

# **Attachment 3 - Preliminary Flora and Fauna Constraints Assessment Report**

**Legally Privileged and Confidential**

10 February 2020

Our ref: 15224

Coffey  
Level 1, 436 Johnston Street  
Abbotsford, Victoria, 3067,  
Australia

Attention: Barton Napier

Dear Barton,

**Project Vega – Preliminary Flora and Fauna Constraints Assessment**

## **INTRODUCTION**

Coffey Services Australia engaged Eco Logical Australia (ELA) to undertake a preliminary flora and fauna assessment for two linear alignments between Lara and Corio, to form part of the due diligence process for Project Vega.

The principal objective of the assessment was to provide an overview of ecological ‘red flags’ or key constraints that may have implications for the implementation of Project Vega under relevant legislation, including the Victorian Government’s *Planning and Environment Act* and *Flora and Fauna Guarantee Act*, and the Australian Government’s *Environment Protection and Biodiversity Conservation Act*.

The assessment study area is based on plans provided by Coffey, which shows the two proposed route alignments Option A and Option B and encompasses the land between, totalling approximately 228 hectares (Figure 1).

## **METHOD**

### *Database and literature review*

Relevant information sources were reviewed to identify the presence or likely occurrence of biodiversity values across the study area and surrounds. This included online databases (e.g. Victorian Biodiversity Atlas, Native Vegetation Information System, Protected Matters Search Tool and VicPlan), spatial datasets (e.g. modelled vegetation and habitat extent), scientific literature, previous reports and relevant environmental legislation, regulations and policies. All online database searches were centred on the study area and covered an investigation area within a 10 km radius.

### *Field validation surveys*

A field survey of the study area was undertaken by ELA ecologist James Garden on 6 February 2020. Features of ecological significance recorded (where present) included:

- the location and nature of all remnant native vegetation, including patches and scattered trees.
- suitable habitat for threatened flora and fauna species.
- state or nationally significant ecological communities or threatened species observed.

### *Likelihood of occurrence*

Based on the results of the desktop review and field survey, the likelihood of occurrence was determined for relevant threatened flora, fauna or communities. Likelihood of occurrence is a determination of the potential for threatened species to be present and make significant use of the study area, and for the potential occurrence of threatened communities. Species were ranked as having either no, low, medium, or high likelihood of occurrence, or as being present, by assessing information contained in public biological datasets (e.g. past records and species distribution models), considering species habitat requirements (including surrounding habitat connectivity) and field observations. Species ranked as medium, high or present were investigated in further detail for the possibility of targeted surveys. The determinations of a species likelihood provided are not absolute; rather, they represent a species' potential to occur in the study area. The results of the likelihood of occurrence analysis are provided in Appendix A.

### *Review of impacts and implications*

A preliminary review of potential impacts and implications has been undertaken based on the two proposed alignments (Figure 1).

### *Limitations*

The site inspections were undertaken in mid-summer which is considered to be sub-optimal timing for surveying native grasslands. This is due to the prevalence of native annual species within this community which are conspicuous primarily in Spring. Annual weedy biomass also tends to be at its highest at this time of year and therefore the extent and quality of native grassland communities can often be underestimated. As a result, a conservation approach to the potential extent and quality of vegetation, and the associated habitat, has been taken in preparing this report.

## **RESULTS**

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The study area is located in Corio, on the northern edge of Geelong. As shown in Figure 1, the study area is bound to the north by Rennie Street, east by Biddlecombe Avenue, south by the Shell refinery and west by the Geelong-Melbourne Rail line.

Land administration details for the study area are provided in Table 1. A summary of the findings of the desktop review and field survey is provided in Table 2 and Figure 1, along with potential implications.

**Table 1. Land use and administration of the study area for both route alignment options**

Feature	Study area
Location	Corio, Geelong (Figure 1)
Proposed works	Gas transmission pipeline
Current Zones	Industrial Zone (IN2Z), Road Zone (RDZ1), Farming Zone (FZ)
Overlays	Environmental Significance Overlay (ESO4)
Bushfire	Bushfire Prone Area
Local council	City of Greater Geelong
Bioregion	Victorian Volcanic Plain
Catchment	Corangamite
Area	228 hectares

**Table 2: Findings and implications of the due diligence assessment**

Feature	Assessment findings	Potential impacts and implications	Risk
<b>Native vegetation</b>	<p>The Department of Environment, Land, Water and Planning’s (DELWP) pre-1750 Ecological Vegetation Class (EVC) modelling indicates that the study area would have supported the Endangered Plains Grassland EVC (132) prior to European settlement.</p> <p>At the time of assessment, vegetation within the study area was comprised almost exclusively of introduced species in the form of exotic grasses and planted native and exotic trees (Plate 1). The only vegetation considered to be indigenous to the study area was associated with the land on either side of Shell Parade, to the south of Bell Road / Rennie Street (Figure 1). Remnant Plains Grassland (EVC 132) vegetation was observed in small, fragmented patches throughout the two paddocks, which were otherwise dominated by exotic grasses (Plate 2). Key species observed within these patches included Spear Grasses (<i>Austrostipa</i> spp.) and Wallaby Grasses (<i>Rytidoperma</i> spp.). Patches of Plains Grassland were not observed near the roadsides, only becoming prevalent towards the centre of the paddocks (i.e. more than 50 metres from the edge of the road and rail line).</p>	<p>A planning permit may be required for the removal of any native vegetation under Clause 52.17 (Native Vegetation) and/or Clause 42.01 (ESO4) of the Greater Geelong planning scheme. This includes isolated or individual plants which may occur within the study area.</p> <p>The permit application may need to show consideration of Victoria’s Native Vegetation Removal Regulations should the project impact any ‘patches’<sup>1</sup> or ‘scattered trees’<sup>2</sup>. This will include the requirement to avoid and minimise impacts prior to offsets being considered. There is potential for minor impacts to patches of Plains Grassland along the proposed Option B route as shown in Figure 1.</p> <p>Planted native vegetation is exempt from requiring a permit for removal under Clause 52.17.</p> <p><b>Recommendations:</b></p> <ul style="list-style-type: none"> <li>Project design should ensure that the alignment stays within the current easement and/or road/rail reserves.</li> </ul>	<b>Low</b>

<sup>1</sup> A patch of native vegetation is: an area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native, or any area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy, or any mapped wetland included in the current wetlands map, available in DELWP systems and tools.

<sup>2</sup> A native canopy tree that does not form part of a patch.

Feature	Assessment findings	Potential impacts and implications	Risk
		<p>Avoid intersecting area of potential sensitivity shown in Figure 1.</p> <ul style="list-style-type: none"> <li>Undertake a detailed ecological assessment on the final route alignment to determine extent of impacts to patches of Plains Grassland.</li> </ul>	
<b>Significant fauna</b>	<p>The desktop review identified total of 104 significant fauna species within 10 km of the study area (Appendix A).</p> <p>Based on the extent and nature of vegetation, and the associated habitat, there is a low likelihood of any significant species occurring within the study area, with the exception of the EPBC Act listed Golden Sun Moth <i>Synemon plana</i>, Swift Parrot <i>Lathamus discolor</i> and Grey-headed Flying-fox <i>Pteropus poliocephalus</i>. These species may use Eucalyptus trees within the study area for foraging.</p>	<p>Golden Sun Moth are unlikely to be significantly impacted by the proposed works provided that the alignment stays within the current easement and/or road/rail reserves, avoiding potential habitat for Golden Sun Moth in the Corio Grassland Reserve.</p> <p>Swift Parrot and Grey-headed Flying-fox are unlikely to be significantly impacted by the proposed works due to the prevalence of foraging resources within the landscape and relatively minimal impacts expected to this resource within the study area. As a result, no further approval implications are considered likely.</p> <p><b>Recommendations:</b></p> <ul style="list-style-type: none"> <li>Project design should minimise impacts to trees.</li> <li>Review impacts to species during detailed ecological assessment based on finalised route.</li> </ul>	<b>Low</b>
<b>Significant flora</b>	<p>The desktop review identified total of 65 significant flora species within 10 km of the study area (Appendix A).</p> <p>Of these, ten are considered to have a moderate or high likelihood of occurring within the study area, including three EPBC Act listed species: Spiny Rice-flower <i>Pimelea spinescens</i> subsp. <i>spinescens</i>, Button Wrinklewort <i>Rutidosis leptorhynchoides</i> and Large-headed Fireweed <i>Senecio macrocarpus</i>. Suitable habitat for all ten species is restricted to areas of Plains Grassland associated with Corio Grassland Reserve to the south of Bell Street (Figure 1).</p>	<p>There is unlikely to be a significant impact on threatened flora species provided works avoid areas of Plains Grassland vegetation identified in Figure 1.</p> <p>Should this area be impacted, further targeted surveys and detailed impact assessments may be required to determine implications under the EPBC Act, FFG Act and Planning and Environment Act.</p> <p><b>Recommendations:</b></p> <ul style="list-style-type: none"> <li>Project design should ensure that the alignment stays within the current easement and/or road/rail reserves. Avoid intersecting area of potential sensitivity (i.e. Plains Grasslands) shown in Figure 1.</li> <li>Undertake a detailed ecological assessment on the final route alignment to determine if impacts to threatened flora species are likely.</li> </ul>	<b>Low</b>

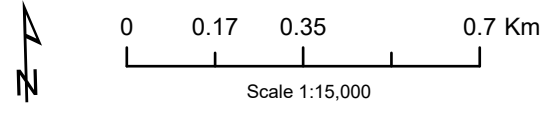
Feature	Assessment findings	Potential impacts and implications	Risk
<b>Significant communities</b>	No nationally significant ecological communities were observed during the field survey however, the EPBC Act listed <i>Natural Temperate Grassland of the Victorian Volcanic Plain</i> ecological community and FFG Act listed <i>Western (Basalt) Plains Grassland Community</i> may be present within the Corio Grassland Reserve to the south of Bell Street (Figure 1).	<p>There is unlikely to be a significant impact on threatened ecological communities provided works avoid areas of Plains Grassland vegetation identified in Figure 1.</p> <p>Should this area be impacted, further surveys may be required to determine implications under the EPBC Act and FFG Act.</p> <p>Recommendations:</p> <ul style="list-style-type: none"> <li>Project design should ensure that the alignment stays within the current easement and/or road/rail reserves. Avoid intersecting area of potential sensitivity (i.e. Plains Grassland) shown in Figure 1.</li> <li>Undertake a detailed ecological assessment on the final route alignment to determine if impacts to threatened communities are likely.</li> </ul>	<b>Low</b>
<b>Other habitat considerations</b>	Habitat along the alignment is restricted to scattered native trees and degraded native and exotic grasslands. Planted native trees may provide nesting and foraging opportunities for commons birds, bats and arboreal mammals.	<p>There are no specific approval implications for the removal of general habitat.</p> <p>Council may request pre-clearance surveys or the presence of a qualified ecologist during the removal of habitat. Fauna salvage may be required where hollow-bearing trees or nesting birds are present.</p>	<b>Neg</b>
<b>Ecologically sensitive areas</b>	<p>The site is located near the RAMSAR listed Port Phillip Bay (western shoreline) and Bellarine Peninsula.</p> <p>The Corio Native Grassland reserve is located between Shell Parade and Biddlecombe Avenue to the south of Bell Road. This is a council managed reserve comprised of vacant parcels of land that Council is currently in the process of buying back, due to an inability to develop the land. The reserve contains Plains Grassland vegetation of varying quality and cover.</p>	<p>Given the nature of works and distance from the Ramsar site, impacts to this value are considered unlikely.</p> <p>The management of potential impacts to the Corio Native Grassland reserve should be discussed with Council once a final route alignment has been determined.</p>	<b>Low</b>
<b>Weeds</b>	The study area contained a high cover of high-risk weeds, many of which are listed as noxious within Victoria. Notable species include African Box-thorn <i>Lycium ferocissimum</i> , Serrated Tussock <i>Nassella trichotoma</i> and Chilean Needle-grass <i>Nassella neesiana</i> .	<p>In accordance with the requirements of the <i>Catchment and Land Protection Act 1994</i> (CaLP Act), the project must ensure all reasonable steps are undertaken to prevent the growth and spread of regionally controlled weeds as a result of the proposed works.</p> <p><b>Recommendation:</b> Implement suitable weed control and hygiene practices during construction.</p>	<b>Neg</b>

**Figure 1. Areas of potential ecological sensitivity**



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- Study area
- Proposed alignments
- Option A
- Option B
- Roads
- Watercourses
- Areas of potential ecological sensitivity
- Scattered patches of Plains Grassland vegetation
- Previous records of threatened flora species



**Client name: Coffey**  
 Project number: 15224  
 Date: 11/02/2020  
 Version: 1



Spatial Reference: GDA 1994 MGA Zone 55



**Plate 1: Introduced vegetation within the study area**



**Plate 2: A patch of Plains Grassland vegetation within the study area (exotic grasses are visible in the foreground, native grasses in the mid-ground)**



## SUMMARY

The proposed study area has been highly modified and notable ecological values are now restricted to the two paddocks on either side of Shell Parade to the south of Bell Road associated with the Corio Grassland Reserve (Figure 1). These values include small, remnant patches of Plains Grassland vegetation within the two paddocks, which may support national and state significant species and/or communities. Despite the degraded nature of these areas due to the prevalence of exotic species throughout, it is recommended that the proponent avoid any potential implications through the isolation of project works to the existing easement and/or rail/road reserves. In addition, the following measures are recommended for consideration during project design and construction:

- Undertake detailed ecological assessment on the final route alignment to determine impacts to patches of Plains Grassland and associated values (e.g. threatened species and communities).
- Project design to minimise impacts to planted native and exotic trees where possible.
- Implement suitable weed control and hygiene practices during construction.

Based on the above measures will be implemented, key ecological approvals are outlined in Table 3 below.

**Table 3. Key ecological approval requirements for the proposed project**

Approval type	Legislation	Likely to be required?	Approval complexity	Project risk
Planning Permit	<i>Planning and Environment Act 1987</i> This Act governs the use, development, and protection of land in Victoria. It does this through the establishment of Victorian Planning Provisions (VPP) and local planning policies and provisions (LPP).	<b>Yes</b>	<b>Low</b> Permit application is unlikely to require consideration of the <i>Guidelines for the removal, destruction or lopping of native vegetation</i> due to avoidance of native 'patches' and 'scattered trees'.	<b>Low</b>
EPBC Act referral	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth) The EPBC Act regulates the assessment and approval of proposed actions which have, or are likely to have, a significant impact on matters of national environmental significance (MNES), including listed threatened species and ecological communities.	<b>No</b> Provided impacts to areas of Plains Grassland are avoided and/or MNES are not present within these areas.	-	-
EES Act referral	<i>Environment Effects Act 1978</i> (Victoria) (EE Act) The EE Act requires the preparation of an Environment Effects Statement (EES) for activities considered to have, or to be capable of having, a significant	<b>No</b> The proposed works are considered unlikely to trigger an EES based on	-	-

Approval type	Legislation	Likely to be required?	Approval complexity	Project risk
	effect on the environment. Triggers for an EES are set out in the Ministerial Guidelines for Assessment of Environment Effects.	impacts to ecological values.		
FFG Act permit	<i>Flora and Fauna Guarantee Act 1988</i> The FFG Act regulates the protection and management of biodiversity including the conservation of threatened species and communities and the management of threatening processes.	<b>Yes</b> The proposed works are considered likely to impact on protected species within the road reserve.	<b>Low</b> Complete three page 'Application for a permit to take protected flora' form and submit to DELWP regional office.	<b>Low</b>

If you have any questions about any aspect of this report, please contact me on 0401 421 161 or through the ELA office on 1300 646 131.

Regards,



James Garden  
Senior Botanist

## References

DoEE, 2018. *Protected Matters Search Tool [Online Resource]*. Available: <http://www.environment.gov.au/webgis-framework/apps/pmst/pmst.jsf>

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DEPI, 2014. *Advisory List of Threatened Plant in Victoria. [Online Resource]*. Available: [https://www.environment.vic.gov.au/\\_data/assets/pdf\\_file/0021/50448/Advisory-List-of-Rare-or-Threatened-Plants-in-Victoria-2014.pdf](https://www.environment.vic.gov.au/_data/assets/pdf_file/0021/50448/Advisory-List-of-Rare-or-Threatened-Plants-in-Victoria-2014.pdf)

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VicFlora 2015. *Flora of Victoria*, Royal Botanic Gardens Victoria. Available: <https://vicflora.rbg.vic.gov.au>.

Visualising Victoria's Biodiversity. *[Online Resource]*. Available: [http://www.vvb.org.au/vvb\\_map.php#](http://www.vvb.org.au/vvb_map.php#)

## Appendix A Likelihood of occurrence table

Likelihood of occurrence	DELWP Advisory list	FFG Act	EPBC Act	Protected Matters Search Tool
<p><b>FLORA</b></p> <p>Present: Recorded within the study area in the last ten years.</p> <p>High: High likelihood of occurrence. Recent records of the species in the local vicinity (i.e. within the last 10 years); and/or, the project area contains high quality suitable habitat.</p> <p>Moderate: Moderate likelihood of occurrence. Previous records of the species in the local vicinity; and/or, the project area contains moderate quality suitable habitat.</p> <p>Low: Low likelihood of occurrence. Limited previous records of the species in the local vicinity; and/or, the study area contains poor or limited habitat. May also be considered low if other environmental factors, such as the fragmented or isolated nature of the habitat, are present.</p> <p>None: No suitable habitat and/or outside species range.</p>	<p>ex: Extinct</p> <p>rx: Regionally extinct</p> <p>ew: Extinct in the wild</p> <p>en: Endangered</p> <p>vu: Vulnerable</p> <p>nt: Near threatened</p> <p>r: Rare</p> <p>k: Poorly known</p> <p>dd: Data deficient</p>	<p>L: Listed</p> <p>N: Nominated</p> <p>X: Rejected</p> <p>I: Invalid or ineligible</p> <p>D: Delisted</p>	<p>EX: Extinct</p> <p>CR: Critically endangered</p> <p>EN: Endangered</p> <p>VU: Vulnerable</p> <p>CD: Conservation dependent</p>	<p>PMST-K: Species or species habitat known to occur within area</p> <p>PMST-L: Species or species habitat likely to occur within area</p> <p>PMST-M: Species or species habitat may occur within area</p> <p>PMST-F: Foraging, feeding or related behaviour likely to occur within area</p>
<p><b>FAUNA</b></p> <p>Present: Known resident of the project area based on site observations, recent database records (i.e. within last ten years) or expert advice.</p> <p>High: Recent records of the species in the local vicinity (i.e. within the last 10 years); and/or, the study area contains high quality or critical/ preferred habitat.</p> <p>Moderate: Previous records of the species in the local vicinity; and/or, the study area contains moderate quality or seasonal habitat.</p> <p>Low: Limited previous records of the species in the local vicinity; and/or, the study area contains habitat the species may use opportunistically or en-route to areas of preferred habitat.</p> <p>None: No suitable habitat and/or outside species range.</p>				

**Table 4: Significant fauna**

Scientific name	Common name	VROTS	FFG	EPBC	Number of records	Last record	Likelihood of occurrence	Rationale
<i>Accipiter novaehollandiae</i>	Grey Goshawk	vu	L		20	31/10/2018	Low	
<i>Actitis hypoleucos</i>	Common Sandpiper	vu			21	20/08/2018	Low	
<i>Anseranas semipalmata</i>	Magpie Goose	nt	L		954	28/07/2019	Low	
<i>Antechinus minimus maritimus</i>	Swamp Antechinus			VU	NA	NA	Low	No swampy habitat in study area.
<i>Anthochaera phrygia</i>	Regent Honeyeater	ce	L	CE	3	1/05/1993	Low	No recent records prefers box-ironbark woodland and dry sclerophyll forest.
<i>Antigone rubicunda</i>	Brolga	vu	L		300	21/07/2019	Low	
<i>Arctocephalus pusillus doriferus</i>	Australian Fur Seal		R		3	5/01/2017	None	
<i>Ardea alba</i>	Great Egret	vu	L		1098	31/07/2019	Low	
<i>Ardea intermedia plumifera</i>	Plumed Egret	en	L		27	13/01/2018	Low	
<i>Arenaria interpres</i>	Ruddy Turnstone	vu			46	22/12/2018	Low	
<i>Aythya australis</i>	Hardhead	vu			1124	21/07/2019	None	
<i>Balaenoptera edeni</i>	Bryde's Whale	dd			1	1/07/1968	None	
<i>Biziura lobata</i>	Musk Duck	vu			428	24/07/2019	Low	
<i>Botaurus poiciloptilus</i>	Australasian Bittern	en	L	EN	30	15/04/2019	Low	Wetland species, inhabits reed beds and other aquatic vegetation. No wetland within the study area.
<i>Burhinus grallarius</i>	Bush Stone-curlew	en	L		1	20/08/1960	Low	
<i>Calamanthus pyrrhopygius</i>	Chestnut-rumped Heathwren	vu	L		1	18/10/1969	Low	
<i>Calidris alba</i>	Sanderling	nt			7	25/11/2017	Low	
<i>Calidris canutus</i>	Red Knot	en		EN	60	3/04/2019	Low	Coastal and marine species. Inhabits estuaries and bays.

Scientific name	Common name	VROTS	FFG	EPBC	Number of records	Last record	Likelihood of occurrence	Rationale
<i>Calidris ferruginea</i>	Curlew Sandpiper	en	L	CE	778	24/07/2019	Low	Coastal and marine species. Inhabits estuaries and bays.
<i>Calidris melanotos</i>	Pectoral Sandpiper	nt			44	8/04/2019	Low	
<i>Calidris subminuta</i>	Long-toed Stint	nt			12	30/03/2016	Low	
<i>Calidris tenuirostris</i>	Great Knot	en	L	CE	15	26/01/2018	Low	Coastal and marine species. Inhabits estuaries and bays.
<i>Ceyx azureus</i>	Azure Kingfisher	nt			2	1/01/1981	Low	
<i>Charadrius leschenaultii</i>	Greater Sand Plover	ce		VU	2	1/01/1996	Low	Coastal and marine species. Inhabits estuaries and bays.
<i>Charadrius mongolus</i>	Lesser Sand Plover	ce		EN	7	1/02/2008	Low	Coastal and marine species. Inhabits estuaries and bays.
<i>Chlidonias hybrida</i>	Whiskered Tern	nt			808	24/03/2019	Low	
<i>Chlidonias leucopterus</i>	White-winged Black Tern	nt			117	7/02/2019	Low	
<i>Chrysococcyx osculans</i>	Black-eared Cuckoo	ny			4	29/08/2018	Low	
<i>Cinclosoma punctatum</i>	Spotted Quail-thrush	nt			2	26/10/1976	Low	
<i>Circus assimilis</i>	Spotted Harrier	nt			211	18/07/2019	Low	
<i>Climacteris picumnus</i>	Brown Treecreeper	nt			17	4/02/2018	Low	
<i>Dasyurus maculatus maculatus</i>	Spot-tailed Quoll			EN	NA	NA	Low	Prefers forest habitat.
<i>Delma impar</i>	Striped Legless Lizard	en	L	VU	1	22/06/1992	Low	Low quality habitat, minimal rocks, debris and cracking soils.
<i>Dromaius novaehollandiae</i>	Emu	nt			428	11/07/2019	Low	
<i>Egretta garzetta</i>	Little Egret	en	L		571	14/07/2019	Low	
<i>Engaeus fultoni</i>	Otway Burrowing Crayfish	vu			1	1/04/1942	Low	
<i>Falco subniger</i>	Black Falcon	vu	L		125	24/07/2019	Low	

Scientific name	Common name	VROTS	FFG	EPBC	Number of records	Last record	Likelihood of occurrence	Rationale
<i>Gallinago hardwickii</i>	Latham's Snipe	nt			195	11/04/2019	Low	
<i>Geopelia cuneata</i>	Diamond Dove	nt	L		1	1/01/1977	Low	
<i>Grantiella picta</i>	Painted Honeyeater	vu	L	VU	2	3/12/2006	Low	Low quality habitat. No mistletoe present.
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	nt			55	2/07/2019	Low	
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	vu	L		91	22/07/2019	Low	
<i>Hesperilla flavescens</i>	Yellow Sedge-skipper Butterfly	vu	L		2	1/05/1989	Low	
<i>Hirundapus caudacutus</i>	White-throated Needletail	vu			14	23/02/2016	Low	
<i>Hydroprogne caspia</i>	Caspian Tern	nt	L		94	24/07/2019	Low	
<i>Ixobrychus dubius</i>	Australian Little Bittern	en	L		1	1/01/1970	Low	
<i>Larus pacificus</i>	Pacific Gull	nt			637	26/07/2019	Low	
<i>Lathamus discolor</i>	Swift Parrot	en	L	CE	35	29/03/2019	Moderate	May forage on scattered Eucalyptus sp. Within the study area. Unlikely to be impacted by impacts to Eucalypts due to the presence of these trees within the landscape.
<i>Lewinia pectoralis</i>	Lewin's Rail	vu	L		28	21/04/2019	Low	
<i>Limosa lapponica</i>	Bar-tailed Godwit				30	10/01/2019	Low	
<i>Limosa limosa</i>	Black-tailed Godwit	vu			116	9/05/2019	Low	
<i>Litoria raniformis</i>	Growling Grass Frog	en	L	VU	365	22/02/2016	Low	Records mostly associated with WTP. Limited connectivity between known populations and the study area so unlikely that GGF will utilise the wetland adjacent to the study area, therefore unlikely to be present in terrestrial habitat associated with the study area.

Scientific name	Common name	VROTS	FFG	EPBC	Number of records	Last record	Likelihood of occurrence	Rationale
<i>Lophochroa leadbeateri</i>	Major Mitchell's Cockatoo	vu	L		3	7/06/2005	Low	
<i>Macronectes halli</i>	Northern Giant Petrel			VU	NA	NA	Low	Marine species.
<i>Macquaria australasica</i>	Macquarie Perch	en	L	EN	2	1/01/1981	None	Aquatic species. No waterbodies present in the study area.
<i>Megaptera novaeangliae australis</i>	Southern Humpback Whale	vu	L	VU	3	10/06/2000	None	Marine species.
<i>Melanodryas cucullata</i>	Hooded Robin	nt	L		12	18/03/2016	Low	
<i>Mirounga leonina</i>	Southern Elephant Seal			VU	10	2/06/2005	Low	Marine species.
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	ce	L	CE	97	14/07/2018	Low	Records primarily associated with WTP. Low quality habitat within study area. Prefers coastal habitats.
<i>Neophema elegans</i>	Elegant Parrot	vu			1	28/12/1993	Low	
<i>Ninox connivens</i>	Barking Owl	en	L		2	3/12/2006	Low	
<i>Ninox strenua</i>	Powerful Owl	vu	L		4	26/10/1976	Low	
<i>Numenius madagascariensis</i>	Eastern Curlew	vu	L	CE	76	3/12/2013	Low	Prefers coastal habitats such as estuaries.
<i>Numenius phaeopus</i>	Whimbrel	vu			4	20/10/1990	Low	
<i>Nycticorax caledonicus</i>	Nankeen Night Heron	nt			312	20/07/2019	Low	
<i>Oxyura australis</i>	Blue-billed Duck	en	L		250	12/07/2019	Low	
<i>Pachyptila turtur</i>	Fairy Prion	vu			1	4/09/1981	Low	
<i>Pelagodroma marina</i>	White-faced Storm-Petrel	vu			2	10/02/2016	Low	
<i>Pelecanoides urinatrix</i>	Common Diving-Petrel	nt			2	1/03/1978	Low	
<i>Perameles gunnii</i>	Eastern Barred Bandicoot	ew	L	VU	36	7/11/1980	None	Extinct on the mainland.
<i>Phalacrocorax fuscescens</i>	Black-faced Cormorant	nt			8	11/04/2019	Low	



Scientific name	Common name	VROTS	FFG	EPBC	Number of records	Last record	Likelihood of occurrence	Rationale
<i>Phalacrocorax varius</i>	Pied Cormorant	nt			610	12/07/2019	Low	
<i>Platalea regia</i>	Royal Spoonbill	nt			907	28/07/2019	Low	
<i>Plegadis falcinellus</i>	Glossy Ibis	nt			148	1/06/2019	Low	
<i>Pluvialis fulva</i>	Pacific Golden Plover	vu			70	5/01/2019	Low	
<i>Pluvialis squatarola</i>	Grey Plover	en			11	24/02/2017	Low	
<i>Porzana pusilla</i>	Baillon's Crake	vu	L		204	14/04/2019	Low	
<i>Prototroctes maraena</i>	Australian Grayling	vu	L	VU	10	26/03/1998	None	No waterbodies present within the study area.
<i>Pseudemoia pagenstecheri</i>	Tussock Skink	vu			3	4/09/2016	Low	
<i>Pseudophryne bibronii</i>	Brown Toadlet	en	L		17	9/05/1965	Low	
<i>Pterodroma leucoptera leucoptera</i>	Gould's Petrel			EN	NA	NA	Low	
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	vu	L	VU	7	4/03/2005	Moderate	Breeding colony located in Geelong. May forage in scattered Eucalyptus. Any impacts to these trees is unlikely to have a significant impact on GHFF due to the availability of these resources in the landscape.
<i>Pyrholaemus sagittatus</i>	Speckled Warbler	vu	L		17	4/04/2019	Low	
<i>Rostratula australis</i>	Australian Painted-snipe	ce	L	EN	2	23/12/2011	Low	Wetland species. Inhabits shallow terrestrial waterbodies. None present within the study area.
<i>Sminthopsis crassicaudata</i>	Fat-tailed Dunnart	nt			10	1/04/2009	Low	
<i>Spatula rhynchotis</i>	Australasian Shoveler	vu			739	12/07/2019	Low	
<i>Stagonopleura guttata</i>	Diamond Firetail	nt	L		37	13/04/2016	Low	
<i>Sterna striata</i>	White-fronted Tern	nt			1	2/07/1989	Low	

Scientific name	Common name	VROTS	FFG	EPBC	Number of records	Last record	Likelihood of occurrence	Rationale
<i>Sternula albifrons</i>	Little Tern	vu	L		124	12/07/2019	Low	
<i>Sternula nereis</i>	Fairy Tern	en	L	VU	264	28/07/2019	Low	Coastal species. Inhabits estuaries, beaches, sewage ponds and inlets.
<i>Stictonetta naevosa</i>	Freckled Duck	en	L		134	13/06/2019	Low	
<i>Stiltia isabella</i>	Australian Pratincole	nt			1	17/02/1985	Low	
<i>Synemon plana</i>	Golden Sun Moth	ce	L	CE	30	12/12/2016	Moderate	Potential moderate habitat within the Corio Grassland Reserve.
<i>Thalassarche carteri</i>	Indian Yellow-nosed Albatross	vu	L	VU	1	1/09/1979	Low	Marine species.
<i>Thinornis rubricollis rubricollis</i>	Hooded Plover			VU	NA	NA	Low	Coastal species. Prefers sandy beaches.
<i>Thyone nigra</i>	Sea-cucumber species	vu	L		3	1/01/1960	Low	
<i>Todiramphus pyrrhopygius</i>	Red-backed Kingfisher	nt			1	7/11/1982	Low	
<i>Tringa brevipes</i>	Grey-tailed Tattler	ce	L		37	2/04/2015	Low	
<i>Tringa glareola</i>	Wood Sandpiper	vu			75	11/04/2019	Low	
<i>Tringa nebularia</i>	Common Greenshank	vu			838	24/07/2019	Low	
<i>Tringa stagnatilis</i>	Marsh Sandpiper	vu			550	25/04/2019	Low	
<i>Turnix velox</i>	Little Button-quail	nt			2	1/10/1977	Low	
<i>Tyto novaehollandiae</i>	Masked Owl	en	L		1	8/11/2018	Low	
<i>Xenus cinereus</i>	Terek Sandpiper	en	L		19	16/04/2017	Low	

**Table 5: Significant flora**

Scientific name	Common name	VROTS	FFG	EPBC	Number of records	Last record	Likelihood of occurrence	Rationale
<i>Acacia boormanii</i>	Snowy River Wattle	r			1	6/10/2002	None	
<i>Acacia cupularis</i>	Cup Wattle	r			1	17/01/1983	None	
<i>Allocasuarina luehmannii</i>	Buloke	en	L		3	4/01/2007	Low	May be planted individuals.
<i>Althenia marina</i>	Sea Water-mat	vu	L		1	23/03/2010	None	
<i>Amphibromus fluitans</i>	River Swamp Wallaby-grass		R	VU	NA	NA	None	
<i>Amyema pendula subsp. longifolia</i>	Drooping Mistletoe	r			1	6/10/2002	None	
<i>Atriplex paludosa subsp. paludosa</i>	Marsh Saltbush	r			11	30/11/1994	Low	
<i>Avicennia marina subsp. australasica</i>	Grey Mangrove	r			5	14/05/2003	None	
<i>Brachyscome cuneifolia</i>	Wedge-leaf Daisy	k			1	6/10/2002	None	
<i>Caladenia pumila</i>	Dwarf Spider-orchid	en	L	CE	NA	NA	Low	
<i>Calotis anthemoides</i>	Cut-leaf Burr-daisy		L		1	22/08/1923	None	
<i>Comesperma polygaloides</i>	Small Milkwort	vu	L		13	17/12/2013	Moderate	
<i>Convolvulus angustissimus subsp. omnigracilis</i>	Slender Bindweed	k			4	14/11/2011	Moderate	
<i>Correa alba var. pannosa</i>	Velvet White Correa	r			1	01/01/1889	None	
<i>Cullen parvum</i>	Small Scurf-pea	en	L		2	23/11/2010	Low	
<i>Dianella amoena</i>	Matted Flax-lily	en	L	EN	22	16/02/2014	Low	
<i>Dianella longifolia var. grandis</i>	Flax-lily	vu			8	28/10/2011	Low	
<i>Diuris basaltica</i>	Small Golden Moths	en	L	EN	1	21/02/1998	None	
<i>Diuris palustris</i>	Swamp Diuris	vu	L		6	12/09/1971	Low	

Scientific name	Common name	VROTS	FFG	EPBC	Number of records	Last record	Likelihood of occurrence	Rationale
<i>Dodonaea procumbens</i>	Trailing Hop-bush	vu		VU	NA	NA	Low	
<i>Eucalyptus camaldulensis</i>	River Red-gum		R		13	15/01/2018	None	
<i>Eucalyptus leucoxylon</i> subsp. <i>connata</i>	Melbourne Yellow-gum	vu	R		5	8/11/2017	Low	
<i>Eucalyptus sideroxylon</i> subsp. <i>sideroxylon</i>	Mugga	r			1	28/08/2015	None	
<i>Glycine latrobeana</i>	Clover Glycine	vu	L	VU	NA	NA	Low	
<i>Grevillea rosmarinifolia</i>	Rosemary Grevillea	All infraspecific taxa included in Advisory List			2	9/08/1967	None	
<i>Halophila australis</i>	Oval Sea-wrack	k			1	5/04/2014	None	
<i>Heterozostera nigricaulis</i>	Australian Grass-wrack	r			1	23/03/2010	None	
<i>Heterozostera tasmanica</i>	Tasman Grass-wrack	r			2	20/01/2005	Low	
<i>Juncus revolutus</i>	Creeping Rush	r			1	25/11/1993	None	
<i>Lachnagrostis adamsonii</i>	Adamson's Blown-grass	vu	L	EN	9	27/05/2002	Low	
<i>Lachnagrostis punicea</i> subsp. <i>punicea</i>	Purple Blown-grass	r			2	9/12/1994	Low	
<i>Lachnagrostis robusta</i>	Salt Blown-grass	r			1	4/02/1997	Low	
<i>Lawrenca spicata</i>	Salt Lawrenca	r			4	16/01/2010	Low	
<i>Leucochrysum albicans</i> var. <i>tricolor</i>	White Sunray	en	L	EN	NA	NA	Low	
<i>Maireana aphylla</i>	Leafless Bluebush	k			4	1/01/2018	High	

Scientific name	Common name	VROTS	FFG	EPBC	Number of records	Last record	Likelihood of occurrence	Rationale
<i>Melaleuca armillaris</i> subsp. <i>armillaris</i>	Giant Honey-myrtle	r			2	19/09/2017	None	
<i>Microlepidium pilosulum</i>	Hairy Shepherd's Purse	en			1	26/11/2009	None	
<i>Nicotiana suaveolens</i>	Austral Tobacco	r			1	6/10/2002	None	
<i>Pimelea spinescens</i> subsp. <i>spinescens</i>	Spiny Rice-flower	en	L	CE	214	16/02/2014	Present	
<i>Pleurosorus subglandulosus</i>	Glandular Blanket-fern	k			1	23/11/2010	None	
<i>Poa labillardierei</i> var. (Volcanic Plains)	Basalt Tussock-grass	k			1	22/12/2003	None	
<i>Podolepis linearifolia</i>	Basalt Podolepis	en			2	23/11/2010	Moderate	
<i>Potamogeton australiensis</i>	Thin Pondweed	k			2	3/11/1923	None	
<i>Prasophyllum frenchii</i>	Maroon Leek-orchid	en	L	EN	NA	NA	Low	
<i>Prasophyllum spicatum</i>	Dense Leek-orchid	en		VU	7	25/09/1934	Low	
<i>Prasophyllum suaveolens</i>	Fragrant Leek-orchid	en	L	EN	1	1/09/1924	None	
<i>Prostanthera nivea</i> var. <i>nivea</i>	Snowy Mint-bush	r			3	25/11/2006	Low	
<i>Pterostylis chlorogramma</i>	Green-striped Greenhood	vu	L	VU	NA	NA	Low	
<i>Pterostylis cucullata</i>	Leafy Greenhood	All infraspecific taxa included in Advisory List	L	VU	NA	NA	Low	
<i>Pterostylis truncata</i>	Brittle Greenhood	en	L		17	15/06/2006	Moderate	

Scientific name	Common name	VROTS	FFG	EPBC	Number of records	Last record	Likelihood of occurrence	Rationale
<i>Rhagodia parabolica</i>	Fragrant Saltbush	r			5	8/11/2017	High	
<i>Rumex crystallinus s.s.</i>	Glistening Dock	vu			1	1/04/1982	Low	
<i>Ruppia tuberosa</i>	Tuberous Tassel	k			1	19/12/2000	None	
<i>Rutidosia leptorhynchoides</i>	Button Wrinklewort	en	L	EN	16	11/05/2011	Moderate	
<i>Rytidosperma richardsonii</i>	Straw Wallaby-grass	vu			1	1/04/1961	Low	
<i>Salsola tragus subsp. pontica</i>	Coast Saltwort	r			5	25/02/2010	Low	
<i>Senecio macrocarpus</i>	Large-headed Fireweed	en	L	VU	41	28/10/2011	Present	
<i>Senecio psilocarpus</i>	Swamp Fireweed	vu		VU	NA	NA	Low	
<i>Swainsona behriana</i>	Southern Swainson-pea	r			1	1/11/1926	None	
<i>Thelymitra epipactoides</i>	Metallic Sun-orchid	en	L	EN	NA	NA	Low	
<i>Thelymitra gregaria</i>	Basalt Sun-orchid	en	L		2	23/11/2010	Low	
<i>Triglochin minutissima</i>	Tiny Arrowgrass	r			1	22/10/1983	None	
<i>Triglochin mucronata</i>	Prickly Arrowgrass	r			2	20/08/2009	Low	
<i>Tripogonella loliiformis</i>	Rye Beetle-grass	r			28	23/11/2010	Present	
<i>Xerochrysum palustre</i>	Swamp Everlasting	vu	L	VU	NA	NA	Low	