	Large	RP		Measured in field	Handheld GPS
358	*Eucalyptus aromaphloia*	Scentbark	67	210.49	Large	RP		Measured in field	Handheld GPS
359	*Eucalyptus aromaphloia*	Scentbark	62	194.78	Large	RP		Measured in field	Handheld GPS
360	*Eucalyptus aromaphloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
361	*Eucalyptus aromaphloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
362	*Eucalyptus aromaphloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
363	*Eucalyptus aromaphloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
364	*Eucalyptus aromaphloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
365	*Eucalyptus aromaphloia*	Scentbark	71	223.05	Large	RP		Measured in field	Handheld GPS
366	*Eucalyptus aromaphloia*	Scentbark	72	226.19	Large	RP		Measured in field	Handheld GPS
367	*Eucalyptus aromaphloia*	Scentbark	72	226.19	Large	RP		Measured in field	Handheld GPS
368	*Eucalyptus aromaphloia*	Scentbark	73	229.34	Large	RP		Measured in field	Handheld GPS
369	*Eucalyptus aromaphloia*	Scentbark	73	229.34	Large	RP		Measured in field	Handheld GPS
370	*Eucalyptus aromaphloia*	Scentbark	73	229.34	Large	RP		Measured in field	Handheld GPS
371	*Eucalyptus aromaphloia*	Scentbark	75	235.62	Large	RP		Measured in field	Handheld GPS
372	*Eucalyptus aromaphloia*	Scentbark	75	235.62	Large	RP		Measured in field	Handheld GPS
373	*Eucalyptus aromaphloia*	Scentbark	76	238.76	Large	RP		Measured in field	Handheld GPS
374	*Eucalyptus aromaphloia*	Scentbark	78	245.04	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
375	*Eucalyptus aromaphloia*	Scentbark	78	245.04	Large	RP		Measured in field	Handheld GPS
376	*Eucalyptus aromaphloia*	Scentbark	78	245.04	Large	RP		Measured in field	Handheld GPS
377	*Eucalyptus aromaphloia*	Scentbark	81	254.47	Large	RP		Measured in field	Handheld GPS
378	*Eucalyptus aromaphloia*	Scentbark	81	254.47	Large	RP		Measured in field	Handheld GPS
379	*Eucalyptus aromaphloia*	Scentbark	82	257.61	Large	RP		Measured in field	Handheld GPS
380	*Eucalyptus aromaphloia*	Scentbark	82	257.61	Large	RP		Measured in field	Handheld GPS
381	*Eucalyptus aromaphloia*	Scentbark	84	263.89	Large	RP		Measured in field	Handheld GPS
382	*Eucalyptus aromaphloia*	Scentbark	85	267.04	Large	RP		Measured in field	Handheld GPS
383	*Eucalyptus aromaphloia*	Scentbark	86	270.18	Large	RP		Measured in field	Handheld GPS
384	*Eucalyptus aromaphloia*	Scentbark	87	273.32	Large	RP		Measured in field	Handheld GPS
385	*Eucalyptus aromaphloia*	Scentbark	88	276.46	Large	RP		Measured in field	Handheld GPS
386	*Eucalyptus aromaphloia*	Scentbark	88	276.46	Large	RP		Measured in field	Handheld GPS
387	*Eucalyptus aromaphloia*	Scentbark	89	279.60	Large	RP		Measured in field	Handheld GPS
388	*Eucalyptus aromaphloia*	Scentbark	89	279.60	Large	RP		Measured in field	Handheld GPS
389	*Eucalyptus aromaphloia*	Scentbark	90	282.74	Large	RP		Measured in field	Handheld GPS
390	*Eucalyptus aromaphloia*	Scentbark	91	285.88	Large	RP		Measured in field	Handheld GPS
391	*Eucalyptus aromaphloia*	Scentbark	92	289.03	Large	RP		Measured in field	Handheld GPS
392	*Eucalyptus aromaphloia*	Scentbark	93	292.17	Large	RP		Measured in field	Handheld GPS
393	*Eucalyptus aromaphloia*	Scentbark	94	295.31	Large	RP		Measured in field	Handheld GPS
394	*Eucalyptus aromaphloia*	Scentbark	95	298.45	Large	RP		Measured in field	Handheld GPS
395	*Eucalyptus aromaphloia*	Scentbark	96	301.59	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
396	*Eucalyptus aromaphloia*	Scentbark	100	314.16	Large	RP		Measured in field	Handheld GPS
397	*Eucalyptus aromaphloia*	Scentbark	101	317.30	Large	RP		Measured in field	Handheld GPS
398	*Eucalyptus aromaphloia*	Scentbark	101	317.30	Large	RP		Measured in field	Handheld GPS
399	*Eucalyptus aromaphloia*	Scentbark	112	351.86	Large	RP		Measured in field	Handheld GPS
400	*Eucalyptus aromaphloia*	Scentbark	113	355.00	Large	RP		Measured in field	Handheld GPS
401	*Eucalyptus aromaphloia*	Scentbark	114	358.14	Large	RP		Measured in field	Handheld GPS
402	*Eucalyptus aromaphloia*	Scentbark	116	364.42	Large	RP		Measured in field	Handheld GPS
403	*Eucalyptus aromaphloia*	Scentbark	119	373.85	Large	RP		Measured in field	Handheld GPS
404	*Eucalyptus aromaphloia*	Scentbark	119	373.85	Large	RP		Measured in field	Handheld GPS
405	*Eucalyptus aromaphloia*	Scentbark	120	376.99	Large	RP		Measured in field	Handheld GPS
406	*Eucalyptus aromaphloia*	Scentbark	120	376.99	Large	RP		Measured in field	Handheld GPS
407	*Eucalyptus aromaphloia*	Scentbark	121	380.13	Large	RP		Measured in field	Handheld GPS
408	*Eucalyptus aromaphloia*	Scentbark	122	383.27	Large	RP		Measured in field	Handheld GPS
409	*Eucalyptus aromaphloia*	Scentbark	126	395.84	Large	RP		Measured in field	Handheld GPS
410	*Eucalyptus aromaphloia*	Scentbark	134	420.97	Large	RP		Measured in field	Handheld GPS
411	*Eucalyptus aromaphloia*	Scentbark	8	25.13	Small	RP		Measured in field	Handheld GPS
412	*Eucalyptus aromaphloia*	Scentbark	63	197.92	Small	RP		Measured in field	Handheld GPS
413	*Eucalyptus aromaphloia*	Scentbark	64	201.06	Small	RP		Measured in field	Handheld GPS
414	*Eucalyptus aromaphloia*	Scentbark	66	207.35	Small	RP		Measured in field	Handheld GPS
415	*Eucalyptus aromaphloia*	Scentbark	67	210.49	Small	RP		Measured in field	Handheld GPS
416	*Eucalyptus aromaphloia*	Scentbark	71	223.05	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
417	*Eucalyptus aromaphloia*	Scentbark	63	197.92	Large	RP		Measured in field	Handheld GPS
418	*Eucalyptus aromaphloia*	Scentbark	66	207.35	Small	RP		Measured in field	Handheld GPS
419	*Eucalyptus aromaphloia*	Scentbark	65	204.20	Large	RP		Measured in field	Handheld GPS
420	*Eucalyptus aromaphloia*	Scentbark	67	210.49	Large	RP		Measured in field	Handheld GPS
421	*Eucalyptus aromaphloia*	Scentbark	86	270.18	Large	RP		Measured in field	Handheld GPS
422	*Eucalyptus aromaphloia*	Scentbark	116	364.42	Large	RP		Measured in field	Handheld GPS
423	*Eucalyptus aromaphloia*	Scentbark	76	238.76	Large	RP		Measured in field	Handheld GPS
424	*Eucalyptus aromaphloia*	Scentbark	62	194.78	Large	RP		Measured in field	Handheld GPS
425	*Eucalyptus aromaphloia*	Scentbark	78	245.04	Large	RP		Measured in field	Handheld GPS
426	*Eucalyptus aromaphloia*	Scentbark	71	223.05	Large	RP		Measured in field	Handheld GPS
427	*Eucalyptus aromaphloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
428	*Eucalyptus aromaphloia*	Scentbark	73	229.34	Large	RP		Measured in field	Handheld GPS
429	*Eucalyptus aromaphloia*	Scentbark	60	188.50	Large	RP		Measured in field	Handheld GPS
430	*Eucalyptus aromaphloia*	Scentbark	63	197.92	Large	RP		Measured in field	Handheld GPS
431	*Eucalyptus aromaphloia*	Scentbark	96	301.59	Large	RP		Measured in field	Handheld GPS
432	*Eucalyptus aromaphloia*	Scentbark	75	235.62	Large	RP		Measured in field	Handheld GPS
433	*Eucalyptus aromaphloia*	Scentbark	68	213.63	Large	RP		Measured in field	Handheld GPS
434	*Eucalyptus aromaphloia*	Scentbark	87	273.32	Large	RP		Measured in field	Handheld GPS
435	*Eucalyptus aromaphloia*	Scentbark	69	216.77	Large	RP		Measured in field	Handheld GPS
436	*Eucalyptus aromaphloia*	Scentbark	60	188.50	Large	RP		Measured in field	Handheld GPS
437	*Eucalyptus aromaphloia*	Scentbark	71	223.05	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
438	*Eucalyptus aromaphloia*	Scentbark	93	292.17	Large	RP		Measured in field	Handheld GPS
439	*Eucalyptus aromaphloia*	Scentbark	68	213.63	Large	RP		Measured in field	Handheld GPS
440	*Eucalyptus aromaphloia*	Scentbark	71	223.05	Large	RP		Measured in field	Handheld GPS
441	*Eucalyptus aromaphloia*	Scentbark	93	292.17	Large	RP		Measured in field	Handheld GPS
442	*Eucalyptus aromaphloia*	Scentbark	82	257.61	Large	RP		Measured in field	Handheld GPS
443	*Eucalyptus aromaphloia*	Scentbark	78	245.04	Large	RP		Measured in field	Handheld GPS
444	*Eucalyptus aromaphloia*	Scentbark	89	279.60	Large	RP		Measured in field	Handheld GPS
445	*Eucalyptus aromaphloia*	Scentbark	76	238.76	Large	RP		Measured in field	Handheld GPS
446	*Eucalyptus aromaphloia*	Scentbark	71	223.05	Large	RP		Measured in field	Handheld GPS
447	*Eucalyptus aromaphloia*	Scentbark	72	226.19	Large	RP		Measured in field	Handheld GPS
448	*Eucalyptus aromaphloia*	Scentbark	82	257.61	Large	RP		Measured in field	Handheld GPS
449	*Eucalyptus aromaphloia*	Scentbark	84	263.89	Large	RP		Measured in field	Handheld GPS
450	*Eucalyptus aromaphloia*	Scentbark	62	194.78	Large	RP		Measured in field	Handheld GPS
451	*Eucalyptus aromaphloia*	Scentbark	83	260.75	Large	RP		Measured in field	Handheld GPS
452	*Eucalyptus aromaphloia*	Scentbark	74	232.48	Large	RP		Measured in field	Handheld GPS
453	*Eucalyptus aromaphloia*	Scentbark	63	197.92	Large	RP		Measured in field	Handheld GPS
454	*Eucalyptus aromaphloia*	Scentbark	69	216.77	Large	RP		Measured in field	Handheld GPS
455	*Eucalyptus aromaphloia*	Scentbark	63	197.92	Large	RP		Measured in field	Handheld GPS
456	*Eucalyptus aromaphloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
457	*Eucalyptus aromaphloia*	Scentbark	93	292.17	Large	RP		Measured in field	Handheld GPS
458	*Eucalyptus aromaphloia*	Scentbark	69	216.77	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
459	*Eucalyptus aromaphloia*	Scentbark	71	223.05	Large	RP		Measured in field	Handheld GPS
460	*Eucalyptus aromaphloia*	Scentbark	73	229.34	Large	RP		Measured in field	Handheld GPS
461	*Eucalyptus aromaphloia*	Scentbark	105	329.87	Large	RP		Measured in field	Handheld GPS
462	*Eucalyptus aromaphloia*	Scentbark	64	201.06	Large	RP		Measured in field	Handheld GPS
463	*Eucalyptus aromaphloia*	Scentbark	88	276.46	Large	RP		Measured in field	Handheld GPS
464	*Eucalyptus aromaphloia*	Scentbark	93	292.17	Large	RP		Measured in field	Handheld GPS
465	*Eucalyptus aromaphloia*	Scentbark	62	194.78	Large	RP		Measured in field	Handheld GPS
466	*Eucalyptus aromaphloia*	Scentbark	129	405.27	Large	RP		Measured in field	Handheld GPS
467	*Eucalyptus aromaphloia*	Scentbark	114	358.14	Large	RP		Measured in field	Handheld GPS
468	*Eucalyptus aromaphloia*	Scentbark	138	433.54	Large	RP		Measured in field	Handheld GPS
469	*Eucalyptus aromaphloia*	Scentbark	93	292.17	Large	RP		Measured in field	Handheld GPS
470	*Eucalyptus aromaphloia*	Scentbark	82	257.61	Large	RP		Measured in field	Handheld GPS
471	*Eucalyptus aromaphloia*	Scentbark	81	254.47	Large	RP		Measured in field	Handheld GPS
472	*Eucalyptus aromaphloia*	Scentbark	116	364.42	Large	RP		Measured in field	Handheld GPS
473	*Eucalyptus aromaphloia*	Scentbark	91	285.88	Large	RP		Measured in field	Handheld GPS
474	*Eucalyptus aromaphloia*	Scentbark	74	232.48	Large	RP		Measured in field	Handheld GPS
475	*Eucalyptus aromaphloia*	Scentbark	94	295.31	Large	RP		Measured in field	Handheld GPS
476	*Eucalyptus aromaphloia*	Scentbark	88	276.46	Large	RP		Measured in field	Handheld GPS
477	*Eucalyptus aromaphloia*	Scentbark	76	238.76	Large	RP		Measured in field	Handheld GPS
478	*Eucalyptus aromaphloia*	Scentbark	81	254.47	Large	RP		Measured in field	Handheld GPS
479	*Eucalyptus aromaphloia*	Scentbark	82	257.61	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
480	*Eucalyptus aromaphloia*	Scentbark	88	276.46	Large	RP		Measured in field	Handheld GPS
481	*Eucalyptus aromaphloia*	Scentbark	103	323.58	Large	RP		Measured in field	Handheld GPS
482	*Eucalyptus aromaphloia*	Scentbark	90	282.74	Large	RP		Measured in field	Handheld GPS
483	*Eucalyptus aromaphloia*	Scentbark	69	216.77	Small	RP		Measured in field	Handheld GPS
484	*Eucalyptus aromaphloia*	Scentbark	71	223.05	Large	ST		Measured in field	Handheld GPS
485	*Eucalyptus aromaphloia*	Scentbark	113	355.00	Large	ST		Measured in field	Handheld GPS
486	*Eucalyptus aromaphloia*	Scentbark	111	348.72	Large	ST		Measured in field	Handheld GPS
487	*Eucalyptus aromaphloia*	Scentbark	107	336.15	Large	ST		Measured in field	Handheld GPS
488	*Eucalyptus aromaphloia*	Scentbark	70	219.91	Large	ST		Measured in field	Handheld GPS
489	*Eucalyptus aromaphloia*	Scentbark	85	267.04	Large	ST		Measured in field	Handheld GPS
490	*Eucalyptus aromaphloia*	Scentbark	99	311.02	Large	ST		Measured in field	Handheld GPS
491	*Eucalyptus aromaphloia*	Scentbark	131	411.55	Large	RP		Measured in field	Handheld GPS
492	*Eucalyptus aromophloia*	Scentbark	79	248.19	Large	RP	HBT	Measured in field	Handheld GPS
493	*Eucalyptus aromophloia*	Scentbark	72	226.19	Large	RP	HBT	Measured in field	Handheld GPS
494	*Eucalyptus aromophloia*	Scentbark	99	311.02	Large	RP	HBT	Measured in field	Handheld GPS
495	*Eucalyptus aromophloia*	Scentbark	95	298.45	Large	RP	HBT	Measured in field	Handheld GPS
496	*Eucalyptus aromophloia*	Scentbark	103	323.58	Large	RP	HBT	Measured in field	Handheld GPS
497	*Eucalyptus aromophloia*	Scentbark	121	380.13	Large	RP	HBT	Measured in field	Handheld GPS
498	*Eucalyptus aromophloia*	Scentbark	137	430.40	Large	RP	HBT	Measured in field	Handheld GPS
499	*Eucalyptus aromophloia*	Scentbark	158	496.37	Large	RP	HBT	Measured in field	Handheld GPS
500	*Eucalyptus aromophloia*	Scentbark	165	518.36	Large	RP	HBT	Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
501	*Eucalyptus aromophloia*	Scentbark	85	267.04	Large	RP	HBT	Measured in field	Handheld GPS
502	*Eucalyptus aromophloia*	Scentbark	78	245.04	Large	RP	HBT	Measured in field	Handheld GPS
503	*Eucalyptus aromophloia*	Scentbark	100	314.16	Large	RP	HBT	Measured in field	Handheld GPS
504	*Eucalyptus aromophloia*	Scentbark	89	279.60	Large	RP		Measured in field	Handheld GPS
505	*Eucalyptus aromophloia*	Scentbark	134	420.97	Large	RP		Measured in field	Handheld GPS
506	*Eucalyptus aromophloia*	Scentbark	61	191.64	Large	RP		Measured in field	Handheld GPS
507	*Eucalyptus aromophloia*	Scentbark	63	197.92	Large	RP		Measured in field	Handheld GPS
508	*Eucalyptus aromophloia*	Scentbark	64	201.06	Large	RP		Measured in field	Handheld GPS
509	*Eucalyptus aromophloia*	Scentbark	65	204.20	Large	RP		Measured in field	Handheld GPS
510	*Eucalyptus aromophloia*	Scentbark	66	207.35	Large	RP		Measured in field	Handheld GPS
511	*Eucalyptus aromophloia*	Scentbark	66	207.35	Large	RP		Measured in field	Handheld GPS
512	*Eucalyptus aromophloia*	Scentbark	69	216.77	Large	RP		Measured in field	Handheld GPS
513	*Eucalyptus aromophloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
514	*Eucalyptus aromophloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
515	*Eucalyptus aromophloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
516	*Eucalyptus aromophloia*	Scentbark	72	226.19	Large	RP		Measured in field	Handheld GPS
517	*Eucalyptus aromophloia*	Scentbark	73	229.34	Large	RP		Measured in field	Handheld GPS
518	*Eucalyptus aromophloia*	Scentbark	75	235.62	Large	RP		Measured in field	Handheld GPS
519	*Eucalyptus aromophloia*	Scentbark	75	235.62	Large	RP		Measured in field	Handheld GPS
520	*Eucalyptus aromophloia*	Scentbark	75	235.62	Large	RP		Measured in field	Handheld GPS
521	*Eucalyptus aromophloia*	Scentbark	75	235.62	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
522	*Eucalyptus aromophloia*	Scentbark	78	245.04	Large	RP		Measured in field	Handheld GPS
523	*Eucalyptus aromophloia*	Scentbark	79	248.19	Large	RP		Measured in field	Handheld GPS
524	*Eucalyptus aromophloia*	Scentbark	79	248.19	Large	RP		Measured in field	Handheld GPS
525	*Eucalyptus aromophloia*	Scentbark	80	251.33	Large	RP		Measured in field	Handheld GPS
526	*Eucalyptus aromophloia*	Scentbark	81	254.47	Large	RP		Measured in field	Handheld GPS
527	*Eucalyptus aromophloia*	Scentbark	84	263.89	Large	RP		Measured in field	Handheld GPS
528	*Eucalyptus aromophloia*	Scentbark	84	263.89	Large	RP		Measured in field	Handheld GPS
529	*Eucalyptus aromophloia*	Scentbark	85	267.04	Large	RP		Measured in field	Handheld GPS
530	*Eucalyptus aromophloia*	Scentbark	86	270.18	Large	RP		Measured in field	Handheld GPS
531	*Eucalyptus aromophloia*	Scentbark	87	273.32	Large	RP		Measured in field	Handheld GPS
532	*Eucalyptus aromophloia*	Scentbark	90	282.74	Large	RP		Measured in field	Handheld GPS
533	*Eucalyptus aromophloia*	Scentbark	92	289.03	Large	RP		Measured in field	Handheld GPS
534	*Eucalyptus aromophloia*	Scentbark	94	295.31	Large	RP		Measured in field	Handheld GPS
535	*Eucalyptus aromophloia*	Scentbark	98	307.88	Large	RP		Measured in field	Handheld GPS
536	*Eucalyptus aromophloia*	Scentbark	106	333.01	Large	RP		Measured in field	Handheld GPS
537	*Eucalyptus aromophloia*	Scentbark	110	345.58	Large	RP		Measured in field	Handheld GPS
538	*Eucalyptus aromophloia*	Scentbark	153	480.66	Large	RP		Measured in field	Handheld GPS
539	*Eucalyptus aromophloia*	Scentbark	67	210.49	Small	RP		Measured in field	Handheld GPS
540	*Eucalyptus aromophloia*	Scentbark	61	191.64	Large	RP		Measured in field	Handheld GPS
541	*Eucalyptus aromophloia*	Scentbark	62	194.78	Large	RP		Measured in field	Handheld GPS
542	*Eucalyptus aromophloia*	Scentbark	62	194.78	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
543	*Eucalyptus aromophloia*	Scentbark	63	197.92	Large	RP		Measured in field	Handheld GPS
544	*Eucalyptus aromophloia*	Scentbark	65	204.20	Large	RP		Measured in field	Handheld GPS
545	*Eucalyptus aromophloia*	Scentbark	66	207.35	Large	RP		Measured in field	Handheld GPS
546	*Eucalyptus aromophloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
547	*Eucalyptus aromophloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
548	*Eucalyptus aromophloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
549	*Eucalyptus aromophloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
550	*Eucalyptus aromophloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
551	*Eucalyptus aromophloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
552	*Eucalyptus aromophloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
553	*Eucalyptus aromophloia*	Scentbark	70	219.91	Large	RP		Measured in field	Handheld GPS
554	*Eucalyptus aromophloia*	Scentbark	71	223.05	Large	RP		Measured in field	Handheld GPS
555	*Eucalyptus aromophloia*	Scentbark	71	223.05	Large	RP		Measured in field	Handheld GPS
556	*Eucalyptus aromophloia*	Scentbark	71	223.05	Large	RP		Measured in field	Handheld GPS
557	*Eucalyptus aromophloia*	Scentbark	72	226.19	Large	RP		Measured in field	Handheld GPS
558	*Eucalyptus aromophloia*	Scentbark	72	226.19	Large	RP		Measured in field	Handheld GPS
559	*Eucalyptus aromophloia*	Scentbark	72	226.19	Large	RP		Measured in field	Handheld GPS
560	*Eucalyptus aromophloia*	Scentbark	72	226.19	Large	RP		Measured in field	Handheld GPS
561	*Eucalyptus aromophloia*	Scentbark	73	229.34	Large	RP		Measured in field	Handheld GPS
562	*Eucalyptus aromophloia*	Scentbark	73	229.34	Large	RP		Measured in field	Handheld GPS
563	*Eucalyptus aromophloia*	Scentbark	74	232.48	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
564	*Eucalyptus aromophloia*	Scentbark	74	232.48	Large	RP		Measured in field	Handheld GPS
565	*Eucalyptus aromophloia*	Scentbark	74	232.48	Large	RP		Measured in field	Handheld GPS
566	*Eucalyptus aromophloia*	Scentbark	75	235.62	Large	RP		Measured in field	Handheld GPS
567	*Eucalyptus aromophloia*	Scentbark	75	235.62	Large	RP		Measured in field	Handheld GPS
568	*Eucalyptus aromophloia*	Scentbark	76	238.76	Large	RP		Measured in field	Handheld GPS
569	*Eucalyptus aromophloia*	Scentbark	76	238.76	Large	RP		Measured in field	Handheld GPS
570	*Eucalyptus aromophloia*	Scentbark	77	241.90	Large	RP		Measured in field	Handheld GPS
571	*Eucalyptus aromophloia*	Scentbark	77	241.90	Large	RP		Measured in field	Handheld GPS
572	*Eucalyptus aromophloia*	Scentbark	78	245.04	Large	RP		Measured in field	Handheld GPS
573	*Eucalyptus aromophloia*	Scentbark	79	248.19	Large	RP		Measured in field	Handheld GPS
574	*Eucalyptus aromophloia*	Scentbark	79	248.19	Large	RP		Measured in field	Handheld GPS
575	*Eucalyptus aromophloia*	Scentbark	79	248.19	Large	RP		Measured in field	Handheld GPS
576	*Eucalyptus aromophloia*	Scentbark	80	251.33	Large	RP		Measured in field	Handheld GPS
577	*Eucalyptus aromophloia*	Scentbark	80	251.33	Large	RP		Measured in field	Handheld GPS
578	*Eucalyptus aromophloia*	Scentbark	81	254.47	Large	RP		Measured in field	Handheld GPS
579	*Eucalyptus aromophloia*	Scentbark	81	254.47	Large	RP		Measured in field	Handheld GPS
580	*Eucalyptus aromophloia*	Scentbark	81	254.47	Large	RP		Measured in field	Handheld GPS
581	*Eucalyptus aromophloia*	Scentbark	81	254.47	Large	RP		Measured in field	Handheld GPS
582	*Eucalyptus aromophloia*	Scentbark	82	257.61	Large	RP		Measured in field	Handheld GPS
583	*Eucalyptus aromophloia*	Scentbark	82	257.61	Large	RP		Measured in field	Handheld GPS
584	*Eucalyptus aromophloia*	Scentbark	82	257.61	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
585	*Eucalyptus aromophloia*	Scentbark	83	260.75	Large	RP		Measured in field	Handheld GPS
586	*Eucalyptus aromophloia*	Scentbark	83	260.75	Large	RP		Measured in field	Handheld GPS
587	*Eucalyptus aromophloia*	Scentbark	84	263.89	Large	RP		Measured in field	Handheld GPS
588	*Eucalyptus aromophloia*	Scentbark	85	267.04	Large	RP		Measured in field	Handheld GPS
589	*Eucalyptus aromophloia*	Scentbark	85	267.04	Large	RP		Measured in field	Handheld GPS
590	*Eucalyptus aromophloia*	Scentbark	85	267.04	Large	RP		Measured in field	Handheld GPS
591	*Eucalyptus aromophloia*	Scentbark	86	270.18	Large	RP		Measured in field	Handheld GPS
592	*Eucalyptus aromophloia*	Scentbark	87	273.32	Large	RP		Measured in field	Handheld GPS
593	*Eucalyptus aromophloia*	Scentbark	88	276.46	Large	RP		Measured in field	Handheld GPS
594	*Eucalyptus aromophloia*	Scentbark	88	276.46	Large	RP		Measured in field	Handheld GPS
595	*Eucalyptus aromophloia*	Scentbark	88	276.46	Large	RP		Measured in field	Handheld GPS
596	*Eucalyptus aromophloia*	Scentbark	89	279.60	Large	RP		Measured in field	Handheld GPS
597	*Eucalyptus aromophloia*	Scentbark	90	282.74	Large	RP		Measured in field	Handheld GPS
598	*Eucalyptus aromophloia*	Scentbark	90	282.74	Large	RP		Measured in field	Handheld GPS
599	*Eucalyptus aromophloia*	Scentbark	90	282.74	Large	RP		Measured in field	Handheld GPS
600	*Eucalyptus aromophloia*	Scentbark	91	285.88	Large	RP		Measured in field	Handheld GPS
601	*Eucalyptus aromophloia*	Scentbark	91	285.88	Large	RP		Measured in field	Handheld GPS
602	*Eucalyptus aromophloia*	Scentbark	91	285.88	Large	RP		Measured in field	Handheld GPS
603	*Eucalyptus aromophloia*	Scentbark	92	289.03	Large	RP		Measured in field	Handheld GPS
604	*Eucalyptus aromophloia*	Scentbark	92	289.03	Large	RP		Measured in field	Handheld GPS
605	*Eucalyptus aromophloia*	Scentbark	92	289.03	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
606	*Eucalyptus aromophloia*	Scentbark	95	298.45	Large	RP		Measured in field	Handheld GPS
607	*Eucalyptus aromophloia*	Scentbark	96	301.59	Large	RP		Measured in field	Handheld GPS
608	*Eucalyptus aromophloia*	Scentbark	96	301.59	Large	RP		Measured in field	Handheld GPS
609	*Eucalyptus aromophloia*	Scentbark	97	304.73	Large	RP		Measured in field	Handheld GPS
610	*Eucalyptus aromophloia*	Scentbark	98	307.88	Large	RP		Measured in field	Handheld GPS
611	*Eucalyptus aromophloia*	Scentbark	98	307.88	Large	RP		Measured in field	Handheld GPS
612	*Eucalyptus aromophloia*	Scentbark	100	314.16	Large	RP		Measured in field	Handheld GPS
613	*Eucalyptus aromophloia*	Scentbark	100	314.16	Large	RP		Measured in field	Handheld GPS
614	*Eucalyptus aromophloia*	Scentbark	102	320.44	Large	RP		Measured in field	Handheld GPS
615	*Eucalyptus aromophloia*	Scentbark	103	323.58	Large	RP		Measured in field	Handheld GPS
616	*Eucalyptus aromophloia*	Scentbark	105	329.87	Large	RP		Measured in field	Handheld GPS
617	*Eucalyptus aromophloia*	Scentbark	105	329.87	Large	RP		Measured in field	Handheld GPS
618	*Eucalyptus aromophloia*	Scentbark	106	333.01	Large	RP		Measured in field	Handheld GPS
619	*Eucalyptus aromophloia*	Scentbark	107	336.15	Large	RP		Measured in field	Handheld GPS
620	*Eucalyptus aromophloia*	Scentbark	107	336.15	Large	RP		Measured in field	Handheld GPS
621	*Eucalyptus aromophloia*	Scentbark	108	339.29	Large	RP		Measured in field	Handheld GPS
622	*Eucalyptus aromophloia*	Scentbark	110	345.58	Large	RP		Measured in field	Handheld GPS
623	*Eucalyptus aromophloia*	Scentbark	110	345.58	Large	RP		Measured in field	Handheld GPS
624	*Eucalyptus aromophloia*	Scentbark	110	345.58	Large	RP		Measured in field	Handheld GPS
625	*Eucalyptus aromophloia*	Scentbark	111	348.72	Large	RP		Measured in field	Handheld GPS
626	*Eucalyptus aromophloia*	Scentbark	111	348.72	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
627	*Eucalyptus aromophloia*	Scentbark	112	351.86	Large	RP		Measured in field	Handheld GPS
628	*Eucalyptus aromophloia*	Scentbark	114	358.14	Large	RP		Measured in field	Handheld GPS
629	*Eucalyptus aromophloia*	Scentbark	120	376.99	Large	RP		Measured in field	Handheld GPS
630	*Eucalyptus aromophloia*	Scentbark	120	376.99	Large	RP		Measured in field	Handheld GPS
631	*Eucalyptus aromophloia*	Scentbark	121	380.13	Large	RP		Measured in field	Handheld GPS
632	*Eucalyptus aromophloia*	Scentbark	122	383.27	Large	RP		Measured in field	Handheld GPS
633	*Eucalyptus aromophloia*	Scentbark	127	398.98	Large	RP		Measured in field	Handheld GPS
634	*Eucalyptus aromophloia*	Scentbark	127	398.98	Large	RP		Measured in field	Handheld GPS
635	*Eucalyptus aromophloia*	Scentbark	128	402.12	Large	RP		Measured in field	Handheld GPS
636	*Eucalyptus aromophloia*	Scentbark	130	408.41	Large	RP		Measured in field	Handheld GPS
637	*Eucalyptus aromophloia*	Scentbark	130	408.41	Large	RP		Measured in field	Handheld GPS
638	*Eucalyptus aromophloia*	Scentbark	134	420.97	Large	RP		Measured in field	Handheld GPS
639	*Eucalyptus aromophloia*	Scentbark	134	420.97	Large	RP		Measured in field	Handheld GPS
640	*Eucalyptus aromophloia*	Scentbark	139	436.68	Large	RP		Measured in field	Handheld GPS
641	*Eucalyptus aromophloia*	Scentbark	140	439.82	Large	RP		Measured in field	Handheld GPS
642	*Eucalyptus aromophloia*	Scentbark	142	446.11	Large	RP		Measured in field	Handheld GPS
643	*Eucalyptus aromophloia*	Scentbark	144	452.39	Large	RP		Measured in field	Handheld GPS
644	*Eucalyptus aromophloia*	Scentbark	148	464.96	Large	RP		Measured in field	Handheld GPS
645	*Eucalyptus aromophloia*	Scentbark	150	471.24	Large	RP		Measured in field	Handheld GPS
646	*Eucalyptus aromophloia*	Scentbark	155	486.95	Large	RP		Measured in field	Handheld GPS
647	*Eucalyptus aromophloia*	Scentbark	159	499.51	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
648	*Eucalyptus aromophloia*	Scentbark	160	502.65	Large	RP		Measured in field	Handheld GPS
649	*Eucalyptus aromophloia*	Scentbark	166	521.50	Large	RP		Measured in field	Handheld GPS
650	*Eucalyptus aromophloia*	Scentbark	175	549.78	Large	RP		Measured in field	Handheld GPS
651	*Eucalyptus aromophloia*	Scentbark	60	188.50	Small	RP		Measured in field	Handheld GPS
652	*Eucalyptus aromophloia*	Scentbark	60	188.50	Small	RP		Measured in field	Handheld GPS
653	*Eucalyptus aromophloia*	Scentbark	60	188.50	Small	RP		Measured in field	Handheld GPS
654	*Eucalyptus aromophloia*	Scentbark	61	191.64	Small	RP		Measured in field	Handheld GPS
655	*Eucalyptus aromophloia*	Scentbark	61	191.64	Small	RP		Measured in field	Handheld GPS
656	*Eucalyptus aromophloia*	Scentbark	62	194.78	Small	RP		Measured in field	Handheld GPS
657	*Eucalyptus aromophloia*	Scentbark	62	194.78	Small	RP		Measured in field	Handheld GPS
658	*Eucalyptus aromophloia*	Scentbark	63	197.92	Small	RP		Measured in field	Handheld GPS
659	*Eucalyptus aromophloia*	Scentbark	63	197.92	Small	RP		Measured in field	Handheld GPS
660	*Eucalyptus aromophloia*	Scentbark	63	197.92	Small	RP		Measured in field	Handheld GPS
661	*Eucalyptus aromophloia*	Scentbark	64	201.06	Small	RP		Measured in field	Handheld GPS
662	*Eucalyptus aromophloia*	Scentbark	64	201.06	Small	RP		Measured in field	Handheld GPS
663	*Eucalyptus aromophloia*	Scentbark	64	201.06	Small	RP		Measured in field	Handheld GPS
664	*Eucalyptus aromophloia*	Scentbark	65	204.20	Small	RP		Measured in field	Handheld GPS
665	*Eucalyptus aromophloia*	Scentbark	66	207.35	Small	RP		Measured in field	Handheld GPS
666	*Eucalyptus aromophloia*	Scentbark	66	207.35	Small	RP		Measured in field	Handheld GPS
667	*Eucalyptus aromophloia*	Scentbark	67	210.49	Small	RP		Measured in field	Handheld GPS
668	*Eucalyptus aromophloia*	Scentbark	67	210.49	Small	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
669	*Eucalyptus aromophloia*	Scentbark	68	213.63	Small	RP		Measured in field	Handheld GPS
670	*Eucalyptus aromophloia*	Scentbark	68	213.63	Small	RP		Measured in field	Handheld GPS
671	*Eucalyptus aromophloia*	Scentbark	68	213.63	Small	RP		Measured in field	Handheld GPS
672	*Eucalyptus aromophloia*	Scentbark	68	213.63	Small	RP		Measured in field	Handheld GPS
673	*Eucalyptus camaldulensis*	River Red-gum	101	317.30	Large	ST		Measured in field	Handheld GPS
674	*Eucalyptus camaldulensis*	River Red-gum	65	204.20	Small	RP		Measured in field	Handheld GPS
675	*Eucalyptus camaldulensis*	River Red-gum	74	232.48	Large	ST		Measured in field	Handheld GPS
676	*Eucalyptus camaldulensis*	River Red-gum	78	245.04	Large	ST		Measured in field	Handheld GPS
677	*Eucalyptus camaldulensis*	River Red-gum	66	207.35	Small	ST		Measured in field	Handheld GPS
678	*Eucalyptus dives*	Broad-leaf Peppermint	76	238.76	Large	RP		Measured in field	Handheld GPS
679	*Eucalyptus dives*	Broad-leaf Peppermint	68	213.63	Small	RP		Measured in field	Handheld GPS
680	*Eucalyptus dives*	Broad-leaf Peppermint	85	267.04	Large	RP	HBT	Measured in field	Handheld GPS
681	*Eucalyptus dives*	Broad-leaf Peppermint	73	229.34	Large	RP		Measured in field	Handheld GPS
682	*Eucalyptus dives*	Broad-leaf Peppermint	63	197.92	Large	RP		Measured in field	Handheld GPS
683	*Eucalyptus dives*	Broad-leaf Peppermint	67	210.49	Large	RP		Measured in field	Handheld GPS
684	*Eucalyptus dives*	Broad-leaf Peppermint	87	273.32	Large	RP		Measured in field	Handheld GPS
685	*Eucalyptus dives*	Broad-leaf Peppermint	88	276.46	Large	RP		Measured in field	Handheld GPS
686	*Eucalyptus dives*	Broad-leaf Peppermint	61	191.64	Large	RP		Measured in field	Handheld GPS
687	*Eucalyptus dives*	Broad-leaf Peppermint	109	342.43	Large	RP		Measured in field	Handheld GPS
688	*Eucalyptus goniocalyx*	Bundy	80	251.33	Large	RP		Estimated in field	Handheld GPS
689	*Eucalyptus goniocalyx*	Bundy	88	276.46	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
690	*Eucalyptus goniocalyx*	Bundy	79	248.19	Large	RP		Measured in field	Handheld GPS
691	*Eucalyptus goniocalyx*	Bundy	119	373.85	Large	RP		Measured in field	Handheld GPS
692	*Eucalyptus goniocalyx*	Bundy	74	232.48	Large	RP		Measured in field	Handheld GPS
693	*Eucalyptus goniocalyx*	Bundy	72	226.19	Large	RP		Measured in field	Handheld GPS
694	*Eucalyptus goniocalyx*	Bundy	97	304.73	Large	RP		Measured in field	Handheld GPS
695	*Eucalyptus goniocalyx*	Bundy	75	235.62	Large	RP	HBT	Measured in field	Handheld GPS
696	*Eucalyptus goniocalyx*	Bundy	92	289.03	Large	RP	HBT	Measured in field	Handheld GPS
697	*Eucalyptus goniocalyx*	Bundy	87	273.32	Large	RP	HBT	Measured in field	Handheld GPS
698	*Eucalyptus goniocalyx*	Bundy	74	232.48	Large	RP	HBT	Measured in field	Handheld GPS
699	*Eucalyptus goniocalyx*	Bundy	71	223.05	Large	RP	HBT	Measured in field	Handheld GPS
700	*Eucalyptus goniocalyx*	Bundy	105	329.87	Large	RP	HBT	Measured in field	Handheld GPS
701	*Eucalyptus goniocalyx*	Bundy	86	270.18	Large	RP	HBT	Measured in field	Handheld GPS
702	*Eucalyptus goniocalyx*	Bundy	139	436.68	Large	RP	HBT	Measured in field	Handheld GPS
703	*Eucalyptus goniocalyx*	Bundy	130	408.41	Large	RP	HBT	Measured in field	Handheld GPS
704	*Eucalyptus goniocalyx*	Bundy	73	229.34	Large	RP		Measured in field	Handheld GPS
705	*Eucalyptus goniocalyx*	Bundy	70	219.91	Large	RP		Measured in field	Handheld GPS
706	*Eucalyptus goniocalyx*	Bundy	85	267.04	Large	RP		Measured in field	Handheld GPS
707	*Eucalyptus goniocalyx*	Bundy	95	298.45	Large	RP		Measured in field	Handheld GPS
708	*Eucalyptus goniocalyx*	Bundy	96	301.59	Large	RP		Measured in field	Handheld GPS
709	*Eucalyptus goniocalyx*	Bundy	75	235.62	Large	RP		Measured in field	Handheld GPS
710	*Eucalyptus goniocalyx*	Bundy	77	241.90	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
711	*Eucalyptus goniocalyx*	Bundy	70	219.91	Large	RP		Measured in field	Handheld GPS
712	*Eucalyptus goniocalyx*	Bundy	131	411.55	Large	RP		Measured in field	Handheld GPS
713	*Eucalyptus goniocalyx*	Bundy	73	229.34	Large	RP		Measured in field	Handheld GPS
714	*Eucalyptus goniocalyx*	Bundy	66	207.35	Large	RP		Measured in field	Handheld GPS
715	*Eucalyptus goniocalyx*	Bundy	88	276.46	Large	RP		Measured in field	Handheld GPS
716	*Eucalyptus goniocalyx*	Bundy	60	188.50	Large	RP		Measured in field	Handheld GPS
717	*Eucalyptus goniocalyx*	Bundy	83	260.75	Large	RP		Measured in field	Handheld GPS
718	*Eucalyptus goniocalyx*	Bundy	65	204.20	Large	RP		Measured in field	Handheld GPS
719	*Eucalyptus goniocalyx*	Bundy	61	191.64	Large	RP		Measured in field	Handheld GPS
720	*Eucalyptus goniocalyx*	Bundy	85	267.04	Large	RP		Measured in field	Handheld GPS
721	*Eucalyptus goniocalyx*	Bundy	90	282.74	Large	RP		Measured in field	Handheld GPS
722	*Eucalyptus goniocalyx*	Bundy	90	282.74	Large	RP		Measured in field	Handheld GPS
723	*Eucalyptus goniocalyx*	Bundy	136	427.26	Large	RP		Measured in field	Handheld GPS
724	*Eucalyptus goniocalyx*	Bundy	140	439.82	Large	RP		Measured in field	Handheld GPS
725	*Eucalyptus goniocalyx*	Bundy	64	201.06	Large	RP		Measured in field	Handheld GPS
726	*Eucalyptus goniocalyx*	Bundy	60	188.50	Large	RP		Measured in field	Handheld GPS
727	*Eucalyptus goniocalyx*	Bundy	76	238.76	Large	RP		Measured in field	Handheld GPS
728	*Eucalyptus goniocalyx*	Bundy	67	210.49	Large	RP		Measured in field	Handheld GPS
729	*Eucalyptus goniocalyx*	Bundy	79	248.19	Large	RP		Measured in field	Handheld GPS
730	*Eucalyptus goniocalyx*	Bundy	85	267.04	Large	RP		Measured in field	Handheld GPS
731	*Eucalyptus goniocalyx*	Bundy	67	210.49	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
732	*Eucalyptus goniocalyx*	Bundy	64	201.06	Large	RP		Measured in field	Handheld GPS
733	*Eucalyptus macrorhyncha*	Red Stringybark	92	289.03	Large	RP		Measured in field	Handheld GPS
734	*Eucalyptus macrorhyncha*	Red Stringybark	68	213.63	Large	RP	HBT	Measured in field	Handheld GPS
735	*Eucalyptus macrorhyncha*	Red Stringybark	84	263.89	Large	RP	HBT	Measured in field	Handheld GPS
736	*Eucalyptus macrorhyncha*	Red Stringybark	86	270.18	Large	RP	HBT	Measured in field	Handheld GPS
737	*Eucalyptus macrorhyncha*	Red Stringybark	71	223.05	Large	RP		Measured in field	Handheld GPS
738	*Eucalyptus macrorhyncha*	Red Stringybark	104	326.73	Large	RP		Measured in field	Handheld GPS
739	*Eucalyptus macrorhyncha*	Red Stringybark	56	175.93	Large	RP		Measured in field	Handheld GPS
740	*Eucalyptus macrorhyncha*	Red Stringybark	61	191.64	Large	RP		Measured in field	Handheld GPS
741	*Eucalyptus macrorhyncha*	Red Stringybark	65	204.20	Large	RP		Measured in field	Handheld GPS
742	*Eucalyptus macrorhyncha*	Red Stringybark	70	219.91	Large	RP		Measured in field	Handheld GPS
743	*Eucalyptus macrorhyncha*	Red Stringybark	73	229.34	Large	RP		Measured in field	Handheld GPS
744	*Eucalyptus macrorhyncha*	Red Stringybark	74	232.48	Large	RP		Measured in field	Handheld GPS
745	*Eucalyptus macrorhyncha*	Red Stringybark	79	248.19	Large	RP		Measured in field	Handheld GPS
746	*Eucalyptus macrorhyncha*	Red Stringybark	86	270.18	Large	RP		Measured in field	Handheld GPS
747	*Eucalyptus macrorhyncha*	Red Stringybark	61	191.64	Small	RP		Measured in field	Handheld GPS
748	*Eucalyptus macrorhyncha*	Red Stringybark	72	226.19	Large	RP		Measured in field	Handheld GPS
749	*Eucalyptus macrorhyncha*	Red Stringybark	90	282.74	Large	ST		Measured in field	Handheld GPS
750	*Eucalyptus macrorhyncha*	Red Stringybark	68	213.63	Small	ST		Measured in field	Handheld GPS
751	*Eucalyptus macrorhyncha*	Red Stringybark	70	219.91	Large	ST		Measured in field	Handheld GPS
752	*Eucalyptus macrorhyncha*	Red Stringybark	93	292.17	Large	RP	HBT	Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
753	*Eucalyptus macrorhyncha*	Red Stringybark	114	358.14	Large	ST	HBT	Measured in field	Handheld GPS
754	*Eucalyptus macrorhyncha*	Red Stringybark	82	257.61	Large	RP	HBT	Measured in field	Handheld GPS
755	*Eucalyptus macrorhyncha*	Red Stringybark	73	229.34	Large	RP		Measured in field	Handheld GPS
756	*Eucalyptus macrorhyncha*	Red Stringybark	75	235.62	Large	RP		Measured in field	Handheld GPS
757	*Eucalyptus macrorhyncha*	Red Stringybark	69	216.77	Large	RP		Measured in field	Handheld GPS
758	*Eucalyptus macrorhyncha*	Red Stringybark	65	204.20	Large	RP		Measured in field	Handheld GPS
759	*Eucalyptus macrorhyncha*	Red Stringybark	65	204.20	Large	RP		Measured in field	Handheld GPS
760	*Eucalyptus macrorhyncha*	Red Stringybark	71	223.05	Large	RP		Measured in field	Handheld GPS
761	*Eucalyptus macrorhyncha*	Red Stringybark	63	197.92	Large	RP		Measured in field	Handheld GPS
762	*Eucalyptus macrorhyncha*	Red Stringybark	75	235.62	Large	RP		Measured in field	Handheld GPS
763	*Eucalyptus macrorhyncha*	Red Stringybark	79	248.19	Large	RP		Measured in field	Handheld GPS
764	*Eucalyptus macrorhyncha*	Red Stringybark	63	197.92	Large	RP		Measured in field	Handheld GPS
765	*Eucalyptus macrorhyncha*	Red Stringybark	71	223.05	Large	RP		Measured in field	Handheld GPS
766	*Eucalyptus macrorhyncha*	Red Stringybark	72	226.19	Large	RP		Measured in field	Handheld GPS
767	*Eucalyptus macrorhyncha*	Red Stringybark	73	229.34	Large	RP		Measured in field	Handheld GPS
768	*Eucalyptus macrorhyncha*	Red Stringybark	77	241.90	Large	RP		Measured in field	Handheld GPS
769	*Eucalyptus macrorhyncha*	Red Stringybark	79	248.19	Large	RP		Measured in field	Handheld GPS
770	*Eucalyptus macrorhyncha*	Red Stringybark	80	251.33	Large	RP		Measured in field	Handheld GPS
771	*Eucalyptus macrorhyncha*	Red Stringybark	90	282.74	Large	RP		Measured in field	Handheld GPS
772	*Eucalyptus macrorhyncha*	Red Stringybark	90	282.74	Large	RP		Measured in field	Handheld GPS
773	*Eucalyptus macrorhyncha*	Red Stringybark	103	323.58	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
774	*Eucalyptus macrorhyncha*	Red Stringybark	63	197.92	Small	ST		Measured in field	Handheld GPS
775	*Eucalyptus macrorhyncha*	Red Stringybark	49	153.94	Small	ST		Measured in field	Handheld GPS
776	*Eucalyptus melliodora*	Yellow Box	80	251.33	Large	RP		Estimated in field	Handheld GPS
777	*Eucalyptus melliodora*	Yellow Box	140	439.82	Large	RP		Estimated in field	Handheld GPS
778	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Estimated in field	Handheld GPS
779	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Estimated in field	Handheld GPS
780	*Eucalyptus melliodora*	Yellow Box	75	235.62	Large	RP		Estimated in field	Handheld GPS
781	*Eucalyptus melliodora*	Yellow Box	85	267.04	Large	RP		Estimated in field	Handheld GPS
782	*Eucalyptus melliodora*	Yellow Box	94	295.31	Large	RP		Measured in field	Handheld GPS
783	*Eucalyptus melliodora*	Yellow Box	84	263.89	Large	RP		Measured in field	Handheld GPS
784	*Eucalyptus melliodora*	Yellow Box	80	251.33	Large	RP		Measured in field	Handheld GPS
785	*Eucalyptus melliodora*	Yellow Box	100	314.16	Large	RP		Measured in field	Handheld GPS
786	*Eucalyptus melliodora*	Yellow Box	118	370.71	Large	RP		Measured in field	Handheld GPS
787	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
788	*Eucalyptus melliodora*	Yellow Box	62	194.78	Small	RP		Measured in field	Handheld GPS
789	*Eucalyptus melliodora*	Yellow Box	75	235.62	Large	RP		Measured in field	Handheld GPS
790	*Eucalyptus melliodora*	Yellow Box	110	345.58	Large	RP		Measured in field	Handheld GPS
791	*Eucalyptus melliodora*	Yellow Box	83	260.75	Large	RP		Measured in field	Handheld GPS
792	*Eucalyptus melliodora*	Yellow Box	78	245.04	Large	RP		Measured in field	Handheld GPS
793	*Eucalyptus melliodora*	Yellow Box	74	232.48	Large	RP		Measured in field	Handheld GPS
794	*Eucalyptus melliodora*	Yellow Box	87	273.32	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
795	*Eucalyptus melliodora*	Yellow Box	92	289.03	Large	RP		Measured in field	Handheld GPS
796	*Eucalyptus melliodora*	Yellow Box	78	245.04	Large	RP		Measured in field	Handheld GPS
797	*Eucalyptus melliodora*	Yellow Box	96	301.59	Large	RP		Measured in field	Handheld GPS
798	*Eucalyptus melliodora*	Yellow Box	121	380.13	Large	RP		Measured in field	Handheld GPS
799	*Eucalyptus melliodora*	Yellow Box	102	320.44	Large	RP		Measured in field	Handheld GPS
800	*Eucalyptus melliodora*	Yellow Box	116	364.42	Large	RP		Measured in field	Handheld GPS
801	*Eucalyptus melliodora*	Yellow Box	74	232.48	Large	RP		Measured in field	Handheld GPS
802	*Eucalyptus melliodora*	Yellow Box	90	282.74	Large	RP		Measured in field	Handheld GPS
803	*Eucalyptus melliodora*	Yellow Box	80	251.33	Large	RP		Measured in field	Handheld GPS
804	*Eucalyptus melliodora*	Yellow Box	121	380.13	Large	RP		Measured in field	Handheld GPS
805	*Eucalyptus melliodora*	Yellow Box	95	298.45	Large	RP		Measured in field	Handheld GPS
806	*Eucalyptus melliodora*	Yellow Box	79	248.19	Large	RP		Measured in field	Handheld GPS
807	*Eucalyptus melliodora*	Yellow Box	89	279.60	Large	ST		Measured in field	Handheld GPS
808	*Eucalyptus melliodora*	Yellow Box	132	414.69	Large	ST		Measured in field	Handheld GPS
809	*Eucalyptus melliodora*	Yellow Box	89	279.60	Large	ST		Measured in field	Handheld GPS
810	*Eucalyptus melliodora*	Yellow Box	107	336.15	Large	RP		Measured in field	Handheld GPS
811	*Eucalyptus melliodora*	Yellow Box	94	295.31	Large	RP		Measured in field	Handheld GPS
812	*Eucalyptus melliodora*	Yellow Box	79	248.19	Large	RP		Measured in field	Handheld GPS
813	*Eucalyptus melliodora*	Yellow Box	110	345.58	Large	RP		Measured in field	Handheld GPS
814	*Eucalyptus melliodora*	Yellow Box	102	320.44	Large	RP		Measured in field	Handheld GPS
815	*Eucalyptus melliodora*	Yellow Box	83	260.75	Large	ST		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
816	*Eucalyptus melliodora*	Yellow Box	95	298.45	Large	ST		Measured in field	Handheld GPS
817	*Eucalyptus melliodora*	Yellow Box	101	317.30	Large	RP	HBT	Measured in field	Handheld GPS
818	*Eucalyptus melliodora*	Yellow Box	90	282.74	Large	RP	HBT	Measured in field	Handheld GPS
819	*Eucalyptus melliodora*	Yellow Box	90	282.74	Large	RP	HBT	Measured in field	Handheld GPS
820	*Eucalyptus melliodora*	Yellow Box	121	380.13	Large	RP	HBT	Measured in field	Handheld GPS
821	*Eucalyptus melliodora*	Yellow Box	132	414.69	Large	RP	HBT	Measured in field	Handheld GPS
822	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP	HBT	Measured in field	Handheld GPS
823	*Eucalyptus melliodora*	Yellow Box	105	329.87	Large	RP	HBT	Measured in field	Handheld GPS
824	*Eucalyptus melliodora*	Yellow Box	132	414.69	Large	RP	HBT	Measured in field	Handheld GPS
825	*Eucalyptus melliodora*	Yellow Box	85	267.04	Large	RP	HBT	Measured in field	Handheld GPS
826	*Eucalyptus melliodora*	Yellow Box	116	364.42	Large	RP	HBT	Measured in field	Handheld GPS
827	*Eucalyptus melliodora*	Yellow Box	121	380.13	Large	RP	HBT	Measured in field	Handheld GPS
828	*Eucalyptus melliodora*	Yellow Box	83	260.75	Large	RP	HBT	Measured in field	Handheld GPS
829	*Eucalyptus melliodora*	Yellow Box	87	273.32	Large	RP	HBT	Measured in field	Handheld GPS
830	*Eucalyptus melliodora*	Yellow Box	83	260.75	Large	RP	HBT	Measured in field	Handheld GPS
831	*Eucalyptus melliodora*	Yellow Box	105	329.87	Large	RP	HBT	Measured in field	Handheld GPS
832	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP	HBT	Measured in field	Handheld GPS
833	*Eucalyptus melliodora*	Yellow Box	123	386.42	Large	ST	HBT	Measured in field	Handheld GPS
834	*Eucalyptus melliodora*	Yellow Box	97	304.73	Large	ST	HBT	Measured in field	Handheld GPS
835	*Eucalyptus melliodora*	Yellow Box	62	194.78	Small	ST	HBT	Measured in field	Handheld GPS
836	*Eucalyptus melliodora*	Yellow Box	125	392.70	Large	ST	HBT	Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
837	*Eucalyptus melliodora*	Yellow Box	116	364.42	Large	ST	HBT	Measured in field	Handheld GPS
838	*Eucalyptus melliodora*	Yellow Box	138	433.54	Large	ST	HBT	Measured in field	Handheld GPS
839	*Eucalyptus melliodora*	Yellow Box	125	392.70	Large	ST	HBT	Measured in field	Handheld GPS
840	*Eucalyptus melliodora*	Yellow Box	106	333.01	Large	ST	HBT	Measured in field	Handheld GPS
841	*Eucalyptus melliodora*	Yellow Box	100	314.16	Large	ST	HBT	Measured in field	Handheld GPS
842	*Eucalyptus melliodora*	Yellow Box	137	430.40	Large	ST	HBT	Measured in field	Handheld GPS
843	*Eucalyptus melliodora*	Yellow Box	129	405.27	Large	ST	HBT	Measured in field	Handheld GPS
844	*Eucalyptus melliodora*	Yellow Box	139	436.68	Large	ST	HBT	Measured in field	Handheld GPS
845	*Eucalyptus melliodora*	Yellow Box	97	304.73	Large	RP		Measured in field	Handheld GPS
846	*Eucalyptus melliodora*	Yellow Box	105	329.87	Large	RP		Measured in field	Handheld GPS
847	*Eucalyptus melliodora*	Yellow Box	60	188.50	Small	RP		Measured in field	Handheld GPS
848	*Eucalyptus melliodora*	Yellow Box	88	276.46	Large	RP		Measured in field	Handheld GPS
849	*Eucalyptus melliodora*	Yellow Box	128	402.12	Large	RP		Measured in field	Handheld GPS
850	*Eucalyptus melliodora*	Yellow Box	83	260.75	Large	RP		Measured in field	Handheld GPS
851	*Eucalyptus melliodora*	Yellow Box	68	213.63	Small	ST		Measured in field	Handheld GPS
852	*Eucalyptus melliodora*	Yellow Box	78	245.04	Large	RP		Measured in field	Handheld GPS
853	*Eucalyptus melliodora*	Yellow Box	112	351.86	Large	RP		Measured in field	Handheld GPS
854	*Eucalyptus melliodora*	Yellow Box	79	248.19	Large	RP		Measured in field	Handheld GPS
855	*Eucalyptus melliodora*	Yellow Box	78	245.04	Large	RP		Measured in field	Handheld GPS
856	*Eucalyptus melliodora*	Yellow Box	85	267.04	Large	RP		Measured in field	Handheld GPS
857	*Eucalyptus melliodora*	Yellow Box	91	285.88	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
858	*Eucalyptus melliodora*	Yellow Box	91	285.88	Large	RP		Measured in field	Handheld GPS
859	*Eucalyptus melliodora*	Yellow Box	76	238.76	Large	RP		Measured in field	Handheld GPS
860	*Eucalyptus melliodora*	Yellow Box	90	282.74	Large	RP		Measured in field	Handheld GPS
861	*Eucalyptus melliodora*	Yellow Box	108	339.29	Large	RP		Measured in field	Handheld GPS
862	*Eucalyptus melliodora*	Yellow Box	77	241.90	Large	RP		Measured in field	Handheld GPS
863	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	RP		Measured in field	Handheld GPS
864	*Eucalyptus melliodora*	Yellow Box	90	282.74	Large	RP		Measured in field	Handheld GPS
865	*Eucalyptus melliodora*	Yellow Box	90	282.74	Large	RP		Measured in field	Handheld GPS
866	*Eucalyptus melliodora*	Yellow Box	95	298.45	Large	RP		Measured in field	Handheld GPS
867	*Eucalyptus melliodora*	Yellow Box	83	260.75	Large	RP		Measured in field	Handheld GPS
868	*Eucalyptus melliodora*	Yellow Box	94	295.31	Large	RP		Measured in field	Handheld GPS
869	*Eucalyptus melliodora*	Yellow Box	81	254.47	Large	RP		Measured in field	Handheld GPS
870	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
871	*Eucalyptus melliodora*	Yellow Box	95	298.45	Large	RP		Measured in field	Handheld GPS
872	*Eucalyptus melliodora*	Yellow Box	76	238.76	Large	RP		Measured in field	Handheld GPS
873	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP		Measured in field	Handheld GPS
874	*Eucalyptus melliodora*	Yellow Box	95	298.45	Large	RP		Measured in field	Handheld GPS
875	*Eucalyptus melliodora*	Yellow Box	75	235.62	Large	RP		Measured in field	Handheld GPS
876	*Eucalyptus melliodora*	Yellow Box	78	245.04	Large	RP		Measured in field	Handheld GPS
877	*Eucalyptus melliodora*	Yellow Box	78	245.04	Large	RP		Measured in field	Handheld GPS
878	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
879	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
880	*Eucalyptus melliodora*	Yellow Box	77	241.90	Large	RP		Measured in field	Handheld GPS
881	*Eucalyptus melliodora*	Yellow Box	136	427.26	Large	RP		Measured in field	Handheld GPS
882	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	RP		Measured in field	Handheld GPS
883	*Eucalyptus melliodora*	Yellow Box	75	235.62	Large	RP		Measured in field	Handheld GPS
884	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
885	*Eucalyptus melliodora*	Yellow Box	83	260.75	Large	RP		Measured in field	Handheld GPS
886	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	RP		Measured in field	Handheld GPS
887	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP		Measured in field	Handheld GPS
888	*Eucalyptus melliodora*	Yellow Box	111	348.72	Large	RP		Measured in field	Handheld GPS
889	*Eucalyptus melliodora*	Yellow Box	112	351.86	Large	RP		Measured in field	Handheld GPS
890	*Eucalyptus melliodora*	Yellow Box	96	301.59	Large	RP		Measured in field	Handheld GPS
891	*Eucalyptus melliodora*	Yellow Box	99	311.02	Large	RP		Measured in field	Handheld GPS
892	*Eucalyptus melliodora*	Yellow Box	96	301.59	Large	RP		Measured in field	Handheld GPS
893	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
894	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	RP		Measured in field	Handheld GPS
895	*Eucalyptus melliodora*	Yellow Box	85	267.04	Large	RP		Measured in field	Handheld GPS
896	*Eucalyptus melliodora*	Yellow Box	79	248.19	Large	RP		Measured in field	Handheld GPS
897	*Eucalyptus melliodora*	Yellow Box	132	414.69	Large	RP		Measured in field	Handheld GPS
898	*Eucalyptus melliodora*	Yellow Box	109	342.43	Large	RP		Measured in field	Handheld GPS
899	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
900	*Eucalyptus melliodora*	Yellow Box	94	295.31	Large	RP		Measured in field	Handheld GPS
901	*Eucalyptus melliodora*	Yellow Box	95	298.45	Large	RP		Measured in field	Handheld GPS
902	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS
903	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS
904	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP		Measured in field	Handheld GPS
905	*Eucalyptus melliodora*	Yellow Box	86	270.18	Large	RP		Measured in field	Handheld GPS
906	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP		Measured in field	Handheld GPS
907	*Eucalyptus melliodora*	Yellow Box	81	254.47	Large	RP		Measured in field	Handheld GPS
908	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
909	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
910	*Eucalyptus melliodora*	Yellow Box	78	245.04	Large	RP		Measured in field	Handheld GPS
911	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP		Measured in field	Handheld GPS
912	*Eucalyptus melliodora*	Yellow Box	85	267.04	Large	RP		Measured in field	Handheld GPS
913	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP		Measured in field	Handheld GPS
914	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
915	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP		Measured in field	Handheld GPS
916	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP		Measured in field	Handheld GPS
917	*Eucalyptus melliodora*	Yellow Box	162	508.94	Large	RP		Measured in field	Handheld GPS
918	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS
919	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS
920	*Eucalyptus melliodora*	Yellow Box	86	270.18	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
921	*Eucalyptus melliodora*	Yellow Box	105	329.87	Large	RP		Measured in field	Handheld GPS
922	*Eucalyptus melliodora*	Yellow Box	110	345.58	Large	RP		Measured in field	Handheld GPS
923	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
924	*Eucalyptus melliodora*	Yellow Box	64	201.06	Large	RP		Measured in field	Handheld GPS
925	*Eucalyptus melliodora*	Yellow Box	60	188.50	Large	RP		Measured in field	Handheld GPS
926	*Eucalyptus melliodora*	Yellow Box	64	201.06	Large	RP		Measured in field	Handheld GPS
927	*Eucalyptus melliodora*	Yellow Box	95	298.45	Large	RP		Measured in field	Handheld GPS
928	*Eucalyptus melliodora*	Yellow Box	35	109.96	Small	RP		Measured in field	Handheld GPS
929	*Eucalyptus melliodora*	Yellow Box	85	267.04	Large	RP		Measured in field	Handheld GPS
930	*Eucalyptus melliodora*	Yellow Box	74	232.48	Large	RP		Measured in field	Handheld GPS
931	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
932	*Eucalyptus melliodora*	Yellow Box	89	279.60	Large	RP		Measured in field	Handheld GPS
933	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
934	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
935	*Eucalyptus melliodora*	Yellow Box	91	285.88	Large	RP		Measured in field	Handheld GPS
936	*Eucalyptus melliodora*	Yellow Box	85	267.04	Large	RP		Measured in field	Handheld GPS
937	*Eucalyptus melliodora*	Yellow Box	94	295.31	Large	RP		Measured in field	Handheld GPS
938	*Eucalyptus melliodora*	Yellow Box	85	267.04	Large	RP		Measured in field	Handheld GPS
939	*Eucalyptus melliodora*	Yellow Box	118	370.71	Large	RP		Measured in field	Handheld GPS
940	*Eucalyptus melliodora*	Yellow Box	128	402.12	Large	RP		Measured in field	Handheld GPS
941	*Eucalyptus melliodora*	Yellow Box	91	285.88	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
942	*Eucalyptus melliodora*	Yellow Box	84	263.89	Large	RP		Measured in field	Handheld GPS
943	*Eucalyptus melliodora*	Yellow Box	79	248.19	Large	RP		Measured in field	Handheld GPS
944	*Eucalyptus melliodora*	Yellow Box	137	430.40	Large	RP		Measured in field	Handheld GPS
945	*Eucalyptus melliodora*	Yellow Box	133	417.83	Large	RP		Measured in field	Handheld GPS
946	*Eucalyptus melliodora*	Yellow Box	144	452.39	Large	RP		Measured in field	Handheld GPS
947	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	RP		Measured in field	Handheld GPS
948	*Eucalyptus melliodora*	Yellow Box	92	289.03	Large	RP		Measured in field	Handheld GPS
949	*Eucalyptus melliodora*	Yellow Box	112	351.86	Large	RP		Measured in field	Handheld GPS
950	*Eucalyptus melliodora*	Yellow Box	92	289.03	Large	RP		Measured in field	Handheld GPS
951	*Eucalyptus melliodora*	Yellow Box	98	307.88	Large	RP		Measured in field	Handheld GPS
952	*Eucalyptus melliodora*	Yellow Box	94	295.31	Large	RP		Measured in field	Handheld GPS
953	*Eucalyptus melliodora*	Yellow Box	123	386.42	Large	RP		Measured in field	Handheld GPS
954	*Eucalyptus melliodora*	Yellow Box	112	351.86	Large	RP		Measured in field	Handheld GPS
955	*Eucalyptus melliodora*	Yellow Box	112	351.86	Large	RP		Measured in field	Handheld GPS
956	*Eucalyptus melliodora*	Yellow Box	112	351.86	Large	RP		Measured in field	Handheld GPS
957	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	RP		Measured in field	Handheld GPS
958	*Eucalyptus melliodora*	Yellow Box	114	358.14	Large	RP		Measured in field	Handheld GPS
959	*Eucalyptus melliodora*	Yellow Box	92	289.03	Large	RP		Measured in field	Handheld GPS
960	*Eucalyptus melliodora*	Yellow Box	99	311.02	Large	RP		Measured in field	Handheld GPS
961	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	RP		Measured in field	Handheld GPS
962	*Eucalyptus melliodora*	Yellow Box	92	289.03	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
963	*Eucalyptus melliodora*	Yellow Box	100	314.16	Large	RP		Measured in field	Handheld GPS
964	*Eucalyptus melliodora*	Yellow Box	92	289.03	Large	RP		Measured in field	Handheld GPS
965	*Eucalyptus melliodora*	Yellow Box		0.00	Large	RP		Measured in field	Handheld GPS
966	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
967	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP		Measured in field	Handheld GPS
968	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	RP		Measured in field	Handheld GPS
969	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
970	*Eucalyptus melliodora*	Yellow Box	96	301.59	Large	RP		Measured in field	Handheld GPS
971	*Eucalyptus melliodora*	Yellow Box	104	326.73	Large	RP		Measured in field	Handheld GPS
972	*Eucalyptus melliodora*	Yellow Box	76	238.76	Large	RP		Measured in field	Handheld GPS
973	*Eucalyptus melliodora*	Yellow Box	75	235.62	Large	RP		Measured in field	Handheld GPS
974	*Eucalyptus melliodora*	Yellow Box	137	430.40	Large	RP		Measured in field	Handheld GPS
975	*Eucalyptus melliodora*	Yellow Box	97	304.73	Large	RP		Measured in field	Handheld GPS
976	*Eucalyptus melliodora*	Yellow Box	78	245.04	Large	RP		Measured in field	Handheld GPS
977	*Eucalyptus melliodora*	Yellow Box	78	245.04	Large	RP		Measured in field	Handheld GPS
978	*Eucalyptus melliodora*	Yellow Box	123	386.42	Large	RP		Measured in field	Handheld GPS
979	*Eucalyptus melliodora*	Yellow Box	81	254.47	Large	RP		Measured in field	Handheld GPS
980	*Eucalyptus melliodora*	Yellow Box	66	207.35	Small	RP		Measured in field	Handheld GPS
981	*Eucalyptus melliodora*	Yellow Box	75	235.62	Large	RP		Measured in field	Handheld GPS
982	*Eucalyptus melliodora*	Yellow Box	98	307.88	Large	RP		Measured in field	Handheld GPS
983	*Eucalyptus melliodora*	Yellow Box	66	207.35	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
984	*Eucalyptus melliodora*	Yellow Box	76	238.76	Large	RP		Measured in field	Handheld GPS
985	*Eucalyptus melliodora*	Yellow Box	67	210.49	Large	RP		Measured in field	Handheld GPS
986	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP		Measured in field	Handheld GPS
987	*Eucalyptus melliodora*	Yellow Box	90	282.74	Large	RP		Measured in field	Handheld GPS
988	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS
989	*Eucalyptus melliodora*	Yellow Box	74	232.48	Large	RP		Measured in field	Handheld GPS
990	*Eucalyptus melliodora*	Yellow Box	80	251.33	Large	RP		Measured in field	Handheld GPS
991	*Eucalyptus melliodora*	Yellow Box	76	238.76	Large	RP		Measured in field	Handheld GPS
992	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS
993	*Eucalyptus melliodora*	Yellow Box	74	232.48	Large	RP		Measured in field	Handheld GPS
994	*Eucalyptus melliodora*	Yellow Box	66	207.35	Large	RP		Measured in field	Handheld GPS
995	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
996	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
997	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
998	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP		Measured in field	Handheld GPS
999	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP		Measured in field	Handheld GPS
1000	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS
1001	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS
1002	*Eucalyptus melliodora*	Yellow Box	74	232.48	Large	RP		Measured in field	Handheld GPS
1003	*Eucalyptus melliodora*	Yellow Box	74	232.48	Large	RP		Measured in field	Handheld GPS
1004	*Eucalyptus melliodora*	Yellow Box	74	232.48	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1005	*Eucalyptus melliodora*	Yellow Box	74	232.48	Large	RP		Measured in field	Handheld GPS
1006	*Eucalyptus melliodora*	Yellow Box	74	232.48	Large	RP		Measured in field	Handheld GPS
1007	*Eucalyptus melliodora*	Yellow Box	75	235.62	Large	RP		Measured in field	Handheld GPS
1008	*Eucalyptus melliodora*	Yellow Box	75	235.62	Large	RP		Measured in field	Handheld GPS
1009	*Eucalyptus melliodora*	Yellow Box	76	238.76	Large	RP		Measured in field	Handheld GPS
1010	*Eucalyptus melliodora*	Yellow Box	77	241.90	Large	RP		Measured in field	Handheld GPS
1011	*Eucalyptus melliodora*	Yellow Box	78	245.04	Large	RP		Measured in field	Handheld GPS
1012	*Eucalyptus melliodora*	Yellow Box	78	245.04	Large	RP		Measured in field	Handheld GPS
1013	*Eucalyptus melliodora*	Yellow Box	78	245.04	Large	RP		Measured in field	Handheld GPS
1014	*Eucalyptus melliodora*	Yellow Box	78	245.04	Large	RP		Measured in field	Handheld GPS
1015	*Eucalyptus melliodora*	Yellow Box	78	245.04	Large	RP		Measured in field	Handheld GPS
1016	*Eucalyptus melliodora*	Yellow Box	78	245.04	Large	RP		Measured in field	Handheld GPS
1017	*Eucalyptus melliodora*	Yellow Box	79	248.19	Large	RP		Measured in field	Handheld GPS
1018	*Eucalyptus melliodora*	Yellow Box	80	251.33	Large	RP		Measured in field	Handheld GPS
1019	*Eucalyptus melliodora*	Yellow Box	80	251.33	Large	RP		Measured in field	Handheld GPS
1020	*Eucalyptus melliodora*	Yellow Box	81	254.47	Large	RP		Measured in field	Handheld GPS
1021	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	RP		Measured in field	Handheld GPS
1022	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	RP		Measured in field	Handheld GPS
1023	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	RP		Measured in field	Handheld GPS
1024	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	RP		Measured in field	Handheld GPS
1025	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1026	*Eucalyptus melliodora*	Yellow Box	83	260.75	Large	RP		Measured in field	Handheld GPS
1027	*Eucalyptus melliodora*	Yellow Box	83	260.75	Large	RP		Measured in field	Handheld GPS
1028	*Eucalyptus melliodora*	Yellow Box	85	267.04	Large	RP		Measured in field	Handheld GPS
1029	*Eucalyptus melliodora*	Yellow Box	85	267.04	Large	RP		Measured in field	Handheld GPS
1030	*Eucalyptus melliodora*	Yellow Box	86	270.18	Large	RP		Measured in field	Handheld GPS
1031	*Eucalyptus melliodora*	Yellow Box	87	273.32	Large	RP		Measured in field	Handheld GPS
1032	*Eucalyptus melliodora*	Yellow Box	87	273.32	Large	RP		Measured in field	Handheld GPS
1033	*Eucalyptus melliodora*	Yellow Box	87	273.32	Large	RP		Measured in field	Handheld GPS
1034	*Eucalyptus melliodora*	Yellow Box	87	273.32	Large	RP		Measured in field	Handheld GPS
1035	*Eucalyptus melliodora*	Yellow Box	87	273.32	Large	RP		Measured in field	Handheld GPS
1036	*Eucalyptus melliodora*	Yellow Box	87	273.32	Large	RP		Measured in field	Handheld GPS
1037	*Eucalyptus melliodora*	Yellow Box	91	285.88	Large	RP		Measured in field	Handheld GPS
1038	*Eucalyptus melliodora*	Yellow Box	91	285.88	Large	RP		Measured in field	Handheld GPS
1039	*Eucalyptus melliodora*	Yellow Box	93	292.17	Large	RP		Measured in field	Handheld GPS
1040	*Eucalyptus melliodora*	Yellow Box	93	292.17	Large	RP		Measured in field	Handheld GPS
1041	*Eucalyptus melliodora*	Yellow Box	93	292.17	Large	RP		Measured in field	Handheld GPS
1042	*Eucalyptus melliodora*	Yellow Box	93	292.17	Large	RP		Measured in field	Handheld GPS
1043	*Eucalyptus melliodora*	Yellow Box	94	295.31	Large	RP		Measured in field	Handheld GPS
1044	*Eucalyptus melliodora*	Yellow Box	99	311.02	Large	RP		Measured in field	Handheld GPS
1045	*Eucalyptus melliodora*	Yellow Box	102	320.44	Large	RP		Measured in field	Handheld GPS
1046	*Eucalyptus melliodora*	Yellow Box	103	323.58	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1047	*Eucalyptus melliodora*	Yellow Box	104	326.73	Large	RP		Measured in field	Handheld GPS
1048	*Eucalyptus melliodora*	Yellow Box	109	342.43	Large	RP		Measured in field	Handheld GPS
1049	*Eucalyptus melliodora*	Yellow Box	109	342.43	Large	RP		Measured in field	Handheld GPS
1050	*Eucalyptus melliodora*	Yellow Box	110	345.58	Large	RP		Measured in field	Handheld GPS
1051	*Eucalyptus melliodora*	Yellow Box	110	345.58	Large	RP		Measured in field	Handheld GPS
1052	*Eucalyptus melliodora*	Yellow Box	111	348.72	Large	RP		Measured in field	Handheld GPS
1053	*Eucalyptus melliodora*	Yellow Box	111	348.72	Large	RP		Measured in field	Handheld GPS
1054	*Eucalyptus melliodora*	Yellow Box	111	348.72	Large	RP		Measured in field	Handheld GPS
1055	*Eucalyptus melliodora*	Yellow Box	113	355.00	Large	RP		Measured in field	Handheld GPS
1056	*Eucalyptus melliodora*	Yellow Box	117	367.57	Large	RP		Measured in field	Handheld GPS
1057	*Eucalyptus melliodora*	Yellow Box	118	370.71	Large	RP		Measured in field	Handheld GPS
1058	*Eucalyptus melliodora*	Yellow Box	119	373.85	Large	RP		Measured in field	Handheld GPS
1059	*Eucalyptus melliodora*	Yellow Box	120	376.99	Large	RP		Measured in field	Handheld GPS
1060	*Eucalyptus melliodora*	Yellow Box	120	376.99	Large	RP		Measured in field	Handheld GPS
1061	*Eucalyptus melliodora*	Yellow Box	126	395.84	Large	RP		Measured in field	Handheld GPS
1062	*Eucalyptus melliodora*	Yellow Box	129	405.27	Large	RP		Measured in field	Handheld GPS
1063	*Eucalyptus melliodora*	Yellow Box	139	436.68	Large	RP		Measured in field	Handheld GPS
1064	*Eucalyptus melliodora*	Yellow Box	139	436.68	Large	RP		Measured in field	Handheld GPS
1065	*Eucalyptus melliodora*	Yellow Box	144	452.39	Large	RP		Measured in field	Handheld GPS
1066	*Eucalyptus melliodora*	Yellow Box	60	188.50	Small	RP		Measured in field	Handheld GPS
1067	*Eucalyptus melliodora*	Yellow Box	61	191.64	Small	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1068	*Eucalyptus melliodora*	Yellow Box	68	213.63	Small	RP		Measured in field	Handheld GPS
1069	*Eucalyptus melliodora*	Yellow Box	69	216.77	Small	RP		Measured in field	Handheld GPS
1070	*Eucalyptus melliodora*	Yellow Box	69	216.77	Small	RP		Measured in field	Handheld GPS
1071	*Eucalyptus melliodora*	Yellow Box	61	191.64	Large	RP		Measured in field	Handheld GPS
1072	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
1073	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
1074	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
1075	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
1076	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
1077	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
1078	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
1079	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
1080	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
1081	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
1082	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
1083	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
1084	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
1085	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
1086	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP		Measured in field	Handheld GPS
1087	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP		Measured in field	Handheld GPS
1088	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1089	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS
1090	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS
1091	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS
1092	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS
1093	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS
1094	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS
1095	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS
1096	*Eucalyptus melliodora*	Yellow Box	74	232.48	Large	RP		Measured in field	Handheld GPS
1097	*Eucalyptus melliodora*	Yellow Box	74	232.48	Large	RP		Measured in field	Handheld GPS
1098	*Eucalyptus melliodora*	Yellow Box	74	232.48	Large	RP		Measured in field	Handheld GPS
1099	*Eucalyptus melliodora*	Yellow Box	74	232.48	Large	RP		Measured in field	Handheld GPS
1100	*Eucalyptus melliodora*	Yellow Box	74	232.48	Large	RP		Measured in field	Handheld GPS
1101	*Eucalyptus melliodora*	Yellow Box	75	235.62	Large	RP		Measured in field	Handheld GPS
1102	*Eucalyptus melliodora*	Yellow Box	76	238.76	Large	RP		Measured in field	Handheld GPS
1103	*Eucalyptus melliodora*	Yellow Box	76	238.76	Large	RP		Measured in field	Handheld GPS
1104	*Eucalyptus melliodora*	Yellow Box	77	241.90	Large	RP		Measured in field	Handheld GPS
1105	*Eucalyptus melliodora*	Yellow Box	78	245.04	Large	RP		Measured in field	Handheld GPS
1106	*Eucalyptus melliodora*	Yellow Box	78	245.04	Large	RP		Measured in field	Handheld GPS
1107	*Eucalyptus melliodora*	Yellow Box	79	248.19	Large	RP		Measured in field	Handheld GPS
1108	*Eucalyptus melliodora*	Yellow Box	79	248.19	Large	RP		Measured in field	Handheld GPS
1109	*Eucalyptus melliodora*	Yellow Box	80	251.33	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1110	*Eucalyptus melliodora*	Yellow Box	80	251.33	Large	RP		Measured in field	Handheld GPS
1111	*Eucalyptus melliodora*	Yellow Box	80	251.33	Large	RP		Measured in field	Handheld GPS
1112	*Eucalyptus melliodora*	Yellow Box	81	254.47	Large	RP		Measured in field	Handheld GPS
1113	*Eucalyptus melliodora*	Yellow Box	81	254.47	Large	RP		Measured in field	Handheld GPS
1114	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	RP		Measured in field	Handheld GPS
1115	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	RP		Measured in field	Handheld GPS
1116	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	RP		Measured in field	Handheld GPS
1117	*Eucalyptus melliodora*	Yellow Box	83	260.75	Large	RP		Measured in field	Handheld GPS
1118	*Eucalyptus melliodora*	Yellow Box	83	260.75	Large	RP		Measured in field	Handheld GPS
1119	*Eucalyptus melliodora*	Yellow Box	83	260.75	Large	RP		Measured in field	Handheld GPS
1120	*Eucalyptus melliodora*	Yellow Box	84	263.89	Large	RP		Measured in field	Handheld GPS
1121	*Eucalyptus melliodora*	Yellow Box	85	267.04	Large	RP		Measured in field	Handheld GPS
1122	*Eucalyptus melliodora*	Yellow Box	85	267.04	Large	RP		Measured in field	Handheld GPS
1123	*Eucalyptus melliodora*	Yellow Box	86	270.18	Large	RP		Measured in field	Handheld GPS
1124	*Eucalyptus melliodora*	Yellow Box	86	270.18	Large	RP		Measured in field	Handheld GPS
1125	*Eucalyptus melliodora*	Yellow Box	86	270.18	Large	RP		Measured in field	Handheld GPS
1126	*Eucalyptus melliodora*	Yellow Box	86	270.18	Large	RP		Measured in field	Handheld GPS
1127	*Eucalyptus melliodora*	Yellow Box	87	273.32	Large	RP		Measured in field	Handheld GPS
1128	*Eucalyptus melliodora*	Yellow Box	88	276.46	Large	RP		Measured in field	Handheld GPS
1129	*Eucalyptus melliodora*	Yellow Box	91	285.88	Large	RP		Measured in field	Handheld GPS
1130	*Eucalyptus melliodora*	Yellow Box	91	285.88	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1131	*Eucalyptus melliodora*	Yellow Box	92	289.03	Large	RP		Measured in field	Handheld GPS
1132	*Eucalyptus melliodora*	Yellow Box	92	289.03	Large	RP		Measured in field	Handheld GPS
1133	*Eucalyptus melliodora*	Yellow Box	93	292.17	Large	RP		Measured in field	Handheld GPS
1134	*Eucalyptus melliodora*	Yellow Box	93	292.17	Large	RP		Measured in field	Handheld GPS
1135	*Eucalyptus melliodora*	Yellow Box	95	298.45	Large	RP		Measured in field	Handheld GPS
1136	*Eucalyptus melliodora*	Yellow Box	95	298.45	Large	RP		Measured in field	Handheld GPS
1137	*Eucalyptus melliodora*	Yellow Box	97	304.73	Large	RP		Measured in field	Handheld GPS
1138	*Eucalyptus melliodora*	Yellow Box	98	307.88	Large	RP		Measured in field	Handheld GPS
1139	*Eucalyptus melliodora*	Yellow Box	98	307.88	Large	RP		Measured in field	Handheld GPS
1140	*Eucalyptus melliodora*	Yellow Box	100	314.16	Large	RP		Measured in field	Handheld GPS
1141	*Eucalyptus melliodora*	Yellow Box	100	314.16	Large	RP		Measured in field	Handheld GPS
1142	*Eucalyptus melliodora*	Yellow Box	100	314.16	Large	RP		Measured in field	Handheld GPS
1143	*Eucalyptus melliodora*	Yellow Box	100	314.16	Large	RP		Measured in field	Handheld GPS
1144	*Eucalyptus melliodora*	Yellow Box	101	317.30	Large	RP		Measured in field	Handheld GPS
1145	*Eucalyptus melliodora*	Yellow Box	101	317.30	Large	RP		Measured in field	Handheld GPS
1146	*Eucalyptus melliodora*	Yellow Box	101	317.30	Large	RP		Measured in field	Handheld GPS
1147	*Eucalyptus melliodora*	Yellow Box	102	320.44	Large	RP		Measured in field	Handheld GPS
1148	*Eucalyptus melliodora*	Yellow Box	102	320.44	Large	RP		Measured in field	Handheld GPS
1149	*Eucalyptus melliodora*	Yellow Box	105	329.87	Large	RP		Measured in field	Handheld GPS
1150	*Eucalyptus melliodora*	Yellow Box	106	333.01	Large	RP		Measured in field	Handheld GPS
1151	*Eucalyptus melliodora*	Yellow Box	107	336.15	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1152	*Eucalyptus melliodora*	Yellow Box	108	339.29	Large	RP		Measured in field	Handheld GPS
1153	*Eucalyptus melliodora*	Yellow Box	108	339.29	Large	RP		Measured in field	Handheld GPS
1154	*Eucalyptus melliodora*	Yellow Box	114	358.14	Large	RP		Measured in field	Handheld GPS
1155	*Eucalyptus melliodora*	Yellow Box	114	358.14	Large	RP		Measured in field	Handheld GPS
1156	*Eucalyptus melliodora*	Yellow Box	117	367.57	Large	RP		Measured in field	Handheld GPS
1157	*Eucalyptus melliodora*	Yellow Box	124	389.56	Large	RP		Measured in field	Handheld GPS
1158	*Eucalyptus melliodora*	Yellow Box	126	395.84	Large	RP		Measured in field	Handheld GPS
1159	*Eucalyptus melliodora*	Yellow Box	144	452.39	Large	RP		Measured in field	Handheld GPS
1160	*Eucalyptus melliodora*	Yellow Box	150	471.24	Large	RP		Measured in field	Handheld GPS
1161	*Eucalyptus melliodora*	Yellow Box	150	471.24	Large	RP		Measured in field	Handheld GPS
1162	*Eucalyptus melliodora*	Yellow Box	155	486.95	Large	RP		Measured in field	Handheld GPS
1163	*Eucalyptus melliodora*	Yellow Box	164	515.22	Large	RP		Measured in field	Handheld GPS
1164	*Eucalyptus melliodora*	Yellow Box	49	153.94	Small	RP		Measured in field	Handheld GPS
1165	*Eucalyptus melliodora*	Yellow Box	60	188.50	Small	RP		Measured in field	Handheld GPS
1166	*Eucalyptus melliodora*	Yellow Box	62	194.78	Small	RP		Measured in field	Handheld GPS
1167	*Eucalyptus melliodora*	Yellow Box	63	197.92	Small	RP		Measured in field	Handheld GPS
1168	*Eucalyptus melliodora*	Yellow Box	65	204.20	Small	RP		Measured in field	Handheld GPS
1169	*Eucalyptus melliodora*	Yellow Box	66	207.35	Small	RP		Measured in field	Handheld GPS
1170	*Eucalyptus melliodora*	Yellow Box	66	207.35	Small	RP		Measured in field	Handheld GPS
1171	*Eucalyptus melliodora*	Yellow Box	67	210.49	Small	RP		Measured in field	Handheld GPS
1172	*Eucalyptus melliodora*	Yellow Box	68	213.63	Small	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1173	*Eucalyptus melliodora*	Yellow Box	68	213.63	Small	RP		Measured in field	Handheld GPS
1174	*Eucalyptus melliodora*	Yellow Box	68	213.63	Small	RP		Measured in field	Handheld GPS
1175	*Eucalyptus melliodora*	Yellow Box	69	216.77	Small	RP		Measured in field	Handheld GPS
1176	*Eucalyptus melliodora*	Yellow Box	69	216.77	Small	RP		Measured in field	Handheld GPS
1177	*Eucalyptus melliodora*	Yellow Box	69	216.77	Small	RP		Measured in field	Handheld GPS
1178	*Eucalyptus melliodora*	Yellow Box	74	232.48	Large	RP		Measured in field	Handheld GPS
1179	*Eucalyptus melliodora*	Yellow Box	94	295.31	Large	RP		Measured in field	Handheld GPS
1180	*Eucalyptus melliodora*	Yellow Box	78	245.04	Large	RP		Measured in field	Handheld GPS
1181	*Eucalyptus melliodora*	Yellow Box	78	245.04	Large	RP		Measured in field	Handheld GPS
1182	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP		Measured in field	Handheld GPS
1183	*Eucalyptus melliodora*	Yellow Box	85	267.04	Large	RP		Measured in field	Handheld GPS
1184	*Eucalyptus melliodora*	Yellow Box	83	260.75	Large	RP		Measured in field	Handheld GPS
1185	*Eucalyptus melliodora*	Yellow Box	74	232.48	Large	RP		Measured in field	Handheld GPS
1186	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP		Measured in field	Handheld GPS
1187	*Eucalyptus melliodora*	Yellow Box	92	289.03	Large	RP		Measured in field	Handheld GPS
1188	*Eucalyptus melliodora*	Yellow Box	108	339.29	Large	RP		Measured in field	Handheld GPS
1189	*Eucalyptus melliodora*	Yellow Box	139	436.68	Large	RP		Measured in field	Handheld GPS
1190	*Eucalyptus melliodora*	Yellow Box	80	251.33	Large	RP		Measured in field	Handheld GPS
1191	*Eucalyptus melliodora*	Yellow Box	132	414.69	Large	RP		Measured in field	Handheld GPS
1192	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
1193	*Eucalyptus melliodora*	Yellow Box	74	232.48	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1194	*Eucalyptus melliodora*	Yellow Box	87	273.32	Large	RP		Measured in field	Handheld GPS
1195	*Eucalyptus melliodora*	Yellow Box	86	270.18	Large	RP		Measured in field	Handheld GPS
1196	*Eucalyptus melliodora*	Yellow Box	66	207.35	Large	RP		Measured in field	Handheld GPS
1197	*Eucalyptus melliodora*	Yellow Box	68	213.63	Small	RP		Measured in field	Handheld GPS
1198	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
1199	*Eucalyptus melliodora*	Yellow Box	85	267.04	Large	RP		Measured in field	Handheld GPS
1200	*Eucalyptus melliodora*	Yellow Box	62	194.78	Large	RP		Measured in field	Handheld GPS
1201	*Eucalyptus melliodora*	Yellow Box	62	194.78	Large	RP		Measured in field	Handheld GPS
1202	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP		Measured in field	Handheld GPS
1203	*Eucalyptus melliodora*	Yellow Box	60	188.50	Large	RP		Measured in field	Handheld GPS
1204	*Eucalyptus melliodora*	Yellow Box	86	270.18	Large	RP		Measured in field	Handheld GPS
1205	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
1206	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
1207	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
1208	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
1209	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
1210	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
1211	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP		Measured in field	Handheld GPS
1212	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS
1213	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS
1214	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1215	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS
1216	*Eucalyptus melliodora*	Yellow Box	75	235.62	Large	RP		Measured in field	Handheld GPS
1217	*Eucalyptus melliodora*	Yellow Box	75	235.62	Large	RP		Measured in field	Handheld GPS
1218	*Eucalyptus melliodora*	Yellow Box	76	238.76	Large	RP		Measured in field	Handheld GPS
1219	*Eucalyptus melliodora*	Yellow Box	77	241.90	Large	RP		Measured in field	Handheld GPS
1220	*Eucalyptus melliodora*	Yellow Box	77	241.90	Large	RP		Measured in field	Handheld GPS
1221	*Eucalyptus melliodora*	Yellow Box	80	251.33	Large	RP		Measured in field	Handheld GPS
1222	*Eucalyptus melliodora*	Yellow Box	80	251.33	Large	RP		Measured in field	Handheld GPS
1223	*Eucalyptus melliodora*	Yellow Box	81	254.47	Large	RP		Measured in field	Handheld GPS
1224	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	RP		Measured in field	Handheld GPS
1225	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	RP		Measured in field	Handheld GPS
1226	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	RP		Measured in field	Handheld GPS
1227	*Eucalyptus melliodora*	Yellow Box	83	260.75	Large	RP		Measured in field	Handheld GPS
1228	*Eucalyptus melliodora*	Yellow Box	84	263.89	Large	RP		Measured in field	Handheld GPS
1229	*Eucalyptus melliodora*	Yellow Box	85	267.04	Large	RP		Measured in field	Handheld GPS
1230	*Eucalyptus melliodora*	Yellow Box	85	267.04	Large	RP		Measured in field	Handheld GPS
1231	*Eucalyptus melliodora*	Yellow Box	85	267.04	Large	RP		Measured in field	Handheld GPS
1232	*Eucalyptus melliodora*	Yellow Box	85	267.04	Large	RP		Measured in field	Handheld GPS
1233	*Eucalyptus melliodora*	Yellow Box	86	270.18	Large	RP		Measured in field	Handheld GPS
1234	*Eucalyptus melliodora*	Yellow Box	92	289.03	Large	RP		Measured in field	Handheld GPS
1235	*Eucalyptus melliodora*	Yellow Box	93	292.17	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1236	*Eucalyptus melliodora*	Yellow Box	94	295.31	Large	RP		Measured in field	Handheld GPS
1237	*Eucalyptus melliodora*	Yellow Box	96	301.59	Large	RP		Measured in field	Handheld GPS
1238	*Eucalyptus melliodora*	Yellow Box	99	311.02	Large	RP		Measured in field	Handheld GPS
1239	*Eucalyptus melliodora*	Yellow Box	99	311.02	Large	RP		Measured in field	Handheld GPS
1240	*Eucalyptus melliodora*	Yellow Box	100	314.16	Large	RP		Measured in field	Handheld GPS
1241	*Eucalyptus melliodora*	Yellow Box	100	314.16	Large	RP		Measured in field	Handheld GPS
1242	*Eucalyptus melliodora*	Yellow Box	100	314.16	Large	RP		Measured in field	Handheld GPS
1243	*Eucalyptus melliodora*	Yellow Box	113	355.00	Large	RP		Measured in field	Handheld GPS
1244	*Eucalyptus melliodora*	Yellow Box	114	358.14	Large	RP		Measured in field	Handheld GPS
1245	*Eucalyptus melliodora*	Yellow Box	115	361.28	Large	RP		Measured in field	Handheld GPS
1246	*Eucalyptus melliodora*	Yellow Box	120	376.99	Large	RP		Measured in field	Handheld GPS
1247	*Eucalyptus melliodora*	Yellow Box	123	386.42	Large	RP		Measured in field	Handheld GPS
1248	*Eucalyptus melliodora*	Yellow Box	160	502.65	Large	RP		Measured in field	Handheld GPS
1249	*Eucalyptus melliodora*	Yellow Box	60	188.50	Small	RP		Measured in field	Handheld GPS
1250	*Eucalyptus melliodora*	Yellow Box	80	251.33	Large	RP		Measured in field	Handheld GPS
1251	*Eucalyptus melliodora*	Yellow Box	83	260.75	Large	RP		Measured in field	Handheld GPS
1252	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
1253	*Eucalyptus melliodora*	Yellow Box	86	270.18	Large	RP		Measured in field	Handheld GPS
1254	*Eucalyptus melliodora*	Yellow Box	80	251.33	Large	RP		Measured in field	Handheld GPS
1255	*Eucalyptus melliodora*	Yellow Box	108	339.29	Large	RP		Measured in field	Handheld GPS
1256	*Eucalyptus melliodora*	Yellow Box	75	235.62	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1257	*Eucalyptus melliodora*	Yellow Box	85	267.04	Large	RP		Measured in field	Handheld GPS
1258	*Eucalyptus melliodora*	Yellow Box	111	348.72	Large	RP		Measured in field	Handheld GPS
1259	*Eucalyptus melliodora*	Yellow Box	91	285.88	Large	RP		Measured in field	Handheld GPS
1260	*Eucalyptus melliodora*	Yellow Box	89	279.60	Large	RP		Measured in field	Handheld GPS
1261	*Eucalyptus melliodora*	Yellow Box	87	273.32	Large	RP		Measured in field	Handheld GPS
1262	*Eucalyptus melliodora*	Yellow Box	79	248.19	Large	RP		Measured in field	Handheld GPS
1263	*Eucalyptus melliodora*	Yellow Box	87	273.32	Large	RP		Measured in field	Handheld GPS
1264	*Eucalyptus melliodora*	Yellow Box	95	298.45	Large	RP		Measured in field	Handheld GPS
1265	*Eucalyptus melliodora*	Yellow Box	111	348.72	Large	RP		Measured in field	Handheld GPS
1266	*Eucalyptus melliodora*	Yellow Box	88	276.46	Large	RP		Measured in field	Handheld GPS
1267	*Eucalyptus melliodora*	Yellow Box	89	279.60	Large	RP		Measured in field	Handheld GPS
1268	*Eucalyptus melliodora*	Yellow Box	78	245.04	Large	RP		Measured in field	Handheld GPS
1269	*Eucalyptus melliodora*	Yellow Box	75	235.62	Large	RP		Measured in field	Handheld GPS
1270	*Eucalyptus melliodora*	Yellow Box	100	314.16	Large	RP		Measured in field	Handheld GPS
1271	*Eucalyptus melliodora*	Yellow Box	150	471.24	Large	RP		Measured in field	Handheld GPS
1272	*Eucalyptus melliodora*	Yellow Box	115	361.28	Large	RP		Measured in field	Handheld GPS
1273	*Eucalyptus melliodora*	Yellow Box	98	307.88	Large	RP		Measured in field	Handheld GPS
1274	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
1275	*Eucalyptus melliodora*	Yellow Box	94	295.31	Large	RP		Measured in field	Handheld GPS
1276	*Eucalyptus melliodora*	Yellow Box	100	314.16	Large	RP		Measured in field	Handheld GPS
1277	*Eucalyptus melliodora*	Yellow Box	111	348.72	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1278	*Eucalyptus melliodora*	Yellow Box	83	260.75	Large	RP		Measured in field	Handheld GPS
1279	*Eucalyptus melliodora*	Yellow Box	90	282.74	Large	RP		Measured in field	Handheld GPS
1280	*Eucalyptus melliodora*	Yellow Box	112	351.86	Large	RP		Measured in field	Handheld GPS
1281	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
1282	*Eucalyptus melliodora*	Yellow Box	77	241.90	Large	RP		Measured in field	Handheld GPS
1283	*Eucalyptus melliodora*	Yellow Box	77	241.90	Large	RP		Measured in field	Handheld GPS
1284	*Eucalyptus melliodora*	Yellow Box	85	267.04	Large	RP		Measured in field	Handheld GPS
1285	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS
1286	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS
1287	*Eucalyptus melliodora*	Yellow Box	94	295.31	Large	RP		Measured in field	Handheld GPS
1288	*Eucalyptus melliodora*	Yellow Box	137	430.40	Large	RP		Measured in field	Handheld GPS
1289	*Eucalyptus melliodora*	Yellow Box	136	427.26	Large	RP		Measured in field	Handheld GPS
1290	*Eucalyptus melliodora*	Yellow Box	137	430.40	Large	RP		Measured in field	Handheld GPS
1291	*Eucalyptus melliodora*	Yellow Box	88	276.46	Large	RP		Measured in field	Handheld GPS
1292	*Eucalyptus melliodora*	Yellow Box	115	361.28	Large	RP		Measured in field	Handheld GPS
1293	*Eucalyptus melliodora*	Yellow Box	79	248.19	Large	RP		Measured in field	Handheld GPS
1294	*Eucalyptus melliodora*	Yellow Box	83	260.75	Large	RP		Measured in field	Handheld GPS
1295	*Eucalyptus melliodora*	Yellow Box	97	304.73	Large	RP		Measured in field	Handheld GPS
1296	*Eucalyptus melliodora*	Yellow Box	105	329.87	Large	RP		Measured in field	Handheld GPS
1297	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	RP		Measured in field	Handheld GPS
1298	*Eucalyptus melliodora*	Yellow Box	89	279.60	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1299	*Eucalyptus melliodora*	Yellow Box	91	285.88	Large	RP		Measured in field	Handheld GPS
1300	*Eucalyptus melliodora*	Yellow Box	79	248.19	Large	RP		Measured in field	Handheld GPS
1301	*Eucalyptus melliodora*	Yellow Box	86	270.18	Large	RP		Measured in field	Handheld GPS
1302	*Eucalyptus melliodora*	Yellow Box	69	216.77	Large	RP		Measured in field	Handheld GPS
1303	*Eucalyptus melliodora*	Yellow Box	79	248.19	Large	RP		Measured in field	Handheld GPS
1304	*Eucalyptus melliodora*	Yellow Box	81	254.47	Large	RP		Measured in field	Handheld GPS
1305	*Eucalyptus melliodora*	Yellow Box	71	216.77	Large	RP		Measured in field	Handheld GPS
1306	*Eucalyptus melliodora*	Yellow Box	80	251.33	Large	RP		Measured in field	Handheld GPS
1307	*Eucalyptus melliodora*	Yellow Box	101	317.30	Large	RP		Measured in field	Handheld GPS
1308	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP		Measured in field	Handheld GPS
1309	*Eucalyptus melliodora*	Yellow Box	89	279.60	Large	RP		Measured in field	Handheld GPS
1310	*Eucalyptus melliodora*	Yellow Box	131	411.55	Large	RP		Measured in field	Handheld GPS
1311	*Eucalyptus melliodora*	Yellow Box	80	251.33	Large	RP		Measured in field	Handheld GPS
1312	*Eucalyptus melliodora*	Yellow Box	98	307.88	Large	RP		Measured in field	Handheld GPS
1313	*Eucalyptus melliodora*	Yellow Box	86	270.18	Large	RP		Measured in field	Handheld GPS
1314	*Eucalyptus melliodora*	Yellow Box	93	292.17	Large	RP		Measured in field	Handheld GPS
1315	*Eucalyptus melliodora*	Yellow Box	136	427.26	Large	RP		Measured in field	Handheld GPS
1316	*Eucalyptus melliodora*	Yellow Box	156	490.09	Large	RP		Measured in field	Handheld GPS
1317	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
1318	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
1319	*Eucalyptus melliodora*	Yellow Box	77	241.90	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1320	*Eucalyptus melliodora*	Yellow Box	101	317.30	Large	ST		Measured in field	Handheld GPS
1321	*Eucalyptus melliodora*	Yellow Box	83	260.75	Large	ST		Measured in field	Handheld GPS
1322	*Eucalyptus melliodora*	Yellow Box	112	351.86	Large	ST		Measured in field	Handheld GPS
1323	*Eucalyptus melliodora*	Yellow Box	135	424.12	Large	ST		Measured in field	Handheld GPS
1324	*Eucalyptus melliodora*	Yellow Box	112	351.86	Large	ST		Measured in field	Handheld GPS
1325	*Eucalyptus melliodora*	Yellow Box	113	355.00	Large	ST		Measured in field	Handheld GPS
1326	*Eucalyptus melliodora*	Yellow Box	95	298.45	Large	ST		Measured in field	Handheld GPS
1327	*Eucalyptus melliodora*	Yellow Box	77	241.90	Large	ST		Measured in field	Handheld GPS
1328	*Eucalyptus melliodora*	Yellow Box	75	235.62	Large	ST		Measured in field	Handheld GPS
1329	*Eucalyptus melliodora*	Yellow Box	61	191.64	Small	ST		Measured in field	Handheld GPS
1330	*Eucalyptus melliodora*	Yellow Box	22	69.12	Small	ST		Measured in field	Handheld GPS
1331	*Eucalyptus melliodora*	Yellow Box	47	147.65	Small	ST		Measured in field	Handheld GPS
1332	*Eucalyptus melliodora*	Yellow Box	58	182.21	Small	ST		Measured in field	Handheld GPS
1333	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	ST		Measured in field	Handheld GPS
1334	*Eucalyptus melliodora*	Yellow Box	76	238.76	Large	ST		Measured in field	Handheld GPS
1335	*Eucalyptus melliodora*	Yellow Box	13	40.84	Small	ST		Measured in field	Handheld GPS
1336	*Eucalyptus melliodora*	Yellow Box	32	100.53	Small	ST		Measured in field	Handheld GPS
1337	*Eucalyptus melliodora*	Yellow Box	34	106.81	Small	ST		Measured in field	Handheld GPS
1338	*Eucalyptus melliodora*	Yellow Box	44	138.23	Small	ST		Measured in field	Handheld GPS
1339	*Eucalyptus melliodora*	Yellow Box	47	147.65	Small	ST		Measured in field	Handheld GPS
1340	*Eucalyptus melliodora*	Yellow Box	6	18.85	Small	ST		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1341	*Eucalyptus melliodora*	Yellow Box	31	97.39	Small	ST		Measured in field	Handheld GPS
1342	*Eucalyptus melliodora*	Yellow Box	39	122.52	Small	ST		Measured in field	Handheld GPS
1343	*Eucalyptus melliodora*	Yellow Box	44	138.23	Small	ST		Measured in field	Handheld GPS
1344	*Eucalyptus melliodora*	Yellow Box	55	172.79	Small	ST		Measured in field	Handheld GPS
1345	*Eucalyptus melliodora*	Yellow Box	64	201.06	Small	ST		Measured in field	Handheld GPS
1346	*Eucalyptus melliodora*	Yellow Box	62	194.78	Small	ST		Measured in field	Handheld GPS
1347	*Eucalyptus melliodora*	Yellow Box	53	166.50	Small	ST		Measured in field	Handheld GPS
1348	*Eucalyptus melliodora*	Yellow Box	44	138.23	Small	ST		Measured in field	Handheld GPS
1349	*Eucalyptus melliodora*	Yellow Box	93	292.17	Large	ST		Measured in field	Handheld GPS
1350	*Eucalyptus melliodora*	Yellow Box	84	263.89	Large	ST		Measured in field	Handheld GPS
1351	*Eucalyptus melliodora*	Yellow Box	90	282.74	Large	ST		Measured in field	Handheld GPS
1352	*Eucalyptus melliodora*	Yellow Box	87	273.32	Large	ST		Measured in field	Handheld GPS
1353	*Eucalyptus melliodora*	Yellow Box	97	304.73	Large	ST		Measured in field	Handheld GPS
1354	*Eucalyptus melliodora*	Yellow Box	104	326.73	Large	ST		Measured in field	Handheld GPS
1355	*Eucalyptus melliodora*	Yellow Box	90	282.74	Large	ST		Measured in field	Handheld GPS
1356	*Eucalyptus melliodora*	Yellow Box	119	373.85	Large	ST		Measured in field	Handheld GPS
1357	*Eucalyptus melliodora*	Yellow Box	119	373.85	Large	ST		Measured in field	Handheld GPS
1358	*Eucalyptus melliodora*	Yellow Box	89	279.60	Large	ST		Measured in field	Handheld GPS
1359	*Eucalyptus melliodora*	Yellow Box	32	100.53	Small	ST		Measured in field	Handheld GPS
1360	*Eucalyptus melliodora*	Yellow Box	41	128.81	Small	ST		Measured in field	Handheld GPS
1361	*Eucalyptus melliodora*	Yellow Box	56	175.93	small	ST		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1362	*Eucalyptus melliodora*	Yellow Box	105	329.87	Large	RP		Measured in field	Handheld GPS
1363	*Eucalyptus obliqua*	Messmate Stringybark	84	263.89	Large	RP		Estimated in field	Handheld GPS
1364	*Eucalyptus obliqua*	Messmate Stringybark	72	226.19	Large	RP		Measured in field	Handheld GPS
1365	*Eucalyptus obliqua*	Messmate Stringybark	80	251.33	Large	RP		Measured in field	Handheld GPS
1366	*Eucalyptus obliqua*	Messmate Stringybark	97	304.73	Large	RP		Measured in field	Handheld GPS
1367	*Eucalyptus obliqua*	Messmate Stringybark	101	317.30	Large	RP		Measured in field	Handheld GPS
1368	*Eucalyptus obliqua*	Messmate Stringybark	76	238.76	Large	RP		Measured in field	Handheld GPS
1369	*Eucalyptus obliqua*	Messmate Stringybark	73	229.34	Large	RP		Measured in field	Handheld GPS
1370	*Eucalyptus obliqua*	Messmate Stringybark	79	248.19	Large	RP		Measured in field	Handheld GPS
1371	*Eucalyptus obliqua*	Messmate Stringybark	83	260.75	Large	RP		Measured in field	Handheld GPS
1372	*Eucalyptus obliqua*	Messmate Stringybark	85	267.04	Large	RP		Measured in field	Handheld GPS
1373	*Eucalyptus obliqua*	Messmate Stringybark	76	238.76	Large	RP		Measured in field	Handheld GPS
1374	*Eucalyptus obliqua*	Messmate Stringybark	70	219.91	Large	RP		Measured in field	Handheld GPS
1375	*Eucalyptus obliqua*	Messmate Stringybark	83	260.75	Large	RP		Measured in field	Handheld GPS
1376	*Eucalyptus obliqua*	Messmate Stringybark	77	241.90	Large	RP		Measured in field	Handheld GPS
1377	*Eucalyptus obliqua*	Messmate Stringybark	95	298.45	Large	RP		Measured in field	Handheld GPS
1378	*Eucalyptus obliqua*	Messmate Stringybark	96	301.59	Large	RP		Measured in field	Handheld GPS
1379	*Eucalyptus obliqua*	Messmate Stringybark	75	235.62	Large	RP		Measured in field	Handheld GPS
1380	*Eucalyptus obliqua*	Messmate Stringybark	92	289.03	Large	RP		Measured in field	Handheld GPS
1381	*Eucalyptus obliqua*	Messmate Stringybark	124	389.56	Large	RP		Measured in field	Handheld GPS
1382	*Eucalyptus obliqua*	Messmate Stringybark	98	307.88	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1383	*Eucalyptus obliqua*	Messmate Stringybark	75	235.62	Large	RP		Measured in field	Handheld GPS
1384	*Eucalyptus obliqua*	Messmate Stringybark	81	254.47	Large	RP		Measured in field	Handheld GPS
1385	*Eucalyptus obliqua*	Messmate Stringybark	64	201.06	Small	ST		Measured in field	Handheld GPS
1386	*Eucalyptus obliqua*	Messmate Stringybark	148	464.96	Large	ST		Measured in field	Handheld GPS
1387	*Eucalyptus obliqua*	Messmate Stringybark	74	232.48	Large	RP		Measured in field	Handheld GPS
1388	*Eucalyptus obliqua*	Messmate Stringybark	124	389.56	Large	RP	HBT	Measured in field	Handheld GPS
1389	*Eucalyptus obliqua*	Messmate Stringybark	60	188.50	Small	RP	HBT	Measured in field	Handheld GPS
1390	*Eucalyptus obliqua*	Messmate Stringybark	77	241.90	Large	RP	HBT	Measured in field	Handheld GPS
1391	*Eucalyptus obliqua*	Messmate Stringybark	96	301.59	Large	RP	HBT	Measured in field	Handheld GPS
1392	*Eucalyptus obliqua*	Messmate Stringybark	107	336.15	Large	RP	HBT	Measured in field	Handheld GPS
1393	*Eucalyptus obliqua*	Messmate Stringybark	101	317.30	Large	RP	HBT	Measured in field	Handheld GPS
1394	*Eucalyptus obliqua*	Messmate Stringybark	102	320.44	Large	RP	HBT	Measured in field	Handheld GPS
1395	*Eucalyptus obliqua*	Messmate Stringybark	83	260.75	Large	RP	HBT	Measured in field	Handheld GPS
1396	*Eucalyptus obliqua*	Messmate Stringybark	86	270.18	Large	RP	HBT	Measured in field	Handheld GPS
1397	*Eucalyptus obliqua*	Messmate Stringybark	77	241.90	Large	RP	HBT	Measured in field	Handheld GPS
1398	*Eucalyptus obliqua*	Messmate Stringybark	92	289.03	Large	RP	HBT	Measured in field	Handheld GPS
1399	*Eucalyptus obliqua*	Messmate Stringybark	127	398.98	Large	RP	HBT	Measured in field	Handheld GPS
1400	*Eucalyptus obliqua*	Messmate Stringybark	73	229.34	Large	RP	HBT	Measured in field	Handheld GPS
1401	*Eucalyptus obliqua*	Messmate Stringybark	78	245.04	Large	RP	HBT	Measured in field	Handheld GPS
1402	*Eucalyptus obliqua*	Messmate Stringybark	85	267.04	Large	RP	HBT	Measured in field	Handheld GPS
1403	*Eucalyptus obliqua*	Messmate Stringybark	81	254.47	Large	RP	HBT	Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1404	*Eucalyptus obliqua*	Messmate Stringybark	83	260.75	Large	RP	HBT	Measured in field	Handheld GPS
1405	*Eucalyptus obliqua*	Messmate Stringybark	99	311.02	Large	RP	HBT	Measured in field	Handheld GPS
1406	*Eucalyptus obliqua*	Messmate Stringybark	84	263.89	Large	RP	HBT	Measured in field	Handheld GPS
1407	*Eucalyptus obliqua*	Messmate Stringybark	60	188.50	Large	RP	HBT	Measured in field	Handheld GPS
1408	*Eucalyptus obliqua*	Messmate Stringybark	82	257.61	Large	RP	HBT	Measured in field	Handheld GPS
1409	*Eucalyptus obliqua*	Messmate Stringybark	71	223.05	Large	RP	HBT	Measured in field	Handheld GPS
1410	*Eucalyptus obliqua*	Messmate Stringybark	97	304.73	Large	RP	HBT	Measured in field	Handheld GPS
1411	*Eucalyptus obliqua*	Messmate Stringybark	60	188.50	Large	RP	HBT	Measured in field	Handheld GPS
1412	*Eucalyptus obliqua*	Messmate Stringybark	93	292.17	Large	RP	HBT	Measured in field	Handheld GPS
1413	*Eucalyptus obliqua*	Messmate Stringybark	118	370.71	Large	RP	HBT	Measured in field	Handheld GPS
1414	*Eucalyptus obliqua*	Messmate Stringybark	74	232.48	Large	RP		Measured in field	Handheld GPS
1415	*Eucalyptus obliqua*	Messmate Stringybark	112	351.86	Large	RP	HBT	Measured in field	Handheld GPS
1416	*Eucalyptus obliqua*	Messmate Stringybark	97	304.73	Large	RP		Measured in field	Handheld GPS
1417	*Eucalyptus obliqua*	Messmate Stringybark	72	226.19	Large	RP		Measured in field	Handheld GPS
1418	*Eucalyptus obliqua*	Messmate Stringybark	75	235.62	Large	RP		Measured in field	Handheld GPS
1419	*Eucalyptus obliqua*	Messmate Stringybark	88	276.46	Large	RP		Measured in field	Handheld GPS
1420	*Eucalyptus obliqua*	Messmate Stringybark	90	282.74	Large	RP		Measured in field	Handheld GPS
1421	*Eucalyptus obliqua*	Messmate Stringybark	74	232.48	Large	RP		Measured in field	Handheld GPS
1422	*Eucalyptus obliqua*	Messmate Stringybark	85	267.04	Large	RP		Measured in field	Handheld GPS
1423	*Eucalyptus obliqua*	Messmate Stringybark	80	251.33	Large	RP		Measured in field	Handheld GPS
1424	*Eucalyptus obliqua*	Messmate Stringybark	76	238.76	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1425	*Eucalyptus obliqua*	Messmate Stringybark	83	260.75	Large	RP		Measured in field	Handheld GPS
1426	*Eucalyptus obliqua*	Messmate Stringybark	87	273.32	Large	RP		Measured in field	Handheld GPS
1427	*Eucalyptus obliqua*	Messmate Stringybark	82	257.61	Large	RP		Measured in field	Handheld GPS
1428	*Eucalyptus obliqua*	Messmate Stringybark	89	279.60	Large	RP		Measured in field	Handheld GPS
1429	*Eucalyptus obliqua*	Messmate Stringybark	91	285.88	Large	RP		Measured in field	Handheld GPS
1430	*Eucalyptus obliqua*	Messmate Stringybark	71	223.05	Large	RP		Measured in field	Handheld GPS
1431	*Eucalyptus obliqua*	Messmate Stringybark	85	267.04	Large	RP		Measured in field	Handheld GPS
1432	*Eucalyptus obliqua*	Messmate Stringybark	88	276.46	Large	RP		Measured in field	Handheld GPS
1433	*Eucalyptus obliqua*	Messmate Stringybark	102	320.44	Large	RP		Measured in field	Handheld GPS
1434	*Eucalyptus obliqua*	Messmate Stringybark	73	229.34	Large	RP		Measured in field	Handheld GPS
1435	*Eucalyptus obliqua*	Messmate Stringybark	71	223.05	Large	RP		Measured in field	Handheld GPS
1436	*Eucalyptus obliqua*	Messmate Stringybark	63	197.92	Large	RP		Measured in field	Handheld GPS
1437	*Eucalyptus obliqua*	Messmate Stringybark	61	191.64	Large	RP		Measured in field	Handheld GPS
1438	*Eucalyptus obliqua*	Messmate Stringybark	73	229.34	Large	RP		Measured in field	Handheld GPS
1439	*Eucalyptus obliqua*	Messmate Stringybark	69	216.77	Small	RP		Measured in field	Handheld GPS
1440	*Eucalyptus obliqua*	Messmate Stringybark	60	188.50	Small	RP		Measured in field	Handheld GPS
1441	*Eucalyptus obliqua*	Messmate Stringybark	61	191.64	Small	RP		Measured in field	Handheld GPS
1442	*Eucalyptus obliqua*	Messmate Stringybark	61	191.64	Small	RP		Measured in field	Handheld GPS
1443	*Eucalyptus obliqua*	Messmate Stringybark	65	204.20	Large	RP		Measured in field	Handheld GPS
1444	*Eucalyptus obliqua*	Messmate Stringybark	70	219.91	Large	RP		Measured in field	Handheld GPS
1445	*Eucalyptus obliqua*	Messmate Stringybark	62	194.78	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1446	*Eucalyptus obliqua*	Messmate Stringybark	87	273.32	Large	RP		Measured in field	Handheld GPS
1447	*Eucalyptus obliqua*	Messmate Stringybark	72	226.19	Large	RP		Measured in field	Handheld GPS
1448	*Eucalyptus obliqua*	Messmate Stringybark	89	279.60	Large	RP		Measured in field	Handheld GPS
1449	*Eucalyptus obliqua*	Messmate Stringybark	68	213.63	Large	RP		Measured in field	Handheld GPS
1450	*Eucalyptus obliqua*	Messmate Stringybark	78	245.04	Large	RP		Measured in field	Handheld GPS
1451	*Eucalyptus obliqua*	Messmate Stringybark	73	229.34	Large	RP		Measured in field	Handheld GPS
1452	*Eucalyptus obliqua*	Messmate Stringybark	69	216.77	Large	RP		Measured in field	Handheld GPS
1453	*Eucalyptus obliqua*	Messmate Stringybark	79	248.19	Large	RP		Measured in field	Handheld GPS
1454	*Eucalyptus obliqua*	Messmate Stringybark	91	285.88	Large	RP		Measured in field	Handheld GPS
1455	*Eucalyptus obliqua*	Messmate Stringybark	82	257.61	Large	RP		Measured in field	Handheld GPS
1456	*Eucalyptus obliqua*	Messmate Stringybark	74	232.48	Large	RP		Measured in field	Handheld GPS
1457	*Eucalyptus obliqua*	Messmate Stringybark	62	194.78	Large	RP		Measured in field	Handheld GPS
1458	*Eucalyptus obliqua*	Messmate Stringybark	69	216.77	Large	RP		Measured in field	Handheld GPS
1459	*Eucalyptus obliqua*	Messmate Stringybark	81	254.47	Large	RP		Measured in field	Handheld GPS
1460	*Eucalyptus obliqua*	Messmate Stringybark	81	254.47	Large	RP		Measured in field	Handheld GPS
1461	*Eucalyptus obliqua*	Messmate Stringybark	88	276.46	Large	RP		Measured in field	Handheld GPS
1462	*Eucalyptus obliqua*	Messmate Stringybark	88	276.46	Large	RP		Measured in field	Handheld GPS
1463	*Eucalyptus obliqua*	Messmate Stringybark	119	373.85	Large	RP		Measured in field	Handheld GPS
1464	*Eucalyptus obliqua*	Messmate Stringybark	131	411.55	Large	RP		Measured in field	Handheld GPS
1465	*Eucalyptus obliqua*	Messmate Stringybark	64	201.06	Small	RP		Measured in field	Handheld GPS
1466	*Eucalyptus obliqua*	Messmate Stringybark	65	204.20	Small	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1467	*Eucalyptus obliqua*	Messmate Stringybark	67	210.49	Small	RP		Measured in field	Handheld GPS
1468	*Eucalyptus obliqua*	Messmate Stringybark	60	188.50	Large	RP		Measured in field	Handheld GPS
1469	*Eucalyptus obliqua*	Messmate Stringybark	60	188.50	Large	RP		Measured in field	Handheld GPS
1470	*Eucalyptus obliqua*	Messmate Stringybark	61	191.64	Large	RP		Measured in field	Handheld GPS
1471	*Eucalyptus obliqua*	Messmate Stringybark	61	191.64	Large	RP		Measured in field	Handheld GPS
1472	*Eucalyptus obliqua*	Messmate Stringybark	62	194.78	Large	RP		Measured in field	Handheld GPS
1473	*Eucalyptus obliqua*	Messmate Stringybark	62	194.78	Large	RP		Measured in field	Handheld GPS
1474	*Eucalyptus obliqua*	Messmate Stringybark	64	201.06	Large	RP		Measured in field	Handheld GPS
1475	*Eucalyptus obliqua*	Messmate Stringybark	65	204.20	Large	RP		Measured in field	Handheld GPS
1476	*Eucalyptus obliqua*	Messmate Stringybark	67	210.49	Large	RP		Measured in field	Handheld GPS
1477	*Eucalyptus obliqua*	Messmate Stringybark	67	210.49	Large	RP		Measured in field	Handheld GPS
1478	*Eucalyptus obliqua*	Messmate Stringybark	69	216.77	Large	RP		Measured in field	Handheld GPS
1479	*Eucalyptus obliqua*	Messmate Stringybark	71	223.05	Large	RP		Measured in field	Handheld GPS
1480	*Eucalyptus obliqua*	Messmate Stringybark	73	229.34	Large	RP		Measured in field	Handheld GPS
1481	*Eucalyptus obliqua*	Messmate Stringybark	77	241.90	Large	RP		Measured in field	Handheld GPS
1482	*Eucalyptus obliqua*	Messmate Stringybark	77	241.90	Large	RP		Measured in field	Handheld GPS
1483	*Eucalyptus obliqua*	Messmate Stringybark	79	248.19	Large	RP		Measured in field	Handheld GPS
1484	*Eucalyptus obliqua*	Messmate Stringybark	79	248.19	Large	RP		Measured in field	Handheld GPS
1485	*Eucalyptus obliqua*	Messmate Stringybark	81	254.47	Large	RP		Measured in field	Handheld GPS
1486	*Eucalyptus obliqua*	Messmate Stringybark	81	254.47	Large	RP		Measured in field	Handheld GPS
1487	*Eucalyptus obliqua*	Messmate Stringybark	82	257.61	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1488	*Eucalyptus obliqua*	Messmate Stringybark	83	260.75	Large	RP		Measured in field	Handheld GPS
1489	*Eucalyptus obliqua*	Messmate Stringybark	83	260.75	Large	RP		Measured in field	Handheld GPS
1490	*Eucalyptus obliqua*	Messmate Stringybark	84	263.89	Large	RP		Measured in field	Handheld GPS
1491	*Eucalyptus obliqua*	Messmate Stringybark	87	273.32	Large	RP		Measured in field	Handheld GPS
1492	*Eucalyptus obliqua*	Messmate Stringybark	90	282.74	Large	RP		Measured in field	Handheld GPS
1493	*Eucalyptus obliqua*	Messmate Stringybark	93	292.17	Large	RP		Measured in field	Handheld GPS
1494	*Eucalyptus obliqua*	Messmate Stringybark	102	320.44	Large	RP		Measured in field	Handheld GPS
1495	*Eucalyptus obliqua*	Messmate Stringybark	103	323.58	Large	RP		Measured in field	Handheld GPS
1496	*Eucalyptus obliqua*	Messmate Stringybark	106	333.01	Large	RP		Measured in field	Handheld GPS
1497	*Eucalyptus obliqua*	Messmate Stringybark	110	345.58	Large	RP		Measured in field	Handheld GPS
1498	*Eucalyptus obliqua*	Messmate Stringybark	111	348.72	Large	RP		Measured in field	Handheld GPS
1499	*Eucalyptus obliqua*	Messmate Stringybark	180	565.49	Large	RP		Measured in field	Handheld GPS
1500	*Eucalyptus obliqua*	Messmate Stringybark	60	188.50	Small	RP		Measured in field	Handheld GPS
1501	*Eucalyptus obliqua*	Messmate Stringybark	62	194.78	Small	RP		Measured in field	Handheld GPS
1502	*Eucalyptus obliqua*	Messmate Stringybark	63	197.92	Small	RP		Measured in field	Handheld GPS
1503	*Eucalyptus obliqua*	Messmate Stringybark	63	197.92	Small	RP		Measured in field	Handheld GPS
1504	*Eucalyptus obliqua*	Messmate Stringybark	63	197.92	Small	RP		Measured in field	Handheld GPS
1505	*Eucalyptus obliqua*	Messmate Stringybark	64	201.06	Small	RP		Measured in field	Handheld GPS
1506	*Eucalyptus obliqua*	Messmate Stringybark	65	204.20	Small	RP		Measured in field	Handheld GPS
1507	*Eucalyptus obliqua*	Messmate Stringybark	65	204.20	Small	RP		Measured in field	Handheld GPS
1508	*Eucalyptus obliqua*	Messmate Stringybark	65	204.20	Small	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1509	*Eucalyptus obliqua*	Messmate Stringybark	66	207.35	Small	RP		Measured in field	Handheld GPS
1510	*Eucalyptus obliqua*	Messmate Stringybark	73	229.34	Large	RP		Measured in field	Handheld GPS
1511	*Eucalyptus obliqua*	Messmate Stringybark	70	219.91	Large	RP		Measured in field	Handheld GPS
1512	*Eucalyptus obliqua*	Messmate Stringybark	70	219.91	Large	RP		Measured in field	Handheld GPS
1513	*Eucalyptus obliqua*	Messmate Stringybark	72	226.19	Large	RP		Measured in field	Handheld GPS
1514	*Eucalyptus obliqua*	Messmate Stringybark	64	201.06	Large	RP		Measured in field	Handheld GPS
1515	*Eucalyptus obliqua*	Messmate Stringybark	86	270.18	Large	RP		Measured in field	Handheld GPS
1516	*Eucalyptus obliqua*	Messmate Stringybark	72	226.19	Large	RP		Measured in field	Handheld GPS
1517	*Eucalyptus obliqua*	Messmate Stringybark	68	213.63	Large	RP		Measured in field	Handheld GPS
1518	*Eucalyptus obliqua*	Messmate Stringybark	69	216.77	Large	RP		Measured in field	Handheld GPS
1519	*Eucalyptus obliqua*	Messmate Stringybark	74	232.48	Large	RP		Measured in field	Handheld GPS
1520	*Eucalyptus obliqua*	Messmate Stringybark	60	188.50	Large	RP		Measured in field	Handheld GPS
1521	*Eucalyptus obliqua*	Messmate Stringybark	98	307.88	Large	RP		Measured in field	Handheld GPS
1522	*Eucalyptus obliqua*	Messmate Stringybark	63	197.92	Large	RP		Measured in field	Handheld GPS
1523	*Eucalyptus obliqua*	Messmate Stringybark	63	197.92	Large	RP		Measured in field	Handheld GPS
1524	*Eucalyptus obliqua*	Messmate Stringybark	93	292.17	Large	RP		Measured in field	Handheld GPS
1525	*Eucalyptus obliqua*	Messmate Stringybark	62	194.78	Large	RP		Measured in field	Handheld GPS
1526	*Eucalyptus obliqua*	Messmate Stringybark	63	197.92	Large	RP		Measured in field	Handheld GPS
1527	*Eucalyptus obliqua*	Messmate Stringybark	70	219.91	Large	RP		Measured in field	Handheld GPS
1528	*Eucalyptus obliqua*	Messmate Stringybark	70	219.91	Large	RP		Measured in field	Handheld GPS
1529	*Eucalyptus obliqua*	Messmate Stringybark	70	219.91	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1530	*Eucalyptus obliqua*	Messmate Stringybark	72	226.19	Large	RP		Measured in field	Handheld GPS
1531	*Eucalyptus obliqua*	Messmate Stringybark	74	232.48	Large	RP		Measured in field	Handheld GPS
1532	*Eucalyptus obliqua*	Messmate Stringybark	84	263.89	Large	RP		Measured in field	Handheld GPS
1533	*Eucalyptus obliqua*	Messmate Stringybark	85	267.04	Large	RP		Measured in field	Handheld GPS
1534	*Eucalyptus obliqua*	Messmate Stringybark	89	279.60	Large	RP		Measured in field	Handheld GPS
1535	*Eucalyptus obliqua*	Messmate Stringybark	90	282.74	Large	RP		Measured in field	Handheld GPS
1536	*Eucalyptus obliqua*	Messmate Stringybark	91	285.88	Large	RP		Measured in field	Handheld GPS
1537	*Eucalyptus obliqua*	Messmate Stringybark	96	301.59	Large	RP		Measured in field	Handheld GPS
1538	*Eucalyptus obliqua*	Messmate Stringybark	110	345.58	Large	RP		Measured in field	Handheld GPS
1539	*Eucalyptus obliqua*	Messmate Stringybark	112	351.86	Large	RP		Measured in field	Handheld GPS
1540	*Eucalyptus obliqua*	Messmate Stringybark	113	355.00	Large	RP		Measured in field	Handheld GPS
1541	*Eucalyptus obliqua*	Messmate Stringybark	121	380.13	Large	RP		Measured in field	Handheld GPS
1542	*Eucalyptus obliqua*	Messmate Stringybark	130	408.41	Large	RP		Measured in field	Handheld GPS
1543	*Eucalyptus obliqua*	Messmate Stringybark	140	439.82	Large	RP		Measured in field	Handheld GPS
1544	*Eucalyptus obliqua*	Messmate Stringybark	61	191.64	Small	RP		Measured in field	Handheld GPS
1545	*Eucalyptus obliqua*	Messmate Stringybark	86	270.18	Large	RP		Measured in field	Handheld GPS
1546	*Eucalyptus obliqua*	Messmate Stringybark	73	229.34	Large	RP		Measured in field	Handheld GPS
1547	*Eucalyptus obliqua*	Messmate Stringybark	69	216.77	Large	RP		Measured in field	Handheld GPS
1548	*Eucalyptus obliqua*	Messmate Stringybark	64	201.06	Large	RP		Measured in field	Handheld GPS
1549	*Eucalyptus obliqua*	Messmate Stringybark	68	213.63	Large	RP		Measured in field	Handheld GPS
1550	*Eucalyptus obliqua*	Messmate Stringybark	69	216.77	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1551	*Eucalyptus obliqua*	Messmate Stringybark	76	238.76	Large	RP		Measured in field	Handheld GPS
1552	*Eucalyptus obliqua*	Messmate Stringybark	60	188.50	Large	RP		Measured in field	Handheld GPS
1553	*Eucalyptus obliqua*	Messmate Stringybark	71	223.05	Large	RP		Measured in field	Handheld GPS
1554	*Eucalyptus obliqua*	Messmate Stringybark	76	238.76	Large	RP		Measured in field	Handheld GPS
1555	*Eucalyptus obliqua*	Messmate Stringybark	80	251.33	Large	RP		Measured in field	Handheld GPS
1556	*Eucalyptus obliqua*	Messmate Stringybark	80	251.33	Large	RP		Measured in field	Handheld GPS
1557	*Eucalyptus obliqua*	Messmate Stringybark	68	213.63	Large	RP		Measured in field	Handheld GPS
1558	*Eucalyptus obliqua*	Messmate Stringybark	64	201.06	Large	RP		Measured in field	Handheld GPS
1559	*Eucalyptus obliqua*	Messmate Stringybark	80	251.33	Large	RP		Measured in field	Handheld GPS
1560	*Eucalyptus obliqua*	Messmate Stringybark	67	210.49	Large	RP		Measured in field	Handheld GPS
1561	*Eucalyptus obliqua*	Messmate Stringybark	61	191.64	Large	RP		Measured in field	Handheld GPS
1562	*Eucalyptus obliqua*	Messmate Stringybark	62	194.78	Large	RP		Measured in field	Handheld GPS
1563	*Eucalyptus obliqua*	Messmate Stringybark	79	248.19	Large	RP		Measured in field	Handheld GPS
1564	*Eucalyptus obliqua*	Messmate Stringybark	60	188.50	Large	RP		Measured in field	Handheld GPS
1565	*Eucalyptus obliqua*	Messmate Stringybark	65	204.20	Large	RP		Measured in field	Handheld GPS
1566	*Eucalyptus obliqua*	Messmate Stringybark	79	248.19	Large	RP		Measured in field	Handheld GPS
1567	*Eucalyptus obliqua*	Messmate Stringybark	62	194.78	Large	RP		Measured in field	Handheld GPS
1568	*Eucalyptus obliqua*	Messmate Stringybark	67	210.49	Large	RP		Measured in field	Handheld GPS
1569	*Eucalyptus obliqua*	Messmate Stringybark	62	194.78	Large	RP		Measured in field	Handheld GPS
1570	*Eucalyptus obliqua*	Messmate Stringybark	84	263.89	Large	RP		Measured in field	Handheld GPS
1571	*Eucalyptus obliqua*	Messmate Stringybark	100	314.16	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1572	*Eucalyptus obliqua*	Messmate Stringybark	72	226.19	Large	RP		Measured in field	Handheld GPS
1573	*Eucalyptus obliqua*	Messmate Stringybark	62	194.78	Large	RP		Measured in field	Handheld GPS
1574	*Eucalyptus obliqua*	Messmate Stringybark	61	191.64	Large	RP		Measured in field	Handheld GPS
1575	*Eucalyptus obliqua*	Messmate Stringybark	85	267.04	Large	RP		Measured in field	Handheld GPS
1576	*Eucalyptus obliqua*	Messmate Stringybark	80	251.33	Large	RP		Measured in field	Handheld GPS
1577	*Eucalyptus obliqua*	Messmate Stringybark	119	373.85	Large	RP		Measured in field	Handheld GPS
1578	*Eucalyptus obliqua*	Messmate Stringybark	74	232.48	Large	RP		Measured in field	Handheld GPS
1579	*Eucalyptus obliqua*	Messmate Stringybark	129	405.27	Large	RP		Measured in field	Handheld GPS
1580	*Eucalyptus obliqua*	Messmate Stringybark	167	524.65	Large	ST		Measured in field	Handheld GPS
1581	*Eucalyptus obliqua*	Messmate Stringybark	75	235.62	Large	ST		Measured in field	Handheld GPS
1582	*Eucalyptus obliqua*	Messmate Stringybark	112	351.86	Large	ST		Measured in field	Handheld GPS
1583	*Eucalyptus obliqua*	Messmate Stringybark	111	348.72	Large	ST		Measured in field	Handheld GPS
1584	*Eucalyptus obliqua*	Messmate Stringybark	91	285.88	Large	RP		Measured in field	Handheld GPS
1585	*Eucalyptus ovata*	Swamp Gum	101	317.30	Large	RP		Measured in field	Handheld GPS
1586	*Eucalyptus pauciflora*	Snow Gum	72	226.19	Large	RP		Measured in field	Handheld GPS
1587	*Eucalyptus pauciflora*	Snow Gum	76	238.76	Large	RP	HBT	Measured in field	Handheld GPS
1588	*Eucalyptus pauciflora*	Snow Gum	72	226.19	Large	RP		Measured in field	Handheld GPS
1589	*Eucalyptus pauciflora*	Snow Gum	106	333.01	Large	RP		Measured in field	Handheld GPS
1590	*Eucalyptus radiata*	Narrow-leaf Peppermint	95	298.45	Large	ST	HBT	Estimated in field	Handheld GPS
1591	*Eucalyptus radiata*	Narrow-leaf Peppermint	80	251.33	Large	ST		Measured in field	Handheld GPS
1592	*Eucalyptus radiata*	Narrow-leaf Peppermint	72	226.19	Large	ST		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1593	*Eucalyptus radiata*	Narrow-leaf Peppermint	70	219.91	Large	ST		Measured in field	Handheld GPS
1594	*Eucalyptus radiata*	Narrow-leaf Peppermint	70	219.91	Large	RP		Measured in field	Handheld GPS
1595	*Eucalyptus radiata*	Narrow-leaf Peppermint	131	411.55	Large	RP	HBT	Measured in field	Handheld GPS
1596	*Eucalyptus radiata*	Narrow-leaf Peppermint	80	251.33	Large	RP		Measured in field	Handheld GPS
1597	*Eucalyptus radiata*	Narrow-leaf Peppermint	103	323.58	Large	RP		Measured in field	Handheld GPS
1598	*Eucalyptus radiata*	Narrow-leaf Peppermint	70	219.91	Large	RP		Measured in field	Handheld GPS
1599	*Eucalyptus radiata*	Narrow-leaf Peppermint	72	226.19	Large	RP		Measured in field	Handheld GPS
1600	*Eucalyptus radiata*	Narrow-leaf Peppermint	71	223.05	Large	RP		Measured in field	Handheld GPS
1601	*Eucalyptus radiata*	Narrow-leaf Peppermint	67	210.49	Large	RP		Measured in field	Handheld GPS
1602	*Eucalyptus radiata*	Narrow-leaf Peppermint	78	245.04	Large	RP		Measured in field	Handheld GPS
1603	*Eucalyptus rubida*	Candlebark	15	47.12	Small	ST		Estimated in field	Handheld GPS
1604	*Eucalyptus rubida*	Candlebark	75	235.62	Large	RP	HBT	Estimated in field	Handheld GPS
1605	*Eucalyptus rubida*	Candlebark	90	282.74	Large	ST	HBT	Estimated in field	Handheld GPS
1606	*Eucalyptus rubida*	Candlebark	115	361.28	Large	ST	HBT	Estimated in field	Handheld GPS
1607	*Eucalyptus rubida*	Candlebark	125	392.70	Large	RP		Estimated in field	Handheld GPS
1608	*Eucalyptus rubida*	Candlebark	70	219.91	Large	RP		Estimated in field	Handheld GPS
1609	*Eucalyptus rubida*	Candlebark	75	235.62	Large	RP		Estimated in field	Handheld GPS
1610	*Eucalyptus rubida*	Candlebark	86	270.18	Large	RP		Measured in field	Handheld GPS
1611	*Eucalyptus rubida*	Candlebark	115	361.28	Large	RP	HBT	Measured in field	Handheld GPS
1612	*Eucalyptus rubida*	Candlebark	115	361.28	Large	RP	HBT	Measured in field	Handheld GPS
1613	*Eucalyptus rubida*	Candlebark	131	411.55	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1614	*Eucalyptus rubida*	Candlebark	90	282.74	Large	RP		Measured in field	Handheld GPS
1615	*Eucalyptus rubida*	Candlebark	125	392.70	Large	RP		Measured in field	Handheld GPS
1616	*Eucalyptus rubida*	Candlebark	113	355.00	Large	RP		Measured in field	Handheld GPS
1617	*Eucalyptus rubida*	Candlebark	152	477.52	Large	RP		Measured in field	Handheld GPS
1618	*Eucalyptus rubida*	Candlebark	78	245.04	Large	RP		Measured in field	Handheld GPS
1619	*Eucalyptus rubida*	Candlebark	78	245.04	Large	RP		Measured in field	Handheld GPS
1620	*Eucalyptus rubida*	Candlebark	162	508.94	Large	RP		Measured in field	Handheld GPS
1621	*Eucalyptus rubida*	Candlebark	105	329.87	Large	RP		Measured in field	Handheld GPS
1622	*Eucalyptus rubida*	Candlebark	76	238.76	Large	RP		Measured in field	Handheld GPS
1623	*Eucalyptus rubida*	Candlebark	117	367.57	Large	RP	HBT	Measured in field	Handheld GPS
1624	*Eucalyptus rubida*	Candlebark	82	257.61	Large	RP	HBT	Measured in field	Handheld GPS
1625	*Eucalyptus rubida*	Candlebark	104	326.73	Large	RP	HBT	Measured in field	Handheld GPS
1626	*Eucalyptus rubida*	Candlebark	104	326.73	Large	RP	HBT	Measured in field	Handheld GPS
1627	*Eucalyptus rubida*	Candlebark	108	339.29	Large	RP	HBT	Measured in field	Handheld GPS
1628	*Eucalyptus rubida*	Candlebark	123	386.42	Large	RP	HBT	Measured in field	Handheld GPS
1629	*Eucalyptus rubida*	Candlebark	89	279.60	Large	RP	HBT	Measured in field	Handheld GPS
1630	*Eucalyptus rubida*	Candlebark	123	386.42	Large	RP	HBT	Measured in field	Handheld GPS
1631	*Eucalyptus rubida*	Candlebark	99	311.02	Large	RP	HBT	Measured in field	Handheld GPS
1632	*Eucalyptus rubida*	Candlebark	152	477.52	Large	RP	HBT	Measured in field	Handheld GPS
1633	*Eucalyptus rubida*	Candlebark	122	383.27	Large	ST	HBT	Measured in field	Handheld GPS
1634	*Eucalyptus rubida*	Candlebark	95	298.45	Large	RP	HBT	Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1635	*Eucalyptus rubida*	Candlebark	97	304.73	Large	RP	HBT	Measured in field	Handheld GPS
1636	*Eucalyptus rubida*	Candlebark	84	263.89	Large	RP	HBT	Measured in field	Handheld GPS
1637	*Eucalyptus rubida*	Candlebark	94	295.31	Large	RP	HBT	Measured in field	Handheld GPS
1638	*Eucalyptus rubida*	Candlebark	83	260.75	Large	RP	HBT	Measured in field	Handheld GPS
1639	*Eucalyptus rubida*	Candlebark	90	282.74	Large	RP	HBT	Measured in field	Handheld GPS
1640	*Eucalyptus rubida*	Candlebark	67	210.49	Large	RP	HBT	Measured in field	Handheld GPS
1641	*Eucalyptus rubida*	Candlebark	130	408.41	Large	RP	HBT	Measured in field	Handheld GPS
1642	*Eucalyptus rubida*	Candlebark	102	320.44	Large	RP	HBT	Measured in field	Handheld GPS
1643	*Eucalyptus rubida*	Candlebark	102	320.44	Large	RP	HBT	Measured in field	Handheld GPS
1644	*Eucalyptus rubida*	Candlebark	91	285.88	Large	RP	HBT	Measured in field	Handheld GPS
1645	*Eucalyptus rubida*	Candlebark	79	248.19	Large	RP	HBT	Measured in field	Handheld GPS
1646	*Eucalyptus rubida*	Candlebark	70	219.91	Large	RP	HBT	Measured in field	Handheld GPS
1647	*Eucalyptus rubida*	Candlebark	72	226.19	Large	RP	HBT	Measured in field	Handheld GPS
1648	*Eucalyptus rubida*	Candlebark	74	232.48	Large	RP	HBT	Measured in field	Handheld GPS
1649	*Eucalyptus rubida*	Candlebark	136	427.26	Large	RP	HBT	Measured in field	Handheld GPS
1650	*Eucalyptus rubida*	Candlebark	110	345.58	Large	RP	HBT	Measured in field	Handheld GPS
1651	*Eucalyptus rubida*	Candlebark	107	336.15	Large	RP	HBT	Measured in field	Handheld GPS
1652	*Eucalyptus rubida*	Candlebark	114	358.14	Large	RP	HBT	Measured in field	Handheld GPS
1653	*Eucalyptus rubida*	Candlebark	100	314.16	Large	RP	HBT	Measured in field	Handheld GPS
1654	*Eucalyptus rubida*	Candlebark	77	241.90	Large	RP	HBT	Measured in field	Handheld GPS
1655	*Eucalyptus rubida*	Candlebark	82	257.61	Large	RP	HBT	Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1656	*Eucalyptus rubida*	Candlebark	108	339.29	Large	RP	HBT	Measured in field	Handheld GPS
1657	*Eucalyptus rubida*	Candlebark	116	364.42	Large	RP	HBT	Measured in field	Handheld GPS
1658	*Eucalyptus rubida*	Candlebark	94	295.31	Large	RP	HBT	Measured in field	Handheld GPS
1659	*Eucalyptus rubida*	Candlebark	70	219.91	Large	RP	HBT	Measured in field	Handheld GPS
1660	*Eucalyptus rubida*	Candlebark	78	245.04	Large	RP	HBT	Measured in field	Handheld GPS
1661	*Eucalyptus rubida*	Candlebark	103	323.58	Large	RP	HBT	Measured in field	Handheld GPS
1662	*Eucalyptus rubida*	Candlebark	75	235.62	Large	RP	HBT	Measured in field	Handheld GPS
1663	*Eucalyptus rubida*	Candlebark	96	301.59	Large	RP	HBT	Measured in field	Handheld GPS
1664	*Eucalyptus rubida*	Candlebark	99	311.02	Large	RP	HBT	Measured in field	Handheld GPS
1665	*Eucalyptus rubida*	Candlebark	162	508.94	Large	RP	HBT	Measured in field	Handheld GPS
1666	*Eucalyptus rubida*	Candlebark	107	336.15	Large	RP	HBT	Measured in field	Handheld GPS
1667	*Eucalyptus rubida*	Candlebark	109	342.43	Large	RP	HBT	Measured in field	Handheld GPS
1668	*Eucalyptus rubida*	Candlebark	132	414.69	Large	RP	HBT	Measured in field	Handheld GPS
1669	*Eucalyptus rubida*	Candlebark	76	238.76	Large	RP	HBT	Measured in field	Handheld GPS
1670	*Eucalyptus rubida*	Candlebark	98	307.88	Large	RP	HBT	Measured in field	Handheld GPS
1671	*Eucalyptus rubida*	Candlebark	75	235.62	Large	RP	HBT	Measured in field	Handheld GPS
1672	*Eucalyptus rubida*	Candlebark	93	292.17	Large	RP	HBT	Measured in field	Handheld GPS
1673	*Eucalyptus rubida*	Candlebark	88	276.46	Large	RP	HBT	Measured in field	Handheld GPS
1674	*Eucalyptus rubida*	Candlebark	79	248.19	Large	RP	HBT	Measured in field	Handheld GPS
1675	*Eucalyptus rubida*	Candlebark	82	257.61	Large	RP	HBT	Measured in field	Handheld GPS
1676	*Eucalyptus rubida*	Candlebark	118	370.71	Large	RP	HBT	Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1677	*Eucalyptus rubida*	Candlebark	99	311.02	Large	RP	HBT	Measured in field	Handheld GPS
1678	*Eucalyptus rubida*	Candlebark	78	245.04	Large	RP	HBT	Measured in field	Handheld GPS
1679	*Eucalyptus rubida*	Candlebark	90	282.74	Large	RP	HBT	Measured in field	Handheld GPS
1680	*Eucalyptus rubida*	Candlebark	133	417.83	Large	RP	HBT	Measured in field	Handheld GPS
1681	*Eucalyptus rubida*	Candlebark	92	289.03	Large	RP	HBT	Measured in field	Handheld GPS
1682	*Eucalyptus rubida*	Candlebark	71	223.05	Large	RP	HBT	Measured in field	Handheld GPS
1683	*Eucalyptus rubida*	Candlebark	81	254.47	Large	RP	HBT	Measured in field	Handheld GPS
1684	*Eucalyptus rubida*	Candlebark	164	515.22	Large	RP	HBT	Measured in field	Handheld GPS
1685	*Eucalyptus rubida*	Candlebark	110	345.58	Large	RP	HBT	Measured in field	Handheld GPS
1686	*Eucalyptus rubida*	Candlebark	117	367.57	Large	RP	HBT	Measured in field	Handheld GPS
1687	*Eucalyptus rubida*	Candlebark	100	314.16	Large	RP	HBT	Measured in field	Handheld GPS
1688	*Eucalyptus rubida*	Candlebark	80	251.33	Large	RP	HBT	Measured in field	Handheld GPS
1689	*Eucalyptus rubida*	Candlebark	74	232.48	Large	RP	HBT	Measured in field	Handheld GPS
1690	*Eucalyptus rubida*	Candlebark	76	238.76	Large	RP	HBT	Measured in field	Handheld GPS
1691	*Eucalyptus rubida*	Candlebark	73	229.34	Large	RP	HBT	Measured in field	Handheld GPS
1692	*Eucalyptus rubida*	Candlebark	88	276.46	Large	RP	HBT	Measured in field	Handheld GPS
1693	*Eucalyptus rubida*	Candlebark	71	223.05	Large	RP	HBT	Measured in field	Handheld GPS
1694	*Eucalyptus rubida*	Candlebark	105	329.87	Large	RP	HBT	Measured in field	Handheld GPS
1695	*Eucalyptus rubida*	Candlebark	127	398.98	Large	RP	HBT	Measured in field	Handheld GPS
1696	*Eucalyptus rubida*	Candlebark	139	436.68	Large	RP	HBT	Measured in field	Handheld GPS
1697	*Eucalyptus rubida*	Candlebark	159	499.51	Large	RP	HBT	Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1698	*Eucalyptus rubida*	Candlebark	72	226.19	Large	RP	HBT	Measured in field	Handheld GPS
1699	*Eucalyptus rubida*	Candlebark	75	235.62	Large	RP	HBT	Measured in field	Handheld GPS
1700	*Eucalyptus rubida*	Candlebark	102	320.44	Large	RP	HBT	Measured in field	Handheld GPS
1701	*Eucalyptus rubida*	Candlebark	104	326.73	Large	RP	HBT	Measured in field	Handheld GPS
1702	*Eucalyptus rubida*	Candlebark	140	439.82	Large	RP	HBT	Measured in field	Handheld GPS
1703	*Eucalyptus rubida*	Candlebark	114	358.14	Large	ST	HBT	Measured in field	Handheld GPS
1704	*Eucalyptus rubida*	Candlebark	93	292.17	Large	ST	HBT	Measured in field	Handheld GPS
1705	*Eucalyptus rubida*	Candlebark	149	468.10	Large	ST	HBT	Measured in field	Handheld GPS
1706	*Eucalyptus rubida*	Candlebark	125	392.70	Large	ST	HBT	Measured in field	Handheld GPS
1707	*Eucalyptus rubida*	Candlebark	190	596.90	Large	ST	HBT	Measured in field	Handheld GPS
1708	*Eucalyptus rubida*	Candlebark	193	606.33	Large	ST	HBT	Measured in field	Handheld GPS
1709	*Eucalyptus rubida*	Candlebark	59	185.35	Small	ST	HBT	Measured in field	Handheld GPS
1710	*Eucalyptus rubida*	Candlebark	120	376.99	Large	ST	HBT	Measured in field	Handheld GPS
1711	*Eucalyptus rubida*	Candlebark	129	405.27	Large	ST	HBT	Measured in field	Handheld GPS
1712	*Eucalyptus rubida*	Candlebark	130	408.41	Large	ST		Measured in field	Handheld GPS
1713	*Eucalyptus rubida*	Candlebark	72	226.19	Large	RP		Measured in field	Handheld GPS
1714	*Eucalyptus rubida*	Candlebark	83	260.75	Large	RP		Measured in field	Handheld GPS
1715	*Eucalyptus rubida*	Candlebark	76	238.76	Large	RP		Measured in field	Handheld GPS
1716	*Eucalyptus rubida*	Candlebark	98	307.88	Large	RP		Measured in field	Handheld GPS
1717	*Eucalyptus rubida*	Candlebark	86	270.18	Large	RP		Measured in field	Handheld GPS
1718	*Eucalyptus rubida*	Candlebark	70	219.91	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1719	*Eucalyptus rubida*	Candlebark	94	295.31	Large	RP		Measured in field	Handheld GPS
1720	*Eucalyptus rubida*	Candlebark	91	285.88	Large	RP		Measured in field	Handheld GPS
1721	*Eucalyptus rubida*	Candlebark	75	235.62	Large	RP		Measured in field	Handheld GPS
1722	*Eucalyptus rubida*	Candlebark	79	248.19	Large	RP		Measured in field	Handheld GPS
1723	*Eucalyptus rubida*	Candlebark	78	245.04	Large	RP		Measured in field	Handheld GPS
1724	*Eucalyptus rubida*	Candlebark	80	251.33	Large	RP		Measured in field	Handheld GPS
1725	*Eucalyptus rubida*	Candlebark	82	257.61	Large	RP		Measured in field	Handheld GPS
1726	*Eucalyptus rubida*	Candlebark	87	273.32	Large	RP		Measured in field	Handheld GPS
1727	*Eucalyptus rubida*	Candlebark	95	298.45	Large	RP		Measured in field	Handheld GPS
1728	*Eucalyptus rubida*	Candlebark	62	194.78	Large	RP		Measured in field	Handheld GPS
1729	*Eucalyptus rubida*	Candlebark	94	295.31	Large	RP		Measured in field	Handheld GPS
1730	*Eucalyptus rubida*	Candlebark	104	326.73	Large	RP		Measured in field	Handheld GPS
1731	*Eucalyptus rubida*	Candlebark	116	364.42	Large	RP		Measured in field	Handheld GPS
1732	*Eucalyptus rubida*	Candlebark	91	285.88	Large	RP		Measured in field	Handheld GPS
1733	*Eucalyptus rubida*	Candlebark	76	238.76	Large	RP		Measured in field	Handheld GPS
1734	*Eucalyptus rubida*	Candlebark	70	219.91	Large	RP		Measured in field	Handheld GPS
1735	*Eucalyptus rubida*	Candlebark	77	241.90	Large	RP		Measured in field	Handheld GPS
1736	*Eucalyptus rubida*	Candlebark	73	229.34	Large	RP		Measured in field	Handheld GPS
1737	*Eucalyptus rubida*	Candlebark	73	229.34	Large	RP		Measured in field	Handheld GPS
1738	*Eucalyptus rubida*	Candlebark	110	345.58	Large	RP		Measured in field	Handheld GPS
1739	*Eucalyptus rubida*	Candlebark	104	326.73	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1740	*Eucalyptus rubida*	Candlebark	74	232.48	Large	RP		Measured in field	Handheld GPS
1741	*Eucalyptus rubida*	Candlebark	143	449.25	Large	RP		Measured in field	Handheld GPS
1742	*Eucalyptus rubida*	Candlebark	72	226.19	Large	RP		Measured in field	Handheld GPS
1743	*Eucalyptus rubida*	Candlebark	75	235.62	Large	RP		Measured in field	Handheld GPS
1744	*Eucalyptus rubida*	Candlebark	81	254.47	Large	RP		Measured in field	Handheld GPS
1745	*Eucalyptus rubida*	Candlebark	83	260.75	Large	RP		Measured in field	Handheld GPS
1746	*Eucalyptus rubida*	Candlebark	107	336.15	Large	RP		Measured in field	Handheld GPS
1747	*Eucalyptus rubida*	Candlebark	144	452.39	Large	RP		Measured in field	Handheld GPS
1748	*Eucalyptus rubida*	Candlebark	150	471.24	Large	RP		Measured in field	Handheld GPS
1749	*Eucalyptus rubida*	Candlebark	114	358.14	Large	RP		Measured in field	Handheld GPS
1750	*Eucalyptus rubida*	Candlebark	71	223.05	Large	RP		Measured in field	Handheld GPS
1751	*Eucalyptus rubida*	Candlebark	71	223.05	Large	RP		Measured in field	Handheld GPS
1752	*Eucalyptus rubida*	Candlebark	71	223.05	Large	RP		Measured in field	Handheld GPS
1753	*Eucalyptus rubida*	Candlebark	72	226.19	Large	RP		Measured in field	Handheld GPS
1754	*Eucalyptus rubida*	Candlebark	74	232.48	Large	RP		Measured in field	Handheld GPS
1755	*Eucalyptus rubida*	Candlebark	78	245.04	Large	RP		Measured in field	Handheld GPS
1756	*Eucalyptus rubida*	Candlebark	78	245.04	Large	RP		Measured in field	Handheld GPS
1757	*Eucalyptus rubida*	Candlebark	78	245.04	Large	RP		Measured in field	Handheld GPS
1758	*Eucalyptus rubida*	Candlebark	78	245.04	Large	RP		Measured in field	Handheld GPS
1759	*Eucalyptus rubida*	Candlebark	80	251.33	Large	RP		Measured in field	Handheld GPS
1760	*Eucalyptus rubida*	Candlebark	82	257.61	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1761	*Eucalyptus rubida*	Candlebark	83	260.75	Large	RP		Measured in field	Handheld GPS
1762	*Eucalyptus rubida*	Candlebark	85	267.04	Large	RP		Measured in field	Handheld GPS
1763	*Eucalyptus rubida*	Candlebark	86	270.18	Large	RP		Measured in field	Handheld GPS
1764	*Eucalyptus rubida*	Candlebark	90	282.74	Large	RP		Measured in field	Handheld GPS
1765	*Eucalyptus rubida*	Candlebark	92	289.03	Large	RP		Measured in field	Handheld GPS
1766	*Eucalyptus rubida*	Candlebark	94	295.31	Large	RP		Measured in field	Handheld GPS
1767	*Eucalyptus rubida*	Candlebark	99	311.02	Large	RP		Measured in field	Handheld GPS
1768	*Eucalyptus rubida*	Candlebark	100	314.16	Large	RP		Measured in field	Handheld GPS
1769	*Eucalyptus rubida*	Candlebark	103	323.58	Large	RP		Measured in field	Handheld GPS
1770	*Eucalyptus rubida*	Candlebark	108	339.29	Large	RP		Measured in field	Handheld GPS
1771	*Eucalyptus rubida*	Candlebark	124	389.56	Large	RP		Measured in field	Handheld GPS
1772	*Eucalyptus rubida*	Candlebark	130	408.41	Large	RP		Measured in field	Handheld GPS
1773	*Eucalyptus rubida*	Candlebark	132	414.69	Large	RP		Measured in field	Handheld GPS
1774	*Eucalyptus rubida*	Candlebark	82	257.61	Large	RP		Measured in field	Handheld GPS
1775	*Eucalyptus rubida*	Candlebark	88	276.46	Large	RP		Measured in field	Handheld GPS
1776	*Eucalyptus rubida*	Candlebark	96	301.59	Large	RP		Measured in field	Handheld GPS
1777	*Eucalyptus rubida*	Candlebark	97	304.73	Large	RP		Measured in field	Handheld GPS
1778	*Eucalyptus rubida*	Candlebark	117	367.57	Large	RP		Measured in field	Handheld GPS
1779	*Eucalyptus rubida*	Candlebark	120	376.99	Large	RP		Measured in field	Handheld GPS
1780	*Eucalyptus rubida*	Candlebark	123	386.42	Large	RP		Measured in field	Handheld GPS
1781	*Eucalyptus rubida*	Candlebark	105	329.87	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1782	*Eucalyptus rubida*	Candlebark	93	292.17	Large	RP		Measured in field	Handheld GPS
1783	*Eucalyptus rubida*	Candlebark	95	298.45	Large	RP		Measured in field	Handheld GPS
1784	*Eucalyptus rubida*	Candlebark	95	298.45	Large	RP		Measured in field	Handheld GPS
1785	*Eucalyptus rubida*	Candlebark	89	279.60	Large	RP		Measured in field	Handheld GPS
1786	*Eucalyptus rubida*	Candlebark	80	251.33	Large	RP		Measured in field	Handheld GPS
1787	*Eucalyptus rubida*	Candlebark	91	285.88	Large	RP		Measured in field	Handheld GPS
1788	*Eucalyptus rubida*	Candlebark	72	226.19	Large	RP		Measured in field	Handheld GPS
1789	*Eucalyptus rubida*	Candlebark	102	320.44	Large	RP		Measured in field	Handheld GPS
1790	*Eucalyptus rubida*	Candlebark	74	232.48	Large	RP		Measured in field	Handheld GPS
1791	*Eucalyptus rubida*	Candlebark	78	245.04	Large	RP		Measured in field	Handheld GPS
1792	*Eucalyptus rubida*	Candlebark	89	279.60	Large	RP		Measured in field	Handheld GPS
1793	*Eucalyptus rubida*	Candlebark	73	229.34	Large	RP		Measured in field	Handheld GPS
1794	*Eucalyptus rubida*	Candlebark	92	289.03	Large	RP		Measured in field	Handheld GPS
1795	*Eucalyptus rubida*	Candlebark	95	298.45	Large	RP		Measured in field	Handheld GPS
1796	*Eucalyptus rubida*	Candlebark	95	298.45	Large	RP		Measured in field	Handheld GPS
1797	*Eucalyptus rubida*	Candlebark	81	254.47	Large	RP		Measured in field	Handheld GPS
1798	*Eucalyptus rubida*	Candlebark	85	267.04	Large	RP		Measured in field	Handheld GPS
1799	*Eucalyptus rubida*	Candlebark	126	395.84	Large	RP		Measured in field	Handheld GPS
1800	*Eucalyptus rubida*	Candlebark	76	238.76	Large	RP		Measured in field	Handheld GPS
1801	*Eucalyptus rubida*	Candlebark	70	219.91	Large	RP		Measured in field	Handheld GPS
1802	*Eucalyptus rubida*	Candlebark	78	245.04	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1803	*Eucalyptus rubida*	Candlebark	92	289.03	Large	RP		Measured in field	Handheld GPS
1804	*Eucalyptus rubida*	Candlebark	77	241.90	Large	RP		Measured in field	Handheld GPS
1805	*Eucalyptus rubida*	Candlebark	86	270.18	Large	RP		Measured in field	Handheld GPS
1806	*Eucalyptus rubida*	Candlebark	72	226.19	Large	RP		Measured in field	Handheld GPS
1807	*Eucalyptus rubida*	Candlebark	86	270.18	Large	RP		Measured in field	Handheld GPS
1808	*Eucalyptus rubida*	Candlebark	77	241.90	Large	RP		Measured in field	Handheld GPS
1809	*Eucalyptus rubida*	Candlebark	80	251.33	Large	RP		Measured in field	Handheld GPS
1810	*Eucalyptus rubida*	Candlebark	70	219.91	Large	RP		Measured in field	Handheld GPS
1811	*Eucalyptus rubida*	Candlebark	78	245.04	Large	RP		Measured in field	Handheld GPS
1812	*Eucalyptus rubida*	Candlebark	83	260.75	Large	RP		Measured in field	Handheld GPS
1813	*Eucalyptus rubida*	Candlebark	84	263.89	Large	RP		Measured in field	Handheld GPS
1814	*Eucalyptus rubida*	Candlebark	85	267.04	Large	RP		Measured in field	Handheld GPS
1815	*Eucalyptus rubida*	Candlebark	90	282.74	Large	RP		Measured in field	Handheld GPS
1816	*Eucalyptus rubida*	Candlebark	92	289.03	Large	RP		Measured in field	Handheld GPS
1817	*Eucalyptus rubida*	Candlebark	93	292.17	Large	RP		Measured in field	Handheld GPS
1818	*Eucalyptus rubida*	Candlebark	93	292.17	Large	RP		Measured in field	Handheld GPS
1819	*Eucalyptus rubida*	Candlebark	98	307.88	Large	RP		Measured in field	Handheld GPS
1820	*Eucalyptus rubida*	Candlebark	98	307.88	Large	RP		Measured in field	Handheld GPS
1821	*Eucalyptus rubida*	Candlebark	103	323.58	Large	RP		Measured in field	Handheld GPS
1822	*Eucalyptus rubida*	Candlebark	107	336.15	Large	RP		Measured in field	Handheld GPS
1823	*Eucalyptus rubida*	Candlebark	74	232.48	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1824	*Eucalyptus rubida*	Candlebark	76	238.76	Large	RP		Measured in field	Handheld GPS
1825	*Eucalyptus rubida*	Candlebark	93	292.17	Large	RP		Measured in field	Handheld GPS
1826	*Eucalyptus rubida*	Candlebark	119	373.85	Large	RP		Measured in field	Handheld GPS
1827	*Eucalyptus rubida*	Candlebark	113	355.00	Large	RP		Measured in field	Handheld GPS
1828	*Eucalyptus rubida*	Candlebark	77	241.90	Large	RP		Measured in field	Handheld GPS
1829	*Eucalyptus rubida*	Candlebark	70	219.91	Large	RP		Measured in field	Handheld GPS
1830	*Eucalyptus rubida*	Candlebark	97	304.73	Large	RP		Measured in field	Handheld GPS
1831	*Eucalyptus rubida*	Candlebark	109	342.43	Large	RP		Measured in field	Handheld GPS
1832	*Eucalyptus rubida*	Candlebark	88	276.46	Large	RP		Measured in field	Handheld GPS
1833	*Eucalyptus rubida*	Candlebark	75	235.62	Large	RP		Measured in field	Handheld GPS
1834	*Eucalyptus rubida*	Candlebark	90	282.74	Large	RP		Measured in field	Handheld GPS
1835	*Eucalyptus rubida*	Candlebark	105	329.87	Large	RP		Measured in field	Handheld GPS
1836	*Eucalyptus rubida*	Candlebark	93	292.17	Large	RP		Measured in field	Handheld GPS
1837	*Eucalyptus rubida*	Candlebark	79	248.19	Large	RP		Measured in field	Handheld GPS
1838	*Eucalyptus rubida*	Candlebark	76	238.76	Large	RP		Measured in field	Handheld GPS
1839	*Eucalyptus rubida*	Candlebark	88	276.46	Large	RP		Measured in field	Handheld GPS
1840	*Eucalyptus rubida*	Candlebark	82	257.61	Large	RP		Measured in field	Handheld GPS
1841	*Eucalyptus rubida*	Candlebark	81	254.47	Large	RP		Measured in field	Handheld GPS
1842	*Eucalyptus rubida*	Candlebark	106	333.01	Large	RP		Measured in field	Handheld GPS
1843	*Eucalyptus rubida*	Candlebark	92	289.03	Large	RP		Measured in field	Handheld GPS
1844	*Eucalyptus rubida*	Candlebark	99	311.02	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1845	*Eucalyptus rubida*	Candlebark	85	267.04	Large	RP		Measured in field	Handheld GPS
1846	*Eucalyptus rubida*	Candlebark	77	241.90	Large	RP		Measured in field	Handheld GPS
1847	*Eucalyptus rubida*	Candlebark	72	226.19	Large	RP		Measured in field	Handheld GPS
1848	*Eucalyptus rubida*	Candlebark	107	336.15	Large	RP		Measured in field	Handheld GPS
1849	*Eucalyptus rubida*	Candlebark	71	223.05	Large	RP		Measured in field	Handheld GPS
1850	*Eucalyptus rubida*	Candlebark	70	219.91	Large	RP		Measured in field	Handheld GPS
1851	*Eucalyptus rubida*	Candlebark	76	238.76	Large	RP		Measured in field	Handheld GPS
1852	*Eucalyptus rubida*	Candlebark	104	326.73	Large	RP		Measured in field	Handheld GPS
1853	*Eucalyptus rubida*	Candlebark	94	295.31	Large	RP		Measured in field	Handheld GPS
1854	*Eucalyptus rubida*	Candlebark	155	486.95	Large	RP		Measured in field	Handheld GPS
1855	*Eucalyptus rubida*	Candlebark	84	263.89	Large	RP		Measured in field	Handheld GPS
1856	*Eucalyptus rubida*	Candlebark	94	295.31	Large	RP		Measured in field	Handheld GPS
1857	*Eucalyptus rubida*	Candlebark	109	342.43	Large	RP		Measured in field	Handheld GPS
1858	*Eucalyptus rubida*	Candlebark	70	219.91	Large	RP		Measured in field	Handheld GPS
1859	*Eucalyptus rubida*	Candlebark	108	339.29	Large	RP		Measured in field	Handheld GPS
1860	*Eucalyptus rubida*	Candlebark	98	307.88	Large	RP		Measured in field	Handheld GPS
1861	*Eucalyptus rubida*	Candlebark	72	226.19	Large	RP		Measured in field	Handheld GPS
1862	*Eucalyptus rubida*	Candlebark	82	257.61	Large	RP		Measured in field	Handheld GPS
1863	*Eucalyptus rubida*	Candlebark	103	323.58	Large	RP		Measured in field	Handheld GPS
1864	*Eucalyptus rubida*	Candlebark	109	342.43	Large	RP		Measured in field	Handheld GPS
1865	*Eucalyptus rubida*	Candlebark	87	273.32	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1866	*Eucalyptus rubida*	Candlebark	79	248.19	Large	RP		Measured in field	Handheld GPS
1867	*Eucalyptus rubida*	Candlebark	73	229.34	Large	RP		Measured in field	Handheld GPS
1868	*Eucalyptus rubida*	Candlebark		0.00	Large	RP		Measured in field, no DBH data	Handheld GPS
1869	*Eucalyptus rubida*	Candlebark	105	329.87	Large	RP		Measured in field	Handheld GPS
1870	*Eucalyptus rubida*	Candlebark	86	270.18	Large	RP		Measured in field	Handheld GPS
1871	*Eucalyptus rubida*	Candlebark	86	270.18	Large	RP		Measured in field	Handheld GPS
1872	*Eucalyptus rubida*	Candlebark	80	251.33	Large	RP		Measured in field	Handheld GPS
1873	*Eucalyptus rubida*	Candlebark	78	245.04	Large	RP		Measured in field	Handheld GPS
1874	*Eucalyptus rubida*	Candlebark	86	270.18	Large	RP		Measured in field	Handheld GPS
1875	*Eucalyptus rubida*	Candlebark	120	376.99	Large	RP		Measured in field	Handheld GPS
1876	*Eucalyptus rubida*	Candlebark	85	267.04	Large	RP		Measured in field	Handheld GPS
1877	*Eucalyptus rubida*	Candlebark	72	226.19	Large	RP		Measured in field	Handheld GPS
1878	*Eucalyptus rubida*	Candlebark	93	292.17	Large	RP		Measured in field	Handheld GPS
1879	*Eucalyptus rubida*	Candlebark	88	276.46	Large	RP		Measured in field	Handheld GPS
1880	*Eucalyptus rubida*	Candlebark	96	301.59	Large	RP		Measured in field	Handheld GPS
1881	*Eucalyptus rubida*	Candlebark	93	292.17	Large	RP		Measured in field	Handheld GPS
1882	*Eucalyptus rubida*	Candlebark	78	245.04	Large	RP		Measured in field	Handheld GPS
1883	*Eucalyptus rubida*	Candlebark	79	248.19	Large	RP		Measured in field	Handheld GPS
1884	*Eucalyptus rubida*	Candlebark	128	402.12	Large	RP		Measured in field	Handheld GPS
1885	*Eucalyptus rubida*	Candlebark	81	254.47	Large	RP		Measured in field	Handheld GPS
1886	*Eucalyptus rubida*	Candlebark	87	273.32	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1887	*Eucalyptus rubida*	Candlebark	125	392.70	Large	RP		Measured in field	Handheld GPS
1888	*Eucalyptus rubida*	Candlebark	130	408.41	Large	RP		Measured in field	Handheld GPS
1889	*Eucalyptus rubida*	Candlebark	98	307.88	Large	RP		Measured in field	Handheld GPS
1890	*Eucalyptus rubida*	Candlebark	126	395.84	Large	RP		Measured in field	Handheld GPS
1891	*Eucalyptus rubida*	Candlebark	155	486.95	Large	RP		Measured in field	Handheld GPS
1892	*Eucalyptus rubida*	Candlebark	84	263.89	Large	RP		Measured in field	Handheld GPS
1893	*Eucalyptus rubida*	Candlebark	86	270.18	Large	RP		Measured in field	Handheld GPS
1894	*Eucalyptus rubida*	Candlebark	109	342.43	Large	RP		Measured in field	Handheld GPS
1895	*Eucalyptus rubida*	Candlebark	117	367.57	Large	RP		Measured in field	Handheld GPS
1896	*Eucalyptus rubida*	Candlebark	132	414.69	Large	ST		Measured in field	Handheld GPS
1897	*Eucalyptus rubida*	Candlebark	73	229.34	Large	ST		Measured in field	Handheld GPS
1898	*Eucalyptus rubida*	Candlebark	87	273.32	Large	ST		Measured in field	Handheld GPS
1899	*Eucalyptus rubida*	Candlebark	99	311.02	Large	ST		Measured in field	Handheld GPS
1900	*Eucalyptus rubida*	Candlebark	83	260.75	Large	ST		Measured in field	Handheld GPS
1901	*Eucalyptus rubida*	Candlebark	24	75.40	Small	ST		Measured in field	Handheld GPS
1902	*Eucalyptus rubida*	Candlebark	5	15.71	Small	ST		Measured in field	Handheld GPS
1903	*Eucalyptus rubida*	Candlebark	111	348.72	Large	ST		Measured in field	Handheld GPS
1904	*Eucalyptus rubida*	Candlebark	81	254.47	Large	ST		Measured in field	Handheld GPS
1905	*Eucalyptus rubida*	Candlebark	126	395.84	Large	ST		Measured in field	Handheld GPS
1906	*Eucalyptus rubida*	Candlebark	93	292.17	Large	ST		Measured in field	Handheld GPS
1907	*Eucalyptus rubida*	Candlebark	70	219.91	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1908	*Eucalyptus rubida*	Candlebark	111	348.72	Large	RP		Measured in field	Handheld GPS
1909	*Eucalyptus rubida*	Candlebark	87	273.32	Large	RP		Measured in field	Handheld GPS
1910	*Eucalyptus rubida*	Candlebark	84	263.89	Large	RP	HBT	Measured in field	Handheld GPS
1911	*Eucalyptus spp.*	Eucalypt	55	172.79	Small	ST		Measured in field	Handheld GPS
1912	*Eucalyptus spp.*	Eucalypt	54	169.65	Small	ST		Measured in field	Handheld GPS
1913	*Eucalyptus spp.*	Eucalypt	67	210.49	Small	RP		Measured in field	Handheld GPS
1914	*Eucalyptus spp.*	Eucalypt	66	207.35	Small	RP		Measured in field	Handheld GPS
1915	*Eucalyptus spp.*	Eucalypt	62	194.78	Large	RP		Measured in field	Handheld GPS
1916	*Eucalyptus spp.*	Eucalypt	60	188.50	Large	RP		Measured in field	Handheld GPS
1917	*Eucalyptus spp.*	Eucalypt	63	197.92	Large	RP		Measured in field	Handheld GPS
1918	*Eucalyptus viminalis*	Manna Gum	120	376.99	Large	RP		Estimated in field	Handheld GPS
1919	*Eucalyptus viminalis*	Manna Gum	200	628.32	Large	ST		Estimated in field	Handheld GPS
1920	*Eucalyptus viminalis*	Manna Gum	130	408.41	Large	ST		Estimated in field	Handheld GPS
1921	*Eucalyptus viminalis*	Manna Gum	70	219.91	Large	ST		Estimated in field	Handheld GPS
1922	*Eucalyptus viminalis*	Manna Gum	81	254.47	Large	RP		Measured in field	Handheld GPS
1923	*Eucalyptus viminalis*	Manna Gum	75	235.62	Large	RP		Measured in field	Handheld GPS
1924	*Eucalyptus viminalis*	Manna Gum	121	380.13	Large	RP		Measured in field	Handheld GPS
1925	*Eucalyptus viminalis*	Manna Gum	156	490.09	Large	ST		Measured in field	Handheld GPS
1926	*Eucalyptus viminalis*	Manna Gum	163	512.08	Large	RP	HBT	Measured in field	Handheld GPS
1927	*Eucalyptus viminalis*	Manna Gum	162	508.94	Large	ST		Measured in field	Handheld GPS
1928	*Eucalyptus viminalis*	Manna Gum	175	549.78	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1929	*Eucalyptus viminalis*	Manna Gum	90	282.74	Large	RP		Measured in field	Handheld GPS
1930	*Eucalyptus viminalis*	Manna Gum	78	245.04	Large	RP		Measured in field	Handheld GPS
1931	*Eucalyptus yarraensis*	Yarra Gum	195	612.61	Large	RP	HBT	Measured in field	Handheld GPS
1932	*Eucalyptus yarraensis*	Yarra Gum	88	276.46	Large	RP	HBT	Measured in field	Handheld GPS
1933	*Eucalyptus yarraensis*	Yarra Gum	94	295.31	Large	RP		Measured in field	Handheld GPS
1934	*Eucalyptus yarraensis*	Yarra Gum	95	298.45	Large	RP		Measured in field	Handheld GPS
1935	*Eucalyptus yarraensis*	Yarra Gum	105	329.87	Large	RP		Measured in field	Handheld GPS
1936	*Eucalyptus yarraensis*	Yarra Gum		0.00	Large	RP		Measured in field, no DBH data	Handheld GPS
1937	*Eucalyptus yarraensis*	Yarra Gum		0.00	Large	RP		Measured in field, no DBH data	Handheld GPS
1938	*Eucalyptus yarraensis*	Yarra Gum		0.00	Large	RP		Measured in field, no DBH data	Handheld GPS
1939	*Eucalyptus yarraensis*	Yarra Gum	71	223.05	Large	RP		Measured in field	Handheld GPS
1940	*Eucalyptus yarraensis*	Yarra Gum	70	219.91	Large	RP		Measured in field	Handheld GPS
1941	*Unknown*	Unknown		0.00	Large	ST		Estimated, no DBH data	Aerial photo
1942	*Eucalyptus rubida*	Candlebark	90	282.74	Large	RP	HBT	Measured in field	Handheld GPS
1943	*Dead*		72	226.19	Large	RP	HBT	Measured in field	Handheld GPS
1944	*Eucalyptus aromaphloia*	Scentbark	90	282.74	Large	RP	HBT	Measured in field	Handheld GPS
1945	*Eucalyptus aromaphloia*	Scentbark	65	204.20	Large	RP		Measured in field	Handheld GPS
1946	*Eucalyptus obliqua*	messmate	60	188.50	Large	RP		Measured in field	Handheld GPS
1947	*Eucalyptus macrorhyncha*	Red Stringybark	61	191.64	Large	RP	HBT	Measured in field	Handheld GPS
1948	*Eucalyptus aromaphloia*	Scentbark	67	210.49	Large	RP		Measured in field	Handheld GPS
1949	*Dead*		73	229.34	Large	RP		Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1950	*Eucalyptus melliodora*	Yellow Box	72	226.19	Large	RP		Measured in field	Handheld GPS
1951	*Eucalyptus melliodora*	Yellow Box	106	333.01	Large	RP		Measured in field	Handheld GPS
1952	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
1953	*Eucalyptus melliodora*	Yellow Box	67	210.49	Large	RP		Measured in field	Handheld GPS
1954	*Eucalyptus melliodora*	Yellow Box	87	273.32	Large	RP		Measured in field	Handheld GPS
1955	*Dead*		92	289.03	Large	RP		Measured in field	Handheld GPS
1956	*Eucalyptus rubida*	Candlebark	67	210.49	Large	RP		Measured in field	Handheld GPS
1957	*Dead*		68	213.63	Large	RP		Measured in field	Handheld GPS
1958	*Eucalyptus aromaphloia*	Scentbark	66	207.35	Large	RP	HBT	Measured in field	Handheld GPS
1959	*Eucalyptus rubida*	Candlebark	66	207.35	Small	RP		Measured in field	Handheld GPS
1960	*Eucalyptus rubida*	Candlebark	68	213.63	Small	RP		Measured in field	Handheld GPS
1961	*Dead*		68	213.63	Small	RP	HBT	Measured in field	Handheld GPS
1962	*Eucalyptus melliodora*	Yellow Box	65	204.20	Small	ST		Measured in field	Handheld GPS
1963	*Eucalyptus melliodora*	Yellow Box	116	364.42	Large	ST	HBT	Measured in field	Handheld GPS
1964	*Eucalyptus radiata*	Narrow-leaf Peppermint	86	270.18	Large	RP	HBT	Measured in field	Handheld GPS
1965	*Eucalyptus macrorhyncha*	Red Stringybark	65	204.20	Large	RP	HBT	Measured in field	Handheld GPS
1966	*Eucalyptus radiata*	Narrow-leaf Peppermint	66	207.35	Large	RP		Measured in field	Handheld GPS
1967	*Eucalyptus goniocalyx*	Bundy	71	223.05	Large	RP		Measured in field	Handheld GPS
1968	*Eucalyptus dives*	Broadleaf Peppermint	79	248.19	Large	RP		Measured in field	Handheld GPS
1969	*Eucalyptus goniocalyx*	Bundy	86	270.18	Large	RP		Measured in field	Handheld GPS
1970	*Eucalyptus goniocalyx*	Bundy	62	194.78	Large	RP		Measured in field	Handheld GPS
1971	*Dead*		65	204.20	Large	RP	HBT	Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1972	*Eucalyptus melliodora*	Yellow Box	58	182.21	Small	RP		Measured in field	Handheld GPS
1973	*Eucalyptus rubida*	Candlebark	88	276.46	Large	RP		Measured in field	Handheld GPS
1974	*Eucalyptus rubida*	Candlebark	63	197.92	Small	RP		Measured in field	Handheld GPS
1975	*Eucalyptus rubida*	Candlebark	65	204.20	Small	RP		Measured in field	Handheld GPS
1976	*Eucalyptus macrorhyncha*	Red Stringybark	69	216.77	Large	RP		Measured in field	Handheld GPS
1977	*Eucalyptus macrorhyncha*	Red Stringybark	58	182.21	Small	RP		Measured in field	Handheld GPS
1978	*Eucalyptus macrorhyncha*	Red Stringybark	62	194.78	Large	ST		Measured in field	Handheld GPS
1979	*Eucalyptus melliodora*	Yellow Box	66	207.35	Large	ST		Measured in field	Handheld GPS
1980	*Eucalyptus macrorhyncha*	Red Stringybark	67	210.49	Large	ST		Measured in field	Handheld GPS
1981	*Eucalyptus macrorhyncha*	Red Stringybark	56	175.93	Small	ST		Measured in field	Handheld GPS
1982	*Eucalyptus macrorhyncha*	Red Stringybark	66	207.35	Large	ST		Measured in field	Handheld GPS
1983	*Eucalyptus macrorhyncha*	Red Stringybark	60	188.50	Large	ST		Measured in field	Handheld GPS
1984	*Eucalyptus macrorhyncha*	Red Stringybark	47	147.65	Small	ST		Measured in field	Handheld GPS
1985	*Eucalyptus macrorhyncha*	Red Stringybark	63	197.92	Large	ST		Measured in field	Handheld GPS
1986	*Eucalyptus macrorhyncha*	Red Stringybark	58	182.21	Small	ST		Measured in field	Handheld GPS
1987	*Eucalyptus macrorhyncha*	Red Stringybark	46	144.51	Small	ST		Measured in field	Handheld GPS
1988	*Eucalyptus macrorhyncha*	Red Stringybark	56	175.93	Small	ST		Measured in field	Handheld GPS
1989	*Eucalyptus melliodora*	Yellow Box	82	257.61	Large	ST		Measured in field	Handheld GPS
1990	*Eucalyptus macrorhyncha*	Red Stringybark	76	238.76	Large	ST		Measured in field	Handheld GPS
1991	*Eucalyptus macrorhyncha*	Red Stringybark	72	226.19	Large	ST		Measured in field	Handheld GPS
1992	*Eucalyptus macrorhyncha*	Red Stringybark	46	144.51	Small	ST		Measured in field	Handheld GPS
1993	*Eucalyptus macrorhyncha*	Red Stringybark	94	295.31	Large	sc	HBT	Measured in field	Handheld GPS
1994	*Eucalyptus melliodora*	Yellow Box	81	254.47	Large	RP		Measured in field	Handheld GPS
1995	*Eucalyptus melliodora*	Yellow Box	99	311.02	Large	RP	HBT	Measured in field	Handheld GPS
1996	*Eucalyptus melliodora*	Yellow Box	69	216.77	Small	RP		Measured in field	Handheld GPS
1997	*Eucalyptus melliodora*	Yellow Box	94	295.31	Large	RP	HBT	Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
1998	*Eucalyptus melliodora*	Yellow Box	76	238.76	Large	RP	HBT	Measured in field	Handheld GPS
1999	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
2000	*Eucalyptus melliodora*	Yellow Box	77	241.90	Large	RP	HBT	Measured in field	Handheld GPS
2001	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP		Measured in field	Handheld GPS
2002	*Eucalyptus melliodora*	Yellow Box	74	232.48	Large	RP	HBT	Measured in field	Handheld GPS
2003	*Eucalyptus melliodora*	Yellow Box	109	342.43	Large	RP		Measured in field	Handheld GPS
2004	*Eucalyptus melliodora*	Yellow Box	71	223.05	Large	RP	HBT	Measured in field	Handheld GPS
2005	*Eucalyptus melliodora*	Yellow Box	75	235.62	Large	RP		Measured in field	Handheld GPS
2006	*Eucalyptus melliodora*	Yellow Box	131	411.55	Large	RP	HBT	Measured in field	Handheld GPS
2007	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP		Measured in field	Handheld GPS
2008	*Eucalyptus aromaphloia*	Scentbark	94	295.31	Large	RP	HBT	Measured in field	Handheld GPS
2009	*Eucalyptus aromaphloia*	Scentbark	77	241.90	Large	RP		Measured in field	Handheld GPS
2010	*Eucalyptus rubida*	Candlebark	90	282.74	Large	RP		Measured in field	Handheld GPS
2011	*Eucalyptus rubida*	Candlebark	97	304.73	Large	RP		Measured in field	Handheld GPS
2012	*Eucalyptus rubida*	Candlebark	93	292.17	Large	RP	HBT	Measured in field	Handheld GPS
2013	*Eucalyptus rubida*	Candlebark	84	263.89	Large	RP		Measured in field	Handheld GPS
2014	*Eucalyptus rubida*	Candlebark	75	235.62	Large	RP		Measured in field	Handheld GPS
2015	*Eucalyptus melliodora*	Yellow Box	117	367.57	Large	RP	HBT	Measured in field	Handheld GPS
2016	*Eucalyptus rubida*	Candlebark	90	282.74	Large	RP	HBT	Measured in field	Handheld GPS
2017	*Eucalyptus melliodora*	Yellow Box	173	543.50	Large	RP	HBT	Measured in field	Handheld GPS
2018	*Eucalyptus rubida*	Candlebark	90	282.74	Large	RP		Measured in field	Handheld GPS
2019	*Eucalyptus melliodora*	Yellow Box	73	229.34	Large	RP	HBT	Measured in field	Handheld GPS
2020	*Eucalyptus rubida*	Candlebark	152	477.52	Large	RP	HBT	Measured in field	Handheld GPS
2021	*Eucalyptus rubida*	Candlebark	130	408.41	Large	RP	HBT	Measured in field	Handheld GPS
2022	*Eucalyptus rubida*	Candlebark	97	304.73	Large	RP	HBT	Measured in field	Handheld GPS
2023	*Eucalyptus rubida*	Candlebark	89	279.60	Large	RP	HBT	Measured in field	Handheld GPS

ID	SCIENTIFIC NAME	COMMON NAME	DBH	CBH	SIZE	CATEGORY	HBT	METHOD	GPS ACC
2024	*Eucalyptus rubida*	Candlebark	97	304.73	Large	RP	HBT	Measured in field	Handheld GPS
2025	*Eucalyptus rubida*	Candlebark	107	336.15	Large	RP	HBT	Measured in field	Handheld GPS
2026	*Eucalyptus rubida*	Candlebark	84	263.89	Large	RP	HBT	Measured in field	Handheld GPS
2027	*Eucalyptus rubida*	Candlebark	106	333.01	Large	RP	HBT	Measured in field	Handheld GPS
2028	*Eucalyptus melliodora*	Yellow Box	88	276.46	Large	RP		Measured in field	Handheld GPS
2029	*Eucalyptus macrorhyncha*	Red Stringybark	71	223.05	Large	RP		Measured in field	Handheld GPS
2030	*Eucalyptus melliodora*	Yellow Box	70	219.91	Large	RP		Measured in field	Handheld GPS
2031	*Eucalyptus radiata*	Narrow-leaf Peppermint	70	219.91	Large	RP		Measured in field	Handheld GPS
2032	*Eucalyptus rubida*	Candlebark	69	216.77	Small	RP		Measured in field	Handheld GPS
2033	*Eucalyptus rubida*	Candlebark	65	204.20	Small	RP		Measured in field	Handheld GPS
2034	*Eucalyptus melliodora*	Yellow Box	94	295.31	Large	RP		Measured in field	Handheld GPS
2035	*Eucalyptus rubida*	Candlebark	74	232.48	Large	RP		Measured in field	Handheld GPS
2036	*Eucalyptus radiata*	Narrow-leaf Peppermint	60	188.50	Small	RP		Measured in field	Handheld GPS

Codes used in the table above:

DBH denotes Diameter at Breast Height

CBH denotes Circumference at Breast Height

RP denotes Remnant Patch or Large Trees in Patches

ST denotes Scattered Tress

HBT denotes Hollow Bearing Tree

APPENDIX F

ENSYM REPORT – OPTIONS ASSESSMENT

Scenario test – native vegetation removal

This report provides offset requirements for internal testing of different proposals to remove native vegetation. **This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria.** A report must be obtained from the Department of Environment, Land, Water and Planning (DELWP).

Date of issue: **27/02/2018** **Report ID: Scenario Testing**
Time of issue: **3:57 pm**

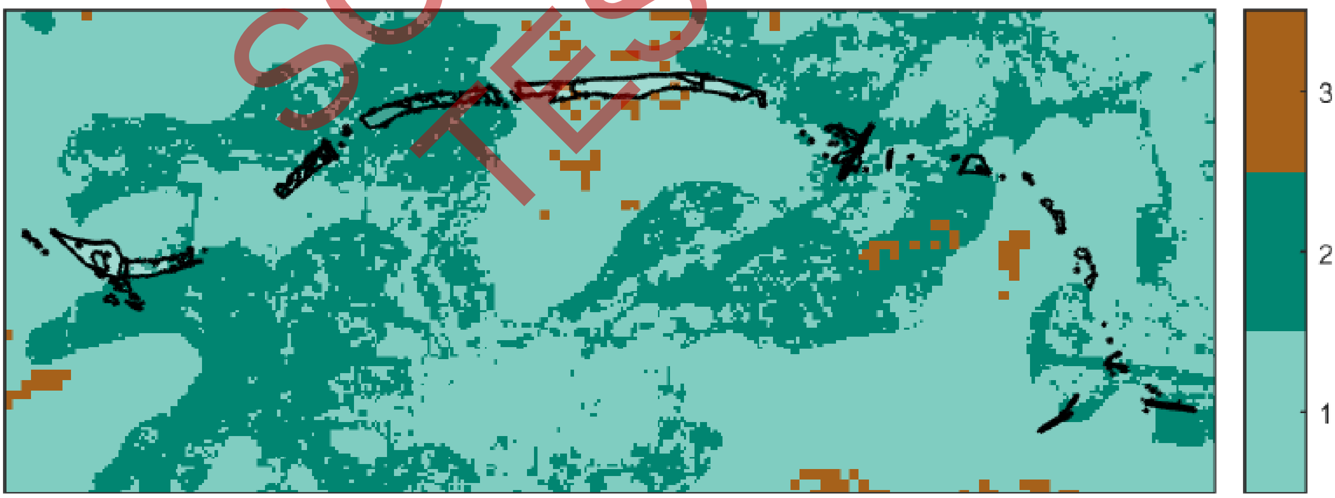
Project ID	EnSym_BB_A0

SCENARIO TESTING

Assessment pathway

Assessment pathway	Detailed Assessment Pathway
Extent including past and proposed	62.613 ha
Extent of past removal	0.000 ha
Extent of proposed removal	62.613 ha
No. Large trees proposed to be removed	388
Location category	Location 3 The native vegetation is in an area where the removal of less than 0.5 hectares could have a significant impact on habitat for one or more rare or threatened species.The native vegetation is also in an area mapped as an endangered Ecological Vegetation Class.

1. Location map



Scenario test – native vegetation removal

Offset requirements if a permit is granted

Any approval granted will include a condition to obtain an offset that meets the following requirements:

General offset amount[1]	2.322 general habitat units
Vicinity	Glenelg Hopkins Catchment Management Authority (CMA) or Pyrenees Shire Council
Minimum strategic biodiversity value score[2]	0.514
Large trees*	26 large trees
Species offset amount[3]	23.088 specific units of habitat for Ben Major Grevillea, *Grevillea floripendula* 34.079 specific units of habitat for Rough Wattle, *Acacia aspera subsp. parviceps* 43.484 specific units of habitat for Emerald-lip Greenhood, *Pterostylis smaragdyna* 43.066 specific units of habitat for Wimmera Scentbark, *Eucalyptus sabulosa*
Large trees*	362 trees
*** The total number of large trees that the offset must protect**	388 large trees to be protected in either the general, species or combination across all habitat units protected

NB: values within tables in this document may not add to the totals shown above due to rounding

Appendix 1 includes information about the native vegetation to be removed

Appendix 2 includes information about the rare or threatened species mapped at the site.

Appendix 3 includes maps showing native vegetation to be removed and extracts of relevant species habitat importance maps

1 The general offset amount required is the sum of all general habitat units in Appendix 1.

2 Minimum strategic biodiversity score is 80 per cent of the weighted average score across habitat zones where a general offset is required

3 The species offset amount(s) required is the sum of all species habitat units in Appendix 1.

Scenario test – native vegetation removal

Next steps

Any proposal to remove native vegetation must meet the application requirements of the Detailed Assessment Pathway and it will be assessed under the Detailed Assessment Pathway.

This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria.

If you wish to remove the mapped native vegetation you must submit the related shapefiles to the Department of Environment, Land, Water and Planning (DELWP) for processing, by email to ensymnvrtool.support@delwp.vic.gov.au. DELWP will provide a *Native vegetation removal report* that is required to meet the permit application requirements in accordance with *Guidelines for the removal, destruction or lopping of native vegetation* (Guidelines).

Appendix 1: Description of native vegetation to be removed

The species-general offset test was applied to your proposal. This test determines if the proposed removal of native vegetation has a proportional impact on any rare or threatened species habitats above the species offset threshold. The threshold is set at 0.005 per cent of the mapped habitat value for a species. When the proportional impact is above the species offset threshold a species offset is required. This test is done for all species mapped at the site. Multiple species offsets will be required if the species offset threshold is exceeded for multiple species.

Where a zone requires species offset(s), the species habitat units for each species in that zone is calculated by the following equation in accordance with the Guidelines:

Species habitat units = extent x condition x species landscape factor x 2, where the species landscape factor = 0.5 + (habitat importance score/2)

The species offset amount(s) required is the sum of all species habitat units per zone

Where a zone does not require a species offset, the general habitat units in that zone is calculated by the following equation in accordance with the Guidelines:

General habitat units = extent x condition x general landscape factor x 1.5, where the general landscape factor = 0.5 + (strategic biodiversity value score/2)

The general offset amount required is the sum of all general habitat units per zone.

Native vegetation to be removed

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
A0-1	Patch	cvu_0067	Endangered	0	no	0.550	0.558	0.558	0.599	0.691	0.519	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.691	0.519	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.691	0.519	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-2	Patch	cvu_0067	Endangered	2	no	0.560	0.200	0.200	0.651	0.676	0.188	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.301	0.187	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-3	Patch	cvu_0067	Endangered	2	no	0.620	0.265	0.265	0.555	0.709	0.281	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.180	0.281	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-4	Patch	cvu_0067	Endangered	2	no	0.550	0.285	0.285	0.589	0.593	0.250	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.593	0.250	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-5	Patch	vvp_0067	Endangered	2	no	0.650	0.086	0.086	0.549	0.710	0.095	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A0-6	Patch	cvu_0067	Endangered	24	no	0.440	1.844	1.844	0.640	0.594	1.294	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.563	1.290	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-7	Patch	cvu_0067	Endangered	11	no	0.510	1.495	1.495	0.799	0.760	1.342	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.270	1.352	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-8	Patch	cvu_0067	Endangered	5	no	0.550	0.629	0.629	0.778	0.790	0.619	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.792	0.620	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.792	0.620	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-9	Patch	cvu_0067	Endangered	11	no	0.780	0.991	0.991	0.606	0.791	1.385	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.786	1.381	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.786	1.381	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-10	Patch	cvu_0067	Endangered	0	no	0.600	0.024	0.024	0.590	0.700	0.025	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.700	0.025	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-11	Patch	cvu_0125	Endangered	0	no	0.380	0.030	0.030	0.590	0.710	0.019	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.710	0.019	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-12	Patch	cvu_0125	Endangered	0	no	0.380	0.006	0.006	0.820		0.003	General
A0-13	Patch	vvp_0653	Endangered	0	no	0.340	0.203	0.203	0.597		0.083	General
A0-14	Patch	cvu_0125	Endangered	0	no	0.230	0.077	0.077	0.580	0.500	0.026	501535 Ben Major Grevillea *Grevillea floripendula*
										0.500	0.026	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.500	0.026	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.500	0.026	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-15	Patch	cvu_0125	Endangered	0	no	0.450	0.164	0.164	0.774	0.692	0.125	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A0-16	Patch	cvu_0125	Endangered	0	no	0.360	0.007	0.007	0.620	0.600	0.004	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.600	0.004	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-17	Patch	cvu_0125	Endangered	0	no	0.570	0.147	0.147	0.554	0.663	0.140	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-18	Patch	cvu_0068	Endangered	0	no	0.250	0.047	0.047	0.525	0.333	0.016	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A0-19	Patch	cvu_0022	Depleted	0	no	0.510	0.002	0.002	0.500		0.001	General
A0-20	Patch	cvu_0022	Depleted	10	no	0.370	0.569	0.569	0.550	0.575	0.332	501535 Ben Major Grevillea *Grevillea floripendula*
A0-21	Patch	cvu_0022	Depleted	1	no	0.680	0.114	0.114	0.586	0.700	0.132	507308 Rough Wattle *Acacia aspera subsp. parviceps*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.569	0.134	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.505	0.134	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-22	Patch	cvu_0022	Depleted	11	no	0.470	0.431	0.431	0.480	0.371	0.278	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.451	0.294	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.451	0.294	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-23	Patch	cvu_0022	Depleted	4	no	0.510	0.335	0.335	0.603	0.600	0.273	501535 Ben Major Grevillea *Grevillea floripendula*
A0-24	Patch	cvu_0022	Depleted	17	no	0.330	0.797	0.797	0.519	0.674	0.440	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.674	0.440	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-25	Patch	cvu_0022	Depleted	2	no	0.370	0.146	0.146	0.480		0.060	General
A0-26	Patch	cvu_0022	Depleted	27	no	0.650	3.963	3.963	0.569	0.829	4.711	501535 Ben Major Grevillea *Grevillea floripendula*
										0.633	4.556	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.648	4.553	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.741	4.485	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-27	Patch	cvu_0175	Endangered	2	no	0.360	0.335	0.335	0.820	0.590	0.192	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A0-28	Patch	cvu_0175	Endangered	0	no	0.500	0.001	0.001	0.692		0.001	General

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
A0-29	Patch	cvu_0175	Endangered	1	no	0.360	0.523	0.523	0.844		0.260	General
A0-30	Patch	cvu_0175	Endangered	0	no	0.300	0.049	0.049	0.623		0.018	General
A0-31	Patch	cvu_0175	Endangered	0	no	0.320	0.045	0.045	0.230		0.013	General
A0-32	Patch	cvu_0175	Endangered	1	no	0.480	0.024	0.024	0.210		0.010	General
A0-33	Patch	cvu_0175	Endangered	8	no	0.510	0.449	0.449	0.500	0.682	0.386	501535 Ben Major Grevillea *Grevillea floripendula*
A0-34	Patch	cvu_0175	Endangered	4	no	0.420	0.320	0.320	0.282		0.129	General
A0-35	Patch	vvp_0175	Endangered	11	no	0.520	0.936	0.936	0.530	0.705	0.830	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.596	0.830	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-36	Patch	vvp_0175	Endangered	2	no	0.640	0.223	0.223	0.790		0.192	General
A0-37	Patch	cvu_0175	Endangered	7	no	0.560	0.392	0.392	0.570	0.686	0.370	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.686	0.370	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-38	Patch	vvp_0175	Endangered	1	no	0.230	0.052	0.052	0.490		0.013	General
A0-39	Patch	cvu_0175	Endangered	5	no	0.550	0.189	0.189	0.530	0.686	0.175	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.686	0.175	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-40	Patch	cvu_0175	Endangered	12	no	0.460	0.738	0.738	0.590	0.705	0.579	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.005	0.581	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-41	Patch	vvp_0175	Endangered	0	no	0.490	0.060	0.060	0.768		0.039	General
A0-42	Patch	cvu_0020	Least Concern	19	no	0.580	1.326	1.326	0.572	0.621	1.247	501535 Ben Major Grevillea *Grevillea floripendula*
										0.670	1.284	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.670	1.284	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.670	1.284	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-43	Patch	cvu_0020	Least Concern	0	no	0.530	0.020	0.020	0.640	0.709	0.018	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.709	0.018	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.709	0.018	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-44	Patch	cvu_0020	Least Concern	0	no	0.430	0.122	0.122	0.640	0.711	0.090	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.711	0.090	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.711	0.090	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-45	Patch	cvu_0020	Least Concern	1	no	0.610	0.156	0.156	0.580	0.720	0.164	501535 Ben Major Grevillea *Grevillea floripendula*
										0.705	0.163	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.705	0.163	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.705	0.163	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-46	Patch	cvu_0020	Least Concern	14	no	0.520	1.031	1.031	0.580	0.584	0.849	501535 Ben Major Grevillea *Grevillea floripendula*
										0.586	0.850	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.586	0.850	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.586	0.850	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-47	Patch	cvu_0020	Least Concern	1	no	0.200	0.047	0.047	0.480	0.541	0.014	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.530	0.014	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.530	0.014	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-48	Patch	cvu_0022	Depleted	47	no	0.640	3.503	3.503	0.631	0.760	3.946	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.760	3.946	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.760	3.946	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-49	Patch	cvu_0022	Depleted	29	no	0.630	10.362	10.362	0.826	0.818	11.868	501535 Ben Major Grevillea *Grevillea floripendula*
										0.817	11.859	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.817	11.859	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.750	11.857	505174 Wimmera Scentbark *Eucalyptus sabulosa*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
A0-50	Patch	cvu_0125	Endangered	0	no	0.400	0.020	0.020	0.220		0.007	General
A0-51	Patch	cvu_0125	Endangered	0	no	0.150	0.174	0.174	0.229		0.024	General
A0-52	Patch	cvu_0125	Endangered	0	no	0.150	0.017	0.017	0.400		0.003	General
A0-53	Patch	cvu_0125	Endangered	0	no	0.590	0.027	0.027	0.640	0.700	0.027	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.700	0.027	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.700	0.027	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-54	Patch	vvp_0125	Endangered	0	no	0.530	0.058	0.058	0.700		0.039	General
A0-55	Patch	vvp_0055	Endangered	0	no	0.270	0.053	0.053	0.550		0.017	General
A0-56	Patch	cvu_0067	Endangered	0	no	0.520	0.028	0.028	0.570	0.730	0.025	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.730	0.025	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.025	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-57	Patch	cvu_0067	Endangered	0	no	0.400	1.328	1.328	0.738	0.782	0.947	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.780	0.945	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.668	0.943	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-58	Patch	cvu_0022	Depleted	0	no	0.190	0.244	0.244	0.743	0.640	0.076	507308 Rough Wattle *Acacia aspera subsp. parviceps*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.015	0.075	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.015	0.075	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-59	Patch	cvu_0022	Depleted	0	no	0.130	0.159	0.159	0.610	0.619	0.033	501535 Ben Major Grevillea *Grevillea floripendula*
A0-60	Patch	cvu_0022	Depleted	0	no	0.290	0.023	0.023	0.480		0.007	General
A0-61	Patch	cvu_0175	Endangered	0	no	0.300	0.132	0.132	0.230		0.037	General
A0-62	Patch	cvu_0175	Endangered	0	no	0.300	0.021	0.021	0.210		0.006	General
A0-63	Patch	cvu_0175	Endangered	0	no	0.120	0.145	0.145	0.500		0.020	General
A0-64	Patch	vvp_0175	Endangered	0	no	0.410	1.692	1.692	0.780		0.926	General
A0-65	Patch	cvu_0020	Least Concern	1	no	0.160	6.708	6.708	0.572	0.583	1.699	501535 Ben Major Grevillea *Grevillea floripendula*
										0.558	1.710	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.558	1.710	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.558	1.710	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-66	Patch	cvu_0020	Least Concern	0	no	0.150	4.263	4.263	0.490	0.585	1.013	501535 Ben Major Grevillea *Grevillea floripendula*
										0.537	0.996	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.560	0.998	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.560	0.998	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-67	Patch	cvu_0047	Vulnerable	0	no	0.480	0.124	0.124	0.770		0.079	General
A0-68	Patch	cvu_0047	Vulnerable	0	no	0.610	0.436	0.436	0.650	0.641	0.436	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.294	0.438	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.294	0.438	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-69	Patch	cvu_0125	Endangered	0	no	0.377	0.036	0.036	0.850		0.019	General
A0-70	Patch	vvp_0125	Endangered	0	no	0.427	0.044	0.044	0.530		0.021	General
A0-71	Patch	wet_0000	Endangered	0	no	0.442	3.842	3.842	0.548	0.651	2.801	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.604	2.762	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.604	2.762	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-72	Patch	wet_0000	Endangered	0	no	0.377	0.168	0.168	0.480	0.600	0.102	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.600	0.102	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-73	Patch	wet_0000	Endangered	0	no	0.328	2.212	2.212	0.558	0.563	1.132	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.436	1.133	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-74	Patch	cvu_0020	Least Concern	0	no	0.150	0.020	0.020	0.480	0.640	0.005	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.640	0.005	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-75	Patch	cvu_0125	Endangered	0	no	0.380	0.006	0.006	0.590	0.710	0.004	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.710	0.004	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-76	Patch	cvu_0125	Endangered	0	no	0.360	0.017	0.017	0.620	0.600	0.010	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.600	0.010	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-77	Patch	cvu_0068	Endangered	0	no	0.250	1.221	1.221	0.530	0.383	0.422	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.168	0.428	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-78	Patch	cvu_0068	Endangered	0	no	0.350	0.322	0.322	0.616	0.692	0.190	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.692	0.190	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-79	Patch	cvu_0022	Depleted	1	no	0.470	0.083	0.083	0.480	0.640	0.064	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.640	0.064	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-80	Patch	cvu_0175	Endangered	2	no	0.560	0.144	0.144	0.611	0.706	0.138	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.706	0.138	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-81	Patch	cvu_0047	Vulnerable	0	no	0.450	0.037	0.037	0.510	0.650	0.027	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.650	0.027	505174 Wimmera Scentbark *Eucalyptus sabulosa*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
A0-82	Canopy Tree	cvu_0175	Endangered	1	no	0.420	0.070	0.041	0.500		0.019	General
A0-83	Canopy Tree	cvu_0175	Endangered	1	no	0.420	0.070	0.022	0.500		0.010	General
A0-84	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.070	0.500		0.016	General
A0-85	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.070	0.500		0.016	General
A0-86	Canopy Tree	cvu_0020	Least Concern	1	no	0.580	0.070	0.054	0.640	0.680	0.053	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.680	0.053	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.680	0.053	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-87	Canopy Tree	cvu_0020	Least Concern	1	no	0.580	0.070	0.056	0.500	0.580	0.051	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.580	0.051	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.580	0.051	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-88	Canopy Tree	cvu_0022	Depleted	1	no	0.370	0.070	0.042	0.500	0.530	0.024	501535 Ben Major Grevillea *Grevillea floripendula*
A0-89	Canopy Tree	cvu_0022	Depleted	1	no	0.370	0.070	0.016	0.500	0.588	0.009	501535 Ben Major Grevillea *Grevillea floripendula*
A0-90	Canopy Tree	cvu_0020	Least Concern	1	no	0.580	0.070	0.019	0.500	0.620	0.018	501535 Ben Major Grevillea *Grevillea floripendula*
										0.620	0.018	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.620	0.018	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.620	0.018	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-91	Canopy Tree	cvu_0020	Least Concern	1	no	0.580	0.070	0.037	0.500	0.629	0.035	501535 Ben Major Grevillea *Grevillea floripendula*
										0.629	0.035	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.629	0.035	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.629	0.035	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-92	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.068	0.480	0.540	0.021	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.540	0.021	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.540	0.021	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-93	Canopy Tree	cvu_0022	Depleted	1	no	0.470	0.070	0.032	0.491	0.360	0.020	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.393	0.021	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.393	0.021	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-94	Canopy Tree	cvu_0022	Depleted	1	no	0.470	0.070	0.045	0.530	0.460	0.031	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.359	0.031	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.359	0.031	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-95	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.070	0.750	0.730	0.083	501535 Ben Major Grevillea *Grevillea floripendula*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.730	0.083	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.083	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-96	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.047	0.560	0.730	0.055	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.055	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-97	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.034	0.560	0.730	0.040	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.040	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-98	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.067	0.680	0.780	0.081	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.135	0.081	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A0-99	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.051	0.680		0.044	General
A0-100	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.028	0.680		0.024	General
A0-101	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.044	0.680		0.038	General
A0-102	Canopy Tree	cvu_0175	Endangered	1	no	0.550	0.070	0.055	0.520	0.677	0.051	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.677	0.051	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-103	Scattered Tree	vvp_0896	Endangered	1	no	0.200	0.070	0.066	0.730		0.017	General
A0-104	Canopy Tree	cvu_0175	Endangered	1	no	0.550	0.070	0.041	0.514	0.670	0.038	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.670	0.038	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-105	Canopy Tree	cvu_0175	Endangered	1	no	0.550	0.070	0.047	0.530	0.690	0.043	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.690	0.043	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-106	Canopy Tree	cvu_0175	Endangered	1	no	0.550	0.070	0.022	0.530	0.688	0.020	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.688	0.020	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-107	Canopy Tree	vvp_0175	Endangered	1	no	0.520	0.070	0.046	0.530	0.703	0.041	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.703	0.041	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-108	Canopy Tree	cvu_0175	Endangered	1	no	0.550	0.070	0.021	0.530	0.683	0.019	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.683	0.019	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-109	Canopy Tree	cvu_0175	Endangered	1	no	0.550	0.070	0.044	0.530	0.680	0.041	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.680	0.041	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-110	Canopy Tree	cvu_0022	Depleted	1	no	0.330	0.070	0.043	0.489	0.691	0.024	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.691	0.024	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-111	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.058	0.480	0.560	0.018	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.560	0.018	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.560	0.018	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-112	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.052	0.481	0.640	0.017	501535 Ben Major Grevillea *Grevillea floripendula*
										0.510	0.016	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.528	0.016	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.528	0.016	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-113	Canopy Tree	cvu_0067	Endangered	1	no	0.550	0.070	0.046	0.606	0.651	0.042	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.651	0.042	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-114	Canopy Tree	cvu_0175	Endangered	1	no	0.560	0.070	0.057	0.490	0.650	0.053	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.650	0.053	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-115	Canopy Tree	cvu_0067	Endangered	1	no	0.550	0.070	0.018	0.620	0.700	0.017	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.700	0.017	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-116	Canopy Tree	cvu_0067	Endangered	1	no	0.550	0.070	0.020	0.620	0.700	0.018	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.700	0.018	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-117	Canopy Tree	cvu_0067	Endangered	1	no	0.550	0.070	0.024	0.620	0.700	0.023	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.700	0.023	505174 Wimmera Scentbark *Eucalyptus sabulosa*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
A0-118	Canopy Tree	cvu_0067	Endangered	1	no	0.550	0.070	0.070	0.620	0.700	0.065	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.700	0.065	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-119	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.045	0.765	0.695	0.015	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A0-120	Scattered Tree	cvu_0125	Endangered	1	no	0.200	0.070	0.061	0.620	0.710	0.021	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.710	0.021	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-121	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.070	0.490	0.510	0.021	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.510	0.021	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.510	0.021	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-122	Canopy Tree	cvu_0022	Depleted	1	no	0.640	0.070	0.061	0.590	0.740	0.068	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.740	0.068	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.740	0.068	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-123	Scattered Tree	cvu_0125	Endangered	1	no	0.200	0.070	0.056	0.510	0.650	0.018	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.650	0.018	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-124	Canopy Tree	cvu_0022	Depleted	1	no	0.640	0.070	0.050	0.722	0.801	0.058	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.795	0.058	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.795	0.058	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-125	Canopy Tree	cvu_0067	Endangered	1	no	0.440	0.070	0.070	0.750	0.620	0.050	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-126	Canopy Tree	cvu_0022	Depleted	1	no	0.640	0.070	0.041	0.590	0.743	0.045	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.743	0.045	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.743	0.045	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-127	Canopy Tree	cvu_0022	Depleted	1	no	0.640	0.070	0.022	0.590	0.712	0.024	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.712	0.024	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.712	0.024	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-128	Canopy Tree	cvu_0067	Endangered	1	no	0.510	0.070	0.041	0.730	0.790	0.038	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A0-129	Canopy Tree	cvu_0022	Depleted	1	no	0.650	0.070	0.052	0.624	0.777	0.060	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.777	0.060	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.777	0.060	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-130	Canopy Tree	cvu_0022	Depleted	1	no	0.650	0.070	0.035	0.584	0.830	0.041	501535 Ben Major Grevillea *Grevillea floripendula*
										0.823	0.041	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.823	0.041	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.823	0.041	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-131	Canopy Tree	cvu_0022	Depleted	1	no	0.630	0.070	0.053	0.970	0.820	0.061	501535 Ben Major Grevillea *Grevillea floripendula*
										0.820	0.061	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.820	0.061	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.820	0.061	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-132	Canopy Tree	cvu_0022	Depleted	1	no	0.630	0.070	0.028	0.840	0.820	0.032	501535 Ben Major Grevillea *Grevillea floripendula*
										0.820	0.032	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.820	0.032	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.820	0.032	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-133	Canopy Tree	cvu_0022	Depleted	1	no	0.630	0.070	0.032	0.840	0.820	0.037	501535 Ben Major Grevillea *Grevillea floripendula*
										0.820	0.037	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.820	0.037	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.820	0.037	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-134	Canopy Tree	cvu_0022	Depleted	1	no	0.630	0.070	0.059	0.590	0.777	0.067	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.777	0.067	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.777	0.067	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-135	Canopy Tree	cvu_0067	Endangered	1	no	0.550	0.070	0.034	0.760	0.790	0.033	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.790	0.033	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.790	0.033	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-136	Canopy Tree	cvu_0067	Endangered	1	no	0.550	0.070	0.040	0.760	0.790	0.039	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.790	0.039	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.790	0.039	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-137	Canopy Tree	cvu_0067	Endangered	1	no	0.510	0.070	0.021	0.900	0.779	0.019	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.641	0.019	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-138	Canopy Tree	cvu_0067	Endangered	1	no	0.510	0.070	0.038	0.900	0.736	0.034	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.080	0.035	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-139	Canopy Tree	cvu_0067	Endangered	1	no	0.440	0.070	0.057	0.730	0.680	0.042	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-140	Canopy Tree	cvu_0067	Endangered	1	no	0.440	0.070	0.041	0.520	0.420	0.026	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.420	0.026	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-141	Canopy Tree	cvu_0067	Endangered	1	no	0.600	0.070	0.060	0.590	0.700	0.061	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.700	0.061	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-142	Canopy Tree	cvu_0022	Depleted	1	no	0.630	0.070	0.049	0.840	0.820	0.056	501535 Ben Major Grevillea *Grevillea floripendula*
										0.820	0.056	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.820	0.056	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.820	0.056	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-143	Canopy Tree	cvu_0022	Depleted	1	no	0.650	0.070	0.057	0.540	0.700	0.063	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.714	0.063	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.714	0.063	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-144	Canopy Tree	cvu_0022	Depleted	1	no	0.630	0.070	0.056	0.840	0.820	0.064	501535 Ben Major Grevillea *Grevillea floripendula*
										0.820	0.064	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.820	0.064	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.820	0.064	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-145	Canopy Tree	cvu_0067	Endangered	1	no	0.780	0.070	0.055	0.590	0.790	0.077	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.790	0.077	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.790	0.077	505174 Wimmera Scentbark *Eucalyptus sabulosa*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
A0-146	Scattered Tree	cvu_0047	Vulnerable	1	no	0.200	0.070	0.038	0.835		0.011	General
A0-147	Scattered Tree	vvp_0067	Endangered	1	no	0.200	0.070	0.042	0.530	0.690	0.014	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.690	0.014	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-148	Scattered Tree	vvp_0067	Endangered	1	no	0.200	0.070	0.029	0.530	0.684	0.010	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.684	0.010	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-149	Scattered Tree	vvp_0067	Endangered	1	no	0.200	0.070	0.028	0.530	0.710	0.010	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.710	0.010	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-150	Scattered Tree	vvp_0067	Endangered	1	no	0.200	0.070	0.034	0.530	0.682	0.012	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.682	0.012	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-151	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.070	0.690		0.018	General
A0-152	Scattered Tree	cvu_0047	Vulnerable	1	no	0.200	0.070	0.070	0.690		0.018	General
A0-153	Scattered Tree	cvu_0047	Vulnerable	0	no	0.200	0.031	0.005	0.690		0.001	General
A0-154	Scattered Tree	cvu_0047	Vulnerable	1	no	0.200	0.070	0.070	0.690		0.018	General
A0-155	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.070	0.670		0.018	General
A0-156	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.070	0.225		0.013	General

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
A0-157	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.035	0.480	0.640	0.011	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.643	0.011	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.643	0.011	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-158	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.055	0.480	0.490	0.017	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.490	0.017	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.490	0.017	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-159	Scattered Tree	cvu_0067	Endangered	0	no	0.200	0.031	0.031	0.492	0.606	0.010	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.606	0.010	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-160	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.015	0.390	0.490	0.004	501535 Ben Major Grevillea *Grevillea floripendula*
										0.490	0.004	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.490	0.004	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.490	0.004	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-161	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.015	0.390	0.490	0.004	501535 Ben Major Grevillea *Grevillea floripendula*
										0.490	0.004	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.490	0.004	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.490	0.004	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-162	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.070	0.480		0.016	General
A0-163	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.070	0.530	0.690	0.024	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.690	0.024	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-164	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.070	0.480	0.560	0.022	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.560	0.022	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-165	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.070	0.480	0.560	0.022	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.400	0.022	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-166	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.070	0.480	0.650	0.023	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A0-167	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.070	0.490	0.450	0.020	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.450	0.020	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.450	0.020	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-168	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.070	0.490	0.570	0.022	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.580	0.022	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.580	0.022	505174 Wimmera Scentbark *Eucalyptus sabulosa*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
A0-169	Scattered Tree	cvu_0896	Endangered	0	no	0.200	0.031	0.018	0.490	0.620	0.006	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.620	0.006	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-170	Scattered Tree	cvu_0896	Endangered	0	no	0.200	0.031	0.015	0.490	0.610	0.005	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.610	0.005	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.610	0.005	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-171	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.070	0.490	0.610	0.023	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.610	0.023	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.610	0.023	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-172	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.070	0.490	0.598	0.022	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.598	0.022	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.598	0.022	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-173	Scattered Tree	cvu_0067	Endangered	0	no	0.200	0.031	0.023	0.605	0.645	0.007	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-174	Scattered Tree	cvu_0067	Endangered	0	no	0.200	0.031	0.023	0.605	0.520	0.007	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.566	0.007	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-175	Scattered Tree	cvu_0020	Least Concern	0	no	0.200	0.031	0.023	0.540	0.680	0.008	505174 Wimmera Scentbark *Eucalyptus sabulosa*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
A0-176	Scattered Tree	cvu_0067	Endangered	0	no	0.200	0.031	0.028	0.520	0.430	0.008	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.430	0.008	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-177	Scattered Tree	cvu_0020	Least Concern	0	no	0.200	0.031	0.023	0.539	0.720	0.008	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.682	0.008	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-178	Scattered Tree	cvu_0067	Endangered	0	no	0.200	0.031	0.028	0.520	0.428	0.008	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.428	0.008	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A0-179	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.070	0.530	0.690	0.024	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Appendix 2: Information about impacts to rare or threatened species' habitats on site

This table lists all rare or threatened species' habitats mapped at the site.

Species common name	Species scientific name	Species number	Conservation status	Group	Habitat impacted	% habitat value affected
Ben Major Grevillea	*Grevillea floripendula*	501535	Vulnerable	Dispersed	Habitat importance map	0.0548
Rough Wattle	*Acacia aspera subsp. parviceps*	507308	Rare	Dispersed	Habitat importance map	0.0456
Rough Wattle	*Acacia aspera subsp. parviceps*	507308	Rare	Dispersed	Top ranking map	0.0221
Ben Major Grevillea	*Grevillea floripendula*	501535	Vulnerable	Dispersed	Top ranking map	0.0168
Emerald-lip Greenhood	*Pterostylis smaragdyna*	503915	Rare	Dispersed	Habitat importance map	0.0089
Wimmera Scentbark	*Eucalyptus sabulosa*	505174	Rare	Dispersed	Habitat importance map	0.0068
Large-headed Fireweed	*Senecio macrocarpus*	503116	Endangered	Dispersed	Habitat importance map	0.0048
Brown Toadlet	*Pseudophryne bibronii*	13117	Endangered	Dispersed	Habitat importance map	0.0045
Yarra Gum	*Eucalyptus yarraensis*	501326	Rare	Dispersed	Habitat importance map	0.0045
Flat Bluebell	*Wahlenbergia planiflora subsp. planiflora*	504064	Vulnerable	Dispersed	Habitat importance map	0.0040
Brush-tailed Phascogale	*Phascogale tapoatafa*	11017	Vulnerable	Dispersed	Habitat importance map	0.0036
Regent Honeyeater	*Anthochaera phrygia*	10603	Critically endangered	Dispersed	Habitat importance map	0.0035
Tiny Bog-sedge	*Schoenus nanus*	503050	Rare	Dispersed	Habitat importance map	0.0031
Dwarf Boronia	*Boronia nana var. pubescens*	504278	Rare	Dispersed	Habitat importance map	0.0028
White Sunray	*Leucochrysum albicans subsp. tricolor*	504581	Endangered	Dispersed	Habitat importance map	0.0027
Grey Grass-tree	*Xanthorrhoea glauca subsp. angustifolia*	507229	Endangered	Dispersed	Habitat importance map	0.0027
Golden Sun Moth	*Synemon plana*	15021	Critically endangered	Dispersed	Habitat importance map	0.0026
Golden Cowslips	*Diuris behrii*	501061	Vulnerable	Dispersed	Habitat importance map	0.0025

Speckled Warbler	*Chthonicola sagittatus*	10504	Vulnerable	Dispersed	Habitat importance map	0.0025
Half-bearded Spear-grass	*Austrostipa hemipogon*	503985	Rare	Dispersed	Habitat importance map	0.0011
Flame Grevillea	*Grevillea dimorpha*	501532	Rare	Dispersed	Habitat importance map	0.0010
Hairy Correa	*Correa aemula*	500828	Rare	Dispersed	Habitat importance map	0.0009
Plump Swamp Wallaby-grass	*Amphibromus pithogastrus*	503624	Endangered	Dispersed	Habitat importance map	0.0009
Button Wrinklewort	*Rutidosis leptorhynchoides*	502982	Endangered	Dispersed	Habitat importance map	0.0009
Forest Bitter-cress	*Cardamine papillata*	505034	Vulnerable	Dispersed	Habitat importance map	0.0009
Grampians Bitter-pea	*Daviesia laevis*	504423	Vulnerable	Dispersed	Habitat importance map	0.0009
Scented Bush-pea	*Pultenaea graveolens*	502849	Vulnerable	Dispersed	Habitat importance map	0.0008
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*	10498	Vulnerable	Dispersed	Habitat importance map	0.0005
Matted Flax-lily	*Dianella amoena*	505084	Endangered	Dispersed	Habitat importance map	0.0005
Pale-flower Crane's-bill	*Geranium sp. 3*	505344	Rare	Dispersed	Habitat importance map	0.0005
Trailing Hop-bush	*Dodonaea procumbens*	501090	Vulnerable	Dispersed	Habitat importance map	0.0004
Enfield Grevillea	*Grevillea bedggoodiana*	503743	Vulnerable	Dispersed	Habitat importance map	0.0004
Arching Flax-lily	*Dianella sp. aff. longifolia (Benambra)*	505560	Vulnerable	Dispersed	Habitat importance map	0.0004
Brolga	*Grus rubicunda*	10177	Vulnerable	Dispersed	Habitat importance map	0.0004
Plains Yam-daisy	*Microseris scapigera s.s.*	504657	Vulnerable	Dispersed	Habitat importance map	0.0004
Purple Diuris	*Diuris punctata*	501084	Vulnerable	Dispersed	Habitat importance map	0.0003
Brackish Plains Buttercup	*Ranunculus diminutus*	504314	Rare	Dispersed	Habitat importance map	0.0003
Lace Monitor	*Varanus varius*	12283	Endangered	Dispersed	Habitat importance map	0.0003
Yellow Watercrown Grass	*Paspalidium flavidum*	507820	Endangered	Dispersed	Habitat importance map	0.0003
Striped Legless Lizard	*Delma impar*	12159	Endangered	Dispersed	Habitat importance map	0.0003
Powerful Owl	*Ninox strenua*	10248	Vulnerable	Dispersed	Habitat importance map	0.0003

Purple Blown-grass	*Lachnagrostis punicea subsp. punicea*	504206	Rare	Dispersed	Habitat importance map	0.0003
Pale Swamp Everlasting	*Coronidium gunnianum*	504655	Vulnerable	Dispersed	Habitat importance map	0.0002
Purple Blown-grass	*Lachnagrostis punicea subsp. filifolia*	504222	Rare	Dispersed	Habitat importance map	0.0002
One-flower Early Nancy	*Wurmbea uniflora*	503583	Rare	Dispersed	Habitat importance map	0.0002
Growling Grass Frog	*Litoria raniformis*	13207	Endangered	Dispersed	Habitat importance map	0.0002
Snowy Mint-bush	*Prostanthera nivea var. nivea*	502746	Rare	Dispersed	Habitat importance map	0.0002
Common Pipewort	*Eriocaulon scariosum*	501218	Rare	Dispersed	Habitat importance map	0.0002
Painted Honeyeater	*Grantiella picta*	10598	Vulnerable	Dispersed	Habitat importance map	0.0002
Clover Glycine	*Glycine latrobeana*	501456	Vulnerable	Dispersed	Habitat importance map	0.0002
Small Milkwort	*Comesperma polygaloides*	500798	Vulnerable	Dispersed	Habitat importance map	0.0002
Fragrant Leek-orchid	*Prasophyllum suaveolens*	504567	Endangered	Dispersed	Habitat importance map	0.0001
Small-flower Mat-rush	*Lomandra micrantha subsp. tuberculata*	504711	Rare	Dispersed	Habitat importance map	0.0001
Spiny Rice-flower	*Pimelea spinescens subsp. spinescens*	504823	Endangered	Dispersed	Habitat importance map	0.0001
Grey Billy-buttons	*Craspedia canens*	504643	Endangered	Dispersed	Habitat importance map	0.0001
Clumping Golden Moths	*Diuris gregaria*	504887	Endangered	Dispersed	Habitat importance map	0.0001
Bearded Dragon	*Pogona barbata*	12177	Vulnerable	Dispersed	Habitat importance map	0.0001
Swamp Everlasting	*Xerochrysum palustre*	503763	Vulnerable	Dispersed	Habitat importance map	0.0001
Hairy Tails	*Ptilotus erubescens*	502825	Vulnerable	Dispersed	Habitat importance map	0.0001
Large White Spider-orchid	*Caladenia venusta*	500533	Rare	Dispersed	Habitat importance map	0.0001
Black Falcon	*Falco subniger*	10238	Vulnerable	Dispersed	Habitat importance map	0.0001
Wavy Swamp Wallaby-grass	*Amphibromus sinuatus*	503625	Vulnerable	Dispersed	Habitat importance map	0.0001
Veined Beard-heath	*Leucopogon neurophyllus*	501986	Rare	Dispersed	Habitat importance map	0.0001
Hardhead	*Aythya australis*	10215	Vulnerable	Dispersed	Habitat importance map	0.0001

Tremont Bundy	*Eucalyptus aff. goniocalyx (Dandenong Ranges)*	507008	Vulnerable	Dispersed	Habitat importance map	0.0001
Australasian Shoveler	*Anas rhynchotis*	10212	Vulnerable	Dispersed	Habitat importance map	0.0001
Swift Parrot	*Lathamus discolor*	10309	Endangered	Dispersed	Habitat importance map	0.0001
Salt Blown-grass	*Lachnagrostis robusta*	504223	Rare	Dispersed	Habitat importance map	0.0001
Tough Scurf-pea	*Cullen tenax*	502776	Endangered	Dispersed	Habitat importance map	0.0000
Branching Groundsel	*Senecio cunninghamii var. cunninghamii*	503104	Rare	Dispersed	Habitat importance map	0.0000
Square-tailed Kite	*Lophoictinia isura*	10230	Vulnerable	Dispersed	Habitat importance map	0.0000
Wind-blown Tussock-grass	*Poa physoclina*	507791	Endangered	Dispersed	Habitat importance map	0.0000
Western Peppermint	*Eucalyptus falciformis*	505358	Rare	Dispersed	Habitat importance map	0.0000
Austral Tobacco	*Nicotiana suaveolens*	502275	Rare	Dispersed	Habitat importance map	0.0000
Lewin's Rail	*Lewinia pectoralis pectoralis*	10045	Vulnerable	Dispersed	Habitat importance map	0.0000
Fine-hairy Spear-grass	*Austrostipa puberula*	503988	Rare	Dispersed	Habitat importance map	0.0000
Button Immortelle	*Leptorhynchos waitzia*	501949	Vulnerable	Dispersed	Habitat importance map	0.0000
Elegant Parrot	*Neophema elegans*	10307	Vulnerable	Dispersed	Habitat importance map	0.0000
White-throated Needletail	*Hirundapus caudacutus*	10334	Vulnerable	Dispersed	Habitat importance map	0.0000
Southern Swainson-pea	*Swainsona behriana*	504944	Rare	Dispersed	Habitat importance map	0.0000
Eltham Copper	*Paralucia pyrodiscus lucida*	65003	Endangered	Dispersed	Habitat importance map	0.0000

Habitat group

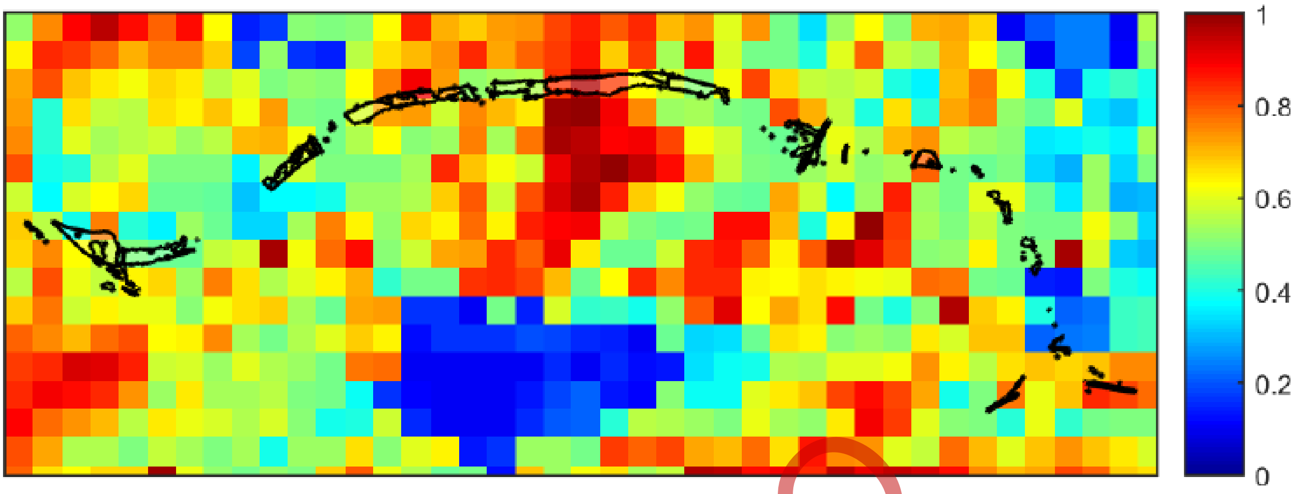
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

Habitat impacted

- Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species
- Top ranking maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat, developed from the highest habitat importance scores in dispersed species habitat maps and selected VBA records
- Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc.

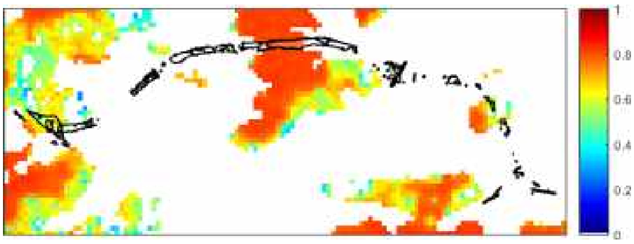
Appendix 3 – Images of mapped native vegetation

2. Strategic biodiversity values map

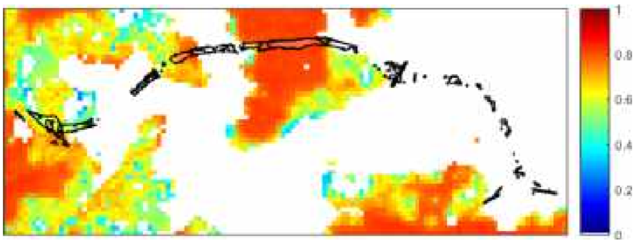


3. Habitat importance maps

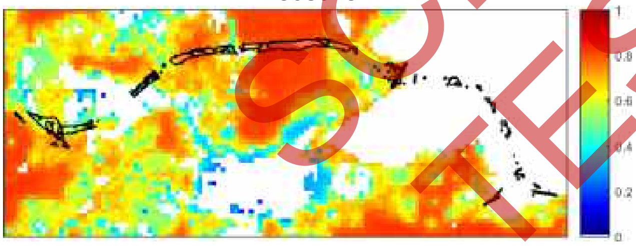
Ben Major Grevillea
Grevillea floripendula
501535



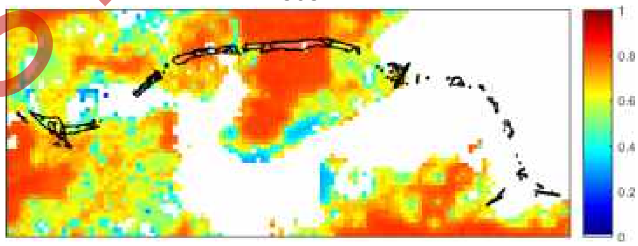
Rough Wattle
Acacia aspera subsp. parviceps
507308



Emerald-lip Greenhood
Pterostylis smaragdyna
503915



Wimmera Scentbark
Eucalyptus sabulosa
505174



Scenario test – native vegetation removal

This report provides offset requirements for internal testing of different proposals to remove native vegetation. **This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria.** A report must be obtained from the Department of Environment, Land, Water and Planning (DELWP).

Date of issue: **27/02/2018**
Time of issue: **6:45 pm**

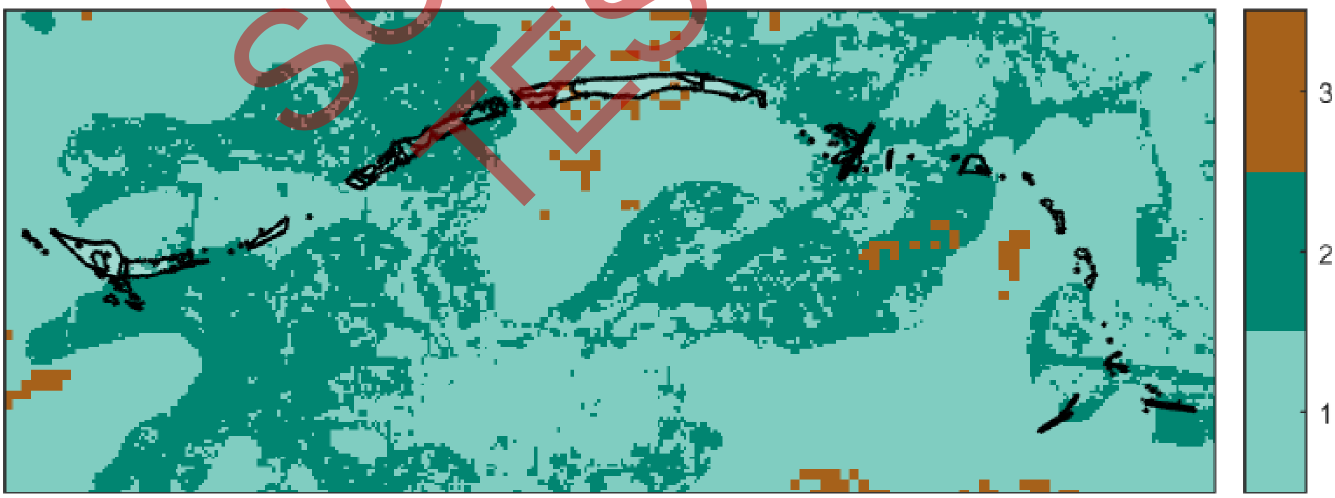
Report ID: Scenario Testing

Project ID	EnSym_BB_A1

Assessment pathway

Assessment pathway	**Detailed Assessment Pathway**
Extent including past and proposed	62.546 ha
Extent of past removal	0.000 ha
Extent of proposed removal	62.546 ha
No. Large trees proposed to be removed	366
Location category	Location 3 The native vegetation is in an area where the removal of less than 0.5 hectares could have a significant impact on habitat for one or more rare or threatened species.The native vegetation is also in an area mapped as an endangered Ecological Vegetation Class.

1. Location map



Scenario test – native vegetation removal

Offset requirements if a permit is granted

Any approval granted will include a condition to obtain an offset that meets the following requirements:

General offset amount[1]	2.360 general habitat units
Vicinity	Glenelg Hopkins Catchment Management Authority (CMA) or Pyrenees Shire Council
Minimum strategic biodiversity value score[2]	0.512
Large trees*	27 large trees
Species offset amount[3]	27.280 specific units of habitat for Ben Major Grevillea, *Grevillea floripendula* 32.898 specific units of habitat for Rough Wattle, *Acacia aspera subsp. parviceps* 43.820 specific units of habitat for Emerald-lip Greenhood, *Pterostylis smaragdyna* 43.136 specific units of habitat for Wimmera Scentbark, *Eucalyptus sabulosa*
Large trees*	339 trees
*** The total number of large trees that the offset must protect**	366 large trees to be protected in either the general, species or combination across all habitat units protected

NB: values within tables in this document may not add to the totals shown above due to rounding

Appendix 1 includes information about the native vegetation to be removed

Appendix 2 includes information about the rare or threatened species mapped at the site.

Appendix 3 includes maps showing native vegetation to be removed and extracts of relevant species habitat importance maps

1 The general offset amount required is the sum of all general habitat units in Appendix 1.

2 Minimum strategic biodiversity score is 80 per cent of the weighted average score across habitat zones where a general offset is required

3 The species offset amount(s) required is the sum of all species habitat units in Appendix 1.

Scenario test – native vegetation removal

Next steps

Any proposal to remove native vegetation must meet the application requirements of the Detailed Assessment Pathway and it will be assessed under the Detailed Assessment Pathway.

This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria.

If you wish to remove the mapped native vegetation you must submit the related shapefiles to the Department of Environment, Land, Water and Planning (DELWP) for processing, by email to ensymnvrtool.support@delwp.vic.gov.au. DELWP will provide a *Native vegetation removal report* that is required to meet the permit application requirements in accordance with *Guidelines for the removal, destruction or lopping of native vegetation* (Guidelines).

Appendix 1: Description of native vegetation to be removed

The species-general offset test was applied to your proposal. This test determines if the proposed removal of native vegetation has a proportional impact on any rare or threatened species habitats above the species offset threshold. The threshold is set at 0.005 per cent of the mapped habitat value for a species. When the proportional impact is above the species offset threshold a species offset is required. This test is done for all species mapped at the site. Multiple species offsets will be required if the species offset threshold is exceeded for multiple species.

Where a zone requires species offset(s), the species habitat units for each species in that zone is calculated by the following equation in accordance with the Guidelines:

Species habitat units = extent x condition x species landscape factor x 2, where the species landscape factor = 0.5 + (habitat importance score/2)

The species offset amount(s) required is the sum of all species habitat units per zone

Where a zone does not require a species offset, the general habitat units in that zone is calculated by the following equation in accordance with the Guidelines:

General habitat units = extent x condition x general landscape factor x 1.5, where the general landscape factor = 0.5 + (strategic biodiversity value score/2)

The general offset amount required is the sum of all general habitat units per zone.

Native vegetation to be removed

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
A1-1	Patch	cvu_0067	Endangered	2	no	0.200	0.042	0.042	0.370	0.370	0.011	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A1-2	Patch	cvu_0067	Endangered	0	no	0.550	0.558	0.558	0.599	0.691	0.519	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.691	0.519	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.691	0.519	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-3	Patch	cvu_0067	Endangered	21	no	0.560	4.235	4.235	0.632	0.698	4.026	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.362	4.064	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-4	Patch	cvu_0067	Endangered	2	no	0.620	0.265	0.265	0.555	0.709	0.281	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.180	0.281	505174 Wimmera Scentbark *Eucalyptus sabulosa*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
A1-5	Patch	cvu_0067	Endangered	0	no	0.190	0.000	0.000	0.500	0.340	0.000	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A1-6	Patch	vvp_0067	Endangered	2	no	0.650	0.086	0.086	0.549	0.710	0.095	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A1-7	Patch	cvu_0067	Endangered	12	no	0.440	0.646	0.646	0.721	0.627	0.462	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.590	0.464	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-8	Patch	cvu_0067	Endangered	11	no	0.780	0.991	0.991	0.606	0.791	1.385	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.786	1.381	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.786	1.381	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-9	Patch	cvu_0067	Endangered	0	no	0.600	0.024	0.024	0.590	0.700	0.025	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.700	0.025	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-10	Patch	cvu_0125	Endangered	0	no	0.380	0.030	0.030	0.590	0.710	0.019	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.710	0.019	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-11	Patch	cvu_0125	Endangered	0	no	0.380	0.006	0.006	0.820		0.003	General
A1-12	Patch	vvp_0653	Endangered	0	no	0.340	0.203	0.203	0.597		0.083	General
A1-13	Patch	cvu_0125	Endangered	0	no	0.230	0.077	0.077	0.580	0.500	0.026	501535 Ben Major Grevillea *Grevillea floripendula*
										0.500	0.026	507308 Rough Wattle *Acacia aspera subsp. parviceps*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.500	0.026	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.500	0.026	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-14	Patch	cvu_0125	Endangered	0	no	0.450	0.164	0.164	0.774	0.692	0.125	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A1-15	Patch	cvu_0125	Endangered	0	no	0.360	0.007	0.007	0.620	0.600	0.004	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.600	0.004	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-16	Patch	cvu_0125	Endangered	0	no	0.570	0.147	0.147	0.554	0.663	0.140	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-17	Patch	cvu_0125	Endangered	0	no	0.530	0.091	0.091	0.510	0.710	0.083	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.710	0.083	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-18	Patch	cvu_0022	Depleted	0	no	0.510	0.002	0.002	0.500		0.001	General
A1-19	Patch	cvu_0022	Depleted	10	no	0.370	0.569	0.569	0.550	0.575	0.332	501535 Ben Major Grevillea *Grevillea floripendula*
A1-20	Patch	cvu_0022	Depleted	1	no	0.680	0.114	0.114	0.586	0.700	0.132	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.569	0.134	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.505	0.134	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-21	Patch	cvu_0022	Depleted	10	no	0.470	0.404	0.404	0.480	0.375	0.261	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.459	0.277	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.459	0.277	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-22	Patch	cvu_0022	Depleted	4	no	0.510	0.335	0.335	0.603	0.600	0.273	501535 Ben Major Grevillea *Grevillea floripendula*
A1-23	Patch	cvu_0022	Depleted	2	no	0.080	0.322	0.322	0.525	0.720	0.044	501535 Ben Major Grevillea *Grevillea floripendula*
										0.721	0.044	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.721	0.044	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.721	0.044	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-24	Patch	cvu_0022	Depleted	17	no	0.330	0.797	0.797	0.519	0.674	0.440	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.674	0.440	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-25	Patch	cvu_0022	Depleted	12	no	0.600	1.125	1.125	0.519	0.711	1.155	501535 Ben Major Grevillea *Grevillea floripendula*
										0.509	1.160	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.719	1.161	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.719	1.161	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-26	Patch	cvu_0022	Depleted	2	no	0.370	0.146	0.146	0.480		0.060	General
A1-27	Patch	cvu_0022	Depleted	25	no	0.650	3.584	3.584	0.582	0.829	4.260	501535 Ben Major Grevillea *Grevillea floripendula*
										0.619	4.146	507308 Rough Wattle *Acacia aspera subsp. parviceps*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.621	4.146	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.743	4.061	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-28	Patch	cvu_0175	Endangered	2	no	0.360	0.335	0.335	0.820	0.590	0.192	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A1-29	Patch	cvu_0175	Endangered	0	no	0.500	0.001	0.001	0.692		0.001	General
A1-30	Patch	cvu_0175	Endangered	1	no	0.360	0.523	0.523	0.844		0.260	General
A1-31	Patch	cvu_0175	Endangered	0	no	0.300	0.049	0.049	0.623		0.018	General
A1-32	Patch	cvu_0175	Endangered	0	no	0.320	0.045	0.045	0.230		0.013	General
A1-33	Patch	cvu_0175	Endangered	1	no	0.480	0.024	0.024	0.210		0.010	General
A1-34	Patch	cvu_0175	Endangered	8	no	0.510	0.449	0.449	0.500	0.682	0.386	501535 Ben Major Grevillea *Grevillea floripendula*
A1-35	Patch	cvu_0175	Endangered	4	no	0.420	0.320	0.320	0.282		0.129	General
A1-36	Patch	vvp_0175	Endangered	11	no	0.520	0.936	0.936	0.530	0.705	0.830	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.596	0.830	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-37	Patch	cvu_0175	Endangered	1	no	0.180	0.061	0.061	0.437	0.490	0.016	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.490	0.016	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-38	Patch	vvp_0175	Endangered	2	no	0.640	0.223	0.223	0.790		0.192	General

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
A1-39	Patch	cvu_0175	Endangered	5	no	0.560	0.564	0.564	0.500	0.650	0.522	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.650	0.522	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-40	Patch	cvu_0175	Endangered	0	no	0.590	0.105	0.105	0.500	0.709	0.105	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.709	0.105	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-41	Patch	vvp_0175	Endangered	1	no	0.230	0.052	0.052	0.490		0.013	General
A1-42	Patch	cvu_0175	Endangered	5	no	0.550	0.189	0.189	0.530	0.686	0.175	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.686	0.175	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-43	Patch	cvu_0175	Endangered	12	no	0.460	0.738	0.738	0.590	0.705	0.579	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.005	0.581	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-44	Patch	vvp_0175	Endangered	0	no	0.490	0.060	0.060	0.768		0.039	General
A1-45	Patch	cvu_0020	Least Concern	19	no	0.580	1.326	1.326	0.572	0.621	1.247	501535 Ben Major Grevillea *Grevillea floripendula*
										0.670	1.284	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.670	1.284	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.670	1.284	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-46	Patch	cvu_0020	Least Concern	0	no	0.530	0.020	0.020	0.640	0.709	0.018	507308 Rough Wattle *Acacia aspera subsp. parviceps*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.709	0.018	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.709	0.018	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-47	Patch	cvu_0020	Least Concern	0	no	0.430	0.122	0.122	0.640	0.711	0.090	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.711	0.090	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.711	0.090	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-48	Patch	cvu_0020	Least Concern	1	no	0.610	0.156	0.156	0.580	0.720	0.164	501535 Ben Major Grevillea *Grevillea floripendula*
										0.705	0.163	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.705	0.163	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.705	0.163	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-49	Patch	cvu_0020	Least Concern	14	no	0.520	1.031	1.031	0.580	0.584	0.849	501535 Ben Major Grevillea *Grevillea floripendula*
										0.586	0.850	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.586	0.850	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.586	0.850	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-50	Patch	cvu_0020	Least Concern	1	no	0.200	0.047	0.047	0.480	0.541	0.014	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.530	0.014	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.530	0.014	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-51	Patch	cvu_0022	Depleted	6	no	0.560	1.403	1.403	0.620	0.690	1.329	501535 Ben Major Grevillea *Grevillea floripendula*
										0.692	1.330	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.692	1.330	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.652	1.328	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-52	Patch	cvu_0022	Depleted	14	no	0.640	1.716	1.716	0.579	0.690	1.856	501535 Ben Major Grevillea *Grevillea floripendula*
										0.691	1.864	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.698	1.864	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.602	1.860	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-53	Patch	cvu_0022	Depleted	29	no	0.630	10.353	10.353	0.826	0.818	11.858	501535 Ben Major Grevillea *Grevillea floripendula*
										0.817	11.849	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.817	11.849	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.750	11.847	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-54	Patch	cvu_0125	Endangered	0	no	0.400	0.020	0.020	0.220		0.007	General
A1-55	Patch	cvu_0125	Endangered	0	no	0.150	0.174	0.174	0.229		0.024	General

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
A1-56	Patch	cvu_0125	Endangered	0	no	0.150	0.017	0.017	0.400		0.003	General
A1-57	Patch	cvu_0125	Endangered	0	no	0.590	0.027	0.027	0.640	0.700	0.027	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.700	0.027	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.700	0.027	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-58	Patch	vvp_0125	Endangered	0	no	0.530	0.058	0.058	0.700		0.039	General
A1-59	Patch	vvp_0055	Endangered	0	no	0.270	0.053	0.053	0.550		0.017	General
A1-60	Patch	cvu_0067	Endangered	0	no	0.520	0.028	0.028	0.570	0.730	0.025	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.730	0.025	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.025	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-61	Patch	cvu_0022	Depleted	0	no	0.190	0.244	0.244	0.743	0.640	0.076	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.015	0.075	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.015	0.075	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-62	Patch	cvu_0022	Depleted	0	no	0.130	0.159	0.159	0.610	0.619	0.033	501535 Ben Major Grevillea *Grevillea floripendula*
A1-63	Patch	cvu_0022	Depleted	0	no	0.140	0.639	0.639	0.500	0.684	0.151	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.648	0.148	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.648	0.148	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-64	Patch	cvu_0022	Depleted	0	no	0.130	0.065	0.065	0.590	0.720	0.015	501535 Ben Major Grevillea *Grevillea floripendula*
										0.716	0.015	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.716	0.015	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.586	0.015	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-65	Patch	cvu_0022	Depleted	0	no	0.290	0.023	0.023	0.480		0.007	General
A1-66	Patch	cvu_0175	Endangered	0	no	0.300	0.132	0.132	0.230		0.037	General
A1-67	Patch	cvu_0175	Endangered	0	no	0.300	0.021	0.021	0.210		0.006	General
A1-68	Patch	cvu_0175	Endangered	0	no	0.120	0.145	0.145	0.500		0.020	General
A1-69	Patch	vvp_0175	Endangered	0	no	0.410	1.692	1.692	0.780		0.926	General
A1-70	Patch	cvu_0020	Least Concern	1	no	0.160	6.708	6.708	0.572	0.583	1.699	501535 Ben Major Grevillea *Grevillea floripendula*
										0.558	1.710	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.558	1.710	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.558	1.710	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-71	Patch	cvu_0020	Least Concern	0	no	0.150	4.261	4.261	0.490	0.585	1.013	501535 Ben Major Grevillea *Grevillea floripendula*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.537	0.996	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.560	0.997	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.560	0.997	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-72	Patch	cvu_0047	Vulnerable	0	no	0.480	0.124	0.124	0.770		0.079	General
A1-73	Patch	cvu_0047	Vulnerable	0	no	0.610	0.436	0.436	0.650	0.641	0.436	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.294	0.438	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.294	0.438	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-74	Patch	cvu_0125	Endangered	0	no	0.377	0.036	0.036	0.850		0.019	General
A1-75	Patch	vvp_0125	Endangered	0	no	0.427	0.044	0.044	0.530		0.021	General
A1-76	Patch	wet_0000	Endangered	0	no	0.442	3.842	3.842	0.548	0.651	2.801	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.604	2.762	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.604	2.762	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-77	Patch	wet_0000	Endangered	0	no	0.377	2.021	2.021	0.353	0.578	1.203	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.105	1.188	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-78	Patch	wet_0000	Endangered	0	no	0.328	0.759	0.759	0.500	0.645	0.409	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.645	0.409	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-79	Patch	cvu_0020	Least Concern	0	no	0.150	0.021	0.021	0.480	0.640	0.005	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.640	0.005	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-80	Patch	cvu_0125	Endangered	0	no	0.380	0.006	0.006	0.590	0.710	0.004	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.710	0.004	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-81	Patch	cvu_0125	Endangered	0	no	0.360	0.017	0.017	0.620	0.600	0.010	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.600	0.010	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-82	Patch	cvu_0068	Endangered	0	no	0.350	0.016	0.016	0.500	0.651	0.009	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.651	0.009	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-83	Patch	cvu_0022	Depleted	1	no	0.470	0.087	0.087	0.480	0.640	0.067	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.640	0.067	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-84	Patch	cvu_0175	Endangered	0	no	0.560	0.026	0.026	0.500	0.672	0.024	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.672	0.024	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-85	Patch	cvu_0125	Endangered	0	no	0.480	0.003	0.003	0.330		0.001	General
A1-86	Patch	cvu_0125	Endangered	0	no	0.460	0.007	0.007	0.330		0.003	General

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
A1-87	Patch	cvu_0047	Vulnerable	0	no	0.450	0.037	0.037	0.510	0.650	0.027	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.650	0.027	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-88	Canopy Tree	cvu_0067	Endangered	1	no	0.560	0.070	0.048	0.580	0.650	0.045	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A1-89	Canopy Tree	cvu_0022	Depleted	1	no	0.640	0.070	0.049	0.730	0.710	0.054	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.710	0.054	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.710	0.054	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-90	Canopy Tree	cvu_0067	Endangered	1	no	0.560	0.070	0.037	0.750		0.027	General
A1-91	Canopy Tree	cvu_0067	Endangered	1	no	0.560	0.070	0.037	0.750	0.660	0.035	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A1-92	Canopy Tree	cvu_0067	Endangered	1	no	0.560	0.070	0.032	0.636	0.722	0.031	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.722	0.031	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-93	Canopy Tree	cvu_0067	Endangered	1	no	0.560	0.070	0.047	0.580	0.700	0.045	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.700	0.045	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-94	Canopy Tree	cvu_0022	Depleted	1	no	0.650	0.070	0.056	0.673	0.670	0.061	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.358	0.061	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.642	0.060	505174 Wimmera Scentbark *Eucalyptus sabulosa*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
A1-95	Scattered Tree	cvu_0125	Endangered	1	no	0.200	0.070	0.056	0.510	0.650	0.018	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.650	0.018	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-96	Canopy Tree	cvu_0022	Depleted	1	no	0.650	0.070	0.043	0.650	0.670	0.047	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.670	0.047	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.670	0.047	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-97	Canopy Tree	cvu_0022	Depleted	1	no	0.650	0.070	0.054	0.650	0.739	0.061	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.739	0.061	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.739	0.061	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-98	Canopy Tree	cvu_0022	Depleted	1	no	0.650	0.070	0.061	0.650	0.810	0.072	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.810	0.072	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.810	0.072	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-99	Canopy Tree	cvu_0022	Depleted	1	no	0.650	0.070	0.047	0.650	0.670	0.051	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.670	0.051	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.670	0.051	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-100	Canopy Tree	cvu_0022	Depleted	1	no	0.650	0.070	0.040	0.650	0.670	0.044	507308 Rough Wattle *Acacia aspera subsp. parviceps*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.670	0.044	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.670	0.044	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-101	Canopy Tree	cvu_0067	Endangered	1	no	0.560	0.070	0.032	0.580	0.680	0.030	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A1-102	Canopy Tree	cvu_0067	Endangered	1	no	0.560	0.070	0.040	0.580	0.680	0.038	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A1-103	Canopy Tree	cvu_0067	Endangered	1	no	0.560	0.070	0.041	0.702	0.630	0.037	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.630	0.037	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-104	Canopy Tree	cvu_0022	Depleted	1	no	0.630	0.070	0.053	0.970	0.820	0.061	501535 Ben Major Grevillea *Grevillea floripendula*
										0.820	0.061	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.820	0.061	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.820	0.061	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-105	Canopy Tree	cvu_0022	Depleted	1	no	0.630	0.070	0.028	0.840	0.820	0.032	501535 Ben Major Grevillea *Grevillea floripendula*
										0.820	0.032	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.820	0.032	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.820	0.032	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-106	Canopy Tree	cvu_0022	Depleted	1	no	0.630	0.070	0.032	0.840	0.820	0.037	501535 Ben Major Grevillea *Grevillea floripendula*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.820	0.037	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.820	0.037	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.820	0.037	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-107	Canopy Tree	cvu_0022	Depleted	1	no	0.630	0.070	0.059	0.590	0.777	0.067	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.777	0.067	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.777	0.067	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-108	Scattered Tree	cvu_0020	Least Concern	0	no	0.200	0.031	0.023	0.539	0.720	0.008	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.682	0.008	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-109	Canopy Tree	cvu_0067	Endangered	1	no	0.600	0.070	0.060	0.590	0.700	0.061	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.700	0.061	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-110	Canopy Tree	cvu_0022	Depleted	1	no	0.630	0.070	0.049	0.840	0.820	0.056	501535 Ben Major Grevillea *Grevillea floripendula*
										0.820	0.056	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.820	0.056	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.820	0.056	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-111	Canopy Tree	cvu_0022	Depleted	1	no	0.630	0.070	0.059	0.840	0.820	0.068	501535 Ben Major Grevillea *Grevillea floripendula*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.820	0.068	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.820	0.068	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.820	0.068	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-112	Canopy Tree	cvu_0067	Endangered	1	no	0.780	0.070	0.055	0.590	0.790	0.077	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.790	0.077	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.790	0.077	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-113	Canopy Tree	cvu_0175	Endangered	1	no	0.420	0.070	0.041	0.500		0.019	General
A1-114	Canopy Tree	cvu_0175	Endangered	1	no	0.420	0.070	0.022	0.500		0.010	General
A1-115	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.070	0.500		0.016	General
A1-116	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.070	0.500		0.016	General
A1-117	Canopy Tree	cvu_0020	Least Concern	1	no	0.580	0.070	0.054	0.640	0.680	0.053	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.680	0.053	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.680	0.053	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-118	Canopy Tree	cvu_0020	Least Concern	1	no	0.580	0.070	0.056	0.500	0.580	0.051	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.580	0.051	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.580	0.051	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-119	Canopy Tree	cvu_0022	Depleted	1	no	0.370	0.070	0.042	0.500	0.530	0.024	501535 Ben Major Grevillea *Grevillea floripendula*
A1-120	Canopy Tree	cvu_0022	Depleted	1	no	0.370	0.070	0.016	0.500	0.588	0.009	501535 Ben Major Grevillea *Grevillea floripendula*
A1-121	Canopy Tree	cvu_0020	Least Concern	1	no	0.580	0.070	0.019	0.500	0.620	0.018	501535 Ben Major Grevillea *Grevillea floripendula*
										0.620	0.018	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.620	0.018	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.620	0.018	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-122	Canopy Tree	cvu_0020	Least Concern	1	no	0.580	0.070	0.037	0.500	0.629	0.035	501535 Ben Major Grevillea *Grevillea floripendula*
										0.629	0.035	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.629	0.035	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.629	0.035	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-123	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.068	0.480	0.540	0.021	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.540	0.021	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.540	0.021	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-124	Canopy Tree	cvu_0022	Depleted	1	no	0.470	0.070	0.042	0.480	0.330	0.026	507308 Rough Wattle *Acacia aspera subsp. parviceps*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.330	0.026	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.330	0.026	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-125	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.070	0.750	0.730	0.083	501535 Ben Major Grevillea *Grevillea floripendula*
										0.730	0.083	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.083	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-126	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.047	0.560	0.730	0.055	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.055	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-127	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.034	0.560	0.730	0.040	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.040	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-128	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.067	0.680	0.780	0.081	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.135	0.081	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A1-129	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.051	0.680		0.044	General
A1-130	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.028	0.680		0.024	General
A1-131	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.044	0.680		0.038	General
A1-132	Canopy Tree	cvu_0175	Endangered	1	no	0.550	0.070	0.055	0.520	0.677	0.051	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.677	0.051	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-133	Scattered Tree	vvp_0896	Endangered	1	no	0.200	0.070	0.066	0.730		0.017	General
A1-134	Canopy Tree	cvu_0175	Endangered	1	no	0.550	0.070	0.041	0.514	0.670	0.038	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.670	0.038	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-135	Canopy Tree	cvu_0175	Endangered	1	no	0.550	0.070	0.047	0.530	0.690	0.043	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.690	0.043	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-136	Canopy Tree	cvu_0175	Endangered	1	no	0.550	0.070	0.022	0.530	0.688	0.020	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.688	0.020	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-137	Canopy Tree	vvp_0175	Endangered	1	no	0.520	0.070	0.046	0.530	0.703	0.041	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.703	0.041	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-138	Canopy Tree	cvu_0175	Endangered	1	no	0.550	0.070	0.021	0.530	0.683	0.019	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.683	0.019	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-139	Canopy Tree	cvu_0175	Endangered	1	no	0.550	0.070	0.044	0.530	0.680	0.041	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.680	0.041	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-140	Canopy Tree	cvu_0022	Depleted	1	no	0.330	0.070	0.043	0.489	0.691	0.024	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.691	0.024	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-141	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.058	0.480	0.560	0.018	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.560	0.018	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.560	0.018	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-142	Canopy Tree	cvu_0175	Endangered	1	no	0.560	0.070	0.039	0.500	0.670	0.036	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.670	0.036	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-143	Canopy Tree	cvu_0175	Endangered	1	no	0.560	0.070	0.033	0.500	0.670	0.030	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.670	0.030	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-144	Canopy Tree	cvu_0022	Depleted	1	no	0.600	0.070	0.062	0.500	0.710	0.063	501535 Ben Major Grevillea *Grevillea floripendula*
										0.710	0.063	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.710	0.063	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.710	0.063	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-145	Canopy Tree	cvu_0022	Depleted	1	no	0.560	0.070	0.056	0.500	0.700	0.053	501535 Ben Major Grevillea *Grevillea floripendula*
										0.700	0.053	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.700	0.053	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.700	0.053	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-146	Canopy Tree	cvu_0022	Depleted	1	no	0.560	0.070	0.068	0.516	0.700	0.064	501535 Ben Major Grevillea *Grevillea floripendula*
										0.699	0.064	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.699	0.064	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.699	0.064	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-147	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.052	0.481	0.640	0.017	501535 Ben Major Grevillea *Grevillea floripendula*
										0.510	0.016	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.528	0.016	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.528	0.016	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-148	Scattered Tree	cvu_0022	Depleted	1	no	0.200	0.070	0.058	0.547	0.708	0.020	501535 Ben Major Grevillea *Grevillea floripendula*
										0.709	0.020	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.709	0.020	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.709	0.020	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-149	Canopy Tree	cvu_0022	Depleted	1	no	0.560	0.070	0.043	0.630	0.680	0.041	501535 Ben Major Grevillea *Grevillea floripendula*
										0.680	0.041	507308 Rough Wattle *Acacia aspera subsp. parviceps*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.680	0.041	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.680	0.041	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-150	Scattered Tree	cvu_0022	Depleted	1	no	0.200	0.070	0.039	0.550	0.720	0.013	501535 Ben Major Grevillea *Grevillea floripendula*
										0.720	0.013	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.720	0.013	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.720	0.013	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-151	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.045	0.765	0.695	0.015	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A1-152	Canopy Tree	cvu_0022	Depleted	1	no	0.640	0.070	0.063	0.630	0.720	0.069	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.720	0.069	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A1-153	Canopy Tree	cvu_0067	Endangered	1	no	0.560	0.070	0.038	0.510	0.701	0.036	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.086	0.036	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-154	Canopy Tree	cvu_0067	Endangered	1	no	0.560	0.070	0.036	0.563	0.737	0.035	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.737	0.035	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-155	Scattered Tree	cvu_0047	Vulnerable	1	no	0.200	0.070	0.038	0.835		0.011	General
A1-156	Scattered Tree	vvp_0067	Endangered	1	no	0.200	0.070	0.042	0.530	0.690	0.014	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.690	0.014	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-157	Scattered Tree	vvp_0067	Endangered	1	no	0.200	0.070	0.029	0.530	0.684	0.010	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.684	0.010	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-158	Scattered Tree	vvp_0067	Endangered	1	no	0.200	0.070	0.028	0.530	0.710	0.010	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.710	0.010	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-159	Scattered Tree	vvp_0067	Endangered	1	no	0.200	0.070	0.034	0.530	0.682	0.012	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.682	0.012	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-160	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.062	0.750	0.660	0.021	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A1-161	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.070	0.690		0.018	General
A1-162	Scattered Tree	cvu_0047	Vulnerable	1	no	0.200	0.070	0.070	0.690		0.018	General
A1-163	Scattered Tree	cvu_0047	Vulnerable	0	no	0.200	0.031	0.005	0.690		0.001	General
A1-164	Scattered Tree	cvu_0047	Vulnerable	1	no	0.200	0.070	0.070	0.690		0.018	General
A1-165	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.070	0.670		0.018	General
A1-166	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.070	0.225		0.013	General
A1-167	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.035	0.480	0.640	0.011	507308 Rough Wattle *Acacia aspera subsp. parviceps*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.643	0.011	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.643	0.011	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-168	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.055	0.480	0.490	0.017	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.490	0.017	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.490	0.017	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-169	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.070	0.570	0.644	0.023	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.644	0.023	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-170	Scattered Tree	cvu_0067	Endangered	0	no	0.200	0.031	0.031	0.492	0.606	0.010	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.606	0.010	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-171	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.070	0.330	0.440	0.020	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.440	0.020	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-172	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.015	0.390	0.490	0.004	501535 Ben Major Grevillea *Grevillea floripendula*
										0.490	0.004	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.490	0.004	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.490	0.004	505174 Wimmera Scentbark *Eucalyptus sabulosa*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
A1-173	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.015	0.390	0.490	0.004	501535 Ben Major Grevillea *Grevillea floripendula*
										0.490	0.004	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.490	0.004	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.490	0.004	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-174	Scattered Tree	cvu_0896	Endangered	0	no	0.200	0.031	0.031	0.330		0.006	General
A1-175	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.070	0.480		0.016	General
A1-176	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.070	0.530	0.690	0.024	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.690	0.024	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-177	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.070	0.480	0.560	0.022	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.560	0.022	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-178	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.070	0.480	0.560	0.022	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.400	0.022	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-179	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.065	0.583	0.710	0.022	501535 Ben Major Grevillea *Grevillea floripendula*
										0.710	0.022	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.710	0.022	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.710	0.022	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-180	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.020	0.550	0.720	0.007	501535 Ben Major Grevillea *Grevillea floripendula*
										0.720	0.007	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.720	0.007	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.720	0.007	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-181	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.026	0.550	0.720	0.009	501535 Ben Major Grevillea *Grevillea floripendula*
										0.720	0.009	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.720	0.009	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.720	0.009	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-182	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.070	0.480	0.650	0.023	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
A1-183	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.070	0.490	0.450	0.020	507308 Rough Wattle *Acacia aspera subsp. parviceps*
										0.450	0.020	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.450	0.020	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-184	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.070	0.700	0.480	0.021	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-185	Scattered Tree	cvu_0067	Endangered	0	no	0.200	0.031	0.031	0.750	0.620	0.010	505174 Wimmera Scentbark *Eucalyptus sabulosa*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
A1-186	Scattered Tree	cvu_0067	Endangered	0	no	0.200	0.031	0.023	0.605	0.645	0.007	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-187	Scattered Tree	cvu_0067	Endangered	0	no	0.200	0.031	0.023	0.605	0.520	0.007	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.566	0.007	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-188	Scattered Tree	cvu_0020	Least Concern	0	no	0.200	0.031	0.023	0.540	0.680	0.008	505174 Wimmera Scentbark *Eucalyptus sabulosa*
A1-189	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.070	0.530	0.690	0.024	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Appendix 2: Information about impacts to rare or threatened species' habitats on site

This table lists all rare or threatened species' habitats mapped at the site.

Species common name	Species scientific name	Species number	Conservation status	Group	Habitat impacted	% habitat value affected
Ben Major Grevillea	*Grevillea floripendula*	501535	Vulnerable	Dispersed	Habitat importance map	0.0598
Rough Wattle	*Acacia aspera subsp. parviceps*	507308	Rare	Dispersed	Habitat importance map	0.0438
Rough Wattle	*Acacia aspera subsp. parviceps*	507308	Rare	Dispersed	Top ranking map	0.0217
Ben Major Grevillea	*Grevillea floripendula*	501535	Vulnerable	Dispersed	Top ranking map	0.0164
Emerald-lip Greenhood	*Pterostylis smaragdyna*	503915	Rare	Dispersed	Habitat importance map	0.0086
Wimmera Scentbark	*Eucalyptus sabulosa*	505174	Rare	Dispersed	Habitat importance map	0.0065
Yarra Gum	*Eucalyptus yarraensis*	501326	Rare	Dispersed	Habitat importance map	0.0044
Large-headed Fireweed	*Senecio macrocarpus*	503116	Endangered	Dispersed	Habitat importance map	0.0044
Flat Bluebell	*Wahlenbergia planiflora subsp. planiflora*	504064	Vulnerable	Dispersed	Habitat importance map	0.0040
Brown Toadlet	*Pseudophryne bibronii*	13117	Endangered	Dispersed	Habitat importance map	0.0040
Brush-tailed Phascogale	*Phascogale tapoatafa*	11017	Vulnerable	Dispersed	Habitat importance map	0.0033
Regent Honeyeater	*Anthochaera phrygia*	10603	Critically endangered	Dispersed	Habitat importance map	0.0033
Tiny Bog-sedge	*Schoenus nanus*	503050	Rare	Dispersed	Habitat importance map	0.0031
Dwarf Boronia	*Boronia nana var. pubescens*	504278	Rare	Dispersed	Habitat importance map	0.0030
Grey Grass-tree	*Xanthorrhoea glauca subsp. angustifolia*	507229	Endangered	Dispersed	Habitat importance map	0.0026
White Sunray	*Leucochrysum albicans subsp. tricolor*	504581	Endangered	Dispersed	Habitat importance map	0.0026
Golden Cowslips	*Diuris behrii*	501061	Vulnerable	Dispersed	Habitat importance map	0.0025
Golden Sun Moth	*Synemon plana*	15021	Critically endangered	Dispersed	Habitat importance map	0.0024

Speckled Warbler	*Chthonicola sagittatus*	10504	Vulnerable	Dispersed	Habitat importance map	0.0024
Half-bearded Spear-grass	*Austrostipa hemipogon*	503985	Rare	Dispersed	Habitat importance map	0.0011
Flame Grevillea	*Grevillea dimorpha*	501532	Rare	Dispersed	Habitat importance map	0.0010
Plump Swamp Wallaby-grass	*Amphibromus pithogastrus*	503624	Endangered	Dispersed	Habitat importance map	0.0009
Button Wrinklewort	*Rutidosis leptorhynchoides*	502982	Endangered	Dispersed	Habitat importance map	0.0009
Forest Bitter-cress	*Cardamine papillata*	505034	Vulnerable	Dispersed	Habitat importance map	0.0009
Hairy Correa	*Correa aemula*	500828	Rare	Dispersed	Habitat importance map	0.0008
Scented Bush-pea	*Pultenaea graveolens*	502849	Vulnerable	Dispersed	Habitat importance map	0.0008
Grampians Bitter-pea	*Daviesia laevis*	504423	Vulnerable	Dispersed	Habitat importance map	0.0007
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*	10498	Vulnerable	Dispersed	Habitat importance map	0.0005
Matted Flax-lily	*Dianella amoena*	505084	Endangered	Dispersed	Habitat importance map	0.0005
Pale-flower Crane's-bill	*Geranium sp. 3*	505344	Rare	Dispersed	Habitat importance map	0.0005
Trailing Hop-bush	*Dodonaea procumbens*	501090	Vulnerable	Dispersed	Habitat importance map	0.0004
Enfield Grevillea	*Grevillea bedggoodiana*	503743	Vulnerable	Dispersed	Habitat importance map	0.0004
Arching Flax-lily	*Dianella sp. aff. longifolia (Benambra)*	505560	Vulnerable	Dispersed	Habitat importance map	0.0004
Plains Yam-daisy	*Microseris scapigera s.s.*	504657	Vulnerable	Dispersed	Habitat importance map	0.0004
Purple Diuris	*Diuris punctata*	501084	Vulnerable	Dispersed	Habitat importance map	0.0003
Brackish Plains Buttercup	*Ranunculus diminutus*	504314	Rare	Dispersed	Habitat importance map	0.0003
Yellow Watercrown Grass	*Paspalidium flavidum*	507820	Endangered	Dispersed	Habitat importance map	0.0003
Brolga	*Grus rubicunda*	10177	Vulnerable	Dispersed	Habitat importance map	0.0003
Striped Legless Lizard	*Delma impar*	12159	Endangered	Dispersed	Habitat importance map	0.0003
Lace Monitor	*Varanus varius*	12283	Endangered	Dispersed	Habitat importance map	0.0003
Purple Blown-grass	*Lachnagrostis punicea subsp. punicea*	504206	Rare	Dispersed	Habitat importance map	0.0003

Powerful Owl	*Ninox strenua*	10248	Vulnerable	Dispersed	Habitat importance map	0.0003
Pale Swamp Everlasting	*Coronidium gunnianum*	504655	Vulnerable	Dispersed	Habitat importance map	0.0002
One-flower Early Nancy	*Wurmbea uniflora*	503583	Rare	Dispersed	Habitat importance map	0.0002
Purple Blown-grass	*Lachnagrostis punicea subsp. filifolia*	504222	Rare	Dispersed	Habitat importance map	0.0002
Snowy Mint-bush	*Prostanthera nivea var. nivea*	502746	Rare	Dispersed	Habitat importance map	0.0002
Common Pipewort	*Eriocaulon scariosum*	501218	Rare	Dispersed	Habitat importance map	0.0002
Painted Honeyeater	*Grantiella picta*	10598	Vulnerable	Dispersed	Habitat importance map	0.0002
Clover Glycine	*Glycine latrobeana*	501456	Vulnerable	Dispersed	Habitat importance map	0.0002
Fragrant Leek-orchid	*Prasophyllum suaveolens*	504567	Endangered	Dispersed	Habitat importance map	0.0001
Small Milkwort	*Comesperma polygaloides*	500798	Vulnerable	Dispersed	Habitat importance map	0.0001
Small-flower Mat-rush	*Lomandra micrantha subsp. tuberculata*	504711	Rare	Dispersed	Habitat importance map	0.0001
Growling Grass Frog	*Litoria raniformis*	13207	Endangered	Dispersed	Habitat importance map	0.0001
Spiny Rice-flower	*Pimelea spinescens subsp. spinescens*	504823	Endangered	Dispersed	Habitat importance map	0.0001
Grey Billy-buttons	*Craspedia canens*	504643	Endangered	Dispersed	Habitat importance map	0.0001
Clumping Golden Moths	*Diuris gregaria*	504887	Endangered	Dispersed	Habitat importance map	0.0001
Bearded Dragon	*Pogona barbata*	12177	Vulnerable	Dispersed	Habitat importance map	0.0001
Swamp Everlasting	*Xerochrysum palustre*	503763	Vulnerable	Dispersed	Habitat importance map	0.0001
Hairy Tails	*Ptilotus erubescens*	502825	Vulnerable	Dispersed	Habitat importance map	0.0001
Large White Spider-orchid	*Caladenia venusta*	500533	Rare	Dispersed	Habitat importance map	0.0001
Black Falcon	*Falco subniger*	10238	Vulnerable	Dispersed	Habitat importance map	0.0001
Wavy Swamp Wallaby-grass	*Amphibromus sinuatus*	503625	Vulnerable	Dispersed	Habitat importance map	0.0001
Tremont Bundy	*Eucalyptus aff. goniocalyx (Dandenong Ranges)*	507008	Vulnerable	Dispersed	Habitat importance map	0.0001
Salt Blown-grass	*Lachnagrostis robusta*	504223	Rare	Dispersed	Habitat importance map	0.0001

Swift Parrot	*Lathamus discolor*	10309	Endangered	Dispersed	Habitat importance map	0.0001
Tough Scurf-pea	*Cullen tenax*	502776	Endangered	Dispersed	Habitat importance map	0.0000
Branching Groundsel	*Senecio cunninghamii var. cunninghamii*	503104	Rare	Dispersed	Habitat importance map	0.0000
Australasian Shoveler	*Anas rhynchotis*	10212	Vulnerable	Dispersed	Habitat importance map	0.0000
Wind-blown Tussock-grass	*Poa physoclina*	507791	Endangered	Dispersed	Habitat importance map	0.0000
Western Peppermint	*Eucalyptus falciformis*	505358	Rare	Dispersed	Habitat importance map	0.0000
Hardhead	*Aythya australis*	10215	Vulnerable	Dispersed	Habitat importance map	0.0000
Austral Tobacco	*Nicotiana suaveolens*	502275	Rare	Dispersed	Habitat importance map	0.0000
Square-tailed Kite	*Lophoictinia isura*	10230	Vulnerable	Dispersed	Habitat importance map	0.0000
Lewin's Rail	*Lewinia pectoralis pectoralis*	10045	Vulnerable	Dispersed	Habitat importance map	0.0000
Fine-hairy Spear-grass	*Austrostipa puberula*	503988	Rare	Dispersed	Habitat importance map	0.0000
Button Immortelle	*Leptorhynchos waitzia*	501949	Vulnerable	Dispersed	Habitat importance map	0.0000
Elegant Parrot	*Neophema elegans*	10307	Vulnerable	Dispersed	Habitat importance map	0.0000
White-throated Needletail	*Hirundapus caudacutus*	10334	Vulnerable	Dispersed	Habitat importance map	0.0000
Veined Beard-heath	*Leucopogon neurophyllus*	501986	Rare	Dispersed	Habitat importance map	0.0000
Southern Swainson-pea	*Swainsona behriana*	504944	Rare	Dispersed	Habitat importance map	0.0000
Eltham Copper	*Paralucia pyrodiscus lucida*	65003	Endangered	Dispersed	Habitat importance map	0.0000

Habitat group

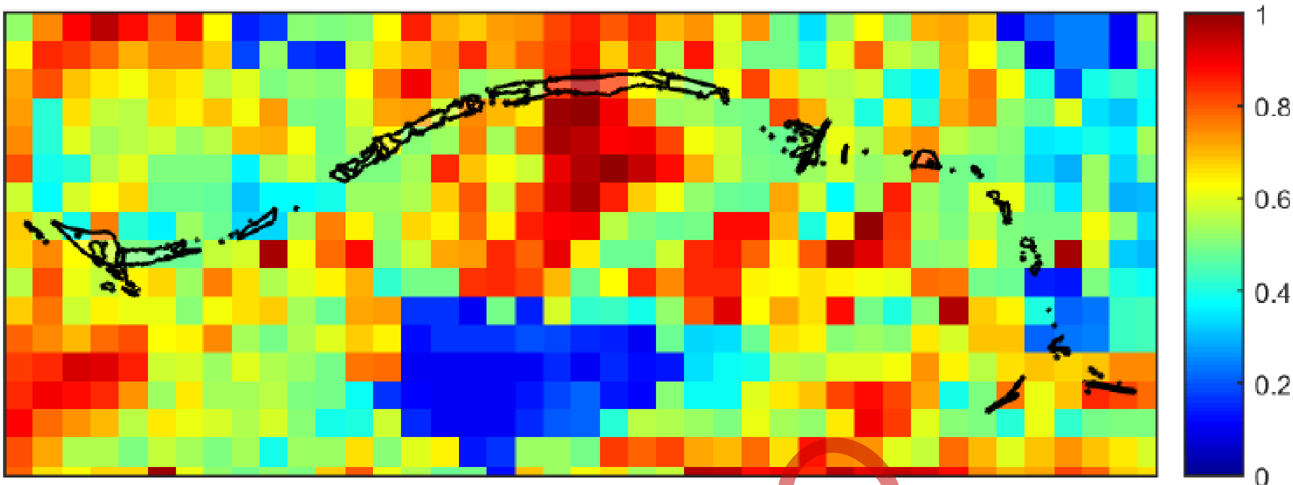
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

Habitat impacted

- Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species
- Top ranking maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat, developed from the highest habitat importance scores in dispersed species habitat maps and selected VBA records
- Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc.

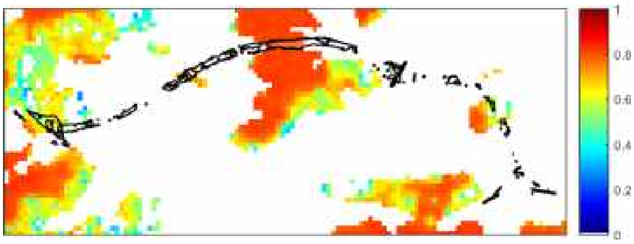
Appendix 3 – Images of mapped native vegetation

2. Strategic biodiversity values map

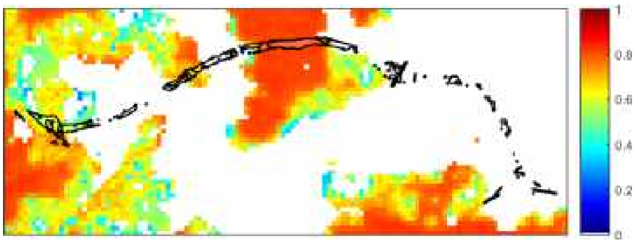


3. Habitat importance maps

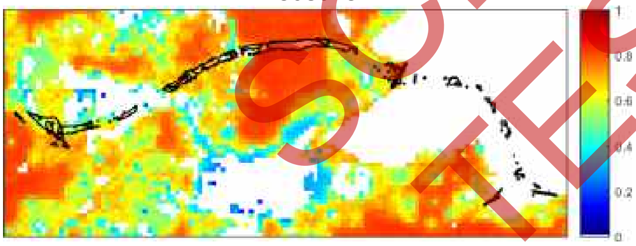
Ben Major Grevillea
Grevillea floripendula
501535



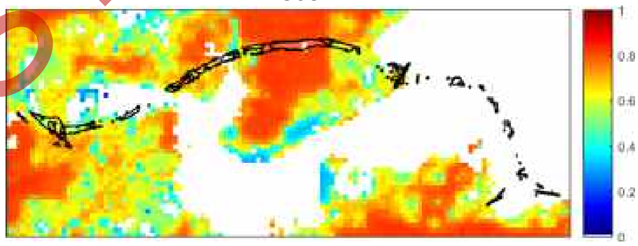
Rough Wattle
Acacia aspera subsp. parviceps
507308



Emerald-lip Greenhood
Pterostylis smaragdyna
503915



Wimmera Scentbark
Eucalyptus sabulosa
505174



Scenario test – native vegetation removal

This report provides offset requirements for internal testing of different proposals to remove native vegetation. **This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria.** A report must be obtained from the Department of Environment, Land, Water and Planning (DELWP).

Date of issue: **27/02/2018**
Time of issue: **4:51 pm**

Report ID: Scenario Testing

Project ID	EnSym_BB_C0

Assessment pathway

Assessment pathway	**Detailed Assessment Pathway**
Extent including past and proposed	62.298 ha
Extent of past removal	0.000 ha
Extent of proposed removal	62.298 ha
No. Large trees proposed to be removed	315
Location category	Location 2 The native vegetation is in an area mapped as an endangered Ecological Vegetation Class. Removal of less than 0.5 hectares of native vegetation in this location will not have a significant impact on any habitat for a rare or threatened species.

1. Location map

Scenario test – native vegetation removal

Offset requirements if a permit is granted

Any approval granted will include a condition to obtain an offset that meets the following requirements:

General offset amount[1]	0.114 general habitat units
Vicinity	Glenelg Hopkins Catchment Management Authority (CMA) or Pyrenees Shire Council
Minimum strategic biodiversity value score[2]	0.469
Large trees*	3 large trees
Species offset amount[3]	29.517 specific units of habitat for Ben Major Grevillea, *Grevillea floripendula* 36.655 specific units of habitat for Large-headed Fireweed, *Senecio macrocarpus* 39.426 specific units of habitat for Emerald-lip Greenhood, *Pterostylis smaragdyna* 13.291 specific units of habitat for White Sunray, *Leucochrysum albicans subsp. tricolor* 36.607 specific units of habitat for Wimmera Scentbark, *Eucalyptus sabulosa* 32.665 specific units of habitat for Rough Wattle, *Acacia aspera subsp. parviceps*
Large trees*	312 trees
*** The total number of large trees that the offset must protect**	315 large trees to be protected in either the general, species or combination across all habitat units protected

NB: values within tables in this document may not add to the totals shown above due to rounding

Appendix 1 includes information about the native vegetation to be removed

Appendix 2 includes information about the rare or threatened species mapped at the site.

Appendix 3 includes maps showing native vegetation to be removed and extracts of relevant species habitat importance maps

1 The general offset amount required is the sum of all general habitat units in Appendix 1.

2 Minimum strategic biodiversity score is 80 per cent of the weighted average score across habitat zones where a general offset is required

3 The species offset amount(s) required is the sum of all species habitat units in Appendix 1.

Scenario test – native vegetation removal

Next steps

Any proposal to remove native vegetation must meet the application requirements of the Detailed Assessment Pathway and it will be assessed under the Detailed Assessment Pathway.

This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria.

If you wish to remove the mapped native vegetation you must submit the related shapefiles to the Department of Environment, Land, Water and Planning (DELWP) for processing, by email to ensymnvrtool.support@delwp.vic.gov.au. DELWP will provide a *Native vegetation removal report* that is required to meet the permit application requirements in accordance with *Guidelines for the removal, destruction or lopping of native vegetation* (Guidelines).

Appendix 1: Description of native vegetation to be removed

The species-general offset test was applied to your proposal. This test determines if the proposed removal of native vegetation has a proportional impact on any rare or threatened species habitats above the species offset threshold. The threshold is set at 0.005 per cent of the mapped habitat value for a species. When the proportional impact is above the species offset threshold a species offset is required. This test is done for all species mapped at the site. Multiple species offsets will be required if the species offset threshold is exceeded for multiple species.

Where a zone requires species offset(s), the species habitat units for each species in that zone is calculated by the following equation in accordance with the Guidelines:

Species habitat units = extent x condition x species landscape factor x 2, where the species landscape factor = 0.5 + (habitat importance score/2)

The species offset amount(s) required is the sum of all species habitat units per zone

Where a zone does not require a species offset, the general habitat units in that zone is calculated by the following equation in accordance with the Guidelines:

General habitat units = extent x condition x general landscape factor x 1.5, where the general landscape factor = 0.5 + (strategic biodiversity value score/2)

The general offset amount required is the sum of all general habitat units per zone.

Native vegetation to be removed

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
C0-1	Patch	cvu_0067	Endangered	0	no	0.550	0.558	0.558	0.599	0.691	0.519	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.691	0.519	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.691	0.519	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.691	0.519	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-2	Patch	cvu_0067	Endangered	2	no	0.300	0.495	0.495	0.650	0.681	0.249	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.570	0.243	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.641	0.243	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-3	Patch	cvu_0067	Endangered	0	no	0.170	0.016	0.016	0.370		0.003	General

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
C0-4	Patch	vvp_0125	Endangered	0	no	0.650	0.327	0.327	0.745	0.661	0.353	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.661	0.353	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-5	Patch	cvu_0125	Endangered	0	no	0.510	0.024	0.024	0.850	0.790	0.022	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.790	0.022	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.790	0.022	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.790	0.022	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-6	Patch	cvu_0125	Endangered	0	no	0.590	0.219	0.219	0.880	0.674	0.216	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.732	0.223	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-7	Patch	cvu_0125	Endangered	0	no	0.340	0.113	0.113	0.503	0.626	0.063	501535 Ben Major Grevillea *Grevillea floripendula*
										0.626	0.063	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.626	0.063	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.626	0.063	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-8	Patch	cvu_0125	Endangered	0	no	0.340	0.491	0.491	0.550	0.425	0.238	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.051	0.228	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
										0.101	0.243	505174 Wimmera Scentbark *Eucalyptus sabulosa*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
C0-9	Patch	cvu_0125	Endangered	0	no	0.230	0.077	0.077	0.580	0.500	0.026	501535 Ben Major Grevillea *Grevillea floripendula*
										0.500	0.026	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.500	0.026	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.500	0.026	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-10	Patch	cvu_0125	Endangered	0	no	0.380	0.014	0.014	0.480	0.500	0.008	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.500	0.008	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-11	Patch	cvu_0136	Vulnerable	0	no	0.680	0.200	0.200	0.520	0.676	0.228	501535 Ben Major Grevillea *Grevillea floripendula*
										0.315	0.228	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.663	0.227	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.663	0.227	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.663	0.227	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-12	Patch	cvu_0022	Depleted	2	no	0.660	0.301	0.301	0.614	0.606	0.319	501535 Ben Major Grevillea *Grevillea floripendula*
										0.281	0.334	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.606	0.319	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.606	0.319	505174 Wimmera Scentbark *Eucalyptus sabulosa*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.606	0.319	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-13	Patch	cvu_0022	Depleted	19	no	0.550	3.129	3.129	0.657	0.713	2.948	501535 Ben Major Grevillea *Grevillea floripendula*
										0.475	2.986	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.678	2.888	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.678	2.888	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.678	2.888	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-14	Patch	cvu_0022	Depleted	4	no	0.690	2.172	2.172	0.684	0.768	2.650	501535 Ben Major Grevillea *Grevillea floripendula*
										0.343	2.665	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.768	2.650	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.768	2.650	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.768	2.650	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-15	Patch	cvu_0022	Depleted	0	no	0.570	0.887	0.887	0.655	0.769	0.895	501535 Ben Major Grevillea *Grevillea floripendula*
										0.769	0.895	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.769	0.895	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.769	0.895	505174 Wimmera Scentbark *Eucalyptus sabulosa*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.769	0.895	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-16	Patch	cvu_0022	Depleted	0	no	0.500	0.023	0.023	0.850	0.800	0.020	501535 Ben Major Grevillea *Grevillea floripendula*
										0.800	0.020	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.800	0.020	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.800	0.020	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.800	0.020	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-17	Patch	cvu_0022	Depleted	12	no	0.460	1.595	1.595	0.639	0.635	1.199	501535 Ben Major Grevillea *Grevillea floripendula*
										0.105	1.230	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.635	1.199	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.635	1.199	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.635	1.199	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-18	Patch	cvu_0022	Depleted	15	no	0.420	1.075	1.075	0.475	0.629	0.735	501535 Ben Major Grevillea *Grevillea floripendula*
										0.031	0.750	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.645	0.743	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.615	0.742	505174 Wimmera Scentbark *Eucalyptus sabulosa*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.222	0.742	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-19	Patch	cvu_0022	Depleted	16	no	0.470	0.939	0.939	0.684	0.601	0.707	501535 Ben Major Grevillea *Grevillea floripendula*
										0.601	0.707	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.601	0.707	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.601	0.707	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-20	Patch	vvp_0022	Depleted	4	no	0.500	0.423	0.423	0.525	0.611	0.341	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.361	0.305	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
										0.025	0.298	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-21	Patch	cvu_0022	Depleted	5	no	0.430	1.673	1.673	0.843	0.650	1.187	501535 Ben Major Grevillea *Grevillea floripendula*
										0.650	1.187	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.650	1.187	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.650	1.187	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-22	Patch	cvu_0022	Depleted	1	no	0.680	0.114	0.114	0.586	0.727	0.134	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.505	0.134	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.064	0.132	507308 Rough Wattle *Acacia aspera subsp. parviceps*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
C0-23	Patch	cvu_0022	Depleted	10	no	0.470	0.420	0.420	0.480	0.451	0.287	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.454	0.287	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.454	0.287	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.257	0.271	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-24	Patch	cvu_0022	Depleted	22	no	0.500	1.226	1.226	0.800	0.800	1.103	501535 Ben Major Grevillea *Grevillea floripendula*
										0.754	1.075	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.754	1.075	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.754	1.075	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.667	1.083	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-25	Patch	cvu_0022	Depleted	6	no	0.520	0.896	0.896	0.562	0.683	0.784	501535 Ben Major Grevillea *Grevillea floripendula*
										0.375	0.785	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.662	0.774	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.662	0.774	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.662	0.774	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-26	Patch	cvu_0175	Endangered	2	no	0.360	0.335	0.335	0.820	0.659	0.200	503116 Large-headed Fireweed *Senecio macrocarpus*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.120	0.192	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.659	0.200	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-27	Patch	cvu_0175	Endangered	0	no	0.500	0.069	0.069	0.723	0.718	0.060	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.718	0.060	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-28	Patch	cvu_0175	Endangered	1	no	0.360	0.561	0.561	0.844	0.719	0.347	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.719	0.347	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-29	Patch	cvu_0175	Endangered	0	no	0.300	0.010	0.010	0.641	0.677	0.005	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.677	0.005	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-30	Patch	cvu_0175	Endangered	22	no	0.630	1.389	1.389	0.823	0.640	1.436	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.685	1.475	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-31	Patch	cvu_0175	Endangered	1	no	0.720	0.109	0.109	0.510	0.703	0.133	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.703	0.133	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-32	Patch	vvp_0175	Endangered	1	no	0.590	0.115	0.115	0.638	0.458	0.099	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.458	0.099	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-33	Patch	vvp_0175	Endangered	5	no	0.670	0.346	0.346	0.629	0.470	0.341	503116 Large-headed Fireweed *Senecio macrocarpus*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.470	0.341	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-34	Patch	cvu_0175	Endangered	11	no	0.540	1.274	1.274	0.835	0.711	1.177	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.224	1.197	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-35	Patch	cvu_0175	Endangered	0	no	0.580	0.096	0.096	0.780	0.718	0.096	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.718	0.096	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-36	Patch	cvu_0175	Endangered	0	no	0.560	0.021	0.021	0.500	0.680	0.020	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.680	0.020	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.680	0.020	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-37	Patch	cvu_0175	Endangered	0	no	0.590	0.098	0.098	0.500	0.680	0.097	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.631	0.094	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.631	0.094	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-38	Patch	cvu_0175	Endangered	10	no	0.550	0.751	0.751	0.516	0.606	0.663	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.061	0.587	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
										0.144	0.595	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-39	Patch	cvu_0020	Least Concern	19	no	0.580	1.326	1.326	0.572	0.621	1.247	501535 Ben Major Grevillea *Grevillea floripendula*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.670	1.284	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.670	1.284	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.670	1.284	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.670	1.284	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-40	Patch	cvu_0020	Least Concern	0	no	0.530	0.020	0.020	0.640	0.709	0.018	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.709	0.018	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.709	0.018	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.709	0.018	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-41	Patch	cvu_0020	Least Concern	0	no	0.430	0.122	0.122	0.640	0.711	0.090	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.711	0.090	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.711	0.090	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.711	0.090	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-42	Patch	cvu_0020	Least Concern	1	no	0.610	0.156	0.156	0.580	0.720	0.164	501535 Ben Major Grevillea *Grevillea floripendula*
										0.705	0.163	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.705	0.163	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.705	0.163	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.705	0.163	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-43	Patch	cvu_0020	Least Concern	14	no	0.520	1.031	1.031	0.580	0.584	0.849	501535 Ben Major Grevillea *Grevillea floripendula*
										0.016	0.897	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.586	0.850	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.586	0.850	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.586	0.850	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-44	Patch	cvu_0020	Least Concern	0	no	0.590	0.027	0.027	0.842	0.699	0.027	501535 Ben Major Grevillea *Grevillea floripendula*
										0.699	0.027	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.699	0.027	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.699	0.027	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-45	Patch	cvu_0022	Depleted	0	no	0.600	0.082	0.082	0.851	0.811	0.089	501535 Ben Major Grevillea *Grevillea floripendula*
										0.811	0.089	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.811	0.089	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.811	0.089	505174 Wimmera Scentbark *Eucalyptus sabulosa*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.811	0.089	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-46	Patch	cvu_0022	Depleted	1	no	0.650	5.112	5.112	0.839	0.813	6.026	501535 Ben Major Grevillea *Grevillea floripendula*
										0.814	6.027	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.814	6.027	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.814	6.027	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.814	6.027	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-47	Patch	cvu_0022	Depleted	0	no	0.520	0.000	0.000	0.850	0.800	0.000	501535 Ben Major Grevillea *Grevillea floripendula*
										0.800	0.000	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.800	0.000	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.800	0.000	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.800	0.000	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-48	Patch	cvu_0022	Depleted	6	no	0.660	3.522	3.522	0.872	0.787	4.153	501535 Ben Major Grevillea *Grevillea floripendula*
										0.250	4.179	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.787	4.153	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.787	4.153	505174 Wimmera Scentbark *Eucalyptus sabulosa*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.787	4.153	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-49	Patch	cvu_0125	Endangered	0	no	0.400	0.021	0.021	0.220	0.685	0.014	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.685	0.014	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-50	Patch	cvu_0125	Endangered	0	no	0.150	0.000	0.000	0.210	0.690	0.000	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.690	0.000	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-51	Patch	cvu_0125	Endangered	0	no	0.590	0.027	0.027	0.640	0.700	0.027	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.700	0.027	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.700	0.027	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.700	0.027	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-52	Patch	cvu_0125	Endangered	0	no	0.540	0.003	0.003	0.640	0.600	0.002	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.600	0.002	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-53	Patch	cvu_0125	Endangered	0	no	0.540	0.017	0.017	0.660	0.677	0.016	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.677	0.016	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.677	0.016	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-54	Patch	vvp_0125	Endangered	0	no	0.730	0.104	0.104	0.693	0.658	0.125	503116 Large-headed Fireweed *Senecio macrocarpus*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.658	0.125	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-55	Patch	cvu_0647	Endangered	0	no	0.500	0.129	0.129	0.640	0.670	0.108	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.621	0.105	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.621	0.105	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-56	Patch	cvu_0647	Endangered	0	no	0.540	0.081	0.081	0.640	0.630	0.072	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.630	0.072	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.630	0.072	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-57	Patch	vvp_0136	Endangered	0	no	0.430	0.020	0.020	0.700	0.645	0.014	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-58	Patch	cvu_0067	Endangered	0	no	0.520	0.028	0.028	0.570	0.730	0.025	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.730	0.025	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.025	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.730	0.025	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-59	Patch	cvu_0067	Endangered	0	no	0.420	0.095	0.095	0.670	0.657	0.066	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.590	0.063	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.590	0.063	504581 White Sunray *Leucochrysum albicans subsp. tricolor*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
C0-60	Patch	cvu_0067	Endangered	0	no	0.200	0.211	0.211	0.533	0.596	0.067	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.399	0.067	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-61	Patch	cvu_0022	Depleted	0	no	0.190	1.127	1.127	0.744	0.700	0.364	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.230	0.348	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.030	0.340	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
										0.230	0.348	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.049	0.351	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-62	Patch	cvu_0022	Depleted	0	no	0.190	0.812	0.812	0.618	0.528	0.236	501535 Ben Major Grevillea *Grevillea floripendula*
										0.088	0.261	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.528	0.236	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.528	0.236	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.528	0.236	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-63	Patch	cvu_0175	Endangered	0	no	0.300	0.058	0.058	0.210	0.687	0.029	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.687	0.029	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-64	Patch	vvp_0175	Endangered	0	no	0.260	0.000	0.000	0.700	0.430	0.000	503116 Large-headed Fireweed *Senecio macrocarpus*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.430	0.000	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-65	Patch	cvu_0175	Endangered	0	no	0.170	0.079	0.079	0.527	0.620	0.022	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.572	0.022	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-66	Patch	cvu_0175	Endangered	0	no	0.170	0.052	0.052	0.528	0.613	0.014	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.549	0.015	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-67	Patch	cvu_0020	Least Concern	1	no	0.160	6.708	6.708	0.572	0.583	1.699	501535 Ben Major Grevillea *Grevillea floripendula*
										0.119	1.780	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.558	1.710	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.558	1.710	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.558	1.710	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-68	Patch	cvu_0020	Least Concern	0	no	0.150	4.264	4.264	0.490	0.585	1.013	501535 Ben Major Grevillea *Grevillea floripendula*
										0.560	0.998	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.560	0.998	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.560	0.998	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.537	0.996	507308 Rough Wattle *Acacia aspera subsp. parviceps*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
C0-69	Patch	cvu_0047	Vulnerable	0	no	0.280	0.997	0.997	0.536	0.629	0.455	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.655	0.462	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.655	0.462	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.055	0.458	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-70	Patch	cvu_0047	Vulnerable	0	no	0.280	0.006	0.006	0.510	0.700	0.003	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.700	0.003	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-71	Patch	cvu_0047	Vulnerable	0	no	0.350	0.611	0.611	0.511	0.696	0.362	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.081	0.363	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
										0.555	0.363	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-72	Patch	cvu_0047	Vulnerable	0	no	0.260	0.136	0.136	0.560	0.636	0.058	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.636	0.058	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.636	0.058	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-73	Patch	cvu_0047	Vulnerable	8	no	0.440	0.350	0.350	0.560	0.636	0.252	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.636	0.252	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.636	0.252	507308 Rough Wattle *Acacia aspera subsp. parviceps*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
C0-74	Patch	cvu_0047	Vulnerable	0	no	0.610	0.499	0.499	0.577	0.676	0.511	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.473	0.504	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.473	0.504	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.399	0.503	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-75	Patch	cvu_0047	Vulnerable	8	no	0.460	1.033	1.033	0.525	0.696	0.806	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.117	0.802	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
										0.579	0.807	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-76	Patch	cvu_0047	Vulnerable	6	no	0.460	0.413	0.413	0.558	0.640	0.312	501535 Ben Major Grevillea *Grevillea floripendula*
										0.301	0.291	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.578	0.300	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.578	0.300	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.260	0.312	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-77	Patch	cvu_0047	Vulnerable	1	no	0.460	0.013	0.013	0.510	0.652	0.010	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.023	0.010	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-78	Patch	cvu_0047	Vulnerable	2	no	0.700	0.267	0.267	0.815	0.681	0.315	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.686	0.316	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-79	Patch	cvu_0047	Vulnerable	7	no	0.720	0.512	0.512	0.516	0.707	0.629	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.472	0.622	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
										0.235	0.645	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-80	Patch	cvu_0125	Endangered	0	no	0.377	0.036	0.036	0.850	0.730	0.024	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.711	0.023	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-81	Patch	wet_0000	Endangered	0	no	0.377	0.310	0.310	0.454	0.597	0.187	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.458	0.187	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.458	0.187	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-82	Patch	wet_0000	Endangered	0	no	0.010	0.003	0.003	0.787	0.684	0.000	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.684	0.000	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-83	Patch	wet_0000	Endangered	0	no	0.328	0.320	0.320	0.503	0.668	0.175	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.668	0.175	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-84	Patch	wet_0000	Endangered	0	no	0.427	1.808	1.808	0.725	0.500	1.158	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.609	1.243	504581 White Sunray *Leucochrysum albicans subsp. tricolor*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
C0-85	Patch	cvu_0175	Endangered	0	no	0.170	0.000	0.000	0.504	0.674	0.000	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.674	0.000	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-86	Patch	cvu_0020	Least Concern	0	no	0.150	0.021	0.021	0.480	0.640	0.005	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.640	0.005	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.640	0.005	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-87	Patch	cvu_0022	Depleted	1	no	0.470	0.087	0.087	0.480	0.640	0.067	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.640	0.067	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.640	0.067	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-88	Patch	vvp_0175	Endangered	0	no	0.260	0.220	0.220	0.680	0.504	0.086	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.507	0.086	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-89	Patch	vvp_0125	Endangered	0	no	0.650	0.477	0.477	0.785	0.675	0.519	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.675	0.519	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-90	Patch	vvp_0022	Depleted	0	no	0.500	0.006	0.006	0.477	0.455	0.005	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-91	Patch	vvp_0175	Endangered	2	no	0.590	0.095	0.095	0.633	0.536	0.086	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.537	0.086	504581 White Sunray *Leucochrysum albicans subsp. tricolor*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
C0-92	Patch	vvp_0175	Endangered	0	no	0.540	0.079	0.079	0.880	0.740	0.075	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-93	Patch	vvp_0125	Endangered	0	no	0.730	0.199	0.199	0.729	0.655	0.241	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.655	0.241	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-94	Patch	vvp_0136	Endangered	0	no	0.550	0.447	0.447	0.683	0.482	0.364	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.485	0.365	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-95	Patch	vvp_0136	Endangered	0	no	0.500	0.007	0.007	0.700	0.560	0.006	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-96	Patch	vvp_0136	Endangered	0	no	0.460	0.655	0.655	0.866	0.705	0.514	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-97	Patch	vvp_0136	Endangered	0	no	0.500	0.039	0.039	0.804	0.679	0.032	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-98	Patch	vvp_0136	Endangered	0	no	0.430	1.382	1.382	0.701	0.656	0.984	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-99	Canopy Tree	cvu_0022	Depleted	1	no	0.470	0.070	0.030	0.480	0.330	0.019	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.330	0.019	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.330	0.019	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.330	0.019	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-100	Canopy Tree	cvu_0022	Depleted	1	no	0.470	0.070	0.067	0.519	0.330	0.042	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.366	0.045	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.366	0.045	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.344	0.045	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-101	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.070	0.750	0.730	0.083	501535 Ben Major Grevillea *Grevillea floripendula*
										0.730	0.083	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.083	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-102	Scattered Tree	cvu_0175	Endangered	1	no	0.200	0.070	0.070	0.416	0.510	0.021	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.480	0.021	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.480	0.021	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-103	Canopy Tree	cvu_0022	Depleted	1	no	0.430	0.070	0.024	0.900	0.730	0.018	501535 Ben Major Grevillea *Grevillea floripendula*
										0.730	0.018	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.018	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.730	0.018	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-104	Canopy Tree	cvu_0022	Depleted	1	no	0.430	0.070	0.049	0.900	0.730	0.036	501535 Ben Major Grevillea *Grevillea floripendula*
										0.730	0.036	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.036	505174 Wimmera Scentbark *Eucalyptus sabulosa*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.730	0.036	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-105	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.047	0.560	0.730	0.055	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.055	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-106	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.034	0.560	0.730	0.040	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.040	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-107	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.067	0.680	0.780	0.081	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.135	0.081	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.135	0.081	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-108	Canopy Tree	cvu_0022	Depleted	1	no	0.470	0.070	0.065	0.860	0.591	0.049	501535 Ben Major Grevillea *Grevillea floripendula*
										0.591	0.049	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.591	0.049	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.591	0.049	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-109	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.051	0.680		0.044	General
C0-110	Canopy Tree	cvu_0067	Endangered	1	no	0.300	0.070	0.049	0.657	0.655	0.024	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.655	0.024	504581 White Sunray *Leucochrysum albicans subsp. tricolor*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
C0-111	Scattered Tree	cvu_0067	Endangered	0	no	0.200	0.031	0.031	0.520	0.570	0.010	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.570	0.010	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.570	0.010	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.570	0.010	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-112	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.028	0.680		0.024	General
C0-113	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.044	0.680		0.038	General
C0-114	Canopy Tree	cvu_0022	Depleted	1	no	0.460	0.070	0.028	0.620	0.574	0.021	501535 Ben Major Grevillea *Grevillea floripendula*
										0.574	0.021	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.574	0.021	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.574	0.021	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-115	Canopy Tree	cvu_0022	Depleted	1	no	0.460	0.070	0.025	0.620	0.570	0.018	501535 Ben Major Grevillea *Grevillea floripendula*
										0.570	0.018	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.570	0.018	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.570	0.018	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-116	Canopy Tree	cvu_0022	Depleted	1	no	0.420	0.070	0.049	0.471	0.603	0.033	501535 Ben Major Grevillea *Grevillea floripendula*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.603	0.033	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.603	0.033	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.056	0.034	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-117	Canopy Tree	cvu_0020	Least Concern	1	no	0.590	0.070	0.042	0.880	0.730	0.043	501535 Ben Major Grevillea *Grevillea floripendula*
										0.730	0.043	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.043	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.730	0.043	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-118	Canopy Tree	cvu_0020	Least Concern	1	no	0.590	0.070	0.058	0.880	0.730	0.059	501535 Ben Major Grevillea *Grevillea floripendula*
										0.730	0.059	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.059	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.730	0.059	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-119	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.070	0.690	0.667	0.023	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.667	0.023	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-120	Scattered Tree	cvu_0047	Vulnerable	1	no	0.200	0.070	0.063	0.670	0.700	0.021	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.700	0.021	504581 White Sunray *Leucochrysum albicans subsp. tricolor*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
C0-121	Scattered Tree	cvu_0047	Vulnerable	1	no	0.200	0.070	0.067	0.670	0.652	0.022	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.652	0.022	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-122	Scattered Tree	cvu_0047	Vulnerable	1	no	0.200	0.070	0.070	0.690	0.692	0.024	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.692	0.024	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-123	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.070	0.648	0.620	0.023	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.120	0.023	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.072	0.023	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-124	Scattered Tree	cvu_0047	Vulnerable	1	no	0.200	0.070	0.070	0.690	0.672	0.024	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.672	0.024	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-125	Canopy Tree	cvu_0047	Vulnerable	1	no	0.440	0.070	0.040	0.560	0.640	0.029	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.640	0.029	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.640	0.029	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-126	Canopy Tree	cvu_0047	Vulnerable	1	no	0.440	0.070	0.022	0.560	0.639	0.016	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.639	0.016	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.639	0.016	507308 Rough Wattle *Acacia aspera subsp. parviceps*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
C0-127	Canopy Tree	cvu_0022	Depleted	1	no	0.550	0.070	0.056	0.740	0.760	0.054	501535 Ben Major Grevillea *Grevillea floripendula*
										0.760	0.054	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.760	0.054	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.760	0.054	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.760	0.054	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-128	Canopy Tree	cvu_0022	Depleted	1	no	0.660	0.070	0.055	0.620	0.680	0.061	501535 Ben Major Grevillea *Grevillea floripendula*
										0.680	0.061	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.680	0.061	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.680	0.061	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.680	0.061	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-129	Canopy Tree	cvu_0022	Depleted	1	no	0.660	0.070	0.029	0.620	0.680	0.032	501535 Ben Major Grevillea *Grevillea floripendula*
										0.680	0.032	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.680	0.032	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.680	0.032	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.680	0.032	507308 Rough Wattle *Acacia aspera subsp. parviceps*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
C0-130	Canopy Tree	cvu_0022	Depleted	1	no	0.660	0.070	0.040	0.619	0.672	0.044	501535 Ben Major Grevillea *Grevillea floripendula*
										0.619	0.044	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.672	0.044	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.672	0.044	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.672	0.044	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-131	Canopy Tree	cvu_0022	Depleted	1	no	0.550	0.070	0.057	0.560	0.490	0.047	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.490	0.047	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.490	0.047	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-132	Canopy Tree	cvu_0047	Vulnerable	1	no	0.440	0.070	0.069	0.560	0.660	0.050	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.660	0.050	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.660	0.050	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-133	Canopy Tree	cvu_0022	Depleted	1	no	0.690	0.070	0.054	0.740	0.710	0.064	501535 Ben Major Grevillea *Grevillea floripendula*
										0.710	0.064	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.710	0.064	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.710	0.064	507308 Rough Wattle *Acacia aspera subsp. parviceps*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
C0-134	Canopy Tree	cvu_0022	Depleted	1	no	0.660	0.070	0.041	0.600	0.640	0.044	501535 Ben Major Grevillea *Grevillea floripendula*
										0.640	0.044	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.640	0.044	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.640	0.044	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-135	Canopy Tree	cvu_0022	Depleted	1	no	0.690	0.070	0.036	0.620	0.582	0.039	501535 Ben Major Grevillea *Grevillea floripendula*
										0.582	0.039	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.582	0.039	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.582	0.039	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-136	Canopy Tree	cvu_0047	Vulnerable	1	no	0.460	0.070	0.044	0.510	0.657	0.033	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.101	0.034	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-137	Canopy Tree	cvu_0020	Least Concern	1	no	0.580	0.070	0.054	0.640	0.680	0.053	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.680	0.053	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.680	0.053	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.680	0.053	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-138	Canopy Tree	vvp_0175	Endangered	1	no	0.590	0.070	0.050	0.644	0.437	0.043	503116 Large-headed Fireweed *Senecio macrocarpus*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.451	0.043	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-139	Canopy Tree	cvu_0022	Depleted	1	no	0.500	0.070	0.063	0.730	0.740	0.054	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.740	0.054	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.740	0.054	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.740	0.054	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-140	Canopy Tree	cvu_0020	Least Concern	1	no	0.580	0.070	0.056	0.500	0.580	0.051	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.580	0.051	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.580	0.051	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.580	0.051	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-141	Canopy Tree	cvu_0022	Depleted	1	no	0.660	0.070	0.047	0.890	0.813	0.056	501535 Ben Major Grevillea *Grevillea floripendula*
										0.596	0.056	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.813	0.056	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.813	0.056	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.813	0.056	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-142	Canopy Tree	cvu_0020	Least Concern	1	no	0.580	0.070	0.019	0.500	0.620	0.018	501535 Ben Major Grevillea *Grevillea floripendula*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.618	0.018	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.620	0.018	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.620	0.018	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.620	0.018	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-143	Canopy Tree	cvu_0020	Least Concern	1	no	0.580	0.070	0.037	0.500	0.629	0.035	501535 Ben Major Grevillea *Grevillea floripendula*
										0.431	0.035	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.629	0.035	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.629	0.035	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.629	0.035	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-144	Canopy Tree	cvu_0175	Endangered	1	no	0.580	0.070	0.045	0.780	0.703	0.045	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.703	0.045	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-145	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.068	0.480	0.540	0.021	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.540	0.021	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.540	0.021	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.540	0.021	507308 Rough Wattle *Acacia aspera subsp. parviceps*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
C0-146	Scattered Tree	cvu_0047	Vulnerable	1	no	0.200	0.070	0.038	0.835	0.736	0.013	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.736	0.013	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-147	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.052	0.560	0.613	0.017	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.613	0.017	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.613	0.017	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-148	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.013	0.560	0.659	0.004	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.659	0.004	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.659	0.004	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-149	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.016	0.530	0.750	0.006	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.750	0.006	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-150	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.028	0.527	0.741	0.010	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.088	0.009	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
										0.653	0.010	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-151	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.038	0.510	0.700	0.013	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.700	0.013	504581 White Sunray *Leucochrysum albicans subsp. tricolor*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
C0-152	Scattered Tree	vvp_0132	Endangered	1	no	0.200	0.070	0.061	0.800	0.670	0.020	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.670	0.020	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-153	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.066	0.500	0.680	0.022	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.680	0.022	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.680	0.022	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-154	Scattered Tree	cvu_0047	Vulnerable	1	no	0.200	0.070	0.059	0.670	0.694	0.020	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.694	0.020	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-155	Scattered Tree	cvu_0047	Vulnerable	0	no	0.200	0.031	0.005	0.690	0.698	0.002	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.698	0.002	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-156	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.070	0.660	0.580	0.022	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-157	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.070	0.690	0.630	0.023	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.630	0.023	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-158	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.070	0.681	0.600	0.022	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.181	0.022	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-159	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.070	0.670	0.650	0.023	503116 Large-headed Fireweed *Senecio macrocarpus*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.650	0.023	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-160	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.035	0.480	0.643	0.011	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.643	0.011	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.643	0.011	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.567	0.011	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-161	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.055	0.480	0.490	0.017	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.490	0.017	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.490	0.017	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.490	0.017	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-162	Scattered Tree	cvu_0067	Endangered	0	no	0.200	0.031	0.031	0.492	0.606	0.010	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.606	0.010	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.606	0.010	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-163	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.015	0.390	0.490	0.004	501535 Ben Major Grevillea *Grevillea floripendula*
										0.490	0.004	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.490	0.004	505174 Wimmera Scentbark *Eucalyptus sabulosa*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.490	0.004	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-164	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.015	0.390	0.490	0.004	501535 Ben Major Grevillea *Grevillea floripendula*
										0.490	0.004	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.490	0.004	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.490	0.004	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-165	Scattered Tree	cvu_0896	Endangered	0	no	0.200	0.031	0.031	0.330		0.006	General
C0-166	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.070	0.680	0.574	0.022	501535 Ben Major Grevillea *Grevillea floripendula*
										0.574	0.022	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.574	0.022	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.574	0.022	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-167	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.070	0.470	0.630	0.023	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.630	0.023	505174 Wimmera Scentbark *Eucalyptus sabulosa*
C0-168	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.045	0.530	0.370	0.012	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.263	0.012	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.367	0.012	504581 White Sunray *Leucochrysum albicans subsp. tricolor*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
C0-169	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.045	0.530	0.370	0.012	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.121	0.012	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.348	0.012	504581 White Sunray *Leucochrysum albicans subsp. tricolor*
C0-170	Scattered Tree	cvu_0020	Least Concern	0	no	0.200	0.031	0.031	0.480	0.580	0.010	503116 Large-headed Fireweed *Senecio macrocarpus*
										0.580	0.010	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.580	0.010	505174 Wimmera Scentbark *Eucalyptus sabulosa*
										0.580	0.010	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C0-171	Scattered Tree	cvu_0067	Endangered	0	no	0.200	0.031	0.030	0.530	0.370	0.008	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.370	0.008	504581 White Sunray *Leucochrysum albicans subsp. tricolor*

Appendix 2: Information about impacts to rare or threatened species' habitats on site

This table lists all rare or threatened species' habitats mapped at the site.

Species common name	Species scientific name	Species number	Conservation status	Group	Habitat impacted	% habitat value affected
Ben Major Grevillea	*Grevillea floripendula*	501535	Vulnerable	Dispersed	Habitat importance map	0.0983
Rough Wattle	*Acacia aspera subsp. parviceps*	507308	Rare	Dispersed	Habitat importance map	0.0460
Emerald-lip Greenhood	*Pterostylis smaragdyna*	503915	Rare	Dispersed	Habitat importance map	0.0079
Large-headed Fireweed	*Senecio macrocarpus*	503116	Endangered	Dispersed	Habitat importance map	0.0059
Wimmera Scentbark	*Eucalyptus sabulosa*	505174	Rare	Dispersed	Habitat importance map	0.0059
White Sunray	*Leucochrysum albicans subsp. tricolor*	504581	Endangered	Dispersed	Habitat importance map	0.0057
Flat Bluebell	*Wahlenbergia planiflora subsp. planiflora*	504064	Vulnerable	Dispersed	Habitat importance map	0.0046
Yarra Gum	*Eucalyptus yarraensis*	501326	Rare	Dispersed	Habitat importance map	0.0043
Brush-tailed Phascogale	*Phascogale tapoatafa*	11017	Vulnerable	Dispersed	Habitat importance map	0.0041
Tiny Bog-sedge	*Schoenus nanus*	503050	Rare	Dispersed	Habitat importance map	0.0032
Golden Sun Moth	*Synemon plana*	15021	Critically endangered	Dispersed	Habitat importance map	0.0032
Dwarf Boronia	*Boronia nana var. pubescens*	504278	Rare	Dispersed	Habitat importance map	0.0032
Regent Honeyeater	*Anthochaera phrygia*	10603	Critically endangered	Dispersed	Habitat importance map	0.0031
Button Wrinklewort	*Rutidosis leptorhynchoides*	502982	Endangered	Dispersed	Habitat importance map	0.0029
Grey Grass-tree	*Xanthorrhoea glauca subsp. angustifolia*	507229	Endangered	Dispersed	Habitat importance map	0.0027
Brown Toadlet	*Pseudophryne bibronii*	13117	Endangered	Dispersed	Habitat importance map	0.0024
Hairy Correa	*Correa aemula*	500828	Rare	Dispersed	Habitat importance map	0.0023
Golden Cowslips	*Diuris behrii*	501061	Vulnerable	Dispersed	Habitat importance map	0.0023

Speckled Warbler	*Chthonicola sagittatus*	10504	Vulnerable	Dispersed	Habitat importance map	0.0022
Plump Swamp Wallaby-grass	*Amphibromus pithogastrus*	503624	Endangered	Dispersed	Habitat importance map	0.0018
Eltham Copper	*Paralucia pyrodiscus lucida*	65003	Endangered	Dispersed	Habitat importance map	0.0015
Brackish Plains Buttercup	*Ranunculus diminutus*	504314	Rare	Dispersed	Habitat importance map	0.0012
Striped Legless Lizard	*Delma impar*	12159	Endangered	Dispersed	Habitat importance map	0.0010
Half-bearded Spear-grass	*Austrostipa hemipogon*	503985	Rare	Dispersed	Habitat importance map	0.0010
Matted Flax-lily	*Dianella amoena*	505084	Endangered	Dispersed	Habitat importance map	0.0010
Pale-flower Crane's-bill	*Geranium sp. 3*	505344	Rare	Dispersed	Habitat importance map	0.0010
Grampians Bitter-pea	*Daviesia laevis*	504423	Vulnerable	Dispersed	Habitat importance map	0.0010
Yellow Watercrown Grass	*Paspalidium flavidum*	507820	Endangered	Dispersed	Habitat importance map	0.0009
Growling Grass Frog	*Litoria raniformis*	13207	Endangered	Dispersed	Habitat importance map	0.0009
Australian Painted Snipe	*Rostratula australis*	10170	Critically endangered	Dispersed	Habitat importance map	0.0008
Trailing Hop-bush	*Dodonaea procumbens*	501090	Vulnerable	Dispersed	Habitat importance map	0.0008
Arching Flax-lily	*Dianella sp. aff. longifolia (Benambra)*	505560	Vulnerable	Dispersed	Habitat importance map	0.0008
Plains Yam-daisy	*Microseris scapigera s.s.*	504657	Vulnerable	Dispersed	Habitat importance map	0.0007
Purple Diuris	*Diuris punctata*	501084	Vulnerable	Dispersed	Habitat importance map	0.0007
Brolga	*Grus rubicunda*	10177	Vulnerable	Dispersed	Habitat importance map	0.0005
Purple Blown-grass	*Lachnagrostis punicea subsp. punicea*	504206	Rare	Dispersed	Habitat importance map	0.0005
Purple Blown-grass	*Lachnagrostis punicea subsp. filifolia*	504222	Rare	Dispersed	Habitat importance map	0.0005
Pale Swamp Everlasting	*Coronidium gunnianum*	504655	Vulnerable	Dispersed	Habitat importance map	0.0005
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*	10498	Vulnerable	Dispersed	Habitat importance map	0.0004
Australasian Shoveler	*Anas rhynchotis*	10212	Vulnerable	Dispersed	Habitat importance map	0.0004

Small Milkwort	*Comesperma polygaloides*	500798	Vulnerable	Dispersed	Habitat importance map	0.0004
Common Pipewort	*Eriocaulon scariosum*	501218	Rare	Dispersed	Habitat importance map	0.0003
One-flower Early Nancy	*Wurmbea uniflora*	503583	Rare	Dispersed	Habitat importance map	0.0003
Clover Glycine	*Glycine latrobeana*	501456	Vulnerable	Dispersed	Habitat importance map	0.0003
Lace Monitor	*Varanus varius*	12283	Endangered	Dispersed	Habitat importance map	0.0003
Hardhead	*Aythya australis*	10215	Vulnerable	Dispersed	Habitat importance map	0.0003
Powerful Owl	*Ninox strenua*	10248	Vulnerable	Dispersed	Habitat importance map	0.0002
Small-flower Mat-rush	*Lomandra micrantha subsp. tuberculata*	504711	Rare	Dispersed	Habitat importance map	0.0002
Hairy Tails	*Ptilotus erubescens*	502825	Vulnerable	Dispersed	Habitat importance map	0.0002
Painted Honeyeater	*Grantiella picta*	10598	Vulnerable	Dispersed	Habitat importance map	0.0002
Black Falcon	*Falco subniger*	10238	Vulnerable	Dispersed	Habitat importance map	0.0002
Australian Little Bittern	*Ixobrychus dubius*	10195	Endangered	Dispersed	Habitat importance map	0.0002
Salt Blown-grass	*Lachnagrostis robusta*	504223	Rare	Dispersed	Habitat importance map	0.0002
Forest Bitter-cress	*Cardamine papillata*	505034	Vulnerable	Dispersed	Habitat importance map	0.0002
Tough Scurf-pea	*Cullen tenax*	502776	Endangered	Dispersed	Habitat importance map	0.0001
Branching Groundsel	*Senecio cunninghamii var. cunninghamii*	503104	Rare	Dispersed	Habitat importance map	0.0001
Clumping Golden Moths	*Diuris gregaria*	504887	Endangered	Dispersed	Habitat importance map	0.0001
Wavy Swamp Wallaby-grass	*Amphibromus sinuatus*	503625	Vulnerable	Dispersed	Habitat importance map	0.0001
Large White Spider-orchid	*Caladenia venusta*	500533	Rare	Dispersed	Habitat importance map	0.0001
Swamp Everlasting	*Xerochrysum palustre*	503763	Vulnerable	Dispersed	Habitat importance map	0.0001
Bearded Dragon	*Pogona barbata*	12177	Vulnerable	Dispersed	Habitat importance map	0.0001
Fragrant Leek-orchid	*Prasophyllum suaveolens*	504567	Endangered	Dispersed	Habitat importance map	0.0001
Baillon's Crake	*Porzana pusilla palustris*	10050	Vulnerable	Dispersed	Habitat importance map	0.0001

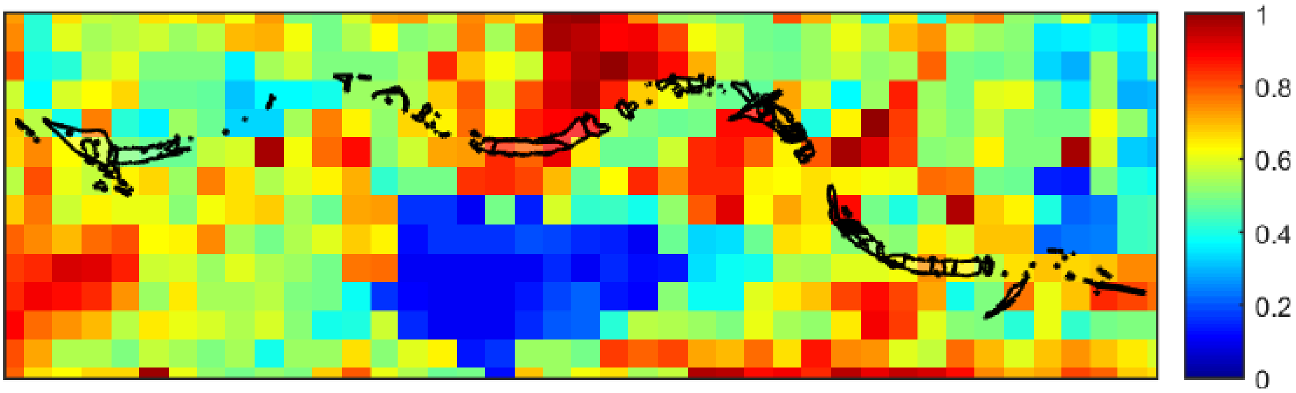
Spiny Rice-flower	*Pimelea spinescens subsp. spinescens*	504823	Endangered	Dispersed	Habitat importance map	0.0001
Lewin's Rail	*Lewinia pectoralis pectoralis*	10045	Vulnerable	Dispersed	Habitat importance map	0.0000
Tremont Bundy	*Eucalyptus aff. goniocalyx (Dandenong Ranges)*	507008	Vulnerable	Dispersed	Habitat importance map	0.0000
Swamp Flax-lily	*Dianella callicarpa*	505086	Rare	Dispersed	Habitat importance map	0.0000
Snowy Mint-bush	*Prostanthera nivea var. nivea*	502746	Rare	Dispersed	Habitat importance map	0.0000
Barking Owl	*Ninox connivens connivens*	10246	Endangered	Dispersed	Habitat importance map	0.0000
Southern Swainson-pea	*Swainsona behriana*	504944	Rare	Dispersed	Habitat importance map	0.0000
Swift Parrot	*Lathamus discolor*	10309	Endangered	Dispersed	Habitat importance map	0.0000
Fine-hairy Spear-grass	*Austrostipa puberula*	503988	Rare	Dispersed	Habitat importance map	0.0000
Flame Grevillea	*Grevillea dimorpha*	501532	Rare	Dispersed	Habitat importance map	0.0000
Square-tailed Kite	*Lophoictinia isura*	10230	Vulnerable	Dispersed	Habitat importance map	0.0000
White-throated Needletail	*Hirundapus caudacutus*	10334	Vulnerable	Dispersed	Habitat importance map	0.0000
Elegant Parrot	*Neophema elegans*	10307	Vulnerable	Dispersed	Habitat importance map	0.0000
Wind-blown Tussock-grass	*Poa physoclina*	507791	Endangered	Dispersed	Habitat importance map	0.0000

Habitat group
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

Habitat impacted
- Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species
- Top ranking maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat, developed from the highest habitat importance scores in dispersed species habitat maps and selected VBA records
- Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc.

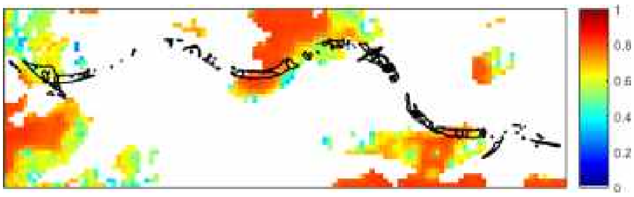
Appendix 3 – Images of mapped native vegetation

2. Strategic biodiversity values map

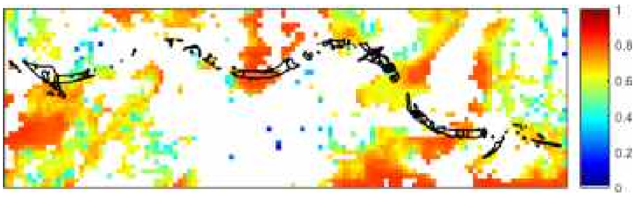


3. Habitat importance maps

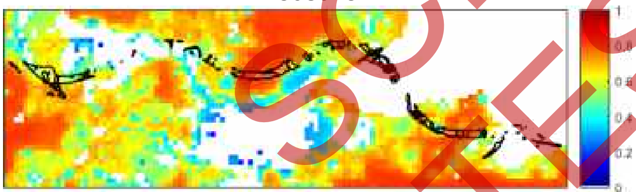
Ben Major Grevillea
Grevillea floripendula
501535



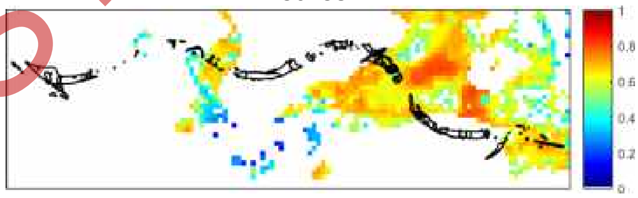
Large-headed Fireweed
Senecio macrocarpus
503116



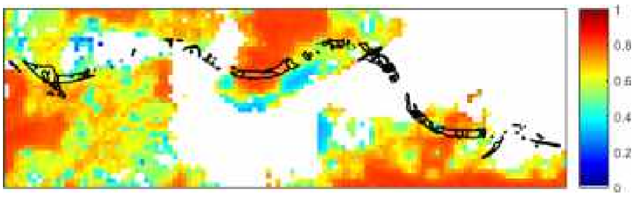
Emerald-lip Greenhood
Pterostylis smaragdyna
503915



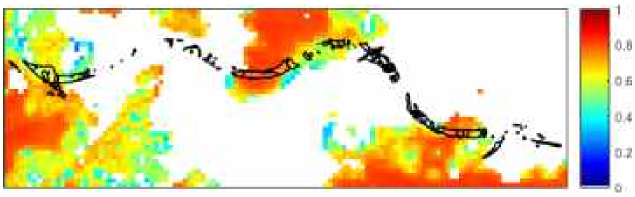
White Sunray
Leucochrysum albicans subsp. tricolor
504581



Wimmera Scentbark
Eucalyptus sabulosa
505174



Rough Wattle
Acacia aspera subsp. parviceps
507308



Scenario test – native vegetation removal

This report provides offset requirements for internal testing of different proposals to remove native vegetation. **This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria.** A report must be obtained from the Department of Environment, Land, Water and Planning (DELWP).

Date of issue: **27/02/2018**
Time of issue: **7:45 pm**

Report ID: Scenario Testing

Project ID	EnSym_BB_C2

Assessment pathway

Assessment pathway	**Detailed Assessment Pathway**
Extent including past and proposed	50.703 ha
Extent of past removal	0.000 ha
Extent of proposed removal	50.703 ha
No. Large trees proposed to be removed	310
Location category	Location 2 The native vegetation is in an area mapped as an endangered Ecological Vegetation Class. Removal of less than 0.5 hectares of native vegetation in this location will not have a significant impact on any habitat for a rare or threatened species.

1. Location map

Scenario test – native vegetation removal

Offset requirements if a permit is granted

Any approval granted will include a condition to obtain an offset that meets the following requirements:

General offset amount[1]	3.000 general habitat units
Vicinity	Glenelg Hopkins Catchment Management Authority (CMA) or Pyrenees Shire Council
Minimum strategic biodiversity value score[2]	0.499
Large trees*	28 large trees
Species offset amount[3]	24.913 specific units of habitat for Ben Major Grevillea, *Grevillea floripendula* 29.785 specific units of habitat for Emerald-lip Greenhood, *Pterostylis smaragdyna* 25.715 specific units of habitat for Rough Wattle, *Acacia aspera subsp. parviceps*
Large trees*	282 trees
*** The total number of large trees that the offset must protect**	310 large trees to be protected in either the general, species or combination across all habitat units protected

NB: values within tables in this document may not add to the totals shown above due to rounding

Appendix 1 includes information about the native vegetation to be removed

Appendix 2 includes information about the rare or threatened species mapped at the site.

Appendix 3 includes maps showing native vegetation to be removed and extracts of relevant species habitat importance maps

1 The general offset amount required is the sum of all general habitat units in Appendix 1.

2 Minimum strategic biodiversity score is 80 per cent of the weighted average score across habitat zones where a general offset is required

3 The species offset amount(s) required is the sum of all species habitat units in Appendix 1.

Scenario test – native vegetation removal

Next steps

Any proposal to remove native vegetation must meet the application requirements of the Detailed Assessment Pathway and it will be assessed under the Detailed Assessment Pathway.

This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria.

If you wish to remove the mapped native vegetation you must submit the related shapefiles to the Department of Environment, Land, Water and Planning (DELWP) for processing, by email to ensymnvrtool.support@delwp.vic.gov.au. DELWP will provide a *Native vegetation removal report* that is required to meet the permit application requirements in accordance with *Guidelines for the removal, destruction or lopping of native vegetation* (Guidelines).

Appendix 1: Description of native vegetation to be removed

The species-general offset test was applied to your proposal. This test determines if the proposed removal of native vegetation has a proportional impact on any rare or threatened species habitats above the species offset threshold. The threshold is set at 0.005 per cent of the mapped habitat value for a species. When the proportional impact is above the species offset threshold a species offset is required. This test is done for all species mapped at the site. Multiple species offsets will be required if the species offset threshold is exceeded for multiple species.

Where a zone requires species offset(s), the species habitat units for each species in that zone is calculated by the following equation in accordance with the Guidelines:

Species habitat units = extent x condition x species landscape factor x 2, where the species landscape factor = 0.5 + (habitat importance score/2)

The species offset amount(s) required is the sum of all species habitat units per zone

Where a zone does not require a species offset, the general habitat units in that zone is calculated by the following equation in accordance with the Guidelines:

General habitat units = extent x condition x general landscape factor x 1.5, where the general landscape factor = 0.5 + (strategic biodiversity value score/2)

The general offset amount required is the sum of all general habitat units per zone.

Native vegetation to be removed

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
C2-1	Patch	cvu_0067	Endangered	0	no	0.550	0.558	0.558	0.599	0.691	0.519	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.691	0.519	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-2	Patch	cvu_0067	Endangered	2	no	0.300	0.495	0.495	0.650	0.639	0.243	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-3	Patch	cvu_0067	Endangered	0	no	0.170	0.016	0.016	0.370		0.003	General
C2-4	Patch	cvu_0067	Endangered	0	no	0.620	0.001	0.001	0.530	0.710	0.001	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-5	Patch	cvu_0125	Endangered	0	no	0.510	0.024	0.024	0.850	0.790	0.022	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.790	0.022	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-6	Patch	cvu_0125	Endangered	0	no	0.380	0.010	0.010	0.490	0.605	0.006	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
C2-7	Patch	cvu_0125	Endangered	0	no	0.380	0.006	0.006	0.820		0.003	General
C2-8	Patch	cvu_0125	Endangered	0	no	0.340	0.113	0.113	0.503	0.626	0.063	501535 Ben Major Grevillea *Grevillea floripendula*
										0.626	0.063	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.626	0.063	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-9	Patch	cvu_0125	Endangered	0	no	0.340	0.491	0.491	0.550	0.425	0.238	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-10	Patch	vvp_0653	Endangered	0	no	0.340	0.248	0.248	0.580		0.100	General
C2-11	Patch	cvu_0125	Endangered	0	no	0.230	0.077	0.077	0.580	0.500	0.026	501535 Ben Major Grevillea *Grevillea floripendula*
										0.500	0.026	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.500	0.026	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-12	Patch	cvu_0136	Vulnerable	0	no	0.680	0.140	0.140	0.520	0.675	0.159	501535 Ben Major Grevillea *Grevillea floripendula*
										0.666	0.158	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.666	0.158	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-13	Patch	cvu_0022	Depleted	0	no	0.510	0.002	0.002	0.500		0.001	General
C2-14	Patch	cvu_0022	Depleted	0	no	0.500	0.023	0.023	0.850	0.800	0.020	501535 Ben Major Grevillea *Grevillea floripendula*
										0.800	0.020	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.800	0.020	507308 Rough Wattle *Acacia aspera subsp. parviceps*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
C2-15	Patch	cvu_0022	Depleted	12	no	0.460	1.599	1.599	0.640	0.635	1.203	501535 Ben Major Grevillea *Grevillea floripendula*
										0.635	1.203	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.635	1.203	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-16	Patch	cvu_0022	Depleted	19	no	0.420	1.283	1.283	0.517	0.646	0.887	501535 Ben Major Grevillea *Grevillea floripendula*
										0.647	0.887	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.571	0.891	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-17	Patch	cvu_0022	Depleted	16	no	0.470	0.939	0.939	0.684	0.601	0.707	501535 Ben Major Grevillea *Grevillea floripendula*
										0.601	0.707	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.601	0.707	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-18	Patch	vvp_0022	Depleted	0	no	0.500	0.145	0.145	0.720	0.680	0.122	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-19	Patch	cvu_0022	Depleted	5	no	0.430	1.673	1.673	0.843	0.650	1.187	501535 Ben Major Grevillea *Grevillea floripendula*
										0.650	1.187	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.650	1.187	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-20	Patch	cvu_0022	Depleted	10	no	0.370	0.569	0.569	0.550	0.575	0.332	501535 Ben Major Grevillea *Grevillea floripendula*
C2-21	Patch	cvu_0022	Depleted	1	no	0.680	0.114	0.114	0.586	0.727	0.134	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.064	0.132	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-22	Patch	cvu_0022	Depleted	10	no	0.470	0.420	0.420	0.480	0.454	0.287	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.257	0.271	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-23	Patch	cvu_0022	Depleted	22	no	0.500	1.226	1.226	0.800	0.800	1.103	501535 Ben Major Grevillea *Grevillea floripendula*
										0.754	1.075	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.667	1.083	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-24	Patch	cvu_0022	Depleted	8	no	0.520	1.622	1.622	0.602	0.685	1.421	501535 Ben Major Grevillea *Grevillea floripendula*
										0.675	1.413	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.675	1.413	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-25	Patch	cvu_0022	Depleted	4	no	0.510	0.335	0.335	0.603	0.600	0.273	501535 Ben Major Grevillea *Grevillea floripendula*
C2-26	Patch	cvu_0022	Depleted	16	no	0.330	0.972	0.972	0.496	0.642	0.527	501535 Ben Major Grevillea *Grevillea floripendula*
										0.658	0.532	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.244	0.524	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-27	Patch	cvu_0022	Depleted	22	no	0.310	0.791	0.791	0.498	0.591	0.390	501535 Ben Major Grevillea *Grevillea floripendula*
										0.588	0.390	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.550	0.390	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-28	Patch	cvu_0022	Depleted	2	no	0.370	0.146	0.146	0.480		0.060	General
C2-29	Patch	cvu_0175	Endangered	2	no	0.360	0.335	0.335	0.820	0.590	0.192	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-30	Patch	cvu_0175	Endangered	0	no	0.500	0.001	0.001	0.692		0.001	General
C2-31	Patch	cvu_0175	Endangered	1	no	0.360	0.523	0.523	0.844		0.260	General
C2-32	Patch	cvu_0175	Endangered	0	no	0.300	0.049	0.049	0.623		0.018	General
C2-33	Patch	cvu_0175	Endangered	0	no	0.320	0.045	0.045	0.230		0.013	General
C2-34	Patch	cvu_0175	Endangered	1	no	0.480	0.024	0.024	0.210		0.010	General
C2-35	Patch	cvu_0175	Endangered	8	no	0.510	0.449	0.449	0.500	0.682	0.386	501535 Ben Major Grevillea *Grevillea floripendula*
C2-36	Patch	cvu_0175	Endangered	4	no	0.420	0.320	0.320	0.282		0.129	General
C2-37	Patch	vvp_0175	Endangered	11	no	0.520	1.000	1.000	0.555	0.703	0.886	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-38	Patch	cvu_0175	Endangered	0	no	0.580	0.096	0.096	0.780	0.718	0.096	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-39	Patch	vvp_0175	Endangered	2	no	0.640	0.223	0.223	0.790		0.192	General
C2-40	Patch	cvu_0175	Endangered	0	no	0.560	0.021	0.021	0.500	0.680	0.020	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-41	Patch	cvu_0175	Endangered	0	no	0.590	0.098	0.098	0.500	0.631	0.094	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
C2-42	Patch	vvp_0175	Endangered	1	no	0.230	0.052	0.052	0.490		0.013	General
C2-43	Patch	cvu_0175	Endangered	14	no	0.550	0.657	0.657	0.566	0.682	0.608	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-44	Patch	vvp_0175	Endangered	0	no	0.490	0.060	0.060	0.768		0.039	General
C2-45	Patch	cvu_0020	Least Concern	19	no	0.580	1.326	1.326	0.572	0.621	1.247	501535 Ben Major Grevillea *Grevillea floripendula*
										0.670	1.284	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.670	1.284	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-46	Patch	cvu_0020	Least Concern	0	no	0.530	0.020	0.020	0.640	0.709	0.018	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.709	0.018	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-47	Patch	cvu_0020	Least Concern	0	no	0.430	0.122	0.122	0.640	0.711	0.090	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.711	0.090	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-48	Patch	cvu_0020	Least Concern	1	no	0.150	0.112	0.112	0.568	0.690	0.028	501535 Ben Major Grevillea *Grevillea floripendula*
										0.689	0.028	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.689	0.028	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-49	Patch	cvu_0020	Least Concern	1	no	0.610	0.156	0.156	0.580	0.720	0.164	501535 Ben Major Grevillea *Grevillea floripendula*
										0.705	0.163	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.705	0.163	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-50	Patch	cvu_0020	Least Concern	14	no	0.520	1.031	1.031	0.580	0.584	0.849	501535 Ben Major Grevillea *Grevillea floripendula*
										0.586	0.850	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.586	0.850	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-51	Patch	cvu_0020	Least Concern	0	no	0.200	0.382	0.382	0.489	0.657	0.127	501535 Ben Major Grevillea *Grevillea floripendula*
										0.636	0.125	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.636	0.125	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-52	Patch	cvu_0020	Least Concern	1	no	0.590	0.116	0.116	0.633	0.682	0.116	501535 Ben Major Grevillea *Grevillea floripendula*
										0.682	0.116	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.682	0.116	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-53	Patch	cvu_0022	Depleted	0	no	0.600	0.082	0.082	0.851	0.811	0.089	501535 Ben Major Grevillea *Grevillea floripendula*
										0.811	0.089	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.811	0.089	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-54	Patch	cvu_0022	Depleted	1	no	0.650	5.112	5.112	0.839	0.813	6.026	501535 Ben Major Grevillea *Grevillea floripendula*
										0.814	6.027	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.814	6.027	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-55	Patch	cvu_0022	Depleted	0	no	0.520	0.000	0.000	0.850	0.800	0.000	501535 Ben Major Grevillea *Grevillea floripendula*
										0.800	0.000	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.800	0.000	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-56	Patch	cvu_0022	Depleted	6	no	0.660	3.522	3.522	0.872	0.787	4.153	501535 Ben Major Grevillea *Grevillea floripendula*
										0.787	4.153	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.787	4.153	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-57	Patch	cvu_0125	Endangered	0	no	0.400	0.020	0.020	0.220		0.007	General
C2-58	Patch	cvu_0125	Endangered	0	no	0.150	0.174	0.174	0.229		0.024	General
C2-59	Patch	cvu_0125	Endangered	0	no	0.150	0.017	0.017	0.400		0.003	General
C2-60	Patch	cvu_0125	Endangered	0	no	0.590	0.027	0.027	0.640	0.700	0.027	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.700	0.027	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-61	Patch	cvu_0125	Endangered	0	no	0.540	0.003	0.003	0.640	0.600	0.002	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-62	Patch	cvu_0125	Endangered	0	no	0.540	0.017	0.017	0.660	0.677	0.016	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-63	Patch	vvp_0125	Endangered	0	no	0.530	0.058	0.058	0.700		0.039	General

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
C2-64	Patch	cvu_0647	Endangered	0	no	0.500	0.129	0.129	0.640	0.621	0.105	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-65	Patch	cvu_0647	Endangered	0	no	0.540	0.081	0.081	0.640	0.630	0.072	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-66	Patch	cvu_0067	Endangered	0	no	0.520	0.028	0.028	0.570	0.730	0.025	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.025	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-67	Patch	cvu_0067	Endangered	0	no	0.420	0.095	0.095	0.670	0.590	0.063	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-68	Patch	cvu_0067	Endangered	0	no	0.200	0.211	0.211	0.533	0.596	0.067	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-69	Patch	cvu_0022	Depleted	0	no	0.190	0.244	0.244	0.743	0.626	0.075	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.005	0.076	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-70	Patch	cvu_0022	Depleted	0	no	0.130	0.159	0.159	0.610	0.619	0.033	501535 Ben Major Grevillea *Grevillea floripendula*
C2-71	Patch	cvu_0022	Depleted	0	no	0.290	0.023	0.023	0.480		0.007	General
C2-72	Patch	cvu_0175	Endangered	0	no	0.300	0.132	0.132	0.230		0.037	General
C2-73	Patch	cvu_0175	Endangered	0	no	0.300	0.021	0.021	0.210		0.006	General
C2-74	Patch	cvu_0175	Endangered	0	no	0.120	0.145	0.145	0.500		0.020	General
C2-75	Patch	vvp_0175	Endangered	0	no	0.410	1.692	1.692	0.780		0.926	General
C2-76	Patch	cvu_0175	Endangered	0	no	0.170	0.079	0.079	0.527	0.620	0.022	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
C2-77	Patch	cvu_0175	Endangered	0	no	0.170	0.052	0.052	0.528	0.613	0.014	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-78	Patch	cvu_0020	Least Concern	1	no	0.160	6.708	6.708	0.572	0.583	1.699	501535 Ben Major Grevillea *Grevillea floripendula*
										0.558	1.710	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.558	1.710	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-79	Patch	cvu_0020	Least Concern	0	no	0.150	4.264	4.264	0.490	0.585	1.013	501535 Ben Major Grevillea *Grevillea floripendula*
										0.560	0.998	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.537	0.996	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-80	Patch	cvu_0047	Vulnerable	0	no	0.480	0.124	0.124	0.770		0.079	General
C2-81	Patch	cvu_0047	Vulnerable	0	no	0.610	0.436	0.436	0.650	0.648	0.438	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.210	0.436	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-82	Patch	cvu_0125	Endangered	0	no	0.377	0.036	0.036	0.850		0.019	General
C2-83	Patch	wet_0000	Endangered	0	no	0.377	0.310	0.310	0.454	0.597	0.187	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-84	Patch	wet_0000	Endangered	0	no	0.328	0.320	0.320	0.503	0.668	0.175	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-85	Patch	wet_0000	Endangered	1	no	0.427	1.335	1.335	0.567		0.670	General
C2-86	Patch	cvu_0175	Endangered	0	no	0.170	0.000	0.000	0.504	0.674	0.000	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
C2-87	Patch	cvu_0020	Least Concern	0	no	0.150	0.021	0.021	0.480	0.640	0.005	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-88	Patch	cvu_0022	Depleted	1	no	0.470	0.087	0.087	0.480	0.640	0.067	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-89	Patch	vvp_0653	Endangered	0	no	0.340	0.010	0.010	0.580		0.004	General
C2-90	Canopy Tree	cvu_0175	Endangered	1	no	0.420	0.070	0.041	0.500		0.019	General
C2-91	Canopy Tree	cvu_0175	Endangered	1	no	0.420	0.070	0.022	0.500		0.010	General
C2-92	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.070	0.500		0.016	General
C2-93	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.070	0.500		0.016	General
C2-94	Canopy Tree	cvu_0020	Least Concern	1	no	0.580	0.070	0.054	0.640	0.680	0.053	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.680	0.053	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-95	Canopy Tree	cvu_0022	Depleted	1	no	0.500	0.070	0.063	0.730	0.740	0.054	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.740	0.054	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-96	Canopy Tree	cvu_0020	Least Concern	1	no	0.580	0.070	0.056	0.500	0.580	0.051	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.580	0.051	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-97	Canopy Tree	cvu_0022	Depleted	1	no	0.370	0.070	0.042	0.500	0.530	0.024	501535 Ben Major Grevillea *Grevillea floripendula*
C2-98	Canopy Tree	cvu_0022	Depleted	1	no	0.370	0.070	0.016	0.500	0.588	0.009	501535 Ben Major Grevillea *Grevillea floripendula*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
C2-99	Canopy Tree	cvu_0022	Depleted	1	no	0.660	0.070	0.047	0.890	0.813	0.056	501535 Ben Major Grevillea *Grevillea floripendula*
										0.813	0.056	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.813	0.056	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-100	Canopy Tree	cvu_0020	Least Concern	1	no	0.580	0.070	0.019	0.500	0.620	0.018	501535 Ben Major Grevillea *Grevillea floripendula*
										0.620	0.018	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.620	0.018	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-101	Canopy Tree	cvu_0020	Least Concern	1	no	0.580	0.070	0.037	0.500	0.629	0.035	501535 Ben Major Grevillea *Grevillea floripendula*
										0.629	0.035	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.629	0.035	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-102	Canopy Tree	cvu_0175	Endangered	1	no	0.580	0.070	0.045	0.780	0.703	0.045	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-103	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.068	0.480	0.540	0.021	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.540	0.021	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-104	Canopy Tree	cvu_0022	Depleted	1	no	0.470	0.070	0.030	0.480	0.330	0.019	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.330	0.019	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-105	Canopy Tree	cvu_0022	Depleted	1	no	0.470	0.070	0.067	0.519	0.438	0.045	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.344	0.045	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-106	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.070	0.750	0.730	0.083	501535 Ben Major Grevillea *Grevillea floripendula*
										0.730	0.083	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-107	Scattered Tree	cvu_0175	Endangered	1	no	0.200	0.070	0.070	0.416	0.480	0.021	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-108	Canopy Tree	cvu_0022	Depleted	1	no	0.430	0.070	0.024	0.900	0.730	0.018	501535 Ben Major Grevillea *Grevillea floripendula*
										0.730	0.018	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.018	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-109	Canopy Tree	cvu_0022	Depleted	1	no	0.430	0.070	0.049	0.900	0.730	0.036	501535 Ben Major Grevillea *Grevillea floripendula*
										0.730	0.036	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.036	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-110	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.047	0.560	0.730	0.055	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-111	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.034	0.560	0.730	0.040	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-112	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.067	0.680	0.780	0.081	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.135	0.081	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-113	Canopy Tree	cvu_0022	Depleted	1	no	0.470	0.070	0.065	0.860	0.591	0.049	501535 Ben Major Grevillea *Grevillea floripendula*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.591	0.049	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.591	0.049	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-114	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.051	0.680		0.044	General
C2-115	Canopy Tree	cvu_0067	Endangered	1	no	0.300	0.070	0.049	0.657	0.655	0.024	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-116	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.028	0.680		0.024	General
C2-117	Canopy Tree	cvu_0022	Depleted	1	no	0.680	0.070	0.044	0.680		0.038	General
C2-118	Canopy Tree	cvu_0022	Depleted	1	no	0.460	0.070	0.028	0.620	0.574	0.021	501535 Ben Major Grevillea *Grevillea floripendula*
										0.574	0.021	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.574	0.021	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-119	Canopy Tree	cvu_0022	Depleted	1	no	0.460	0.070	0.025	0.620	0.570	0.018	501535 Ben Major Grevillea *Grevillea floripendula*
										0.570	0.018	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.570	0.018	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-120	Canopy Tree	cvu_0022	Depleted	1	no	0.420	0.070	0.060	0.470	0.600	0.040	501535 Ben Major Grevillea *Grevillea floripendula*
										0.627	0.041	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-121	Canopy Tree	cvu_0020	Least Concern	1	no	0.590	0.070	0.042	0.880	0.730	0.043	501535 Ben Major Grevillea *Grevillea floripendula*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.730	0.043	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.043	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-122	Canopy Tree	cvu_0020	Least Concern	1	no	0.590	0.070	0.058	0.880	0.730	0.059	501535 Ben Major Grevillea *Grevillea floripendula*
										0.730	0.059	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.059	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-123	Canopy Tree	cvu_0022	Depleted	1	no	0.520	0.070	0.040	0.710	0.710	0.036	501535 Ben Major Grevillea *Grevillea floripendula*
										0.703	0.036	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.703	0.036	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-124	Canopy Tree	cvu_0022	Depleted	1	no	0.520	0.070	0.029	0.570	0.684	0.026	501535 Ben Major Grevillea *Grevillea floripendula*
										0.684	0.026	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.684	0.026	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-125	Canopy Tree	cvu_0022	Depleted	1	no	0.520	0.070	0.051	0.570	0.687	0.045	501535 Ben Major Grevillea *Grevillea floripendula*
										0.687	0.045	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.687	0.045	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-126	Scattered Tree	vvp_0896	Endangered	1	no	0.200	0.070	0.066	0.730		0.017	General

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
C2-127	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.057	0.500	0.566	0.018	501535 Ben Major Grevillea *Grevillea floripendula*
										0.566	0.018	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.566	0.018	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-128	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.067	0.500	0.610	0.022	501535 Ben Major Grevillea *Grevillea floripendula*
										0.610	0.022	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.610	0.022	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-129	Canopy Tree	vvp_0175	Endangered	1	no	0.520	0.070	0.034	0.530	0.712	0.030	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-130	Canopy Tree	vvp_0175	Endangered	1	no	0.520	0.070	0.054	0.530	0.720	0.048	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-131	Canopy Tree	cvu_0022	Depleted	1	no	0.330	0.070	0.045	0.530	0.670	0.025	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-132	Canopy Tree	cvu_0022	Depleted	1	no	0.330	0.070	0.050	0.492	0.616	0.027	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-133	Canopy Tree	cvu_0022	Depleted	1	no	0.330	0.070	0.060	0.530	0.720	0.034	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-134	Canopy Tree	vvp_0175	Endangered	1	no	0.520	0.070	0.057	0.530	0.678	0.050	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-135	Scattered Tree	cvu_0047	Vulnerable	1	no	0.200	0.070	0.038	0.835		0.011	General
C2-136	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.051	0.490	0.645	0.017	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-137	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.050	0.490	0.600	0.016	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

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Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
C2-138	Scattered Tree	vvp_0067	Endangered	1	no	0.200	0.070	0.054	0.490	0.651	0.018	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-139	Scattered Tree	vvp_0067	Endangered	1	no	0.200	0.070	0.036	0.530	0.690	0.012	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-140	Scattered Tree	vvp_0067	Endangered	1	no	0.200	0.070	0.034	0.530	0.684	0.012	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-141	Scattered Tree	vvp_0067	Endangered	1	no	0.200	0.070	0.028	0.530	0.710	0.010	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-142	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.066	0.500	0.680	0.022	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-143	Scattered Tree	vvp_0067	Endangered	1	no	0.200	0.070	0.034	0.530	0.682	0.012	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-144	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.070	0.690		0.018	General
C2-145	Scattered Tree	cvu_0047	Vulnerable	1	no	0.200	0.070	0.070	0.690		0.018	General
C2-146	Scattered Tree	cvu_0047	Vulnerable	0	no	0.200	0.031	0.005	0.690		0.001	General
C2-147	Scattered Tree	cvu_0047	Vulnerable	1	no	0.200	0.070	0.070	0.690		0.018	General
C2-148	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.070	0.670		0.018	General
C2-149	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.070	0.225		0.013	General
C2-150	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.035	0.480	0.643	0.011	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.567	0.011	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-151	Scattered Tree	cvu_0896	Endangered	1	no	0.200	0.070	0.055	0.480	0.490	0.017	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.490	0.017	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-152	Scattered Tree	cvu_0067	Endangered	0	no	0.200	0.031	0.031	0.492	0.606	0.010	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-153	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.015	0.390	0.490	0.004	501535 Ben Major Grevillea *Grevillea floripendula*
										0.490	0.004	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.490	0.004	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-154	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.015	0.390	0.490	0.004	501535 Ben Major Grevillea *Grevillea floripendula*
										0.490	0.004	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.490	0.004	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-155	Scattered Tree	cvu_0896	Endangered	0	no	0.200	0.031	0.031	0.330		0.006	General
C2-156	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.070	0.680	0.574	0.022	501535 Ben Major Grevillea *Grevillea floripendula*
										0.574	0.022	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.574	0.022	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-157	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.045	0.530	0.370	0.012	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-158	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.045	0.530	0.370	0.012	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-159	Scattered Tree	cvu_0020	Least Concern	0	no	0.200	0.031	0.031	0.480	0.580	0.010	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

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Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.580	0.010	507308 Rough Wattle *Acacia aspera subsp. parviceps*
C2-160	Scattered Tree	cvu_0020	Least Concern	1	no	0.200	0.070	0.070	0.480		0.016	General
C2-161	Scattered Tree	cvu_0067	Endangered	0	no	0.200	0.031	0.030	0.530	0.370	0.008	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-162	Scattered Tree	vvp_0067	Endangered	1	no	0.200	0.070	0.070	0.530		0.016	General
C2-163	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.070	0.490	0.640	0.023	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-164	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.070	0.490	0.590	0.022	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
C2-165	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.070	0.070	0.490	0.646	0.023	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Appendix 2: Information about impacts to rare or threatened species' habitats on site

This table lists all rare or threatened species' habitats mapped at the site.

Species common name	Species scientific name	Species number	Conservation status	Group	Habitat impacted	% habitat value affected
Ben Major Grevillea	*Grevillea floripendula*	501535	Vulnerable	Dispersed	Habitat importance map	0.0778
Rough Wattle	*Acacia aspera subsp. parviceps*	507308	Rare	Dispersed	Habitat importance map	0.0366
Emerald-lip Greenhood	*Pterostylis smaragdyna*	503915	Rare	Dispersed	Habitat importance map	0.0060
Large-headed Fireweed	*Senecio macrocarpus*	503116	Endangered	Dispersed	Habitat importance map	0.0049
Wimmera Scentbark	*Eucalyptus sabulosa*	505174	Rare	Dispersed	Habitat importance map	0.0048
Yarra Gum	*Eucalyptus yarraensis*	501326	Rare	Dispersed	Habitat importance map	0.0032
Brush-tailed Phascogale	*Phascogale tapoatafa*	11017	Vulnerable	Dispersed	Habitat importance map	0.0031
Flat Bluebell	*Wahlenbergia planiflora subsp. planiflora*	504064	Vulnerable	Dispersed	Habitat importance map	0.0029
Dwarf Boronia	*Boronia nana var. pubescens*	504278	Rare	Dispersed	Habitat importance map	0.0027
White Sunray	*Leucochrysum albicans subsp. tricolor*	504581	Endangered	Dispersed	Habitat importance map	0.0025
Hairy Correa	*Correa aemula*	500828	Rare	Dispersed	Habitat importance map	0.0025
Tiny Bog-sedge	*Schoenus nanus*	503050	Rare	Dispersed	Habitat importance map	0.0024
Regent Honeyeater	*Anthochaera phrygia*	10603	Critically endangered	Dispersed	Habitat importance map	0.0023
Golden Sun Moth	*Synemon plana*	15021	Critically endangered	Dispersed	Habitat importance map	0.0020
Grey Grass-tree	*Xanthorrhoea glauca subsp. angustifolia*	507229	Endangered	Dispersed	Habitat importance map	0.0020
Brown Toadlet	*Pseudophryne bibronii*	13117	Endangered	Dispersed	Habitat importance map	0.0019
Speckled Warbler	*Chthonicola sagittatus*	10504	Vulnerable	Dispersed	Habitat importance map	0.0017
Eltham Copper	*Paralucia pyrodiscus lucida*	65003	Endangered	Dispersed	Habitat importance map	0.0015

Golden Cowslips	*Diuris behrii*	501061	Vulnerable	Dispersed	Habitat importance map	0.0013
Button Wrinklewort	*Rutidosis leptorhynchoides*	502982	Endangered	Dispersed	Habitat importance map	0.0013
Grampians Bitter-pea	*Daviesia laevis*	504423	Vulnerable	Dispersed	Habitat importance map	0.0013
Plump Swamp Wallaby-grass	*Amphibromus pithogastrus*	503624	Endangered	Dispersed	Habitat importance map	0.0011
Scented Bush-pea	*Pultenaea graveolens*	502849	Vulnerable	Dispersed	Habitat importance map	0.0008
Half-bearded Spear-grass	*Austrostipa hemipogon*	503985	Rare	Dispersed	Habitat importance map	0.0008
Matted Flax-lily	*Dianella amoena*	505084	Endangered	Dispersed	Habitat importance map	0.0006
Pale-flower Crane's-bill	*Geranium sp. 3*	505344	Rare	Dispersed	Habitat importance map	0.0006
Trailing Hop-bush	*Dodonaea procumbens*	501090	Vulnerable	Dispersed	Habitat importance map	0.0005
Arching Flax-lily	*Dianella sp. aff. longifolia (Benambra)*	505560	Vulnerable	Dispersed	Habitat importance map	0.0005
Striped Legless Lizard	*Delma impar*	12159	Endangered	Dispersed	Habitat importance map	0.0005
Brackish Plains Buttercup	*Ranunculus diminutus*	504314	Rare	Dispersed	Habitat importance map	0.0004
One-flower Early Nancy	*Wurmbea uniflora*	503583	Rare	Dispersed	Habitat importance map	0.0004
Purple Diuris	*Diuris punctata*	501084	Vulnerable	Dispersed	Habitat importance map	0.0004
Plains Yam-daisy	*Microseris scapigera s.s.*	504657	Vulnerable	Dispersed	Habitat importance map	0.0004
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*	10498	Vulnerable	Dispersed	Habitat importance map	0.0004
Enfield Grevillea	*Grevillea bedggoodiana*	503743	Vulnerable	Dispersed	Habitat importance map	0.0004
Yellow Watercrown Grass	*Paspalidium flavidum*	507820	Endangered	Dispersed	Habitat importance map	0.0004
Purple Blown-grass	*Lachnagrostis punicea subsp. punicea*	504206	Rare	Dispersed	Habitat importance map	0.0004
Pale Swamp Everlasting	*Coronidium gunnianum*	504655	Vulnerable	Dispersed	Habitat importance map	0.0003
Common Pipewort	*Eriocaulon scariosum*	501218	Rare	Dispersed	Habitat importance map	0.0003
Purple Blown-grass	*Lachnagrostis punicea subsp. filifolia*	504222	Rare	Dispersed	Habitat importance map	0.0003

Snowy Mint-bush	*Prostanthera nivea var. nivea*	502746	Rare	Dispersed	Habitat importance map	0.0003
Brolga	*Grus rubicunda*	10177	Vulnerable	Dispersed	Habitat importance map	0.0002
Lace Monitor	*Varanus varius*	12283	Endangered	Dispersed	Habitat importance map	0.0002
Small Milkwort	*Comesperma polygaloides*	500798	Vulnerable	Dispersed	Habitat importance map	0.0002
Painted Honeyeater	*Grantiella picta*	10598	Vulnerable	Dispersed	Habitat importance map	0.0002
Clover Glycine	*Glycine latrobeana*	501456	Vulnerable	Dispersed	Habitat importance map	0.0002
Fragrant Leek-orchid	*Prasophyllum suaveolens*	504567	Endangered	Dispersed	Habitat importance map	0.0002
Powerful Owl	*Ninox strenua*	10248	Vulnerable	Dispersed	Habitat importance map	0.0002
Small-flower Mat-rush	*Lomandra micrantha subsp. tuberculata*	504711	Rare	Dispersed	Habitat importance map	0.0002
Clumping Golden Moths	*Diuris gregaria*	504887	Endangered	Dispersed	Habitat importance map	0.0002
Forest Bitter-cress	*Cardamine papillata*	505034	Vulnerable	Dispersed	Habitat importance map	0.0002
Growling Grass Frog	*Litoria raniformis*	13207	Endangered	Dispersed	Habitat importance map	0.0001
Swamp Everlasting	*Xerochrysum palustre*	503763	Vulnerable	Dispersed	Habitat importance map	0.0001
Bearded Dragon	*Pogona barbata*	12177	Vulnerable	Dispersed	Habitat importance map	0.0001
Hairy Tails	*Ptilotus erubescens*	502825	Vulnerable	Dispersed	Habitat importance map	0.0001
Spiny Rice-flower	*Pimelea spinescens subsp. spinescens*	504823	Endangered	Dispersed	Habitat importance map	0.0001
Grey Billy-buttons	*Craspedia canens*	504643	Endangered	Dispersed	Habitat importance map	0.0001
Black Falcon	*Falco subniger*	10238	Vulnerable	Dispersed	Habitat importance map	0.0001
Large White Spider-orchid	*Caladenia venusta*	500533	Rare	Dispersed	Habitat importance map	0.0001
Wavy Swamp Wallaby-grass	*Amphibromus sinuatus*	503625	Vulnerable	Dispersed	Habitat importance map	0.0001
Tussock Skink	*Pseudemoia pagenstecheri*	12993	Vulnerable	Dispersed	Habitat importance map	0.0001
Salt Blown-grass	*Lachnagrostis robusta*	504223	Rare	Dispersed	Habitat importance map	0.0001
Branching Groundsel	*Senecio cunninghamii var. cunninghamii*	503104	Rare	Dispersed	Habitat importance map	0.0001

Tough Scurf-pea	*Cullen tenax*	502776	Endangered	Dispersed	Habitat importance map	0.0001
Australasian Shoveler	*Anas rhynchotis*	10212	Vulnerable	Dispersed	Habitat importance map	0.0000
Wind-blown Tussock-grass	*Poa physoclina*	507791	Endangered	Dispersed	Habitat importance map	0.0000
Western Peppermint	*Eucalyptus falciformis*	505358	Rare	Dispersed	Habitat importance map	0.0000
Austral Tobacco	*Nicotiana suaveolens*	502275	Rare	Dispersed	Habitat importance map	0.0000
Hardhead	*Aythya australis*	10215	Vulnerable	Dispersed	Habitat importance map	0.0000
Lewin's Rail	*Lewinia pectoralis pectoralis*	10045	Vulnerable	Dispersed	Habitat importance map	0.0000
Tremont Bundy	*Eucalyptus aff. goniocalyx (Dandenong Ranges)*	507008	Vulnerable	Dispersed	Habitat importance map	0.0000
Fine-hairy Spear-grass	*Austrostipa puberula*	503988	Rare	Dispersed	Habitat importance map	0.0000
Swift Parrot	*Lathamus discolor*	10309	Endangered	Dispersed	Habitat importance map	0.0000
White-throated Needletail	*Hirundapus caudacutus*	10334	Vulnerable	Dispersed	Habitat importance map	0.0000
Button Immortelle	*Leptorhynchos waitzia*	501949	Vulnerable	Dispersed	Habitat importance map	0.0000
Elegant Parrot	*Neophema elegans*	10307	Vulnerable	Dispersed	Habitat importance map	0.0000
Southern Swainson-pea	*Swainsona behriana*	504944	Rare	Dispersed	Habitat importance map	0.0000
Square-tailed Kite	*Lophoictinia isura*	10230	Vulnerable	Dispersed	Habitat importance map	0.0000

Habitat group

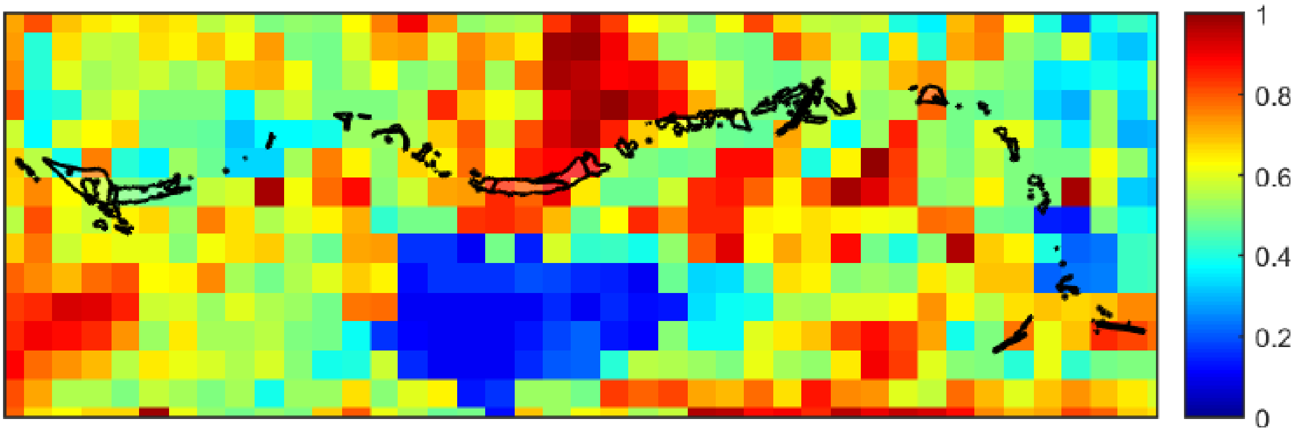
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

Habitat impacted

- Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species
- Top ranking maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat, developed from the highest habitat importance scores in dispersed species habitat maps and selected VBA records
- Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc.

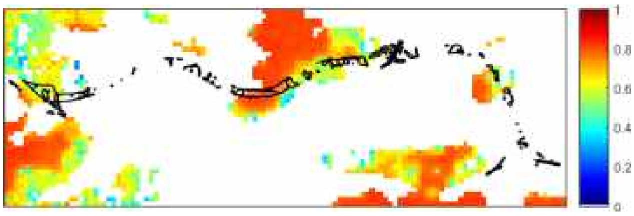
Appendix 3 – Images of mapped native vegetation

2. Strategic biodiversity values map

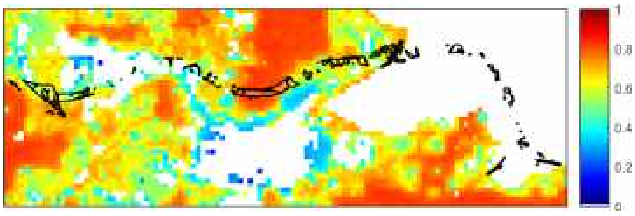


3. Habitat importance maps

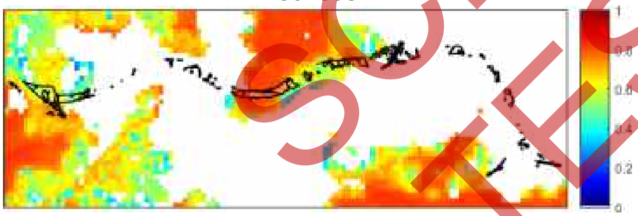
Ben Major Grevillea
Grevillea floripendula
501535



Emerald-lip Greenhood
Pterostylis smaragdyna
503915



Rough Wattle
Acacia aspera subsp. parviceps
507308



Native vegetation removal report

This report provides information to support an application to remove, destroy or lop native vegetation in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation*. The report **is not an assessment by DELWP** of the proposed native vegetation removal. Native vegetation information and offset requirements have been determined using spatial data provided by the applicant or their consultant.

Date of issue: **28/07/2021**
Time of issue: **2:54 pm**

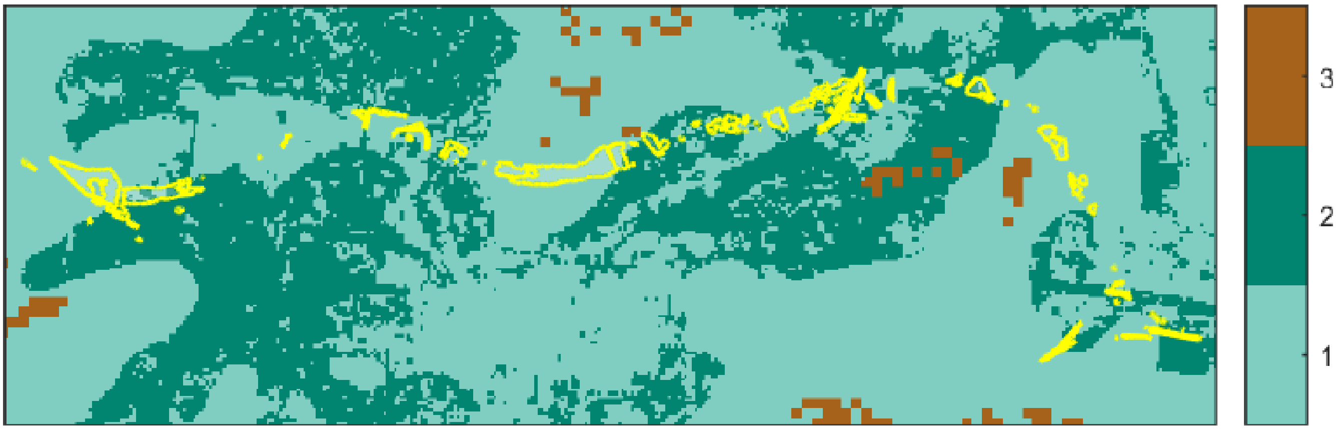
Report ID: WSP_2021_020

Project ID	WSP_EnSym_Beaufort_July2021

Assessment pathway

Assessment pathway	**Detailed Assessment Pathway**
Extent including past and proposed	50.714 ha
Extent of past removal	0.000 ha
Extent of proposed removal	50.714 ha
No. Large trees proposed to be removed	348
Location category of proposed removal	Location 2 The native vegetation is in an area mapped as an endangered Ecological Vegetation Class (as per the statewide EVC map). Removal of less than 0.5 hectares of native vegetation in this location will not have a significant impact on any habitat for a rare or threatened species.

1. Location map



Offset requirements if a permit is granted

Any approval granted will include a condition to obtain an offset that meets the following requirements:

General offset amount[1]	2.041 general habitat units
Vicinity	Glenelg Hopkins Catchment Management Authority (CMA) or Pyrenees Shire Council
Minimum strategic biodiversity value score[2]	0.489
Large trees*	19 large trees
Species offset amount[3]	27.002 species units of habitat for Ben Major Grevillea, *Grevillea floripendula* 32.250 species units of habitat for Emerald-lip Greenhood, *Pterostylis smaragdyna* 28.002 species units of habitat for Rough Wattle, *Acacia aspera subsp. parviceps*
Large trees*	329 trees
*** The total number of large trees that the offset must protect**	348 large trees to be protected in either the general, species or combination across all habitat units protected

NB: values within tables in this document may not add to the totals shown above due to rounding

Appendix 1 includes information about the native vegetation to be removed

Appendix 2 includes information about the rare or threatened species mapped at the site.

Appendix 3 includes maps showing native vegetation to be removed and extracts of relevant species habitat importance maps

1 The general offset amount required is the sum of all general habitat units in Appendix 1.

2 Minimum strategic biodiversity score is 80 per cent of the weighted average score across habitat zones where a general offset is required

3 The species offset amount(s) required is the sum of all species habitat units in Appendix 1.

Next steps

Any proposal to remove native vegetation must meet the application requirements of the Detailed Assessment Pathway and it will be assessed under the Detailed Assessment Pathway.

If you wish to remove the mapped native vegetation you are required to apply for a permit from your local council. Council will refer your application to DELWP for assessment, as required. **This report is not a referral assessment by DELWP.**

This *Native vegetation removal report* must be submitted with your application for a permit to remove, destroy or lop native vegetation.

Refer to the *Guidelines for the removal, destruction or lopping of native* vegetation (the Guidelines) for a full list of application requirements This report provides information that meets the following application requirements:

- The assessment pathway and reason for the assessment pathway
- A description of the native vegetation to be removed (partly met)
- Maps showing the native vegetation and property (partly met)
- Information about the impacts on rare or threatened species.
- The offset requirements determined in accordance with section 5 of the Guidelines that apply if approval is granted to remove native vegetation.

Additional application requirements must be met including:

- Topographical and land information
- Recent dated photographs
- Details of past native vegetation removal
- An avoid and minimise statement
- A copy of any Property Vegetation Plan that applies
- A defendable space statement as applicable
- A statement about the Native Vegetation Precinct Plan as applicable
- A site assessment report including a habitat hectare assessment of any patches of native vegetation and details of trees
- An offset statement that explains that an offset has been identified and how it will be secured.

Appendix 1: Description of native vegetation to be removed

The species-general offset test was applied to your proposal. This test determines if the proposed removal of native vegetation has a proportional impact on any rare or threatened species habitats above the species offset threshold. The threshold is set at 0.005 per cent of the mapped habitat value for a species. When the proportional impact is above the species offset threshold a species offset is required. This test is done for all species mapped at the site. Multiple species offsets will be required if the species offset threshold is exceeded for multiple species.

Where a zone requires species offset(s), the species habitat units for each species in that zone is calculated by the following equation in accordance with the Guidelines:

Species habitat units = extent x condition x species landscape factor x 2, where the species landscape factor = 0.5 + (habitat importance score/2)

The species offset amount(s) required is the sum of all species habitat units per zone

Where a zone does not require a species offset, the general habitat units in that zone is calculated by the following equation in accordance with the Guidelines:

General habitat units = extent x condition x general landscape factor x 1.5, where the general landscape factor = 0.5 + (strategic biodiversity value score/2)

The general offset amount required is the sum of all general habitat units per zone.

Native vegetation to be removed

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
3-A	Patch	vvp_0047	Endangered	0	no	0.400	1.529	1.529	0.773		0.813	General
4-A	Patch	cvu_0047	Endangered	1	no	0.600	0.060	0.060	0.530	0.709	0.062	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
5-A	Patch	vvp_0047	Endangered	0	no	0.610	0.060	0.060	0.768		0.049	General
8-A	Patch	vvp_0047	Endangered	2	no	0.630	0.216	0.216	0.790		0.183	General
9-A	Patch	cvu_0047	Endangered	10	no	0.590	1.722	1.722	0.712	0.759	1.787	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.006	1.837	507308 Rough Wattle *Acacia aspera subsp. parviceps*
10-A	Patch	vvp_0047	Endangered	0	no	0.520	0.007	0.007	0.740		0.005	General
11-A	Patch	vvp_0047	Endangered	1	no	0.270	0.067	0.067	0.490		0.020	General
18-A	Patch	cvu_0047	Endangered	1	no	0.530	0.023	0.023	0.210		0.011	General
19-A	Patch	cvu_0047	Endangered	0	no	0.370	0.042	0.042	0.230		0.014	General

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
22-A	Patch	cvu_0047	Endangered	0	no	0.510	0.002	0.002	0.692		0.001	General
24-A	Patch	cvu_0047	Endangered	0	no	0.500	0.003	0.003	0.530		0.001	General
28-A	Patch	cvu_0022	Depleted	5	no	0.610	0.490	0.490	0.500	0.647	0.492	501535 Ben Major Grevillea *Grevillea floripendula*
29-A	Patch	cvu_0022	Depleted	16	no	0.440	0.909	0.909	0.530	0.591	0.637	501535 Ben Major Grevillea *Grevillea floripendula*
33-A	Patch	cvu_0136	Vulnerable	0	no	0.666	0.350	0.350	0.520	0.678	0.391	501535 Ben Major Grevillea *Grevillea floripendula*
										0.663	0.387	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.663	0.387	507308 Rough Wattle *Acacia aspera subsp. parviceps*
34-A	Patch	cvu_0125	Endangered	0	no	0.396	0.014	0.014	0.480	0.500	0.008	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
35-A	Patch	cvu_0125	Endangered	0	no	0.516	0.002	0.002	0.640	0.750	0.002	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.750	0.002	507308 Rough Wattle *Acacia aspera subsp. parviceps*
36-A	Patch	cvu_0125	Endangered	0	no	0.516	0.052	0.052	0.507	0.621	0.044	501535 Ben Major Grevillea *Grevillea floripendula*
										0.621	0.044	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.621	0.044	507308 Rough Wattle *Acacia aspera subsp. parviceps*
37-A	Patch	cvu_0125	Endangered	0	no	0.366	0.003	0.003	0.820		0.001	General
38-A	Patch	cvu_0125	Endangered	0	no	0.168	0.015	0.015	0.640	0.560	0.004	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
39-A	Patch	cvu_0125	Endangered	0	no	0.337	0.077	0.077	0.580	0.500	0.039	501535 Ben Major Grevillea *Grevillea floripendula*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.500	0.039	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.500	0.039	507308 Rough Wattle *Acacia aspera subsp. parviceps*
42-A	Patch	cvu_0125	Endangered	0	no	0.560	0.018	0.018	0.780	0.670	0.017	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
43-A	Patch	cvu_0125	Endangered	0	no	0.288	0.494	0.494	0.548	0.425	0.202	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
44-A	Patch	cvu_0125	Endangered	0	no	0.396	0.010	0.010	0.490	0.605	0.006	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
45-A	Patch	cvu_0125	Endangered	0	no	0.652	0.029	0.029	0.850	0.790	0.034	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.790	0.034	507308 Rough Wattle *Acacia aspera subsp. parviceps*
46-A	Patch	cvu_0067	Endangered	0	no	0.220	0.016	0.016	0.370		0.004	General
47-A	Patch	cvu_0020	Least Concern	14	no	0.530	1.031	1.031	0.580	0.584	0.866	501535 Ben Major Grevillea *Grevillea floripendula*
										0.586	0.867	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.586	0.867	507308 Rough Wattle *Acacia aspera subsp. parviceps*
48-A	Patch	cvu_0020	Least Concern	1	no	0.530	0.162	0.162	0.580	0.720	0.148	501535 Ben Major Grevillea *Grevillea floripendula*
										0.705	0.147	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.705	0.147	507308 Rough Wattle *Acacia aspera subsp. parviceps*
49-A	Patch	cvu_0020	Least Concern	1	no	0.190	0.092	0.092	0.567	0.690	0.030	501535 Ben Major Grevillea *Grevillea floripendula*
										0.689	0.030	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.689	0.030	507308 Rough Wattle *Acacia aspera subsp. parviceps*
50-A	Patch	cvu_0020	Least Concern	0	no	0.240	0.004	0.004	0.500	0.610	0.001	501535 Ben Major Grevillea *Grevillea floripendula*
										0.610	0.001	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.610	0.001	507308 Rough Wattle *Acacia aspera subsp. parviceps*
54-A	Patch	cvu_0175	Endangered	6	no	0.550	0.289	0.289	0.500	0.683	0.268	501535 Ben Major Grevillea *Grevillea floripendula*
55-A	Patch	cvu_0175	Endangered	4	no	0.470	0.262	0.262	0.252		0.116	General
57-A	Patch	cvu_0022	Depleted	0	no	0.370	0.011	0.011	0.480		0.005	General
60-A	Patch	cvu_0022	Depleted	22	no	0.320	0.765	0.765	0.498	0.592	0.390	501535 Ben Major Grevillea *Grevillea floripendula*
										0.589	0.389	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.549	0.390	507308 Rough Wattle *Acacia aspera subsp. parviceps*
63-A	Patch	cvu_0022	Depleted	9	no	0.530	0.746	0.746	0.601	0.635	0.647	501535 Ben Major Grevillea *Grevillea floripendula*
65-A	Patch	cvu_0125	Endangered	0	no	0.170	0.319	0.319	0.503	0.668	0.090	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
66-A	Patch	vvp_0125	Endangered	0	no	0.160	0.466	0.466	0.559		0.087	General
69-A	Patch	cvu_0125	Endangered	0	no	0.160	0.077	0.077	0.370		0.013	General
70-A	Patch	cvu_0175	Endangered	0	no	0.350	0.043	0.043	0.210		0.014	General
71-A	Patch	cvu_0175	Endangered	0	no	0.350	0.117	0.117	0.230		0.038	General
77-A	Patch	cvu_0067	Endangered	0	no	0.140	0.226	0.226	0.534	0.593	0.050	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
79-A	Patch	cvu_0022	Depleted	0	no	0.220	0.527	0.527	0.605	0.638	0.190	501535 Ben Major Grevillea *Grevillea floripendula*
80-A	Patch	vvp_0125	Endangered	0	no	0.451	0.252	0.252	0.700		0.145	General
82-A	Patch	cvu_0647	Endangered	0	no	0.570	0.030	0.030	0.640	0.630	0.027	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
83-A	Patch	vvp_0125	Endangered	0	no	0.441	0.058	0.058	0.700		0.033	General
84-A	Patch	cvu_0067	Endangered	0	no	0.600	0.019	0.019	0.610	0.730	0.020	501535 Ben Major Grevillea *Grevillea floripendula*
										0.717	0.019	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.717	0.019	507308 Rough Wattle *Acacia aspera subsp. parviceps*
85-A	Patch	cvu_0067	Endangered	0	no	0.660	0.122	0.122	0.609	0.730	0.139	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
87-A	Patch	cvu_0022	Depleted	0	no	0.570	0.006	0.006	0.860	0.650	0.006	501535 Ben Major Grevillea *Grevillea floripendula*
										0.650	0.006	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.650	0.006	507308 Rough Wattle *Acacia aspera subsp. parviceps*
90-A	Patch	cvu_0067	Endangered	0	no	0.480	0.009	0.009	0.610	0.730	0.007	501535 Ben Major Grevillea *Grevillea floripendula*
										0.730	0.007	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.730	0.007	507308 Rough Wattle *Acacia aspera subsp. parviceps*
91-A	Patch	cvu_0125	Endangered	1	no	0.554	0.033	0.033	0.640	0.695	0.031	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.695	0.031	507308 Rough Wattle *Acacia aspera subsp. parviceps*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
92-A	Patch	cvu_0020	Least Concern	1	no	0.420	0.138	0.138	0.640	0.710	0.099	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.710	0.099	507308 Rough Wattle *Acacia aspera subsp. parviceps*
96-A	Patch	cvu_0022	Depleted	0	no	0.230	0.042	0.042	0.480	0.640	0.016	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
98-A	Patch	cvu_0047	Vulnerable	0	no	0.370	0.006	0.006	0.690		0.003	General
100-A	Patch	cvu_0022	Depleted	0	no	0.670	0.008	0.008	0.980	0.770	0.010	501535 Ben Major Grevillea *Grevillea floripendula*
										0.770	0.010	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.770	0.010	507308 Rough Wattle *Acacia aspera subsp. parviceps*
103-A	Patch	cvu_0047	Endangered	0	no	0.370	0.001	0.001	0.815		0.000	General
106-A	Patch	cvu_0022	Depleted	2	no	0.530	0.141	0.141	0.620	0.580	0.118	501535 Ben Major Grevillea *Grevillea floripendula*
										0.580	0.118	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.580	0.118	507308 Rough Wattle *Acacia aspera subsp. parviceps*
108-A	Patch	cvu_0022	Depleted	0	no	0.500	0.009	0.009	0.560	0.620	0.007	501535 Ben Major Grevillea *Grevillea floripendula*
										0.620	0.007	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.620	0.007	507308 Rough Wattle *Acacia aspera subsp. parviceps*
109-A	Patch	cvu_0022	Depleted	25	no	0.570	1.354	1.354	0.739	0.615	1.247	501535 Ben Major Grevillea *Grevillea floripendula*
										0.615	1.247	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.615	1.247	507308 Rough Wattle *Acacia aspera subsp. parviceps*
110-A	Patch	cvu_0022	Depleted	0	no	0.570	0.045	0.045	0.882	0.691	0.044	501535 Ben Major Grevillea *Grevillea floripendula*
										0.691	0.044	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.691	0.044	507308 Rough Wattle *Acacia aspera subsp. parviceps*
113-A	Patch	cvu_0022	Depleted	0	no	0.530	0.172	0.172	0.523	0.601	0.146	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.601	0.146	507308 Rough Wattle *Acacia aspera subsp. parviceps*
114-A	Patch	cvu_0125	Endangered	0	no	0.160	0.346	0.346	0.480	0.596	0.088	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
116-A	Patch	cvu_0125	Endangered	0	no	0.140	0.015	0.015	0.850		0.003	General
117-A	Patch	cvu_0020	Least Concern	2	no	0.230	4.326	4.326	0.490	0.585	1.577	501535 Ben Major Grevillea *Grevillea floripendula*
										0.562	1.554	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.534	1.551	507308 Rough Wattle *Acacia aspera subsp. parviceps*
118-A	Patch	cvu_0020	Least Concern	0	no	0.230	0.007	0.007	0.573	0.632	0.002	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.632	0.002	507308 Rough Wattle *Acacia aspera subsp. parviceps*
120-A	Patch	cvu_0022	Depleted	1	no	0.630	0.056	0.056	0.595	0.721	0.061	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.143	0.060	507308 Rough Wattle *Acacia aspera subsp. parviceps*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
121-A	Patch	cvu_0022	Depleted	0	no	0.670	0.024	0.024	0.570	0.739	0.028	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.739	0.028	507308 Rough Wattle *Acacia aspera subsp. parviceps*
123-A	Patch	vvp_0022	Depleted	2	no	0.410	0.083	0.083	0.720	0.680	0.057	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
124-A	Scattered Tree	cvu_0022	Depleted	0	no	0.200	0.031	0.031	0.492	0.606	0.010	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
125-A	Scattered Tree	cvu_0047	Endangered	0	no	0.200	0.031	0.023	0.850		0.006	General
126-A	Scattered Tree	cvu_0022	Depleted	0	no	0.200	0.031	0.031	0.520	0.570	0.010	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.570	0.010	507308 Rough Wattle *Acacia aspera subsp. parviceps*
127-A	Scattered Tree	cvu_0022	Depleted	0	no	0.200	0.031	0.031	0.330		0.006	General
128-A	Scattered Tree	cvu_0067	Endangered	0	no	0.200	0.031	0.030	0.530	0.370	0.008	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
129-A	Scattered Tree	cvu_0047	Endangered	0	no	0.200	0.031	0.005	0.690		0.001	General
130-A	Scattered Tree	cvu_0022	Depleted	0	no	0.200	0.031	0.031	0.480	0.580	0.010	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.580	0.010	507308 Rough Wattle *Acacia aspera subsp. parviceps*
131-A	Scattered Tree	cvu_0022	Depleted	1	no	0.200	0.071	0.070	0.490	0.646	0.023	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
132-A	Scattered Tree	cvu_0022	Depleted	1	no	0.200	0.071	0.070	0.490	0.640	0.023	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
133-A	Scattered Tree	cvu_0022	Depleted	1	no	0.200	0.071	0.052	0.490	0.645	0.017	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
134-A	Scattered Tree	cvu_0022	Depleted	1	no	0.200	0.071	0.051	0.490	0.600	0.016	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
135-A	Scattered Tree	cvu_0022	Depleted	1	no	0.200	0.071	0.071	0.490	0.590	0.022	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
152-A	Scattered Tree	cvu_0047	Endangered	1	no	0.200	0.071	0.055	0.490	0.651	0.018	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
136-A	Scattered Tree	cvu_0022	Depleted	1	no	0.200	0.071	0.071	0.520	0.640	0.023	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.640	0.023	507308 Rough Wattle *Acacia aspera subsp. parviceps*
137-A	Scattered Tree	cvu_0047	Endangered	1	no	0.200	0.071	0.071	0.690		0.018	General
138-A	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.071	0.045	0.530	0.370	0.012	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
139-A	Scattered Tree	cvu_0175	Endangered	1	no	0.200	0.071	0.071	0.225		0.013	General
140-A	Scattered Tree	cvu_0047	Endangered	1	no	0.200	0.071	0.071	0.690		0.018	General
141-A	Scattered Tree	cvu_0047	Endangered	1	no	0.200	0.071	0.071	0.690		0.018	General
142-A	Scattered Tree	vvp_0047	Endangered	1	no	0.200	0.071	0.060	0.580		0.014	General
143-A	Scattered Tree	vvp_0047	Endangered	1	no	0.200	0.071	0.071	0.530		0.016	General
144-A	Scattered Tree	cvu_0175	Endangered	1	no	0.200	0.071	0.069	0.500	0.680	0.023	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
145-A	Scattered Tree	cvu_0047	Endangered	1	no	0.200	0.071	0.038	0.835		0.011	General
146-A	Scattered Tree	cvu_0067	Endangered	1	no	0.200	0.071	0.045	0.530	0.370	0.012	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
147-A	Scattered Tree	cvu_0022	Depleted	1	no	0.200	0.071	0.071	0.480		0.016	General
148-A	Scattered Tree	cvu_0047	Endangered	1	no	0.200	0.071	0.071	0.670		0.018	General
149-A	Scattered Tree	cvu_0022	Depleted	1	no	0.200	0.071	0.071	0.500		0.016	General
150-A	Scattered Tree	cvu_0022	Depleted	1	no	0.200	0.071	0.071	0.680	0.574	0.022	501535 Ben Major Grevillea *Grevillea floripendula*
										0.574	0.022	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.574	0.022	507308 Rough Wattle *Acacia aspera subsp. parviceps*
151-A	Canopy Tree	cvu_0022	Depleted	1	no	0.630	0.071	0.071	0.680		0.056	General
59-A	Patch	cvu_0022	Depleted	13	no	0.620	0.549	0.549	0.480	0.491	0.508	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.203	0.467	507308 Rough Wattle *Acacia aspera subsp. parviceps*
53-A	Patch	cvu_0020	Least Concern	25	no	0.620	1.492	1.492	0.570	0.622	1.501	501535 Ben Major Grevillea *Grevillea floripendula*
										0.666	1.542	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.666	1.542	507308 Rough Wattle *Acacia aspera subsp. parviceps*
74-A	Patch	cvu_0175	Endangered	0	no	0.230	0.076	0.076	0.527	0.624	0.028	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
73-A	Patch	cvu_0175	Endangered	0	no	0.230	0.054	0.054	0.528	0.609	0.020	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
86-A	Patch	cvu_0022	Depleted	11	no	0.500	1.846	1.846	0.909	0.707	1.576	501535 Ben Major Grevillea *Grevillea floripendula*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
										0.707	1.576	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.707	1.576	507308 Rough Wattle *Acacia aspera subsp. parviceps*
112-A	Patch	cvu_0022	Depleted	14	no	0.530	1.171	1.171	0.574	0.648	1.023	501535 Ben Major Grevillea *Grevillea floripendula*
										0.650	1.024	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.650	1.024	507308 Rough Wattle *Acacia aspera subsp. parviceps*
32-A	Patch	cvu_0022	Depleted	22	no	0.530	1.326	1.326	0.506	0.642	1.154	501535 Ben Major Grevillea *Grevillea floripendula*
										0.644	1.155	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.519	1.160	507308 Rough Wattle *Acacia aspera subsp. parviceps*
52-A	Patch	cvu_0020	Least Concern	9	no	0.240	0.485	0.485	0.489	0.659	0.193	501535 Ben Major Grevillea *Grevillea floripendula*
										0.634	0.190	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.634	0.190	507308 Rough Wattle *Acacia aspera subsp. parviceps*
61-A	Patch	cvu_0022	Depleted	24	no	0.350	1.272	1.272	0.503	0.642	0.731	501535 Ben Major Grevillea *Grevillea floripendula*
										0.662	0.740	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.186	0.727	507308 Rough Wattle *Acacia aspera subsp. parviceps*
101-A	Patch	cvu_0047	Endangered	15	no	0.520	0.615	0.615	0.554	0.683	0.538	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
30-A	Patch	vvp_0022	Depleted	0	no	0.410	0.069	0.069	0.720	0.680	0.047	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
15-A	Patch	vvp_0047	Endangered	17	no	0.520	1.341	1.341	0.546	0.704	1.188	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
64-A	Patch	vvp_0125	Endangered	0	no	0.160	0.416	0.416	0.564		0.078	General
40-A	Patch	vvp_0653	Endangered	0	no	0.318	0.229	0.229	0.590		0.087	General
76-A	Patch	cvu_0022	Depleted	0	no	0.200	0.420	0.420	0.748	0.621	0.136	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
27-A	Patch	cvu_0047	Vulnerable	3	no	0.510	0.538	0.538	0.676	0.648	0.452	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.172	0.451	507308 Rough Wattle *Acacia aspera subsp. parviceps*
115-A	Patch	cvu_0125	Endangered	0	no	0.140	0.235	0.235	0.698		0.042	General
20-A	Patch	cvu_0047	Endangered	0	no	0.340	0.045	0.045	0.618		0.019	General
17-A	Patch	cvu_0047	Endangered	3	no	0.370	0.855	0.855	0.835	0.590	0.503	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
12-A	Patch	cvu_0047	Endangered	3	no	0.640	0.385	0.385	0.500	0.651	0.407	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
111-A	Patch	cvu_0067	Endangered	4	no	0.280	0.931	0.931	0.647	0.619	0.422	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
81-A	Patch	cvu_0125	Endangered	0	no	0.196	0.169	0.169	0.229		0.030	General
26-A	Patch	cvu_0020	Least Concern	3	no	0.230	6.743	6.743	0.570	0.583	2.455	501535 Ben Major Grevillea *Grevillea floripendula*
										0.557	2.471	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.557	2.471	507308 Rough Wattle *Acacia aspera subsp. parviceps*
1-A	Patch	cvu_0022	Depleted	33	no	0.670	9.218	9.218	0.857	0.809	11.172	501535 Ben Major Grevillea *Grevillea floripendula*

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
										0.810	11.176	503915 Emerald-lip Greenhood *Pterostylis smaragdyna*
										0.800	11.177	507308 Rough Wattle *Acacia aspera subsp. parviceps*

Appendix 2: Information about impacts to rare or threatened species' habitats on site

This table lists all rare or threatened species' habitats mapped at the site.

Species common name	Species scientific name	Species number	Conservation status	Group	Habitat impacted	% habitat value affected
Ben Major Grevillea	*Grevillea floripendula*	501535	Vulnerable	Dispersed	Habitat importance map	0.0753
Rough Wattle	*Acacia aspera subsp. parviceps*	507308	Rare	Dispersed	Habitat importance map	0.0368
Emerald-lip Greenhood	*Pterostylis smaragdyna*	503915	Rare	Dispersed	Habitat importance map	0.0065
Large-headed Fireweed	*Senecio macrocarpus*	503116	Endangered	Dispersed	Habitat importance map	0.0043
Hairy Correa	*Correa aemula*	500828	Rare	Dispersed	Habitat importance map	0.0037
Yarra Gum	*Eucalyptus yarraensis*	501326	Rare	Dispersed	Habitat importance map	0.0034
Brush-tailed Phascogale	*Phascogale tapoatafa*	11017	Vulnerable	Dispersed	Habitat importance map	0.0034
Flat Bluebell	*Wahlenbergia planiflora subsp. planiflora*	504064	Vulnerable	Dispersed	Habitat importance map	0.0030
Dwarf Boronia	*Boronia nana var. pubescens*	504278	Rare	Dispersed	Habitat importance map	0.0029
Regent Honeyeater	*Anthochaera phrygia*	10603	Critically endangered	Dispersed	Habitat importance map	0.0027
Tiny Bog-sedge	*Schoenus nanus*	503050	Rare	Dispersed	Habitat importance map	0.0026
White Sunray	*Leucochrysum albicans subsp. tricolor*	504581	Endangered	Dispersed	Habitat importance map	0.0023
Golden Sun Moth	*Synemon plana*	15021	Critically endangered	Dispersed	Habitat importance map	0.0022
Grey Grass-tree	*Xanthorrhoea glauca subsp. angustifolia*	507229	Endangered	Dispersed	Habitat importance map	0.0020
Brown Toadlet	*Pseudophryne bibronii*	13117	Endangered	Dispersed	Habitat importance map	0.0019
Speckled Warbler	*Chthonicola sagittatus*	10504	Vulnerable	Dispersed	Habitat importance map	0.0018
Eltham Copper	*Paralucia pyrodiscus lucida*	65003	Endangered	Dispersed	Habitat importance map	0.0017
Golden Cowslips	*Diuris behrii*	501061	Vulnerable	Dispersed	Habitat importance map	0.0015

Scented Bush-pea	*Pultenaea graveolens*	502849	Vulnerable	Dispersed	Habitat importance map	0.0014
Grampians Bitter-pea	*Daviesia laevis*	504423	Vulnerable	Dispersed	Habitat importance map	0.0013
Plump Swamp Wallaby-grass	*Amphibromus pithogastrus*	503624	Endangered	Dispersed	Habitat importance map	0.0012
Button Wrinklewort	*Rutidosis leptorhynchoides*	502982	Endangered	Dispersed	Habitat importance map	0.0011
Enfield Grevillea	*Grevillea bedggoodiana*	503743	Vulnerable	Dispersed	Habitat importance map	0.0011
Half-bearded Spear-grass	*Austrostipa hemipogon*	503985	Rare	Dispersed	Habitat importance map	0.0008
Forest Bitter-cress	*Cardamine papillata*	505034	Vulnerable	Dispersed	Habitat importance map	0.0008
Matted Flax-lily	*Dianella amoena*	505084	Endangered	Dispersed	Habitat importance map	0.0007
Pale-flower Crane's-bill	*Geranium sp. 3*	505344	Rare	Dispersed	Habitat importance map	0.0007
Trailing Hop-bush	*Dodonaea procumbens*	501090	Vulnerable	Dispersed	Habitat importance map	0.0006
Arching Flax-lily	*Dianella sp. aff. longifolia (Benambra)*	505560	Vulnerable	Dispersed	Habitat importance map	0.0005
Purple Diuris	*Diuris punctata*	501084	Vulnerable	Dispersed	Habitat importance map	0.0004
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*	10498	Vulnerable	Dispersed	Habitat importance map	0.0004
Brackish Plains Buttercup	*Ranunculus diminutus*	504314	Rare	Dispersed	Habitat importance map	0.0004
Striped Legless Lizard	*Delma impar*	12159	Endangered	Dispersed	Habitat importance map	0.0004
Plains Yam-daisy	*Microseris scapigera s.s.*	504657	Vulnerable	Dispersed	Habitat importance map	0.0004
One-flower Early Nancy	*Wurmbea uniflora*	503583	Rare	Dispersed	Habitat importance map	0.0004
Snowy Mint-bush	*Prostanthera nivea var. nivea*	502746	Rare	Dispersed	Habitat importance map	0.0004
Purple Blown-grass	*Lachnagrostis punicea subsp. punicea*	504206	Rare	Dispersed	Habitat importance map	0.0003
Painted Honeyeater	*Grantiella picta*	10598	Vulnerable	Dispersed	Habitat importance map	0.0003
Pale Swamp Everlasting	*Coronidium gunnianum*	504655	Vulnerable	Dispersed	Habitat importance map	0.0003
Common Pipewort	*Eriocaulon scariosum*	501218	Rare	Dispersed	Habitat importance map	0.0003
Lace Monitor	*Varanus varius*	12283	Endangered	Dispersed	Habitat importance map	0.0002

Purple Blown-grass	*Lachnagrostis punicea subsp. filifolia*	504222	Rare	Dispersed	Habitat importance map	0.0002
Fragrant Leek-orchid	*Prasophyllum suaveolens*	504567	Endangered	Dispersed	Habitat importance map	0.0002
Clover Glycine	*Glycine latrobeana*	501456	Vulnerable	Dispersed	Habitat importance map	0.0002
Small-flower Mat-rush	*Lomandra micrantha subsp. tuberculata*	504711	Rare	Dispersed	Habitat importance map	0.0002
Brolga	*Grus rubicunda*	10177	Vulnerable	Dispersed	Habitat importance map	0.0002
Powerful Owl	*Ninox strenua*	10248	Vulnerable	Dispersed	Habitat importance map	0.0002
Clumping Golden Moths	*Diuris gregaria*	504887	Endangered	Dispersed	Habitat importance map	0.0002
Small Milkwort	*Comesperma polygaloides*	500798	Vulnerable	Dispersed	Habitat importance map	0.0002
Bearded Dragon	*Pogona barbata*	12177	Vulnerable	Dispersed	Habitat importance map	0.0002
Growling Grass Frog	*Litoria raniformis*	13207	Endangered	Dispersed	Habitat importance map	0.0001
Swamp Everlasting	*Xerochrysum palustre*	503763	Vulnerable	Dispersed	Habitat importance map	0.0001
Large White Spider-orchid	*Caladenia venusta*	500533	Rare	Dispersed	Habitat importance map	0.0001
Hairy Tails	*Ptilotus erubescens*	502825	Vulnerable	Dispersed	Habitat importance map	0.0001
Black Falcon	*Falco subniger*	10238	Vulnerable	Dispersed	Habitat importance map	0.0001
Spiny Rice-flower	*Pimelea spinescens subsp. spinescens*	504823	Endangered	Dispersed	Habitat importance map	0.0001
Grey Billy-buttons	*Craspedia canens*	504643	Endangered	Dispersed	Habitat importance map	0.0001
Wavy Swamp Wallaby-grass	*Amphibromus sinuatus*	503625	Vulnerable	Dispersed	Habitat importance map	0.0001
Swift Parrot	*Lathamus discolor*	10309	Endangered	Dispersed	Habitat importance map	0.0001
Austral Tobacco	*Nicotiana suaveolens*	502275	Rare	Dispersed	Habitat importance map	0.0001
Western Peppermint	*Eucalyptus falciformis*	505358	Rare	Dispersed	Habitat importance map	0.0001
Tussock Skink	*Pseudemoia pagenstecheri*	12993	Vulnerable	Dispersed	Habitat importance map	0.0001
Branching Groundsel	*Senecio cunninghamii var. cunninghamii*	503104	Rare	Dispersed	Habitat importance map	0.0001

Tremont Bundy	*Eucalyptus aff. goniocalyx (Dandenong Ranges)*	507008	Vulnerable	Dispersed	Habitat importance map	0.0001
Salt Blown-grass	*Lachnagrostis robusta*	504223	Rare	Dispersed	Habitat importance map	0.0001
Tough Scurf-pea	*Cullen tenax*	502776	Endangered	Dispersed	Habitat importance map	0.0000
Square-tailed Kite	*Lophoictinia isura*	10230	Vulnerable	Dispersed	Habitat importance map	0.0000
Wind-blown Tussock-grass	*Poa physoclina*	507791	Endangered	Dispersed	Habitat importance map	0.0000
Australasian Shoveler	*Anas rhynchotis*	10212	Vulnerable	Dispersed	Habitat importance map	0.0000
Basalt Sun-orchid	*Thelymitra gregaria*	504019	Endangered	Dispersed	Habitat importance map	0.0000
Hardhead	*Aythya australis*	10215	Vulnerable	Dispersed	Habitat importance map	0.0000
Lewin's Rail	*Lewinia pectoralis pectoralis*	10045	Vulnerable	Dispersed	Habitat importance map	0.0000
Fine-hairy Spear-grass	*Austrostipa puberula*	503988	Rare	Dispersed	Habitat importance map	0.0000
White-throated Needletail	*Hirundapus caudacutus*	10334	Vulnerable	Dispersed	Habitat importance map	0.0000
Button Immortelle	*Leptorhynchos waitzia*	501949	Vulnerable	Dispersed	Habitat importance map	0.0000
Elegant Parrot	*Neophema elegans*	10307	Vulnerable	Dispersed	Habitat importance map	0.0000
Swamp Flax-lily	*Dianella callicarpa*	505086	Rare	Dispersed	Habitat importance map	0.0000
Australian Painted Snipe	*Rostratula australis*	10170	Critically endangered	Dispersed	Habitat importance map	0.0000
Southern Swainson-pea	*Swainsona behriana*	504944	Rare	Dispersed	Habitat importance map	0.0000

Habitat group

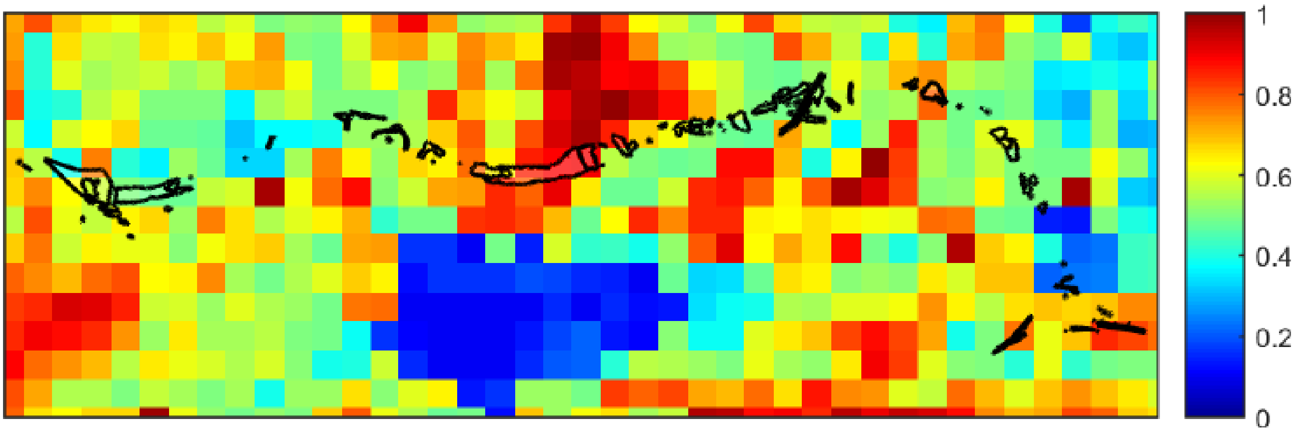
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

Habitat impacted

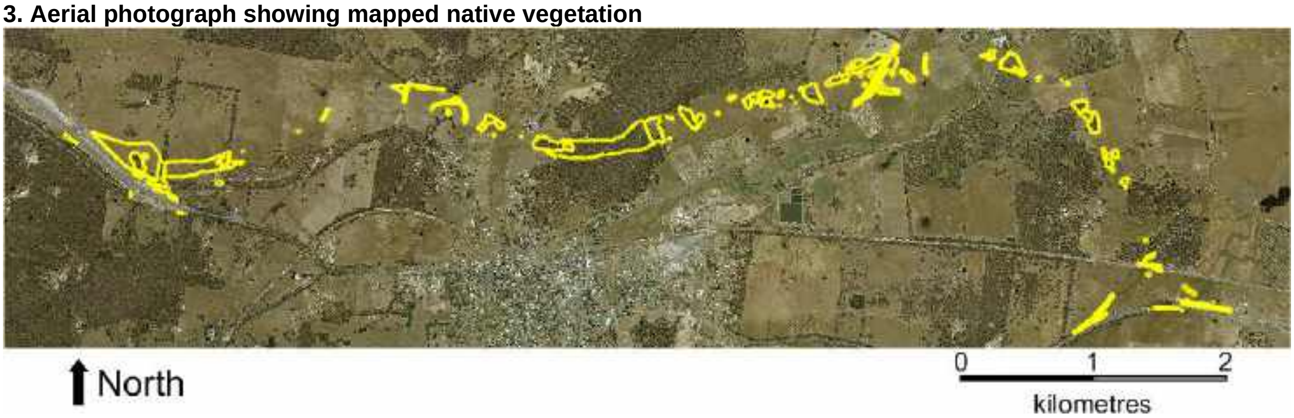
- Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species
- Top ranking maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat, developed from the highest habitat importance scores in dispersed species habitat maps and selected VBA records
- Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc.

Appendix 3 – Images of mapped native vegetation

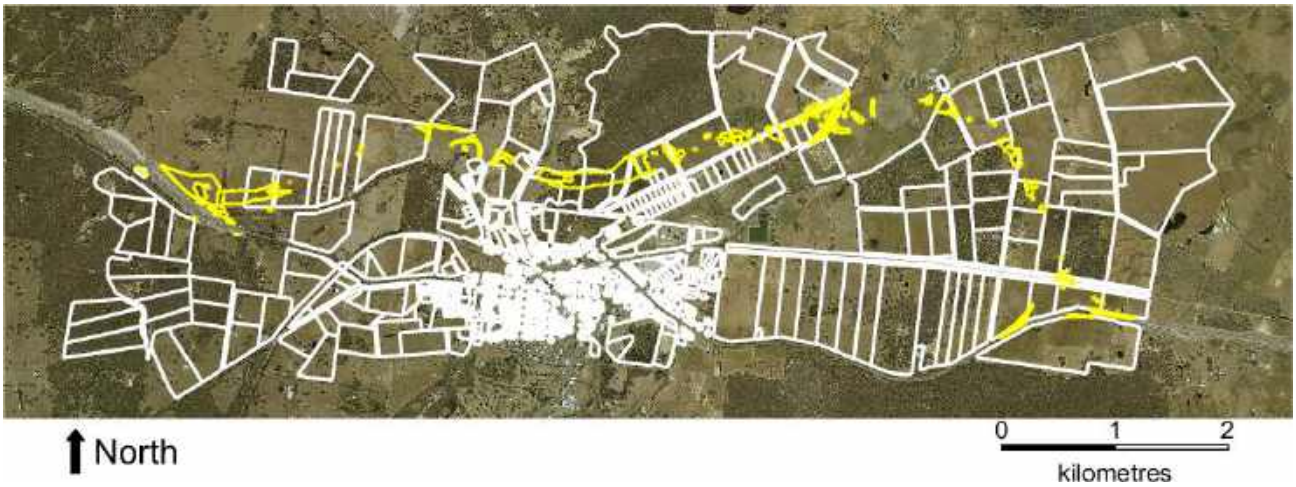
2. Strategic biodiversity values map



3. Aerial photograph showing mapped native vegetation



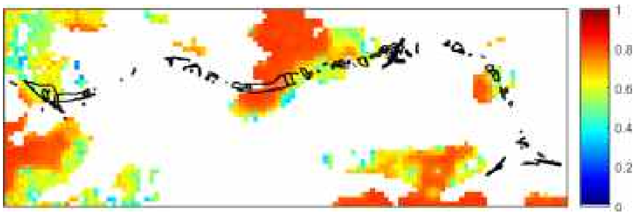
4. Map of the property in context



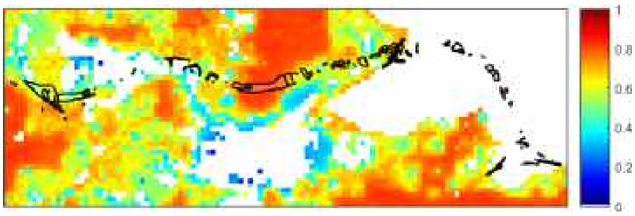
Yellow boundaries denote areas of proposed native vegetation removal.

4. Habitat importance maps

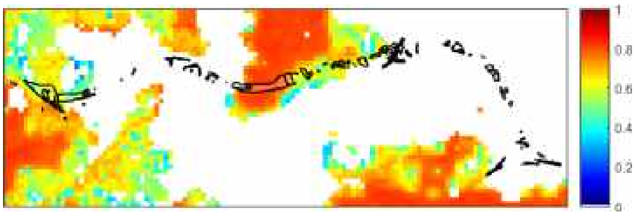
Ben Major Grevillea
Grevillea floripendula
501535



Emerald-lip Greenhood
Pterostylis smaragdyna
503915



Rough Wattle
Acacia aspera subsp. parviceps
507308



APPENDIX G

WATER QUALITY DATA

G1 WATER QUALITY DATA

Water Quality testing was completed by Streamline Research. The results of the testing are presented below. Note that the location of the survey sites are provided on Figure 4.5.

SITE NUMBER	WATERWAY	PH	TEMPERATURE (ºC)	DISSOLVED OXYGEN (MG/L)	ELECTRICAL CONDUCTIVITY (µS/CM)	TURBIDITY (NTU)
1	Mt. Emu Creek	7.1	22.7	3.2	946	7.7
2	Yam Holes Creek	no flow				
3	Yam Holes Creek	7.4	25.8	3.3	680	19
4	Yam Holes Creek	7.3	25.1	3.0	714	16.3
5	Yam Holes Creek	7.3	25.9	2.4	717	15.9
6	Yam Holes Creek	7.5	25.6	4.3	719	12.1
7	Yam Holes Creek	7.2	29.6	2.3	731	13.6
8	Yam Holes Creek	7.3	31.3	3.3	728	9.6
9	Yam Holes Creek	7.2	27.1	1.8	711	15.7
10	Yam Holes Creek	7.0	25.7	2.9	721	13.4
11	Yam Holes Creek	7.2	23.6	4.3	705	
12	Yam Holes Creek	7.3	23.7	3.2	709	12.9
13	Yam Holes Creek	7.1	24.2	5.2	953	29.8
14	Yam Holes Creek	7.0	23.5	4.5	941	12.6
15	Yam Holes Creek	7.0	23.1	6.0	942	9.4
16	Yam Holes Creek	7.3	16.9	5.8	933	7.6
17	Yam Holes Creek	6.7	16.5	6.3	581	24.5
18	Yam Holes Creek	7.7	17.8	3.6	466	23.0
19	Yam Holes Creek	7.5	18.5	3.9	455	8.1
20	Yam Holes Creek	7.7	19.7	3.2	474	10.2
21	Yam Holes Creek	7.4	20.2	4.0	641	10.0
22	Yam Holes Creek	7.8	19.6	3.8	518	4.5
23	Yam Holes Creek	7.6	19.4	3.6	859	16.3
24	Yam Holes Creek	7.5	19.4	4.1	819	16.6
25	Yam Holes Creek	7.5	19.2	4.4	733	22.3
26	wetland	no measurement				
27	Yam Holes Creek tributary	dry				

SITE NUMBER	WATERWAY	PH	TEMPERATURE (ºC)	DISSOLVED OXYGEN (MG/L)	ELECTRICAL CONDUCTIVITY (μS/CM)	TURBIDITY (NTU)
28	wetland (on Yam Holes Creek second channel)	7.9	22.1	4.1	286	14.7
29	wetland	7.3	23.5	5.3	721	10.9
30	wetland	7.1	22.8	8.5	943	13.7
31	farm dam	no measurement				
32	wetland	7.3	15.2	1.5	123	6.3
33	wetland	7.4	17.0	3.8	199	7.1
34	Cumberland Creek	dry				
35	Cumberland Creek	6.9	22.0	8.6	188	43.1
36	Cemetery Creek	7.7	21.4	6.9	791	47
37	Ding Dong Creek	8.3	22.6	6.5	81	42
38	Yam Holes Creek tributary	dry				
39	Yam Holes Creek tributary	dry				
40	Yam Holes Creek tributary	7.5	23.8	5.9	1394	21.4

APPENDIX H

FISH SURVEY

H1 LITTLE GALAXIAS HABITAT ASSESSMENT

The following provides an assessment of Little Galaxias habitat at the study area and surrounds. This section was prepared by Streamline Research and edited by WSP for inclusion in this report.

H1.1 PAST RECORDS

The Little Galaxias was recorded in Yam Holes Creek near the crossing of Adamthwaite Lane in 2011 (DELWP, 2017). Subsequent investigations (GHD 2015; WSP | Parsons Brinckerhoff 2016b) failed to detect Little Galaxias.

Records of Little Galaxias are known for Mount. Emu Creek on the Trawalla Waterloo Road in 2008 and Trawalla Road in 2006 (DELWP, 2017). The Little Galaxias has not been recorded in these areas in more recent surveys (Rhys Coleman pers. comm. 2014, (WSP | Parsons Brinckerhoff 2016b).

The fish survey in November 2015 recorded the Southern Pygmy Perch *Nannoperca australis* in Yam Holes Creek at Racecourse Road and also immediately upstream of the Ding Dong Creek junction at King Street (WSP | Parsons Brinckerhoff 2016b). The finding is of some significance as the Southern Pygmy Perch, like the Little Galaxias, requires permanent water as refugia during dry periods and the two species often occupy the same habitat. Finding of a Southern Pygmy Perch population can also lead to the finding of a Little Galaxias population.

The surveys undertake in 2016 were a supplement to two other aquatic ecology surveys undertaken in 2014 by GHD (GHD 2015) and WSP | Parsons Brinckerhoff in 2015 (WSP | Parsons Brinckerhoff 2016b). These previous surveys in 2014 and 2015 did not detect Little Galaxias, nor did the 2016 survey (results presented in this report).

H1.2 HABITAT AND LIKELIHOOD

The species occurs in waters which have an array of native aquatic vegetation, typically preferring swampy floodplain environments, but can also be found in creeks and rivers. The natural degree of wetland connectivity to a more permanent waterbody (such as a river or creek) may be vital to their long-term survival (particularly during extended dry conditions) and must be considered as part of the habitat requirement critical to their survival (Saddlier et al., 2008).

The Little Galaxias can be found in two types of habitats: primary habitats which have permanent water, and secondary habitats which have intermittent or ephemeral water regimes. Primary habitats are responsible for the long-term survival of the species (McGuckin, 2001).

The species can establish self-sustaining populations in secondary habitats (sink populations), but these populations can be lost when the habitat dries out for too long. Recolonisation is then reliant on the movement of fish from primary habitat (source populations).

The species is opportunistic, using floodplains for the movement of fish from primary habitat into new habitats (secondary habitat) for range extensions during flood events. New environments are advantageous as they can provide food for the growth of young and often, have few predators. Spawning has been observed in seemingly unsustainable habitats such as puddles created by vehicle wheel marks, pools in low lying grassed paddocks, sand pits and farm dams. Long term persistence in these environments is largely dependent on permanent water remaining at the location.

The Little Galaxias was not recorded in this survey and is not expected to currently exist within the Beaufort Bypass study area. The absence of the recent records from the Beaufort Bypass study area suggests that Yam Holes Creek and the other waterways sampled are not primary habitat for the Little Galaxias. The primary habitat source responsible for the movement of the Little Galaxias into Yam Holes Creek during the January 2011 flood is yet to be determined. **However, Little Galaxias is considered to have a high likelihood of occurrence for the purposes of impact assessment as there is a reasonable likelihood that they could recolonise the catchment under suitable conditions.**

H1.3 SITE-SPECIFIC HABITAT DISCUSSION

As noted previously, Yam Holes Creek is not expected to support a self-sustaining population of Little Galaxias, as the creek regularly ceases to flow, and on occasions can completely dry out. It does not support deep pools which could provide refugia to aquatic fauna during dry periods. The population of Little Galaxias present in the creek in 2011 appears to have been lost as a result of the creek drying out for too long at some time over the past five years. In some recent years, conditions have been so dry that even Beaufort Lake has been dry (e.g. 2015).

Being historically mined for gold has contributed to the poor condition of instream habitat in Yam Holes Creek. The main channel has been realigned and straightened and there is little riparian vegetation cover, which limits aquatic fauna diversity. A few low-lying areas adjacent to the sewerage works possibly receive sewerage dam seepage. Despite this, it is suspected that permanent surface water is not available for aquatic refuge during dry periods.

The source of the Little Galaxias that found their way into Yam Holes Creek during the 2011 flood is unknown, however may have been Mount. Emu Creek. In 2011 the Little Galaxias was known to be present in Mount. Emu Creek in the vicinity of Trawalla. Unfortunately, as has occurred in Yam Holes Creek, the Little Galaxias can now no longer be found in Mount. Emu Creek near Trawalla. It is possible that the extremely dry period over the past five years may have resulted in all localised populations of Little Galaxias being lost.

One survey location was found to support a Southern Pygmy Perch population (site 26) however no Little Galaxias were found within the wetland. The site provides hope permanent water habitat refugia have persisted over the past five years.

The sampled floodplain farm dam (site 31) is another location which is expected to have retained permanent water over the past 5 years. Unfortunately, it harboured an Eastern Gambusia population which has subsequently recolonised Yam Holes Creek. This species is a major threat to Little Galaxias, particularly in modified (lower quality) environments, and may predate on eggs and fry, nip fins, and compete for resources. Little Galaxias is highly unlikely to persist in a dam with this species.

Some wetland habitats, such as the one alongside Racecourse Road (site 28), in Snowgums Bushland Reserve (site 32) and in the farmland adjacent to the reserve (site 33) all support habitat that would be ideal to the Little Galaxias. Unfortunately, all are suspected to have dried out since 2011 and no Little Galaxias were recorded.

Without a spring water supply, refugia habitat for survival of the Little Galaxias is unlikely to have been retained in or near Beaufort. If such habitat does exist, there has been no connectivity to habitats within Yam Holes Creek or Mount. Emu Creek during the wet period of 2016. Another refuge location may still exist, one that still supports the Little Galaxias and one that might lead to the re-distribution of the Little Galaxias in the Beaufort and Trawalla area.

H2 TOPOGRAPHICAL REFERENCES FOR EACH FISH SURVEY SITE

SITE	WATERWAY	LOCATION	BEAUFORT 7523 1:100000	
			EAST	NORTH
1	Mt. Emu Creek	Trawalla Waterloo Road	718046	5854241
2	Yam Holes Creek	Trawalla Waterloo Road	717494	5855045
3	Yam Holes Creek	Racecourse Road	716081	5856992
4	Yam Holes Creek	Between Racecourse Road and Adamthwaite Lane	715940	5857063
5	Yam Holes Creek	Between Racecourse Road and Adamthwaite Lane	715720	5857236
6	Yam Holes Creek	Between Racecourse Road and Adamthwaite Lane	715501	5857131
7	Yam Holes Creek	Between Racecourse Road and Adamthwaite Lane	715341	5857145
8	Yam Holes Creek	Between Racecourse Road and Adamthwaite Lane	715132	5857174
9	Yam Holes Creek	Between Racecourse Road and Adamthwaite Lane	714025	587220
10	Yam Holes Creek	Between Racecourse Road and Adamthwaite Lane	714501	5857146
11	Yam Holes Creek	Between Adamthwaite Lane and sewerage works	714318	5856871
12	Yam Holes Creek	Between Adamthwaite Lane and sewerage works	714160	5856653
13	Yam Holes Creek	Between Adamthwaite Lane and sewerage works	713778	5856492
14	Yam Holes Creek	Between Adamthwaite Lane and sewerage works	713535	5855897
15	Yam Holes Creek	Between Adamthwaite Lane and sewerage works	713293	5855768
16	Yam Holes Creek	Behind eastern end of the sewerage works	712828	5855727
17	Yam Holes Creek	Just upstream of sewerage outlet	712635	5855721
18	Yam Holes Creek	Behind western end of the sewerage works	712392	5855574
19	Yam Holes Creek	Between sewerage works and Beaufort Lexton Road	712341	5855539
20	Yam Holes Creek	Between sewerage works and Beaufort Lexton Road	712266	5855492
21	Yam Holes Creek	Between sewerage works and Beaufort Lexton Road	712092	5855485
22	Yam Holes Creek	Between sewerage works and Beaufort Lexton Road	711723	5855415
23	Yam Holes Creek	Between sewerage works and Beaufort Lexton Road	711474	5855239
24	Yam Holes Creek	Between sewerage works and Beaufort Lexton Road	711249	5855171
25	Yam Holes Creek	Beaufort Lexton Road	711015	5855148
26	wetland	Alongside railway near Trawalla Waterloo Road	718144	5854097
27	Yam Holes Creek tributary	Smiths Lane	715970	5855170

SITE	WATERWAY	LOCATION	BEAUFORT 7523 1:100000	
			EAST	NORTH
28	wetland (on Yam Holes Creek second channel)	Northern side of Racecourse Road	716309	5856992
29	wetland	Between Adamthwaite Lane and sewerage works	713972	5856603
30	wetland	Between Adamthwaite Lane and sewerage works	713601	5856207
31	farm dam	Between Adamthwaite Lane and sewerage works	713878	5856562
32	wetland	In Snowgums Bushland Reserve	713672	5855640
33	wetland	In paddock immediately west of Snowgums Bushland Reserve	713309	5855682
34	Cumberland Creek	Racecourse Road south of railway	711757	5855041
35	Cumberland Creek	Immediately south of Western Highway	711740	5854540
36	Cemetery Creek	High Street	711199	5855014
37	Ding Dong Creek	Market Street	710505	5854906
38	Yam Holes Creek tributary	Back Raglan Road	710240	5855150
39	Yam Holes Creek tributary	Main Lead Road	710535	5855869
40	Yam Holes Creek tributary	Near Martins Lane	709633	5856173

APPENDIX I

PHOTOGRAPHS OF FISH SURVEY SITES

Mt. Emu Creek site 1

Yam Holes Creek tributary site 2

Yam Holes Creek site 3

Yam Holes Creek site 4

Yam Holes Creek site 5

Yam Holes Creek site 6

Yam Holes Creek site 7

Yam Holes Creek site 8

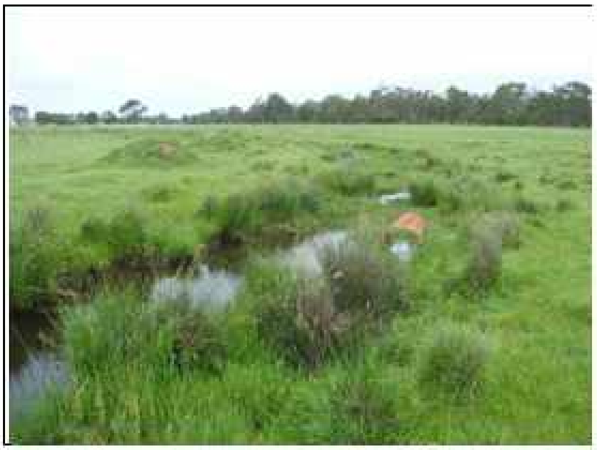
Yam Holes Creek site 9

Yam Holes Creek site 10

Yam Holes Creek site 11

Yam Holes Creek site 12

Yam Holes Creek site 13



Yam Holes Creek site 14

Yam Holes Creek site 15

Yam Holes Creek site 16

Yam Holes Creek site 17

Yam Holes Creek site 18

Yam Holes Creek site 19

Yam Holes Creek site 20

Yam Holes Creek site 21

Yam Holes Creek site 22

Yam Holes Creek site 23

Yam Holes Creek site 24

Yam Holes Creek site 25

wetland site 26

Yam Holes Creek tributary site 27

wetland site 28

Yam Holes Creek site 29

wetland site 30

farm dam site 31

wetland site 32

wetland site 33

Cumberland Creek site 34

Cumberland Creek site 35

Cumberland Creek site 36

Cemetery Creek site 37

Ding Dong Creek site 38

Yam Holes Creek tributary site 39

Yam Holes Creek tributary site 40

Note that the location of these survey sites are provided on Figure 4.5.

APPENDIX J

PRELIMINARY ASSESSMENT OF SIGNIFICANT IMPACTS UNDER THE EPBC ACT – OPTIONS ASSESSMENT

J1 MIGRATORY SPECIES

Fourteen migratory species were listed on the PMST as potentially occurring within the study area. Only two species have records within 10 km of the study area on the VBA but only one of these is considered moderately likely to utilise the habitat available in the Study area, Latham's Snipe.

J1.1 SIGNIFICANT IMPACT CRITERIA

The significant impact criteria for migratory species are detailed below from (Department of the Environment 2013b; DoEE 2017):

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

Criterion 1. *substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species*

Criterion 2. *result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or*

Criterion 3. *seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.*

J1.2 IMPORTANT HABITAT

Critical to the assessment of significant impact is the definition of 'important habitat':

a. habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or

b. habitat that is of critical importance to the species at particular life-cycle stages, and/or

c. habitat utilised by a migratory species which is at the limit of the species range, and/or

d. habitat within an area where the species is declining.

The migratory bird species with the potential to be affected by the works include several species considered to be migratory shorebirds. The assessment of important habitat for these species is more specific than the general migratory species definition and is detailed in EPBC Act Policy Statement 3.21 *Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species* (DoEE 2017).

According to (DoEE 2017), wetland habitat should be considered internationally important if it regularly supports:

- 1 per cent of the individuals in a population of one species or subspecies of waterbird OR
- a total abundance of at least 20 000 waterbirds.

Nationally important habitat for migratory shorebirds supports:

- 0.1% of the flyaway population of a single species of migratory shorebird OR
- 2000 migratory shorebirds OR
- 15 migratory shorebird species.

A habitat area is the geographic area that had been used by the same group of shorebirds over the main non-breeding period. This is effectively the home range of the local population when present.

Important habitat for Latham Snipe is classified by any area that has previous identified as internationally important for the species, or any area that supports at least 18 individuals of the species (DoEE 2017).

There have only been 3 records of Latham's Snipe within 10km of the Study area, the most recent being in 2000.

“IMPORTANT HABITAT” DEFINITION	STUDY AREA
habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species	With the low number of records within 10 km, the region would not be considered to support an ecologically significant proportion of the population.
habitat that is of critical importance to the species at particular life-cycle stages, and/or	Species does not breed in Australia.
habitat utilised by a migratory species which is at the limit of the species range, and/or	Species has a large non-breeding range across southern and eastern Australia. This would not be considered the limit of its range.
habitat within an area where the species is declining.	Species is likely to have only visited the area in passing to other sites where its more frequently recorded. Would not be considered to be in decline in the area.

Latham’s Snipe would not be significantly impacted by any alignment of the Project based on the study area not meeting the definition of ‘important habitat’ in the significant impact criteria.

J2 THREATENED FLORA

Four EPBC Act listed threatened flora species have been recorded in the study area, with one further species considered moderately likely to occur. Three of the recorded species are listed as vulnerable and one is Endangered.

An assessment against the EPBC Act significant impact criteria for each species is provided on the following pages.

This is a preliminary assessment, used for options comparison only and using indicative construction footprints. For the detailed assessment for the preferred alignment using the current construction footprint, including the detailed mitigation measures, refer to Appendix Q.

J2.1 RIVER SWAMP WALLABY-GRASS (VULNERABLE)

The significant impact criteria for vulnerable species is whether the action will have a significant impact on an *important* population of the species. An important population is one that is necessary for the species' long-term survival and recovery. This may include populations identified as such in recovery plans and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

Field assessments found 38 new records for this species across the study area. No previous records for the species were on the VBA within 10 km of the study area and the Flora of Victoria does not list the Central Victorian Uplands Bioregion as being part of the known distribution for this species. As these records represent an expansion to the currently known distribution of this species, the new records could be considered an important population. The records were scattered across various wetlands and farm dams. The different sites would be interconnected by water, wind or bird dispersal from one or more source populations. All the records around Beaufort are considered to be an important population as a whole, but each individual site is not necessarily an important population on its own.

Table J.1 Assessment of potential for significant impacts upon River Swamp Wallaby-grass

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Lead to a long-term decrease in the size of an important population of a species	Two records within the alignment, one in a farm dam and one in a drainage line. Loss of these records unlikely to have significant impact on population as a whole. LOW	One record within alignment in a farm dam. Loss of this record unlikely to have significant impact on population as a whole. LOW	Multiple records within alignment at several locations including two in farm dams and two in patches of EPBC listed Seasonal Herbaceous Wetland. The larger patch of EPBC listed community is the most population site of this species found in the study area and likely acts as a source population from where the plant can spread to other sites in the area. Loss of this site could lead to a decrease in the size of an important population. HIGH	Two records within alignment including one in a farm dam and one in a small patch of EPBC listed Seasonal Herbaceous Wetland. These are smaller sites and less likely to have a significant impact on the population size of the population as a whole. LOW

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Reduce the area of occupancy of an important population	The sites impacted by this alignment are smaller sub-populations. While this alignment will reduce the area of occupancy the species is likely to be able to spread and colonise other dams and waterways in the area. MODERATE	The sites impacted by this alignment are smaller sub-populations. While this alignment will reduce the area of occupancy the species is likely to be able to spread and colonise other dams and waterways in the area. MODERATE	This alignment passes through a whole wetland that contains an important sub-population of this species within the Beaufort area. HIGH	The sites impacted by this alignment are smaller sub-populations. While this alignment will reduce the area of occupancy the species is likely to be able to spread and colonise other dams and waterways in the area. MODERATE
Fragment an existing important population into two or more populations	This population is already highly fragmented around the Beaufort area. This alignment will not further contribute to fragmentation of the population. LOW	This population is already highly fragmented around the Beaufort area. This alignment will not further contribute to fragmentation of the population. LOW	This population is already highly fragmented around the Beaufort area. This alignment will not further contribute to fragmentation of the population. LOW	This population is already highly fragmented around the Beaufort area. This alignment will not further contribute to fragmentation of the population. LOW
Adversely affect habitat critical to the survival of a species	The habitat along this alignment is unlikely to be critical to this species survival as there are many other similar dams and drainage lines in the area. LOW	The habitat along this alignment is unlikely to be critical to this species survival as there are many other similar dams and drainage lines in the area. LOW	This alignment passes through a wetland that is likely to be critical habitat within this population. HIGH	The habitat along this alignment is unlikely to be critical to this species survival as there are many other similar dams and drainage lines in the area. LOW
Disrupt the breeding cycle of an important population	The Project will not disrupt the breeding cycle of the species which reproduces by rizomes (asexual spreading) and sexually (generalist pollinators unlikely to be affected by the works). LOW	The Project will not disrupt the breeding cycle of the species which reproduces by rizomes (asexual spreading) and sexually (generalist pollinators unlikely to be affected by the works). LOW	The Project will not disrupt the breeding cycle of the species which reproduces by rizomes (asexual spreading) and sexually (generalist pollinators unlikely to be affected by the works) LOW.	The Project will not disrupt the breeding cycle of the species which reproduces by rizomes (asexual spreading) and sexually (generalist pollinators unlikely to be affected by the works). LOW

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The habitat along this alignment is unlikely to be critical to this species survival as there are many other similar dams and drainage lines in the area. Loss of these sites is unlikely to cause a decline in species. LOW	The habitat along this alignment is unlikely to be critical to this species survival as there are many other similar dams and drainage lines in the area. Loss of these sites is unlikely to cause a decline in species. LOW	This alignment passes through a wetland that is likely to be critical habitat within this population. Loss at this larger site could cause a decline in the species within this area. HIGH	The habitat along this alignment is unlikely to be critical to this species survival as there are many other similar dams and drainage lines in the area. Loss of these sites is unlikely to cause a decline in species. LOW
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Roads can contribute to weed spread both during construction and ongoing from cars and construction vehicles bringing seeds into the area. Vegetation clearing also leaves vacant land along road verges that fast colonising species can take advantage of. MODERATE	Roads can contribute to weed spread both during construction and ongoing from cars and construction vehicles bringing seeds into the area. Vegetation clearing also leaves vacant land along road verges that fast colonising species can take advantage of. MODERATE	Roads can contribute to weed spread both during construction and ongoing from cars and construction vehicles bringing seeds into the area. Vegetation clearing also leaves vacant land along road verges that fast colonising species can take advantage of. MODERATE	Roads can contribute to weed spread both during construction and ongoing from cars and construction vehicles bringing seeds into the area. Vegetation clearing also leaves vacant land along road verges that fast colonising species can take advantage of. MODERATE
Introduce disease that may cause the species to decline	There are no known disease risks for this species. LOW	There are no known disease risks for this species. LOW	There are no known disease risks for this species. LOW	There are no known disease risks for this species. LOW
Interfere substantially with the recovery of the species	There is no recovery plan for this species, however this alignment is unlikely to affect the recovery of this species. LOW	There is no recovery plan for this species, however this alignment is unlikely to affect the recovery of this species. LOW	This alignment goes through the most significant sub-population found within the area. Could impact the local recovery of this species however unlikely to affect the recovery of the species as a whole. MODERATE	There is no recovery plan for this species, however this alignment is unlikely to affect the recovery of this species. LOW

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Overall likelihood of a significant impact (with no mitigation measures implemented)	LOW	LOW	MODERATE	LOW
Overall mitigation measure(s)	Some sites could be avoided through construction footprint design. Weed and pathogen controls should be implemented through the CEMP.	Some sites could be avoided through construction footprint design. Weed and pathogen controls should be implemented through the CEMP.	Some sites could be avoided through construction footprint design. However the largest patch covers the whole width of the alignment and will be significantly impacted. Weed and pathogen controls should be implemented through the CEMP.	Some sites could be avoided through construction footprint design. Weed and pathogen controls should be implemented through the CEMP.
Overall residual risk to MNES with mitigation measures applied	LOW	LOW	MODERATE	LOW
Overall likelihood of a significant impact (with mitigation measures implemented)	LOW	LOW	MODERATE	LOW

J2.2 MATTED FLAX-LILY (ENDANGERED)

Fifteen records of Matted Flax-lily were located within the study area during field assessments. No previous records exist on the VBA within a 10 km radius.

Table J.2 provides an assessment of the potential for significant impacts upon the species in accordance with the significant impact criteria.

Table J.2 Assessment of potential for significant impacts upon Matted Flax-lily

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Lead to a long-term decrease in the size of a population	There is one record of this species within this alignment, but close to the alignment boundary. Any loss would be unlikely to result in a long-term decrease in the size of a population. LOW	The species was recorded twice in this alignment with another recording located just outside the boundary. Any loss would be unlikely to result in a long-term decrease in the size of a population. LOW	Nine records of species in alignment (one in the middle). Losses may result in a long-term decrease in the size of a population. MODERATE	Two records for this species in the alignment (one in the middle). Any loss would be unlikely to result in a long-term decrease in the size of a population. LOW
Reduce the area of occupancy of the species	The works may reduce the area of occupancy of the species through the direct loss of habitat. MODERATE	The works may reduce the area of occupancy of the species through the direct loss of habitat. MODERATE	The works may reduce the area of occupancy of the species through the direct loss of habitat. MODERATE	The works may reduce the area of occupancy of the species through the direct loss of habitat. MODERATE
Fragment an existing population into two or more populations	Records for this species are scattered around the Beaufort area, the habitat and population is already highly fragmented however the road will further contribute to this and potentially reduce gene flow. MODERATE	Records for this species are scattered around the Beaufort area, the habitat and population is already highly fragmented however the road will further contribute to this and potentially reduce gene flow. MODERATE	Records for this species are scattered around the Beaufort area, the habitat and population is already highly fragmented however the road will further contribute to this and potentially reduce gene flow. MODERATE	Records for this species are scattered around the Beaufort area, the habitat and population is already highly fragmented however the road will further contribute to this and potentially reduce gene flow. MODERATE

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Adversely affect habitat critical to the survival of a species	The habitat in this alignment is unlikely to be critical to the survival of the species. LOW	The habitat in this alignment is unlikely to be critical to the survival of the species. LOW	The habitat in this alignment is unlikely to be critical to the survival of the species. LOW	The habitat in this alignment is unlikely to be critical to the survival of the species. LOW
Disrupt the breeding cycle of a population	The project would not disrupt the breeding cycle of a population. LOW	The project would not disrupt the breeding cycle of a population. LOW	The project would not disrupt the breeding cycle of a population. LOW	The project would not disrupt the breeding cycle of a population. LOW
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	This alignment may cause local small populations of the species to decline through removal, modification and subsequent decrease in quality of suitable habitat. However, it is unlikely to have a significant impact on the species as a whole. LOW	This alignment may cause local small populations of the species to decline through removal, modification and subsequent decrease in quality of suitable habitat. However, it is unlikely to have a significant impact on the species as a whole. LOW	This alignment may cause local small populations of the species to decline through removal, modification and subsequent decrease in quality of suitable habitat. However, it is unlikely to have a significant impact on the species as a whole. LOW	This alignment may cause local small populations of the species to decline through removal, modification and subsequent decrease in quality of suitable habitat. However, it is unlikely to have a significant impact on the species as a whole. LOW

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Weed invasion is identified as a key current threat in the species National Recovery Plan (Carter, O 2010). It is likely that construction and ground disturbance may increase weed incursion in the area. However, it is unlikely to have a significant impact on the species. This is evident from the fact that the recorded populations of this species located in/near this alignment already occur in a highly modified environment with a high density of weeds. LOW	Weed invasion is identified as a key current threat in the species National Recovery Plan (Carter, O 2010). It is likely that construction and ground disturbance may increase weed incursion in the area. However, it is unlikely to have a significant impact on the species. This is evident from the fact that the recorded populations of this species located in/near this alignment already occur in a highly modified environment with a high density of weeds. LOW	Weed invasion is identified as a key current threat in the species National Recovery Plan (Carter, O 2010). It is likely that construction and ground disturbance may increase weed incursion in the area. However, it is unlikely to have a significant impact on the species. This is evident from the fact that the recorded populations of this species located in/near this alignment already occur in a highly modified environment with a high density of weeds. LOW	Weed invasion is identified as a key current threat in the species National Recovery Plan (Carter, O 2010). It is likely that construction and ground disturbance may increase weed incursion in the area. However, it is unlikely to have a significant impact on the species. This is evident from the fact that the recorded populations of this species located in/near this alignment already occur in a highly modified environment with a high density of weeds. LOW
Introduce disease that may cause the species to decline	There are no known disease risks for this species. LOW	There are no known disease risks for this species. LOW	There are no known disease risks for this species. LOW	There are no known disease risks for this species. LOW
Interfere with the recovery of the species.	'Manage threats to populations' is identified in the National Recovery Plan for the species (Carter, O 2010). This project may threaten small populations of the species however this is unlikely to interfere with the recovery of the species as a whole. LOW	'Manage threats to populations' is identified in the National Recovery Plan for the species (Carter, O 2010). This project may threaten small populations of the species however this is unlikely to interfere with the recovery of the species as a whole. LOW	'Manage threats to populations' is identified in the National Recovery Plan for the species (Carter, O 2010). This project may threaten small populations of the species however this is unlikely to interfere with the recovery of the species as a whole. LOW	'Manage threats to populations' is identified in the National Recovery Plan for the species (Carter, O 2010). This project may threaten small populations of the species however this is unlikely to interfere with the recovery of the species as a whole. LOW

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Overall likelihood of a significant impact (with no mitigation measures implemented)	LOW	LOW	MODERATE	LOW
Overall mitigation measure(s)	Record on the edge of alignment, construction footprint could be designed to avoid it.	Both records on the edge of alignment, construction footprint could be designed to avoid them.	All records are on the edge of alignment, construction footprint could be designed to avoid them.	Both records on the edge of alignment, construction footprint could be designed to avoid them.
Overall residual risk to MNES with mitigation measures applied	LOW	LOW	LOW	LOW
Overall likelihood of a significant impact (with mitigation measures implemented)	LOW	LOW	LOW	LOW

J2.3 BEN MAJOR GREVILLEA (VULNERBALE)

The Camp Hill recreation reserve north of Beaufort township is known habitat for one of the few populations of this species. A targeted survey for this species was conducted in quadrats across the likely range which found 85 new records of this species. Many of which were seedlings. This population as a whole would be considered to be an important population.

Table J.3 Assessment of potential for significant impacts upon Ben Major Grevillea

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Lead to a long-term decrease in the size of an important population of a species	Alignment avoids all individuals recorded during surveys. No decrease in population size likely. LOW	Alignment avoids all individuals recorded during surveys. No decrease in population size likely. LOW	Alignment avoids all individuals recorded during surveys. No decrease in population size likely. LOW	Alignment avoids all individuals recorded during surveys. No decrease in population size likely. LOW
Reduce the area of occupancy of an important population	Alignment does not impact known habitat but is potential habitat for this species adjacent to known locations. LOW	Alignment does not impact known habitat but is potential habitat for this species adjacent to known locations LOW	Alignment does not impact known habitat but is potential habitat for this species adjacent to known locations LOW	Alignment does not impact known habitat but is potential habitat for this species adjacent to known locations LOW
Fragment an existing important population into two or more populations	Alignment runs between sub-populations of this species and may impact gene flow between. May also affect pollination if plant has a specific pollinator. MODERATE	Alignment runs between sub-populations of this species and may impact gene flow between. May also affect pollination if plant has a specific pollinator. MODERATE	Alignment will not fragment existing populations. LOW	Alignment will not fragment existing populations. LOW
Adversely affect habitat critical to the survival of a species	Alignment avoids most critical habitat for this species within the study area. LOW	Alignment avoids most critical habitat for this species within the study area. LOW	Alignment avoids most critical habitat for this species within the study area. LOW	Alignment avoids most critical habitat for this species within the study area. LOW

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Disrupt the breeding cycle of an important population	This alignment is unlikely to disrupt the breeding of this population. LOW	This alignment is unlikely to disrupt the breeding of this population. LOW	This alignment is unlikely to disrupt the breeding of this population. LOW	This alignment is unlikely to disrupt the breeding of this population. LOW
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Alignment will reduce the size of potential habitat available but unlikely to the extent that the species will decline. LOW	Alignment will reduce the size of potential habitat available but unlikely to the extent that the species will decline. LOW	Alignment will reduce the size of potential habitat available but unlikely to the extent that the species will decline. LOW	Alignment will reduce the size of potential habitat available but unlikely to the extent that the species will decline. LOW
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	This alignment is close to records of this species. Road construction could facilitate weed spread into this area through construction machinery brought in and from the road itself prompting edge effects. MODERATE	This alignment is close to records of this species. Road construction could facilitate weed spread into this area through construction machinery brought in and from the road itself prompting edge effects. MODERATE	This alignment is close to records of this species. Road construction could facilitate weed spread into this area through construction machinery brought in and from the road itself prompting edge effects. MODERATE	This alignment is close to records of this species. Road construction could facilitate weed spread into this area through construction machinery brought in and from the road itself prompting edge effects. MODERATE
Introduce disease that may cause the species to decline	There are no known disease risks for this species. LOW	There are no known disease risks for this species. LOW	There are no known disease risks for this species. LOW	There are no known disease risks for this species. LOW
Interfere substantially with the recovery of the species	As the alignment does not directly impact any known individuals of this species, it is unlikely to interfere substantially with the recovery of this species.	As the alignment does not directly impact any known individuals of this species, it is unlikely to interfere substantially with the recovery of this species.	As the alignment does not directly impact any known individuals of this species, it is unlikely to interfere substantially with the recovery of this species.	As the alignment does not directly impact any known individuals of this species, it is unlikely to interfere substantially with the recovery of this species.

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Overall likelihood of a significant impact (with no mitigation measures implemented)	LOW	LOW	LOW	LOW
Overall mitigation measure(s)	Weed control measures and monitoring incorporated into CEMP	Weed control measures and monitoring incorporated into CEMP	Weed control measures and monitoring incorporated into CEMP	Weed control measures and monitoring incorporated into CEMP
Overall residual risk to MNES with mitigation measures applied	LOW	LOW	LOW	LOW
Overall likelihood of a significant impact (with mitigation measures implemented)	LOW	LOW	LOW	LOW

J2.4 ORNATE PINK FINGERS (VULNERABLE)

Targeted surveys located eight new records for this species within the study area. There were no previous records for this species within 10 km on the VBA. For this reason, it will be considered an important population.

Table J.4 Assessment of potential for significant impacts upon Ornate Pink Fingers

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Lead to a long-term decrease in the size of an important population of a species	This alignment passes through one individual record and a separate patch of several nearby records. These two locations include all but one individuals found of this species in then study area. HIGH	This alignment passes through a patch of several nearby records. This location includes all but two individuals found of this species in then study area. HIGH	Alignment avoids all records of this species. LOW	Alignment avoids all records of this species. LOW
Reduce the area of occupancy of an important population	Alignment will reduce the area of occupancy of an important population. HIGH	Alignment will reduce the area of occupancy of an important population. HIGH	Alignment will not impact areas of occupancy of this species. LOW	Alignment will not impact areas of occupancy of this species. LOW
Fragment an existing important population into two or more populations	Records are already highly fragmented around the study area. Road construction may further restrict gene flow between populations. MODERATE	Records are already highly fragmented around the study area. Road construction may further restrict gene flow between populations. MODERATE	Records are already highly fragmented around the study area. Road construction may further restrict gene flow between populations. MODERATE	Records are already highly fragmented around the study area. Road construction may further restrict gene flow between populations. MODERATE
Adversely affect habitat critical to the survival of a species	Alignment will impact habitat critical to the survival of this population but unlikely the species as a whole. LOW	Alignment will impact habitat critical to the survival of this population but unlikely the species as a whole. LOW	Alignment will impact habitat critical to the survival of this population but unlikely the species as a whole. LOW	Alignment will impact habitat critical to the survival of this population but unlikely the species as a whole. LOW

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Disrupt the breeding cycle of an important population	Alignment will likely prevent breeding by direct removal of an important population. HIGH	Alignment will likely prevent breeding by direct removal of an important population. HIGH	Alignment will not impact breeding for this species. LOW	Alignment will not impact breeding for this species. LOW
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Alignment will directly remove habitat for this species resulting in a local decline. HIGH	Alignment will directly remove habitat for this species resulting in a local decline. HIGH	Alignment will not impact habitat for this species. LOW	Alignment will not impact habitat for this species. LOW
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	This alignment is close to records of this species. Road construction could facilitate weed spread into this area through construction machinery brought in and from the road itself prompting edge effects. MODERATE	This alignment is close to records of this species. Road construction could facilitate weed spread into this area through construction machinery brought in and from the road itself prompting edge effects. MODERATE	This alignment is close to records of this species. Road construction could facilitate weed spread into this area through construction machinery brought in and from the road itself prompting edge effects. MODERATE	This alignment is close to records of this species. Road construction could facilitate weed spread into this area through construction machinery brought in and from the road itself prompting edge effects. MODERATE
Introduce disease that may cause the species to decline	There are no known disease risks for this species. LOW	There are no known disease risks for this species. LOW	There are no known disease risks for this species. LOW	There are no known disease risks for this species. LOW
Interfere substantially with the recovery of the species	Alignment may impact the recovery of this species at a local level but not at a state wide level. LOW	Alignment may impact the recovery of this species at a local level but not at a state wide level. LOW	Alignment will not substantially impact the recovery of this species. LOW	Alignment will not substantially impact the recovery of this species. LOW

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Overall likelihood of a significant impact (with no mitigation measures implemented)	HIGH	HIGH	LOW	LOW
Overall mitigation measure(s)	Design of construction footprint could avoid some individuals of this species across the alignment. Weed control measures in CEMP	Design of construction footprint could avoid some individuals of this species across the alignment. Weed control measures in CEMP	Weed control measures in CEMP	Weed control measures in CEMP
Overall residual risk to MNES with mitigation measures applied	MODERATE	MODERATE	LOW	LOW
Overall likelihood of a significant impact (with mitigation measures implemented)	MODERATE	MODERATE	LOW	LOW

J3 THREATENED FAUNA

Two EPBC Act listed species have been recorded within the study area; Golden Sun Moth and Painted Honeyeater, with two further species, Growling Grass Frog and Little Galaxias deemed moderately or highly likely to occur. Assessments against the relevant significant impact criteria for each of the four species is provided below.

This is a preliminary assessment, used for options comparison only and using indicative construction footprints. For the detailed assessment for the preferred alignment using the current construction footprint, including the full suite of mitigation measures recommended, refer to Appendix Q.

J3.1 GROWLING GRASS FROG (VULNERABLE)

Growling Grass Frogs were not detected during surveys however previous records and habitat exist for them in the study area. For the purposes of the assessment, it is assumed Growling Grass Frogs are present in the study area. An assessment under the significant impact criteria has therefore been completed for the species.

An important population is defined in the significant impact guidelines as any viable population, which is:

> *one that is not isolated from other populations or waterbodies such that it has the opportunity to interact with other nearby populations or has the ability to establish new populations when waterbodies fill and become available.*

Table J.5 Assessment of potential for significant impacts upon Growling Grass Frog

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Habitat degradation in an area supporting an important population				
Permanent removal or degradation of terrestrial habitat (for example between ponds, drainage lines or other temporary/permanent habitat) within 200 metres of a water body in temperate regions, or 350 metres of a water body in semi-arid regions, that results in the loss of dispersal or overwintering opportunities for an important population.	Alignment passes through 18.44 ha of high quality potential terrestrial habitat (200 m buffer around aquatic habitat). Also mapped was 46.79 ha of medium quality terrestrial habitat. Road construction will require permanent removal of some of this potential habitat. MODERATE	Alignment passes through 18.44 ha of high quality potential terrestrial habitat (200 m buffer around aquatic habitat). Also mapped was 50.58 ha of medium quality terrestrial habitat. Road construction will require permanent removal of some of this potential habitat. MODERATE	Alignment passes through 15.50 ha of high quality potential terrestrial habitat (200 m buffer around aquatic habitat). Also mapped was 46.73 ha of medium quality terrestrial habitat. Road construction will require permanent removal of some of this potential habitat. MODERATE	Alignment passes through 15.76 ha of high quality potential terrestrial habitat (200 m buffer around aquatic habitat). Also mapped was 62.08 ha of medium quality terrestrial habitat. Road construction will require permanent removal of some of this potential habitat. MODERATE

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Alteration of aquatic vegetation diversity or structure that leads to a decrease in habitat quality.	Alignment passes through 0.37 ha of high quality potential aquatic habitat and 0.87 ha of medium quality aquatic habitat Would lead to a decrease in available potential aquatic habitat. MODERATE	Alignment passes through 0.37 ha of high quality potential aquatic habitat and 0.44 ha of medium quality aquatic habitat Would lead to a decrease in available potential aquatic habitat. MODERATE	Alignment passes through a significant wetland with 2.20 ha of high quality potential aquatic habitat as well as 0.68 ha of medium quality aquatic habitat Would lead to a decrease in available potential aquatic habitat. MODERATE	Alignment passes through 0.37 ha of high quality potential aquatic habitat and 0.73 ha of medium quality aquatic habitat Would lead to a decrease in available potential aquatic habitat. MODERATE
Alteration to wetland hydrology, diversity and structure (for example any changes to timing, duration or frequency of flood events) that leads to a decrease in habitat quality.	Minimal impact to wetland hydrology. LOW	Minimal impact to wetland hydrology. LOW	Alignment passes directly through the middle of a large wetland which will fragment it into two smaller wetlands. Considerable impacts to wetland hydrology and structure are possible. MODERATE	Minimal impact to wetland hydrology. LOW
Introduction of predatory fish and/or disease agents.	Works should not result in the introduction of any predatory fish. Works may introduce waterborne fungal pathogen Batrachochytrium dendrobatidis which causes the disease chytridiomycosis (chytrid fungus). MODERATE	Works should not result in the introduction of any predatory fish. Works may introduce waterborne fungal pathogen Batrachochytrium dendrobatidis which causes the disease chytridiomycosis (chytrid fungus). MODERATE	Works should not result in the introduction of any predatory fish. Works may introduce waterborne fungal pathogen Batrachochytrium dendrobatidis which causes the disease chytridiomycosis (chytrid fungus). MODERATE	Works should not result in the introduction of any predatory fish. Works may introduce waterborne fungal pathogen Batrachochytrium dendrobatidis which causes the disease chytridiomycosis (chytrid fungus). MODERATE

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Isolation and fragmentation of populations				
Net reduction in the number and/or diversity of water bodies available to an important population.	Potential reduction in the number and/or diversity of water bodies however unlikely to be considered an important population due to fragmentation of habitats and lower levels of consistent records throughout the study area. MODERATE	Potential reduction in the number and/or diversity of water bodies however unlikely to be considered an important population due to fragmentation of habitats and lower levels of consistent records throughout the study area. MODERATE	Potential reduction in the number and/or diversity of water bodies however unlikely to be considered an important population due to fragmentation of habitats and lower levels of consistent records throughout the study area. MODERATE	Potential reduction in the number and/or diversity of water bodies however unlikely to be considered an important population due to fragmentation of habitats and lower levels of consistent records throughout the study area. MODERATE
Removal or alteration of available terrestrial or aquatic habitat corridors (including alteration of connectivity during flood events).	Alignment passes through the middle of mapped 200m habitat buffer, removing and fragmenting potential terrestrial habitat. MODERATE	Alignment passes through the middle of mapped 200m habitat buffer, removing and fragmenting potential terrestrial habitat. MODERATE	Alignment passes through the middle of mapped 200m habitat buffer, removing and fragmenting potential terrestrial and aquatic habitat. MODERATE	Alignment passes through the middle of mapped 200m habitat buffer, removing and fragmenting potential terrestrial habitat. MODERATE
Construction of physical barriers to movement between water bodies, such as roads or buildings.	This alignment will result in the creation of a physical barrier to movement and dispersal between current habitat and the potential habitat available within the study area. MODERATE	This alignment will result in the creation of a physical barrier to movement and dispersal between current habitat and the potential habitat available within the study area. MODERATE	This alignment will result in the creation of a physical barrier to movement and dispersal between current habitat and the potential habitat available within the study area. MODERATE	This alignment will result in the creation of a physical barrier to movement and dispersal between current habitat and the potential habitat available within the study area. MODERATE

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Overall likelihood of a significant impact (with no mitigation measures implemented)	MODERATE	MODERATE	MODERATE	MODERATE
Overall mitigation measure(s)	Appropriate fauna movement culverts and crossings around wetlands incorporated into road design to maintain connectivity between potential habitat patches. Enhance habitat either side of fauna crossings by constructing small ponds either side of culvert with appropriate wetland plantings. Apply appropriate chytrid hygiene practices during construction using the threat abatement plan (DoEE 2016).	Appropriate fauna movement culverts and crossings around wetlands incorporated into road design to maintain connectivity between potential habitat patches. Enhance habitat either side of fauna crossings by constructing small ponds either side of culvert with appropriate wetland plantings. Apply appropriate chytrid hygiene practices during construction using the threat abatement plan (DoEE 2016).	Appropriate fauna movement culverts and crossings around wetlands incorporated into road design to maintain connectivity between potential habitat patches. Enhance habitat either side of fauna crossings by constructing small ponds either side of culvert with appropriate wetland plantings. Apply appropriate chytrid hygiene practices during construction using the threat abatement plan (DoEE 2016).	Appropriate fauna movement culverts and crossings around wetlands incorporated into road design to maintain connectivity between potential habitat patches. Enhance habitat either side of fauna crossings by constructing small ponds either side of culvert with appropriate wetland plantings. Apply appropriate chytrid hygiene practices during construction using the threat abatement plan (DoEE 2016).
Overall residual risk to MNES with mitigation measures applied	LOW	LOW	MODERATE	LOW

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Overall likelihood of a significant impact (with mitigation measures implemented)	LOW– whilst there appears to be a large area of terrestrial habitat affected, the potential impact on high quality habitat is low and with mitigation measures tailored to Growling Grass Frog, it is unlikely to be a significant impact.	LOW – whilst there appears to be a large area of terrestrial habitat affected, the potential impact on high quality habitat is low and with mitigation measures tailored to Growling Grass Frog, it is unlikely to be a significant impact.	MODERATE – this alignment crosses over a waterway and will remove an important wetland with high quality Growling Grass Frog habitat. There is a moderate potential for significant impact, even with mitigation measures.	LOW – whilst there appears to be a large area of terrestrial habitat affected, the potential impact on high quality habitat is low and with mitigation measures tailored to Growling Grass Frog, it is unlikely to be a significant impact.

J3.2 GOLDEN SUN MOTH (CRITICALLY ENDANGERED)

Surveys within the study area detected Golden Sun Moth in multiple locations. An assessment under the significant impact guidelines for the Golden Sun Moth (DEWHA 2009b) is provided below.

Table J.6 Assessment of potential for significant impacts upon Golden Sun Moth using the construction footprint

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Large or contiguous habitat area (>10 ha)				
Habitat loss, degradation or fragmentation >0.5 ha	Mapped area of high potential habitat >10 ha north of Martins Lane near the proposed interchange with the Western Highway. Alignment may impact on a total of 15.48 ha of habitat (combined confirmed, high and low potential habitat). Golden Sun Moths recorded in alignment. HIGH	Mapped area of high potential habitat >10 ha north of Martins Lane near the proposed interchange with the Western Highway. Alignment may impact on a total of 14.07 ha of habitat (combined confirmed, high and low potential habitat). Golden Sun Moths recorded in alignment. HIGH	Mapped area of high potential habitat >10 ha north of Martins Lane near the proposed interchange with the Western Highway. Alignment may impact on a total of 15.48 ha of habitat (combined confirmed, high and low potential habitat). Golden Sun Moths recorded in alignment. HIGH	Mapped area of high potential habitat >10 ha north of Martins Lane near the proposed interchange with the Western Highway. Alignment may impact on a total of 13.92 ha of habitat (combined confirmed, high and low potential habitat). Golden Sun Moths recorded in alignment. HIGH
Small or fragmented habitat area (<10 ha)				
Any habitat loss, degradation or fragmentation	N/A Site considered a large or contiguous habitat area.	N/A Site considered a large or contiguous habitat area.	N/A Site considered a large or contiguous habitat area.	N/A Site considered a large or contiguous habitat area.
Habitat connectivity				
Fragmentation of a population through the introduction of a barrier to dispersal	Alignment is likely to lead to an increase in habitat fragmentation and present a barrier to dispersal. HIGH	Alignment is likely to lead to an increase in habitat fragmentation and present a barrier to dispersal. HIGH	Alignment is likely to lead to an increase in habitat fragmentation and present a barrier to dispersal. HIGH	Alignment is likely to lead to an increase in habitat fragmentation and present a barrier to dispersal. HIGH

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Overall likelihood of a significant impact (with no mitigation measures implemented)	HIGH	HIGH	HIGH	HIGH
Overall mitigation measure(s)	Habitat covers parts of the alignment making total avoidance by the construction footprint difficult but amount impacted can be minimised by keeping construction footprint narrow where habitat is impacted.	Habitat covers parts of the alignment making total avoidance by the construction footprint difficult but amount impacted can be minimised by keeping construction footprint narrow where habitat is impacted.	Habitat covers parts of the alignment making total avoidance by the construction footprint difficult but amount impacted can be minimised by keeping construction footprint narrow where habitat is impacted.	Habitat covers parts of the alignment making total avoidance by the construction footprint difficult but amount impacted can be minimised by keeping construction footprint narrow where habitat is impacted.
Overall residual risk to MNES with mitigation measures applied	HIGH – Some habitat will be impacted even with avoidance and minimisation strategies.	HIGH – Some habitat will be impacted even with avoidance and minimisation strategies.	HIGH– Some habitat will be impacted even with avoidance and minimisation strategies.	HIGH – Some habitat will be impacted even with avoidance and minimisation strategies.
Overall likelihood of a significant impact (with mitigation measures implemented)	HIGH	HIGH	HIGH	HIGH

J3.3 LITTLE GALAXIAS (VULNERABLE)

Little Galaxias were not detected during 2016 targeted surveys. However, the species has previously been recorded in Yam Holes Creek near the crossing of Adamthwaite Lane in 2011, Mount. Emu Creek on Trawalla Waterloo Road in 2008 and Trawalla Road in 2006 (DELWP, 2017).

Whilst Little Galaxias is not expected to currently exist within the Beaufort Bypass study area, the species is considered to have a high likelihood of occurrence for the purposes of impact assessment as there is a reasonable likelihood that they could recolonise the catchment under suitable conditions.

The following provides an assessment under the significant impact guidelines for a Vulnerable species. Note that the threatened status of the Little Galaxias has been taken from the listed EPBC status of Dwarf Galaxias. This section was prepared by Streamline Research and edited by WSP for inclusion in this report.

Table J.7 Assessment of potential for significant impacts upon Little Galaxias

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Lead to a long-term decrease in the size of an important population of a species	Yam Holes Creek habitat has been known to support Little galaxias as recently as 2011 (DELWP, 2017) and a nearby small population in Mt. Emu Creek has been identified in the National Recovery Plan (Saddlier, Jackson & Hammer 2010). Whilst the Little Galaxias is not currently known to have a self-sustaining population within any of the six creek crossings that intercept this alignment, it can potentially be dispersed into Yam Holes Creek during flood events.	Yam Holes Creek habitat has been known to support Little galaxias as recently as 2011 (DELWP, 2017) and a nearby small population in Mt. Emu Creek has been identified in the National Recovery Plan (Saddlier, Jackson & Hammer 2010) Whilst the Little Galaxias is not currently known to have a self-sustaining population within any of the five creek crossings that intercept this alignment, it can potentially be dispersed into Yam Holes Creek during flood events.	Yam Holes Creek habitat has been known to support Little galaxias as recently as 2011 (DELWP, 2017) and a nearby small population in Mt. Emu Creek has been identified in the National Recovery Plan (Saddlier, Jackson & Hammer 2010) Whilst the Little Galaxias is not currently known to have a self-sustaining population within any of the five creek crossings or one wetland that intercept this alignment, it can potentially be dispersed into Yam Holes Creek during flood events.	Yam Holes Creek habitat has been known to support Little galaxias as recently as 2011 (DELWP, 2017) and a nearby small population in Mt. Emu Creek has been identified in the National Recovery Plan (Saddlier, Jackson & Hammer 2010) Whilst the Little Galaxias is not currently known to have a self-sustaining population within any of the seven creek crossings that intercept this alignment, it can potentially be dispersed into Yam Holes Creek during flood events.

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
	If this were to occur, construction activities may impact on water quality and habitat, which may lead to a long-term decrease in the size of an important Little Galaxias population. MODERATE	If this were to occur, construction activities may impact on water quality and habitat, which may lead to a long-term decrease in the size of an important Little Galaxias population. MODERATE	If this were to occur, construction activities may impact on water quality and habitat, which may lead to a long-term decrease in the size of an important Little Galaxias population. MODERATE	If this were to occur, construction activities may impact on water quality and habitat, which may lead to a long-term decrease in the size of an important Little Galaxias population. MODERATE
Reduce the area of occupancy of an important population	Apart from potential intrusion to waterways, there will be limited impact to areas that can be occupied by the Little Galaxias. LOW	Apart from potential intrusion to waterways, there will be limited impact to areas that can be occupied by the Little Galaxias. LOW	Apart from potential intrusion to waterways, there will be limited impact to areas that can be occupied by the Little Galaxias. LOW	Apart from potential intrusion to waterways, there will be limited impact to areas that can be occupied by the Little Galaxias. LOW
Fragment an existing important population into two or more populations	Fragmentation will not occur, as the Little Galaxias is currently not found in the Beaufort Bypass study area. Furthermore, connectivity of Yam Holes Creek and Mt. Emu Creeks will not be compromised during road construction. LOW	Fragmentation will not occur, as the Little Galaxias is currently not found in the Beaufort Bypass study area. Furthermore, connectivity of Yam Holes Creek and Mt. Emu Creeks will not be compromised during road construction. LOW	Fragmentation will not occur, as the Little Galaxias is currently not found in the Beaufort Bypass study area. Furthermore, connectivity of Yam Holes Creek and Mt. Emu Creeks will not be compromised during road construction. LOW	Fragmentation will not occur, as the Little Galaxias is currently not found in the Beaufort Bypass study area. Furthermore, connectivity of Yam Holes Creek and Mt. Emu Creeks will not be compromised during road construction. LOW

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Adversely affect habitat critical to the survival of a species	Construction will not be in reaches that are critical habitat for the Little Galaxias. The Little Galaxias has a wider natural distribution than the Beaufort area, so proposed road works will not impact on the survival of the species. LOW	Construction will not be in reaches that are critical habitat for the Little Galaxias. The Little Galaxias has a wider natural distribution than the Beaufort area, so proposed road works will not impact on the survival of the species. LOW	Construction will not be in reaches that are critical habitat for the Little Galaxias. The Little Galaxias has a wider natural distribution than the Beaufort area, so proposed road works will not impact on the survival of the species. LOW	Construction will not be in reaches that are critical habitat for the Little Galaxias. The Little Galaxias has a wider natural distribution than the Beaufort area, so proposed road works will not impact on the survival of the species. LOW
Disrupt the breeding cycle of an important population	The works are to take place in areas which currently do not support Little Galaxias populations. The project is unlikely to impact upon the breeding cycle of an important population of Little Galaxias. LOW	The works are to take place in areas which currently do not support Little Galaxias populations. The project is unlikely to impact upon the breeding cycle of an important population of Little Galaxias. LOW	The works are to take place in areas which currently do not support Little Galaxias populations. The project is unlikely to impact upon the breeding cycle of an important population of Little Galaxias. LOW	The works are to take place in areas which currently do not support Little Galaxias populations. The project is unlikely to impact upon the breeding cycle of an important population of Little Galaxias. LOW
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The Little Galaxias has a natural range through the study area. Therefore, the project could result in modification, destruction, removal or isolation or decrease the availability or quality of habitat to the extent that the species is likely to decline at a local scale. MODERATE	The Little Galaxias has a natural range through the study area. Therefore, the project could result in modification, destruction, removal or isolation or decrease the availability or quality of habitat to the extent that the species is likely to decline at a local scale. MODERATE	The Little Galaxias has a natural range through the study area. Therefore, the project could result in modification, destruction, removal or isolation or decrease the availability or quality of habitat to the extent that the species is likely to decline at a local scale. MODERATE	The Little Galaxias has a natural range through the study area. Therefore, the project could result in modification, destruction, removal or isolation or decrease the availability or quality of habitat to the extent that the species is likely to decline at a local scale. MODERATE

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The project is unlikely to result in invasive fish, as no interconnectivity waters will be linked by the road works. LOW	The project is unlikely to result in invasive fish, as no interconnectivity waters will be linked by the road works. LOW	The project is unlikely to result in invasive fish, as no interconnectivity waters will be linked by the road works. LOW	The project is unlikely to result in invasive fish, as no interconnectivity waters will be linked by the road works. LOW
Introduce disease that may cause the species to decline	The construction activities are unlikely to introduce disease that may cause the Little Galaxias to decline. LOW	The construction activities are unlikely to introduce disease that may cause the Little Galaxias to decline. LOW	The construction activities are unlikely to introduce disease that may cause the Little Galaxias to decline. LOW	The construction activities are unlikely to introduce disease that may cause the Little Galaxias to decline. LOW
Interfere substantially with the recovery of the species	The project has potential to interfere with species recovery through disruptions to habitat connectivity. MODERATE	The project has potential to interfere with species recovery through disruptions to habitat connectivity. MODERATE	The project has potential to interfere with species recovery through disruptions to habitat connectivity. MODERATE	The project has potential to interfere with species recovery through disruptions to habitat connectivity. MODERATE
Overall likelihood of a significant impact (with no mitigation measures implemented)	MODERATE	MODERATE	MODERATE	MODERATE

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Overall mitigation measure(s)	Design alignment to avoid or minimise impacts to Yam Holes Creek habitat. Ensure streamflow is uninterrupted to maintain connectivity between upstream and downstream reaches of watercourses during construction. Implement road erosion, sediment and pollution controls to protect stream habitat and water quality. Ensure controls are in accordance with the Victorian EPA best practice guidelines for the management of sediment laden runoff. Any disturbances to watercourses should be treated immediately to protect banks from erosion and sediment discharges. Store fuel and chemicals outside of flood zones and have designated refill areas to minimise the risk of pollution. Develop a contingency plan for containment, treatment and disposal of any spills.	Design alignment to avoid or minimise impacts to Yam Holes Creek habitat. Ensure streamflow is uninterrupted to maintain connectivity between upstream and downstream reaches of watercourses during construction. Implement road erosion, sediment and pollution controls to protect stream habitat and water quality. Ensure controls are in accordance with the Victorian EPA best practice guidelines for the management of sediment laden runoff. Any disturbances to watercourses should be treated immediately to protect banks from erosion and sediment discharges. Store fuel and chemicals outside of flood zones and have designated refill areas to minimise the risk of pollution. Develop a contingency plan for containment, treatment and disposal of any spills.	Alignment Design alignment to avoid or minimise impacts to Yam Holes Creek habitat. Ensure streamflow is uninterrupted to maintain connectivity between upstream and downstream reaches of watercourses during construction. Implement road erosion, sediment and pollution controls to protect stream habitat and water quality. Ensure controls are in accordance with the Victorian EPA best practice guidelines for the management of sediment laden runoff. Any disturbances to watercourses should be treated immediately to protect banks from erosion and sediment discharges. Store fuel and chemicals outside of flood zones and have designated refill areas to minimise the risk of pollution. Develop a contingency plan for containment, treatment and disposal of any spills.	Design alignment to avoid or minimise impacts to Yam Holes Creek habitat. Ensure streamflow is uninterrupted to maintain connectivity between upstream and downstream reaches of watercourses during construction. Implement road erosion, sediment and pollution controls to protect stream habitat and water quality. Ensure controls are in accordance with the Victorian EPA best practice guidelines for the management of sediment laden runoff. Any disturbances to watercourses should be treated immediately to protect banks from erosion and sediment discharges. Store fuel and chemicals outside of flood zones and have designated refill areas to minimise the risk of pollution. Develop a contingency plan for containment, treatment and disposal of any spills.
Overall residual risk to MNES with mitigation measures applied	LOW	LOW	LOW	LOW

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Overall likelihood of a significant impact (with mitigation measures implemented)	LOW	LOW	LOW	LOW

J3.4 PAINTED HONEYEATER (VULNERABLE)

Painted Honeyeater has not been formally recorded during surveys. However, an unconfirmed, but reasonably reliable, record has been provided by a local landowner on their property (Johnston, H. pers. comm. Nov 2015). The site is located in the north of the study area, west of Camp Hill State Forest on Johnston's Lane. The following provides an assessment under the significant impact guidelines for a Vulnerable species.

Table J.8 Assessment of potential for significant impacts upon Painted Honeyeater

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Lead to a long-term decrease in the size of an important population of a species	Only one record in VBA within 10 km, over 30 years ago, plus one recent land owner sighting. With this few records, there is unlikely to be an important population in the area. LOW	Only one record in VBA within 10 km, over 30 years ago, plus one recent land owner sighting. With this few records, there is unlikely to be an important population in the area. LOW	Only one record in VBA within 10 km, over 30 years ago, plus one recent land owner sighting. With this few records, there is unlikely to be an important population in the area. LOW	Only one record in VBA within 10 km, over 30 years ago, plus one recent land owner sighting. With this few records, there is unlikely to be an important population in the area. LOW
Reduce the area of occupancy of an important population	No important population present. LOW	No important population present. LOW	No important population present. LOW	No important population present. LOW
Fragment an existing important population into two or more populations	No important population present. LOW	No important population present. LOW	No important population present. LOW	No important population present. LOW

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Adversely affect habitat critical to the survival of a species	The habitat within this alignment is unlikely to constitute critical habitat for this species. The species prefers larger patches of native vegetation with high canopy cover. Due to the low number of records, species is likely to only be an occasional visitor to the area, stopping through on its northern migration. LOW	The habitat within this alignment is unlikely to constitute critical habitat for this species. The species prefers larger patches of native vegetation with high canopy cover. Due to the low number of records, species is likely to only be an occasional visitor to the area, stopping through on its northern migration. LOW	The habitat within this alignment is unlikely to constitute critical habitat for this species. The species prefers larger patches of native vegetation with high canopy cover. Due to the low number of records, species is likely to only be an occasional visitor to the area, stopping through on its northern migration. LOW	The habitat within this alignment is unlikely to constitute critical habitat for this species. The species prefers larger patches of native vegetation with high canopy cover. Due to the low number of records, species is likely to only be an occasional visitor to the area, stopping through on its northern migration. LOW
Disrupt the breeding cycle of an important population	No important population present. LOW	No important population present. LOW	No important population present. LOW	No important population present. LOW
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The habitat along this alignment is unlikely to be critical to the species' survival. The majority of records in Victoria are in larger woodland remnants to the north and east of the study area. No decline in the species is likely to result from this alignment. LOW	The habitat along this alignment is unlikely to be critical to the species' survival. The majority of records in Victoria are in larger woodland remnants to the north and east of the study area. No decline in the species is likely to result from this alignment. LOW	The habitat along this alignment is unlikely to be critical to the species' survival. The majority of records in Victoria are in larger woodland remnants to the north and east of the study area. No decline in the species is likely to result from this alignment. HIGH	The habitat along this alignment is unlikely to be critical to the species' survival. The majority of records in Victoria are in larger woodland remnants to the north and east of the study area. No decline in the species is likely to result from this alignment. LOW

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Roads can contribute to weed spread both during construction and ongoing from cars and construction vehicles bringing seeds into the area. Vegetation clearing also leaves vacant land along road verges that fast colonising species can take advantage of. MODERATE	Roads can contribute to weed spread both during construction and ongoing from cars and construction vehicles bringing seeds into the area. Vegetation clearing also leaves vacant land along road verges that fast colonising species can take advantage of. MODERATE	Roads can contribute to weed spread both during construction and ongoing from cars and construction vehicles bringing seeds into the area. Vegetation clearing also leaves vacant land along road verges that fast colonising species can take advantage of. MODERATE	Roads can contribute to weed spread both during construction and ongoing from cars and construction vehicles bringing seeds into the area. Vegetation clearing also leaves vacant land along road verges that fast colonising species can take advantage of. MODERATE
Introduce disease that may cause the species to decline	There are no known disease risks for this species. LOW	There are no known disease risks for this species. LOW	There are no known disease risks for this species. LOW	There are no known disease risks for this species. LOW
Interfere substantially with the recovery of the species	The study area is not likely to be critical habitat for this species, therefore the project is unlikely to interfere with the recovery of the species. LOW	The study area is not likely to be critical habitat for this species, therefore the project is unlikely to interfere with the recovery of the species. LOW	The study area is not likely to be critical habitat for this species, therefore the project is unlikely to interfere with the recovery of the species. LOW	The study area is not likely to be critical habitat for this species, therefore the project is unlikely to interfere with the recovery of the species. LOW
Overall likelihood of a significant impact (with no mitigation measures implemented)	LOW	LOW	LOW	LOW

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Overall mitigation measure(s)	Native vegetation removal will be minimised where possible. Weed and pathogen controls will be implemented through the CEMP.	Native vegetation removal will be minimised where possible. Weed and pathogen controls will be implemented through the CEMP.	Native vegetation removal will be minimised where possible. Weed and pathogen controls will be implemented through the CEMP.	Native vegetation removal will be minimised where possible. Weed and pathogen controls will be implemented through the CEMP.
Overall residual risk to MNES with mitigation measures applied	LOW	LOW	LOW	LOW
Overall likelihood of a significant impact (with mitigation measures implemented)	LOW	LOW	LOW	LOW

J4 THREATENED ECOLOGICAL COMMUNITIES

Two threatened ecological communities listed under the EPBC Act: Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains, and White Box – Yellow Box – Blakley's Red Gum Grassy Woodland, were identified within the relevant area. The presence of these communities was confirmed via plot analysis (see Appendix A for details).

Both communities are listed as Critically Endangered pursuant to the EPBC Act. Neither community has either a Recovery Plan or a Threat Abatement Plan.

The following impact assessment table are based on the significant impact criteria identified in the Significant Impact Guidelines (Department of the Environment 2013b).

This is a preliminary assessment, used for options comparison only and using indicative construction footprints. For the detailed assessment for the preferred alignment using the current construction footprint, including the full suite of mitigation measures recommended, refer to Appendix Q.

J4.1 SEASONAL HERBACEOUS WETLANDS (FRESHWATER) OF THE TEMPERATE LOWLAND PLAINS

Table J.9 Potential impacts on Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains using construction footprint

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Reduce the extent of an ecological community	0.06 ha in preliminary construction footprint. This amount represents a small proportion on the edge of a larger wetland complex. LOW	0.06 ha in preliminary construction footprint This amount represents a small proportion on the edge of a larger wetland complex. LOW	2.58 ha in preliminary construction footprint. This footprint cuts through the middle of a large wetland. HIGH	0.06 ha in preliminary construction footprint This amount represents a small proportion on the edge of a larger wetland complex. LOW
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	The amount of the community in this footprint is small and on the end of the complex, while it will remove some it will not create additional fragmentation. LOW	The amount of the community in this footprint is small and on the end of the complex, while it will remove some it will not create additional fragmentation. LOW	This footprint runs directly through the middle of a large wetland. The middle section will be lost with the wetland also being fragmented into two smaller wetlands. HIGH	The amount of the community in this footprint is small and on the end of the complex, while it will remove some it will not create additional fragmentation. LOW
Adversely affect habitat critical to the survival of an ecological community	This footprint will adversely affect only a small section of the wetland and unlikely to impact the survival of the remaining wetland. LOW	This footprint will adversely affect only a small section of the wetland and unlikely to impact the survival of the remaining wetland. LOW	Loss of the middle section of this wetland, fragmenting the remaining into two smaller wetlands may affect the survival of the wetland as a whole. HIGH	This footprint will adversely affect only a small section of the wetland and unlikely to impact the survival of the remaining wetland. LOW

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	Footprint will only remove a small part of a larger wetland complex. Unlikely to threaten survival of remainder of wetland. LOW	Footprint will only remove a small part of a larger wetland complex. Unlikely to threaten survival of remainder of wetland. LOW	The footprint cutting through the middle of this wetland may impact groundwater and drainage into the remaining wetland. Could impact survival of wetland. MODERATE	Footprint will only remove a small part of a larger wetland complex. Unlikely to threaten survival of remainder of wetland. LOW
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	Footprint will only remove a small part of a larger wetland complex. Unlikely to cause a substantial change in the species composition of the wetland complex as a whole. LOW	Footprint will only remove a small part of a larger wetland complex. Unlikely to cause a substantial change in the species composition of the wetland complex as a whole. LOW	The footprint cuts through the middle of the wetland where three important species are present which will cause a decline in these species. HIGH	Footprint will only remove a small part of a larger wetland complex. Unlikely to cause a substantial change in the species composition of the wetland complex as a whole. LOW

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: — assisting invasive species, that are harmful to the listed ecological community, to become established, or — causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community	The footprint removes a small wetland which forms part of a larger complex. It is possible the road could result in an increase in weed spread or contaminated run off into the remaining wetland. MODERATE	The footprint removes a small wetland which forms part of a larger complex. It is possible the road could result in an increase in weed spread or contaminated run off into the remaining wetland. MODERATE	The footprint cuts through the middle of the wetland creating two smaller wetlands on either side both at higher risk of detrimental edge effects such as weed spread and contaminated run off from the road. HIGH	The footprint removes a small wetland which forms part of a larger complex. It is possible the road could result in an increase in weed spread or contaminated run off into the remaining wetland. MODERATE
Interfere with the recovery of an ecological community	Small amount of removal unlikely to impact recovery of community. LOW	Small amount of removal unlikely to impact recovery of community. LOW	Large amount of removal of a very high quality remnant wetland likely to interfere with community recovery. HIGH	Small amount of removal unlikely to impact recovery of community. LOW

SIGNIFICANT IMPACT CRITERIA	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
	RISK TO MNES WITHOUT MITIGATION MEASURES			
Overall likelihood of a significant impact (with no mitigation measures implemented)	LOW	LOW	HIGH	LOW
Overall mitigation measure(s)	Impacts could be minimised by reducing footprint width or moving south. Control drainage and run off from road away from wetland.	Impacts could be minimised by reducing footprint width or moving south. Control drainage and run off from road away from wetland.	This wetland covers the alignment from east to west so not possible to avoid through footprint design within alignment. Control drainage and run off from road away from wetland.	Impacts could be minimised by reducing footprint width or moving south. Control drainage and run off from road away from wetland.
Overall residual risk to MNES with mitigation measures applied	LOW	LOW	HIGH	LOW
Overall likelihood of a significant impact (with mitigation measures implemented)	LOW	LOW	HIGH	LOW

J4.2 WHITE BOX – YELLOW BOX – BLAKLEY’S RED GUM GRASSY WOODLAND

Table J.10 Potential impacts on White Box – Yellow Box – Blakley’s Red Gum Grassy Woodland

	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
SIGNIFICANT IMPACT CRITERIA				
Reduce the extent of an ecological community	2.64 ha in preliminary construction footprint. Footprint will reduce the extent of two geographically separate patches of this community. HIGH	0.65 ha in preliminary construction footprint. Footprint will reduce the extent of one patch of this community. LOW	3.97 ha in preliminary construction footprint. Footprint will reduce the extent of a large patch of this community. HIGH	Alignment C2 does not impact any of this community. LOW
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	The part of one patch to be impacted is on the edge and will not lead to fragmentation of the community. The larger patch will be fragmented into two smaller patches by the road footprint. MODERATE	The part of the patch to be impacted is on the edge and will not lead to fragmentation of the community. LOW	The footprint cuts through the middle of a large patch of this community which will fragment it into two smaller patches. HIGH	LOW
Adversely affect habitat critical to the survival of an ecological community	Footprint will impact a portion of the ecological community but unlikely to impact survival of the remaining community. However, the smaller fragmented patch will no longer be large enough to meet the criteria of the community. MODERATE	Footprint will impact a portion of the ecological community but unlikely to impact survival of the remaining community. LOW	Footprint will impact a portion of the ecological community but unlikely to impact survival of the remaining community. HIGH	LOW

	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
SIGNIFICANT IMPACT CRITERIA				
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	Road may impact surface water run off into the community. MODERATE	Road may impact surface water run off into the community. MODERATE	Road may impact surface water run off into the community. MODERATE	LOW
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	Footprint will result in a loss of a portion of the community as a whole including all species present. MODERATE	Footprint will result in a loss of a portion of the community as a whole including all species present. MODERATE	Footprint will result in a loss of a portion of the community as a whole including all species present. MODERATE	LOW

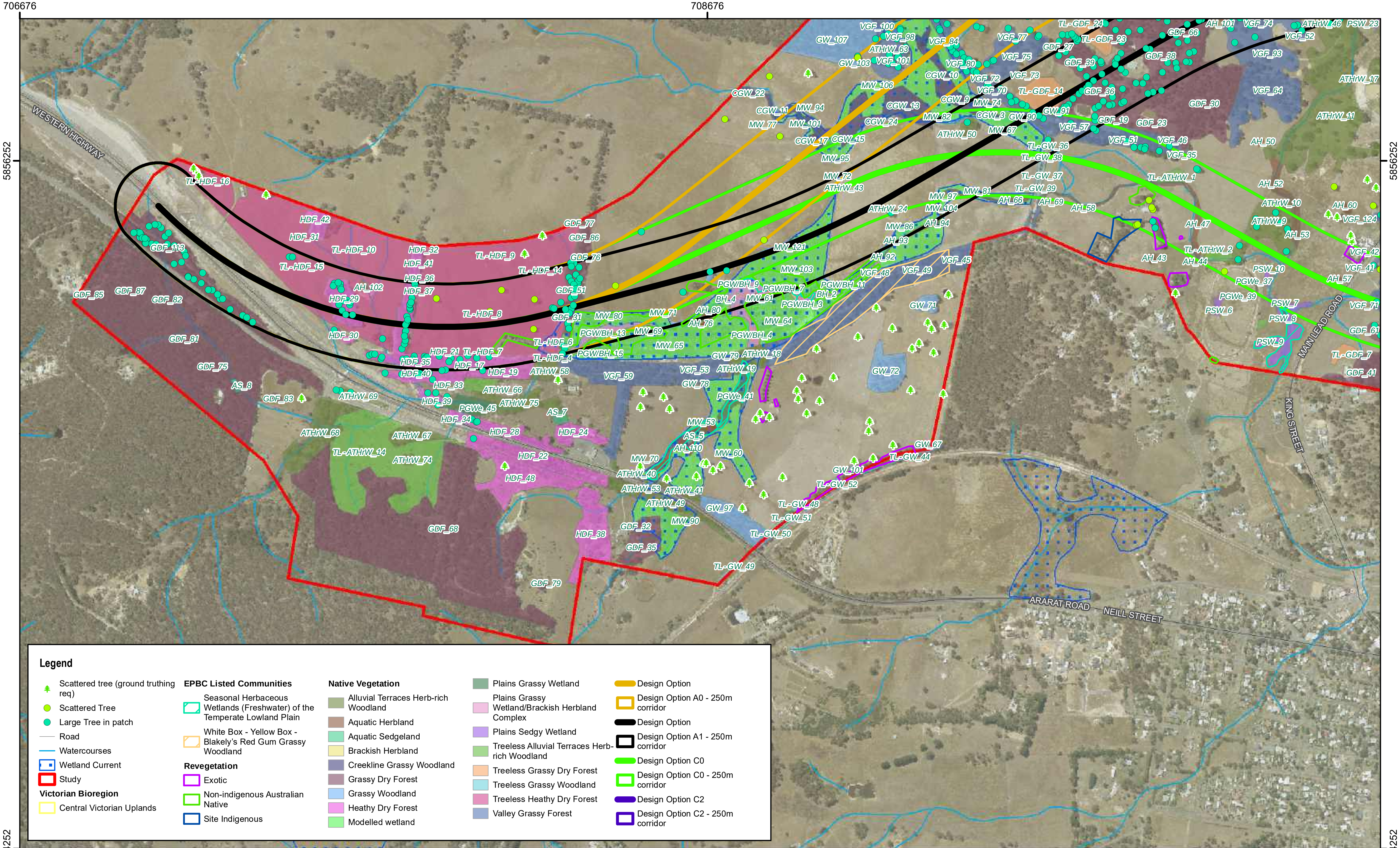
	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
SIGNIFICANT IMPACT CRITERIA				
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: — assisting invasive species, that are harmful to the listed ecological community, to become established, or — causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community	Construction of the road will open the community to pressures from edge effects including weed invasion and contaminated run off. MODERATE	Construction of the road will open the community to pressures from edge effects including weed invasion and contaminated run off. MODERATE	Construction of the road will open the community to pressures from edge effects including weed invasion and contaminated run off. MODERATE	LOW
Interfere with the recovery of an ecological community	The large amount of the community impacted in multiple patches and through the middle of a large patch is likely to interfere with the recovery of the community.	Only a small amount on the edge of a patch will be impacted and unlikely to interfere with the recovery of the community. LOW	The large amount of the community impacted in multiple patches and through the middle of a large patch is likely to interfere with the recovery of the community. HIGH	LOW

	ALIGNMENT OPTION A0	ALIGNMENT OPTION A1	ALIGNMENT OPTION C0	ALIGNMENT OPTION C2
SIGNIFICANT IMPACT CRITERIA				
Overall likelihood of a significant impact (with no mitigation measures implemented)	HIGH	LOW	HIGH	LOW
Overall mitigation measure(s)	If design of footprint could be moved south, one patch cold be avoided and a second patch impacted on the edge rather than through the middle of the community	NA	Footprint cuts through middle of community, not possible to re-design to avoid.	NA
Overall residual risk to MNES with mitigation measures applied	MODERATE	LOW	HIGH	LOW
Overall likelihood of a significant impact (with mitigation measures implemented)	MODERATE	LOW	HIGH	LOW

APPENDIX K

MAPS OF NATIVE VEGETATION AND IMPACTS

APPENDIX K-1
MAP OF NATIVE VEGETATION AND TREES



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Date: 12-Feb-21	Approved by: -		
Data source: VicRoads, Trimble			Coordinate system: GDA 1994 MGA Zone 54 Scale ratio correct when printed at A3

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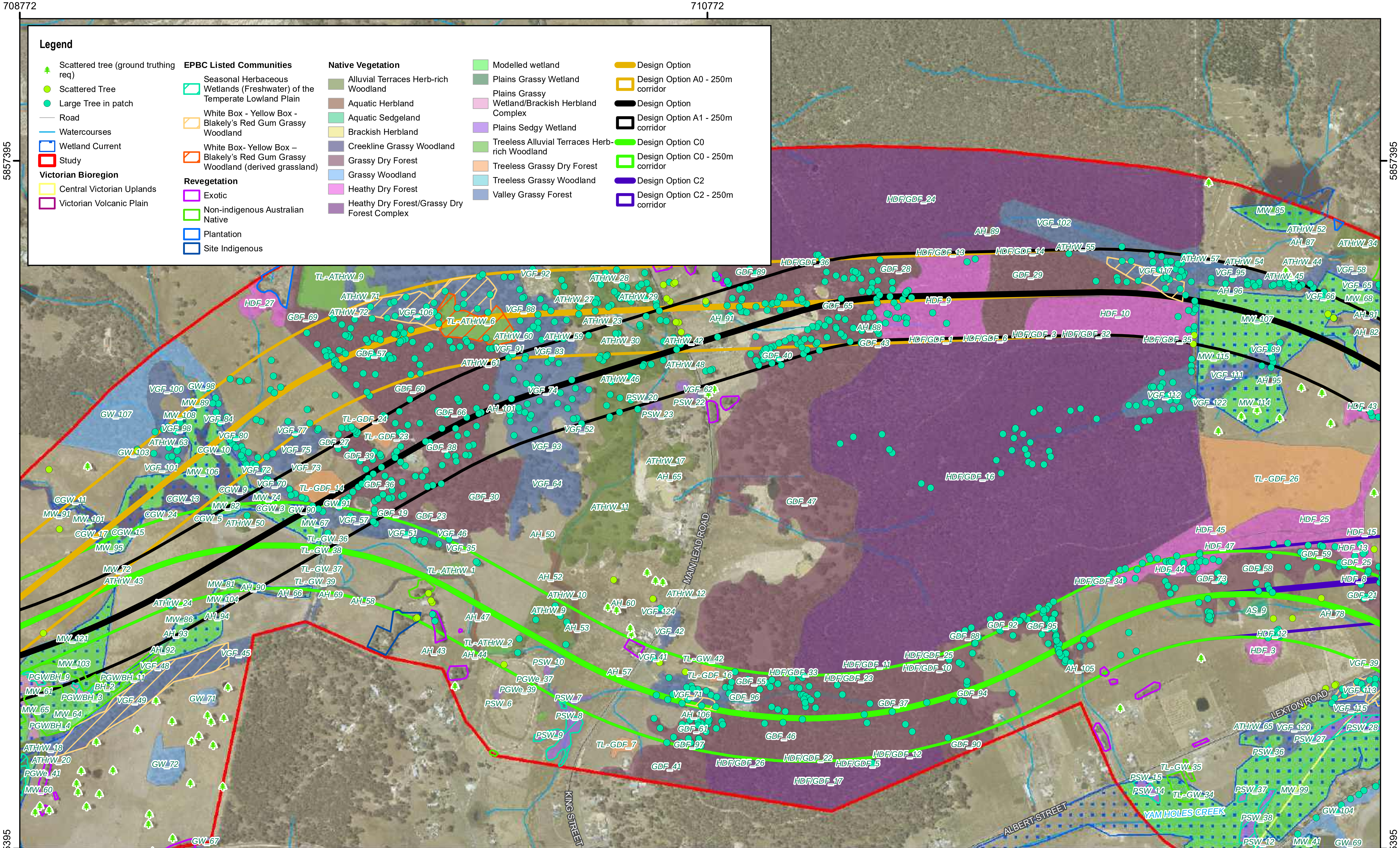
Native Vegetation
Map 1



Map: 2270290A_GIS_073_A4	Author: AS
Date: 12-Feb-21	Approved by: -

Data source: VicRoads, Trimble

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Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3

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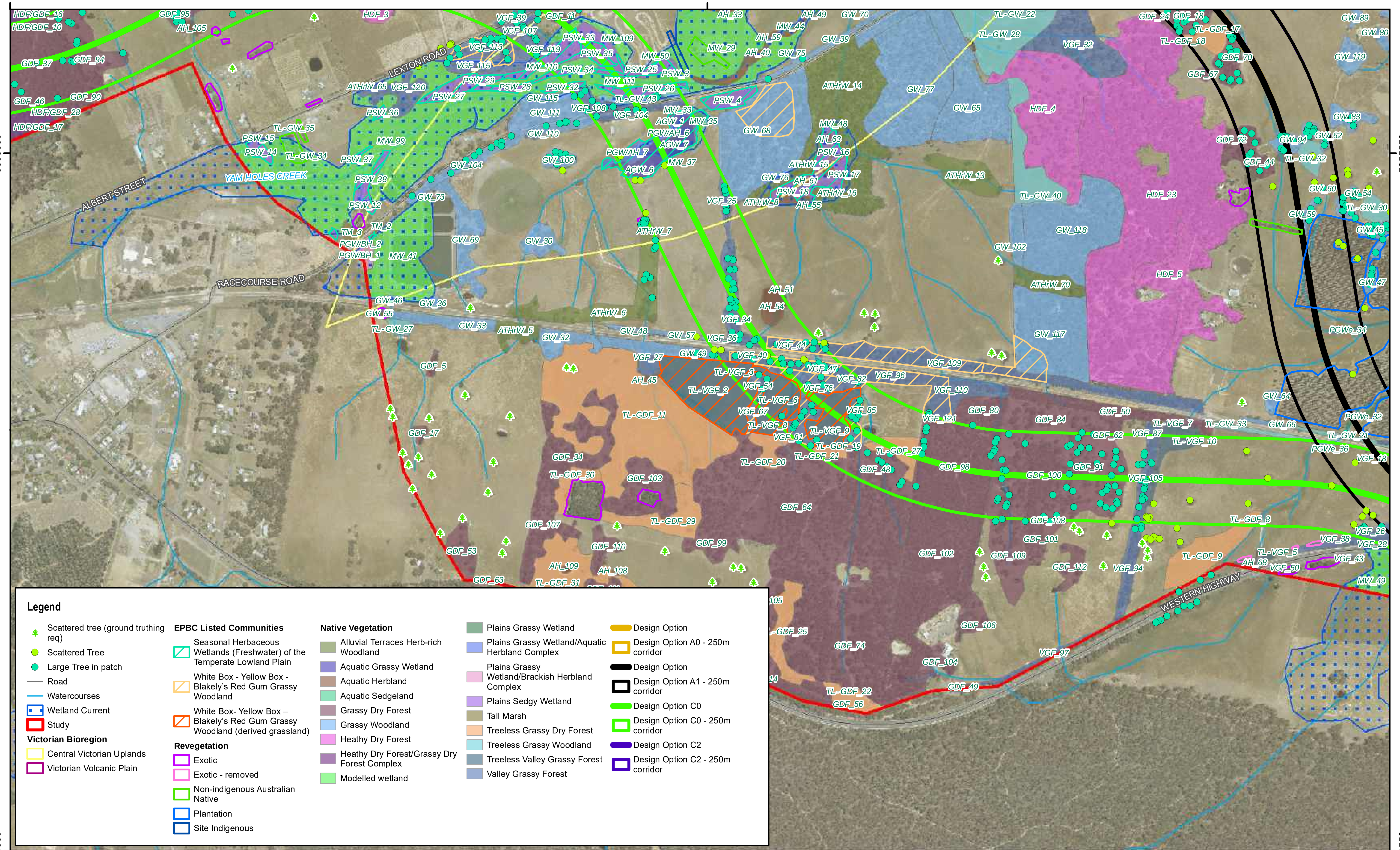
Native Vegetation
Map 2



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Date: 12-Feb-21	Approved by: -		
Data source: VicRoads, Trimble		Coordinate system: GDA 1994 MGA Zone 54 Scale ratio correct when printed at A3	

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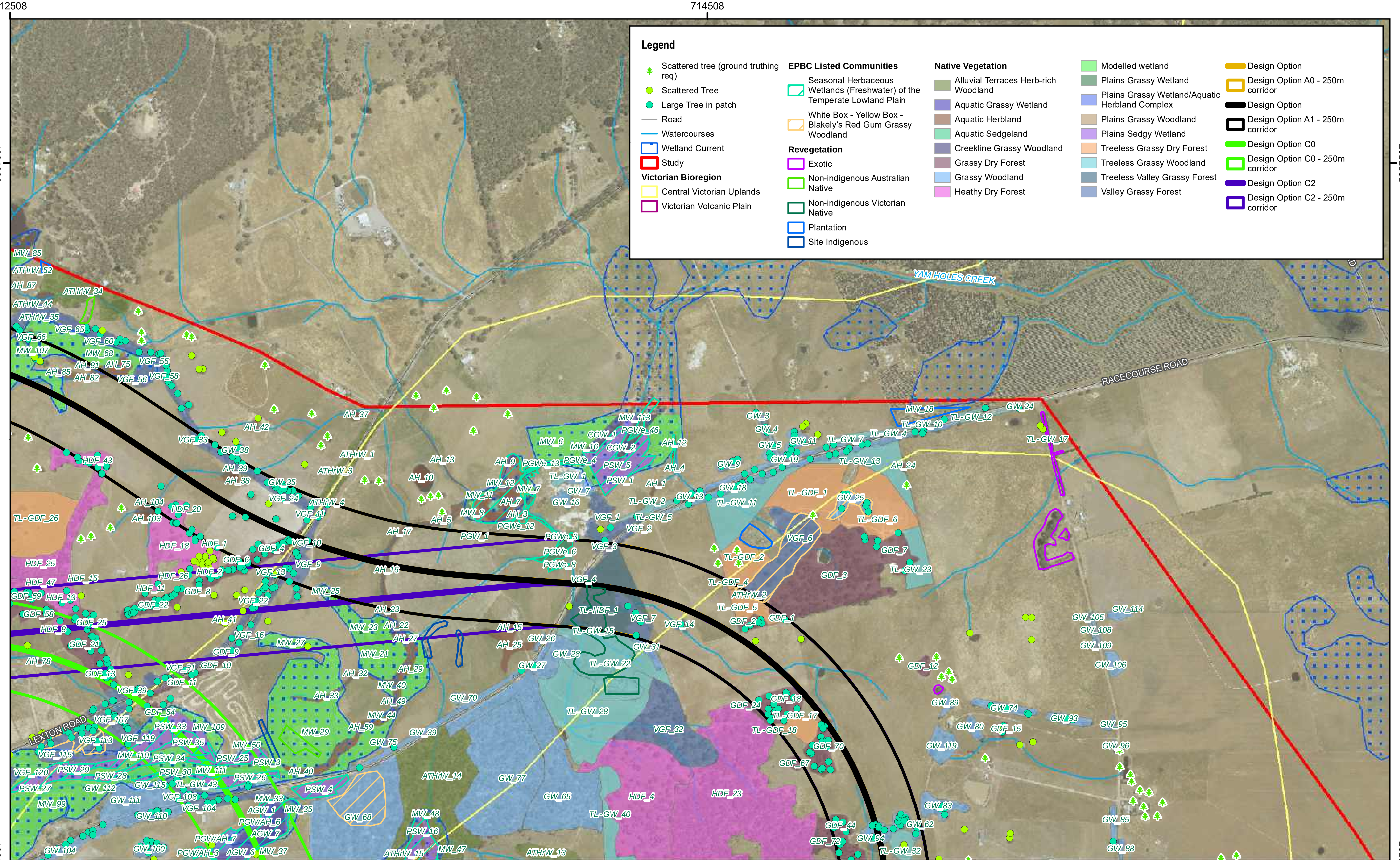
Native Vegetation
Map 3



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Date: 12-Feb-21	Approved by: -	Coordinate system: GDA 1994 MGA Zone 54 Scale ratio correct when printed at A3	Native Vegetation Map 4

Data source: VicRoads, Trimble

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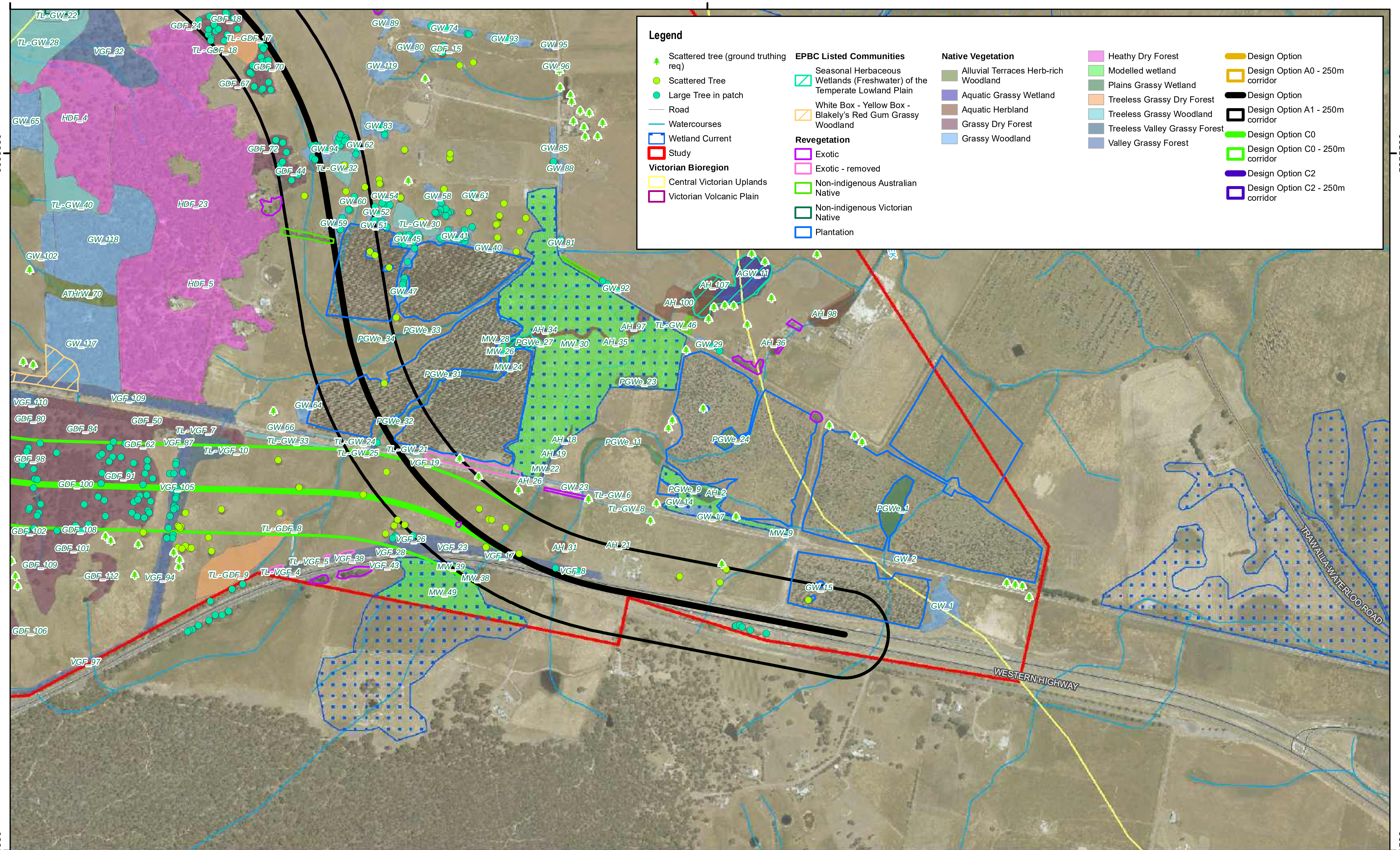

Map: 2270290A_GIS_073_A4	Author: AS
Date: 12-Feb-21	Approved by: -

Data source: VicRoads, Trimble

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Native Vegetation
Map 5

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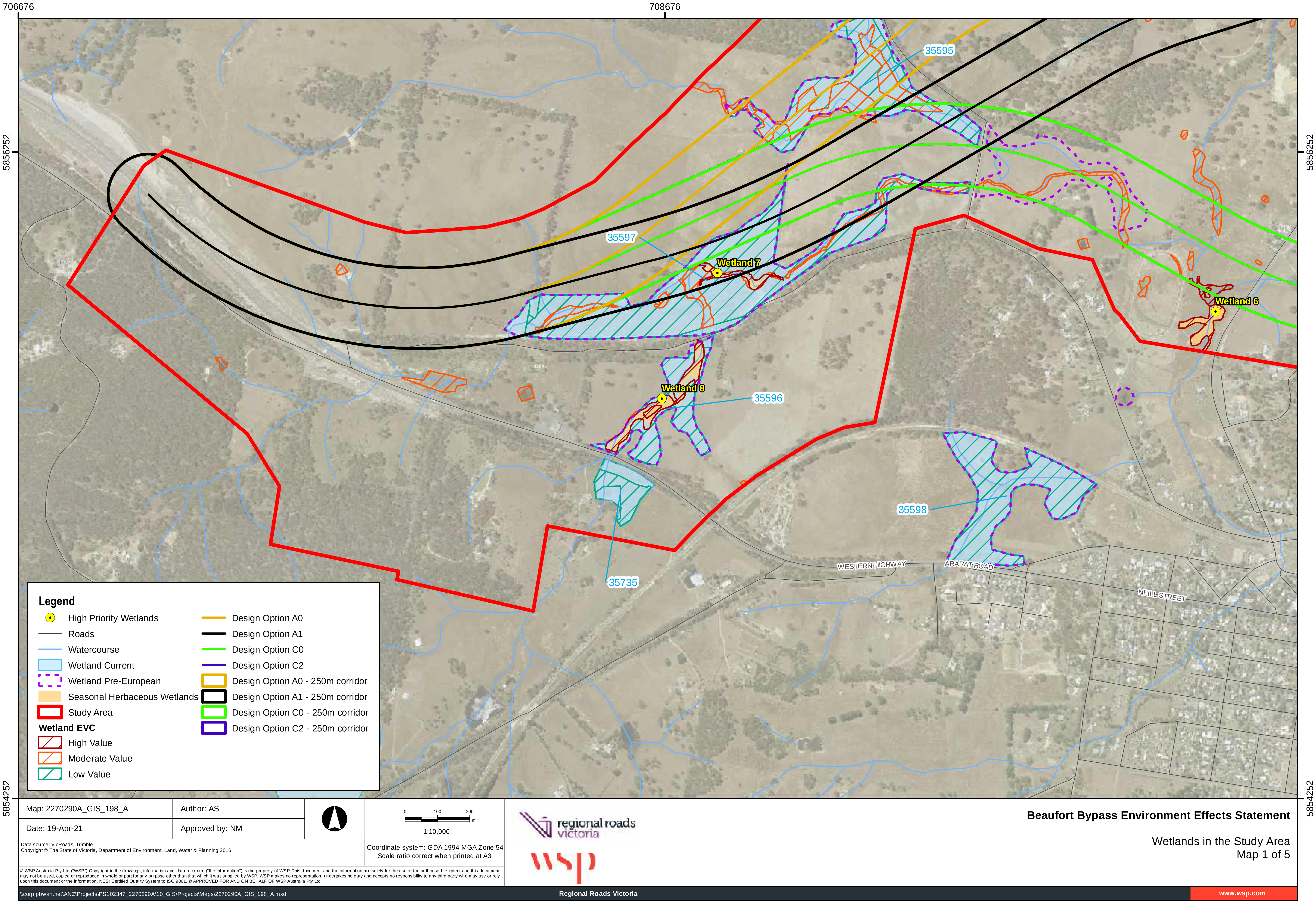
APPENDIX K-2
WETLANDS


706676
708676
5856252
5854252
35595
35597
Wetland 7
Wetland 6
Wetland 8
35596
35598
35735
WESTERN HIGHWAY
ARARAT ROAD
NEILL STREET
Legend
High Priority Wetlands
Roads
Watercourse
Wetland Current
Wetland Pre-European
Seasonal Herbaceous Wetlands
Study Area
Wetland EVC
High Value
Moderate Value
Low Value
Design Option A0
Design Option A1
Design Option C0
Design Option C2
Design Option A0 - 250m corridor
Design Option A1 - 250m corridor
Design Option C0 - 250m corridor
Design Option C2 - 250m corridor
Map: 2270290A_GIS_198_A
Author: AS
Date: 19-Apr-21
Approved by: NM
Data source: VicRoads, Trimble
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Coordinate system: GDA 1994 MGA Zone 54
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Wetlands in the Study Area
Map 1 of 5
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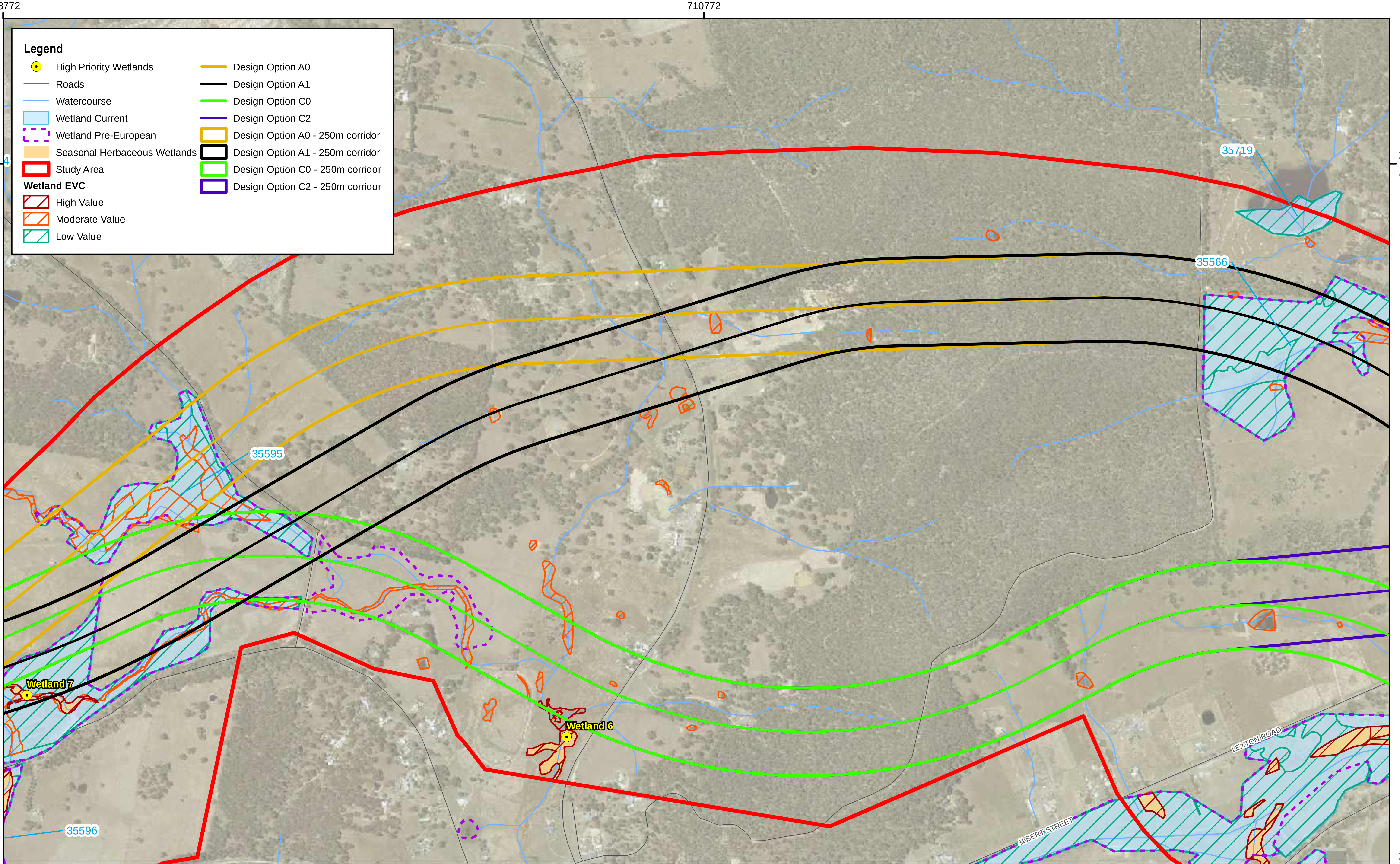

Map: 2270290A_GIS_198_A	Author: AS	0 100 200 m 1:10,000	**Beaufort Bypass Environment Effects Statement**
Date: 19-Apr-21	Approved by: NM	Coordinate system: GDA 1994 MGA Zone 54 Scale ratio correct when printed at A3	Wetlands in the Study Area Map 2 of 5

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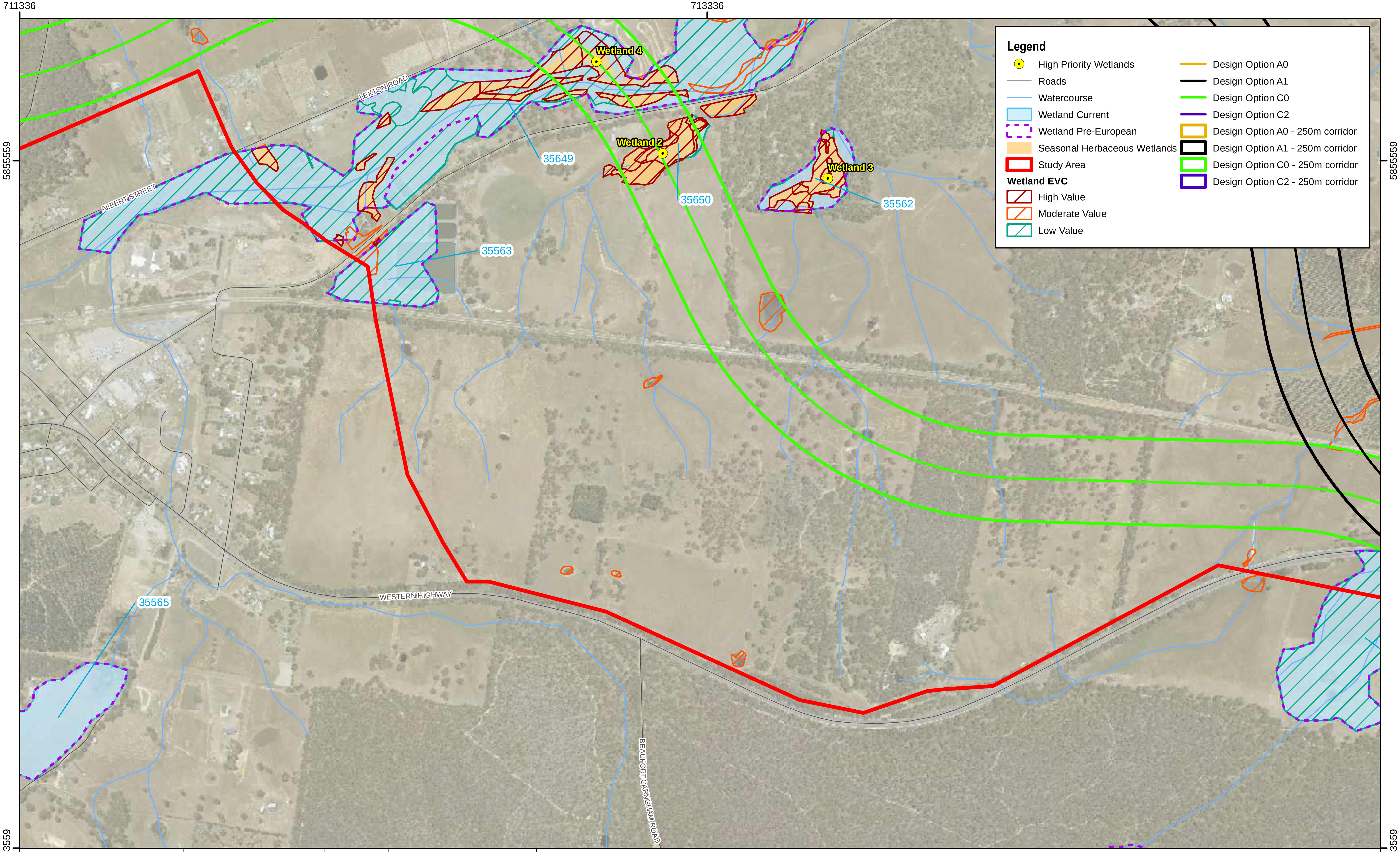

Map: 2270290A_GIS_198_A	Author: AS
Date: 19-Apr-21	Approved by: NM

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Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3

Data source: VicRoads, Trimble

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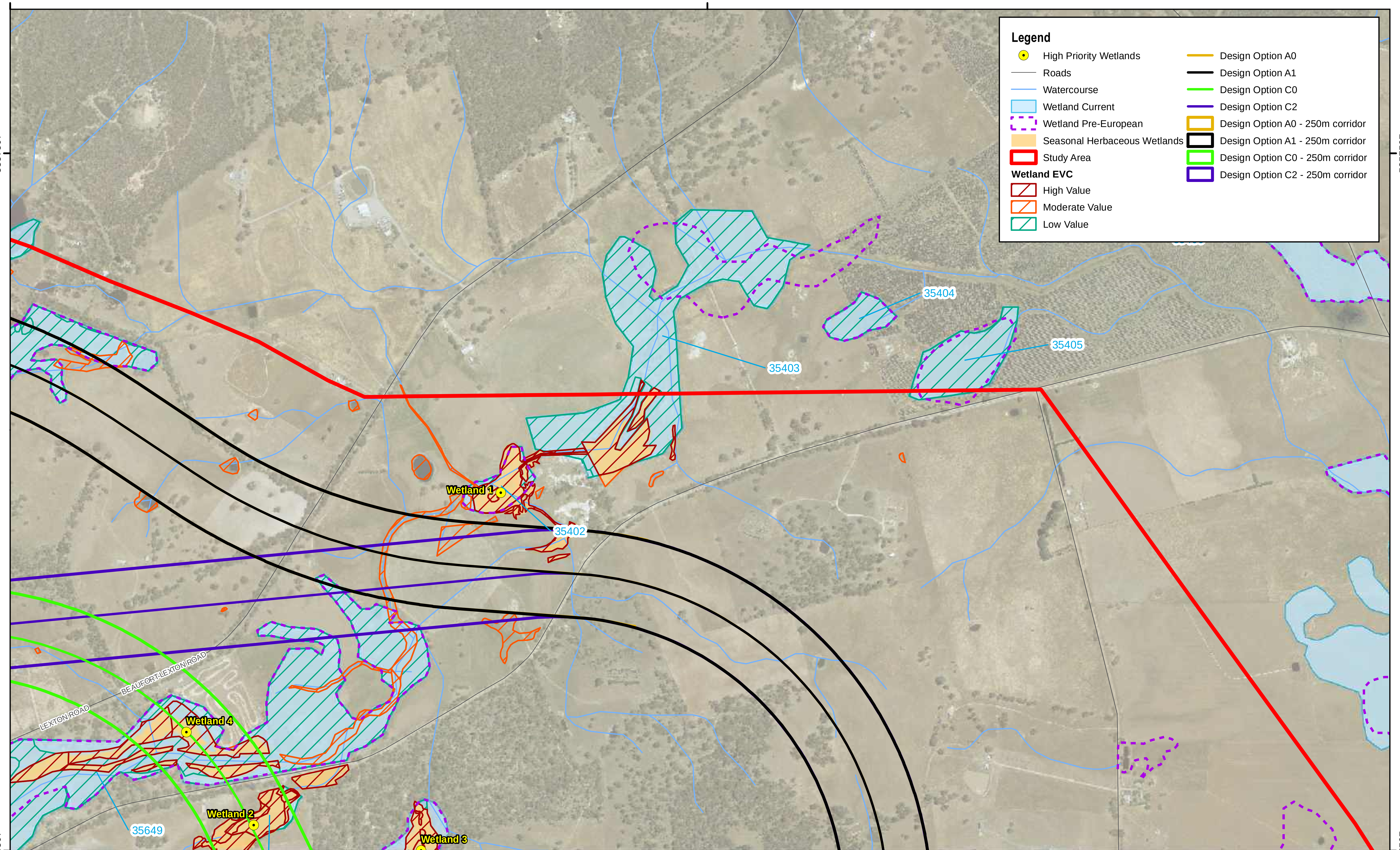
Wetlands in the Study Area
Map 3 of 5



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Date: 19-Apr-21 | Approved by: NM

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Coordinate system: GDA 1994 MGA Zone 54
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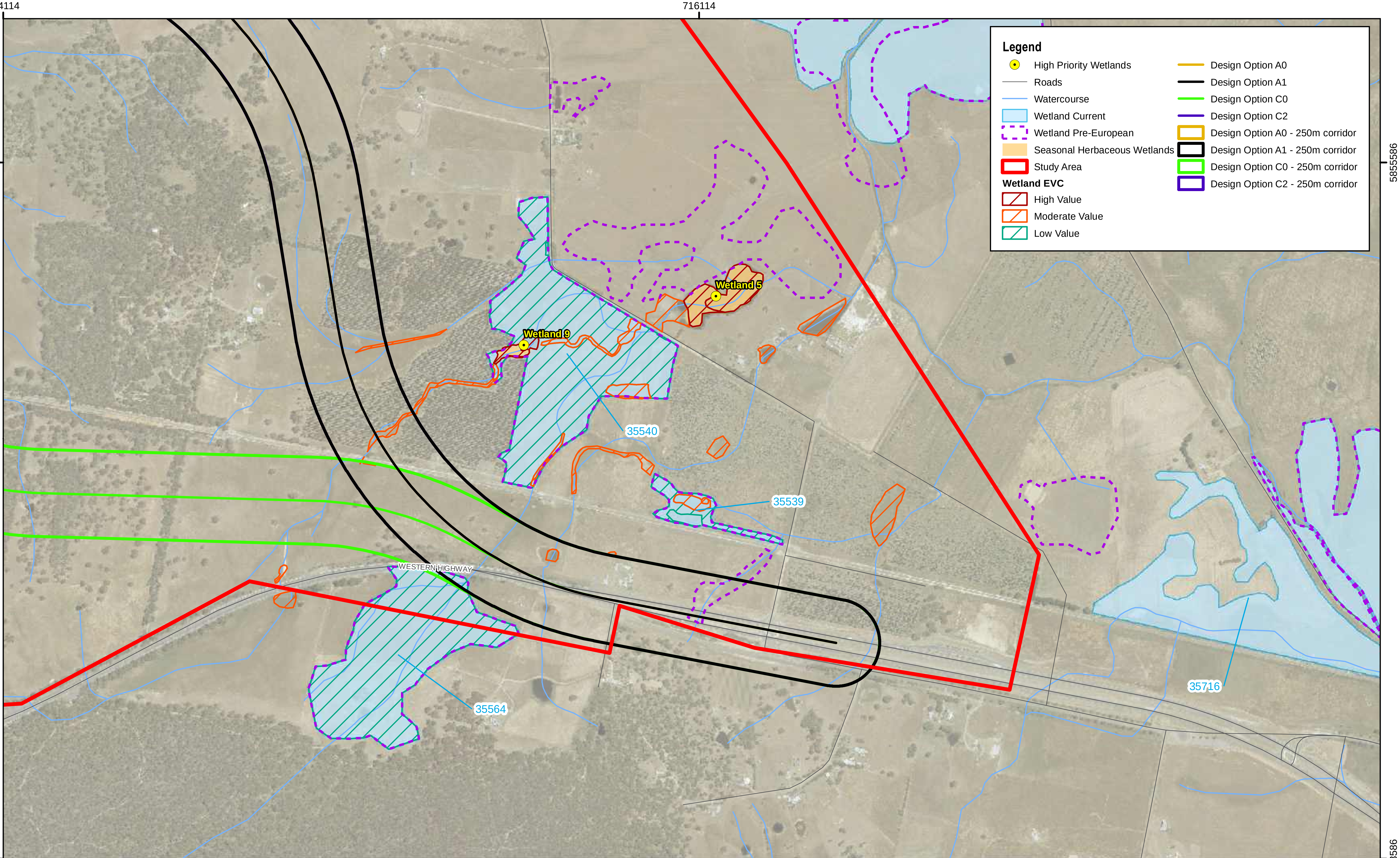
Wetlands in the Study Area
Map 4 of 5



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Data source: VicRoads, Trimble

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Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3

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Wetlands in the Study Area
Map 5 of 5

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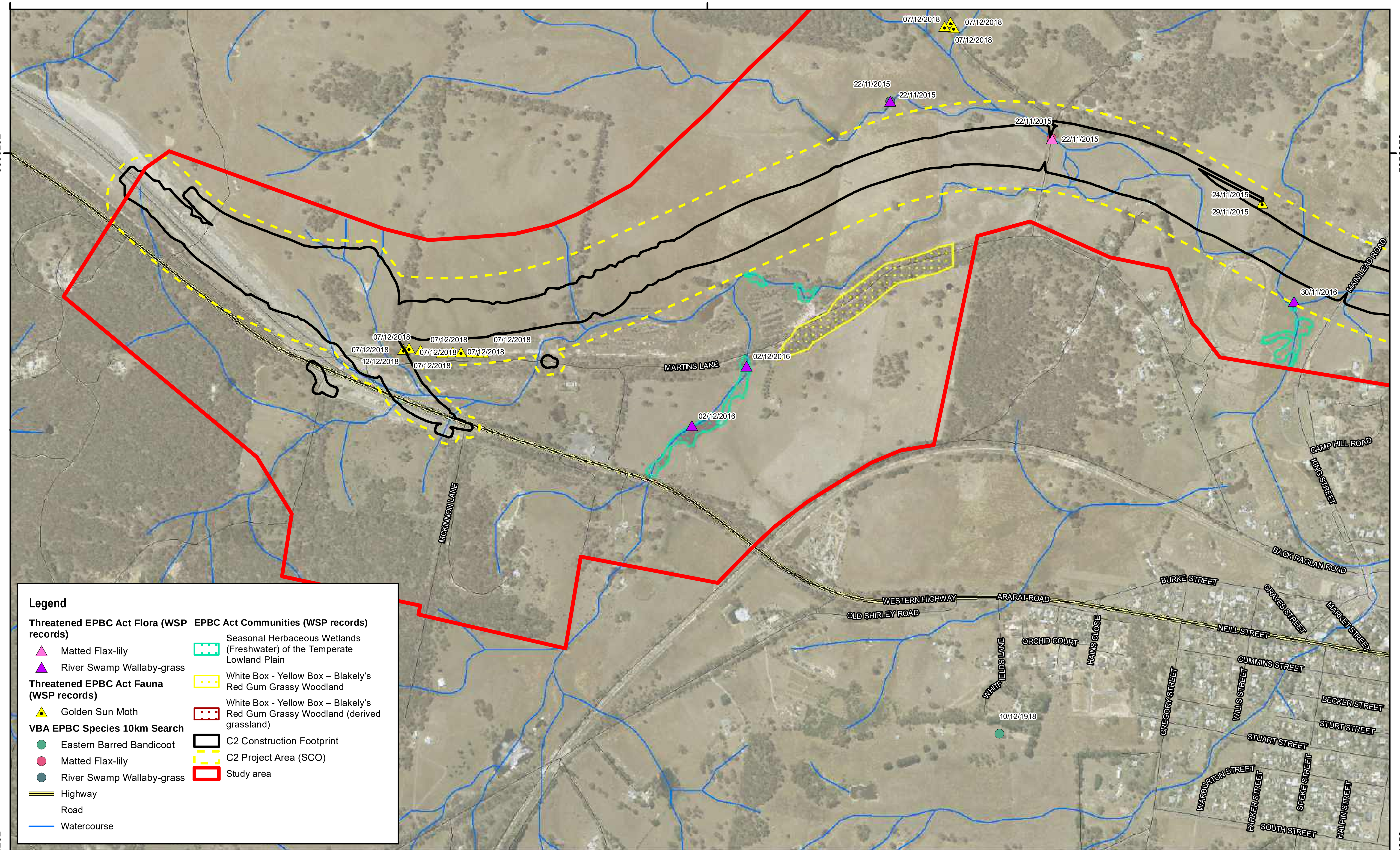
APPENDIX K-3
MAP OF EPBC ACT MNES



Map: 2270290A_GIS_207_A1	Author: AS
Date: 19-Jan-21	Approved by: -

Data source: VicRoads, Trimble
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EPBC Act Matters of National Environmental Significance (MNES)
Map 1 of 5

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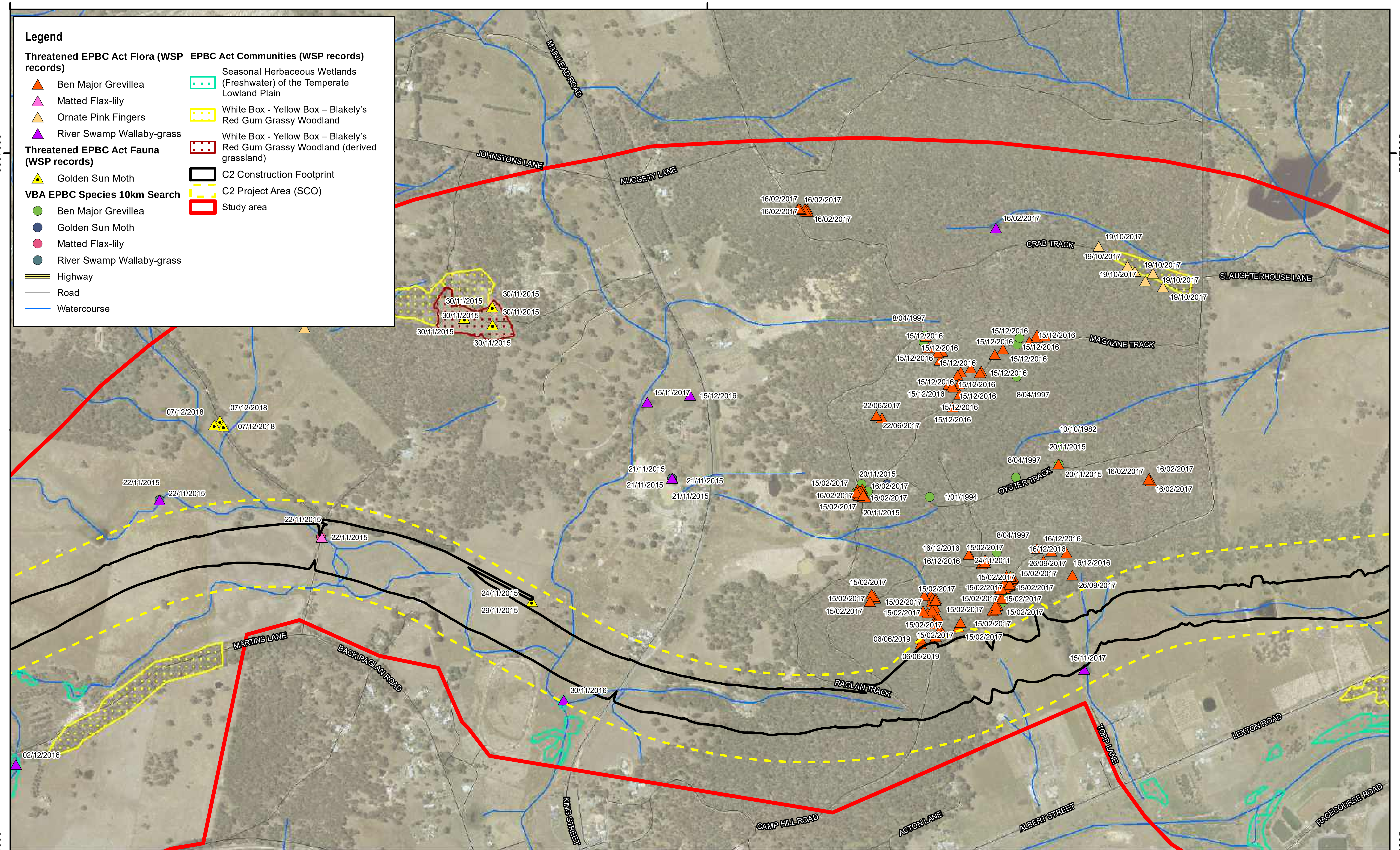

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Map: 2270290A_GIS_207_A1	Author: AS	
Date: 19-Jan-21	Approved by: -	

Data source: VicRoads, Trimble

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EPBC Act Matters of National Environmental Significance (MNES)
Map 2 of 5

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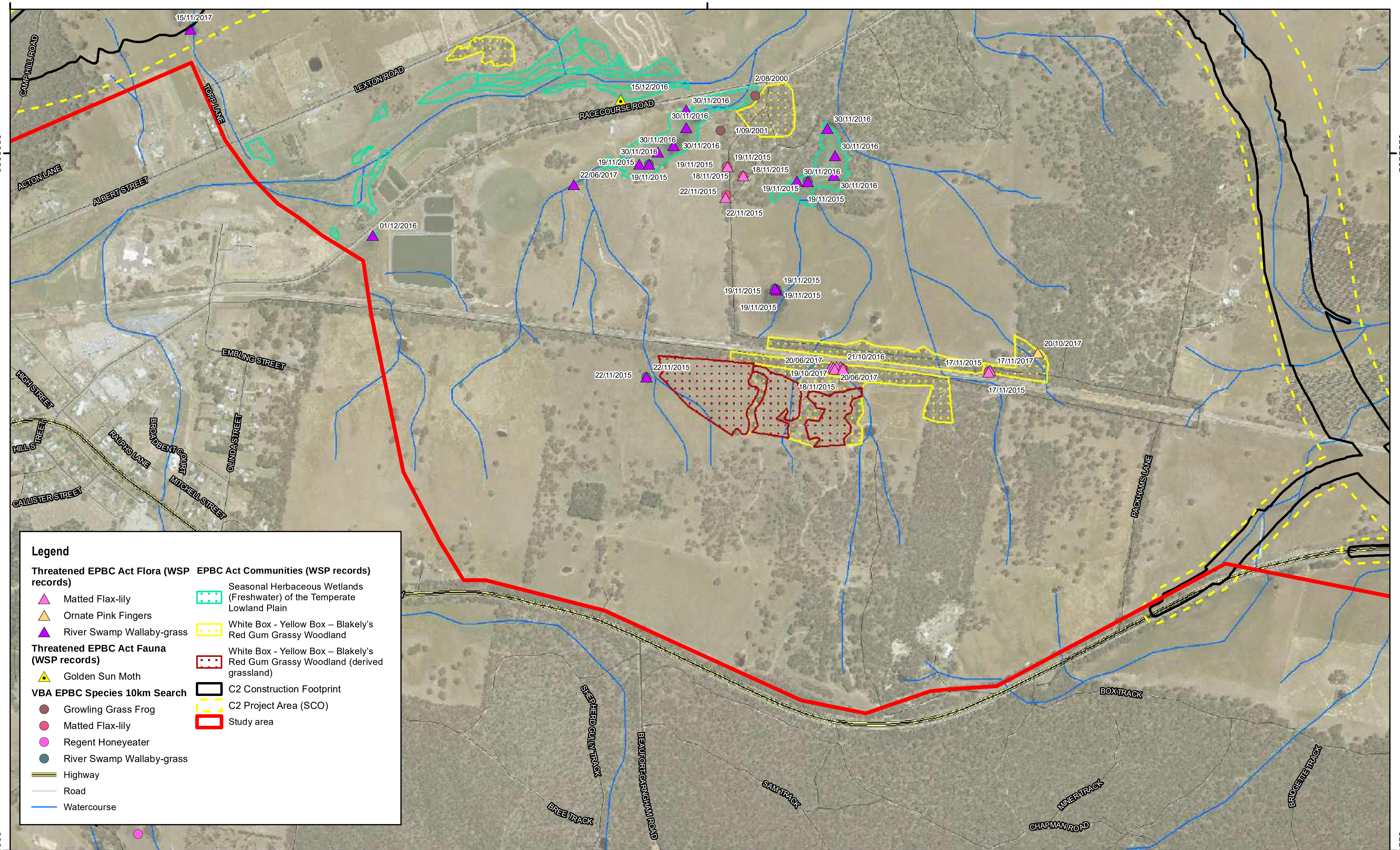

Legend

Threatened EPBC Act Flora (WSP records)
- Matted Flax-lily
- Ornate Pink Fingers
- River Swamp Wallaby-grass

Threatened EPBC Act Fauna (WSP records)
- Golden Sun Moth

VBA EPBC Species 10km Search
- Growling Grass Frog
- Matted Flax-lily
- Regent Honeyeater
- River Swamp Wallaby-grass
- Highway
- Road
- Watercourse

EPBC Act Communities (WSP records)
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plain
- White Box - Yellow Box – Blakely's Red Gum Grassy Woodland
- White Box - Yellow Box – Blakely's Red Gum Grassy Woodland (derived grassland)
- C2 Construction Footprint
- C2 Project Area (SCO)
- Study area

Map: 2270290A_GIS_207_A1	Author: AS
Date: 19-Jan-21	Approved by: -

Data source: VicRoads, Trimble

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Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3

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EPBC Act Matters of National Environmental Significance (MNES)
Map 3 of 5

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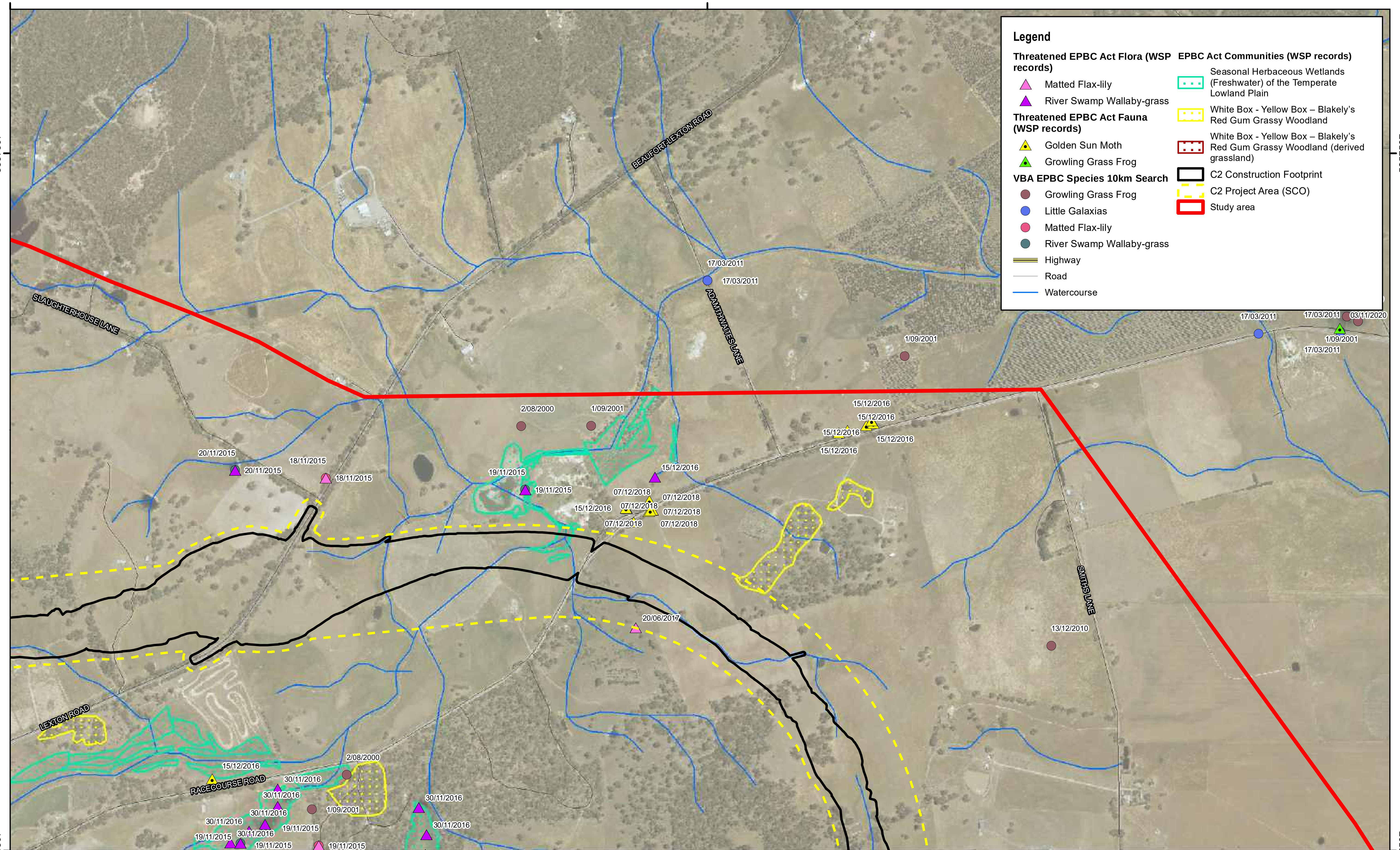

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Date: 19-Jan-21 | Approved by: -

Data source: VicRoads, Trimble

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EPBC Act Matters of National Environmental Significance (MNES)
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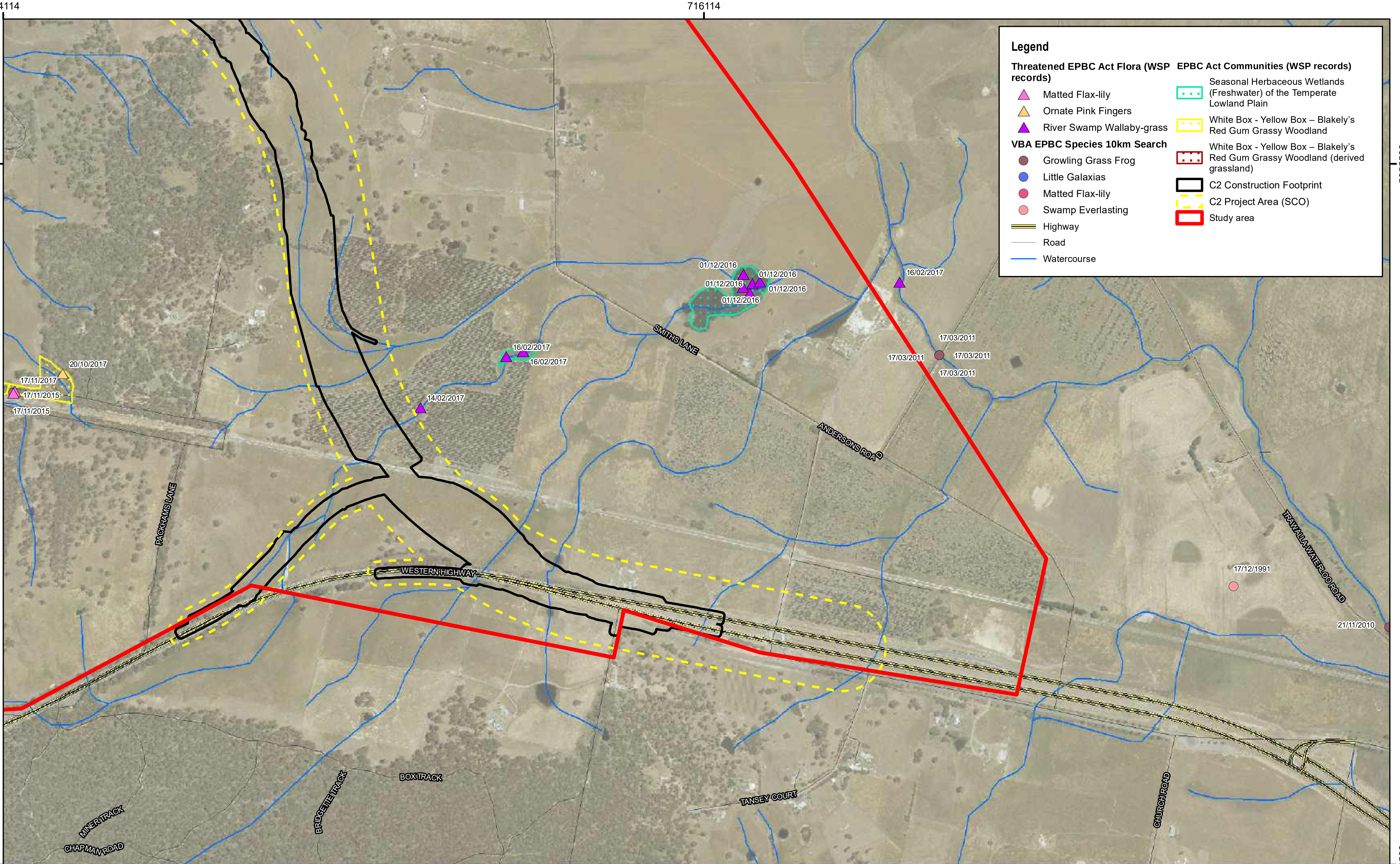

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Date: 19-Jan-21	Approved by: -

Data source: VicRoads, Trimble

Coordinate system: GDA 1994 MGA Zone 54
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EPBC Act Matters of National Environmental Significance (MNES)
Map 5 of 5

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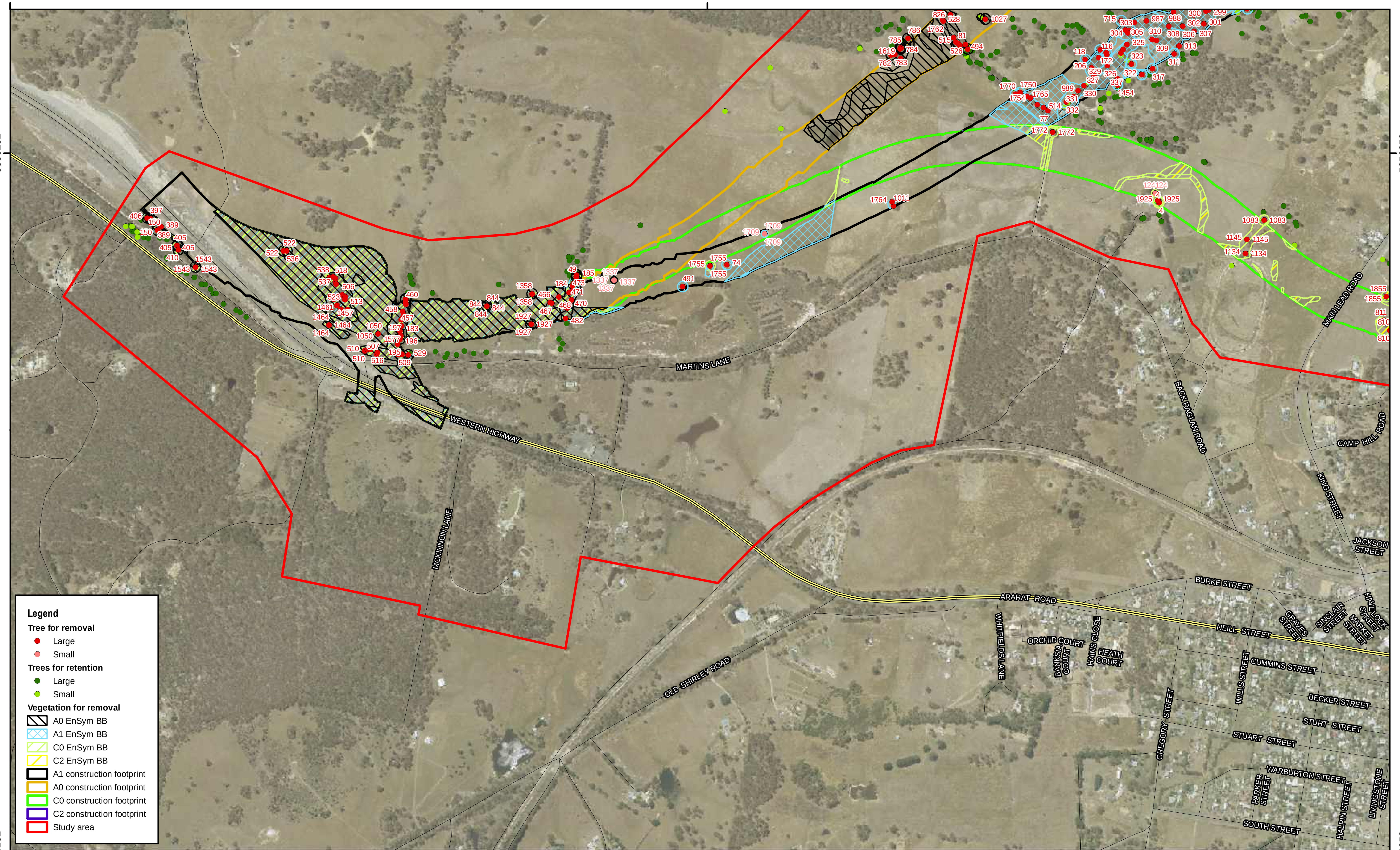
APPENDIX K-4
MAP OF NATIVE VEGETATION IMPACTS AND TREE LOSSES – OPTIONS ASSESSMENT

Map series shows all native vegetation used in DELWP's EnSym software to calculate offset requirements. Tree losses include those with greater than 10% impact on Tree Protection Zones.



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Date: 14/03/2018	Approved by: -

Data source: VicRoads, Trimble

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Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3

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Figure ###
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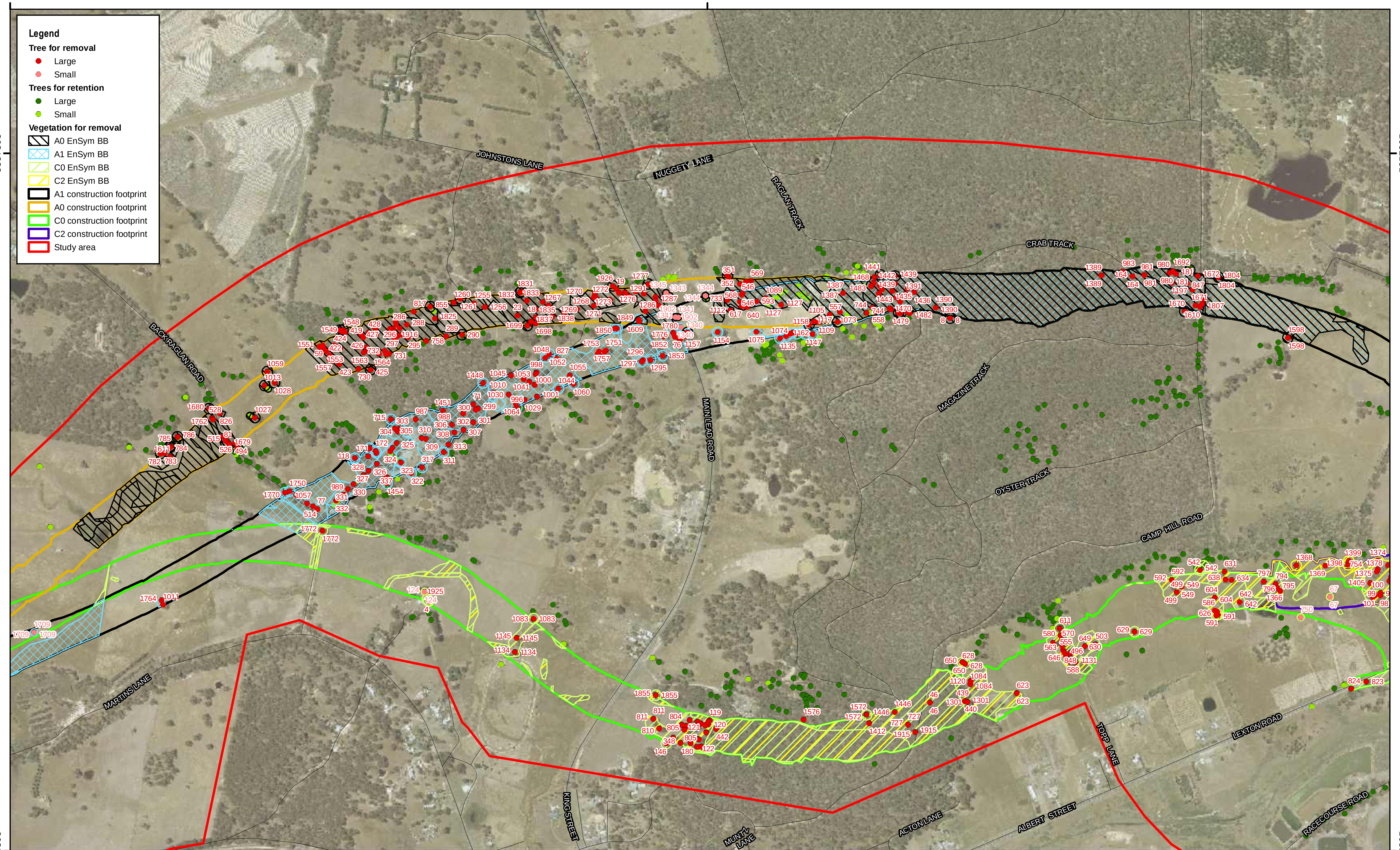
Map 1



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Date: 14/03/2018	Approved by: -			
Data source: VicRoads, Trimble			Coordinate system: GDA 1994 MGA Zone 54 Scale ratio correct when printed at A3	

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Figure ###
####
Map 2

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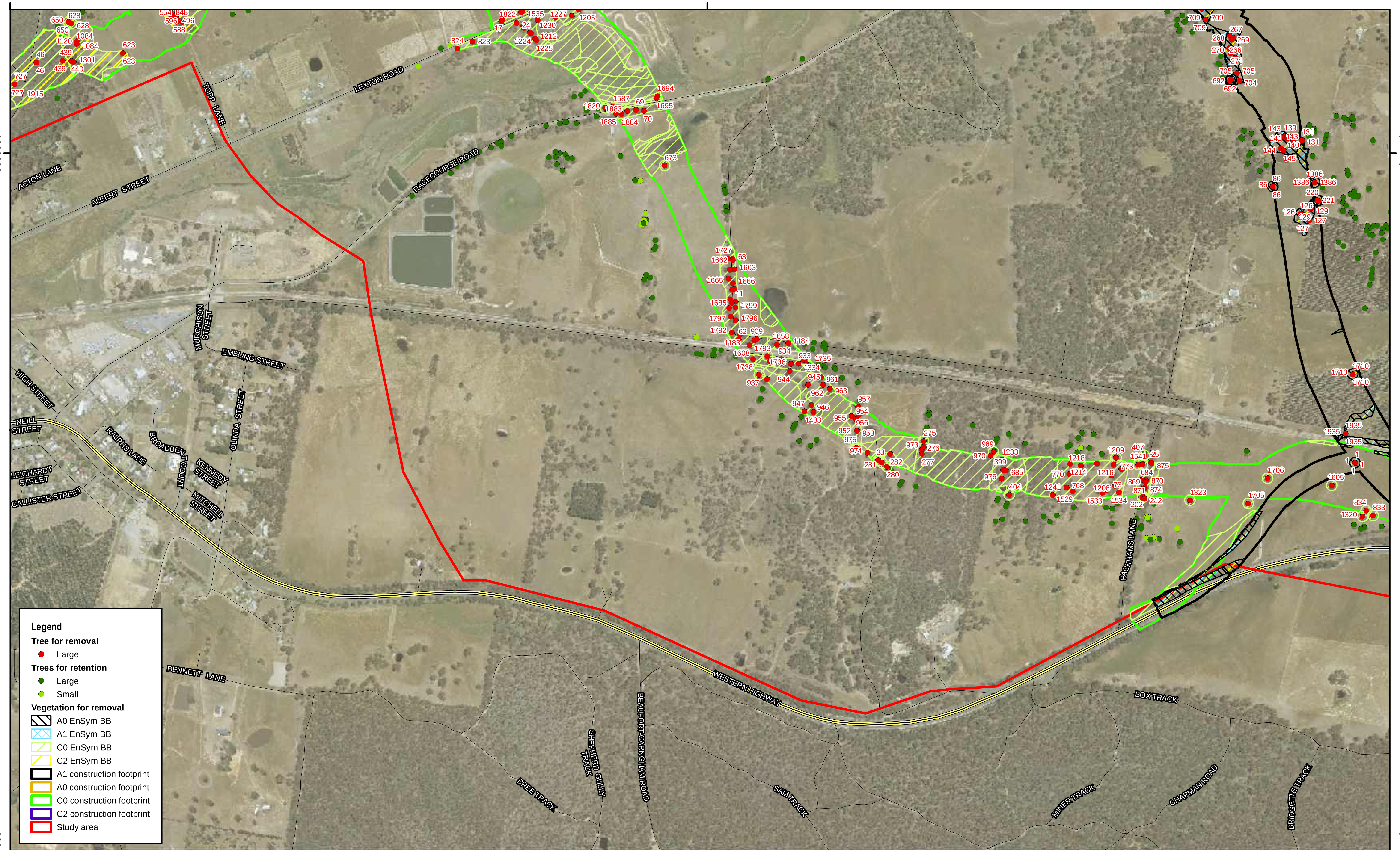

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Date: 14/03/2018	Approved by: -		

Data source: VicRoads, Trimble
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Figure ###
####
Map 3

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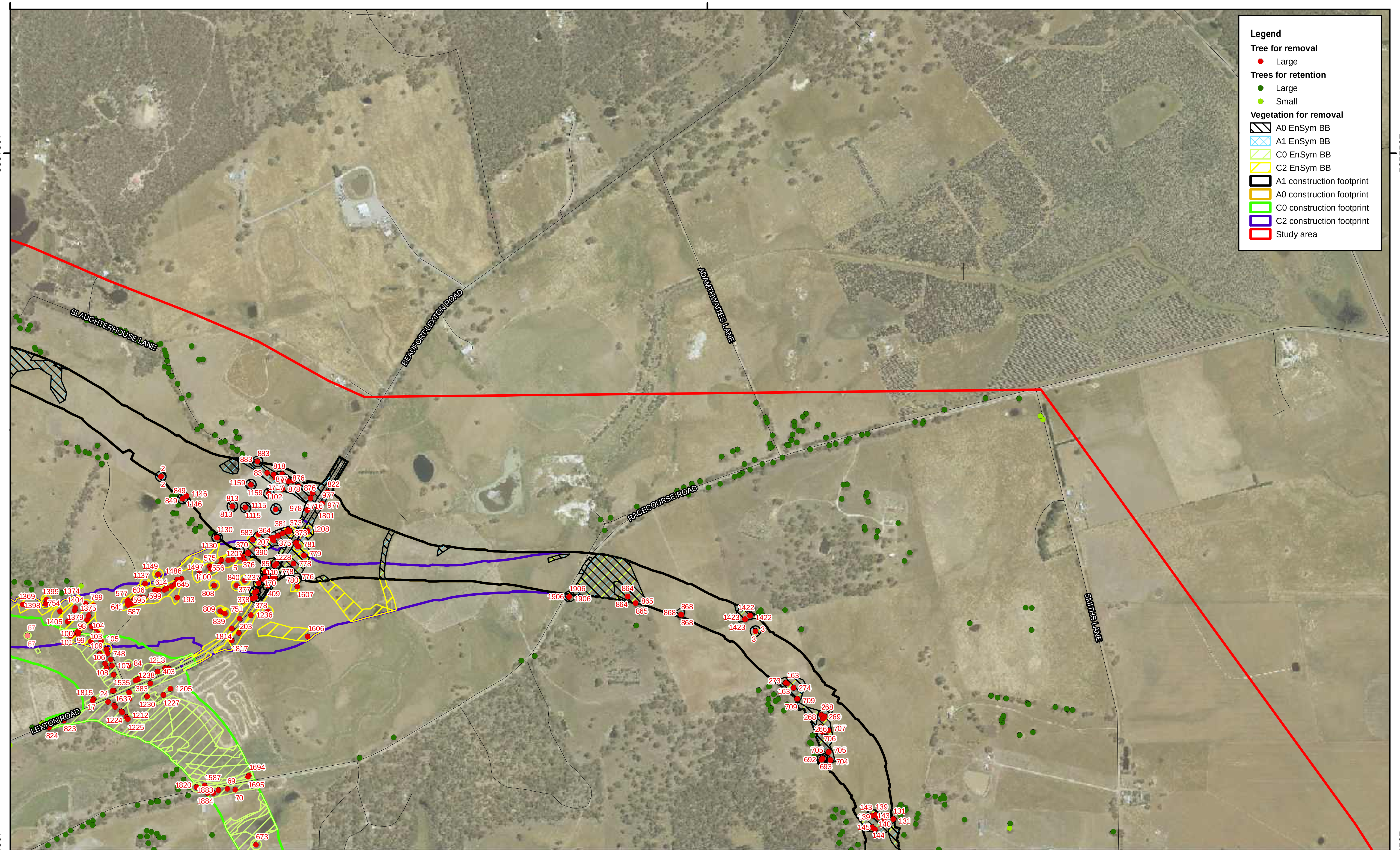

Map: 2270290A_GIS_079_A1	Author: MB
Date: 14/03/2018	Approved by: -

Data source: VicRoads, Trimble

0 100 200 m

1:10,000

Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3

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Figure ###
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Map 4

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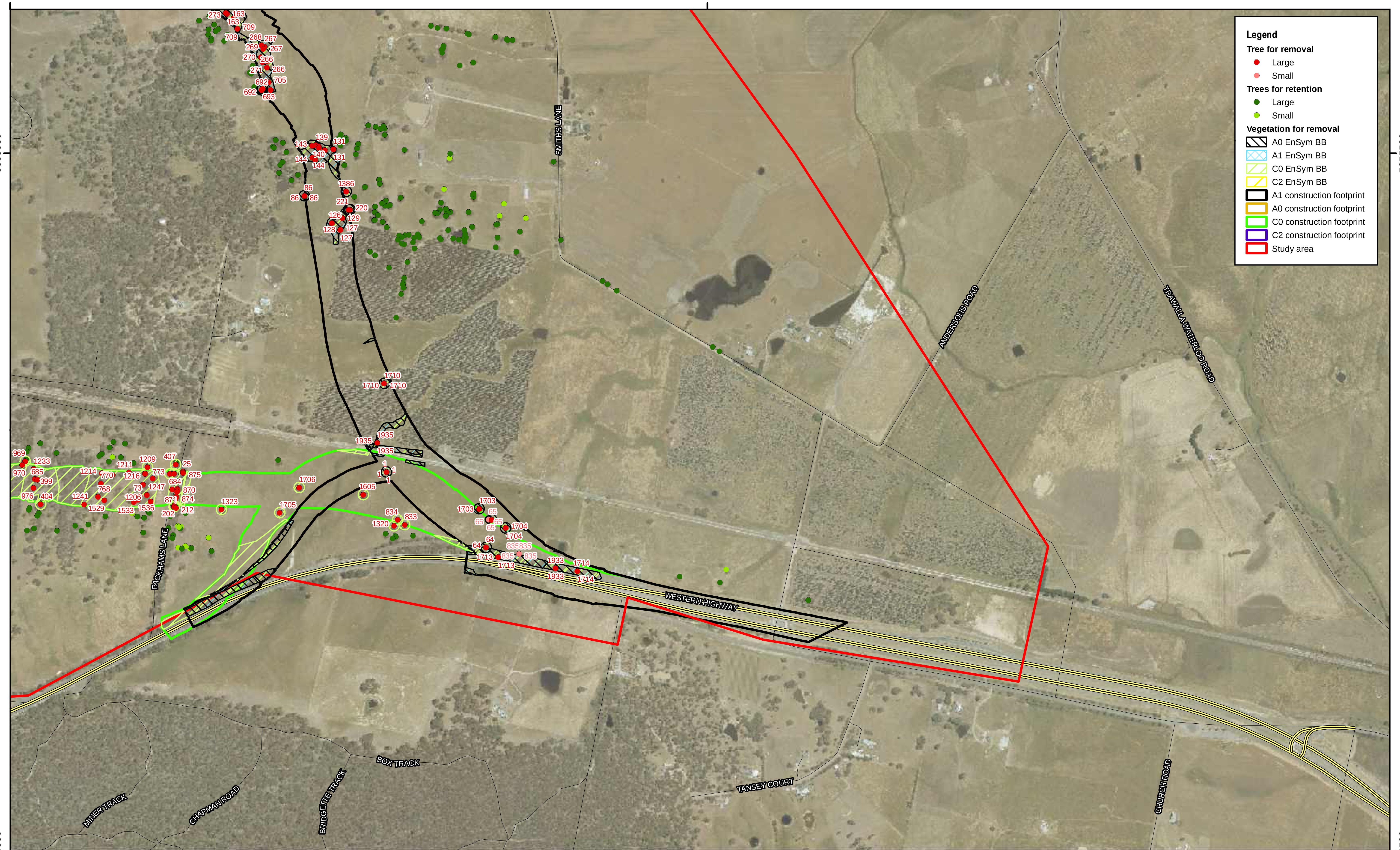

Map: 2270290A_GIS_079_A1	Author: MB	
Date: 14/03/2018	Approved by: -	
Data source: VicRoads, Trimble		

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Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3

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Beaufort Bypass Environment Effects Statement
Figure ###
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Map 5

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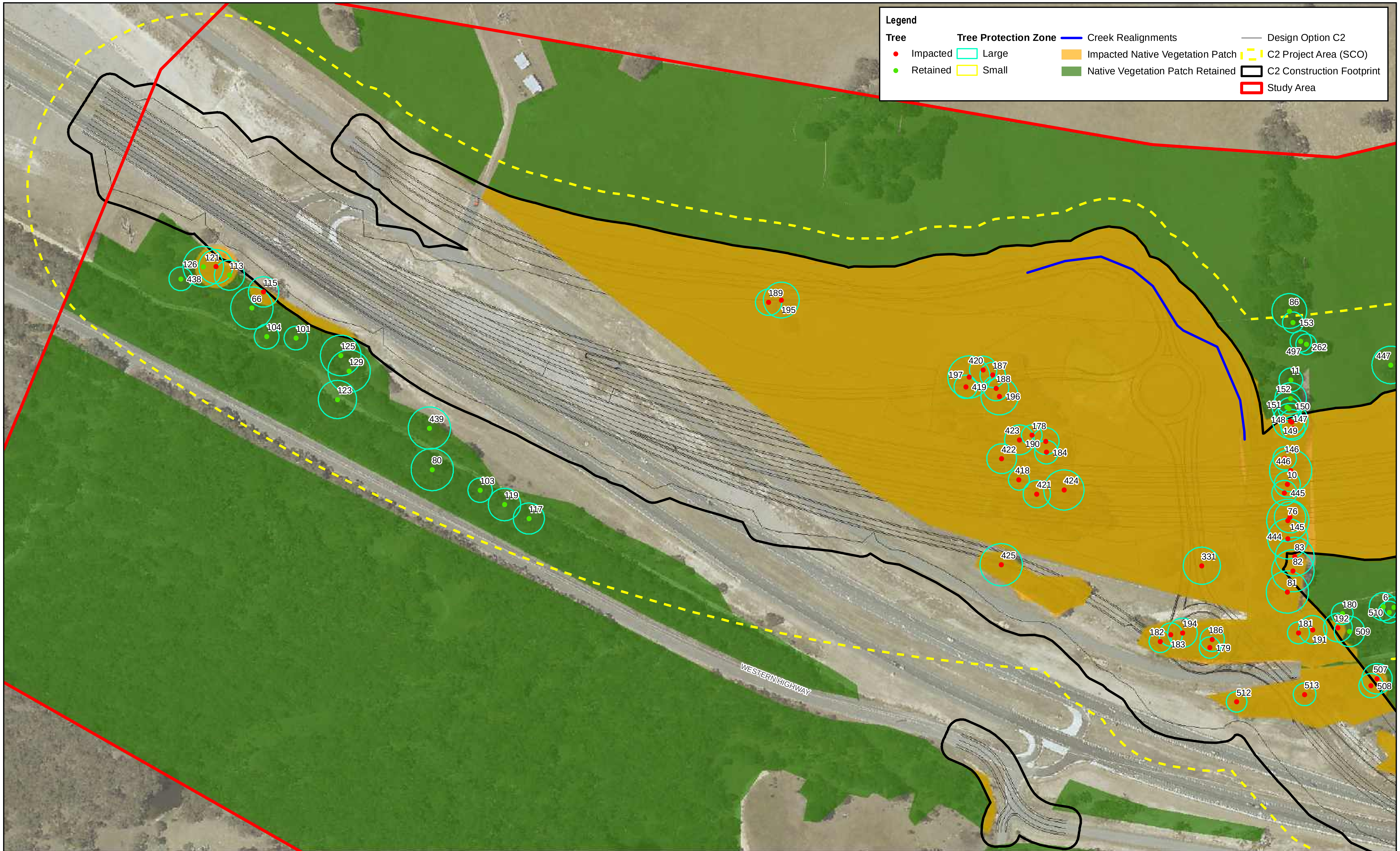
APPENDIX K-5
MAP OF NATIVE VEGETATION IMPACTS AND TREE LOSSES – PREFERRED ALIGNMENT



Map: 2270290A_GIS_223_A3 | Author: VD/RP

Date: 6/2/2021 | Approved by: NM

Data source: VicRoads, Trimble
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0 25 50 m
1:2,500

Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3

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1 2 3 4 5 6 7 8 9 10 11 12 13

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Preferred alignment vegetation impacts (Ensym)

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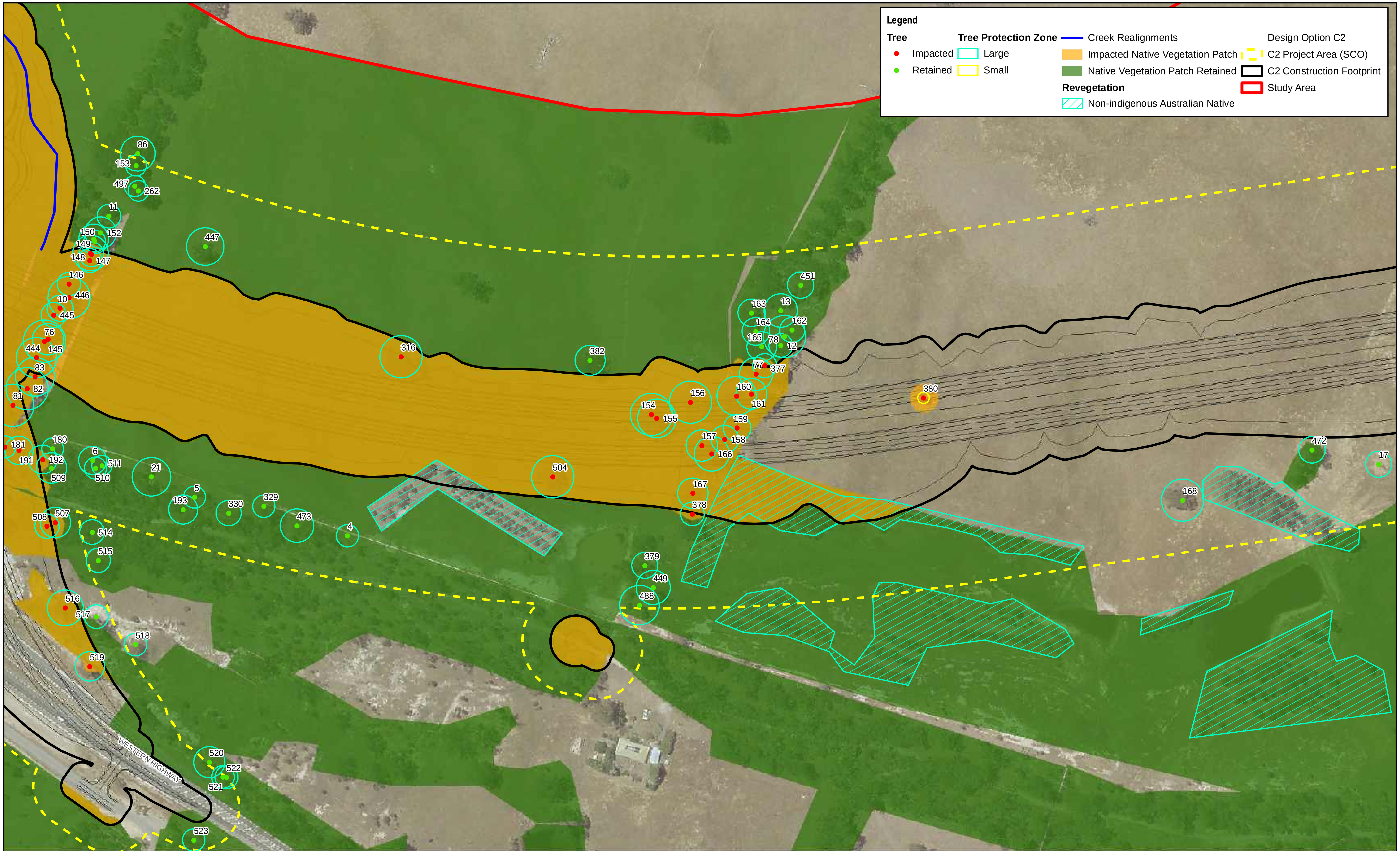

Map: 2270290A_GIS_223_A3	Author: VD/RP
Date: 6/2/2021	Approved by: NM

Data source: VicRoads, Trimble
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0 25 50 m
1:2,500
Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3

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1 2 3 4 5 6 7 8 9 10 11 12 13

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Preferred alignment vegetation impacts (Ensym)

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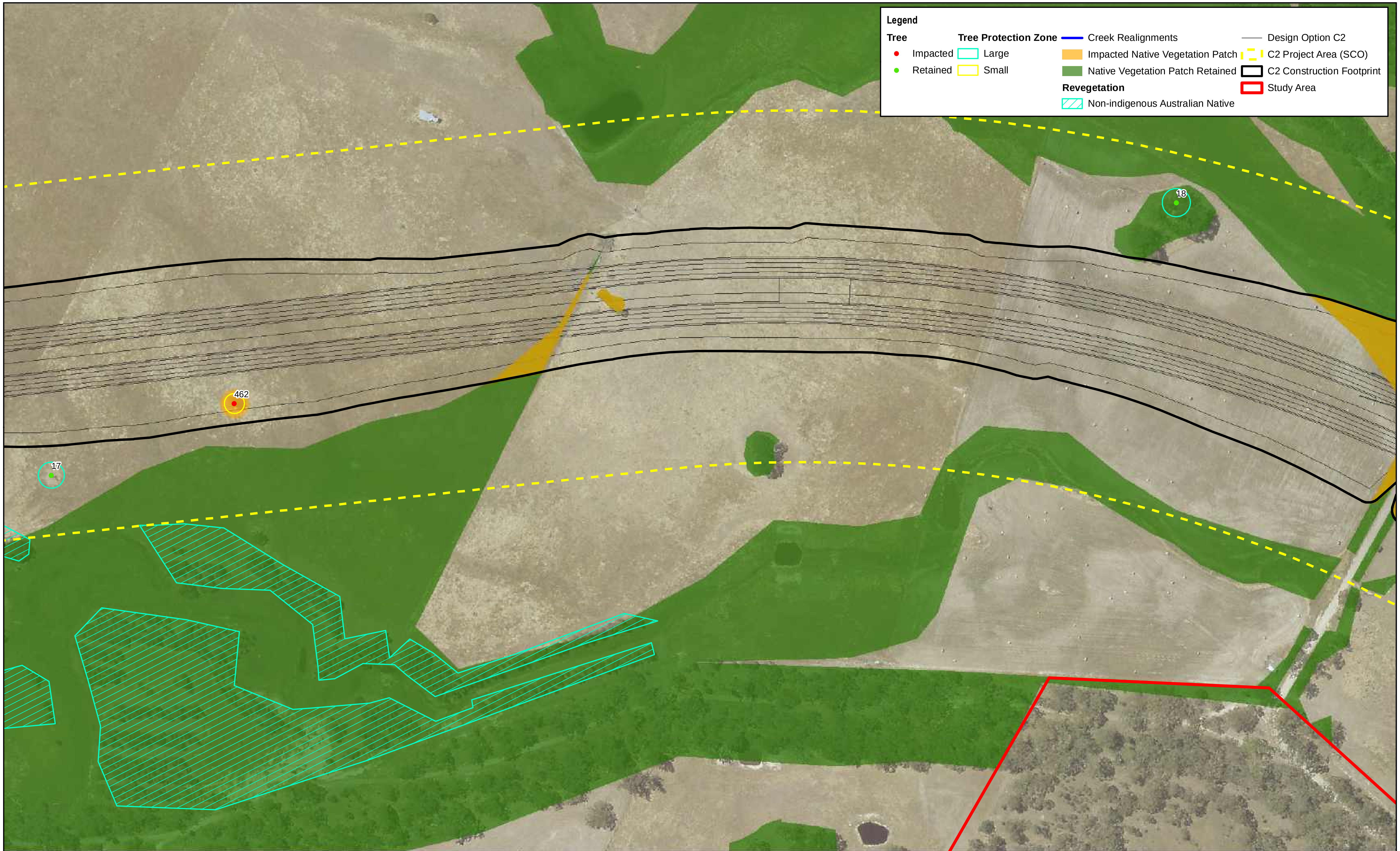

Map: 2270290A_GIS_223_A3	Author: VD/RP
Date: 6/2/2021	Approved by: NM

Data source: VicRoads, Trimble
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1:2,500

Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3

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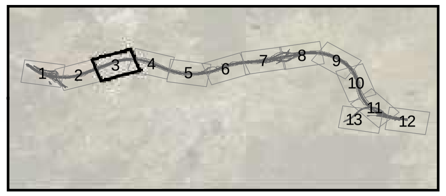

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Preferred alignment vegetation impacts (Ensym)

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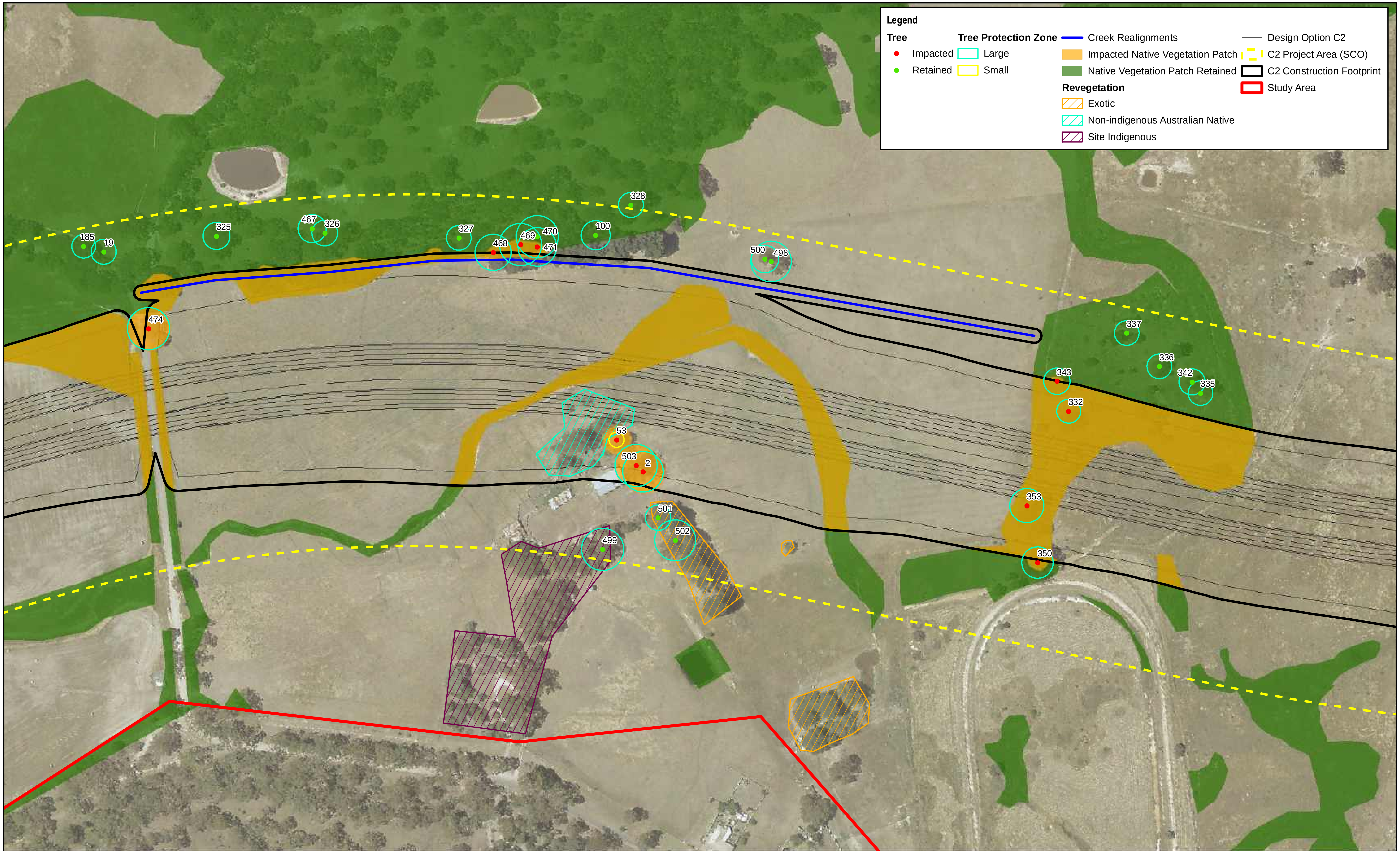

Map: 2270290A_GIS_223_A3	Author: VD/RP
Date: 6/2/2021	Approved by: NM

Data source: VicRoads, Trimble
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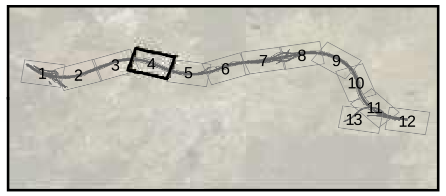
Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3



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Preferred alignment vegetation impacts (Ensym)

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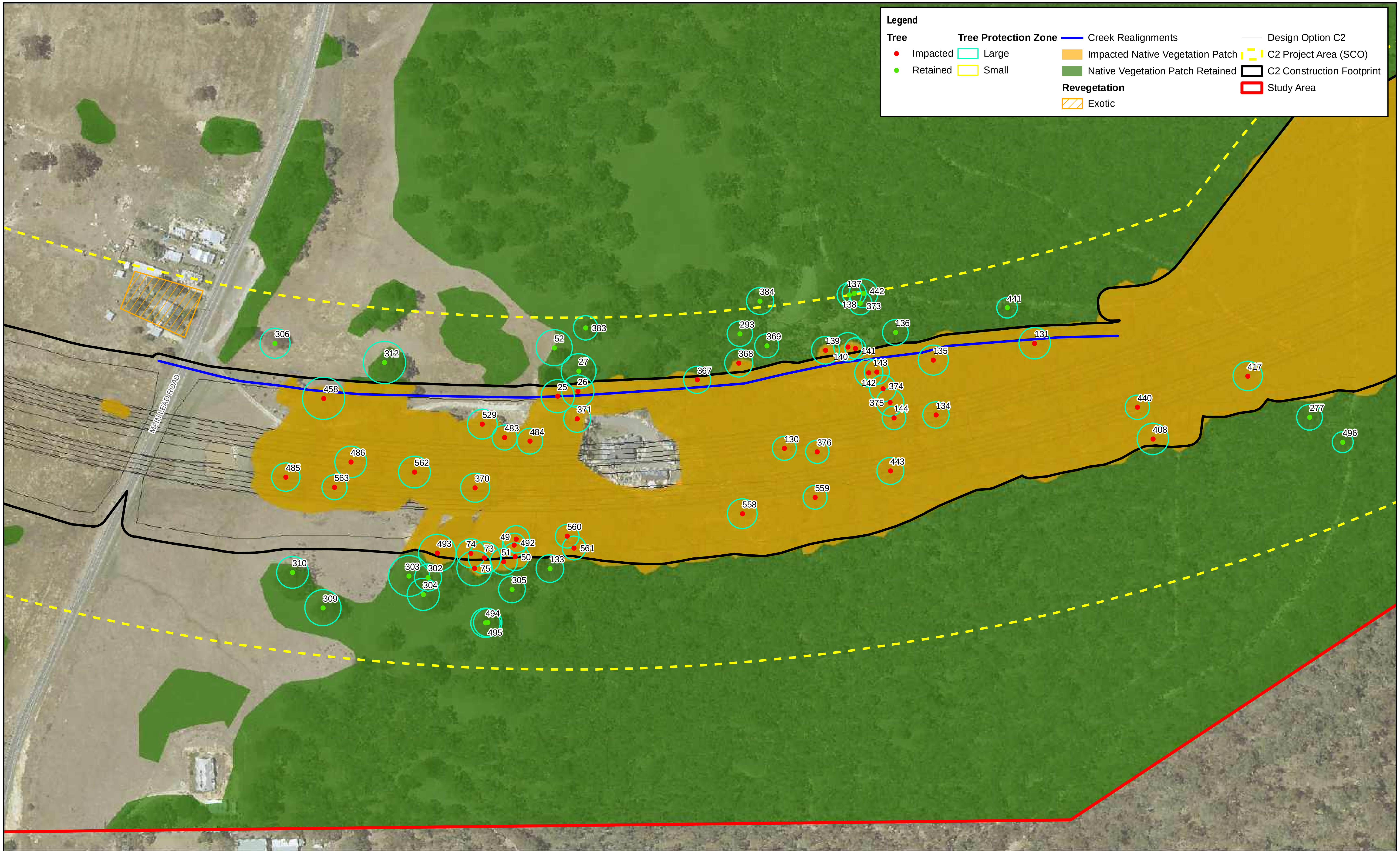

Map: 2270290A_GIS_223_A3
Author: VD/RP
Date: 6/2/2021
Approved by: NM

Data source: VicRoads, Trimble
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0 25 50 m
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Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3

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Preferred alignment vegetation impacts (Ensym)

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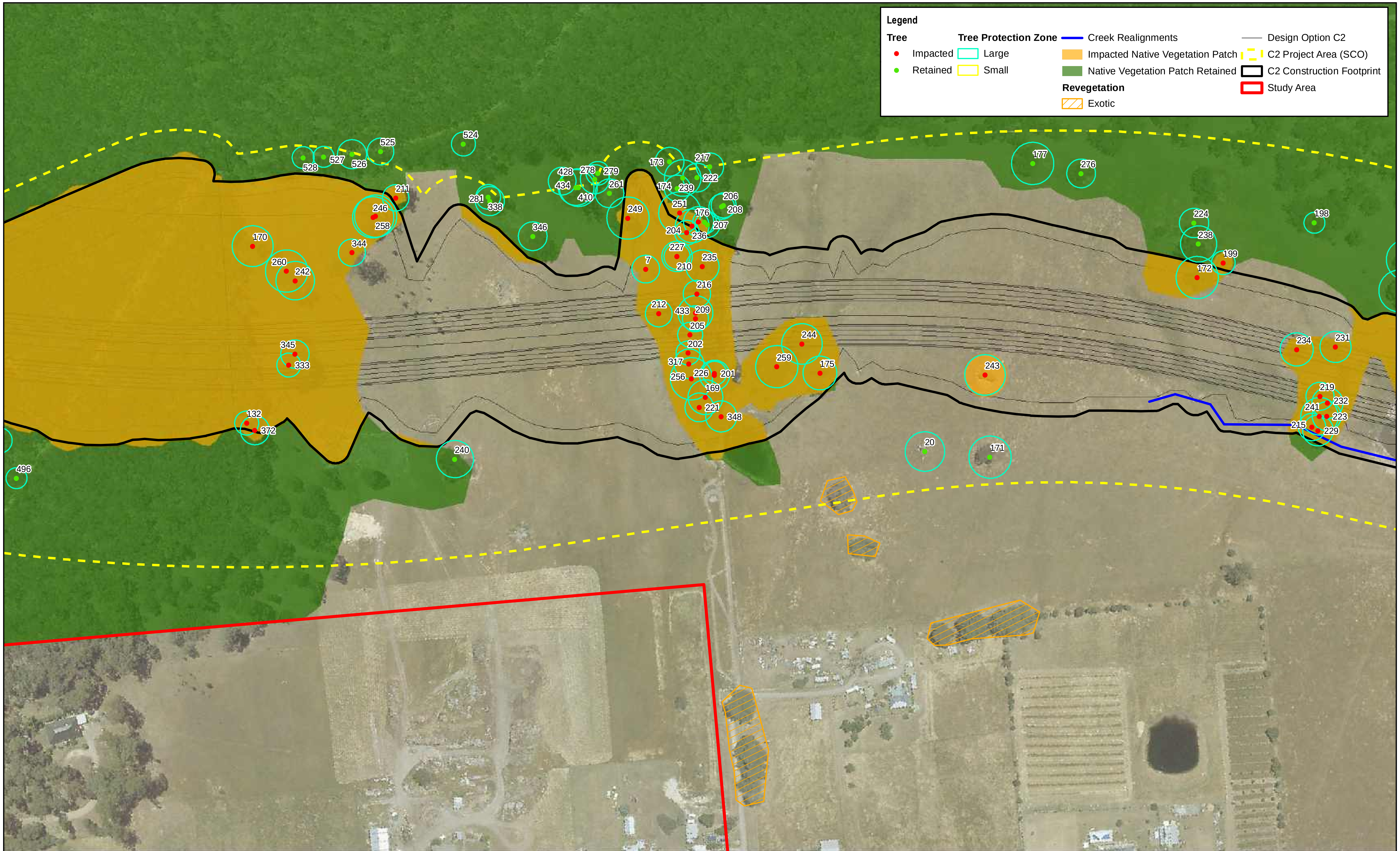

Map: 2270290A_GIS_223_A3	Author: VD/RP
Date: 6/2/2021	Approved by: NM

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Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3

Data source: VicRoads, Trimble

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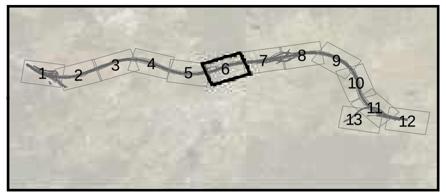

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Preferred alignment vegetation impacts (Ensym)

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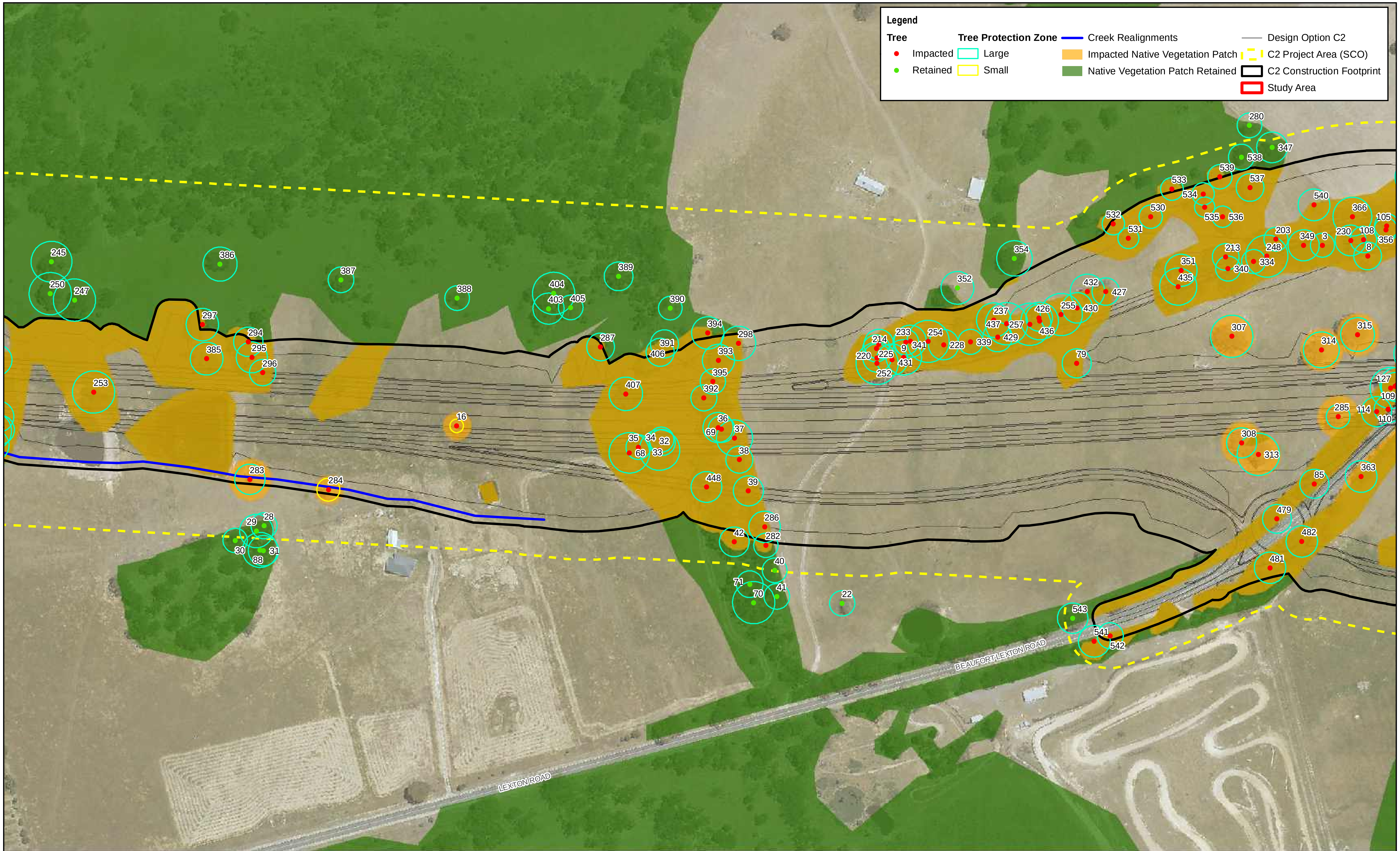

Map: 2270290A_GIS_223_A3	Author: VD/RP		1:2,500
Date: 6/2/2021	Approved by: NM		Coordinate system: GDA 1994 MGA Zone 54 Scale ratio correct when printed at A3

Data source: VicRoads, Trimble
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Preferred alignment vegetation impacts (Ensym)

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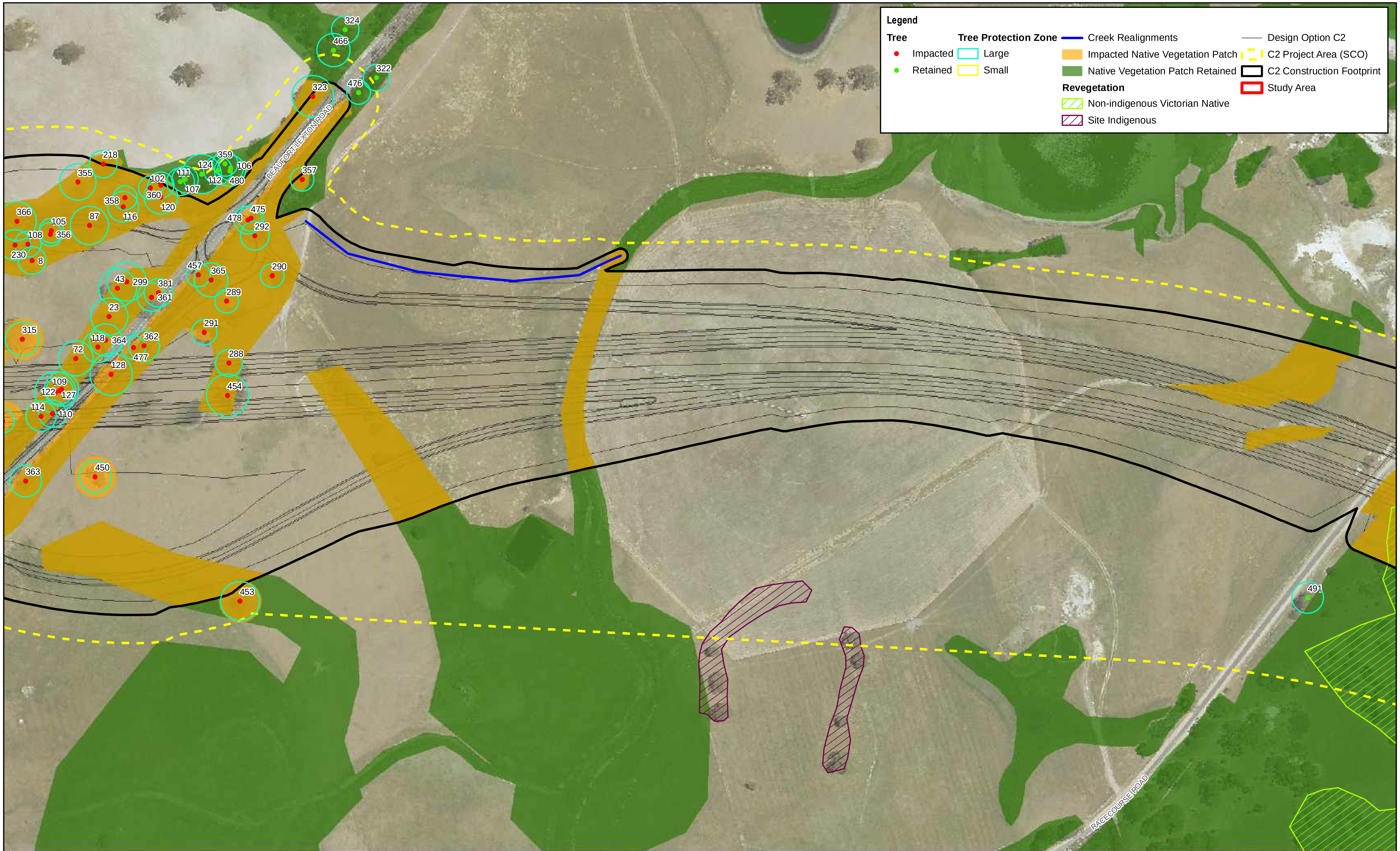

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Date: 6/2/2021	Approved by: NM		

Data source: VicRoads, Trimble

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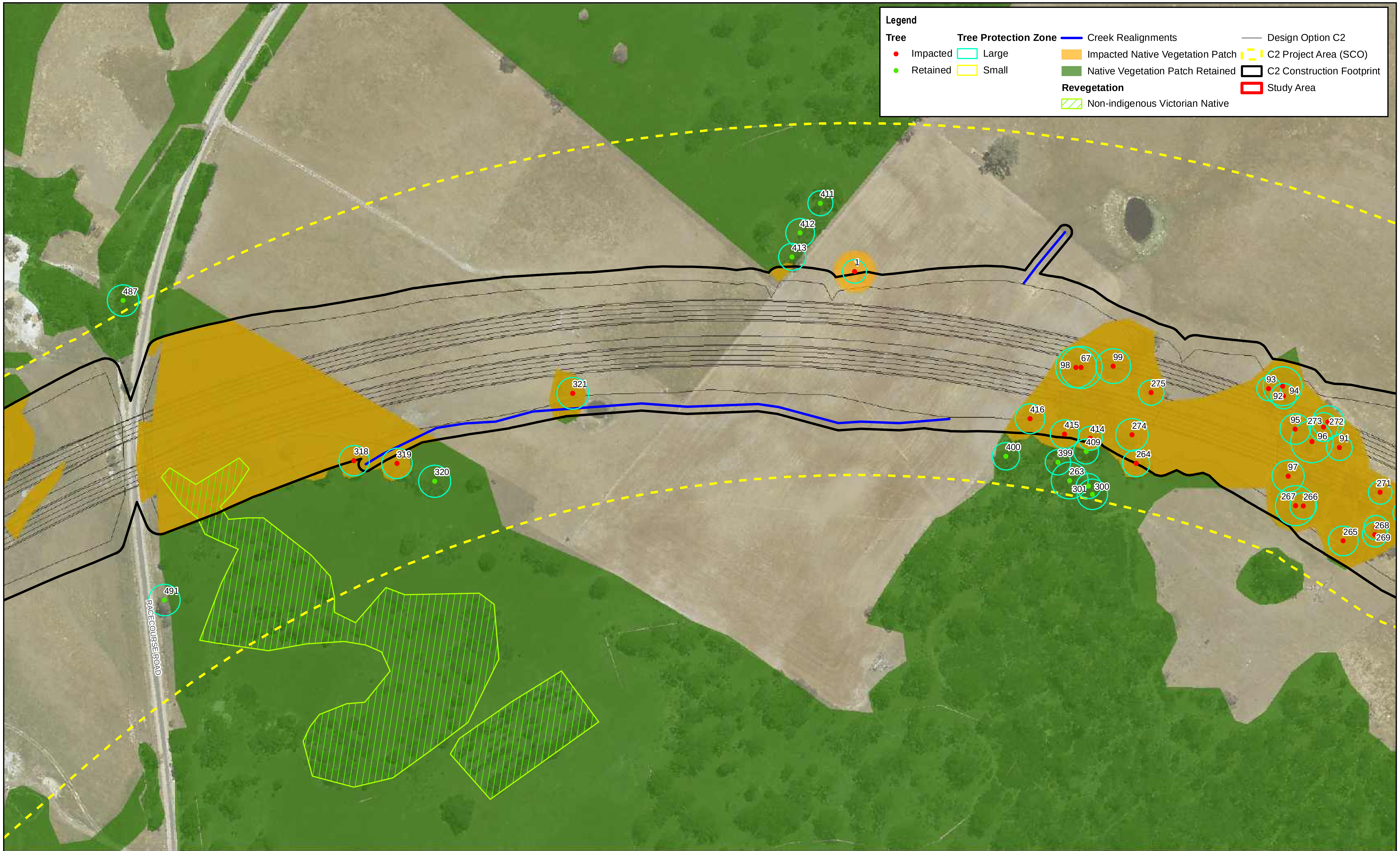
Preferred alignment vegetation impacts (Ensym)



Map: 2270290A_GIS_223_A3	Author: VD/RP	0 25 50 m 1:2,500	
Date: 6/2/2021	Approved by: NM		

Data source: VicRoads, Trimble
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Coordinate system: GDA 1994 MGA Zone 54
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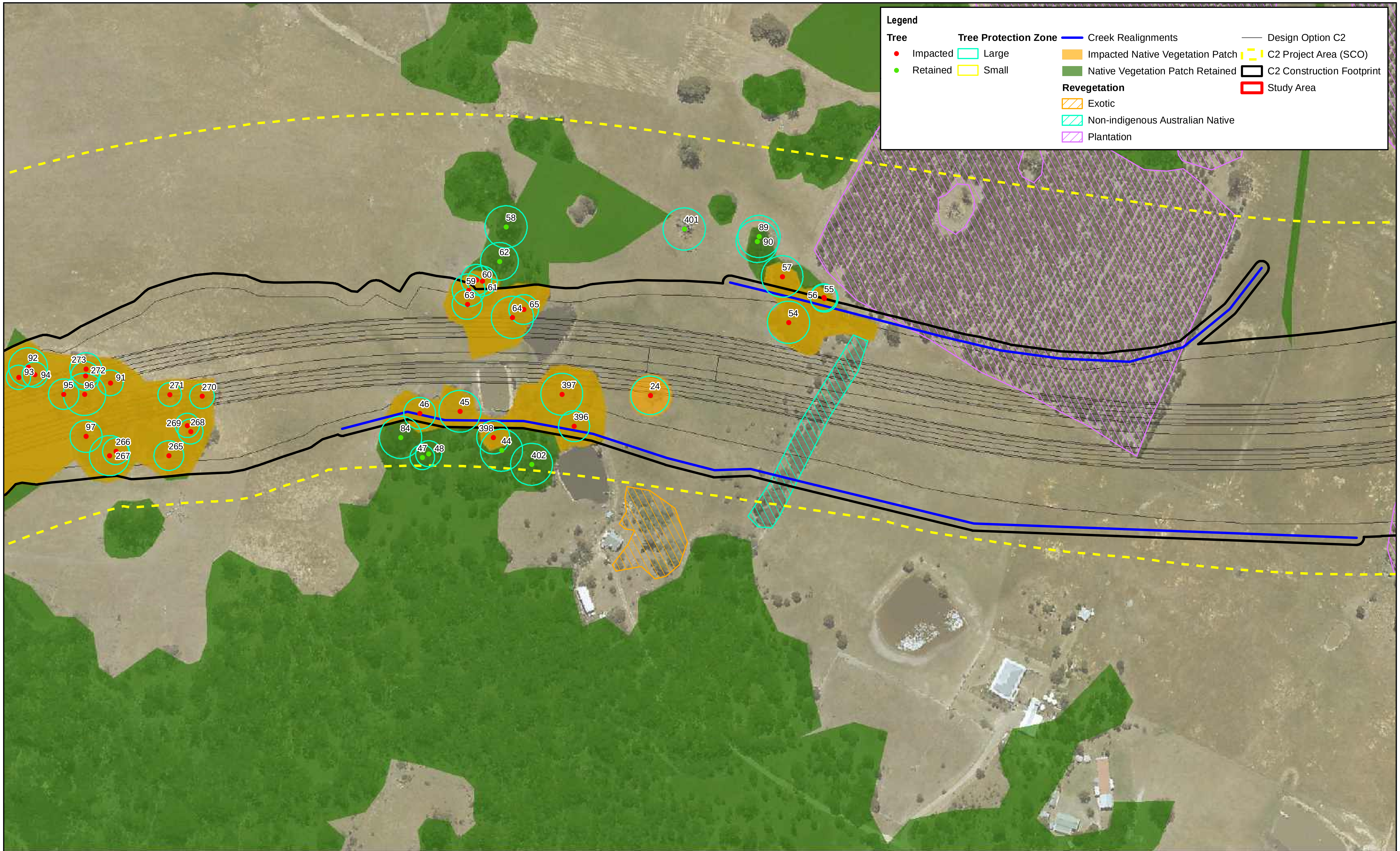
Preferred alignment vegetation impacts (Ensym)



Map: 2270290A_GIS_223_A3

Author: VD/RP

Date: 6/2/2021

Approved by: NM

Data source: VicRoads, Trimble
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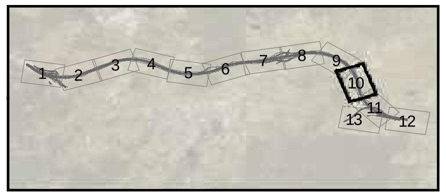
1:2,500

Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3



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Preferred alignment vegetation impacts (Ensym)

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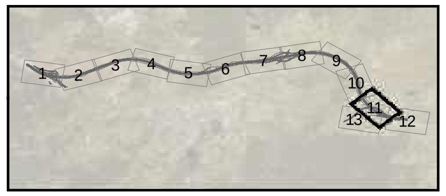
Preferred alignment vegetation impacts (Ensym)



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Date: 6/2/2021	Approved by: NM

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Coordinate system: GDA 1994 MGA Zone 54
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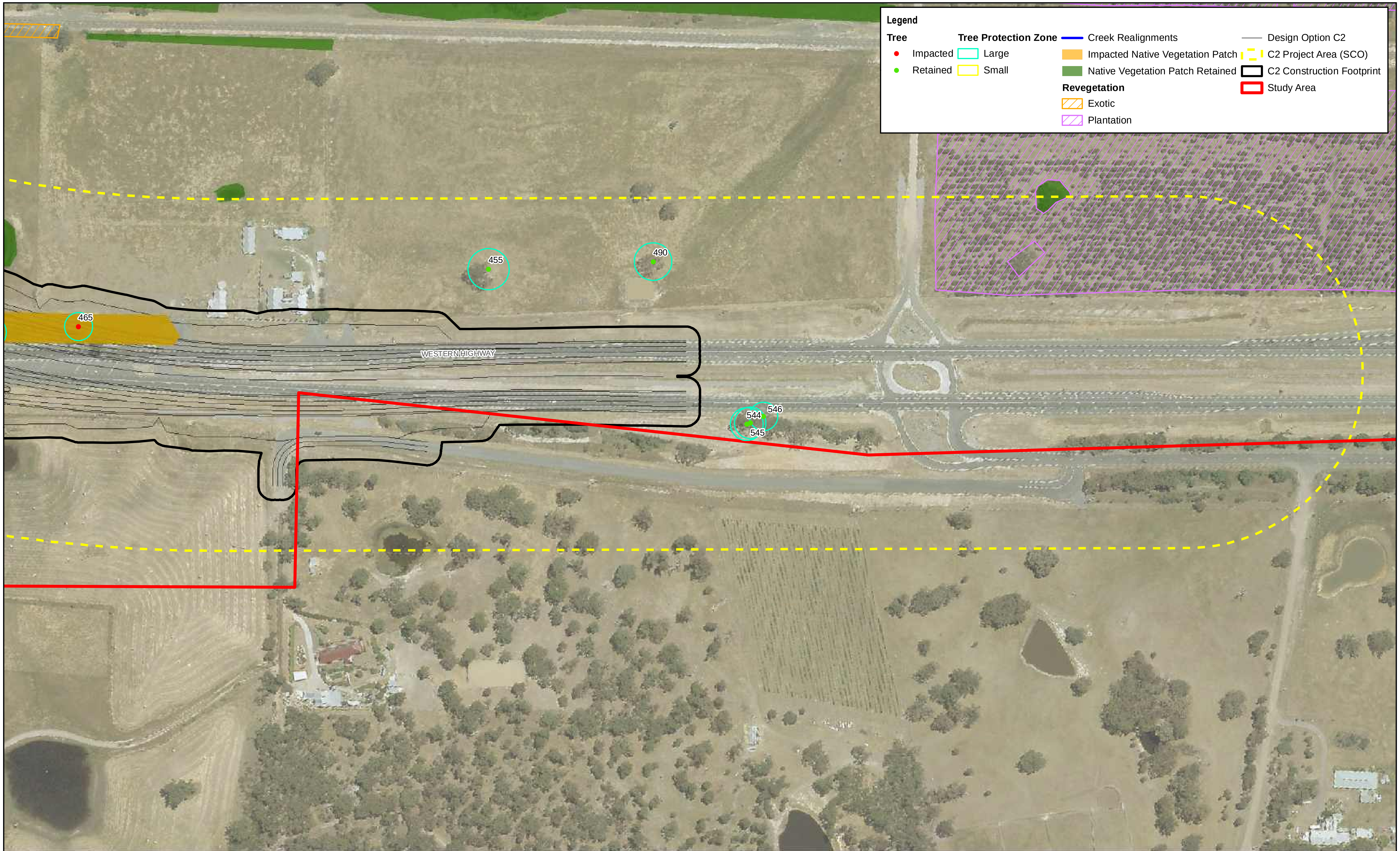

Map: 2270290A_GIS_223_A3

Author: VD/RP

Date: 6/2/2021

Approved by: NM

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Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3

Data source: VicRoads, Trimble
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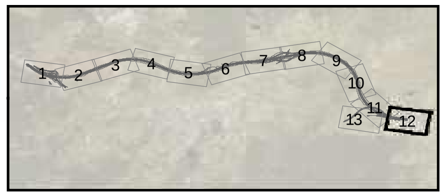

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Preferred alignment vegetation impacts (Ensym)

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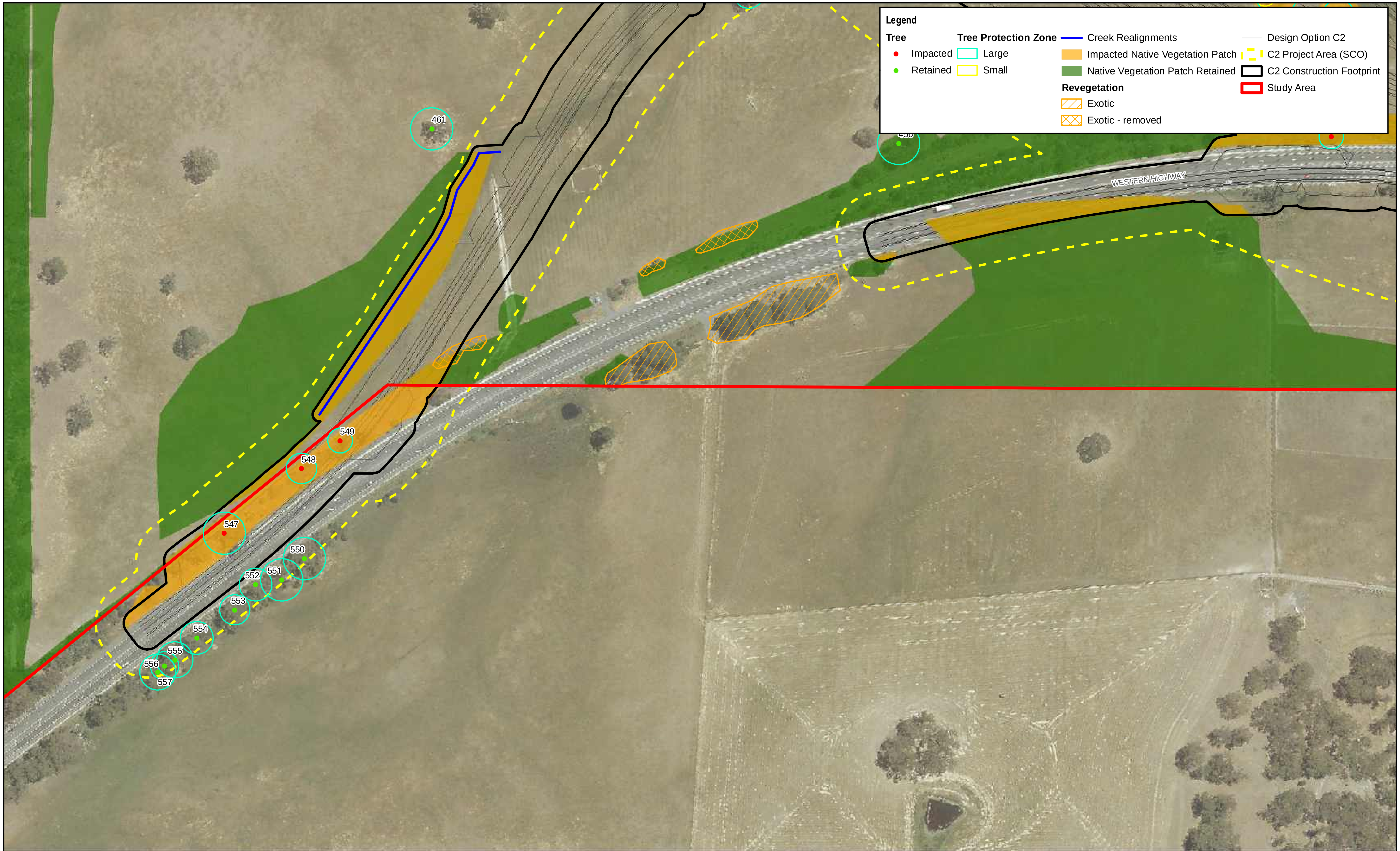

Map: 2270290A_GIS_223_A3	Author: VD/RP		0 25 50 m 1:2,500	vicroads wsp	Beaufort Bypass
Date: 6/2/2021	Approved by: NM		Coordinate system: GDA 1994 MGA Zone 54 Scale ratio correct when printed at A3		Preferred alignment vegetation impacts (Ensym)

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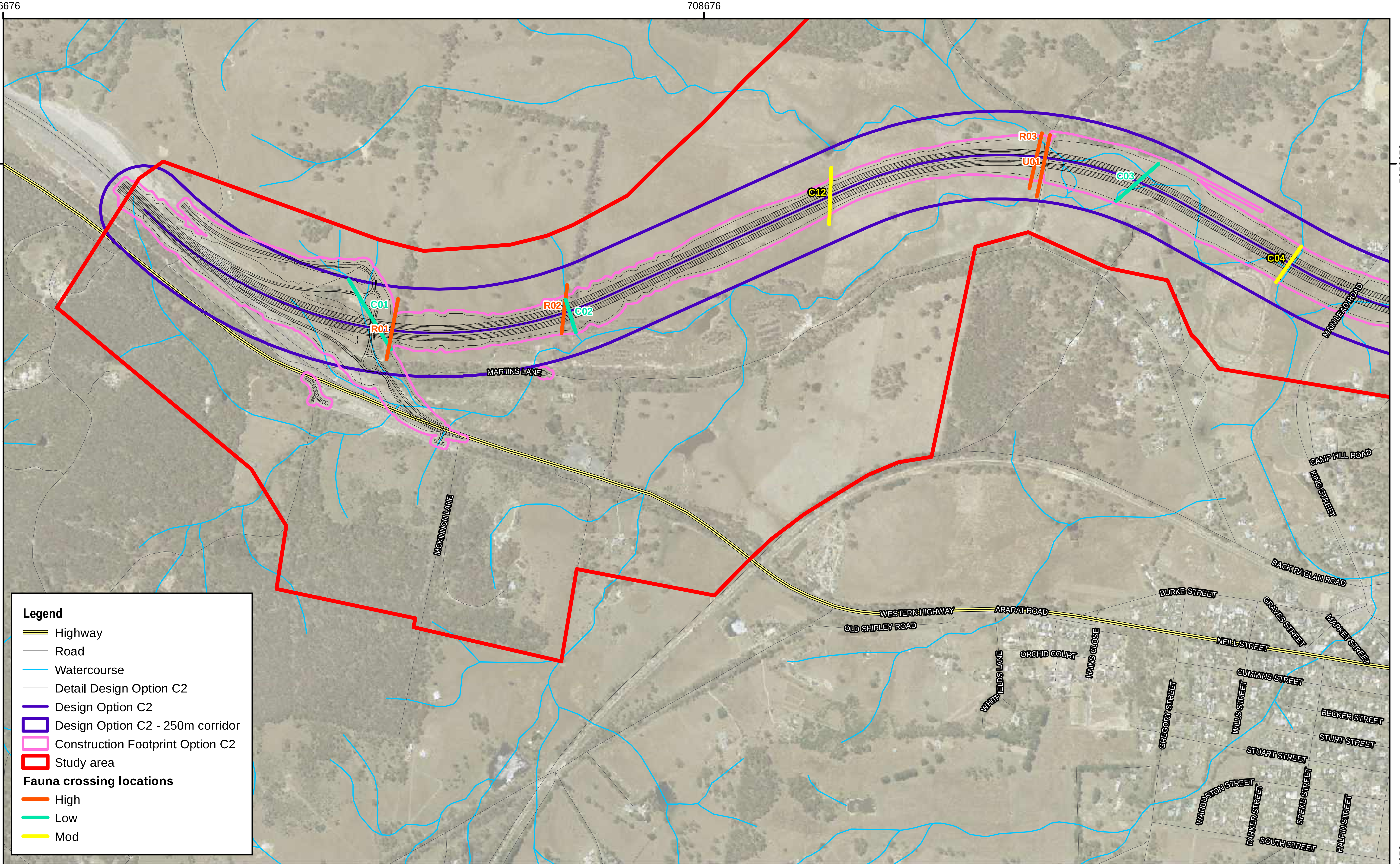
APPENDIX K-6
MAP OF POTENTIAL MITIGATION OPTIONS



Map: 2270290A_GIS_199_A2

Author: AS

Date: 11/25/2020

Approved by: -

Data source: VicRoads, Trimble

Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3

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Wildlife Crossing Locations
Map 1 of 5

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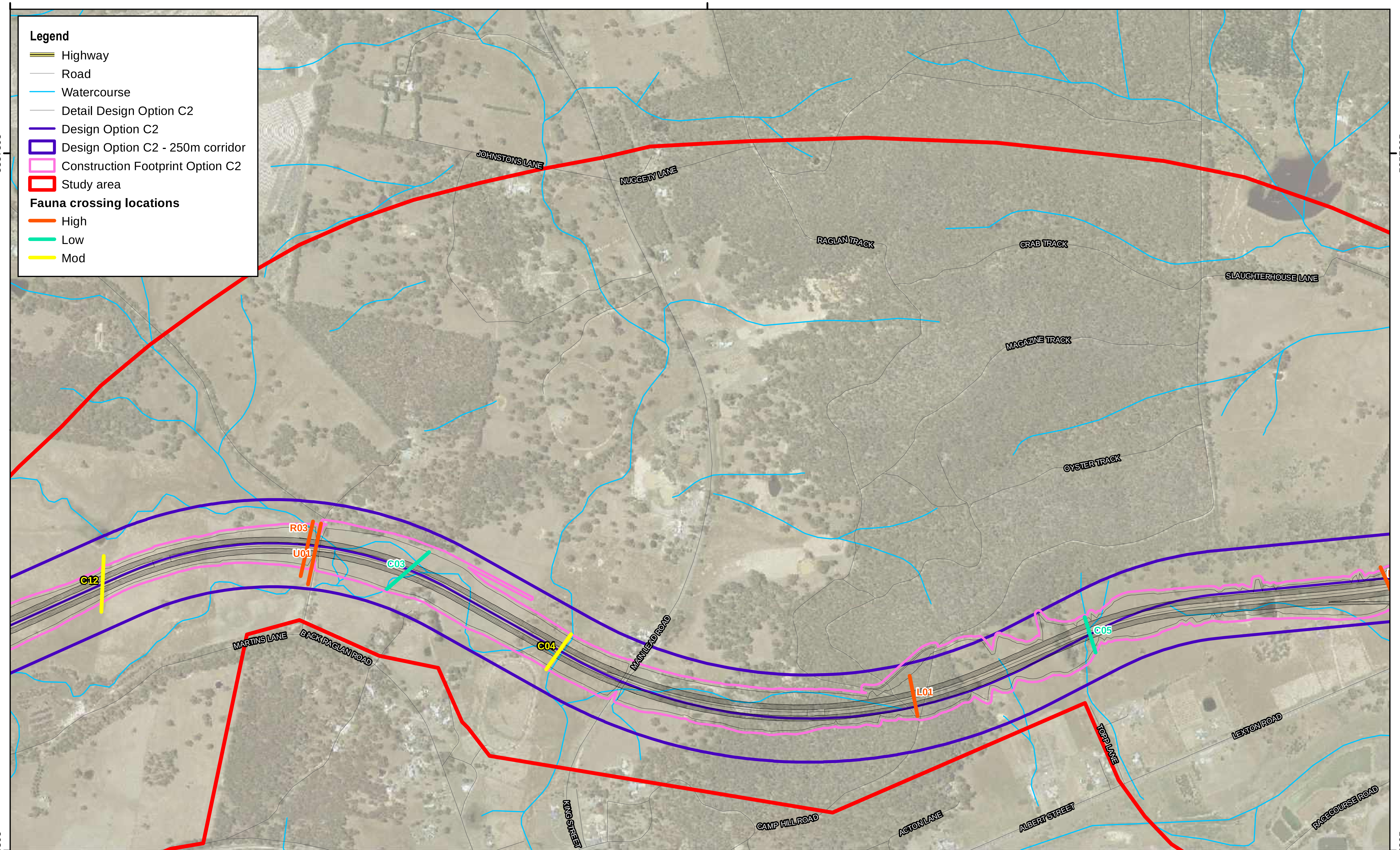

Map: 2270290A_GIS_199_A2

Author: AS

Date: 11/25/2020

Approved by: -

Data source: VicRoads, Trimble

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Coordinate system: GDA 1994 MGA Zone 54
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Wildlife Crossing Locations
Map 2 of 5

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Map: 2270290A_GIS_199_A2	Author: AS		0 100 200 m 1:10,000
Date: 11/25/2020	Approved by: -		
Data source: VicRoads, Trimble			Coordinate system: GDA 1994 MGA Zone 54 Scale ratio correct when printed at A3

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Wildlife Crossing Locations
Map 3 of 5

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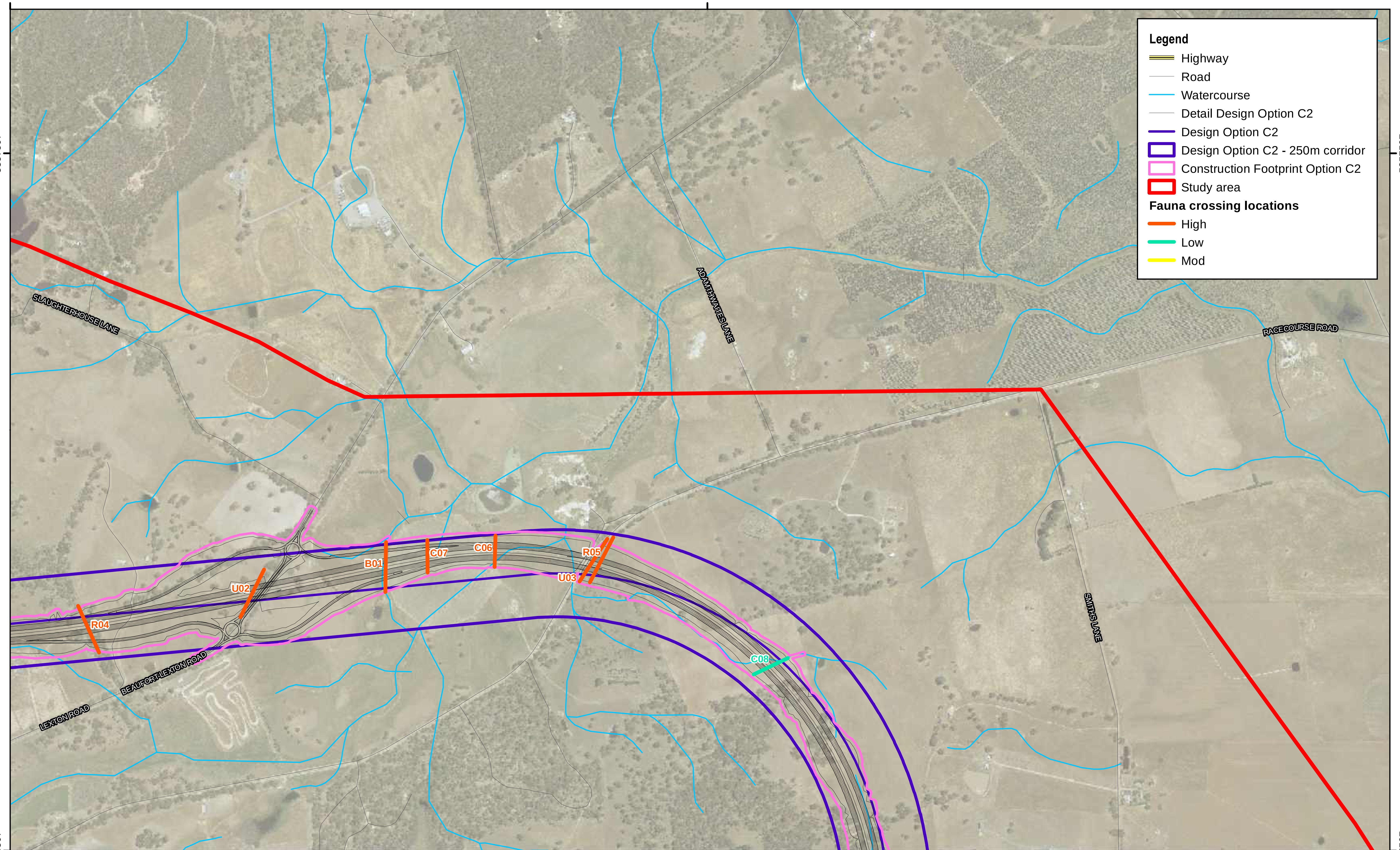

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Date: 11/25/2020	Approved by: -		
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Wildlife Crossing Locations
Map 4 of 5

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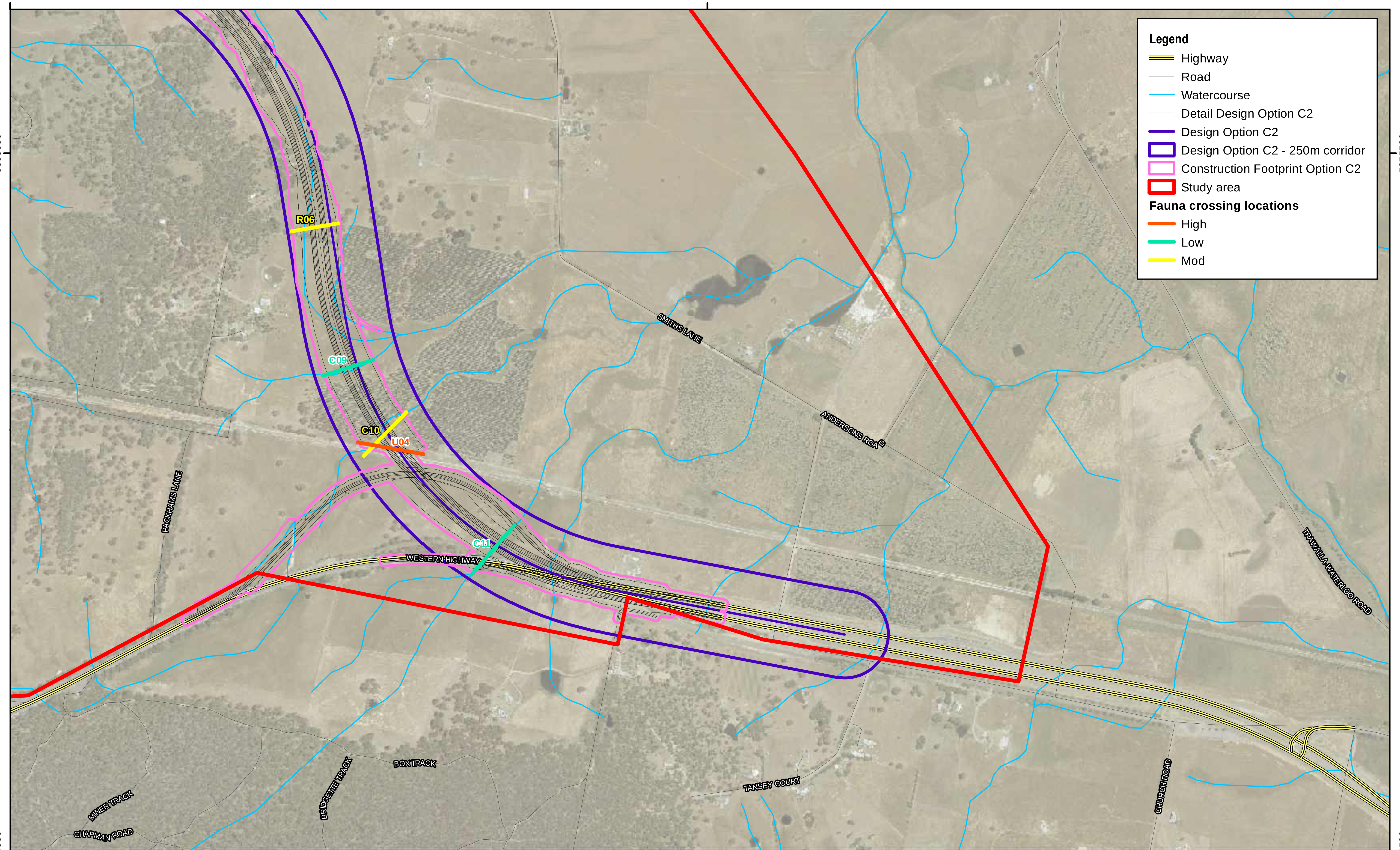

Map: 2270290A_GIS_199_A2 | Author: AS

Date: 11/25/2020 | Approved by: -

Data source: VicRoads, Trimble

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Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3

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Wildlife Crossing Locations
Map 5 of 5

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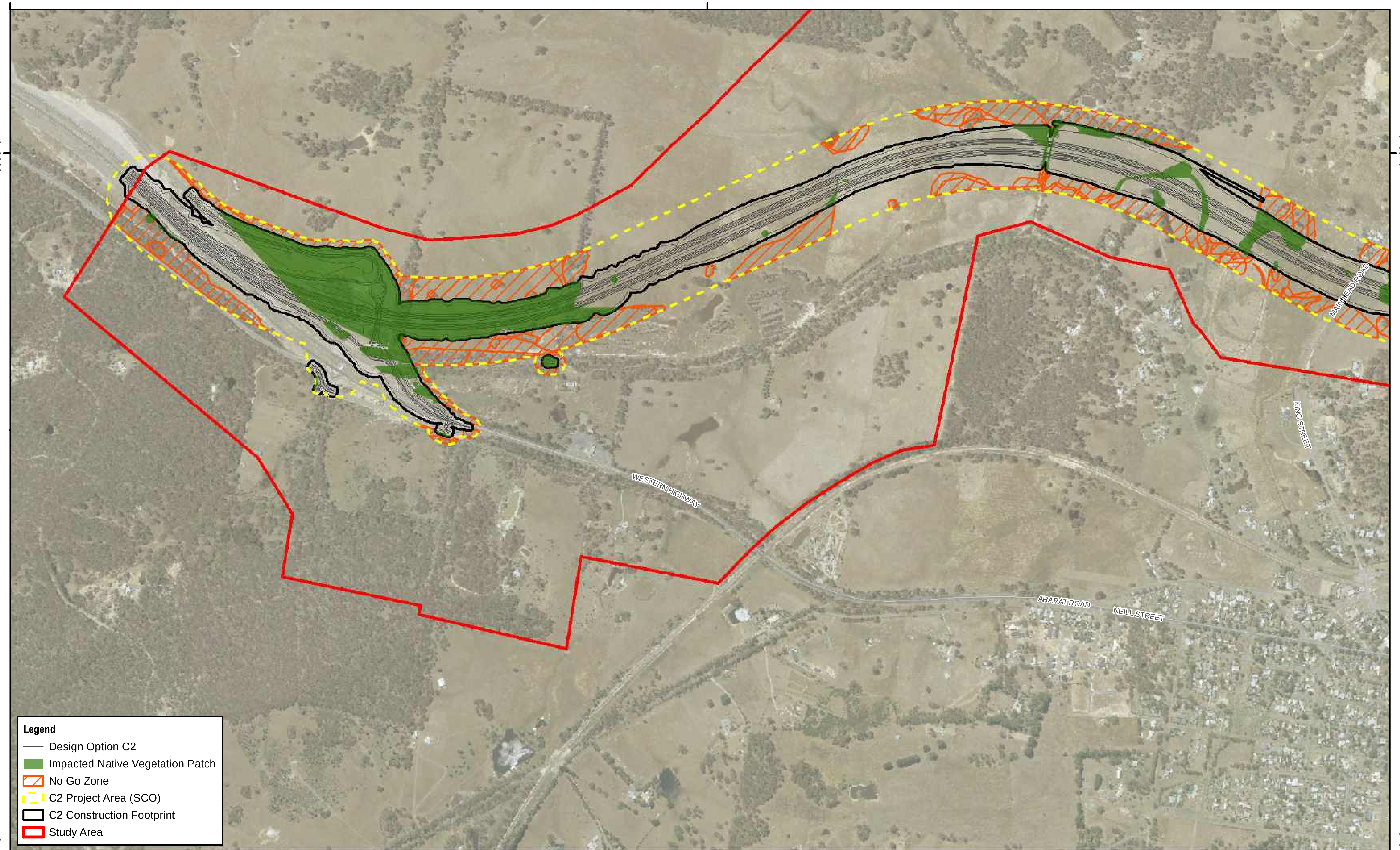
APPENDIX K-7
MAP OF NO GO ZONE AREAS



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Date: 4/13/2021	Approved by: NM			
Data source: VicRoads, Trimble			Coordinate system: GDA 1994 MGA Zone 54 Scale ratio correct when printed at A3	

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1 2 3 4 5

Beaufort Bypass

No-go zone map
Map 1

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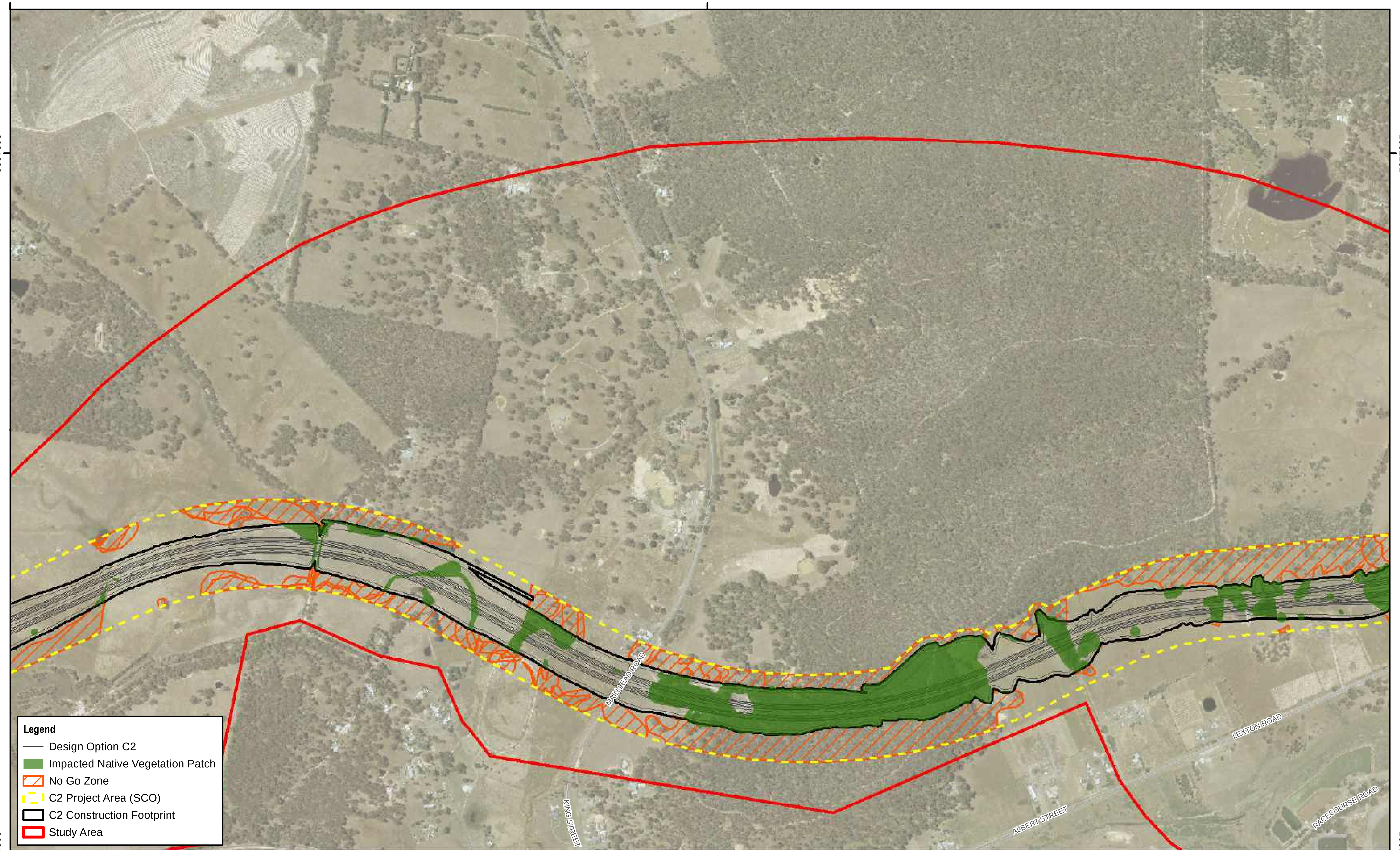

Map: 2270290A_GIS_222_A3	Author: VD		0 100 200 m 1:10,000
Date: 4/13/2021	Approved by: NM		Coordinate system: GDA 1994 MGA Zone 54 Scale ratio correct when printed at A3

Data source: VicRoads, Trimble
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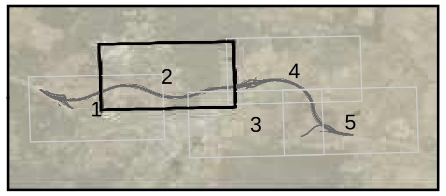

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No-go zone map
Map 2

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Map: 2270290A_GIS_222_A3	Author: VD	
Date: 4/13/2021	Approved by: NM	

Data source: VicRoads, Trimble

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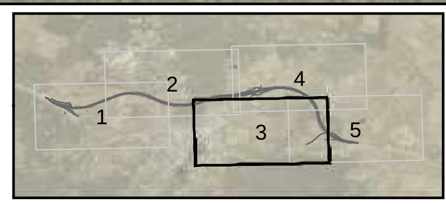
Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3



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No-go zone map
Map 3

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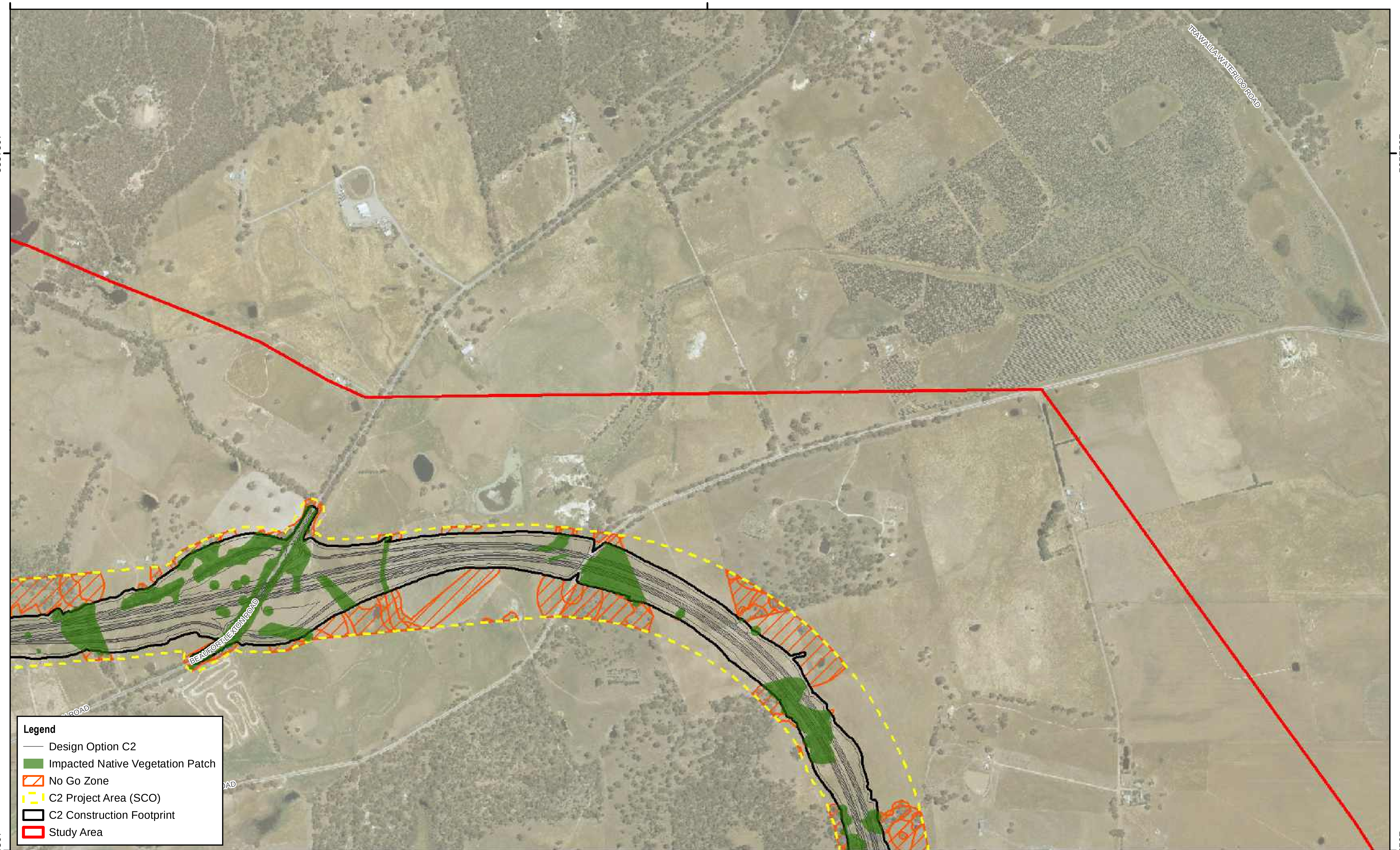

Map: 2270290A_GIS_222_A3	Author: VD
Date: 4/13/2021	Approved by: NM

Data source: VicRoads, Trimble

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Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3

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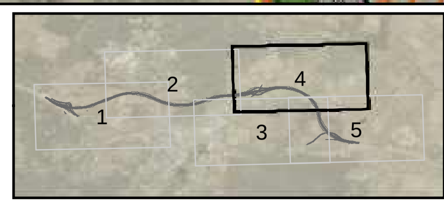

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No-go zone map
Map 4

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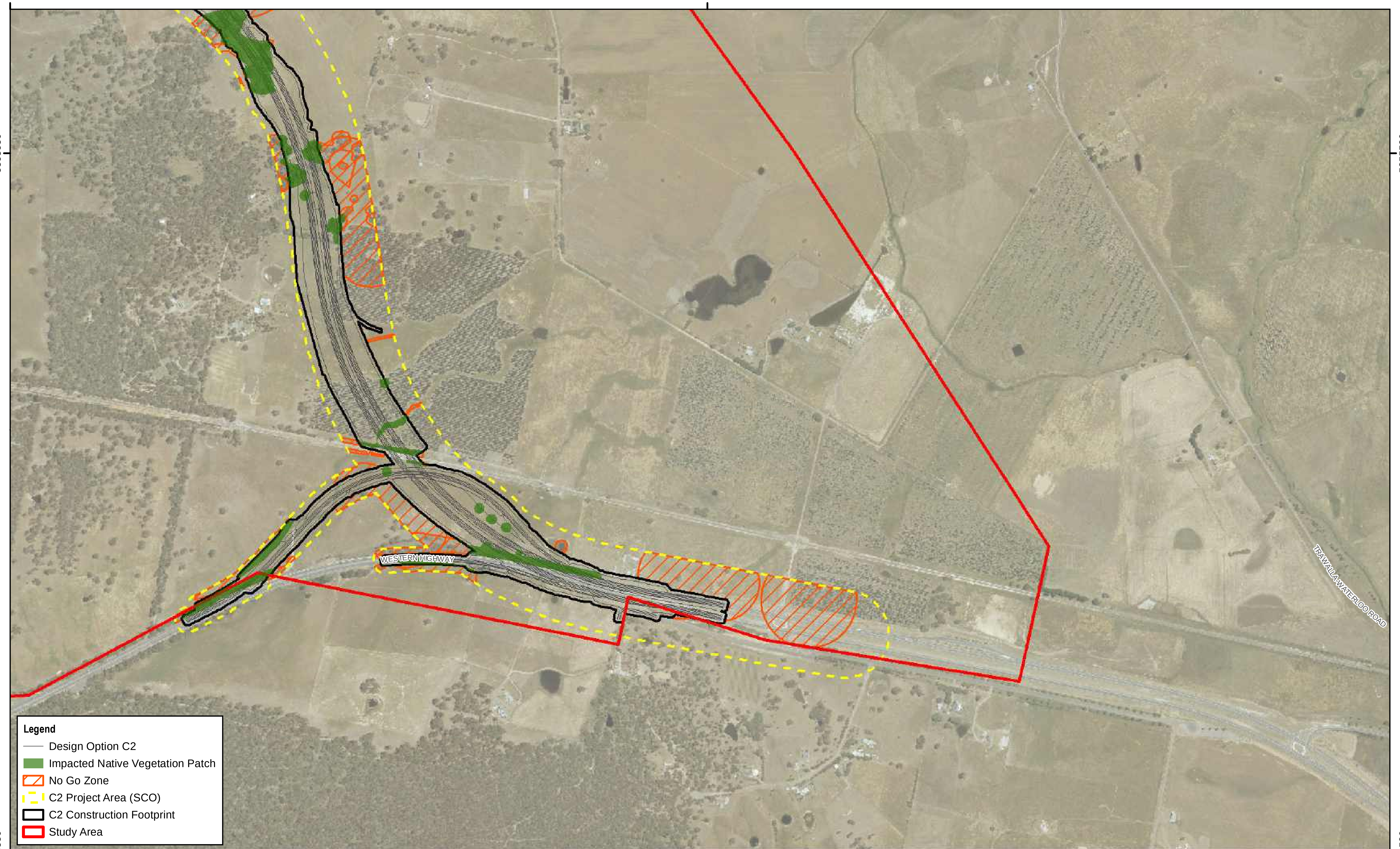

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Date: 4/13/2021	Approved by: NM	
Data source: VicRoads, Trimble		

0 100 200 m
1:10,000

Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3

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No-go zone map
Map 5

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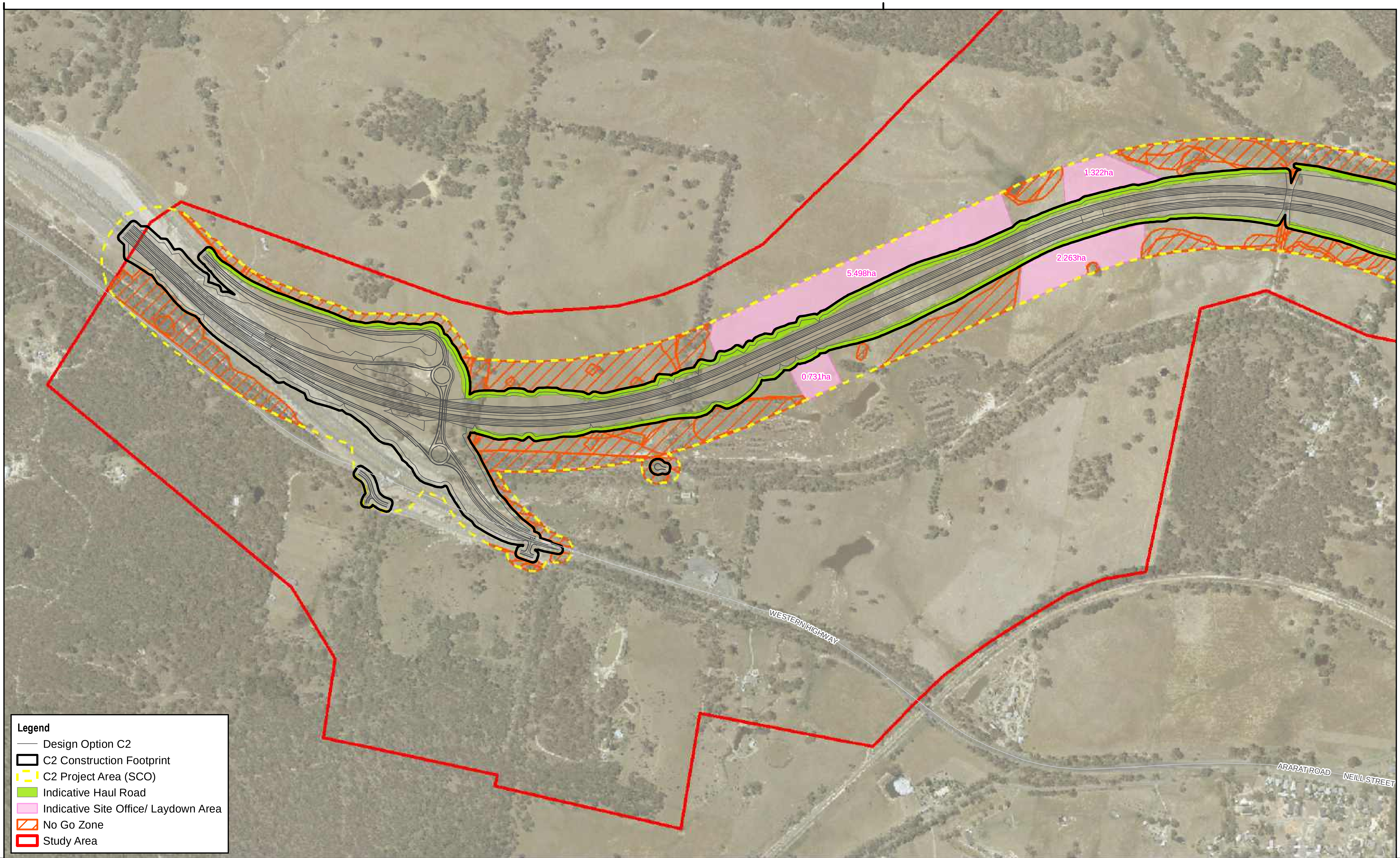
APPENDIX K-8
INDICATIVE SITE OFFICE AND LAYDOWN AREAS



Map: 2270290A_GIS_225_A1	Author: AS
Date: 06-May-21	Approved by:

Data source: VicRoads, Trimble

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Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3

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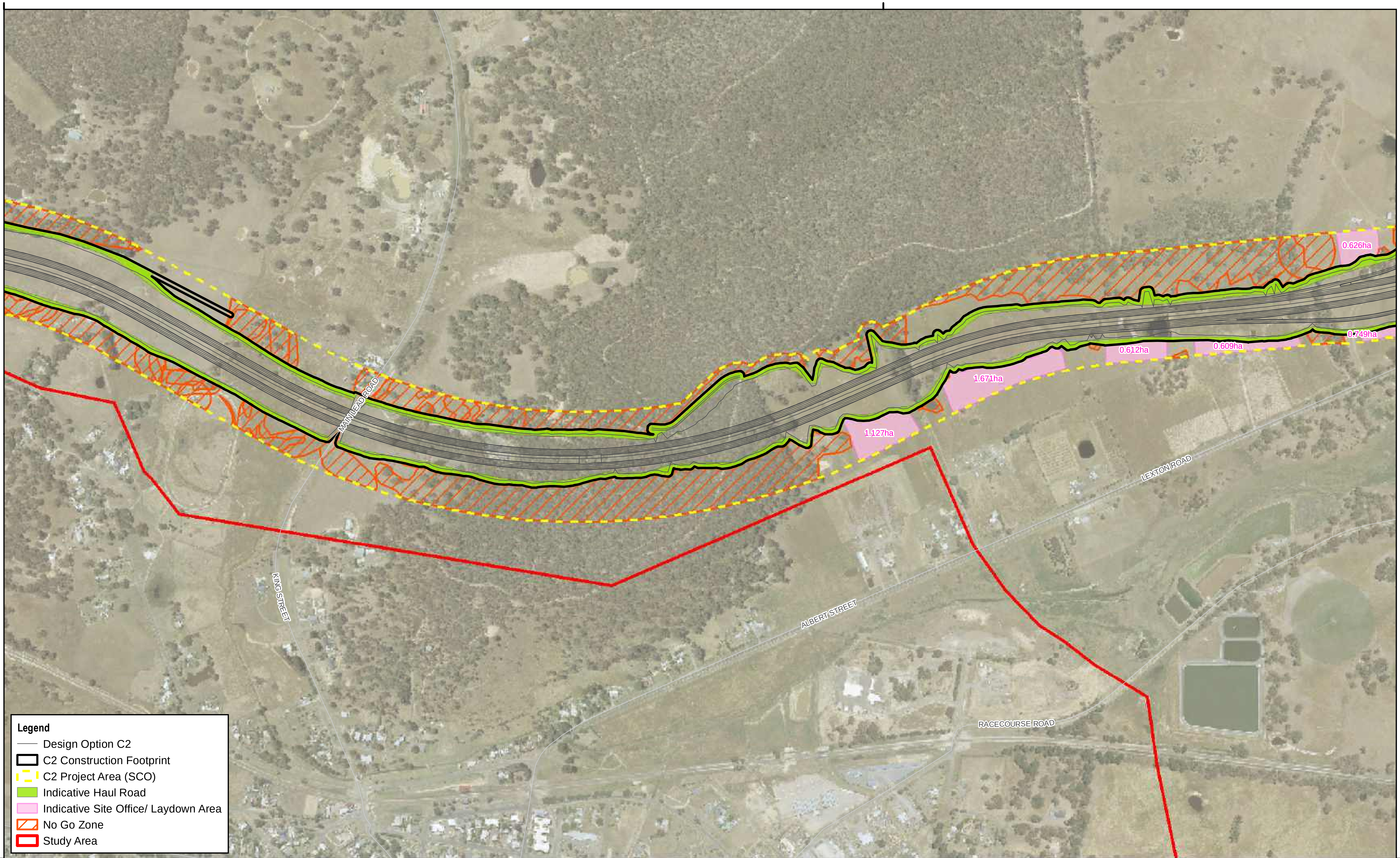
Indicative Site Office and Laydown Areas
Map 1 of 4



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Date: 06-May-21	Approved by:	
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1:8,000

Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3

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Indicative Site Office and Laydown Areas
Map 2 of 4

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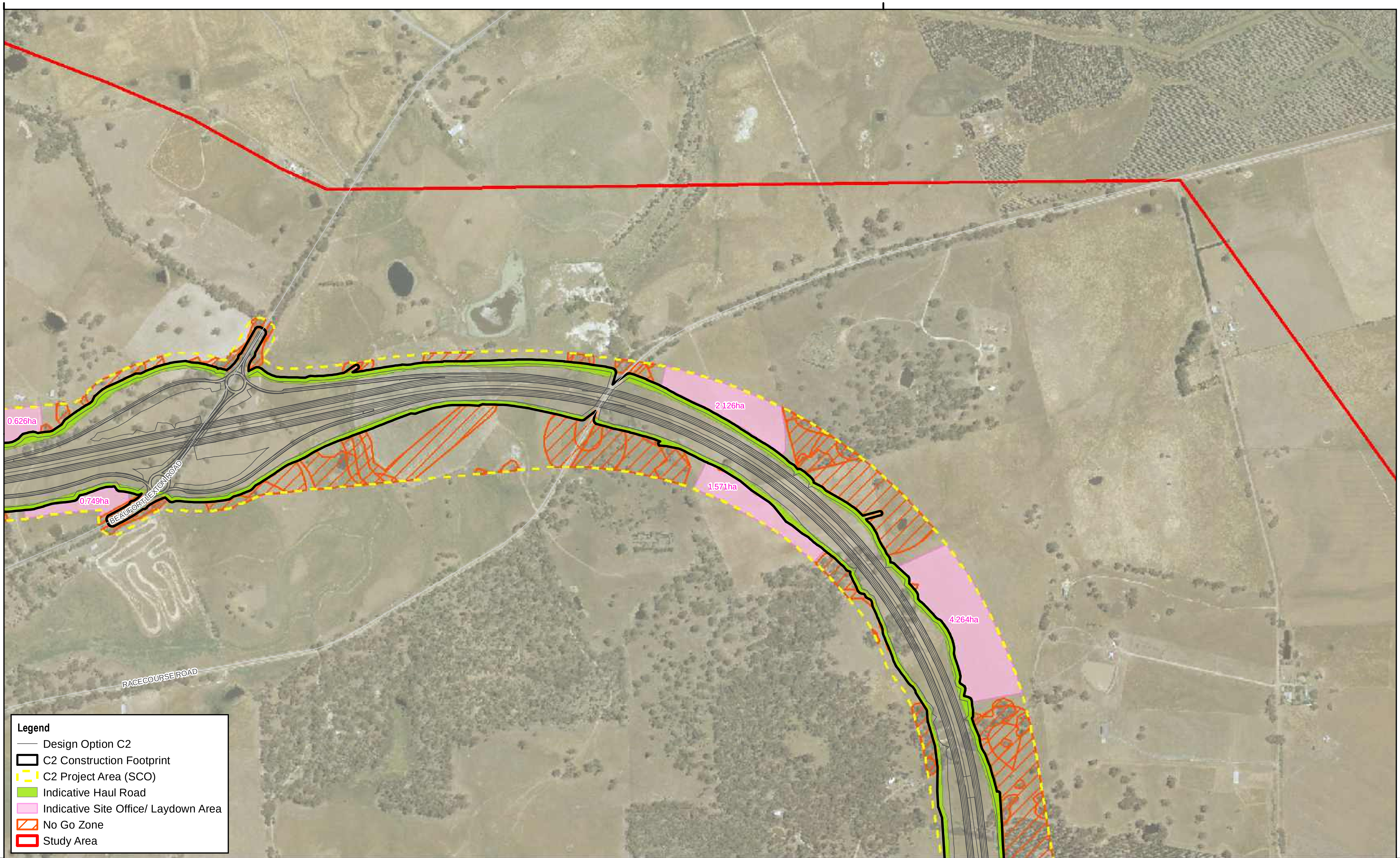

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Coordinate system: GDA 1994 MGA Zone 54
Scale ratio correct when printed at A3

regional roads victoria

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Beaufort Bypass

Indicative Site Office and Laydown Areas
Map 3 of 4

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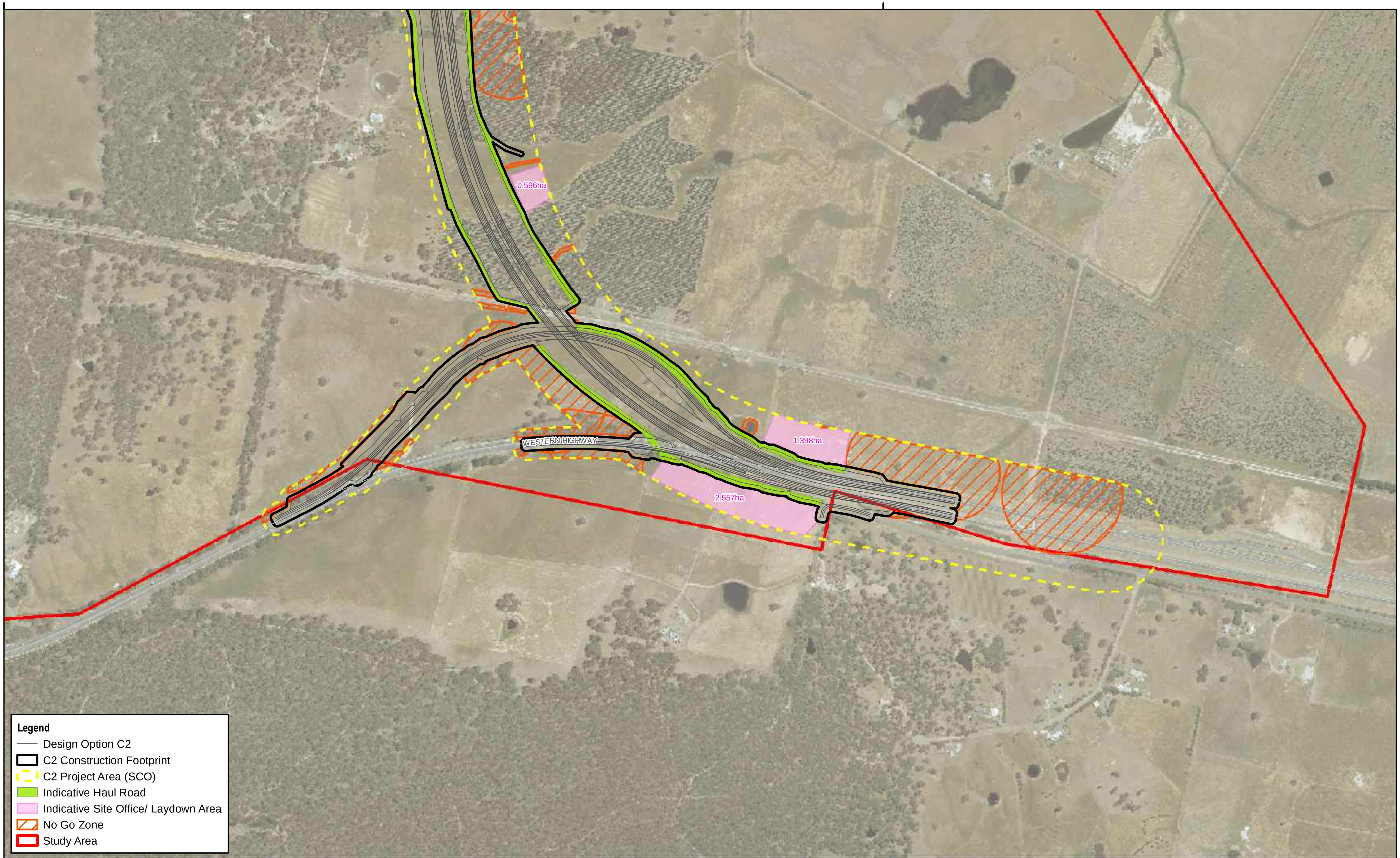
VicRoads

www.wsp.com



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Beaufort Bypass

Indicative Site Office and Laydown Areas
Map 4 of 4

APPENDIX L

APPLICATION OF DELWP'S ASSESSOR'S HANDBOOK ON NATIVE VEGETATION

L1 NATIVE VEGETATION VALUE

Native vegetation values in Appendix 1D of the *Assessor's handbook - Applications to remove, destroy or lop native vegetation*[2] (DELWP 2017a) (the Handbook) outline other values to be considered for avoidance and minimisation with the application of DELWP's *Guidelines for the removal, destruction or lopping of native vegetation 2017*. This is enacted through Clause 12 of all Victorian Planning Schemes and has been used in a recent VCAT case (McDonald vs West Wimmera, VCAT Ref: P1133/2018). Specifically, consideration of policy for protection of biodiversity (Clause 12.01-1S) and native vegetation management (Clause 12.01-2S) were used and interpreted.

L1.1 SCOPE

Appendix 1D contains four tables of relevance (Tables 6, 7, 8 and 9) which can be interpreted in tabular format or in geographic format. For the purposes of evaluating lower and higher values in the Tables 6, 7, 8 and 9 for the comparison of alignments, we undertook the following tasks:

- use the values in Tables 6, 7, 8 and 9 of the *Assessor's handbook* as to determine lower and higher values against native vegetation data mapped in the field by WSP as a part of the *Flora and Fauna Impact Assessment for the Beaufort Bypass EES*
- summarise the quantities in hectares of lower and higher values for each alignment

Appendix 1D of the Handbook includes four tables:

- *Table 6. Other values of native vegetation* (Table 1)
- *Table 7. Biodiversity values of native vegetation considered in all assessment pathways* (Table 2)
- *Table 8. Additional biodiversity values considered in the Intermediate and Detailed Assessment Pathways* (Table 3)
- *Table 9. Additional biodiversity value of native vegetation considered in the Detailed Assessment Pathway* (Table 4).

These tables have been reproduced below in Table L.1, Table L.2, Table L.3 and Table L.4. Against each assessment line WSP's assessment methodology has been detailed, and a brief discussion of results also provided.

A detailed assessment of the results, including statistics and maps, is provided in Section 2 and a brief summary of the overall assessment on native vegetation patches is provided in Section 3.

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[2] https://www.environment.vic.gov.au/__data/assets/pdf_file/0022/91255/Assessors-handbook-Applications-to-remove,-lop-or-destroy-native-vegetation-V1.1-October-2018.pdf

Table L.1 Table 6: Other values of native vegetation

VALUE	LOWER VALUE	HIGHER VALUE	METHODOLOGY	RESULTS DISCUSSION
Land and water protection	The native vegetation is not close to a wetland, waterway or riparian ecosystems and not in a special water supply catchment area listed in the *Catchment and Land Protection Act 1994*. The native vegetation is on flat land that is not subject to soil erosion or slippage. The land is not within a coastal or alpine area. The native vegetation is not on land that is close to groundwater recharge or discharge area or on land where groundwater recharges saline water tables.	The native vegetation is close (within 30 metres) to a wetland, waterway or riparian ecosystems, or in special water supply catchment areas listed in the *Catchment and Land Protection Act 1994*. The native vegetation plays an important role in preventing land degradation because the land is unstable, steep (slopes are more than 20 per cent), subject to soil erosion or slippage or the land is located in a coastal or alpine area. The native vegetation is on land that is close to groundwater recharge or discharge areas or on land where groundwater recharges saline water tables.	Native vegetation was attributed High where it intersected a 30m buffer of modelled watercourses (DEPI, 2013), and current wetlands (DELWP, 2013). GIS analysis was also undertaken using contours (DELWP, 2020e) to gain a rough understanding of gradients across the study area. Slopes within study area less than 20% were attributed Low, while areas with gradients over 20% attributed High. Native vegetation value for Groundwater recharge of saline water tables not assessed.	Due to watercourses being linear in nature, and this dataset containing large non-linear patches, this result is an over-indication of vegetation within proximity to waterways. Areas where slope was analysed as being greater than 20%, were relatively small across the study area. C2 resulted in the lowest hectarage of High value intersect for Land and Water Protection. Results are detailed in section L2.1.
Landscape values	The native vegetation or land where the native vegetation is to be removed does not have to be managed to preserve identified landscape values.	The native vegetation or land where the native vegetation is to be removed has to be managed to preserve identified landscape values.	This assessment has been undertaken with the assumption that any native vegetation occurring on Crown land (DELWP, 2020d), road reserves (DELWP, 2020a), within modelled parks or reserves (DELWP, 2020b), or within a State Park (DELWP, 2020c) is under active management for conservation purposes and would therefore be considered High.	C2 resulted in the lowest hectarage of High value intersect for landscape Values. Results are detailed in section L2.2.

VALUE	LOWER VALUE	HIGHER VALUE	METHODOLOGY	RESULTS DISCUSSION
Protection under the *Aboriginal Heritage Act 2006*	The native vegetation is not listed on the Victorian Aboriginal Heritage Register. The native vegetation has not been identified as important by the relevant Registered Aboriginal Party. The native vegetation has not been identified as important by Aboriginal Victoria.	The native vegetation is listed on the Victorian Aboriginal Heritage Register. The native vegetation has been identified as important by the relevant Registered Aboriginal Party. The native vegetation has been identified as important by Aboriginal Victoria.	Native vegetation was attributed High where it intersected the dataset of 'Areas of Cultural Heritage Sensitivity' (DPC, 2015)	This resulted in 18% of Patches, and 21 Scattered Trees attributed as high across the study area. C2 resulted in the lowest hectarage of High value intersect for Aboriginal Heritage. Results are detailed in section L2.3.

Table L.2 Table 7: Biodiversity values of native vegetation considered in all assessment pathways

VALUE	LOWER VALUE	HIGHER VALUE	METHODOLOGY	RESULTS DISCUSSION
Extent The amount of native vegetation to be removed and the context it is being removed from	Small extent (less than 0.5 hectares) with no long- term viability (it may be isolated or degraded by surrounding land uses). Removal does not impact on viability of remaining vegetation (it does not result in fragmentation). Removal does not include large trees.	Larger extent (more than 1 hectare). Smaller extent (less than 1 hectare) but with good viability in an otherwise cleared landscape. Smaller extent but from within a larger patch and the removal leads to fragmentation of the patch. Removal includes large trees.	All patches greater than 1 hectare considered high. All patches over 0.5 hectares considered to have good viability unless grazed grassy understory. Patches less than 0.5 hectares not providing connectivity or large trees considered low. All patches providing connectivity were considered high regardless of size or viability.	Sixty-nine patches over 0.5 hectares in size, totalling 232 hectares, considered low due to absence of canopy and/or understory subject to grazing. Assessment of viability was undertaken manually with reference to recent and high definition aerial imagery and GIS. Assessment of connectivity was undertaken manually using GIS. C2 resulted in the lowest hectarage of High value intersect for Extent. Results are detailed in section L2.4
Condition The condition score of the vegetation to be removed. Scores range from 0.2 to 1.	Condition scores are in the low range when they are less than 0.3.	Condition scores are in the high range, 0.6 and above, noting 1 means pristine, pre-settlement condition.	Patches with a site condition score as per the habitat hectare methodology (DSE, 2004) over 0.6 considered High.	This guideline resulted in categorisation of only six patches as high, none of these were intersected by any alignment. It should be noted that when also considering the landscape context scoring 15% of patches scored 0.6 or higher for the Vegetation Quality Assessment. Results are detailed in section L2.5.

VALUE	LOWER VALUE	HIGHER VALUE	METHODOLOGY	RESULTS DISCUSSION
Strategic biodiversity value (SBV) The SBV score of the vegetation to be removed. Scores range from 0.1 to 1	SBV scores are in the low range between 0.1 and 0.3. Lower scores indicate locations where either only a few values are the same values (and the other found together, or areas where there are many other locations with locations have better condition and connectivity).	SBV scores are in the high range, 0.8 and above. A higher score indicates a location where many values, that are not widespread or common, are found together.	SBV values have been broken up by 0.0–0.29 (low value), 0.3–0.79 (moderate value) and 0.8–1.0 (high value) which provides an extra value (moderate) to Table 7 in the *Assessors Handbook*.	The assessment on SBV scores highlighted a similarity across all four alignment options. Each alignment included areas of low, moderate and high SBV scores. In all cases, moderate SBV scores constituted the largest component (> 75%) of area within each alignment. This is based on modelled data and as such should not be used for alignment choice. C2 resulted in the lowest hectarage of High and Moderate value intersect for SBV. The results per alignment of the intersection analysis for SBV scores are detailed in section L2.6.

Source: (DELWP 2017a)

Table L.3 Table 8: Additional biodiversity values considered in the intermediate and detailed assessment pathways

VALUE	LOWER VALUE	HIGHER VALUE	METHODOLOGY	NOTES
Large trees Large trees are usually old and difficult to replace in the short term	No large trees are being removed. If large trees removal cannot be avoided, a large tree is likely to have lower biodiversity value if: — it is isolated from other vegetation and has little opportunity to contribute to landscape connectivity — it is unviable in the long term in the absence of active management, and considering surrounding existing land uses — it does not include special features such as shelter hollows or an important food source.	Large trees are being removed. If large tree removal cannot be avoided, a large tree may have higher biodiversity value if: — it facilitates landscape connectivity (e.g. green corridor or 'stepping stone') and its removal could result in further habitat fragmentation — the local area has experienced a decline in the number of large trees and they are infrequent in the landscape — it has long term viability — it has special features such as shelter hollows or an important food source.	Trees within patches were accounted for via attribution of native vegetation patches. Patches attributed with a positive large tree count, one or greater, attributed as high. Patches without large trees were attributed as low. All Large scattered trees were considered high value. 72% of scattered trees were attributed as high by this methodology. The assessment also attributed values based on ecological connectivety. A large tree (scattered or in a patch) was given a high value if it intersected one of the following: Core area, node, stepping stone, terrestrial corridors or wetlnd and riparian corridor.	47% of Patches attributed as high due to Large trees. Large tree values for patches outside alignments may be an extrapolation based on trees mapped within proximity of the alignment and extent of patches outside of alignments. C2 resulted in the lowest hectarage of High value intersect for Large trees, and the highest number of Large Scattered Trees. Regarding connectivity, most large trees were found to occur in core areas and terrestrial corridores. Only one scattered tree intersected an area of ecological connectivity. Results are detailed in section L2.7.

VALUE	LOWER VALUE	HIGHER VALUE	METHODOLOGY	NOTES
Ecological Vegetation Class (EVC) Bioregional Conservation Status	It is not an endangered EVC. The EVC is well represented in existing protected areas.	It is an endangered EVC (location category 2) in the *Location map.* the EVC is not well represented in existing protected areas.	This assessment was undertaken via GIS analysis. EVCs were considered for this assessment as they were identified in the field. Patches of native vegetation for which the EVC conservation status is Endangered or Rare were attributed as High. Patches intersecting locations 2 and 3 of the Location Map (DELWP, 2017b) were attributed as High.	Conversion of the Location Map (DELWP, 2017b) from .tiff to vector resulted in a modified although similarly granular shapes. Although slightly different, his shapefile was considered representative of the Location Map and fit for the purposes of this exercise. This step resulted in 61% of patches being attributed as high. The breakdown of native vegetation according to EVC BCS showed more variation across each alignment. Option C2 was identified as having the lowest impact on total native vegetation loss at 46.68 ha. Alignment C2 also had the lowest impact on endangered EVC’s which comprised 10.97% of the total vegetation within the whole alignment, almost half of that calculated for alignment A0. C2 resulted in the lowest hectarage of High value intersect. The results per alignment of the intersection analysis for EVC conservation status are provided in L2.8.

VALUE	LOWER VALUE	HIGHER VALUE	METHODOLOGY	NOTES
Sensitive wetland and coastal areas The land is nationally or internationally listed for its value	It is not mapped as a sensitive wetland or coastal area (location category 2) in the Location map.	It is mapped as a sensitive wetland or coastal area (location category 2) in the Location map.	No sensitive wetland or coastal area in Ensym reports.	All areas of native vegetation considered lower value – result not mapped.

Source: *(DELWP 2017a)*

Table L.4 Table 9. Additional biodiversity value of native vegetation considered in the detailed assessment pathway

VALUE	LOWER VALUE	HIGHER VALUE	METHODOLOGY	NOTES
Habitat for rare or threatened species This includes those listed as critically endangered, endangered, vulnerable or rare	— Few species' habitats are impacted. — Low proportional impact (less than 0.005%). — No or few species offsets. — Species have lower conservation — No or few species offsets. — Status (rare or vulnerable). — The species' habitats are dispersed and not an important area of habitat within a dispersed species.	— Numerous species' habitats are impacted. With few to many species offsets. — Proportional impact is relatively higher than the species threshold (proportional impact represents the percentage of the habitat affected). — Species have higher conservation status (endangered or critically endangered). — The species' habitats are highly localised or an important area of habitat within a dispersed species or selected VBA records.	Following on ground assessments species specific habitat mapping has been undertaken for: — Brolga *Antigone rubicunda* — Brown Toadlet *Pseudophryne bibronii* – Vic (e) — Ben Major Grevillea *Grevillea floripendula* – EPBC Act (VU); Vic (v); FFG Act listed — Ornate Pink Fingers *Caladenia ornata* – EPBC (VU), Vic (v), FFG Act listed — Emerald -lip Greenhood *Pterostylis smaragdyna* - Vic (r) — Growling Grass Frog *Litoria raniformis* – EPBC Act (VU), Vic (e), FFG Act listed — Little Galaxias *Galaxiella toourtkoourt* – EPBC Act (VU), Vic (vu). — Pale-flower Cranesbill *Geranium Sp. 3* - Vic (r) — Rosemary Grevillea *Grevilia rosmarinifolia subsp. Rosmarinifolia* - Vic (r) — River Swamp Wallaby Grass *Amphibromus fluitans* EPBC (VU)	Due to a large proportion of native vegetation being identified as habitat for species of conservation significance, appropriate buffers around waterways for amphibians this exercise resulted in 97% of native vegetation patches attributed as high. Map is not shown as the majority of the alignment options are considered 'higher value'.

VALUE	LOWER VALUE	HIGHER VALUE	METHODOLOGY	NOTES
			As areas have been specifically identified as suitable habitat for the above-mentioned species no modelling analysis was anticipated to be required. All likely habitat for the above species was dissolved into a single layer and all patches that intersected this layer were attributed as High. To supplement this information, the following information is provided below: — total number of species with habitat values affected in Appendix 2 of Ensym reports — species offset amount — number of endangered and critically endangered species requiring species offsets.	

Source: (DELWP 2017a)

L2 DETAILED ASSESSMENT RESULTS – STATISTICS AND MAPS

L2.1 LAND AND WATER PROTECTION

Table L.5 Area and percentage of Patches, and large trees attributed to high and Low per alignment during the Land and Water protection assessment

PATCHES					SCATTERED TREES				
HIGH/LOW	A0	A1	C0	C2	HIGH/LOW	A0	A1	C0	C2
High (ha)	53.34	53.51	53.7	39.8	High (#)	7	5	6	5
High %	91.00	92.00	91.00	85.00	Low (#)	13	15	20	23
Low (ha)	4.97	4.47	5.14	7.25					
Low %	9.00	8.00	9.00	15.00					

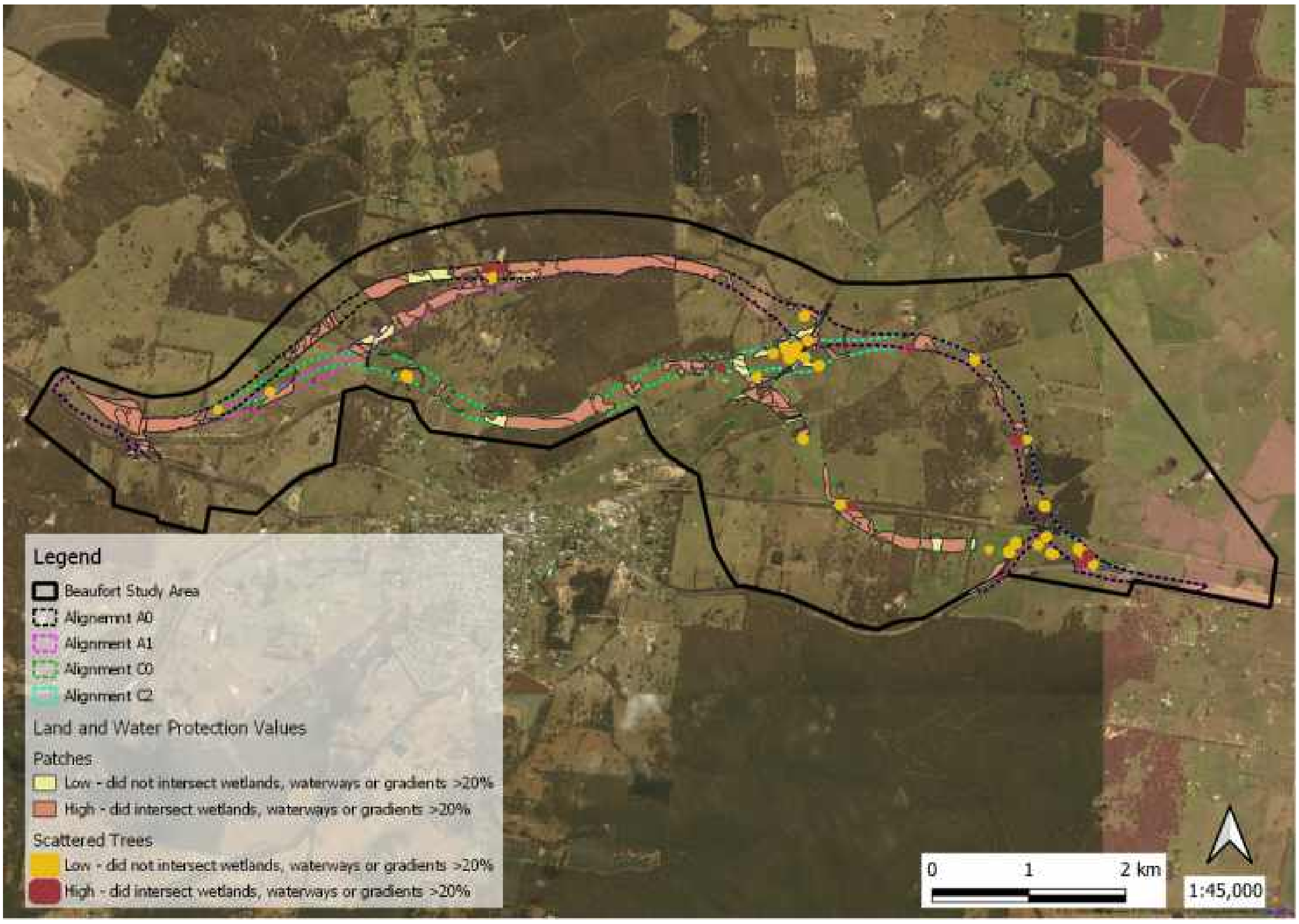

Figure L.1 Land & Water Protection value assessing 30m wetland buffer within the four alignment options assessed as low or high as per Table 6 of the Assessors Handbook

L2.2 LANDSCAPE VALUES

Table L.6 Area and percentage of Patches, and large trees attributed to high and Low per alignment during the Landscape Values assessment

PATCHES					SCATTERED TREES				
HIGH/LOW	**A0**	**A1**	**C0**	**C2**	**HIGH/LOW**	**A0**	**A1**	**C0**	**C2**
High (ha)	31.9	31.42	28.25	25.5	High (#)	8	7	6	4
High %	54.70	54.19	47.97	54.16	Low (#)	12	13	20	24
Low (ha)	26.42	26.56	30.64	21.58					
Low %	45.30	45.81	52.03	45.84					

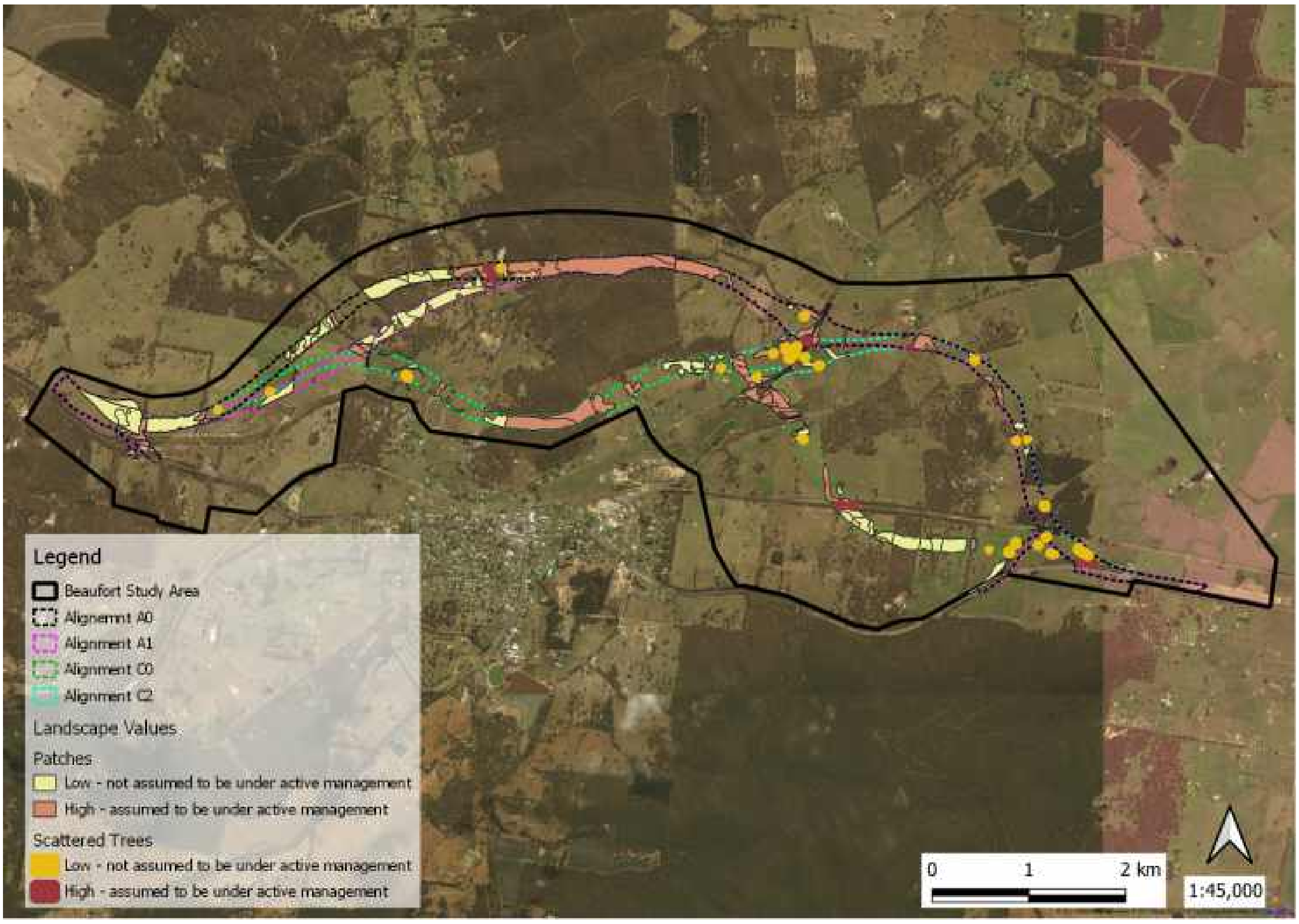

Figure L.2 Landscape values within the four alignment options assessed as low or high as per Table 6 of the Assessors Handbook

Other broader landscape values and impacts on ecological values such as connectivity have been addressed in L2.7 Large Trees below and in detail in the report – see Section 7.2.2.

L2.3 PROTECTION UNDER THE ABORIGINAL HERITAGE ACT 2006

Table L.7 Area and percentage of Patches, and large trees attributed to high and Low per alignment during the Aboriginal Heritage assessment

PATCHES					**SCATTERED TREES**				
High/Low	**A0**	**A1**	**C0**	**C2**	**High/Low**	**A0**	**A1**	**C0**	**C2**
High (ha)	17.8	18.83	16.64	11.8	High (#)	11	10	6	6
High %	30.52	32.48	28.26	25.06	Low (#)	9	10	20	22
Low (ha)	40.52	39.15	42.24	35.27					
Low %	69.48	67.52	71.73	74.92					

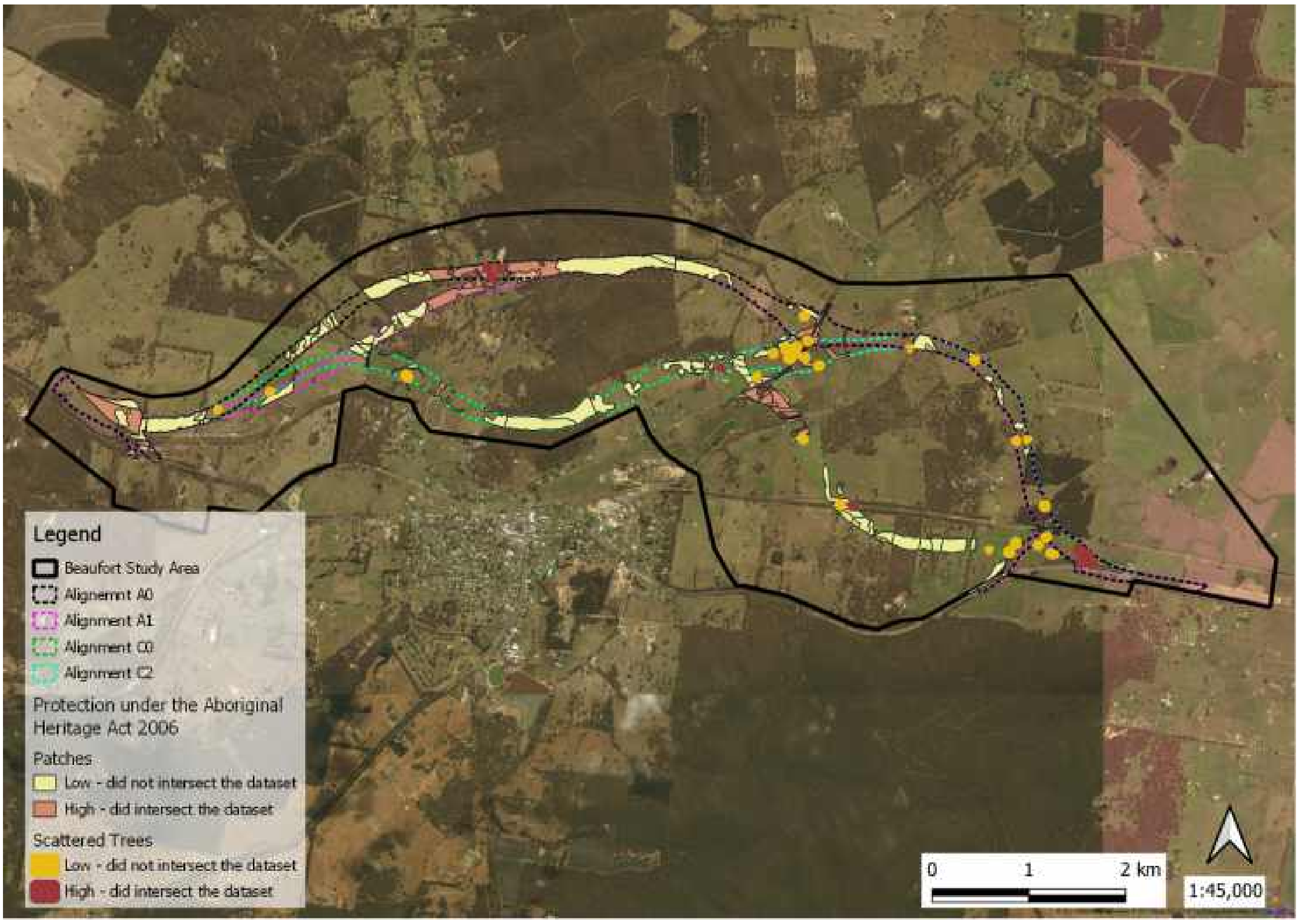

Figure L.3 Protection under the Aboriginal Heritage Act 2006 within the four alignment options assessed as low or high as per Table 6 of the Assessors Handbook

L2.4 EXTENT

Table L.8 Area and percentage of Patches attributed to high and Low per alignment during the Extent assessment

HIGH/LOW	A0	A1	C0	C2
High (ha)	34.7	36.54	39.19	27.72
High %	59.50	63.02	66.55	58.88
Low (ha)	23.62	21.44	19.7	19.36
Low %	40.50	36.98	33.45	41.12

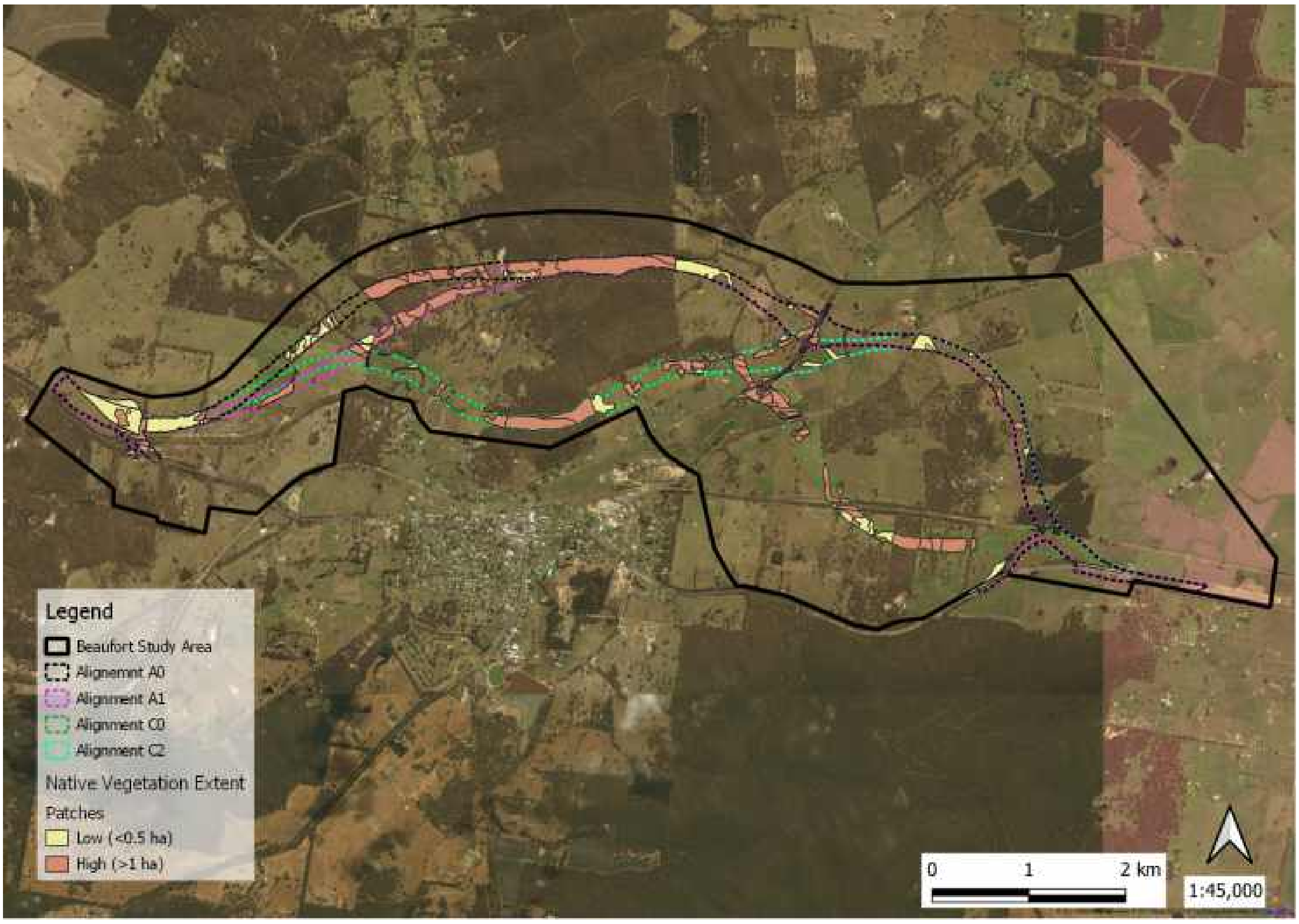

Figure L.4 Native Vegetation extent within the four alignment options assessed as low or high as per Table 7 of the Assessors Handbook

L2.5 CONDITION

Table L.9 Area and percentage of Patches attributed to high and Low per alignment during the Condition assessment

HIGH/LOW	A0	A1	C0	C2
High (ha)	0.00	0.00	0.00	0.00
High %	0.00	0.00	0.00	0.00
Low (ha)	58.15	57.80	58.88	47.06
Low %	100.00	100.00	100.00	100.00

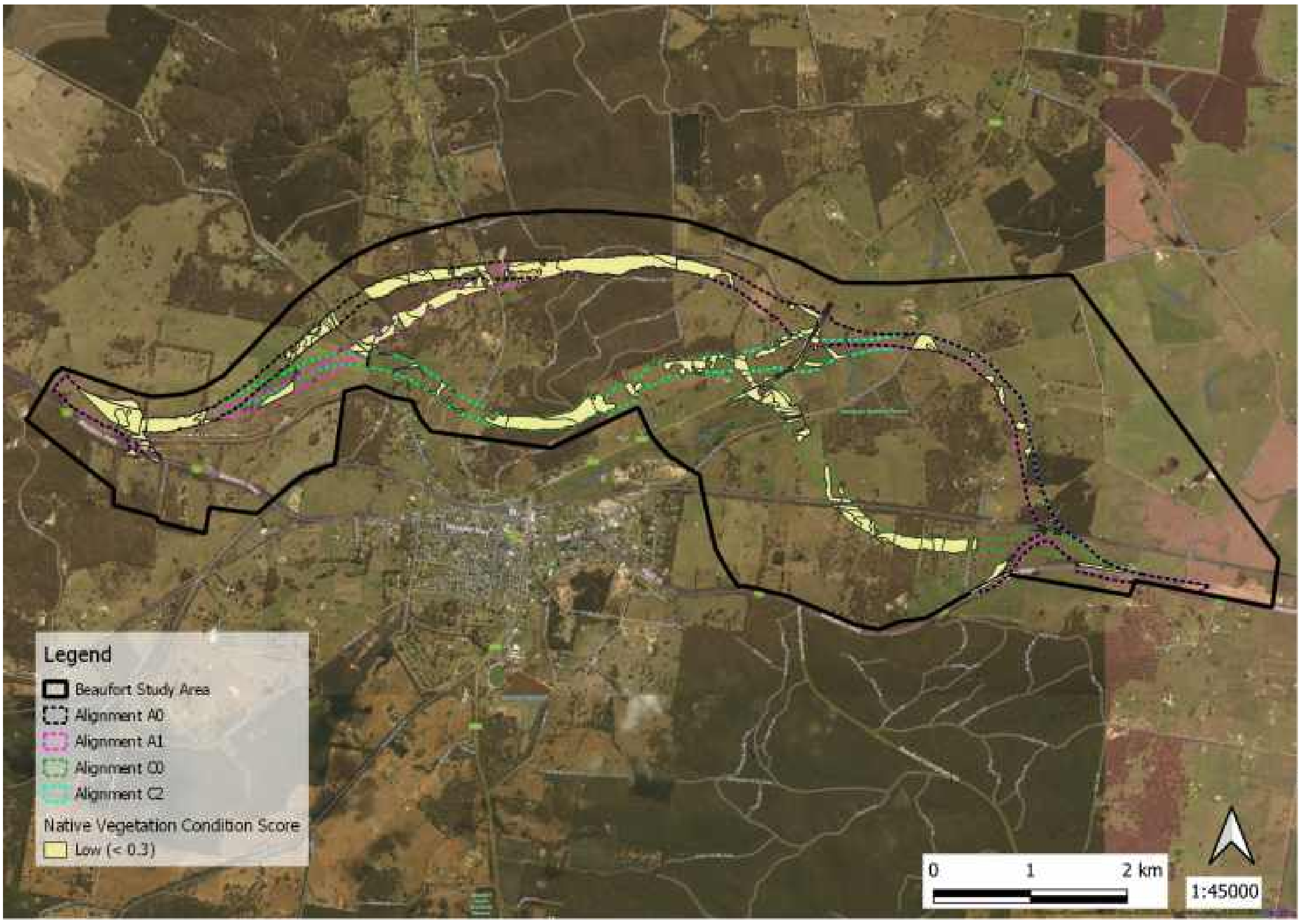

Figure L.5 Native Vegetation Condition score within the four alignment options assessed as low or high as per Table 7 of the Assessors Handbook

L2.6 STRATEGIC BIODIVERSITY VALUE

Table L.10 Area and percentage of categorised SBV scores across each alignment

SBV VALUE	A1		A1		C0		C2	
	AREA (HA)	%	AREA (HA)	%	AREA (HA)	%	AREA (HA)	%
Low	0.61	1.05%	0.61	1.05%	0.08	0.14%	0.61	1.30%
Moderate	47.14	80.80%	47.82	82.45%	44.79	76.03%	36.96	78.49%
High	10.59	18.15%	9.57	16.50%	14.04	23.83%	9.52	20.22%

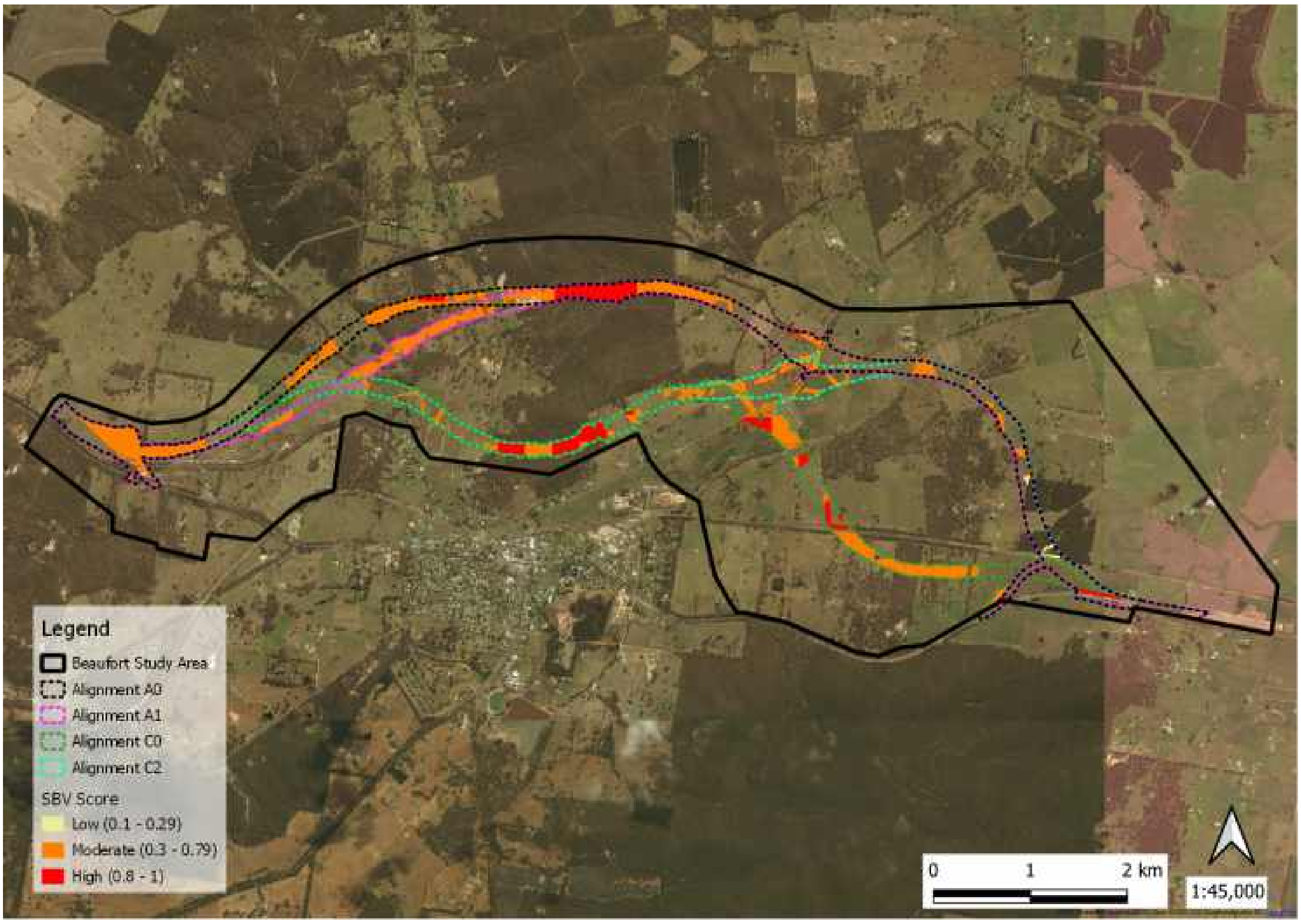

Figure L.6 Strategic Biodiversity Value (SBV) score within the four alignment options assessed as low, moderate or high as per Table 7 of the Assessors Handbook

L2.7 LARGE TREES

Table L.11 Area and percentage of Patches, and large trees attributed to high and Low per alignment during the Large Trees assessment

PATCHES					SCATTERED TREES				
High/Low	**A0**	**A1**	**C0**	**C2**	**High/Low**	**A0**	**A1**	**C0**	**C2**
High (ha)	46.42	46.13	46.76	40.13	High (#)	12	12	19	22
High %	79.60	79.56	79.40	85.24	Low (#)	8	8	7	6
Low (ha)	11.9	11.85	12.13	6.95					
Low %	20.40	20.44	20.60	14.76					

Table L.12 Number of large trees in patches and large scattered trees per alignment with a high value (i.e. located within a connectivity element)

CONNECTIVITY ELEMENT	PATCHES				SCATTERED TREES			
	A0	**A1**	**C0**	**C2**	**A0**	**A1**	**C0**	**C2**
Core Area	188	167	67	38	0	0	0	0
Node	2	2	0	2	0	0	0	0
Stepping stone	65	68	106	160	0	0	0	1
Terrestrial corridor	92	86	93	68	0	0	0	0
Wetland & riparian corridor	0	0	0	0	0	0	0	0
Total	**347**	**323**	**266**	**268**	**0**	**0**	**0**	**1**

Table L.13 Summary of proposed tree losses (large trees and small scattered trees only) within construction footprint per alignment option (see Section 7.1.2.2 in report from more detail)

TREE SIZE	A0	A1	C0	C2
Small	9	8	7	6
Large trees in patches	372	351	293	286
Large scattered trees	15	15	22	25
Total	**396**	**374**	**322**	**317**

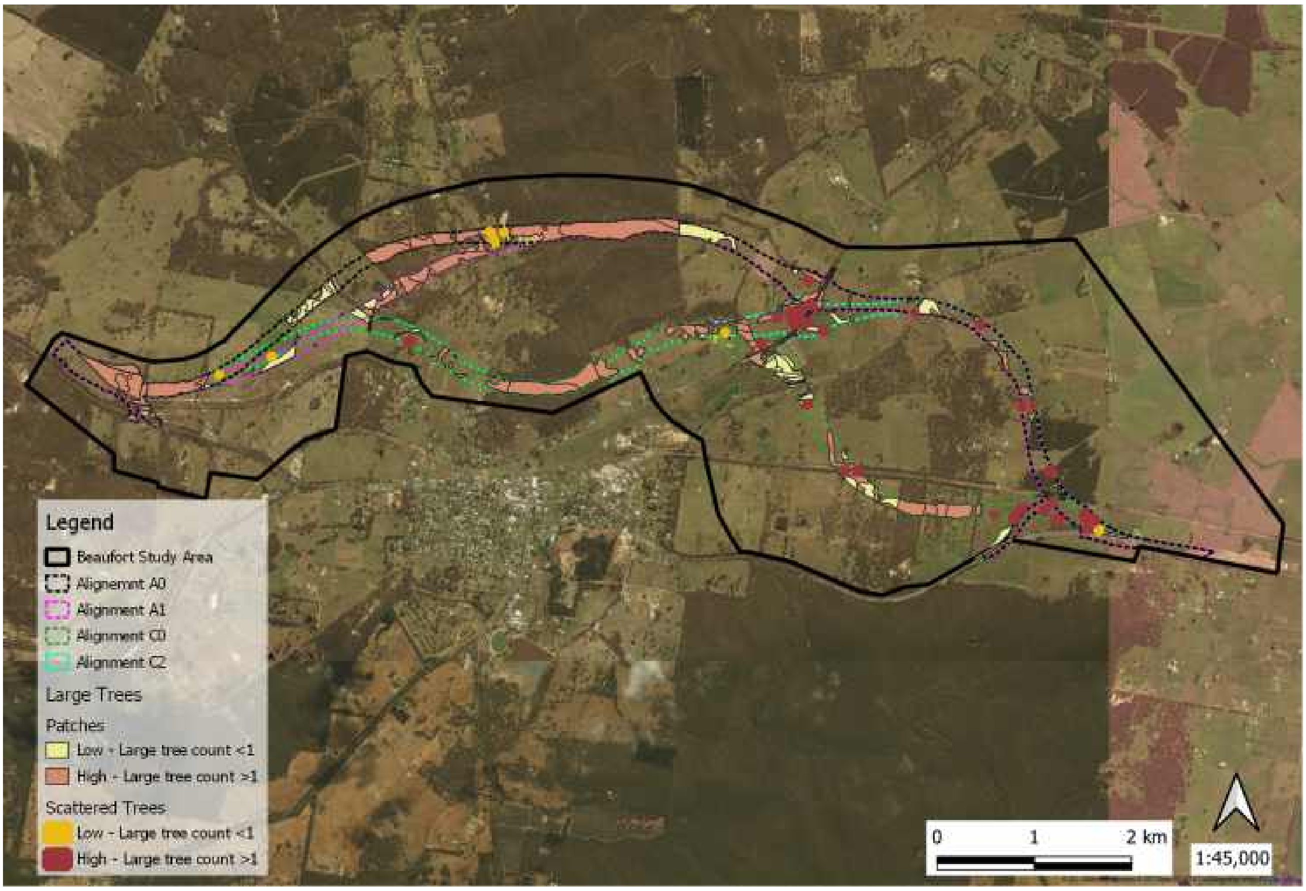

Figure L.7 Large Tree values within the four alignment options assessed as low or high as per Table 8 of the Assessors Handbook

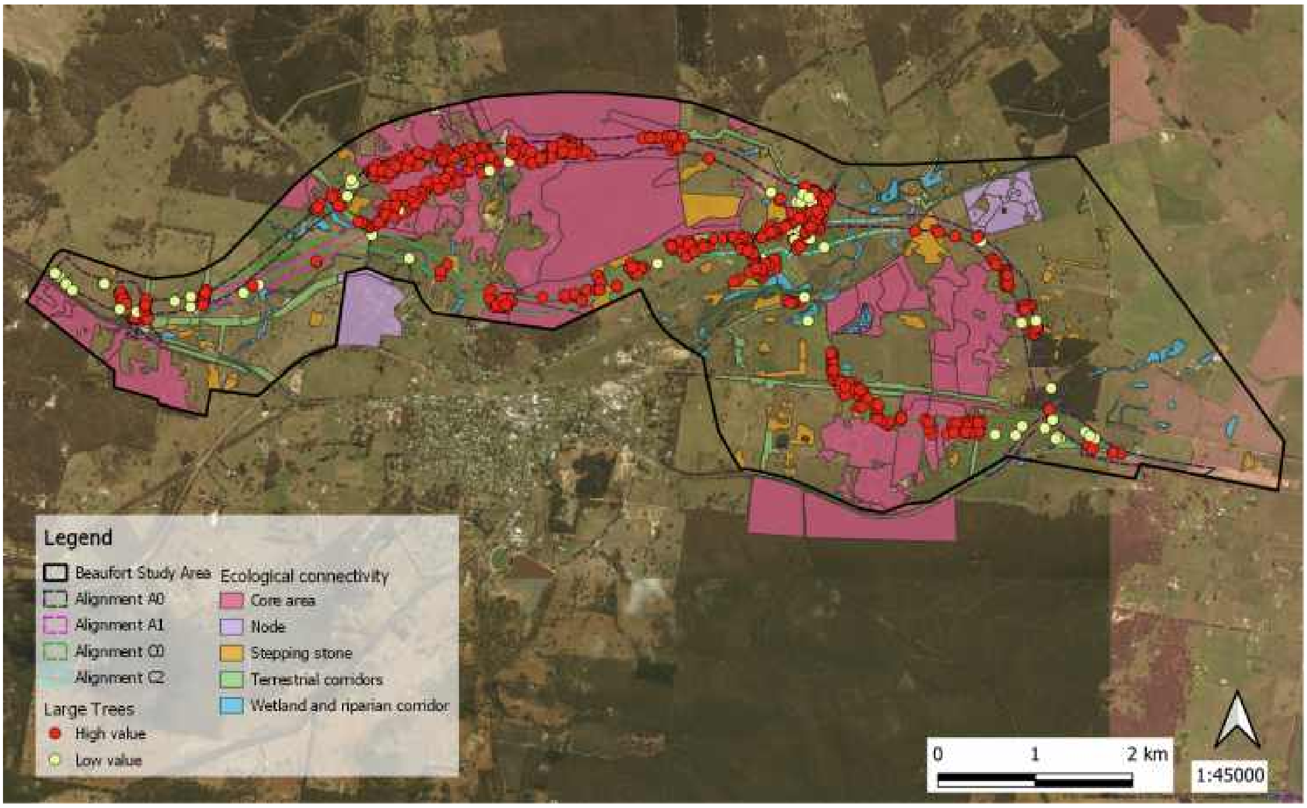

Figure L.8 Large Tree values within the four alignment options assessed as low or high based on ecological connectivity as per Table 8 of the Assessors Handbook

L2.8 ECOLOGICAL VEGETATION CLASS (EVC)

Table L.14 Mapped vegetation within each alignment according to EVC conservation status

EVC CONSERVATION STATUS	**A1**		**A1**		**C0**		**C2**	
	Area (ha)	**%**	**Area (ha)**	**%**	**Area (ha)**	**%**	**Area (ha)**	**%**
Least Concern (low)	19.99	34.52%	19.99	34.69%	13.80	23.59%	14.38	30.82%
Depleted (low)	14.56	25.14%	15.97	27.71%	25.64	43.82%	21.10	45.21%
Vulnerable (low)	11.47	19.80%	12.33	21.40%	10.50	17.95%	6.07	13.01%
Endangered (high)	11.89	20.54%	9.34	16.20%	8.56	14.63%	5.12	10.97%

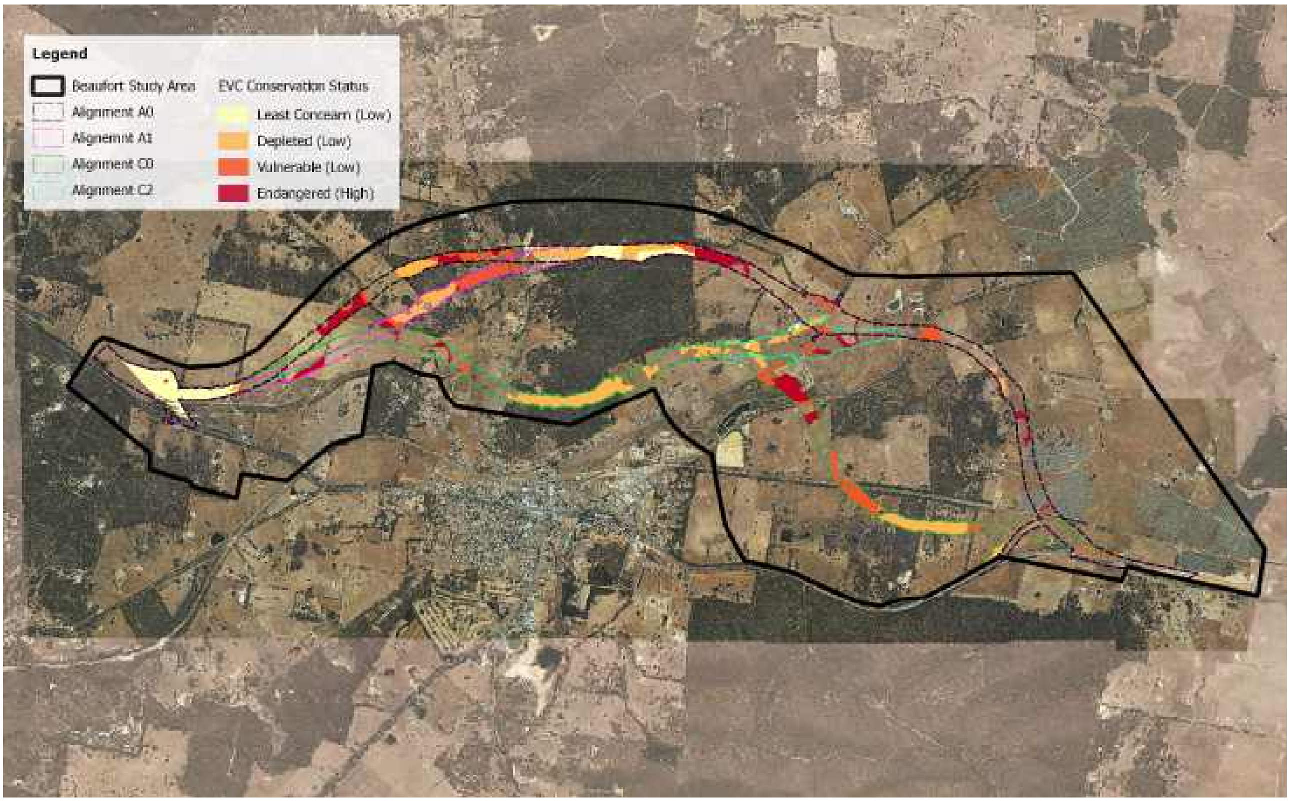

Figure L.9 Native Vegetation assessed according to EVC conservation status as Low (Least Concern. Depleted, Vulnerable) and High (Endangered) biodiversity value as per Table 8 of the Assessors Handbook

L2.9 HABITAT FOR RARE OR THREATENED SPECIES

Table L.15 Comparison of rare or threatened species habitat values and offset triggers in Ensym reports

	A0	A1	C0	C2
Total number of species with habitat values affected in Appendix 2 of Ensym reports				
Rare and threatened	60	60	54	57
Endangered and critically endangered	21	21	23	22
Total number of species	81	81	77	79
Species offset amount	23.088 specific units of habitat for Ben Major Grevillea, *Grevillea floripendula* 34.079 specific units of habitat for Rough Wattle, *Acacia aspera subsp. parviceps* 43.484 specific units of habitat for Emerald-lip Greenhood, *Pterostylis smaragdyna* 43.066 specific units of habitat for Wimmera Scentbark, *Eucalyptus sabulosa*	27.280 specific units of habitat for Ben Major Grevillea, *Grevillea floripendula* 32.898 specific units of habitat for Rough Wattle, *Acacia aspera subsp. parviceps* 43.820 specific units of habitat for Emerald-lip Greenhood, *Pterostylis smaragdyna* 43.136 specific units of habitat for Wimmera Scentbark, *Eucalyptus sabulosa*	29.517 specific units of habitat for Ben Major Grevillea, *Grevillea floripendula* **36.655 specific units of habitat for Large-headed Fireweed, *Senecio macrocarpus*** 39.426 specific units of habitat for Emerald-lip Greenhood, *Pterostylis smaragdyna* **13.291 specific units of habitat for White Sunray, *Leucochrysum albicans subsp. tricolor*** 36.607 specific units of habitat for Wimmera Scentbark, *Eucalyptus sabulosa* 32.665 specific units of habitat for Rough Wattle, *Acacia aspera subsp. parviceps*	24.913 specific units of habitat for Ben Major Grevillea, *Grevillea floripendula* 29.785 specific units of habitat for Emerald-lip Greenhood, *Pterostylis smaragdyna* 25.715 specific units of habitat for Rough Wattle, *Acacia aspera subsp. parviceps*
Number of endangered and critically endangered species requiring species offsets – species in **bold**	0	0	2	0

L3 RESULTS SUMMARY

All the native vegetation values presented above were considered for each patch of native vegetation. The result of the assessment was 100% of patches within the study area attributed as High (i.e. each patch of native vegetation scored high for at least one native veegtation value). An intersection analysis of the resultant High and Low value vegetation is provided for each alignment option in Tables L.16 below.

Table L.16 Intersection of lower and higher values based off the combined assessment of native vegetation patches per alignment (inclusive of values outlined in Tables 6-9 in Appendix 1D of the Assossrs Handbook)

ALIGNMENT	LOWER VALUE INTERSECTED	HIGHER VALUE INTERSECTED
A0	0 hectares	58.15 hectares
A1	0 hectares	57.80 hectares
C0	0 hectares	58.88 hectares
C2	0 hectares	47.06 hectares

L4 CONCLUSION

Analyses of lower and higher values against Tables 6, 7, 8 and 9 in Appendix 1D of the *Assessors Handbook* was undertaken using GIS. The majority of native vegetation in the study area is deemed to be of higher value. This includes Scattered Trees. As such, the use of the *Assessors Handbook* as an additional tool to assist with alignment choice provides no further value than using total native vegetation impacts.

As the combination of values didn't enable any discrimination between alignments due to most native vegetation patches and trees scoring a higher value, an evaluation of eight additional elements that were of interest to DELWP were used.

The assessment on SBV scores highlighted a similarity across all four alignment options. As this is based on modelled data and as such should not be used for alignment choice.

The breakdown of native vegetation according to EVC BCS showed more variation across each alignment. Option C2 was identified as having the lowest impact on total native vegetation loss at 46.68 ha. Alignment C2 also had the lowest impact on endangered EVC's which comprised 10.97% of the total vegetation within the whole alignment, almost half of that calculated for alignment A0.

- **C2** resulted in the lowest hectarage of High value intersect for **Land and Water Protection.**
- **C2** resulted in the lowest hectarage of High value intersect for **Landscape Values.**
- **C2** resulted in the lowest hectarage of High value intersect for **Aboriginal Heritage**.
- **C2** resulted in the lowest hectarage of High value intersect for **Extent**.
- **C2** resulted in the lowest hectarage of Low value intersect for **Condition**. Note that none of the four alignment options intersected patches of Native Vegetation with a High condition.
- **C2** resulted in the lowest hectarage of High and Moderate value intersect for **SBV**.
- **C2** resulted in the lowest hectarage of High value intersect for **Large trees**, and the lowest number of **tree loss (large trees and small scattered trees)**. Alignemnt C2 has the second lowest number of large trees and large scattered trees within a connectivitiy element.
- **C2** resulted in the lowest hectarage of High value intersect of High Value **EVC**.

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APPENDIX M

BEAUFORT BYPASS WILDLIFE CONNECTIVITY IMPACT AND MITIGATION ASSESSMENT

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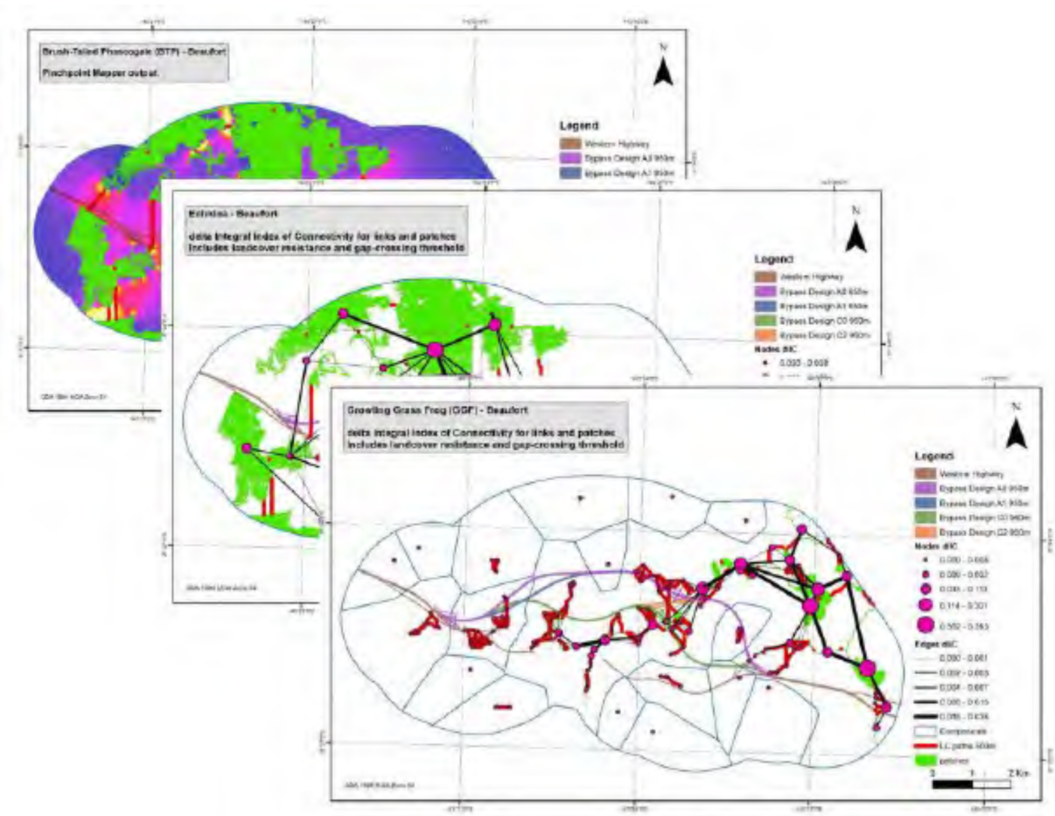
Beaufort Bypass Wildlife Connectivity Impact and Mitigation Assessment



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7 July 2019

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Beaufort Bypass Wildlife Connectivity Impact and Mitigation Assessment

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Contents

Figures

Tables

Glossary

Below is a list of commonly used modelling terms in the report. The terms have been defined from the perspective of this report which in some cases may differ slightly from there general usage.

Term	Definition
Circuit theory	Application of electrical circuit theory to landscape connectivity, where the landscape is considered to be synonymous with an electrical circuit and resistance within a landscape is characterised based on the assumption that current flow corresponds to individual movement probabilities across every grid cell in a raster (see McRae et al 2008). Measured with current density, where high values indicate higher probabilities of an individual randomly found dispersing at a pixel.
Circuitscape	Connectivity modelling software that uses circuit theory (see McRae et al 2008).
Component	A group of nodes or patches of habitat for a particular species or group of species that are linked to each other but isolated from other components.
Connectivity	The degree to which the landscape facilitates or impedes the movement of individuals among habitat patches. Maximising connectivity is often an objective of conservation planning.
Connectivity elements	Landscape features, which do not provide habitat in themselves, but can be used for dispersal. It includes wildlife corridors (linear links between patches), disconnected linear elements and stepping-stones (paddock trees, shrubs, rocky outcrops or small clusters of these features).
Connectivity model	A modelling method for assessing dispersal.
Cumulative cost distance	The cumulative cost distance describes the accumulated travel cost from one location to another based on the resistance surface rather than actual distance.
Current density	This specifically refers to Circuitscape maps outputs where warmer colours refer to areas with higher current density hence higher chance of movement.
Dispersal-cost	A value assigned to each land cover type in a landscape that reflects the ecological costs for individuals to move through it.
Delta Integral Index of connectivity (dIIC)	A patch-based graph metric which describes the importance of a patch or linkage for connecting habitat in the landscape. The dIIC metric is defined as the probability that two points randomly placed within a landscape fall into habitat areas that can be reached. Values for this metric increase with greater connectivity from zero to one. Higher values indicate that a patch is more important for connecting the landscape.
Edge	In graph theory edges are represented by paths/lines connecting neighbouring nodes (i.e. habitat patches). The presence of an edges indicate which nodes/habitat patches are connected to one another.
Gap-crossing distance threshold	Maximum (average) distance an individual will move between two structural connectivity elements.
GAP CLoSR	General Approach to Planning Connectivity from Local Scales to Regional (GAP CLoSR) is a connectivity modelling framework, which describes fine-scale dispersal patterns across large spatial extents (Lechner, Doerr, Harris, Doerr, & Lefroy, 2015; Lechner, Harris, et al., 2015; Lechner & Lefroy, 2014; Lechner, Sprod, Carter, & Lefroy, 2017).
Graphab	A software for modelling ecological networks using landscape graphs and least-cost paths (see Foltête et al. 2012)

Graph	A set of linked nodes/patches. Applied to landscape ecology a graph is a set of patches within a landscape linked by movement pathways.
Graph theory	The graph theoretic perspective applied to landscape ecology represents landscapes as a graph; whereby the landscapes are composed of a series of nodes (patches). Graph theory uses mathematical structures to describe pairwise relations between nodes.
Graph metrics	Metrics derived using graph theory to describe connectivity at the landscape scale or patch scale.
Integral Index of connectivity (IIC)	A landscape-scale describes how connected habitat is within a landscape. The IIC metric is defined as the probability that two points randomly placed within a landscape fall into habitat areas that can be reached. Values for this metric increase with greater connectivity from zero to one. Higher values indicate that a landscape is highly connected.
Interpatch-crossing distance threshold	The maximum distance that individuals would move between patches provided there is some kind of structural connectivity element such as stepping-stones (for example, scattered paddock trees) or corridors.
Landscape-scale graph metric	A graph metric that describe how well a whole landscape is connected.
Least-cost path	The shortest pathway between two patches as a function of land cover resistance. i.e. the optimal pathway between two patches for an individual to move.
Least-cost corridor	An alternative to calculating a least-cost path is calculating the least-cost corridor. A least-cost corridor is defined as a corridor between two patches where its width is limited by the cost-weighted distance threshold defined by the resistance surface and interpatch dispersal distance threshold.
Link/Linkages	A linkage is a pathway between patches of habitat described by a least-cost path.
Linkage Mapper	Connectivity modelling software which combines least-cost corridors with Circuitscape. In this report it is used to characterise pinchpoints.
Matrix	Species specific non-habitat areas. Areas between patches which individuals move through. Commonly characterised by anthropogenic land uses such as pasture or residential areas.
Network/Graph	A graph theory term describing a collection of nodes connected by links. In landscape ecology, nodes and links represent patches and pathways within a landscape.
Node	An element of a network/graph that is represented by patches in landscape ecology.
Patch	A relatively homogeneous area, often habitat, which differs from its surroundings. In this study, patches are defined as an area of indigenous vegetation greater than the minimum size for a focal species or scenario being tested. These are represented by nodes in graph theory.
Patch-scale graph metric	A graph metric that describe how important a patch or a link is for connecting the whole landscape.
Pinchpoint	Pinch-points (or choke-points) (calculated with circuitscape) are areas where animal movement is constrained within corridors and represent areas where linkages are most vulnerable to being severed.
Raster	A rectangular grid of pixels commonly used in a GIS to represent land cover.

Resistance	A value assigned to each land cover type in a landscape that reflects the ecological costs for individuals to move through it. Also, sometimes referred to as dispersal-cost. High resistance means high dispersal costs.

Executive summary

The University of Nottingham was commissioned by WSP Australia Pty Limited on behalf of Regional Roads Victoria (RRV) to assess the potential impacts of the proposed Beaufort Bypass on ecological connectivity within the Beaufort Bypass project area. A spatially explicit analysis of connectivity based on leading practice connectivity modelling approaches within the study area was conducted using the General Approach to Planning Connectivity from Local Scales to Regional (GAP CLoSR) framework to characterise how the Beaufort Bypass will fragment the landscape and affect wildlife movement, and identify mitigation measures to avoid or reduce negative impacts on the environment.

The study involved the following steps:

- Identify five wildlife species or species groups that occur in the area and represent a range of different types of dispersal characteristics and habitat use in the landscape (e.g. arboreal mammals, Woodland birds, amphibians, ground-based mammals). These species are referred to as conservation targets.
- Create land cover maps using a combination of remote sensing land cover mapping and GIS processing to incorporate existing GIS datasets.
- Characterise and model connectivity using modelling methods which simulate how animals move through the landscape based on their movement ecology and habitat preferences, and how they respond to anthropogenic land cover. For example, roads may be a barrier to the movement of some species, while other species can move vast distances across cleared land between habitat patches. All these different types of animal behaviour and responses to habitat fragmentation and land cover change were incorporated in our model.
- Using the model created for each of the five conservation targets we quantified the impact of four alignment alternative bypass design options on wildlife movement (A0, A1, C0 and C2).
- Visually and quantitatively assessed how each alternative design option fragmented the conservation target's landscape. This assessment included the quantification of the relative change to connectivity across the landscape using mathematically derived metrics.
- For the best bypass option, based on the risks of fragmentation, we assessed the impact of potential mitigation measure locations at avoiding and minimising the negative effects of roadkill and fragmentation.

The five conservation targets modelled were:

- Woodland birds
- Short-beaked Echidna
- Brush-tailed Phascogale
- Growling Grass Frog
- Golden Sun Moth

The connectivity modelling characterised, through the production of a variety of mapping outputs, how the diverse range of dispersal behaviours and habitat preferences affected patterns of movement for each of the conservation targets. These movement patterns determine whether a landscape is considered fragmented from the perspective of each of the conservation targets. For example, the Golden Sun Moth and Growling Grass Frog both had short maximum dispersal distances, but due to the Golden Sun Moth's patches being far apart from each other, most of their patches were isolated from each other, unlike the Growling

Grass Frog's habitat which was well connected. In contrast, species with longer dispersal distances, such as the Brush-tailed Phascogale and Echidna were found to utilise the majority of the matrix (i.e. areas such as pastures which are not habitat), which means they had many alternative options for moving between patches and well-connected habitat.

The quantitative and visual assessment of the connectivity modelling for the five species and assessment of road alignment options provided strong support for design C2 as having the lowest impact on connectivity for woody-dependent conservation targets (i.e. Woodland birds, Short-beaked Echidna and Brush-tailed Phascogale). However, the differences between impacts from the bypass designs for the Golden Sun Moth and Growling Grass Frog are likely to be negligible and the majority of impacts are likely to be from total habitat lost rather than a reduction in connectivity.

WSP provided indicative locations for connectivity mitigation structures across the preferred alignment option C2, based on tree cover locations and the bypass concept design. Two types of measure were assessed: canopy rope bridges for Phascogales and a single vegetated land bridge for woodland dependent species. The modelling of the mitigation of alignment option C2, assessed whether these measures would support connectivity across the C2 alignment and which of the locations had the greatest contribution to increasing connectivity for Phascogales. The mitigation modelling provided support for an overpass connecting patches of habitat in the north to habitat in the south dissected by the bypass. The mitigation modelling also showed, for the Brush-tailed Phascogale, each additional mitigation measure (rope bridges) resulted in significant increases in connectivity.

The results of this study suggest that all bypass options will impact on landscape connectivity, however, specific designs options and the application of mitigation measures such as an overpass and/or rope bridges is likely to reduce these impacts. Mitigating the impacts of the bypass on habitat fragmentation is not only important for the habitat modelled in the study area but also maintaining north-south connectivity between important habitat beyond the study area.

1.0 Introduction

1.1. Background

University of Nottingham was commissioned by WSP Australia Pty Limited on behalf of Regional Roads Victoria (RRV) to assess the potential impacts of the proposed Beaufort Bypass on ecological connectivity within the Beaufort Bypass project area. This work was undertaken as a part of the Beaufort Bypass Environment Effects Statement (EES) to specifically address elements in the Scoping Requirements relating to fragmentation and wildlife movement:

Priorities for characterising the existing environment

- Characterise the distribution and quality of biodiversity values that could be affected by the proposed project, including remnant native vegetation, large old trees, terrestrial and aquatic habitat for threatened species and patterns of wildlife movement in the area.

Assessment of likely effects

- Assess the likely direct and indirect effects of each alignment alternative on wildlife movement and biodiversity values, including native vegetation, large old trees, listed threatened flora and fauna species and ecological communities, including those listed under the FFG Act and DELWP Advisory List.

Design and mitigation measures

- Identify mitigation measures to avoid or reduce negative impacts on the environment including wildlife movement and connectivity (e.g. suitable fencing and overhead or under-road wildlife crossings including in relation to bridges for waterway crossings).

1.2. Scope

The aim of this project is to assess the impact of proposed bypass options on wildlife connectivity. The work includes 3 tasks:

- Assess current wildlife connectivity for conservation targets (i.e. without the bypass).
- Compare the four alignment alternative bypass options on wildlife movement.
- Assess mitigation options for the best bypass option.

The analysis was conducted using the General Approach to Planning Connectivity from Local Scales to Regional (GAP CLoSR) model (Lechner, Doerr, et al., 2015; Lechner, Harris, et al., 2015; Lechner & Lefroy, 2014; Lechner et al., 2017) to characterise how the Beaufort Bypass will fragment the landscape and affect wildlife movement and to assess the effect of mitigation measures at avoiding or reducing negative impacts on the environment.

To address each of the requirements above, the following steps were followed:

Assessment of current wildlife connectivity for conservation targets

1. Identify five fauna conservation targets to be representative species and communities of the different types of dispersal characteristics and habitat use in the

landscape (e.g. arboreal mammals, Woodland birds, amphibians, ground-based mammals).
2. Develop resistance surface models for each of the conservation targets which describes how land cover effects movement within the landscape (e.g. roads may be barriers to some ground-based mammals and not affect woodland birds).
3. Characterise connectivity and least-cost path analysis using GAP CLoSR framework.

Quantitative comparison of the four alignment alternative bypass options on wildlife movement

- Assess most sensitive areas affected by fragmentation due to the proposed freeway alignment using habitat connectivity and least-cost paths used to assess wildlife movement.
- Compare the risks of fragmentation of each alignment on each conservation target as well as potential roadkill hotspots.

Assessment of mitigation options for the best bypass option

- Based on the risks of fragmentation above, quantify the effectiveness of potential mitigation measures to avoid and minimise negative effects of roadkill and fragmentation for the preferred alignment option.

1.3. Importance of connectivity and methods for modelling impacts of roads

Fragmentation of contiguous ecosystems into remnant patches, due to land use change associated with roads, agriculture and urbanisation results in habitat loss and restriction of species movement (Brook, Sodhi, & Bradshaw, 2008; Caughley, 1994; Fischer & Lindenmayer, 2006). Fragmentation decreases wildlife connectivity which in turn puts species at risk of localised extinction, effecting population viability and inevitably leads to species extinction (Fischer & Lindenmayer, 2006; Torres, Jaeger, & Alonso, 2016). Fragmentation is driven by a number of anthropogenic land use changes, of which, road building is one of the greatest drivers of fragmentation and biodiversity loss across the globe (Laurance, 2015; Laurance et al., 2014; van der Ree, Smith, & Grilo, 2015).

Roads have a range of negative impacts on wildlife populations which include the direct effects of roads through removal of habitat to roads posing a barrier to movement of individuals (van der Ree et al., 2015). Firstly, habitat loss from roads results in the subdivision of larger contiguous habitat into smaller patches. Once patch size is below a minimum viable area, patches can no longer support a self-sustainable sub-population of individuals unless maintained by immigration from neighbouring sub-populations (Caughley, 1994). Secondly, habitat quality often declines around roads due to a range of interacting biotic and abiotic drivers (van der Ree et al., 2015). These impacts are known as edge effects and include changes to microclimate and encouraging invasive weedy species (Forman & Godron, 1986). Finally, roads can act as barriers or filters to movement of wildlife due to increased road mortality for individuals crossing roads and road avoidance where individuals avoid roads and edge habitats due to traffic disturbance and/or habitat degradation (van der Ree et al., 2015). Mortality due to collisions with vehicles also directly reduces the size of wildlife populations, further increasing the risk of local extinction.

There is a pressing need for better management of human modified landscapes to address the impacts of roads on connectivity and species movement, and ultimately the viability of populations and ecosystems. Jaeger (2015) pointed out that the effects of fragmentation will vary with time; with the effects of habitat loss being felt almost immediately, reduced habitat quality and traffic mortality taking longer and finally the impacts of reduced connectivity even longer still. Therefore, when planning roads with biodiversity in mind, in the long term it is important to maintain and restore connectivity across landscapes, ensuring that patches either side of a road development are connected while minimizing road mortality. One way of assessing the potential impacts of proposed roads and informing the design process is through the application of connectivity modelling (e.g. Clauzel et al., 2015), which accounts for the location and importance of patches for a variety of species (Lechner, Doerr, et al., 2015; Lechner et al., 2017).

1.4. Ecological characteristics of dispersal

For this study, we applied an expert-based parameterisation of a connectivity model using a combination of least-cost path, circuit theory and graph theory methods within the General Approach to Planning Connectivity from Local Scales to Regional (GAP CLoSR) connectivity modelling framework, which describes fine-scale dispersal patterns across large spatial extents (for further details see Lechner et al., 2017, 2015b, 2015a; Lechner and Lefroy, 2014).

Fine-scale movement patterns and habitat were modelled based on three key parameters in the GAP CLoSR approach identified for each species/groups (Figure 1):

1. The minimum habitat patch size required to support viable populations.

2. The gap-crossing distance between connectivity elements such as scattered trees, which limit the distances of open ground (gaps) which individuals will move across.

3. The interpatch-crossing distance threshold, which is the maximum distance an animal is able to move between patches of habitat.

The existence of *connectivity elements*, such as corridors, scattered-tress or road side vegetation, is imperative to facilitate species movement from one patch to another (Fischer & Lindenmayer, 2002; van der Ree, Bennett, & Gilmore, 2004). The GAP CLoSR framework takes into account fine-scale dispersal behaviour which is often absent from other connectivity modelling approaches (Figure 1).

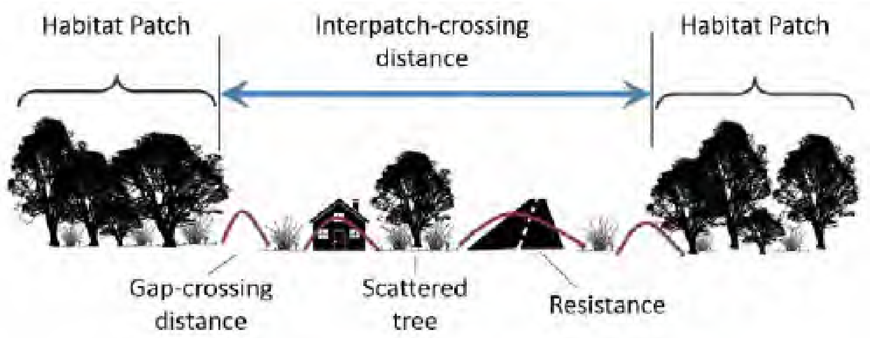
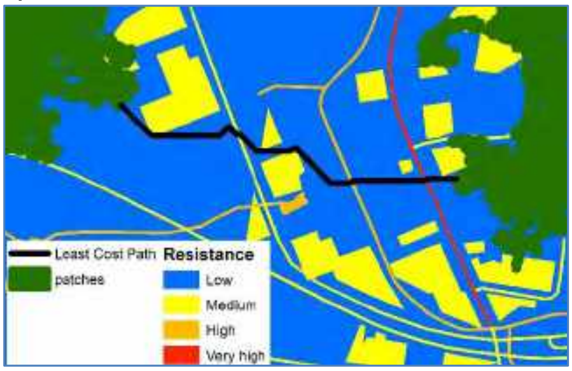


Figure 1: Conceptual model of fine-scale connectivity behaviour of mammal fauna, where the likelihood of individuals moving between two patches is a function of two thresholds, the interpatch-crossing distance and gap-crossing distance, and the dispersal cost of landcover features (such as roads).

1.5. Modelling connectivity

Existing methods used to model landscape connectivity, such as least-cost path analysis, circuit theory and graph theory, provides a modern and diverse toolbox for the purpose of studying the different aspects of connectivity (Adriaensen et al., 2003; Foltête, Clauzel, & Vuidel, 2012; Brad H. McRae, Dickson, Keitt, & Shah, 2008; Urban & Keitt, 2001) (Figure 2). These methods characterise non-habitat/matrix according to their dispersal costs for the target wildlife species, which depicts the mortality risk and metabolic price of moving across the landscape (Adriaensen et al., 2003; Sawyer, Epps, & Brashares, 2011). Dispersal costs are represented by land cover attributes which are linked to species-specific dispersal cost probabilities. These dispersal costs are used to characterise least-cost pathways that represent the optimal pathways which species are likely to use to move between patches. Graph theoretic mathematical approaches can then be used quantitatively assess the significance of patches and pathways for connecting patches in a landscape (Minor & Urban, 2008; Rayfield, Fortin, & Fall, 2011). Conversely, an alternative approach to modelling dispersal is possible with circuit theory, where the landscape is considered to be synonymous with an electrical circuit and, resistance within the landscape is characterised based on the assumption that current flow corresponds to individual movement probabilities across every grid cell in a raster (Brad H. McRae et al., 2008). More details on these approaches are provided in section 2 (methods).

a) b)



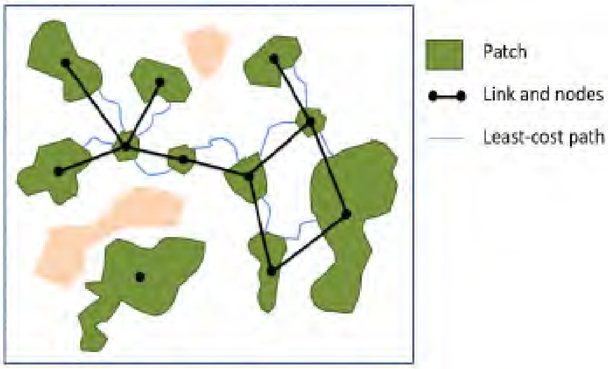


Figure 2: a) A least cost-path represents the optimal path between two patches which avoids hostile species-specific land cover within the matrix (i.e. non-habitat). This example shows how the least-cost path avoids location of higher resistance to move between a patch on the left to the patch on the right. b) In order to apply a graph theoretic approach to a landscape with multiple patches of habitat, patches and least-cost paths are summarized as a set of nodes and links. Graph theory can then be used to mathematically determine the relative importance of each patch and link for connecting a landscape.

The software Graphab (Foltête et al., 2012) was used in our study to calculate graph-metrics and least-cost paths between patches and Linkage Mapper (with Circuitscape) (B.H. McRae & Kavanagh, 2011; Brad H. McRae et al., 2008) was used to characterise least-cost corridors and individual movement probabilities within corridors. In addition, a graph theoretic approach was used to characterise the importance of patches and linkages for connecting the landscape.

Although the benefits of promoting ecological connectivity is intuitively appealing to experts and the public alike, characterising species movement and the connectedness of habitat in a landscape is not a trivial task. The approach used in this study represents leading-practice spatial modelling methods used across the world - though practitioners in Australia have been slow to take up such approaches. The approach allows for the simulation of the very complex ecological process of wildlife dispersal. Understanding how wildlife movement operates and how it affects the survival of species is a property of several factors ranging from the number and size of habitat patches, the spatial distribution of those patches and the permeability (i.e. ability of species to move through a landscape) of the matrix (i.e. the land cover between patches). Changing any one of those factors can result in completely contrasting impacts on a species connectivity.

The approach taken in this report allows for a mathematical, repeatable and transparent approach to characterising landscape connectivity according to our best understanding of the ecology of wildlife movement and dispersal. However, the drawback of such an approach is that the methods are spatially complex and involve a series of GIS processing steps.

2.0 Methods

2.1. Overview

This study had a number of processing steps which included the application of remote sensing to land cover mapping and selection and parametrisation of conservation targets for assessing impacts and mitigation of the Beaufort bypass (Figure 3).

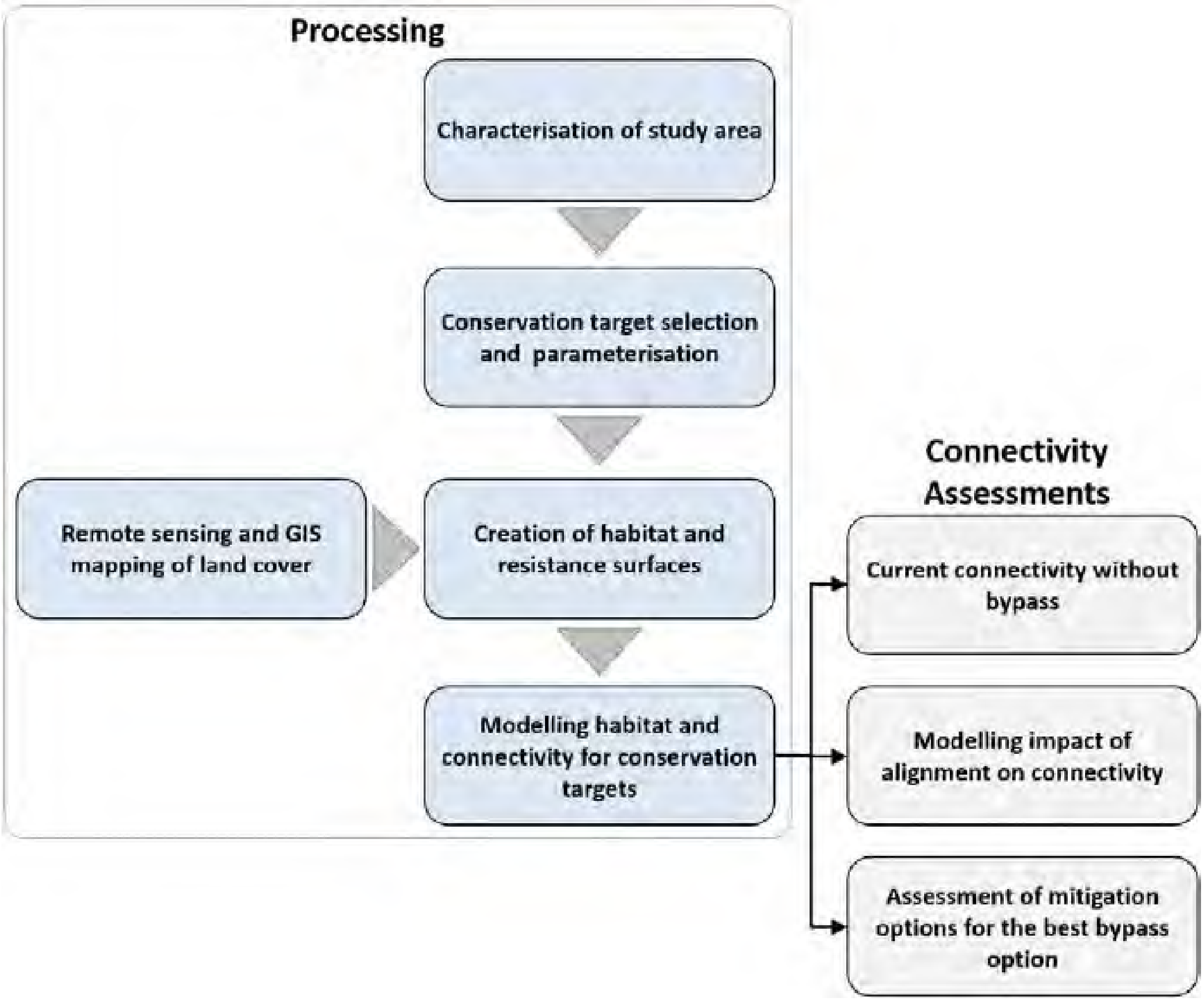


Figure 3: General schematic of processing steps to assess the impacts of the Beaufort Bypass on wildlife. Processing steps on the left were used to produce spatially explicit models of connectivity for the five conservation targets in the study area. The boxes on the right represent the types of analyses conducted to assess the impacts of the different bypass options on wildlife movement.

2.2. Characterisation of study area for landscape-scale analysis

The town of Beaufort is located in Victoria, Australia, with a population of 1,072, as of 2016 (Australian Bureau of Statistics, 2016). The Western Highway is the primary highway linking Melbourne and Adelaide and it currently crosses the centre of the town. The proposed Beaufort Bypass will be built to avoid the town, however, depending on the location of the road alignment the impacts on wildlife connectivity will vary.

In order to assess the impacts of the Beaufort Bypass, we extended the study area used in the Environment Effects Statement (EES) to also include the portions of the woodland in the north, southeast and southwest of the town to allow us to look at connectivity at the landscape-scale. We buffered the EES study area by 2 km, increasing the total study area by approximately 80 km^2 A key focus for the maintenance of connectivity in the study area should be maintaining north-south links between the native woody vegetation to the north and south of Beaufort which will be intersected by the proposed Beaufort Bypass (Figure 4). The patches in our study area to the north include the Camp Hill State Forest and to the south is the Trawalla State Forest. Even further to the north outside of the study area are a number of areas of intact forest such as the Ben Major Flora Reserve.

Figure 4: Study area for Beaufort bypass connectivity modelling.

2.3. Conservation target selection and parameterisation

The study area is within the Central Victorian Uplands bioregion. The bioregion and the ecosystems in our study area serve as important habitat for native fauna such as the Golden Sun Moth, Growling Grass Frog and Brush-tailed Phascogale. These species have been classified as “significant” in a biodiversity assessment for the *Beaufort Bypass EES - Flora and Fauna Assessment: Impact Assessment (draft)* (WSP, 2019).

We chose five conservation targets to represent a range of dispersal and habitat characteristics in the study area and included species of conservation concern where possible. First, we determined the broad species or fauna groups present in the study area from a short list provided from WSP derived from their original report (WSP, 2019). This short list was identified based on an expert assessment of the species groupings in the area (c.f. dispersal guilds (Lechner et al., 2017)). These groups were chosen to represent broad groups of species that share similar habitat and dispersal behavioural features such as patch size, vegetation structure, dispersal characteristics and resource exploitation (see Table 2). However, each of these groups had very different habitat and/or dispersal characteristics and thus may respond differently each of the road alignment options. The groups identified were:

- Tree cover sensitive birds
- Ground-dwelling mammal
- Arboreal mammal
- Amphibian
- Invertebrate

The following selected conservation targets were then identified for each of the groups above:

- Woodland birds
- Short-beaked Echidna
- Brush-tailed Phascogale
- Growling Grass Frog
- Golden Sun Moth

The above selected list of conservation targets resulted from balancing data availability (i.e. habitat distribution data and data on the parameterisation of dispersal characteristics) with modelling a diverse range of dispersal and habitat characteristics (Table 1). As a priority, any threatened species which occur in the study area were used as conservation targets if there were habitat parameters available from previous studies. If there were none available, non-threatened species which occur in the study area were used. The choice of species was severely limited by available data, as connectivity modelling parameters are only available for a limited number of species.

Following Lechner et al., (2017) the aim of conservation target selection was to ensure that we included sufficient diversity in the range of conservation targets modelled. All the conservation targets apart from woodland birds were single species.

For woodland birds, general woody vegetation parameters were used to represent bird assemblage synonymous with the Victorian Temperate Woodland Bird Community listed under the Flora and Fauna Guarantee Act 1988 (FFG Act) (see Appendix for full list).

Table 1: Characteristics of target species, the general species or fauna groups they represent and their habitat and dispersal characteristics. These conservation targets were chosen so that a diverse range of habitat and dispersal characteristics were modelled.

Conservation Targets	Species or fauna groups	Habitat and dispersal characteristics
Woodland Birds	Tree cover sensitive birds	Native woody vegetation (dominant remnant ecosystem within the study area), tree cover sensitive. Representative of the "average species" dispersal characteristics (cf. Lechner & Lefroy, 2014).
Short-beaked Echidna	Ground-dwelling mammal	Ground-dwelling mammal, long disperser, woody-vegetation dependent.
Brush-tailed Phascogale	Arboreal mammal	Small arboreal mammal, woody-vegetation dependent, long disperser, woody-vegetation dependent.
Growling Grass Frog	Amphibian	Wetland amphibians, short disperser.
Golden Sun Moth	Invertebrate	Grassland, short disperser.

The habitat requirements and movement parameters for the five conservation targets varied considerably (Table 2), which was intentional to ensure a wide range of species would be represented. For example, interpatch dispersal distances ranged from 200 m for the Golden Sun Moth to 5500 m for the Brush Tailed Phascogale (Table 2). Similarly, minimum size of habitat patches varied from less than one ha for the Growling Grass Frog and Golden Sun Moth to 50 ha for the Echidna.

Table 2: Conservation targets and parameters used for connectivity modelling. Resistance values are given as multipliers of the cost to move through optimal habitat (i.e. a value of 1 – no cost) and a resistance value of 2 means the land cover type is 2 times as costly to travel through.

Parameter		**Woodland birds**	**Echidna**	**Brush Tailed Phascogale**	**Growling Grass Frog**	**Golden Sun Moth**
Habitat	Broad Habitat Group	Woody Veg.	Woody Veg.	Woody Veg.	Riparian and Wet habitat	Grassland and Grassy woodland
Movement and patch size	Minimum Habitat Patch Size (ha)	5	50	45	0.000082	0.00046
	Gap-crossing threshold (m)	106	500	750	500	200
	Interpatch-crossing distance threshold (m)	1000	5000	5500	500	200
Resistance (multiplier)	No resistance (%) i.e. pasture, open grasslands	1	1	1	1	1
	Woody vegetation (used for gap-crossing layer)	1	1	1	1	1
	Waterways and water bodies	3	2	3	1	1.5
	Residential	2	10	2	2.5	2
	Rail	2	2	2	1.5	1.5
	Roads	2	1.5	3	1.5	1.5
	Bypass and existing highway	10	Infinite	20	10	10
Reference for parameterisation[1]		(Lechner & Lefroy, 2014; O'Malley & Lechner, 2017)	(O'Malley & Lechner, 2017)	(Eco Logical Australia, 2012)	(O'Malley & Lechner, 2017)	(O'Malley & Lechner, 2017)

[1]The parameterisations for each conservation target was derived from existing studies based on expert opinion.

2.4. Land cover and habitat mapping

A land cover map was created to characterise land cover for modelling dispersal and habitat for each conservation target. We used a combination of automated image classification and manual interpretation to derive the land covers (Table 3). All spatial layers were created at 2 m pixel size. This was the highest spatial resolution at which we could run the model due to computational limitations and limitation around mapping precision. However, this is a relatively high spatial resolution compared to many examples of connectivity models which have used pixel sizes ranging between 25 m and 50 m (e.g. Lechner et al., 2017, 2015a) and is fine enough to model the interpatch and gap crossing distances for all the conservation targets.

Table 3: Land cover categories mapped and relation to connectivity modelling.

Land cover	**Description and impact on connectivity**
Native woody vegetation	Native woody vegetation occurring in patches greater than a minimum area (see Table 2) were considered habitat for the three conservation targets dependent on woody native vegetation. Small and linear woody vegetation were included in this category although it was difficult to always ascertain their precise origins (i.e. native or exotic) from aerial photography. However, small and linear woody vegetation only contributed to the modelling as connectivity elements (i.e. single trees and roadside vegetation) and not habitat.
Non-native woody vegetation	Non-native vegetation, predominantly plantations that do not contribute to habitat for most species but will support connectivity.
Water – rivers	Increase resistance for some species.
Water – ponds and lakes	Increase resistance for some species.
Western Highway	Large multi-lane road with high traffic that increases resistance at least ten-fold for all species. They have a width of 12 m.
Roads – major	These major roads lead in and out of the study area. They are likely to include moderate to high volumes of traffic. They will increase resistance and, in some case, may be barriers. They have a width of 5.5 m but have a higher resistance value than minor roads.
Roads – minor	These include all other kinds of roads and will increase resistance. They have a width of 5.5 m and have the lowest resistance of the three road categories.
Rail	Increase resistance for all species.
Residential areas	Small lots with houses. It is primarily the human activity on these properties which will increase resistance.
Pasture and open spaces	Pasture or grasslands without woody trees. These areas are neutral when it comes to resistance.

To delineate woody vegetation and pasture we applied semi-automated methods for classifying these land covers. We initially applied a Maximum Likelihood supervised classification in ArcGIS and then manually updated the layer by fixing errors in the automated classification. The primary layer used for the mapping was the high resolution 25 cm true colour data provided by WSP (Table 4). However, this was only available for 2016 and only for the central region of the study area. For areas outside of the high resolution 25 cm true colour data extent we used the 3 m GE 30k layer using the same supervised classification and manual updating method (Table 4).

Table 4: Datasets used for the derivation of the habitat and resistance surfaces.

Dataset description	Dataset name	Date	Pixel size	Extent	Notes/challenges
High resolution true colour 25 cm	HighResBeau.tif	2016	.25 m	Only available for part of the study	Only available for part of the study area
Planet Lab true colour imagery	Planet 2019.tif	2019	3 m	Study area	Blurry
GEE 30k true colour imagery	GE30k_image_201604 24.tif (source VicRoads)	2016	3 m	Study area	Lots of shadows
Open Street Map	Minor Roads.shp, Main Roads.shp, Rail.shp	2019	Vector	Study area	
Road data (TR_ROAD)	Western Highway.shp	2019	vector	Study area	
Streams and Rivers (Vicmap Hydro)	Watercourse.shp	2019	Vector	Study area	
State wide land use layer	Statewide_landuse.shp	2019	Vector	Study area	Urban parcels instead of building footprints
Native vegetation layer	Native vegetation patch 12 JUN 2018.shp and Revegetation 13 JUN 2018.shp from WSP (2019)	2018	Vector	Study area	Attribute table for "Statewide_LU.shp" show contradicting class info. Specifically, LU_DESC and LU_DESC 14
Growling Grass Frog and Golden Sun Moth habitat	Habitat layers provided by WSP (2019)	2019	Vector	Study area	
Bypass designs	X-2270290A-CIV-DESIGN_OPTION_A0_950m.shp, X-2270290A-CIV-DESIGN_OPTION_A1_950m.shp, X-2270290A-CIV-DESIGN_OPTION_C0_950m, X-2270290A-CIV-DESIGN_OPTION_C2_950m.shp	2019	Vector	Study area	Footprint was used to erase vegetation. Attribute features "C-ROAD-SHOU" AND "X-OTHER" was used as road extent and serves as resistance

We also used Planet Lab imagery (3.5 m pixel size) from 22nd March 2019 to update the mapping outputs to represent the current land cover for the whole study area. We did not use this layer for linework (i.e. the land cover features identified with the 2016 mapping) but instead, used it for validating and classifying and in some case removing features especially vegetation that were no longer present. Plantations were identified from the woody vegetation derived using the statewide landuse layer with corrections from WSP.

For classifying roads, we used the Open Street Map (OSM) data (line features) and road data provided by WSP and verified both datasets with Planet Lab's data. Roads within the OSM data set are classified by size and informal roads such as those within plantations and state forests, driveways to farm houses and internal roads within properties were excluded. The remaining roads were buffered by their average width (as determined from aerial imagery, namely 6 m for major roads and 2.5 m for minor roads) before being converted from lines to raster. The final width of major and minor roads was 12 m and 5.5 m, respectively.

The Western Highway was divided into two parts which we mapped and modelled differently. The portions leading up to the potential bypass design from the west and east are dual carriageway with a large median strip. The sections of the Western Highway sections nearer to town are single carriageways and of a similar width to the other major roads in the study area.

The watercourse data was sourced from Data Vic (https://data.vic.gov.au/), and the ponds and lakes were digitized manually used the Planet Lab data.

Residential areas were derived from the statewide land use layer which is divided into parcels. Parcels in which the majority of the area was made up of a building footprint were included as residential (i.e. the quarter acre block). These parcels were identified manually from the true colour imagery.

The datasets from Table 4 were processed in ArcMap 10.6.1 and combined into a landcover map (Figure 5).

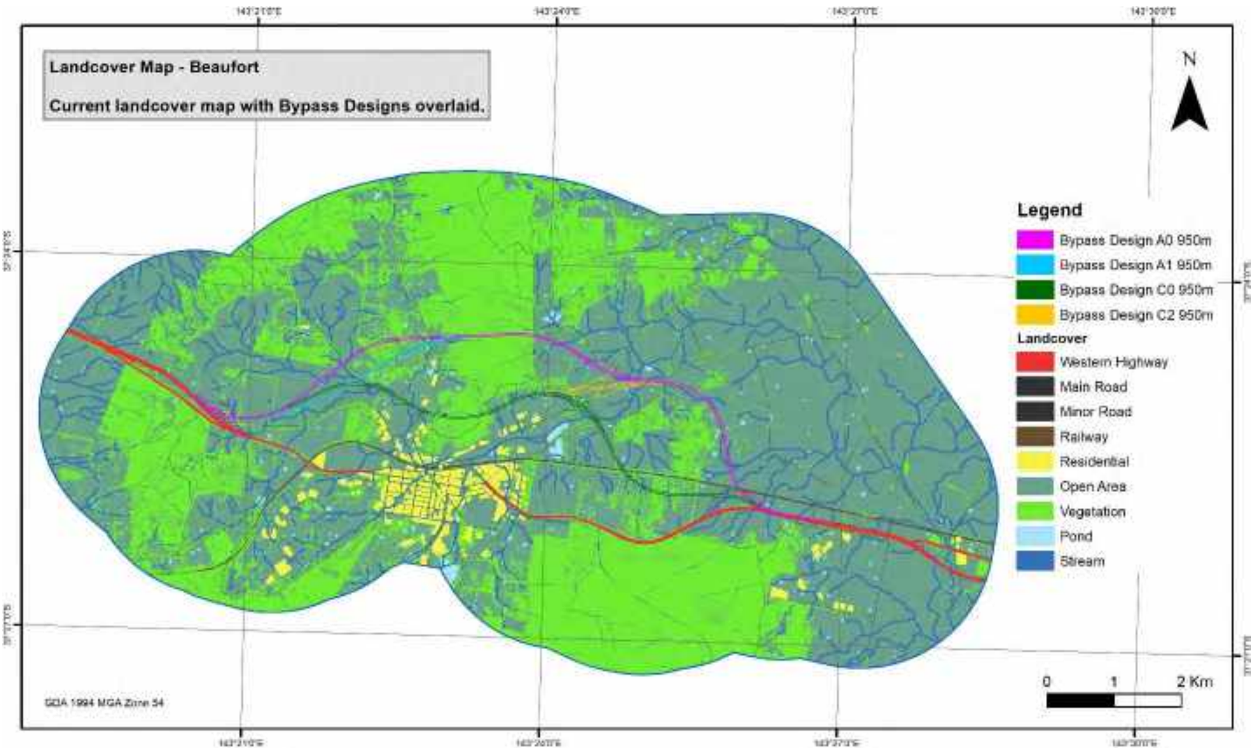


Figure 5: Landcover map for current scenario modelling. The four alternative alignments being considered for the Beaufort Bypass are overlaid to show their placement.

2.5. Modelling habitat and connectivity for conservation targets

We modelled connectivity for all five target species based on parameterisation from previous studies which had the same or similar conservation targets (Eco Logical Australia, 2012; O'Malley & Lechner, 2017). These previous studies parameterised these conservation targets using expert opinion (Table 2). Each conservation target had specific characteristics associated with how land cover impedes or promotes movement characterised by the resistance surface and habitat characteristics which was based on the land cover map and parameterised using values from Table 2. Therefore, for each conservation target we created unique input spatial layers for processing with the connectivity modelling software.

To assess the connectivity within the study area, a graph theoretic approach was applied with least-cost paths (Figure 6). Based on graph theory, the landscape was portrayed as a system of patches associated by links which were characterised by least-cost paths (Dale & Fortin, 2010; Minor & Urban, 2008) and Circuitscape. Graphab 2.2. software was used to conduct the least-cost path analysis (Foltête et al., 2012) and Linkage Mapper (B.H. McRae & Kavanagh, 2011; Brad H. McRae et al., 2008) with Circuitscape was used to movement based on current density (Brad H. McRae et al., 2008).

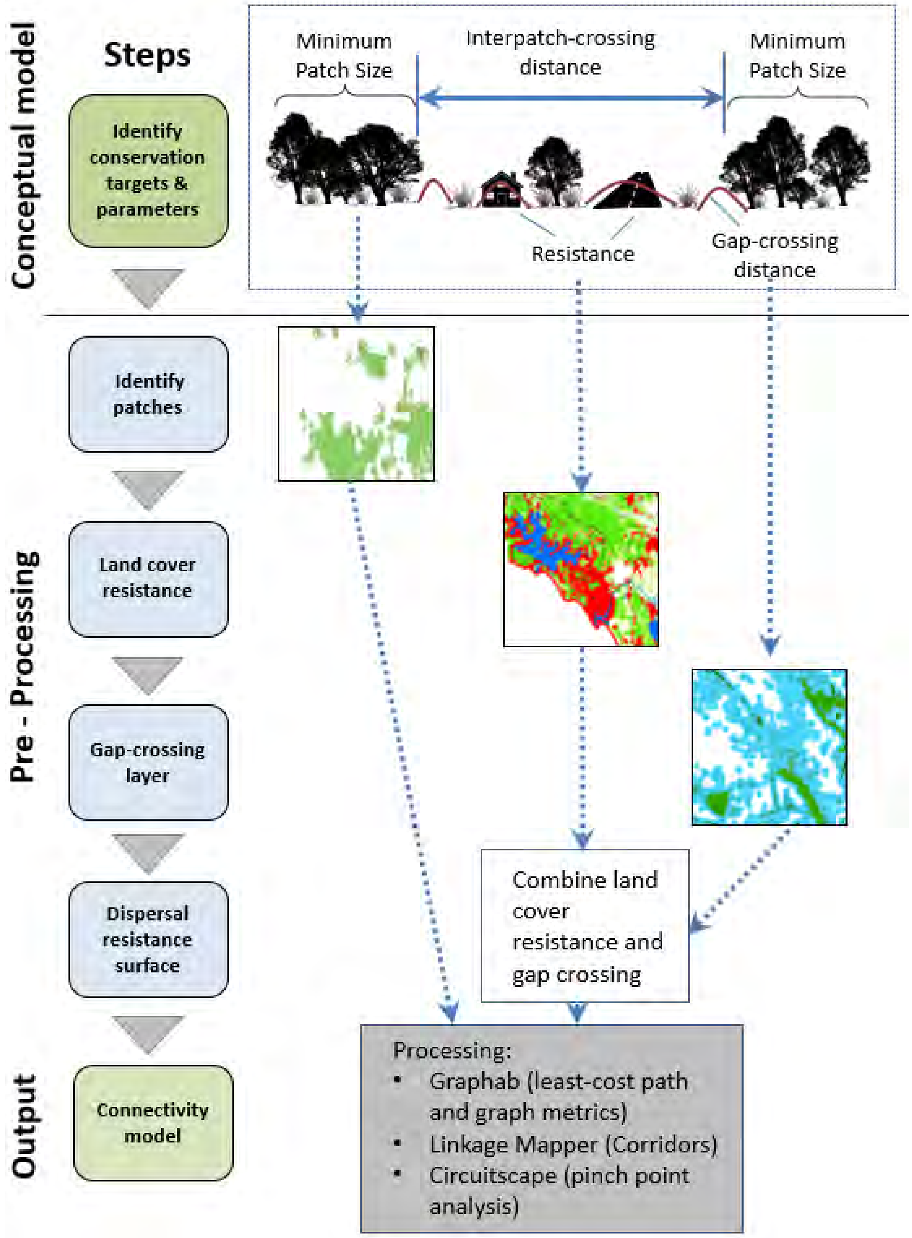


Figure 6: Summary of geospatial processing steps used to model connectivity.

Identify patches

In the first step patches were identified based on a minimum patch size for woody-dependent, woodland birds, the Echidna and the Brush-tailed Phascogale by selecting patches of woody vegetation greater than the patch threshold (Table 2). All areas characterised as habitat for the Growling Grass Frog and Golden Sun Moth, as mapped by WSP (in WSP 2019) was included as habitat regardless of size.

Characterise land cover resistance

Resistance to dispersal was described by the cost of movement due to different kinds of land cover and how it reduces the maximum distance individuals can travel between patches (interpatch-crossing distance threshold). For example, the land cover "Residential" has a resistance multiplier of 2 for woodland birds, meaning that it would double dispersal cost and therefore would reduce the interpatch-crossing distance threshold from 1000 m to 500 m (Table 2). For each conservation target a separate resistance surface was created from the resistance values in Table 2. These resistance values were derived from existing studies which used expert based workshops/interviews to identify these values (Eco Logical Australia, 2012; Lechner & Lefroy, 2014; O'Malley & Lechner, 2017). An expert-based approach is commonly required for connectivity modelling due to the lack of empirical data to support such modelling.

Create gap crossing layer

The gap-crossing layer was used to characterise distances between connectivity elements (e.g. scattered trees) and patches based on a gap-crossing distance threshold unique to each target species (Figure 7). Firstly, habitat smaller than the minimum patch size is considered as connectivity elements only, which means animals can only use them to move through the landscape, but they are too small to support viable populations. These connectivity elements represent land cover features such as scattered trees or linear roadside vegetation.

To model gap-crossing behaviour, a gap crossing layer was created by buffering all connectivity elements (e.g. scattered trees) and patches by half of the species-specific gap-crossing distance threshold (Table 2). If connectivity elements are found within the gap-crossing distance, the buffer areas touch or overlap at the gap-crossing distance (or less) (Figure 7a). Areas outside of the buffered areas are considered as barriers to dispersal and represent areas where distances between connectivity elements (e.g. scattered trees) and patches is greater than the gap-crossing distance. Thus, dispersal can only take place in areas within the gap crossing distance. This geoprocessing method creates a simple surface for modelling areas as barriers to dispersal. For example, cleared pasture that lack any connectivity features (i.e. scattered trees) will not have any least-cost paths modelling across them. However, for both the Growling Grass Frog and Golden Sun Moth, we didn't create a gap-crossing layer as data to provide high resolution mapping of these fine-scale elements for these species were unavailable.

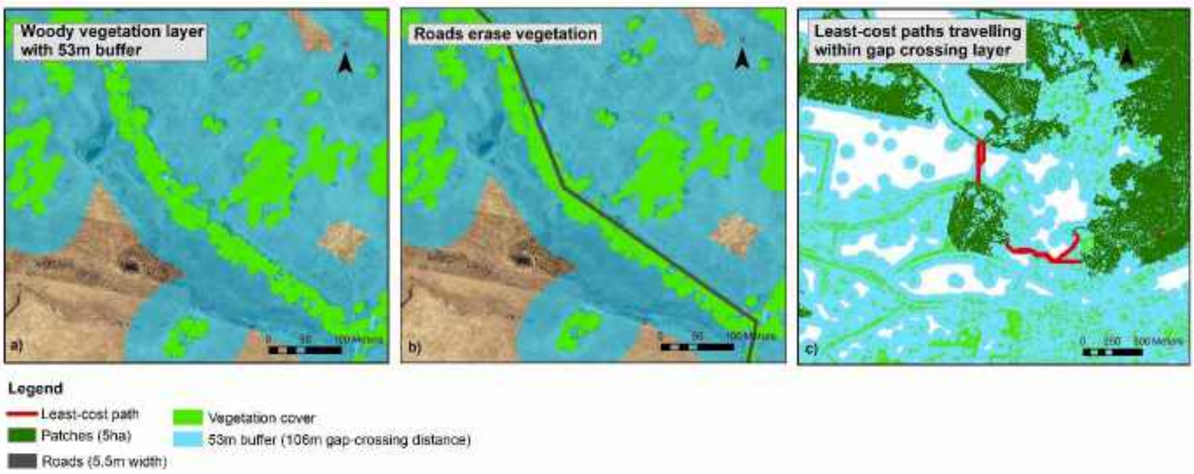


Figure 7: Example of processing steps used to create the gap-crossing layer for woodland birds. (a) High spatial resolution vegetation data representing structural connectivity elements were buffered by half of the gap-crossing threshold distance of 107 m. (b) Roads and other layers with higher resistance will take precedence over vegetation and will reduce movement. (c) Areas outside of these buffer areas (white areas) are considered a barrier to dispersal because they are beyond the gap-crossing threshold of 107 m and are a no-go zone for least-cost paths. In other words, the least cost paths are unable to be placed within areas that are beyond the movement capacity of the conservation targets.

Create Dispersal Resistance Layer

In the final step we combined the gap-crossing layer with the resistance surface produced with the land cover map for each conservation target (Figure 8). The gap-crossing layer has priority over the land cover map, which means that areas which are beyond the gap-crossing threshold are represented as a barrier to movement. The combined layer is then used within connectivity software in the normal way. The resulting dispersal cost layer is one that acknowledges fine-scale threshold dynamics as it ensures dispersal is impossible where gaps are greater than the gap-crossing distance.

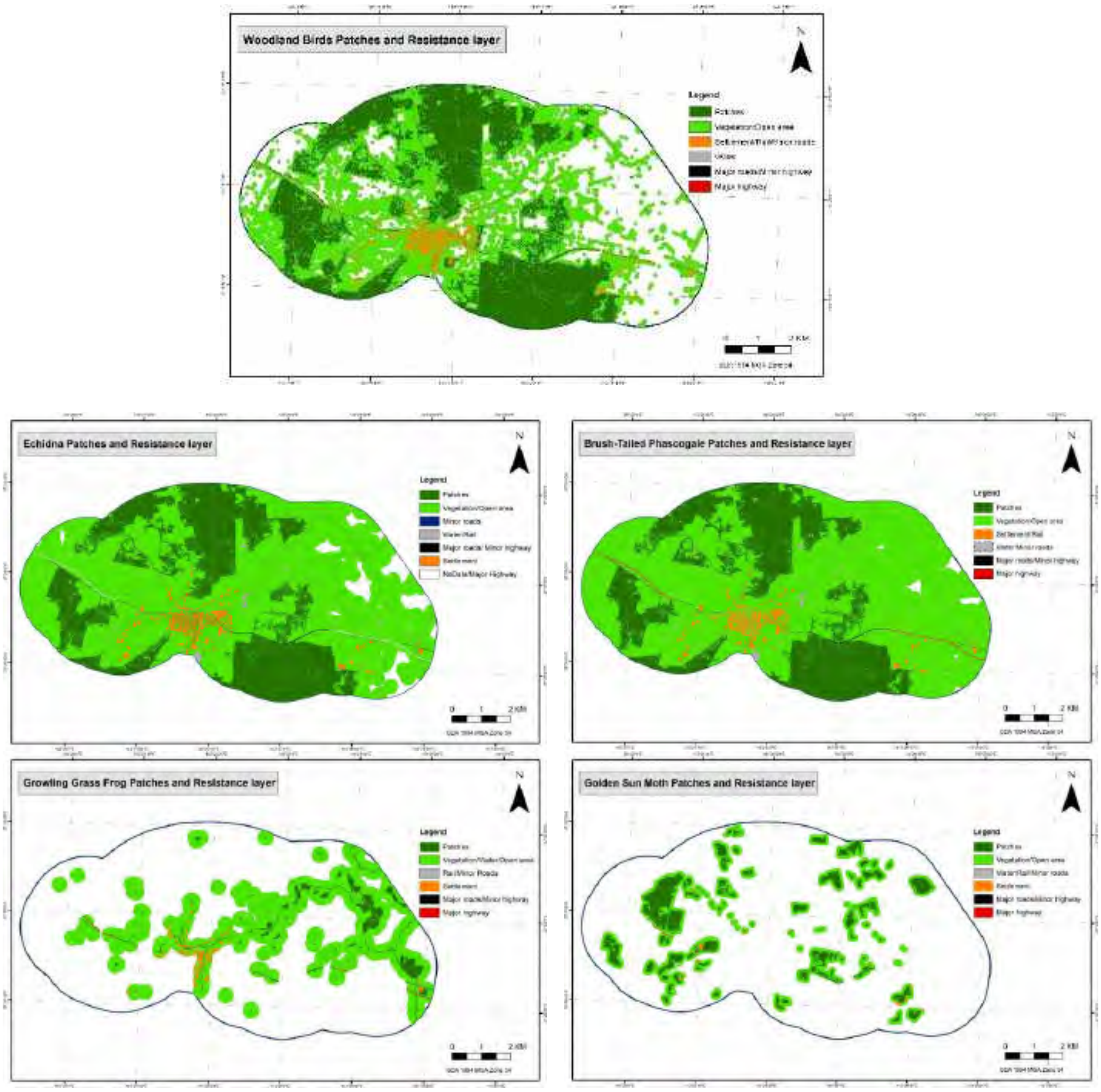


Figure 8: Patches and resistance layers for each conservation target. The resistance layer is integrated with the gap crossing layer, giving the limiting effect to movement where structural connectivity elements do not exist within the gap crossing distance (areas in white inside the study area boundary).

Model connectivity with Graphab

Least-cost paths were generated with the software Graphab to identify the optimal paths among all patches, where a least-cost path can be generated. A least-cost path between two patches will exist if the cumulative cost distance is below the interpatch dispersal distance threshold. A least-cost path will not be generated if the cumulative cost to traverse the distance between the two patches exceeds the interpatch dispersal distance threshold. The cumulative cost distance describes the accumulated travel cost from one location to another based on the resistance surface rather than actual distance.

Figure 9a provides an example of least-cost paths derived for the Echidna. Figure 9b shows how a modelled least-cost path avoided “Residential” which is of higher resistance than adjacent open or woody vegetation. Figure 9c shows a least-cost path which avoided a pond but went over a few streams as there are no other alternative options for connecting two patches. Figure 9d shows that a least-cost path avoided the dual carriageway highway and instead crossed the single carriageway which has no median strip and just a single lane on either side (i.e. minor highway). This is because the resistance of the main highway exceeded the inter-patch crossing distance threshold, diverting the least-cost path around the dual-carriageway.

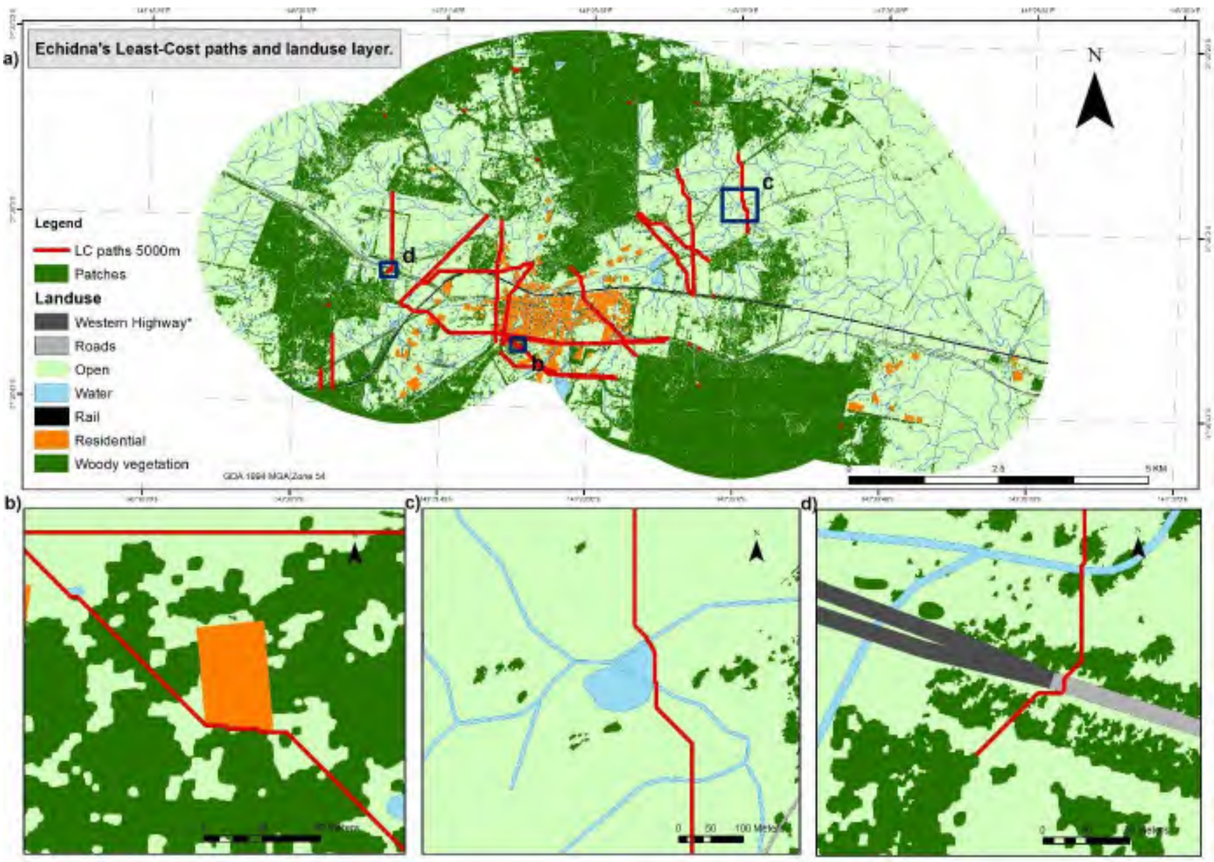


Figure 9: Example of how least-cost paths modelling for the Echidna is used to characterise animal movement which avoids land cover which impedes or restricts movement as characterised by a resistance surface.

Model connectivity with Linkage Mapper and Circuitscape

Linkage mapper was then used to calculate least-cost corridors. Linkage Mapper also includes the software Circuitscape which is used to characterise movement within these corridors based on Circuit theory.

An alternative to calculating a least-cost path is calculating the least-cost corridor. A least-cost corridor is defined as a corridor between two patches where its width is limited by the cost-weighted distance threshold defined by the resistance surface and interpatch dispersal distance threshold. Areas not within the least-cost corridors represent parts of the matrix which are not utilised for movement. For some species the whole of the matrix can be potentially used for movement and thus the whole study area is represented within these corridors. While for other species with restricted movement only a small component of the matrix will be found within the least-cost corridor.

Within these corridors Circuitscape was used to characterise pinch points based on random walk patterns between patches identified using circuit theory (McRae et al. 2008). Circuitscape uses current density as a proxy for movement probability. High current density values indicate areas which have higher probability of movement and vice versa. Pinch-points (or choke-points) are areas where fauna movement is constrained and funnelled and represents areas where the loss of a single linkage will cause significant reductions in landscape connectivity (McRae et al. 2008). These areas are represented by high current density values restricted to a particular location between patches. These locations will often overlap with the least-cost path, providing an indication of which parts of the least-cost path have low redundancy. This analysis is important for characterising the redundancy of the least-cost pathways which only represent a single optimal pathway between patches.

Assess fragmentation

Landscape connectivity for each of the conservation targets was analysed by assessing their mapping outputs in terms of which patches or groups of patches were isolated and the location and patterns of the least-cost paths. In addition, graph metrics were used to quantify the significance of linkages and patches quantitatively.

In the first step of the assessment we identified components for each conservation target, which represents groups of connected patches that are isolated from other patches. The spatial patterns of these components were analysed in order to identify regions which are highly fragmented and made up of numerous groups or single isolated patches (Lechner, Doerr, et al., 2015). In contrast, areas with large components made up of many patches represent well-connected regions.

We calculated one patch-scale metric and four landscape-scale metrics (Table 5). The patch-scale metric delta Integral index of connectivity (dIIC) (Pascual-Hortal & Saura, 2006; Saura & Pascual-Hortal, 2007) was used to represent the importance of a linkage or patch for connecting the landscape. dIIC expresses the change in habitat availability caused by the elimination of the focal patch. A higher dIIC value denotes that a linkage or patch is important for connecting habitat in the study area.

Landscape graph metrics provide a single metric in the form of a numerical value that characterises how well-connected a landscape is. There are many landscape metrics which could have been applied (Rayfield et al., 2011), but in our study we only used the most straightforward metrics which were easy to interpret (Table 5). While most of the metrics we used have literal interpretations, the IIC (Pascual-Hortal & Saura, 2006; Saura & Pascual-

Hortal, 2007) is the landscape-scale form of the patch-scale metric. Higher IIC values indicate that the landscape is well connected, while low values indicate that it is not.

Table 5: Landscape-scale (network) and patch-scale graph metrics used in the study and their ecological significance.

Graph metric	Ecological description	Reference
Landscape-scale metrics		
Mean size of components (km^2)	Describes the average total patch area for each component; useful for representing how isolated/fragmentated the landscape is.	(Urban & Keitt, 2001)
Size of largest component (km^2)	Describes the largest components total patch area in the landscape; useful for representing how isolated/fragmentated the landscape is.	(Urban & Keitt, 2001)
Number of components	Simple measure that describes the number component; useful for representing how isolated/fragmentated the landscape is.	(Urban & Keitt, 2001)
Integral Index of Connectivity (IIC)	A landscape-scale describes how connected habitat is within a landscape. The IIC metric is defined as the probability that two points randomly placed within a landscape fall into habitat areas that can be reached. Values for this metric increase with greater connectivity from zero to one. Higher values indicate that a landscape is highly connected.	(Pascual-Hortal and Saura, 2006)
Patch-scale metrics		
Delta Integral Index of Connectivity (dIIC)	The impact of the loss of habitat availability caused by the removal of a link or patch relative to the connectivity for a whole landscape. High values indicate important linkages or patches.	(Pascual-Hortal & Saura, 2006)

2.6. Modelling impact of alignment on connectivity

Four bypass design options were provided by WSP in the form of bypass footprints and construction footprints. We modelled the four bypass design options and its impacts on connectivity through clearing vegetation and increasing resistance from the construction footprint and the road itself. Four new resistance surfaces were created for each of the conservation targets (Five conservation targets X four bypass designs).

The construction footprint was the total extent of the bypass design, drain inverts and batter walls, and other earthworks. The footprint was also buffered by 20 m to represent the area that may be cleared for construction. The footprint was used to erase any vegetation within it, thus affecting dispersal by increasing the gap crossing distance.

The road design extent was used to change the resistance values described in Table 2. For the bypass design variation, we chose the 950 m variation of each bypass design. This variation fits the construction footprint best among all other variations and this is consistent across the four design options.

For bypass extent, we chose the "C-Road-Shou" and "X-Other" polyline feature in the road design file. This was because this extent width matched the width of the current highway, the Western Highway and aligns closely to it. The width of the bypass extent ranged from 10 m to 23 m. With each lane averaging to about 11 m wide. Parts of the bypass that are narrower are entrances and exits of interchanges and where the bypass meet main roads that lead to and away from Beaufort town.

The impact of the different bypass designs was assessed by comparing the current scenario with the bypass design scenarios by the location of the least-cost paths, components and dIIC.

In addition, we calculated the relative difference in landscape metrics between the current and each design option.

2.7. Assessment of mitigation options for the best bypass option

In the final step, we modelled the impacts of wildlife crossing structures (namely rope bridges and a vegetated land bridge) on native-wood dependent species, for the preferred alignment option. These locations were provided by WSP on the preferred alignment option. These locations were identified by WSP based on having adequate tree cover near the road and on locations where the concept design permits these types of structures and/or are logical to locate these structures based on the ecology of movement. For example, the locations were in areas where the road was not elevated from the surrounding landscape.

The “Patch addition” tool in Graphab was used to calculate the increase in connectivity associated with the addition of the mitigation structures using IIC. We modelled the use of the land bridge for the echidna and Woodland birds, while the rope bridges and the land bridge were modelled for the phascogales.

3.0 Impact assessment

3.1. Overview

In the following sections we assess the current scenario and then the impacts of the four bypass designs for each of the conservation targets one at a time. For the first conservation target – Woodland birds - we provide additional explanations to assist in interpreting the outputs of the analysis. For the other conservation targets, to avoid repetition we do not provide the same extended explanation; please refer to the Woodland birds section for guidance.

3.2. Woodland Birds

3.2.1. Current Scenario

In Figure 10 connectivity is visualised for Woodland birds with explanatory comments. For Woodland birds, woody vegetation greater than a minimum patch size (Table 2) of 5 ha is considered as habitat. The least-cost path analysis assessed whether these patches were connected based on the ecology of dispersal (i.e. gap-crossing distance; interpatch-crossing distance and resistance).

Patches are visualised both by their extent and also by a circle at the centre of the patch (centroid). Pairs of patches which are connected have a least-cost path in red and a black line between the centroids (known as an edge) between them (Figure 2).

For Woodland birds the existence of least-cost paths between patches indicates that the cumulative cost-weighted distance between the patches were less than 1000 m (the interpatch crossing threshold for Woodland birds; see Table 2) and also that the gap-crossing distances between connectivity elements were less than 106 m. Individuals can move a maximum distance of 1000 m between each patch as long as there are connectivity elements (e.g. scattered trees) between them at less than 106 m apart. In addition, least-cost paths will avoid higher resistance land covers such as residential areas. In areas of high resistance, the cumulative cost-weighted distance between patches will be less than 1000 m. For example, if the land cover between two patches is only Residential (i.e. for Woodland birds it costs twice as much to move through residential land covers; Table 2) the patches would need to be less than 500 m apart to be connected.

A visual assessment of the connectivity modelling outputs in Figure 10 showed that patches in the northwest and southeast are not currently connected i.e. there are no least-cost paths connecting these two groups of patches. These groups of patches are identified in Figure 10 as surrounded by blue lines which represent component boundaries. Components are groups of patches that are linked to each other but isolated from other components, also made of groups of patches. The blue lines are represented by the midpoints between components and are only for visualisation purposes.

From the perspective of Woodland birds, the landscape is fragmented into two large groups of interconnected patches. This is likely to affect Woodland bird viability due to the well-studied negative impacts of isolation.

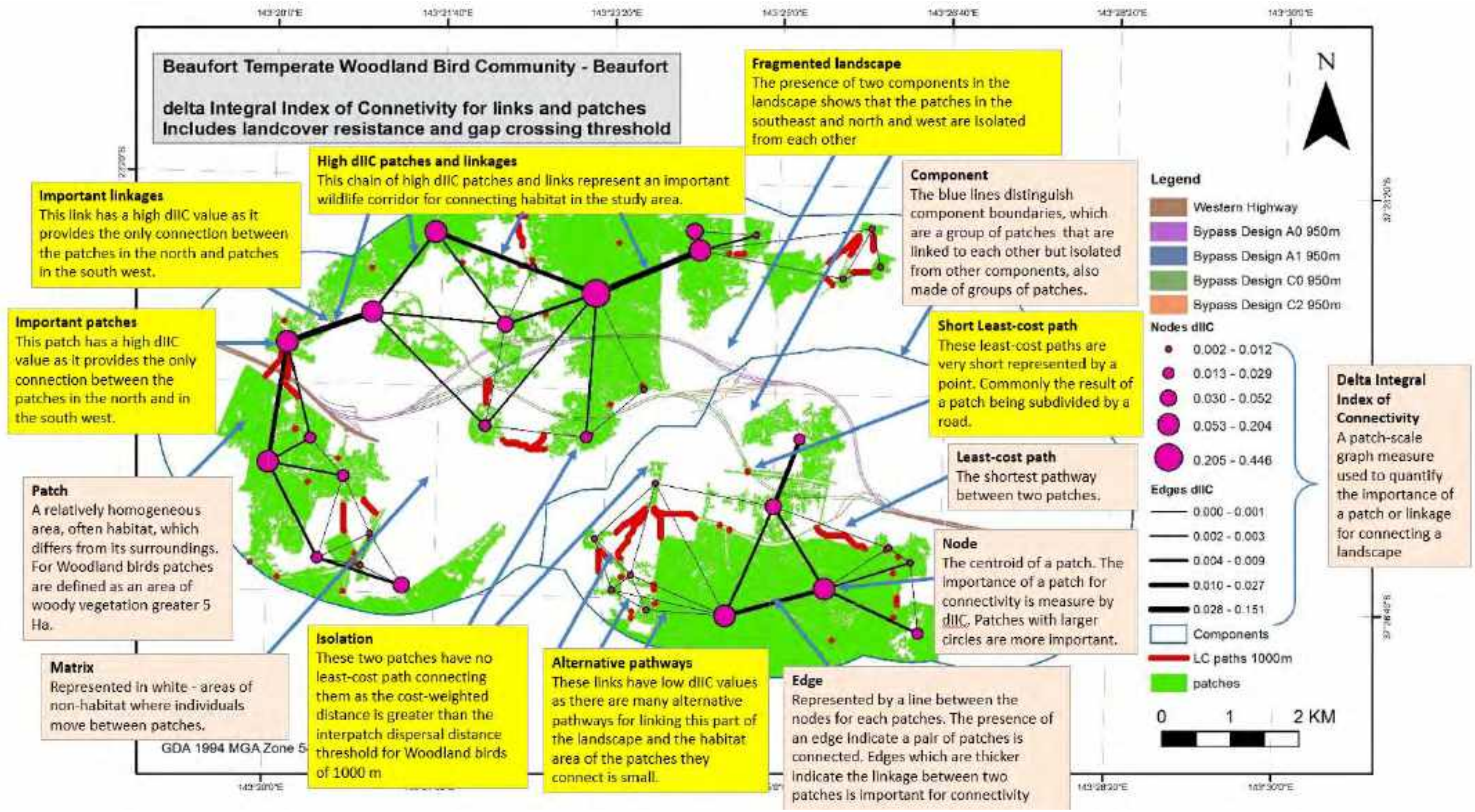


Figure 10: Current habitat patches for Woodland birds with component boundaries, Least-Cost (LC) paths and delta Integral Index of Connectivity (dIIC) for patches and linkages. Important linkages and patches are denoted by thick lines and large circles respectively. The circles located at the centroid of each patch describe patch-scale graph metric values. The bypass designs are included (but not modelled) to allow for a comparison with current connectivity. Definitions are found within pink boxes and explanations within yellow boxes.

Using patch-scale graph metrics the importance of a patch or linkage for connecting a landscape can be quantified. Figure 10 describes the distribution of dIIC values for patches and linkages by the size of the nodes and edges. High dIIC values, represented by larger circles and/or thicker lines indicate that a patch or linkage is important for connecting habitat in the landscape. dIIC accounts for the area of patches as well as which patches important a patch is for linking the landscape. For example, a small patch between two large patches may have a high dIIC value because if it is removed the two large patches would no longer be connected. Alternatively, a large patch could have a high dIIC value even if it is isolated as it is responsible for a large proportion of the total habitat area in a landscape. dIIC values provide a useful means of quantitatively characterising the importance of patches. While the dIIC has a mathematical basis, it is perhaps easiest to interpret the values in a qualitative fashion to support what can be visualised from the patterns of the location and size of patches and links.

Habitat with high dIIC values for woodland birds are mostly found in large patches and the linkages connecting them. In the larger component in the northwest of the study area, there is a chain of high dIIC patches which represent an important wildlife corridor for connecting habitat across the landscape. Within that chain of high dIIC patches and linkages there are a number of high dIIC linkages and one patch which provide the only connections between the patches in the north and patches in the southwest within the component. These patches and linkages are critical for connectivity and without them, the northwest component would be fragmented into two smaller components.

In the smaller component in the southeast, a triangular distribution of high dIIC patches and linkages connect the majority of habitat area in that component. However, the majority of the habitat area is found within two very large patches divided by a road.

The second figure, Figure 11, focuses on movement within the matrix through characterising least-cost corridors and current density within those corridors. Firstly, the white areas in Figure 11 represent areas outside of the least-cost corridors. This means that the cumulative cost-weighted distance between all the patches was greater than the interpatch dispersal distance. From the assessment it can be seen that majority of the matrix was not used for dispersal by Woodland birds. In some locations such as the residential areas in Beaufort with higher resistance the least-cost corridors were highly constrained and narrow. While in other areas with low resistance, wide least-cost corridors were present. The underlying resistance surface in these locations is composed of open pasture land with connectivity elements such as scattered trees present within the gap-crossing distance.

The Circuitscape analysis in Figure 11 shows areas of high current density as warmer in colour (yellow) and low current density in cooler colours (blue). Pixels with high current density represent areas with a higher probability of a random individual moving between patches. Locations with high current density, constrained to a small number of pixels represent pinchpoints. Pinchpoints (or chokepoints) are areas where animal movement is constrained within corridors and areas with such linkages are areas that will have significant impacts on connectivity if severed. Commonly the least-cost paths and pinchpoints overlap.

There are a number of pinchpoints across the study area, but one of the more critical locations for the Woodland birds is in the larger component in the northwest. Within the chain of high dIIC patches and linkages mentioned previously there is a pinchpoint between the patches in the north and patches in the southwest. This pinpoint is critical for maintaining the northwest component as a single component. Areas of which have low current density across a wide area between patches show that there are many options for connecting patches in the areas. This indicates high redundancy in the least-cost path connecting patches in that location.

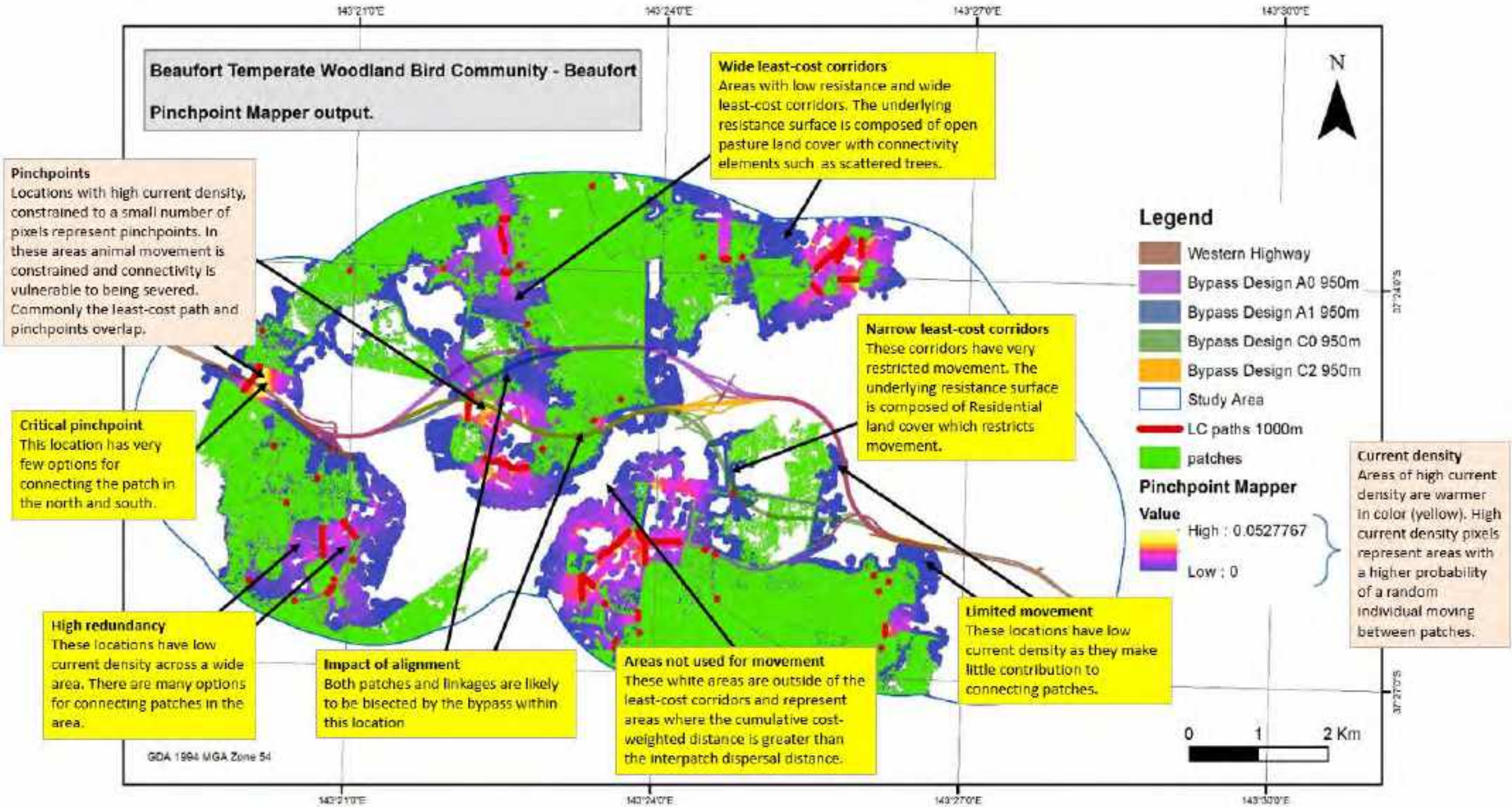


Figure 11: Linkage mapper and Circuitscape pinchpoint analysis of current levels of connectivity for Woodland Birds with the Western Highway and Bypass design A0, A1, C0 and C2 overlaid. The bypass designs are included (but not modelled) to allow for a comparison with current connectivity. Definitions are found within pink boxes and explanations within yellow boxes.

3.2.2. Future Scenario

A comparison of current connectivity overlaid with the bypass design options in

and Figure 11 shows the potential for bypass designs to impact on connectivity for Woodland birds. Depending on the alignment, contiguous existing habitat may be lost, and linkages impacted. Figure 11 identifies some of the key locations within the centre of the study area which are likely to be impacted.

Figure 12 describes the outcome of connectivity modelling for each of the design options. In order to model the impact of each of the design options, habitat under each alignment was removed, the land cover map was altered (i.e. resistance increased for the bypass) and then the connectivity model was rerun with this new input data. A compilation of the modelled impacts for each of the four bypass designs on connectivity for Woodland birds is presented in Figure 12 and the impacts summarized using graph metrics in Table 6.

Table 6: Landscape-scale graph-metrics and the number of patches and links for the scenarios tested for Woodland birds. Values in brackets refer to percentage difference compared to the current connectivity, for IIC, and total patch area. IIC and total patch area are correlated, with the impacts colour coded from red, orange, yellow to green; where green means least impact and red means greatest impact.

Network characteristic	Current Scenario	Future Scenario			
		Design Option A0	Design Option A1	Design Option C0	Design Option C2
Mean size of components (km^2)	12.285	12.168	12.186	12.186	12.238
Size of largest component (km^2)	15.779	15.547	15.584	15.687	15.687
Number of components	2	2	2	2	2
IIC	0.012785	0.012431 (-2.776%)	0.012049 (-5.762%)	0.012344 (-3.455%)	0.012479 (-2.395%)
Patches	34	36	36	36	35
Links	61	81	66	62	60
Total patch area (km^2)	24.569	24.336 (-0.233)	24.373 (-0.196)	24.372 (-0.197)	24.476 (-0.093)

For Woodland birds, the group of patches in the north would be most affected as all four bypass designs intersect them. However, all bypass designs did not result in the creation of new components; indicating that the creation of new patches and changes to resistance did not result in any patches or groups of patches being isolated. This is primarily the result of all bypass designs bisecting existing patches. The width or the clearance and resistance associated with the bypass was not high enough to create a barrier for dispersal. In contrast, the highway was a dispersal barrier for all other land-based animals.

Bypass designs A0 and A1 resulted in more disconnected habitat patches in the central region compared to C0 and C2. Bypass design C0 is the only design which impacted the component in the southeast while design C2 appears to have the least impact on connectivity and habitat by avoiding majority of the habitat patches. Bypass designs A0, A1 and C0 created 2 new patches by bisecting existing patches (Table 6) and bypass C2 only created one additional patch. The decrease in total patch area is the greatest (i.e. greatest amount of habitat lost) with Bypass Design A0, followed by C0 and A1. Bypass Design C2 will have the least effect on total patch area for Woodland birds.

The percentage change in the graph metric IIC between the current and bypass design option scenarios can be used to quantify the impact of each of the design options on landscape connectivity. IIC values increase with greater connectivity from zero to one. IIC analysis at the landscape scale is best used as a relative measure to triangulate and support what could be visually seen with the least-cost path assessment. IIC also incorporates total habitat so design options which remove more habitat will also reduce IIC values even if connectivity remains the same. According to the IIC analysis, bypass design C2 had the smallest relative impact, decreasing IIC value by 2.4% compared to design option A1 with the greatest impact which decreased IIC by 5.8%.

For Woodland birds the other graph metrics related to the characteristics of the components appear to have changed little, primarily because none of the design options result in the creation of new components. As connectivity is such a multidimensional phenomenon, the analysis of impacts requires a range of different metrics and assessments to be interpreted.

A visual and quantitative assessment of the design options shows that option C2 had the least impacts. The habitat patches are least fragmented with bypass design C2 and most fragmented with A0, C0 and A1.

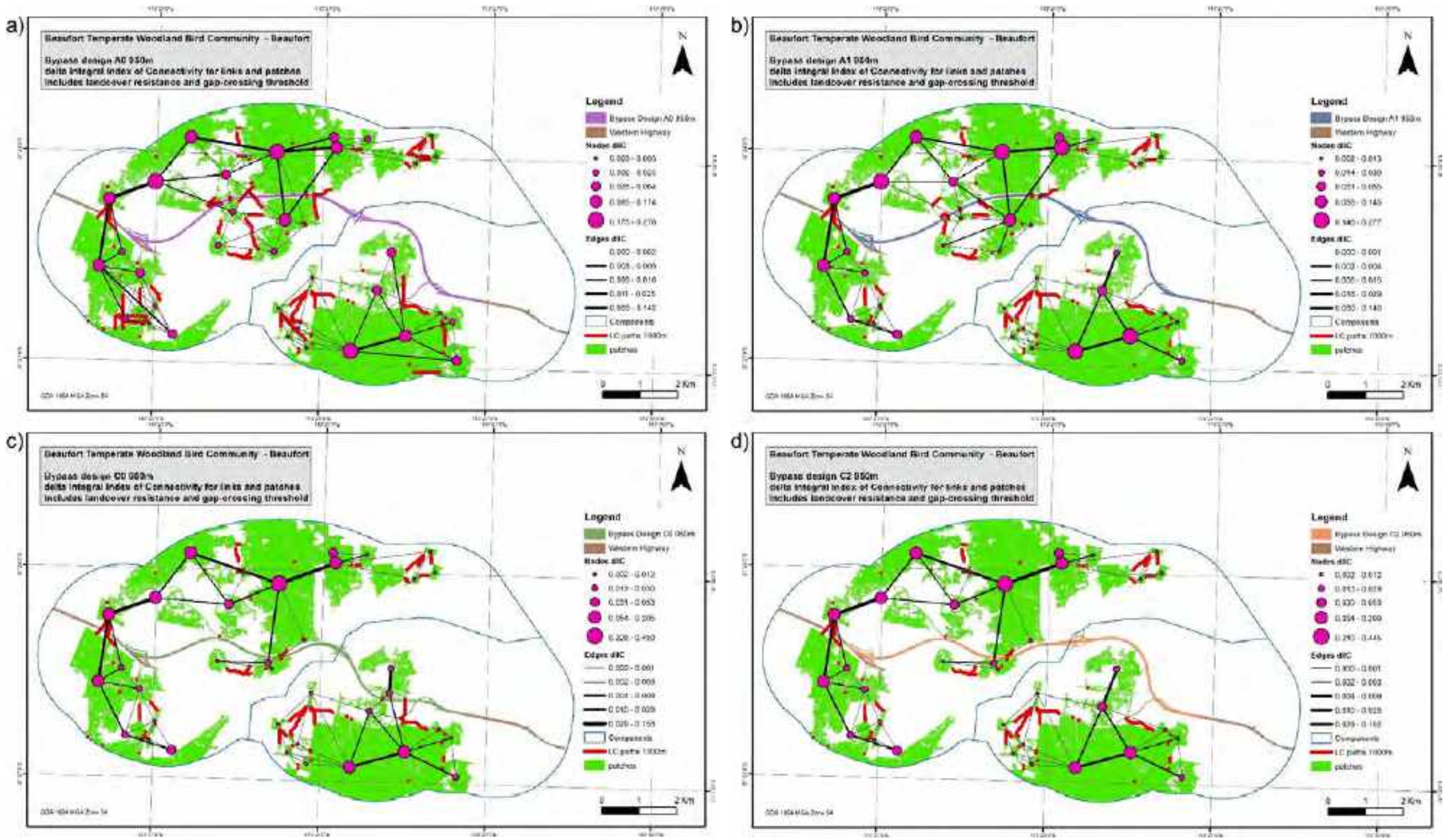


Figure 12 Future scenario modelling output for Woodland birds and Bypass design (a) A0, (b) A1, (c) C0 and (d) C2. The figures include the habitat patches with component boundaries and delta Integral Index of Connectivity (dIIC) for patches and linkages. The circles located at the centroid of each patch describe patch-scale graph metric values. Important linkages and patches are denoted by thicker lines and larger circles respectively.

3.3. Brush-tailed Phascogale

3.3.1. Current Scenario

A visual assessment of the modelling output showed that the habitat patches within the study area for the Brush-tailed Phascogale are connected within a single component (Figure 13); meaning that there are currently no isolated patches within the study area. The existence of least-cost paths between patches indicated that the cumulative cost-weighted distance between those specific patches was less than 5500 m and also that the gap-crossing distance between structural connectivity elements was less than 750 m. The Brush-tailed Phascogale has a particularly long interpatch dispersal distance relative to the study area, and this outcome is to be expected. The study area is approximately 7 km from north to south and 14 km from east to west.

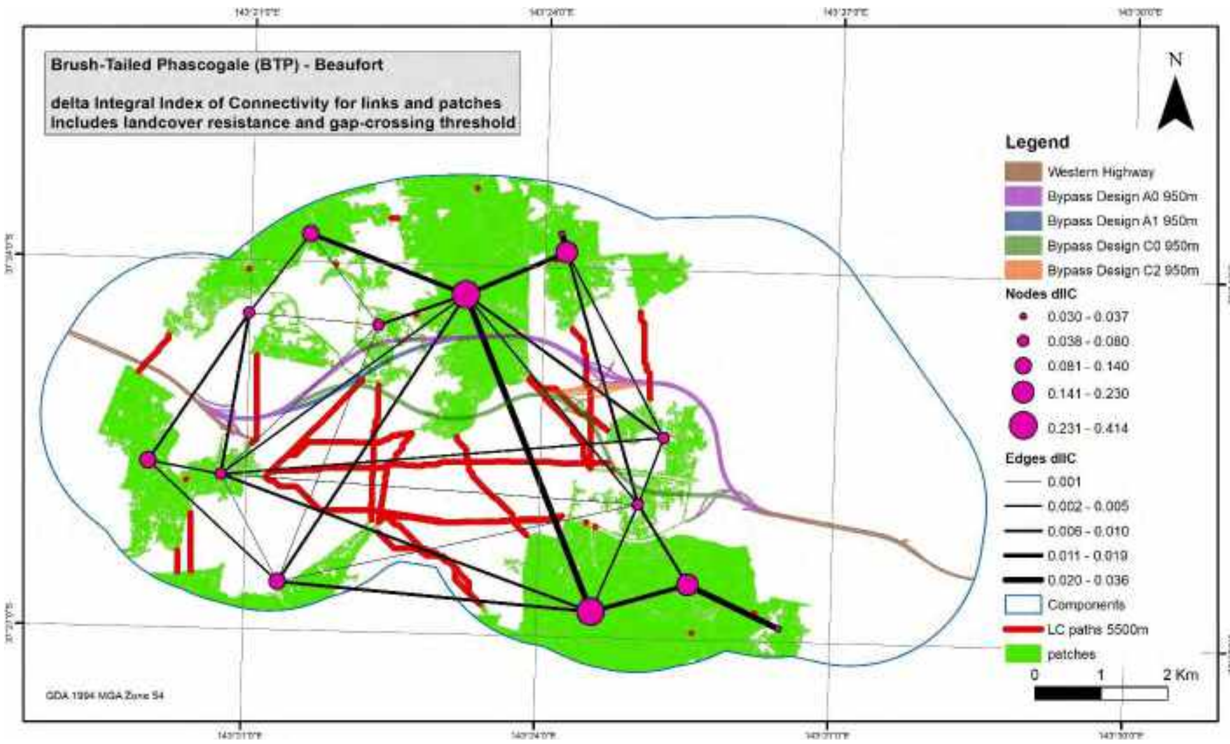


Figure 13: Current habitat patches for Brush-tailed Phascogale with component boundaries, least-Cost (LC) paths and delta Integral Index of Connectivity (dIIC) for patches and linkages. Important linkages and patches are denoted by thick lines and large circles respectively. The circles located at the centroid of each patch describe patch-scale graph metric values. The bypass designs are included (but not modelled) to allow for a comparison with current connectivity.

Figure 13 also show the distribution of dIIC values for patches and linkages, and show that one of the most critical linkages is between the central northern patch and another large patch in the southeast of the study area. However, most dIIC values for linkages and patches are relatively low as there is a lot of redundancy. This is because most patches are accessible due to the long interpatch-dispersal distance of the Phascogales and thus there are very few critical patches, which if lost, would result in fragmenting the landscape. dIIC values are primarily driven by patch size for the Brush-tailed Phascogale.

The Circuitscape assessment described in Figure 14 shows that Brush-tailed Phascogale are likely to utilise most of the matrix for dispersal because of their long interpatch dispersal distance and gap-crossing distance, and therefore there are few pinch points where dispersal is constrained. However, there are two exceptions to this general trend. The first is through the residential areas in the town of Beaufort which constrain dispersal between the two large patches in the south. The second location in the southeast occurs where dispersal is constrained due to a number of roads and ponds in between the two large patches.

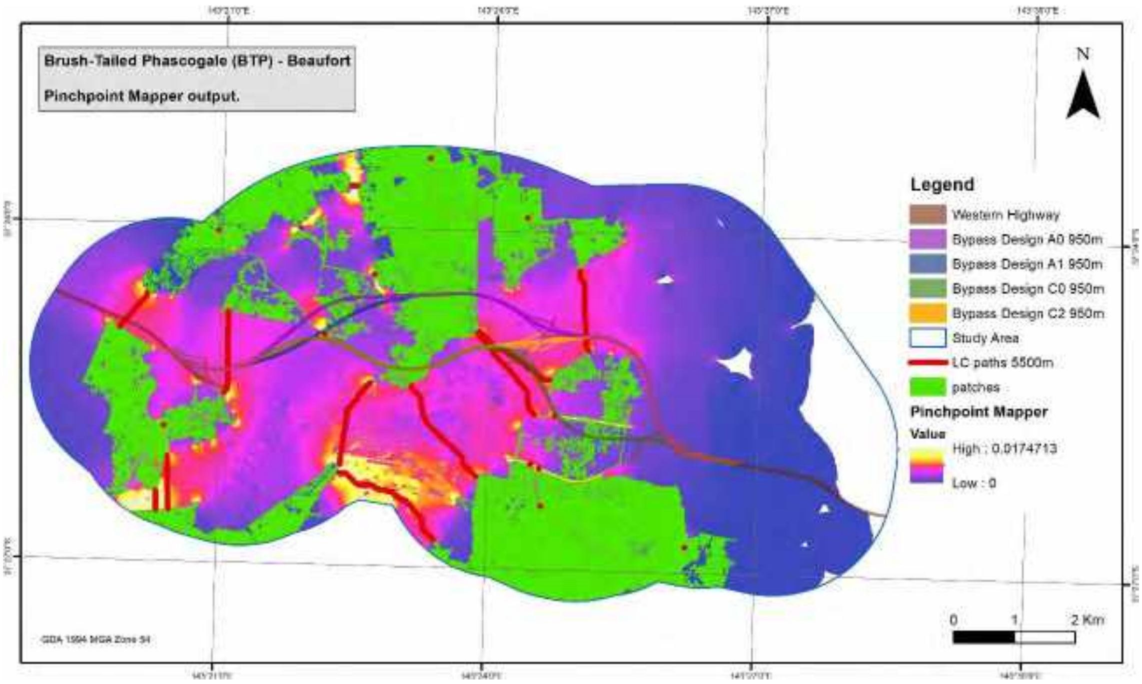


Figure 14: Linkage mapper and Circuitscape pinchpoint analysis of current conditions for Brush-tailed Phascogale with the Western Highway and Bypass design A0, A1, C0 and C2 overlaid. The bypass designs are shown (but not modelled) to allow for a comparison with current connectivity.

3.3.2. Future Scenario

Figure 13 and Figure 14 shows how current levels of connectivity for Brush-tailed Phascogale will be affected by the bypass designs. For this species, the group of patches in the north of the study area would be most affected as all four bypass designs intersect them. Bypass Design A0 and A1 will leave greater disconnected habitat patches compared to C0 and C2 which only intersects two least-cost paths. Bypass Design C0 overlaps three least-cost paths connecting the large patches in the southwest and southeast of the study area to the northern patches while C2 will overlaps four least-cost paths.

A compilation of the modelled quantitative impacts of the four Bypass Designs on current levels of connectivity for Brush-tailed Phascogale is presented in Figure 15 and summarized in Table 7. The overall impact of all bypass designs on the Brush-tailed Phascogale was relatively low compared to Woodland birds, primarily due to the long interpatch dispersal distance of the species.

The differences between the different bypass designs on the Brush-tailed Phascogale was mostly driven by the loss of habitat. Bypass design C2 had the smallest impact on habitat loss compared to A0 which dissects core contiguous habitat area in the central region. Bypass Design A0 and C2 did not change the number of patches while A1 results in the creation of two more patches. All four bypass designs do not cause isolation of any patches in the landscape and therefore all patches are found within a single component regardless of the alternative designs.

Table 7: Landscape-scale graph-metrics and the number of patches and links for the scenarios tested for Brush-tailed Phascogale. Values in brackets refer to percentage difference compared to the current connectivity, for IIC, and total patch area. IIC and total patch area are correlated, with the impacts colour coded from red, yellow, orange to green; where green means least impact and red means greatest impact.

Network characteristic	Current Scenario	Future Scenario			
		Design Option A0	Design Option A1	Design Option C0	Design Option C2
Mean size of components (km²)	22.001	21.218	21.218	21.272	21.797
Size of largest component (km²)	22.001	21.218	21.218	21.272	21.797
Number of components	1	1	1	1	1
IIC	0.019285	0.0174386 (-9.845%)	0.0174386 (-9.845%)	0.019494 (-1.09%)	0.019279 (-0.030%)
Patches	14	14	15	13	14
Links	31	35	36	31	33
Total patch area (km²)	22.001	21.218 (-0.783)	21.727 (-0.274)	21.272 (-0.729)	21.797 (-0.204)

The assessment of overall IIC values show that option C2 has the least impact on Brush-tailed Phascogales with only a 0.03% decrease in IIC value versus a 9.45% decrease for bypass designs A0 and A1.

For the Brush-tailed Phascogale both visually and quantitatively it appeared as though design option C2 had the least impacts. The habitat patches are least fragmented with bypass design C2 and most fragmented with A0 and A1 based on IIC.

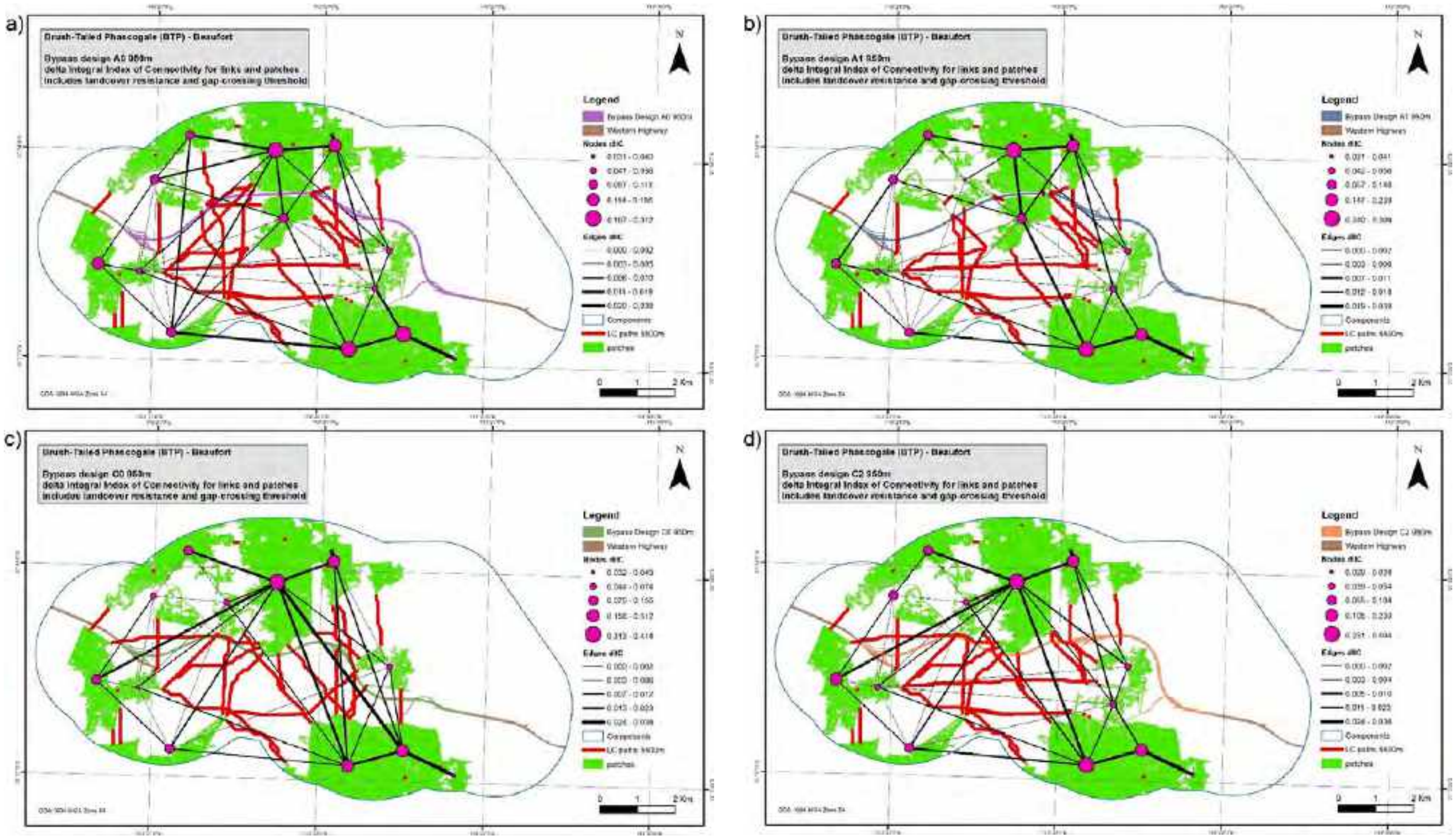


Figure 15: Future scenario modelling output for Brush-tailed Phascogale and Bypass design (a) A0, (b) A1, (c) C0 and (d) C2. Includes the habitat patches with component boundaries and delta Integral Index of Connectivity (dIIC) for patches and linkages. The circles located at the centroid of each patch describe patch-scale graph metric values. Important linkages and patches are denoted by thicker lines and larger circles respectively.

3.4. Echidna

3.4.1. Current Scenario

A visual assessment of the modelling output showed that the habitat patches within the study area for the Echidna are connected within a single component indicating that all the patches in the landscape are linked (Figure 16). The existence of least-cost paths between patches indicate that the cumulative cost-weighted distances between patches were less than 5000 m and that the gap-crossing distance between structural connectivity elements was less than 500 m. Similar to the Brush-tailed Phascogale, most of the landscape is well-connected for the Echidna due to the long interpatch dispersal distances of the species

Figure 16 describes the distribution of dIIC values for patches and linkages for the Echidna. Similar to the Brush-tailed Phascogale, the analysis showed that one of the most critical linkages is between the central patch in the north and another large patch in the southeast.

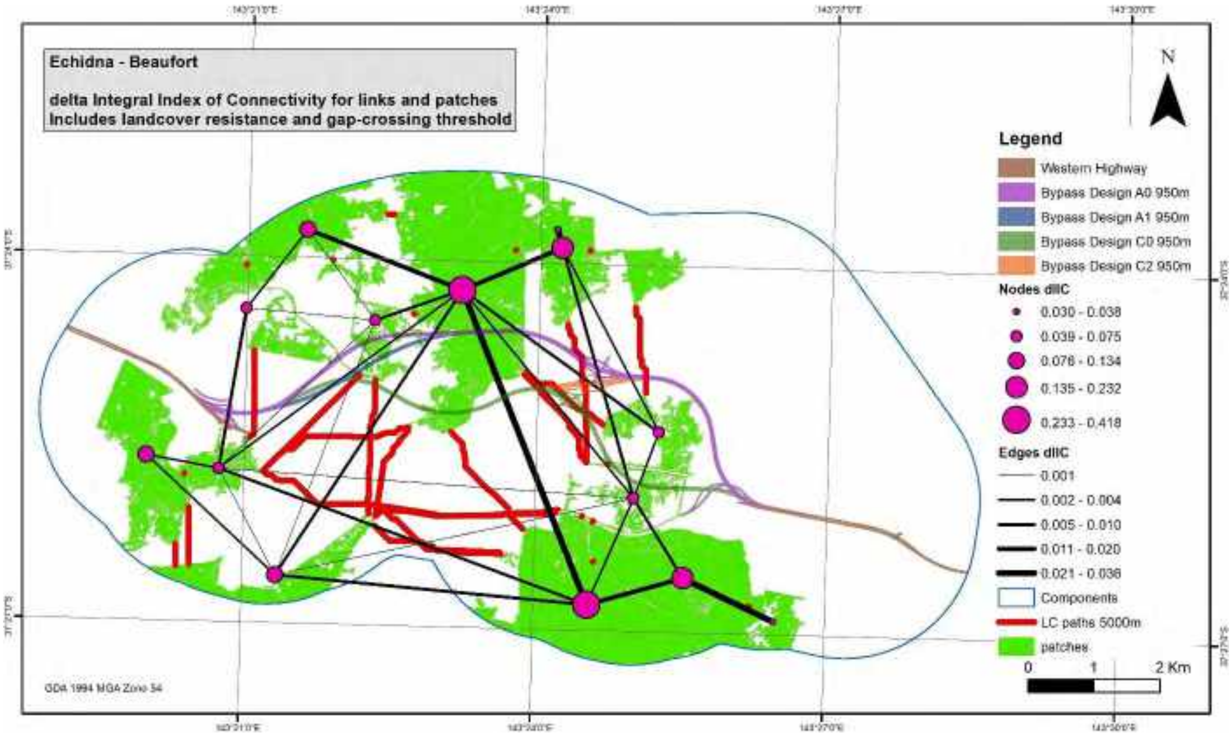


Figure 16: Habitat patches of Echidna with component boundaries, Least-Cost (LC) paths and delta Integral Index of Connectivity (dIIC) for patches and linkages. Important linkages and patches are denoted by thick lines and large circles respectively. The circles located at the centroid of each patch describe patch-scale graph metric values.

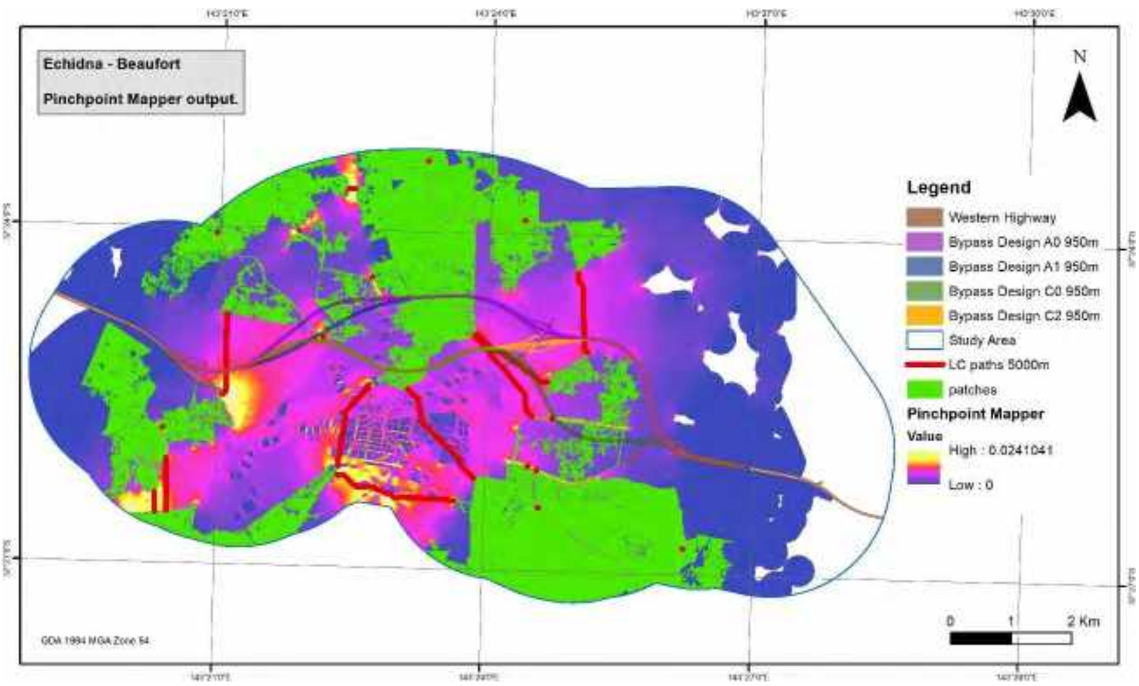


Figure 17: Linkage mapper and Circuitscape pinchpoint analysis for current levels of connectivity Echidna with the Western Highway and Bypass design A0, A1, C0 and C2 overlaid. The bypass designs are shown (but not modelled) to allow for a comparison with current connectivity.

3.4.2. Future Scenario

Figure 16 and Figure 17 show how current connectivity for the Echidna will be affected by the bypass designs. For the Echidna, the group of patches in the north would be most affected as all four bypass designs bisects them. Bypass Design A0 and A1 will leave a larger, disconnected habitat patch compared to C0 and C2. Bypass Design C0 intersects three least-cost paths connecting the southwest and a large patch in the southeast to the northern patches while C2 will intersects four least-cost paths.

A compilation of the modelled quantitative impacts of the four Bypass Designs on current connectivity for Echidna is presented in Figure 18 and summarized in Table 8. From the visual assessment and the metric assessment bypass design C2 has the least impact, followed by C0, A1 and A0.

Unlike the previous two woody-dependent conservation target species, Echidnas perceive the Western Highway as a barrier to dispersal, so regardless of bypass design the landscape will be fragmented into 2 isolated components with movement between the patches to the north and south restricted.

Habitat patches were least fragmented by bypass design C0, where the number of patches decreased by one (Table 8) and bypass designs A0, A1 and C2 did not change the number of patches. The decrease in total patch area was the greatest with Bypass Design A0, followed by A1, C0 and C2.

The IIC assessment shows a large decrease in the IIC value of 40% or over for all bypass designs. This is because the bypass will fragment the landscape into two components which are approximately half the total habitat area in each of them. The smallest decrease in IIC value was associated with bypass design C2 and the largest with A0.

Table 8: Landscape-scale graph-metrics and the number of patches and links for the scenarios tested for Echidna. Values in brackets refer to percentage difference compared to the current connectivity, for IIC, and total patch area. IIC and total patch area are correlated, with the impacts colour coded from red to green; where green means least impact and red means greatest impact.

Network characteristic	Current Scenario	Future Scenario			
		Design Option A0	Design Option A1	Design Option C0	Design Option C2
Mean size of components (km^2)	22.001	10.609	10.615	10.636	10.899
Size of largest component (km^2)	22.001	12.924	12.923	10.721	11.725
Number of components	1	2	2	2	2
IIC	0.019138	0.010909 (-42.994%)	0.010919 (-42.947%)	0.010933 (-42.872%)	0.011317 (-40.862%)
Patches	14	14	14	13	14
Links	29	22	22	16	19
Total patch area (km^2)	22.001	21.218 (-0.783)	21.229 (-0.772)	21.272 (-0.729)	21.797 (-0.204)

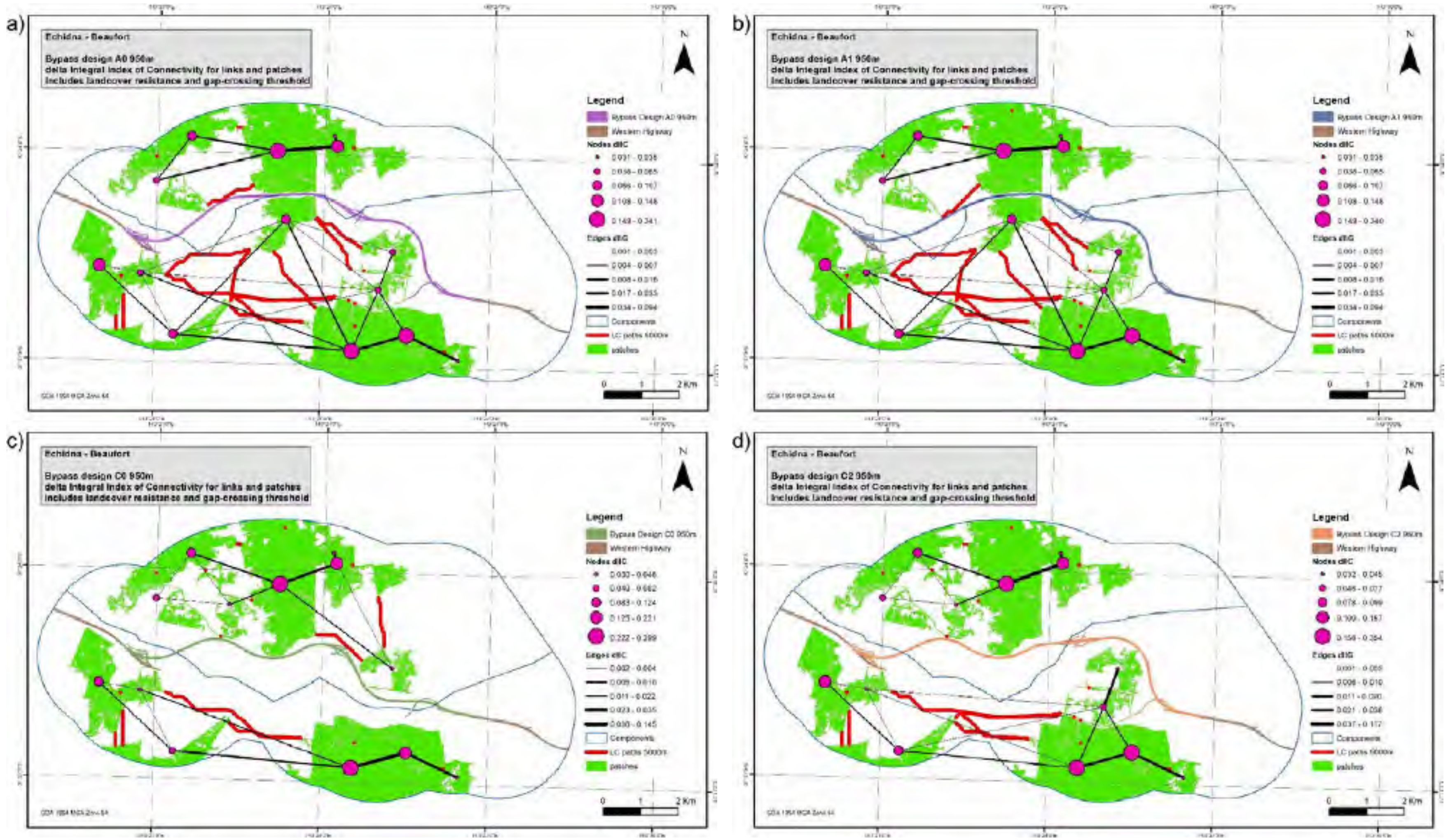


Figure 18: Future scenario modelling output for Echidna and Bypass design (a) A0, (b) A1, (c) C0 and (d) C2. Includes the habitat patches with component boundaries and delta Integral Index of Connectivity (dIIC) for patches and linkages. The circles located at the centroid of each patch describe patch-scale graph metric values. Important linkages and patches are denoted by thicker lines and larger circles respectively.

3.5. Growling Grass Frog

3.5.1. Current Scenario

A visual assessment of the modelling output shows that the habitat patches within the study area for the Growling Grass Frog are broken into 18 components indicating that the landscape is highly fragmented, however, there is a large component extending from the centre to the east of the study area which is well-connected. These components are visualized in Figure 19 as 18 groups of connected patches surrounded by blue lines representing the component boundaries. In addition to the central connected component, there are also a number of isolated, but smaller patches scattered across the study area.

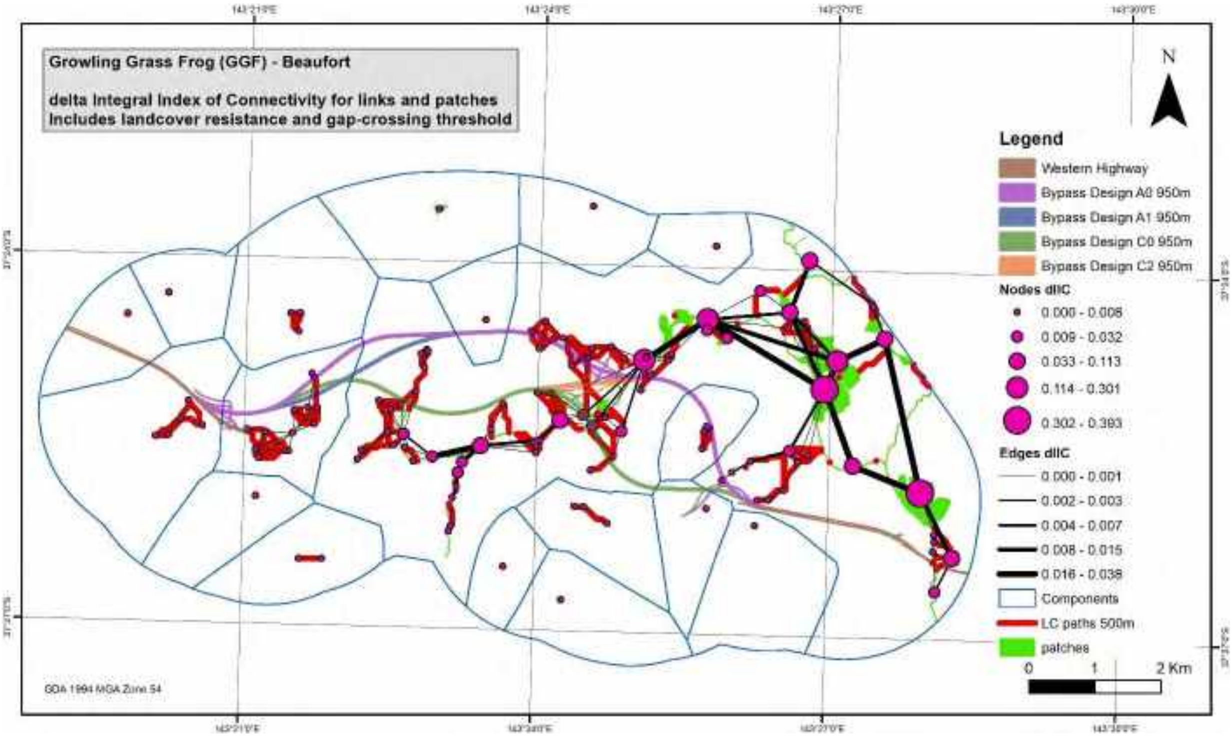


Figure 19: Current habitat patches for Growling Grass Frogs with component boundaries, Least-Cost (LC) paths and delta Integral Index of Connectivity (dIIC) for patches and linkages. Important linkages and patches are denoted by thick lines and large circles respectively. The circles located at the centroid of each patch describe patch-scale graph metric values. The bypass designs are shown (but not modelled) to allow for a comparison with current connectivity.

The existence of least-cost paths between patches indicate that the cumulative cost-weighted distance between patches was less than 500 m. For the Growling Grass Frog we did not include the gap-crossing distance as data for modelling this was not available. Thus, our modelling is likely to overestimate dispersal capability of the species.

Figure 19 describes the distribution of dIIC values for patches and linkages for the Growling Grass Frog. The high dIIC areas are mostly made up of large patches and the linkages connecting them. The largest component extending from the centre of the study area to the east is composed of a chain of high dIIC patches and linkages. The chain connects habitat patches to the larger patches along the eastern boundary of the component, where the high dIIC value patches and least-cost paths are found.

The Circuitscape analysis in Figure 20 shows that the Growling Grass Frog is likely to be very restricted in its use of the matrix due to its small habitat area and short interpatch dispersal distance threshold. There are very few locations with pinchpoints present.

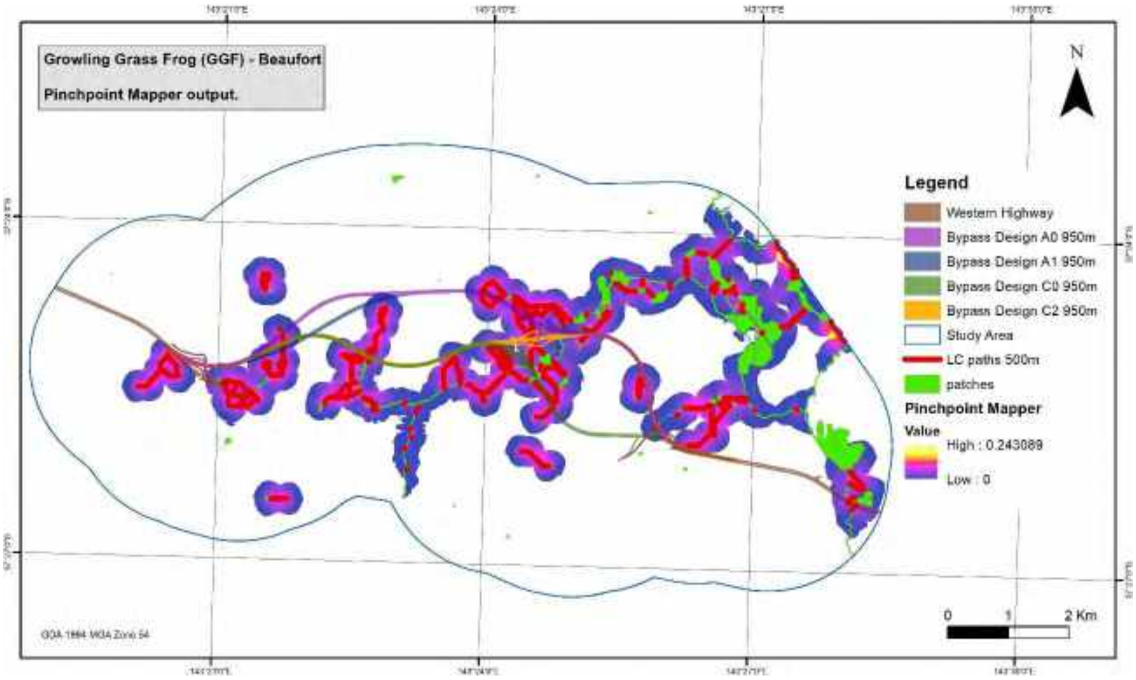


Figure 20: Linkage mapper and Circuitscape pinchpoint analysis of current levels of connectivity for Growling Grass Frogs with the Western Highway and Bypass design A0, A1, C0 and C2 overlaid. The bypass designs are shown (but not modelled) to allow for a comparison with current connectivity.

3.5.2. Future Scenario

Figure 19 and Figure 20 show current levels of connectivity with the various bypass designs overlaid. For this species, all four bypass designs affected the large clusters of linkages and small, scattered habitat patches in the central region of the study area.

A compilation of the modelled quantitative impacts of the four Bypass Designs on current connectivity for Growling Grass Frog is presented in Figure 22 and summarized in Table 9. The number of components increased by two with the implementation of Bypass Design A0, A1 and C0 and C2 resulted in an increase of one component from the original value. The IIC values will decrease the most with Bypass Design C2. However, the difference between the bypass designs on IIC are negligible at ~0.01%.

Table 9: Landscape-scale (network) graph-metrics and the number of patches for the scenarios tested for Growling Grass Frog. Values in brackets refer to percentage difference compared to the current connectivity, for dIIC, and change in area for total patch area. IIC and total patch area are correlated, with the impacts colour coded from red to green; where green means least impact and red means greatest impact.

Network characteristic	Current Scenario	Future Scenario			
		Design Option A0	Design Option A1	Design Option C0	Design Option C2
Mean size of components (km^2)	0.119	0.107	0.107	0.106	0.113
Size of largest component (km^2)	2.038	2.031	2.031	2.010	2.030
Number of components	18	20	20	20	19
IIC	0.00013399	0.00013005 (-2.942%)	0.00013004 (-2.947%)	0.00013080 (-2.382%)	0.00013004 (-2.949%)
Patches	127	125	124	130	124
Links	199	184	183	199	188
Total patch area (km^2)	2.150	2.138 (-0.012)	2.142 (-0.008)	2.124 (-0.026)	2.141 (-0.009)

Surprisingly, for this species the bypass did not always result in the isolation and creation of new components. Figure 21 shows the impact of the bypass design on dispersal for the Growling Grass Frog focusing on where the bypass bisects patches. The subsets show that despite the presence of a bypass, least-cost paths still exist across the bypass. The least-cost paths can cross the bypass as the patches are very close to each other.

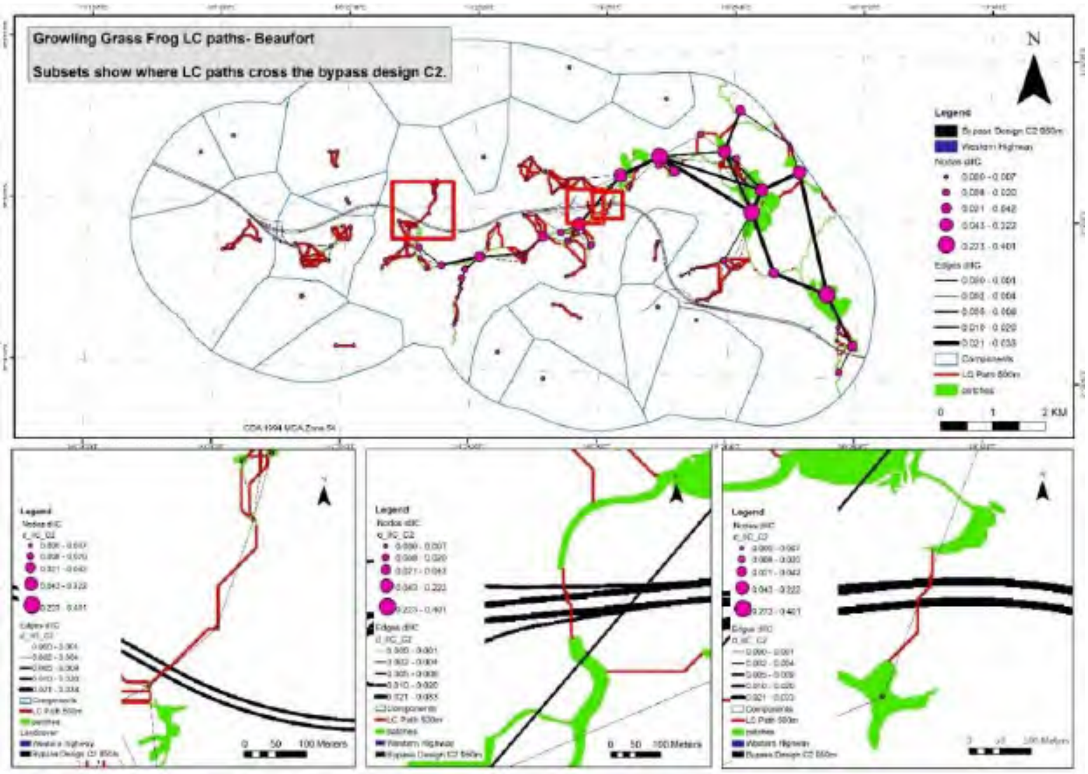


Figure 21: Assessment of the impacts of design C2 on the least-cost paths of Growling Grass Frog.

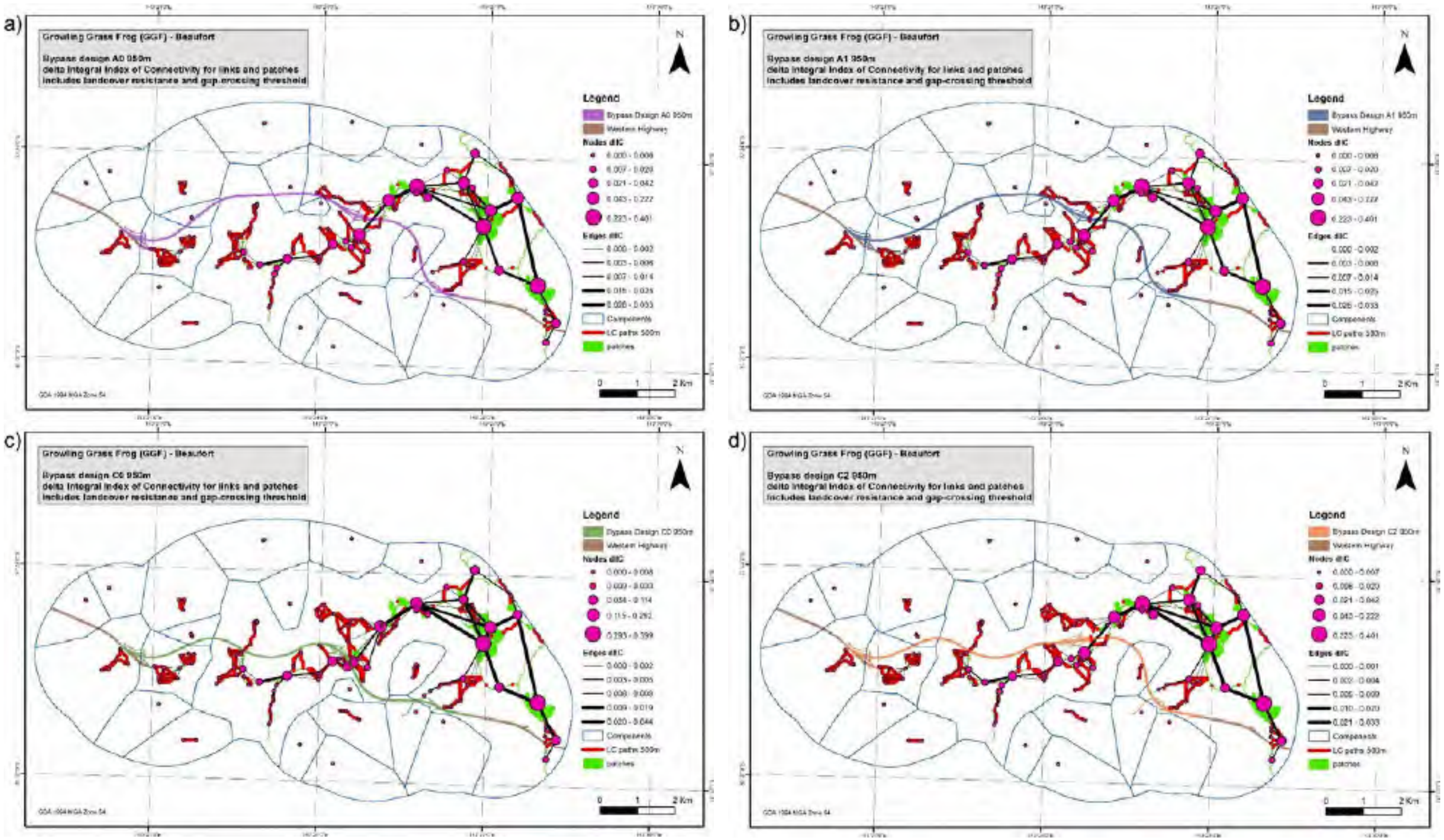


Figure 22: Future scenario modelling output for Growling Grass Frog and Bypass design (a) A0, (b) A1, (c) C0 and (d) C2. Includes the habitat patches with component boundaries and delta Integral Index of Connectivity (dIIC) for patches and linkages. Includes the habitat patches with component boundaries and delta Integral Index of Connectivity (dIIC) for patches and linkages. The circles located at the centroid of each patch describe patch-scale graph metric values. Important linkages and patches are denoted by thicker lines and larger circles respectively.

3.6. Golden Sun Moth

3.6.1. Current Scenario

A visual assessment of the modelling outputs in Figure 23 show that the habitat for the Golden Sun Moth within the study area is highly fragmented. In Figure 23 there are 39 groups of connected patches surrounded by blue lines representing the component boundaries. From the perspective of the ecology of the Golden Sun Moth dispersal characteristics the landscape is highly fragmented, and most patches are either isolated or connected to a small number of patches. The existence of least-cost paths between patches for the Golden Sun Moth indicate that the cumulative cost-weighted distance between those linked patches was less than 200 m. For the Golden Sun Moth, we did not include the gap-crossing distance as data for modelling this was not available. Thus, our modelling is likely to overestimate dispersal.

The landscape for the Golden Sun Moth is characterised by a number of larger components which include one or more larger interconnected patches. The distances between most of the components within the study are much further than 200 m, and thus are unlikely to be connected based on the 200 m interpatch dispersal distance even if the intervening land cover had no resistance. Figure 23 also describes the distribution of dIIC values for patches and linkages. The high dIIC areas are mostly made up of large patches and its connecting linkages.

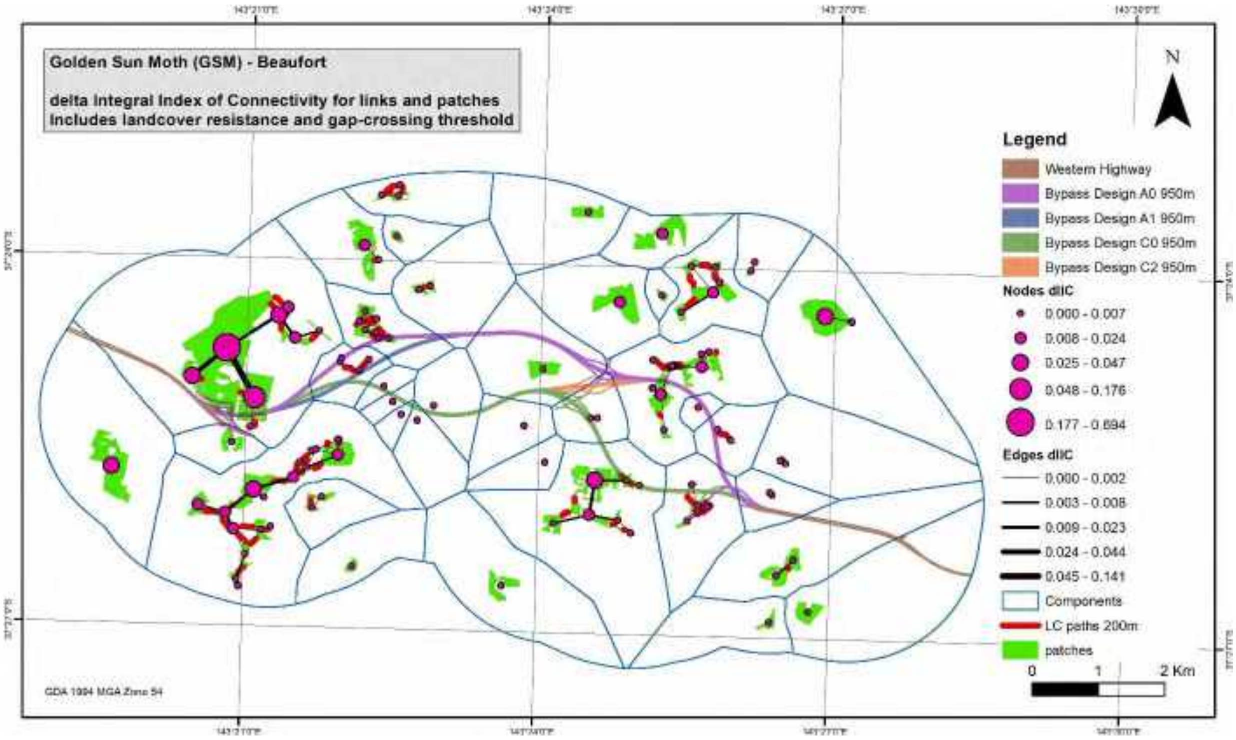


Figure 23: Current habitat patches for Golden Sun Moths with component boundaries, least-Cost (LC) paths and delta Integral Index of Connectivity (dIIC) for patches and linkages. Important linkages and patches are denoted by thick lines and large circles respectively.

The results of the Linkage mapper analysis shown in Figure 24 suggests that not much of the matrix is utilised for dispersal by Golden Sun Moth due to its short interpatch dispersal distance.

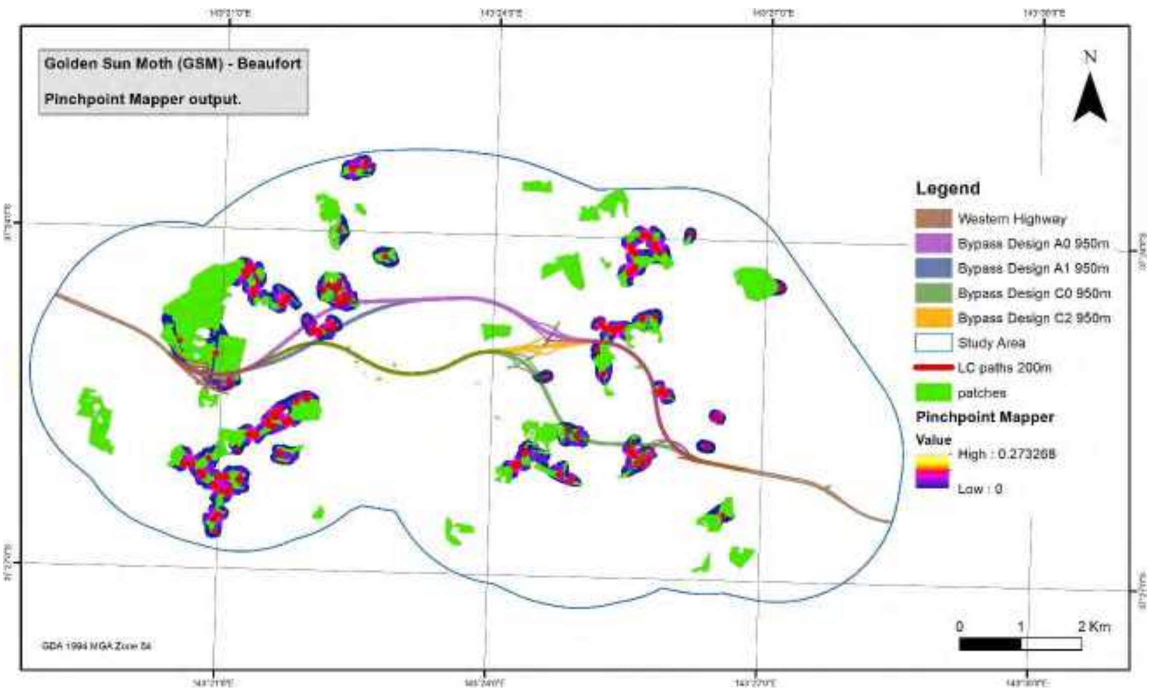


Figure 24: Linkage mapper and Circuitscape pinchpoint analysis for Golden Sun Moths with the Western Highway and Bypass design A0, A1, C0 and C2 overlaid. The bypass designs are shown (but not modelled) to allow for a comparison with current connectivity.

3.6.2. Future Scenario

The overlay of the different design options in Figure 23 and Figure 24 shows how current connectivity for the Golden Sun Moth will be affected by the bypass designs. For this species, Bypass Design A0 and A1 will intersect several least-cost paths and habitat patches in the northwest and northeast of the study area. Bypass design C2 appears to avoid most of the large patches in the study area except in the southeast.

A compilation of the modelled quantitative impacts of the four bypass designs on current connectivity for Golden Sun Moths are presented in Figure 25 and summarized in Table 10. The number of components increased the most with Bypass Designs A0 and C0 with an increase of four components. The habitat patches will be least fragmented with Bypass Design C2 followed by A1, A0 and C0. The decrease in total patch area is the greatest with Bypass Design A0, followed by C0 and A1. Bypass Design C2 will have the least effect on total patch area for Golden Sun Moth.

An assessment of the change in the IIC value shows that bypass design C2 had the least impact and A1 the most. However, the differences between the different designs were very small at less than 0.1%.

Overall, design C2 had the least impact quantitatively (in terms of IIC and total area) but it should be noted that all of the designs have broadly similar impacts on the Golden Sun Moth and all are relatively benign for the species, given the current levels of habitat loss and fragmentation. The major difference in impacts between designs is on whether the group of patches in the north east or south east are impacted.

Table 10: Landscape-scale graph-metrics and the number of patches and links for the scenarios tested for Golden Sun Moths. Values in brackets refer to percentage difference compared to the current connectivity, for IIC, and total patch area. IIC and total patch area are correlated, with the impacts colour coded from red to orange, yellow and green; where green means least impact and red means greatest impact.

Network characteristic	Current Scenario	Future Scenario			
		Design Option A0	Design Option A1	Design Option C0	Design Option C2
Mean size of components (km^2)	0.137	0.121	0.127	0.121	0.127
Size of largest component (km^2)	1.613	1.482	1.481	1.481	1.481
Number of components	39	43	41	43	41
IIC	0.00022892	0.00020258 (-11.504%)	0.00020249 (-11.546%)	0.00020271 (-11.447%)	0.00020262 (-11.488%)
Patches	118	125	124	128	123
Links	120	128	127	132	126
Total patch area (km^2)	5.359	5.205 (-0.154)	5.218 (-0.141)	5.208 (-0.151)	5.224 (-0.135)

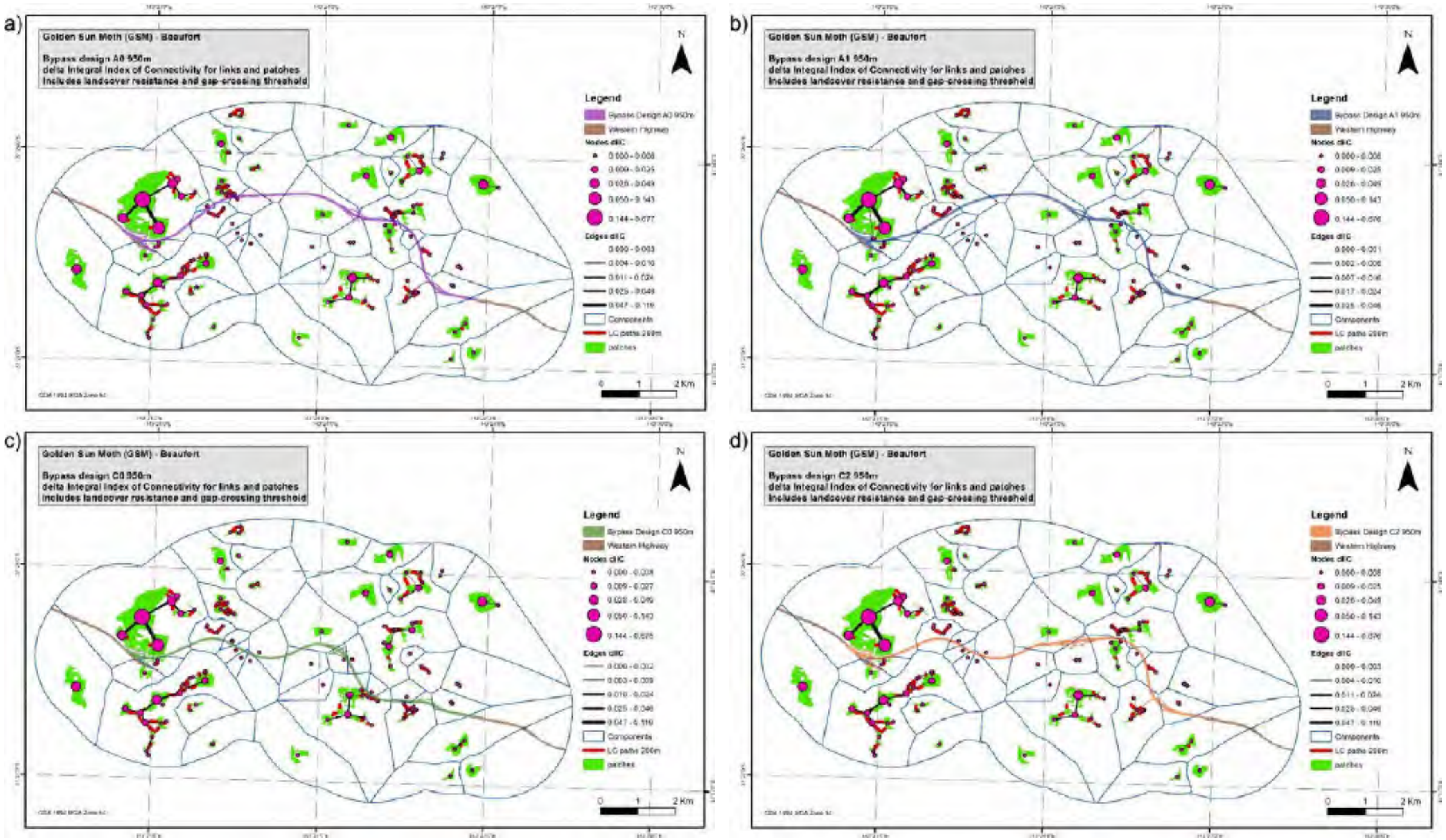


Figure 25: Future Scenario Modelling output for Golden Sun Moth and Bypass design (a) A0, (b) A1, (c) C0 and (d) C2. Includes the habitat patches with component boundaries and delta Integral Index of Connectivity (dIIC) for patches and linkages. The circles located at the centroid of each patch describe patch-scale graph metric values. Important linkages and patches are denoted by thicker lines and larger circles respectively.

3.7. Summary

The quantitative assessment via IIC and dIIC values as well as the interpretation of the least-cost paths, current density and component boundaries provides a relatively unambiguous interpretation of impacts. In terms of the alternative designs, C2 has the smallest amount of impacts on connectivity for woodland birds, Echidna and Brush-tailed Phascogale. Interestingly, differences among the impacts of the alternative bypass designs on connectivity for the Golden Sun Moth and Growling Grass Frog were negligible.

Below we summarise the key outputs from the modelling of the current and future bypass impact scenarios.

Current:

- For species with short dispersal distances with highly fragmented and small habitat such as the Golden Sun Moth and Growling Grass Frog, the current landscape appeared highly fragmented for the former and is relatively connected for the latter.
- For medium dispersers such as the Woodland Birds, the large patches of habitat in the north and south of the study area are currently isolated from each other due to the existing roads and built up area of Beaufort.
- The relatively longer-distance dispersers, namely the Echidna and Brush-tailed Phascogale, are able to move through most of the matrix thanks to the presence of scattered trees and woody vegetation along minor roads and overall they perceive the landscape as relatively unfragmented.

Bypass impacts:

- Of the four alternative design alignments, design C2 had the least impacts, especially for woody-dependent species, as it avoided the large central patches of habitat.
- The decrease in IIC (i.e. a measure of overall connectivity) values for design C2 was the smallest for all the species apart from the Growling Grass Frog, showing it had the least impact on connectivity.
- The differences in impacts on the Golden Sun Moth and Growling Grass Frog among the design alternatives was very small. For example, for the Golden Sun Moth and Growling Grass Frog, the reduction in IIC was ~0.1% versus reductions from 2% to 10% for the woody-dependent species.
- All bypass options go directly through parts of the Golden Sun Moth and Growling Grass Frog habitat or are in the neighbouring areas and therefore the impacts of the bypass on these species are most likely felt through the loss of habitat and other impacts such as road mortality and edge effects which weren't modelled.
- Design A0 and A1 had the greatest impacts on connectivity, especially for woody-dependent species as it fragmented the large contiguous patches of habitat in the central region of the study area.
- Species such as the Echidna perceive the bypass as a barrier and are therefore likely to be most impacted because the habitat in the study area will be divided in half.
- Critically, all bypass designs will increase resistance for movement of all conservation targets between patches in the north and south. While in all cases (apart from the Echidna), this did not isolate patches in the north from patches in the south; it is likely there would be increased road mortality at locations where least-cost paths overlap with the bypass unless mitigation measures that prevent road mortality are included in the design of the road.

4.0 Mitigation

4.1. Mitigation measure modelling

The bypass design option C2 was chosen as the preferred alignment option that had the least impact on connectivity for all species modelled. We were provided by WSP with mitigation measures for the woodland dependent species, namely Brush-tailed Phascogale, woodland birds and Echidna after design option C2 was chosen (Figure 26). However, these mitigation measures are likely to mitigate impacts for other species in the region with similar dispersal characteristics.

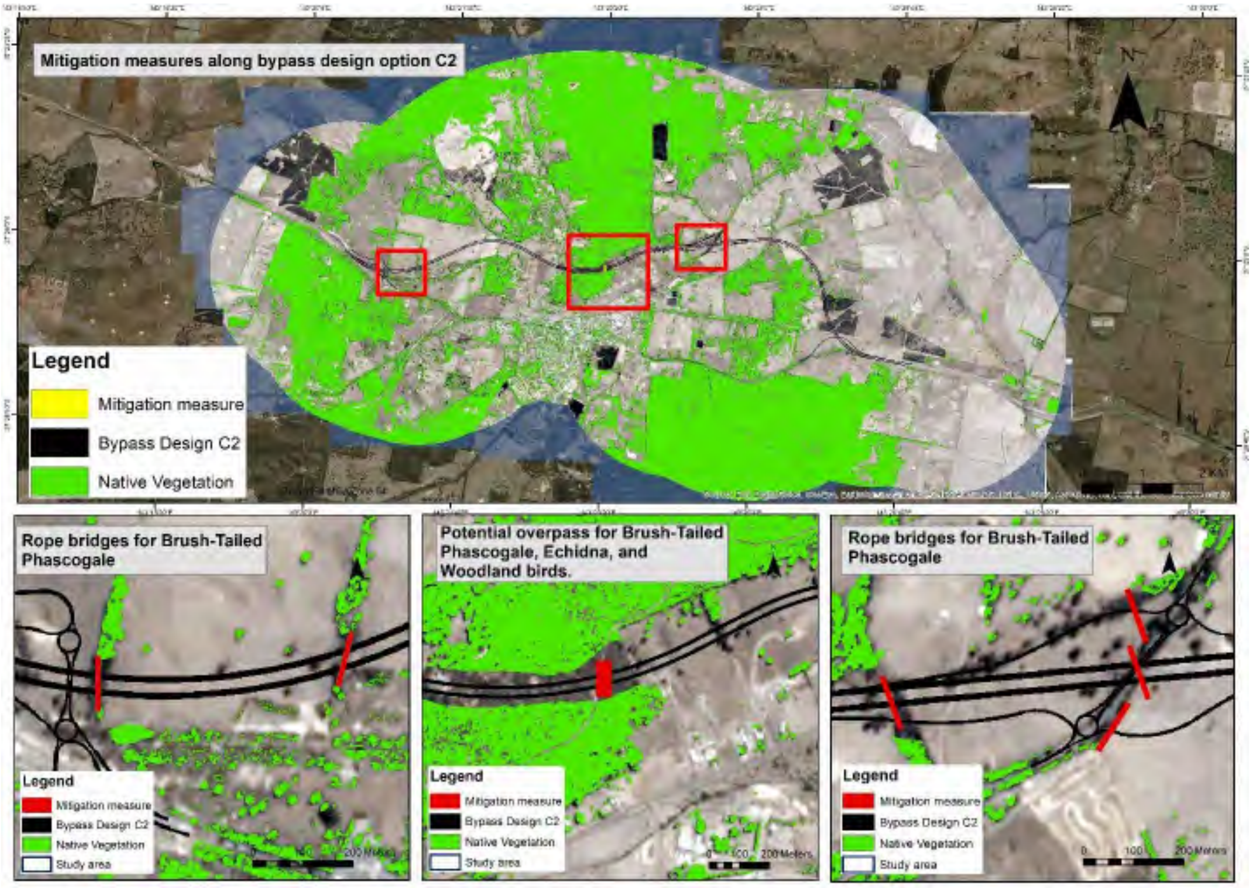


Figure 26: Examples of locations of mitigation measures provided by WSP, that consists of rope bridges and a potential overpass. These structures aim to connect woody vegetation on both sides of the bypass, allowing animals to cross. An overpass would suit all animal types whereas rope bridges cater to arboreal species only.

The effects of two types of mitigation were evaluated through modelling, namely canopy rope bridges and vegetated land bridge/overpass. The locations of these were provided by WSP and were based on locations where existing tree cover was dissected by the C2 design alternative and where the design of the road allowed for the particular type of mitigation. For example, canopy rope bridges were installed where the bypass was at grade or in a cutting while the vegetated land bridge was proposed for a location where the bypass was in a cutting.

We modelled the following mitigation scenarios:

- Rope bridges and landbridge – Brush-tailed Phascogales
- Landbridge only – Woodland Birds and Echidna

The following sub-sections presents the impacts of these mitigation measures on improvements to connectivity for each native-woodland species.

4.1.1. Woodland Bird Community

Figure 27 shows connectivity for Woodland birds with the addition of an overpass for design option C2 (the preferred design option). This resulted in a positive increase in IIC from 0.0125 to 0.0127 (Figure 27). The impact of the overpass was relatively small as these two patches were connected even without the addition of the mitigation feature (see Figure 11). However, our analysis is unable to take into account reductions in mortality and the vegetated land bridge would likely result in significant reductions in the mortality of woodland birds compared to where crossings are undertaken at-grade.

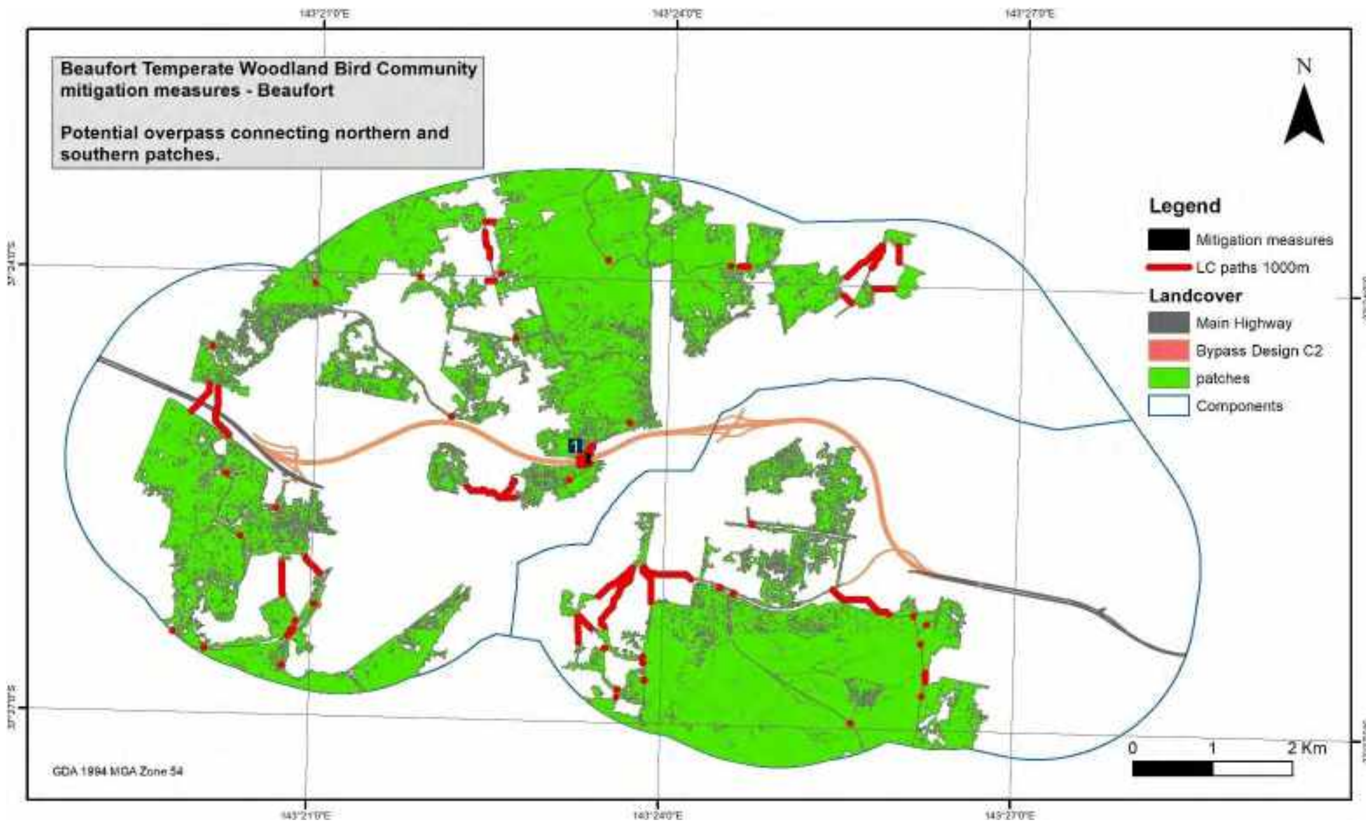
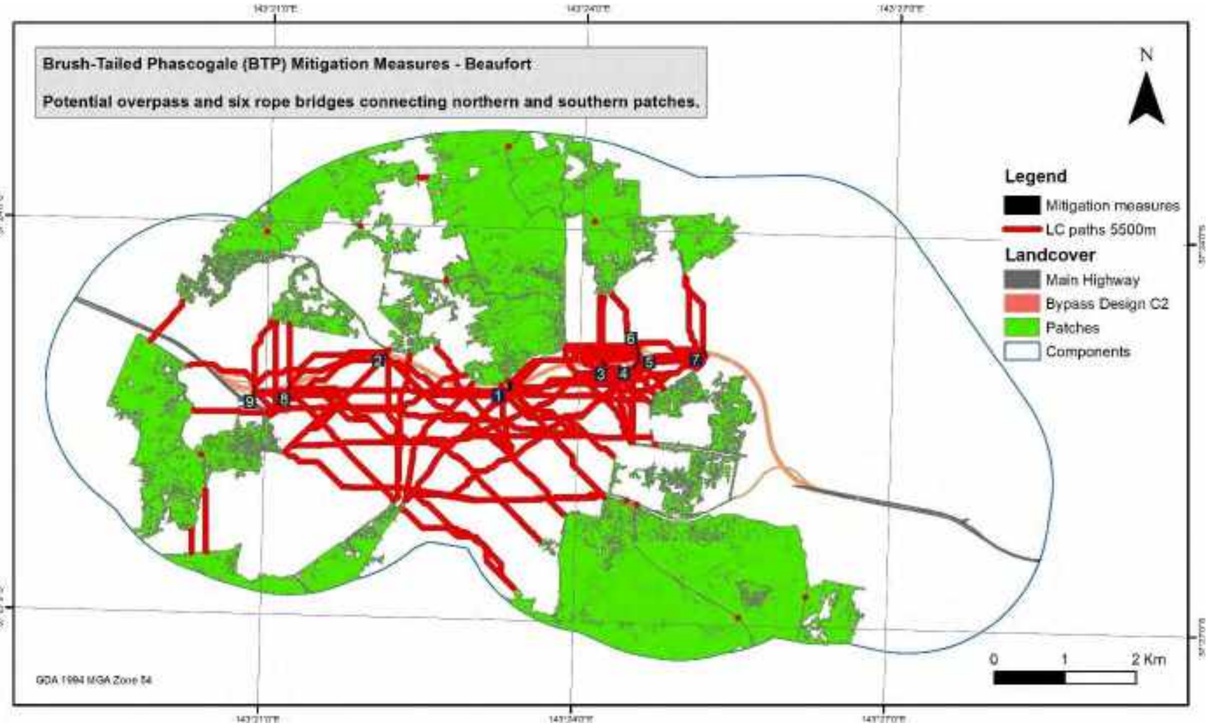


Figure 27: New least cost paths for Woodland Birds along Bypass design option C2 after the addition of the vegetated landbridge/overpass, denoted by the Number 1.

4.1.2. Brush-tailed Phascogale

Figure 28a shows the new least-cost paths due to the addition of 9 new mitigation measures to design option C2 (the preferred design option) for the Brush-tailed Phascogale. Figure 28b is a plot of the change in IIC with the addition of each new mitigation measure. IIC increased from 0.0193 to 0.0291 (41.87% increase) after adding all nine mitigation measures. The greatest increase in IIC occurred as a result of adding mitigation measure 1 (the vegetated landbridge/overpass) which increased IIC from 0.0193 to 0.0207 (7.25% increase). Additional mitigation measures increased IIC values linearly and each canopy rope bridge clearly results in continued improvements in connectivity.



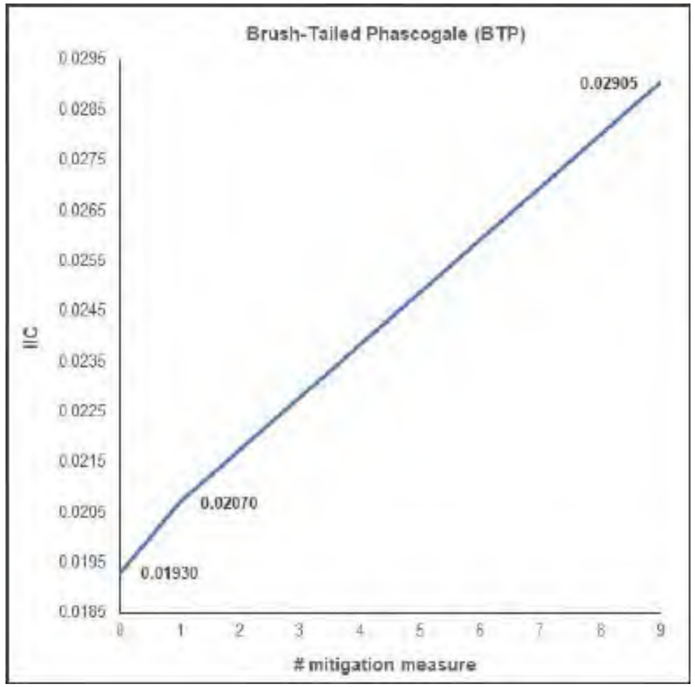


Figure 28: a) New least cost paths for Brush-tailed Phascogales along Bypass design option C2 after adding one landbridge and eight canopy rope bridges. b) IIC versus the cumulative impact of adding mitigation measures for Brush-tailed Phascogales along design option C2 ordered by mitigation measure with greatest positive impact on connectivity. The mitigation numbers on (a) and (b) correspond with each other, with mitigation measure 1 being the vegetated land bridge/overpass.

4.1.3. Echidna

Figure 29 shows the new least-cost paths added from the addition of a single land bridge. **Error! Reference source not found.**The IIC for the Echidna increased from 0.01132 to 0.01942 (71.55% percent increase). Without the mitigation measure the patches in the north would be isolated from patches in the south as the Echidna perceives the Western freeway bypass as a barrier to dispersal.

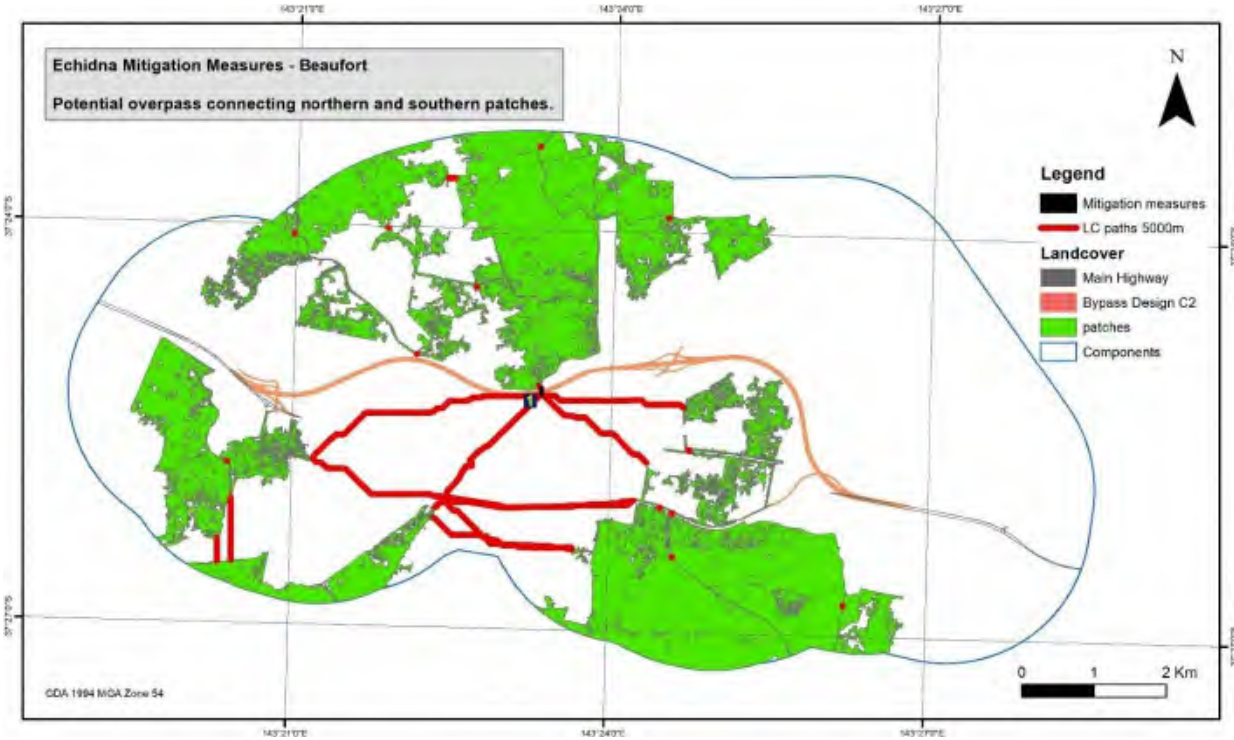


Figure 29: New least cost paths the Echidna along Bypass design option C2 ater the addition of the vegetated landbridge/overpass.

5.0 Summary and other considerations

5.1. Summary

The quantitative assessment and the interpretation of the least-cost paths and component boundaries presented in this report provide strong support for design C2 having the least impact on connectivity for the woody-dependent species. The differences between impacts from the bypass designs on the movement of the Golden Sun Moth and Growling Grass Frog are likely to be negligible and the majority of impacts for these species are likely to be from total habitat lost.

It is not feasible to evaluate the impacts of the proposed bypass on all species and the species we modelled were representative of a diverse range of dispersal behaviours and habitat choices. The modelling demonstrated that different species can perceive the degree of habitat fragmentation of the landscape in very different ways. For example, the Golden Sun Moth and Growling Grass Frog had similar interpatch dispersal distances, yet the majority of the Golden Sun Moths patches were isolated from each other, unlike the Growling Grass Frog whose habitat patches were more connected and linked through creek lines and waterways. We also found that species with comparatively longer dispersal distances, such as the Brush-tailed Phascogale, utilised scattered trees and roadside vegetation across much of the matrix, implying they have many alternative options for dispersing among patches. However, species which perceive the highway as a barrier, such as the Echidna, will be highly impacted by the bypass as it will isolate patches to the north from patches to the south.

Mitigation measures which restore connectivity across the road are critical for maintaining connectivity in the study area for species which perceive the bypass as a barrier. The mitigation modelling provided support for a land bridge being important for connecting patches to the north and south for woodland dependent species. Importantly, we found that each additional mitigation measure resulted in significant increases in connectivity for Brush-tailed Phascogales.

If we consider the study area in the context of how it contributes to habitat outside the study area, the isolation of patches in the north from the patches in the south will potentially have significant long-term consequences for regional scale connectivity.

5.2. Other considerations

The application of GAP CLoSR to the Beaufort bypass assessment provides a transparent and quantitative approach to assessing and impacts and evaluating the effectiveness of mitigation measures. However, it is important to recognise that spatial data accuracy, connectivity model type, target species and community and ecological parameterisation will all potentially affect the outcome of the modelling (Lechner, Langford, Bekessy, & Jones, 2012; Lechner & Rhodes, 2016). These impacts however, are likely to have been partly addressed through modelling a range of conservation targets with a diverse range of ecological characteristics.

Another key source of uncertainty is that our model relied on expert-based modelling of species dispersal patterns. A more rigorous approach would be to carry out field assessments. However, obtaining empirical field data is a much greater task, especially for multiple species (Compton, McGarigal, Cushman, & Gamble, 2007; Rudnick et al., 2012) and thus impractical considering the time-limitations and budget constraints of this project. It is recommended that ongoing monitoring and adaptive planning be undertaken as a precaution.

Finally, roads have a range of negative effects on wildlife which ranges from direct impacts such as road mortality to long-term impacts on genetic diversity. In this study, we only modelled the impacts on connecting habitat and not these other impacts. Therefore, the results presented in this report must be interpreted in combination with these other impacts when deciding on the final road alignment and any mitigation measures.

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7.0 Appendix

Victorian temperate woodland bird community species list.

	Common Name	Scientific Name
1	Painted Button-quail	*Turnix varia*
2	Bush Stone-curlew	*Burhinus grallarius*
3	Red-tailed Black-Cockatoo	*Calyptorhynchis banksii graptogyne*
4	Little Lorikeet	*Glossopsitta pusilla*
5	Superb Parrot	*Polytelis swainsonii*
6	Swift Parrot	*Lathamus discolor*
7	Turquoise Parrot	*Neophema pulchella*
8	Barking Owl	*Ninox connivens*
9	Brown Treecreeper	*Climacteris picumnus victoriae*
10	Speckled Warbler	*Chthonicola sagittata*
11	Western Gerygone	*Gerygone fusca*
12	Regent Honeyeater	*Xanthomyza phrygia*
13	Yellow-tufted Honeyeater	*Lichenostomus melanops meltoni*
14	Fuscous Honeyeater	*Lichenostomus fuscus*
15	Black-chinned Honeyeater	*Melithreptus gularis*
16	Brown-headed Honeyeater	*Melithreptus brevirostris*
17	Painted Honeyeater	*Grantiella picta*
18	Jacky Winter	*Microeca fascinans*
19	Red-capped Robin	*Petroica goodenovii*
20	Hooded Robin	*Melanodryas cucullata*
21	Grey-crowned Babbler	*Pomatostomus temporalis*
22	Ground Cuckoo-shrike	*Coracina maxima*
23	Apostlebird	*Struthidea cinerea*
24	Diamond Firetail	*Stagonopleura guttata*

APPENDIX N

CUMULATIVE IMPACT ANALYSIS

BEAUFORT BYPASS EES – CUMULATIVE IMPACTS

Prepared by Nic McCaffrey and Danelle Scicluna. Updated on 11 November 2020.

N1 OVERVIEW

N1.1 SCOPE

The aim of this task was to:

- update the Cumulative Impact Assessment for the Beaufort Bypass (hereafter; *the Project*) following the conclave meeting with Regional Roads Victoria (RRV) and DELWP
- undertake GIS analysis of the Cumulative Impact Assessment
- summarise the implications of the Cumulative Impact Assessment; and
- incorporate this assessment into the Beaufort Bypass flora and fauna impact assessment report as part of the Environment Effects Statement (EES).

N1.2 SUMMARY

A cumulative impact assessment was undertaken at several scales including the state of Victoria and two bioregions (refer to Table N.1). For some species and communities which are likely to be affected by the Beaufort Bypass, the combined impact of the bypass with other projects within a 20 km radius may result in the potential for minor cumulative impacts. Such potential impacts are relevant to Yarra Gum, Brolga, Brown Toadlet, Growling Grass Frog, Golden Sun Moth, Little Galaxias and native vegetation. Due to the negligible difference in impact area across the four alignments (especially at a broader scale), it appears unlikely the cumulative impact will be significant. However, there are potential impacts to local populations of those species, which is addressed in the main report. To minimise potential cumulative impacts, the alignment with the smallest impacts should be considered along with measures to avoid, minimise and mitigate those impacts.

N1.2.1 SCOPING REQUIREMENT OBJECTIVE

The objective specific to cumulative effects under the Scoping Requirements for the Beaufort Bypass project under the Environment Effects Act 1978 ((DELWP 2016) Scoping Requirements) is:

> *"Assessment of the cumulative effect on biodiversity values and extent of remaining remnant vegetation on a regional scale and the effectiveness of the proposed mitigation measures in addressing regional ecological effects"*.

As there was no definition of 'regional scale' or detailed guidance on how to assess cumulative impacts, a proposed approach was discussed with DELWP Impact Assessment Unit (IAU) and regional staff on 20 July 2017. Further consultation with DELWP IAU and regional staff was undertaken on 30 January 2019 with RRV staff. During both of these consultations, comments on the approach and method were discussed, resulting in this impacts assessment.

N1.3 LEGISLATIVE CONTEXT

Cumulative Impact Assessments (CIAs) aim to consider the effects of multiple actions or impacts on the environment (Minerals Council of Australia 2015 and are undertaken to ensure the incremental effects of multiple actions in a given area are considered and assessed holistically for their combined impact (Hegmann et al. 1999).

Accounting for cumulative impacts on biodiversity values is not commonplace in road projects in Victoria and its consideration in an EES in Victoria has typically applied to wind farms. In the Ministerial Guidelines for Assessment of Environmental Effects under the *Environment Effects Act 1978,* cumulative effects are described as *"…where a project, in combination with one or more other proposed projects, or existing activities in an area, may have an overall significant effect on the same environmental asset"* (DSE 2006). In some circumstances, an EES can identify the potential for cumulative effects but due to a number of constraining factors on quantitative assessments, often only qualitative assessments may be practicable (DSE 2006). Perhaps the most recent significant example of cumulative impacts in Victoria is the Melbourne Strategic Assessment (MSA) (DSE 2009), which aimed to *"deliver improved biodiversity outcomes through early consideration and mitigation of the cumulative impacts of Melbourne's development"*.

The treatment of cumulative impacts under the previous vegetation policy *Permitted clearing of native vegetation* (DEPI 2013a), which was referenced in the scoping requirements, states that they are implicit within the Location Risk mapping including the remaining area of occupancy of habitat for a species and the amount of vegetation which is proposed to be removed. It is also one of the decision guidelines under high-risk based pathway applications in that document. The latest change to native vegetation clearing policy in Victoria named *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017a) states that *'native vegetation will be protected and managed through strategic planning……allows for indirect and cumulative impacts of use or development on native vegetation to be understood and addressed'.*

There is no specific mention of cumulative impacts under Victoria's *Flora and Fauna Guarantee Act 1988* (FFG Act) or the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). However, the EPBC Act requires the Minister to give regard to the 'relevant impacts' but the case law around cumulative impacts under the EPBC Act remains unsettled (Minerals Council of Australia 2015). In an independent review of the EPBC Act, a recurring theme in public comment was the Act's perceived failure to adequately manage cumulative environmental impacts (Hawke 2009).

N1.4 BACKGROUND

In addition to the Beaufort Bypass, there are several other road and major infrastructure projects within a 20 km radius which have had, or will likely have, impacts on native vegetation and habitat within the past 5 years. These include sections of the Western Highway Upgrade Project and a wind farm. Examples of other projects are listed below with their current status:

- Stage 1 – Burrumbeet to Beaufort (complete)
- Stage 2A – Beaufort to Buangor (complete)
- Stage 2B – Buangor to Ararat & Buangor Bypass (first section of stage 2B) (completed); and
- Stockyard Hill wind farm (planning complete, project commenced)

The impacts from these separate projects do not occur in isolation. Small amounts of impacted habitat in each stage could add up to a significant impact on threatened species or communities. Therefore, the CIA should identify the potential for cumulative impacts on a local and regional scale from the project in conjunction with other sections of the Western Highway duplication and other existing and proposed projects that may give rise to an overall significant impact on the same environmental asset or value.

The duplication of the Western Highway between Beaufort and Ararat resulted in a significant amount of large old tree and native vegetation removal, all of which was appropriately offset in accordance with statutory approvals. However, the project was the subject of intense public scrutiny (VicRoads 2016) and a Supreme Court challenge. There are also ongoing concerns with areas of cultural heritage being identified by the wider community.

Key issues identified in the Beaufort Bypass EES Scoping Requirements (DELWP 2016) include:

- *Loss or degradation of native vegetation and habitat for threatened species and communities, including those listed under the FFG Act and DELWP Advisory List.*
- *Degradation to local and downstream ecology of aquatic environments.*
- *The impact of the road bypass on wildlife movement within continuous vegetation linkages.*

With these issues in mind, the CIA aimed to focus on cumulative impacts to the Project that may actually be a contributing factor.

N1.4.1 APPROACH

As there is no specific guidance on how to undertake a CIA under an EES or other relevant state or federal environmental legislation, the approach to CIA for this Project has been developed as 'fit for purpose'. CIAs are not intended to be prescriptive and need to be applied at different scales to different projects (Harriman & Noble 2008; Minerals Council of Australia 2015). Development of the approach has involved consultation with RRV and DELWP staff from the IAU and regional officers.

Based on (Hegmann et al. 1999), a cumulative effects assessment is expected to:

- *assess effects over a larger (i.e., "regional") area that may cross jurisdictional boundaries*
- *assess effects during a longer period of time into the past and future*
- *consider effects on Valued Ecosystem Components (VECs) due to interactions with other actions, and not just the effects of the single action under review*
- *include other past, existing and future (e.g., reasonably foreseeable) actions; and*
- *evaluate significance in consideration of other than just local, direct effects.*

There are two main approaches of CIA based on strategic and non-strategic (environmental impact assessment (EIA)-driven) characteristics (Harriman & Noble 2008). These can be further broken into two groups based on single or multiple regions or projects. This Project best aligns with the Type II EIA-driven approach in (Harriman & Noble 2008) which is characterised by cumulative effects assessment of multiple projects.

With these considerations, the scoping of this CIA has been developed using several guidance documents (Harriman & Noble 2008; Hegmann et al. 1999; IFC 2013; Minerals Council of Australia 2015; Whitehead, Kujala & Wintle 2016). See Table N.1 below for the CIA scope and definitions.

Table N.1 Cumulative Impact Assessment scope and definitions

ASPECT	DEFINITION
Regional issues of concern	— Loss or degradation of large old trees, native vegetation and habitat for threatened species and communities — The impact of the road bypass on wildlife movement. (DELWP 2016; VicRoads 2016)
Project Disturbance Area (PDA)	The extent of the proposed Beaufort Bypass for each of the alignment options. This includes the area of proposed disturbance associated with the construction of a freeway and associated infrastructure for the construction and maintenance of a freeway.
Spatial boundary	The boundary of the cumulative impacts should consider the 'zone of influence', that is, the area beyond which an effect becomes trivial or insignificant (Minerals Council of Australia 2015). As this requires reference to regional distributions, home ranges, dispersal movements, this could become a very detailed exercise for multiple species. As such, a nominal 20km buffer area of the PDA was chosen primarily as it covers the broader impacts of other freeway sections that occur in the same bioregions as the Beaufort Bypass; the Victorian Volcanic Plain (VVP) and Central Victorian Uplands (CVU). This is the approximate area from Burrumbeet to Buangor. Also, this area is likely to cover the majority of the Valued Ecosystem Components (VECs) in the PDA when considering distribution, dispersal and home ranges for threatened species and communities. However, to ensure that all impacts on threatened species are considered, the cumulative impacts are also assessed across the two bioregions and the state. The different spatial scales covered are: — Cumulative Impact Assessment Area (CIAA) - 20km buffer area of the PDA covering Burrumbeet to Buangor — Victorian Volcanic Plain (VVP) — Central Victorian Uplands (CVU) — State-wide (Victoria).
Temporal boundary	Parts of the Western Highway and other projects recently constructed (within the last 5-7 years) and planned for construction with committed funding or planning studies underway (for the next 5 years).
Valued Ecosystem Components (VEC)	The determination of VECs or ecological values for consideration of cumulative impacts has been undertaken to prioritise potential impacts on key values in a regional context. These are mostly threatened species or communities. A short list of priority species and communities is useful to consider where they may be critically affected by the Project (IFC 2013). Further detail is provided below in the methods section.
Initial (high level) identification of potential impacts and effects	Potential significant cumulative impacts on VECs from the interaction of the Project and other nearby projects are assessed in a spatial context. Additionally, the applicability of each of the identified VECs in alignment decision making has been briefly evaluated from a qualitative perspective, which is useful in cases where it appears that a spatially explicit method may not have identified the significance of the potential impacts. If no significant cumulative impacts are likely this is stated, however further analysis of the impacts in the study area are provided in the relevant section. If it appears likely that cumulative impacts may occur, recommendations of measures to reduce regional effects on biodiversity, and assess their effectiveness, are provided.

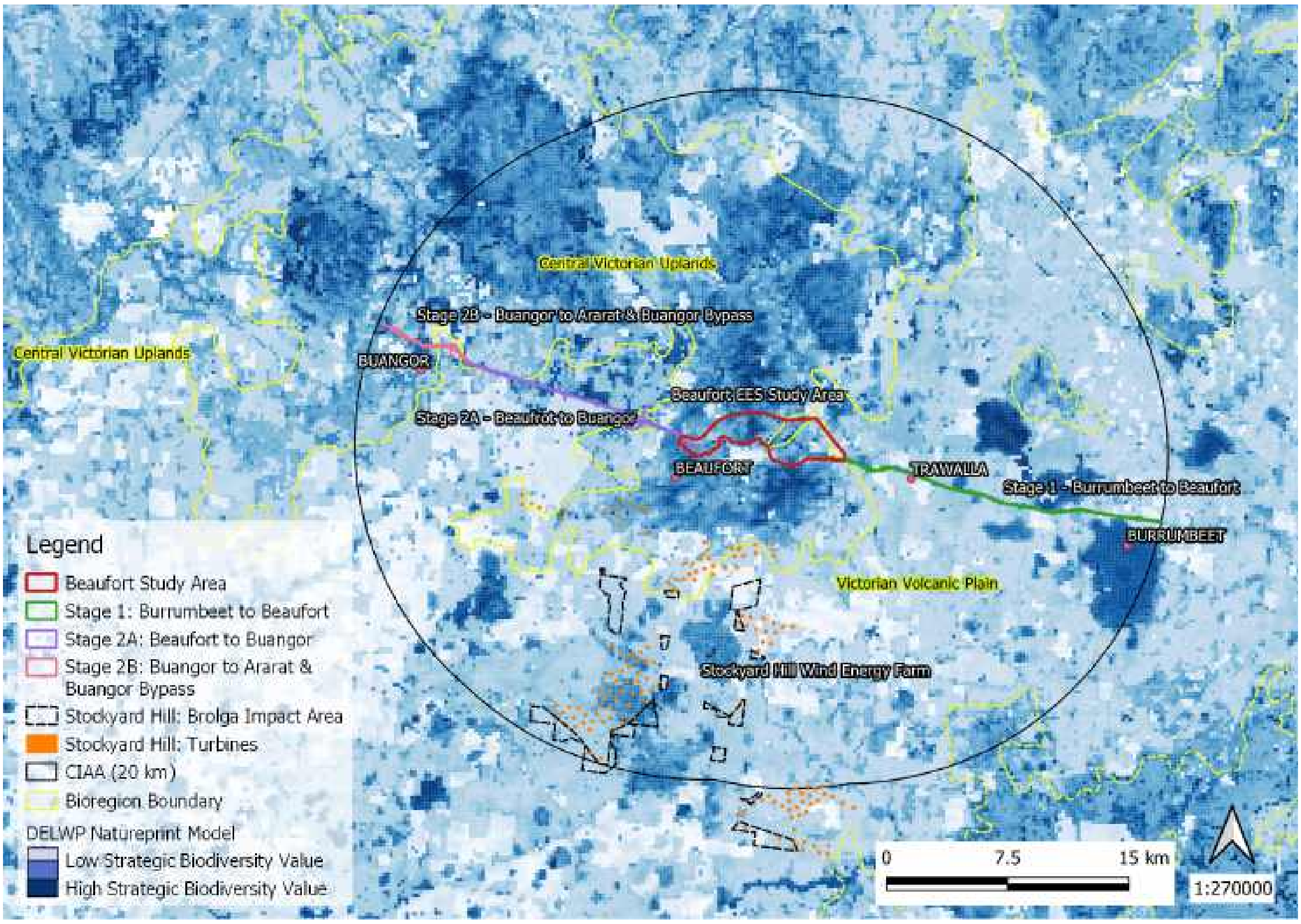


Figure N.1 Proposed spatial boundary for cumulative impacts

N1.5 METHODS

N1.5.1 DETERMINATION OF VALUED ECOSYSTEM COMPONENTS FOR CUMULATIVE IMPACT ASSESSMENT

The determination of ecological values for consideration of cumulative impacts has been undertaken to prioritise potential impacts on key values in a regional context. A short list of priority species and communities is useful to consider where they may be critically affected by the project. A short evaluation of species and communities was undertaken, with consideration of the following points when assessing the requirement for their inclusion in this CIA:

- species or communities recorded or likely to be present in the study area
- species or communities recorded or likely to be in the CIAA (within 20 km from the Project)
- availability of DELWP modelled data in the CIAA
- conservation status. Higher emphasis is placed on species which are listed under EPBC Act and FFG Act and are threatened under DELWP Advisory Lists, with lower emphasis on species or communities listed as rare, data deficient or near threatened.

N1.5.2 SPATIAL ANALYSIS OF CUMULATIVE IMPACTS

A spatial analysis of potential cumulative impacts has been undertaken for several priority species and communities. The analysis was undertaken by calculating the area of potential habitat within each project footprint. In the case of the Beaufort Bypass, this involved calculating the potential impact area across all four alignment options utilising mapped habitat for each species or community. Note that the area used for alignment C2 was the nominal preliminary construction footprint, which does not include areas needed for creek realignments that are used for the preferred alignment assessment impacts. Doing so allowed for a fair comparison between the four alignment options.

For the other projects, the potential impact area was calculated using Species Distribution Models (DELWP 2017b). In the same way, analysis was also undertaken using three DELWP datasets; Native Vegetation (NV2005_EVCBCS), NaturePrint and Location Map.

The potential impact areas across all five projects were tallied to provide a total cumulative impact area for each alignment. This area was then calculated as a percentage of the total amount of habitat modelled to occur within four different habitat extents; State of Victoria, Central Victorian Uplands and Victorian Volcanic Plain Bioregions and the CIAA (20 km buffer).

This conservative approach provides a “worst case” scenario of potential cumulative impacts to threatened species and communities as a result of multiple projects within the region and allows for a direct comparison between the Beaufort Bypass alignment options.

Projects included in the assessment are:

- Stage 1 – Burrumbeet to Beaufort (complete)
- Stage 2A – Beaufort to Buangor (complete)
- Stage 2B – Buangor to Ararat & Buangor Bypass (first section of stage 2B) (completed)
- Stockyard Hill wind farm (planning complete, project commenced).

Whilst other projects in the CIAA exist, such as minor planning applications to remove native vegetation, no other major projects, commensurate with the scale of major projects above, are occurring within the CIAA. Therefore no other projects have been considered.

N1.5.3 DATA SOURCES

A combination of publicly available data sources from DELWP and other agencies were used as a basis for areas of impacts on previous sections of the Western Highway. Previous impact assessment reports have been used for a preliminary assessment as an approximate measure of impact.

RRV have provided WSP with ‘as built’ alignments which have been will be used to better reflect the area of actual impacts. Note that for the Stage 2B – Buangor to Ararat & Buangor Bypass project, the construction footprint was drawn using recent aerial photography of the area compared to historical photos (e.g. 2015).

N1.5.4 LIMITATIONS

There is no known threshold to estimate when a cumulative impact may occur or what an unacceptable change or impact on a population is. Therefore, there is discussion of likely or unlikely cumulative impacts as they relate to each VEC discussed.

N2 RESULTS

N2.1 ECOLOGICAL IMPACTS BASED ON EXISTING LITERATURE IN CUMULATIVE IMPACT AREA

The following table provides a summary of impacts based on existing previous impact assessment reports. This helps determine if the impacts of the proposed Beaufort Bypass, in combination with impacts from Stockyard Hill Windfarm and the other sections of the Western Highway, are expected to have a cumulative impact on certain ecological values. The CIA is provided individually for each priority species and communities in the following pages.

Note that a summary of ecological impacts was not provided for Stage 2B – Buangor to Ararat & Buangor Bypass as it was not possible to extract the required information for the specific section of the project located within the CIAA.

Table N.2 Summary of ecological impacts based on existing literature in Cumulative Impact Area

ECOLOGICAL COMPONENT	STAGE 1 - BURRUMBEET TO BEAUFORT (ECOLOGY PARTNERS PTY LTD 2010)	STAGE 2A - BEAUFORT TO BUANGOR (VICROADS 2016)	STOCKYARD HILL WINDFARM (ECOLOGY & HERITAGE PARTNERS 2016)
EVC	8.97 to 14.31 ha depending on final alignment that was selected (information not available)	110 ha of EVCs	32.657 ha of native vegetation
Large Trees	77 to 101 depending on final alignment that was selected (information not available)	1581	25 (although unknown how many are large and how many are small)
Threatened Ecological Communities	FFG listed Western (Basalt) Plains Grassland	11.14 ha Grassy Eucalypt Woodland (EPBC Act listed) and 5.25 ha Natural Temperate Grassland (EPBC Act listed)	0.06 ha Natural Temperate Grassland of the Victoria Volcanic Plain (CR), and the equivalent FFG listed Western (Basalt) Plains Grassland.
Listed Flora Species	None	1 Spiny Rice Flower (CR, L), 1 Golden Cow Slips, 12 Emerald-lip Greenhood and 8 Yarra Gums	White Sunray (EN, L) Plump Swamp Wallaby-grass (L) and Golden Cowslips have the potential to be impacted (although in some cases impacts may be avoided/minimised through detailed design and micro-siting)
Fauna habitat	None	31.56 ha of Golden Sun Moth (CR, L) habitat, Dwarf Galaxias (VU, L), Brown Toadlet and Brown Treecreeper, quantity unknown but impacts expected to be minor with appropriate mitigation measures	Striped Legless Lizard (VU, L), Golden Sun Moth (CR, L) and Growling Grass Frog (VU, L) (potential)

N2.2 DETERMINATION OF VALUED ECOSYSTEM COMPONENTS

The three tables below evaluate the species and communities that were considered for inclusion in this CIA. All species with a moderate or higher likelihood have been assessed.

Table N.3 Flora species rationale for Cumulative Impact Assessment

COMMON NAME	SCIENTIFIC NAME	CONSERVATION STATUS	RATIONALE FOR CUMULATIVE ASSESSMENT
Ben Major Grevillea	*Grevillea floripendula*	VU vu L	**Recommended** Present in the study area. Although not detected or considered likely to occur in previous assessments for Stage 1 or Stage 2A duplications, some modelled habitat is present and it is an EPBC and FFG Act species.
Emerald-lip Greenhood	*Pterostylis smaragdyna*	r	**Recommended** Present in the study area. Found in previous assessments for Stage 1 duplication and some modelled habitat is present in the cumulative impact study area.
Floodplain Fireweed	*Senecio campylocarpus*	r	**Not recommended** Present in the study area. Not found in previous assessments for Stage 1 or Stage 2A duplications. As these are new records for the region, there is no modelled habitat present.
Matted Flax-lily	*Dianella amoena*	EN en L	**Recommended** Present in the study area. Although not detected or considered likely to occur in previous assessments for Stage 1 or Stage 2A duplications, some modelled habitat is present and it is an EPBC and FFG Act species.
Ornate Pink Fingers	*Caladenia ornata*	VU vu L	**Not recommended** Present in the study area. Not found in previous assessments for Stage 1 or Stage 2A duplications. As these are new records for the region, there is no modelled habitat present.
Pale-flower Cranesbill	*Geranium sp. 3*	r	**Recommended** Present in the study area. Although not found in previous assessments for Stage 1 or Stage 2A duplications, some modelled habitat is present.
River Swamp Wallaby-grass	*Amphibromus fluitans*	VU X	**Not recommended** Present in the study area. Not found in previous assessments for Stage 1 or Stage 2A duplications. As this species is not on DELWP's advisory list, there is no modelled data available.
Rosemary Grevillea	*Grevillea rosmarinifolia*	P # r	**Not recommended** Not found in previous assessments for Stage 1 or Stage 2A duplications and there is no modelled data available.

COMMON NAME	SCIENTIFIC NAME	CONSERVATION STATUS	RATIONALE FOR CUMULATIVE ASSESSMENT
Rough Wattle	*Acacia aspera subsp. parviceps*	r	**Recommended** Not located during 2015-2016-2017 surveys but considered moderately likely to occur in the study area. Although not found in previous assessments for Stage 1 or Stage 2A duplications, some modelled habitat is present.
Yarra Gum	*Eucalyptus yarraensis*	r X	**Recommended** Present in the study area. Found in previous assessments for Stage 1 duplication and some modelled habitat is present in the cumulative impact study area.

EPBC Act status: *EN = Endangered, VU = Vulnerable;* ***FFG Act status:*** *L = listed as threatened, X = Rejected for listing as threatened;* ***Victorian Advisory List Status:*** *en = Endangered, vu = Vulnerable, r = rare, P = All infraspecific taxa included in Advisory List, # = native but some strains may be alien*

Table N.4 Fauna species rationale for Cumulative Impact Assessment

COMMON NAME	SCIENTIFIC NAME	CONSERVATION STATUS	RATIONALE FOR CUMULATIVE ASSESSMENT
Australasian Shoveler	*Anas rhynchotis*	vu	**Not recommended** Likely to occur in the study area. Not recorded in previous assessments for Stage 1 or Stage 2A duplications.
Blue-billed Duck	*Oxyura australis*	en L	**Not recommended** Likely to occur in the study area. Not recorded in previous assessments for Stage 1 or Stage 2A duplications.
Brolga	*Grus rubicunda*	vu L	**Recommended** Present in the study area. Although not recorded in previous assessments for Stage 1 or Stage 2A duplications, it was recorded at Stockyard Hill and some modelled habitat is present in the cumulative impact study area.
Brown Toadlet	*Pseudophryne bibronii*	en L	**Recommended** Present in the study area. Found in previous assessments in the study area, Stage 1 and some modelled habitat is present in the CIAA.
Brown Treecreeper (south-eastern ssp.)	*Climacteris picumnus victoriae*	nt	**Not recommended** Present in the study area however cannot be assessed as this species is listed as ‘near threatened’ on DELWP’s advisory list and there is no modelled habitat present for ‘near threatened’ listed species.
Brush-tailed Phascogale	*Phascogale tapoatafa*	vu L	**Recommended** Present in the study area. Although not found in previous assessments for Stage 1 or Stage 2A duplications, some modelled habitat is present in the cumulative impact study area.
Diamond Firetail	*Stagonopleura guttata*	nt L	**Not recommended** Possible in the study area. Not found in previous assessments for Stage 1 or Stage 2A duplications.
Eastern Great Egret	*Ardea modesta*	vu L	**Not recommended** Likely in the study area. Not found in previous assessments for Stage 1 or Stage 2A duplications.
Eastern Snake-necked Tortoise	*Chelodina longicollis*	dd	**Not recommended** Present in the study area. Not found in previous assessments for Stage 1 or Stage 2A duplications and no modelled layer available.

COMMON NAME	SCIENTIFIC NAME	CONSERVATION STATUS	RATIONALE FOR CUMULATIVE ASSESSMENT
Emu	*Dromaius novaehollandiae*	nt	**Not recommended** Likely in the study area. Not found in previous assessments for Stage 1 or Stage 2A duplications and no modelled layer available.
Golden Sun Moth	*Synemon plana*	CR cr L	**Recommended** Present in the study area. Found in previous assessments in the study area, Stage 2A and some modelled habitat is present in the CIAA.
Growling Grass Frog	*Litoria raniformis*	VU en L	**Recommended** Present in the study area. Found in previous assessments in the study area and some modelled habitat is present in the CIAA.
Hardhead	*Aythya australis*	vu	**Not recommended** Likely in the study area. Not found in previous assessments for Stage 1 or Stage 2A duplications.
Little Galaxias	*Galaxiella toourtkoourt*	VU en L	**Recommended** Likely to occur in the study area. Found in previous assessments in the study area, in Stage 2A however modelled habitat is very restricted in the CIAA.
Painted Honeyeater	*Grantiella picta*	VU vu L	**Not recommended** Possible in the study area. Not found in previous assessments for Stage 1 or Stage 2A duplications.
Powerful Owl	*Ninox strenua*	vu L	**Recommended** Likely to occur in the study area. Although not found in previous assessments for Stage 1 or Stage 2A duplications, some modelled habitat is present in the cumulative impact study area.
Squirrel Glider	*Petaurus norfolcensis*	en L	**Not recommended** Present in the study area. Although not recorded in previous assessments for Stage 1 or Stage 2A duplications, no modelled data available for region.

EPBC Act status: *CR = Critically Endangered, VU = Vulnerable,* ***FFG Act status:*** *L = listed as threatened,* ***Victorian Advisory List status:*** *cr = Critically Endangered, en = Endangered, vu = Vulnerable, nt = near threatened, dd = Data Deficient*

Table N.5 Modelled datasets and ecological communities - rationale for cumulative impact assessment

NAME	CONSERVATION STATUS	RATIONALE FOR CUMULATIVE ASSESSMENT
DELWP modelled datasets		
Native vegetation (NV2005_EVCBCS)	n/a	**Recommended** Modelled native vegetation dataset delineates the Bioregional Conservation Status of EVCs. This dataset can provide an indication of the area of native vegetation affected by the Project.
NaturePrint (NaturePrint v4.0 Strategic Biodiversity Values)	n/a	**Recommended** This dataset combines information on important areas for threatened flora and fauna, levels of depletion, connectivity, vegetation types and condition to provide a view of relative biodiversity importance of all parts of the Victorian landscape. This provides a spatially explicit view of importance of biodiversity. A limitation of using this layer in the CIA is that it covers all areas, not just areas of native vevegtation.
Location map (Native Vegetation Regulation Location (2017)	n/a	**Not recommended** This dataset provides three categories to indicate the potential risk to biodiversity for the purposes in the native vegetation removal regulations. Categories are calculated from a set of spatial models describing the importance of suitable habitat within the current extent of native vegetation for many rare or threatened species, and the location of an endangered Ecological Vegetation Class or sensitive coast or wetland area. However, as it is designed for input into determining the assessment pathway of an application for a permit to remove native vegetation, it is not appropriate to use for this purpose.
Threatened ecological communities		
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered under EPBC Act	**Not recommended** Not present in the study area.
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered under EPBC Act	**Not recommended** Not present in the study area.
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered under EPBC Act	**Recommended** Present in the study area. Although not found in previous assessments for Stage 1 or Stage 2A duplications, this may be due to the relatively recent listing and some modelled habitat is present and it is an EPBC and FFG Act community.
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered under EPBC Act	**Not recommended** Present in the study area. Not found in previous assessments for Stage 1 or Stage 2A duplications and no modelled layer available.

NAME	CONSERVATION STATUS	RATIONALE FOR CUMULATIVE ASSESSMENT
Victorian Temperate Woodland Bird Community	Threatened under FFG Act	**Recommended** Present in the study area. Although not found in previous assessments for Stage 1 or Stage 2A duplications, is was deemed necessary to include in the CIA because there is the potential for VTWBC to occur. A limitation of assessing this community is that there is no available VTWBC layer.

N2.3 BEN MAJOR GREVILLEA, GREVILLEA FLORIPENDULA

Table N.6 Cumulative Impact Assessment on Ben Major Grevillea, *Grevillea floripendula*

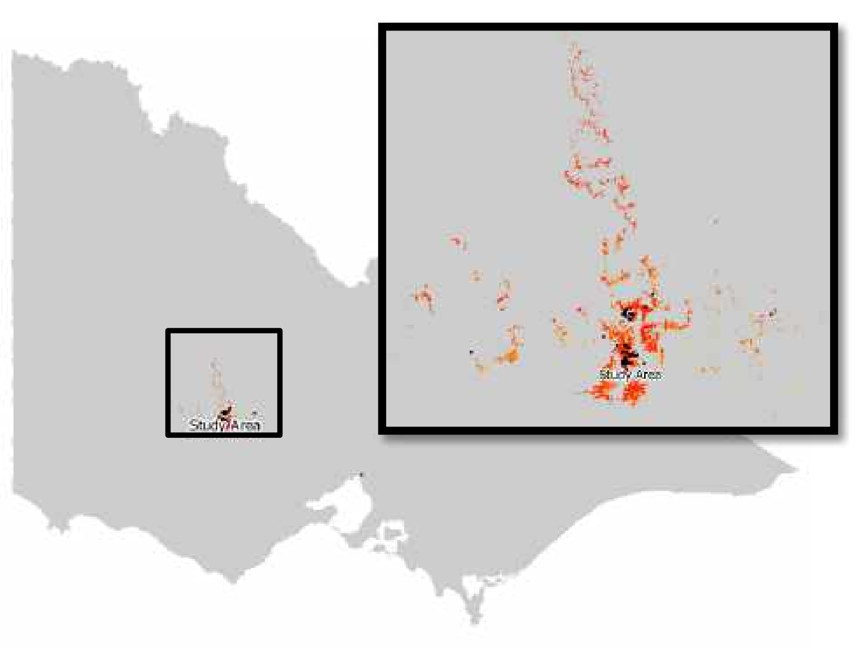
BEAUFORT ALIGNMENT OPTION	POTENTIAL IMPACT AREA (HA) *					FOOTPRINT AREA (HA)			CUMULATIVE IMPACT (%) RELATIVE TO HABITAT EXTENT (HA)**			
	BEAUFORT BYPASS	STAGE 2A BEAUFORT TO BUANGOR	STAGE 1 BURRUMBEET TO BEAUFORT	STAGE 2B BUANGOR TO ARARAT & BUANGOR BYPASS	STOCKYARD HILL	IN THE CVU ^	IN THE VVP ^^	TOTAL CUMULATIVE IMPACT AREA	VICTORIA (19,939.01 HA)	CVU BIOREGION (12,887.40 HA)	VVP BIOREGION (785.92 HA)	CIAA (20KM BUFFER) (13,404.28 HA)
A0	6.83 ha	10.82 ha	0 ha	0 ha The species distribution model did not intersect with this project.	9.38 ha	26.46 ha	0.57 ha	**27.03 ha**	0.14%	0.21%	0.07%	0.2%
A1	6.82 ha					26.45 ha	0.57 ha	**27.02 ha**	0.14%	0.21%	0.07%	0.2%
C0	2.12 ha					21.74 ha	0.57 ha	**22.31 ha**	0.11%	0.17%	0.07%	0.17%
C2	2.12 ha					21.74 ha	0.57 ha	**22.31 ha**	0.11%	0.17%	0.07%	0.17%

** Potential impact areas within the Beaufort Bypass Alignment options were determined from WSP mapped habitat (high and medium quality) for the species. Impact areas for the other four projects were determined using the Ben Major Grevillea species distribution model (DELWP 2017b)*

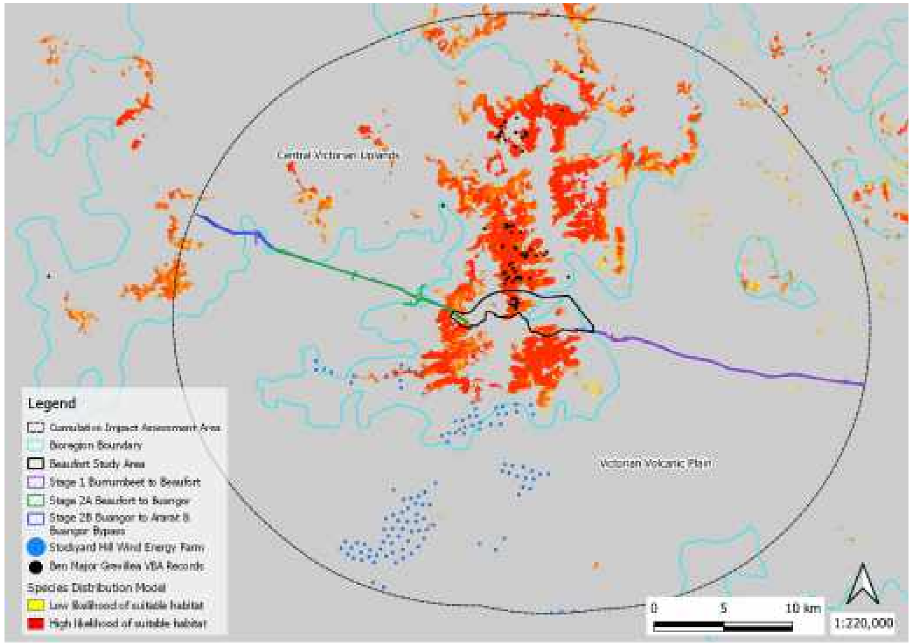
*** All areas determined from Ben Major Grevillea species distribution model (DELWP 2017b)*

^ *Central Victorian Uplands Bioregion*

^^ *Victorian Volcanic Plains Bioregion*



VBA Ben Major Grevillea records and DELWP modelled distribution across Vic



VBA Ben Major Grevillea records and DELWP modelled distribution in broader 20km local area

SUMMARY OF RESULTS

The total amount of potential cumulative impact to Ben Major Grevillea habitat ranges between 22.31 ha and 27.03 ha. The northern alignments (A0 and A1) are anticipated to have a larger impact on Ben Major Grevillea habitat than the southern alignments (C0 and C2) given that they intersect a larger portion of Camp Hill State Forest. The majority of this impact is located within the CVU bioregion.

Whist the species distribution model did not intersect the Stage 1 or Stage 2B sections of the Western Highway, it is likely that the Stage 2A (Beaufort to Buangor) alignment resulted in some modelled habitat loss with further potential impacts possible as a result of the Stockyard Hill Windfarm. However, there are no known locations of Ben Major Grevillea in those areas and it is likely the modelled dataset is an overestimation.

The total cumulative impact areas from all projects in the CIAA (within a 20km buffer) comprises 0.2% of the modelled habitat for both A alignments and 0.17% for the C alignments.

APPLICABILITY OF THIS SPECIES IN ALIGNMENT DECISION MAKING

Whilst the A alignments have slightly higher potential impact than the C alignments, it appears unlikely that a significant cumulative impact on Ben Major Grevillea will occur as a result of other projects. Additionally, the project is not expected to remove any known populations or individuals of Ben Major Grevillea.

N2.4 EMERALD-LIP GREENHOOD, PTEROSTYLIS SMARAGDYNA

Table N.7 Cumulative Impact Assessment on Emerald-lip Greenhood, *Pterostylis smaragdyna*

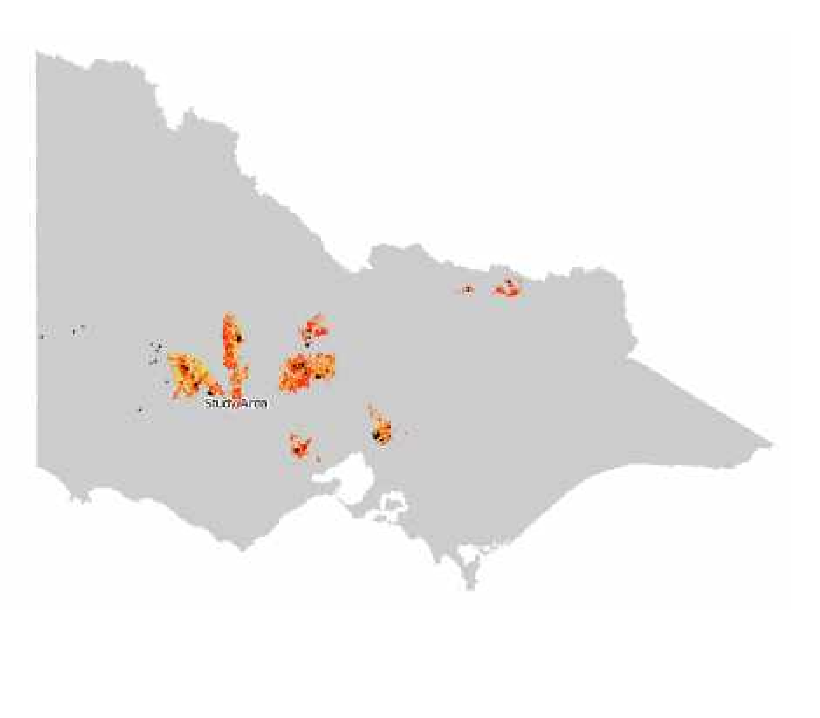
BEAUFORT ALIGNMENT OPTION	POTENTIAL IMPACT AREA (HA) *					FOOTPRINT AREA (HA)			CUMULATIVE IMPACT (%) RELATIVE TO HABITAT EXTENT (HA)**			
	BEAUFORT BYPASS	STAGE 2A BEAUFORT TO BUANGOR	STAGE 1 BURRUMBEET TO BEAUFORT	STAGE 2B BUANGOR TO ARARAT & BUANGOR BYPASS	STOCKYARD HILL	IN THE CVU ^	IN THE VVP ^^	TOTAL CUMULATIVE IMPACT AREA	VICTORIA (461,949.41 HA)	CVU BIOREGION (86,006.43 HA)	VVP BIOREGION (14,373.64 HA)	CIAA (20KM BUFFER) (29,333.07 HA)
A0	11.20 ha	25.47 ha	6.28 ha	0 ha The species distribution model did not intersect with this project.	31.53 ha	74.48 ha	0 ha	**74.48 ha**	0.02%	0.09%	0%	0.25%
A1	11.19 ha					74.48 ha	0 ha	**74.48 ha**	0.02%	0.09%	0%	0.25%
C0	11.78 ha					75.06 ha	0 ha	**75.06 ha**	0.02%	0.09%	0%	0.26%
C2	9.61 ha					72.89 ha	0 ha	**72.89 ha**	0.02%	0.08%	0%	0.25%

** Potential impact areas within the Beaufort Bypass Alignment options were determined from WSP mapped habitat for the species. Impact areas for the other four projects were determined using the Emerald-lip Greenhood species distribution model (DELWP 2017b)*

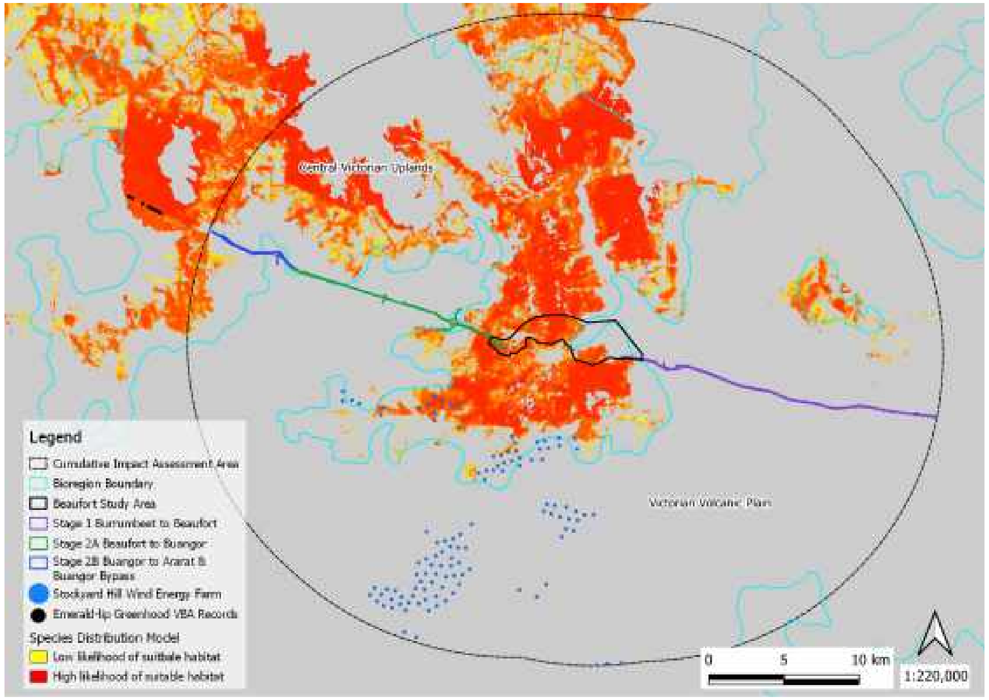
*** All areas determined from Emerald-lip Greenhood species distribution model (DELWP 2017b)*

^ Central Victorian Uplands Bioregion

^^ Victorian Volcanic Plains Bioregion



VBA Emerald-Lip Greenhood records and DELWP modelled distribution across Vic



VBA Emerald-Lip Greenhood records and DELWP modelled distribution in broader 20km local area

SUMMARY OF RESULTS

The total amount of potential cumulative impact to Emerald-Lip Greenhood habitat ranges between 72.89 and 75.06 ha with alignment C0 having slightly higher impact on Emerald-Lip Greenhood habitat (0.26%) than the other three alignments (equal 0.25%). There were 12 Emerald-Lip Greenhood affected by the Stage 2A Western Highway project but none affected by the Beaufort Bypass.

APPLICABILITY OF THIS SPECIES IN ALIGNMENT DECISION MAKING

Whilst C0 alignment has slightly higher potential impact than the all other alignments, it appears unlikely that a significant cumulative impact on Emerald-Lip Greenhood will occur as a result of other projects. Additionally, the project is not expected to remove any known populations or individuals of Emerald-Lip Greenhood.

N2.5 MATTED FLAX-LILY, DIANELLA AMOENA

Table N.8 Cumulative Impact Assessment on Matted Flax-lily, *Dianella amoena*

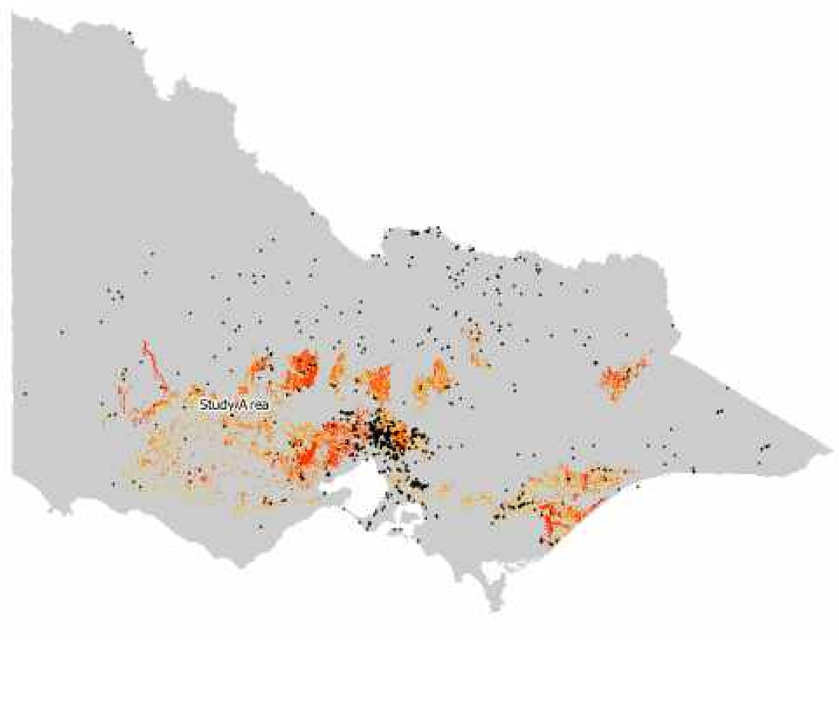
BEAUFORT ALIGNMENT OPTION	POTENTIAL IMPACT AREA (HA) *					FOOTPRINT AREA (HA)			CUMULATIVE IMPACT (%) RELATIVE TO HABITAT EXTENT (HA)**			
	BEAUFORT BYPASS	STAGE 2A BEAUFORT TO BUANGOR	STAGE 1 BURRUMBEET TO BEAUFORT	STAGE 2B BUANGOR TO ARARAT & BUANGOR BYPASS	STOCKYARD HILL	IN THE CVU^	IN THE VVP^^	TOTAL CUMULATIVE IMPACT AREA	VICTORIA (1,012,318.58 HA)	CVU BIOREGION (193,791.35 HA)	VVP BIOREGION (316,251.03 HA)	CIAA (20KM BUFFER) (32,103.81 HA)
A0	5.14 ha	74.62 ha	128.22 ha	59.78 ha	84.36 ha	61.51 ha	290.62 ha	**352.13 ha**	0.03%	0.03%	0.09%	1.10%
A1	5.14 ha					61.51 ha	290.62 ha	**352.13 ha**	0.03%	0.03%	0.09%	1.10%
C0	3.83 ha					62.36 ha	288.45 ha	**350.81 ha**	0.03%	0.03%	0.09%	1.09%
C2	3.97 ha					59.81 ha	291.15 ha	**350.96 ha**	0.03%	0.03%	0.09%	1.09%

** Potential impact areas within the Beaufort Bypass Alignment options were determined from WSP mapped habitat for the species. Impact areas for the other four projects were determined using the Matted Flax-lily species distribution model (DELWP 2017b)*

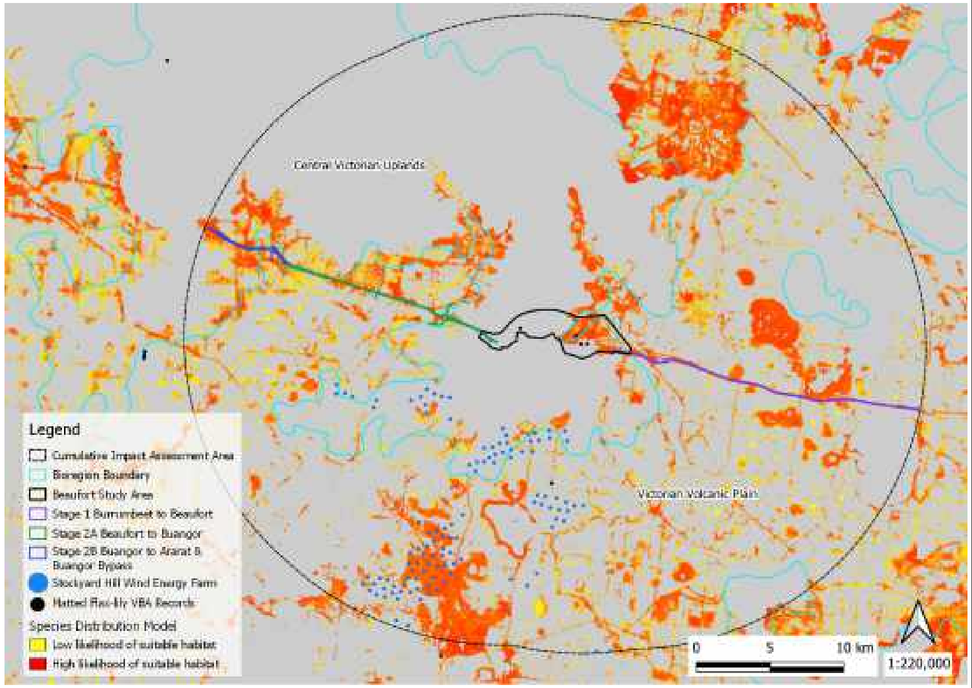
*** All areas determined from Matted Flax-lily species distribution model (DELWP 2017b)*

^ Central Victorian Uplands Bioregion

^^ Victorian Volcanic Plains Bioregion



VBA Matted Flax-lily records and DELWP modelled distribution across Vic



VBA Matted Flax-lily records and DELWP modelled distribution in broader 20km local area

SUMMARY OF RESULTS

The total amount of potential cumulative impact to Matted Flax-lily habitat ranges between 352.13 and 350.81 ha. Overall, all alignments have very similar levels of cumulative impacts on the total area of Matted Flax-lily habitat modelled within the CIAA (i.e. ranges between 1.09-1.10%).

APPLICABILITY OF THIS SPECIES IN ALIGNMENT DECISION MAKING

Whilst there are some impacts on modelled habitat proposed and actual plant populations may be removed in the study area, no other populations were affected in other projects in the CIAA. Therefore, it appears unlikely that a significant cumulative impact on Matted Flax-lily will occur as a result of this and other projects.

N2.6 PALE-FLOWER CRANESBILL, GERANIUM SP. 3

Table N.9 Cumulative Impact Assessment on Pale-flower Cranesbill, *Geranium sp. 3*

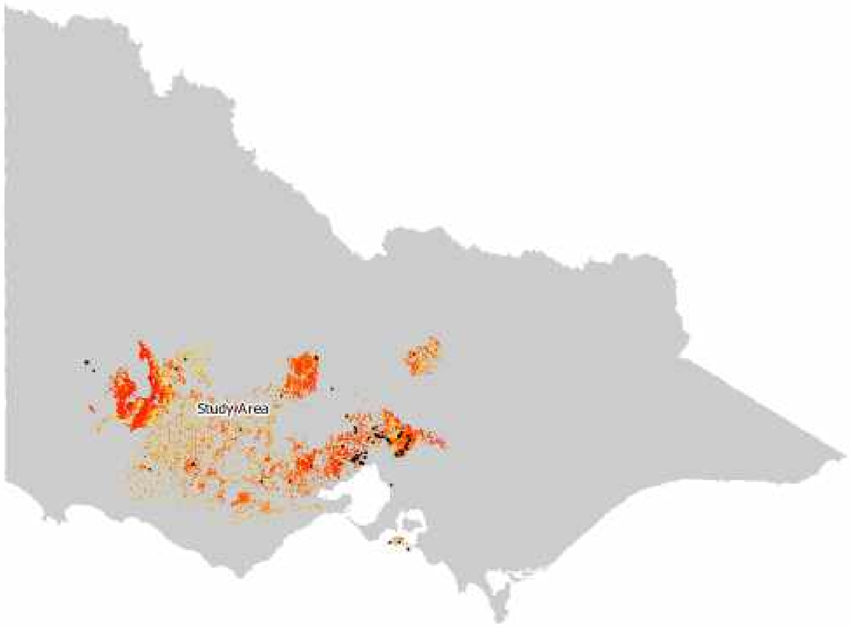
BEAUFORT ALIGNMENT OPTION	POTENTIAL IMPACT AREA (HA) *					FOOTPRINT AREA (HA)			CUMULATIVE IMPACT (%) RELATIVE TO HABITAT EXTENT (HA)**			
	BEAUFORT BYPASS	STAGE 2A BEAUFORT TO BUANGOR	STAGE 1 BURRUMBEET TO BEAUFORT	STAGE 2B BUANGOR TO ARARAT & BUANGOR BYPASS	STOCKYARD HILL	IN THE CVU^	IN THE VVP^^	TOTAL CUMULATIVE IMPACT AREA	VICTORIA (914,100.23 HA)	CVU BIOREGION (103,617.39 HA)	VVP BIOREGION (402,127.93 HA)	CIAA (20KM BUFFER) (29,356.83 HA)
A0	4.82 ha	76.23 ha	131.34 ha	59.45 ha	84.36 ha	62.83 ha	293.38 ha	**356.21 ha**	0.04%	0.06%	0.07%	1.21%
A1	4.93 ha					62.94 ha	293.38 ha	**356.32 ha**	0.04%	0.06%	0.07%	1.21%
C0	8.90 ha					67.05 ha	293.24 ha	**360.29 ha**	0.04%	0.06%	0.07%	1.23%
C2	7.79 ha					65.27 ha	293.90 ha	**359.18 ha**	0.04%	0.06%	0.07%	1.22%

** Potential impact areas within the Beaufort Bypass Alignment options were determined from WSP mapped habitat for the species. Impact areas for the other four projects were determined using the Pale-flower Cranesbill species distribution model (DELWP 2017b)*

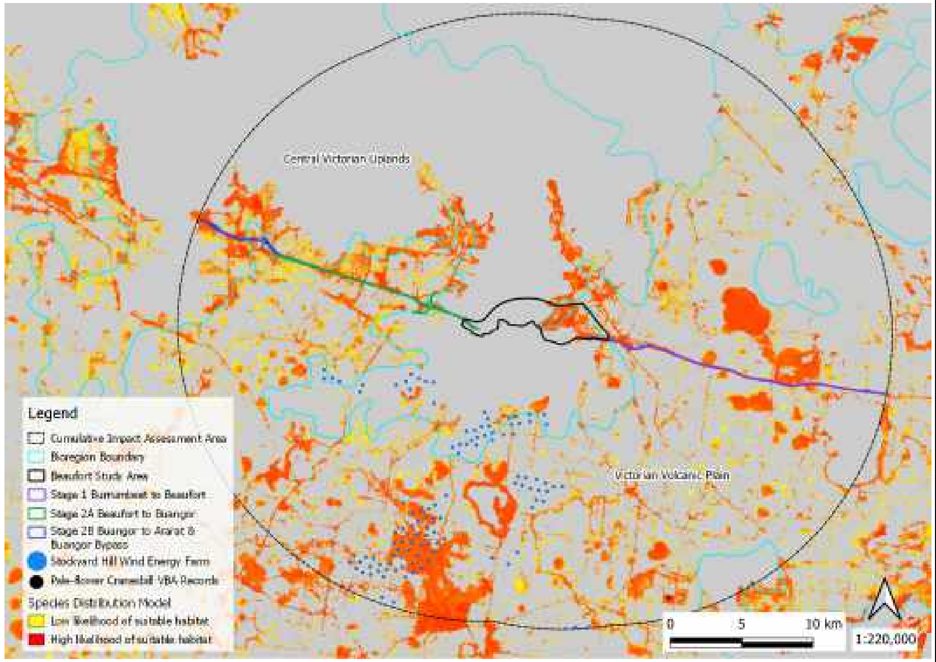
*** All areas determined from Pale-flower Cranesbill species distribution model (DELWP 2017b)*

^ *Central Victorian Uplands Bioregion*

^^ *Victorian Volcanic Plains Bioregion*



VBA Pale-flower Cranesbill records and DELWP modelled distribution across Vic



VBA Pale-flower Cranesbill records and DELWP modelled distribution in broader 20km local area

SUMMARY OF RESULTS

The total amount of potential cumulative impact to Pale-flower Cranesbill habitat ranges between 356.21 and 360.29 ha. Overall, this constitutes between a 1.21 and 1.23% of Pale-flower Cranesbill habitat modelled within the CIAA. Despite the large modelled habitat areas across the region, the only records for known Pale-flower Cranesbill occur within the Beaufort Bypass study area. These plants may be affected by the project, depending on the alignment and detailed design.

APPLICABILITY OF THIS SPECIES IN ALIGNMENT DECISION MAKING

Whilst there are some impacts on modelled habitat proposed and actual plant populations may be removed in the study area, no other populations were affected in other projects in the CIAA. Therefore, it appears unlikely that a significant cumulative impact on Pale-flower Cranesbill will occur as a result of this and other projects.

N2.7 ROUGH WATTLE, ACACIA ASPERA SUBSP. PARVICEPS

Table N.10 Cumulative Impact Assessment on Rough Wattle, *Acacia aspera subsp. parviceps*

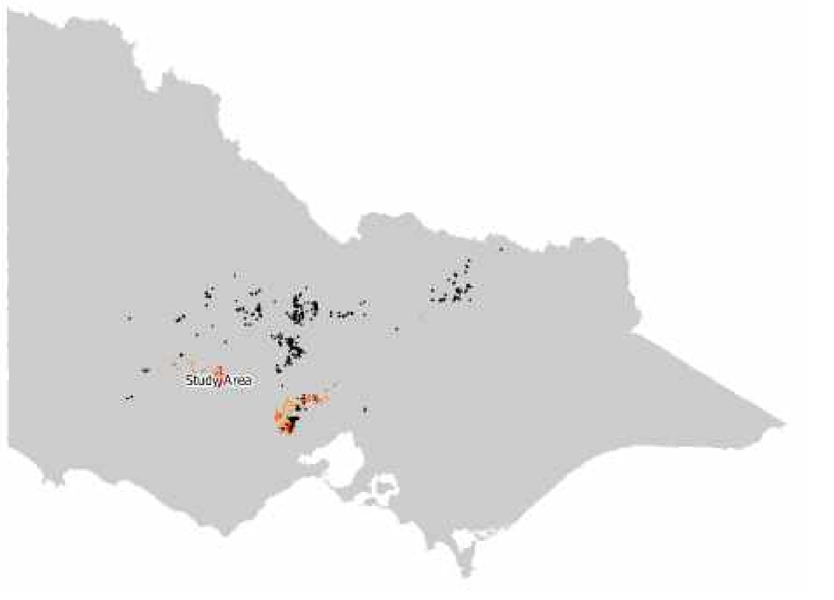
BEAUFORT ALIGNMENT OPTION	POTENTIAL IMPACT AREA (HA) *					FOOTPRINT AREA (HA)			CUMULATIVE IMPACT (%) RELATIVE TO HABITAT EXTENT (HA)**			
	BEAUFORT BYPASS	**STAGE 2A BEAUFORT TO BUANGOR**	**STAGE 1 BURRUMBEET TO BEAUFORT**	**STAGE 2B BUANGOR TO ARARAT & BUANGOR BYPASS**	**STOCKYARD HILL**	**IN THE CVU^**	**IN THE VVP^^**	**TOTAL CUMULATIVE IMPACT AREA**	**VICTORIA** (58,667.95 HA)	**CVU BIOREGION** (43,411.02 HA)	**VVP BIOREGION** (13,819.55 HA)	**CIAA (20KM BUFFER)** (14,260.21 HA)
A0	40.54 ha	21.36 ha	0 ha The species distribution model did not intersect with this project.	0 ha The species distribution model did not intersect with this project.	27.07 ha	88.97 ha	0 ha	**88.97 ha**	0.15%	0.20%	0%	0.62%
A1	38.75 ha					87.18 ha	0 ha	**87.18 ha**	0.15%	0.20%	0%	0.61%
C0	51.14 ha					99.58 ha	0 ha	**99.58 ha**	0.17%	0.23%	0%	0.70%
C2	47.11 ha					95.54 ha	0 ha	**95.54 ha**	0.16%	0.22%	0%	0.67%

* *Potential impact areas for all projects (including the Beaufort Bypass) were determined using the Rough Wattle species distribution model (DELWP 2017b)*

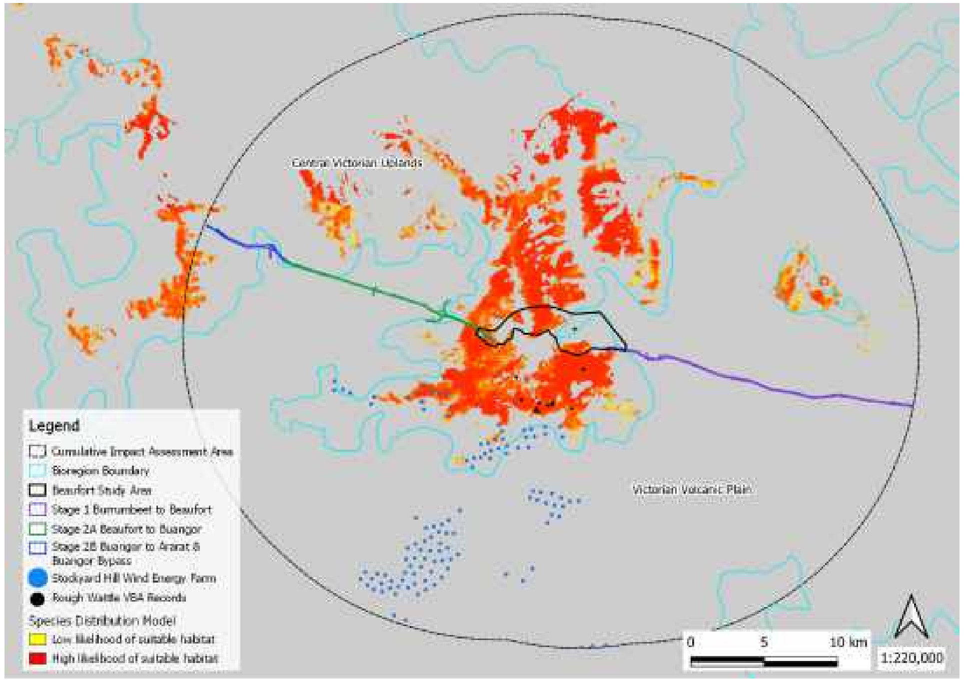
** *All areas determined from Rough Wattle species distribution model (DELWP 2017b)*

^ *Central Victorian Uplands Bioregion*

^^ *Victorian Volcanic Plains Bioregion*



VBA Rough Wattle records and DELWP modelled distribution across Vic



VBA Rough Wattle records and DELWP modelled distribution in broader 20km local area

SUMMARY OF RESULTS

Based on the DELWP distribution models for Rough Wattle habitat, the total amount of potential cumulative impact ranges between 87.18 and 99.58 ha. This comprises between 0.61% and 0.70% of habitat modelled within the CIAA with alignment A1 having the least amount of impact. Important to note is that the species is not modelled to occur within the VVP bioregion.

APPLICABILITY OF THIS SPECIES IN ALIGNMENT DECISION MAKING

There are some impacts on modelled habitat proposed with all alignments of the project, however no significant impacts in the CIAA as a result of other projects. Therefore, it appears unlikely that a significant cumulative impact on Rough Wattle will occur as a result of the Beaufort Bypass and other projects.

N2.8 YARRA GUM, EUCALYPTUS YARRAENSIS

Table N.11 Cumulative Impact Assessment on Yarra Gum *Eucalyptus yarraensis*

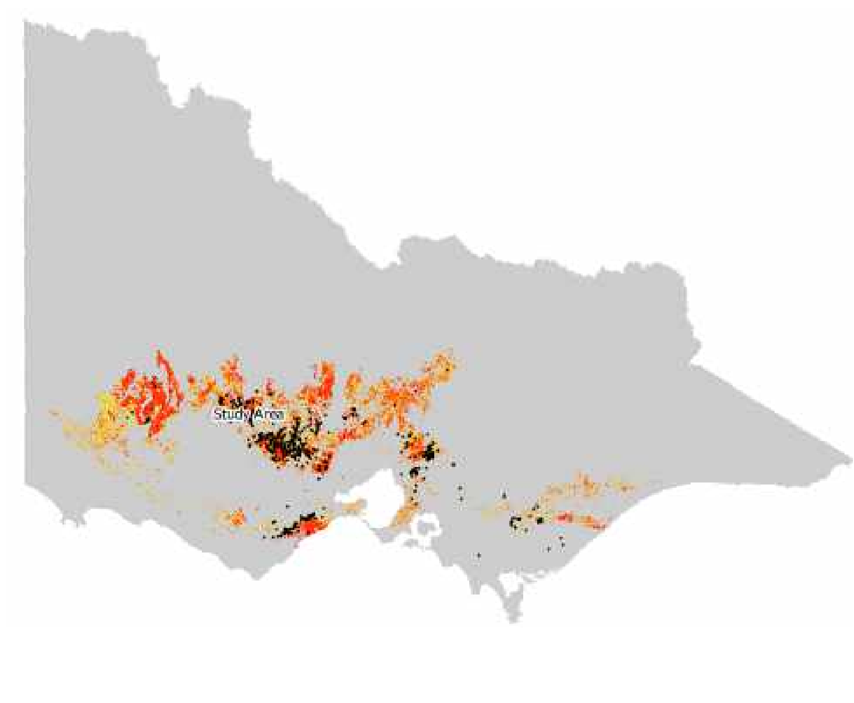
BEAUFORT ALIGNMENT OPTION	POTENTIAL IMPACT AREA (HA) *					FOOTPRINT AREA (HA)			CUMULATIVE IMPACT (%) RELATIVE TO HABITAT EXTENT (HA)**			
	BEAUFORT BYPASS	STAGE 2A BEAUFORT TO BUANGOR	STAGE 1 BURRUMBEET TO BEAUFORT	STAGE 2B BUANGOR TO ARARAT & BUANGOR BYPASS	STOCKYARD HILL	IN THE CVU^	IN THE VVP^^	TOTAL CUMULATIVE IMPACT AREA	VICTORIA (1,173,160.60 HA)	CVU BIOREGION (346,432.80 HA)	VVP BIOREGION (169,639.57 HA)	CIAA (20KM BUFFER) (59,976.10 HA)
A0	7.36 ha	102.22 ha	137.80 ha	59.48 ha	98.21 ha	131.23 ha	273.84 ha	**405.08 ha**	0.03%	0.04%	0.16%	0.68%
A1	7.43 ha					131.31 ha	273.84 ha	**405.15 ha**	0.03%	0.04%	0.16%	0.68%
C0	2.15 ha					126.02 ha	273.84 ha	**399.87 ha**	0.03%	0.04%	0.16%	0.67%
C2	2.21 ha					126.09 ha	273.84 ha	**399.93 ha**	0.03%	0.04%	0.16%	0.67%

** Potential impact areas within the Beaufort Bypass Alignment options were determined from WSP mapped habitat for the species. Impact areas for the other four projects were determined using the Yarra Gum species distribution model (DELWP 2017b)*

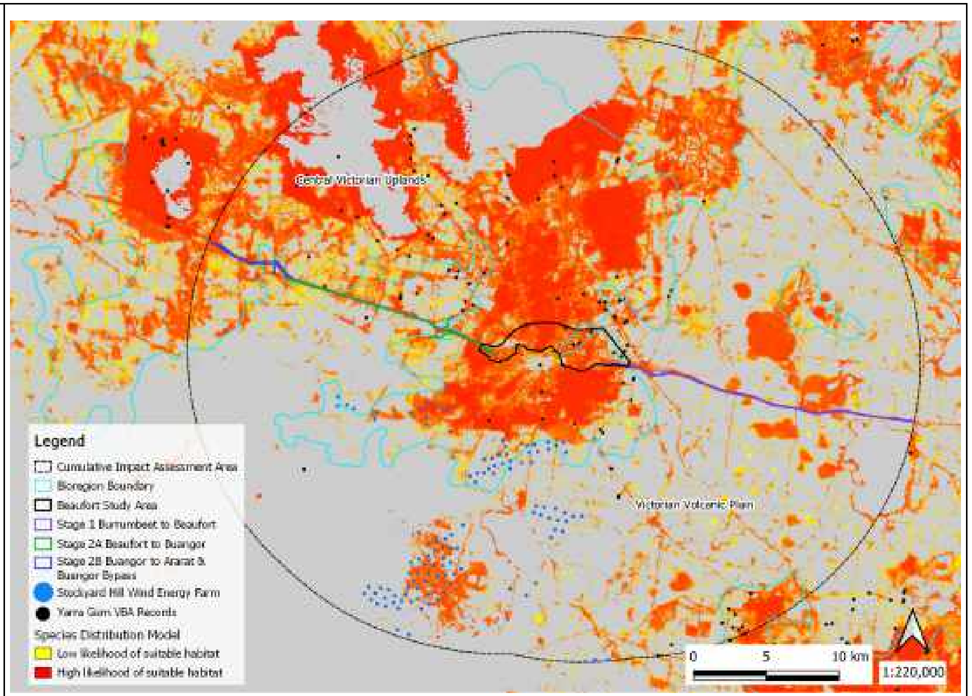
*** All areas determined from Yarra Gum species distribution model (DELWP 2017b)*

^ *Central Victorian Uplands Bioregion*

^^ *Victorian Volcanic Plains Bioregion*



VBA Yarra Gum records and DELWP modelled distribution across Vic



VBA Yarra Gum records and DELWP modelled distribution in broader 20km local area

SUMMARY OF RESULTS

The total amount of potential cumulative impact to Yarra Gum habitat ranges between 399.87 and 405.15 ha. Overall, this constitutes 0.68% for the A alignments and 0.67% for the C alignments of habitat modelled within the CIAA. There were eight Yarra Gums affected by the Stage 1 Western Highway project and there will be two trees affected as a result of the Beaufort Bypass. Despite the large modelled habitat areas and number of records in the CIAA, there are very few actual individual trees affected by this and previous projects.

APPLICABILITY OF THIS SPECIES IN ALIGNMENT DECISION MAKING

There are some impacts on modelled habitat proposed with all alignments showing similar levels of impact, however no significant impacts using modelled data in the CIAA as a result of other projects.

Two or three trees may be removed in the study area, along with eight Yarra Gums affected by the Stage 1 Western Highway project. Therefore, based on actual site observations, there is a minor cumulative impact, however it appears unlikely that a significant cumulative impact on Yarra Gum will occur as a result of the Beaufort Bypass and other projects.

N2.9 BROLGA, GRUS RUBICUNDA

Table N.12 Cumulative Impact Assessment on Brolga, *Grus rubicunda*

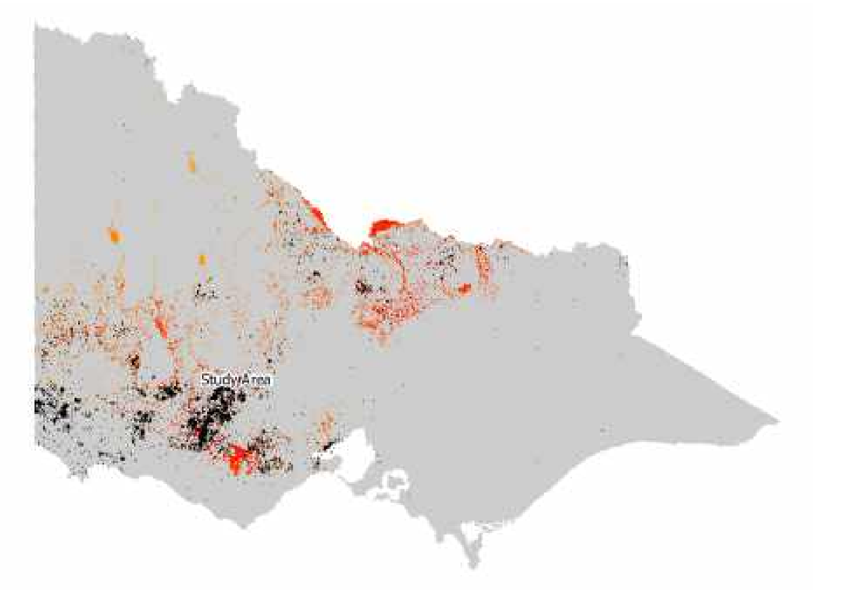
BEAUFORT ALIGNMENT OPTION	POTENTIAL IMPACT AREA (HA) *					FOOTPRINT AREA (HA)			CUMULATIVE IMPACT (%) RELATIVE TO HABITAT EXTENT (HA)**			
	BEAUFORT BYPASS	STAGE 2A BEAUFORT TO BUANGOR	STAGE 1 BURRUMBEET TO BEAUFORT	STAGE 2B BUANGOR TO ARARAT & BUANGOR BYPASS	STOCKYARD HILL	IN THE CVU^	IN THE VVP^^	TOTAL CUMULATIVE IMPACT AREA	VICTORIA (960,276.63 HA)	CVU BIOREGION (11,085.80 HA)	VVP BIOREGION (221,800.88 HA)	CIAA (20KM BUFFER) (22,113.61 HA)
A0	2.01 ha	55.86 ha	51.22 ha	20.31 ha	140.09 ha	26.99 ha	242.50 ha	**269.49 ha**	0.03%	0.24%	0.11%	1.22%
A1	0.58 ha					25.57 ha	242.50 ha	**268.07 ha**	0.03%	0.23%	0.11%	1.21%
C0	4.22 ha					25.71 ha	246.00 ha	**271.71 ha**	0.03%	0.23%	0.11%	1.23%
C2	0.71 ha					25.69 ha	242.50 ha	**268.19 ha**	0.03%	0.23%	0.11%	1.21%

** Potential impact areas within the Beaufort Bypass Alignment options were determined from WSP mapped habitat (high and medium quality) for the species. Impact areas for the other four projects were determined using the Brolga species distribution model (DELWP 2017b)*

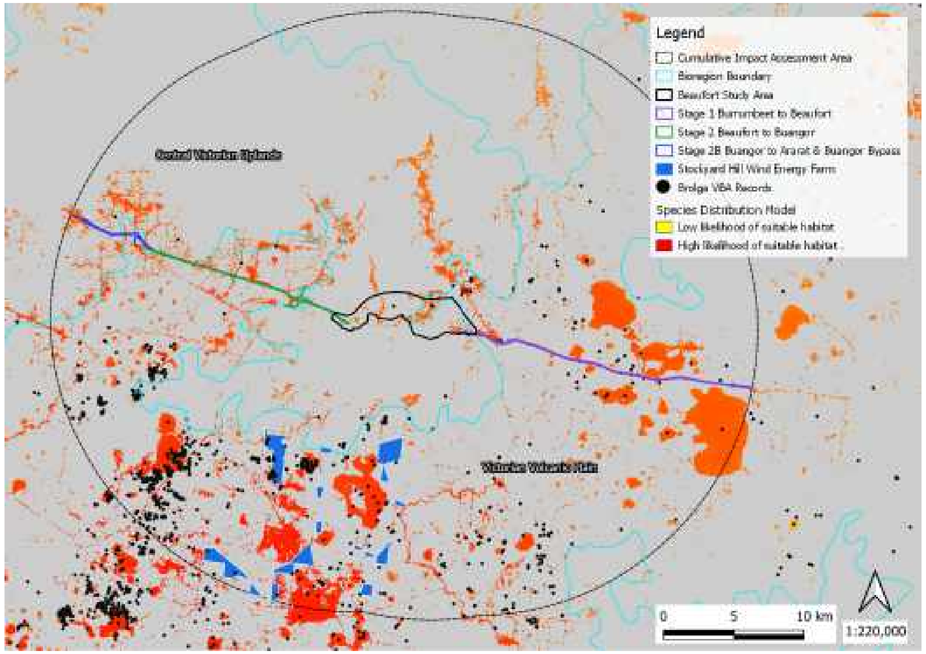
*** All areas determined from Brolga species distribution model (DELWP 2017b)*

^ Central Victorian Uplands Bioregion

^^ Victorian Volcanic Plains Bioregion



VBA Brolga records and DELWP modelled distribution across Vic



VBA Brolga records and DELWP modelled distribution in broader 20km local area

SUMMARY OF RESULTS

The Victorian Brolga population is estimated to only be between 600 – 650 birds (DuGuesclin 2003; Moles et al. 2010). Wetlands and waterbodies within and adjacent to the Beaufort alignment options are likely to be used on a seasonal basis by this species for foraging and possibly breeding. The Brolga has a large (average 232 ha) but varied home range (70 ha – 523 ha) {Veltheim, 2019 #8268}, and there are several key wetland habitats within the area so it is important to consider the effects of other projects to ensure the species is not critically impacted. Roads may not be a significant impediment to movement of adult birds but may affect prefledged chicks if a road is located between suitable habitats (Inka Veltheim pers. comm.).

Unlike the other projects which remove potential Brolga habitat, no direct removal of Brolga habitat is expected as a result of the Stockyard Hill Wind Energy Farm (WEF). Instead, potential direct impacts from Brolga collisions with the turbines and overhead powerlines are anticipated. None-the-less, the potential impacts to this species as a result of the WEF should be considered in this cumulative impact assessment. Indirect effects are considered by using polygons that intersect Brolga habitat quality within the WEF.

Overall, (not accounting for any indirect impacts as a result of the WEF) the total amount of cumulative impact to potential Brolga habitat ranges between 268.07 and 271.71 ha. This constitutes 0.03% of the modelled Brolga habitat within the state of Victoria, 0.11% of modelled habitat within the VVP Bioregion and between 0.23 – 0.24% of modelled habitat within the CVU Bioregion. The total cumulative impact area is between 1.21 – 1.23% of the modelled habitat within the CIAA.

APPLICABILITY OF THIS SPECIES IN ALIGNMENT DECISION MAKING

Given the small loss of Brolga habitat as a result of the Beaufort Bypass Project, the negligible difference in impact area across the four alignments (especially at a broader scale) and the large home range of the species, it appears unlikely that a significant cumulative impact on Brolga will occur as a result of other projects. However, there are potential impacts to a local population in the Yam Holes Creek Valley, which is addressed in the impacts section of the Beaufort Bypass EES report.

N2.10 BROWN TOADLET, PSEUDOPHRYNE BIBRONII

Table N.13 Cumulative Impact Assessment on Brown Toadlet, *Pseudophryne bibronii*

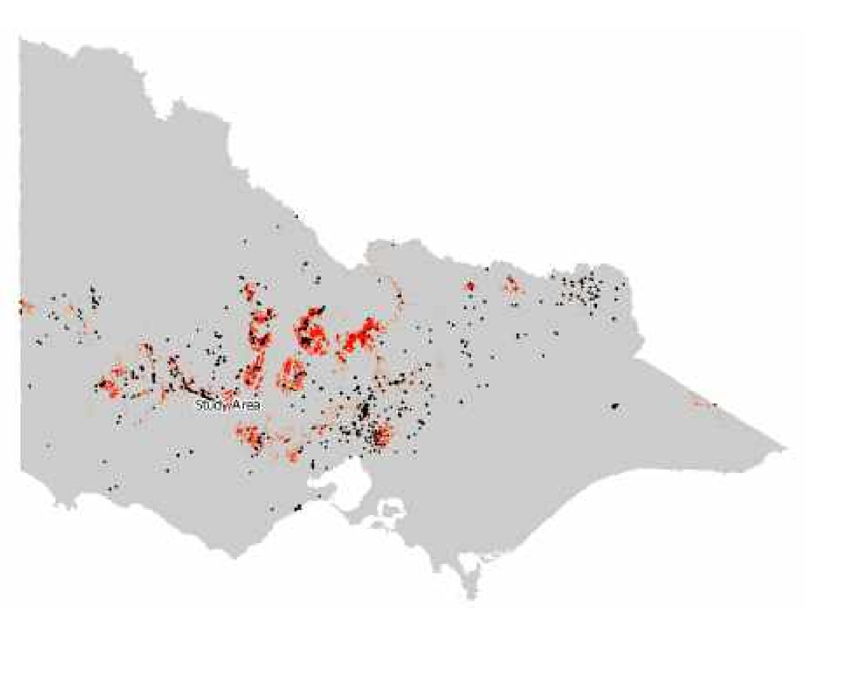
BEAUFORT ALIGNMENT OPTION	POTENTIAL IMPACT AREA (HA) *					FOOTPRINT AREA (HA)			CUMULATIVE IMPACT (%) RELATIVE TO HABITAT EXTENT (HA)**			
	BEAUFORT BYPASS	**STAGE 2A BEAUFORT TO BUANGOR**	**STAGE 1 BURRUMBEET TO BEAUFORT**	**STAGE 2B BUANGOR TO ARARAT & BUANGOR BYPASS**	**STOCKYARD HILL**	**IN THE CVU^**	**IN THE VVP^^**	**TOTAL CUMULATIVE IMPACT AREA**	**VICTORIA** (491,516.99 HA)	**CVU BIOREGION** (80,760.65 HA)	**VVP BIOREGION** (12,848.02 HA)	**CIAA (20KM BUFFER)** (14,201.84 HA)
A0	1.66 ha	19.34 ha	6.38 ha	2.89 ha	5.04 ha	28.25 ha	7.07 ha	**35.32 ha**	0.01%	0.03%	0.06%	0.25%
A1	1.25 ha					27.85 ha	7.07 ha	**34.91 ha**	0.01%	0.03%	0.06%	0.25%
C0	3.20 ha					27.95 ha	8.91 ha	**36.86 ha**	0.01%	0.03%	0.07%	0.26%
C2	1.31 ha					27.78 ha	7.19 ha	**34.97 ha**	0.01%	0.03%	0.06%	0.25%

** Potential impact areas within the Beaufort Bypass Alignment options were determined from WSP mapped habitat for the species. Impact areas for the other four projects were determined using the Brown Toadlet species distribution model (DELWP 2017b)*

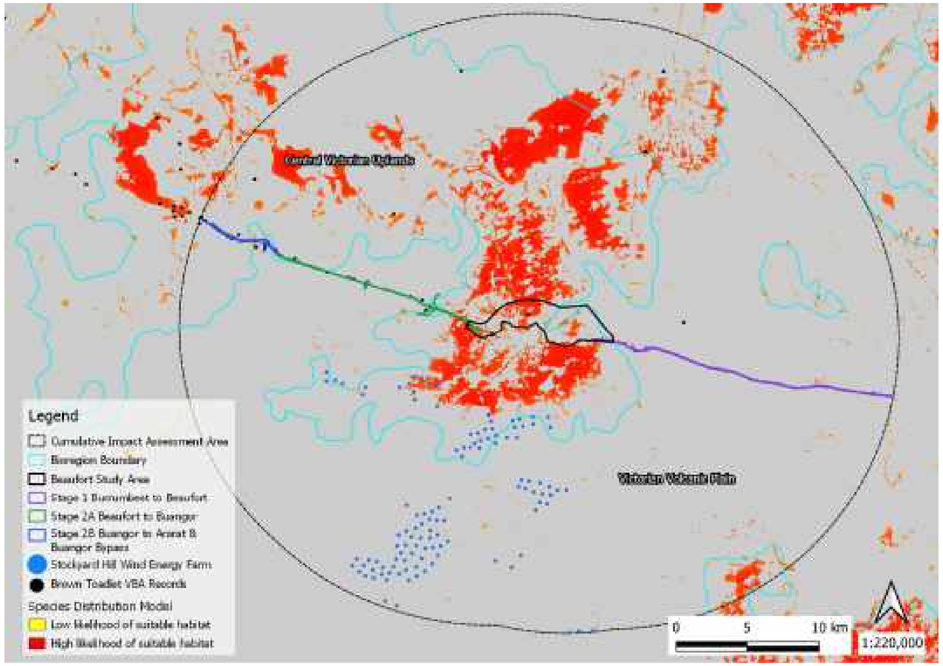
*** All areas determined from Brown Toadlet species distribution model (DELWP 2017b)*

^ Central Victorian Uplands Bioregion

^^ Victorian Volcanic Plains Bioregion



VBA Brown Toadlet records and DELWP modelled distribution across Vic



VBA Brown Toadlet records and DELWP modelled distribution in broader 20km local area

SUMMARY OF RESULTS

The total amount of potential cumulative impact to Brown Toadlet habitat ranges between 34.91 and 36.86 ha. Overall, this constitutes 0.25% on all alignments except C0 which is slightly higher at 0.26% of habitat modelled within the CIAA. There was habitat for Brown Toadlet removed in Stage 2A however the area was not quantified. There is likely to be habitat affected in the Beaufort study area for all alignments, therefore this would constitute a minor cumulative impact.

APPLICABILITY OF THIS SPECIES IN ALIGNMENT DECISION MAKING

There are some impacts on modelled habitat proposed with all alignments showing similar levels of impact, however no significant impacts using modelled data in the CIAA as a result of other projects.

There are some impacts on known habitat likely to be removed in the study area, along with some populations affected in Stage 2B. Therefore, based on actual site observations and habitat, there is a minor cumulative impact however it appears unlikely that a significant cumulative impact on Brown Toadlet will occur as a result of the Beaufort Bypass and other projects.

N2.11 BRUSH-TAILED PHASCOGALE, PHASCOGALE TAPOATAFA

Table N.14 Cumulative impact assessment on Brush-tailed Phascogale, *Phascogale tapoatafa*

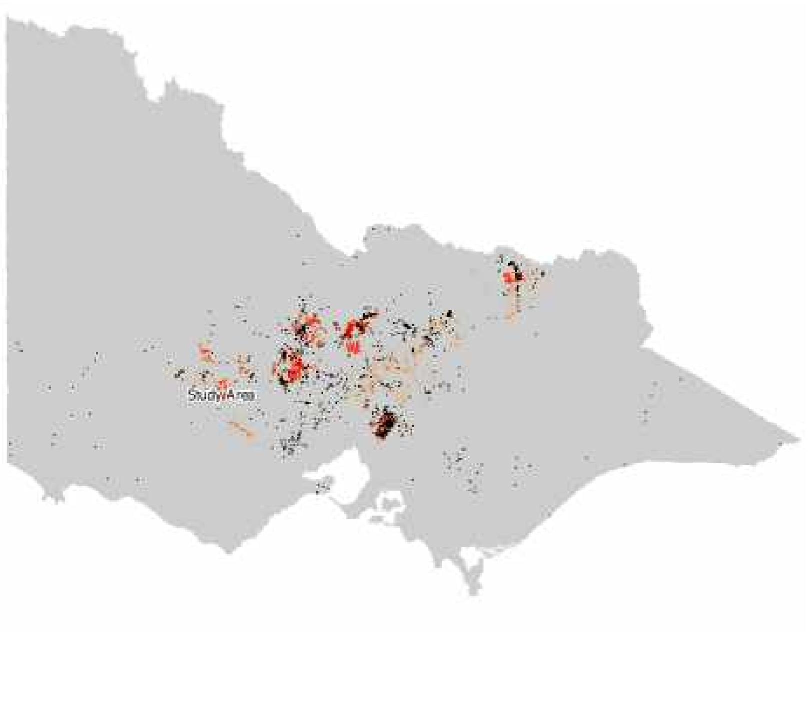
BEAUFORT ALIGNMENT OPTION	POTENTIAL IMPACT AREA (HA) *					FOOTPRINT AREA (HA)			CUMULATIVE IMPACT (%) RELATIVE TO HABITAT EXTENT (HA)**			
	BEAUFORT BYPASS	STAGE 2A BEAUFORT TO BUANGOR	STAGE 1 BURRUMBEET TO BEAUFORT	STAGE 2B BUANGOR TO ARARAT & BUANGOR BYPASS	STOCKYARD HILL	IN THE CVU^	IN THE VVP^^	TOTAL CUMULATIVE IMPACT AREA	VICTORIA (260,694.30 HA)	CVU BIOREGION (56,277.29 HA)	VVP BIOREGION (397.35 HA)	CIAA (20KM BUFFER) (14,546.58 HA)
A0	22.32 ha	7.44 ha	0 ha The species distribution model did not intersect with this project.	0 ha The species distribution model did not intersect with this project.	10.01 ha	39.11 ha	0.65 ha	**39.77 ha**	0.02%	0.07%	0.16%	0.27%
A1	21.17 ha					37.96 ha	0.65 ha	**38.62 ha**	0.01%	0.07%	0.16%	0.27%
C0	20.30 ha					37.42 ha	0.33 ha	**37.75 ha**	0.01%	0.07%	0.08%	0.26%
C2	15.01 ha					31.20 ha	1.26 ha	**32.46 ha**	0.01%	0.06%	0.32%	0.22%

** Potential impact areas within the Beaufort Bypass Alignment options were determined from WSP mapped habitat (high and medium quality) for the species. Impact areas for the other four projects were determined using the Brush-tailed Phascogale species distribution model (DELWP 2017b)*

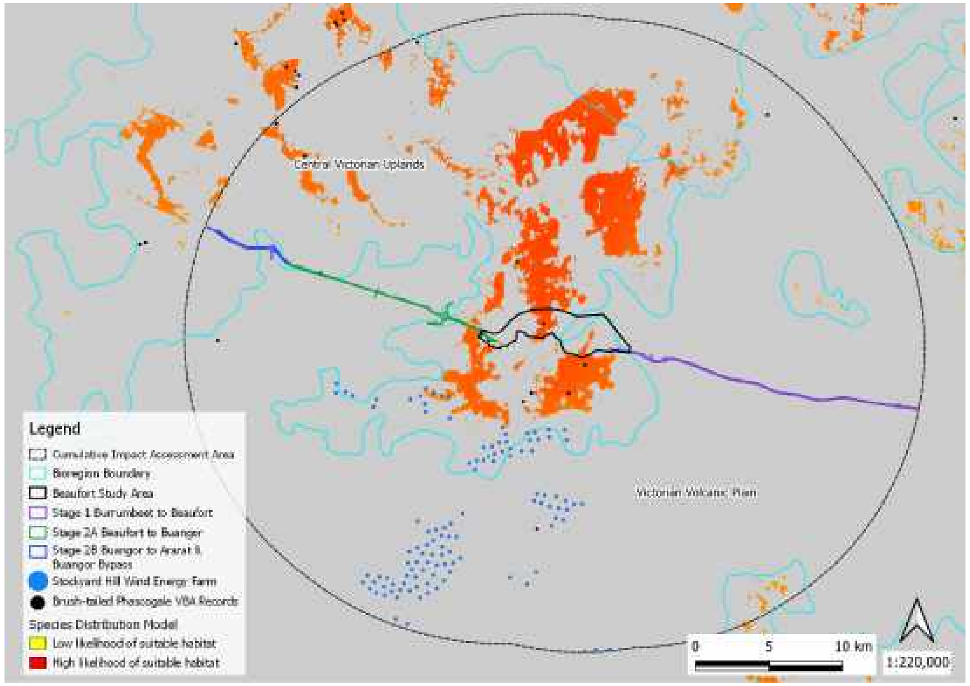
*** All areas determined from Brush-tailed Phascogale species distribution model (DELWP 2017b)*

^ Central Victorian Uplands Bioregion

^^ Victorian Volcanic Plains Bioregion



VBA Brush-tailed Phascogale records and DELWP modelled distribution across Vic



VBA Brush-tailed Phascogale records and DELWP modelled distribution in broader 20km local area

SUMMARY OF RESULTS

By using modelled habitat to calculate the area of potential impact, a conservative approach has been adopted which provides a ‘worst case’ scenario of potential cumulative impacts to the Phascogale. The total amount of potential cumulative impact ranges between 39.77 and 32.46 ha. The Beaufort to Buangor upgrade and Stockyard Hill WEF are the only other projects that are likely to have had some impacts on potential Phascogale habitat. These areas of impact are approximately half the Beaufort Bypass area of impact to potential Phascogale habitat.

The total cumulative impact areas from these projects, and across all four alignments, comprises < 0.1% of the modelled Phascogale habitat within the state of Victoria and <0.1% of modelled habitat within the Central Victorian Uplands (CVU) Bioregion. Similarly, the total cumulative impact area is <1% of the modelled habitat within the VVP bioregion and the CIAA.

The impact area within the Beaufort Bypass study area ranges from 22.32 and 15.01 ha of actual mapped habitat. The alignment with the lower impact is C2 with 0.22%.

APPLICABILITY OF THIS SPECIES IN ALIGNMENT DECISION MAKING

There are some impacts on modelled habitat proposed with all alignments showing similar levels of impact, however no significant impacts using modelled data in the CIAA as a result of other projects.

Whilst different alignments are likely to have different impacts on Brush-tailed Phascogale in the study area (due to the species small home range and potential fragmentation of habitat) it appears unlikely that a significant cumulative impact on Brush-tailed Phascogale will occur as a result of other projects. However, there will be impacts within the study area which are discussed further within the impact section of the Beaufort Bypass EES report.

N2.12 GOLDEN SUN MOTH, SYNEMON PLANA

Table N.15 Cumulative Impact Assessment on Golden Sun Moth, *Synemon Plana*

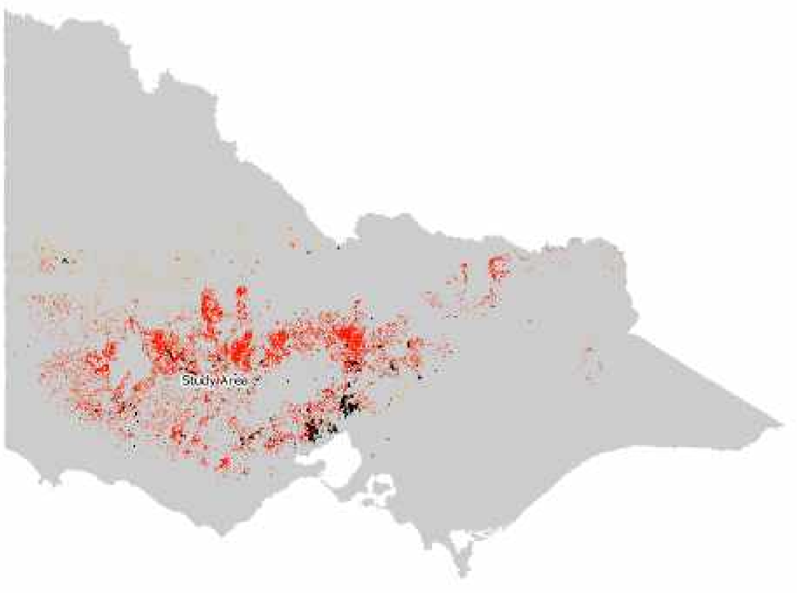
BEAUFORT ALIGNMENT OPTION	POTENTIAL IMPACT AREA (HA) *					FOOTPRINT AREA (HA)			CUMULATIVE IMPACT (%) RELATIVE TO HABITAT EXTENT (HA)**			
	BEAUFORT BYPASS	STAGE 2A BEAUFORT TO BUANGOR	STAGE 1 BURRUMBEET TO BEAUFORT	STAGE 2B BUANGOR TO ARARAT & BUANGOR BYPASS	STOCKYARD HILL	IN THE CVU^	IN THE VVP^^	TOTAL CUMULATIVE IMPACT AREA	VICTORIA (236,366.54 HA)	CVU BIOREGION (156,934.39 HA)	VVP BIOREGION (1,010,873.08 HA)	CIAA (20KM BUFFER) (31,254.41 HA)
A0	15.45 ha	47.51 ha	70.01 ha	6.06 ha	64.82 ha	13.76 ha	190.10 ha	**203.85 ha**	0.09%	0.01%	0.02%	0.65%
A1	14.05 ha					12.36 ha	190.10 ha	**202.45 ha**	0.09%	0.01%	0.02%	0.65%
C0	15.18 ha					14.96 ha	188.62 ha	**203.58 ha**	0.09%	0.01%	0.02%	0.65%
C2	13.65 ha					11.96 ha	190.10 ha	**202.06 ha**	0.09%	0.01%	0.02%	0.65%

** Potential impact areas within the Beaufort Bypass Alignment options were determined from WSP mapped habitat. Impact areas for the other four projects were determined using the Golden Sun Moth species distribution model (DELWP 2017b)*

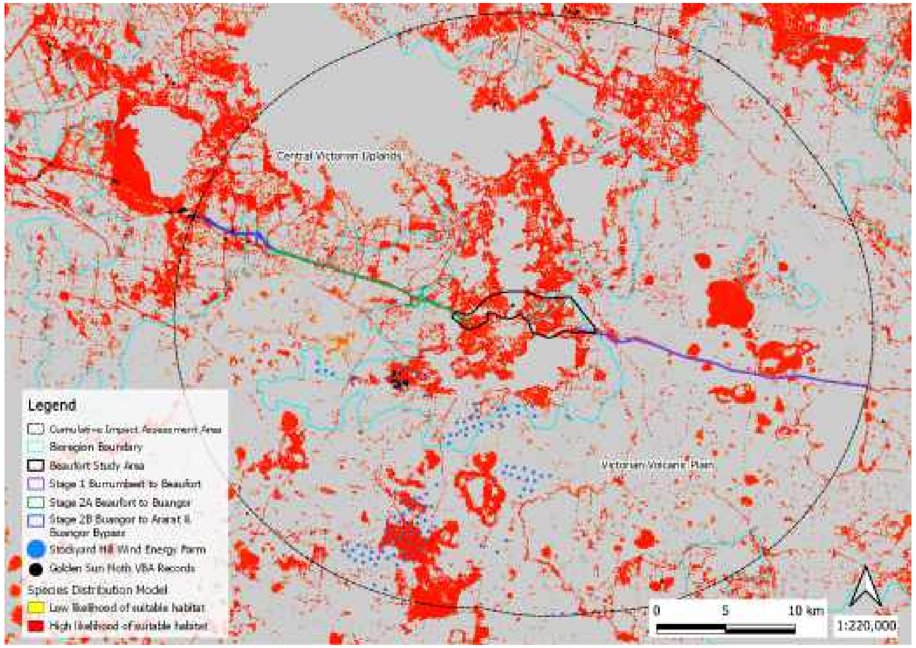
*** All areas determined from Golden Sun Moth species distribution model (DELWP 2017b)*

^ Central Victorian Uplands Bioregion

^^ Victorian Volcanic Plains Bioregion



VBA Golden Sun Moth records and DELWP modelled distribution across Vic



VBA Golden Sun Moth records and DELWP modelled distribution in broader 20km local area

SUMMARY OF RESULTS

The total amount of potential cumulative impact to Golden Sun Moth habitat ranges between 202.06 to 203.85 ha. Overall, this constitutes 0.65% impact on modelled habitat within the CIAA. 31.56 ha of Golden Sun Moth habitat was removed for the Stage 2A project (VicRoads 2016). Golden Sun Moth habitat impacts area also anticipated as a result of the Stockyard Hill WEF, however the area impacted could not be found in the relevant documents. There will be habitat affected within the Beaufort study area for all alignment options. This would constitute a minor cumulative impact across the broader geographic distribution, however, the populations are unlikely linked given that they are several kilometres apart and the moth’s dispersal ability is limited.

APPLICABILITY OF THIS SPECIES IN ALIGNMENT DECISION MAKING

There are some impacts on modelled habitat proposed with all alignments showing similar levels of impact, however no significant impacts using modelled data in the CIAA as a result of other projects.

There are some impacts on actual mapped habitat proposed with all alignments and known habitat is likely to be removed in the Beaufort Bypass study area, along with some populations affected in Stage 2A. Therefore, there is a minor cumulative impact however it appears unlikely that a significant cumulative impact on Golden Sun Moth will occur as a result of the Beaufort Bypass and other projects. To minimise the effect of cumulative impact, the alignment with the lowest impacts should be considered (either A1 and C2).

N2.13 GROWLING GRASS FROG, LITORIA RANIFORMIS

Table N.16 Cumulative Impact Assessment on Growling Grass Frog, *Litoria raniformis*

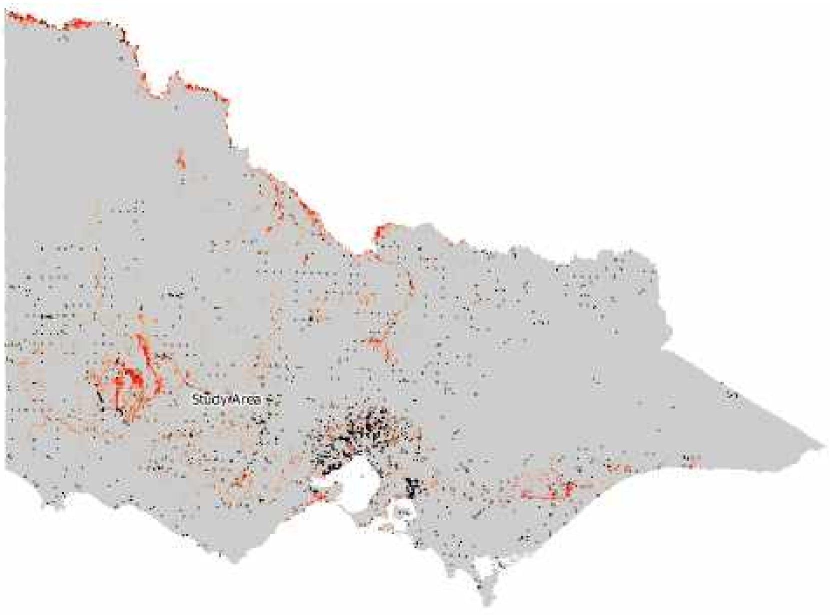
BEAUFORT ALIGNMENT OPTION	POTENTIAL IMPACT AREA (HA) *					FOOTPRINT AREA (HA)			CUMULATIVE IMPACT (%) RELATIVE TO HABITAT EXTENT (HA)**			
	BEAUFORT BYPASS	STAGE 2A BEAUFORT TO BUANGOR	STAGE 1 BURRUMBEET TO BEAUFORT	STAGE 2B BUANGOR TO ARARAT & BUANGOR BYPASS	STOCKYARD HILL	IN THE CVU^	IN THE VVP^^	TOTAL CUMULATIVE IMPACT AREA	VICTORIA (555,603.03 HA)	CVU BIOREGION (19,408.84 HA)	VVP BIOREGION (87,784.07 HA)	CIAA (20KM BUFFER) (5,022.13 HA)
A0	66.22 ha	23.69 ha	10.25 ha	11.65 ha	0 ha The species distribution model did not intersect with this project	68.50 ha	43.31 ha	**111.81 ha**	0.02%	0.35%	0.05%	2.23%
A1	69.56 ha					71.85 ha	43.31 ha	**115.15 ha**	0.02%	0.37%	0.05%	2.29%
C0	64.83 ha					67.79 ha	42.62 ha	**110.42 ha**	0.02%	0.35%	0.05%	2.20%
C2	78.63 ha					76.81 ha	47.41 ha	**124.22 ha**	0.02%	0.40%	0.05%	2.47%

** Potential impact areas within the Beaufort Bypass Alignment options were determined from WSP mapped habitat (high and medium quality) for the species. Impact areas for the other four projects were determined using the Growling Grass Frog species distribution model (DELWP 2017b)*

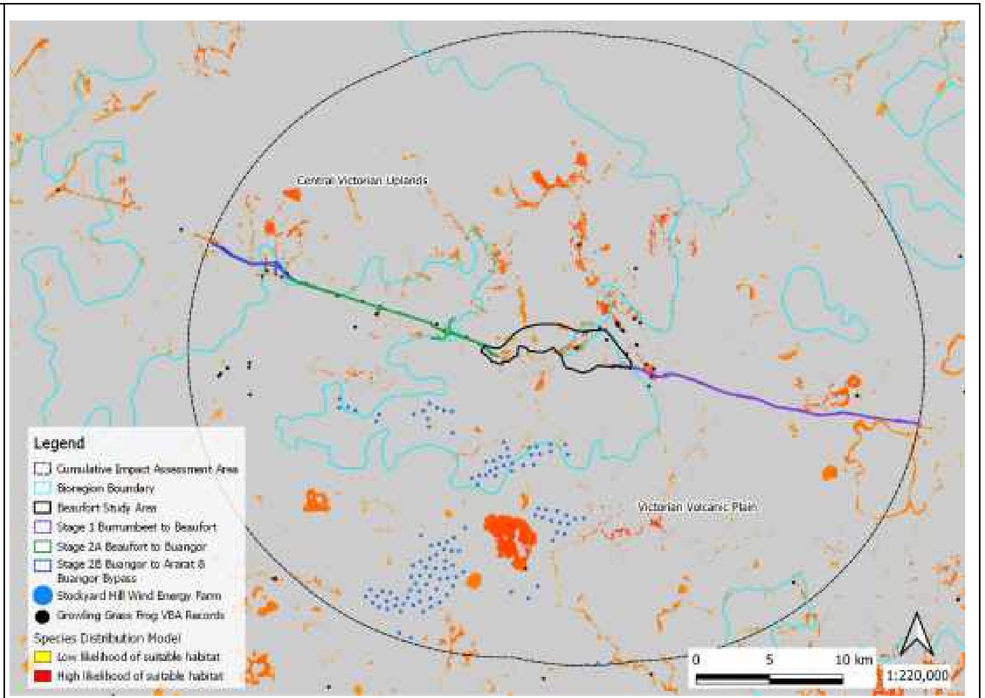
*** All areas determined from Growling Grass Frog species distribution model (DELWP 2017b)*

^ Central Victorian Uplands Bioregion

^^ Victorian Volcanic Plains Bioregion



VBA Growling Grass Frog records and DELWP modelled distribution across Vic



VBA Growling Grass Frog records and DELWP modelled distribution in broader 20km local area

SUMMARY OF RESULTS

The total amount of potential cumulative impact to Growling Grass Frog habitat ranges between 110.42 to 124.22 ha. There seemed to be an indication that there may be impacts on Growling Grass Frog at Stockyard Hill but the level of impact was not quantified. Despite the fact that the other projects overlapped with modelled Growling Grass Frog distribution, they did not appear to be impacting on Growling Grass Frog populations.

APPLICABILITY OF THIS SPECIES IN ALIGNMENT DECISION MAKING

There are some impacts on modelled habitat proposed with all alignments showing similar levels of impact, however no significant impacts using modelled data in the CIAA as a result of other projects.

There are some impacts on actual mapped habitat proposed with all alignments and known habitat is likely to be removed in the Beaufort Bypass study area, along with some potential habitat at Stockyard Hill. Therefore, there is a minor cumulative impact however it appears unlikely that a significant cumulative impact on Growling Grass Frog will occur as a result of the Beaufort Bypass and other projects. To minimise the effect of cumulative impact, the alignment with the lowest impacts should be considered.

N2.14 LITTLE GALAXIAS, GALAXIELLA TOOURTKOOURT

Table N.17 Cumulative Impact Assessment on Little Galaxias, *Galaxiella toourtkoourt*

BEAUFORT ALIGNMENT OPTION	**POTENTIAL IMPACT AREA (HA) ***					**FOOTPRINT AREA (HA)**			**CUMULATIVE IMPACT (%) RELATIVE TO HABITAT EXTENT (HA)****			
	BEAUFORT BYPASS	**STAGE 2A BEAUFORT TO BUANGOR**	**STAGE 1 BURRUMBEET TO BEAUFORT**	**STAGE 2B BUANGOR TO ARARAT & BUANGOR BYPASS**	**STOCKYARD HILL**	**IN THE CVU^**	**IN THE VVP^^**	**TOTAL CUMULATIVE IMPACT AREA**	**VICTORIA** (34,162.42 HA)	**CVU BIOREGION** (160.57 HA)	**VVP BIOREGION** (7,813.68 HA)	**CIAA (20KM BUFFER)** (49.47 HA)
A0	0.27 ha	0.38 ha	0 ha The species distribution model did not intersect with this project	0 ha The species distribution model did not intersect with this project	0 ha The species distribution model did not intersect with this project	0.15 ha	0.50 ha	**0.65 ha**	< 0.01%	0.09%	0.01%	1.32%
A1	0.25 ha					0.13 ha	0.50 ha	**0.63 ha**	< 0.01%	0.08%	0.01%	1.28%
C0	1.64 ha					0.49 ha	1.53 ha	**2.02 ha**	< 0.01%	0.31%	0.02%	4.08%
C2	0.62 ha					0.49 ha	0.51 ha	**1.01 ha**	< 0.01%	0.31%	0.01%	2.03%

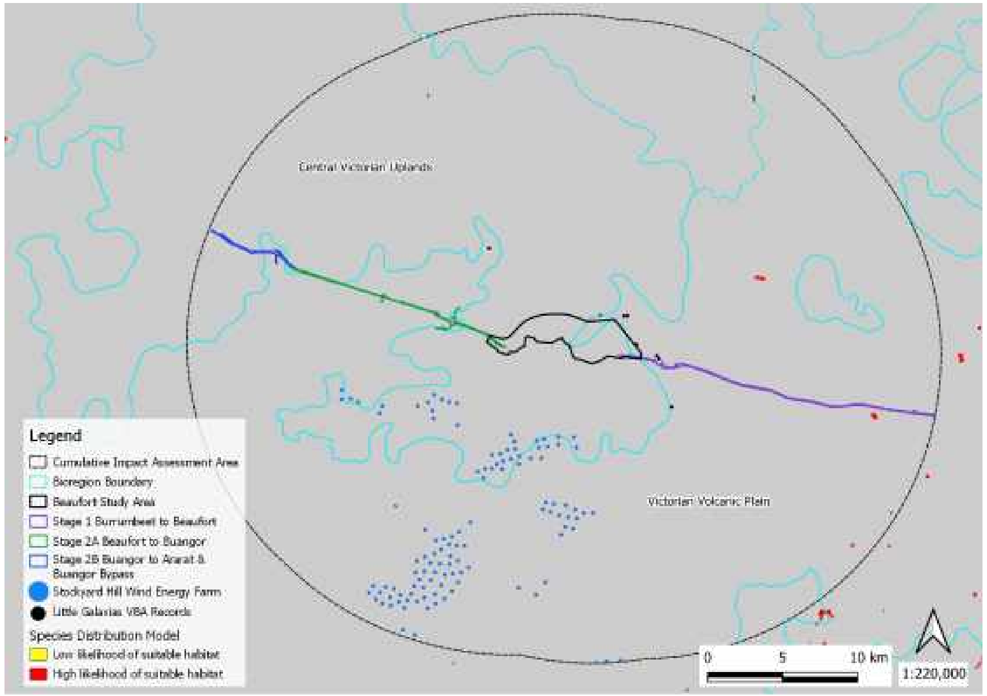
** Potential impact areas within the Beaufort Bypass Alignment options were determined from WSP mapped habitat for the species. Impact areas for the other four projects were determined using the Little Galaxias species distribution model (DELWP 2017b)*

*** All areas determined from Little Galaxias species distribution model (DELWP 2017b)*

^ Central Victorian Uplands Bioregion

^^ Victorian Volcanic Plains Bioregion

VBA Little Galaxias records and DELWP modelled distribution across Vic



VBA Little Galaxias records and DELWP modelled distribution in broader 20km local area

SUMMARY OF RESULTS

The total amount of potential cumulative impact to Little Galaxias habitat ranges between 0.63 to 2.02 ha. Some creeklines with Little Galaxias were affected by the Stage 2A Project – Beaufort to Buangor.

APPLICABILITY OF THIS SPECIES IN ALIGNMENT DECISION MAKING

There are some impacts on modelled habitat with up to 2.02 ha (4.08%) for C0 proposed with all alignments, however there are no significant impacts using modelled data in the CIAA as a result of other projects. With actual site observcation data, some creeklines with Little Galaxias were affected by the Stage 2A Project – Beaufort to Buangor and potential habitat may be affected for Little Galaxias in the study area across all alignments. Therefore, there is a minor potential cumulative impact, however it appears unlikely that a significant cumulative impact on Little Galaxias will occur as a result of the Beaufort Bypass and other projects.

N2.15 POWERFUL OWL, NINOX STRENUA

Table N.18 Cumulative Impact Assessment on Powerful Owl, *Ninox strenua*

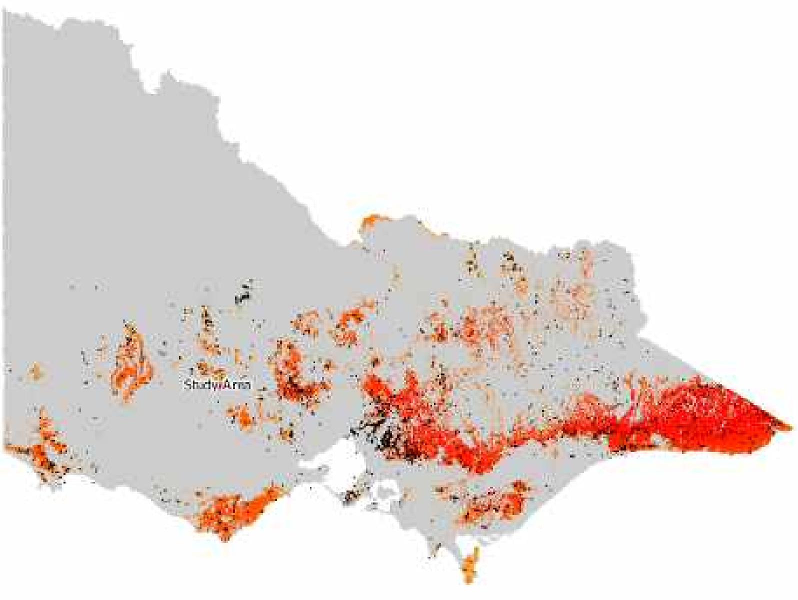
BEAUFORT ALIGNMENT OPTION	POTENTIAL IMPACT AREA (HA) *					FOOTPRINT AREA (HA)			CUMULATIVE IMPACT (%) RELATIVE TO HABITAT EXTENT (HA)**			
	BEAUFORT BYPASS	STAGE 2A BEAUFORT TO BUANGOR	STAGE 1 BURRUMBEET TO BEAUFORT	STAGE 2B BUANGOR TO ARARAT & BUANGOR BYPASS	STOCKYARD HILL	IN THE CVU^	IN THE VVP^^	TOTAL CUMULATIVE IMPACT AREA	VICTORIA (2,772,229.65 HA)	CVU BIOREGION (225,811.46 HA)	VVP BIOREGION (49,669.43 HA)	CIAA (20KM BUFFER) (17,352.94 HA)
A0	35.03 ha	3.93 ha	0 ha The species distribution model did not intersect with this project	0 ha The species distribution model did not intersect with this project	7.94 ha	45.39 ha	1.51 ha	**46.90 ha**	< 0.01%	0.02%	< 0.01%	0.27%
A1	34.76 ha					45.12 ha	1.51 ha	**46.63 ha**	< 0.01%	0.02%	< 0.01%	0.27%
C0	35.38 ha					45.38 ha	1.87 ha	**47.25 ha**	< 0.01%	0.02%	< 0.01%	0.27%
C2	29.35 ha					39.22 ha	2.01 ha	**41.22 ha**	< 0.01%	0.02%	< 0.01%	0.24%

** Potential impact areas within the Beaufort Bypass Alignment options were determined from WSP mapped Victorian Temperate Woodland Bird Community (VTWBC) habitat. Impact areas for the other four projects were determined using the Powerful Owl distribution model (DELWP 2017b)*

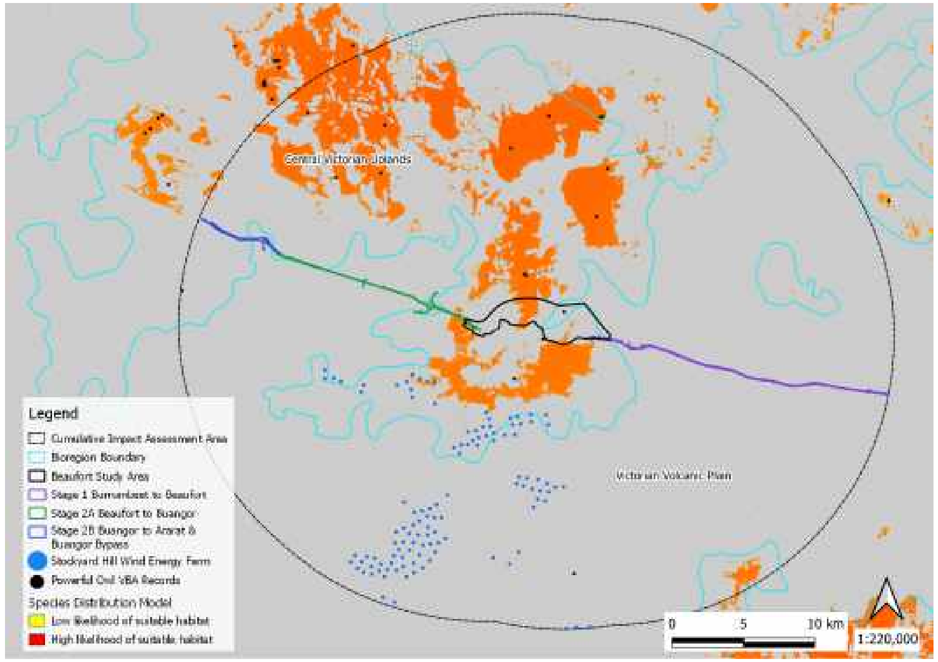
*** All areas determined from Powerful Owl distribution model (DELWP 2017b)*

^ Central Victorian Uplands Bioregion

^^ Victorian Volcanic Plains Bioregion



VBA Powerful Owl records and DELWP modelled distribution across Vic



VBA Powerful Owl records and DELWP modelled distribution in broader 20km local area

SUMMARY OF RESULTS

The total amount of potential cumulative impact to Powerful Owl habitat ranges between 41.22 to 47.25 ha, of which the majority occurs within the Beaufort Bypass study area. Very little habitat is affected by the other four projects.

APPLICABILITY OF THIS SPECIES IN ALIGNMENT DECISION MAKING

There are some impacts on modelled habitat proposed with all alignments and known habitat likely to be removed in the Beaufort Bypass study area, however there are no substantial impacts anticipated in the CIAA as a result of other projects. Therefore, it appears unlikely that a significant cumulative impact on Powerful Owl will occur as a result of the Beaufort Bypass and other projects.

N2.16 VICTORIAN TEMPERATE WOODLAND BIRD COMMUNITY

Table N.19 Cumulative Impact Assessment on Victorian Temperate Woodland Bird Community

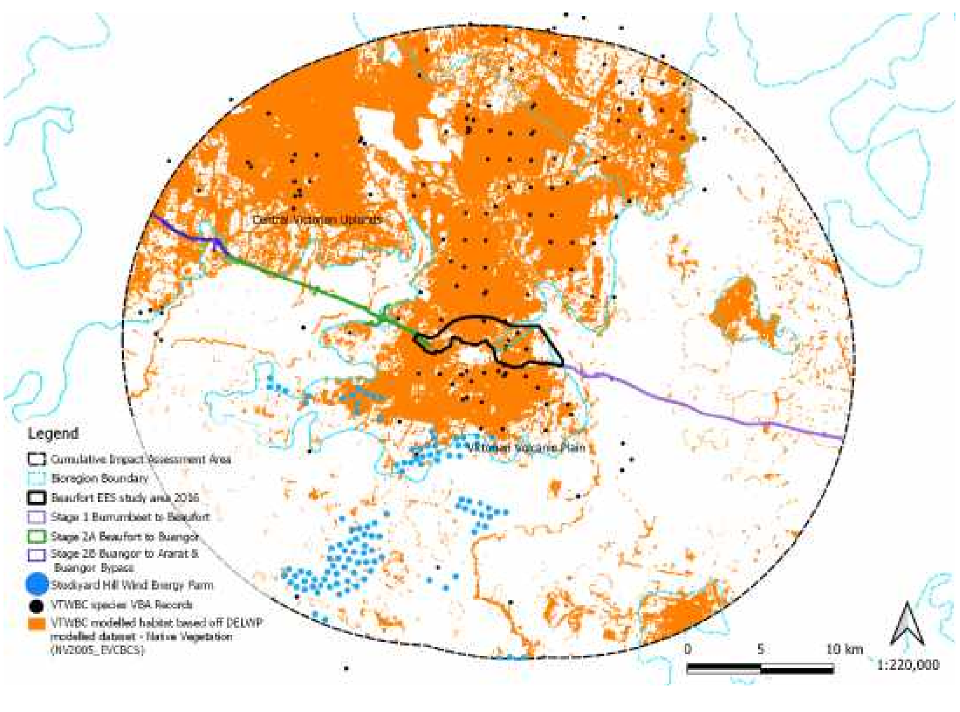
BEAUFORT ALIGNMENT OPTION	POTENTIAL IMPACT AREA (HA) *					FOOTPRINT AREA (HA)			CUMULATIVE IMPACT (%) RELATIVE TO HABITAT EXTENT (HA)**			
	BEAUFORT BYPASS	**STAGE 2A BEAUFORT TO BUANGOR**	**STAGE 1 BURRUMBEET TO BEAUFORT**	**STAGE 2B BUANGOR TO ARARAT & BUANGOR BYPASS**	**STOCKYARD HILL**	**IN THE CVU^**	**IN THE VVP^^**	**TOTAL CUMULATIVE IMPACT AREA**	**VICTORIA** DATA NOT AVAILABLE	**CVU BIOREGION** DATA NOT AVAILABLE	**VVP BIOREGION** DATA NOT AVAILABLE	**CIAA (20KM BUFFER)** (42,382.19 HA)
A0	38.43 ha	33.59 ha	2.45 ha	32.92 ha	27.91 ha	111.62 ha	23.69 ha	**135.31 ha**	-	-	-	0.32%
A1	38.09 ha					111.28 ha	23.69 ha	**134.97 ha**	-	-	-	0.32%
C0	37.59 ha					110.41 ha	24.05 ha	**134.46 ha**	-	-	-	0.32%
C2	31.56 ha					104.25 ha	24.19 ha	**128.44 ha**	-	-	-	0.30%

** Potential impact areas within the Beaufort Bypass Alignment options were determined from WSP mapped Victorian Temperate Woodland Bird Community (VTWBC) habitat. Impact areas for the other four projects were determined using the DELWP modelled dataset - Native Vegetation (NV2005_EVCBCS) which was modified to inlcude only woodland and forested areas*

*** All areas determined from a modified version of the DELWP modelled dataset - Native Vegetation (NV2005_EVCBCS) (DELWP 2017b)*

^ Central Victorian Uplands Bioregion

^^ Victorian Volcanic Plains Bioregion



Distribution of Victorian Temeprate Woodland Bird Community in broader 20km local area

SUMMARY OF RESULTS

The total amount of potential cumulative impact to Victorian Temperate Woodland Bird Community (VTWBC) ranges between 128.44 to 135.31 ha. This area, which is largely based on a manipulation of modelled vegetation data, is evenly distributed across all the projects, except Stage 1 – Burrumbeet to Beaufort (potential impact calculated to be 2.45 ha). However, VTWBC was not actually found in previous assessments for Stage 1 or Stage 2A duplications. According to mapped data within the Beaufort Study area, alignment C2 intersects the least amount of VTWBC habitat (31.56 ha).

APPLICABILITY OF THIS COMMUNITY IN ALIGNMENT DECISION MAKING

There are some impacts on assumed mapped habitat for VTWBC proposed with all alignments in the context of the CIAA showing similar levels of impact, however no significant impacts using modelled data in the CIAA as a result of other projects. As there are impacts to actual mapped habitat with all alignments and known habitat will likely be removed in the Beaufort study area, there is some cumulative impact resulting from the combined effect of these projects. To minimise the effect of cumulative impacts, the alignment with the lowest impacts should be considered (C2).

It is important to note that there is no layer available for VTWBC. The area within the Beaufort study area was based off mapped habitat collected by ecologists in the field. In contrast, the area of VTWBC across the CIAA was created using DELWP's modelled layer *Native Vegetation (NV2005_EVCBCS)*, whereby the modelled presence of woodland and forested EVCs were used as surrogates for the area of VTWBC. Therfore, the area of impact suggested in the table above is likely to have been overestimated and is not a reliable way of assessing potential CIA impacts on this listed community.

N2.17 SEASONAL HERBACEOUS WETLANDS (FRESHWATER) OF THE TEMPERATE LOWLAND PLAINS

Table N.20 Cumulative Impact Assessment on Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

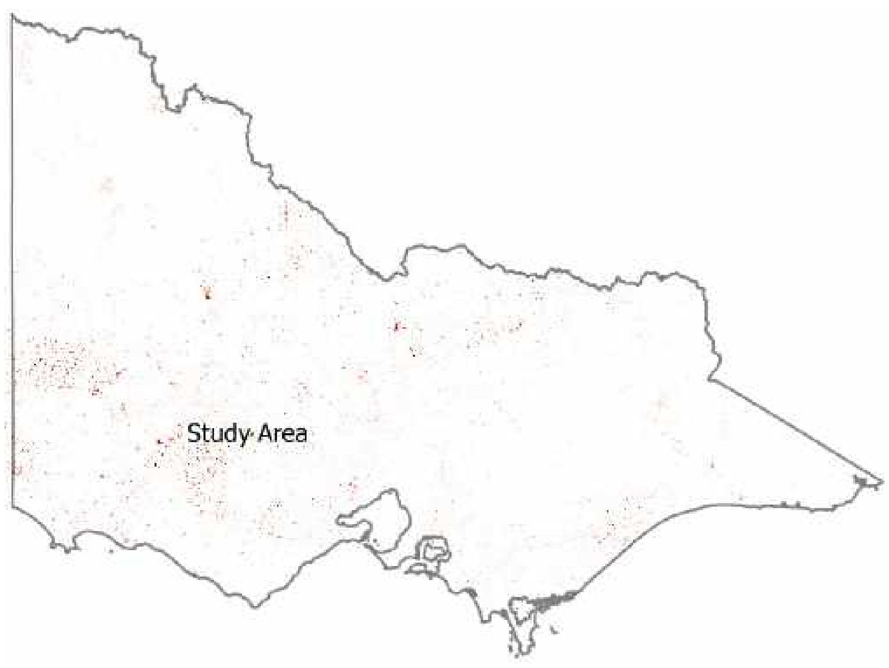
BEAUFORT ALIGNMENT OPTION	POTENTIAL IMPACT AREA (HA) *					FOOTPRINT AREA (HA)			CUMULATIVE IMPACT (%) RELATIVE TO HABITAT EXTENT (HA)**			
	BEAUFORT BYPASS	STAGE 2A BEAUFORT TO BUANGOR	STAGE 1 BURRUMBEET TO BEAUFORT	STAGE 2B BUANGOR TO ARARAT & BUANGOR BYPASS	STOCKYARD HILL	IN THE CVU^	IN THE VVP^^	TOTAL CUMULATIVE IMPACT AREA	VICTORIA (847,257.87 HA)	CVU BIOREGION (54,451.78 HA)	VVP BIOREGION (150,046.10 HA)	CIAA (20KM BUFFER) (12,705.54 HA)
A0	0.06 ha	13.36 ha	7.76 ha	9.42 ha	16.26 ha	14.22 ha	32.63 ha	**46.85 ha**	0.01%	0.03%	0.02%	0.37%
A1	0.06 ha					14.23 ha	32.63 ha	**46.86 ha**	0.01%	0.03%	0.02%	0.37%
C0	2.85 ha					14.23 ha	35.42 ha	**49.65 ha**	0.01%	0.03%	0.02%	0.39%
C2	0.06 ha					14.23 ha	32.63 ha	**46.85 ha**	0.01%	0.03%	0.02%	0.37%

** Potential impact areas within the Beaufort Bypass Alignment options were determined from WSP mapped Seasonal Herbaceous Wetland habitat. Impact areas for the other four projects were determined using the Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains model (DELWP 2017b)*

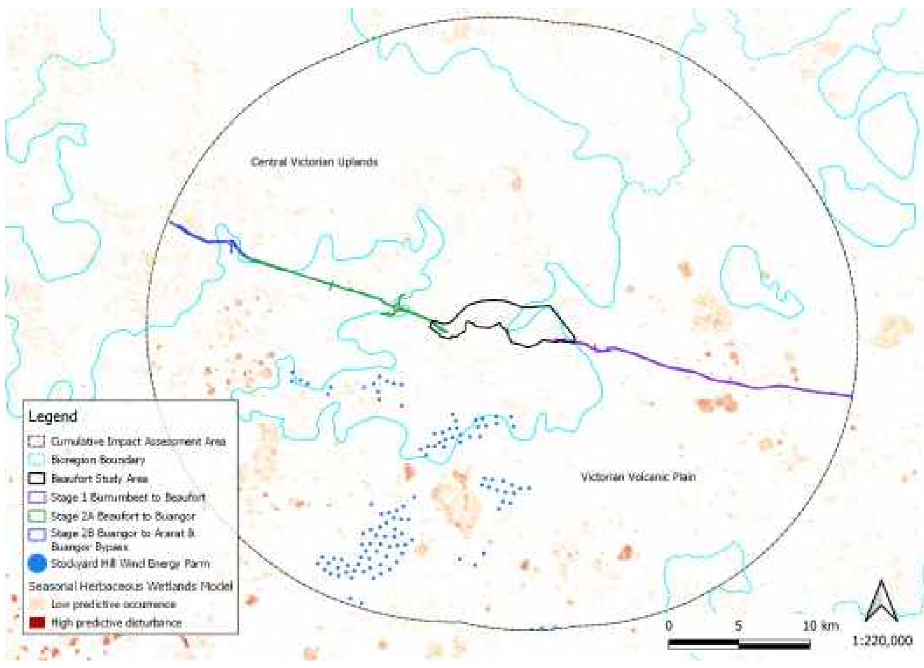
*** All areas determined from Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains model (DELWP 2017b)*

^ Central Victorian Uplands Bioregion

^^ Victorian Volcanic Plains Bioregion



DELWP modelled distribution of Seasonal Herbaceous Wetlands across Victoria



DELWP modelled distribution of Seasonal Herbaceous Wetlands in broader 20km local area

SUMMARY OF RESULTS

The total amount of potential cumulative impact to Seasonal Herbaceous Wetlands modelled extent ranges between 46.85 to 49.65 ha, of which the majority occurs outside the Beaufort study area. However, Seasonal Herbaceous Wetlands were not actually identified in any other project which may be due to the lack of quality wetlands in those project areas or the relatively recent listing of this community. There will still be impacts within the Beaufort study area on modelled and known wetlands, therefore the alignments with the lower impacts A0, A1 and C2 should be preferenced over C0.

APPLICABILITY OF THIS COMMUNITY IN ALIGNMENT DECISION MAKING

There are some impacts on modelled habitat proposed with all alignments and known habitat will likely be removed in the Beaufort study area, however there are no substantial impacts anticipated in the CIAA as a result of other projects. Therefore, it appears unlikely that a significant cumulative impact on Seasonal Herbaceous Wetlands will occur as a result of the Beaufort Bypass and other projects.

N2.18 NATIVE VEGETATION (NV2005_EVCBCS)

Table N.21 Cumulative Impact Assessment on Native Vegetation

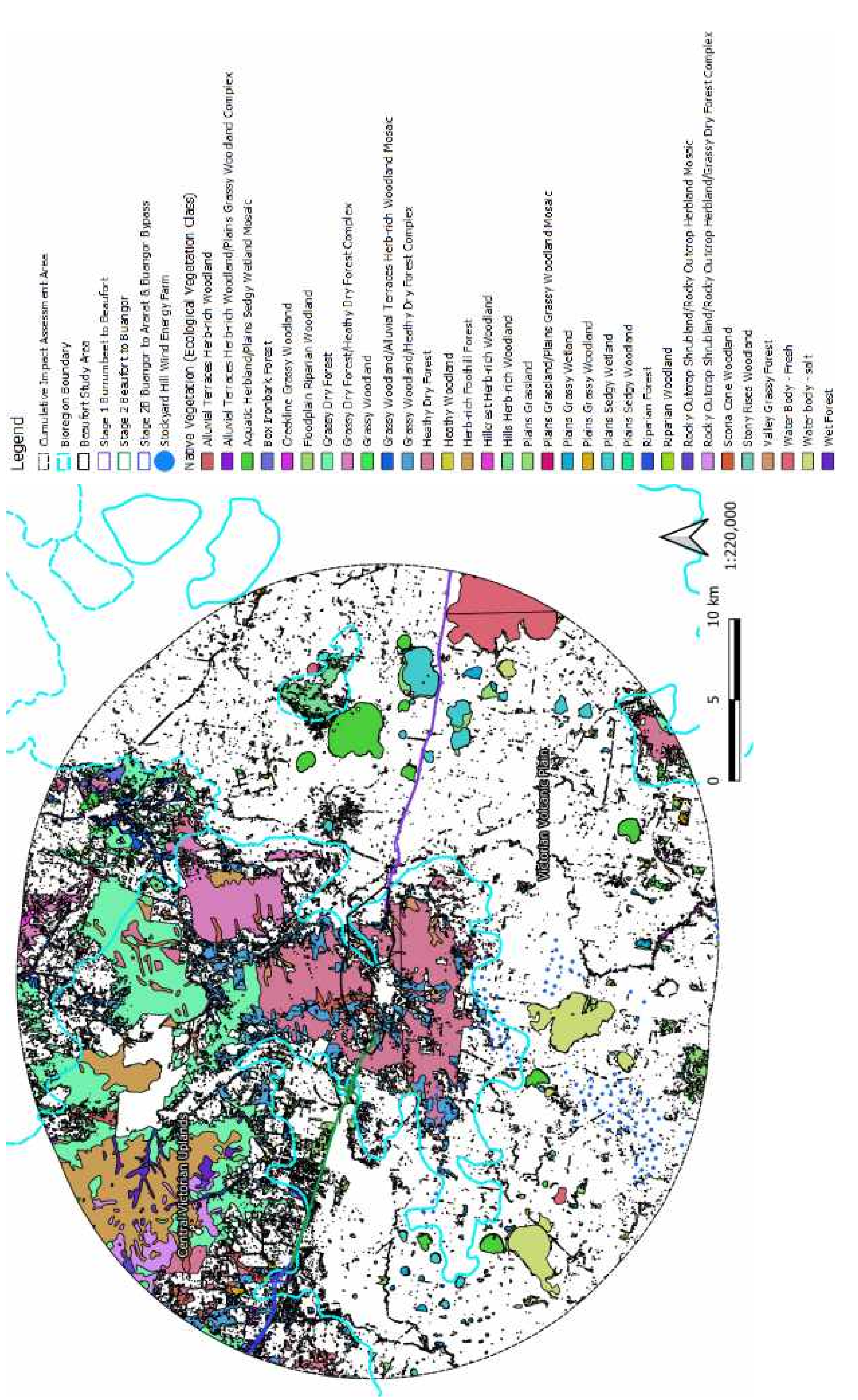
BEAUFORT ALIGNMENT OPTION	POTENTIAL IMPACT AREA (HA) *					FOOTPRINT AREA (HA)			CUMULATIVE IMPACT (%) RELATIVE TO HABITAT EXTENT (HA)**			
	BEAUFORT BYPASS	STAGE 2A BEAUFORT TO BUANGOR	STAGE 1 BURRUMBEET TO BEAUFORT	STAGE 2B BUANGOR TO ARARAT & BUANGOR BYPASS	STOCKYARD HILL	IN THE CVU^	IN THE VVP^^	TOTAL CUMULATIVE IMPACT AREA	VICTORIA (10,732,139.45 HA)	CVU BIOREGION (577,833.94 HA)	VVP BIOREGION (347,993.49 HA)	CIAA (20KM BUFFER) (53,441.81 HA)
A0	57.49 ha	57.78 ha	16.25 ha	35.75 ha	30.53 ha	128.97 ha	68.82 ha	**197.80 ha**	< 0.01%	0.02%	0.02%	0.37%
A1	57.14 ha					128.62 ha	68.82 ha	**197.44 ha**	< 0.01%	0.02%	0.02%	0.37%
C0	58.22 ha					125.85 ha	72.68 ha	**198.53 ha**	< 0.01%	0.02%	0.02%	0.37%
C2	46.40 ha					116.01 ha	70.69 ha	**186.70 ha**	< 0.01%	0.02%	0.02%	0.35%

** Potential impact areas within the Beaufort Bypass Alignment options were determined from WSP mapped areas of native vegetation. Impact areas for the other four projects were determined using the DELWP modelled dataset - Native Vegetation (NV2005_EVCBCS) (DELWP 2017b)*

*** All areas determined from Native Vegetation (NV2005_EVCBCS) dataset (DELWP 2017b)*

^ Central Victorian Uplands Bioregion

^^ Victorian Volcanic Plains Bioregion



DELWP modelled distribution of Native Vegetation in broader 20km local area

SUMMARY OF RESULTS

The total amount of potential cumulative impact to native vegetation modelled extent ranges between 186.70 to 198.53 ha. Actual amounts of native vegetation impacts vary considerably to mapped data however it was not possible to attain these datasets used in the ‘as built’ designs. Regardless of the accuracy, given that there has been native vegetation impacted in other projects in the CIAA, there is some level of cumulative impact. Within the CIAA, this constitutes 0.35 to 0.37% removal of native vegetation. The percentage of the CIAA does not appear to be substantial, however, as there has been other native vegetation affected in the CIAA, consideration of the alignments with the lowest level of impact should be made in the context of cumulative impacts. C2 has the lowest level of impacts in the CIAA compared with the other three alignments which are relatively similar.

APPLICABILITY OF THIS DATASET IN ALIGNMENT DECISION MAKING

There are some impacts on modelled native vegetation proposed with all alignments and known native vegetation is likely to be removed in the Beaufort study area, along with native vegetation affected in the other four projects in the CIAA. Therefore, there is some cumulative impact resulting from the combined effect of these projects. To minimise the effect of cumulative impacts, the alignment with the lowest impacts should be considered (C2).

N2.19 NATUREPRINT

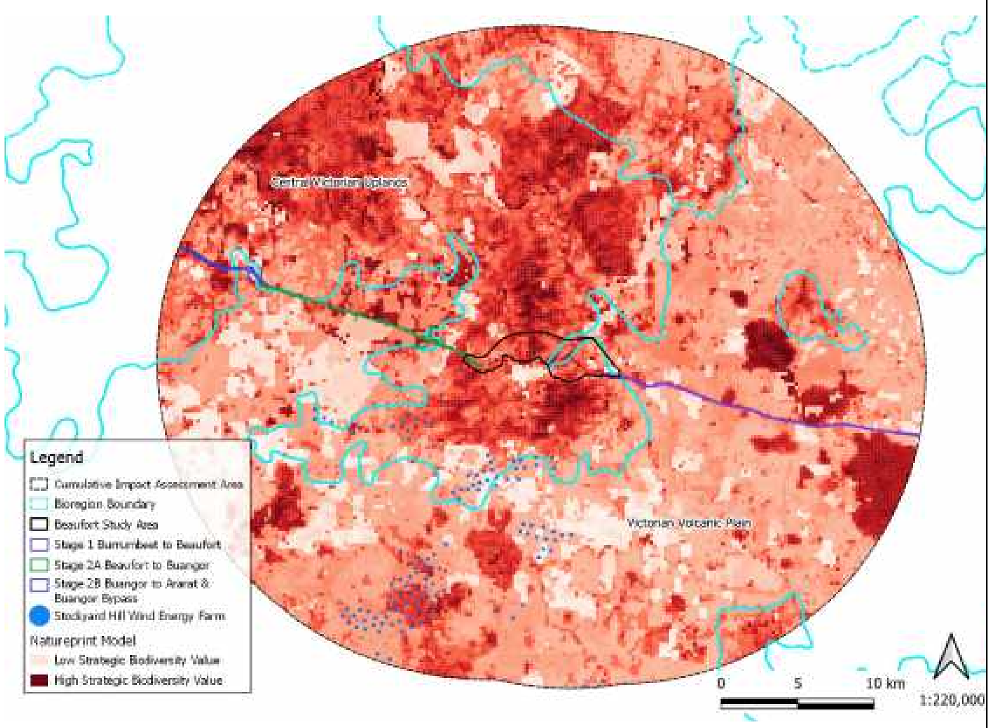
Table N.22 Cumulative Impact Assessment using the NaturePrint dataset

BEAUFORT ALIGNMENT OPTION	POTENTIAL IMPACT AREA (HA)* AND AVERAGE STRATEGIC BIODIVERSITY VALUE SCORE (/100)					FOOTPRINT AREA (HA)			CUMULATIVE IMPACT (%) RELATIVE TO HABITAT EXTENT (HA)*			
	BEAUFORT BYPASS	STAGE 2A BEAUFORT TO BUANGOR	STAGE 1 BURRUMBEET TO BEAUFORT	STAGE 2B BUANGOR TO ARARAT & BUANGOR BYPASS	STOCKYARD HILL	IN THE CVU^	IN THE VVP^^	TOTAL CUMULATIVE IMPACT AREA	VICTORIA (22,716,647.99 HA)	CVU BIOREGION (1,206,750.44 HA)	VVP BIOREGION (2,354,062.38 HA)	CIAA (20KM BUFFER) (173,877.50 HA)
A0	132.61 ha (57)	119.81 ha (65)	171.53 ha (47)	74.75 ha (59)	360.20 ha (43)	316.30 ha	542.60 ha	**858.90 ha (54)**	< 0.01%	0.03%	0.02%	0.49%
A1	132.12 ha (56)					315.81 ha	542.60 ha	**858.41 ha (54)**	< 0.01%	0.03%	0.02%	0.49%
C0	127.57 ha (61)					314.58 ha	539.28 ha	**853.86 ha (55)**	< 0.01%	0.03%	0.02%	0.49%
C2	138.22 ha (58)					317.97 ha	546.54 ha	**864.51 ha (54)**	< 0.01%	0.03%	0.02%	0.50%

* *Impact areas for all projects (including the Beaufort Bypass) were determined using the DELWP modelled dataset - Natureprint V4.0 Strategic Biodiversity Values (DELWP 2017b)*

^ *Central Victorian Uplands Bioregion*

^^ *Victorian Volcanic Plains Bioregion*



DELWP Natureprint Model in broader 20km local area

SUMMARY OF RESULTS

The Beaufort study area and the two road projects to the west are situated in a region of higher modelled Strategic Biodiversity Value (SBV) compared to other areas within the CIAA such as the location of Stockyard Hill Windfarm and Burrumbeet to Beaufort upgrade. In this instance, it appears that areas of higher SBV are largely synonymous with the Central Victorian Uplands Bioregion. The results for the Beaufort alignment options were very similar with a difference in average SBV score of only five separating C0 (61) and A1 (56).

APPLICABILITY OF THIS DATASET IN ALIGNMENT DECISION MAKING

There are some impacts on modelled habitat proposed with all alignments ranging from 853.86 to 864.51 ha, however, being a modelled dataset with values much higher than the native vegetation values presented above, highlights the lack of reliability of this dataset for this purpose.

N2.20 CONCLUSION

This assessment aimed to undertake GIS analyses of modelled and, where available, mapped data for certain threatened species and ecological communities determined to have a moderate or higher likelihood of occurrence within the Beauport Bypass study area. The purpose of the assessment was to holistically assess the potential for cumulative impacts on these threatened species and communities as a result of the proposed Beaufort Bypass in conjunction with the following projects:

- Stage 1 of the Western Highway Upgrade (Burrumbeet to Beaufort)
- Stage 2A of the Western Highway Upgrade (Beaufort to Buangor)
- Stage 2B – Buangor to Ararat & Buangor Bypass
- Stockyard Hill Wind farm.

Of the six flora species that were assessed, only one, Yarra Gum, was determined likely to be affected by minor cumulative impacts from the five projects within the CIAA. For the other five flora species, it is unlikely that a cumulative impact will occur. This is either because the Beaufort Bypass is not expected to remove any known populations or individuals of these species or, in instances where plant populations may be removed, no other populations were affected as a result of the other projects within the CIAA.

Impacts to Brown Toadlet and Golden Sun Moth modelled and known habitat within the Beaufort study area and the additional impacts associated with the Stage 2A upgrade and Growling Grass Frog at Stockyard Hill are likely to result in a minor cumulative impact to the species. However, they are not anticipated to be significant given that the anticipated impact to each species comprises less than 1% of their distribution modelled to occur within the CIAA. A minor cumulative impact is also anticipated to a local Brolga population in the Yam Holes Creek Valley.

Impacts on modelled Seasonal Herbaceous Wetland habitat are proposed with all four Beaufort alignments, however no substantial impacts in the CIAA have occurred as a result of other projects so a cumulative impact is considered unlikely. In contrast, native vegetation and mapped VTWBC habitat has/will be affected by all projects within the CIAA. As a result, a cumulative impact resulting from the combined effect of these projects is anticipated.

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APPENDIX O

THREATENED SPECIES TARGETED ASSESSMENTS REPORT – 2015

VICROADS

THREATENED SPECIES TARGETED ASSESSMENTS

May 2016

BEAUFORT BYPASS

Q46/07221

Threatened Species Targeted Assessments

BEAUFORT BYPASS

Vicroads

Project no: 2267031A-ENV-REP-001 RevB.docx

Rev	Date	Details
A	28/01/2016	Draft report
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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PHOTOGRAPHS

LIST OF APPENDICES

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GLOSSARY

Biodiversity	The biological diversity of life is commonly regarded as being made up of the following three components: → Genetic diversity — the variety of genes (or units of heredity) in any population. → Species diversity — the variety of species. → Ecosystem diversity — the variety of communities or ecosystems.
Bioregion (region)	A bioregion defined in a national system of bioregionalisation. The majority of the Study Area falls within the Central Victorian Uplands bioregion with smaller areas covered by the Victorian Volcanic Plain bioregion.
CMA	Catchment Management Area.
Department of Environment, Land, Water and Planning (DELWP)	This department was formerly known as: → Department of Environment and Primary Industries (DEPI) → Department of Planning, Local Government, and Property and Land Titles (DTPLI).
Department of the Environment (DoE)	The department develops and implements national policy, programs and legislation to protect and conserve Australia's natural environment and cultural heritage and administers the EPBC Act. The Commonwealth Department of the Environment was previously known as: → Department of Sustainability, Environment, Water, Population and Communities (SEWPAC). → Department of the Environment, Water, Heritage and the Arts (DEWHA). → Department of Environment and Heritage (DEH). → Department of the Environment and Water Resources (DEWR).
Ecological community	An assemblage of species occupying a particular area.
Ecological Vegetation Class (EVC)	A type of native vegetation classification that is described through a combination of its floristics, life form and ecological characteristics, and through an inferred fidelity to particular environmental attributes. Each EVC includes a collection of floristic communities (i.e. lower level in the classification that is based solely on groups in the same species) that occur across a biogeographic range, and although differing in species, have similar habitat and ecological processes operating.
EES	Environment Effects Statement
Elliot Trapping	Aluminium box-style folding trap made and used to trap small marsupials and rats.
Environmental weed	Any plant that is not native to a local area that has invaded native vegetation.
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.*
Exotic	Introduced from outside the area . Used in the context of this report to refer to species introduced from overseas.
Funnel trap	Reptile trap for fauna surveys
Fyke Nets	A bag net for catching fish

GPS	Global Positioning System- a navigational tool which uses radio receivers to pick up signals from four or more special satellites to provide precise determination of location.
Habitat	An area or areas occupied, or periodically or occasionally occupied, by a species, population or ecological community, including any biotic or abiotic components.
Hair tube trapping	Device designed to capture mammalian hair on a specially developed sticky sampling wafer. Subsequent analysis of the captured hair sample enables reliable identification of many species of small to medium mammals.
Indigenous	Native to the area: not introduced.
Introduced	Not native to the area: not indigenous. Refers to both exotic and non-indigenous Australian native species of plants and animals.
Likely	Taken to be a real chance or possibility.
Local population	The population that occurs within the site, unless the existence of contiguous or proximal occupied habitat and the movement of individuals or exchange of genetic material across the boundary can be demonstrated.
Locality	The area within a 10 km radius of the site.
Migratory species	Species listed as Migratory under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* relating to international agreements to which Australia is a signatory. These include Japan-Australia Migratory Bird Agreement, China-Australia Migratory Bird Agreement, Republic of Korea-Australia Migratory Bird Agreement and the Bonn Convention on the Conservation of Migratory Species of Wild Animals. Capitalisation of the term ‘Migratory’ in this report refers to those species listed as Migratory under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.*
Matters of National Environmental Significance (MNES)	The following Matters of National Environmental Significance are protected under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act): listed threatened species and communities, listed Migratory species, Ramsar wetlands of international importance, Commonwealth marine environment, World Heritage Properties, National Heritage Places, the Great Barrier Reef Marine Park and nuclear actions.
Nocturnal call playback	A survey technique undertaken (at night) which attempts to stimulate fauna species to call by imitating or playing their call at probable breeding sites.
Noxious weed	An introduced species listed under the Noxious Weeds Act 1993. Under the Act, noxious weeds have specific control measure and reporting requirements.
P&E Act	*Planning and Environment Act 1987*
Potentially Threatening Processes	The state equivalents of Key Threatening Processes, Potentially Threatening Processes are listed under Section 10 of the *Flora and Fauna Guarantee Act 1988* (FFG Act).
Protected species	Those species defined as protected under the National Parks and Wildlife Act 1974. Includes all native animals, as well as all native plants listed on Schedule 13 of the National Parks and Wildlife Act 1974.

Recovery plan	A plan prepared under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 to assist the recovery of a Threatened species, population or ecological community.
Remnant Patch	An area of vegetation, with or without trees, where less than 75% of the total understorey plant cover is weeds or non-native plants (bare ground is not included). That is at least 25% of the understorey cover is native; or a group (i.e. three or more) of trees where the tree canopy cover is at least 20%.
Revegetation	Establishment of native vegetation to a minimum standard in formerly cleared areas, outside of a Remnant Patch
Significant	Important, weighty or more than ordinary; typically used to describe the importance of a species or community at local, regional, state or federal levels.
Species richness	Species richness is simply the number of species present in a sample, community, or taxonomic group. Species richness is one component of the concept of species diversity, which also incorporates evenness, that is, the relative abundance of species.
Spp.	Abbreviation of species
Study area	The study area is the area of contained between the Western Highway to the east and west of Beaufort township to the north of Camp Hill State Forest.
Subsp.	Abbreviation for subspecies
The project	The project is located on the eastern, northern and western outskirts of the Beaufort township. Preliminary bypass alignments have been identified within a broader investigation corridor (the study area). The eastern end of the study area joins to the duplicated section of the Western Highway immediately east of Beaufort and the western end ties in with the currently under construction (as of late 2015) section of the of the Western Highway duplication west of Beaufort.
Threatened species, populations and ecological communities	Species, populations and ecological communities listed as Vulnerable, Endangered or Critically Endangered (collectively referred to as Threatened) under the TSC Act, FM Act or the EPBC Act. Capitalisation of the terms ‘Threatened’, ‘Vulnerable’, ‘Endangered’ or ‘Critically Endangered’ in this report refers to listing under the relevant state and/or Commonwealth legislation.
Weed	A plant growing out of place or where it is not wanted: often characterized by high seed production and the ability to colonise disturbed ground quickly. Weeds include both exotic and Australian native species of plant naturalised outside of their natural range.

EXECUTIVE SUMMARY

Introduction

WSP | Parsons Brinckerhoff has been engaged by VicRoads to undertake Threatened Species Targeted Assessments along three preliminary alignment options (Option B4-A, Option B4-B and Option B5) for the proposed Beaufort Bypass. This study will contribute to the planning for the ultimate construction of a dual carriageway along a new alignment around the town of Beaufort. The bypass will be constructed to a freeway standard and will link the currently under construction Western Highway duplication to the east and west of Beaufort, as well as connections to major intersecting roads.

The purpose of this study is to build upon previous investigations completed within the study area, undertake targeted surveys of threatened flora and fauna species, assess all fieldwork data and information from relevant literature and databases against relevant policy and legislation and evaluate the potential impacts and potential impact mitigation measures.

Study area

The study area is located within Pyrenees Shire Council and extends for approximately 9km from the eastern end to the western end of the Beaufort township. The proposed alignments occur across a patchwork of landscapes including cleared agricultural freehold land, vegetated privately owned land, state forests and a bushland reserve, private mine tenements and roadsides. The majority of the study area falls within the Central Victorian Uplands bioregion with smaller areas covered by the Victorian Volcanic Plain bioregion in two eastern areas (Department of Environment Land, Water and Planning 2016a).

The study area supports a number of native vegetation communities (Ecological Vegetation Classes): Valley Grassy Forest, Plains Grassland, Alluvial Terraces Herb-rich Woodland, Heathy Dry Forest, Grassy Dry Forest and a number of mosaics between several aforementioned Ecological Vegetation Classes. Wetland Ecological Vegetation Classes include Plains Sedgy Wetland, Plains Grassy Wetland and Aquatic Herbland. There are extensive areas of cleared land throughout the study area and preliminary alignments, of which some contains modified native vegetation or unimproved pasture with >25% perennial native vegetation. Additionally there are many scattered trees throughout the various alignments, of which many would be classified as large or very large old trees.

Methods

A review of previous ecological and environmental studies in the area was undertaken. Previous ecological survey work for the Western Highway duplication projects between Burrumbeet and Ararat had identified a number of flora and fauna species and communities of state and national significance (EHP 2014). A target list of threatened flora and fauna species and a vegetation community was derived from these earlier investigation and a preliminary flora and fauna investigation (GHD 2015).

A search of biological databases including the Victorian Biodiversity Atlas and the Protected Matters Search Tool, along with updated likelihood of occurrence estimates based on field surveys in this study was undertaken.

Flora

The majority of the flora surveys were undertaken between 16 November 2015 to 22 November 2015 with an additional survey undertaken on 29 November 2015. The majority of the survey methods involved targeted searches of suitable habitat for each of the target species by using random meander, parallel line traverses and to a lesser extent the timed meander.

Fauna

The majority of the fauna surveys were undertaken between 20 November 2015 to 2 December 2015 with additional Golden Sun Moth surveys undertaken on 24 December 2015. Detailed fauna surveys (mostly terrestrial) included the following standardised survey techniques; Elliott trapping, remote camera trapping, hair tube trapping, spotlighting, nocturnal call playback (amphibians and owls), diurnal birds surveying, nocturnal bird surveying, Golden Sun Moth surveying, fauna habitat assessment, as well as recording any incidental observations or evidence of fauna.

Aquatic fauna

The targeted surveys were undertaken on the 16, 17 and 28 November 2015. Potential targeted aquatic fauna survey sites were initially identified based on the results of the 2015 rapid field assessment (GHD 2015) comprised of 45 sites with additional sites located in this study.

The survey methods used for the survey aligned with standardised survey protocols which included dip-netting, bait traps and fyke nets (fish trap).

Results

Flora

The field surveys identified:

- Five significant flora species:
  - Ben Major Grevillea (listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the *Victorian Flora and Fauna Guarantee Act 1988*)
  - Matted Flax-lily (listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the *Victorian Flora and Fauna Guarantee Act 1988*)
  - River Swamp Wallaby-grass (listed under Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*)
  - Yarra Gum (rare in Victoria)
  - Snow Gum (of local significance).
- Three threatened ecological communities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*:
  - White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland
  - Natural Temperate Grassland of the Victorian Volcanic Plain
  - Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains.

The records of both Matted Flax-lily and River Swamp Wallaby-grass are new for the region with the nearest records near Ballarat.

Given there are previous records in or near the preliminary alignment options, there is also a very high likelihood of two other rare species, the Victoria Rough Wattle and Emerald-lip Orchid within the surveys areas. However, they were not found during surveys. There is also a moderate likelihood of the Spiral Sun-orchid (listed under State and Commonwealth legislation), Candy Spider-orchid (listed under State and Commonwealth legislation), Golden Cowslips (listed under State legislation), Swamp Everlasting (listed under State and Commonwealth legislation) and Swamp Fireweed (listed under State and Commonwealth legislation). No orchids were found during the surveys as anticipated due to the later time in the year to commence surveying. The understory and ground vegetation was very dry which may have influenced the growth patterns of various orchids. However, a number of areas, particularly through the Camp Hill State Forest, private land north of the rail reserve near Packham’s Lane, along the rail reserve and some road reserves, have potential habitat for several of the rare or threatened orchid species. Follow up targeted survey areas for those orchids is recommended.

Fauna

Of the 15 species targeted for survey, the field surveys identified five threatened fauna species listed under the *Victorian Flora and Fauna Guarantee Act 1988:* Bibron's Toadlet, Brush-tailed Phascogale, Squirrel Glider, Brolga and Golden Sun Moth (also listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*). In addition, Brown Treecreeper (listed as near threatened in Victoria) was also recorded along with areas assessed as meeting the Victorian Temperate Woodland Bird Community listed under the *Flora and Fauna Guarantee Act 1988*.

There is also a very high likelihood of two other threatened fauna to occupy parts of the study area given the presence of suitable habitat and recent recordings from 2011:

- Growling Grass Frog (listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the Victorian *Flora and Fauna Guarantee Act 1988*) and
- Powerful Owl (listed under the Victorian *Flora and Fauna Guarantee Act 1988*).

There is also a moderate likelihood for a number of other significant fauna species to occupy parts of the study area.

Aquatic fauna

No target threatened aquatic species (Little Galaxias or Yarra Pygmy Perch) were identified during surveys undertaken for this study. This was unsurprising given that the weather leading up to the survey was hot and dry with no significant rainfall. Therefore many of the waterways and water bodies in the study area were dry or retracting rapidly due to evaporation. However, there is a very high likelihood that Little Galaxias occupy parts of the study area, particularly along Yam Holes Creek, at least when there are higher water levels through the creeks and wetlands.

Legislative implications

Depending on the alignment adopted, the project has the potential to impact on a number of Matters of National Environmental Significance (listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999)* such as the species and communities known to exist in the study area: Matted Flax-lily, River Swamp Wallaby-grass, Ben Major Grevillea, White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland, Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains, Natural Temperate Grassland of the Victorian Volcanic Plain, Golden Sun Moth, Growling Grass Frog and Little Galaxias.

Again, depending on the alignment adopted, the project has the potential to impact on ecological values listed under the Victorian *Flora and Fauna Guarantee Act 1988* including: eight listed fauna species, two flora species and two communities within or in close proximity to the alignments, some of which are on public land. In the scenario that these would be impacted, a management authority (permit) from the Victorian Department of Environment, Land, Water and Planning would be required.

According to the Permitted Clearing of Native Vegetation – Biodiversity Assessment Guidelines, the 'location risk' is to be considered in relation to native vegetation proposed to be removed. Location risk has been determined for all locations in Victoria. The Biodiversity Assessment Guidelines note that native vegetation will be in Location A, Location B or Location C (shown on the Native Vegetation Location Risk Map). The majority of the study area is covered by Location A with patches of Location C in the areas of the Camp Hill State Forest and the Snow Gums Bushland Reserve. Due to the scale of native vegetation and scattered tree removal for any of the alignment options, the application would be assessed as a high risk-based pathway application and would be referred to the Victorian Department of Environment, Land, Water and Planning.

Potential impacts and mitigation

Based on the preliminary alignment options, the following vegetation losses estimated for each alignment are 51.8ha (B4A + B4C), 48.4ha (B4B + B4C) and 51.9ha (B5A + B5B), as defined as 'remnant' under *Permitted Clearing of native vegetation: biodiversity assessment guidelines* (Department of Environment and Primary Industries 2013).The remnant native vegetation clearing areas by ecological vegetation classes are based on GHD (2015) with updates from this report. There is a clear distinction between the impacts on native vegetation on the alignment options, with B4-B having the least impact (48.4ha), B4-A having the middle (51.8ha) and B5 having the greatest potential impact (51.9ha). Conversely, B5 appears to have less potential impacts on threatened flora species and communities than B4-A and B4-B, but would still impact on Matters of National Environmental Significance and Flora Fauna Guarantee Act species and communities. The difference in the impact from the alignment options on fauna species and habitats is more obscure with no option necessarily more preferable to the other. Table ES.1 provides a summary of the impacts for all alignment. The information contained in this report does not conclusively identify a single most preferable option from an ecological perspective.

There is significant native vegetation and fauna habitat within and adjacent to the preliminary alignment options that is known to support Commonwealth and Victorian listed species and communities and potentially supports more species. Wherever possible, the route selection should be based on avoiding and minimising impacts on vegetation and fauna habitat, as stated in relevant environmental legislation and policy. A range of broad measures are provided in this report which aim to reduce and / or mitigate potential impacts to threatened species and their habitat.

Based on the findings of this assessment, several recommendations for further targeted surveys for threatened flora and fauna are provided.

Table ES.1 Summary of the potential impacts of different options on threatened flora, fauna and ecological communities

Option	Section	Potential impacts on threatened flora and habitats	Potential impacts on threatened aquatic fauna and habitats on threatened fauna and habitats	Potential impacts on threatened fauna and habitats
B4	A	→ 2 x Matted Flax-lily patches → Several other Matted Flax-lily patches close the alignment footprint → Areas of the Commonwealth listed community Natural Temperate Grassland of the Victorian Volcanic Plain along the Western Highway and the State listed Western (Basalt) Plains Natural Temperate Grassland (including 0.5 hectares to be cleared) → Areas of the Commonwealth-listed community White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (including 0.5 hectares to be cleared). → Direct impact and indirect impacts on the catchment areas and hydrology of Commonwealth listed Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (including 0.4 hectares to be cleared).	→ Potential impacts to little galaxias and/or its habitat where alignment crosses Yam Holes Creek	→ Species associated with Victorian Temperate Woodland Community i.e. Brown Treecreeper etc – State listed → Areas of known habitat for Growling Grass Frog – Commonwealth and State listed
	B	→ Areas of the Commonwealth listed community Natural Temperate Grassland of the Victorian Volcanic Plain along the Western Highway and the State listed Western (Basalt) Plains Natural Temperate Grassland along the Western Highway (including 0.8 hectares to be cleared). → Areas of the Commonwealth listed community White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland → Significantly fragment the vegetation and habitat of the Snowgums Bushland Reserve → Potential impact on Rough Wattle (if present – old record close to alignment)	→ Potential impacts to little galaxias and/or its habitat where alignment crosses Yam Holes Creek	→ Areas of known habitat for Growling Grass Frog – Commonwealth and State listed → Species associated with Victorian Temperate Woodland Community i.e. Brown Treecreeper etc – State listed → Powerful Owl – State listed

Option	Section	Potential impacts on threatened flora and habitats	Potential impacts on threatened aquatic fauna and habitats on threatened fauna and habitats	Potential impacts on threatened fauna and habitats
	C	→ Remove at least one previously recorded individual or population of Ben Major Grevillea → Potentially impact another population of Ben Major Grevillea recorded in this study and previous records close to the alignment → Significantly fragment the vegetation and habitat of the Camp Hill State Forest → Remove one population of River Swamp Wallaby-grass in a dam close to Main Leads Road → Remove one Matted Flax-lily along Back Raglan Road	→ None	Areas of known habitat and possibly individuals: → Squirrel Gilder – State listed → Brush-tailed Phascogale – State listed Species associated with Victorian Temperate Woodland Community i.e. Brown Treecreeper etc – State listed → Powerful Owl – State listed
B5	A	→ Areas of the Commonwealth-listed community Natural Temperate Grassland of the Victorian Volcanic Plain along the Western Highway and the State listed Western (Basalt) Plains Natural Temperate Grassland along the Western Highway (including 0.3 hectares to be cleared). → Close to a patch of Matted Flax-lily patches near the alignment footprint → Remove a number of Emerald–lip Greenhood orchids along the Western Highway	→ None	→ Species associated with Victorian Temperate Woodland Community i.e. Brown Treecreeper etc – State listed → Powerful Owl – State listed
	B	→ Remove one Matted Flax-lily along Beaufort-Lexton Road → Remove one population of River Swamp Wallaby-grass in a dam close to Slaughterhouse Lane → Potentially affect the hydrology of nearby Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains → Significantly fragment the vegetation and habitat of the Camp Hill State Forest	→ Potential impacts to little galaxias and/or its habitat where alignment crosses Yam Holes Creek	Areas of known habitat and possibly individuals: → Golden Sun Moth – Commonwealth and state listed → Squirrel Gilder – State listed → Brush-tailed Phascogale – State listed → Species associated with the *Flora and Fauna Guarantee Act 1988* Victorian Temperate Woodland Community i.e. Brown Treecreeper etc –State listed → Powerful Owl – State listed

1 INTRODUCTION

WSP | Parsons Brinckerhoff has been engaged by VicRoads to undertake Threatened Species Targeted Assessments for the proposed Beaufort Bypass. This study will contribute to the planning for the ultimate construction of a dual carriageway along a new alignment around the town of Beaufort. The bypass will be constructed to a freeway standard and will link the currently under construction Western Highway duplication to the east and west of Beaufort, as well as connections to major intersecting roads.

The purpose of this study is to undertake targeted surveys of threatened flora and fauna species and identify mitigation measures associated with three preliminary alignment options for the future Beaufort Bypass Environment Effects Statement.

1.1 Background

The project is located on the eastern, northern and western outskirts of the Beaufort township. Preliminary bypass alignments have been identified within a broader investigation corridor (the study area). The eastern end of the study area joins to the duplicated section of the Western Highway immediately east of Beaufort and the western end ties in with the currently under construction (as of late 2015) section of the of the Western Highway duplication west of Beaufort.

The project would include the following components:

- construction of a dual carriageway to freeway standard
- construction of interchanges to connect the township of Beaufort to Western Highway
- several waterway crossings
- overpass of the Beaufort-Ballarat rail line
- intersection treatment of local roads and provision for service roads if required
- provision of connections for existing and future transport network.

There have been a number of previous studies and investigations about the need and possible locations of a bypass around Beaufort. In July 2015, the Minister for Planning determined that an Environment Effects Statement is required for the Beaufort Bypass.

1.2 Aims

In order to determine the ecological values and of the study area and assess potential impacts of the project, flora and fauna field surveys were required. The field surveys focussed on vegetated areas within 50 metres either side of the three alignments and other areas in the study area where suitable habitat for threatened species may have existed.

The field surveys within the study area aimed to:

- build upon previous investigations completed within the study area
- survey known locations of threatened flora and fauna species and record any new locations
- verify vegetation community boundaries as mapped in previous studies identified in the literature review and update where needed
- determine vegetation and fauna habitat condition across the study area
- determine the likelihood of threatened species and communities occurring within the study area
- assess all fieldwork data and information from relevant ecological literature and databases against relevant policy and environmental legislation such as the Victorian *Flora and Fauna Guarantee Act 1988* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
- evaluate the different alignment options and provide details on the potential impacts of the project and potential measures to mitigate those impacts.
- provide recommendations for any further surveys, where needed
- A target list of threatened flora and fauna species and a vegetation community was derived from a preliminary flora and fauna investigation (GHD 2015).

1.3 Study area

The study area is located within Pyrenees Shire Council and extends for approximately 9km from the eastern end to the western end of the Beaufort township. The proposed alignments options occur across a patchwork of landscapes including cleared agricultural freehold land, vegetated privately owned land, state forests and a bushland reserve, private mine tenements and roadsides. Alignment options are described as B4-A, B4-B and B5. Alignment option B4 also has B4-C which is one alignment after B4-A And B4-B. B5 has two sections – B5-A and B5-B. Both B4 and B5 have off-ramp alignments joining the Western Highway in a south-westerly direction. Refer to Figure 1.1 for the study area location and alignment options.

The majority of the study area falls within the Central Victorian Uplands bioregion with smaller areas covered by the Victorian Volcanic Plain bioregion in two eastern areas (Department of Environment Land, Water and Planning 2016).

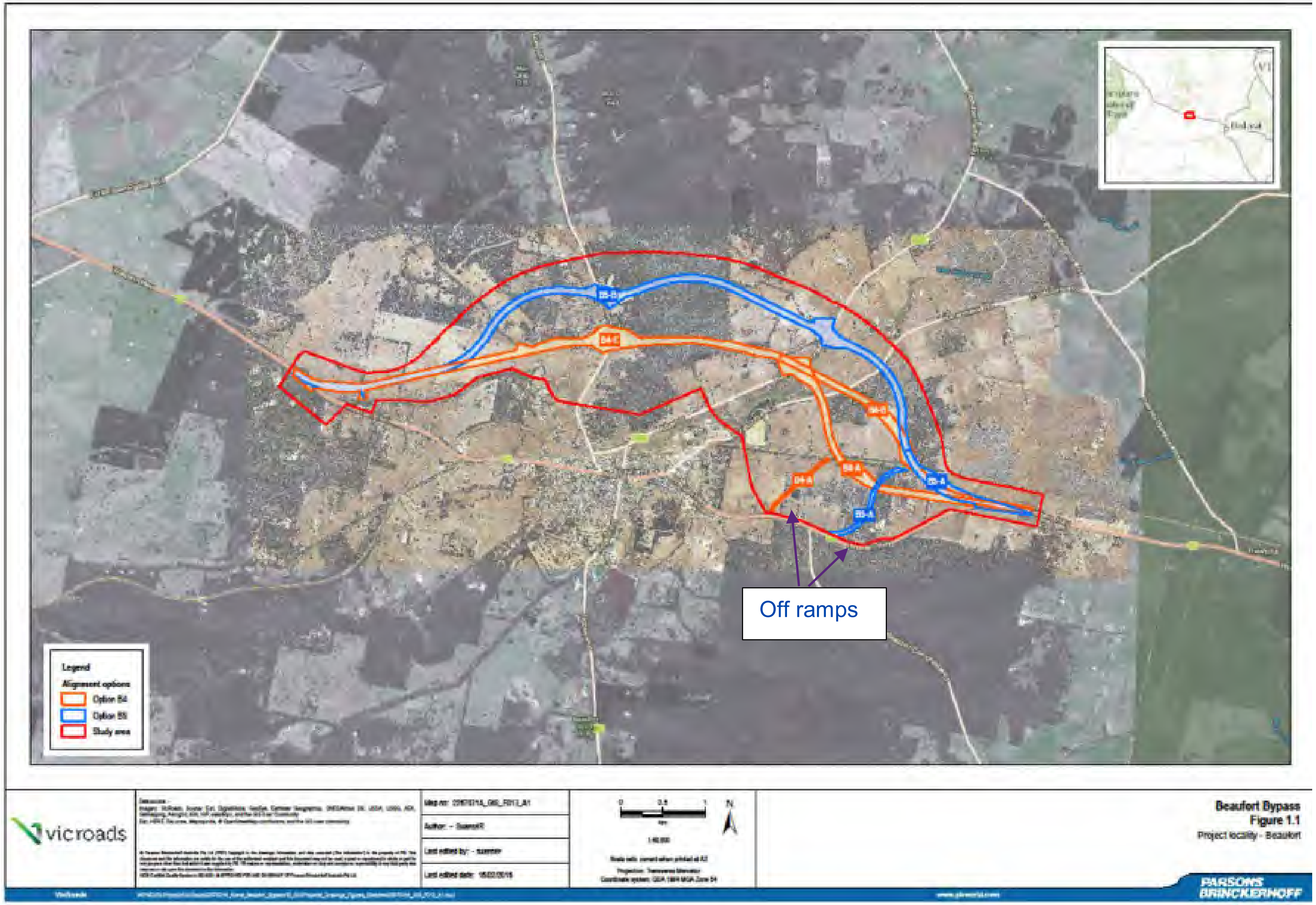

Figure 1.1 Study area

2 METHODOLOGY

2.1 Definitions

For the purpose of this report the following definitions apply:

- **Study area** is the area of contained between the Western Highway to the east and west of Beaufort township to the north of Camp Hill State Forest (refer to Figure 1.1).
- **Alignments** are described as B4-A, B4-B and B5 (refer to Figure 1.1).
- **Threatened flora survey area** is the study area used to undertake targeted threatened flora species surveys 50 metres either side of the three alignment options provided for in the brief.
- **Threatened fauna survey site** are individual survey locations determined by the specific habitat requirements of the target terrestrial or aquatic fauna species.
- **Locality** is defined as an approximate 10 km radius around the proposal area.
- **Region** is a bioregion defined in the state system of bioregionalisation (Department of Environment Land, Water and Planning 2016). For this study the bioregions covered are the Central Victorian Uplands and the Victorian Volcanic Plain bioregions.

2.2 Personnel

The contributors to the preparation of this report, their qualification and roles are provided in Table 2.1.

Table 2.1 Contributors and their roles

Name	Qualifications	Role
Sean Myers	B.Urp, Grad Dip Natural Resource Management	Project Director – Technical Executive
Philippa Forge	BSc (Ecology), BSc (Hons, Botany), Grad Cert Applied Law	Principal Environmental Scientist - Project Manager
Alex Cockerill	BSc (Hons)	Principal Ecologist – Report review
Nic McCaffrey	BSc (Natural Resource Management)	Senior Ecologist – Field manager/botanical lead, lead report preparation
Rob Gration	M. Wildlife Management (Habitat), Post Graduate Certificate in Applied Science (Wildlife Ecology/Management),Dip Applied Science (Natural Resource Management)	Principal Ecologist – Terrestrial fauna survey lead, report preparation
Aaron Jenkin	BEnvSci (Aquatic Ecology)	Principal Ecologist – Aquatic fauna survey lead, report preparation
Tanya Bangel	BSc (Hons)	Ecologist – flora survey, report preparation
Troy Jennings	BBioCons	Ecologist – fauna and flora survey, report preparation
Rob Suansri	Bach. Of Science/Bach of Economics (BSc,BEc)	Mapping and data management – GIS Consultant
Stephen Hart	BSc (GIS)	Mapping – GIS Consultant

2.3 Nomenclature

Scientific and common names of flora and terrestrial and aquatic fauna species used in this document follow the Victorian Biodiversity Atlas (Department of Environment Land, Water and Planning 2016). Common names are used in this report for a plant or animal species followed by the scientific names in italics. Introduced species are identified within the text with an asterisk following the name, for example **Briza maxima*.

Terrestrial fauna species identifications were aided by the following field guides and reference material; Mammals (Van Dyck et al 2013), evidence of mammals (Triggs 2004), birds (Morecombe 2014) and bird calls (Morecombe App V1.4), reptiles (Wilson and Swan 2013), frogs (Tyler and Knight 2011) and frog calls (Glenelg Hopkins CMA, date unknown)

Aquatic species identifications were aided by the following field guides and reference material:

- The Field Guide to the Freshwater Fish of Australia (Allen et. al. 2003);
- Freshwater Fishes of South-Eastern Australia (McDowell 1996); and
- Ecological vegetation class names have followed that of (Department of Environment Land, Water and Planning 2016a).

2.4 Literature and database assessment

2.4.1 Database searches

Records of threatened species known or predicted to occur in the study area were obtained from a range of databases as detailed in Table 2.2.

Table 2.2 Database searches

Database	Search dates	Area searched	Reference
Biodiversity Interactive Maps	13/11/2015	10 km buffer around project(1)	Department of Environment Land, Water and Planning 2016a
Victorian Biodiversity Atlas	20/1/2016	10 km buffer around project(1)	Department of Environment Land, Water and Planning 2016b
Atlas of Living Australia	13/11/2015	10 km buffer around project(1)	Atlas of Living Australia 2016
Australia's Virtual Herbarium	13/11/2015	10 km buffer around project(1)	Australia's Virtual Herbarium 2016
Protected Matters Search Tool	20/1/2016	10 km buffer around project(1)	Department of the Environment 2016a
Aerial photography from Google Maps, BirdsEye (Garmin™) and high resolution imagery supplied by Vicroads	various	10-20km buffer around project	

(1) Linear coordinates following the most central alignment option used

2.4.2 Previous surveys and assessments

Due to the locality's history for potential freeway bypass, a number of previous ecological and environmental studies have been undertaken within the study area, including:

- Beca (2012) Alignment Options Report Beaufort Bypass – Western Highway. Report for VicRoads.
- GHD (2015) Western Highway Bypass Project – Beaufort. Stage 1 – Flora, Fauna and Aquatic Assessment. Prepared for VicRoads.
- Ecology and Heritage Partners Pty Ltd 2012a. Western Highway Project: Section 2, Beaufort to Ararat, Victoria Impact Assessment Report – Flora, Fauna and Ecological Communities. Prepared for VicRoads.

- Ecology and Heritage Partners Pty Ltd 2012b. Western Highway Project: Section 3, Ararat to Stawell, Victoria Impact Assessment Report – Flora, Fauna and Ecological Communities. Prepared for VicRoads.
- Ecology Partners Pty Ltd 2010. Targeted Flora, Fauna & Aquatic Surveys of the Western Highway Upgrade: Burrumbeet to Beaufort. Prepared for VicRoads.
- Ecology Partners Pty Ltd 2010. Flora, Fauna and Net Gain Assessment of the Proposed Western Highway Duplication, Burrumbeet to Beaufort, Victoria. Prepared for VicRoads.
- Ecology Partners Pty Ltd 2008. Desktop Flora and Fauna Assessment of the Western Highway, Burrumbeet to Stawell, Victoria. Prepared for VicRoads.
- Ecology Partners Pty Ltd (2014) Environment Effects Statement referral for the Beaufort Bypass – update to flora and fauna information. Prepared for VicRoads.
- VicRoads (2012) Western Highway Project Section 2: Beaufort to Ararat. Environmental Effects Statement.
- VicRoads (2013) Western highway Project Section 3: Ararat to Stawell. Environmental Effects Statement.

Furthermore, staff experience and knowledge in the study area provide important knowledge of species distribution and habitat occurrence, particularly as it applies to threatened flora, fauna and communities.

2.5 Flora survey

2.5.1 Targeted surveys for threatened flora

Surveys for selected threatened flora species identified in the project brief were conducted in November 2015 and included the species outlined in Table 2.3.

Table 2.3 Summary of targeted threatened flora searches

Common name	Scientific name	Nominated survey period (from project brief)
Target species:		
Clover Glycine	*Glycine latrobeana*	October to December
Spiral Sun-orchid	*Thelymitra matthewsii*	August to November
Matted Flax-lily	*Dianella amoena*	November
Candy Spider-orchid	*Caladenia versicolor*	September to November
Trailing Hop-bush	*Dodonaea procumbens*	September to November
Ben Major Grevillea	*Grevillea floripendula*	September to November
White Sunray	*Leucochrysum albicans var. tricolor*	September to November
Snow Gum	*Eucalyptus pauciflora subsp. pauciflora*	No info
Small milkwort	*Comesperma polygaloides*	August to January
Target community:		
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland		September to January

2.5.2 Methods for targeted species

The floristic diversity and possible presence of threatened species was assessed using a combination of random meander searches of preferred habitats, parallel line searches and population demographic surveys.

Random meander surveys were completed along the entire length of the threatened flora survey area and some areas outside of this area within the larger study area. Random meander surveys are a variation of the transect type survey and were completed in accordance with the technique described by Cropper (1993), whereby the recorder walks in a random meander throughout the site recording all species observed, boundaries between various vegetation communities and condition of vegetation. The time spent in each vegetation community was generally proportional to the size of the community and its species richness.

Parallel line searches were used in some areas to target known locations of flora species (e.g. *Grevillea floripendula*) in order to cover a specified survey width.

For some selected flora species, population demographic surveys were undertaken where this data might be relevant for population estimates, and hence impact estimation as well as management implications.

The survey design was based on relevant state and Commonwealth survey guidelines. The following guidelines are considered: the *'Best Practice'* and formed the basis of the surveys undertaken:

- Department of Sustainability and Environment (2010) Biodiversity Precinct Structure Planning Kit
- Cropper (1993) *Management of Endangered Plants*
- Parks Victoria (2007) *Pest Plant Mapping & Monitoring Protocol*
- Department of Environment (2013b) Survey Guidelines For Australia's Threatened Orchids - Guidelines For Detecting Orchids Listed As 'Threatened' Under The Environment Protection And Biodiversity Conservation Act 1999 (draft)
- Goff, Dawson and Rochow (1982) Site examination for threatened and endangered plant species – for timed meander technique
- Department of the Environment (2016a) *Dianella amoena* in Species Profile and Threats Database
- Department of the Environment (2016b) *Grevillea floripendula* in Species Profile and Threats Database
- Elzinga, et al. (2001) *Monitoring Plant and Animal Populations.*

Where possible the field assessments were undertaken in the most appropriate season acknowledged in the relevant survey guidelines. A summary of the targeted species, survey guideline applied and the relevant survey effort is provided in the Table 2.4.

2.5.3 Survey effort

Targeted threatened flora surveys was undertaken over one week in November 2015 to ensure that the majority of species' flowering periods were covered. These surveys were undertaken for threatened plants that were assessed as having a moderate or greater chance of occurrence, based on known distributions and habitat types present within the study area, as provided in the project brief. Targeted surveys were undertaken for nine threatened plants (Table 2.4) for which potential habitat occur within the study area. Table 2.4 below outlines the survey dates and survey effort for each species that the current surveys were undertaken.

Table 2.4 Summary of targeted threatened flora searches

Species targeted	Dates of targeted survey	Vegetation type searched within study area	Type of survey effort	Total survey effort (person hours)
Target species:				
Clover Glycine	16, 22 and 29 November 2015	Valley Grassy Forest, Plains Grassland and Alluvial Terraces Herb-rich Woodland	Random meander and parallel line traverses	82

Species targeted	Dates of targeted survey	Vegetation type searched within study area	Type of survey effort	Total survey effort (person hours)
Spiral Sun-orchid	16, 22 and 29 November 2015	Open forests and woodlands, often where there has been soil disturbance such as road verges (Duncan 2010) Opportunistic surveys only where conducting searches for other threatened species as it was likely too late in the season to detect this orchid.	Random meander (opportunistic only)	94
Matted Flax-lily	16, 22 and 29 November 2015	Valley Grassy Forest, Plains Grassland and Alluvial Terraces Herb-rich Woodland	Random meander	70
Candy Spider-orchid	16, 22 and 29 November 2015	Preferred habitat is Yellow Box woodland on seasonally wet soils (Jeanes & Backhouse 2006). Opportunistic surveys only where conducting searches for other threatened species as it was considered too late in the season to detect this orchid. Surveys can only be undertaken whilst the species is flowering (Backhouse & Jeanes 1995).	Random meander (opportunistic only)	38
Trailing Hop-bush	16, 22 and 29 November 2015	Valley Grassy Forest, Plains Grassland and Alluvial Terraces Herb-rich Woodland as well as roadside verges.	Random meander	82
Ben Major Grevillea	19, 22 and 29 November 2015	Intact Heathy Dry Forest, Grassy Dry Forest and complexes, mostly through Camp Hill State Forest and intact private land sites.	Parallel line traverses	42
White Sunray	18-19 November 2015	Intact Plains Grassland (mostly) and small areas of Valley Grassy Forest and Alluvial Terraces Herb-rich Woodland close to heavier basalt soils.	Random meander	20
Snow Gum	16, 18, 21, 22 and 29 November 2015	Valley Grassy Forest and Alluvial Terraces Herb-rich Woodland	Parallel line traverses	66
Small milkwort	18-19 November 2015	Intact Plains Grassland (mostly) and small areas of Valley Grassy Forest and Alluvial Terraces Herb-rich Woodland close to heavier basalt soils.	Random meander	20
Target community:				
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	16, 22 and 29 November 2015	Valley Grassy Forest, Alluvial Terraces Herb-rich Woodland and to a lesser extent Heathy Dry Forest and Grassy Dry Forest	Random meander	94

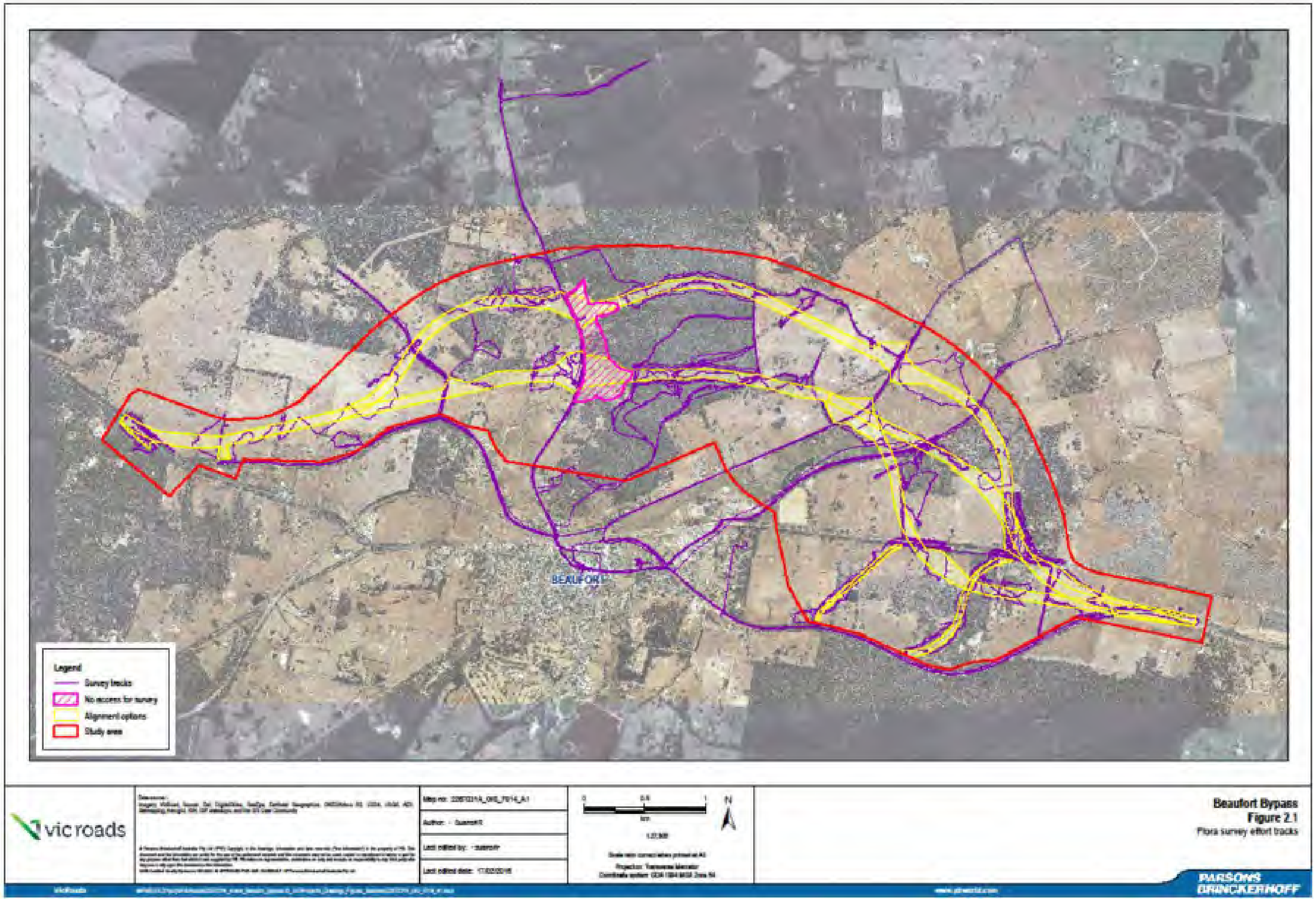

Figure 2.1 Flora survey effort

2.5.4 Field validation of existing vegetation mapping

Vegetation within the study area and locality has been previously mapped at a 1:100,000 scale in the Regional Forest Agreement West Victoria mapping (Commonwealth of Australia 2000) and then refined in 2005 (mapped as NV2005_EXTANT by Department of Environment Land, Water and Planning 2016a). This was then further refined for the study area in previous vegetation mapping for the project in 2015 (GHD 2015).

Field validation (or ground-truthing) of existing vegetation mapping (Department of Environment Land, Water and Planning 2016a; GHD 2015) was undertaken to determine the site specific classification of the vegetation structure, any wetland formations, dominant canopy species, native diversity and condition. The field validation included updating or adding new vegetation patches (polygons in ArcGIS mapping) including:

- → patches of native vegetation defined as ‘remnant’ under *Permitted Clearing of native vegetation: biodiversity assessment guidelines* (Department of Environment and Primary Industries 2013)
- → patches of vegetation communities listed under the Victorian *Flora and Fauna Guarantee Act* 1988 or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
- → wetland vegetation in natural wetland basins, drainage lines and dams and other artificial structures (mapped as WETLAND_CURRENT and WETLAND_1994 by the Department of Environment, Land, Water and Planning).

The validation exercise was primarily undertaken whilst conducting targeted threatened flora surveys and apart from mapping vegetation communities listed under the Victorian *Flora and Fauna Guarantee Act 1988* or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, it was considered opportunistic.

Under the document *Permitted Clearing of native vegetation: biodiversity assessment guidelines* (Department of Environment and Primary Industries 2013), a remnant patch of native vegetation is either:

- → an area of vegetation where at least 25 per cent of the total perennial understory plant cover is native
- → any area with three or more native canopy trees where the canopy foliage cover is at least 20 per cent of the area.

In some cases, patches of native vegetation met the criteria of ‘remnant’ but were not considered to represent an Ecological Vegetation Class.

No scattered trees were surveyed or mapped.

2.5.5 Plant identification

Flora species that could not be identified in the field were recorded to the nearest possible family or genera. These were then collected as per protocols of WSP | Parsons Brinckerhoff’s permits (10007800 & 10007794) issued under the Victorian *Flora and Fauna Guarantee Act 1988* for the collection of plant material. A number of voucher specimens were lodged at the National Herbarium of Victoria as confirmations of new records and identifications.

2.6 Fauna survey

The survey methodology targeted specific threatened species and centred on intensive and systematic approaches. Opportunistic surveying were undertaken and regarded as an important additional technique to contribute to the assessment of the presence of these species. For all survey work at least one member of the survey team had direct field experience with that specific faunal group. It is important to note that these surveys can reveal the presence of a species, but a negative result does not guarantee that the targeted species is absent from the site. Using standardised survey methodology for specific species where such methods exists does, however, provide a degree of confidence that a species is absent.

2.6.1 Targeted surveys for threatened fauna

Information regarding the conservation status of the fauna species targeted is provided in Table 2.5.

Table 2.5 Threatened status for fauna searches

Scientific Name	Common Name	Conservation Status		
		Commonwealth	Victorian	
		Environment Protection and Biodiversity Conservation Act 1999	*Flora and Fauna Guarantee Act 1988*	Advisory list[1]
Mammals				
Dasyurus maculatus maculatus	Spot-tailed Quoll		Listed	Vulnerable
Phascogale tapoatafa	Brush-tailed Phascogale		Listed	Vulnerable
Birds				
Anthochaera phrygia (syn. Xanthomyza phrygia)	Regent Honeyeater	Endangered	Listed	Critically endangered
Grantiella picta	Painted Honeyeater	Vulnerable	Listed	Vulnerable
Grus rubicunda	Brolga		Listed	Vulnerable
Lathamus discolor	Swift Parrot	Endangered	Listed	Endangered
Ninox connivens	Barking Owl		Listed	Endangered
Ninox strenua	Powerful Owl		Listed	Vulnerable
Stagonopleura guttata	Diamond Firetail		Listed	Near threatened
Tyto novaehollandiae	Masked Owl		Listed	Endangered
Reptiles				
Delma impar	Striped Legless Lizard	Vulnerable	Listed	Endangered
Varanus varius	Lace Monitor			Endangered
Amphibians				
Litoria raniformis	Growling Grass Frog	Vulnerable	Listed	Endangered
Pseudophryne bibronii	Bibron's Toadlet		Listed	Endangered
Invertebrates				
Synemon plana	Golden Sun Moth	Critically endangered	Listed	Critically endangered

Note:

(1) Advisory List = listed on Advisory List of Threatened Vertebrate Fauna in Victoria.

2.6.2 Methods for targeted species

The survey design was based on relevant state and Commonwealth survey guidelines. The following guidelines are considered: the *'Best Practice'* and formed the basis of the surveys undertaken:

- Remote cameras as a mammal survey tool: Survey design and practical considerations (Nelson and Scroggie 2009)
- Survey guidelines for Australia's threatened frogs: Guidelines for detecting frogs listed as threatened under the EPBC Act 1999 (Department of the Environment, Water, Heritage and the Arts 2010a)

- Survey guidelines for Australia’s threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act 1999 (Department of the Environment, Water, Heritage and the Arts 2010b)
- Survey guidelines for Australia's threatened reptiles: Guidelines for detecting reptiles listed as threatened under the EPBC Act (Department of Sustainability, Environment, Water, Population and Communities 2011a)
- Survey guidelines for Australia's threatened mammals: Guidelines for detecting mammals listed as threatened under the EPBC Act (Department of Sustainability, Environment, Water, Population and Communities 2011b)
- Approved Survey Standards: Powerful Owl Ninox strenua. (Department of Sustainability and Environment 2011a)
- Approved Survey Standards: Spot-tailed Quoll Dasyurus maculatus maculatus. (Department of Sustainability and Environment 2011b)
- Biodiversity Precinct Structure Planning Kit (Department of Sustainability and Environment 2010).
- Interim Guidelines for the Assessment, Avoidance, Mitigation and Offsetting of Potential Wind Farm Impacts on the Victorian Brolga Population 2011 Revision 1 February 2012 (Department of Sustainability and Environment 2012)
- A guide for the use of remote cameras for wildlife survey in northern Australia (Gillespie et al. 2015)
- Addressing Welfare Concerns When Observing and Trapping Vertebrate Fauna (Gration 2010)
- Flora and Fauna Survey Assessment Documents (Melbourne Water 2011).

A summary of the targeted species, survey guideline applied and the relevant survey effort is provided in Table 2.6.

Table 2.6 Call playback results

Survey technique	Description	Targeted threatened species	Threatened species survey guidelines	Survey effort	Comments
Fauna – Targeted Amphibian Surveys					
Nocturnal call playback (Amphibians)	Calls were broadcasted using a portable MP3 player and amplified through a megaphone.	Growling Grass Frog and Bibron's Toadlet	Department of Sustainability and Environment Biodiversity Precinct Structure Planning Kit (Department of Sustainability and Environment 2010). Survey guidelines for Australia's threatened frogs, Guidelines for detecting frogs listed as threatened under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Department of the Environment, Water, Heritage and the Arts 2010a).	Visits were undertaken at six waterbodies within the study area (refer to Figure 2.2). Total survey effort: 150- person minutes.	
Systematic habitat search	At the completion of the call playback, two-field staff undertook a systematic search using an LED hand torch was undertaken to search for frogs on the banks, on floating vegetation and in areas of emergent vegetation. In addition, surrounding terrestrial habitat within 10 metres of all waterbodies was searched.	Growling Grass Frog and Bibron's Toadlet	Department of Sustainability and Environment Biodiversity Precinct Structure Planning Kit (Department of Sustainability and Environment 2010). Survey guidelines for Australia's threatened frogs Guidelines for detecting frogs listed as threatened under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Department of the Environment, Water, Heritage and the Arts 2010a).	Two water bodies were searched (refer to Figure 2.2). Total search effort: 90-person minutes.	

Survey technique	Description	Targeted threatened species	Threatened species survey guidelines	Survey effort	Comments
Fauna – Targeted Mammal surveys					
Elliott traps	Elliott B traps were deployed for trapping Brush-tailed Phascogale. Traps were mounted 2metres above the ground approximately 25 metres apart where suitable habitat existed.	Brush-tailed Phascogale	Guidelines for detecting mammals listed as threatened under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Department of the Environment, Water, Heritage and the Arts 2011b).	Six traplines consisting of 60 traps were deployed across the study area (refer to Figure 2.2) for 6 nights. Total survey effort: 360 Elliott trap nights	
Remote camera trapping	Cameras were placed across the study area where suitable habitat existed.	Brush-tailed Phascogale and Spot-tail Quoll	A guide for the use of remote cameras for wildlife survey in northern Australia. Darwin: Charles Darwin University (Gillespie, et al. 2015) Guidelines for detecting mammals listed as threatened under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Department of the Environment, Water, Heritage and the Arts 2011b).	Nine cameras were deployed in selected habitat (refer to Figure 2.2) over the course of 6-days and nights. Total survey effort: 54 camera trap nights.	
Hair tubes	A mixture of small (40mm) and large (90mm) hair-tubes were deployed. Hair-tubes were placed on hollow bearing tree across the study area.	Brush-tailed Phascogale and Spot-tail Quoll	Flora and Fauna Survey Guidelines Version 4.2 December 2012 (Lake Macquarie City Council 2012)	Thirty three hair-tubes were deployed (refer to Figure 2.2) over the course of 6days. Total Survey effort: 198 hair-tube nights.	Hair analysis was undertaken by a company named Scats

Survey technique	Description	Targeted threatened species	Threatened species survey guidelines	Survey effort	Comments
Spotlighting	Vehicle survey undertaken by twofield staff using a handheld LED spotlight undertook the survey. The speed of survey averaged approximately 5 km per hour.	Brush-tailed Phascogale and, Spot-tail Quoll	Approved Survey Standards: Spot-tailed Quoll *Dasyurus maculatus maculatus* (Department of Sustainability and Environment 2011b) Guidelines for detecting mammals listed as threatened under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Department of the Environment, Water, Heritage and the Arts 2011b)	Spotlighting was undertaken on five occasions along tracks and roads within the study area (refer to Figure 2.2). Total Survey effort: 8.5 persons hours over a distance of 18km.	
Targeted bird surveys					
Diurnal birds surveys	Surveys were conducted using the species accumulation method i.e. fiveminute survey periods are undertaken until such time as no new species have been recorded for two consecutive periods.	*Woodland birds* Diamond Firetail; Painted Honeyeater; Regent Honeyeater and Swift Parrot	Department of Sustainability and Environment Biodiversity Precinct Structure Planning Kit (Department of Sustainability and Environment 2010) Survey guidelines for Australia's threatened birds Guidelines for detecting birds listed as threatened under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Department of the Environment, Water, Heritage and the Arts 2009).	Surveys were undertaken at four sites. Total survey effort: 350 person minutes.	Incidental observations were recorded over the duration of conducting all surveys.

Survey technique	Description	Targeted threatened species	Threatened species survey guidelines	Survey effort	Comments
	Roaming surveys were undertaken at water bodies that provided potential habitat.	Brolga	Department of Sustainability and Environment Interim Guidelines for the Assessment, Avoidance, Mitigation and Offsetting of Potential Wind Farm Impacts on the Victorian Brolga Population 2011 Revision 1 February 2012 (Department of Sustainability and Environment 2012)	Surveys were undertaken at five water bodies with (refer to Figure 2.2). Total survey effort: 100 person minutes.	
Nocturnal bird surveys	Call playback was undertaken at the commencement of the spotlighting surveys and in some instances, the completion of spotlighting. Calls were broadcast for a period of two-minutes per species at ~ 110% of natural volume, interspersed with periods of silence to listen (and watch) for a response.	Powerful Owl, Barking and Masked Owl	Approved Survey Standards: Powerful Owl *Ninox strenua* (Department of Sustainability and Environment 2011a) Department of Sustainability and Environment Biodiversity Precinct Structure Planning Kit (Department of Sustainability and Environment 2010)	Call playback was undertaken for a period of 15 minutes on six occasions. Total survey effort: 90 call playback minutes.	
Reptiles and invertebrate surveys					
Invertebrates	Surveys were undertaken when the flight season was confirmed by the Victorian Department of Environment, Land, Water and Planning endorsed Golden Sun Moth Golden Sun Moth email group.	Golden Sun Moth	Department of Sustainability and Environment Biodiversity Precinct Structure Planning Kit (Department of Sustainability and Environment 2010)	One survey was undertaken by twofield staff at two sites deemed suitable for Golden Sun Moth (refer to Figure 2.2). Total survey effort: Four person hours	Conditions were mild during the survey period with only one day providing not ideal climatic conditions. The Golden Sun Moth email list was used to determine if Golden Sun Moth flying on the day.

Survey technique	Description	Targeted threatened species	Threatened species survey guidelines	Survey effort	Comments
Reptiles	As a result of the optimum active period being missed for the most effective survey method (the placement of tiles during winter), an alternative method was deployed. An active search was undertaken by two field staff where suitable habitat existed. Funnel Traps were also deployed.	Striped Legless Lizard	Survey guidelines for Australia's threatened reptiles: Guidelines for detecting reptiles listed as threatened under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Department of the Environment, Water, Heritage and the Arts 2011a).	An active search was undertaken for 20 minutes at 3 locations. Total survey effort: 120 person minutes. Funnel traps were deployed f at one site. Total survey effort: 50 funnel trap days and nights	
	The use of multiple survey techniques was deployed, a visual search and camera traps. These survey techniques were undertaken in conjunction with the active reptile search and camera trapping surveys described above.	Lace monitor	Survey guidelines for Australia's threatened reptiles: Guidelines for detecting reptiles listed as threatened under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Department of the Environment, Water, Heritage and the Arts 2011a)	An active search was undertaken for 20 minutes at 3 locations by 2 field staff. Total survey effort: 120 person minutes.	
General surveys					
Fauna habitat assessment	Where suitable habitat was present for each threatened species or, for which the habitat could be important, an assessment was undertaken to ascertain if the site constitutes "the best 50% of habitat" for the species or "the remaining 50% of habitat"	Various threatened species	Department of Sustainability and Environment Biodiversity Precinct Structure Planning Kit (Department of Sustainability and Environment 2010)	Habitat assessments were undertaken at each trapping locations.	Assessments were used to inform Likelihood of Occurrence Table
Incidental observations or evidence of fauna	Any other incidental observations or evidence of fauna will also be recorded including track and scat searches.	As per all of the aforementioned threatened species.	Flora and Fauna Survey Assessment Documents (Melbourne Water 2011)	Duration of the survey period.	

All surveys were undertaken in accordance with the Standard Operating Procedures approved by the Department of Economic Development, Jobs, Transport and Resources, Wildlife and Small Institutions Animal Ethics Committee (03.13) and Wildlife Act 1975 Research Permit (100007593).

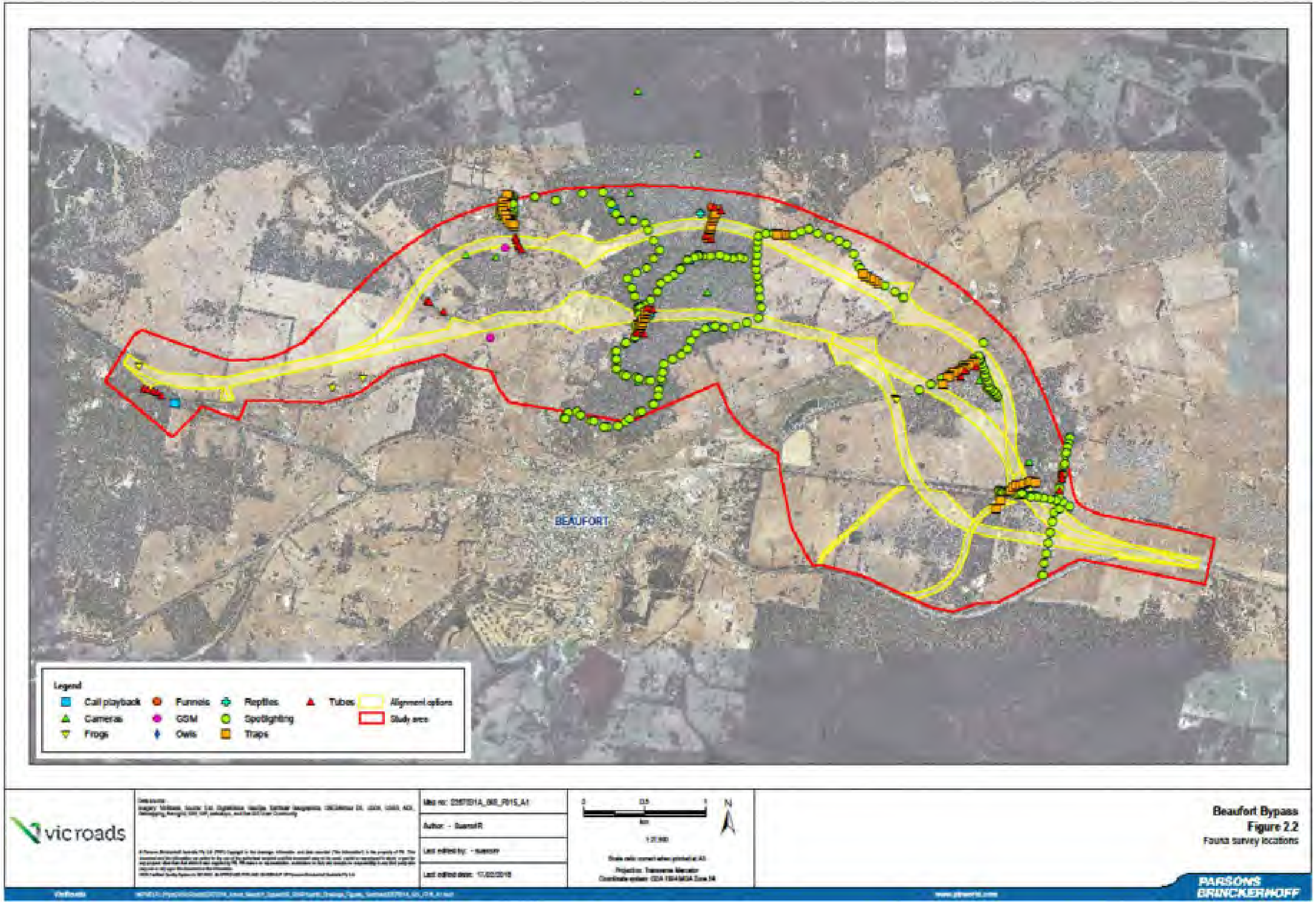

Figure 2.2 Fauna survey locations

2.7 Aquatic fauna survey

2.7.1 Targeted aquatic fauna survey species

The targeted survey was undertaken for the following threatened aquatic fauna species:

- Little Galaxias *Galaxiella toourtkoourt*:
  - vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
  - endangered under the Advisory List of Threatened Vertebrate Fauna in Victoria
  - listed under the Victorian *Flora and Fauna Guarantee Act* 1988 (see note below).
- Yarra Pygmy Perch *Nannoperca obscura*:
  - vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
  - vulnerable under the Advisory List of Threatened Vertebrate Fauna in Victoria
- listed under the Victorian *Flora and Fauna Guarantee Act 1988* (see note below) .

The Project brief requested a targeted survey for Dwarf Galaxias *Galaxiella pusilla*. However, Dwarf Galaxias was recently revised into two species including Eastern Dwarf Galaxias which occurs east of Melbourne and the newly described Little Galaxias *Galaxiella toourtkoourt* (Colemann *et. al*. 2015) which occurs west of Melbourne). Based on this revision and the now separate species distributions it is little galaxias that occurs in the Beaufort area. There are currently some inconsistencies with common names and how the new species is listed (e.g. it is referred to as Western Plains Galaxiella on the 2013 Advisory List). In addition, Little Galaxias has not as yet been entered into the relevant legislation, however, it would be prudent to assume it will be afforded at least the same level of protection as Eastern Dwarf Galaxias. Accordingly, for the purposed of this report, the relevant legislative protection, mitigations, permits and approvals processes afforded to Eastern Dwarf Galaxias will apply.

2.7.2 Survey site selection

Potential targeted aquatic fauna survey sites were initially identified based on the results of the 2015 rapid field assessment (GHD 2015). The rapid field assessment assessed 45 sites, of which ten were considered as in moderate condition for threatened aquatic fauna, two as in good condition and nine as having habitat for Little Galaxias. It was these moderate and good condition and Little Galaxias habitat sites that were initially targeted for this survey.

In addition, further sites were located for potential survey by referring to hydrological maps of the study area, to locate waterways and water bodies, and traversing the study area looking for potential survey sites.

The following considerations were made in determining whether an identified site had the potential for the targeted species to be present and therefore should be surveyed:

- Was there sufficient water to provide habitat for the target fish species?
- Was there suitable habitat for the target species?
- Was the site’s in situ water quality within a reasonable tolerance range for the target species?
- Were there existing records of the target species at or in close proximity to the site?

Appendix E provides details and a summary of the assessed and surveyed sites.

2.7.3 Targeted aquatic fauna survey methods

The survey methods used for the survey aligned with the survey protocols outlined in the Survey Guidelines for Australia's Threatened Fish (Department of Sustainability, Environment, Water, Population and Communities2004) and Biodiversity Precinct Structure Planning Kit (Department of Sustainability and Environment 2010) and included hand-help dip-net, overnight bait traps and overnight fyke nets (fish trap):

- Dip-netting: Active searches for the target species were undertaken at each identified survey site. Dip-netting was undertaken in the range of available aquatic habitat types at each site in order to optimise the collection of the target species, the range of possible size classes (i.e. larvae, juvenile and adults (if present) and other aquatic biota present in water bodies on the site.
- Bait traps: Overnight setting of bait traps was deployed at suitable sites. Traps were set baited with glow sticks in the afternoon and retrieved the following morning.
- Fyke nets: Overnight setting of fyke nets was deployed at suitable sites. Fyke nets were deployed in the afternoon and retrieved the following morning.

Backpack electrofishing was not used during the survey as:

1. There were no sites that had sufficient of aquatic vegetation to warrant its use over the other applicable methods (refer to "hierarchy of survey methods" as per Department of Sustainability and Environment 2010).
2. The electrical conductivity (or salinity) of many sites was above that which an electrofisher can effectively operate.

As part of the research permit requirement, all fish were identified and recorded in the field and released as near to the point of capture as practicable. The only exception was any Department of Environment, Land, Water and Planning listed noxious aquatic species (e.g. Mosquitofish **Gambusia holbrooki*), which cannot be returned to a waterway, were euthanized using an approved method according to the specific animal ethic approval.

All fish were counted to a maximum of 30 individuals. Where fish numbers were greater than 30 individuals broad estimations were adopted (i.e. 30+, 50+, 100+).

Photographic records of fish species encountered were also taken.

Appendix E provides details and a summary of the methods deployed at each survey site.

2.7.4 In situ water quality

To assist in the analysis of fish data the following in situ parameters were measured at each survey site:

- Temperature (ºC)
- Dissolved oxygen (mg/L)
- Percentage dissolved oxygen (%)
- pH
- Electrical conductivity (µS/cm)
- Turbidity (NTU)

Water quality measurements were taken using an Aquaread Aquaprobe AP-2000.

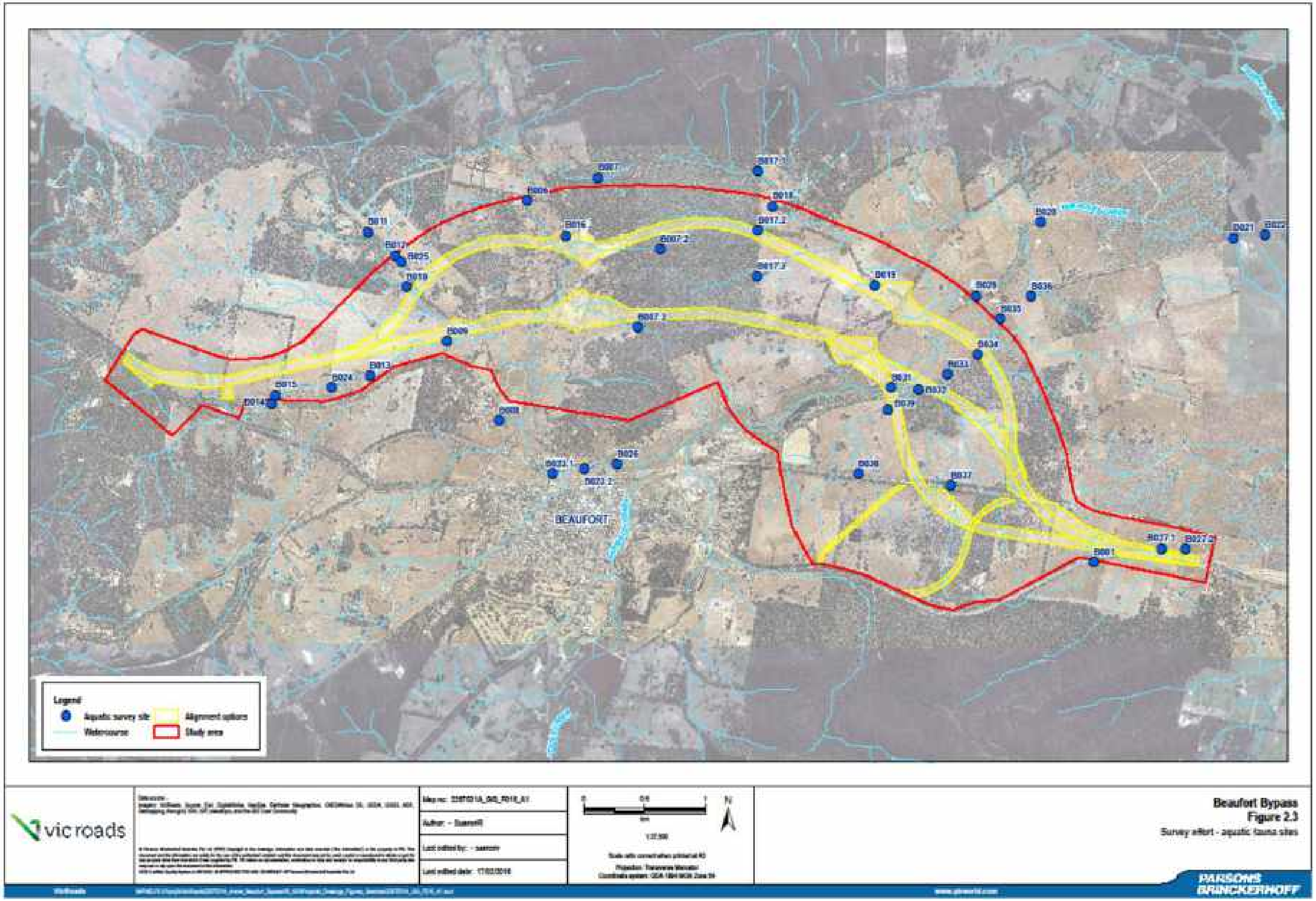

Figure 2.3 Aquatic fauna survey effort

2.8 Likelihood of occurrence

As with most biological assessments, the presence or absence of a particular species cannot be definitively determined during a relative short survey timeline. WSP | Parsons Brinckerhoff has developed a method to assess the likelihood of occurrence of threatened species within a site. This method identifies the habitat requirements of the species, outcomes of a habitat assessment and habitat connectivity in conjunction with Victorian Biodiversity Atlas records.

The likelihood assessment was based on the following criteria:

1. **VERY HIGH:** Best 50% of habitat for threatened species in a Victorian Bioregion. Vegetation still retains the structural characteristics of the pre-European equivalent. Vegetation has usually changed very little over time and displays resilience to weed invasion due to intact ground cover, shrub and canopy layers. Recent records (1-5 years) within close proximity to the study site.
2. **HIGH:** Remaining 50% of habitat for threatened species in a Victorian Bioregion and / or best 50% of habitat for rare species in a Victorian bioregion. Vegetation generally still retains its structural integrity but has been disturbed and has lost some component of its original species complement. Weed invasion is minor in such remnants. Historical records (last 6-10 years) within close proximity to the study site.
3. **MEDIUM:** Vegetation generally still retains its structural integrity but has been disturbed and has lost some component of its original species complement. Weed invasion can be significantly minor in such remnants. Historical records (last 11- 20 years) within close proximity to the study site.
4. **LOW:** Vegetation that has lost most of its species and is significantly modified structurally. Often such areas now have a discontinuous vegetation cover, very few shrubs and exotic species such as introduced pasture grasses or weeds, dominating indigenous ground cover. Environmental weeds are often co-dominant with the original indigenous species. Provides little in the way of fauna habitat for species. No records (for more than the last 20 years) within close proximity to the study site.

This process is to be used as a guide and is NOT to be used as indicating species presence or absence.

The definition of '*close proximity*' will differ between species and is based on the size of its home range, ability to move across the landscape and if suitable habitat linkages are present.

2.9 Limitations

2.9.1 Reliance on externally supplied information

In preparing this study, WSP | Parsons Brinckerhoff has relied upon data, surveys, analyses, designs, plans and other information provided by the client and other individuals and organisations. Except as otherwise stated in the study, WSP | Parsons Brinckerhoff has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in this study (conclusions) are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. WSP | Parsons Brinckerhoff will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to WSP | Parsons Brinckerhoff.

2.9.2 Field survey limitations

2.9.2.1 FLORA SURVEY LIMITATIONS

No sampling technique can totally eliminate the possibility that a species is present on a site. For example, some species of plant may be present in the soil seed bank and some fauna species use habitats on a sporadic or seasonal basis and may not be present on site during surveys. The conclusions in this report are based upon data acquired for the study area and the environmental field surveys and are, therefore, merely indicative of the environmental condition of the site at the time of preparing the report, including the presence or otherwise of species. It should be recognised that site conditions, including the presence of threatened species, can change with time.

Fieldwork for this study was undertaken late spring (mid-November) throughout a time with below average rainfall following some unusually hot weather through September 2015. These conditions may have affected the growth rates and flowering (and hence detectability) of some species such as ground orchids. Where appropriate, the report will state if these limitations apply to each of the target species. Additionally, an area of private land along Main Lead Road could not be accessed due to an active mine lease (area shown on Figure 2.1).

Mapping was conducted using hand-held (uncorrected) Garmin Dakota GPS unit and aerial photo interpretation. The accuracy of uncorrected GPS is subject to the accuracy of the unit and access to satellite information (generally less than 5 metres). As such, these points should not be relied on for design purposes.

2.9.2.2 FAUNA SURVEY LIMITATIONS

This assessment has been undertaken to provide an account of biodiversity assets within the survey sites. The study effort, combined with information available from other sources, is considered suitable to assess the overall ecological values of the study area. However, the following limitations apply:

- Where there have not been any recent records, the likely presence of significant species relies on the judgement of experienced ecologists to determine the habitat suitability for species that have been recorded in existing databases.
- The spatial analysis of biodiversity attributes is complex and has significant limitations when it is driven by historical record data such as the Victorian Biodiversity Atlas. The timing of incidental observations may not correspond with ideal sampling periods and some species have naturally low delectability rates.
- Mapping was conducted using hand-held (uncorrected) Garmin Rhino® GPS unit and aerial photo interpretation. The accuracy of uncorrected GPS is subject to the accuracy of the unit and access to satellite information (generally less than5-metres). As such, these points should not be relied on for design purposes.
- The fauna habitat assessments presented in this report present a qualitative assessment of the vegetation condition at the time of survey. This quality is likely to fluctuate depending on the management of the study area and the varying external impacts e.g. slashing of roadside verges, fire.

2.9.2.3 AQUATIC FAUNA SURVEY LIMITATIONS

The following limitations apply:

- The results communicated in this report are the results of a single three-day field sampling visit, and accordingly represent the conditions present at that time.
- This assessment is restricted to aquatic vertebrate fauna (namely fish). Aquatic invertebrates have not been considered in detail as part of this assessment, except where listed threatened species are known or suspected to occur. There is relatively little information available on these latter groups.
- Aquatic fauna species composition and abundance can also vary throughout the year (due to factors including seasonal changes). It is not possible to observe or measure such variation with only one site(s) visit. These limitations are partially supplemented by records from the Victorian Biodiversity Atlas database.
- The absence of detection of the threatened species during the survey does not mean absence of the species in the study area. Where possible we have assessed the ‘likelihood of occurrence’ of potential rare and threatened species that may occur in the study area.

2.9.3 Other limitations

To the best of WSP | Parsons Brinckerhoff’s knowledge, the project presented and the facts and matters described in this study reasonably represent the client’s intentions at the time of preparation of the study. However, the passage of time, the manifestation of latent conditions or the impact of future events (including a change in applicable law) may have resulted in a variation of the project and of its possible environmental impact.

2.10 Permits

All WSP | Parsons Brinckerhoff's staff and subcontractors are covered under the Standard Operating Procedures approved by the Department of Economic Development, Jobs, Transport and Resources, Wildlife and Small Institutions Animal Ethics Committee approval (03.13) and Victorian *Wildlife Act 1975* Research Permit (100007593). Additionally, all relevant WSP | Parsons Brinckerhoff staff are covered under the Victorian *Flora and Fauna Guarantee Act 1988* Permit to take/keep protected flora (10007800) and the project specific permit (10007794) to take/keep protected and several project specific listed flora on Schedule 2 of the Victorian *Flora and Fauna Guarantee Act 1988* for the purposes of lodging herbarium specimens.

The aquatic fauna surveys were undertaken in accordance with the following approvals and permits held by Aquatic Environmental:

- Department of Economic Development, Jobs, Transport and Resources Wildlife and Small Institutions Animal Ethics Committee approval (No. 28.14).
- Victorian *Fisheries Act 1995* General (Research) Permit (No. RP1193).
- Victorian *Flora and Fauna Guarantee Act 1988* and Victorian *Wildlife Act 1975* Research Permit / Permit To Take Protected Fish (No. 10007600).

2.11 Accessibility

It is understood that VicRoads has adopted the Whole of Victorian Government Accessibility Standard, based on the Web Content Accessibility Guidelines 2.0. This Standard aims to ensure that information on VicRoads' website will be available to all people without discrimination on the basis of disability and to make finding, using and interacting with the website easier.

WSP | Parsons Brinckerhoff believe that this report is aligned with the requirements of the Standard. We have significant experience in the public display of documents for consultation periods in hardcopy and digital formats and are available to assist with modifications that may be required to images, text or mapping to support access of the document through the VicRoads' website.

3 RESULTS

3.1 Flora

Three of the total nine target species were located in the study area. An additional two species were identified throughout the study area. Several specimens were sent for external confirmation of identification to the National Herbarium of Victoria.

No orchids were found during the surveys as anticipated due to the later time in the year to commence surveying. The understory and ground vegetation was very dry which may influenced the growth patterns of various orchids. However a number of areas, particularly through the Camp Hill State Forest, private land north of the rail reserve near Packham's Lane, along the rail reserve and some road reserves, have potential habitat for several of the rare or threatened orchid species. Follow up targeted survey areas for those orchids is recommended.

Additionally, several areas of native vegetation meet the size and condition criteria for listing of three community types under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

There are extensive areas of cleared land throughout the study area and preliminary alignments, of which some contains modified native vegetation or unimproved pasture with greater than 25 per cent perennial native vegetation. Additionally there are many scattered trees throughout the various alignments, of which many would be classified as large or very large old trees.

3.1.1 Targeted surveys for threatened flora

The field surveys identified five threatened flora as being recorded within the study area. These threatened species are outlined in Table 3.1 below and shown in Figure 3.1. The sections below describe the findings of the recorded threatened flora species within the study area.

Table 3.1 Summary table of targeted threatened flora survey findings

Common name	Scientific name	Conservation status			Presence
		Commonwealth	Victorian		
		Environment Protection and Biodiversity Conservation Act 1999	Flora and Fauna Guarantee Act 1988	Advisory list[1]	
Target species:					
Clover Glycine	*Glycine latrobeana*	Vulnerable			Not found during surveys
Spiral Sun-orchid	*Thelymitra matthewsii*	Vulnerable			Not found during surveys
Matted Flax-lily	*Dianella amoena*	Endangered	Listed	Endangered	Several plants found – new records for region. Specimens to be sent to herbarium.
Candy Spider-orchid	*Caladenia versicolor*	Vulnerable	Listed	Endangered	Not found during surveys
Trailing Hop-bush	*Dodonaea procumbens*	Vulnerable		Vulnerable	Not found during surveys
Ben Major Grevillea	*Grevillea floripendula*	Vulnerable	Listed	Vulnerable	Present – several plants found

Common name	Scientific name	Conservation status			Presence
		Commonwealth	Victorian		
		Environment Protection and Biodiversity Conservation Act 1999	**Flora and Fauna Guarantee Act 1988**	**Advisory list[1]**	
White Sunray	*Leucochrysum albicans var. tricolor*	Endangered	Listed	Endangered	Not found during surveys
Snow Gum	*Eucalyptus pauciflora subsp. pauciflora*		Local – not listed		Present – several plants found
Small milkwort	*Comesperma polygaloides*		Listed		Not found during surveys
Target community:					
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	n/a	Critically endangered			Present along rail corridor
Additional species/communities:					
Yarra Gum	*Eucalyptus yarraensis*		Rejected for listing as threatened	rare	One plant found during surveys
River Swamp Wallaby-grass	*Amphibromus fluitans*	Vulnerable			Several plants found – new records for region Specimens to be sent to herbarium for confirmation.
Natural Temperate Grassland of the Victorian Volcanic Plain/ Grassy Eucalypt Woodland of the Victorian Volcanic Plain	n/a	Critically Endangered			Present along Western Highway
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	n/a				Present in several locations near Yam Holes Creek

Note: (1) Advisory list = listed on Advisory List of Threatened Vertebrate Fauna in Victoria.

3.1.1.1 ORCHIDS

Two orchids were targeted as a part of the threatened species surveys Spiral Sun-orchid *Thelymitra matthewsii* and Candy Spider-orchid *Caladenia versicolor*. Opportunistic surveys in preferred habitats of Spiral Sun-orchid or any *Thelymitra spp.* failed to find any individuals, largely due to the lateness of surveys in the season. Spiral Sun-orchid usually flowers earlier than other *Thelymitra spp.* between August to November. The same applies for the Candy Spider-orchid which typically flowers between September and November – no other *Caladenia spp*. were observed during surveys.

3.1.1.2 CLOVER GLYCINE AND TRAILING HOP-BUSH

No Clover Glycine *Glycine latrobeana* or Trailing Hop-bush *Dodonaea procumbens* were found despite extensive targeted searches throughout preferred habitats in the study area. Survey for Clover Glycine followed guidelines in Department of the Environment (2015) recommending surveys in October and December when in flower/fruit and suitable habitat. Suitable habitat was present in the study area such as the main Ecological Vegetation Classes targeted Valley Grassy Forest, Plains Grassland and Alluvial Terraces Herb-rich Woodland and as such, the Clover Glycine may still exist in small populations which were not detected during the surveys.

Detection and identification of Trailing Hop-bush is possible with or without flowers/seeds however detection would be assisted when red winged seeds are present in September to November. Suitable habitat in the study area exists throughout all remnant vegetation areas, particularly grassy woodland habitats and remnant roadsides and surveys were conducted in the optimum time. However, Trailing Hop-bush may still exist in the study area as individuals or small populations which weren't detected during the surveys.

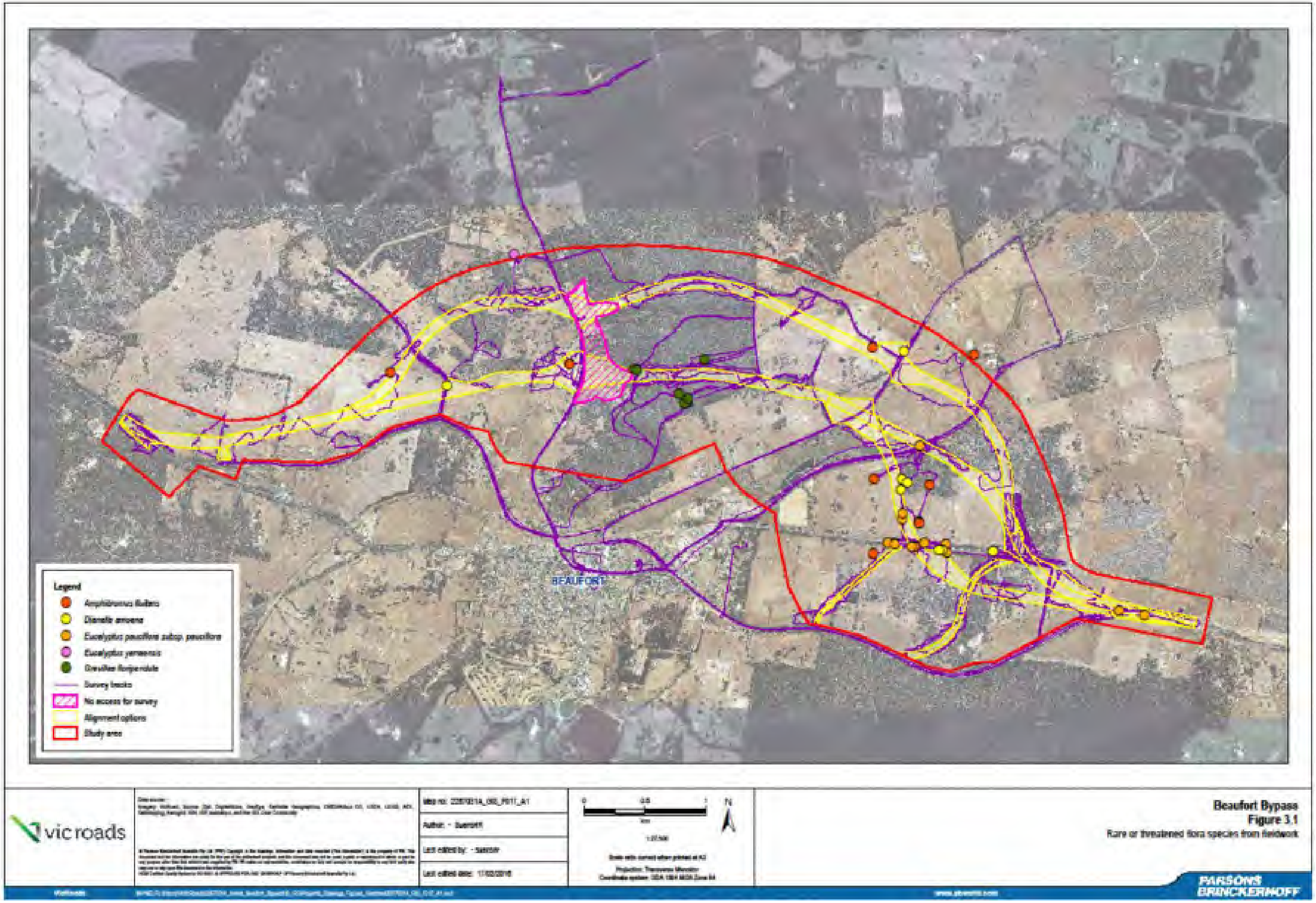

Figure 3.1 Locations of threatened flora species recorded during fieldwork surveys

3.1.1.3 MATTED FLAX-LILY

Several Matted Flax-lily *Dianella amoena* plants were detected in the study area. Searches were conducted primarily in the preferred Ecological Vegetation Classes: Valley Grassy Forest, Plains Grassland and Alluvial Terraces Herb-rich Woodland with micro-site preference of remnant roadsides, rail corridors and along fence lines. Individual plants are difficult to isolate as Matted Flax-lily is rhizomatous and one plant can spread for up to 20 x 20m with many isolated individual shoots (Carter 2010), however individuals often occupy a much smaller area. In a study by North Barker Ecosystem Services (2009), they assumed that a single plant occupied $3m^2$ in larger patches. Therefore in this study, new locations marked with a GPS are typically recorded where there are gaps in vegetative shoots of over 5m.

Ten new locations of Matted Flax-lily were recorded in the study area comprised of the following population clusters:

- Three locations in Snow Gum Bushland Reserve (all ~$2x1m^2$, mostly short 10cm long leaves only)
- Five locations close near the Melbourne-Adelaide rail corridor (2 plants <$1m^2$, other plants ~$3m^2$ each)
- One location along Beaufort-Lexton Road, near the corner of Slaughterhouse Lane ($1m^2$)
- One location along Back Raglan Road ($2x1m^2$).

The ability to detect this species increases when it is flowering (author personal observation), which is generally October to April (Carter 2010a).

However, most plants were not flowering at the time of the survey apart from the plant on the roadside at Beaufort-Lexton Road.

There are very few records of this species west of Ballarat recorded in the Atlas of Living Australia, so these records are an extension to the known distribution. A voucher specimen (NM00356) with flowers was lodged with National Herbarium of Victoria and confirmed as *Dianella amoena*.

Photo 3.1 Matted Flax-lily in flower (late November) along Beaufort-Lexton Road (right – flowers; left – close up of the irregularly spaced teeth along the margins; a useful identification trait when not in flower

3.1.1.4 BEN MAJOR GREVILLEA

Several Ben Major Grevillea *Grevillea floripendula* were detected in the study area. The more detailed parallel targeted searches were conducted throughout intact Heathy Dry Forest, Grassy Dry Forest and related Ecological Vegetation Class complexes, mostly through Camp Hill State Forest and intact private land sites between Camp Hill State Forest and Musical Gully State Forest. Detection and identification of this species is possible with or without flowers/seeds as it has distinct morphological characters (e.g. deeply lobed, rigid leaves), different to most other flora species in the study area. Therefore detection of this species was not influenced by seasonal factors.

All records were data points which appeared to have been observed in past records on the Victorian Biodiversity Atlas. No new locations were found despite search efforts. Five parallel searches by two staff were conducted at approximately 40m apart throughout alignment B4-B as there were previous records close to and within this alignment. One population cluster near alignment B4-B was located. Another two populations were recorded between the south of alignment B4-B and Camp Hill Road. Four parallel searches by two staff were conducted at approximately 40-50m apart throughout alignment B5 as there were no previous records within this alignment. No records were detected in this alignment and were unlikely due to the lower lying nature of the area which passes along a drainage line. Also, *Grevillea floripendula* is typically found on higher, north-facing ridges throughout the Camp Hill State Forest and Musical Gully State Forest (observation by Nick Jeshencko), landscape characteristics not seen in this alignment.

Photo 3.2 Ben Major Grevillea in Camp Hill State Forest. Leaf form (left) and seed pods (right)

3.1.1.5 WHITE SUNRAY AND SMALL MILKWORT

White Sunray *Leucochrysum albicans var. tricolor* and Small milkwort *Comesperma polygaloides* are considered together as they occupy similar habitats in the study area where there is higher-quality Plains Grassland (mostly) and small areas of Valley Grassy Forest and Alluvial Terraces Herb-rich Woodland close to heavier basalt soils. No White Sunray or Small milkwort were found despite extensive targeted searches throughout preferred habitats in the study area. Habitat areas are restricted in the study area to areas covered by the Victorian Volcanic Plain through the Yam Holes Creek area and the eastern most part of the study area. It is unlikely that White Sunray is present due to its highly restricted and well known populations in Victoria and the ease of detecting the plant with its large, white ‘paper daisy’ flowers. Small milkwort may still exist in the study area as individuals or small populations which weren’t detected during the surveys, particularly along the areas mapped as Plains Grassland along the northern side of the Western Highway in the eastern end of the study area.

3.1.1.6 SNOW GUM

A number of Snow Gum *Eucalyptus pauciflora subsp. pauciflora* were detected throughout the lower-lying, more fertile soils in the study area, particularly throughout areas of Valley Grassy Forest and Alluvial Terraces Herb-rich Woodland close to the rail corridor, the unbuilt road reserve from Snow Gum Bushland Reserve to the rail corridor and areas along Racecourse Road. Several large old Snow Gums were observed along the rail corridor and as scattered trees through paddocks nearby. There are few Snow Gums in the actual Snow Gum Bushland Reserve itself – the white-barked eucalypts are mostly Candlebark *Eucalyptus rubida*.

3.1.2 Additional threatened species encountered during fieldwork

3.1.2.1 YARRA GUM

One Yarra gum *Eucalyptus yarraensis* tree was encountered at a location in the north part of the study area just outside of alignment option B5-B. Identification of this species can be difficult to separate from Swamp Gum *Eucalyptus ovata* which is common across lowland Victoria. However, the more persistent bark and smaller fruits can be indicative differences. A boil test can readily differentiate Yarra gum from close relatives by boiling the leaves for a few minutes to release the characteristic odour of benzaldehyde (smell of almonds or marzipan), which others have in low levels (Simmons and Parsons 1999).

Source: Honk Johnston

Photo 3.3 Yarra gum off Main Lead Rd

3.1.2.2 RIVER SWAMP WALLABY-GRASS

Several River Swamp wallaby-grass *Amphibromus fluitans* plant populations were found throughout wetlands and dams across the study area. This species can be difficult to identify from other *Amphibromus spp.* due to the interpretation of the key morphological characteristics through the different growth phases in response to how moist or deep the water of the wetland the plant is growing in. However the plants recorded in the study area were all found in the drier mud and drawdown areas of wetlands, mostly in full flower facilitating identification. There are very few records (five) west of Ballarat according to Atlas of Living Australia, so these records are an addition to the known distribution. Two voucher specimens with seeds (NM00353 and NM00356) were lodged with National Herbarium of Victoria and confirmed as *Amphibromus fluitans.*

Photo 3.4 Typical stoloniferous growth form of River Swamp wallaby-grass growing amongst Upright Water-milfoil *Myriophyllum crispatum* (left) and comparison of seeds (right) – *Amphibromus fluitans* (top) *Amphibromus neesiana*, a more common, tussock species (bottom)

3.1.3 Incidental flora species recorded

A total of 139 plant species were recorded in the study area during field surveys of which 103 species (74 percent) were native and 36 species (26 percent) were exotic (please refer to Appendix B).

3.1.4 Targeted surveys for threatened vegetation communities

3.1.4.1 WHITE BOX-YELLOW BOX-BLAKELY'S RED GUM GRASSY WOODLAND AND DERIVED NATIVE GRASSLAND

White Box-Yellow Box-Blakely’s Red Gum Grassy Woodland and Derived Native Grassland is listed as a critically endangered ecological community under the Commonwealth *Environment Protection and Biodiversity Assessment Act 1999*. The ecological community can occur either as woodland or derived native grassland (i.e. grassy woodland where the tree overstorey has been removed). The Box-Gum Grassy Woodlands and Derived Grasslands were previously widespread across the slopes and tablelands of the Great Dividing Range throughout Queensland, New South Wales, Australian Capital Territory and Victoria.

To be listed as endangered under the Commonwealth *Environment Protection and Biodiversity Assessment Act 1999,* the vegetation must be consistent with the criteria outlined in the National Recovery Plan for White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland. White Box and Blakely’s Red Gum are typically found north of the Great Dividing Range not near the study area, so just Yellow Box could be part of this community in this area. This community can be difficult to determine from other grassy woodland communities with a component of Yellow Box in the canopy. Therefore as a guide, in consultation with the Department of the Environment, Ecological Communities Section, further to the criteria in National Recovery Plan, the first criteria was further assessed:

> *“Is, or was the most common overstorey species White Box and/or Yellow Box and/or Blakely’s Red Gum (and/or Western Grey box and/or Coastal Grey Box in the Nandewar Bioregion)?”*

With the following:

- → For Yellow Box to be the most common overstorey species, we assumed it had to have over 50% total composition of the tree canopy cover; OR
- → To be co-dominant, we assumed Yellow Box should have equal or greater total composition of the tree canopy cover shared over multiple species (e.g. Yellow Box 30%, Candlebark 30%, Snow Gum 25%).

Several vegetation patches were assessed against the scientific determination criteria with a single patch of Valley Grassland Forest along the rail corridor identified as meeting the determination criteria (refer to Table 3.2). This is consistent with recovery plan which indicates that Valley Grassy Forest in the Central Victorian Uplands can be considered part of Box-Gum Grassy Woodlands and Derived Grasslands. Additionally, this assessment was provided to the Department of the Environment, Ecological Communities Section who informally agreed with the determination (23 February 2016).

Table 3.2 Assessment of White Box-Yellow Box-Blakely’s Red Gum Grassy Woodland and Derived Native Grassland

Scientific Determination Criteria		Valley Grassy Forest along rail corridor
1.	Is, or was the most common overstorey species White Box and/or Yellow Box and/or Blakely’s Red Gum (and/or Western Grey box and/or Coastal Grey Box in the Nandewar Bioregion)?	Yes – Yellow Box (>50% cover) is co-dominant with Candlebark and in some areas Snow Gum.
2.	Does shrub cover comprise less than 30 percent cover?	Yes – there are patches of Hedge Wattle which overall provide less than 30 percent shrub cover.
3.	Does the patch have a predominantly native ground layer with at least 50 percent of the perennial vegetation cover in the ground layer is made up of native species?	Yes – the introduced weed cover varies from 10-40 percent cover, with a dominance of annual weed grasses such as **Briza maxima* which is not considered in the cover assessment. There are also woody weeds including **Rosa rubiginosa, *Genista monspessulana and *Rubus fruticosus spp. agg*. Which constitute 10-20 percent cover overall.

Scientific Determination Criteria		Valley Grassy Forest along rail corridor
4.	Is the patch 0.1 ha (1,000 m^2) or greater in size?	Yes – both sides of the rail form part of much larger remnant native vegetation patches much greater than 0.1ha.
5.	Is there 12 or more native understorey species present within the patch (excluding grasses). There must be at least one important species. See list of species at: http://www.environment.gov.au/epbc/publications/box-gum.html	Yes – patch characteristically dominated by *Dianella admixta, Helichrysum scorpioides, Chrysocephalum apiculatum, Gompholobium huegelii, Pimelea curviflora, Rytidosperma spp. Austrostipa semibarbata* and *Austrostipa pubinodis.*
6.	If there are not the characters as above, is the patch 2 ha or greater in size	n/a – meets criteria above
7.	If the answer is 'yes' to the question above, does the patch have an average of 20 or more mature trees per hectare, or is there natural regeneration of the dominant overstorey eucalypts?	n/a

Photo 3.5 Areas of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland with Snow Gum to the left (white bark tree) and Yellow Box behind

3.1.5 Additional threatened vegetation communities encountered during fieldwork

3.1.5.1 NATURAL TEMPERATE GRASSLAND OF THE VICTORIAN VOLCANIC PLAIN

Natural Temperate Grassland of the Victorian Volcanic Plain is listed as a critically endangered ecological community under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. The community is dominated by a ground layer of native tussock-forming perennial grasses along with a number of herbs and small shrubs or subshrubs. Trees and large shrubs are sparse to absent.

There are a number of diagnostic characteristics and condition thresholds which generally are based on features which apply all year round. Further details on the determination criteria can be found in Threatened Species Scientific Committee (2008). One area consisting of several separate patches is considered to meet the diagnostic characteristics and condition threshold criteria. This is eastern end of the Western Highway on the northside of the highway. This is in a transition area from the Central Victorian Uplands into the Victorian Volcanic Plain bioregion, indicated by the change in geology and a flatter landscape. The vegetation in this area in the past would have likely transitioned from Valley Grassy Forest to Plains Grassland/Plains Grassy

Woodland. There are a number of trees, some remnant such as Snow Gums and some planted non-indigenous natives and Monterey Pines **Pinus radiata.*

3.1.5.2 SEASONAL HERBACEOUS WETLANDS (FRESHWATER) OF THE TEMPERATE LOWLAND PLAINS

The community Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains is listed as a critically endangered ecological community under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. These are freshwater wetlands which are typically inundated on a seasonal basis through rainfall then dry out over summer. The vegetation structure is treeless and dominated by herbs, grasses and sedges and includes flora, fauna and micro-organisms present in both wet and dry periods.

There are a number of key diagnostic characteristics and condition thresholds which define if a wetland meets the listing of Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains. Further details on the determination criteria can be found in (Threatened Species Scientific Committee 2012). Several wetlands in the study area, particularly in the Yam Holes Creek valley were assessed against the criteria, with most intact patches meeting the diagnostic characteristics and condition thresholds. This assessment was provided to the Department of the Environment, Ecological Communities Section who informally agreed with the determination (23 February 2016). The most widespread wetland Ecological Vegetation Class was Plains Sedgy Wetland (Ecological Vegetation Class 647) which is known to correspond with Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains. The largest area of open water was the lagoon between Racecourse Road and Beaufort-Lexton Road. This had narrow edges of Plains Sedgy Wetland with Aquatic Herbland (Ecological Vegetation Class 653) in the shallower sections dominated by *Ornduffa reniformis* with scattered *Amphibromus fluitans*. Please refer to photos below.


Photo 3.6 Areas of Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains: (left) Carex tereticaulis dominated wetland, synonymous with Plains Sedgy Wetland (Ecological Vegetation Class 647) behind motorbike track (right) Aquatic Herbland (Ecological Vegetation Class 653) in a large wetland along Yam Holes Creek

3.1.6 Field verification of vegetation mapping

The study area intersects two Bioregions: *Victorian Volcanic Plains* and *Central Victorian Uplands*. A significant proportion of the corridor is mapped as native vegetation according to Ecological Vegetation Class (EVC) mapping on Biodiversity Interactive Maps (Department of Environment, Land, Water and Planning, 2016c). The study area supports a number of Ecological Vegetation Classes (EVC) including the terrestrial EVCs: Valley Grassy Forest, Plains Grassland, Alluvial Terraces Herb-rich Woodland, Heathy Dry Forest, Grassy Dry Forest and a number of mosaics between several aforementioned EVCs. Wetland EVCs include Plains Sedgy Wetland, Plains Grassy Wetland and Aquatic Herbland. There are extensive areas of cleared land throughout the study area and preliminary alignments, of which some contains modified native vegetation or unimproved pasture with >25% perennial native vegetation. Additionally there are many scattered trees throughout the various alignments, of which many would be classified as large or very large old trees.

Field validation (or ground-truthing) of the Department of Environment, Land, Water and Planning vegetation mapping (DELWP NV2005_EXTANT) and updates in the GHD (2015) maps was undertaken to determine if any alterations or additions could be made whilst primarily undertaking targeted threatened flora surveys. The summary of the changes or additions are described below:

- A number of patches of treeless native vegetation defined as 'remnant' under *Permitted Clearing of native vegetation: biodiversity assessment guidelines* (Department of Environment and Primary Industries 2013). This was mostly characterised by paddocks where there was unimproved pasture, likely with limited previous land use practices such as cultivation or fertiliser application which drastically alters the composition of the understorey.
- Several wetlands not previously mapped or defined with different Ecological Vegetation Classes.

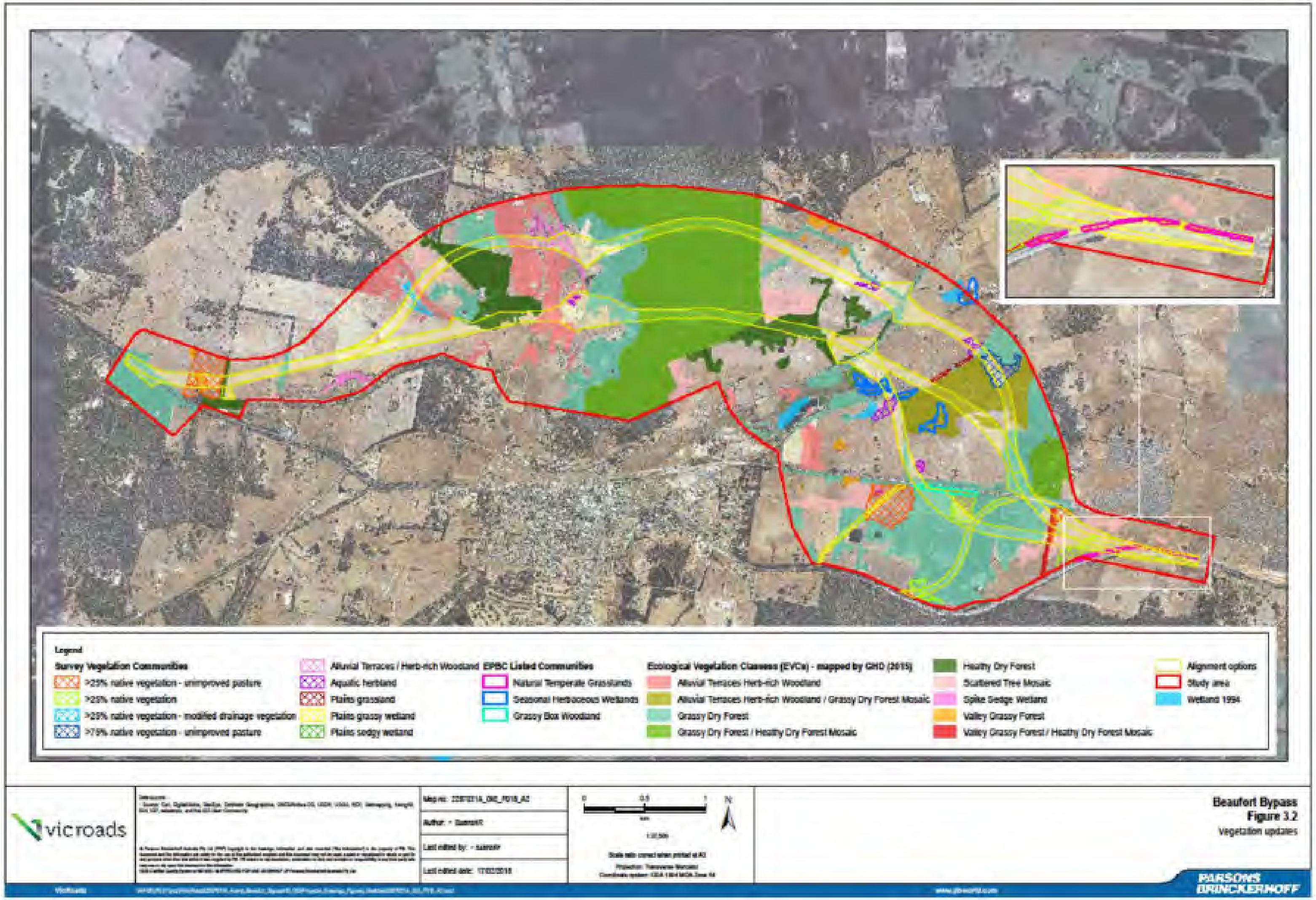

Figure 3.2 Field verification of vegetation mapping

3.1.7 Likelihood of occurrence – flora species

Table 3.3 below identifies the species identified within of the Victorian Biodiversity Atlas databases searches as occurring in the locality (see Section 2.4.1 for details of searches undertaken). The corresponding likelihood of occurrence within the study area of each species is also provided. Figure 3.3 also shows those records from the Victorian Biodiversity Atlas search within proximity of the study area.

Table 3.3 Likelihood of occurrence of threatened species for Beaufort Bypass

Scientific Name	Common Name	Conservation Status			Likelihood of occurrence
		Commonwealth ***Environment Protection and Biodiversity Conservation Act***	State ***Flora and fauna Guarantee Act 1988***	**Advisory List[1]**	
Acacia aspera subsp. parviceps				Rare	VERY HIGH – one record from 1978 in Snow Gum Bushland Reserve. Not found during searches of alignments but further searches outside of alignments may find this species. A number of records from Trawalla State Forest
Amphibromus fluitans	River Swamp Wallaby-grass	Vulnerable			VERY HIGH – new records for area located in this study. Can be difficult to identify at times without seeds.
Caladenia tensa	Rigid Spider-orchid	Endangered		Vulnerable	LOW – only known in Victoria from the Nhill area (GHD 2015)
Caladenia versicolor	Candy Spider-orchid	Vulnerable		Rare / Presumed extinct	LOW-MODERATE – Preferred habitat is Yellow Box woodland on seasonally wet soils, (Jeanes & Backhouse 2006), which is limited in the study area
Calotis anthemoides	Cut-leaf Burr-daisy			Nominated	MODERATE – One record near Eurambeen, within 3 km's of the western edge of the study area
Comesperma polygaloides	Small Milkwort			Vulnerable / Listed	LOW – no records for greater than 20km and not seen during surveys, however may exist in small areas not detected.
Coronidium gunnianum				Vulnerable	LOW – no records for greater than 7km east and not seen during surveys, however, may exist in small areas not detected.

Scientific Name	Common Name	Conservation Status			Likelihood of occurrence
		Commonwealth ***Environment Protection and Biodiversity Conservation Act***	**State** ***Flora and fauna Guarantee Act 1988***	**Advisory List[1]**	
Daviesia laevis	Grampians Bitter-pea	Vulnerable	Listed	Vulnerable	LOW – no records for >14km north-west and not seen during surveys; no suitable habitat
Dianella amoena	Matted Flax-lily	Endangered	Listed	Endangered	VERY HIGH - 10 new records for area located in this study.
Diuris behrii	Golden Cowslips			Vulnerable	MODERATE - 1 record near Eurambeen, within 3 km's of the western edge of the study area
Dodonaea procumbens	Trailing Hop-bush	Vulnerable		Vulnerable	LOW – no records for >30km west and not seen during surveys, however may exist in small areas not detected.
Eucalyptus crenulata	Buxton Gum	Endangered	Listed	Endangered	N/A – A widely planted ornamental tree which is only native to the Acheron River valley and at Yering near Yarra Glen. One herbarium record from 1982 of a planted individual in the Beaufort township (AVH 2016) –
Eucalyptus diversifolia subsp. megacarpa	Coast Gum			Vulnerable	LOW – lack of suitable habitat and one record.
Eucalyptus yarraensis	Yarra Gum		Rejected	Rare	VERY HIGH – Present: one new record found during this survey and several others recorded in or near the study area including one record near Snow Gum Bushland Reserve. Can be difficult to distinguish from Swamp Gum.

Scientific Name	Common Name	Conservation Status			Likelihood of occurrence
		Commonwealth *Environment Protection and Biodiversity Conservation Act*	**State** *Flora and fauna Guarantee Act 1988*	**Advisory List[1]**	
Glycine latrobeana	Clover Glycine	Vulnerable	Listed	Vulnerable	LOW – limited habitat in grassland and grassy woodland areas and very few records from the surrounding area. Nearest record is 16km north.
Grevillea floripendula	Ben Major Grevillea	Vulnerable	Listed	Vulnerable	VERY HIGH – Several known populations relocated in this study. Numerous records in the Victorian Biodiversity Atlas. Distinctive leaf form makes larger plants easy to detect.
Leptospermum turbinatum	Shiny Tea-tree			Rare	LOW - lack of suitable habitat (GHD 2015)
Leucochrysum albicans subsp. albicans var. tricolor	White Sunray	Endangered	Listed	Endangered	LOW - limited habitat in study area; likely would have seen during surveys in 2015 if present. Easy to detect when present.
Olearia speciosa	Netted Daisy-bush			Poorly Known	LOW – lack of suitable habitat
Pimelea spinescens subsp. spinescens	Spiny Rice-flower	Critically Endangered	Listed	Endangered	LOW – limited suitable habitat of Plains Grassland available in study area.
Poa sallacustris	Salt-lake Tussock-grass	Vulnerable	Listed	Vulnerable	LOW – lack of suitable habitat as it typically grows on the margins of salt lakes.
Podolepis linearifolia				Endangered	LOW – lack of suitable habitat
Rutidosis leptorhynchoides	Button Wrinklewort	Endangered	Listed	Endangered	LOW – lack of suitable habitat of Plains Grassland and Plains Grassy Woodland available in study area.

Scientific Name	Common Name	Conservation Status			Likelihood of occurrence
		Commonwealth ***Environment Protection and Biodiversity Conservation Act***	State ***Flora and fauna Guarantee Act 1988***	**Advisory List[1]**	
Senecio psilocarpus	Swamp Fireweed	Vulnerable		Vulnerable	MODERATE – possible habitat in wetlands. Can be overlooked due to similarity with other *Senecio spp*.
Thelymitra matthewsii	Spiral Sun-orchid	Vulnerable		Vulnerable	MODERATE – some suitable habitat (GHD 2015). ID is simple as it has a distinct spiral leaf.
Xerochrysum palustre	Swamp Everlasting	Vulnerable	Listed	Vulnerable	MODERATE – There is an unconfirmed record of this species from the confluence of Yam Holes and Mt. Emu Creeks, not found on the Victorian Biodiversity Atlas or other database. As such some of the sedgy wetland habitat outside the current alignments not searched in this assessment may support this species.
Pterostylis smaragdyna	Emerald lip orchid			Rare	VERY HIGH – found during targeted surveys for the Burrumbeet to Beaufort Vicroads surveys (EHP 2010). Not found on the Victorian Biodiversity Atlas or other database.

Note: (1) Advisory List = listed on Advisory List of Threatened Vertebrate Fauna in Victoria

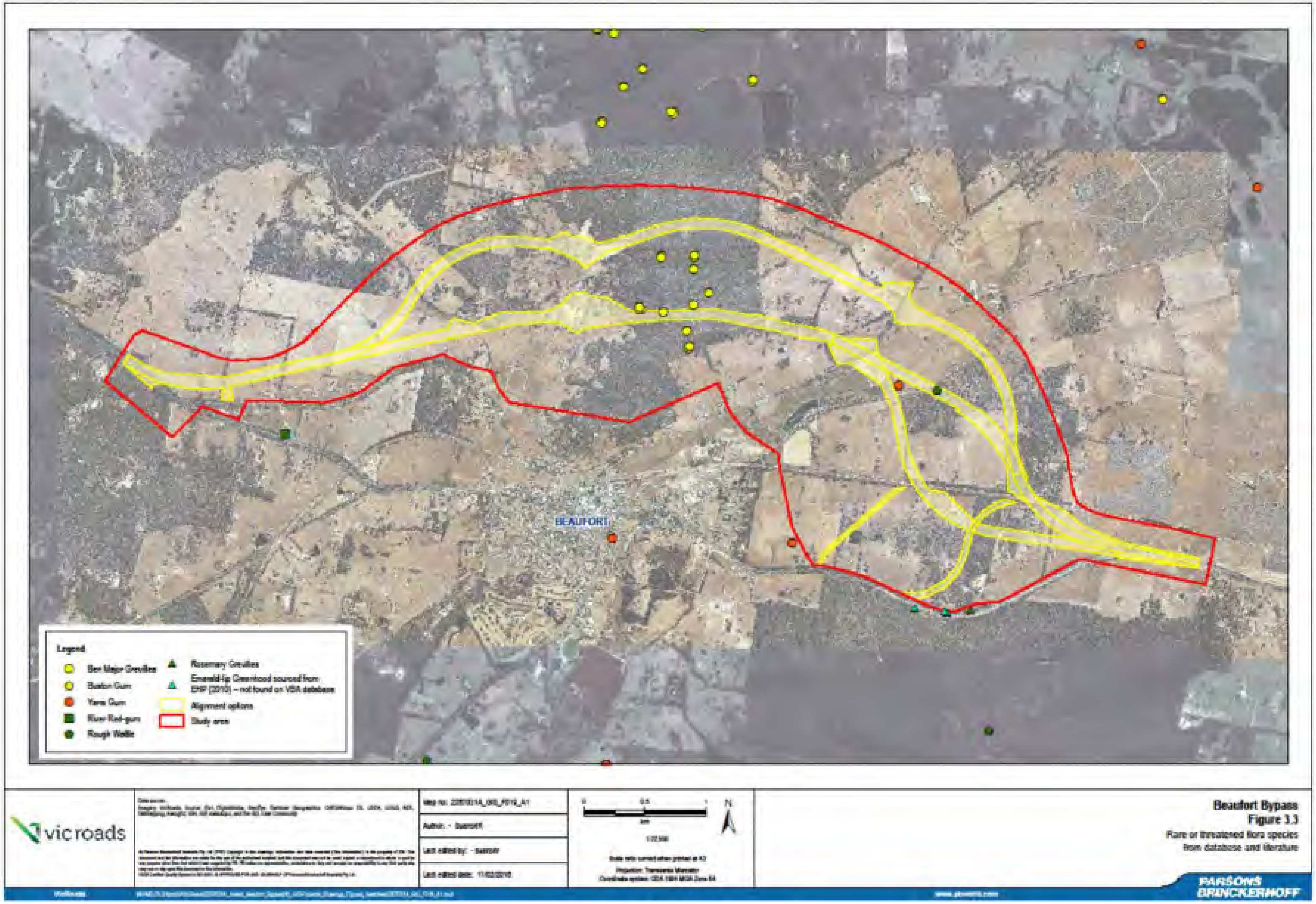

Figure 3.3 Rare or threatened flora species from databases or literature

3.2 Fauna

There was a high degree of disturbance of fauna habitat in the public reserves where there was distinct lack of a mid-storey and in some cases ground flora. There were many large hollow bearing trees on road reserves and on a privately owned property, in particular the property on Johnston's Road. These trees are extremely important for roosting, foraging and nesting for a number of the targeted species (e.g. Squirrel Glider, Brush-tailed Phascogale and Brown Tree Creeper). There are also two significant patches of native grassland adjacent to Options B4 and, within Option B5 that support populations of Golden Sun Moth.

Of the 15 fauna species targeted for survey, Brush-tail Phascogale, Brolga, Bibron's Toadlet and Golden Sun Moth were recorded during the current surveys. An additional threatened species that was not included for targeted surveys, (Victorian *Flora and Fauna Guarantee Act 1988*, Squirrel Glider) was also recorded whilst spotlighting on privately owned land. The land owner, has stated he has seen the Victorian *Flora and Fauna Guarantee Act 1988* listed Painted Honeyeater and Diamond Firetail on his property (H. Johnston, pers comm 8 January 2016).

Using the most recent Victorian Biodiversity Atlas records for each of the targeted species and the habitat present, a further two species; Powerful Owl and Growling Grass Frog are considered as having a very high likelihood of occurring within or adjacent to the two proposed alignments (Options B4 and B5). It should also be noted that the presence or otherwise of a species can be greatly influenced by seasonal conditions.

3.2.1 Targeted surveys for threatened fauna

The following tables provide the location and details of the species recorded when undertaking a specific survey task. The date column refers to the start of the survey period through to the completion date. The time refers to when the relevant trap, equipment was checked or retrieved or a species was observed. See Section 3.2.1.9 photos of selected threatened fauna found during fieldwork.

The weather details have been sourced from the Ballarat Bureau of Meteorology (BoM) weather station. The weather conditions are provided for each of the days the relevant survey task was undertaken. BoM only provides weather conditions for 0900 and 1500 each day. The weather reading closest to the time of the survey period is displayed in each table.

3.2.1.1 GROWLING GRASS FROG AND BIBRON'S TOADLET

Growling Grass Frog did not responded during the call playback surveys. Bibron's or Brown Toadlet responded at two of the five sites surveyed. Ewing's Tree Frog *Litoria ewingii*, Striped Marsh Frog *Limnodynastes peroni* and Banjo Frog *Limnodynastes dumerilii* were heard calling. Survey details are provided in Table 3.4.

Table 3.4 Call playback results

Date	Time	Location	Species Recorded	Temperature (°C)	Humidity %	Cloud Cover
20/11/2015	2210 – 2225	Dam 1	-	13.5	94	No significant cloud
20/11/2015	2145 – 2150	Dam 2	-	13.5	94	No significant cloud
20/11/2015	2155 – 2210	Wet 1	-	13.5	94	No significant cloud
20/11/2015	2135 – 2145	Wet 2	-	13.5	94	No significant cloud
20/11/2015	2135 – 2140	Wet 3	Bibron's Toadlet Banjo Frog Ewing's Tree Frog	13.5	94	No significant cloud

Date	Time	Location	Species Recorded	Temperature (°C)	Humidity %	Cloud Cover
21/11/2015	2045 – 2105	Wet 4	Bibron's Toadlet Striped Marsh Frog (refer to Figure 3.4)	14	-	No significant cloud
22/11/2015	1400 – 1430	Wet 4	-	20	-	Broken

Only Bibron's Toadlet was observed whilst undertaking the active searches. Survey details are provided in Table 3.5.

Table 3.5 Active search results

Date	Time	Location	Species Recorded	Temperature (°C)	Humidity %	Cloud Cover
20/11/2015	0900 – 0930	Dam 1	-	15	84	Broken
21/11/2015	1000 -1030	Wet 1	-	9.9	85	Overcast
21/11/2015	2045 - 2105	Wet 4	Bibron's Toadlet x 3 (refer to Figure 3.4)	17.1	44	No significant cloud

3.2.1.2 BRUSH-TAILED PHASCOGALE

A juvenile male Brush-tailed Phascogale was caught at one of the trapping sites located in Camp Hill State Forest. Details are provided in Table 3.6.

Table 3.6 Elliott Traps

Date	Time	Location	Species recorded	Temperature (°°C)	Humidity %	Cloud Cover
20/11/2015	0600 – 0830	Trapline B1	Brush-tailed Phascogale (refer to Figure 3.4)	15	84	Broken
21/11/2015	0600 – 0830	-	-	9.9	85	Overcast
22/11/2015	0600 – 0830	-	-	10.5	72	Overcast
23/11/2015	0600 – 0830	-	-	12.1	82	Overcast
24/11/2015	0600 – 0830	-	-	13.1	71	Broken
25/11/2015	0600 – 0830	-	-	18.2	33	Overcast

Images of seven species were recorded, with Brushtail Possum being the most common. There were not any images of the two targeted species, Brush-tailed Phascogale and Spot-tail Quoll. Details are provided in Table 3.7.

Table 3.7 Camera traps

Date	Location	Species recorded
20-26/11/2015	Camera 1	Eastern Grey Kangaroo
20-26/11/2015	Camera 2	European Fox
20-26/11/2015	Camera 3	Brushtail Possum Eastern Grey Kangaroo x 2 Australian Magpie European Fox White-winged Chough
20-26/11/2015	Camera 4	Eastern Grey Kangaroo x 8
20-26/11/2015	Camera 5	-
20-26/11/2015	Camera 6	-
20-26/11/2015	Camera 7	Black-tailed Wallaby Echidna Brushtail Possum (refer to Figure 3.4)
20-26/11/2015	Camera 8	-
20-26/11/2015	Camera 9	-

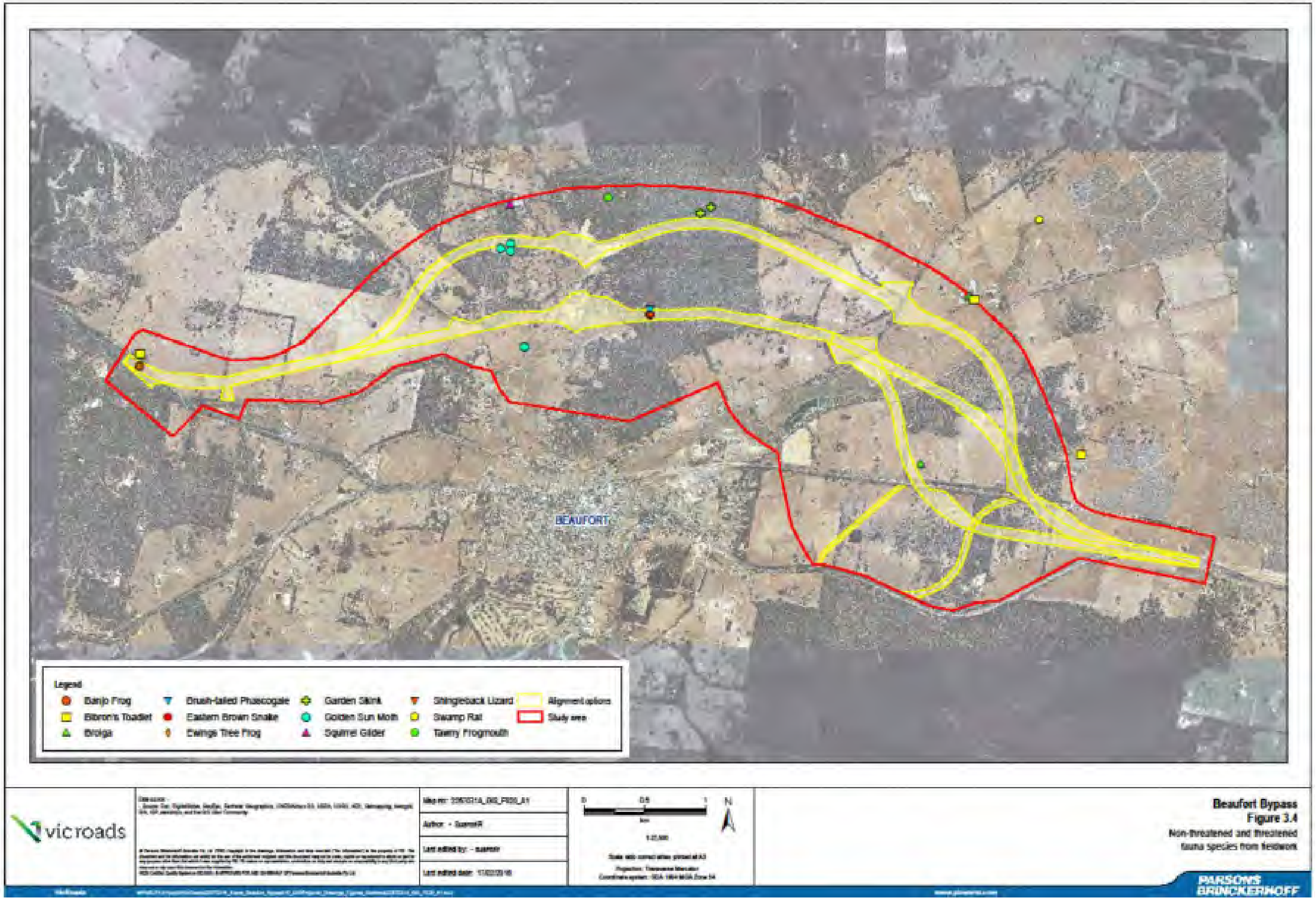

Figure 3.4 Location of non-threatened and threatened fauna species recorded during surveys

None of the 27 hair tubes had hair for analysis. Details are provided in Table 3.8.

Table 3.8 Hair tubes

Date	Location	Species recorded
20- 26/11/2015	BH1 – BH27	N/A
20- 26/11/2015	BH1 – BH27	N/A
20- 26/11/2015	BH1 – BH27	N/A
20- 26/11/2015	BH1 – BH27	N/A
20- 26/11/2015	BH1 – BH27	N/A
20- 26/11/2015	BH1 – BH27	N/A
20- 26/11/2015	BH1 – BH27	N/A

Four species were observed during the spotlight surveys one of which was potentially a targeted species; Squirrel Glider (refer to Figure 3.4). Details of the species observed are provided in Table 3.9.

Table 3.9 Spotlighting

Date	Time	Location	Species recorded	Temperature (°C)	Humidity %	Cloud Cover
23/11/2015	2120 – 2210	Spot 4	Brushtail Possum	19	40	Broken
24/11/2015	2100 – 2140	Spot 5	Squirrel Glider, Brushtail Possum & Boobook Owl x2	23.5	24	No Significant Cover
24/11/2015	2145 – 2225	Spot 6	Tawny Frogmouth & Boobook Owl (refer to Figure 3.4)	23.5	24	No Significant Cover

3.2.1.3 TARGETED WOODLAND BIRD SURVEY

A total of 36 species of birds were recorded whilst undertaking the species accumulation surveys, only one of the species targeted was recorded, Brown Treecreeper. Details are provided in Table 3.10.

Table 3.10 Species accumulation bird surveys

Date	Time	Location	Species	Temperature (°C)	Humidity %	Cloud Cover
22/11/2015	1500 – 1530	Bird 1B	Grey Fantail, Crimson Rosella, Rufous Whistler, Grey-shrike Thrush, Little Raven, Sacred Kingfisher, Australian Magpie, Fuscous Honeyeater, Superb Fairy-wren, Laughing Kookaburra, White-throated Treecreeper, Horsfield's-bronze Cuckoo, Striated Pardalote, Little Corella, Striated Thornbill, Red Wattlebird, Pacific Black Duck	19.3	43	No Significant Cover

Date	Time	Location	Species	Temperature (°C)	Humidity %	Cloud Cover
22/11/2015	1610 – 1650	Bird 2B	Little Raven, Australian Magpie, Little Corella, Eastern Rosella, Superb Fairy-Wren, Fuscous Honeyeater, Grey Fantail, Striated Pardalote, Willy Wagtail, Restless Flycatcher, Eastern Yellow Robin, White-throated Treecreeper, Red Wattlebird, White-naped Honeyeater, Fairy Martin, Black-faced Cuckoo Shrike, Crimson Rosella, Grey Currawong, Magpie-lark	19.3	43	No Significant Cover
24/11/2015	0745 – 0840	Bird 3B	Laughing Kookaburra, Restless Flycatcher, Superb Fairy-wren, Galah, Australian Magpie, Little Corella, Grey-shrike Thrush, Brown Treecreeper, Red Wattle Bird, Fuscous Honeyeater, Little Raven, Striated Pardalote, Rufous Whistler, Yellow-tailed Black Cockatoo, Dusky Woodswallow, Crimson Rosella, White-throated Treecreeper, Sulphur-crested Cockatoo, Eastern Yellow Robin	13.1	71	Broken
24/11/2015	1956 – 2044	Bird 4B	Red Wattlebird, White-necked Heron, Dusky Woodswallow, Sulphur-crested Cockatoo, Long-billed Corella, Brown Treecreeper, Grey Shrike-thrush, White-winged Chough, White-throated Treecreeper, Little Raven, Laughing Kookaburra, Galah, Eastern Yellow Robin, Brolga, Australian Magpie, Fuscous Honeyeater, Superb Fairy-wren, Restless Flycatcher, Southern Boobook, Rufous Whistler, Striated Pardalote, Crimson Rosella, Tawny Frogmouth, Willie Wagtail, Masked Lapwing	23.5	24	No Significant Cover

3.2.1.4 INCIDENTAL RECORDS – BIRDS

A total of 54 species were recorded as incidental observations, of which 17 were not recorded during the targeted surveys (refer to Table 3.11 below). A detailed list of the 54 species recorded as incidental records is provided in Appendix C.

Table 3.11 Incidental observations – species not recorded during the targeted surveys

Date	Time	Location	Bird Species recorded
26/11/2015 26/11/2015	Daily	Across the study area	Restless Flycatcher, Southern Boobook Crested Pigeon, Olive-backed Oriole Rufous Whistler, Striated Pardalote, Tree Martin, Yellow-billed Spoonbill, Crimson Rosella, Eastern Rosella, Tawny Frogmouth, Grey Fantail, Willie Wagtail, Grey Currawong Australian White Ibis, Sacred Kingfisher Masked Lapwing

3.2.1.5 WATERBODY SEARCH – BROLGA

A pair of Brolga were seen on a regular basis at two locations over the duration of the survey period. Details are provided in Table 3.12.

Table 3.12 Brolga surveys

Date	Time	Location	Brolga	Temperature (°C)	Humidity %	Cloud Cover
19/11/2015	1330	Brolga 1	2	29.4	31	No significant cloud
21/11/2015	1630	Wet 4	2	17.1	44	No significant cloud
22/11/2015	1600	Snow Gum	2 x flying overhead	19.3	43	No significant cloud
25/11/2015	0700	Brolga 1	2 (refer to Figure 3.4)	18.2	33	Overcast

3.2.1.6 NOCTURNAL BIRDS – POWERFUL OWL, BARKING OWL, MASKED OWL AND, AUSTRALIAN BUSTARD

Owls did not respond to the call playback surveys. Survey details are provided in Table 3.13.

Table 3.13 Call playback

Date	Time	Location	Species recorded	Temperature (°C)	Humidity %	Cloud Cover
21/11/2015	2200	Playback 1B	-	17.1	44	No significant cloud
22/11/2015	2115	Playback 2B	-	19.3	43	No significant cloud
22/11/2015	2145	Playback 3B	-	19.3	43	No significant cloud
23/11/2015	2145	Playback 4B	-	19	40	Broken
24/11/2015	2115	Playback 5B	-	23.5	24	No significant cloud
24/11/2015	2155	Playback 6B	-	23.5	24	No significant cloud
30/11/2015	2130	Playback 7B	-	28.8	23	Scattered

A pair of Boobook owls were observed at the property on Johnston Road. No owls were observed during the spotlighting surveys. Refer to Table 3.13 above for species other than owls observed. Survey details are provided in Table 3.14.

Table 3.14 Owl spotlighting

Date	Time	Location	Owl Species	Temperature (°C)	Humidity %	Cloud Cover
21/11/2015	2150 – 2220	Spot 1B	-	17.1	44	No significant cloud
22/11/2015	2110 – 2130 2130 – 2235	Spot 2B and Spot 3B	-	19.3	43	No significant cloud
23/11/2015	2125 – 2205	Spot 4B	-	19	40	Broken
24/11/2015	2115 – 2145 2146 – 1015	Spot 5B and 6B	Boobook Owl x 2	23.5	24	No significant cloud

3.2.1.7 REPTILES – STRIPED LEGLESS LIZARD AND LACE MONITOR

Neither of the two targeted species Striped Legless Lizard or Lace Monitor were recorded during the targeted surveys or, as incidental observations.

Table 3.15 Active search & funnel traps

Date	Time	Location	Species	Temperature (˚C)	Humidity %	Cloud Cover
21/11/2015	1535 – 1605	Reptile 1	18 x Garden Skink (*Lampropholis guichenoti*) Juvenile Eastern Brown Snake (*Pseudonaja textilis*) Shingleback Lizard (*Teliqua rugosa*)	17.1	44	No significant cloud
25/11/2015	1500 -1530	Reptile 2	6 x Garden Skink (refer to Figure 3.4)	29.2	13	Overcast

3.2.1.8 INVERTEBRATE – GOLDEN SUN MOTH

A numbr of male Golden Sun Moths were recorded during fieldwork on two occasions.

Table 3.16 Active search

Date	Time	Location	Golden Sun Moth	Temperature (°C)	Humidity %	Wind Speed
29/11/2015		Golden Sun Moth 1	Approximately 20 males	22	-	17km / N
30/12/2015	1100 -1135	Golden Sun Moth 2	Approximately 32 males (refer to Figure 3.4)	23	-	11km/ SSW

3.2.1.9 PHOTOS OF SELECTED THREATENED FAUNA FOUND DURING FIELDWORK

Photo 3.7 Brush-tailed Phascogale

Photo 3.8 Golden Sun Moth

Photo 3.9 Brolga

3.2.2 Likelihood of occurrence

The species within the likelihood of occurrence table below (Table 3.17) have been identified with the potential to occur or suitable habitat is likely to occur within the study area. The species include those listed in the Protected Matter Search Tool and the Victorian Biodiversity Atlas within a 10km buffer of the proposed alignments and the species targeted for this study. Also see Figure 3.5 for the location of the species identified in the Victorian Biodiversity Atlas search (Department of Environment, Land, Water and Planning 2016b) that are in close proximity or within the study area.

Table 3.17 Likelihood of occurrence of species

Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of occurrence
		Commonwealth	**State**		
		Environment Protection and Biodiversity Conservation Act 1999	**Advisory List[1] / *Flora and fauna Guarantee Act 1988***		
Amphibians					
Litoria raniformis	Southern Bell Frog	Vulnerable	Endangered / Listed	The Southern Bell Frog is usually found amongst emergent vegetation such as Typha, Phragmites and Eleocharis within or at the edges of still or slow-flowing water bodies such as lagoons, swamps, lakes, ponds, and farm dams (Robinson, 1993). It also in occurs in irrigation channels and crops, lignum shrublands, black box and river red gum woodlands and at the periphery of rivers. Apart from breeding and foraging habitat, refuge areas for this species may include soil cracks, fallen timber, debris and dense vegetation on low, frequently inundated floodplains (Cogger, 2000). Vegetation types in which this species occurs include open grassland (including crops and pastures), open forest, and ephemeral and permanent non-saline marshes and swamps (Department of Environment and Conservation, 2005).	Very high Most recent record 2011
Pseudophryne bibronii	Bibron's Toadlet		Endangered / Listed	Usually found singly under rocks and logs on slopes in grasslands or beside ditches. Found both in wet and dry sclerophyll forest. Breeding congregations usually occur in inundated grassy areas beside gutters, small creeks etc. Also occurs in alpine grasslands and mossy bogs.	Very high Most recent record 2011
Pseudophryne semimarmorata	Southern Toadlet		Vulnerable	Distributed on the extreme south-east of South Aust, southern Victoria and eastern Tasmania. Found in a variety of damp habitats in sclerophyll forests under logs and leaf-litter where it lives in small tunnels during breeding season (March-May) (Cogger 2000).	Low Most recent record 1885

Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of occurrence
		Commonwealth	State		
		Environment Protection and Biodiversity Conservation Act 1999	**Advisory List[1] / *Flora and fauna Guarantee Act 1988***		
Birds					
Anas rhynchotis	Australasian Shoveler		Vulnerable	Uses a wide variety of wetlands; prefers large permanent lakes or swamps that have abundant cover. A semi-nocturnal feeder; during the day floats with other ducks far out on open water. Usually breeds August - November or after rain in semi-arid interior.	Low Most recent record 1980
Anthochaera phrygia (syn. Xanthomyza phrygia)	Regent Honeyeater	Endangered, Migratory	Critically Endangered / Listed	Occurs mostly in box-ironbark forests and woodland and prefers wet, fertile sites such as along creek flats, broad river valleys and foothills. Riparian forests with *Casuarina cunninghamiana* and *Amyema cambagei* are important for feeding and breeding. Spotted Gum and Swamp Mahogany forests are also important feeding areas in coastal areas. Important food trees include *Eucalyptus sideroxylon* (Mugga Ironbark), *E. albens* (White Box), *E. melliodora* (Yellow Box) and *E. leucoxylon* (Yellow Gum) (Garnett, 2000).	Low Most recent record 1971
Apus pacificus	Fork-tailed Swift	Migratory		Breeds in the northern hemisphere, wintering south to Australia. It is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground. It mostly occurs over inland plains but sometimes above foothills or in coastal areas over cliffs, beaches, islands and well out to sea. It also occurs over towns and cities. It mostly occurs over dry and/or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh, grassland, spinifex sandplains, farmland and sand-dunes. It sometimes occurs above forests. It probably roosts aerially, but has occasionally been observed to land (Higgins, 1999).	Medium No local records in the Victorian Biodiversity Atlas

Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of occurrence
		Commonwealth	State		
		Environment Protection and Biodiversity Conservation Act 1999	**Advisory List[1] / *Flora and fauna Guarantee Act 1988***		
Ardea (Bulbulcus) ibis	Cattle Egret	Migratory		Occurs in tropical and temperate grasslands, wooded lands and terrestrial wetlands and very rarely in arid and semi-arid regions. High numbers may occur in moist, poorly drained pastures with high grass; it avoids low grass pastures but has been recorded on earthen dam walls and ploughed fields. It is commonly associated with the habitats of farm animals, particularly cattle, but also pigs, sheep, horses and deer. It is known to follow earth-moving machinery and has been located at rubbish tips. It uses predominately shallow, open and fresh wetlands including meadows and swamps with low emergent vegetation and abundant aquatic flora (Marchant, 1990, Morton, 1989).	Medium No local records in the Victorian Biodiversity Atlas
Ardea (Casmerodius) modesta	Eastern Great Egret	Migratory	Vulnerable / Listed	Great Egrets occur throughout most of the world. They are common throughout Australia, with the exception of the most arid areas. Great Egrets prefer shallow water, particularly when flowing, but may be seen on any watered area, including damp grasslands. Great Egrets can be seen alone or in small flocks, often with other egret species, and roost at night in groups. In Australia, the breeding season of the Great Egret is normally October to December in the south and March to May in the north. This species breeds in colonies, and often in association with cormorants, ibises and other egrets. (Australian Museum, 2003).	Medium Most recent record 1999
Aythya australis	Hardhead		Vulnerable	On terrestrial wetlands and occasionally sheltered estuarine and inshore waters. Almost entirely aquatic, preferring large deep fresh waters with abundant aquatic vegetation; particularly deep swamps, lakes, creeks, billabongs and alluvial plains (Marchant, 1990).	Medium Most recent record 1980

Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of occurrence
		Commonwealth	State		
		Environment Protection and Biodiversity Conservation Act 1999	**Advisory List[1] / *Flora and fauna Guarantee Act 1988***		
Biziura lobata	Musk Duck		Vulnerable	Widespread in SE and SW parts of continent, on terrestrial wetlands, estuarine habitats and sheltered inshore waters. Almost entirely aquatic; preferring deep water of large permanent swamps, lakes and estuaries, where conditions stable and aquatic flora abundant. Open water needed for feeding and display, but nesting birds secretive and remain within or beside vegetation. Wetlands with both dense marginal vegetation and large expanses of water suitable all year (Marchant, 1990).	Medium
Botaurus poiciloptilus	Australasian Bittern	Endangered	Endangered / Listed	Occurs in shallow, vegetated freshwater or brackish swamps. Requires permanent wetlands with tall dense vegetation, particularly bulrushes and spike rushes. When breeding, pairs are found in areas with a mixture of tall and short sedges but will also feed in more open territory. (Garnett, 2000, NSW National Parks and Wildlife Service, 2002).	Low No local records in the Victorian Biodiversity Atlas
Chrysococcyx osculans	Black-eared Cuckoo		Near threatened	Mainly open vegetation associations, especially open woodlands and open shrublands. Often in open woodlands dominated by Eucalyptus, particularly stunted mallee communities; Open woodlands of River Red Gum along rivers or round other wetlands in otherwise open grasslands; or open acacia woodlands, dominated by Mulga, Myall or Boree. Also often in saltbush or bluebush shrubland on sandhills or sandy flats; and in heathland, spinifex grassland or samphire shrubland (Higgins, P.J. 1999).	Low Most recent record 1970

Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of occurrence
		Commonwealth	State		
		Environment Protection and Biodiversity Conservation Act 1999	**Advisory List[1] / *Flora and fauna Guarantee Act 1988***		
Chthonicola sagittata (syn. Pyrrholaemus sagittatus)	Speckled Warbler		Vulnerable / Listed	Occurs in a wide range of eucalypt dominated vegetation with a grassy understorey and is often found on rocky ridges or in gullies. It feeds on seeds and insects and builds domed nests on the ground (Garnett, 2000 21). The species has been shown to decrease in abundance as woodland area decreased, and it appears to be extinct in districts where no fragments larger than 100ha remain (Barrett, 1994 3628). Isolation of Speckled Warbler populations in small remnants increases their vulnerability to local extinction as a result of stochastic events and decreases their genetic viability in the long term (NSW Scientific Committee, 2001).	Medium No local records in the Victorian Biodiversity Atlas
Cinclosoma punctatum	Spotted Quail-thrush		Near Threatened	This is species is known to inhabit dry forest/woodland and scrubs that contain leaf litter, leaves, rocks and tussocks. Within these habitats this species prefers the sunny side along ridges (Pizzey & Knight 2012).	Low No local records in the Victorian Biodiversity Atlas
Circus assimilis	Spotted Harrier		Near threatened	The Spotted Harrier occurs throughout the Australian mainland in grassy open woodland including acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe (e.g. chenopods) (Marchant & Higgins 1993). It is found mostly commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. The diet of the Spotted Harrier includes terrestrial mammals, birds and reptiles, occasionally large insects and rarely carrion (Department of Environment Climate Change and Water 2010).	Low Most recent record 1982
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)		Near Threatened / Nominated	Found in eucalypt woodlands and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly in habits woodlands dominated by stringybarks or other rough-barked eucalypts. Nesting occurs in tree hollows (Department of Environment and Conservation, 2005).	Very high Recorded during current survey

Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of occurrence
		Commonwealth	State		
		Environment Protection and Biodiversity Conservation Act 1999	**Advisory List[1] / *Flora and fauna Guarantee Act 1988***		
Dromaius novaehollandiae	Emu		Near Threatened	Widespread throughout Aust. mainland in a variety of habitats from timbered areas to open country. Found from tropical monsoonal to temperate regions and at all altitudes from coasts to above winter snow-line in Great Dividing Range. Mostly found in flat undulating lands but also on timbered ridges, tablelands and moderately hilly terrain, also recorded on ocean beaches, wading in shallow estuarine inlets, mudflats, and saltmarshes. Other coastal habitats include sandplains, sand-dunes, heathlands and low foothills. Tends to nest in areas of extensive cover where disturbance is infrequent and tend to avoid areas frequently disturbed by human activity (Marchant, 1990).	Low Most recent record 1991
Gallinago hardwickii	Latham's Snipe	Migratory	Near Threatened / Nominated	Occurs in freshwater or brackish wetlands generally near protective vegetation cover. This species feeds on small invertebrates, seeds and vegetation. It migrates to the northern hemisphere to breed (Garnett, 2000).	Medium Most recent record 2000
Gelochelidon nilotica	Gull-billed Tern		Endangered / Listed	Prefer shallow, often ephemeral, terrestrial wetlands, either fresh or saline, especially lakes, swamps and lagoons, particularly those with mudflats; sometimes on inundated ground, including saltpans, claypans and saltmarsh or watercourses and associated floodplains. Also occur in sheltered coastal embayments, estuaries and river deltas with tidal sandflats, mudflats or beaches. Inland, often occur well away from water, on dry samphire, grassy plains or even gibber. Usually breed on large, often ephemeral, inland lakes and swamps, on low exposed islands, banks, flats or spits of dry mud, sand or, occasionally, rocks; either bare or vegetated with sparse dry grass, reeds and rushes or scattered samphire (Higgins, P.J. & Davies 1997).	Low No local records in the Victorian Biodiversity Atlas

Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of occurrence
		Commonwealth	State		
		Environment Protection and Biodiversity Conservation Act 1999	**Advisory List[1] / *Flora and fauna Guarantee Act 1988***		
Grantiella picta	Painted Honeyeater		Vulnerable / Listed	Lives in dry forests and woodlands. Primary food is the mistletoes in the genus Amyema, though it will take some nectar and insects. Its breeding distribution is dictated by presence of mistletoes which are largely restricted to older trees. Less likely to be found in in strips of remnant box-ironbark woodlands, such as occur along roadsides and in windbreaks, than in wider blocks (Garnett, 2000).	High Based on land owner observation on their property
Grus rubicunda	Brolga		Vulnerable / Listed	Occurs in well vegetated shallow freshwater wetlands, small isolated swamps in eucalypt forests, floodplains, grasslands, paddocks, ploughed fields, irrigated pastures, stubbles, crops, desert claypans, bore drains, tidal areas, mangroves, beach wastes. Roosts in shallow, bare swamps and nests on small islands in wetland or standing in shallow water, eggs are occasionally laid on bare ground (Pizzey, 1997).	Very high Recorded during current survey
Haliaeetus leucogaster	White-bellied Sea-Eagle	Migratory	Vulnerable / Listed	Occurs in coastal areas including islands, estuaries, inlets, large rivers, inland lakes and reservoirs. Builds a huge nest of sticks in tall trees near water, on the ground on islands or on remote coastal cliffs (Pizzey, 2007).	Low No local records in the Victorian Biodiversity Atlas
Hirundapus caudacutus	White-throated Needletail	Migratory		Occurs in airspace over forests, woodlands, farmlands, plains, lakes, coasts and towns. Breeds in the northern hemisphere and migrates to Australia in October-April (Pizzey, 2007).	Meduim No local records in the Victorian Biodiversity Atlas

Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of occurrence
		Commonwealth	State		
		Environment Protection and Biodiversity Conservation Act 1999	**Advisory List[1] / *Flora and fauna Guarantee Act 1988***		
Lathamus discolor	Swift Parrot	Endangered	Endangered / Listed	Breeding occurs in Tasmania, majority migrates to mainland Australia in autumn, over-wintering, particularly in Victoria and central and eastern NSW, but also south-eastern Queensland as far north as Duaringa. In mainland Australia is semi-nomadic, foraging in flowering eucalypts in eucalypt associations, particularly box-ironbark forests and woodlands. Preference for sites with highly fertile soils where large trees have high nectar production, including along drainage lines and isolated rural or urban remnants, and for sites with flowering Acacia pycnantha, is indicated. Sites used vary from year to year. (Garnett, 2000),(Swift Parrot Recovery Team, 2001).	Low No local records in the Victorian Biodiversity Atlas
Melanodryas cucullata cucullata	Hooded Robin (South-Eastern)		Near Threatened / Listed	Found in south-eastern Australia, generally east of the Great Dividing Range. Found in eucalypt woodland and mallee and acacia shrubland. This is one of a suite of species that has declined in woodland areas in south-eastern Australia (Traill, 2000 42; Garnett, 2000 21). The species appears unable to survive in remnants smaller than 100-200ha (NSW Scientific Committee, 2001).	Low No local records in the Victorian Biodiversity Atlas
Merops ornatus	Rainbow Bee-eater	Migratory		Usually occur in open or lightly timbered areas, often near water. Breed in open areas with friable, often sandy soil, good visibility, convenient perches and often near wetlands. Nests in embankments including creeks, rivers and sand dunes. Insectivorous, most foraging is aerial, in clearings (Higgins, 1999).	Medium No local records in the Victorian Biodiversity Atlas
Monarcha melanopsis	Black-faced Monarch	Migratory		Occurs in rainforests, eucalypt woodlands, coastal scrubs, damp gullies in rainforest, eucalypt forest and in more open woodland when migrating (Pizzey & Knight 2007).	Low No local records in the Victorian Biodiversity Atlas

Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of occurrence
		Commonwealth	State		
		Environment Protection and Biodiversity Conservation Act 1999	**Advisory List[1] / *Flora and fauna Guarantee Act 1988***		
Motacilla flava	Yellow Wagtail	Migratory		This species occurs in a range of habitats including estuarine habitats such as sand dunes, mangrove forests and coastal saltmarshes. This species also occurs in open grassy areas including disturbed sites such as sports grounds and has been recorded on the edges of wetlands, swamps, lakes and farm dams. This species migrates from Asia to Australia in spring-summer. It has been recorded in the estuarine areas of the Hunter River in Newcastle NSW and in QLD and the north of NT and WA (Higgins, 2006).	Low No local records in the Victorian Biodiversity Atlas
Myiagra cyanoleuca	Satin Flycatcher	Migratory		Occurs in heavily vegetated gullies, in forests and taller woodlands. During migration it is found in coastal forests, woodlands, mangroves, trees in open country and gardens (Pizzey, 2007).	Low No local records in the Victorian Biodiversity Atlas
Ninox connivens	Barking Owl		Endangered / Listed	Barking Owls are found in open woodlands and the edges of forests, often adjacent to farmland. They are less likely to use the interior of forested habitat. They are usually found in habitats that are dominated by eucalyptus species, particularly red gum, and, in the tropics, paperbark species. They prefer woodlands and forests with a high density of large trees and particularly sites with hollows that are used by the owls as well as their prey. Roost sites are often located near waterways or wetlands. Barking Owl feeds on a variety of small to medium-sized mammals, birds, reptiles and insects (Strahan 1994; Morcombe 2014).	Low No local records in the Victorian Biodiversity Atlas

Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of occurrence
		Commonwealth	State		
		Environment Protection and Biodiversity Conservation Act 1999	**Advisory List[1] / *Flora and fauna Guarantee Act 1988***		
Ninox strenua	Powerful Owl		Vulnerable / Listed	Powerful Owl are endemic to eastern and south-eastern Australia, predominately on the eastern side of the Great Dividing Range. Australia. They are typically found in open forests and woodlands, sheltered gullies in wet forests with dense understoreys along watercourses. Will sometimes be found in open areas near forests such as farmland, parks and suburban areas, as well as in remnant bushland patches. They need hollow bearing trees to nest. Powerful Owl eat medium to large tree-dwelling mammals; Common Ringtail Possum, Brushtail Possum and Great Glider (Strahan 1994; Morcombe 2014).	Very high Most recent record 2011
Nycticorax caledonicus	Nankeen Night Heron		Near Threatened	This species prefers shallow margins along rivers, creek lines and wetlands. The species is also known to inhabit mangrove lines estuaries, offshore islands and perch in garden trees (Pizzey & Knight 2012).	Medium No local records in the Victorian Biodiversity Atlas
Oreoica gutturalis	Crested Bellbird		Near Threatened / Listed	This species prefers to inhabit arid scrublands that include acacia (including mulga), saltbush, belah, mallee-spinifex species and also occurs in eucalypt woodlands (Pizzey & Knight 2012).	Low No local records in the Victorian Biodiversity Atlas
Oxyura australis	Blue-billed Duck		Endangered / Listed	Relatively sparse throughout species range. Regularly found breeding in south-east Queensland, north-east South Australia and throughout New South Wales. Found on temperate, fresh to saline, terrestrial wetlands, and occupies artificial wetlands. Prefers deep permanent open water, within or near dense vegetation. Nest in rushes, sedge, Lignum, (*Muehlenbeckia cunninghami*) and paperbark Melaleuca (Garnett, 2000).	Medium No local records in the Victorian Biodiversity Atlas

Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of occurrence
		Commonwealth	State		
		Environment Protection and Biodiversity Conservation Act 1999	**Advisory List[1] / *Flora and fauna Guarantee Act 1988***		
Pedionomus torquatus	Plains-wanderer	Vulnerable	Critically Endangered / Listed	Sparse grasslands that have 50 percent bare ground, widely spaced plants up to 10 cm high and remaining standing vegetation less than 5 centimetres in height. Occasionally uses cereal stubble but cannot persist in agricultural landscape. Suitable habitat tends to be restricted to small (50-300 ha) patches that do not support dense pasture growth under any seasonal conditions.	Low No local records in the Victorian Biodiversity Atlas
Plegadis falcinellus	Glossy Ibis	Migratory	Near Threatened	It feeds in very shallow water and nests in freshwater or brackish wetlands with tall dense stands of emergent vegetation (e.g. reeds or rushes) and low trees or bushes. It shows a preference for marshes at the edges of lakes and rivers, as well as lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and irrigated cultivation. It less often occurs in coastal locations such as estuaries, deltas, saltmarshes and coastal lagoons. Roosting sites are often large trees that may be far from water. The nest is a platform of twigs and vegetation usually positioned less than 1 m above water in tall dense stands of emergent vegetation (e.g. reeds or rushes), low trees or bushes over water (BirdLife International 2009).	Medium No local records in the Victorian Biodiversity Atlas
Polytelis anthopeplus	Regent Parrot	Vulnerable	Vulnerable / Listed	In NSW, found in red gum forest and mallee adjacent to the Murray River and Wakool River, downstream of Tooleybuc and Kyalite, respectively. Critical foraging habitat includes Mallee woodland up to 20km from mature nesting trees that are typically close to rivers. Outside the breeding season Regent Parrots may be found up to 60 km from watercourses (Department of Environment and Climate Change 2007).	Low Most recent record 1971

Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of occurrence
		Commonwealth	State		
		Environment Protection and Biodiversity Conservation Act 1999	**Advisory List[1] / *Flora and fauna Guarantee Act 1988***		
Pomatostomus temporalis temporalis	Grey-Crowned Babbler (Eastern subspecies)		Endangered / Listed	The eastern form of the species formerly ranged throughout eastern Australia from South Australia, through Victoria and broadly through NSW and central Queensland but is now extinct in South Australia, coastal Victoria and the ACT. In NSW, it occurs on the western slopes and plains but is less common at the higher altitudes of the tablelands. Isolated populations are known from coastal woodlands on the North Coast, in the Hunter Valley and from the South Coast near Nowra (Blakers, 1984 376) (Schodde, 1999 3518).Grey-crowned Babblers occupy open woodlands dominated by mature eucalypts, with regenerating trees, tall shrubs, and an intact ground cover of grass and forbs. The species builds conspicuous dome-shaped nests and breeds co-operatively in sedentary family groups of 2-13 birds (Davidson, 1992).Grey-crowned Babblers are insectivorous and forage in leaf litter and on bark of trees (NSW Scientific Committee, 2001).	Low Most recent record 1898
Rhipidura rufifrons	Rufous Fantail	Migratory		Occurs in a range of habitats including the undergrowth of rainforests/wetter eucalypt forests/gullies, monsoon forests paperbarks, sub-inland and coastal scrubs, mangroves, watercourses, parks and gardens. When migrating they may also be recorded on farms, streets and buildings. Migrates to SE Australia in October-April to breed, mostly in or on the coastal side of the Great Dividing Range (Pizzey, 2007).	Medium No local records in the Victorian Biodiversity Atlas

Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of occurrence
		Commonwealth	State		
		Environment Protection and Biodiversity Conservation Act 1999	**Advisory List[1] / *Flora and fauna Guarantee Act 1988***		
Rostratula australis (syn. R. benghalensis)	Australian Painted Snipe (Painted Snipe)	Vulnerable, Migratory	Critically Endangered / Listed	Inhabits shallow, vegetated, temporary or infrequently filled wetlands, including where there are trees such as *Eucalyptus camaldulensis* (River Red Gum), *E. populnea* (Poplar Box) or shrubs such as *Muehlenbeckia florulenta* (Lignum) or *Sarcocornia quinqueflora* (Samphire). Feeds at the water's edge and on mudlflats on seeds and invertebrates, including insects, worms, molluscs and crustaceans. Males incubate eggs in a shallow scrape nest (Garnett, 2000).	Low No local records in the Victorian Biodiversity Atlas
Stagonopleura guttata	Diamond Firetail		Vulnerable / Listed	Distributed through central and eastern NSW, extending north into southern and central Queensland and south through Victoria to the Eyre Peninsula, South Australia. In NSW, the species occurs predominantly west of the Great Dividing Range, although populations are known from drier coastal areas (Blakers, 1984 376) (Schodde, 1999 3629). Occurs in a range of eucalypt dominated communities with a grassy understorey including woodland, forest and mallee. Most populations occur on the inland slopes of the dividing range (Garnett, 2000 21). Firetails nest in trees and bushes, and forage on the ground, largely for grass seeds and other plant material, but also for insects (Blakers, 1984) (Read, 1994).	High Based on land owner observation on their property
Tringa nebularia	Common Greenshank	Migratory		Occurs in a range of inland and coastal environments. Inland, it occurs in both permanent and temporary wetlands, billabongs, swamps, lakes floodplains, sewage farms, saltworks ponds, flooded irrigated crops. On the coast, it occurs in sheltered estuaries and bays with extensive mudflats, mangrove swamps, muddy shallows of harbours and lagoons, occasionally rocky tidal ledges. It generally prefers wet and flooded mud and clay rather than sand (Morcombe 2003).	Low No local records in the Victorian Biodiversity Atlas

Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of occurrence
		Commonwealth	State		
		Environment Protection and Biodiversity Conservation Act 1999	**Advisory List[1] / *Flora and fauna Guarantee Act 1988***		
Tyto novaehollandiae	Masked Owl		Endangered / Listed	Masked Owl has a broad coastal band around mainland Australia and throughout Tasmania, Population numbers are low on the mainland. Masked Owl are found in forests, woodlands, timbered waterways and open country on the fringe of these areas. They prefer tall trees with hollows for nesting and roosting. Masked Owls pairs remain in or near their territory all year round. They prefer to feed on small mammals; rodents, rabbits and bandicoots. They will also include possums, reptiles, birds and insects in tier diet (Strahan 1994; Morcombe 2014).	Low No local records in the Victorian Biodiversity Atlas
Fish					
Galaxiella pusilla	Dwarf Galaxias	Vulnerable	Endangered / Listed	The species has broad habitat requirements and occurs in slow flowing and still, shallow, permanent and temporary freshwater habitats such as swamps, drains and the backwaters of streams and creeks, often (but not always) containing dense aquatic macrophytes and emergent plants (Cadwallader & Backhouse 1983; McDowall 1996; Hammer 2002a). In larger pools, the species is usually found amongst marginal vegetation. Some wetlands where it occurs may partially or completely dry up during summer (Humphries 1986) and such wetlands rely on seasonal flooding plus linkages to other sites where the species occurs, for recolonisation (Backhouse & Vanner 1978). Wetlands connected to a more permanent waterbody (such as river or creek) may also be vital to their long-term survival (particularly during extended dry conditions) and must therefore be considered as part of the habitat requirement critical to survival (Saddlier et al. 2010).	Very high Species has been recorded in Yam Holes Creek immediately downstream of the project area and there is suitable habitat in the project area in Yam Holes Creek and its associated wetland areas.

Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of occurrence
		Commonwealth	State		
		Environment Protection and Biodiversity Conservation Act 1999	**Advisory List[1] / *Flora and fauna Guarantee Act 1988***		
Macquaria australasica	Macquarie Perch	Endangered	Endangered / Listed	The natural range of Macquarie Perch included the upper and middle reaches of the Murray-Darling basin as well as the Shoalhaven and Hawkesbury Rivers. However, this species has recently been sighted in only a few localities within these river systems. Preferred habitat is deep holes covered with rocks, and spawning occurs above shallow running water. Macquarie Perch is a schooling species (Department of the Environment and Water Resources, 2007).	Low Lack of suitable habitat
Nannoperca obscura	Yarra Pygmy Perch	Vulnerable	Vulnerable / Listed	The species generally occurs in lakes, ponds and slow-flowing rivers (Saddlier & Hammer 2010), but prefers small-medium sized, relatively shallow (1-2 m) freshwater streams with moderate to high flow (Saddlier et al. 2013). It is usually associated with large amounts of aquatic vegetation (particularly emergent vegetation) and log snags in clear, fresh to slightly brackish water (Llewellyn 1980; Woodward & Malone 2002; Bice & Ye 2006 cited in Saddlier et al. 2013).	Low Low quality habitat in the project area, but not recorded during survey and no existing records despite numerous surveys.
Invertebrates					
Synemon plana	Golden Sun Moth	Critically Endangered	Endangered / Listed	Golden Sun Moth occurs between Queanbeyan, Gunning, Young and Tumut, and in nearby areas of Victoria and the ACT. This species occurs where wallaby grasses Austrodanthonia spp. dominate the understory, such as grassy Box-Gum Woodlands or Natural Temperate Grasslands, as larvae feed exclusively on the roots of wallaby grass. Bare ground separating low tussocks of wallaby grass are key microhabitat features for the Golden Sun Moth, as courting behaviour occurs here (Department of the Environment and Water Resources, 2007).	Very high Recorded during current surveys

Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of occurrence
		Commonwealth	State		
		Environment Protection and Biodiversity Conservation Act 1999	**Advisory List[1] / *Flora and fauna Guarantee Act 1988***		
Mammals					
Dasyurus maculatus maculatus	Spotted-tailed Quoll (Southern Subspecies)	Endangered	Endangered / Listed	Occurs from the Bundaberg area in south-east Queensland, south through NSW to western Victoria and Tasmania. Occurs in wide range of forest types, although appears to prefer moist sclerophyll and rainforest forest types, and riparian habitat. Most common in large unfragmented patches of forest. It has also been recorded from dry sclerophyll forest, open woodland and coastal heathland, and despite its occurrence in riparian areas, it also ranges over dry ridges. Nests in rock caves and hollow logs or trees. Feeds on a variety of prey including birds, terrestrial and arboreal mammals, small macropods, reptiles and arthropods (NSW National Parks and Wildlife Service, 1999 27; NSW National Parks and Wildlife Service, 1999).	Medium Regularly sighted 25 to 30km note of site
Isoodon obesulus obesulus	Southern Brown Bandicoot		Near Threatened / Nominated	Inhabit a variety of habitats including heathland, shrubland, sedgeland, heathy open forest and woodland and are usually associated with infertile, sandy and well drained soils, but can be found in a range of soil types (*Coates et al. 2008; Menkhorst and Seebeck 1990; NSW DEC 2006; Paull 1993*). Within these vegetation communities they typically inhabit areas of dense ground cover. Species experts define suitable habitat for Southern Brown Bandicoots (eastern) to be any patches of native or exotic vegetation, within their distribution, which contains understorey vegetation structure with 50–80% average foliage density in the 0.2–1 m height range. In areas where native habitats have been degraded or diminished, exotic vegetation, such as Blackberry (Rubus spp.), can and often does, provide important habitat (*Department of Sustainability, Environment, Water, Population and Communities 2011g*).	Low No local records in the Victorian Biodiversity Atlas

Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of occurrence
		Commonwealth	State		
		Environment Protection and Biodiversity Conservation Act 1999	**Advisory List[1] / *Flora and fauna Guarantee Act 1988***		
Perameles gunnii	Eastern Barred Bandicoot	Endangered	Extinct in Wild / Listed	Widely distributed in Tasmania, particularly in northern and eastern parts. Its mainland range has been dramatically reduced to relict colonies near Hamilton, VIC. Its preferred habitat consists of open grasslands on basalt soils. In suburban VIC it survives in gardens and nearby grasslands (mostly improved pasture) (Australian Museum 1983).	Low Most recent record 1918
Petaurus norfolcensis	Squirrel Glider		Endangered / Listed	Squirrel Gliders are distributed along the Great Dividing Range from central Cape York to central Victoria with isolated pockets in eastern South Australia. Their preferred habitat is open woodland with mature eucalyptus containing hollows. They live primarily on insects but pollen, nectar and tree sap are also key part of their diet. Their diet is influenced by seasonal food resource availability (Menkhorst 1996; Menkhorst and Knight 2010).	Very high Recorded during current surveys
Phascogale tapoatafa	Brush-tailed Phascogale		Vulnerable / Listed	Largely arboreal it occurs in a range of habitats which have reliable rainfall (500-2000mm), but has preference for open dry sclerophyll forest on ridges (up to 600 m alt) with little/sparse ground cover. It nests in tree hollows and feeds at dusk on arthropods and small vertebrates (Strahan, 1995).	High Most recent record 2011
Pseudomys fumeus	Smoky Mouse	Endangered	Critically Endangered / Listed	The Smoky Mouse is currently limited to a small number of sites in Victoria, south-east NSW and the ACT. The Smoky Mouse occurs in a variety of vegetation communities, ranging from coastal heath to dry ridgeline forest, sub-alpine heath and, occasionally, wetter gullies (Menkhorst, 1981 3719). Except for the wetter sites, a consistent feature of Smoky Mouse habitats is the diversity of heath and bush-pea species present, combined with potential shelter sites in the form of woody debris or rocks. The vegetation at capture sites varies widely in age post-fire (Menkhorst, 2006).	Low No local records in the Victorian Biodiversity Atlas

Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of occurrence
		Commonwealth	State		
		Environment Protection and Biodiversity Conservation Act 1999	**Advisory List[1] / *Flora and fauna Guarantee Act 1988***		
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Vulnerable / Listed	Occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps. Urban gardens and cultivated fruit crops also provide habitat for this species. Feeds on the flowers and nectar of eucalypts and native fruits including lily pillies. It roosts in the branches of large trees in forests or mangroves (NSW National Parks and Wildlife Service, 2001 56; Churchill, 2008)	Medium No local records in the Victorian Biodiversity Atlas
Sminthopsis crassicaudata	Fat-tailed Dunnart		Near Threatened / Nominated	Occurs widely in southern Aust. in a variety of open vegetation habitats including open woodland, low shrublands of saltbush and bluebush, tussock grasslands on clay or sandy soils, gibber plain and, in southern parts of its range, farmlands. Their range extends from relatively moist regions near southern coast through the arid inland, and into the plains of Lake Eyre basin (Australian Museum, 1983 4196).	Low Most recent record1963
Reptiles					
Aprasia parapulchella	Pink-tailed Worm Lizard (syn. Pink-tailed Legless Lizard)	Vulnerable	Endangered / Listed	This lizard is known from four sites in eastern Australia: near Canberra in the ACT, Tarcutta and Bathurst in NSW, and near Bendigo in Vic. In general, lizards occur in open grassland habitats that have a substantial cover of small rocks (Osbourne, 1995 1326). Lizards also show a preference for sunny aspects, avoiding S facing slopes. Some specimens have been collected from grassland sites that appear not to support any native grasses and several animals have been found on the edge of *Callitris enlicheri* woodland and *Eucalyptus macrorhyncha* woodland (Barrer, 1992). A burrowing species, it is usually found under rocks on well-drained soil and in ant nests, occasionally with several individuals found under the same rock (Swan, 2004).	Low No local records in the Victorian Biodiversity Atlas

Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of occurrence
		Commonwealth	State		
		Environment Protection and Biodiversity Conservation Act 1999	**Advisory List[1] / *Flora and fauna Guarantee Act 1988***		
Chelodina longicollis	Eastern Long-necked Tortoise		Data Deficient	Widespread through eastern drainage systems from Adelaide, SA to south of Townsville, QLD. Coastal and inland waterways, typically inhabiting swamps, lagoons and slow-moving rivers and creeks, but often seen wandering overland far from any apparent water (Swan 2003).	High Most recent record in 2012
Delma impar	Striped Legless Lizard	Vulnerable	Endangered / Listed	Until recently, *D. impar* was thought to inhabit only native tussock grasslands. In recent years, surveys have revealed D. impar in many sites dominated by exotic grasses such as *Phalaris aquatica*, *Nasella trichotoma* and *Hypocharis radicata* (Corrigan, 1996) (O'Shea, 1996) (Kukolic, 1994) (Rauhala, 1995) (Rauhala, 1996) (Coulson, 1990). They have also been found in several secondary/derived grassland sites. A relatively dense and continuous structure, rather than the floristic composition of grasslands, may be important in influencing the persistence of *D. impar*. The key to their survival in rural areas may be the availability of shelter during disturbance events (such as heavy grazing or perhaps even ploughing), from which they may be able to recolonise disturbed sites after the cessation of the disturbance (Dorrough, 1995). This shelter may take the form of plant species which are relatively unpalatable to stock, such as Serrated Tussock or Juncus sp., road easements, less disturbed neighbouring land or even soil cracks and arthropod burrows in the short-term (Smith, 1999).	Low No local records in the Victorian Biodiversity Atlas
Pseudemoia pagenstecheri	Tussock Skink		Vulnerable	Disjunct through highlands of NSW and north-east VIC to low-altitude basalt plains of southern VIC from the Grampians in the west, through the basalt plains west of Melbourne. Preferred habitat of subalpine to alpine grassland and heathland and tussock grasslands with few or no trees (Cogger 2000; Swan; 2003).	Very high Most recent record 2012

Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of occurrence
		Commonwealth	State		
		Environment Protection and Biodiversity Conservation Act 1999	**Advisory List[1] / *Flora and fauna Guarantee Act 1988***		
Varanus varius	Lace Monitor		Vulnerable	Occurs in well-timbered areas, from dry woodlands to cool temperate southern forests. Arboreal, ascending large trees when disturbed. Clutches of eggs are laid in arboreal or terrestrial termite mounds (Swan 2003).	Low No local records in the Victorian Biodiversity Atlas

Notes:

(2) Advisory List = listed on Advisory List of Threatened Vertebrate Fauna in Victoria (Department of Environment and Primary Industries 2014)

Please note: The likelihood of a number of species rated as medium could change to a higher likelihood if drought conditions were to break e.g. Eastern Great Egret

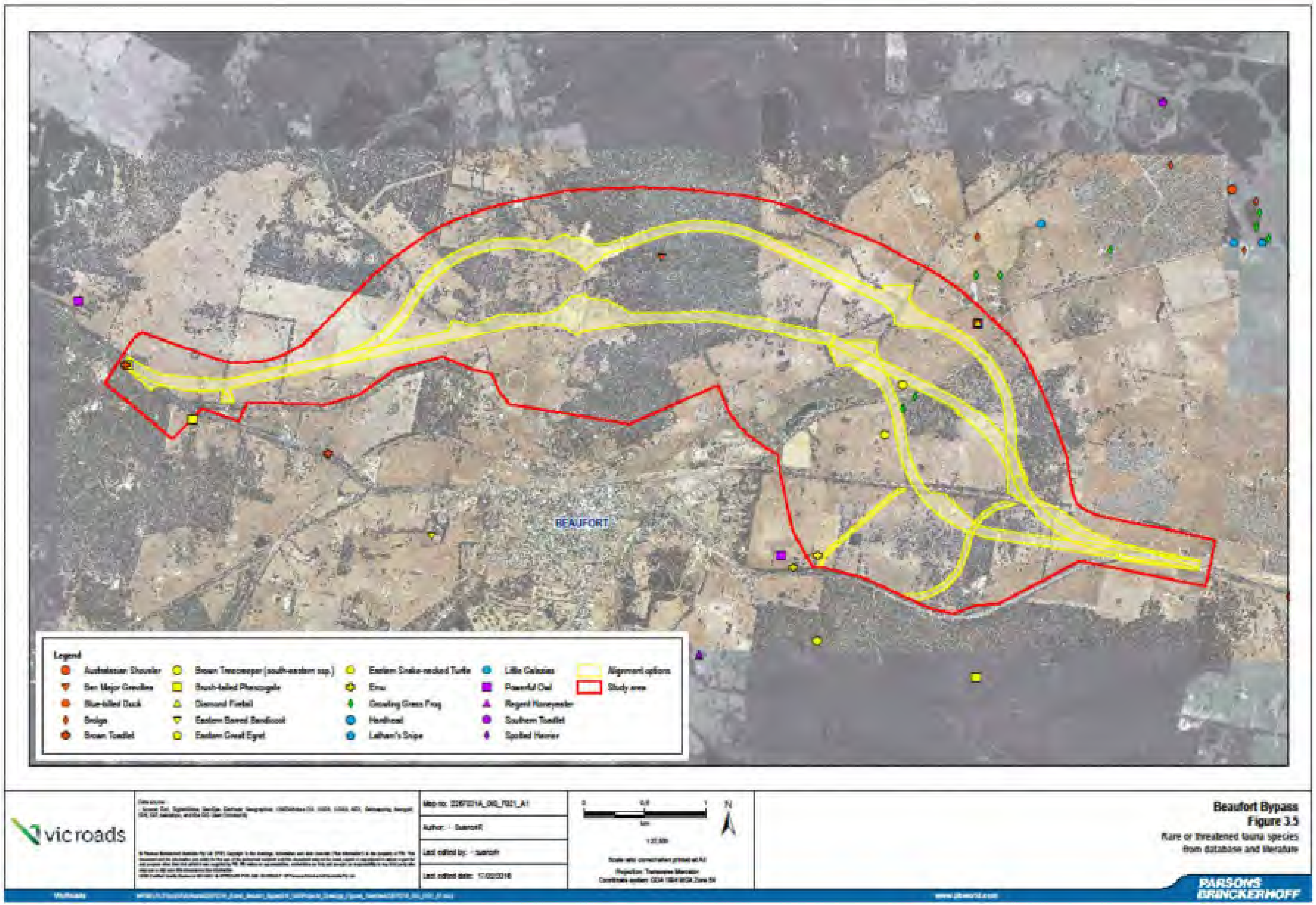

Figure 3.5 Rare or threatened fauna species from databases or literature

3.3 Aquatic fauna

3.3.1 Desktop review

The review of the Victorian Biodiversity Atlas species databases and other supplied sources of information (see Section 2.4) returned a number of records of significant aquatic species including:

- Little Galaxias from 2011 in Yam Holes Creek to the northwest of the study area at sites B020, B021 and B022. There are also a number of older records in Mt Emu Creek near Trawalla. It is understood the 2011 records were associated with a significant flooding event that occurs in the Beaufort region, but suggests the species is resident in the area and the population is at least directly associated with Yam Holes Creek.
- Yarra Pygmy Perch were also been recorded in Mt Emu Creek near Trawalla in 2010 (EHP 2014).

The desktop review returned no other aquatic fauna species of Commonwealth or state significance. All aquatic sites are shown on Figure 2.3.

3.3.2 Survey sites

At the time of the survey the Beaufort region had been experiencing a significant and prolonged dry period. Many of the sites identified during the rapid field assessment (GHD 2012) were dry (see Photo 3.10) or significantly retracted to small stagnant pools.

Thirty-nine sites were assessed during the survey (Table 3.18). Of these 18 were assessed as potentially having habitat appropriate for the target species and were surveyed using one or a number of the methods outlined in Section 2.7.3.

The only obviously flowing surface water in the study area was in sections of Yam Holes Creek within the study area (sites B023.1, B023.2 and B026), with the creek then no longer showing surface flow further downstream to the west of the study area (e.g. sites B020 to B022 and at B031). Given the appearance and disappearance of surface water and surface flows along the length of Yam Hols Creek assessed, it is likely that at some points, flows may be subterranean.

Photo 3.10 Site B008 during the targeted survey (left) compared to the rapid field assessment (right)

Appendices E and F provides details and a summary of the assessed sites and Table 3.18 below provides a description of each of the site that were surveyed.

3.3.3 Targeted aquatic fauna survey

No Little Galaxias or Yarra Pygmy Perch were recorded during the targeted survey despite also checking sites outside of the study area that had previous records of little galaxias.

No Commonwealth or State listed aquatic fauna species were recorded in, or in the vicinity of, the study area during the targeted survey.

The following common fish species were recorded during the targeted survey (see also Photo 3.11 to Photo 3.14):

- Native (indigenous):
  - **Southern pygmy perch** *Nannoperca australis* – a common a small native species, often associated with water bodies that have higher emergent and aquatic vegetation.
- Native (introduced)
  - **Freshwater catfish** *Tandanus tandanus* - Not indigenous to the region and highly likely it was deliberately stocked into the site it was recorded (B018, large farm dam) for the purposes of recreational fishing.
- Exotic:
  - **Mosquitofish** (otherwise called Gambusia Plague minnow) **Gambusia holbrooki* – Listed as a noxious aquatic species in Victoria and a significant threat to native fish populations, in particle little galaxias. Very tolerant of a wide range of water quality and habitats, but tends to prefer shallow, warmer water edges with little aquatic vegetation or overstorey. Easily re-invades dried waterways upon the next watering event. Was introduces in in Victoria from the 1920's in a failed attempt to control mosquitos.
  - **Redfin perch** *Perca fluviatilis* – Introduced in the 20th century as a sport fishing species and commonly stocked into farm dams. Highly predatory towards native aquatic fauna (e.g. fish and frogs).

Photo 3.11 Southern Pygmy Perch at Site B023.1

Photo 3.12 Mosquitofish at Site B026

Photo 3.13 Redfin Perch at Site B018

Photo 3.14 Freshwater Catfish at Site B018

Table 3.18 below shows the methods deployed and fish species recorded at each of the surveyed sites.

Table 3.18 Fish species recorded at surveyed site during the targeted survey

Site Name	Method				Native		Exotic	
	Dip-net	Bait trap	Fyke net	Observed	Freshwater catfish	Southern pygmy perch	Redfin perch	Mosquitofish
B001	X				-	-	-	-
B006	X	X			-	-	1	10
B013	X	X			-	-	-	13
B014	X				-	-	-	-
B018	X			X	3	-	≈ 100's	-
B019	X	X			-	-	-	-
B020*	X				-	-	-	5
B021*	X	X			-	10	-	≈ 50
B022*					-	-	-	-
B023.1	X	X			-	2	-	6
B023.2			X		-	-	-	≈ 100's
B024	X				-	-	-	-
B026	X	X			-	-	-	10
B027.1	X				-	-	-	-
B027.2	X				-	-	1	-
B028	X	X			-	-	3	1
B029	X				-	-	≈ 10's	-
B030	X				-	-	≈ 10's	-

Note that it is Sites B020, B021 and B022 (Figure 2.3) that have existing records of little galaxias from 2011.

3.3.4 Water quality

Water quality readings were taken as some of the survey sites to assist with interoperating their suitability as habitat for the targeted species (see Appendix E). The key parameter that eliminated a number of sites as suitable habitat (namely for little galaxias) were a number of sites that recorded very high levels of salinity (or electrical conductivity) including:

- Site B013 – 7492 uS/cm
- Site B024 – 6537 uS/cm; and
- Site B018 – 3774 uS/cm.

Dwarf galaxias species generally occur in water bodies with less than 3,000 uS/cm (Bachman et. al 2014)

3.3.5 Likelihood of occurrence

Refer to Table 3.17 within the fauna section above.

4 DISCUSSION

4.1 Matters of National Environmental Significance – Flora

Depending on the alignment adopted, the project has the potential to impact on three Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* listed flora species known to occur in the study area, most notably Matted Flax-lily, Swamp Wallaby-grass and Ben Major Grevillea. These three species and three communities are discussed further below. Additionally, the project may impact on four nationally listed flora species which have a moderate likelihood of occurring in the study area, including Candy Spider-orchid, Swamp Fireweed, Swamp Everlasting and Spiral Sun-orchid.

4.1.1 Matted Flax-lily

Key threats to Matted Flax-lily on which Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* referral assessments are judged include the loss, degradation, modification and fragmentation of habitat through:

- weed invasion
- habitat destruction
- biomass reduction and fire regimes
- pollinator replacement.

(Department of the Environment 2016)

The new records from this study are shown below (Figure 4.1) in context to the rest of the known records on the Department of Environment, Land, Water and Planning's Victorian Biodiversity Atlas (Department of Environment, Land, Water and Planning 2016b). Potential impacts on Matted Flax-lily in accordance with the Significant Impact Guidelines (Department of the Environment 2013a) are covered below in Table 4.1.

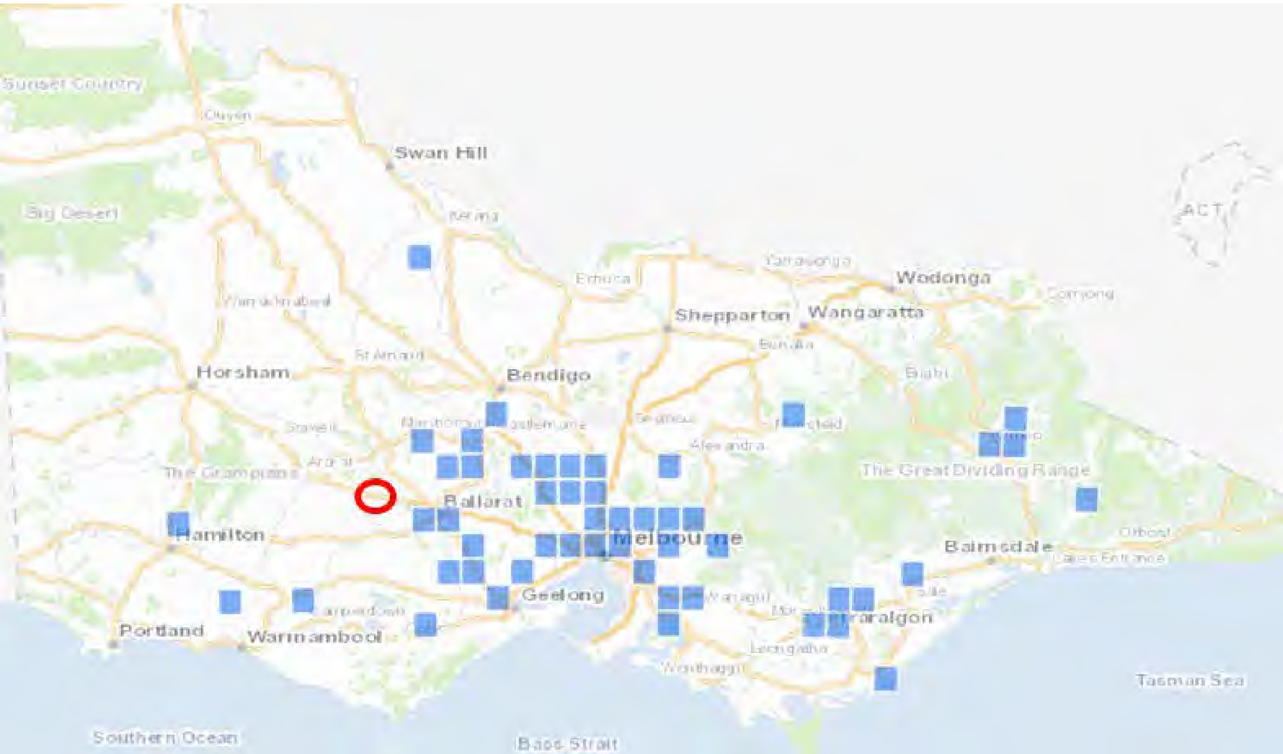

Figure 4.1 Geographic distribution of Matted Flax-lily; blue squares are known locations in the Victorian Biodiversity Atlas (Department of Environment, Land, Water and Planning 2016), red circle showing new Beaufort records from this study

Table 4.1 Potential impacts on Matted Flax-lily in accordance with the Significant Impact Guidelines (Critically Endangered and Endangered Species)

Significant impact criteria	Potential outcome
Lead to a long-term decrease in the size of an population	**Possible:** If Option B4 is constructed, it is likely to lead to a long term decrease in size of the Beaufort population and impact on habitat. Option B5 would impact on only one plant.
Reduce the area of occupancy of a species	**Possible:** If Option B4 is constructed, it is likely to lead to a long term decrease in size of the Beaufort population and impact on habitat. Option B5 would impact on only one plant.
Fragment an existing population into two or more populations	**Possible:** Depending on the option and section selected, this might fragment populations and/or pollinators.
Adversely affect habitat critical to the survival of a species	**Unlikely:** The construction of any of the three options and sections is unlikely to adversely affect habitat critical to the survival of a species.
Disrupt the breeding cycle of an population	**Possible:** Depending on the timing works and the works affect pollinators.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Possible:** If Option B4 is constructed, it is likely to lead to a long term decrease in size of the Beaufort population and impact on habitat. Option B5 would impact on only one plant.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	**Possible:** The construction of any of the alignment options may increase the establishment of an invasive species that impact on Matted Flax-lily.
Introduce disease that may cause the species to decline, or	**Unlikely:** The construction of any of the alignment options is unlikely to introduce disease that may cause the species to decline
Interfere with the recovery of the species.	**Unlikely:** The construction of any of the alignment options is unlikely to interfere with the recovery of the species.

4.1.2 Ben Major Grevillea

Four population locations of Ben Major Grevillea where found comprised of 54 plants – see Table 4.2 below. Three populations relocated from known records were located away from the alignments with one relocated population near alignment B4 (Figure 4.2). There was also a previous record within alignment B4 which could not be relocated during this survey. Most known populations which were rediscovered during this study were in recently burnt forest. Ben Major Grevillea is an obligate seed regenerator with new seedlings appearing after fire. However, inappropriate fire regimes such as repeated fires without adequate time for plants to meet maturity and spread seed is a key threat to Ben Major Grevillea (Department of the Environment 2016b). This is particularly pronounced when a burn is conducted in drought conditions, which has led to the failure of young recruited seedlings (Nick Jeshencko pers. comm.).

Key threats to the Ben Major Grevillea, according to the National Recovery Plan for the Ben Major Grevillea (Carter, Murphy and Downe 2006) include:

- inappropriate fire regimes
- weed invasion
- timber harvesting & firewood collection
- road works
- defoliation by insect
- gold prospecting.

(Department of the Environment 2016b)

The records from this study are shown below (Figure 4.2) in context to the rest of the known records on DELWP's Victorian Biodiversity Atlas (Department of Environment, Land, Water and Planning 2016). Potential impacts on Ben Major Grevillea in accordance with the Significant Impact Guidelines (Department of the Environment 2013a) are covered below in Table 4.2.

Figure 4.2 Locations of Ben Major Grevillea on context with alignments B4 (right or south) and B5 (left or north). Previous locations from Victorian Biodiversity Atlas records (white) circles and locations from this study with population labels (red squares)

Table 4.2 Rapid population demographic estimates located in this study

Height category	Pop 1		Pop 2	Pop 3	Pop 4
	South of Camp Hill Rd (unburnt)	North of Camp Hill Rd (burnt)	(burnt)	(burnt)	(burnt)
<10	14	5	10	8	
10 – 50			2	5	1
50 – 100	7			1	
100 – 150	1				
Totals	**22**	**5**	**12**	**14**	**1**

Note: Populations in Table 4.2 correspond to those shown on Figure 4.2.

Figure 4.3 Geographic distribution of Ben Major Grevillea; blue squares are known locations in the Victorian Biodiversity Atlas (Department of Environment, Land, Water and Planning 2016), red circle showing Beaufort records

Table 4.3 Potential impacts on Ben Major Grevillea in accordance with the Significant Impact Guidelines (Vulnerable species)

Significant impact criteria	Potential outcome
Lead to a long-term decrease in the size of an important population of a species	**Possible:** If Option B4 is constructed, it could lead to a long term decrease in size of the population and impact on habitat. Option B5 would not impact on any known plants.
Reduce the area of occupancy of an important population	**Possible:** Option B4 will result in a reduction on the area of occupancy. See above comments in relation to important population.
Fragment an existing important population into two or more populations	**Likely:** Both options are likely to fragment an existing southerly most important population into two or more populations.
Adversely affect habitat critical to the survival of a species	**Unlikely:** The construction of either option is unlikely to adversely affect habitat critical to the survival of a species.
Disrupt the breeding cycle of an important population	**Possible:** Both options may affect pollinators and natural and managed fire regimes.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Possible:** Option B4, may result in modification, destruction, removal or isolation or a decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	**Unlikely:** The project is unlikely to contribute towards the establishment of an invasive species.
Introduce disease that may cause the species to decline, or	**Possible:** The project could introduce a disease that may cause the species to decline, such as Phytophthora.

Significant impact criteria	Potential outcome
Interfere substantially with the recovery of the species.	**Possible:** The project could interfere with the recovery of the species.

4.1.3 River Swamp Wallaby-grass

Eight new population locations of River Swamp Wallaby-grass where found comprised multiple plants at each location. The species is stoloniferous (horizontal roots on the surface), and sometimes rhizomatous (roots under the soil surface (PlantNet 2016), therefore it is difficult to know the full extent of individual plants. Only one records was taken from each wetland or dam the species was recorded in.

Key threats to River Swamp Wallaby-grass are:

- pastoral development (changed land use or draining and conversion of wetlands to agricultural lands)
- changing water regimes
- invasion of remnant habitat by exotic grasses and weeds
- grazing and trampling by stock, especially in summer.

(Department of the Environment 2016c)

The records from this study are shown below (Figure 4.4) in context to the rest of the known records on the Department of Environment, Land, Water and Planning's Victorian Biodiversity Atlas (Department of Environment, Land, Water and Planning 2016). Potential impacts on River Swamp Wallaby-grass in accordance with the Significant Impact Guidelines (Department of the Environment 2013a) are covered below in Table 4.4.

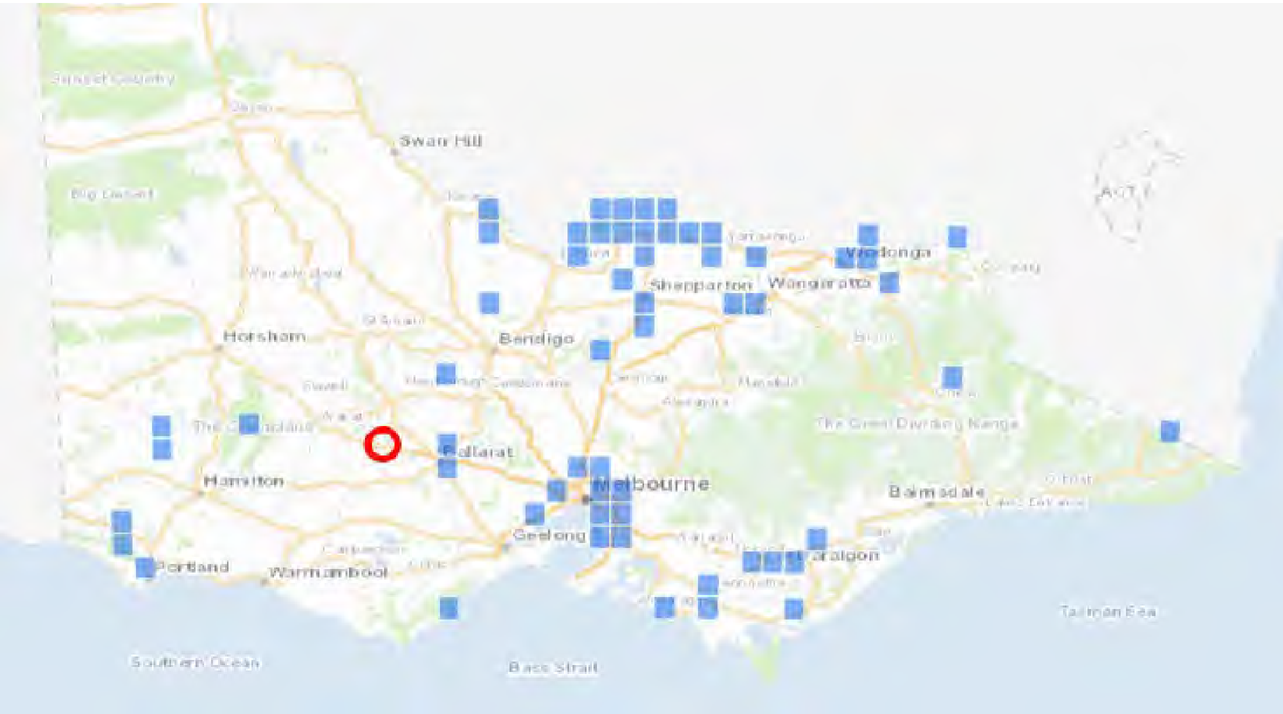

Figure 4.4 Geographic distribution of River Swamp Wallaby-grass; blue squares are known locations in the Victorian Biodiversity Atlas (Department of Environment, Land, Water and Planning 2016), red circle showing Beaufort records

Table 4.4 Potential impacts on River Swamp Wallaby-grass in accordance with the Significant Impact Guidelines (Vulnerable species)

Significant impact criteria	Potential outcome
Lead to a long-term decrease in the size of an important population of a species	**Possible**: If either option is constructed, it could lead to a long term decrease in size of the population around Beaufort and impact on surface hydrology.
Reduce the area of occupancy of an important population	**Possible**: Option B4 will result in a reduction on the area of occupancy of one population and several others indirectly through altered hydrology. Option B5 will impact on two populations and at least one other population indirectly.
Fragment an existing important population into two or more populations	**Likely**: Both options are likely to fragment existing important populations.
Adversely affect habitat critical to the survival of a species	**Unlikely**: The construction of either option is unlikely to adversely affect habitat critical to the survival of a species.
Disrupt the breeding cycle of an important population	**Possible**: Both options may affect dispersal mechanisms such as wetland birds and wind.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Possible**: Both options may result in modification, destruction, removal or isolation or a decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	**Possible**: The project may contribute towards the establishment of an invasive species through the spread of wetland weeds or nutrient-rich water.
Introduce disease that may cause the species to decline, or	**Possible**: The project could introduce a disease that may cause the species to decline.
Interfere substantially with the recovery of the species.	**Possible**: The project could interfere with the recovery of the species.

4.1.4 White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

One patch of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Grassy Box Woodlands) was located along the rail corridor which coincides with part of alignment option B4-A. Potential impacts on (Grassy Box Woodlands) in accordance with the Significant Impact Guidelines (Department of the Environment 2013a) are covered below in Table 4.5.

Table 4.5 Potential impacts on Grassy Box Woodlands in accordance with the Significant Impact Guidelines (Critically Endangered and Endangered Species)

Significant impact criteria	Potential outcome
Reduce the extent of an ecological community	**Possible:** Option B4-A would remove approximately 50% of the extent this community.
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	**Possible:** Option B4-A could fragment this community from other connecting vegetation communities.

Significant impact criteria	Potential outcome
Adversely affect habitat critical to the survival of an ecological community	**Unlikely:** The patch identified in the study area is on the southern edge of the range for this community and is unlikely critical for its survival.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	**Possible:** As Option B4-A would remove approximately 50% of the extent this community, this could affect the abiotic factors influencing the remaining area outside of the alignment.
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	**Possible:** Option B4-A could introduce weed species.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: → assisting invasive species, that are harmful to the listed ecological community, to become established, or → causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community.	**Possible:** Option B4-A would remove approximately 50% of the extent this community.
Interfere with the recovery of an ecological community.	**Unlikely:** Options B4-A would unlikely affect the recovery of this community on a State-wide level.

4.1.5 Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains

Three patches of Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (Seasonal Herbaceous Wetlands) are located within part of alignment B4-A. Potential impacts on (Seasonal Herbaceous Wetlands) in accordance with the Significant Impact Guidelines (Department of the Environment 2013a) are covered below in Table 4.6.

Table 4.6 Potential impacts on Seasonal Herbaceous Wetlands in accordance with the Significant Impact Guidelines (Critically Endangered and Endangered Species)

Significant impact criteria	Potential outcome
Reduce the extent of an ecological community	**Possible:** Option B4-A would remove three patches of this community.
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	**Likely:** Option B4-A could change the hydrological function of the wetlands.
Adversely affect habitat critical to the survival of an ecological community	**Unlikely:** The three wetlands are unlikely to affect the survival of this community across southern Victoria.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	**Possible:** Option B4-A could affect the abiotic factors such as hydrology influencing the remaining area outside of the alignment.
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	**Possible:** B4-A could introduce weed species and adversely affect the water filling and emptying wetlands.

Significant impact criteria	Potential outcome
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: → assisting invasive species, that are harmful to the listed ecological community, to become established, or → causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community.	**Possible:** Option B4-A would remove three patches of this community.
Interfere with the recovery of an ecological community.	**Unlikely:** Options B4-A would unlikely affect the recovery of this community on a State-wide level.

4.1.6 Natural Temperate Grassland of the Victorian Volcanic Plain

Three patches of Natural Temperate Grassland of the Victorian Volcanic Plain (Natural Temperate Grassland) were located along the Western Highway which coincides with part of alignments B4 and B5. Potential impacts on (Natural Temperate Grassland) in accordance with the Significant Impact Guidelines (Department of the Environment 2013a) are covered below in Table 4.7.

Table 4.7 Potential impacts on Natural Temperate Grassland in accordance with the Significant Impact Guidelines (Critically Endangered and Endangered Species)

Significant impact criteria	Potential outcome
Reduce the extent of an ecological community	**Possible:** Options B4 and B5 would remove more than 50% of the extent this community in the study area along the Western Highway.
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	**Possible:** Options B4 and B5 have the potential to fragment this community.
Adversely affect habitat critical to the survival of an ecological community	**Unlikely:** The removal of this patch will unlikely affect this community across southern Victoria.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	**Possible:** Both options may alter surface water drainage patterns.
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	**Possible:** Both options may introduce weed species.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: — assisting invasive species, that are harmful to the listed ecological community, to become established, or — causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community.	**Possible:** Options B4 and B5 would remove more than 50% of the extent this community in the study area
Interfere with the recovery of an ecological community.	**Unlikely:** Options B4 and B5 would unlikely affect the recovery of this community on a State-wide level.

4.2 Flora and Fauna Guarantee Act 1988 and Advisory List of Threatened Vertebrate Fauna in Victoria – Flora

Flora species listed under the Victorian *Flora and Fauna Guarantee Act 1988* known to be present in the study area include Matted Flax-lily and Ben Major Grevillea, which are both addressed in the section above as they are also listed under the Commonwealth *Environment, Protection and Biodiversity Conservation Act 1999*t.

Western (Basalt) Plains Natural Temperate Grassland, listed under the Victorian *Flora and Fauna Guarantee Act 1988* is also found in the same patch as Natural Temperate Grassland of the Victorian Volcanic Plain, listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999,* and as such is addressed in the section above.

The Yarra Gum is considered 'rare' on the Advisory list of rare or threatened plants in Victoria – 2014 (Department of Environment and Primary Industries 2014) but not listed under the Victorian *Flora and Fauna Guarantee Act 1988* or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. The individual located in this study is located 350m north of Option B5 on a track from Main Lead Road. However, there are several records in the Victorian Biodiversity Atlas (Department of Environment, Land, Water and Planning 2016b) close to Options B4-A and B4-B which may impact on these individuals.

Both Rough Wattle and Emerald lip orchid are considered 'rare' (Department of Environment and Primary Industries 2014). They were not recorded in this study but have a Very High likelihood of occurrence. Option B4-B may impact on Rough Wattle given that there is a record in or close to the alignment, but targeted surveys would be needed to ascertain the accuracy of this record and if the plant still remains at the Snow Gums Bushland Reserve. Option B5-A would likely impact on several individuals or populations of Emerald lip orchid along Western Highway, as it was recorded (EHP 2010).

4.3 Matters of National Environmental Significance – Fauna

One Matter of National Environmental Significance, the Golden Sun Moth, was recorded during the current surveys within Alignment B5. One other species, the Growling Grass Frog is considered to have a very high likelihood to occur in alignment B4 based on the presence of suitable habitat and recent records. The drought conditions are considered to have had on impact on Growling Grass Frog being recorded during the current surveys.

The **Growling Grass Frog** record in 2011 was during a period of unseasonal rainfall with many areas in the district being in flood (http://www.floodsreview.vic.gov.au/). Growling Grass Frog is known to respond as a result of episodic rainfall events and can be found widespread during these events, only to retreat to refuges in less than ideal conditions. In this scenario, Growling Grass Frog is known to have significantly higher levels of dispersal moving large distances (Wassens 2005).

The ideal habitat characteristics for Growling Grass Frog are large and relatively permanent waterbodies, with a high proportion of emergent vegetation cover (Hamer and Organ 2006) and / or off-stream wetlands, which contain water at least periodically (Department of Environment, Water, Heritage and the Arts 2009a and b)

Key threats to Growling Grass Frog on which Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* referral assessments are judged include the loss, degradation, modification and fragmentation of habitat through:

- draining, infilling or changes to flooding patterns of permanent and non-permanent water bodies, or their adjoining watercourses and surrounding vegetation
- alteration of wetland hydrology, diversity and structure
- removal of aquatic vegetation
- clearing of terrestrial vegetation, fallen logs and ground debris surrounding water bodies
- isolation of populations
- introduction of exotic pests
- deterioration of water quality and any introduction of pollutants and biocides (Department of Environment, Water, Heritage and the Arts 2009a and b)

Growling Grass Frog was not recorded during the current surveys, however there are two recent records (2011) within Option B4. The construction of Option B4 has the potential to trigger one or more of the above Commonwealth assessment criteria and the need for a Commonwealth referral. Table 4.8 provides an outline of the potential outcomes of the potential impacts in accordance with the Significant Impact Guidelines for the Vulnerable Growling Grass Frog (Department of the Environment, Water, Heritage and the Arts 2010c).

Table 4.8 Potential impacts in accordance with the Significant Impact Guidelines for the Vulnerable Growling Grass Frog

Ecological element affected	Impact threshold	Comment	Potential outcome
Habitat degradation in an area supporting an important population	1. Permanent removal or degradation of terrestrial habitat (for example between ponds, drainage lines or other temporary/permanent habitat) within 200 metres of a water body in temperate regions, or 350 m of a water body in semi-arid regions, that results in the loss of dispersal or overwintering opportunities for an important population. 2. Alteration of aquatic vegetation diversity or structure that leads to a decrease in habitat quality. 3. Alteration to wetland hydrology, diversity and structure (for example any changes to timing, duration or frequency of flood events) that leads to a decrease in habitat quality. Introduction of predatory fish and/or disease agents.	Habitat is a connected area that supports one or more key ecological functions for this species. These functions may include, but are not limited to: foraging, breeding, dispersal, shelter. Any action that results in the degradation of habitat such that the recruitment, survival or dispersal rates of an important population are lowered may have a significant impact on the species. Habitat quality increases with: → increasing wetland area, → water permanence, and → aquatic vegetation cover. Habitat quality decreases with the degree of development in the terrestrial zone (that is roads, buildings etc) and the presence of predatory fish.	**Possible:** Growling Grass Frog previously recorded adjacent to Option B4-B, B5-A within B4-A. Construction of any of these options has the potential to trigger impact thresholds 1-3. **Please note:** The size and distribution of the local population is uncertain. As a consequence it cannot be determined whether the population meets the definition of an *'important population'*.
Isolation and fragmentation of populations	1. Net reduction in the number and/or diversity of water bodies available to an important population. 2. Removal or alteration of available terrestrial or aquatic habitat corridors (including alteration of connectivity during flood events). 3. Construction of physical barriers to movement between water bodies, such as roads or buildings.	Habitat connectivity could be provided by a linear water body (for example a creekline) or by suitable terrestrial habitat between waterbodies. Individuals may use a range of terrestrial and aquatic habitats as movement corridors between water bodies, including floodways or grassy fields. Any isolation of water bodies, through destruction of habitat, or creation of a barrier such that movement or migration between waterbodies is less likely could have a significant impact on the species.	**Possible:** Growling Grass Frog previously recorded adjacent to Option B4-B and B5-A within B4-A. Construction of either of these options has the potential to trigger impact thresholds 1-3.

Golden Sun Moth Golden Sun Moth has quite specific climatic requirements before they become active i.e. warm to hot day (above 20°C by 1000 hrs), warmest part the day 1000 to 1400 hrs, clear or mostly cloudless sky, still or relatively still wind conditions with at least two days since rain. Conditions were ideal for conducting Golden Sun Moth surveys at Beauport. Golden Sun Moth were recorded flying at the sites that were identified as providing suitable Golden Sun Moth habitat. One of the sites is located within Option B5, the other site south of Option B4 but within the project study area.

Habitat for the Golden Sun Moth includes areas which have, or once had, native grasslands or grassy woodlands (including derived grasslands) and occupy degraded grasslands that is dominated by Chilean Needlegrass **Nassella neesiana* (Department of Environment, Water, Heritage and the Arts 2009c and d).

Threats to Golden Sun Moth on which Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* referral assessments are judged include the loss, degradation, modification and fragmentation of habitat through:

- removal of vegetation
- inappropriate fire regimes
- weed invasion
- overstocking changes to agricultural practices loss of inter-tussock spaces
- soil compaction(Department of Environment, Water, Heritage and the Arts 2009c and d).

During the course of the field studies and, a discussion with Nick Jaschenko (Department of Environment Land, Water and Planning), one site was identified as potentially supporting Golden Sun Moth habitat. A 2nd site was identified on private property north of this site. Golden Sun Moth were recorded at these two locations, one south of Option B4 and the other within Option B5. Since the completion of the surveys, a small area of native grassland that could support Golden Sun Moth has been identified.

The Golden Sun Moth flying at the location south of Option B4 was confined to a small area of habitat (approx 50sq metres) where wallaby grass persisted on a boundary fence line. The Golden Sun Moth habitat located within Option B5 was an area of approximately 650sq metres of high quality habitat dominated by wallaby grass. A post fieldwork review of studies undertaken by Ecology Partners (EHP 2010) for the upgrade of the western highway from Burrumbeet to Beaufort, indicates a small area of native grassland that could support Golden Sun Moth at start of the bypass east of Beaufort. Golden Sun Moth surveys at this location during the 2016 season would further inform the potential Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* implications for the by-pass project.

The removal of habitat in Option B5 would trigger one or more of the above threats and the need for an EPBC referral.

Table 4.9 provides an outline of the potential outcomes of these impacts in accordance with the Significant Impact Guidelines for the critically endangered Golden Sun Moth (Department of the Environment, Water, Heritage and the Arts 2009).

Table 4.9 Potential impacts in accordance with the Significant Impact Guidelines for the critically endangered Golden Sun Moth

Ecological element affected	Impact threshold	Comment	Potential outcome
Large or contiguous habitat area (>10 ha)	Habitat loss, degradation or fragmentation >0.5 ha	Habitat is a similar or connected area within which the golden sun moth is found during surveys or known from records. The function of the area may include, but is not limited to: feeding, breeding, dispersal.	**Unlikely:** Golden Sun Moth habitat does not meet the affected ecological element.
Small or fragmented habitat area (<10 ha)	Any habitat loss, degradation or fragmentation	Small areas of habitat are more likely to suffer significant impacts from loss, degradation and fragmentation than larger areas. The limited dispersal ability of the golden sun moth means habitat areas separated by >200 m are effectively isolated and should be considered as separate habitat areas. Extremely small, isolated and degraded habitat patches (e.g. <0.25 ha) may support populations of golden sun moth but are unlikely to contribute to the overall ecological health of the species.	**Likely:** Golden Sun Moths were recorded within Option B5-B and 700m south, adjacent to Option B4-C.
Habitat connectivity	Fragmentation of a population through the introduction of a barrier to dispersal	Barriers to dispersal could include: breaks in habitat of >200 m; structures that prohibit movement (e.g. buildings, solid fences).	**Likely:** Golden Sun Moths were recorded within Option B5-B and 700m south, adjacent to Option B4-C.

Striped Legless Lizard is the only species in the *Delma* genus restricted to temperate grassland habitats. Its preferred habitat is lowland native grasslands and grassy woodlands dominated by Kangaroo Grass *Themeda triandra*, spear grasses *Austrostipa* spp and tussocks *Poa* spp. It is also known to be occasionally found in area dominated by introduced grasses (Department of Sustainability, Water, Population and Communities 2011).

The three key threats to the Striped Legless Lizard are; habitat loss, degradation and modification; fragmentation and isolation of populations and invasive plants and animals (Department of Sustainability, Water, Population and Communities 2011).

Active searches and trapping failed to record the lizard. Due to limited suitable habitat and the lack of local records in the Victorian Biodiversity Atlas database, it is considered a low likelihood that Striped Legless Lizard is present within, or adjacent to the proposed northern alignment.

4.4 Flora and Fauna Guarantee Act 1988 & Advisory List of Threatened Vertebrate Fauna in Victoria – Fauna

4.4.1 Arboreal and terrestrial mammals

Brush-tailed Phascogale prefers open woodland with mature rough barked eucalyptus containing hollows and woody debris at ground level. Mature hollow bearing trees and wood debris was for the main part confined to the road reserves, a private property within and south of Option B5. The Camp Hill NCR had the occasional mature hollow bearing tree. There were areas however where there was considerable amounts of woody debris that appeared to have been as a result of firewood collection.

It is acknowledged that Phascogale can be difficult to capture due to their cryptic behaviour (Menkhorst 1996) Never the less, a juvenile Brush-tailed Phascogale was caught within Option B4 during the current surveys in Camp Hill Nature Conservation Reserve (refer to Appendix D). This was the only arboreal fauna caught over the duration of the survey period. The impacts of drought were quite noticeable with many senescing trees and a lack of regeneration of overstorey, mid-storey and ground flora. Notwithstanding the less than ideal habitat conditions, the capture of a juvenile indicates that the reserve currently supports a breeding population. There are also records of Brush-tailed Phascogale adjacent to Option B4 and where the two options merge west of Beaufort. The landowner immediately south of the property on Johnston Road informed field staff that he has occasionally seen an animal that meet the description of Brush-tailed Phascogale on his property.

Squirrel Glider was not included as a targeted species for the Beaufort region study, however the survey methods deployed (trapping, spotlighting, camera traps and hair tubes) are applicable to Squirrel Glider. A Squirrel Glider was observed whilst spotlighting on private property adjacent to Option B5. The owners of this property have found gliders in the past at the base of a tree. In this instance the description matched the characteristics of Feathertail Glider *Acrobates pygmaeus.*

Spot-tailed Quoll occurs in wide range of forest types, although appears to prefer moist sclerophyll and rainforest forest types, and riparian habitat. It is most common in large unfragmented patches of forest. Although there are not any recent records in the study area, there are recent records to the north-east approximately 25km away where they are seen on a fairly regular basis (personal communication with N. Jaschenko. 19 November 2015). The deployment of camera traps, hair tubes and spotlighting failed to record quoll, like Brush-tailed Phascogale they are cryptic and it can be difficult to detect their presence. Notwithstanding the lack of local records, they are considered to have a medium likelihood of occurring in Musical Gully Nature Conservation Reserve / Camp Hill Nature Conservation Reserve due to the habitat connectivity to the population to the north-east.

Potential habitat for Brush-tailed Phascogale and Squirrel Glider is present in both alignment options where they intersect areas of mature native vegetation i.e. Camp Hill Nature Conservation Reserve, road reserves and, private property on the eastern and western sections of the Option B5. Habitat for Spot-tailed Quoll is confined to Musical Gully Nature Conservation Reserve / Camp Hill Nature Conservation Reserve.

The loss of hollow-bearing trees and habitat fragmentation are listed as a threatening process under the *Flora and Fauna Guarantee Act*. There is the potential for both of these impacts to occur, in this scenario a management authority (permit) from the Department of Environment, Land, Water and Planning would be required under the *Flora and Fauna Guarantee Act* to remove habitat and salvage animals for translocation.

During the course of undertaking surveys in Camp Hill Nature Conservation Reserve, a mine with a horizontal shaft was found that was considered to potentially support cave / mine roosting bats. Investigations using a bat detector (sound recorder) at the entrance to the shaft indicated relatively high levels of activity consistent with bats exiting a roost. Ball call analysis was not conclusive to be able positively identify the species. However, the fundamental frequency (45khz+/--2khz), one of the key call identification diagnostic characteristics is consistent with the Eastern Bent-wing Bat. Further investigation using trapping techniques would clarify identification of the species.

4.4.2 Victorian temperate woodland bird community

This bird community prefers woodlands of open structure with fallen timber, grassy ground cover and light shrubby understorey. This habitat structure was present to varying degrees within the Camp Hill Nature Conservation Reserve, road reserves within both alignment options, with the best habitat present on the property Johnston Road within Option B5.

None of the five targeted species that form part of the *Flora and Fauna Guarantee Act* listed woodland bird community (Regent Honeyeater, Painted Honeyeater, Swift Parrot, Diamond Firetail and Barking Owl), were recorded during the current survey period. A local landowner however provided a bird list of observations (refer to Appendix C) from their property of which Painted Honeyeater and Diamond Firetail were included. Confirmation of correct identification cannot be confirmed. However, we have a degree of confidence with their identification based on various other flora and fauna observations they made in the presence of field staff e.g. Yarra Gum and Feathertail Glider.

Two further species that form the woodland community were also recorded, Brown Treecreeper and Fuscous Honeyeater, both of which were observed on the property on Johnston Road. It is considered a low likelihood that Regent Honeyeater, Swift Parrot and Barking Owl are regularly present, if present at all, within the study area.

The loss of hollow-bearing trees and habitat fragmentation are listed as a threatening process under the *Flora and Fauna Guarantee Act*, there is the potential for both of these impacts to occur. The impact however is less (depending on timing) than that of less mobile fauna (e.g. gliders and possums etc.). Birds are able to move across the landscape to where other suitable habitat exists. Notwithstanding this, a management authority (permit) from the DELWP would be required under the *Flora and Fauna Guarantee Act* to remove habitat and salvage animals.

4.4.3 Owls – excluding Barking Owl

Although there appears to be suitable habitat for Powerful Owl across the study area, (open forests and woodlands), they were not recorded during the current survey. A pair of Boobook Owls were observed at the property on Johnston Road whilst spotlighting and, heard calling in Camp Hill Nature Conservation Reserve. Powerful Owl has been recorded (2011) in woodland adjacent to where the options merge west of Beaufort. There is similar habitat present within both alignment options where intact vegetation exists; e.g. Camp Hill Nature Conservation Reserve and on private land.

Masked Owl population numbers are low and its preferred habitat is forests, woodlands, timbered waterways and open country concentrated on a broad coastal band on mainland Australia. It is considered that there is sub-optimal habitat within the study area for Masked Owl and based on its known distribution and recorded sightings in the Victorian Biodiversity Atlas, it is considered of having a low likelihood of occurring.

The loss of hollow-bearing trees and habitat fragmentation are listed as a threatening process under the *Flora and Fauna Guarantee Act*, there is the potential for both of these impacts to occur. The impact however is less (depending on timing) than that of less mobile fauna (e.g. gliders and possums etc.). Birds are able to move across the landscape to where other suitable habitat exists. Notwithstanding this, a management authority (permit) from the Department of Environment, Land, Water and Planning would be required under the *Flora and Fauna Guarantee Act* to remove habitat and salvage animals.

4.4.4 Wetland birds

Brolga prefers well vegetated shallow freshwater wetlands, small isolated swamps in eucalypt forests, floodplains, grasslands bore drains and paddock dams. A pair of Brolga was seen on 4 occasions at two sites, a paddock dam, (with sub-optimum habitat) within alignment Option B4 and, a wetland to the north of Option B5. The wetland provides ideal habitat for Brolga (refer to Appendix D) and it appears that they are resident birds. There a number of records of Brolga in the Victorian Biodiversity Atlas, the most recent in 2011.

It is not considered that that there any *Flora and Fauna Guarantee Act* implications related to Brolga for either of the proposed alignments (Options B4 & B5).

4.4.5 Reptiles

Lace Monitor occurs in well-timbered areas, from dry woodlands to cool temperate southern forests. They lead solitary lives except during the breeding season (Swan 2003); as a consequence surveys are not always effective in establishing their presence.

Weather conditions were generally conducive for reptile activity, with many skinks and a snake observed during the survey period and land owners regularly sighting Bearded Dragon. Using the records in the Victorian Biodiversity Atlas, and observations by local residents we had contact with, it is considered that there is a medium likelihood that they are present within the wider study area.

Although Lace Monitor is listed as endangered in the Advisory List of Threatened Vertebrate Fauna in Victoria, the advisory list is not a statutory list as per those listed under the *Flora and Fauna Guarantee Act 1988*. There are no direct legal requirements or consequences that flow from inclusion of a species in the advisory list (Department of Sustainability and Environment 2013). Notwithstanding this, native wildlife is protected under the *Wildlife Act 1975*. The *Flora and Fauna Guarantee Act* is not relevant for this species.

The status of Striped Legless Lizard is addressed in detail in section 4.4 above. It is considered a low likelihood that Striped Legless Lizard is present within either of the proposed alignment options. As a consequence there are not any *Flora and Fauna Guarantee Act* implications.

4.4.6 Amphibians

Bibron’s Toadlet is found in wet and dry sclerophyll forest with breeding congregations occurring in inundated grassy areas beside gutters and small creeks. Bibron’s Toadlet has previously been recorded in 2011 at the most western end of where the 2 alignment options merge. Bibron’s Toadlet was recorded at 3 locations, one of which is near the 2011 record within a constructed wetland within the merged alignment’s, the other 2 locations are on the boundary of the study area but not within the alignments.

Growling Grass Frog was not recorded during the current surveys, however there are 2 recent records within Option B4. The construction of the alignment Option B4 has the potential to trigger habitat fragmentation as a threatening process under the *Flora and Fauna Guarantee Act*.

4.4.7 Invertebrates

Golden Sun Moth were recorded at 2 locations, one south of Option B4 and the other within Option B5. The Golden Sun Moth flying at the location south of Option B4 was confined to a small area of habitat (approximately 50sq metres), where wallaby grass persisted on a property boundary fence line. The Golden Sun Moth habitat located within Option B5 was an area of approximately 650sq metres of high quality habitat dominated by wallaby grass. The removal of habitat in Option B5 would require a management authority (permit) under the *Flora and Fauna Guarantee Act*.

4.5 Matters of National Environmental Significance – Aquatic fauna

Neither of the targeted species (Little galaxias or Yarra pygmy perch) nor any other commonwealth or state listed aquatic fauna species were recorded during the targeted survey. However, at the time the survey was undertaken, the Beaufort region was experiencing a prolonged dry period, with a number of creeks and their tributaries understood to have had no significant surface flows since the last major rain/flood event in 2011.

There are no records of Yarra pygmy perch in the immediate vicinity of the study area, with the nearest record being approximately 8 km downstream near Trawalla in 2010 (EHP 2014). The species occurs in small to medium, shallow (1-2 m) freshwater streams with moderate to high flow and is usually associated with large amounts of aquatic vegetation in clear water (Department of the Environment 2016), which is generally not present in the study area. Given the lack of records in the study area, lack of suitable habitat, distance to the nearest records and low likelihood that the project will impact on known habitat, it is considered unlikely that the project will result in a significant impact to Yarra pygmy perch or their habitat under the Significant Impact Guidelines.

There are existing records of little galaxias on the north-eastern boundary of the study area in Yam Holes Creek at Sites B020, B021 and B022 from 2011 (Victorian Biodiversity Atlas, Department of the Environment, Land, Water and Planning 2016b and GHD 2015). It is understood that these records were associated with a survey that occurred after a major flood event in the Beaufort region that followed a prolonged period of drought. Little galaxias are well suited to seeking refuge during the dry and breeding and disbursing during higher rainfall and flood events, where they utilise floodwaters to move from refuge areas it inundated areas to breed. Given the existing records occur immediately downstream of where Yam Holes Creek transects the study area it can be theorised that the source/refuge habitat for the resident population may be in or in the immediate vicinity of the study area. It is also likely any resident population is associated with Yam Holes Creek, its remnant (i.e. refuge) pools and/or its fringing wetlands such as that located at Site B028.

Without further study, it difficult to ascertain the spatial distribution of the local population, their specific refuge site/s and therefore the significance of the population. The Commonwealth publication *Survey Guidelines for Australia's Threatened Fish* (2011) states that “December through to April are the best months for sampling fishes in Victoria as water flows are lower.” However, as the waterways in the Beaufort region mostly completely dry throughout the survey period, a follow-up survey should be undertaken outside the preferred survey period, during a wetter period (late winter to spring) and ideally great surface water and flows.

The key impacts predicted to result from the project to little galaxias and their habitat, assuming presence and before any mitigation measures are applied may include, but not be limited to, the following:

- → the removal of refuge areas of remnant pools in Yam Holes Creek and/or its associated wetlands are lost
- → the removal of ephemeral and/or inundation prone areas (including wetlands, drains and low-lying areas) suitable for little galaxias breeding
- → changes to hydrology in the area resulting in loss or reduction in quality of little galaxias habitat
- → the loss of riparian or waterway shading vegetation resulting in a reduction in habitat quality
- → reduction in water quality during construction and operational phases due to sediments and other pollutants entering waterways.

4.6 Summary of impacts on aquatic fauna

Table 4.10 provides an outline of the potential outcomes of these impacts in accordance with the significant impact guidelines.

Table 4.10 Little Galaxias, potential impacts in accordance with the Significant Impact Guidelines (Vulnerable species)

Significant impact criteria	Potential outcome
Lead to a long-term decrease in the size of an important population of a species	**Possible**: The size and distribution of the local population is uncertain and the specific alignment option and scale of works are still undefined. Therefore, taking a precautionary approach, it is possible the project may result in a long-term decrease in the size of a population.

Significant impact criteria	Potential outcome
Reduce the area of occupancy of an important population	**Possible**: The project has the potential to result in a reduction on the area of occupancy and/or possible removal and/or modification of refuge and ephemeral habitat.
Fragment an existing important population into two or more populations	**Unlikely**: If more broadly distributed than the records indicate, it is probable the local population is already fragmented to some degree give the paucity of records and highly ephemeral nature of the study area's waterways.
Adversely affect habitat critical to the survival of a species	**Unlikely**: the project is unlikely to adversely affect habitat critical to the survival of a species.
Disrupt the breeding cycle of an important population	**Possible**: Depending on the timing and location of works, the project has the possibility to impact upon the breeding cycle of the local population. Whether that population is and 'important population' and whether it is present in the study area is still unclear.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Unlikely**: The project is unlikely m result in modification, destruction, removal or isolation or a decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	**Unlikely**: The project is unlikely to contribute towards the establishment of an invasive species. Mosquitofish are known to be one of the highest threats to dwarf galaxias species and they are already fully established in the study area and region.
Introduce disease that may cause the species to decline, or	**Unlikely**: The project is unlikely to introduce disease that may cause the species to decline
Interfere substantially with the recovery of the species.	**Unlikely**: The project is unlikely to substantially interfere with the recovery of the species.

4.7 Summary of impacts on threatened species and vegetation

Based on the preliminary alignment options, the following vegetation losses estimated for each alignment are 51.8ha (B4A + B4C), 48.4ha (B4B + B4C) and 51.9ha (B5A + B5B), as defined as 'remnant' under *Permitted Clearing of native vegetation: biodiversity assessment guidelines* (Department of Environment and Primary Industries 2013).The remnant native vegetation clearing areas by ecological vegetation classes are based on GHD (2015) with updates from this report (Table 4.11). Estimated losses on EPBC listed communities for each alignment are also included 1.4ha (B4A + B4C), 0.8ha (B4B + B4C) and 0.3ha (B5A + B5B) (Table 4.11). There is a clear distinction between the impacts on native vegetation on the alignment options, with B4-B having the least impact (48.4ha), B4-A having the middle (51.8ha) and B5 having the greatest potential impact (51.9ha). Conversely, B5 appears to have less potential impacts on threatened flora species and communities than B4-A and B4-B, but would still impact on Matters of National Environmental Significance and Flora Fauna Guarantee Act species and communities. The difference in the impact from the alignment options on fauna species and habitats is more obscure with either option not necessarily more preferable to the other. Table ES.1 provides a summary of the impacts for all alignment. The information contained in this report does not conclusively identify a single most preferable option from an ecological perspective.

There is significant native vegetation and fauna habitat within and adjacent to the preliminary alignment options that is known to support Matters of National Environmental Significance and *Flora and Fauna Guarantee Act* listed species and communities and potentially supports more species. Wherever possible, the route selection should be based on avoiding and minimising impacts on vegetation and fauna habitat, as stated in relevant environmental legislation and policy. A range of broad measures are provided in this report which aim to reduce and / or mitigate potential impacts to threatened species and their habitat.

Based on the findings of this assessment, several recommendations for further targeted surveys for threatened flora and fauna are provided.

Table 4.11 Vegetation losses

EVC_Name	Conservation status	Area (hectares) for each alignment section				
		B4A	B4B	B4C	B5A	B5B
Alluvial Terraces Herb-rich Woodland	Endangered	0.9	1.1	3.3	1.1	4.7
Alluvial Terraces Herb-rich Woodland / Grassy Dry Forest Mosaic	Endangered	0.4	4.9			2.1
Aquatic Herbland	Endangered	0.5				1.0
Grassy Dry Forest	Depleted	11.7	7.6	8.1	8.7	12.0
Grassy Dry Forest / Heathy Dry Forest Mosaic	Depleted		0.1	8.1	0.1	7.9
Heathy Dry Forest	Least Concern	0.7	0.2	9.0		2.4
Plains Grassland	Endangered	0.5	0.8		0.3	
Plains Grassy Wetland	Endangered	0.0	0.0		0.0	
Plains Sedgy Wetland	Endangered	0.5				
Scattered Tree Mosaic	Vulnerable	0.8	0.5	0.3	1.0	1.2
Valley Grassy Forest	Vulnerable	0.7	0.7	0.8	0.1	0.8
Valley Grassy Forest / Heathy Dry Forest Mosaic	Vulnerable	0.3	0.3		0.5	
Areas not defined as EVCs but considered native vegetation:						
Modified drainage line vegetation (>25%)	Least Concern					0.2
>25% native vegetation	Least Concern	3.2	0.4	2.0	1.5	4.2
TOTALS		**17.0**	**16.4**	**29.6**	**11.9**	**32.2**

Areas below also cover areas mapped as EVCs

EPBC listed communities		B4A	B4B	B4C	B5A	B5B
Natural Temperate Grasslands		0.5	0.8		0.3	
Seasonal Herbaceous Wetlands		0.4				
Grassy Box Woodland		0.5				
TOTALS		**1.4**	**0.8**	**0.0**	**0.3**	**0.0**

This table below (Table 4.12) provides an overview of the summary of impacts of the different alignment options on flora and fauna species and communities.

Table 4.12 Summary of the potential impacts of different options on threatened flora, fauna and ecological communities

Option	Section	Potential impacts on threatened flora and habitats	Potential impacts on threatened aquatic fauna and habitats on threatened fauna and habitats	Potential impacts on threatened fauna and habitats
B4	A	→ 2 x Matted Flax-lily patches → Several other Matted Flax-lily patches close the alignment footprint → Areas of the Commonwealth listed community Natural Temperate Grassland of the Victorian Volcanic Plain along the Western Highway and the State listed Western (Basalt) Plains Natural Temperate Grassland (including 0.5 hectares to be cleared) → Areas of the Commonwealth-listed community White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (including 0.5 hectares to be cleared). → Direct impact and indirect impacts on the catchment areas and hydrology of Commonwealth listed Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (including 0.4 hectares to be cleared).	→ Potential impacts to little galaxias and/or its habitat where alignment crosses Yam Holes Creek	→ Species associated with Victorian Temperate Woodland Community i.e. Brown Treecreeper etc – State listed → Areas of known habitat for Growling Grass Frog – Commonwealth and State listed
	B	→ Areas of the Commonwealth listed community Natural Temperate Grassland of the Victorian Volcanic Plain along the Western Highway and the State listed Western (Basalt) Plains Natural Temperate Grassland along the Western Highway (including 0.8 hectares to be cleared). → Areas of the Commonwealth listed community White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland → Significantly fragment the vegetation and habitat of the Snowgums Bushland Reserve → Potential impact on Rough Wattle (if present – old record close to alignment)	→ Potential impacts to little galaxias and/or its habitat where alignment crosses Yam Holes Creek	→ Areas of known habitat for Growling Grass Frog – Commonwealth and State listed → Species associated with Victorian Temperate Woodland Community i.e. Brown Treecreeper etc – State listed → Powerful Owl – State listed

Option	Section	Potential impacts on threatened flora and habitats	Potential impacts on threatened aquatic fauna and habitats on threatened fauna and habitats	Potential impacts on threatened fauna and habitats
	C	→ Remove at least one previously recorded individual or population of Ben Major Grevillea → Potentially impact another population of Ben Major Grevillea recorded in this study and previous records close to the alignment → Significantly fragment the vegetation and habitat of the Camp Hill State Forest → Remove one population of River Swamp Wallaby-grass in a dam close to Main Leads Road → Remove one Matted Flax-lily along Back Raglan Road	→ None	Areas of known habitat and possibly individuals: → Squirrel Gilder – State listed → Brush-tailed Phascogale – State listed Species associated with Victorian Temperate Woodland Community i.e. Brown Treecreeper etc – State listed → Powerful Owl – State listed
B5	A	→ Areas of the Commonwealth-listed community Natural Temperate Grassland of the Victorian Volcanic Plain along the Western Highway and the State listed Western (Basalt) Plains Natural Temperate Grassland along the Western Highway (including 0.3 hectares to be cleared). → Close to a patch of Matted Flax-lily patches near the alignment footprint → Remove a number of Emerald–lip Greenhood orchids along the Western Highway	→ None	→ Species associated with Victorian Temperate Woodland Community i.e. Brown Treecreeper etc – State listed → Powerful Owl – State listed
	B	→ Remove one Matted Flax-lily along Beaufort-Lexton Road → Remove one population of River Swamp Wallaby-grass in a dam close to Slaughterhouse Lane → Potentially affect the hydrology of nearby Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains → Significantly fragment the vegetation and habitat of the Camp Hill State Forest	→ Potential impacts to little galaxias and/or its habitat where alignment crosses Yam Holes Creek	Areas of known habitat and possibly individuals: → Golden Sun Moth – Commonwealth and state listed → Squirrel Gilder – State listed → Brush-tailed Phascogale – State listed → Species associated with the *Flora and Fauna Guarantee Act 1988* Victorian Temperate Woodland Community i.e. Brown Treecreeper etc –State listed → Powerful Owl – State listed

5 LEGISLATION AND POLICY

This section covers any permits, approvals, management plans and offset requirements that may be required for the project under federal, state and local government environmental legislation.

5.1 Commonwealth

5.1.1 *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* is the Australian Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places defined in the Act as matters of national environmental significance. There are seven matters of national environmental significance to which the Act applies, these are:

- world heritage sites
- national heritage places
- wetlands of international importance (often called 'Ramsar' wetlands after the international treaty under which such wetlands are listed)
- nationally threatened species and ecological communities
- migratory species
- Commonwealth marine areas
- nuclear actions.

If a project is likely to have a significant impact on one of the seven matters of national environmental significance, the action or proposal must be referred to the Commonwealth Department of the Environment. This 'referral' is, then released to the public for comment.

Under the Act, actions that are likely to have a significant impact upon Matters of National Environmental Significance require approval from the Environment Minister to undertake those actions. An action includes any project, development, undertaking, activity or series of activities.

To make a decision as to whether or not to refer an action to the Minister, the following must be considered:

1. Are there any matters of national environmental significance located in the area of the proposed action (noting that 'the area of the proposed action' is broader than the immediate location where the action is undertaken; consider also whether there are any matters of national environmental significance adjacent to or downstream from the immediate location that may potentially be impacted)?
2. Considering the proposed action at its broadest scope (that is, considering all stages and components of the action, and all related activities and infrastructure), is there potential for impacts, including indirect impacts, on matters of national environmental significance?
3. Are there any proposed measures to avoid or reduce impacts on matters of national environmental significance (and if so, is the effectiveness of these measures certain enough to reduce the level of impact below the 'significant impact' threshold)?
4. Are any impacts of the proposed action on matters of national environmental significance likely to be significant impacts (important, notable, or of consequence, having regard to their context or intensity)?

Depending on the alignment adopted, the project has the potential to impact on three Commonwealth listed flora species known to occur in the study area Matted Flax-lily, River Swamp Wallaby-grass and Ben Major Grevillea and three listed communities White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland, Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains and Natural Temperate Grassland of the Victorian Volcanic Plain. Additionally, the project may impact on four nationally listed flora species which have a moderate likelihood of occurring in the study area, including Candy Spider-orchid, Swamp Fireweed, Swamp Everlasting and Spiral Sun-orchid.

The project has the potential to impact upon the nationally threatened, and listed as vulnerable, Little Galaxias and/or its habitat in Yam Holes Creek, its associated wetlands and downstream receiving waterways. It is probable a referral to the Commonwealth Department of the Environment will be required, given the scale of the project, and therefore, it would be precautionary to include reference to little galaxias and how potential impacts will be mitigated.

There is also the potential for a significant impact to occur to the habitat of two listed fauna species within the proposed alignment/s; Golden Sun Moth and Growling Grass Frog.

As a consequence, a referral to the federal environment minister will need to include at least the following species and communities:

- Matted Flax-lily
- River Swamp Wallaby-grass
- Ben Major Grevillea
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains
- Natural Temperate Grassland of the Victorian Volcanic Plain
- Golden Sun Moth
- Growling Grass Frog
- Little Galaxias.

5.1.2 Ramsar – The Convention on Wetlands of International Importance 1971

The Convention on Wetlands is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and appropriate use of wetlands and their resources. The Convention uses a broad definition of the types of wetlands covered in its mission, including swamps and marshes, lakes and rivers, wet grasslands and peat lands, oases, estuaries, deltas and tidal flats, near-shore marine areas, mangroves and coral reefs, and human-made sites such as fish ponds, rice paddies, reservoirs, and salt pans.

This is not relevant to the proposed alignments.

5.2 Victorian legislation

5.2.1 *Flora and Fauna Guarantee Act 1988*

The Victorian *Flora and Fauna Guarantee Act 1988* was established to provide a legal framework for enabling and promoting the conservation of all Victoria's native flora and fauna, and to enable management of potentially threatening processes. One of the main features of the Act is the listing process, whereby native species and communities of flora and fauna, and the processes that threaten native flora and fauna are listed in the schedules of the Act. This assists in identifying those species and communities that require management to survive, and identifies the processes that require management to minimise the threat to native flora and fauna species and communities within Victoria.

A permit from the Department of Environment, Land, Water and Planning is required to 'take' listed flora species that are members of listed communities or protected flora from public land. A permit is not required under the Act for private land, unless listed species are present and the land is declared 'critical habitat' for the species.

Schedule 3 of the Act lists "the prevention of fish passage of aquatic biota as a result of instream structures" as a potentially threatening process. Projects that may trigger this threatening process may require the production of an action statement describing the threatening process, and the proposed approach to ensure it does not pose a threat to the long-term survival of native taxon or communities.

In addition, if project activities require, or potentially require, the handling, capture and release or translocation of protected fish (e.g. Little Galaxias) a research permit to “take protected fish’ will be need to be obtained from the Department of Environment, Land, Water and Planning.

Depending on the alignment adopted, the project has the potential to impact on 8 *Flora and Fauna Guarantee Act 1988* listed fauna species, two flora species and one communities within or in close proximity to the alignments, some of which are on public land. In the scenario that a listed species is to be impacted, a management authority (permit) from the Department of Environment, Land, Water and Planning is required.

5.2.2 *Fisheries Act 1995*

One of the objectives of the *Fisheries Act 1995* is to protect and conserve fisheries resources, habitats and ecosystems including the maintenance of aquatic ecological processes and genetic diversity. One of the provisions of this Act is that a person must not, except as permitted by or under the Fisheries Act or any other Act, create an obstruction across or within a bay, inlet, river or creek or across or around an inter-tidal flat that:

> “(a) fish will or could be blocked and left stranded; or
>
> (b) immature fish will or could be destroyed; or
>
> (c) the free passage of fish will or could be obstructed.”

This act is relevant if there is a likelihood that a development will impact on fish habitat and aquatic ecological processes. Similar to the *Flora and Fauna Guarantee Act*, action statements must outline the process that will be implemented to ensure the long-term protection of fish habitat and/or specific species.

If fish handling, capture and release or translocation is required (i.e. capture and release of entrapped fish in any instream construction structures such as coffer dames for pier construction) a ‘FORM 06 – Application for a General Permit for the purpose of research (this includes capture and release or translocation) may be required from the Department of Environment, Land, Water and Planning. The Department generally prefer that a proponent err on the side of caution and apply for the permit if there is the ‘possibility’ of encountering fish.

In addition, Victoria has listed a number of species and genera as noxious under Section 75 of the Fisheries Act. By declaring a particular species noxious, the Victorian Government applies regulations to control the use and potential spread of such animals. A number of Fisheries Act-listed noxious fish species have been documented to occur within the study area including European carp (*Cyprinus carpio*) and mosquito fish (*Gambusia holbrooki*). These species are highly invasive and may potentially be encountered within instream construction-related structures, such as coffer dams for pier/pylon construction (if required).

5.2.3 *Water Act 1989*

The Victorian Water Act 1989 provides the framework for allocating surface water and groundwater throughout Victoria. Section 67 states that work on waterways, such as the construction of dams, weirs and erosion control structures, are licensed in accordance with the Water Act. The Act allows conditions to be included in a works licence to protect the "environment, including the riverine and riparian environment".

A key purpose of the Water Act is to “*provide formal means for the protection and enhancement of the environmental qualities of waterways*”.

Under the Act approval must be sort from the Glenelg Hopkins CMA and a "Works on Waterways Permit" is required to "construct, alter, operate, remove or decommission:

- any works on a waterway (i.e. Yam Holes Creek), including works to deviate (temporarily or permanently) a waterway; or
- a bore.

5.2.4 *Environment Effects Act 1978*

Under Victoria's *Environmental Effects Act 1978*, projects that could have a 'significant effect' on Victoria's environment can potentially require an Environmental Effect Statement. This Act applies to any public works 'reasonably considered to have or be capable of having a significant effect on the environment'. The Minister for Planning and Environment is the responsible person for assessing whether this Act applies.

Before commencing any public works to which this Act applies, the proponent must initiate an Environment Effects Statement to be prepared and submit it to the Minister for the Minister's assessment of the environmental effects of the works.

The criteria for the types of potential effects on the environment that might be of significance and therefore warrant referral of a project include:

- potential clearing of 10 ha or more of native vegetation
- matters listed under the *Flora and Fauna Guarantee Act 1988*:
  - potential loss of a significant area of a listed ecological community; or
  - potential loss of a genetically important population of an endangered or threatened species (listed or nominated for listing), including as a result of loss or fragmentation of habitats; or
  - potential loss of critical habitat; or
  - potential significant effects on habitat values of a wetland supporting migratory bird species
- potential extensive or major effects on land stability, acid sulphate soils or highly erodible soils over the short or long term
- potential extensive or major effects on beneficial uses of waterbodies over the long term due to changes in water quality, stream flows or regional groundwater levels.

On 16 June 2015, The Minister for Planning decided that an Environment Effects Statement is required for the Western Highway Beaufort Bypass. The reasons provided were that:

- "The project has the potential to result in significant adverse effects on biodiversity, land uses and cultural heritage values.
- The opportunity to avoid or minimise significant adverse effects through alignment selection and mitigation requires further investigation via an integrated assessment of environmental effects, prior to decision-making on a final alignment".

(Department of Environment, Land, Water and Planning 2016c)

5.2.5 *Wildlife Act 1975*

The *Wildlife Act 1975* forms the procedural, administrative and operational basis for the protection and conservation of native wildlife within Victoria. This Act often sits as the default reference for other associated legislation, and is the basis for the majority of Wildlife permit / licensing requirements within the state. In accordance with this Act, any wildlife located within vegetation proposed for clearing may require salvage and translocation.

The Department of Environment, Land, Water and Planning will require salvage and translocation management plans to be prepared for threatened flora and fauna proposed for translocation.

5.2.6 *Catchment and Land Protection Act 1994*

5.2.6.1 DECLARED NOXIOUS WEEDS

The study area supports a number of weeds that are declared noxious under the *Catchment and Land Protection Act 1994*.Plants occurring on this list are known to or have the potential to result in detrimental environmental or economic impact.

Under the Act declared noxious weeds are categorised into four groups depending on their known and potential impact and specific circumstances for each region. These categories are:

- State Prohibited Weeds
- Regionally Prohibited Weeds
- Regionally Controlled Weeds
- Restricted Weeds.

State Prohibited Weeds are either currently absent in Victoria or are restricted enough to be eradicated. The Victorian Government is responsible for their control. Regionally Prohibited Weeds in the Glenelg region are not necessarily widespread but have the potential to become widespread. It is expected that weeds that meet this criteria can be eradicated from the region. For weeds considered to be Regionally Prohibited it is the responsibility of the land owner to control these weeds on their land but not on adjacent roadside reserves.

Regionally Controlled weeds are usually widespread but it is important to prevent further spread. It is the responsibility of the landowner to control these weeds on their property and on adjacent roadside reserves. Restricted Weeds are considered to be a serious threat to primary production, Crown land, the environment and/or community health if they were traded in Victoria.

The study area supports four regionally controlled and three regionally restricted weeds (Table 5.1). These weeds are listed in Department of Economic Development, Jobs, Transport and Resources (2014). The landholder must take all reasonable measures to prevent their spread and control these weed species.

Table 5.1 Declared noxious weeds occurring within the study area

	Scientific Name	Common Name	*Category under Catchment and Land Protection Act*
*	*Hypericum perforatum*	St John's Wort	Regionally Controlled Weed
*	*Rosa rubiginosa*	Sweet Briar	Regionally Controlled Weed
*	*Rubus fruticosus spp. agg.*	Blackberry	Regionally Controlled Weed
*	*Ulex europaeus*	Gorse	Regionally Controlled Weed
*	*Cirsium vulgare*	Spear Thistle	Restricted Weed
*	*Genista monspessulana*	Montpellier Broom	Restricted Weed
*	*Asparagus asparagoides*	Bridal Creeper	Restricted Weed

5.2.7 *Planning and Environment Act 1987*

This statute governs the use and development of land. It provides for the preparation of standard provisions for planning schemes which are administered by local government.

5.2.8 Victorian planning provisions

Under Clause 52.17-2 of Victoria's Planning Provisions a permit is required to remove, destroy or lop native vegetation, including dead native vegetation. This does not apply if exemptions under Clause 52.17-6 are relevant or the area for removal is included in a schedule or Native Vegetation Precinct Plan. Before deciding on an application a responsible authority must consider a number of issues outlined in Clause 52.17-5.

5.2.9 Permitted clearing of native vegetation guidelines

The guidelines have been designed to manage the risk to Victoria's biodiversity associated with the removal of native vegetation. This risk is determined via an assessment of the location risk and the extent risk. Location risk is determined by assessing the likelihood that the removal of a small amount of native vegetation may impact the persistence of a rare or threatened species. Location risk has been determined for all of Victoria. The native vegetation location risk map is available from the Native Vegetation Information Management tool found on the Department of Environment, Land, Water and Planning website (Department of Sustainability, Water, Population and Communities, 2016b).

Extent risk is determined by the amount of the native vegetation that is proposed to be removed. Together, these two risk types are used to determine the risk-based pathway for assessing a permit application to remove native vegetation (Department of Environment and Primary Industries 2013). An application to remove native vegetation can be assessed under one of three risk-based pathways of the guidelines – Low, Moderate or High risk. The risk-based pathway determines the process to be followed for the assessment of planning permit applications and dictates the types of offsets that are required to be implemented for the vegetation removal. Table 5.2 presents the risk-based pathways for remnant patches of native vegetation and Table 5.3 present the risk-based pathways for scattered trees.

Table 5.2 Remnant patch risk-based pathways

Extent	Location		
	Location A	Location B	Location C
<0.5 hectares	Low	Low	High
≥0.5 hectares and < 1 hectare	Low	Moderate	High
≥ 1 hectare	Moderate	High	High

Table 5.3 Scattered tree risk-based pathways

Extent	Location		
	Location A	Location B	Location C
< 15 scattered trees	Low	Moderate	High
≥ 15 scattered trees	Moderate	High	High

LOW RISK-BASED PATHWAYS APPLICATIONS

A habitat hectare assessment is not required for vegetation removals determined to be of low risk. Modelled site condition scores are used to assess low risk-based pathway applications. It is important to note that a habitat hectare report can be obtained if the applicant wishes to dispute the condition of the native vegetation provided in the spatial data. If a proponent provides a habitat hectare assessment report with their application to remove native vegetation, this will be used in place of the modelled data.

MODERATE AND HIGH RISK-BASED PATHWAY APPLICATIONS

Moderate and high-risk applications must include a habitat-hectare assessment report of the native vegetation to be removed. They must also be accompanied by a statement outlining the steps that have been taken to ensure that impacts on biodiversity from the removal of native vegetation have been minimised. These steps should have regard to the contribution the native vegetation removed and retained makes to biodiversity. The application must also include an assessment of whether the proposed removal of native vegetation will have a significant impact on Victoria's biodiversity, with regard to the proportional impact on habitat for any rare or threatened species. An offset strategy must also be provided that details how a compliant offset will be secured to offset biodiversity impacts from the removal of native vegetation.

Victoria's Permitted Clearing Regulations are relevant to the project if the removal of any remnant vegetation patches or scattered trees are proposed.

The majority of the study area is covered by Location A with patches of Location C, due to the scale of native vegetation and scattered tree removal for any of the alignment options, the application would be assessed as a high risk-based pathway application.

5.2.9.1 TREE PROTECTION ZONES

Any works proposed near patches of native vegetation with trees should consider how the impact might affect the critical root zone of tree species by following the *Permitted clearing of native vegetation - Biodiversity assessment handbook* (Department of Environment, Land, Water and Planning 2015).This recommends Tree Protection Zones to prevent indirect losses of native vegetation during construction activities. If the activities impact on <10% of the total area of the Tree Protection Zones, the tree is considered 'retained' unless a qualified arborist confirms that specific works will not significantly impact on a greater area of the Tree Retention Zones.

6 MITIGATION MEASURES

There is significant native vegetation and fauna habitat within and adjacent to the bypass footprint that is known to support Matters of National Environmental Significance and State listed species. Route selection should undergo a careful design phase aimed at avoiding direct and indirect impacts on native vegetation, fauna habitats and threatened species populations. Where steps to avoid impacts have been exhausted, the minimisation of permanent impacts and reduction of inadvertent impacts during construction are key to retaining biodiversity values in the local area.

This section outlines the potential strategies that can be taken to minimise the impacts on native vegetation and threatened species and their habitat. As there are three preliminary alignments with no preferred alignment as yet, only general mitigation advice can be provided.

6.1 The mitigation process

The mitigation process is typically managed through a Construction Environmental Management Plan. VicRoads has standard environmental protection measures as well as more specific measures relating to fauna sensitive road design. A Construction Environmental Management Plan typically outlines all practicable measures to minimise and mitigate impacts on biodiversity from the construction and operation phase to the management and maintenance phases. Clear prescriptive guidelines need to be developed that detail how impacts on Matters of National Environmental Significance, state significant species and wildlife protected under the *Wildlife Act* and *Flora and Fauna Guarantee Act* are going to be minimised. The development a Construction Environmental Management Plan is the key tool used to address mitigation. The Construction Environmental Management should include, where appropriate, procedures for:

- → detailed design of mitigation measures
- → staff and contractor inductions to address the location of sensitive biodiversity and their role and responsibilities to the protection and/or minimisation of impacts to all native biodiversity
- → pre-clearing surveys and fauna salvage/translocation where practical
- → vegetation clearing protocols
- → flora and fauna salvage
- → post construction monitoring
- → rehabilitation and restoration, including:
  - establishing rehabilitation protocols
  - establishing weed control measures
  - establishing pest management measures.

The Construction Environmental Management Plan should include clear objectives and actions including:

- → minimising human interferences to flora and fauna
- → minimising vegetation clearing/disturbance
- → minimising impact to threatened species and communities.

6.2 Species specific mitigation

This section provides an overview of mitigation measures for the species listed under the *Environment Protection and Biodiversity Conservation Act 1999.*

6.2.1 Matted Flax-lily

Where avoidance of patches of Matted Flax-lily is not possible, several mitigation approaches have been used including minimising the number of plants impacted, propagating from seed and salvage and translocation to new sites. Translocation of Matted Flax-lily has been undertaken in a number of areas including the F2 Freeway site of the Craigieburn bypass (DSE 2003), Sugarloaf Pipeline (Carr and Rodda 2011), Kilmore-Gisborne Road and numerous other sites (Department of the Environment 2016). The process of salvage (digging up, dividing rhizomes and establishing in tubestock) can be achieved with relative ease, however successful establishment in recipient sites depends on a number of factors including appropriate levels of management, particularly in the early phases of establishment. Successful translocation only occurs when there is evidence of reproduction and establishment of young plants other than those which have been planted.

If Matted Flax-lily is approved for removal at a site, it is likely that a fully-costed translocation and/or propagation and ex situ Conservation Management Plan would be required by the federal Department of the Environment and the Victorian Department of Environment, Land, Water and Planning. Plants should be translocated to a suitable recipient site within secure conservation reserves (either on or off site). Translocation should follow the Guidelines for the Translocation of Threatened Plants in Australia (Vallee et al. 2004) and other documents relating to the translocation of Matted Flax-lily. A monitoring program is often required as a part of a conservation management plan as a mechanism to report on the success and failure of the translocation as well as recommending management interventions as needed.

Suitable recipient sites would need to have sites which have similar environmental variables (eg. soil types, position in the landscape, relatively intact understorey) and are secured for conservation purposes. This may include conservation estate such as the Snow Gums Bushland Reserve and potentially areas along the rail corridor and higher quality road reserves. All sites would need agreement from landowner or relevant management authority.

6.2.2 Ben Major Grevillea

Where avoidance of Ben Major Grevillea plants is not possible and approval to remove plants is granted, it is likely that a fully-costed propagation and ex situ conservation management plan would be required by the federal Department of the Environment and the Victorian Department of Environment, Land, Water and Planning. These should be planted in a suitable recipient site within secure conservation reserves (either on or off site), which would likely include Camp Hill State Forest and Musical Gully State Forest.

Ben Major Grevillea can be grown easily from cuttings (Bill Blackburn pers. comm.) but are considered difficult to grow from seed (Nick Jeshencko pers. comm.). Further research is likely needed to understand mechanisms which might break the dormancy in the seeds (e.g. smoke water treatment) to enable a greater number of individuals to be grown. It is not known if translocation has been trialled but it is unlikely suitable for a shrub with deep, sprawling roots through hard, rocky soils. Part of a conservation management plan may need to involve relevant agencies (e.g. universities) and experts in Grevillea propagation to assist with appropriate propagation techniques.

Suitable recipient sites would need to have sites which have similar environmental variables (eg. soil and geology types, north-facing position in the landscape, relatively intact understorey) and are secured for conservation purposes. Any future recipient sites would need to consider how to minimise inappropriate fire regimes such as repeated fires without adequate time for plants to meet maturity and spread seed. All sites would need agreement from landowner or relevant management authority.

6.2.3 River Swamp Wallaby-grass

Where avoidance of River Swamp Wallaby-grass populations and wetland habitat areas is not possible, several mitigation measures may be required, depending on the final alignment. The mitigation approaches used to mitigate impacts from the Peninsula Link freeway in the south-east region of Melbourne was to:

→ retain substantial areas of the habitat found
→ collect seed from the species to propagate to introduce to other areas
→ fence off areas to be retained during construction as a ‘no go’ zone.
→ increase water flows into the wetland area to improve the long-term habitat viability for the species.

(Southern Way 2013)

Similar mitigation measures could be applied to the River Swamp Wallaby-grass populations throughout the wetlands and dams in the study area. Where there are connected wetlands such as those along Yam Holes

Creek and the wetland in the Snow Gums Bushland Reserve, overland flows should be maintained or not significantly altered, otherwise too little or too much water may affect populations.

If River Swamp Wallaby-grass is approved for removal at a site, it is likely that a fully-costed propagation and ex situ Conservation Management Plan would be required by the federal Department of the Environment and the Victorian Department of Environment, Land, Water and Planning.

6.2.4 Growling Grass Frog

If avoidance of Growling Grass Frog habitat areas is not possible, several mitigation measures may be required, depending on the final alignment. Several mitigation approaches have been used in a number of road and related linear infrastructure projects including salvage and translocation, creation of new suitable wetland habitats, installation of 'frog friendly' wildlife crossings/culverts and installation of preventative fences to reduce mortality of frogs accessing roads.

Examples of where the above specific mitigation strategies were deployed is the Pakenham Bypass. Ten culverts were installed and 32 wetlands (ponds) were created during construction of the Pakenham bypass. They were located at the entrance of underpasses, right of ways and on natural drainage lines along the length of the bypass. These underpasses were located within 500m of ponds known to support Growling Grass Frog. Drift fences were installed parallel to the bypass to prevent frogs moving onto the road and to direct them to the underpass (Gleeson and Gleeson 2012).

The VicRoads Fauna Sensitive Road Design Guidelines (Vicroads 2012b) recommends the following mitigation strategies:

- Habitat creation including frog pond and wetland design
- Wildlife connectivity should be maintained where possible to prevent mortality from traffic collision.
- Frog culverts should be designed using specialist advice. Generally speaking frogs have low levels of mobility so crossing zones should be strategically placed.
- All crossing zones will need to be fenced using design concepts

Habitat creation should follow the Growling Grass Frog habitat requirements as described by Heard et al. (2010), they include: water surface area, hydro period, aquatic vegetation cover, water depth, water chemical composition and landscape requirements.

To ensure compliance under the EPBC Act, DEWHA (2009a) provides steps for avoiding, minimising and managing impacts on Growling Grass Frog populations. If Growling Grass Frog habitat is approved for removal at a site, it is likely that a fully-costed propagation and ex situ Conservation Management Plan would be required by the federal Department of the Environment and the Victorian Department of Environment, Land, Water and Planning.

6.2.5 Golden Sun Moth

There are not many examples of mitigation strategies for Golden Sun Moth that has been applied to road projects. The VicRoads Fauna Sensitive Road Design Guidelines (Vicroads 2012b) recommends the following mitigation strategies:

- When designing land bridges and underpasses for larger species, consider designs that cater for species such as the Golden sun moth.
- Landscape using habitat plants which cater for species such as the Golden sun moth. Consider planting species such as preferred Wallaby Grass species which occur in the study area.
- In general landscape plantings should use indigenous species and should consider catering for invertebrates.

To ensure compliance under the EPBC Act, DEWHA (2009d) provides steps for avoiding, minimising and managing impacts on Growling Grass Frog populations. If Growling Grass Frog habitat is approved for removal at a site, it is likely that a fully-costed propagation and ex situ Conservation Management Plan would be required by the federal Department of the Environment and the Victorian Department of Environment, Land, Water and Planning.

6.2.6 Little Galaxias

Where avoidance of Little Galaxias habitat areas is not possible, several mitigation measures may be required, depending on the final alignment across Yam Holes Creek. Several mitigation approaches have been used in a number of road and related linear infrastructure projects (mostly for the related Dwarf Galaxias) including construction of fish passages, improving water quality and run-off from roads and creating new habitats. The mitigation approaches used to mitigate impacts on Dwarf Galaxias from the Peninsula Link freeway in the south-east region of Melbourne was to:

→ Create new ponds and enhance habitats
→ Apply water sensitive road design to ameliorate water flows from road surfaces and improve overall water quality
→ Revegetate surrounding wetland and riparian areas
→ Design waterways for to allow for unimpeded fish crossings.

(Southern Way 2013)

The VicRoads Fauna Sensitive Road Design Guidelines (Vicroads 2012b) recommends the following mitigation strategies for Dwarf Galaxias, but also applies to Little Galaxias:

→ Installation of baffles in new and existing culverts
→ Creation of habitat to allow for unimpeded fish movement along the waterway
→ Avoid creating waterways with sharp bends and strong currents

Where works are to occur in-stream or in the vicinity of a waterway, there is a range of industry standard and best practice mitigation measures that should be implemented to protect aquatic habitat and water quality during construction, such as those applied in the Beaufort to Ararat Western Highway duplication (McGuckin 2014). These mitigation measures will also act to protect Little Galaxias and their habitat which include:

→ Habitat connectivity: flow connectivity will be maintained and unimpeded along Yam Holes Creek at all times during construction works that water is present and/or during flooding events.

→ No go zones: areas of important aquatic habitat (i.e. Yam Holes Creek, other creeks and drainage lines, wetlands and farm dams) will be identified on construction drawings and through signage on site identified as 'No Go Zones'. Their associated buffer areas will be identified as 'Proceed with Caution Zones'. Work within the buffer area will require supervision by an ecologist. No work apart from conservation management activities is to be permitted within these zones.

→ Exclusion fencing and signage: temporary exclusion fencing will be erected to protect retained riparian vegetation areas, waterways (i.e. key Little Galaxias habitat) and any new habitat areas created during construction. Signage is to be attached to fencing clearly identifying the site as a significant ecological area and a 'No Go Zone', and no entry permitted unless approval given by the site manager/project ecologist.

→ Stormwater management: temporary and/or permanent stormwater management devices will be installed and maintained to ensure stormwater quality and quantity is at pre-construction levels and/or meets relevant state guidelines/triggers (e.g. State Environment Protection Policy).

→ Sediment and erosion controls: control measures will be installed to prevent construction areas sediments from entering waterways (e.g. sild fences, sausage /inlet filters, straw bale sediment traps, etc.).

6.3 Proposed addition to existing study area

As there is the potential for impacts on a number of threatened flora and fauna species and native vegetation, as outlined in sections above, another potential alignment option to minimise impacts through the areas between the rail corridor and Racecourse Rd may be to explore the option of an alignment further east, just outside the current study area. This area was chosen based on the lesser impact from aerial photography and the Department of Environment, Land, Water and Planning risk mapping. Further investigation of this area could be incorporated into additional threatened species surveys.

6.4 Additional mitigation resources

In addition to the measures mentioned above, there are several key documents which describe detailed mitigation measures for the effects of roads on fauna:

- Vicroads Fauna Sensitive Road Design Guidelines (Vicroads 2012b)
- Fauna Sensitive Road Design Manual – Volume 1: Past and Existing Practices (Queensland Department of Main Roads 2000).
- Fauna Sensitive Road Design Manual – Volume 2 (Queensland Department of Transport and Main Roads 2010).
- Review of mitigation measures used to deal with the issues of habitat fragmentation (van der Ree et al. 2008)
- Road Ecology (Forman et al. 2003).
- Handbook of Road Ecology (Van der Ree et al. 2015).

Additionally, there are now a number of examples of mitigation techniques and their effectiveness, such as fauna underpasses (Slatey Creek, Blackwood Road and Metcalfe-Taradale Road, Calder Highway), multiple Pacific Highway upgrades (northern NSW) and rope ladders and bridges (Violet Town). There are also a range of software and modelling tools (eg. CircuitScape, Zonation) which can be used to assist with multi-factorial spatial decision making for selecting alignment options such as ‘least cost path’ modelling.

6.5 Specific mitigation measures

Table 6.1 below outlines the specific mitigation measures recommended for implementation to alleviate impacts on biodiversity that may during construction and operation of the freeway. Each predicted impact is assigned mitigating measures where appropriate.

Table 6.1 Mitigation measures during construction and operation of the freeway

Impact	Proposed mitigation measure	Implementation phase	
		Construction	Operation
Vegetation and habitat clearing	→ In order to avoid further disturbance to areas outside of those necessary for the proposed freeway alignment, vegetation outside the areas to be removed should be clearly identified and marked as 'no go' zones. These areas should be marked on maps provided to staff and fenced to prevent vehicle or machinery access and damage. No direct disturbance should occur in these areas, including vehicle access. This will be particularly important where there are *Environment Protection and Biodiversity Conservation Act 1999* listed ecological communities including Natural Temperate Grassland of the Victorian Volcanic Plain, Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland. → Designated areas for stockpiles and equipment lay-down should be placed in cleared areas to avoid or minimise impact to vegetation and habitat. → The freeway alignment should aim to avoid large trees wherever possible. Additionally, consideration for the Australian Standard for protection trees on development sites (AS 4970-2009) and the establishment of appropriate Tree Protection Zones, should be adhered to for successful management of trees where these can be retained during construction. → Salvage tree hollows and dead wood and dead trees for use in revegetation and rehabilitation works (if these will occur). → Install nest boxes in adjacent habitat to compensate for loss of hollow bearing trees.	✓	✓
Proliferation of weed and pest species	→ Include appropriate hygiene measures in the Construction Environmental Management Plan to prevent the introduction of weeds and pathogens. → Appropriate weed hygiene measures will be implemented due to the absence of significant weed infestations within the study area. Machinery is to arrive on site in a clean condition and is to be maintained free of weeds and pathogens.	✓	✓
Direct fauna mortality	→ All construction personnel shall be required to attend a project-specific induction prior to commencing site work. The inductions shall include relevant information about the ecological sensitivities of the site and appropriate management measures. → Vehicle speeds along the access road shall be kept low, particularly around dawn and dusk. → All habitat tree and stags shall be marked clearly with non-toxic paint and tape prior to the commencement of clearing. → A two stage clearing protocol shall be adopted on site to reduce the likelihood of injury to roosting fauna as follows: ▪ Clear all non-habitat trees and stags. ▪ Wait 24-48 hours before commencing felling of habitat trees and dead stags.	✓	

Impact	Proposed mitigation measure	Implementation phase	
		Construction	Operation
	▪ Immediately prior to felling, tap the habitat trees and dead stags with the excavator arm prior to startle any fauna present and encourage them to relocate voluntarily. ▪ Shear all habitat trees and dead stags at the base and gently lower to the ground to prevent injury to any roosting fauna. ▪ A suitably trained and qualified ecologist shall inspect all tree hollows for fauna once the tree is on the ground. ▪ A suitably licensed person shall capture and translocate any fauna that does not relocate voluntarily or capture any injured fauna and take away for treatment. ▪ Keep appropriate records to document that this protocol is followed and record the details of any fauna encountered. → Habitat clearing works will be supervised by a qualified environmental specialist and any animals disturbed during the works will be relocated. → Sides of the trenches should be graded to allow for animal escape. Trenches should be checked in the morning prior to the start of works to identify trapped animals. Trapped animals should be removed before works commence.		
Hydrological changes	→ Design permanent freeway crossings to minimise alteration to the natural overland flows through Yam Holes Creek. This should particularly aim to reduce the impact on the *Environment Protection and Biodiversity Conservation Act 1999* listed species and community including River Swamp Wallaby-grass, Brolga, Growling Grass Frog, Little Galaxias and Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains. → Minimise disturbance to the bed and banks of ephemeral watercourses and wetlands during construction of the freeway. → Develop an Erosion and Sediment Control Plan for the construction site and access road that includes relevant controls to reduce potential erosion and sedimentation impacts including (but not limited to): ▪ divert run-off from upslope areas around the construction site ▪ intercept and filter run-off leaving the site, and ▪ reduce the potential for scour and erosion in the ephemeral watercourses. → Stabilise all surface disturbed during construction as soon as practicable following the disturbance. → Avoid works in wet weather to avoid potential sediment delivery into the ephemeral watercourses	✓	✓

Impact	Proposed mitigation measure	Implementation phase	
		Construction	Operation
Key threatening processes	→ Minimise clearing of native vegetation to that necessary and avoid areas of vegetation that are not necessary to be cleared during construction. → Salvage tree hollows and dead wood and dead trees for use in revegetation and rehabilitation works (if these will occur). → Install nest boxes in adjacent habitat to compensate for loss of hollow bearing trees. → Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks, noxious weeds and pathogens. → Washing, refuelling and servicing of machinery and storage of fuel and other materials must occur off site and away from the creeks. An emergency spill kit must be present on site in case of fluid leaks or spills from machinery.	✓	

7 CONCLUSION

This assessment report was required to identify threatened flora and fauna species and vegetation of national significance for the future Beaufort Bypass Environment Effects Statement. A target list of threatened flora and fauna species and vegetation formed the basis of the field assessment component of the study.

Three of the total nine target species were located in the study area. An additional two species were identified throughout the study area. The five species include:

- Ben Major Grevillea (listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the Victorian *Flora and Fauna Guarantee Act 1988*)
- Matted Flax-lily (Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the Victorian *Flora and Fauna Guarantee Act 1988*) - new for the region
- River Swamp Wallaby-grass (listed under Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*) - new for the region
- Yarra Gum (rare in Victoria)
- Snow Gum (local significance).

One threatened ecological community listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* was targeted and another two were recorded, including:

- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (targeted)
- Natural Temperate Grassland of the Victorian Volcanic Plain
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains.

While not confirmed during current surveys, there is also a moderate likelihood of four species occurring in the study area, including Candy Spider-orchid, Swamp Fireweed, Swamp Everlasting and Spiral Sun-orchid.

Of the 15 fauna species targeted for survey, the field surveys identified five threatened fauna species

- Golden Sun Moth (listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and Victorian *Flora and Fauna Guarantee Act 1988*)
- Bibron’s Toadlet (listed under the Victorian *Flora and Fauna Guarantee Act 1988*)
- Brush-tailed Phascogale (listed under the Victorian *Flora and Fauna Guarantee Act 1988*)
- Squirrel Glider (listed under the Victorian *Flora and Fauna Guarantee Act 1988*)
- Brown Treecreeper (near threatened in Victoria).

Additionally, the fauna habitat community Victorian Temperate Woodland Bird Community listed under the *Flora and Fauna Guarantee Act 1988* was identified in the study area.

While not confirmed during current surveys, there is also a very high likelihood of two other threatened fauna to occupy parts of the study area:

- Growling Grass Frog (listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the Victorian *Flora and Fauna Guarantee Act 1988*)
- Powerful Owl (listed under the Victorian *Flora and Fauna Guarantee Act 1988*)
- Little Galaxias – closely related Dwarf Galaxias (listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the Victorian *Flora and Fauna Guarantee Act 1988*).

Legislative implications

Depending on the alignment adopted, the project has the potential to impact on a number of Matters of National Environmental Significance (listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999)* such as the species and communities known to exist in the study area: Matted Flax-lily, River Swamp Wallaby-grass, Ben Major Grevillea, White Box-Yellow Box-Blakely’s Red Gum Grassy Woodland and Derived Native Grassland, Seasonal Herbaceous Wetlands (Freshwater) of the Temperate

Lowland Plains, Natural Temperate Grassland of the Victorian Volcanic Plain, Golden Sun Moth, Growling Grass Frog and Little Galaxias.

Again, depending on the alignment adopted, the project has the potential to impact on ecological values listed under the Victorian *Flora and Fauna Guarantee Act 1988* including: eight listed fauna species, two flora species and two communities within or in close proximity to the alignments, some of which are on public land. In the scenario that these would be impacted, a management authority (permit) from the Victorian Department of Environment, Land, Water and Planning is required.

According to the Permitted Clearing of Native Vegetation – Biodiversity Assessment Guidelines, the majority of the study area is covered by Location A with patches of Location C in the areas of the Camp Hill State Forest and the Snow Gums Bushland Reserve. Due to the scale of native vegetation and scattered tree removal for any of the alignment options, the application would be assessed as a high risk-based pathway application and would be referred to the Victorian Department of Environment, Land, Water and Planning.

Potential impacts and mitigation

There is a clear distinction between the impacts on native vegetation on the alignment options. Alignment B4-B would require the lowest native vegetation clearing (63.9 ha) of all the options. Alignment B4-A would require clearing of 69.2 ha while alignment B5 would require the greatest area of native vegetation (70.3 ha) to be cleared (EHP 2014). Conversely, alignment B5 appears to have less potential impacts on threatened flora species and communities than B4-A and B4-B, but would still impact on listed species and communities. The difference in the impact from the alignment options on fauna species and habitats is more obscure with either option not necessarily more preferable to the other. The information contained in this report does not conclusively identify a single most preferable option from an ecological perspective.

There is significant native vegetation and fauna habitat within and adjacent to the preliminary alignment options that is known to support Commonwealth and Victorian listed species and communities and potentially supports more species. Wherever possible, the route selection should be based on avoiding and minimising impacts on vegetation and fauna habitat, as stated in relevant environmental legislation and policy. A range of broad measures are provided in this report which aim to reduce and / or mitigate potential impacts to threatened species and their habitat.

8 RECOMMENDATIONS

Based on the findings of this targeted threatened species assessment, the following recommendations are made:

8.1 Flora surveys

Targeted surveys for threatened orchids such as Spiral Sun-orchid, Candy Spider-orchid, Swamp Everlasting and Emerald lip orchid should be undertaken throughout suitable habitats in early spring.

Targeted surveys for other rare and threatened flora should include further searches for Yarra Gum in low-lying areas in the Yam Holes valley and Snow Gums Bushland Reserve. Opportunistic surveys should include Rough Wattle, Golden Cowslips and Swamp Fireweed.

8.2 Fauna surveys

8.2.1 Golden Sun Moth

An area potentially suitable as Golden Sun Moth habitat has been identified during the post field report review process. Based on the results of this review, we would recommend that further surveys are undertaken at the start of the 2016 flying season (November –December) where the by-pass diverges from the western highway east of Beaufort

8.2.2 Eastern Bent-wing Bat

Ball call analysis was not conclusive to be able positively identify if the State listed Eastern Bent-wing Bat is present in an abandoned mine in alignment Option B4. Further investigation using trapping techniques at the entrance of the mine would clarify if there are any *Flora and Fauna Guarantee Act* implications. Trapping should be undertaken during the acknowledged active bat season i.e. late September through too early to mid-April.

8.3 Aquatic fauna surveys

Upon determination of the final bypass alignment, it would be prudent to undertake a repeat targeted Little Galaxias survey. The survey should specifically target potential Little Galaxias habitat in the immediate vicinity of the proposed alignment and should be undertaken when there is more water present in the area and Little Galaxias likely to me more active (e.g. late winter to spring).

8.4 Overall

As there is the potential for impacts on a number of threatened flora and fauna species and native vegetation, as outlined in sections above, another potential alignment option to minimise impacts through the areas between the rail corridor and Racecourse Rd would be to explore the option of an alignment further east, just outside the current study area. This area was chosen based on the lesser impact from aerial photography and the Department of Environment, Land, Water and Planning risk mapping. Further investigation of this area should be incorporated into additional threatened species surveys.

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Appendix A

PROJECT BRIEF

THE ASSIGNMENT

THREATENED SPECIES TARGETED ASSESSMENTS– BEAUFORT BYPASS

1. PURPOSE OF THIS ASSIGNMENT

The purpose of this assignment is to undertake targeted surveys of threatened flora and fauna species and identify mitigation measures associated with three designated alignment options for the Beaufort Bypass EES.

The targeted survey is required to be undertaken during spring 2015 and a report will be prepared by the provider inclusive of mapping, further actions, referrals, permits or approvals required to implement the project.

This assignment will be used to inform the nature and extent of a more detailed flora and fauna assessment to be undertaken consistent with:

1. the Scoping Requirements as prepared by the Department of Environment, Land, Water and Planning (DELWP) in consultation with VicRoads; and
2. an EPBC Referral.

2. BACKGROUND

2.1 Project details

The Beaufort Bypass Planning Study involves planning for the ultimate construction of a dual carriageway along a new alignment around the town of Beaufort. The bypass will be constructed to a freeway standard (AMP1) and will link the currently under construction Western Highway duplication to the east and west of Beaufort, as well as connections to major intersecting roads.

2.1.1 Beaufort

The project is located on the eastern, northern and western outskirts of the Beaufort Township. Potential bypass alignments have been identified within a broader investigation corridor, termed hereafter as the study area. The eastern end of the study area ties in with the already duplicated section of the Western Highway immediately east of Beaufort and the western end ties in with the currently under construction section of the Western Highway duplication west of Beaufort.

The project would include the following components:

- Construction of a dual carriageway to AMP1 standard;
- Construction of interchanges to connect the township of Beaufort to Western Highway;
- Several waterway crossings;
- Overpass of the Beaufort-Ballarat rail line;
- Intersection treatment of local roads and provision for service roads if required; and
- Provision of connections for existing and future transport network.

Aurecon has developed three concept alignments for the bypass. These alignments are subject to VicRoads approval. The area nominated for investigation covers these alignments, with scope to expand if necessary.

2.2 Study area description

2.2.1 Beaufort

The study area is located to the north of the existing Western Highway and the township of Beaufort, approximately 150 km west of Melbourne. It extends to the east in between Beaufort-Lexton Road and Trawalla-Waterloo Road, and to the west it terminates between Old Shirley Road and Eurambeen-Streatham Road. A map of the study area (including proposed alignment options) is attached (Refer to Appendix C).

The township of Beaufort adjoins the central southern boundary of the project investigation corridor. Beaufort is the largest town within the Pyrenees Shire, with a population of just over 1,000 people. The town is horizontally bisected by the Western Highway, and as such it currently functions as a highway service centre.

The main regional transport route in addition to the Western Highway is the Ararat - Beaufort rail line, which runs to the north of the existing Western Highway and intersects the south-eastern corner of the investigation corridor.

Commercial activities within the local area are primarily focussed around agriculture, timber plantations and timber processing. The main sawmill and timber processing plant is located just outside of the project investigation corridor, in the area bounded by Racecourse Road to the south and the railway line to the north.

As the predominant land use within the project investigation corridor is agricultural and most of the area is zoned for farming, the density of residential dwellings is expected to be generally low.

The topography of the investigation corridor is relatively gentle, characterised by undulating plains and rolling low hills, steepest in the north where the project investigation corridor converges with the Camp Hill State Forest. The township of Beaufort is located approximately 387 m above sea level. No landscapes of regional or State significance have been identified within or near the investigation corridor.

2.3 Planning history

The Pyrenees Shire Council has at different times in the past undertaken studies and consultation with the community about the desire for and possible location of bypasses of the townships. These studies have generally had varied outcomes; however no concept road design work was produced.

In 2011, VicRoads undertook a preliminary investigation to understand the Western Highway's connection points that could cater for a future bypass of the towns.

VicRoads has since identified an investigation area north of the townships to undertake the detailed specialist studies.

In July 2015, the Minister for Planning determined that an EES is required for the Beaufort Bypass.

2.4 Summary of previous consultation

During the planning for the Western Highway Duplication Project in 2011, VicRoads together with the Pyrenees Shire Council undertook a high level investigation of all possible options for the town bypasses. The purpose of these investigations was to determine the start and end points for the duplication project.

The preliminary investigations took into consideration areas north and south of both townships. They also considered available information from government departments and agencies, council, aerial photography, preliminary topographical information and some local knowledge. They avoided, as far as possible, known areas of environmental, heritage, planning, future development and social sensitivities.

Community information sessions were held in both townships in 2011 to communicate findings of the preliminary studies and information was made available at council offices.

During the initial identification and evaluation of alignment options, the project team also consulted with DELWP, Department of Economic Development, Jobs, Transport and Resources and Parks Victoria.

In late 2014, a stakeholder workshop was held with the following organisations invited to present the investigation corridor and discuss pathways and objectives for the investigation into a bypass of Beaufort and Ararat:

Pyrenees Shire,
Parks Victoria,
Regional Development Victoria,
Department of Environment, Land, Water and Planning,
Department of Economic Development, Jobs, Transport and Resources,
Office of Aboriginal Affairs Victoria,
Glenelg Hopkins Catchment Management Authority,
Central Highlands Water.

Also in late 2014, VicRoads engaged GHD to undertake a rapid Flora, Fauna and Aquatic Assessment for the Study Area. The findings from this assessment are included in the list of species requiring targeted surveys (Assignment Task 2).

2.5 Other Information

- Beaufort Bypass EES Referral: http://www.dtpli.vic.gov.au/planning/environmental-assessment/environment-effects-referrals/referrals2013#Beaufort

3. ASSIGNMENT TASKS

3.1 Methodology

Conduct the targeted surveys in accordance with the methodology submitted to and approved by VicRoads (using Schedule 32), prior to the commencement of the works.

Conduct the surveys in accordance with the guidelines and survey methodology provided by the relevant authorities such as DEWLP or Department of the Environment (DotE) for the particular species or community to be surveyed and with regard to any relevant recovery plans and procedures.

Hold Point: The methodology is to be approved by DELWP in consultation with VicRoads prior to commencement of the Assignment.

3.2 Detailed Task Descriptions

Task 1 Data and Literature Review

The provider shall review relevant databases and literature to determine any recorded information relevant to the study area. Information may be obtained from but not limited to the following:

- Biodiversity Interactive Mapping – Department of Environment Land Water and Planning (DELWP);
- Native Vegetation Information Management system (NVIM) – DELWP;
- Victorian Biodiversity Atlas – DELWP;
- Protected Matters Search Tool – Department of the Environment (DotE);
- DELWP – Pest, diseases and weeds (including Cinnamon Fungus and Phylloxera);
- Previous investigations and reports for the area;
- Records and databases for the species in the vicinity of the study area; and
- Consultation with Departmental officers and other specialists on the target species, habitat and known existence in the study area (these discussions are to be summarised in the report).

Task 2 Field Surveys and Investigations

The provider shall undertake targeted surveys and investigations relating to the following list of species within the specified assessment area and record all sightings, habitat or potential habitat and its quality that does/may support the species:

Name of the Species	Nominated Survey Dates	Comments
Clover Glycine	October to December	
Spiral Sun-orchid	August to November	
Matted Flax-lily	November	
Candy Spider-orchid	September to November	
Trailing Hop-bush	September to November	
Ben Major Grevillea	September to November	
White Sunray	September to November	
Growling Grass Frog	September to February	
Golden Sun Moth	November to March	
Striped Legless Lizard	November to December	
Brown Toadlet	October to June	
Brush-tailed Phascogale	April to November	
Lace Monitor	September to March	
Dwarf Galaxias	July to October	
Snow Gum (of local significance)		
Small milkwort	August to January	
White box / Yellow box / Blakely's Red Gum woodlands	September to January	
Brolga	November to April	
Barking Owl	October to April	
Masked Owl	October to April	
Powerful Owl	October to April	
Painted Honeyeater	September to January	
Regent Honeyeater	September to January	
Diamond Firetail	August to January	
Swift Parrot	September to December	
Yarra Pygmy Perch	May to August	Rainy Season – please consider & check
Spot-tailed-Quoll	May to August	Please consider and check

The field surveys shall be undertaken by qualified and experienced staff, in accordance with the relevant survey standards and guidelines issued by the relevant authority including but not limited to:

- Department of the Environment (DotE) (Commonwealth)
    - Guidelines for Biological Survey and Mapped Data 17 July 2006; and
    - Survey Guidelines for Australia's threatened reptiles, frogs, birds, bats mammals, orchids etc.
    - Significant Impact Guidelines 1.1 – Matters of National Environmental Significance

- Department of Environment, Land, Water and Planning (DEWLP) (State)
    - Approved specific survey standards as listed on the DEWLP website.

Task 3 Mapping Requirements

The provider shall map (accuracy of at least 1m) all native vegetation patches, scattered trees and other relevant environmental features. Native vegetation mapping is to be provided to VicRoads as an ESRI shapefile meeting DELWP's data standard requirements of the "Permitted Clearing of native vegetation – Meeting the moderate and high risk-based pathway application requirements" (DEWLP).

The provider shall produce a CADD file Microstation Version 8 or dxf, (coordinates in MGA, zone 54) and GIS file or another similar standard agreed with the Superintendent that can be utilised to map all native vegetation patches, scattered trees and other relevant environmental features.

Task 4 Identify Protected Species

The provider shall identify and provide a total of the number of each Flora and Fauna Guarantee Act 1988 (FFG Act), Environment Protection Biodiversity and Conservation Act 1999 (EPBC Act) and DELWP (Advisory List) listed species that may be impacted by the project.

Task 5 Assess Impacts

The provider shall undertake an assessment of the significant impacts of the proposed bypasses on the target species including but not limited to:

- Specific details of the likely significant impacts of the proposal on the species as they relate to the legislation (e.g. Significant Impact Guidelines 1.1 – Matters of National Environmental Significance [MNES], DotE)

- The level of impact on the species at the site with reference to significance in a localised context; and

- The level of impact on the species as a whole with reference to significance in an Australian context.

Where concept designs are available, the provider shall identify the likely significant impact of the construction footprint and construction methods on the target species.

Task 6 Identify/Recommend Mitigation Measures

The provider shall identify and recommend any measures to mitigate the significant impacts of the specified assessment area that aim to avoid and or practically reduce the impact.

Measures proposed must be specific to the protection/mitigation of significant impacts to biodiversity.

Measures proposed must be specific to the protection/mitigation of significant impacts as identified in the DotE's Significant Impact Guidelines for the EPBC target species.

Task 7 Identify Approvals

The provider shall identify any permits, approvals, management plans and offset requirements that may be required for the project under the following environmental legislation:

- Wildlife Act 1975;
- Flora and Fauna Guarantee Act 1988;
- Environment Protection Biodiversity and Conservation Act 1999;
- Planning and Environment Act 1987;
- Victorian Planning Provisions and Planning Schemes;
- Catchment and Land Protection Act 1994; and
- Environment Effects Act 1978.

Task 8 Identify Further Actions

The provider shall identify any further actions or investigations which may be required as part of the project.

Task 9 Report

A report covering the outputs from the tasks listed above and subject to any specific modifications required for this Assignment, it is expected that the report will have the following chapter headings:

- Executive summary
- Introduction/background
- Methodology
- Results
- Discussion
- Legislation and Policy
- Mitigation measures
- Conclusions
- Recommendations
- Glossary of terms
- References
- A copy of this Assignment brief as Appendix 1
- Other Appendices, as required

The reports section titled "Mitigation Measures" shall utilise the table for MNES Assessment of Impact to document the findings and advice for Tasks 2, 8 and 9 (above).

The reports section titled "Conclusion" shall utilise the table for MNES – Evaluation of Significance of Impact to be completed for each MNES where, before the application of mitigation measures, it is likely that the action can have a significant impact on a MNES.

It is also expected that the report will contain:

- A Cover Page with the Project name, type of consultancy, author's name and date
- A Table of Contents with a list of maps, drawings, tables and Appendices
- Footers on each page including the date and version number
- Numbering of all pages, and
- Text that is readable and not less than 10 point Verdana, or approved equivalent
- Acknowledgements for persons and organisations that have contributed to the report

NOTE: The report produced for this Assignment shall comply with the Whole of Victorian Government (WoVG) Accessibility Standard. The Provider should ensure that Accessibility requirements are incorporated as documents are being written and not leave this as a separate task to be carried out when finalising documents. Further details are provided in the Deliverables section of this brief.

Task 10 Attendance at meetings

The Provider shall suitably prepare for and then attend all meetings, as instructed by the Superintendent. It is expected the Provider shall be required to prepare for and then attend 5 No. meetings.

These meetings are expected to consist of:
- an inception meeting with VicRoads in Ballarat, followed by a site inspection with DELWP members;
- a meeting with VicRoads to discuss the contents of the Provider's draft report in Ballarat; and
- up to 3 No. contract progress meetings with VicRoads in Ballarat.

3.3 Information to be Provided by VicRoads to the Provider

VicRoads will provide the following information to the Provider:

- Investigation corridor GIS file
- GHD Rapid Flora, Fauna and Aquatic Assessment
- Desktop studies
- Digital alignments
- Beaufort EES Referral document

3.4 Access to Properties

VicRoads may provide details of property owners, where available. VicRoads may also arrange access to private properties, or may inform the Provider where access is not available or of any known special requirements for access.

The Provider shall contact Sam Brown of VicRoads Western Region on (03) 5333 8756 prior to arranging access to private property. Under no circumstances is the Provider to enter private property before contacting Sam Brown.

Entry on public land or private property for the purpose of carrying out site inspections is only permitted after the VicRoads has contacted and received permission from the appropriate authorities or landowners. The Provider must provide reasonable advance notice to the authority, or landowner before entering public land or private property.

3.5 Permits

The Provider is responsible for obtaining all necessary permits for undertaking the investigations required under this Contract, and for ensuring that all work is carried out in accordance with any such permits. Copies of relevant permits are to be provided to VicRoads prior to works commencing on site.

The provider shall identify required permits and approvals that relate directly to the targeted species and communities.

3.6 Deliverables

3.6.1 Report

Accessibility

VicRoads has adopted the Whole of Victorian Government (WoVG) Accessibility Standard which is based on the Web Content Accessibility Guidelines (WCAG) 2.0. This Standard aims to ensure that information on VicRoads' website will be available to all people without discrimination on the basis of disability and to make finding, using and interacting with the website easier. The Standard is available from the Policies and Standards section of the Victorian Government Department of Treasury and Finance Chief Information Officer's website. The Accessibility Standard is under the "Website Management Framework" tab at the following website address: https://www.dtf.vic.gov.au/CA257310001D7FC4/pages/policies-and-standards-website-management-framework.

As the report produced for this Assignment could be made available for viewing via VicRoads' website, it needs to be prepared to comply with the WoVG Accessibility Standard which involves meeting all Level AA Success Criteria of WCAG 2.0. Further advice on how to meet the WoVG Accessibility Standard can be provided by the Superintendent, if required.

Timing and Format

Step	Timing	Details
1. Provider to submit draft report	26th January 2016 (following September-December targeted surveys)	An electronic copy of the complete draft report is to be provided to VicRoads in Microsoft Word format, along with electronic copies of all maps, drawings and photos in the format agreed with VicRoads. If the draft report is incomplete or inappropriately structured, VicRoads may request the draft report to be revised before reviewing it.
2. VicRoads to review all revisions as submitted	Two weeks after receipt of each revision	The Provider may be asked to consider making changes to the report based on the reviewer's comments before the report is finalised. Where the Provider has concerns about any of the review comments, these are to be discussed with VicRoads Superintendent's Representative prior to finalisation of the report.
3. Provider to submit final report	Two weeks following completion of targeted surveys	Electronic copies of the complete final report are to be provided to VicRoads in both a secured and unsecured Adobe Portable Document File (PDF) format and in Microsoft Word format. A digital copy of all maps, drawings and figures to be provided separately in formats agreed with VicRoads.
4. VicRoads acceptance of final report		The final report will only be accepted after all changes requested by VicRoads in Step 3 and agreed by the Provider, have been completed.

Maps and Drawings

The report shall include separate maps and drawings showing the assessment area and alignment options. The intent of this is to display the biodiversity impacts on the entire area and an overlay on the alignments. The source of all maps and drawings used in the report needs to be quoted, unless they have been prepared using data collected specifically for this Assignment. Maps need to be prepared to an appropriate scale so that information is clearly legible. Font sizes should be large enough to be able to read legends and text e.g. road names, when produced in A4.

The Provider shall ensure that roads, features etc. referred to in the report are shown clearly on the relevant maps and drawings.

The Provider shall ensure that maps and drawings comply with the DTPLI Communicating Data with Colour Guidelines.

Format of Electronic Mapping

GIS data should be provided in an ESRI Shape file format. Individual ESRI shape files are to be provided for each separate major feature collection type as directed by the superintendent. The project coordinate system must be MGA Zone 54 or 55 as appropriate to at least an accuracy of 1m, or another similar standard agreed with VicRoads prior to the contract being awarded.

3.7 Key Project Personnel

The Provider must nominate key project personnel in Schedule 28. The key roles to be nominated include:

- Project Manager – The role of the Project Manager is to ensure that the project is completed in a timely and efficient manner. The Project Manager is expected to be the day to day contact between VicRoads and the Provider.
- Field Manager – The role of the Field Manager is to ensure all field works are undertaken in an appropriate manner and comply with relevant guidelines and legislation. This role may also be completed by the Project Manager.
- Project Director – The role of the Project Director is to ensure that objectives of the project are being achieved in a timely and effective manner.

If the Provider intends to change any nominated key project personnel during the course of the contract, the Provider shall only do so with the prior agreement of the Superintendent.

Appendix B

INCIDENTAL FLORA OBSERVATIONS

Table B.1 Incidental flora species recorded across the study area

Weed species	Scientific Name	Common Name	Status
	Acacia aculeatissima	Snake Wattle	Herbarium specimen
	Acacia dealbata	Silver Wattle	
	Acacia genistifolia	Spreading Wattle	
	Acacia melanoxylon	Blackwood	
	Acacia paradoxa	Hedge Wattle	
	Acacia pycnantha	Golden Wattle	
	Acaena novae-zelandiae	Bidgee-widgee	
*	*Acetosella vulgaris*	Sheep Sorrel	
	Acrotriche serrulata	Honey-pots	
*	*Aira cupaniana*	Quicksilver Grass	
	Amphibromus fluitans	River Swamp Wallaby-grass	Vulnerable under *Environment Protection and Biodiversity Conservation Act* Herbarium specimen
	Amphibromus neesii	Southern Swamp Wallaby-grass	
	Amphibromus nervosus	Common Swamp Wallaby-grass	
*	*Anthoxanthum odoratum*	Sweet Vernal-grass	
	Arthropodium strictum s.l.	Chocolate Lily	
*	*Asparagus asparagoides*	Bridal Creeper	Restricted Weed under the *Catchment and Land Protection Act*
	Austrostipa mollis	Supple Spear-grass	
	Austrostipa oligostachya	Fine-head Spear-grass	
	Austrostipa pubinodis	Tall Spear-grass	
	Austrostipa semibarbata	Fibrous Spear-grass	
	Austrostipa spp.	Spear Grass	
	Bossiaea prostrata	Creeping Bossiaea	
*	*Briza maxima*	Large Quaking-grass	
*	*Briza minor*	Lesser Quaking-grass	
*	*Bromus diandrus*	Great Brome	
*	*Bromus hordeaceus subsp. hordeaceus*	Soft Brome	
	Caesia parviflora	Pale Grass-lily	

Weed species	Scientific Name	Common Name	Status
*	*Callitriche brutia subsp. brutia*	A Starwort	
	Carex appressa	Tall Sedge	
	Carex breviculmis	Common Grass-sedge	
	Carex tereticaulis	Poong'ort	
	Centella cordifolia	Centella	
	Centipeda cunninghamii	Common Sneezeweed	
	Chrysocephalum apiculatum s.l.	Common Everlasting	
*	*Cirsium vulgare*	Spear Thistle	Restricted Weed under the *Catchment and Land Protection Act*
	Comesperma ericinum	Heath Milkwort	
	Convolvulus angustissimus subsp. angustissimus	Blushing Bindweed	
	Coronidium scorpioides s.s.	Button Everlasting	
	Cotula australis	Common Cotula	
*	*Cotula coronopifolia*	Water Buttons	
	Crassula helmsii	Swamp Crassula	
*	*Crataegus monogyna*	Hawthorn	
*	*Cynosurus echinatus*	Rough Dog's-tail	
	Cyperus spp.	Flat Sedge	
*	*Dactylis glomerata*	Cocksfoot	
	Daviesia leptophylla	Narrow-leaf Bitter-pea	
	Daviesia ulicifolia	Gorse Bitter-pea	
	Dianella admixta	Black-anther Flax-lily	
	Dianella amoena	Matted Flax-lily	Endangered under the *Environment Protection and Biodiversity Conservation Act* Endangered under and Advisory List of Threatened Vertebrate Fauna in Victoria, Listed under the *Flora and Fauna Guarantee Act* Herbarium specimen
	Dillwynia cinerascens s.l.	Grey Parrot-pea	
	Dodonaea viscosa subsp. cuneata	Wedge-leaf Hop-bush	

Weed species	Scientific Name	Common Name	Status
	Eleocharis acuta	Common Spike-sedge	
	Eleocharis sphacelata	Tall Spike-sedge	
*	*Erica lusitanica*	Spanish Heath	
	Eryngium ovinum	Blue Devil	
	Eryngium vesiculosum	Prickfoot	
	Eucalyptus aromaphloia	Scentbark	
	Eucalyptus baxteri s.l.	Brown Stringybark	
	Eucalyptus camaldulensis	River Red-gum	
	Eucalyptus dives	Broad-leaf Peppermint	
	Eucalyptus goniocalyx s.s.	Bundy	
	Eucalyptus macrorhyncha	Red Stringybark	
	Eucalyptus melliodora	Yellow Box	
	Eucalyptus obliqua	Messmate Stringybark	
	Eucalyptus pauciflora	Snow Gum	
	Eucalyptus radiata s.l.	Narrow-leaf Peppermint	
	Eucalyptus rubida	Candlebark	
	Eucalyptus viminalis subsp. viminalis	Manna Gum	
	Eucalyptus yarraensis	Yarra Gum	Rare
*	*Festuca arundinacea*	Tall Fescue	
*	*Genista monspessulana*	Montpellier Broom	Restricted Weed under the *Catchment and Land Protection Act*
	Geranium spp.	Crane's Bill	
	Glossostigma elatinoides	Small Mud-mat	
	Glyceria australis	Australian Sweet-grass	
	Gompholobium huegelii	Common Wedge-pea	
	Gonocarpus tetragynus	Common Raspwort	
	Gratiola peruviana	Austral Brooklime	

Weed species	Scientific Name	Common Name	Status
	Grevillea floripendula	Ben Major Grevillea	Vulnerable under *Environment Protection and Biodiversity Conservation Act* Vulnerable under the Advisory List of Threatened Vertebrate Fauna in Victoria Listed under the Flora and Fauna Guarantee Act
	Hardenbergia violacea	Purple Coral-pea	
*	*Holcus lanatus*	Yorkshire Fog	
*	*Hordeum spp.*	Barley Grass	
*	*Hypericum perforatum subsp. veronense*	St John's Wort	Regionally Controlled Weed under the *Catchment and Land Protection Act*
*	*Hypochaeris radicata*	Flatweed	
	Isolepis cernua var. platycarpa	Broad-fruit Club-sedge	
	Isolepis inundata	Swamp Club-sedge	
	Juncus holoschoenus	Joint-leaf Rush	
	Juncus spp.	Rush	
	Kennedia prostrata	Running Postman	
	Lachnagrostis filiformis s.l.	Common Blown-grass	
	Leptorhynchos squamatus	Scaly Buttons	
	Lissanthe strigosa subsp. subulata	Peach Heath	
*	*Lolium rigidum*	Wimmera Rye-grass	
	Lomandra filiformis	Wattle Mat-rush	
	Lomandra nana	Dwarf Mat-rush	Herbarium specimen
	Melicytus dentatus s.s.	Tree Violet	
	Microlaena stipoides var. stipoides	Weeping Grass	
	Myriophyllum crispatum	Upright Water-milfoil	
	Myriophyllum spp.	Water Milfoil	
	Ornduffia reniformis	Running Marsh-flower	
	Ozothamnus obcordatus	Grey Everlasting	
*	*Paspalum dilatatum*	Paspalum	
*	*Paspalum distichum*	Water Couch	
	Pelargonium australe	Austral Stork's-bill	

Weed species	Scientific Name	Common Name	Status
	Persicaria prostrata	Creeping Knotweed	
*	*Phalaris aquatica*	Toowoomba Canary-grass	
	Pimelea curviflora s.l.	Curved Rice-flower	
	Pimelea curviflora s.s.	Curved Rice-flower	
*	*Pinus radiata*	Radiata Pine	
*	*Plantago coronopus*	Buck's-horn Plantain	
	Poa labillardierei	Common Tussock-grass	
	Poa sieberiana	Grey Tussock-grass	
	Podolepis decipiens	Bright Podolepis	Herbarium specimen
*	*Polypogon monspeliensis*	Annual Beard-grass	
	Pterostylis longifolia s.l.	Tall Greenhood	
	Pultenaea pedunculata	Matted Bush-pea	
	Pultenaea spp.	Bush-pea	
	Ranunculus amphitrichus	Small River Buttercup	
	Ranunculus inundatus	River Buttercup	
*	*Romulea rosea*	Onion Grass	
*	*Rosa rubiginosa*	Sweet Briar	Regionally Controlled Weed under the *Catchment and Land Protection Act*
*	*Rubus fruticosus spp. agg.*	Blackberry	Regionally Controlled Weed under the *Catchment and Land Protection Act*
	Rumex spp.	Dock	
	Rytidosperma duttonianum	Brown-back Wallaby-grass	
	Rytidosperma geniculatum	Kneed Wallaby-grass	
	Rytidosperma pallidum	Silvertop Wallaby-grass	
	Rytidosperma setaceum	Bristly Wallaby-grass	
	Schoenus apogon	Common Bog-sedge	
	Senecio glomeratus	Annual Fireweed	
	Senecio minimus	Shrubby Fireweed	
	Spergularia spp.	Sand-spurrey	
	Thelymitra spp.	Sun Orchid	
	Themeda triandra	Kangaroo Grass	

Weed species	Scientific Name	Common Name	Status
	Tricoryne elatior	Yellow Rush-lily	
*	*Trifolium angustifolium var. angustifolium*	Narrow-leaf Clover	
*	*Trifolium dubium*	Suckling Clover	
*	*Trifolium subterraneum*	Subterranean Clover	
	Triglochin striata	Streaked Arrowgrass	
*	*Ulex europaeus*	Gorse	Regionally Controlled Weed under the *Catchment and Land Protection Act*
*	*Vulpia bromoides*	Squirrel-tail Fescue	
*	*Vulpia spp.*	Fescue	

Herbarium specimen = herbarium specimen lodged with the National Herbarium of Victoria

Appendix C

INCIDENTAL FAUNA OBSERVATIONS

Table C.1 Incidental records 21/11/2015

Scientific Name	Common Name
Acanthiza nana	Yellow Thornbill
Acanthiza chrysorrhoa	Yellow-rumped Thornbill
Acanthiza reguloides	Buff-rumped Thornbill
Anas superciliosa	Pacific Black Duck
Anthochaera carunculata	Red Wattlebird
Ardea pacifica	White-necked Heron
Cacatua galerita	Sulphur-crested Cockatoo
Cacatua tenuirostris	Long-billed Corella
Calyptorhynchus funereus	Yellow-tailed Black-Cockatoo
Chenonetta jubata	Australian Wood Duck
Climacteris picumnus	Brown Treecreeper
Colluricincla harmonica	Grey Shrike-thrush
Corcorax melanorhamphos	White-winged Chough
Cormobates leucophaea	White-throated Treecreeper
Corvus coronoides	Australian Raven
Dacelo novaeguineae	Laughing Kookaburra
Egretta novaehollandiae	White-faced Heron
Eolophus roseicapilla	Galah
Glossopsitta concinna	Musk Lorikeet
Gymnorhina tibicen	Australian Magpie
Lichenostomus fuscus	Fuscous Honeyeater
Malurus cyaneus	Superb Fairy-wren
Melithreptus lunatus	White-naped Honeyeater
Myiagra inquieta	Restless Flycatcher
Oriolus sagittatus	Olive-backed Oriole
Pachycephala rufiventris	Rufous Whistler
Pardalotus punctatus	Spotted Pardalote
Platycercus elegans	Crimson Rosella
Rhipidura albiscapa	Grey Fantail
Strepera versicolor	Grey Currawong

Table C.2 Incidental records 22/11/2015

Scientific Name	Common Name
Acanthiza lineata	Striated Thornbill
Anas superciliosa	Pacific Black Duck
Anthochaera carunculata	Red Wattlebird
Aquila audax	Wedge-tailed Eagle
Artamus cyanopterus	Dusky Woodswallow
Cacatua tenuirostris	Long-billed Corella
Carduelis carduelis	European Goldfinch
Chrysococcyx basalis	Horsfield's Bronze-Cuckoo
Colluricincla harmonica	Grey Shrike-thrush
Coracina novaehollandiae	Black-faced Cuckoo-shrike
Cormobates leucophaea	White-throated Treecreeper
Corvus mellori	Little Raven
Dacelo novaeguineae	Laughing Kookaburra
Elseyornis melanops	Black-fronted Dotterel
Eolophus roseicapilla	Galah
Eopsaltria australis	Eastern Yellow Robin
Falco cenchroides	Nankeen Kestrel
Grallina cyanoleuca	Magpie-lark
Gymnorhina tibicen	Australian Magpie
Lichenostomus fuscus	Fuscous Honeyeater
Malurus cyaneus	Superb Fairy-wren
Melithreptus lunatus	White-naped Honeyeater
Myiagra inquieta	Restless Flycatcher
Ocyphaps lophotes	Crested Pigeon
Pachycephala rufiventris	Rufous Whistler
Pardalotus striatus	Striated Pardalote
Petrochelidon nigricans	Tree Martin
Platalea flavipes	Yellow-billed Spoonbill
Platycercus elegans	Crimson Rosella
Platycercus eximius	Eastern Rosella

Scientific Name	Common Name
Rhipidura albiscapa	Grey Fantail
Rhipidura leucophrys	Willie Wagtail
Strepera versicolor	Grey Currawong
Todiramphus sanctus	Sacred Kingfisher

Table C.3 Incidental records 23/11/2015

Scientific Name	Common Name
Haliastur sphenurus	Whistling Kite
Threskiornis moluccus	Australian White Ibis

Table C.4 Incidental records 26/11/2015

Scientific Name	Common Name
Dicaeum hirundinaceum	Mistletoebird

Table C.5 Records provided by property owner (Honk Johnston)

Scientific Name	Common Name
Anas superciliosa	Pacific Black Duck
Chenonetta jubata	Australian Wood Duck
Phalacrocorax sulcirostris	Little Black Cormorant,
Egretta novaehollandiae	White-faced Heron
Ardea pacifica	White-necked Heron
Platalea flavipes	Yellow-billed Spoonbill
Cacatua tenuirostris	Long-billed Corella
Neochmia temporalis	Red-browed Firetail
Stagonopleura guttata	Diamond Firetail
Todiramphus sanctus	Sacred Kingfisher
Podargus strigoides	Tawny Frogmouth
Falcunculus frontatus	Crested Shrike-tit
Strepera versicolor	Grey Currawong
Lichenostomus chrysops	Yellow-faced Honeyeater
Lichenostomus leucotis	White-eared Honeyeater
Melithreptus lunatus	White-naped Honeyeater

Scientific Name	Common Name
Grantiella picta	Painted Honeyeater
Acanthorhynchus tenuirostris	Eastern Spinebill

Appendix D

SITE PHOTOGRAPHS

ID	Site Photograph	Comments
Wet 4A		High quality wetland habitat. Brolga and Bibron’s Toadlet were observed at this wetland.
Golden Sun Moth 1		Approximately 20 male Golden Sun Moth were flying at this location
Golden Sun Moth 2		Approximately 30 male Golden Sun Moth were observed flying at extensive area of native grassland on Jill and Honk Johnston’s property
		Female Golden Sun Moth

ID	Site Photograph	Comments
		Male Golden Sun Moth
Trapping Site B1-B60		Example of the highly disturbed habitat on public land. All trapping sites, with the exception of the property on Johnston Road, lacked a variety of spatial layers of vegetation
Reptile 2		Funnel traps only caught 1 Garden Skink
Trapline 11- 20		Brush-tailed Phascogale

ID	Site Photograph	Comments
Spotlight 6B		Tawny Frogmouth

Appendix E

AQUATIC SURVEY SITE SUMMARY

Table E.1 Aquatic survey site summary

Site Name	Site Description	Wet/ Dry	Potential Hab. For taget Spp.?	Survey Y/N	Photos	Water Quality taken?	Sampling time	Temperature (oC)	ORP (mV)	pH	Dissolved Oxygen (%)	Electrical Conductivity (uS/cm)	Total Dissolved Salts ()	Salinity (ppt)	Turbidity (NTU)	Survey method/s deployed[1]	Fish recorded
B001	Farm dam on Hwy	Wet	Y	Y	N	N	-	-	-	-	-	-	-	-	-	D	-
B006	Farm dam (Honk's place)	Wet	Y	Y	Y	Y	16:10	9:36	89.5	8.45	135.2	233	150	0.07	508	D, B	Redfin perch gambusia
B007	Forest drain	Dry	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-
B007.2	Forest drain	Dry	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-
B007.3	Forest drain	Dry	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-
B008	Wetland area	Dry	N	N	Y	N	-	-	-	-	-	-	-	-	-	-	-
B009	Drain	Wet	N	N	Y	N	-	-	-	-	-	-	-	-	-	-	-
B010	Dam	Wet	N	N	Y	N	-	-	-	-	-	-	-	-	-	-	-
B011	Dam	Dry	N	N	Y	N	-	-	-	-	-	-	-	-	-	-	-
B012	Dam	Dry	N	N	Y	N	-	-	-	-	-	-	-	-	-	-	-
B013	Saline wetland	Wet		Y	Y	Y	11:20	22.3	73.3	7.57	105.6	7492	4872	4.11	529	D, B	Gambusia
B014	Drain	Wet		Y	Y	N	-	-	-	-	-	-	-	-	-	D	-
B015	Drain	Wet	N	N	Y	N	-	-	-	-	-	-	-	-	-	-	-
B016	Wetland area	Dry	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-
B017.1	Drainage line	Dry	N	N	Y	N	-	-	-	-	-	-	-	-	-	-	-
B017.2	Drainage line	Dry	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-
B017.3	Drainage line	Dry	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-

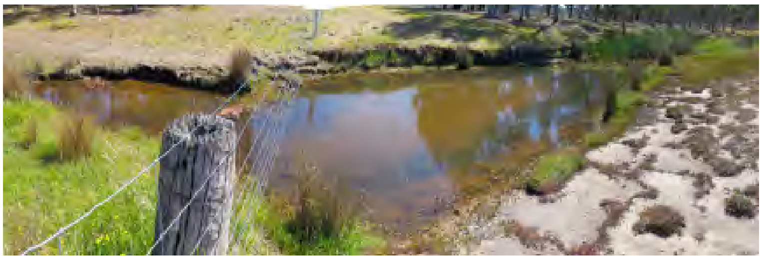
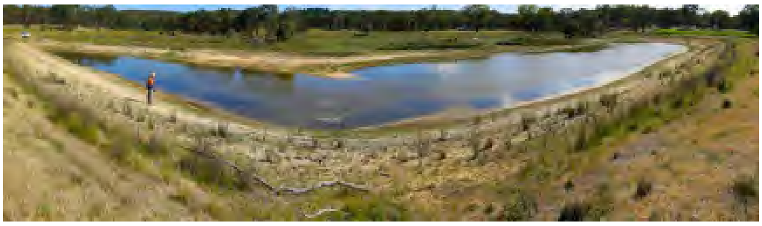
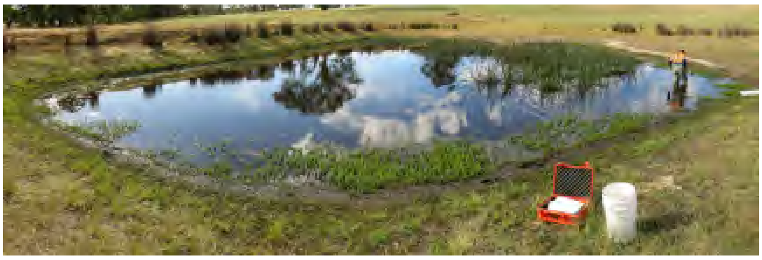
Site Name	Site Description	Wet/ Dry	Potential Hab. For taget Spp.?	Survey Y/N	Photos	Water Quality taken?	Sampling time	Temperature (oC)	ORP (mV)	pH	Dissolved Oxygen (%)	Electrical Conductivity (uS/cm)	Total Dissolved Salts ()	Salinity (ppt)	Turbidity (NTU)	Survey method/s deployed[1]	Fish recorded
B018	Large farm dam	Wet	Y	Y	Y	Y	9:45	20.1	60.1	8.88	123.2	3774	2456	1.98	520	D, F	Redfin perch, freshwater catfish
B019	Farm dam	Wet	Y	Y	Y	Y	9:00	19.2	134.4	6.55	111.7	303	196	0.1	456	D, B	-
B020*	Yam Hole Creek	Wet	Y	Y	Y	Y	15:30	26.7	-15.7	9.99	214.2	733	475	0.31	172	D	Gambusia
B021	Yam Hole Creek	Wet	Y	Y	Y	Y	14:00/9:00	14.9/ 25.8	107.7/ 95.0	7.00/ 7.39	94.8/ 116.8	380/ 663	241/ 430	0.12/ 0.27	287/ 277	D, B	Gambusia, southern pygmy perch
B022	Wetland	Wet	Y	Y	Y	Y	15:00	28.6	53.3	8.16	108.1	1147	745	0.54	454	D	-
B023.1	Yam Hole Creek	Wet	Y	Y	Y	Y	17:00	27.1	111.6	8.05	166.5	1323	860	0.63	442	D, B	Gambusia, southern pygmy perch
B023.2	Yam Hole Creek	Wet	Y	Y	Y	N										V	Gambusia
B024	Farm dam	Wet	Y	Y	Y	Y	12:00	25.8	106.1	7.82	158.4	6537	4249	3.57	376	D	-
B025	Drain crossing raod	Dry	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-
B026	Yam Hole Creek in town	Wet	Y	Y	Y	Y	12:30	29.2	89.2	9.03	252.8	75	48	0.02	263	D, B	Gambusia
B027.1	Creek under Fwy	Wet	Y	Y	Y	Y	14:20	29.4	100.5	7.36	95.9	75	48	0.02	263	D	-
B027.2	Twin Farm Dam	Wet	Y	Y	Y	Y	14:35	27.5	85.3	8.96	190.1	304	197	0.1	460	D	Redfin perch
B028	Wetland	Wet	Y	Y	Y	Y	13:00	20	86.6	8.16	144.1	1114	723	0.52	471	D, B	Gambusia
B029	Mt Emu Creek	Wet	Y	Y	Y	N	-	-	-	-	-	-	-	-	-	D	Redfin perch
B030	Mt Emu Creek	Wet	Y	Y	Y	N	-	-	-	-	-	-	-	-	-	D	Redfin perch
B031	Yam Hole Creek	Wet	Y	N	Y	N	-	-	-	-	-	-	-	-	-	-	-

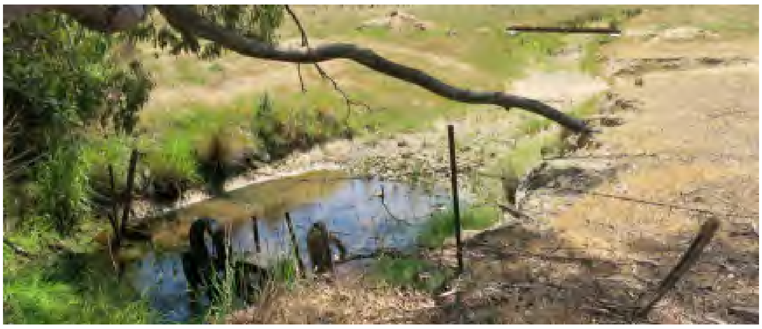
Site Name	Site Description	Wet/ Dry	Potential Hab. For taget Spp.?	Survey Y/N	Photos	Water Quality taken?	Sampling time	Temperature (oC)	ORP (mV)	pH	Dissolved Oxygen (%)	Electrical Conductivity (uS/cm)	Total Dissolved Salts ()	Salinity (ppt)	Turbidity (NTU)	Survey method/s deployed[1]	Fish recorded
B032	Drainage line under Road	Dry	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-
B033	Drainage line under Road	Dry	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-
B034	Drainage line under Road	Dry	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-
B035	Drainage line under Road	Dry	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-
B036	Drainage line under Road	Dry	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-
B037	Railway culvert	Dry	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-
B038	Railway culvert	Dry	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-
B039	Farm Dam	Wet	Y	N	N	N	-	-	-	-	-	-	-	-	-	-	-

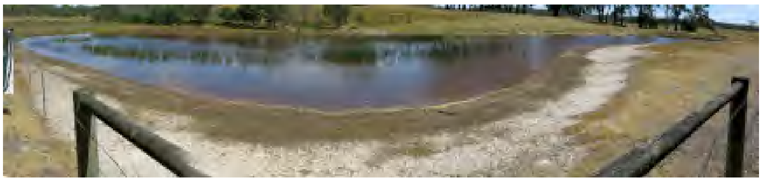
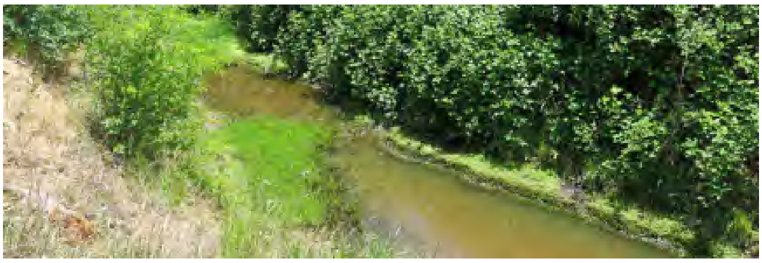
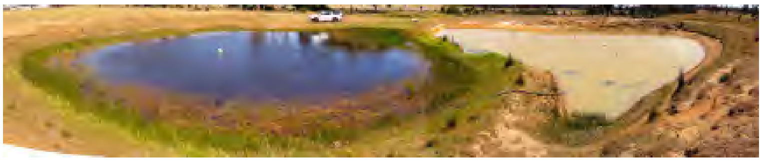
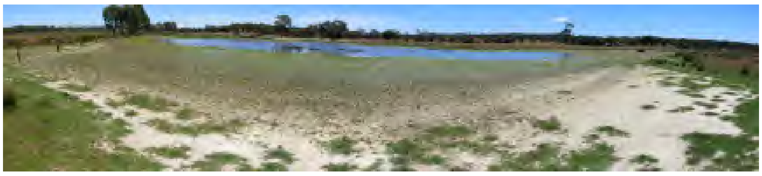
Key: 1) Survey methods: D = dip-net, B = bait trap, F = fyke net, V = visual

Appendix F

SURVEY SITE DESCRIPTIONS AND PHOTOS

Site name	Site description	Site photo
B001	Farm dam on southern side of the Western Highway. A wide range of aquatic and emergent vegetation. Obvious signs of yabbies and predatory bird activity (i.e. herons). Overflows into a drain that is likely a tributary of Yam Holes Creek.	No photo
B006	Small farm dam on private property. No stock access and connected to a dry tributary of Yam Holes Creek. Owner advised no flows in the tributary since the 2011 flood event.	No photo
B013	Saline pools associated with an area of revegetation neighbouring farmland. Wetland-like, this site is part of the Yam Holes Creek catchment and significantly elevated salinity levels at about 15% that of seawater. Downstream of this site, there were no observable surface flows indicating the water become subterranean.	
B014	Small pool in a drain that flows to sites B015, B024 and B013 and then Yam Holes Creek. High turbidity likely due to Western Highway roadwork occurring at the time of the survey.	
B018	Large farm dam on a private property. Some aquatic vegetation and lots of waterbird activity. Redfin perch and freshwater catfish were recorded at this site indicating they had been artificially stocked for recreational purposes.	
B019	Farm dam with a wide range of aquatic and emergent vegetation. Obvious signs of yabbies and predatory bird activity (i.e. herons). No direct connectivity to Yam Holes Creek.	

Site name	Site description	Site photo
B020	Yam Hole Creek at Adamsthwaite Track. A drying pool with dense filamentous algae. There is an existing record (circa 2011) of little galaxias at this site.	
B021	Yam Hole Creek at Racecourse Road. There were a number of pools along this reach, all with high turbidity due to stock access (sheep). Minimal emergent and aquatic vegetation. There is an existing record (circa 2011) of little galaxias at this site.	
B022	Large wetland to the north of the study area. Previous records of little galaxias in the vicinity (circa 2011). Likely associated with and connected to Yam Holes Creek during higher flow events	
B023.1	Yam Hole Creek at Albert Street west. Steep sided with some litter. Patchy but dense instream vegetation. No obvious slows at the time of the survey but large numbers of Mosquitofish observed.	

Site name	Site description	Site photo
B023.2	Yam Hole Creek at Albert Street east. Shallow weedy reach of the creek. No obvious slow at the time of the survey but large numbers of Mosquitofish observed.	
B024	Farm dam in the area of high salinity. Spare aquatic vegetation and heavy sheep access.	
B026	Yam Holes Creek in Beaufort near Beaufort-Lexton Road. No obvious flow at the time of the survey but large numbers of Mosquitofish observed.	
B027.1	A tributary of Yam Holes Creek that was pooled on the northern side of the freeway. Consisted a range of emergent and aquatic species indicating the site may stay wet for prolonged periods. No obvious flow.	
B027.2	Twin farm dams located on a grazing property with sheep access. One dam was clear with a wide range of aquatic and emergent vegetation. No obvious connectivity to nearby tributaries of Yam Holes Creek.	
B028	Large retracting wetland located within a grazing property and likely associated with and connected to Yam Holes Creek during higher flow events.	

Site name	Site description	Site photo
B029	Mount Emu Creek: Located well outside of the study area, this site was assessed as a comparison to Yam Holes Creek and as there were previous records of little galaxias in its vicinity.	
B030	Same as B029	

APPENDIX P

RISK ASSESSMENT

Project	Beaufort Bypass	Lead	WSP
Description	EES Environmental Risk Register	Last Updated	Oct-20

				Impact Pathway					Initial Risk				Residual Risk		
Risk No.	Alignment Option	Discipline	Project Phase	Project Activity / Aspect	Primary Environmental Impact	Secondary Environmental Impact (if applicable) (further details provided in column V)	Description of risk and impact	Standard Controls (i.e. VicRoads Contract Specification e.g. Section 177, Section 720, Section 750; EPA Environmental Guidelines for Major Construction Sites and other relevant industry standards) (please detail)	Consequence	Likelihood	Risk Rating	Additional Controls (recommended to further reduce risk)	Consequence	Likelihood	Risk Rating
BIO1a	A0	Biodiversity and Habitat	Initial	Planning	Statutory planning and environmental approval non-compliances		State offsets for clearing of vegetation and habitat are difficult to source, leading to project delays and expense.	No relevant standards.	Major	Possible	High	Source offsets early. Consider impacts and resulting offset requirements in route selection and detailed design.	Moderate	Possible	Medium
BIO1b	A1	Biodiversity and Habitat	Initial	Planning	Statutory planning and environmental approval non-compliances		State offsets for clearing of vegetation and habitat are difficult to source, leading to project delays and expense.	No relevant standards.	Major	Possible	High	Source offsets early. Consider impacts and resulting offset requirements in route selection and detailed design.	Moderate	Possible	Medium
BIO1c	C0	Biodiversity and Habitat	Initial	Planning	Statutory planning and environmental approval non-compliances		State offsets for clearing of vegetation and habitat are difficult to source, leading to project delays and expense.	No relevant standards.	Major	Possible	High	Source offsets early. Consider impacts and resulting offset requirements in route selection and detailed design.	Moderate	Possible	Medium
BIO1d	C2	Biodiversity and Habitat	Initial	Planning	Statutory planning and environmental approval non-compliances		State offsets for clearing of vegetation and habitat are difficult to source, leading to project delays and expense.	No relevant standards.	Moderate	Possible	Medium	Source offsets early. Consider impacts and resulting offset requirements in route selection and detailed design.	Minor	Possible	Low
BIO2a	A0	Biodiversity and Habitat	Initial	Planning	Statutory planning and environmental approval non-compliances		Commonwealth offsets are difficult to source, leading to project delays and expense.	No relevant standards.	Major	Likely	High	Source offsets early. Consider impacts and resulting offset requirements in route selection and detailed design. Further avoid and minimise to reduce offset requirements	Major	Unlikely	Medium
BIO2b	A1	Biodiversity and Habitat	Initial	Planning	Statutory planning and environmental approval non-compliances		Commonwealth offsets are difficult to source, leading to project delays and expense.	No relevant standards.	Major	Likely	High	Source offsets early. Consider impacts and resulting offset requirements in route selection and detailed design. Further avoid and minimise to reduce offset requirements	Moderate	Unlikely	Medium
BIO2c	C0	Biodiversity and Habitat	Initial	Planning	Statutory planning and environmental approval non-compliances		Commonwealth offsets are difficult to source, leading to project delays and expense.	No relevant standards.	Major	Likely	High	Source offsets early. Consider impacts and resulting offset requirements in route selection and detailed design. Further avoid and minimise to reduce offset requirements	Moderate	Unlikely	Medium
BIO2d	C2	Biodiversity and Habitat	Initial	Planning	Statutory planning and environmental approval non-compliances		Commonwealth offsets are difficult to source, leading to project delays and expense.	No relevant standards.	Major	Likely	High	Source offsets early. Consider impacts and resulting offset requirements in route selection and detailed design. Further avoid and minimise to reduce offset requirements	Major	Unlikely	Medium
BIO3a	A0	Biodiversity and Habitat	Development	Clearing	Impacts significant vegetation or ecological communities		Clearing impacts EPBC Act listed ecological communities (Seasonal herbaceous Wetlands and/or White Box Box-Yellow Box – Blakely's Red Gum Grassy Woodland)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Major	Possible	High	Detailed refinement of design / impact footprint to minimise impact on these communities. Incentives to contractors to further minimise vegetation and habitat loss.	Moderate	Possible	Medium
BIO3b	A1	Biodiversity and Habitat	Development	Clearing	Impacts significant vegetation or ecological communities		Clearing impacts EPBC Act listed ecological communities (Seasonal herbaceous Wetlands and/or White Box Box-Yellow Box – Blakely's Red Gum Grassy Woodland)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Moderate	Possible	Medium	Detailed refinement of design / impact footprint to minimise impact on these communities. Incentives to contractors to further minimise vegetation and habitat loss.	Moderate	Possible	Medium
BIO3c	C0	Biodiversity and Habitat	Development	Clearing	Impacts significant vegetation or ecological communities		Clearing impacts EPBC Act listed ecological communities (Seasonal herbaceous Wetlands and/or White Box Box-Yellow Box – Blakely's Red Gum Grassy Woodland)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Major	Possible	High	Detailed refinement of design / impact footprint to minimise impact on these communities. Incentives to contractors to further minimise vegetation and habitat loss.	Major	Possible	High
BIO3d	C2	Biodiversity and Habitat	Development	Clearing	Impacts significant vegetation or ecological communities		Clearing impacts EPBC Act listed ecological communities (Seasonal herbaceous Wetlands and/or White Box Box-Yellow Box – Blakely's Red Gum Grassy Woodland)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Minor	Possible	Low	Not required	Minor	Possible	Low

				Impact Pathway					Initial Risk				Residual Risk		
Risk No.	Alignment Option	Discipline	Project Phase	Project Activity / Aspect	Primary Environmental Impact	Secondary Environmental Impact (if applicable) (further details provided in column V)	Description of risk and impact	Standard Controls (i.e. VicRoads Contract Specification e.g. Section 177, Section 720, Section 750; EPA Environmental Guidelines for Major Construction Sites and other relevant industry standards) (please detail)	Consequence	Likelihood	Risk Rating	Additional Controls (recommended to further reduce risk)	Consequence	Likelihood	Risk Rating
BIO4a	A0	Biodiversity and Habitat	Development	Clearing	Impacts significant vegetation or ecological communities		Clearing impacts native vegetation. Loss of >20ha of an endangered EVC or total vegetation loss of over >30ha.	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201 and section 177. No go zones will be implemented for vegetation to be retained.	Catastrophic	Almost Certain	Extreme	Detailed refinement of design / impact footprint to minimise vegetation to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss. Seed collection and revegetation of project area with local native species.	Catastrophic	Almost Certain	Extreme
BIO4b	A1	Biodiversity and Habitat	Development	Clearing	Impacts significant vegetation or ecological communities		Clearing impacts native vegetation. Loss of >20ha of an endangered EVC or total vegetation loss of over >30ha.	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201 and section 177. No go zones will be implemented for vegetation to be retained.	Catastrophic	Almost Certain	Extreme	Detailed refinement of design / impact footprint to minimise vegetation to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss. Seed collection and revegetation of project area with local native species.	Catastrophic	Almost Certain	Extreme
BIO4c	C0	Biodiversity and Habitat	Development	Clearing	Impacts significant vegetation or ecological communities		Clearing impacts native vegetation. Loss of >20ha of an endangered EVC or total vegetation loss of over >30ha.	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201 and section 177. No go zones will be implemented for vegetation to be retained.	Catastrophic	Almost Certain	Extreme	Detailed refinement of design / impact footprint to minimise vegetation to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss. Seed collection and revegetation of project area with local native species.	Catastrophic	Almost Certain	Extreme
BIO4d	C2	Biodiversity and Habitat	Development	Clearing	Impacts significant vegetation or ecological communities		Clearing impacts native vegetation. Loss of >20ha of an endangered EVC or total vegetation loss of over >30ha.	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201 and section 177. No go zones will be implemented for vegetation to be retained.	Catastrophic	Almost Certain	Extreme	Detailed refinement of design / impact footprint to minimise vegetation to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss. Seed collection and revegetation of project area with local native species.	Catastrophic	Almost Certain	Extreme
BIO5a	A0	Biodiversity and Habitat	Development	Clearing	Impacts significant vegetation or ecological communities		Clearing impacts FFG Act listed community: Victorian Temperate Woodland Bird Community	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Catastrophic	Almost Certain	Extreme	Detailed refinement of design / impact footprint to minimise the extent of this community to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss. Revegetation of project area with local native species to re-establish habitat.	Major	Likely	High
BIO5b	A1	Biodiversity and Habitat	Development	Clearing	Impacts significant vegetation or ecological communities		Clearing impacts FFG Act listed community: Victorian Temperate Woodland Bird Community	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Catastrophic	Almost Certain	Extreme	Detailed refinement of design / impact footprint to minimise the extent of this community to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss. Revegetation of project area with local native species to re-establish habitat.	Major	Likely	High
BIO5c	C0	Biodiversity and Habitat	Development	Clearing	Impacts significant vegetation or ecological communities		Clearing impacts FFG Act listed community: Victorian Temperate Woodland Bird Community	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Catastrophic	Almost Certain	Extreme	Detailed refinement of design / impact footprint to minimise the extent of this community to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss. Revegetation of project area with local native species to re-establish habitat.	Major	Likely	High
BIO5d	C2	Biodiversity and Habitat	Development	Clearing	Impacts significant vegetation or ecological communities		Clearing impacts FFG Act listed community: Victorian Temperate Woodland Bird Community	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Catastrophic	Almost Certain	Extreme	Detailed refinement of design / impact footprint to minimise the extent of this community to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss. Revegetation of project area with local native species to re-establish habitat.	Catastrophic	Almost Certain	Extreme
BIO6a	A0	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing results in impacts upon EPBC Act listed migratory species	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Minor	Unlikely	Low	Not required	Minor	Unlikely	Low
BIO6b	A1	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing results in impacts upon EPBC Act listed migratory species	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Minor	Unlikely	Low	Not required	Minor	Unlikely	Low
BIO6c	C0	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing results in impacts upon EPBC Act listed migratory species	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Minor	Unlikely	Low	Not required	Minor	Unlikely	Low

				Impact Pathway					Initial Risk				Residual Risk		
Risk No.	Alignment Option	Discipline	Project Phase	Project Activity / Aspect	Primary Environmental Impact	Secondary Environmental Impact (if applicable) (further details provided in column V)	Description of risk and impact	Standard Controls (i.e. VicRoads Contract Specification e.g. Section 177, Section 720, Section 750; EPA Environmental Guidelines for Major Construction Sites and other relevant industry standards) (please detail)	Consequence	Likelihood	Risk Rating	Additional Controls (recommended to further reduce risk)	Consequence	Likelihood	Risk Rating
BIO6d	C2	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing results in impacts upon EPBC Act listed migratory species	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Minor	Unlikely	Low	Not required	Minor	Unlikely	Low
BIO7a	A0	Biodiversity and Habitat	Development	Clearing	Impacts fauna habitat values		Clearing results in loss of over 300 large remnant trees. These may be valuable fauna habitat and cannot be replaced.	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Catastrophic	Almost Certain	Extreme	Detailed refinement of design / impact footprint to minimise large remnant trees to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss.	Catastrophic	Almost Certain	Extreme
BIO7b	A1	Biodiversity and Habitat	Development	Clearing	Impacts fauna habitat values		Clearing results in loss of over 300 large remnant trees. These may be valuable fauna habitat and cannot be replaced.	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Catastrophic	Almost Certain	Extreme	Detailed refinement of design / impact footprint to minimise large remnant trees to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss.	Catastrophic	Almost Certain	Extreme
BIO7c	C0	Biodiversity and Habitat	Development	Clearing	Impacts fauna habitat values		Clearing results in loss of over 300 large remnant trees. These may be valuable fauna habitat and cannot be replaced.	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Catastrophic	Almost Certain	Extreme	Detailed refinement of design / impact footprint to minimise large remnant trees to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss.	Catastrophic	Almost Certain	Extreme
BIO7d	C2	Biodiversity and Habitat	Development	Clearing	Impacts fauna habitat values		Clearing results in loss of over 300 large remnant trees. These may be valuable fauna habitat and cannot be replaced.	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Catastrophic	Almost Certain	Extreme	Detailed refinement of design / impact footprint to minimise large remnant trees to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss.	Catastrophic	Almost Certain	Extreme
BIO8a	A0	Biodiversity and Habitat	Development	Clearing	Impacts significant flora species		Clearing impacts River Swamp Wallaby Grass (EPBC Act vulnerable).	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Minor	Likely	Medium	Detailed design to minimise impact on habitat for this species. Relocation of plants occurring within construction footprint.	Minor	Possible	Low
BIO8b	A1	Biodiversity and Habitat	Development	Clearing	Impacts significant flora species		Clearing impacts River Swamp Wallaby Grass (EPBC Act vulnerable).	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Minor	Likely	Medium	Detailed design to minimise impact on habitat for this species. Relocation of plants occurring within construction footprint.	Minor	Possible	Low
BIO8c	C0	Biodiversity and Habitat	Development	Clearing	Impacts significant flora species		Clearing impacts River Swamp Wallaby Grass (EPBC Act vulnerable).	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Moderate	Likely	High	Detailed design to minimise impact on habitat for this species. Relocation of plants occurring within construction footprint.	Moderate	Possible	Medium
BIO8d	C2	Biodiversity and Habitat	Development	Clearing	Impacts significant flora species		Clearing impacts River Swamp Wallaby Grass (EPBC Act vulnerable).	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Minor	Likely	Medium	Detailed design to minimise impact on habitat for this species. Relocation of plants occurring within construction footprint.	Minor	Possible	Low
BIO9a	A0	Biodiversity and Habitat	Development	Clearing	Impacts significant flora species		Clearing impacts Matted Flax-lily (EPBC Act endangered, FFG Act listed, Vic advisory list endangered).	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Moderate	Possible	Medium	Detailed design to minimise impact on habitat for this species. Relocation of plants occurring within construction footprint.	Moderate	Unlikely	Medium

				Impact Pathway					Initial Risk				Residual Risk		
Risk No.	Alignment Option	Discipline	Project Phase	Project Activity / Aspect	Primary Environmental Impact	Secondary Environmental Impact (if applicable) (further details provided in column V)	Description of risk and impact	Standard Controls (i.e. VicRoads Contract Specification e.g. Section 177, Section 720, Section 750; EPA Environmental Guidelines for Major Construction Sites and other relevant industry standards) (please detail)	Consequence	Likelihood	Risk Rating	Additional Controls (recommended to further reduce risk)	Consequence	Likelihood	Risk Rating
BIO9b	A1	Biodiversity and Habitat	Development	Clearing	Impacts significant flora species		Clearing impacts Matted Flax-lily (EPBC Act endangered, FFG Act listed, Vic advisory list endangered).	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Moderate	Possible	Medium	Detailed design to minimise impact on habitat for this species. Relocation of plants occurring within construction footprint.	Moderate	Unlikely	Medium
BIO9c	C0	Biodiversity and Habitat	Development	Clearing	Impacts significant flora species		Clearing impacts Matted Flax-lily (EPBC Act endangered, FFG Act listed, Vic advisory list endangered).	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Moderate	Possible	Medium	Detailed design to minimise impact on habitat for this species. Relocation of plants occurring within construction footprint.	Moderate	Unlikely	Medium
BIO9d	C2	Biodiversity and Habitat	Development	Clearing	Impacts significant flora species		Clearing impacts Matted Flax-lily (EPBC Act endangered, FFG Act listed, Vic advisory list endangered).	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Moderate	Possible	Medium	Detailed design to minimise impact on habitat for this species. Relocation of plants occurring within construction footprint.	Moderate	Unlikely	Medium
BIO10a	A0	Biodiversity and Habitat	Development	Clearing	Impacts significant flora species		Clearing impacts Ornate Pink Fingers (EPBC Act vulnerable, FFG Act listed, Vic Advisory List vulnerable)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Moderate	Likely	High	Detailed design to minimise impact on habitat for this species. Relocation of plants occurring within construction footprint.	Moderate	Possible	Medium
BIO10b	A1	Biodiversity and Habitat	Development	Clearing	Impacts significant flora species		Clearing impacts Ornate Pink Fingers (EPBC Act vulnerable, FFG Act listed, Vic Advisory List vulnerable)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Moderate	Likely	High	Detailed design to minimise impact on habitat for this species. Relocation of plants occurring within construction footprint.	Moderate	Possible	Medium
BIO10c	C0	Biodiversity and Habitat	Development	Clearing	Impacts significant flora species		Clearing impacts Ornate Pink Fingers (EPBC Act vulnerable, FFG Act listed, Vic Advisory List vulnerable)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Minor	Unlikely	Low	Detailed design to minimise impact on habitat for this species. Relocation of plants occurring within construction footprint.	Minor	Unlikely	Low
BIO10d	C2	Biodiversity and Habitat	Development	Clearing	Impacts significant flora species		Clearing impacts Ornate Pink Fingers (EPBC Act vulnerable, FFG Act listed, Vic Advisory List vulnerable)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Minor	Unlikely	Low	Detailed design to minimise impact on habitat for this species. Relocation of plants occurring within construction footprint.	Minor	Unlikely	Low
BIO11a	A0	Biodiversity and Habitat	Development	Clearing	Impacts significant flora species		Clearing impacts Yarra Gum (Vic Advisory List rare)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Minor	Likely	Medium	Detailed design to minimise impact on habitat for this species. Seed collection and replanting.	Minor	Possible	Low
BIO11b	A1	Biodiversity and Habitat	Development	Clearing	Impacts significant flora species		Clearing impacts Yarra Gum (Vic Advisory List rare)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Minor	Likely	Medium	Detailed design to minimise impact on habitat for this species. Seed collection and replanting.	Minor	Possible	Low
BIO11c	C0	Biodiversity and Habitat	Development	Clearing	Impacts significant flora species		Clearing impacts Yarra Gum (Vic Advisory List rare)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Minor	Likely	Medium	Detailed design to minimise impact on habitat for this species. Seed collection and replanting.	Minor	Possible	Low
BIO11d	C2	Biodiversity and Habitat	Development	Clearing	Impacts significant flora species		Clearing impacts Yarra Gum (Vic Advisory List rare)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Minor	Likely	Medium	Detailed design to minimise impact on habitat for this species. Seed collection and replanting.	Minor	Possible	Low
BIO12a	A0	Biodiversity and Habitat	Development	Clearing	Impacts significant flora species		Clearing impacts other significant flora species. (Emerald-lip Greenhood, Floodplain Fireweed, Ben Major Grevillea, Pale-flower Cranesbill, Rosemary Grevillea, Rough Wattle) . Alignment avoid known records.	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Minor	Possible	Low	Current alignment avoids known records and populations of these species. Further design refinement to minimise vegetation impacts will assist in minimising impacts to any other potential or modelled habitat. Pre-clearing survey and relocation of any threatened flora found.	Minor	Unlikely	Low
BIO12b	A1	Biodiversity and Habitat	Development	Clearing	Impacts significant flora species		Clearing impacts other significant flora species. (Emerald-lip Greenhood, Floodplain Fireweed, Ben Major Grevillea, Pale-flower Cranesbill, Rosemary Grevillea, Rough Wattle) . Alignment avoid known records.	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Minor	Possible	Low	Current alignment avoids known records and populations of these species. Further design refinement to minimise vegetation impacts will assist in minimising impacts to any other potential or modelled habitat. Pre-clearing survey and relocation of any threatened flora found.	Minor	Unlikely	Low

				Impact Pathway					Initial Risk				Residual Risk		
Risk No.	Alignment Option	Discipline	Project Phase	Project Activity / Aspect	Primary Environmental Impact	Secondary Environmental Impact (if applicable) (further details provided in column V)	Description of risk and impact	Standard Controls (i.e. VicRoads Contract Specification e.g. Section 177, Section 720, Section 750; EPA Environmental Guidelines for Major Construction Sites and other relevant industry standards) (please detail)	Consequence	Likelihood	Risk Rating	Additional Controls (recommended to further reduce risk)	Consequence	Likelihood	Risk Rating
BIO12c	C0	Biodiversity and Habitat	Development	Clearing	Impacts significant flora species		Clearing impacts other significant flora species. (Emerald-lip Greenhood, Floodplain Fireweed, Ben Major Grevillea, Pale-flower Cranesbill, Rosemary Grevillea, Rough Wattle) . Alignment avoid known records.	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Minor	Possible	Low	Current alignment avoids known records and populations of these species. Further design refinement to minimise vegetation impacts will assist in minimising impacts to any other potential or modelled habitat. Pre-clearing survey and relocation of any threatened flora found.	Minor	Unlikely	Low
BIO12d	C2	Biodiversity and Habitat	Development	Clearing	Impacts significant flora species		Clearing impacts other significant flora species. (Emerald-lip Greenhood, Floodplain Fireweed, Ben Major Grevillea, Pale-flower Cranesbill, Rosemary Grevillea, Rough Wattle) . Alignment avoid known records.	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Minor	Possible	Low	Current alignment avoids known records and populations of these species. Further design refinement to minimise vegetation impacts will assist in minimising impacts to any other potential or modelled habitat. Pre-clearing survey and relocation of any threatened flora found.	Minor	Unlikely	Low
BIO13a	A0	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing impacts Golden Sun Moth (EPBC Act critically endangered, FFG Act listed, Vic advisory list critically endangered).	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation and habitat to be retained.	Moderate	Likely	High	Detailed design to minimise impact on habitat for this species. Incentives to contractors to further minimise vegetation and habitat loss.	Moderate	Likely	High
BIO13b	A1	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing impacts Golden Sun Moth (EPBC Act critically endangered, FFG Act listed, Vic advisory list critically endangered).	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation and habitat to be retained.	Moderate	Likely	High	Detailed design to minimise impact on habitat for this species. Incentives to contractors to further minimise vegetation and habitat loss.	Moderate	Likely	High
BIO13c	C0	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing impacts Golden Sun Moth (EPBC Act critically endangered, FFG Act listed, Vic advisory list critically endangered).	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation and habitat to be retained.	Moderate	Likely	High	Detailed design to minimise impact on habitat for this species. Incentives to contractors to further minimise vegetation and habitat loss.	Moderate	Likely	High
BIO13d	C2	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing impacts Golden Sun Moth (EPBC Act critically endangered, FFG Act listed, Vic advisory list critically endangered).	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation and habitat to be retained.	Moderate	Likely	High	Detailed design to minimise impact on habitat for this species. Incentives to contractors to further minimise vegetation and habitat loss.	Moderate	Likely	High
BIO14a	A0	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing impacts Growling Grass Frog through direct loss of habitat (EPBC Act Vulnerable, FFG Act listed, Vic Advisory List endangered)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation and habitat to be retained.	Moderate	Possible	Medium	Detailed refinement of design / impact footprint to minimise vegetation to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss.	Moderate	Possible	Medium
BIO14b	A1	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing impacts Growling Grass Frog through direct loss of habitat (EPBC Act Vulnerable, FFG Act listed, Vic Advisory List endangered)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation and habitat to be retained.	Moderate	Possible	Medium	Detailed refinement of design / impact footprint to minimise vegetation to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss.	Moderate	Possible	Medium
BIO14c	C0	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing impacts Growling Grass Frog through direct loss of habitat (EPBC Act Vulnerable, FFG Act listed, Vic Advisory List endangered)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation and habitat to be retained.	Major	Possible	High	Detailed refinement of design / impact footprint to minimise vegetation to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss.	Major	Possible	High
BIO14d	C2	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing impacts Growling Grass Frog through direct loss of habitat (EPBC Act Vulnerable, FFG Act listed, Vic Advisory List endangered)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation and habitat to be retained.	Moderate	Possible	Medium	Detailed refinement of design / impact footprint to minimise vegetation to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss.	Moderate	Possible	Medium
BIO15a	A0	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing impacts Little Galaxias through direct loss of habitat or impediment to passage	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation and habitat to be retained.	Moderate	Possible	Medium	Maintenance of connectivity and minimisation of impacts at creek crossings. Specific culvert design to facilitate fish passage as per FFIA. Stringent erosion and sedimentation controls in CEMP. Monitoring, with penalties for contractors for impacts to creeks.	Minor	Possible	Low

				Impact Pathway					Initial Risk				Residual Risk		
Risk No.	Alignment Option	Discipline	Project Phase	Project Activity / Aspect	Primary Environmental Impact	Secondary Environmental Impact (if applicable) (further details provided in column V)	Description of risk and impact	Standard Controls (i.e. VicRoads Contract Specification e.g. Section 177, Section 720, Section 750; EPA Environmental Guidelines for Major Construction Sites and other relevant industry standards) (please detail)	Consequence	Likelihood	Risk Rating	Additional Controls (recommended to further reduce risk)	Consequence	Likelihood	Risk Rating
BIO15b	A1	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing impacts Little Galaxias through direct loss of habitat or impediment to passage	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation and habitat to be retained.	Moderate	Possible	Medium	Maintenance of connectivity and minimisation of impacts at creek crossings. Specific culvert design to facilitate fish passage as per FFIA. Stringent erosion and sedimentation controls in CEMP. Monitoring, with penalties for contractors for impacts to creeks.	Minor	Possible	Low
BIO15c	C0	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing impacts Little Galaxias through direct loss of habitat or impediment to passage	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation and habitat to be retained.	Moderate	Possible	Medium	Maintenance of connectivity and minimisation of impacts at creek crossings. Specific culvert design to facilitate fish passage as per FFIA. Stringent erosion and sedimentation controls in CEMP. Monitoring, with penalties for contractors for impacts to creeks.	Minor	Possible	Low
BIO15d	C2	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing impacts Little Galaxias through direct loss of habitat or impediment to passage	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation and habitat to be retained.	Moderate	Possible	Medium	Maintenance of connectivity and minimisation of impacts at creek crossings. Specific culvert design to facilitate fish passage as per FFIA. Stringent erosion and sedimentation controls in CEMP. Monitoring, with penalties for contractors for impacts to creeks.	Minor	Possible	Low
BIO16a	A0	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing impacts other significant fauna species through direct loss of habitat (Woodland birds and arboreal mammals)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Moderate	Likely	High	Detailed refinement of design / impact footprint to minimise vegetation to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss.	Moderate	Possible	Medium
BIO16b	A1	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing impacts other significant fauna species through direct loss of habitat (Woodland birds and arboreal mammals)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Moderate	Likely	High	Detailed refinement of design / impact footprint to minimise vegetation to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss.	Moderate	Possible	Medium
BIO16c	C0	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing impacts other significant fauna species through direct loss of habitat (Woodland birds and arboreal mammals)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Moderate	Likely	High	Detailed refinement of design / impact footprint to minimise vegetation to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss.	Moderate	Possible	Medium
BIO16d	C2	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing impacts other significant fauna species through direct loss of habitat (Woodland birds and arboreal mammals)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation and habitat to be retained.	Moderate	Likely	High	Detailed refinement of design / impact footprint to minimise vegetation to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss.	Moderate	Possible	Medium
BIO17a	A0	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing impacts other significant fauna species through direct loss of habitat (Wetland birds and other wetland fauna)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Moderate	Possible	Medium	Detailed refinement of design / impact footprint to minimise vegetation to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss.	Minor	Possible	Low
BIO17b	A1	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing impacts other significant fauna species through direct loss of habitat (Wetland birds and other wetland fauna)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Moderate	Possible	Medium	Detailed refinement of design / impact footprint to minimise vegetation to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss.	Minor	Possible	Low
BIO17c	C0	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing impacts other significant fauna species through direct loss of habitat (Wetland birds and other wetland fauna)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation to be retained.	Major	Possible	High	Detailed refinement of design / impact footprint to minimise vegetation to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss.	Moderate	Possible	Medium
BIO17d	C2	Biodiversity and Habitat	Development	Clearing	Impacts significant fauna species		Clearing impacts other significant fauna species through direct loss of habitat (Wetland birds and other wetland fauna)	Clearing to be undertaken in accordance with Vic Roads Contract Specification Section 201. No go zones will be implemented for vegetation and habitat to be retained.	Moderate	Possible	Medium	Detailed refinement of design / impact footprint to minimise vegetation to be removed and develop no-go zones. Incentives to contractors to further minimise vegetation and habitat loss.	Minor	Possible	Low
BIO18a	A0	Biodiversity and Habitat	Development	Clearing	Impacts fauna habitat values		Clearing fragments fauna habitat. As well as potentially impacting threatened species, this can impact numerous common species and will result in a negative public perception.	No standard controls	Major	Almost Certain	Extreme	Utilise wildlife crossings in strategic locations to maintain connectivity for various fauna groups.	Major	Possible	High
BIO18b	A1	Biodiversity and Habitat	Development	Clearing	Impacts fauna habitat values		Clearing fragments fauna habitat. As well as potentially impacting threatened species, this can impact numerous common species and will result in a negative public perception.	No standard controls	Major	Almost Certain	Extreme	Utilise wildlife crossings in strategic locations to maintain connectivity for various fauna groups.	Major	Possible	High
BIO18c	C0	Biodiversity and Habitat	Development	Clearing	Impacts fauna habitat values		Clearing fragments fauna habitat. As well as potentially impacting threatened species, this can impact numerous common species and will result in a negative public perception.	No standard controls	Major	Almost Certain	Extreme	Utilise wildlife crossings in strategic locations to maintain connectivity for various fauna groups.	Major	Possible	High

				Impact Pathway					Initial Risk				Residual Risk		
Risk No.	Alignment Option	Discipline	Project Phase	Project Activity / Aspect	Primary Environmental Impact	Secondary Environmental Impact (if applicable) (further details provided in column V)	Description of risk and impact	Standard Controls (i.e. VicRoads Contract Specification e.g. Section 177, Section 720, Section 750; EPA Environmental Guidelines for Major Construction Sites and other relevant industry standards) (please detail)	Consequence	Likelihood	Risk Rating	Additional Controls (recommended to further reduce risk)	Consequence	Likelihood	Risk Rating
BIO18d	C2	Biodiversity and Habitat	Development	Clearing	Impacts fauna habitat values		Clearing fragments fauna habitat. As well as potentially impacting threatened species, this can impact numerous common species and will result in a negative public perception.	No standard controls	Major	Almost Certain	Extreme	Utilise wildlife crossings in strategic locations to maintain connectivity for various fauna groups.	Major	Possible	High
BIO19a	A0	Biodiversity and Habitat	Development	Clearing	Impacts fauna habitat values		Clearing results in fauna mortality (e.g. during clearing of hollow-bearing trees etc.)	Works to be conducted in accordance with Vic Roads Contract Specification Section 201 in relation to site clearing and in accordance with Vic Roads Contract Specification Section 177.1 in relation to fauna.	Moderate	Possible	Medium	Utilise two stage clearing with specific protocols to be detailed in FFIA. Provide replacement hollows in nearby/retained native vegetation to be retained for use by any displaced fauna. Pre-clearing survey and fauna relocation.	Minor	Possible	Low
BIO19b	A1	Biodiversity and Habitat	Development	Clearing	Impacts fauna habitat values		Clearing results in fauna mortality (e.g. during clearing of hollow-bearing trees etc.)	Works to be conducted in accordance with Vic Roads Contract Specification Section 201 in relation to site clearing and in accordance with Vic Roads Contract Specification Section 177.1 in relation to fauna.	Moderate	Possible	Medium	Utilise two stage clearing with specific protocols to be detailed in FFIA. Provide replacement hollows in nearby/retained native vegetation to be retained for use by any displaced fauna. Pre-clearing survey and fauna relocation.	Minor	Possible	Low
BIO19c	C0	Biodiversity and Habitat	Development	Clearing	Impacts fauna habitat values		Clearing results in fauna mortality (e.g. during clearing of hollow-bearing trees etc.)	Works to be conducted in accordance with Vic Roads Contract Specification Section 201 in relation to site clearing and in accordance with Vic Roads Contract Specification Section 177.1 in relation to fauna.	Moderate	Possible	Medium	Utilise two stage clearing with specific protocols to be detailed in FFIA. Provide replacement hollows in nearby/retained native vegetation to be retained for use by any displaced fauna. Pre-clearing survey and fauna relocation.	Minor	Possible	Low
BIO19d	C2	Biodiversity and Habitat	Development	Clearing	Impacts fauna habitat values		Clearing results in fauna mortality (e.g. during clearing of hollow-bearing trees etc.)	Works to be conducted in accordance with Vic Roads Contract Specification Section 201 in relation to site clearing and in accordance with Vic Roads Contract Specification Section 177.1 in relation to fauna.	Moderate	Possible	Medium	Utilise two stage clearing with specific protocols to be detailed in FFIA. Provide replacement hollows in nearby/retained native vegetation to be retained for use by any displaced fauna. Pre-clearing survey and fauna relocation.	Minor	Possible	Low
BIO20a	A0	Biodiversity and Habitat	Development	Clearing	Impacts fauna habitat values		Clearance of vegetation results in decrease in non-listed native fauna due to habitat loss	Works to be conducted in accordance with Vic Roads Contract Specification Section 201 in relation to site clearing and in accordance with Vic Roads Contract Specification Section 177.1 in relation to fauna.	Minor	Likely	Medium	Restoration, including facilitating natural recruitment and revegetation/replanting of native vegetation in the project area, including midstorey vegetation, to supplement fauna habitat in the locality, particularly for e.g. small birds. Ensure high structural diversity in revegetation areas. Seed collection from key species of multiple strata for use in revegetation should sufficient local provenance plants not be available. Utilise timber in revegetation areas to supplement fauna habitat	Minor	Possible	Low
BIO20b	A1	Biodiversity and Habitat	Development	Clearing	Impacts fauna habitat values		Clearance of vegetation results in decrease in non-listed native fauna due to habitat loss	Works to be conducted in accordance with Vic Roads Contract Specification Section 201 in relation to site clearing and in accordance with Vic Roads Contract Specification Section 177.1 in relation to fauna.	Minor	Likely	Medium	Restoration, including facilitating natural recruitment and revegetation/replanting of native vegetation in the project area, including midstorey vegetation, to supplement fauna habitat in the locality, particularly for e.g. small birds. Ensure high structural diversity in revegetation areas. Seed collection from key species of multiple strata for use in revegetation should sufficient local provenance plants not be available. Utilise timber in revegetation areas to supplement fauna habitat	Minor	Possible	Low
BIO20c	C0	Biodiversity and Habitat	Development	Clearing	Impacts fauna habitat values		Clearance of vegetation results in decrease in non-listed native fauna due to habitat loss	Works to be conducted in accordance with Vic Roads Contract Specification Section 201 in relation to site clearing and in accordance with Vic Roads Contract Specification Section 177.1 in relation to fauna.	Minor	Likely	Medium	Restoration, including facilitating natural recruitment and revegetation/replanting of native vegetation in the project area, including midstorey vegetation, to supplement fauna habitat in the locality, particularly for e.g. small birds. Ensure high structural diversity in revegetation areas. Seed collection from key species of multiple strata for use in revegetation should sufficient local provenance plants not be available. Utilise timber in revegetation areas to supplement fauna habitat	Minor	Possible	Low

				Impact Pathway					Initial Risk				Residual Risk		
Risk No.	Alignment Option	Discipline	Project Phase	Project Activity / Aspect	Primary Environmental Impact	Secondary Environmental Impact (if applicable) (further details provided in column V)	Description of risk and impact	Standard Controls (i.e. VicRoads Contract Specification e.g. Section 177, Section 720, Section 750; EPA Environmental Guidelines for Major Construction Sites and other relevant industry standards) (please detail)	Consequence	Likelihood	Risk Rating	Additional Controls (recommended to further reduce risk)	Consequence	Likelihood	Risk Rating
BIO20d	C2	Biodiversity and Habitat	Development	Clearing	Impacts fauna habitat values		Clearance of vegetation results in decrease in non-listed native fauna due to habitat loss	Works to be conducted in accordance with Vic Roads Contract Specification Section 201 in relation to site clearing and in accordance with Vic Roads Contract Specification Section 177.1 in relation to fauna.	Minor	Likely	Medium	Restoration, including facilitating natural recruitment and revegetation/replanting of native vegetation in the project area, including midstorey vegetation, to supplement fauna habitat in the locality, particularly for e.g. small birds. Ensure high structural diversity in revegetation areas. Seed collection from key species of multiple strata for use in revegetation should sufficient local provenance plants not be available. Utilise timber in revegetation areas to supplement fauna habitat	Minor	Possible	Low
BIO21a	A0	Biodiversity and Habitat	Development	Clearing	Unauthorised clearing		Clearing or other impacts (e.g. through stockpiling, tracks etc.) occurs beyond approved clearance area and results in impacts upon biodiversity or habitat values which were not authorised to be impacted.	No go zones around vegetation outside of construction footprint. CEMP including toolbox talks and other requirements to ensure significant values are understood and protected. Pre-clearing survey undertaken. Additional checking is undertaken to ensure that all significant values are recorded.	Moderate	Possible	Medium	Penalties for contractors that impact No-go Zones or any vegetation/habitat outside of the project area. Regular monitoring and enforcement.	Minor	Possible	Low
BIO21b	A1	Biodiversity and Habitat	Development	Clearing	Unauthorised clearing		Clearing or other impacts (e.g. through stockpiling, tracks etc.) occurs beyond approved clearance area and results in impacts upon biodiversity or habitat values which were not authorised to be impacted.	No go zones around vegetation outside of construction footprint. CEMP including toolbox talks and other requirements to ensure significant values are understood and protected. Pre-clearing survey undertaken. Additional checking is undertaken to ensure that all significant values are recorded.	Moderate	Possible	Medium	Penalties for contractors that impact No-go Zones or any vegetation/habitat outside of the project area. Regular monitoring and enforcement.	Minor	Possible	Low
BIO21c	C0	Biodiversity and Habitat	Development	Clearing	Unauthorised clearing		Clearing or other impacts (e.g. through stockpiling, tracks etc.) occurs beyond approved clearance area and results in impacts upon biodiversity or habitat values which were not authorised to be impacted.	No go zones around vegetation outside of construction footprint. CEMP including toolbox talks and other requirements to ensure significant values are understood and protected. Pre-clearing survey undertaken. Additional checking is undertaken to ensure that all significant values are recorded.	Moderate	Possible	Medium	Penalties for contractors that impact No-go Zones or any vegetation/habitat outside of the project area. Regular monitoring and enforcement.	Minor	Possible	Low
BIO21d	C2	Biodiversity and Habitat	Development	Clearing	Unauthorised clearing		Clearing or other impacts (e.g. through stockpiling, tracks etc.) occurs beyond approved clearance area and results in impacts upon biodiversity or habitat values which were not authorised to be impacted.	No go zones around vegetation outside of construction footprint. CEMP including toolbox talks and other requirements to ensure significant values are understood and protected. Pre-clearing survey undertaken. Additional checking is undertaken to ensure that all significant values are recorded.	Moderate	Possible	Medium	Penalties for contractors that impact No-go Zones or any vegetation/habitat outside of the project area. Regular monitoring and enforcement.	Minor	Possible	Low
BIO22a	A0	Biodiversity and Habitat	Development	Earthworks	Impacts fauna habitat values		Damage to vegetation and habitat due to airborne dust from earthworks	In accordance with Vic Roads Contract Specification Section 177.1 in relation to flora. Compliance with CEMP.	Minor	Possible	Low	Not required	Minor	Possible	Low
BIO22b	A1	Biodiversity and Habitat	Development	Earthworks	Impacts fauna habitat values		Damage to vegetation and habitat due to airborne dust from earthworks	In accordance with Vic Roads Contract Specification Section 177.1 in relation to flora. Compliance with CEMP.	Minor	Possible	Low	Not required	Minor	Possible	Low
BIO22c	C0	Biodiversity and Habitat	Development	Earthworks	Impacts fauna habitat values		Damage to vegetation and habitat due to airborne dust from earthworks	In accordance with Vic Roads Contract Specification Section 177.1 in relation to flora. Compliance with CEMP.	Minor	Possible	Low	Not required	Minor	Possible	Low
BIO22d	C2	Biodiversity and Habitat	Development	Earthworks	Impacts fauna habitat values		Damage to vegetation and habitat due to airborne dust from earthworks	In accordance with Vic Roads Contract Specification Section 177.1 in relation to flora. Compliance with CEMP.	Minor	Possible	Low	Not required	Minor	Possible	Low

				Impact Pathway					Initial Risk				Residual Risk		
Risk No.	Alignment Option	Discipline	Project Phase	Project Activity / Aspect	Primary Environmental Impact	Secondary Environmental Impact (if applicable) (further details provided in column V)	Description of risk and impact	Standard Controls (i.e. VicRoads Contract Specification e.g. Section 177, Section 720, Section 750; EPA Environmental Guidelines for Major Construction Sites and other relevant industry standards) (please detail)	Consequence	Likelihood	Risk Rating	Additional Controls (recommended to further reduce risk)	Consequence	Likelihood	Risk Rating
BIO23a	A0	Biodiversity and Habitat	Development	Earthworks	Impacts fauna habitat values		Works impact downstream aquatic habitat	In accordance with Vic Roads Contract Specification Section 201 in relation to site clearing Implementation of VicRoads Specification (Section 177 Part B -Water Quality and Section 177D (sediment and erosion control)). Implementation of other guidelines including: - EPA Publication No. 275. Construction Techniques for Sediment Pollution Control (1991) - EPA Publication No. 480. Environmental Guidelines for Major Construction Sites (1996). Works to be carried out in consultation with Glenelg Hopkins CMA and Pyrenees Shire Council. The CMA to approve the CEMP prior to construction works commencing on site.	Moderate	Possible	Medium	Monitoring by RRV, with penalties for contractors for impacts to creeks and No-go Zones	Minor	Possible	Low
BIO23b	A1	Biodiversity and Habitat	Development	Earthworks	Impacts fauna habitat values		Works impact downstream aquatic habitat	In accordance with Vic Roads Contract Specification Section 201 in relation to site clearing Implementation of VicRoads Specification (Section 177 Part B -Water Quality and Section 177D (sediment and erosion control)). Implementation of other guidelines including: - EPA Publication No. 275. Construction Techniques for Sediment Pollution Control (1991) - EPA Publication No. 480. Environmental Guidelines for Major Construction Sites (1996). Works to be carried out in consultation with Glenelg Hopkins CMA and Pyrenees Shire Council. The CMA to approve the CEMP prior to construction works commencing on site.	Moderate	Possible	Medium	Monitoring by RRV, with penalties for contractors for impacts to creeks and No-go Zones	Minor	Possible	Low
BIO23c	C0	Biodiversity and Habitat	Development	Earthworks	Impacts fauna habitat values		Works impact downstream aquatic habitat	In accordance with Vic Roads Contract Specification Section 201 in relation to site clearing Implementation of VicRoads Specification (Section 177 Part B -Water Quality and Section 177D (sediment and erosion control)). Implementation of other guidelines including: - EPA Publication No. 275. Construction Techniques for Sediment Pollution Control (1991) - EPA Publication No. 480. Environmental Guidelines for Major Construction Sites (1996). Works to be carried out in consultation with Glenelg Hopkins CMA and Pyrenees Shire Council. The CMA to approve the CEMP prior to construction works commencing on site.	Moderate	Possible	Medium	Monitoring by RRV, with penalties for contractors for impacts to creeks and No-go Zones	Minor	Possible	Low
BIO23d	C2	Biodiversity and Habitat	Development	Earthworks	Impacts fauna habitat values		Works impact downstream aquatic habitat	In accordance with Vic Roads Contract Specification Section 201 in relation to site clearing Implementation of VicRoads Specification (Section 177 Part B -Water Quality and Section 177D (sediment and erosion control)). Implementation of other guidelines including: - EPA Publication No. 275. Construction Techniques for Sediment Pollution Control (1991) - EPA Publication No. 480. Environmental Guidelines for Major Construction Sites (1996). Works to be carried out in consultation with Glenelg Hopkins CMA and Pyrenees Shire Council. The CMA to approve the CEMP prior to construction works commencing on site.	Moderate	Possible	Medium	Monitoring by RRV, with penalties for contractors for impacts to creeks and No-go Zones	Minor	Possible	Low
BIO24a	A0	Biodiversity and Habitat	Development	Construction	Destroys rare fauna/ecological community		Death or injury of native fauna during construction (e.g. due to vehicle and/or construction plant collision, potentially exacerbated by entrapment by construction fencing, or due to entrapment in excavations)	In accordance with Vic Roads Contract Specification Section 177.1 in relation to fauna.	Minor	Likely	Medium	Include closing of trenches at night. Where trenches cannot be closed, check trenches first thing in the morning. Incorporate wildlife egress points in construction fencing. Construction and traffic control personnel to report fauna entrapment and traffic control to slow vehicles to minimise collision risk.	Minor	Possible	Low
BIO24c	A1	Biodiversity and Habitat	Development	Construction	Destroys rare fauna/ecological community		Death or injury of native fauna during construction (e.g. due to vehicle and/or construction plant collision, potentially exacerbated by entrapment by construction fencing, or due to entrapment in excavations)	In accordance with Vic Roads Contract Specification Section 177.1 in relation to fauna.	Minor	Likely	Medium	Include closing of trenches at night. Where trenches cannot be closed, check trenches first thing in the morning. Incorporate wildlife egress points in construction fencing. Construction and traffic control personnel to report fauna entrapment and traffic control to slow vehicles to minimise collision risk.	Minor	Possible	Low

				Impact Pathway					Initial Risk				Residual Risk		
Risk No.	Alignment Option	Discipline	Project Phase	Project Activity / Aspect	Primary Environmental Impact	Secondary Environmental Impact (if applicable) (further details provided in column V)	Description of risk and impact	Standard Controls (i.e. VicRoads Contract Specification e.g. Section 177, Section 720, Section 750; EPA Environmental Guidelines for Major Construction Sites and other relevant industry standards) (please detail)	Consequence	Likelihood	Risk Rating	Additional Controls (recommended to further reduce risk)	Consequence	Likelihood	Risk Rating
BIO24c	C0	Biodiversity and Habitat	Development	Construction	Destroys rare fauna/ecological community		Death or injury of native fauna during construction (e.g. due to vehicle and/or construction plant collision, potentially exacerbated by entrapment by construction fencing, or due to entrapment in excavations)	In accordance with Vic Roads Contract Specification Section 177.1 in relation to fauna.	Minor	Likely	Medium	Include closing of trenches at night. Where trenches cannot be closed, check trenches first thing in the morning. Incorporate wildlife egress points in construction fencing. Construction and traffic control personnel to report fauna entrapment and traffic control to slow vehicles to minimise collision risk.	Minor	Possible	Low
BIO24d	C2	Biodiversity and Habitat	Development	Construction	Destroys rare fauna/ecological community		Death or injury of native fauna during construction (e.g. due to vehicle and/or construction plant collision, potentially exacerbated by entrapment by construction fencing, or due to entrapment in excavations)	In accordance with Vic Roads Contract Specification Section 177.1 in relation to fauna.	Minor	Likely	Medium	Include closing of trenches at night. Where trenches cannot be closed, check trenches first thing in the morning. Incorporate wildlife egress points in construction fencing. Construction and traffic control personnel to report fauna entrapment and traffic control to slow vehicles to minimise collision risk.	Minor	Possible	Low
BIO25a	A0	Biodiversity and Habitat	Development	Construction	Destroys rare fauna/ecological community		Temporary or permanent loss of vegetation and habitat due to fires instigated by construction activities	In accordance with Vic Roads Contract Specification Section 177.1 in relation to flora. Compliance with AS 5062-2006 Fire protection of mobile and transportable equipment. Compliance with CEMP	Major	Rare	Medium	Maintain close contact with State Emergency Services and local Fire services. Controls in CEMP to minimise fire risk during construction. Fire extinguishers in vehicles and along length of the alignment. Inclusion in toolbox talks. Extra precautions on days of very high and extreme fire risk.	Moderate	Rare	Low
BIO25b	A1	Biodiversity and Habitat	Development	Construction	Destroys rare fauna/ecological community		Temporary or permanent loss of vegetation and habitat due to fires instigated by construction activities	In accordance with Vic Roads Contract Specification Section 177.1 in relation to flora. Compliance with AS 5062-2006 Fire protection of mobile and transportable equipment. Compliance with CEMP	Major	Rare	Medium	Maintain close contact with State Emergency Services and local Fire services. Controls in CEMP to minimise fire risk during construction. Fire extinguishers in vehicles and along length of the alignment. Inclusion in toolbox talks. Extra precautions on days of very high and extreme fire risk.	Moderate	Rare	Low
BIO25c	C0	Biodiversity and Habitat	Development	Construction	Destroys rare fauna/ecological community		Temporary or permanent loss of vegetation and habitat due to fires instigated by construction activities	In accordance with Vic Roads Contract Specification Section 177.1 in relation to flora. Compliance with AS 5062-2006 Fire protection of mobile and transportable equipment. Compliance with CEMP	Major	Rare	Medium	Maintain close contact with State Emergency Services and local Fire services. Controls in CEMP to minimise fire risk during construction. Fire extinguishers in vehicles and along length of the alignment. Inclusion in toolbox talks. Extra precautions on days of very high and extreme fire risk.	Moderate	Rare	Low
BIO25d	C2	Biodiversity and Habitat	Development	Construction	Destroys rare fauna/ecological community		Temporary or permanent loss of vegetation and habitat due to fires instigated by construction activities	In accordance with Vic Roads Contract Specification Section 177.1 in relation to flora. Compliance with AS 5062-2006 Fire protection of mobile and transportable equipment. Compliance with CEMP	Major	Rare	Medium	Maintain close contact with State Emergency Services and local Fire services. Controls in CEMP to minimise fire risk during construction. Fire extinguishers in vehicles and along length of the alignment. Inclusion in toolbox talks. Extra precautions on days of very high and extreme fire risk.	Moderate	Rare	Low
BIO26a	A0	Biodiversity and Habitat	Development	Construction	Impacts significant fauna species		Increased noise and/or light during construction causes disturbance or altered behaviour in native fauna	In accordance with Vic Road Contract Specification Section 177.1 in relation to fauna. Implementation of CEMP. In accordance with Fauna Sensitive Road Design Guidelines (VicRoads 2012) in relation to fauna. Compliance with Swift Parrot Management Plan and CEMP Contract Specification Section 177.H - Noise and Vibration	Minor	Likely	Medium	Minimise construction at night where practicable Minimise impact of construction lighting through consideration of siting, fixtures etc. Do not point lighting at habitat	Minor	Possible	Low
BIO26b	A1	Biodiversity and Habitat	Development	Construction	Impacts significant fauna species		Increased noise and/or light during construction causes disturbance or altered behaviour in native fauna	In accordance with Vic Road Contract Specification Section 177.1 in relation to fauna. Implementation of CEMP. In accordance with Fauna Sensitive Road Design Guidelines (VicRoads 2012) in relation to fauna. Compliance with Swift Parrot Management Plan and CEMP Contract Specification Section 177.H - Noise and Vibration	Minor	Likely	Medium	Minimise construction at night where practicable Minimise impact of construction lighting through consideration of siting, fixtures etc. Do not point lighting at habitat	Minor	Possible	Low
BIO26c	C0	Biodiversity and Habitat	Development	Construction	Impacts significant fauna species		Increased noise and/or light during construction causes disturbance or altered behaviour in native fauna	In accordance with Vic Road Contract Specification Section 177.1 in relation to fauna. Implementation of CEMP. In accordance with Fauna Sensitive Road Design Guidelines (VicRoads 2012) in relation to fauna. Compliance with Swift Parrot Management Plan and CEMP Contract Specification Section 177.H - Noise and Vibration	Minor	Likely	Medium	Minimise construction at night where practicable Minimise impact of construction lighting through consideration of siting, fixtures etc. Do not point lighting at habitat	Minor	Possible	Low
BIO26d	C2	Biodiversity and Habitat	Development	Construction	Impacts significant fauna species		Increased noise and/or light during construction causes disturbance or altered behaviour in native fauna	In accordance with Vic Road Contract Specification Section 177.1 in relation to fauna. Implementation of CEMP. In accordance with Fauna Sensitive Road Design Guidelines (VicRoads 2012) in relation to fauna. Compliance with Species-specific Management Plan and CEMP Contract Specification Section 177.H - Noise and Vibration	Minor	Likely	Medium	Minimise construction at night where practicable Minimise impact of construction lighting through consideration of siting, fixtures etc. Do not point lighting at habitat	Minor	Possible	Low

				Impact Pathway					Initial Risk				Residual Risk		
Risk No.	Alignment Option	Discipline	Project Phase	Project Activity / Aspect	Primary Environmental Impact	Secondary Environmental Impact (if applicable) (further details provided in column V)	Description of risk and impact	Standard Controls (i.e. VicRoads Contract Specification e.g. Section 177, Section 720, Section 750; EPA Environmental Guidelines for Major Construction Sites and other relevant industry standards) (please detail)	Consequence	Likelihood	Risk Rating	Additional Controls (recommended to further reduce risk)	Consequence	Likelihood	Risk Rating
BIO27a	A0	Biodiversity and Habitat	Operation/Maintenance	Operation	Impacts fauna habitat values		Operation results in increased fauna mortality from wildlife-vehicle collisions	No standard controls	Moderate	Likely	High	Utilise wildlife crossings in strategic locations to maintain connectivity and minimise mortality for various fauna groups. Utilise strategic fencing to encourage crossings. Investigate and consider strategic signage and other mortality-reduction measures.	Moderate	Possible	Medium
BIO27b	A1	Biodiversity and Habitat	Operation/Maintenance	Operation	Impacts fauna habitat values		Operation results in increased fauna mortality from wildlife-vehicle collisions	No standard controls	Moderate	Likely	High	Utilise wildlife crossings in strategic locations to maintain connectivity and minimise mortality for various fauna groups. Utilise strategic fencing to encourage crossings. Investigate and consider strategic signage and other mortality-reduction measures.	Moderate	Possible	Medium
BIO27c	C0	Biodiversity and Habitat	Operation/Maintenance	Operation	Impacts fauna habitat values		Operation results in increased fauna mortality from wildlife-vehicle collisions	No standard controls	Moderate	Likely	High	Utilise wildlife crossings in strategic locations to maintain connectivity and minimise mortality for various fauna groups. Utilise strategic fencing to encourage crossings. Investigate and consider strategic signage and other mortality-reduction measures.	Moderate	Possible	Medium
BIO27d	C2	Biodiversity and Habitat	Operation/Maintenance	Operation	Impacts fauna habitat values		Operation results in increased fauna mortality from wildlife-vehicle collisions	No standard controls	Moderate	Likely	High	Utilise wildlife crossings in strategic locations to maintain connectivity and minimise mortality for various fauna groups. Utilise strategic fencing to encourage crossings. Investigate and consider strategic signage and other mortality-reduction measures.	Moderate	Possible	Medium
BIO28a	A0	Biodiversity and Habitat	Operation/Maintenance	Operation	Impacts fauna habitat values		Road noise impacts fauna	No standard controls	Minor	Likely	Medium	Further investigation noise-reducing measures nearby sensitive fauna habitat	Minor	Likely	Medium
BIO28b	A1	Biodiversity and Habitat	Operation/Maintenance	Operation	Impacts fauna habitat values		Road noise impacts fauna	No standard controls	Minor	Likely	Medium	Further investigation noise-reducing measures nearby sensitive fauna habitat	Minor	Likely	Medium
BIO28c	C0	Biodiversity and Habitat	Operation/Maintenance	Operation	Impacts fauna habitat values		Road noise impacts fauna	No standard controls	Minor	Likely	Medium	Further investigation noise-reducing measures nearby sensitive fauna habitat	Minor	Likely	Medium
BIO28d	C2	Biodiversity and Habitat	Operation/Maintenance	Operation	Impacts fauna habitat values		Road noise impacts fauna	No standard controls	Minor	Likely	Medium	Further investigation noise-reducing measures nearby sensitive fauna habitat	Minor	Likely	Medium
BIO29a	A0	Biodiversity and Habitat	Operation/Maintenance	Operation	Impacts fauna habitat values		Light from the road (headlights or road lighting) impacts native fauna	No standard controls	Moderate	Possible	Medium	Revegetation and restoration to incorporate midstorey plants which will improve screening capabilities. Use of fauna-sensitive lighting where lighting is required. Barriers where required.	Minor	Possible	Low

				Impact Pathway					Initial Risk				Residual Risk		
Risk No.	Alignment Option	Discipline	Project Phase	Project Activity / Aspect	Primary Environmental Impact	Secondary Environmental Impact (if applicable) (further details provided in column V)	Description of risk and impact	Standard Controls (i.e. VicRoads Contract Specification e.g. Section 177, Section 720, Section 750; EPA Environmental Guidelines for Major Construction Sites and other relevant industry standards) (please detail)	Consequence	Likelihood	Risk Rating	Additional Controls (recommended to further reduce risk)	Consequence	Likelihood	Risk Rating
BIO29b	A1	Biodiversity and Habitat	Operation/Maintenance	Operation	Impacts fauna habitat values		Light from the road (headlights or road lighting) impacts native fauna	No standard controls	Moderate	Possible	Medium	Revegetation and restoration to incorporate midstorey plants which will improve screening capabilities. Use of fauna-sensitive lighting where lighting is required. Barriers where required.	Minor	Possible	Low
BIO29c	C0	Biodiversity and Habitat	Operation/Maintenance	Operation	Impacts fauna habitat values		Light from the road (headlights or road lighting) impacts native fauna	No standard controls	Moderate	Possible	Medium	Revegetation and restoration to incorporate midstorey plants which will improve screening capabilities. Use of fauna-sensitive lighting where lighting is required. Barriers where required.	Minor	Possible	Low
BIO29d	C2	Biodiversity and Habitat	Operation/Maintenance	Operation	Impacts fauna habitat values		Light from the road (headlights or road lighting) impacts native fauna	No standard controls	Moderate	Possible	Medium	Revegetation and restoration to incorporate midstorey plants which will improve screening capabilities. Use of fauna-sensitive lighting where lighting is required. Barriers where required.	Minor	Possible	Low
BIO30a	A0	Biodiversity and Habitat	Operation/Maintenance	Operation	Impacts significant vegetation or ecological communities		Clearing/construction/operation/maintenance results in increase in weed infestation which threatens nearby habitat.	Standard construction and maintenance controls for reducing weed spread (e.g. In accordance with Vic Roads Contract Specification Section 201 in relation to site clearing and in accordance with Vic Roads Contract Specification Section 177.1 in relation to weed management. Compliance with CEMP. Maintenance requirements in VicRoads' Roadside Management Strategy 2011)	Minor	Likely	Medium	Additional weed control required adjacent to sensitive vegetation (such as areas of Yellow Box Grassy Woodland). Follow up monitoring and weed control. All machinery to be cleaned prior to entering site and moving between sections of the alignment.	Minor	Possible	Low
BIO30b	A1	Biodiversity and Habitat	Operation/Maintenance	Operation	Impacts significant vegetation or ecological communities		Clearing/construction/operation/maintenance results in increase in weed infestation which threatens nearby habitat.	Standard construction and maintenance controls for reducing weed spread (e.g. In accordance with Vic Roads Contract Specification Section 201 in relation to site clearing and in accordance with Vic Roads Contract Specification Section 177.1 in relation to weed management. Compliance with CEMP. Maintenance requirements in VicRoads' Roadside Management Strategy 2011)	Minor	Likely	Medium	Additional weed control required adjacent to sensitive vegetation (such as areas of Yellow Box Grassy Woodland). Follow up monitoring and weed control. All machinery to be cleaned prior to entering site and moving between sections of the alignment.	Minor	Possible	Low
BIO30c	C0	Biodiversity and Habitat	Operation/Maintenance	Operation	Impacts significant vegetation or ecological communities		Clearing/construction/operation/maintenance results in increase in weed infestation which threatens nearby habitat.	Standard construction and maintenance controls for reducing weed spread (e.g. In accordance with Vic Roads Contract Specification Section 201 in relation to site clearing and in accordance with Vic Roads Contract Specification Section 177.1 in relation to weed management. Compliance with CEMP. Maintenance requirements in VicRoads' Roadside Management Strategy 2011)	Minor	Likely	Medium	Additional weed control required adjacent to sensitive vegetation (such as areas of Yellow Box Grassy Woodland). Follow up monitoring and weed control. All machinery to be cleaned prior to entering site and moving between sections of the alignment.	Minor	Possible	Low
BIO30d	C2	Biodiversity and Habitat	Operation/Maintenance	Operation	Impacts significant vegetation or ecological communities		Clearing/construction/operation/maintenance results in increase in weed infestation which threatens nearby habitat.	Standard construction and maintenance controls for reducing weed spread (e.g. In accordance with Vic Roads Contract Specification Section 201 in relation to site clearing and in accordance with Vic Roads Contract Specification Section 177.1 in relation to weed management. Compliance with CEMP. Maintenance requirements in VicRoads' Roadside Management Strategy 2011)	Minor	Likely	Medium	Additional weed control required adjacent to sensitive vegetation (such as areas of Yellow Box Grassy Woodland). Follow up monitoring and weed control. All machinery to be cleaned prior to entering site and moving between sections of the alignment.	Minor	Possible	Low
BIO31a	A0	Biodiversity and Habitat	Operation/Maintenance	Operation	Impacts significant vegetation or ecological communities		Clearing/construction/operation/maintenance results in disease introduction or spread (e.g. Chytrid or Phytophthora) which threatens nearby habitat.	Standard construction and maintenance controls for reducing weed spread (e.g. In accordance with Vic Roads Contract Specification Section 201 in relation to site clearing and in accordance with Vic Roads Contract Specification Section 177.1 in relation to weed management. Compliance with CEMP. Maintenance requirements in VicRoads' Roadside Management Strategy 2011)	Moderate	Possible	Medium	Additional disease control required in CEMP as detailed in FFIA, particularly for Chytrid and Phytophthora. Monitoring, testing and reporting.	Moderate	Rare	Low

				Impact Pathway					Initial Risk				Residual Risk		
Risk No.	Alignment Option	Discipline	Project Phase	Project Activity / Aspect	Primary Environmental Impact	Secondary Environmental Impact (if applicable) (further details provided in column V)	Description of risk and impact	Standard Controls (i.e. VicRoads Contract Specification e.g. Section 177, Section 720, Section 750; EPA Environmental Guidelines for Major Construction Sites and other relevant industry standards) (please detail)	Consequence	Likelihood	Risk Rating	Additional Controls (recommended to further reduce risk)	Consequence	Likelihood	Risk Rating
BIO31b	A1	Biodiversity and Habitat	Operation/Maintenance	Operation	Impacts significant vegetation or ecological communities		Clearing/construction/operation/maintenance results in disease introduction or spread (e.g. Chytrid or Phytophthora) which threatens nearby habitat.	Standard construction and maintenance controls for reducing weed spread (e.g. In accordance with Vic Roads Contract Specification Section 201 in relation to site clearing and in accordance with Vic Roads Contract Specification Section 177.1 in relation to weed management. Compliance with CEMP. Maintenance requirements in VicRoads' Roadside Management Strategy 2011)	Moderate	Possible	Medium	Additional disease control required in CEMP as detailed in FFIA, particularly for Chytrid and Phytophthora. Monitoring, testing and reporting.	Moderate	Rare	Low
BIO31c	C0	Biodiversity and Habitat	Operation/Maintenance	Operation	Impacts significant vegetation or ecological communities		Clearing/construction/operation/maintenance results in disease introduction or spread (e.g. Chytrid or Phytophthora) which threatens nearby habitat.	Standard construction and maintenance controls for reducing weed spread (e.g. In accordance with Vic Roads Contract Specification Section 201 in relation to site clearing and in accordance with Vic Roads Contract Specification Section 177.1 in relation to weed management. Compliance with CEMP. Maintenance requirements in VicRoads' Roadside Management Strategy 2011)	Moderate	Possible	Medium	Additional disease control required in CEMP as detailed in FFIA, particularly for Chytrid and Phytophthora. Monitoring, testing and reporting.	Moderate	Rare	Low
BIO31d	C2	Biodiversity and Habitat	Operation/Maintenance	Operation	Impacts significant vegetation or ecological communities		Clearing/construction/operation/maintenance results in disease introduction or spread (e.g. Chytrid or Phytophthora) which threatens nearby habitat.	Standard construction and maintenance controls for reducing weed spread (e.g. In accordance with Vic Roads Contract Specification Section 201 in relation to site clearing and in accordance with Vic Roads Contract Specification Section 177.1 in relation to weed management. Compliance with CEMP. Maintenance requirements in VicRoads' Roadside Management Strategy 2011)	Moderate	Possible	Medium	Additional disease control required in CEMP as detailed in FFIA, particularly for Chytrid and Phytophthora. Monitoring, testing and reporting.	Moderate	Rare	Low

APPENDIX Q

ASSESSMENT OF SIGNIFICANT IMPACTS UNDER THE EPBC ACT FOR THE PREFERRED ALIGNMENT

This appendix presents the significant impact criteria assessment for the project (preferred alignment only). Some differences occur between this assessment and the preliminary EPBC Act significant impact assessment used for options assessment (Appendix J). Risk ratings might be slightly different due to differences in the current and the preliminary/nominal construction footprints. This assessment also includes the full suite of mitigation recommended for the preferred alignment, which is further developed from the preliminary measures in Appendix J. Further detail regarding the mitigation measures recommended in this appendix is provided in Section 10 of this report.

Q1 GROWLING GRASS FROG

The EPBC Act listed Vulnerable Growling Grass Frog *Litoria raniformis*, has not been recorded in the study area during recent surveys in 2015, 2016 and 2020. This includes surveys conducted in spring/early summer 2020 throughout the preferred alignment in optimal conditions when the species was recorded calling at a nearby reference site. As such, the species is currently considered unlikely to be occurring and breeding within the preferred alignment. However, given the extent of potential habitat in the area and the number of past records, the likelihood of this species has still been assessed as high, as the species has the potential re-colonise under suitable conditions or may still be present in low (undetectable) numbers. As such, a significant impact criteria assessment has been undertaken for this species.

Potential aquatic habitat across the study area was mapped as 'high quality potential aquatic habitat' and 'moderate quality potential aquatic habitat', based on the extent to which the waterbodies displayed preferred habitat features. Across the whole study area, used for the assessment of the four alignments, there is 11.624 ha of high quality potential aquatic habitat and 22.502 ha of moderate quality potential aquatic habitat. Growling Grass Frog potential terrestrial habitat across the study area was also calculated using a 200 m buffer from waterbodies as per the Significant Impact Guidelines for the species (DEWHA 2009b). Much of this terrestrial habitat is likely to be unsuitable for the species, being heavily grazed or cropped, not occurring between waterbodies, or not supporting habitat features used for overwintering or foraging. The potential terrestrial habitat largely comprises modified grazed or cropped paddocks.

Q1.1 IMPACT SUMMARY

Based on the current construction footprint there are likely to be direct impacts to 0.281 ha of high quality aquatic potential habitat and 1.132 ha of moderate quality aquatic potential habitat (refer to habitat and impact map, Section Q1.3). Potential impact to Growling Grass Frog terrestrial habitat was also conservatively estimated using a 200 m buffer from waterbodies as per the Significant Impact Guidelines for the species (DEWHA 2009b). Using this method, the anticipated loss of potential terrestrial habitat associated with high quality potential aquatic habitat is 17.285 ha and the anticipated loss of potential terrestrial habitat associated with moderate quality potential aquatic habitat is 68.179 ha (excluding any overlap with high quality). A large proportion of this terrestrial habitat would be unlikely to be used by the species, as it does not occur between waterbodies or does not support features preferred by the species for overwintering or foraging (rocks, tussock grasses etc.).

As well as direct habitat loss, other potential impacts to this species include introduction of new barriers to movement, injury and mortality from the construction and operation phase of the project, spread of chytrid fungus, hydrological changes, and decreased water quality of retained habitat as a result of erosion, sedimentation and pollution.

Q1.2 SIGNIFICANT IMPACT ASSESSMENT

For a vulnerable species, it is important to first determine whether the population being impacted is an 'important population'.

For this species, an important population is defined as any viable population, which is:

> *"…one which is not isolated from other populations or water bodies, such that it has the opportunity to interact with other nearby populations or has the ability to establish new populations when water bodies fill and become available."*

Source: (DEWHA 2009b)

Although the species is unlikely to currently occur and breed in the preferred alignment, an important population may occur in the future due to the potential for recolonisation of potential habitat.

A significant impact criteria assessment has been undertaken in accordance with the Significant Impact Guidelines for the species (DEWHA 2009b) in Table Q.1. Based on the current proposed design and construction footprint, a significant impact upon the species is considered unlikely with the proposed mitigation.

Table Q.1 Significant impact assessment for Growling Grass Frog as per the specific significant impact guidelines for this species (DEWHA 2009b)

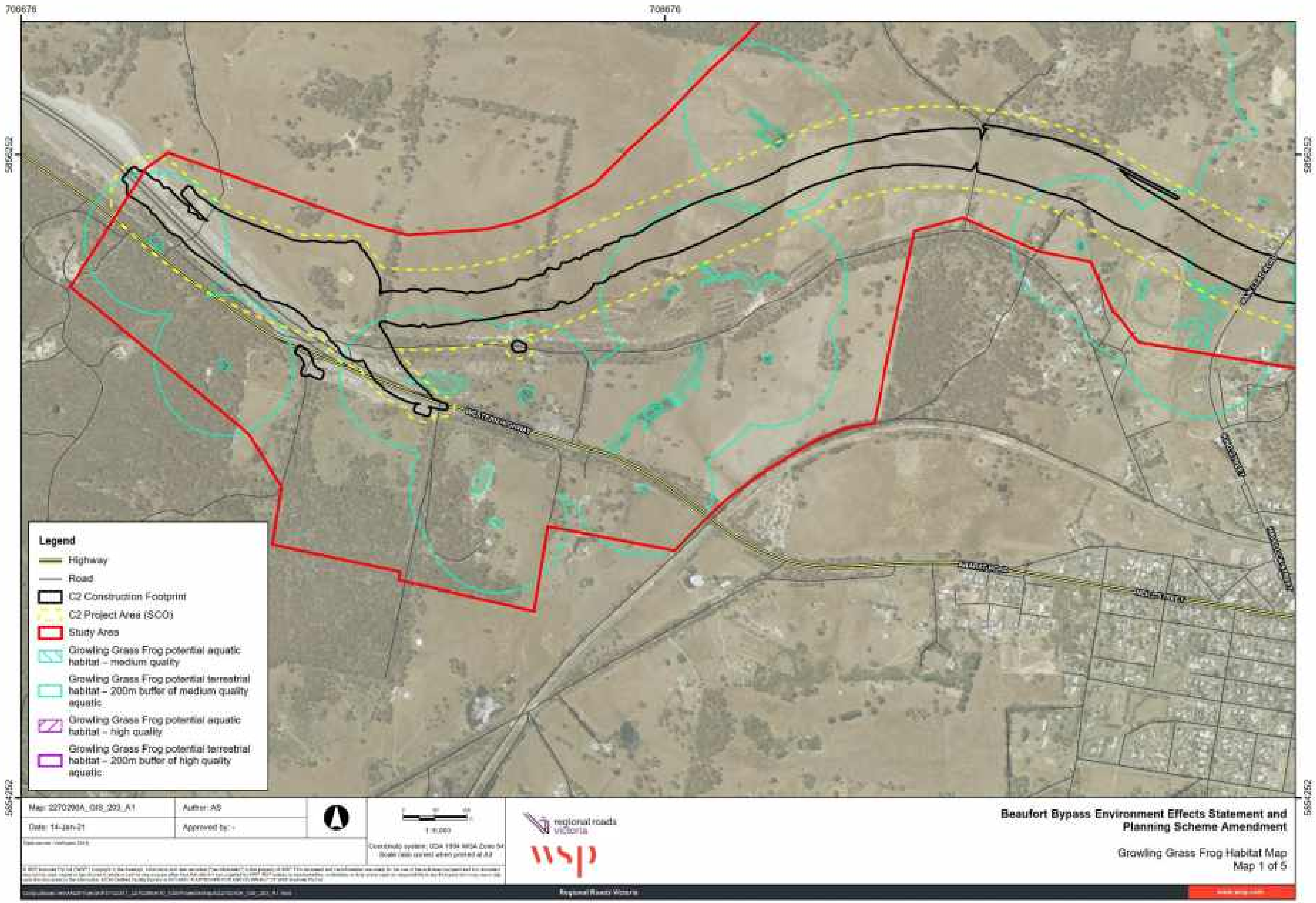
IMPACT THRESHOLD AND DETAILS	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Habitat degradation in an area supporting an important population				
Permanent removal or degradation of terrestrial habitat (for example between ponds, drainage lines or other temporary/permanent habitat) within 200 m of a water body in temperate regions, or 350 metres of a water body in semi-arid regions, that results in the loss of dispersal or overwintering opportunities for an important population.	The anticipated loss of potential terrestrial habitat associated with high quality potential aquatic habitat is 17.285 ha and the anticipated loss of potential terrestrial habitat associated with moderate quality potential aquatic habitat is 68.179 ha (excluding any overlap with high quality (total = 85.464). This is calculated conservatively using a 200 m buffer from waterbodies as per the Significant Impact Guidelines for the species (DEWHA 2009b). The potential terrestrial habitat is unlikely to currently be utilised by the species, which was not recorded in the study area. Furthermore, a large proportion of this terrestrial habitat would be unlikely to be used by the species, as it does not occur between waterbodies, is utilised for high-intensity grazing or cropping, or does not support features preferred by the species for overwintering or foraging (rocks, tussock grasses etc.). The potential terrestrial habitat largely comprises modified grazed or cropped paddocks. Nevertheless, the potential for the species to utilise some of this habitat for movement or overwintering in future should be considered.	Moderate	No-go Zones to protect retained habitat including potential terrestrial habitat. Salvage from impacted ponds if required (may not be required as species has not been recently recorded from the study area) Re-instatement of temporary impacts to habitat which may support overwintering of Growling Grass Frog. This will result in lower permanent loss of potential terrestrial habitat. Where practicable, avoidance of maintenance measures between potential habitat ponds and other potential aquatic habitat in the project area which may impact the species' survival or use of habitat, such as slashing to a short height or slashing during winter.	Low

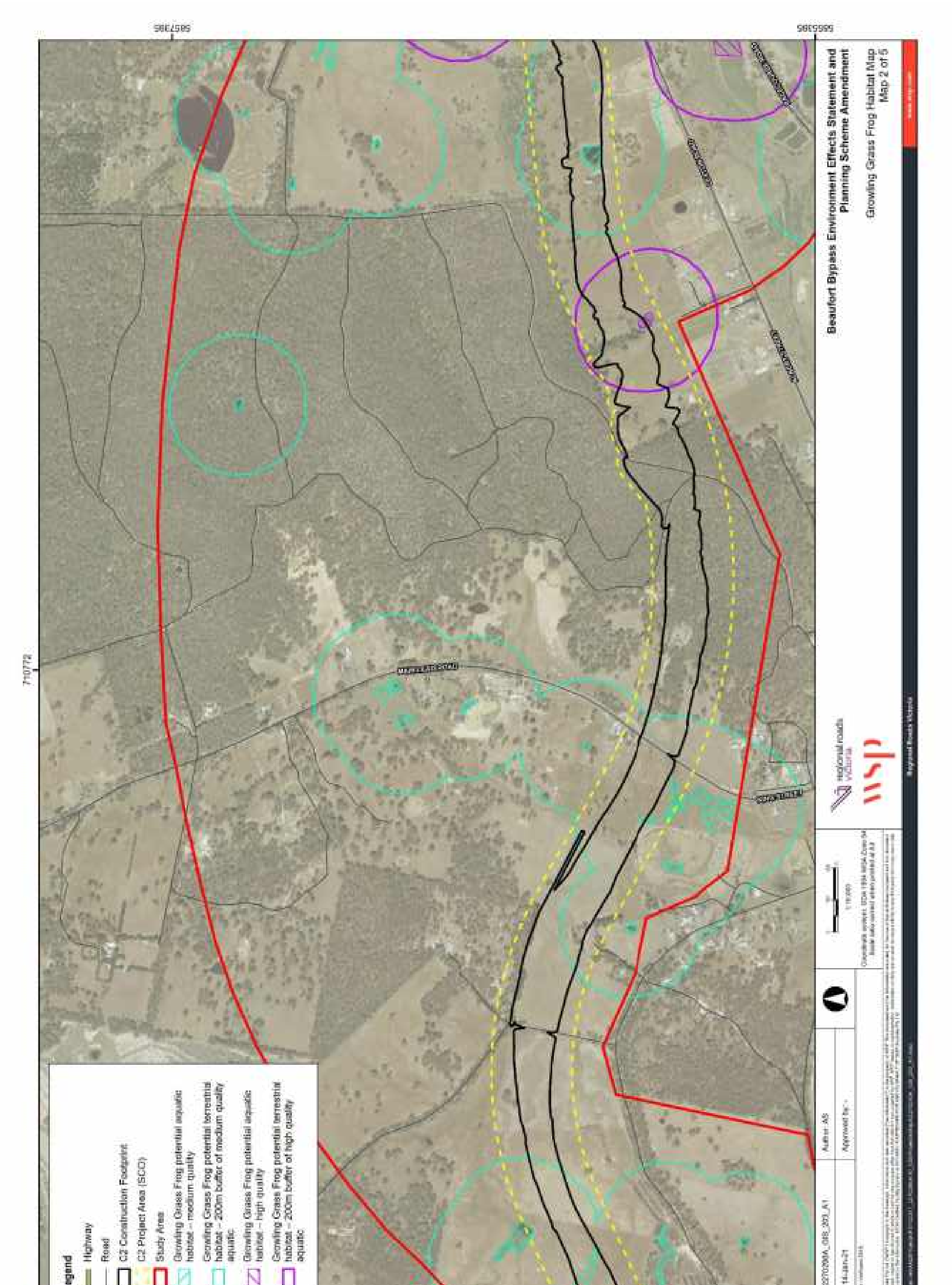
IMPACT THRESHOLD AND DETAILS	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Alteration of aquatic vegetation diversity or structure that leads to a decrease in habitat quality.	Erosion, sedimentation and dust from construction impacting the aquatic vegetation in retained habitat is possible. Similarly, pollution and rubbish from operation of the road may also enter waterways and ponds and degrade habitat quality. While each impact is unlikely to significantly impact the species on its own, measures to minimise the risk overall are required.	Moderate	No-go Zones to protect retained habitat. Erosion and sedimentation controls to protect wetland habitat. Measures are required in the CEMP to minimise water quality impacts during construction. Where practicable, earthworks and storage of material near Yam Holes Creek and other waterbodies should be avoided, particularly in the spring/summer breeding season. Dust controls (which could include dust screens where works are occurring nearby high quality potential habitat). Measures to prevent rubbish from entering habitat during both construction and operation. During operation, this may include gross pollutant traps where WSRD elements and roadside maintenance and not sufficient. WSRD elements to minimise pollutants entering waterways and potential habitat ponds. Construction should occur using techniques which minimise impacts on wetlands which are partially within the construction footprint to avoid impacts on the retained potential habitat. Direct impacts on wetlands and ponds should occur outside of the spring/summer breeding season if possible.	Low

IMPACT THRESHOLD AND DETAILS	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Alteration to wetland hydrology, diversity and structure (for example any changes to timing, duration or frequency of flood events) that leads to a decrease in habitat quality.	Some hydrological changes are possible without mitigation.	Moderate	WSRD elements and drainage structures are proposed to ensure that changes to drainage which may affect this species do not occur. Specifically, where there are connected wetlands such as those along Yam Holes Creek, overland seasonal flows will be maintained or not significantly altered.	Low
Introduction of predatory fish and/or disease agents	Works are unlikely to result in the introduction of any predatory fish however may spread the waterborne fungal pathogen *Batrachochytrium dendrobatidis* which causes the disease chytridiomycosis (chytrid fungus). Although this disease may be present in the study area, measures to minimise spread are required.	Moderate	Incorporation of appropriate chytrid hygiene practices during construction using the threat abatement plan (Commonwealth of Australia 2016).	Low
Isolation and fragmentation of populations				
Net reduction in the number and/or diversity of water bodies available to an important population.	The project will result in impacts to or loss of eleven waterbodies available to this species, totalling 0.281 ha of high quality aquatic potential habitat (two waterbodies) and 1.132 ha of moderate quality aquatic potential habitat (total 1.413 ha). These ponds are unlikely to currently support the species based on survey results (i.e. are unlikely to currently support an important population). They are also largely isolated from other potential habitat ponds. However, there is the potential for some of this habitat to support an important population in future.	Moderate	Strategic habitat creation to include planted ponds which may support this species (e.g. in WSRD elements and at culvert entrances to enhance connectivity) Measures to protect retained habitat including No-go Zones.	Low Although some potential aquatic habitat for this species will be lost, this habitat does not currently appear to support the species and the loss is unlikely to significantly impact the species given the potential habitat remaining and the mitigation proposed.

IMPACT THRESHOLD AND DETAILS	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Removal or alteration of available terrestrial or aquatic habitat corridors (including alteration of connectivity during flood events).	The project will alter both terrestrial and aquatic habitat corridors, with the potential to remove these corridors altogether without mitigation. The alignment passes between potential habitat wetlands and crosses Yam Holes Creek.	Moderate	Maintain connectivity for the species through crossings and strategic habitat creation. Four crossing points for Growling Grass Frog are currently proposed, to include bridges and culverts designed to the Growling Grass Frog Crossing Design Standards (DELWP 2017a). WSRD elements to ensure that changes to drainage which may affect this species do not occur. Specifically, where there are connected wetlands such as those along Yam Holes Creek, overland seasonal flows should be maintained or not significantly altered.	Low The potential connectivity for this species in the landscape is expected to be effectively maintained with the proposed mitigation.
Construction of physical barriers to movement between water bodies, such as roads or buildings.	The project will create a large physical barrier between water bodies although some barriers are already present in the landscape (existing roads, unsuitable habitat such as heavily crazed or cropped paddocks etc.).	Moderate	Maintain connectivity for the species through crossings and strategic habitat creation. Four crossing points for Growling Grass Frog are currently proposed, to include bridges and culverts designed to the Growling Grass Frog Crossing Design Standards (DELWP 2017a).	Low The potential connectivity for this species in the landscape is expected to be effectively maintained with the proposed mitigation.
Overall likelihood of a significant impact	Although direct impacts on aquatic potential habitat are low, the project is likely to increase fragmentation and may result in degradation of retained habitat without mitigation.	Moderate	All mitigation described above	Low

Q1.3 HABITAT AND IMPACT MAPS

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Growling Grass Frog Habitat Map
Map 2 of 5
Legend
Highway
Road
C2 Construction Footprint
C2 Project Area (SCO)
Study Area
Growling Grass Frog potential aquatic habitat – medium quality
Growling Grass Frog potential terrestrial habitat – 200m buffer of medium quality aquatic
Growling Grass Frog potential aquatic habitat – high quality
Growling Grass Frog potential terrestrial habitat – 200m buffer of high quality aquatic
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Approved by: -
Date: 14-Jan-21
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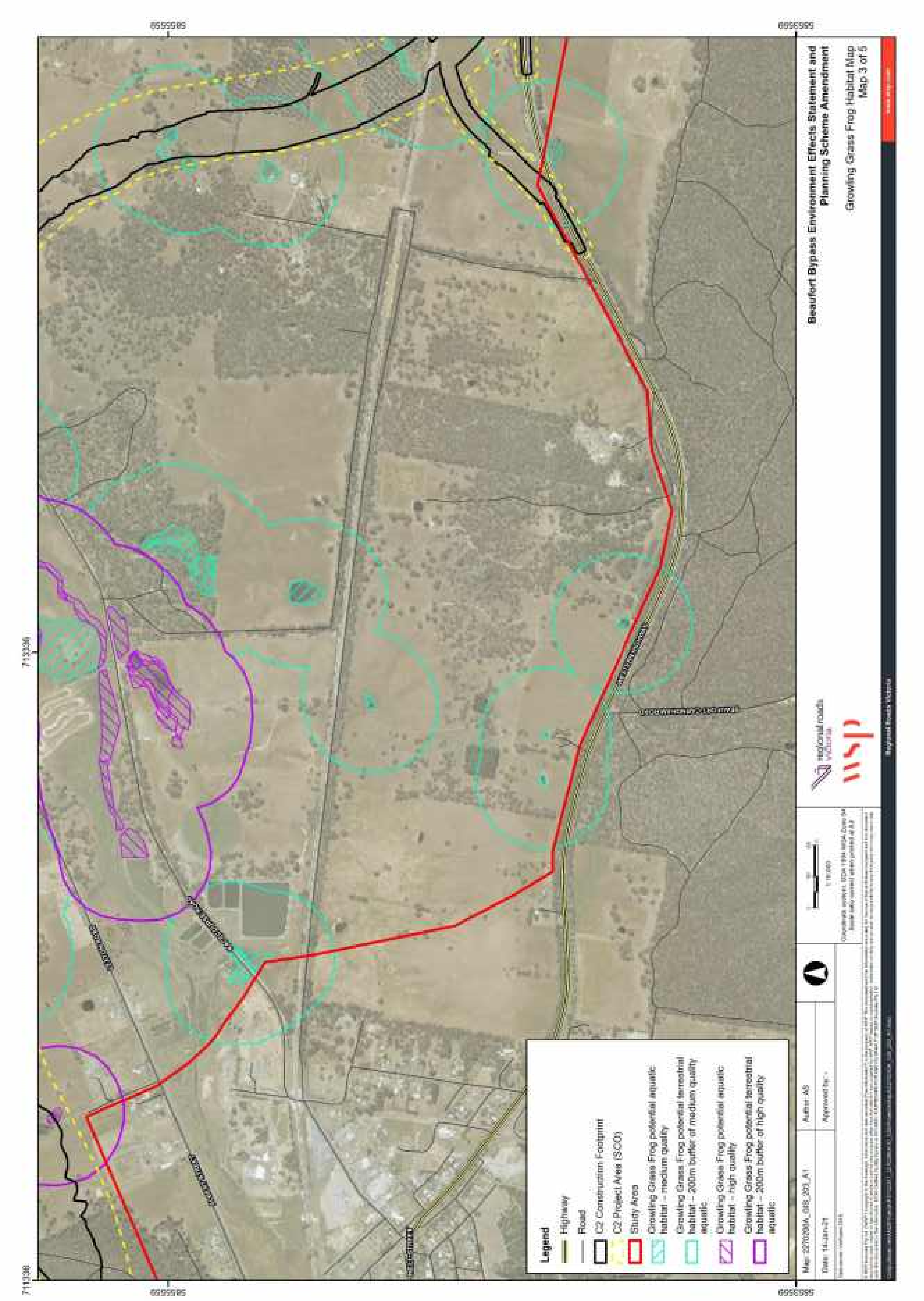
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Map 3 of 5
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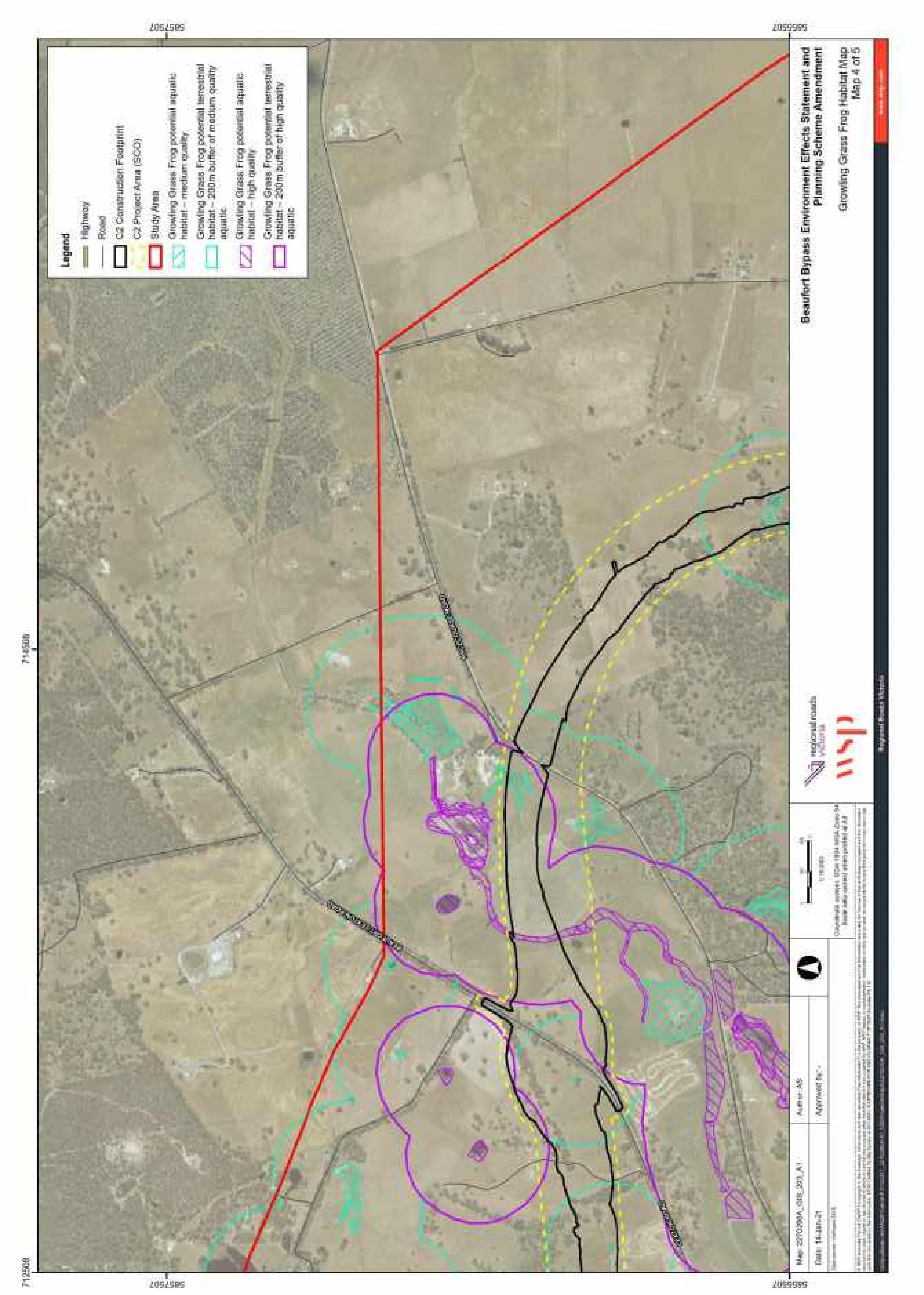
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Beaufort Bypass Environment Effects Statement and Planning Scheme Amendment
Growling Grass Frog Habitat Map
Map 4 of 5
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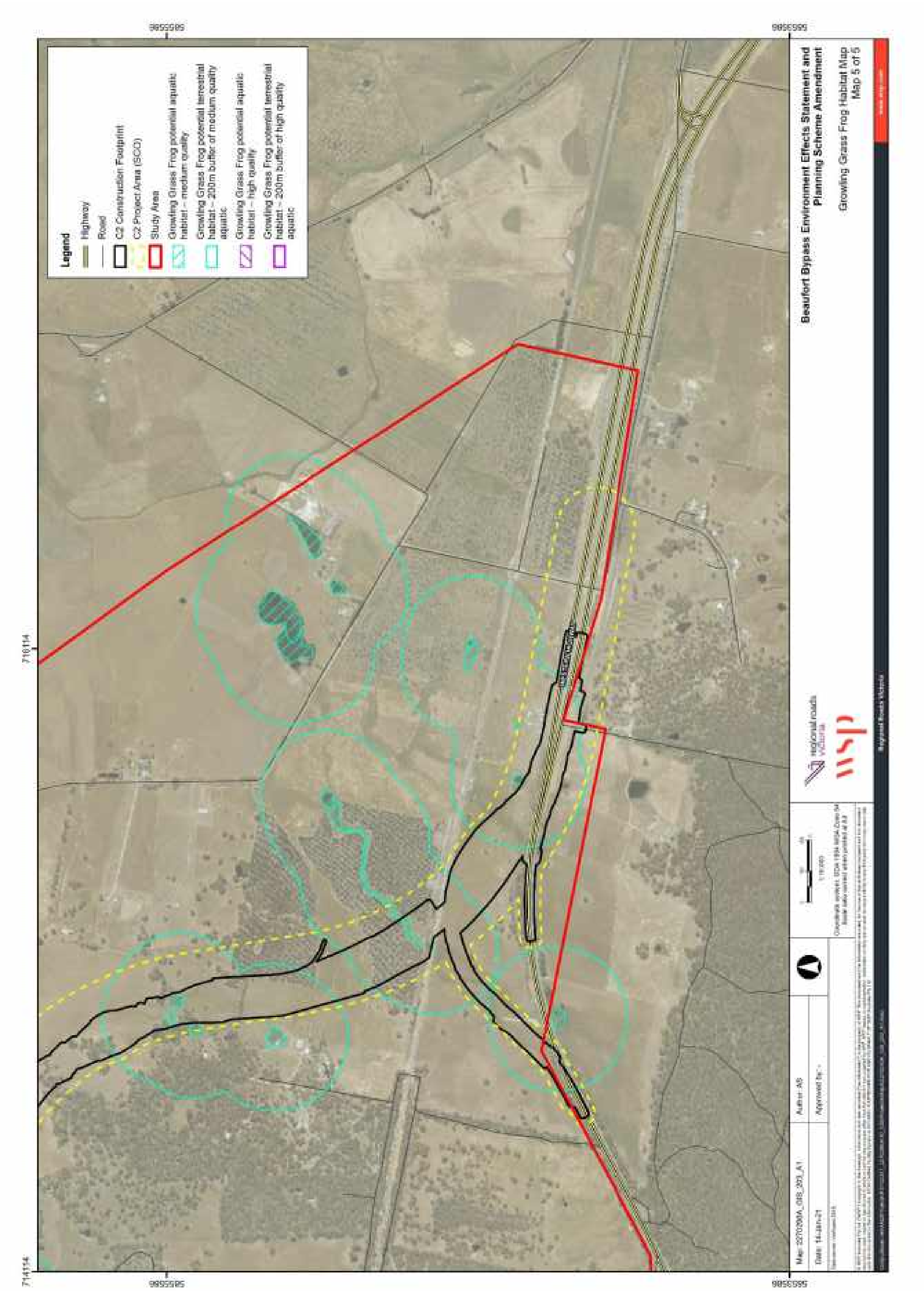
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Beaufort Bypass Environment Effects Statement and Planning Scheme Amendment
Growling Grass Frog Habitat Map
Map 5 of 5
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Regional Roads Victoria

Q2 GOLDEN SUN MOTH

The EPBC Act listed Critically Endangered Golden Sun Moth *Synemon plana* was recorded by WSP in targeted surveys in 2015-2017 and again in 2018. Prior to surveys for this project in 2015, the species had not been recorded in the study area. Now, large areas of habitat have been confirmed through surveys. Potential habitat has also been mapped, where the species has not been recorded during surveys but where some or all of the preferred habitat characteristics are present. Potential habitat was mapped as either higher or lower quality, based on the characteristics of the potential habitat and the proximity to confirmed habitat. Across the whole study area, there is 8.014 ha of confirmed habitat, 41.214 ha of higher quality potential habitat and 72.601 ha of lower quality potential habitat.

Q2.1 IMPACTS

Based on the current construction footprint, 1.672 ha of confirmed Golden Sun Moth habitat is likely to be impacted along with 9.431 ha of higher quality potential habitat and 2.822 ha of lower quality potential habitat (refer to habitat and impact maps, Section Q2.3). Impacts are anticipated to be highest just north of Martins Lane, near the proposed interchange with the Western Highway, where high quality Golden Sun Moth habitat was mapped and the species was recorded during 2018 surveys.

The project is also likely to lead to an increase in habitat fragmentation by presenting a barrier to dispersal for the species.

Q2.2 SIGNIFICANT IMPACT ASSESSMENT

A significant impact criteria assessment is provided below in accordance with the *Significant impact guidelines for the critically endangered Golden Sun Moth (Synemon plana)* (DEWHA 2009a). Based on the current proposed design and construction footprint, habitat loss and fragmentation is likely to impact the species locally, however as impacts are expected to be well-over the significant impact threshold, a significant impact upon the species is considered likely.

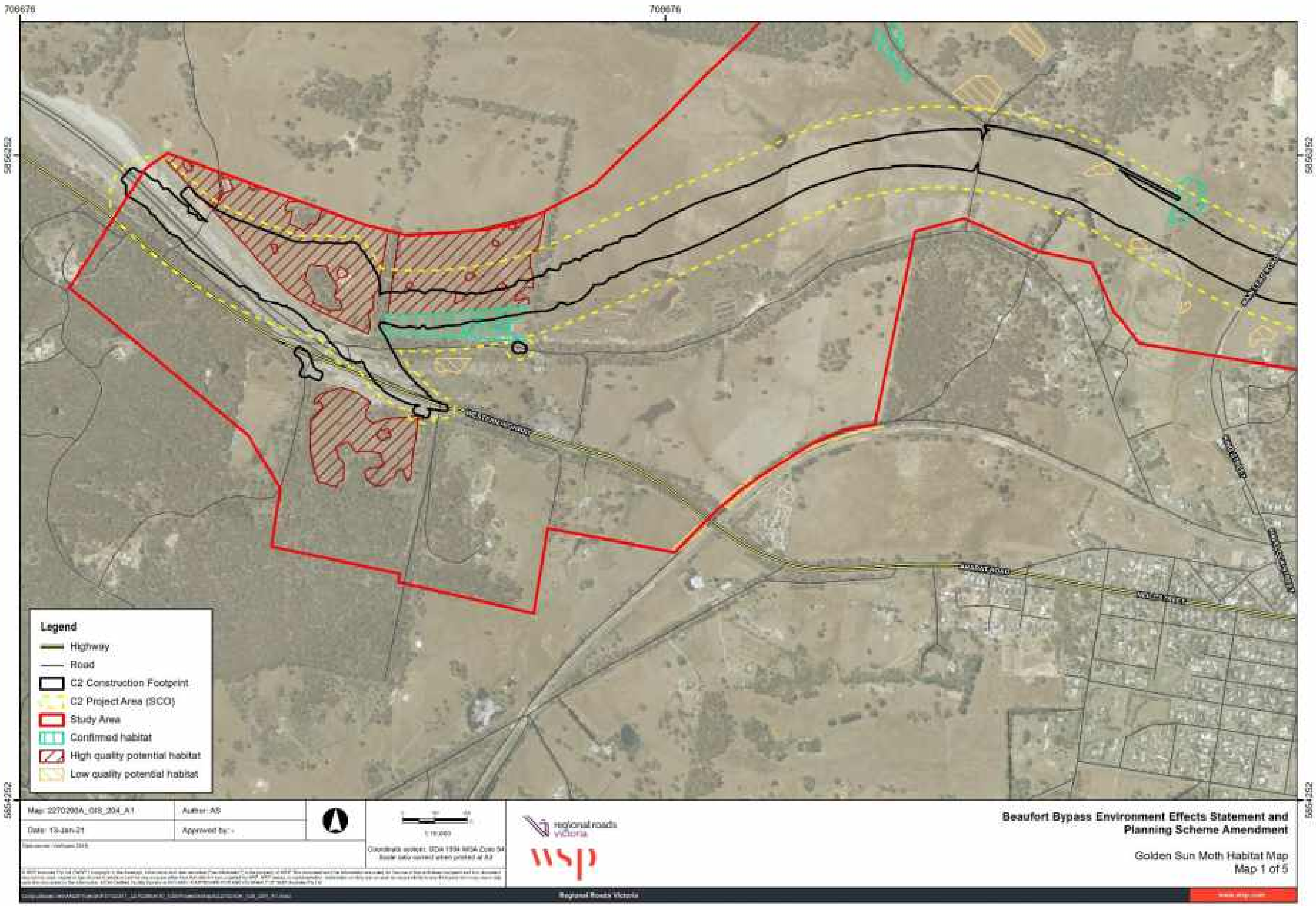
Table Q.2 Significant impact assessment for Golden Sun Moth in accordance with the Significant impact guidelines for the critically endangered Golden Sun Moth (Synemon plana) (DEWHA 2009a)

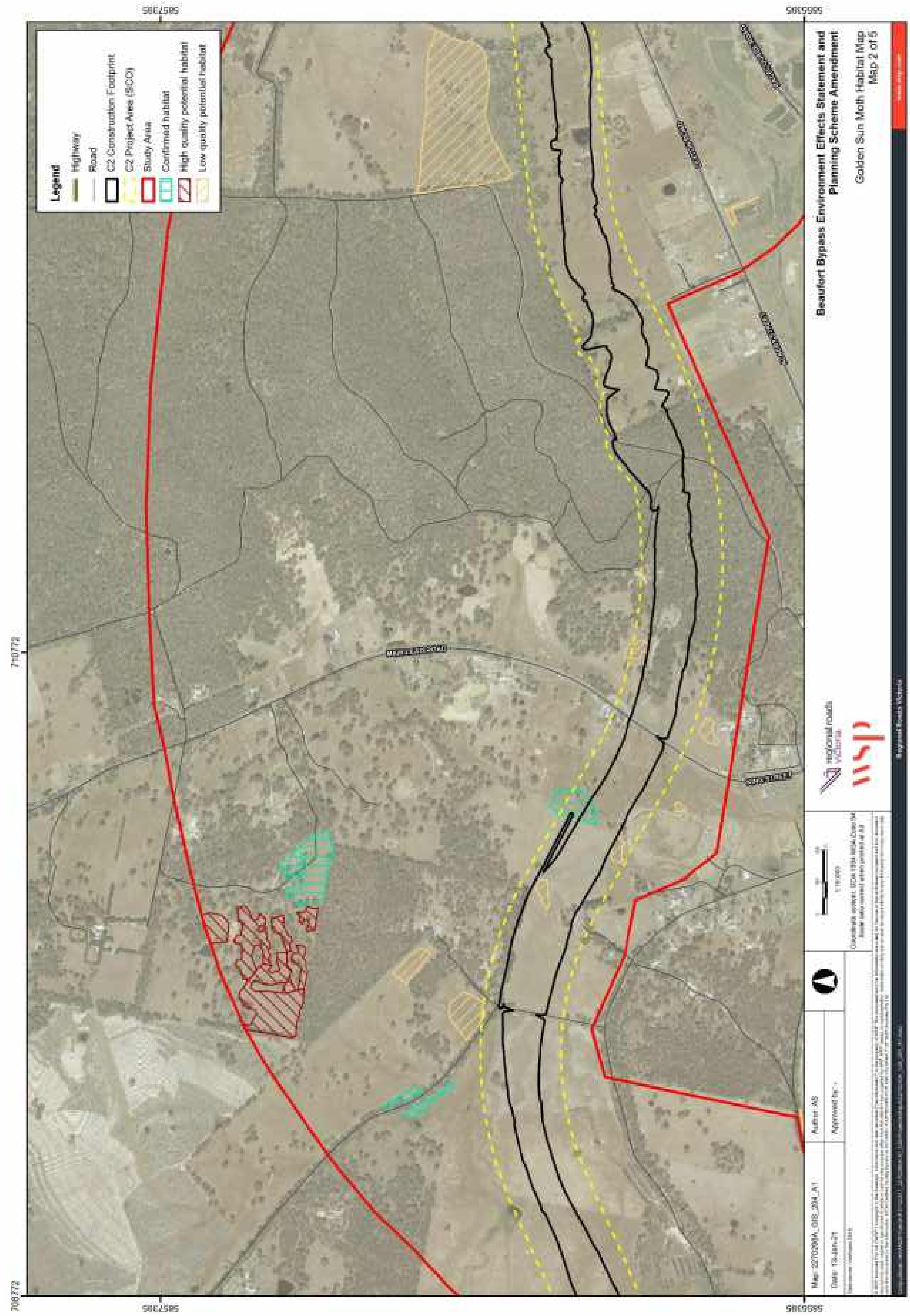
HABITAT AREA TYPE	IMPACT THRESHOLD AND DETAILS	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Large or contiguous habitat area (>10 ha)	**Habitat loss, degradation or fragmentation >0.5 ha** Habitat is a similar or connected area within which the Golden Sun Moth is found during surveys or known from records. The function of the area may include, but is not limited to: feeding, breeding, dispersal.	Across the whole study area, there is 8.014 ha of confirmed habitat, 41.214 ha of higher quality potential habitat and 72.601 ha of lower quality potential habitat. Based on the amount of habitat, particularly confirmed and higher quality potential habitat, it is likely that the site would be considered a 'large or contiguous habitat area'. The project will impact 1.672 ha of confirmed Golden Sun Moth habitat. In addition, 9.431 ha of higher quality potential habitat and 2.822 ha of lower quality potential habitat occurs within the current construction footprint. This may impact the species locally but it unlikely to have a substantial impact on the species as a whole. There is the potential for further degradation of retained habitat without mitigation from dust during construction, weeds, and rubbish.	High	Minimisation of impacts through design and use of No-go Zones to protect retained habitat. Landscaping with Golden Sun Moth feed species and consideration of habitat requirements in maintenance. Dust controls, which could include dust screens if required where works are occurring near confirmed habitat. Weed management, monitoring, and control measures to protect retained habitat. Measures to minimise rubbish entering retained habitat during construction and operation.	Moderate Mitigation measures may reduce impacts to some degree however impacts are expected to be over the significant impact threshold.

HABITAT AREA TYPE	IMPACT THRESHOLD AND DETAILS	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Small or fragmented habitat area (<10 ha)	**Any habitat loss, degradation or fragmentation** Small areas of habitat are more likely to suffer significant impacts from loss, degradation and fragmentation than larger areas. The limited dispersal ability of the Golden Sun Moth means habitat areas separated by >200 m are effectively isolated and should be considered as separate habitat areas. Extremely small, isolated and degraded habitat patches (for example <0.25 ha) may support populations of Golden Sun Moth but are unlikely to contribute to the overall ecological health of the species.	N/A – assessed as a large or contiguous habitat area due to the extent of confirmed and high-quality potential habitat present.	N/A	N/A	N/A

HABITAT AREA TYPE	IMPACT THRESHOLD AND DETAILS	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Habitat connectivity (Both large and small habitat areas)	**Fragmentation of a population through the introduction of a barrier to dispersal.** Barriers to dispersal could include: breaks in habitat of >200 m; structures that prohibit movement (for example buildings, solid fences).	Although the current construction footprint does not bisect any patches of confirmed habitat, it does fragment a patch which is partly confirmed habitat and partly high quality potential habitat north of Martin's Lane. Although the roadway will be <200 m, the project will introduce a barrier to dispersal between this confirmed and high-quality potential habitat. The construction footprint also bisects an area of lower quality potential habitat south of Racecourse Road and will increase fragmentation between a patch of confirmed and a small patch of low-quality potential habitat west of Main lead Road (north of the Beaufort Trotting Track). The remaining patches of confirmed and potential habitat area are either distant from the construction footprint or already fragmented by >200 m. This is likely to locally impact the species, although is considered unlikely to substantially impact the species as a whole.	High	Revegetation and habitat creation to improve habitat connectivity where possible. It is expected that plans would be developed during detailed design. If practicable, consideration of movement of this species through underpass design. Note: likely to not be practicable for the project as structures most likely to be utilised by the species (such as open span bridges and land bridges) are unlikely to be feasible where habitat is present.	High (potential to be reduced depending on the extent to which the mitigation can be incorporated)
Overall likelihood of significant impact		Habitat loss and fragmentation is likely to impact the species locally. As there is confirmed and potential habitat remaining and the species is locally common and protected elsewhere in Victoria, this may not significantly impact the species as a whole. However, based on the significant impact criteria assessment, a significant impact should be assumed unless otherwise determined by DAWE.	High	All mitigation described above.	Moderate-high

Q2.3 GOLDEN SUN MOTH HABITAT AND IMPACT MAPS

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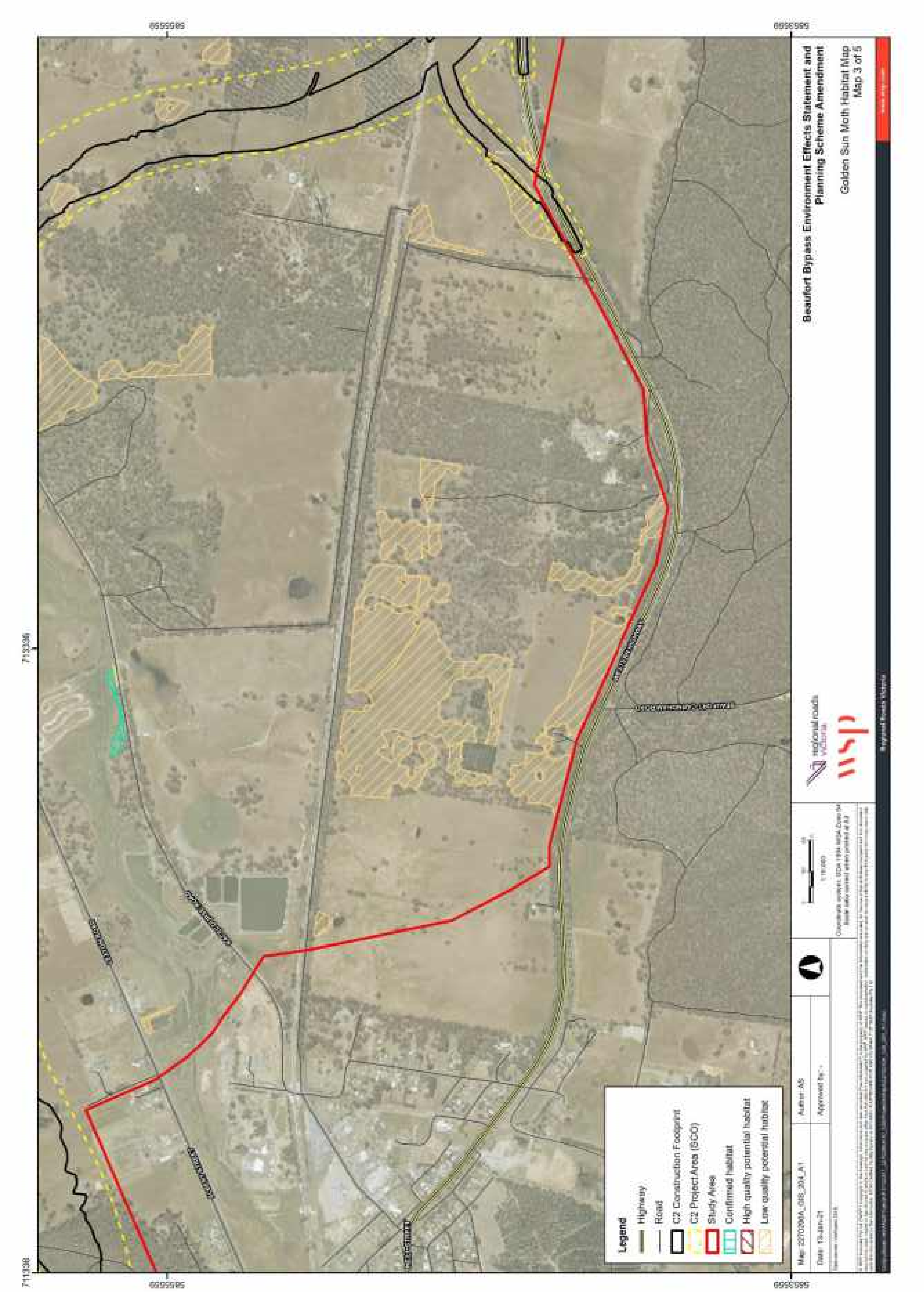
C2 Project Area (SCO)
Study Area
Confirmed habitat
High quality potential habitat
Low quality potential habitat
Beaufort Bypass Environment Effects Statement and
Planning Scheme Amendment
Golden Sun Moth Habitat Map
Map 2 of 5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Golden Sun Moth Habitat Map
Map 3 of 5
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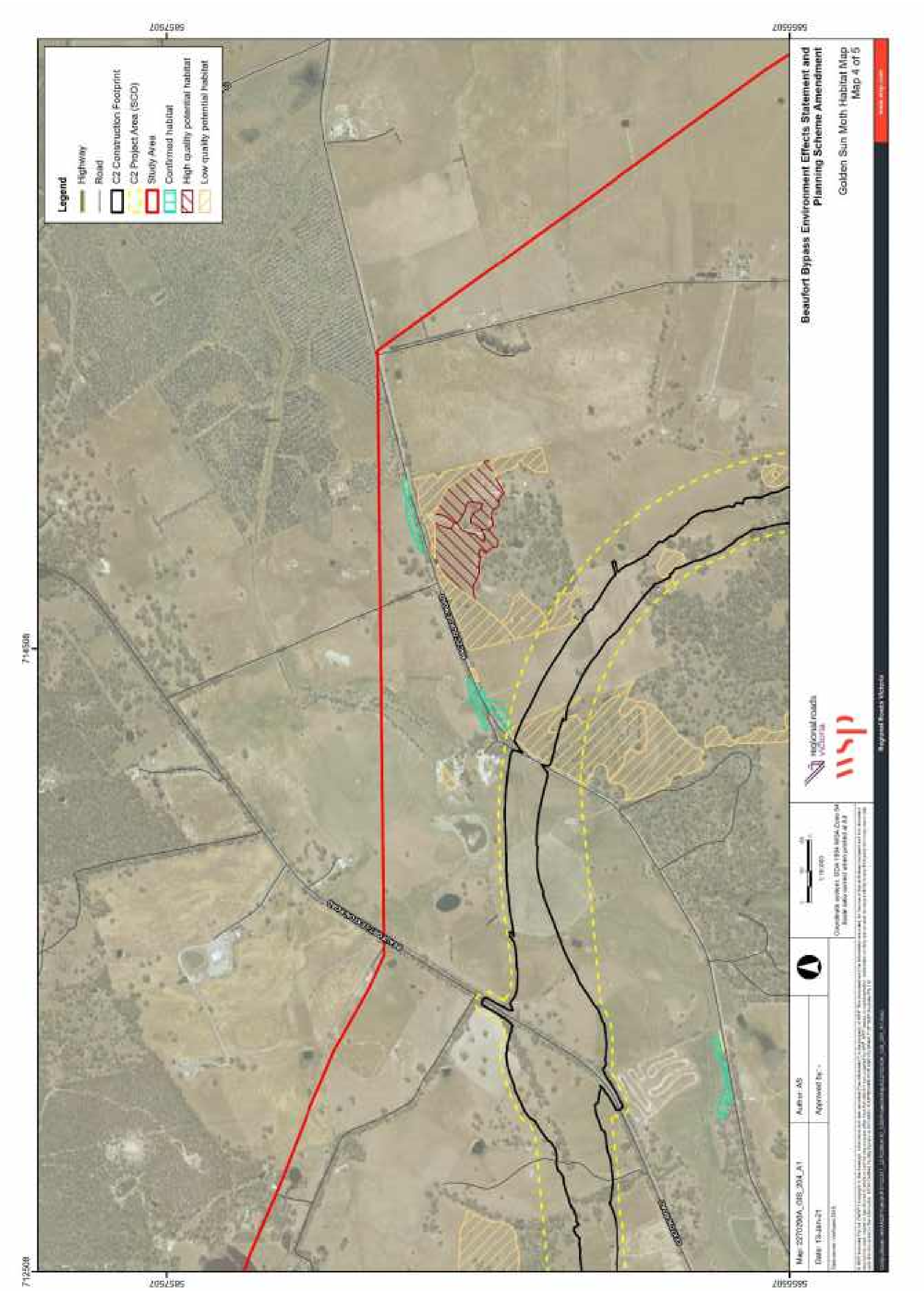
High quality potential habitat
Low quality potential habitat
Author: AS
Approved by: -
Date: 13-Jan-21
regional roads victoria
wsp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Golden Sun Moth Habitat Map
Map 4 of 5
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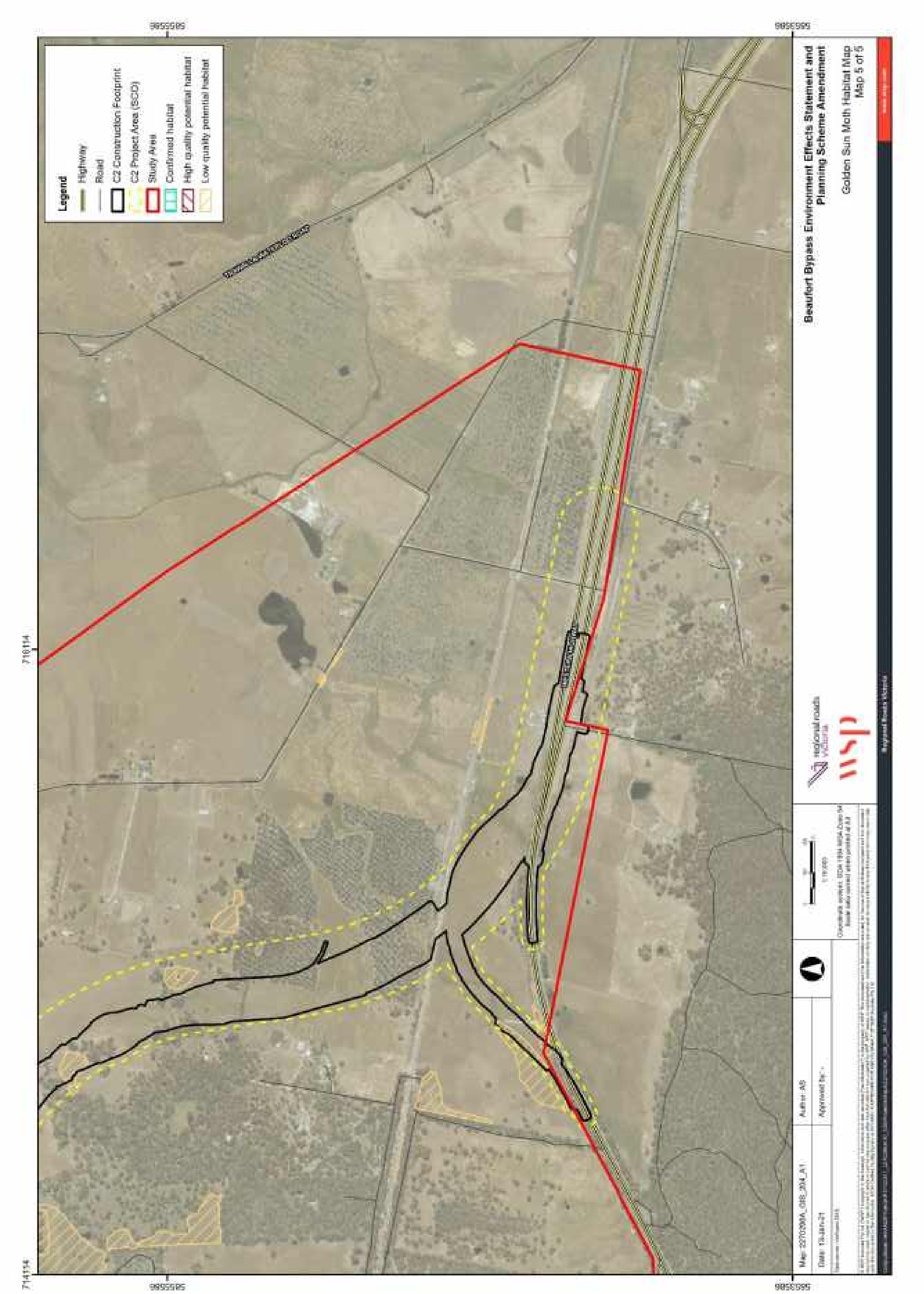
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Study Area
Confirmed habitat
High quality potential habitat
Low quality potential habitat
Beaufort Bypass Environment Effects Statement and Planning Scheme Amendment
Golden Sun Moth Habitat Map
Map 5 of 5

Q3 LITTLE GALAXIAS

The EPBC Act listed Vulnerable Little Galaxias *Galaxiella toourtkoourt* is not currently known to have a self-sustaining population within the study area. The species occurs in waters which have an array of native aquatic vegetation, typically preferring swampy floodplain environments, but can also be found in creeks and rivers.

The Little Galaxias was recorded in Yam Holes Creek near the crossing of Adamthwaite Lane in 2011 and records of Little Galaxias are known for Mt Emu Creek on the Trawalla Waterloo Road in 2008 and Trawalla Road in 2006 (DELWP 2017b). The Mt. Emu Creek population is identified in the National Recovery Plan (Saddlier, Jackson & Hammer 2010). Subsequent investigations (GHD 2015; WSP | Parsons Brinckerhoff 2016) (Rhys Coleman pers. comm. 2014) have all failed to detect Little Galaxias within the study area, including these areas where they have previously been recorded. It is likely that extended dry conditions after 2011 resulted in the loss of the local population/s.

Based on the above, Little Galaxias is not expected to currently occur as a self-sustaining population within the Beaufort Bypass study area. However, Little Galaxias is considered to have a high likelihood of occurrence for the purposes of impact assessment as they may recolonise the catchment under suitable conditions, such as flood events.

Q3.1 IMPACTS

The construction footprint intersects Yam Holes Creek and smaller tributaries and will result in some loss of potential Little Galaxias habitat. The current construction footprint intersects 2.011 km of waterways that are potential habitat for this species (refer to habitat and impact maps, Section Q3.3). It would also require seven creek crossings which could result in fragmentation and shading of potential habitat. Any significant changes in surface water hydrology may have flow on effects for this species as may decreased water quality from erosion, sedimentation and water pollution.

The following provides an assessment under the significant impact guidelines for a Vulnerable species. Note that the conservation status of the Little Galaxias has been assumed based on the EPBC Act status of Dwarf Galaxias, from which this species was recently split.

Q3.2 SIGNIFICANT IMPACT ASSESSMENT

For a Vulnerable species, it is important to first determine whether the population is an ‘important population’.

An ‘important population’ is defined in the significant impact guidelines as:

> *one that is necessary for a species’ long-term survival and recovery.*
>
> *This may include populations identified as such in recovery plans, and/or that are:*
>
> — *key source populations either for breeding or dispersal*
>
> — *populations that are necessary for maintaining genetic diversity, and/or*
>
> — *populations that are near the limit of the species range.*

Source: (Department of the Environment 2013)

Based on this definition, any population at the study area could be considered an important population, as the area occurs at the north-eastern limit of the species’ range. However, we note that any future population in the study area is unlikely to be a key source population or necessary for genetic diversity as it will have been washed in from elsewhere in the catchment.

A significant impact criteria assessment for this species has been completed and is provided below. A significant impact assessment was originally prepared by Streamline Research and has been edited by WSP for the revised construction footprint. With the proposed mitigation, the species is unlikely to be significantly impacted.

Table Q.3 Potential for significant impacts upon Little Galaxias assessed under the EPBC Act Significant Impact Guidelines (Vulnerable Species) (Department of the Environment 2013)

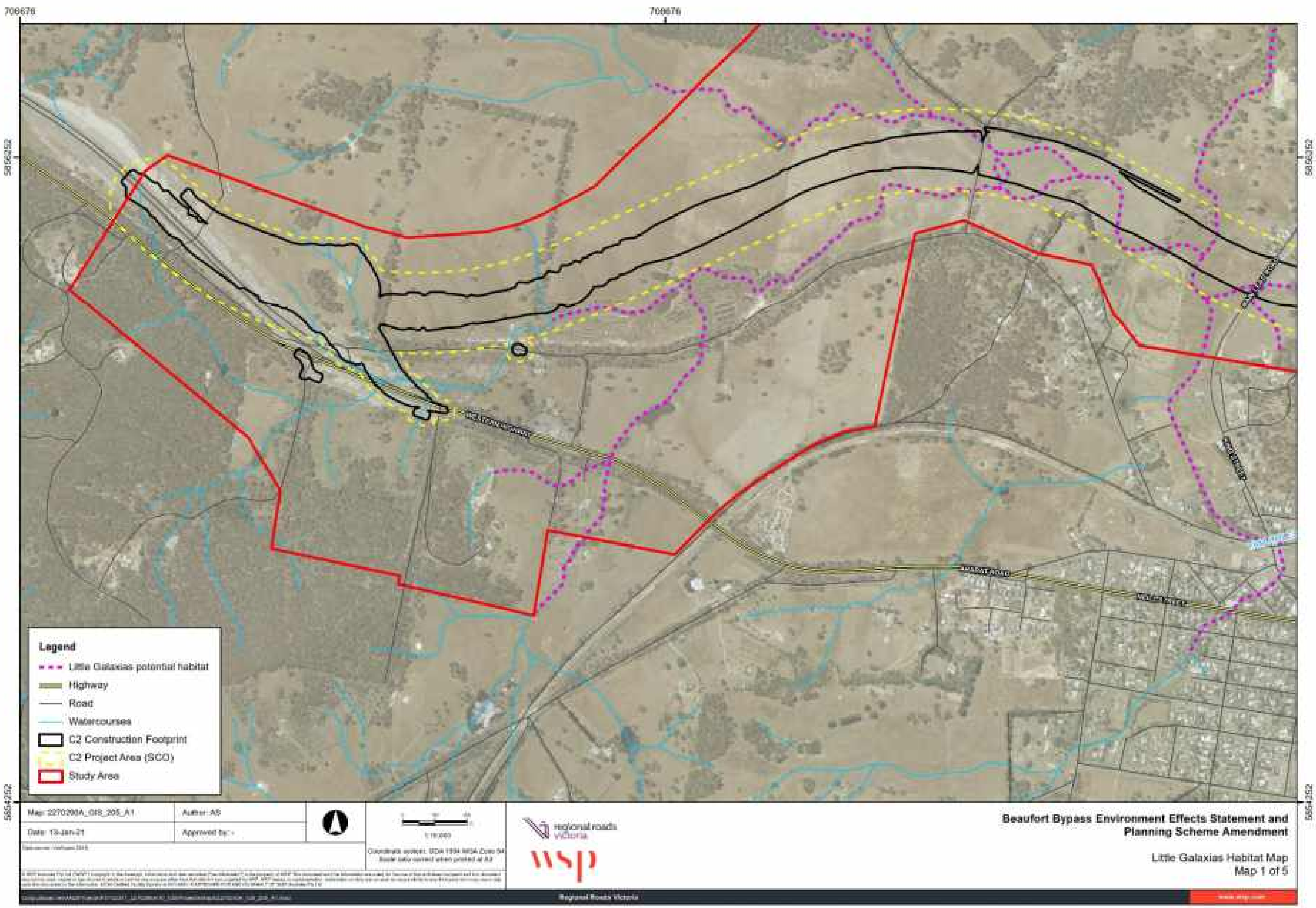
SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF SIGNIFICANT IMPACT WITH MITIGATION
Lead to a long-term decrease in the size of an important population of a species	Whilst the Little Galaxias is not currently known to have a self-sustaining population within any of the seven creek sections that intercept this alignment, it may be dispersed into Yam Holes Creek and tributaries during flood events. If this were to occur, construction and operation may impact on water quality and habitat, which could lead to a long-term decrease in the size of an important Little Galaxias population.	Moderate	No-go zone identification/mapping, fencing and signage to protect retained habitat including a riparian buffer of 30 metres. WSRD elements should be installed where required to minimise changes in surface water flow and quality and should take into consideration potential habitat for this species. Sediment and erosion controls including control measures installed to prevent construction area sediments from entering waterways. Stormwater management: temporary and/or permanent stormwater management devices should be installed and maintained to ensure stormwater quality and quantity is at pre-construction levels and/or meets relevant state guidelines/triggers (e.g. State Environment Protection Policy). Measures to prevent rubbish from entering potential habitat including gross pollutant traps where necessary.	Low
Reduce the area of occupancy of an important population	Apart from a small amount of intrusion into waterways, there will be limited impact to areas that can be occupied by the Little Galaxias. Creek realignments should mean little change to the overall availability of potential habitat.	Low	N/A	

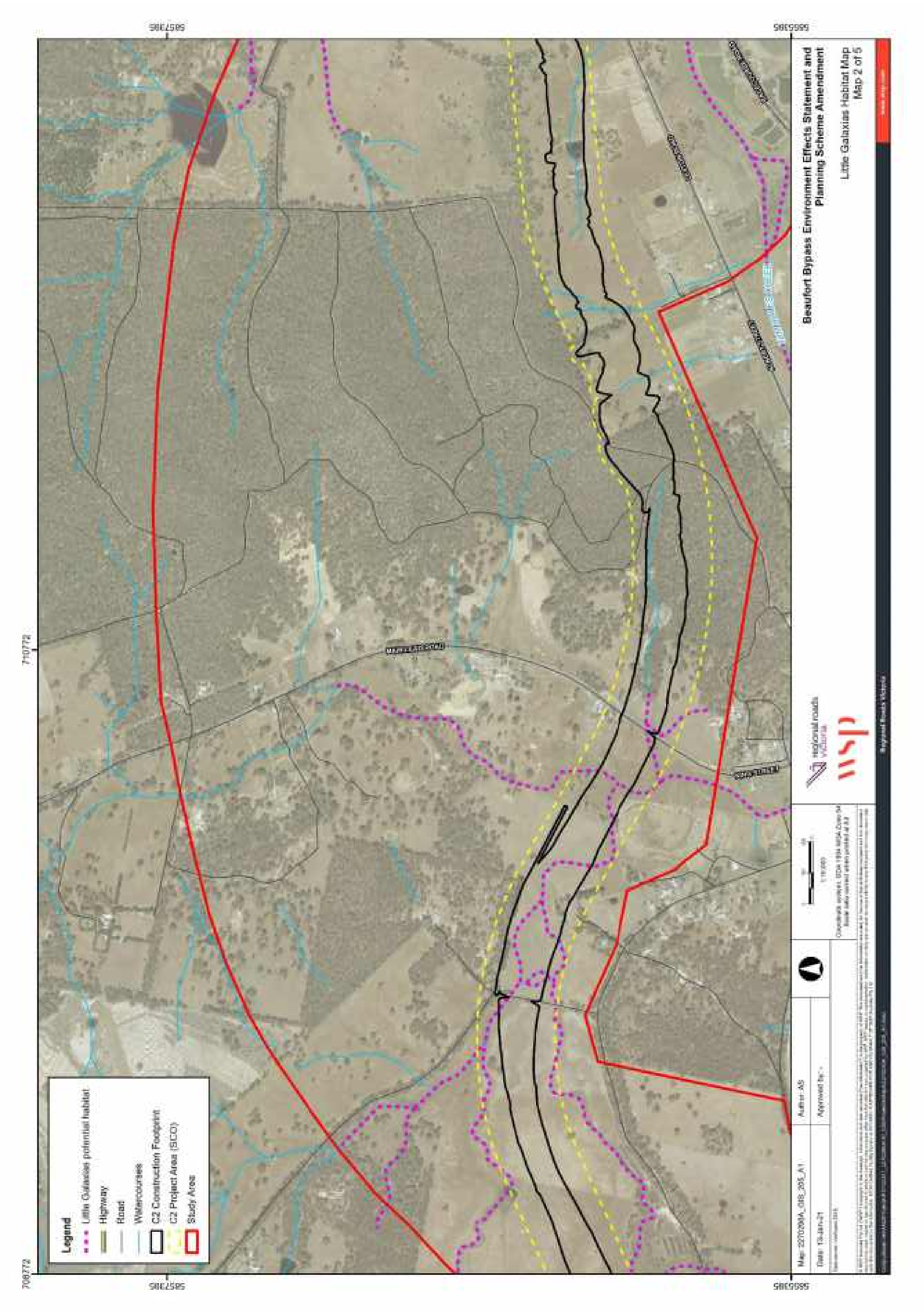
SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF SIGNIFICANT IMPACT WITH MITIGATION
Fragment an existing important population into two or more populations	Fragmentation could occur should culverts be used which do not permit easy movement of the species. Although this would not currently split an important population (as one is not currently present) it could reduce potential future connectivity for an important population.	Low-moderate	During construction works, flow connectivity to be maintained and unimpeded along Yam Holes Creek at all times that water is present and/or during flooding events. Connectivity structures designed specifically for Little Galaxias to be included in the detailed design. Bridges across Yam Holes Creek to maximise connectivity in this area for this species	Low
Adversely affect habitat critical to the survival of a species	Construction will not be in reaches that are critical habitat for the Little Galaxias. The Little Galaxias has a wider natural distribution than the Beaufort area, so proposed road works will not impact on the survival of the species.	Low	N/A	Low
Disrupt the breeding cycle of an important population	The works are to take place in areas which currently do not support Little Galaxias populations. The project is unlikely to impact upon the breeding cycle of an important population of Little Galaxias.	Low	N/A	Low

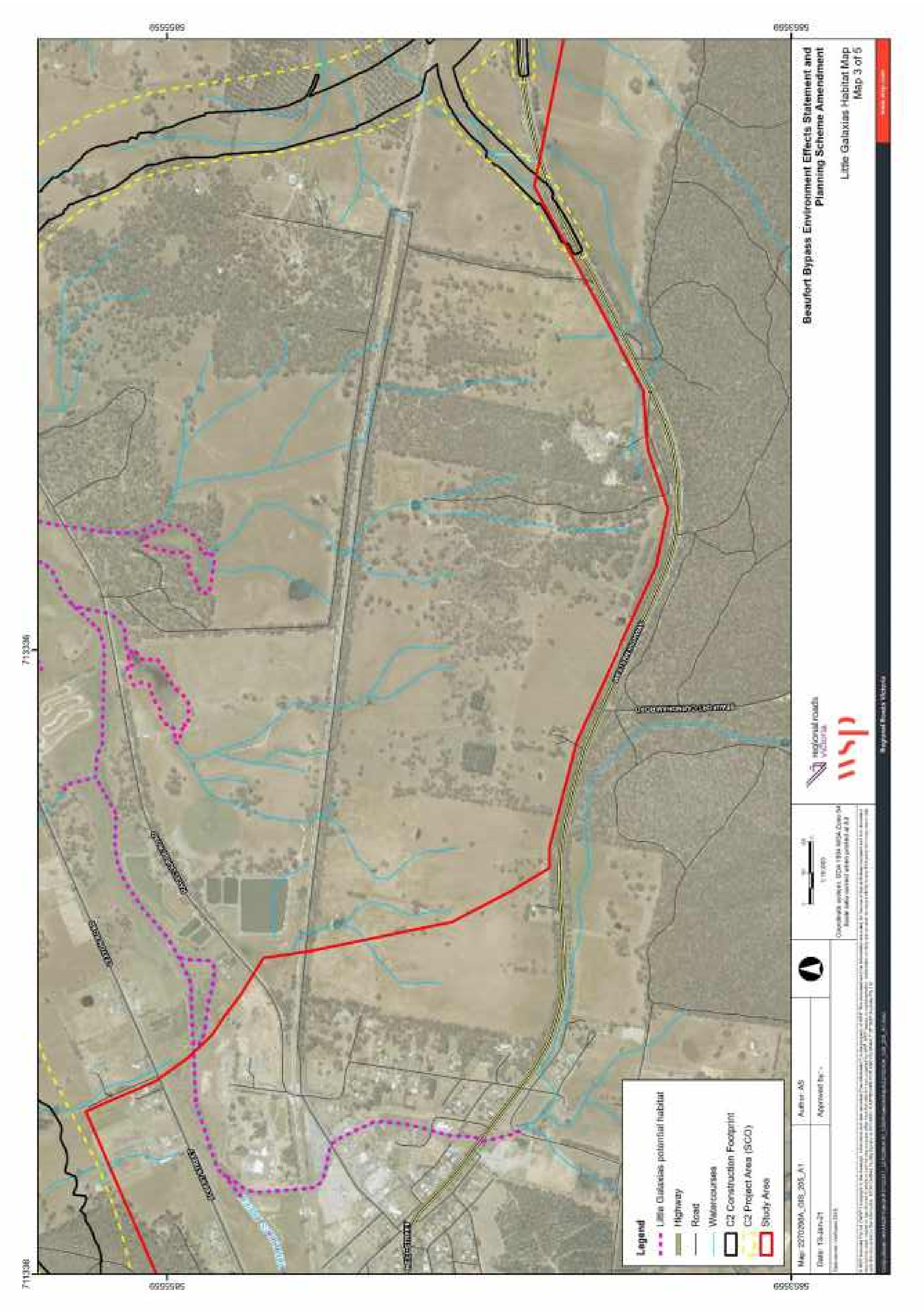
SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF SIGNIFICANT IMPACT WITH MITIGATION
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The Little Galaxias has a natural range through the study area. Therefore, the project could result in modification, destruction, removal or isolation or decrease the availability or quality of habitat to the extent that the species is likely to decline at a local scale.	Low-moderate	No-go zone identification/mapping, fencing and signage to protect retained habitat to include a riparian buffer of 30 metres where possible. WSRD elements where required to minimise surface water and water quality changes, to take into consideration potential habitat for this species. Sediment and erosion controls including control measures installed to prevent construction area sediments from entering waterways. Store fuel and chemicals outside of flood zones and have designated refill areas to minimise the risk of pollution. Develop a contingency plan for containment, treatment and disposal of any spills. Measures to prevent rubbish from entering habitat such as gross pollutant traps, where WSRD is not sufficient.	Low
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The project is unlikely to result in invasive fish, as no waterways will be linked by the road works.	Low	N/A	Low
Introduce disease that may cause the species to decline	The construction activities are unlikely to introduce disease that may cause the Little Galaxias to decline.	Low	N/A	Low

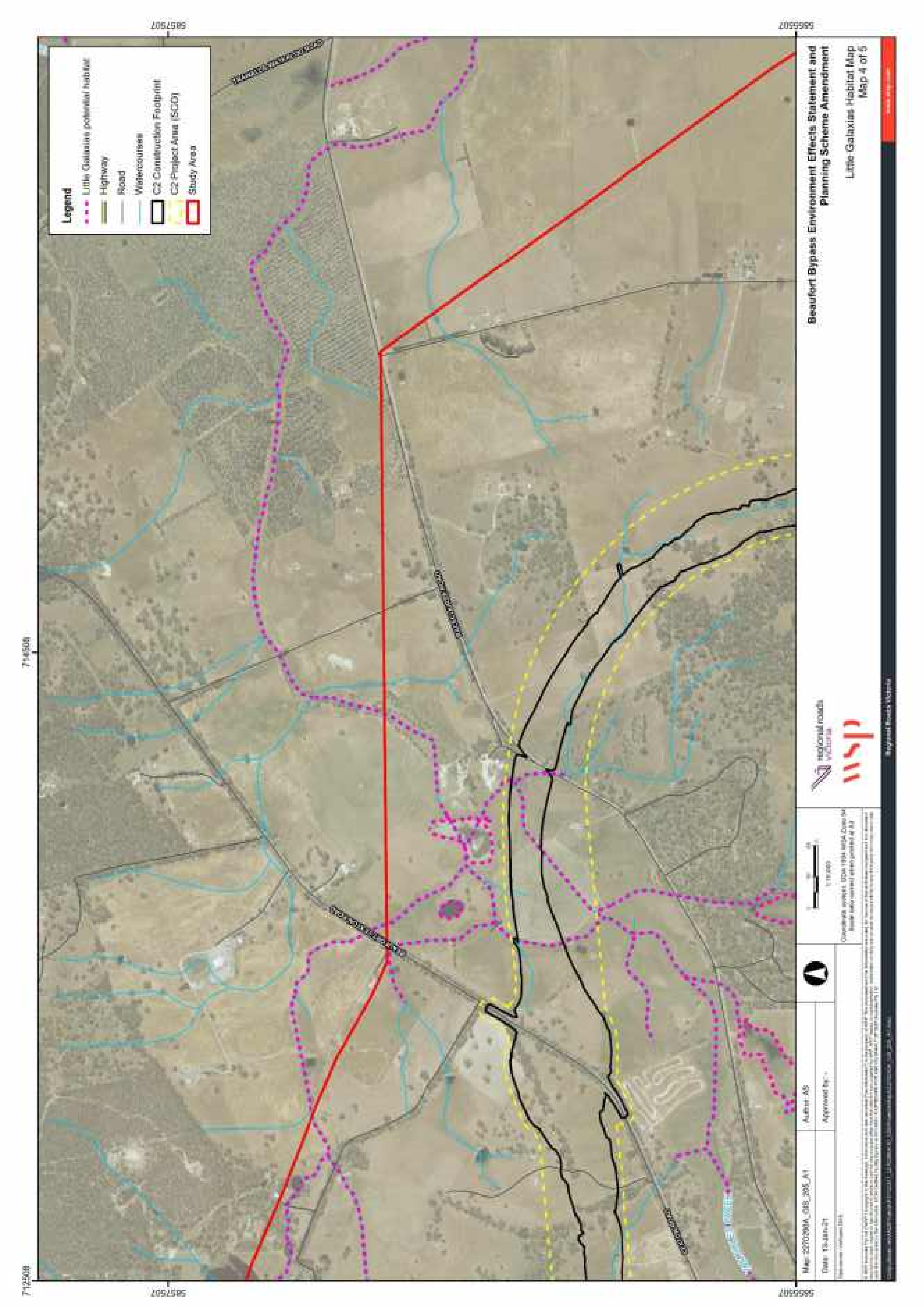
SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF SIGNIFICANT IMPACT WITH MITIGATION
Interfere with the recovery of the species.	The project has potential to interfere with the species' recovery through disruption to habitat connectivity.	Moderate	During construction works, flow connectivity to be maintained and unimpeded along Yam Holes Creek at all times that water is present and/or during flooding events. Connectivity structures for Little Galaxias to be included in the final design. Bridges to be used across Yam Holes Creek to maximise connectivity in this area for this species.	Low
Overall likelihood of a significant impact		Moderate	All mitigation described above.	Low

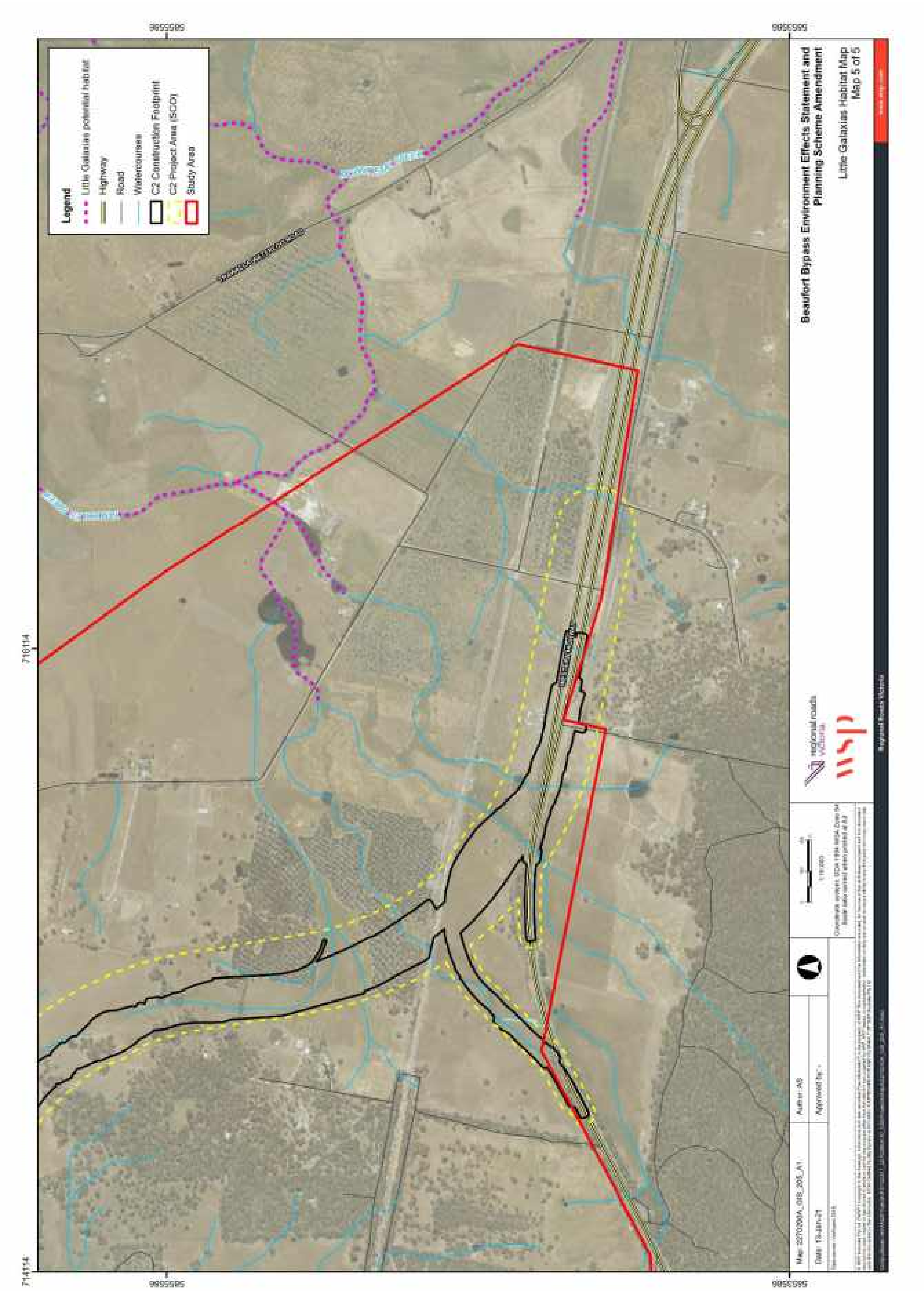
Q3.3 LITTLE GALAXIAS HABITAT AND IMPACT MAPS




Beaufort Bypass Environment Effects Statement and Planning Scheme Amendment
Little Galaxias Habitat Map
Map 2 of 5
Legend
Little Galaxias potential habitat
Highway
Road
Watercourses
C2 Construction Footprint
C2 Project Area (SCO)
Study Area
Author: AS
Approved by: -
Date: 13-Jan-21


Beaufort Bypass Environment Effects Statement and Planning Scheme Amendment
Little Galaxias Habitat Map
Map 3 of 5
Legend
Little Galaxias potential habitat
Highway
Road
Watercourses
C2 Construction Footprint
C2 Project Area (SCO)
Study Area
Author: AS
Approved by: -
Date: 13-Jan-21
regional roads victoria
wsp
Regional Roads Victoria


Legend
Little Galaxias potential habitat
Highway
Road
Watercourses
C2 Construction Footprint
C2 Project Area (SCO)
Study Area
Beaufort Bypass Environment Effects Statement and Planning Scheme Amendment
Little Galaxias Habitat Map
Map 4 of 5
Regional Roads Victoria
wsp


Legend
Little Galaxias potential habitat
Highway
Road
Watercourses
C2 Construction Footprint
C2 Project Area (SCO)
Study Area
Beaufort Bypass Environment Effects Statement and Planning Scheme Amendment
Little Galaxias Habitat Map
Map 5 of 5
Author: AS
Date: 13-Jan-21
regional roads victoria
wsp
Regional Roads Victoria

Q4 PAINTED HONEYEATER

The EPBC Act listed Vulnerable Painted Honeyeater *Grantiella picta* is one of the more specialised honeyeater species. The species displays seasonal north-south movements that closely correspond to the fruiting of mistletoe which constitutes a major component of the species' diet. Painted Honeyeaters also eat arthropods and nectar from flowering mistletoe, eucalypts and possibly banksias. Painted Honeyeaters live in dry forest and woodland habitats. The species is more likely to occur in patches of larger vegetation than in strips of remnant box-ironbark woodlands, such as occur along roadsides and in windbreaks (Garnett & Crowley 2000).

The species has not been formally recorded during any of the surveys undertaken in the study area. There is only one record in the VBA within 10 km of the study area, and this was from over 30 years ago. There are no observations from eBird of this species in the Beaufort area (eBird 2020). However, an unconfirmed, but reasonably reliable, record has been provided by a local landowner on their property (Johnston, H. pers. comm. Nov 2015). The site of the record is located in the north of the study area, west of Camp Hill State Forest on Johnston's Lane, outside of the construction footprint.

Q4.1 IMPACTS

Although 32.800 ha of woodland bird habitat is proposed to be impacted, most of this habitat is unlikely to be utilised by the species. Given the species' preference for larger patches of vegetation, impact on this species will largely occur where the project intersects Camp Hill State Forest. Based on the low number of records around Beaufort, it is unlikely that this habitat is of particularly high significance to the Painted Honeyeater. Other potential impacts on the species include increased habitat fragmentation, although if the habitat is not of high significance, it is unlikely that fragmentation of it would materially impact the species.

Q4.2 SIGNIFICANT IMPACT ASSESSMENT

For a Vulnerable species, it is important to first determine whether the population is an 'important population'.

An 'important population' is defined in the significant impact guidelines as:

> *one that is necessary for a species' long-term survival and recovery.*
>
> *This may include populations identified as such in recovery plans, and/or that are:*
>
> — *key source populations either for breeding or dispersal*
>
> — *populations that are necessary for maintaining genetic diversity, and/or*
>
> — *populations that are near the limit of the species range.*

Source: (Department of the Environment 2013)

Based on this definition, it is unlikely that an important population is present. Based on the low number of records, the potential habitat is likely to be infrequently used for foraging by a low number of birds only. Should a breeding population be present it is expected that there would be more records or observations of the species from the Camp Hill or the broader Beaufort area.

A significant impact criteria assessment for this species has been completed and is provided below. The species is unlikely to be significantly impacted by the project. No mitigation is required for this species.

Table Q.4 Potential for significant impacts upon Painted Honeyeater assessed under the EPBC Act Significant Impact Guidelines (Vulnerable Species) (Department of the Environment 2013)

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF SIGNIFICANT IMPACT WITH MITIGATION
Lead to a long-term decrease in the size of an important population of a species	Important population is unlikely to be present based on the low number of records from the Beaufort area.	Low	N/A	Low
Reduce the area of occupancy of an important population	Important population unlikely to be present.	Low	N/A Although the proposed No go zones will protect retained habitat for this species.	Low
Fragment an existing important population into two or more populations	Important population unlikely to be present.	Low	N/A Although the proposed land bridge at Camp Hill State Forest will help to maintain habitat connectivity for this species.	Low
Adversely affect habitat critical to the survival of a species	Based on the low number of records around Beaufort, it is unlikely that this habitat is of particularly high significance to the Painted Honeyeater and the survival of the species.	Low	N/A	Low
Disrupt the breeding cycle of an important population	Important population unlikely to be present.	Low	N/A	Low
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Based on the low number of records around Beaufort, it is unlikely that loss of some potential habitat in this area would cause decline of the species.	Low	N/A	Low
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The project is unlikely to result in invasive species which could affect habitat quality for this species.	Low	N/A	Low

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF SIGNIFICANT IMPACT WITH MITIGATION
Introduce disease that may cause the species to decline	The project is unlikely to introduce disease that may cause the species to decline.	Low	N/A	Low
Interfere with the recovery of the species.	The project is unlikely to interfere with the species' recovery. Based on the paucity of records, the habitat is unlikely to be of substantial value to the species.	Low	N/A	Low
Overall likelihood of a significant impact		Low	N/A	Low

Q5 MIGRATORY SPECIES: LATHAM'S SNIPE

Fourteen EPBC Act listed Migratory species were listed by the Protected Matters Search Tool as potentially occurring within the study area. There are only records of two of these within 10 km of the study area on the VBA but only one of these, Latham's Snipe *Gallinago hardwickii*, is considered moderately likely to utilise the habitat available in the study area. A non-breeding visitor to south-eastern Australia, Latham's Snipe is a wading bird that inhabits a variety of freshwater permanent and ephemeral wetland habitats that support low, dense vegetation. The species may utilise wetlands within the study area and construction footprint, preferring wetlands with lots of dense fringing vegetation.

Q5.1 IMPACTS

No direct impacts on high quality waterbird habitat are anticipated however loss of 1.520 ha medium-quality waterbird habitat is proposed. Some of this habitat may be visited periodically by Latham's Snipe. There may be a slightly increased risk of increased mortality from road collisions, although the species is not commonly hit on roads in Australia as it tends not to fly low when disturbed. Other potential impacts include reduction in the quality of remaining habitat due to an increase in noise disturbance, visual disturbance, and light pollution. The species is readily disturbed by people and dogs and may be impacted should there be increased access to habitat. In addition, any significant changes in surface water hydrology, including water levels and water quality, may have flow on effects for this species.

An assessment using the significant impact criteria for migratory species has been undertaken and is provided below.

Q5.2 SIGNIFICANT IMPACT ASSESSMENT

IMPORTANT HABITAT

Critical to the assessment of significant impact is the definition of 'important habitat'. The Latham's Snipe is a migratory shorebird. The assessment of important habitat for migratory shorebirds is more specific than the general migratory species definition and is detailed in EPBC Act Policy Statement 3.21 *Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species* (DoEE 2017).

According to (DoEE 2017), wetland habitat should be considered internationally important if it regularly supports:

- 1 per cent of the individuals in a population of one species or subspecies of waterbird, or
- a total abundance of at least 20 000 waterbirds.

Nationally important habitat for migratory shorebirds supports:

- 0.1% of the flyaway population of a single species of migratory shorebird, or
- 2000 migratory shorebirds, or
- 15 migratory shorebird species.

However, for Latham's Snipe, which does not usually congregate in large groups as do other migratory shorebirds, important habitat is further classified by any area that has been previously identified as internationally important for the species, or any area that supports at least 18 individuals of the species (DoEE 2017).

There are only 3 records of Latham's Snipe within 10 km of the study area in the VBA, the most recent being in 2000. The closest two records, about 2 km south of the study area, are of a total of eight birds at/near Beaufort Reservoir. There are also more recent records from 2017 in the Atlas of Living Australia from this location, including of single birds recorded by Birdlife Australia. As such, it appears that the species is an infrequent to regular visitor to the general area in low numbers. However, there are no records within the study area itself, and the species has not been recorded during any surveys conducted for the project. As such, it is highly unlikely that the study area regularly supports at least 18 individuals and therefore unlikely that the study area supports important habitat for the species.

ASSESSMENT

The significant impact criteria for migratory species are detailed below.

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

Criterion 1. *substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species*

Criterion 2. *result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or*

Criterion 3. *seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.*

Source: (Department of the Environment 2013; DoEE 2017)

Latham's Snipe would not be significantly impacted by the project based on the potential habitat present not meeting the definition of 'important habitat' in the significant impact criteria and the lack of an 'ecologically significant proportion' of the population utilising the area. No mitigation is required for this species.

Q6 SEASONAL HERBACEOUS WETLANDS (FRESHWATER) OF THE TEMPERATE LOWLAND PLAINS

The EPBC Act listed Critically Endangered Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains have been recorded within the study area. At the study area, these are freshwater wetlands which are typically inundated on a seasonal basis through rainfall then dry out over summer (WSP 2020a). The majority of vegetation surveys of Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains were assessed in a ‘wet phase’ in mid spring and early summer 2016, which are considered optimum conditions.

The main wetland systems in the Study Area determined to meet the criteria for Seasonal Herbaceous Wetlands are found in the following locations:

- extensive areas along the Yam Holes Creek and valley between Racecourse Road and Beaufort-Lexton Road
- south of Racecourse Road and within the Snow Gums Bushland Reserve
- north of Smiths Lane
- between Martins Lane and Western Highway.

A total of 18.981 ha of seasonal herbaceous wetlands was mapped within the study area.

Q6.1 IMPACTS

0.312 ha of seasonal herbaceous wetlands are within the construction footprint and will be impacted by the project (refer to mapping of impacts and records for EPBC Act MNES, Section Q12). The only direct loss of the community will occur near Yam Holes Creek, where the project will impact part of the wetland complex which is associated with the creek. Other impacts may occur during construction, such as from dust and introduction of weeds. Furthermore, any significant changes in surface water hydrology, including water levels and water quality, may have flow on effects for this community. Groundwater in the study area has been shown to be deep and not connected to the wetlands. As such, no groundwater impacts are anticipated (WSP 2020a).

Q6.2 SIGNIFICANT IMPACT ASSESSMENT

A significant impact assessment has been undertaken and is provided in the following table. Based on this assessment, the project is unlikely to significantly impact the threatened ecological community with the mitigation proposed.

Table Q.5 Potential for significant impacts upon Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains assessed under the EPBC Act Significant Impact Guidelines (Department of the Environment 2013)

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Reduce the extent of an ecological community	Project would clear up 0.312 ha of this community. This amount represents a small area on the edge of a larger wetland complex and a small proportion of the 18.981 ha of this community which was mapped in the broader EES study area. This minor reduction in the extent of lower quality part of this community is unlikely to constitute a significant impact although impacts during construction on retained areas of this community are possible without controls.	Low-moderate	No-go zone identification/mapping, fencing and signage to protect retained wetland areas. Sediment and erosion controls to prevent construction area sediments from entering waterways.	Low
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	The extent of the community within the construction footprint is small and on the edge of the wetland complex. Loss of this area will not fragment the community.	Low	N/A	Low
Adversely affect habitat critical to the survival of an ecological community	The project will adversely affect only a small area of wetland and is unlikely to impact the survival of the remaining wetland complex or the community as a whole.	Low	N/A	Low

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	Without controls, the construction of the road has the potential to modify abiotic factors which could impact the remaining areas of the community. This includes potential changes to surface water hydrology, increased pollution, and spills. Flood modelling, catchment calculations and water quality modelling was undertaken in the Surface Water Report (WSP 2020b). For impacts on flooding regimes, only Wetlands 35649 and 35402 will experience changes in their flooding regimes but these changes are expected to be minimal and mainly occur at the high order events, with most significant impacts occurring within the project boundary. The impacts on the wetlands are therefore considered to be minor. Groundwater in the study area has been shown to be deep and not connected to the wetlands. As such, no groundwater impacts are anticipated (WSP 2020a).	Moderate	WSRD elements to be installed where required to minimise changes in surface water hydrology which may impact this community. Sediment and erosion controls including control measures to prevent construction area sediments from entering waterways. Store fuel and chemicals outside of flood zones and have designated refill areas to minimise the risk of pollution. Develop a contingency plan for containment, treatment and disposal of any spills. Measures to prevent rubbish from entering habitat where required, which may include gross pollutant traps where WSRD elements are not sufficient. Dust controls as appropriate should be utilised to ensure there are no impacts on the community from dust during construction.	Low

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	Surface water changes and introduction and spread of weeds in the community could lead to changes in species composition. — Changes to flooding conditions and water levels in sensitive wetlands caused by clearing of vegetation along the route alignment and cut and fill works to achieve proposed alignment design levels.	Low-moderate	To manage impacts on water quality, sedimentation and increases in flows from road surface, areas for enhanced treatment (e.g. treatment swales, bioretention ponds) are to be built: — Implementing engineering controls and staging rehabilitation of areas during the construction phase to reduce erosion and sediment run-off entering waterways. Hydrological regime to mimic pre-existing conditions to reduce adverse impacts on seasonal wetland hydrology. Habitat restoration or creation of habitat around culverts where new crossings are proposed to include wetland vegetation. Weed and disease controls during construction and road maintenance including monitoring and targeted control.	Low

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: – assisting invasive species, that are harmful to the listed ecological community, to become established, or – causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community	The footprint removes part of a larger wetland complex. The road could result in an increase in weed spread or contaminated run off into the remaining wetland without controls.	Moderate	Measures described above.	Low
Interfere with the recovery of an ecological community	The small area of impact is unlikely to interfere with the recovery of the ecological community.	Low	N/A	Low
Overall likelihood of significant impact	Although the area of clearance is relatively small, without controls, other impacts during construction and operation such as hydrological changes may affect the community outside of the construction footprint.	Moderate	All mitigation described above	Low

Q7 WHITE BOX – YELLOW BOX – BLAKELY'S RED GUM GRASSY WOODLAND

The EPBC Act listed Critically Endangered ecological community White box – Yellow Box – Blakely's Red Gum Grassy Woodland ('Box Gum Woodland') occurs within the study area. The ecological community occurs at the study area as both woodland and derived native grassland patches. In the patches at the study area, Yellow Box is (or was) dominant or co-dominant, and there is a sparse shrub cover and a diverse native grassy groundcover. A total of 31.884 ha of this community was mapped in the study area, with only approximately 0.1 ha of the community occurring in the C2 alignment (part of a larger 2.148 ha patch in the north east of the study area).

Q7.1 IMPACTS

No direct impacts on this community are proposed, as the mapped Box Gum Woodland occurs outside of the current construction footprint. However, the community could be affected by inadvertent clearing, dust and the introduction of weeds during construction. Works are occurring approximately 80 metres from the edge of the closest patch of Box Gum Woodland (refer to mapping of impacts and records for EPBC Act MNES, Section Q12).

Q7.2 SIGNIFICANT IMPACT ASSESSMENT

A significant impact assessment has been undertaken and is provided in the following table. Based on this assessment, the project is unlikely to significantly impact the threatened ecological community. Mitigation will further minimise the risk of impact.

Table Q.6 Potential for significant impacts upon White box – Yellow Box – Blakely's Red Gum Grassy Woodland assessed under the EPBC Act Significant Impact Guidelines (Department of the Environment 2013)

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Reduce the extent of an ecological community	The works would not reduce the extent of this community. Works are occurring approximately 80 m from the nearest patch of this community such that material impacts on retained patches of this community are unlikely.	Low	Precautionary mitigation is recommended: No-go zone identification/mapping, fencing and signage to protect retained threatened community.	Low
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	The project will not fragment the community.	Low	N/A	Low
Adversely affect habitat critical to the survival of an ecological community	The project will not adversely affect habitat critical to the community's survival.	Low	N/A	Low

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	The project is unlikely to affect drainage or other factors which may impact this community as the works are occurring approximately 80 metres from the edge of the closest patch of Box Gum Woodland.	Low	N/A	Low
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	Species composition could be affected by dust, rubbish and weeds introduced during construction or operation of the road. However, as works are occurring approximately 80 m from the community, impacts are likely to be negligible.	Low	Precautionary mitigation is recommended to further reduce the risk, to include the following. Measures to prevent rubbish from entering habitat, which may include roadside fencing where appropriate. Dust screens or other controls as appropriate should be utilised to ensure there are no impacts on the community from dust during construction. Weed and disease controls during construction and road maintenance including monitoring and targeted control.	Low
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: – assisting invasive species, that are harmful to the listed ecological community, to become established, or – causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community	Given the distance of the construction footprint from the community (approximately 80 m), works are unlikely to cause a substantial reduction in the quality or integrity the ecological community.	Low	N/A	Low

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Interfere with the recovery of an ecological community	The project is unlikely to interfere with the recovery of the ecological community.	Low	N/A	Low
Overall likelihood of significant impact	Although none of this community is proposed to be cleared, other impacts during construction and operation may affect the community outside of the construction footprint.	Low	N/A	Low

Q8 RIVER SWAMP WALLABY-GRASS

The EPBC Act listed Vulnerable River Swamp Wallaby-grass *Amphibromus fluitans* is a rhizomatous and stoloniferous aquatic or semi-aquatic grass found across northern Victoria on the Murray River and with a scattered, uncommon distribution across southern Victoria (RBGV 2020). Prior to the targeted surveys in 2015 for the Beaufort Bypass (WSP | Parsons Brinckerhoff 2016), there were no records of this species in the broader region.

This species can be difficult to differentiate from other *Amphibromus spp.* due to the interpretation of the key morphological characteristics through the different growth phases. These characteristics are heavily influenced by soil moisture and water depth (if growing in water). All plants recorded in the study area in 2015 were found in the drier mud and drawdown areas of wetlands, mostly in full flower which facilitated identification. In 2016 and 2017, all plants were identified in flower, many growing in water. Two voucher specimens with seeds (NM00353 and NM00356) were lodged with National Herbarium of Victoria in 2015 and confirmed as *Amphibromus fluitans.*

In the study area, the species has mostly been found in the EVCs Aquatic Grassy Wetland, Aquatic Herbland and Plains Grassy Wetland, growing in water 0.5–1 m deep, wetland edges or on the floor of wetlands in drawdown phase.

Thirty-six new records of River Swamp Wallaby-grass have been made during current surveys in 2015–2017, with each record corresponding to patch of the species (often a single wetland or dam). Most records comprised many plants, however, it is difficult to estimate numbers of individuals due to its rhizomatous form. There are very few records (five) west of Ballarat according to VBA, so these records are an addition to the known distribution. The records were scattered across various wetlands and farm dams. The different sites are interconnected by water, wind or bird dispersal from one or more source populations.

Q8.1 IMPACT SUMMARY

One occurrence of River Swamp Wallaby-grass is located in a dam which is partially within the construction footprint off Topp Lane and which will be impacted. The area of the dam to be impacted is approximately 300 m^2 (0.03 ha) (refer to mapping of impacts and records for EPBC Act MNES, Section Q12).

The closest other record occurs approximately 55 metres from the construction footprint within the project area. This record is located west of Main Lead Road and is not proposed to be directly impacted. Other records of the species are located outside of the project area.

Impacts on the species outside of the construction footprint may occur from construction without the implementation of mitigation measures, particularly from dust and weeds. Furthermore, any significant changes in surface water hydrology, including water levels and water quality, may have flow on effects for this species due to the high degree of hydrological connectivity between the construction footprint and habitat supporting the species in the landscape.

Q8.2 SIGNIFICANT IMPACT ASSESSMENT

For a Vulnerable species, it is important to first determine whether the population is an ‘important population’.

An ‘important population’ is defined in the significant impact guidelines as:

> *one that is necessary for a species’ long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:*
>
> - *key source populations either for breeding or dispersal*
> - *populations that are necessary for maintaining genetic diversity, and/or*
> - *populations that are near the limit of the species range.*

Source: (Department of the Environment 2013)

Based on this definition, populations in the study area could be considered an important population, as the area is a disjunct location and is appears to be a north-western limit of the species' range. However, each individual site is not necessarily an important population on its own.

A significant impact criteria assessment has been undertaken in accordance with the EPBC Act Significant Impact Guidelines for a Vulnerable species outlined in the *Matters of National Environmental Significance – Significant Impact Guidelines* (Department of the Environment 2013). Based on the current proposed design and construction footprint, a significant impact upon the species is considered unlikely with the proposed mitigation.

Table Q.7 Significant impact assessment for River Swamp Wallaby-grass as per the EPBC Act Significant Impact Guidelines (Vulnerable Species) (Department of the Environment 2013)

IMPACT THRESHOLD AND DETAILS	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Lead to a long-term decrease in the size of an important population of a species.	River Swamp Wallaby-grass was recorded within the construction footprint in a dam off Topp Lane which will be impacted as a result of the proposed works. As the site of impact is small (approx 300 m^2 / 0.03 ha) the removal is unlikely to have a material impact on the size of the important population as a whole. Other records are located outside the construction footprint, with the closest being approximately 55 m from the construction footprint. Based on the distance of the works from this record (and other more distant records within the study area), indirect impacts on these occurrences are unlikely. Some precautionary mitigation is recommended, particularly for erosion, dust, hydrological changes and pollution.	Low	Precautionary mitigation includes: Pre-clearing survey for threatened flora to identify and, where possible, protect any new/additional occurrences in the project area. Erosion and sedimentation controls to protect wetland habitat Dust controls, which may include dust screens where works are occurring near wetland habitat. Implement measures to prevent rubbish from entering wetland habitat, where feasible. Utilise WSRD elements to ensure that changes to drainage and water quality which may affect this species do not occur. Consider collecting seed from the impacted site and propagate for use in WSRD ponds.	Low

IMPACT THRESHOLD AND DETAILS	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Reduce the area of occupancy of an important population	The site to be impacted covers an area of approximately 300 m^2 (0.03 ha). While this alignment will reduce the area of occupancy the species is likely to be able to spread and colonise other dams and waterways in the area. Indirect impacts of the project could also impact area of occupancy for this species outside of the construction footprint.	Moderate	Utilise WSRD elements to ensure that changes to drainage and water quality which may affect this species do not occur. WSRD elements to include ponds or swales which could be colonised by this species. Ponds at culverts entrances (e.g. for Growling Grass Frog connectivity) may also be appropriate for this species. Consider collecting seed from the impacted population and propagate for use in WSRD ponds.	Low
Fragment an existing important population into two or more populations.	Populations of River Swamp Wallaby-grass in the study area are already spread across the study area and seeds and propagules are likely spread by wind, water and via waterbirds. The project will not further contribute to fragmentation of the population.	Low	N/A	Low
Adversely affect habitat critical to the survival of a species.	The habitat along this alignment is unlikely to be critical to this species survival as there are many other similar dams and drainage lines in the area.	Low	N/A	Low
Disrupt the breeding cycle of an important population.	The project will not disrupt the breeding cycle of the species which reproduces by rhizomes (asexual spreading) and sexually (abiotic pollination which would not be affected by the project).	Low	N/A	Low
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	The habitat along this alignment is unlikely to be critical to this species' survival as there are many other similar dams and drainage lines in the area. Loss of these sites is unlikely to cause a decline in species.	Low	N/A	Low

IMPACT THRESHOLD AND DETAILS	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.	Roads can contribute to weed spread both during construction and ongoing from cars and construction vehicles bringing seeds into the area. Vegetation clearing also leaves vacant land along road verges that fast colonising species can take advantage of.	Moderate	Weed management, monitoring, and control measures incorporated into a CEMP to protect retained habitat.	Low
Introduce disease that may cause the species to decline.	There are no known disease risks for this species.	Low	N/A	Low
Interfere substantially with the recovery of the species.	There is no recovery plan for this species, however the project is unlikely to affect the recovery of this species.	Low	N/A	Low
Overall likelihood of a significant impact		Low-moderate	All measures detailed above.	Low

Q9 MATTED FLAX-LILY

The EPBC Act listed Endangered Matted Flax-lily *Dianella amoena* is a small, perennial, tufted lily (Carter 2010), endemic to Victoria. Several Matted Flax-lily plants were detected in the study area. Searches were conducted primarily in the preferred EVCs: Valley Grassy Forest, Grassy Woodland and Alluvial Terraces Herb-rich Woodland; with micro-site preference of remnant roadsides, rail corridors and along fence lines. Individual plants are difficult to isolate as Matted Flax-lily is rhizomatous and one plant can spread for up to 20 x 20 m with many isolated individual shoots (Carter 2010), however individuals usually occupy a much smaller area. In a study by (North Barker Ecosystem Services 2009), they assumed that a single plant occupied 3 m^2 in larger patches. Therefore, for the Beaufort Bypass, new locations marked with a GPS were typically recorded where there are gaps in vegetative shoots of over 5 m.

Fifteen new occurrences of Matted Flax-lily were recorded in the study area. There are very few records of this species west of Ballarat recorded in the VBA, so these records are an extension to the known distribution. A voucher specimen with flowers was lodged with National Herbarium of Victoria in 2015 (NM00356) and confirmed as *Dianella amoena* in (WSP | Parsons Brinckerhoff 2016).

Q9.1 IMPACTS

Two records of Matted flax-lily were made within the project area (refer to mapping of impacts and records for EPBC Act MNES, Section Q12). One is located within the construction footprint and will be impacted, the other is located outside the construction footprint by approximately 75 m. Impacts on the species from construction may occur without mitigation, particularly from dust, weeds, or inadvertent clearing.

Material impacts from surface water changes are unlikely as a tributary nearby is to be realigned and is downslope of the location of the retained Matted Flax-lily.

Q9.2 SIGNIFICANT IMPACT ASSESSMENT

A significant impact criteria assessment has been undertaken in accordance with the EPBC Act Significant Impact Guidelines for an Endangered species outlined in the *Matters of National Environmental Significance – Significant Impact Guidelines* (Department of the Environment 2013). Based on the current proposed design and construction footprint, a significant impact upon the species is considered unlikely with the proposed mitigation.

Table Q.8 Significant impact assessment for Matted Flax-lily as per the EPBC Act Significant Impact Guidelines (Endangered Species) (Department of the Environment 2013)

IMPACT THRESHOLD AND DETAILS	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Lead to a long-term decrease in the size of a population	One record of the species is currently proposed to be impacted. This is unlikely to result in a material long-term decrease in the size of a population. Precautionary mitigation measures are recommended due to the high conservation significance of the species.	Low	Precautionary mitigation is recommended, including: Avoidance of impacts on second Matted Flax-lily plant through use of No-go Zones to protect retained individual plant and habitat. Pre-clearing survey for threatened flora to identify and (where possible) protect any additional plants. For any plants which cannot be avoided (currently only one plant/clump likely to be impacted), translocation should occur in accordance with the Procedures Statement for the Translocation of Threatened Native Flora in Victoria (DEPI 2013) and the Guidelines for the Translocation of Threatened Plants in Australia (Commander et al. 2018).	Low
Reduce the area of occupancy of the species	The works may reduce the area of occupancy of the species through the direct loss of potential habitat, although this habitat is currently only known to support one plant. Measures to minimise the potential for indirect impacts from construction and operation on retained habitat and potential future habitat are recommended.	Moderate	No-go zone identification/mapping, fencing and signage to protect retained occurrence and other native vegetation (which could support this species in future). Pre-clearing survey for threatened flora to identify and (where possible) protect any additional plants. Weed and disease controls to protect retained potential habitat. Dust controls during construction. Implement measures to minimise rubbish from entering habitat where practicable.	Low

IMPACT THRESHOLD AND DETAILS	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Fragment an existing population into two or more populations	Records for this species are scattered around the Beaufort area. The habitat and population is already fragmented. The road may further contribute to this and potentially reduce gene flow and movement of pollinators (native bees) and seed dispersers (frugivorous birds) however this is considered unlikely to result in complete fragmentation of the local population.	Low-Moderate	No-go Zones to protect retained habitat and other native vegetation, which would support native pollinators and seed dispersers. Restoration and revegetation as part of the landscape plan to encourage interaction between populations through movement of pollinators and seed dispersers.	Low
Adversely affect habitat critical to the survival of a species	The habitat in this alignment is unlikely to be critical to the survival of the species based on the low density of records.	Low	N/A	Low
Disrupt the breeding cycle of a population	The project would not disrupt the breeding cycle of a population.	Low	N/A	Low
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The loss of some habitat (supporting only one known individual) is unlikely to cause the species to decline.	Low	N/A	Low
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Weed invasion is identified as a key current threat in the species National Recovery Plan (Carter 2010). It is likely that construction and ground disturbance may increase weed incursion in the area. However, it is unlikely to have a significant impact on the species. This is evident from the fact that the recorded populations of this species located in/near this alignment already occur in a highly modified environment with a high density of weeds. Precautionary mitigation is recommended to minimise the risk of new high threat weeds becoming established.	Low	Precautionary mitigation is recommended: Weed management, monitoring, and control measures to protect retained habitat.	Low
Introduce disease that may cause the species to decline	There are no known disease risks for this species.	Low	N/A	Low

IMPACT THRESHOLD AND DETAILS	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Interfere with the recovery of the species.	'Manage threats to populations' is identified in the National Recovery Plan for the species (Carter 2010). This project may threaten small populations of the species however this is unlikely to interfere with the recovery of the species as a whole.	Low	N/A	Low
Overall likelihood of a significant impact		Low-moderate	All measures detailed above.	Low

Q10 BEN MAJOR GREVILLEA

The EPBC Act listed Vulnerable Ben Major Grevillea *Grevillea floripendula* is a spreading decumbent to semi-prostrate shrub that can grow up to 1 m tall. It is restricted to a small area north of Beaufort to Ben Major State Forest and grows in dry open forests on shallow quartzitic soils (Walsh & Entwistle 1996). There are two forms of Ben Major Grevillea of which only one, the Musical Gully form, was recorded in the study area. It occurs north of Beaufort in Camp Hill State Forest and Musical Gully State Forest.

Targeted searches were conducted throughout intact Heathy Dry Forest, Grassy Dry Forest and related Ecological Vegetation Class complexes, mostly through Camp Hill State Forest and intact private land sites between Camp Hill State Forest and Musical Gully State Forest. Other private properties supporting relatively intact vegetation in the east and west of the study area were also searched for this species.

Many records in the VBA, occurring as individual data points and from monitoring data, are located in the study area. Each of the previous recorded occurrence points were visited in 2015, 2016 and 2017 by WSP. During targeted searches, approximately 65 new locations supporting approximately 662 individual Ben Major Grevillea plants were found in the Camp Hill State Forest which were not previously recorded in the VBA.

Q10.1 IMPACTS

The alignment passes through the southern part of Camp Hill State Forest and north of the Camp Hill Recreation Reserve, at the southern limit of the species known range. Several Ben Major Grevillea plants were recorded just north of the construction footprint within the state forest with three of these occurring within the project area (refer to mapping of impacts and records for EPBC Act MNES, Section Q12). The construction footprint passes approximately 10 m to the closest one. In this area, a fire track is proposed to be constructed. Impacts on the species from construction may occur without mitigation, particularly from dust, weeds, or unapproved clearing.

Material impacts from surface water changes are highly unlikely as only a fire track is proposed nearby the recorded plants while the bypass itself is located downslope of these records and in a cutting.

Q10.2 SIGNIFICANT IMPACT ASSESSMENT

For a Vulnerable species, it is important to first determine whether the population is an ‘important population’.

An ‘important population’ is defined in the significant impact guidelines as:

> *one that is necessary for a species’ long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:*
>
> – *key source populations either for breeding or dispersal*
>
> – *populations that are necessary for maintaining genetic diversity, and/or*
>
> – *populations that are near the limit of the species range.*

Source: (Department of the Environment 2013)

Given the above definition, populations of Ben Major Grevillea within the study area may be considered to be an important population as they are at the limit of their natural known range. A significant impact criteria assessment has been undertaken in accordance with the EPBC Act Significant Impact Guidelines for a Vulnerable species outlined in the *Matters of National Environmental Significance – Significant Impact Guidelines* (Department of the Environment 2013). Based on the current proposed design and construction footprint, a significant impact upon the species is considered unlikely providing the proposed mitigation measures are implemented.

Table Q.9 Significant impact assessment for Ben Major Grevillea as per the EPBC Act Significant Impact Guidelines (Vulnerable Species) (Department of the Environment 2013)

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF SIGNIFICANT IMPACT WITH MITIGATION
Lead to a long-term decrease in the size of an important population of a species	Alignment avoids all individuals recorded during surveys however the current construction footprint passes in close proximity to the species where a fire track is proposed to be constructed. Impacts on the species from construction may occur without mitigation, particularly from dust, weeds, or inadvertent clearing. Despite this, any minor impacts are unlikely to lead to a long-term decrease in the size of an important population of Ben Major Grevillea. Precautionary mitigation is recommended.	Low	The following precautionary measures are recommended. No-go zone identification/mapping, fencing and signage to protect retained habitat and individual specimens. Pre-clearing survey for threatened flora at Camp Hill to find and (where possible) protect any new plants in the project area. Dust controls should be utilised in this location to ensure there are no impacts on the nearby plants as a result of dust from the construction of the fire track. Weed management, monitoring, and control measures to protect retained habitat.	Low
Reduce the area of occupancy of an important population	The project would not impact known habitat, however potential habitat adjacent to known records is proposed to be cleared. This is unlikely to reduce the area of occupancy of the population.	Low	N/A	Low
Fragment an existing important population into two or more populations	Alignment will not fragment existing populations.	Low	N/A	Low
Adversely affect habitat critical to the survival of a species	Alignment avoids the critical (occupied) habitat for this species within the study area.	Low	N/A	Low
Disrupt the breeding cycle of an important population	This alignment is unlikely to disrupt the breeding of this population.	Low	N/A	Low

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF SIGNIFICANT IMPACT WITH MITIGATION
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Alignment will reduce the size of potential habitat available but unlikely to the extent that the species will decline.	Low	N/A	Low
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The construction footprint is close to records of this species (occupied habitat) which currently supports a low density of weeds. Road construction could facilitate weed spread into this area through construction machinery and track use.	Moderate	Weed management, monitoring, and control measures to protect retained habitat.	Low
Introduce disease that may cause the species to decline	There are no known disease risks for this species. An unidentified leaf defoliation/miner pest was observed on plants in 2018 (N. McCaffrey pers. obs.) which caused leaf damage to multiple plants however these plants have since recovered (2019, 2020).	Low	N/A	Low
Interfere substantially with the recovery of the species	As the alignment does not directly impact any known individuals of this species, it is unlikely to interfere substantially with the recovery of this species. Location of the proposed freeway may reduce dependence of fuel-reduction burning to protect the township therefore reduce the negative effects of repeated burning on Ben Major Grevillea.	Low	N/A	Low
Overall likelihood of a significant impact		Low-moderate	All mitigation described above.	Low

Q11 ORNATE PINK FINGERS

The EPBC Act listed Vulnerable Ornate Pink Fingers *Caladenia ornata* is a terrestrial orchid which grows 10–18 cm tall. Endemic to Victoria, it grows in heathy forest on seasonally moist sandy loam soils (RBGV 2020).

Previous to the Beaufort Bypass assessment, Ornate Pink Fingers had only been recorded around Stawell and in areas south west of Victoria. One specimen was recorded during the surveys in 2016 and more individuals were recorded in October 2017 through Camp Hill State Forest and on a private land block. In some areas, where it grows with the more common Pink Fingers *Caladenia carnea*, specimens can be difficult to distinguish from each other (RBGV 2020). This was evident in Camp Hill State Forest where Ornate Pink Fingers were intermixed with Pink Fingers. It is possible that these species are hybridising in this location. Overall, targeted surveys located eight new records for this species within the study area. Note that intermediate specimens are not included in this count.

Q11.1 IMPACTS

The construction footprint avoids all known occurrences of Ornate Pink Fingers, with the nearest records located >500 m away (refer to mapping of impacts and records for EPBC Act MNES, Section Q12).

Q11.2 SIGNIFICANT IMPACT ASSESSMENT

For a Vulnerable species, it is important to first determine whether the population is an ‘important population’.

An ‘important population’ is defined in the significant impact guidelines as:

> *one that is necessary for a species’ long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:*
>
> - *key source populations either for breeding or dispersal*
> - *populations that are necessary for maintaining genetic diversity, and/or*
> - *populations that are near the limit of the species range.*

Source: (Department of the Environment 2013)

Targeted surveys located eight new records for this species within the study area. There were no previous records for this species within 10 km on the VBA. For this reason, it will be considered an important population.

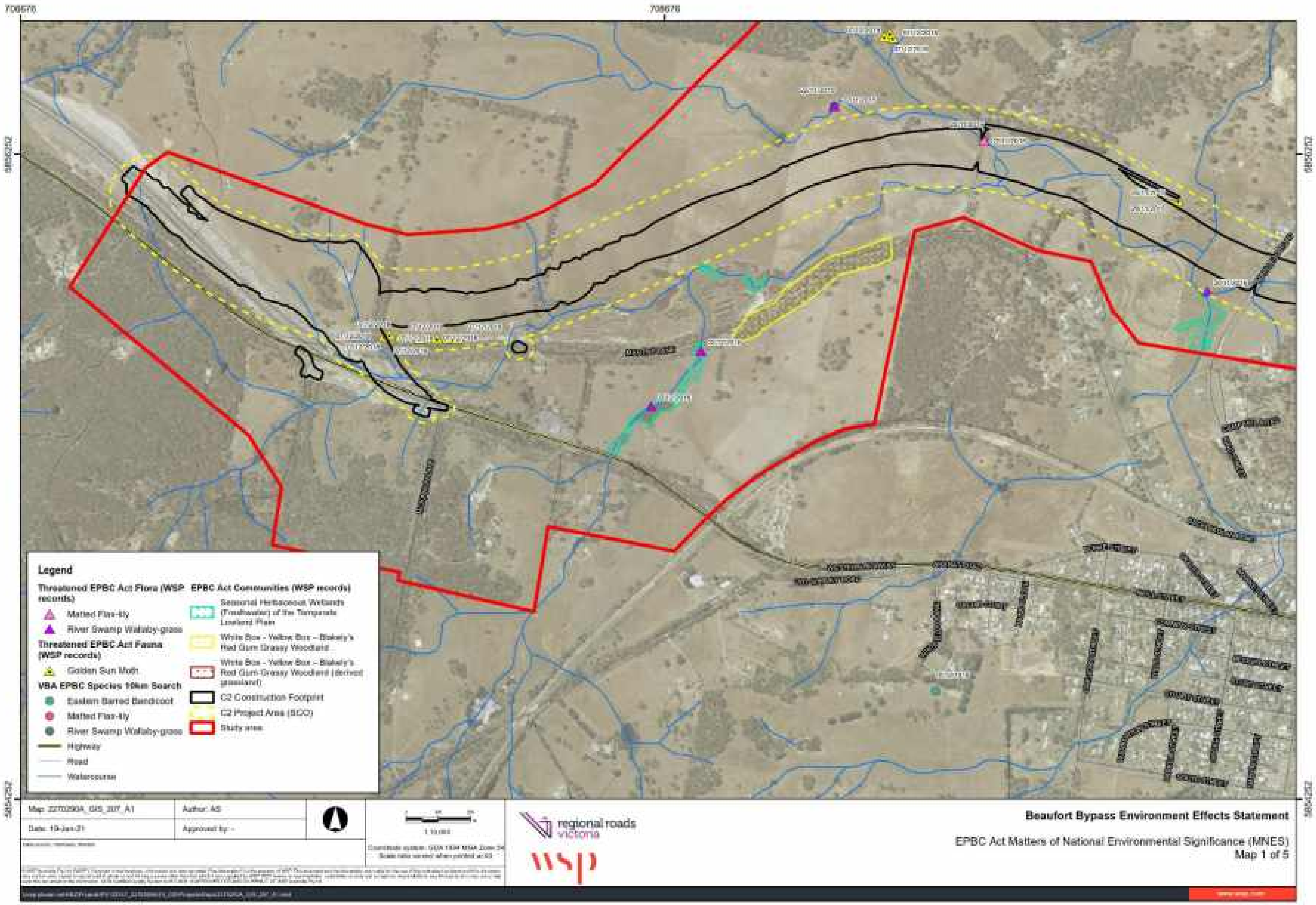
A significant impact criteria assessment has been undertaken in accordance with the EPBC Act Significant Impact Guidelines for a Vulnerable species outlined in the *Matters of National Environmental Significance – Significant Impact Guidelines* (Department of the Environment 2013). Based on the current proposed design and construction footprint, which avoids all records of Ornate Pink Fingers, a significant impact upon the species is considered unlikely. Mitigation specifically for this species is not required.

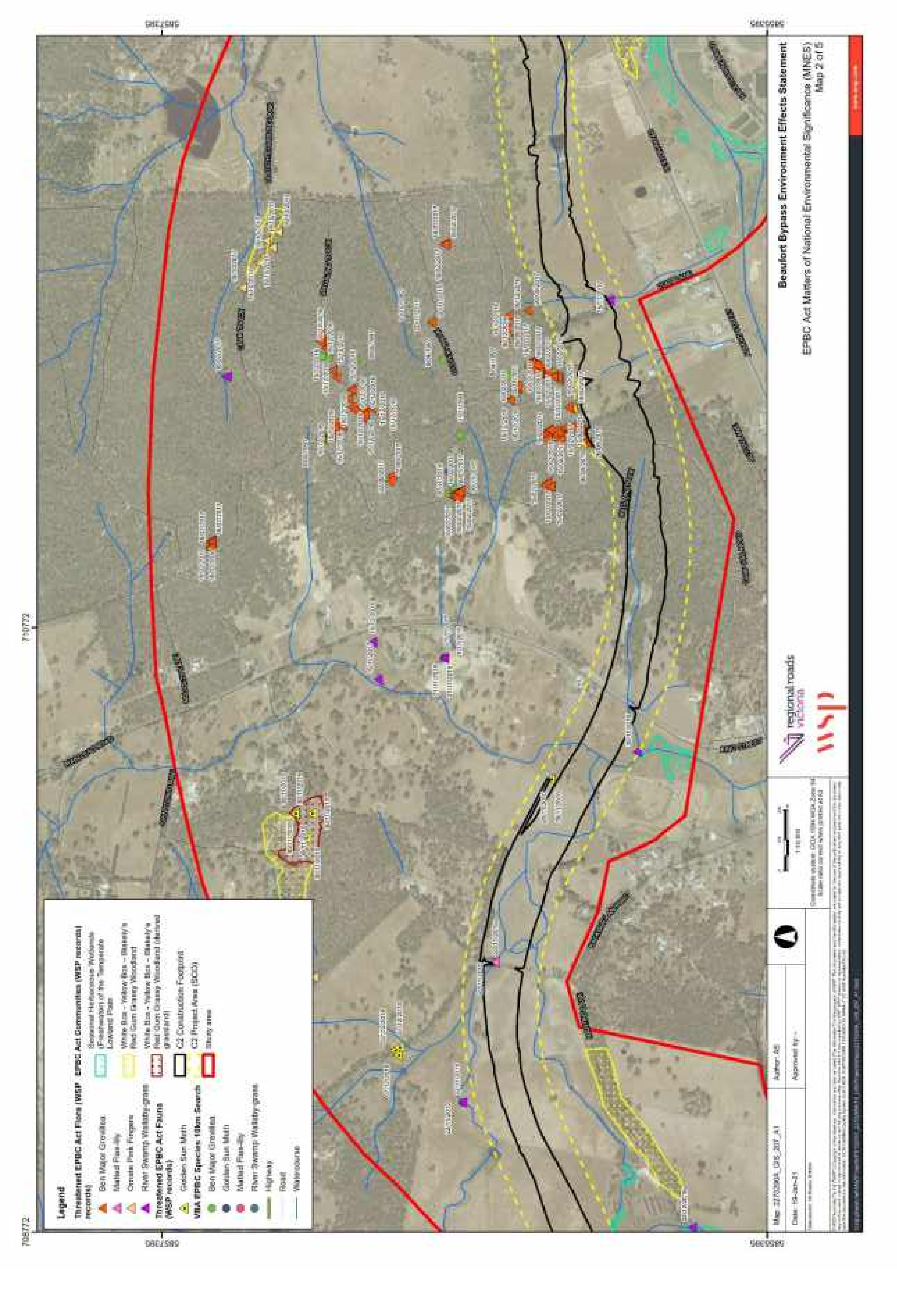
Table Q.10 Significant impact assessment for Ornate Pink Fingers as per the EPBC Act Significant Impact Guidelines (Vulnerable Species) (Department of the Environment 2013)

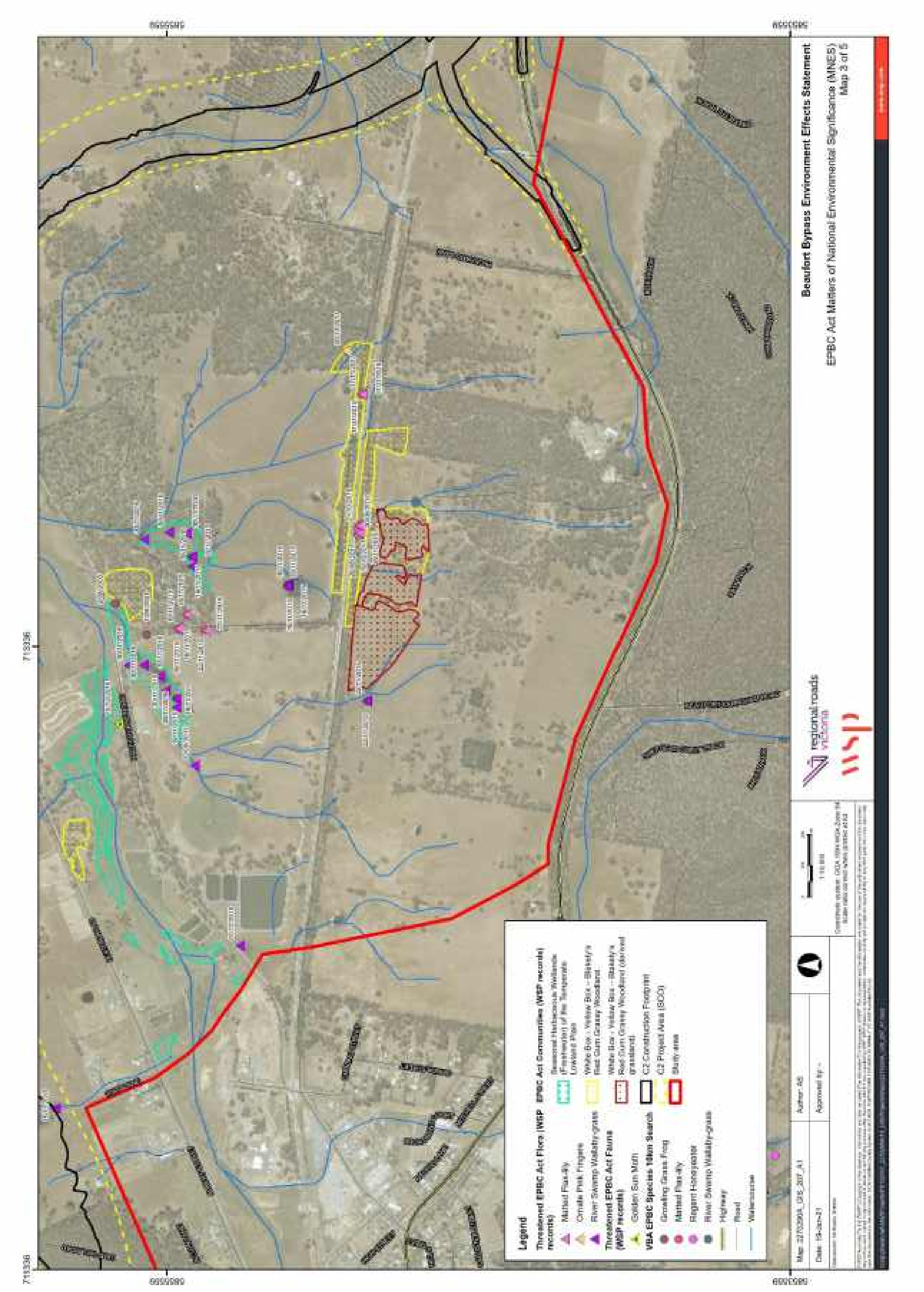
SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Lead to a long-term decrease in the size of an important population of a species	Alignment avoids all records of this species, with the nearest records located >600 m away. Therefore, a long-term decrease in the size of an important population of the species is not anticipated.	Low	N/A	Low
Reduce the area of occupancy of an important population	Alignment will not impact areas of occupancy of this species.	Low	N/A Although no go zones will minimise impacts on retained native vegetation which may provide potential future habitat for the species.	Low
Fragment an existing important population into two or more populations	Given the scattered occupancy of individual plants and their location from the construction footprint, it is unlikely that the alignment will further contribute to fragmentation of the populations in the area.	Low	N/A	Low
Adversely affect habitat critical to the survival of a species	Alignment will not impact habitat critical to the survival of this population.	Low	N/A	Low
Disrupt the breeding cycle of an important population	Alignment will not impact breeding for this species.	Low	N/A	Low
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Alignment will not impact habitat for this species.	Low	N/A	Low
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Road construction could facilitate weed spread into the area through construction machinery and from the road itself, prompting edge effects. However, known records of this species are >600 m away and are unlikely to be impacted by weed invasion.	Low	N/A	Low
Introduce disease that may cause the species to decline	There are no known disease risks for this species.	Low	N/A.	Low

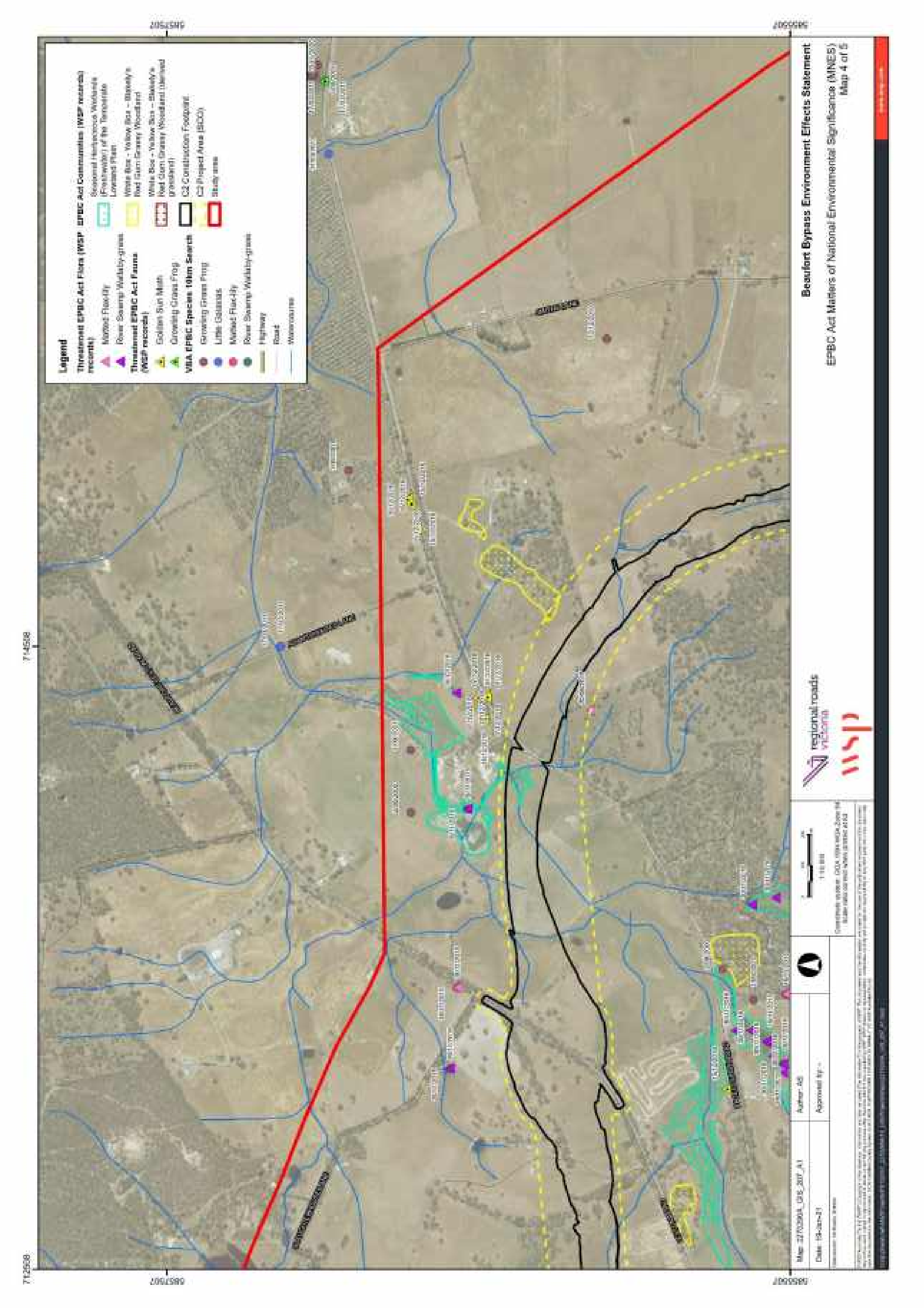
SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITHOUT MITIGATION	MITIGATION	LIKELIHOOD OF A SIGNIFICANT IMPACT WITH MITIGATION
Interfere substantially with the recovery of the species	The alignment will not substantially impact the recovery of this species.	Low	N/A	Low
Overall likelihood of a significant impact		Low	N/A	Low

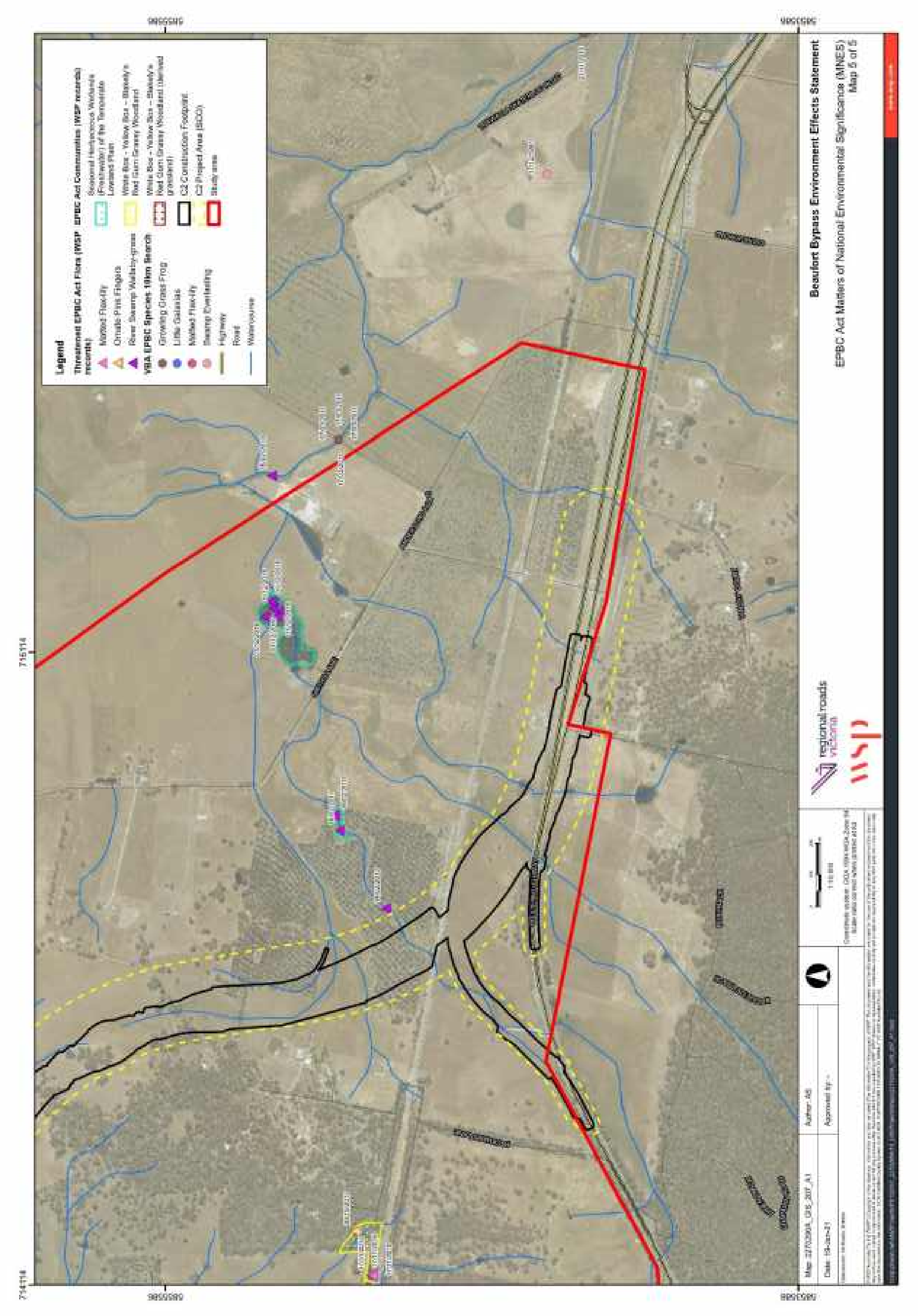
Q12 MAPPING OF MNES RECORDS AND COMMUNITIES




Beaufort Bypass Environment Effects Statement
EPBC Act Matters of National Environmental Significance (MNES)
Map 2 of 5


Beaufort Bypass Environment Effects Statement
EPBC Act Matters of National Environmental Significance (MNES)
Map 3 of 5
Legend
Threatened EPBC Act Flora (WSP records)
Matted Flax-lily
Ornate Pink Fingers
River Swamp Wallaby-grass
Threatened EPBC Act Fauna (WSP records)
Golden Sun Moth
VBA EPBC Species 10km Search
Growling Grass Frog
Matted Flax-lily
Regent Honeyeater
River Swamp Wallaby-grass
Highway
Road
Watercourse
EPBC Act Communities (WSP records)
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plain
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland (derived grassland)
C2 Construction Footprint
C2 Project Area (SCO)
Study area
regional roads victoria
wsp


Legend
Threatened EPBC Act Flora (WSP records)
Matted Flax-lily
River Swamp Wallaby-grass
Threatened EPBC Act Fauna (WSP records)
Golden Sun Moth
Growling Grass Frog
VBA EPBC Species 10km Search
Growling Grass Frog
Little Galaxias
Matted Flax-lily
River Swamp Wallaby-grass
Highway
Road
Watercourse
EPBC Act Communities (WSP records)
C2 Construction Footprint
C2 Project Area (SDO)
Study area
Beaufort Bypass Environment Effects Statement
EPBC Act Matters of National Environmental Significance (MNES)
Map 4 of 5



Legend
Threatened EPBC Act Flora (WSP records)
Matted Flax-lily
Ornate Pink Fingers
River Swamp Wallaby-grass
VBA EPBC Species 10km Search
Growling Grass Frog
Little Galaxias
Matted Flax-lily
Swamp Everlasting
Highway
Road
Watercourse
EPBC Act Communities (WSP records)
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plain
White Box – Yellow Box – Blakely's Red Gum Grassy Woodland
White Box – Yellow Box – Blakely's Red Gum Grassy Woodland (derived grassland)
C2 Construction Footprint
C2 Project Area (SOO)
Study area
Beaufort Bypass Environment Effects Statement
EPBC Act Matters of National Environmental Significance (MNES)
Map 5 of 5
regional roads victoria
wsp

APPENDIX Q REFERENCES

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APPENDIX R

DELWP ALTERNATIVE OFFSET ARRANGEMENT LETTER

Department of Environment,
Land, Water and Planning

PO Box 500
East Melbourne, Victoria 8002
delwp.vic.gov.au

Mr Will Parker
Senior Environmental Consultant
WSP Australia Pty Ltd
Level 15, 28 Freshwater Place
SOUTHBANK VIC 3006

Dear Mr Parker

NATIVE VEGETATION REMOVAL REGULATIONS – WIMMERA SCENTBARK (TAXON ID 505174) HABITAT IMPORTANCE MAP

Thank you for your application requesting written approval to remove modelled habitat for Wimmera Scentbark (*Eucalyptus sabulosa*) from consideration. I understand this request relates to the Beaufort Bypass Project.

The Department of Environment, Land, Water and Planning (DELWP) has completed an assessment of your proposal and concludes that consideration of modelled habitat for Wimmera Scentbark can be removed from the areas shown in Attachment 1. This determination is based on the characteristics of the subject areas of native vegetation being clearly inconsistent with the habitat requirements of the species.

This written agreement applies to any subsequent amendments to the exclusion area shown in Attachment 1, provided those amendments have been supported by the DELWP Native Vegetation Regulation Team.

Please include this letter when requesting any amendments to your native vegetation removal report and contact Native Vegetation Regulation by email at nativevegetation.support@delwp.vic.gov.au if you have any further questions.

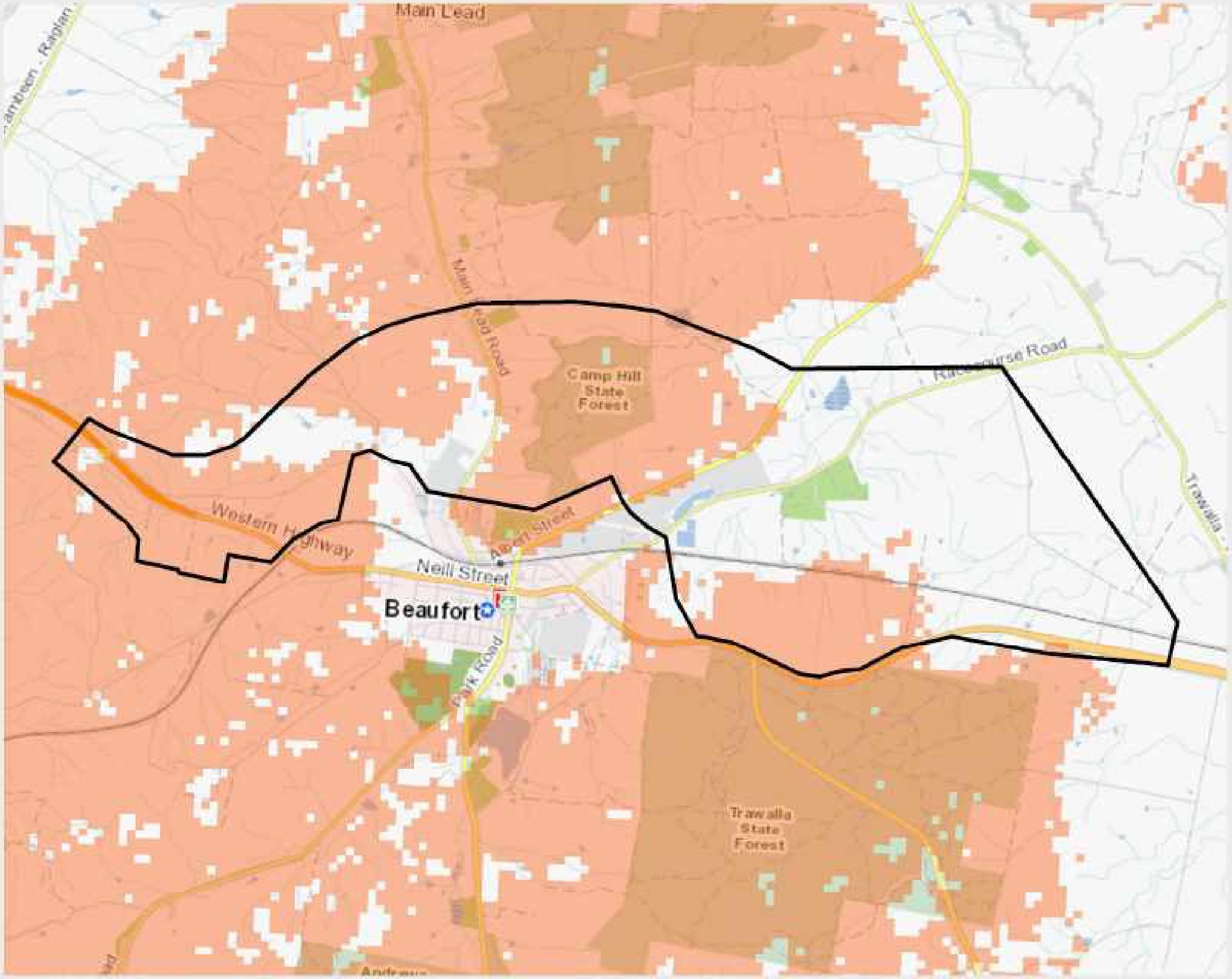
Yours sincerely

James Todd
Executive Director Biodiversity, for and on behalf of John Bradley, Secretary to Department of Environment, Land, Water and Planning

27/07/2021

Encl. (1)

Attachment 1: Area where modelled Wimmera Scentbark habitat will be removed from consideration



Legend

- HIM Exclusion Area
- Modelled Habitat for Wimmera Scentbark

14 July 2021

Map Scale 1:55,000

km

0 0.5 1

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VICTORIA State Government | Environment, Land, Water and Planning

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