

Appendices



Appendix A – Figures









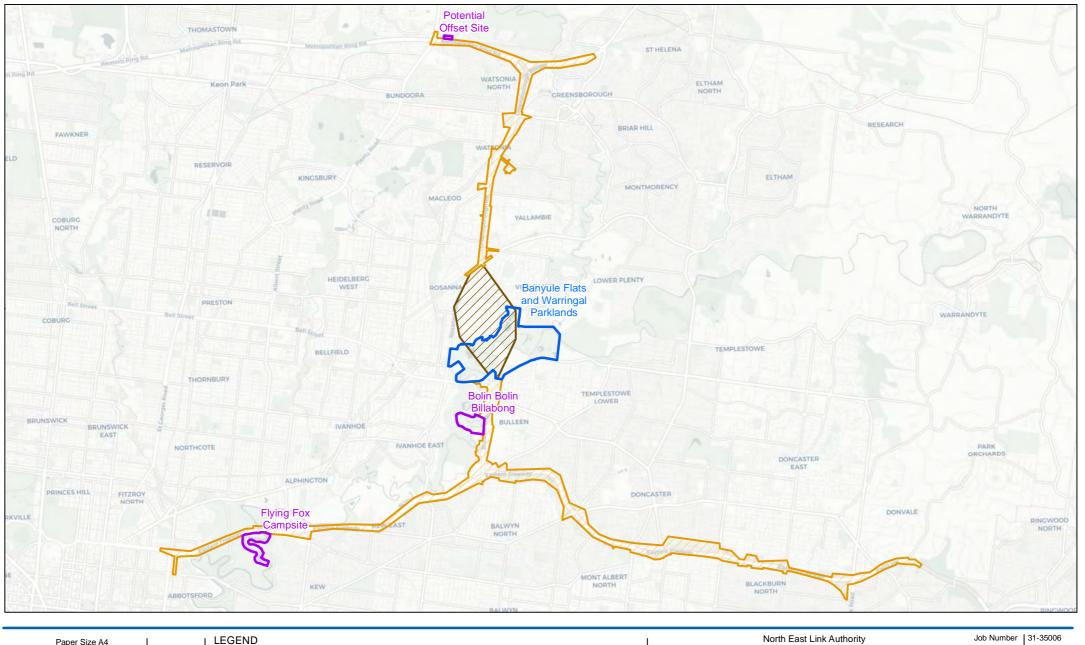


North East Link Authority North East Link Project

Job Number | 31-35006 Revision 0 Date 10 Jan 2018

Referred Project Area

Figure 1





Grid: GDA 1994 MGA Zone 55



Conditional No Go Zone No Go Zone

Referred project area Above ground Tunnel

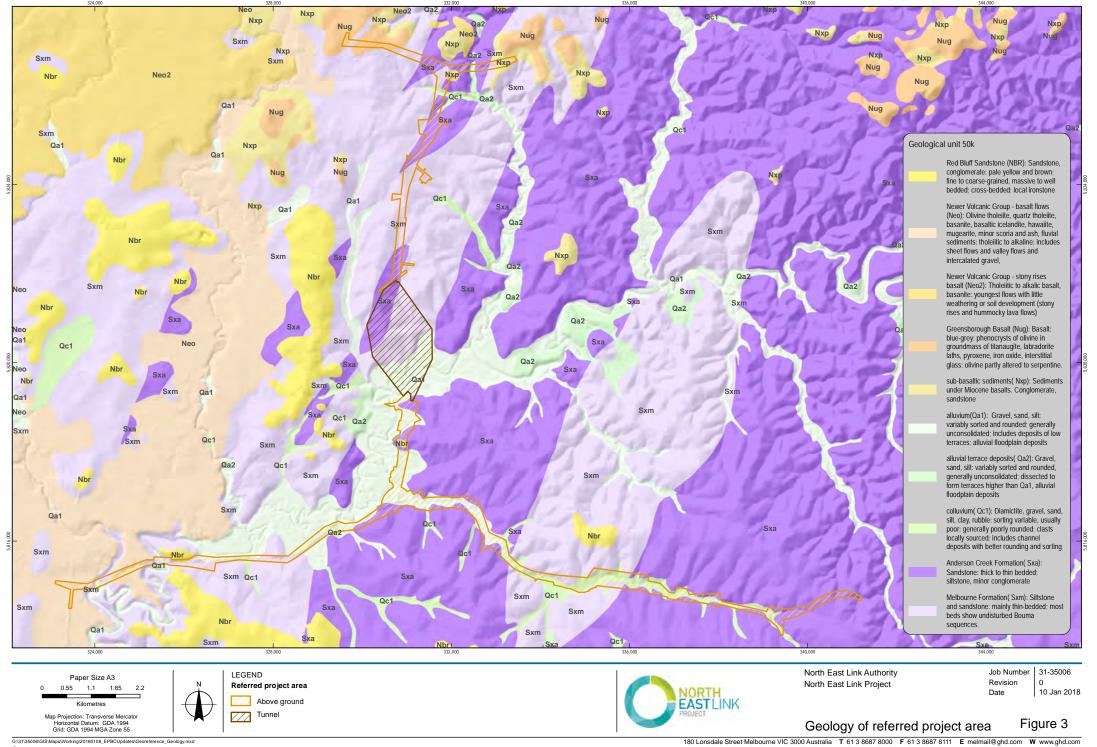


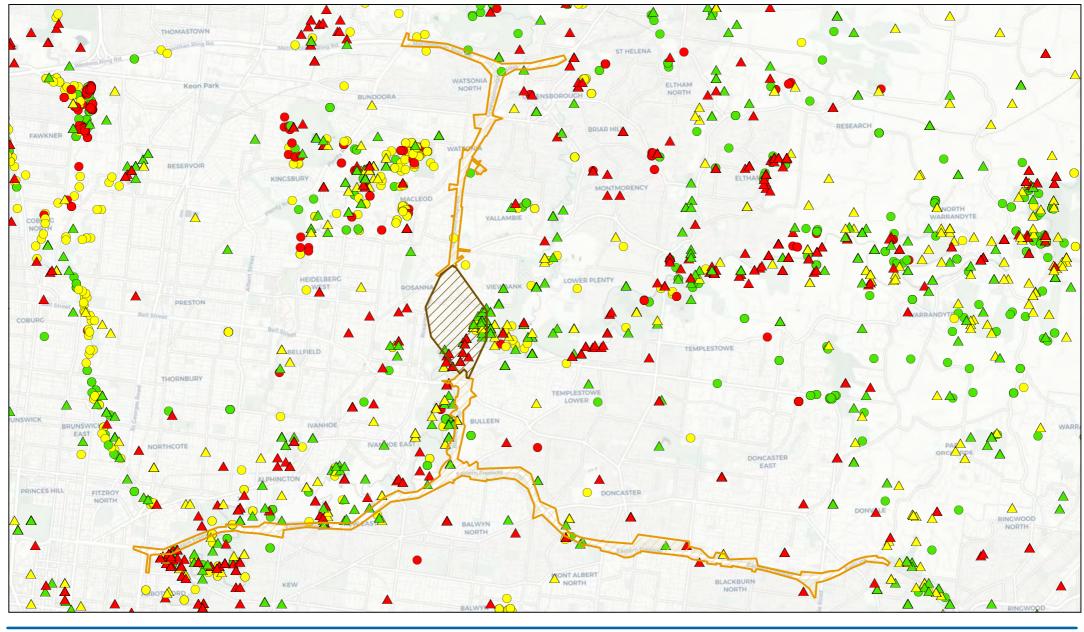
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No Go Zones

Figure 2













Above ground EPBC Listed FFG Listed

EPBC Listed FFG Listed



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VBA Threathened Flora and Fauna







LEGEND

Referred project area



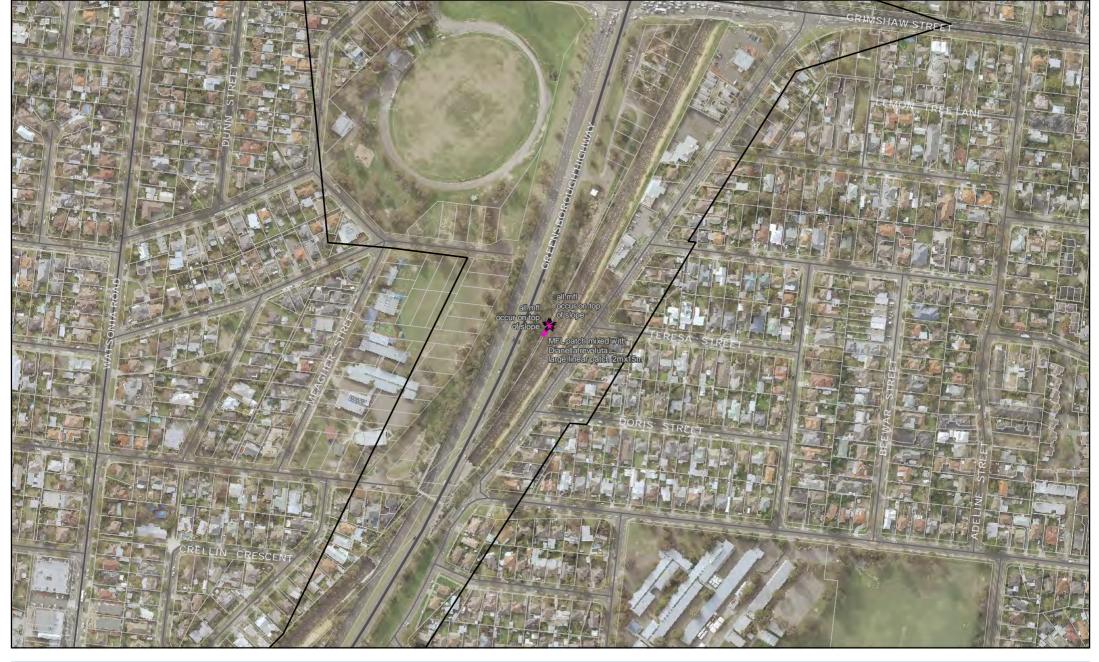




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Figure 5a







LEGEND

Referred project area







North East Link Authority North East Link Project

Matted Flax-lily records -Hurstbridge Rail Line
 Job Number
 31-35006

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Figure 5b

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North East Link Project

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Matted Flax-lily records - Simpson Barracks

Figure 5c

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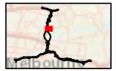














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Matted Flax-lily records - Simpson Barracks

Figure 5d

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LEGEND

Commonwealth land







North East Link Authority North East Link Project

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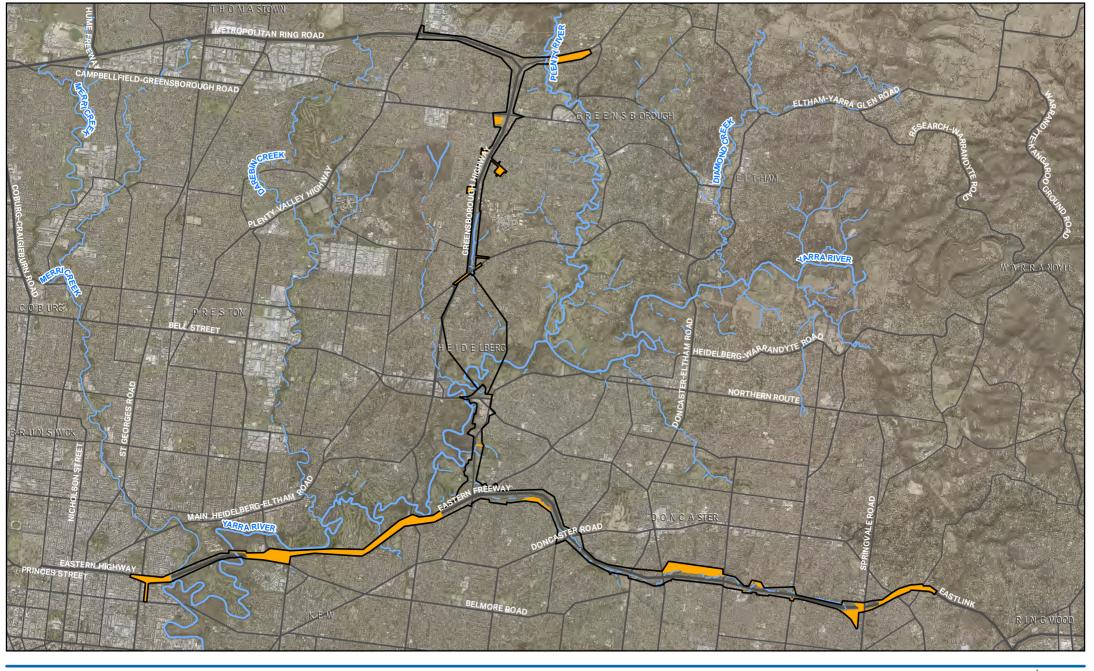
Matted Flax-lily records - Simpson Barracks

Figure 5e

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LEGEND

EPBC referred project area

Areas to be assessed in 2018 - flora and EVCs

NORTH EAST INC Areas of

North East Link Authority North East Link Project

Areas of flora to be assessed in 2018

 Job Number
 31-35006

 Revision
 A

 Date
 21 Dec 2017

Figure 6



Appendix B – Threatened species likelihood of occurrence assessment

This assessment is used to determine the likelihood of species presence based on the results of the habitat assessment and the dates and number of previous records of each species. The following likelihood categories were used to rate each species' likelihood of occurrence:

Unlikely: no preferred habitat in the desktop study area or the project is beyond the species current range and distribution. Species unlikely to be present in the desktop study area at any time or season.

Low: some of the preferred habitat is present on the desktop study area. Species may infrequently visit the site en-route to foraging resources or suitable habitat but would not depend on habitats in the desktop study area for their survival. Migratory and aerial foraging birds may overfly the desktop study area and migratory fish may pass through waterways. Isolated individuals may occur but limited records exist in the region and the age of records is old.

High: desktop study area contains the preferred habitat which is likely to support a population of the species, including roosting sites. Numerous records occur within the region of varying age.

Present: Species directly observed in the desktop study area or recently recorded in the desktop study area. Preferred habitat is present in the desktop study area. The species is likely to be present at appropriate times of the year.

Table 23 Threatened flora likelihood of occurrence within Project area

Common name	Scientific name	EPBC Act	FFG Act	DELWP	Source	Likelihood	Habitat requirement
Small or prostra	te herb						
Button Wrinklewort	Rutidosis leptorrhynchoides	EN	L	е	PMST	Low	Confined to basaltic grasslands. In Victoria known distribution is between Rokewood and Melbourne. Not recorded within 5-km of the project area.
Charming Spider-orchid	Caladenia amoena	EN	L	V	PMST	Low	Endemic to south-central Victoria where known from a few sites on ridges and sheltered slopes in open forests on shallow clay loams. Known only by a few small remnant populations on the outskirts of Melbourne. Not recorded within 5-km of the project area.



Common name	Scientific name	EPBC Act	FFG Act	DELWP	Source	Likelihood	Habitat requirement
Clover Glycine	Glycine latrobeana	VU	L	V	2011 PMST	High	Grows mainly in grasslands, dry sclerophyll forests, woodlands and low open woodlands with a grassy ground layer http://www.dpi.vic.gov.au/CA256F310024B628/0/A167C20D00684249 CA2573A20081D5D2/\$File/clover+glycine+october+2007.pdf;
Green-striped Greenhood	Pterostylis chlorogramma	VU	L	V	PMST	Low	Apparently localized in Victoria, but exact range uncertain due to confusion with closely allied species. Grows in moist areas of heathy and shrubby forest, on well-drained soils. Not recorded within 5-km of the project area.
Leafy Greenhood	Pterostylis cucullata	VU	L	е	PMST	Low	Widely distributed but disjunct, mostly occurring in coastal areas, rarely inland. Recent records from volcanic soils. Coastal populations occur on stabilised sand dunes under open to closed scrub of Coast Tea-tree <i>Leptospermum laevigatum</i> or Moonah <i>Melaleuca lanceolata</i> . Not recorded within 5-km of the project area.
Lilac Leek- orchid	Prasophyllum colemaniae	VU	L	x	PMST	Unlikely	Known with certainty only by the type collection (1922) from grassy woodland near Bayswater, probably now extinct. Not recorded within 5-km of the project area.
Maroon Leek- orchid	Prasophyllum frenchii	EN	L	е	PMST	Low	Grasslands, grassy woodlands and heaths. Predominantly in or near coastal swamps. Rarely occupies sites more than 10 km inland. Not recorded within 5-km of the project area. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=9704 http://www.environment.gov.au/biodiversity/threatened/publications/rec overy/25-orchids/index.html http://www.dse.vic.gov.au/CA256F310024B628/0/2CF98DDA2B97F64 CCA2570ED001985A8/\$File/154+Maroon+Leek-orchid+2002.pdf



Common name	Scientific name	EPBC Act	FFG Act	DELWP	Source	Likelihood	Habitat requirement
Plains Rice- flower	Pimelea spinescens subsp. spinescens	EN	L	е	PMST	Low	The Spiny Rice-flower occurs in grassland or open shrubland on basalt-derived soils, usually comprising black or grey clays (Walsh & Entwisle 1996). Plants from more northerly populations occur on red clay complexes, while plants from southern populations occur on heavy grey-black clay loams. Topography is generally flat but populations may occur on slight rises or in slightly wettish depressions. Vegetation is often dominated by <i>Themeda triandra</i> , with <i>Austrostipa</i> spp. or <i>Rytidosperma</i> spp. co-dominant. Not recorded within 5-km of the project area.
Rosella Spider- orchid	Caladenia rosella	EN	L	е	PMST	Low	Known from only a few sites in the north-eastern outer suburbs of Melbourne and near the Grampians. Grows in woodland on skeletal soils. Not recorded within 5-km of the project area.
Sunshine Diuris	Diuris fragrantissima	EN	L	е	PMST	Unlikely	Grassland plains immediately west of Melbourne. The sole remaining natural population occurs in remnant dry grassland on the basalt plains near Sunshine west of Melbourne, where about 30 plants remain. An introduced population established at the Altona reserve is believed to have died out by 2001. Not recorded within 5-km of the project area.
Large herb							
Basalt Pepper- cress	Lepidium hyssopifolium	EN	L	е	PMST	Unlikely	Collected from scattered sites on the volcanic plain, but now much reduced from its former range and recorded recently only from e.g. Moorabool, Winchelsea, Bacchus Marsh, Woodend, Trentham. Most recent collections are from disturbed, rather weedy sites. One collection from near Port Fairy is noteworthy for its occurrence in a slightly saline estuary amongst saltmarsh and fringing sedgeland. Not recorded within 5-km of the project area.
Medium to tiny n	on-tufted graminoid						



Common name	Scientific name	EPBC Act	FFG Act	DELWP	Source	Likelihood	Habitat requirement
River Swamp Wallaby-grass	Amphibromus fluitans	VU	X		2011 PMST	High	Inhabits both natural and man-made water-bodies, including swamps, lagoons, billabongs and dams. Numerous populations exist in northern Victoria, near the Murray River and its tributaries, such as Ovens River and Broken River between Kerang and Tallangatta. In southern Victoria, it is known from several localities in south Gippsland, including a rail corridor southwest of Rosedale, Moe, Yarram, Meeniyan and Wonthaggi areas, Cresswick, Clunes, as well as in the Lysterfield Lake Park in Melbourne, Ballarat, and the Portland-Casterton areas.
Medium to small	tufted graminoid						
Matted Flax-lily	Dianella amoena	EN	L	е	2014 PMST	Present	Associated with plains grassland and grassy woodlands in Victoria, where it occurs from the Gippsland Plain, to the basalt plain west of Melbourne, and north of the Great Dividing Range near Yea.
Large tufted grad	minoid						
Adamson's Blown-grass	Lachnagrostis adamsonii	EN	L	V	PMST	Unlikely	Slightly saline, seasonally wet areas. Not recorded within 5-km of the project area.http://www.environment.gov.au/biodiversity/threatened/publication s/recovery/pubs/draft-for-comment-lachnagrostis-adamsonii.pdf
Medium shrub							
Round-leaf Pomaderris	Pomaderris vacciniifolia	EN	L	е	PMST	Unlikely	Endemic in moist forest and scrubs in the upper catchment of the Yarra, Plenty and Yea Rivers in an area bounded by Healesville, Marysville and Whittlesea. Not recorded within 5-km of the project area.



Common name	Scientific name	EPBC Act	FFG Act	DELWP	Source	Likelihood	Habitat requirement
Rufous Pomaderris	Pomaderris brunnea	VU		V	1996	Unlikely	Localized in eastern Victoria, along and near the Rodger River near its confluence with the Snowy River where growing on shallow, shaley soils. 1996 record near project area likely to be erroneous.

 Table 24
 Threatened and Migratory fauna likelihood of occurrence

Common name	Scientific name	EPBC Act	FFG Act	DELWP	Source	Likelihood	Habitat requirement
Mammals							
Spot-tailed Quoll	Dasyurus maculatus maculatus	EN	L	EN	1930 PMST	Unlikely - No recent records. Suitable habitat not expected to be present.	Woodlands and forests
Southern Brown Bandicoot	Isoodon obesulus obesulus	EN	L	NT	1955 PMST	Unlikely - No recent records. Suitable habitat not expected to be present.	Typically occurs in heathland, shrubland, heathy forest and woodland, and coastal scrub habitat across southern Victoria.
Broad-toothed Rat	Mastacomys fuscus	VU	L	EN	PMST	Unlikely - Never recorded within the project area or buffer. Suitable habitat not expected to be present.	Wet sedges and grasslands in forested areas, from alpine areas to sea level
Swamp Antechinus	Antechinus minimus maritimus	VU	L	NT	PMST	Unlikely - Never recorded within the project area or buffer. Suitable habitat not expected to be present.	Swampy areas with dense grassy cover
Grey-headed Flying-fox	Pteropus poliocephalus	VU	L	VU	2013 PMST	High - Known camp/colony at Yarra Bend Park near Eastern Freeway upgrade. Also expected to forage on flowering Eucalypts and fruit trees across the project area.	Densely vegetated flowering and fruiting trees, mainly east of Melbourne. Roosts in dense gullies. Uses a wide range of habitats in Victoria, from lowland rainforest and coastal Stringybark forests to agricultural land and suburban gardens.



Common name	Scientific name	EPBC Act	FFG Act	DELWP	Source	Likelihood	Habitat requirement
							Established colonies known in Melbourne, Geelong and Mallacoota.
Greater Glider	Petauroides volans	VU		VU	PMST	Unlikely - Never recorded within the project area or buffer. Suitable habitat not expected to be present.	Eucalypt-dominated low open forests on coast to tall forests in the ranges and low woodland W of Great Dividing Range; not in rainforests.
Smoky Mouse	Pseudomys fumeus	EN	L	NT	PMST	Unlikely - Never recorded within the project area or buffer. Suitable habitat not expected to be present.	Dry heathy forest on ridges. Coastal and subalpine heath.
Birds							
Plains-wanderer	Pedionomus torquatus	CR	L	CR	1980 PMST	Unlikely - No recent records. Suitable habitat not expected to be present.	Grasslands
Orange-bellied Parrot	Neophema chrysogaster	CR	L	CR	PMST	Unlikely - Never recorded within the project area or buffer. Suitable habitat not expected to be present.	Winter migrant to coastal Victoria and South Australia from breeding areas in south-west Tasmania. Forages in coastal or near-coastal areas such as saltmarshes, coastal dunes, pastures, shrublands, estuaries, islands, beaches.
Regent Honeyeater	Anthochaera phrygia	CR	L	CR	2001 PMST	Low - Isolated individuals may forage within the project area and buffer however the species is not expected to rely on any habitats present.	Open forests and woodlands. Generally absent from very wet and very dry areas. Dry woodlands and forests dominated by Box Ironbark eucalypts. May be restricted to the Chiltern-Mt Pilot National Park (NE Victoria) following population decline and range contraction.
Swift Parrot	Lathamus discolor	CR	L	EN	2009	High - Known to forage across areas intersected by the project	Winter migrant to Victoria (and other parts of SE Australia) from breeding areas in Tasmania. In



Common name	Scientific name	EPBC Act	FFG Act	DELWP	Source	Likelihood	Habitat requirement
					PMST	area and buffer, targeting flowering Eucalypts. Seasonal visitor that may turn up anywhere, usually in small numbers.	Victoria, prefers dry, open eucalypt forests and woodlands, especially Box Ironbark Forest in north-central Victoria. Occasionally recorded in urban parks, gardens, street trees and golf courses with flowering ornamental trees and shrubs.
Red Knot	Calidris canutus	EN, Mi		EN	PMST	Unlikely - No recent records. Suitable habitat not expected to be present.	Non-breeding migrant to Australia during the austral summer. Coastal. Typically occurs on intertidal mudflats, sandflats and sandy beaches of sheltered coasts, and a range of other coastal and near-coastal environments such as lakes, lagoons, pools and pans, sewage ponds and saltworks. Inland lakes and swamps less commonly used.
Curlew Sandpiper	Calidris ferruginea	CR, Mi		EN	1966 PMST	Unlikely - No recent records. Suitable habitat not expected to be present.	Regular summer migrant to Victoria. Occurs in a variety of wetland habitats with fringing mudflats including bays, coastal lagoons, lakes, swamps, creeks, inundated grasslands, saltmarshes and artificial wetlands.
Eastern Curlew	Numenius madagascariensis	CR, Mi		VU	PMST	Unlikely - Never recorded within the project area or buffer. Suitable habitat not expected to be present.	Non-breeding migrant to Australia during the austral summer. Coastal. Sheltered coastal habitats, usually with large sand flats or intertidal mudflats with seagrass, estuaries, open sandy beaches. Occasionally on coastal rock platforms.
Australian Painted Snipe	Rostratula australis	EN	L	CR	2001 PMST	Low - Isolated individuals may occur however habitat is expected to largely be avoided as a result of tunnelling.	Generally in shallow, terrestrial freshwater wetlands with rank, emergent tussocks of grass, sedges and rushes. Occurs in well vegetated lakes, swamps, inundated pasture, saltmarsh and



Common name	Scientific name	EPBC Act	FFG Act	DELWP	Source	Likelihood	Habitat requirement
							dams. Fresh to saline water. May use riverine forest.
Australasian Bittern	Botaurus poiciloptilus	EN	L	EN	2007 PMST	Low - Expected to occur along the Yarra River and Banyule Creek though these areas are being tunnelled. Isolated individuals may occur. No records are present at the western end of the Eastern Freeway Upgrade where the corridor nears the Yarra. Given the heavily surveyed nature of this area, records would be expected if the species persisted here.	Wetlands with tall, dense vegetation in permanent freshwater habitats, particularly when dominated by sedges, rushes and reeds.
Superb Parrot	Polytelis swainsonii	VU	L	EN	1999	Low - Isolated individuals may occur though limited records exist in the region and species has not been observed for almost 20 years. Individuals observed in Melbourne most likely to be aviary escapees.	Open woodland and riverine forest. Nests in eucalypt hollows.
Painted Honeyeater	Grantiella picta	VU	L	VU	1990 PMST	Low - Species not recorded for almost 30 years. May infrequently visit foraging resources or suitable habitat but would not depend on any habitat present.	Forest, woodland, dry scrub, often with abundant mistletoe. Nomadic or migratory; uncommon.
Caspian Tern	Hydroprogne caspia	Mi	L	NT	1988	Low - Isolated individuals may occur however species is known from limited records from over 20 years ago.	Coastal areas and large inland wetlands and rivers. Exposed ocean beaches, sheltered coastal bays, harbours, lagoons, inlets, estuaries, usually with sandy or muddy margins. Breeds in a



Common name	Scientific name	EPBC Act	FFG Act	DELWP	Source	Likelihood	Habitat requirement
							variety of coastal habitats including banks, ridges and beaches of sand and shell, often in open or among low or sparse vegetation.
Pectoral Sandpiper	Calidris melanotos	Mi		NT	PMST	Unlikely - Never recorded within the project area or buffer. Suitable habitat not expected to be present.	Non-breeding migrant to Australia during the austral summer. Occurs in a variety of wetland habitats with fringing mudflats including bays, coastal lagoons, lakes, swamps, creeks, inundated grasslands, saltmarshes and artificial wetlands. Mostly recorded from Port Phillip Bay and Murray River Valley region.
Latham's Snipe	Gallinago hardwickii	Mi		NT	2013 PMST	High – Most likely to occur along the Yarra River in the Banyule Flats area, though these areas are being tunnelled to avoid impacts. The species has also been recorded within the Bolin Bolin Wetland area, a no-go zone for the project.	Non-breeding migrant to Australia during the austral summer. Uses a wide variety of permanent and ephemeral wetlands, generally freshwater wetlands with cover. Also recorded along creeks, rivers and floodplains. Forages in soft mud at edge of wetlands and roosts in a variety of vegetation around wetlands including tussock grasslands, reeds and rushes, tea-tree scrub, woodlands and forests.
Glossy Ibis	Plegadis falcinellus	Mi		NT	2002	Low - Isolated individuals may occur however habitat is expected to largely be avoided as a result of tunnelling.	Wetlands, dams, flooded fields, mudflats, mangroves
Common Sandpiper	Actitis hypoleucos	Mi		VU	1976 PMST	Unlikely - No recent records. Suitable habitat not expected to be present.	Migrates to Australia for austral summer. In Australia, inhabits a wide variety of coastal and inland wetlands with muddy margins, including lakes, rivers, sewage ponds.



Common name	Scientific name	EPBC Act	FFG Act	DELWP	Source	Likelihood	Habitat requirement
Common Greenshank	Tringa nebularia	Mi		VU	PMST	Unlikely - Never recorded within the project area or buffer. Suitable habitat not expected to be present.	Non-breeding migrant to Australia during the austral summer. Coastal mudflats, estuaries, salt marshes, mangroves, lakes and swamps.
Marsh Sandpiper	Tringa stagnatilis	Mi		VU	1999	Low - Isolated individuals may occur however habitat is expected to largely be avoided as a result of tunnelling.	Non-breeding migrant to Australia during the austral summer. Estuaries, and coastal and inland shallow wetlands.
White-throated Needletail	Hirundapus caudacutus	Mi		VU	2006 PMST	Low - Species may infrequently visit the site <i>en route</i> to foraging resources or suitable habitat or fly over head but would not depend on habitats within the project area or buffer.	Almost exclusively aerial within Australia, occurring over most types of habitat, particularly wooded areas. Less often seen over open farm paddocks but has been recorded in vineyards flying between the rows of trees.
Short-tailed Shearwater	Puffinus tenuirostris	Mi			2004	Unlikely - Suitable habitat not present.	Breeds at Phillip Island. Likely to forage across Victorian oceans and coasts.
Sharp-tailed Sandpiper	Calidris acuminata	Mi			1999 PMST	Low - Isolated individuals may occur however habitat is expected to largely be avoided as a result of tunnelling.	Non-breeding migrant to Australia during the austral summer. Prefers muddy edges of shallow fresh or brackish wetlands with inundated or emergent low vegetation.
Osprey	Pandion haliaetus	Mi			PMST	Unlikely - Never recorded within the project area or buffer. Suitable habitat not expected to be present.	Coastal waters and estuaries - but not usually far out to sea except on islets or exposed reefs. Follows major rivers far inland from the coast, even to arid regions where large pools lie in gorges. Uncommon to rare or absent from closely settled parts of SE Australia.
Fork-tailed Swift	Apus pacificus	Mi			1995	Low - Isolated individuals may occur	Aerial species, occurring over a wide range of



Common name	Scientific name	EPBC Act	FFG Act	DELWP	Source	Likelihood	Habitat requirement
					PMST	however species known from limited old records. Species not expected to rely on habitat present.	environments, predominately over open countryside but sometimes over forests and urban landscapes.
Rufous Fantail	Rhipidura rufifrons	Mi			2010 PMST	Low - Isolated individuals may occur however habitat is expected to largely be avoided as a result of tunnelling. Species not expected to rely on habitat present.	Common migrant (Sep-Apr) or resident in rainforest and forest in eastern mainland.
Satin Flycatcher	Myiagra cyanoleuca	Mi			2010 PMST	Low - Isolated individuals may occur however habitat is expected to largely be avoided as a result of tunnelling. Species not expected to rely on habitat present.	Uncommon summer migrant in forests, particularly densely vegetated gullies.
Black-faced Monarch	Monarcha melanopsis	Mi			PMST	Unlikely - Never recorded within the project area or buffer. Suitable habitat not expected to be present.	Summer migrant to rainforests, forests, denser woodlands and densely vegetated gullies.
Yellow Wagtail	Motacilla flava	Mi			PMST	Unlikely - Never recorded within the project area or buffer. Suitable habitat not expected to be present.	Open country near swamps, salt marshes, sewage ponds, grassed surrounds to airfields, bare ground; occasionally on drier inland plains. Rare but regular visitor around Aust especially the NW coast.
Reptiles							
Striped Legless Lizard	Delma impar	VU	L	EN	1975 PMST	Unlikely - No recent records. Suitable habitat not expected to be present.	Native and some non-native grasslands and grassy woodlands, where soil is little disturbed



Common name	Scientific name	EPBC Act	FFG Act	DELWP	Source	Likelihood	Habitat requirement		
Amphibians									
Growling Grass Frog	Litoria raniformis	VU	L	EN	2014 PMST	High – Potentially suitable habitat present and numerous nearby recent records. Species not detected during targeted surveys. If present, species likely to be in small numbers.	Permanent and semi-permanent waterbodies, generally containing abundant submerged and emergent vegetation. Within lowland grasslands, woodlands and open forests. Open vegetated wetlands, flooded paddocks, drains, farm dams, river pools.		
Invertebrates	Invertebrates								
Golden Sun Moth	Synemon plana	CR	L	CR	PMST	Unlikely - Never recorded within the project area or buffer. Suitable habitat not expected to be present.	Native grasslands and grassy woodlands, particularly where Austrodanthonia (Rytidosperma) dominant. Now recognised to occur also in exotic grasslands dominated by Chilean Needle Grass.		
Eltham Copper	Paralucia pyrodiscus lucida	EN	L	EN	1988 PMST	Unlikely - No recent records. Suitable habitat not expected to be present.	Around Melbourne occurs exclusively in the Eltham to Greensborough area. found in dry open woodlands. Its occurrence is dependent upon an obligatory association between a dwarfed form of the Sweet Bursaria Bursaria spinosa and colonies of Notoncus sp. of ants.		
Aquatic and semi aquatic fauna, including turtles									
Murray Hardyhead	Craterocephalus fluviatilis	EN	L	Cr	1989	Unlikely - isolated record within the project area buffer. Suitable habitat not expected to be present.	Ephemeral lakes and billabongs.		
Dwarf Galaxias	Galaxiella pusilla	VU	L	En	2010 PMST	High - Potentially in Simpson Barracks. Suitable habitat present but species not recorded in Yarra	Amongst marginal vegetation in still or gently flowing water of roadside ditches, swamps and backwaters of creeks. Occupies both ephemeral		



Common name	Scientific name	EPBC Act	FFG Act	DELWP	Source	Likelihood	Habitat requirement
						catchment except for isolated translocated populations.	and permanent habitats.
Murray Cod	Maccullochella peelii	VU	L	Vu	2015 PMST	High - Suitable habitat in the Yarra River and potentially tributaries.	Slowly flowing, turbid Rivers and streams at low elevations, and also fast moving, clear rocky upland streams.
Macquarie Perch	Macquaria australasica	EN	L	En	2015	High - Suitable habitat in the Yarra River and potentially tributaries	Cool, clear water of rivers and lakes and reservoirs. Prefers slow-flowing, deep rocky pools.
Yarra Pygmy Perch	Nannoperca obscura	VU	L	Vu	1872; PMST	Unlikely – marginal habitat may be present in Plenty River and Koonung Creek, but only one isolated record from Yarra River.	Prefers still or slow flowing waters, with abundant aquatic vegetation and woody debris.
Australian Grayling	Prototroctes maraena	VU	L	Vu	2015 PMST	High - Suitable habitat in the Yarra River and potentially tributaries	Clear, moderate to fast flowing streams in the upper reaches of rivers. Typically found in gravel bottom pools. Often forming aggregations below barriers to upstream movement. Known in the Yarra catchment.