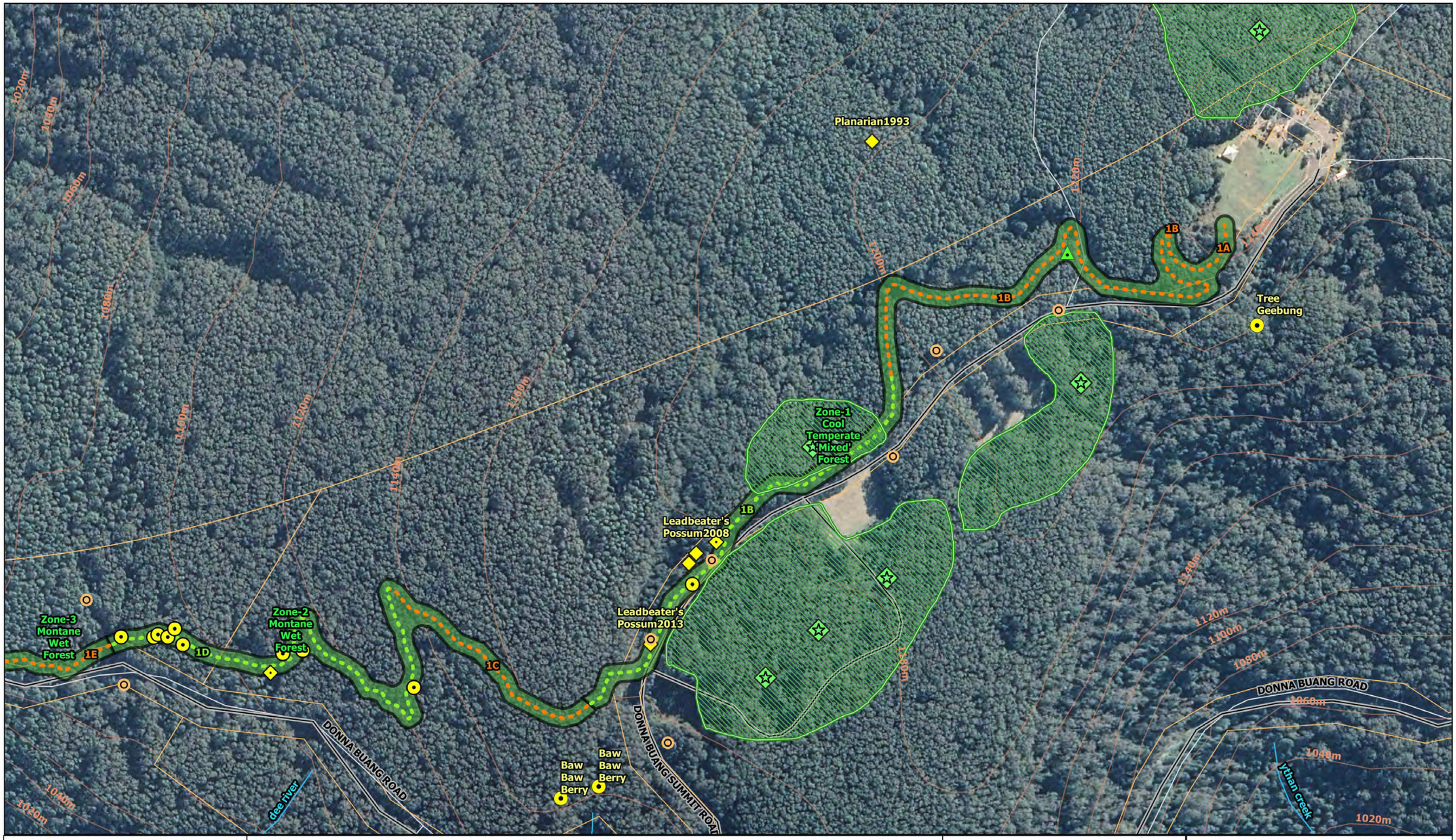
Appendix 3. Map Series 2– High Risk Areas



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- Threatened Fauna (VBA)
- Threatened Flora (VBA)
- LBP Nest Boxes
- MDB Stonefly Locations
- MDB Stonefly Buffer Zones
- Habitat Hectare Assessment (10m corridor)

Significant Trees

- Large Tree >120cm (small hollows)
- Large Tree >120cm (no hollows observed)
- Large Tree 90-120cm (small hollows)

Trail Alignment and Ref No.

- New Trails (Assessed 2019)
- New Trails (Assessed 2017)

Details

Date: 17 October 2019
Created by: Greg James

Data Source:
Aerial Photography from Google Earth
Base Map Data copyright State of Victoria
Map Program: QGIS 3.6

N

0 50 100 150 200 m

Map 1 – Donna Buang Summit Region

Map Series 2 – High Risk Areas, Proposed Warburton Mountain Bike Trail

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Predominantly Rainforest (Ground Truthed)

Habitat Hectare Assessment (10m corridor)

Significant Trees

Large Tree >120cm (no hollows observed)

Large Tree 90-120cm (large hollows)

Large Tree 90-120cm (small hollows)

Small Habitat Tree <90cm

Trail Alignment and Ref No.

New Trails (Assessed 2019)

New Trails (Assessed 2017)

Details

Date: 17 October 2019
Created by: Greg James

Data Source:
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N

0 50 100 150 200 m

Map 2 – Donna Buang Road Central Region

Map Series 2 – High Risk Areas, Proposed Warburton Mountain Bike Trail

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- Threatened Fauna (VBA)
- Threatened Flora (VBA)
- LBP Nest Boxes
- Predominantly Rainforest (Ground Truthed)
- Habitat Hectare Assessment (10m corridor)

Trail Alignment and Ref No.

- New Trails (Assessed 2019)
- New Trails (Assessed 2017)

Details

Date: 17 October 2019
Created by: Greg James

Data Source:
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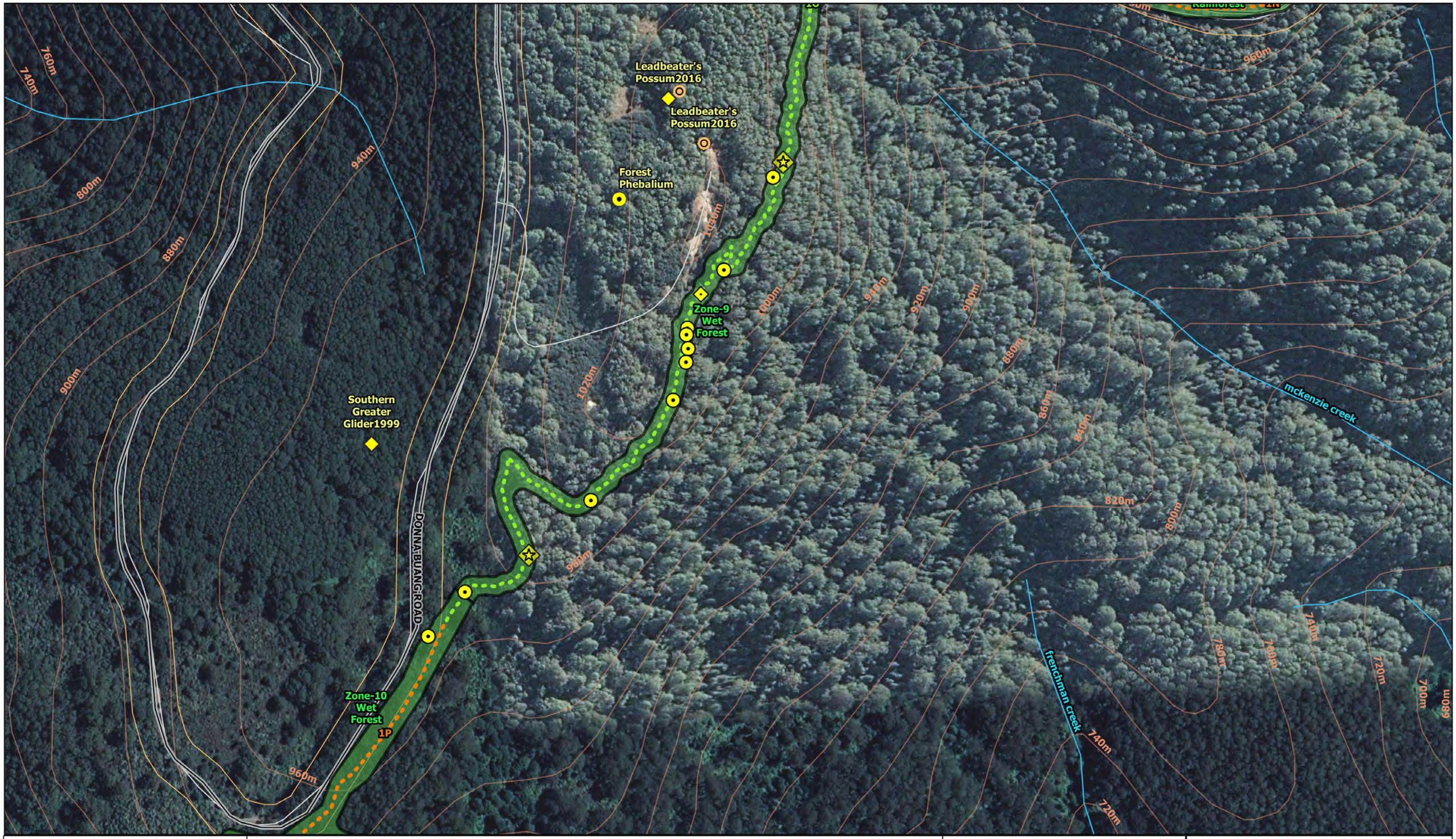
Base Map Data copyright State of Victoria
Map Program: QGIS 3.6

N

0 50 100 150 200 m

Map 3 – Donna Buang Road Westernl Region

Map Series 2 – High Risk Areas, Proposed Warburton Mountain Bike Trail



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- Threatened Flora (VBA)
- LBP Nest Boxes
- Habitat Hectare Assessment (10m corridor)

Significant Trees

- Large Tree >120cm (large hollows)
- Large Tree >120cm (small hollows)
- Large Tree >120cm (no hollows observed)

Trail Alignment and Ref No.

- New Trails (Assessed 2019)
- New Trails (Assessed 2017)

Details

Date: 17 October 2019
Created by: Greg James

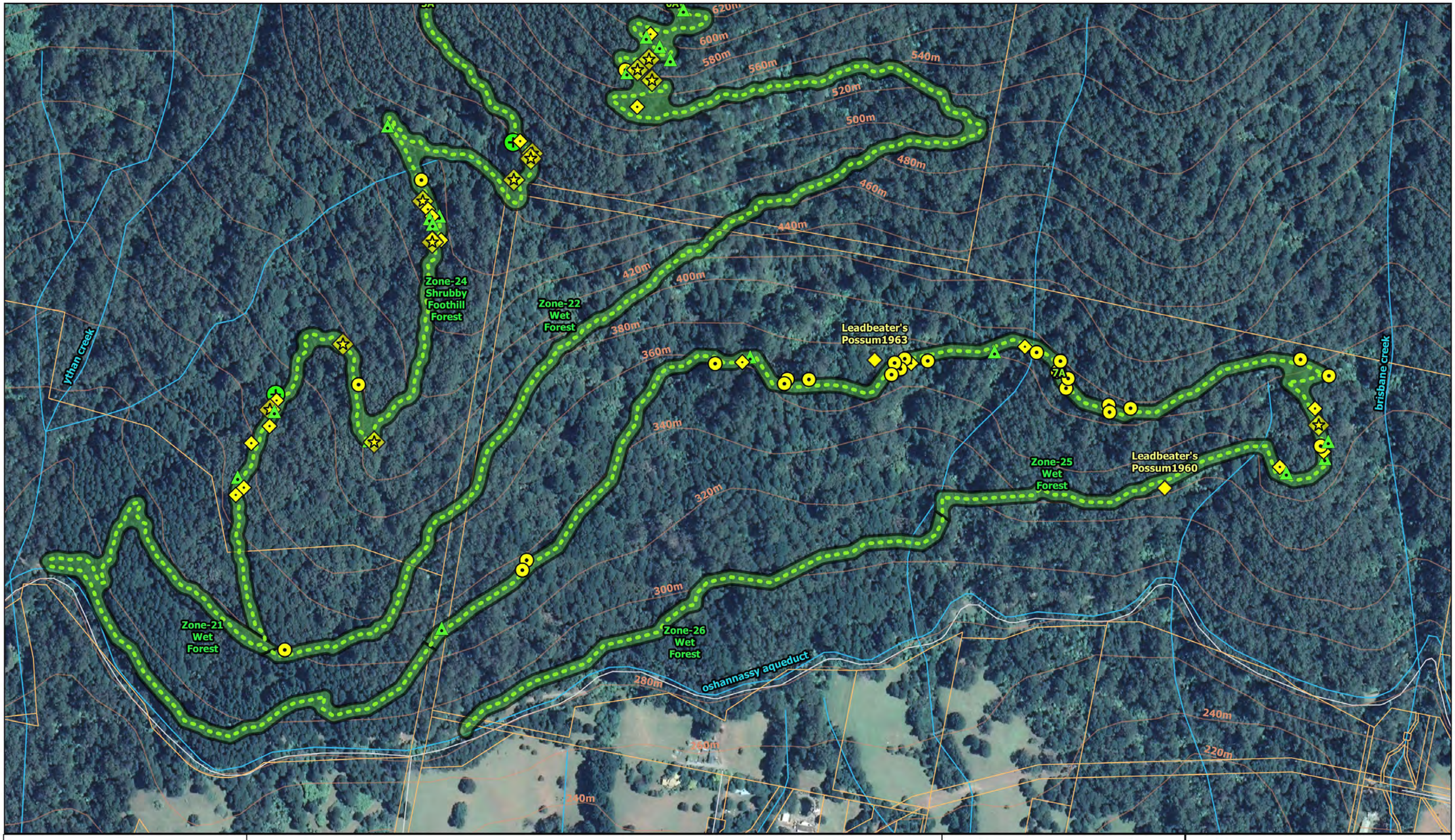
Data Source:
Aerial Photography from Google Earth
Base Map Data copyright State of Victoria
Map Program: QGIS 3.6

N

0 50 100 150 200 m

Map 4 – Ben Cairn Region

Map Series 2 – High Risk Areas, Proposed Warburton Mountain Bike Trail



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- Threatened Fauna (VBA)
- Habitat Hectare Assessment (10m corridor)

Significant Trees

- Large Tree >120cm (large hollows)
- Large Tree >120cm (small hollows)
- Large Tree >120cm (no hollows observed)
- Large Tree 90-120cm (large hollows)
- Large Tree 90-120cm (small hollows)

Trail Alignment and Ref No.

- New Trails (Assessed 2019)

Details

Date: 17 October 2019
Created by: Greg James

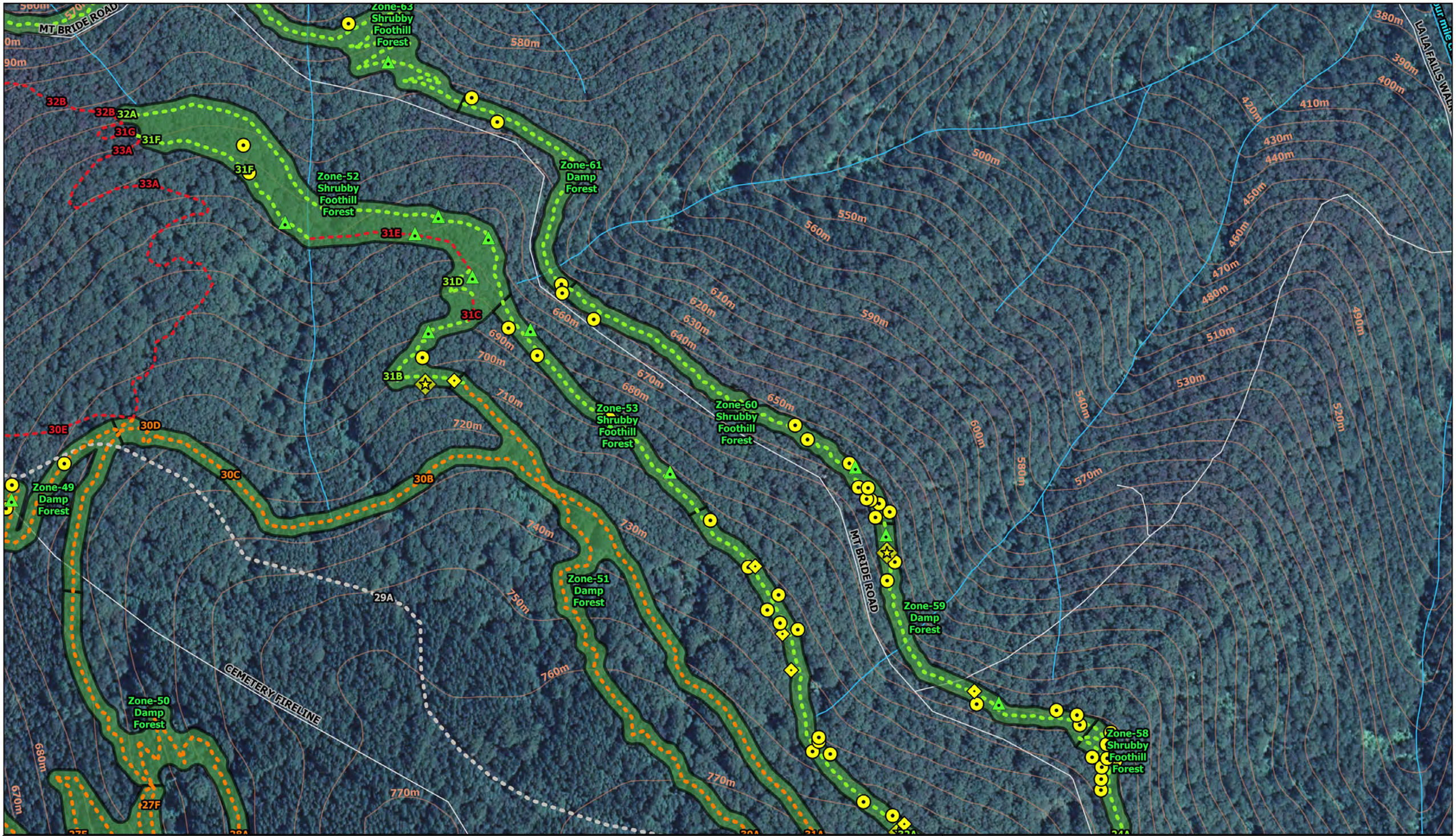
Data Source:
Aerial Photography from Google Earth
Base Map Data copyright State of Victoria
Map Program: QGIS 3.6

N

0 60 120 180 240 m

Map 5 – Donna Buang Rd to Aqueduct Link

Map Series 2 – High Risk Areas, Proposed Warburton Mountain Bike Trail



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Habitat Hectare Assessment (10m corridor)

Significant Trees

- Large Tree >120cm (large hollows)
- Large Tree >120cm (small hollows)
- Large Tree >120cm (no hollows observed)
- Large Tree 90-120cm (small hollows)

Trail Alignment and Ref No.

- New Trails (Assessed 2019)
- Existing Trail
- Existing Vehicle Track
- New Trails (Assessed 2017)

Details

Date: 17 October 2019
Created by: Greg James

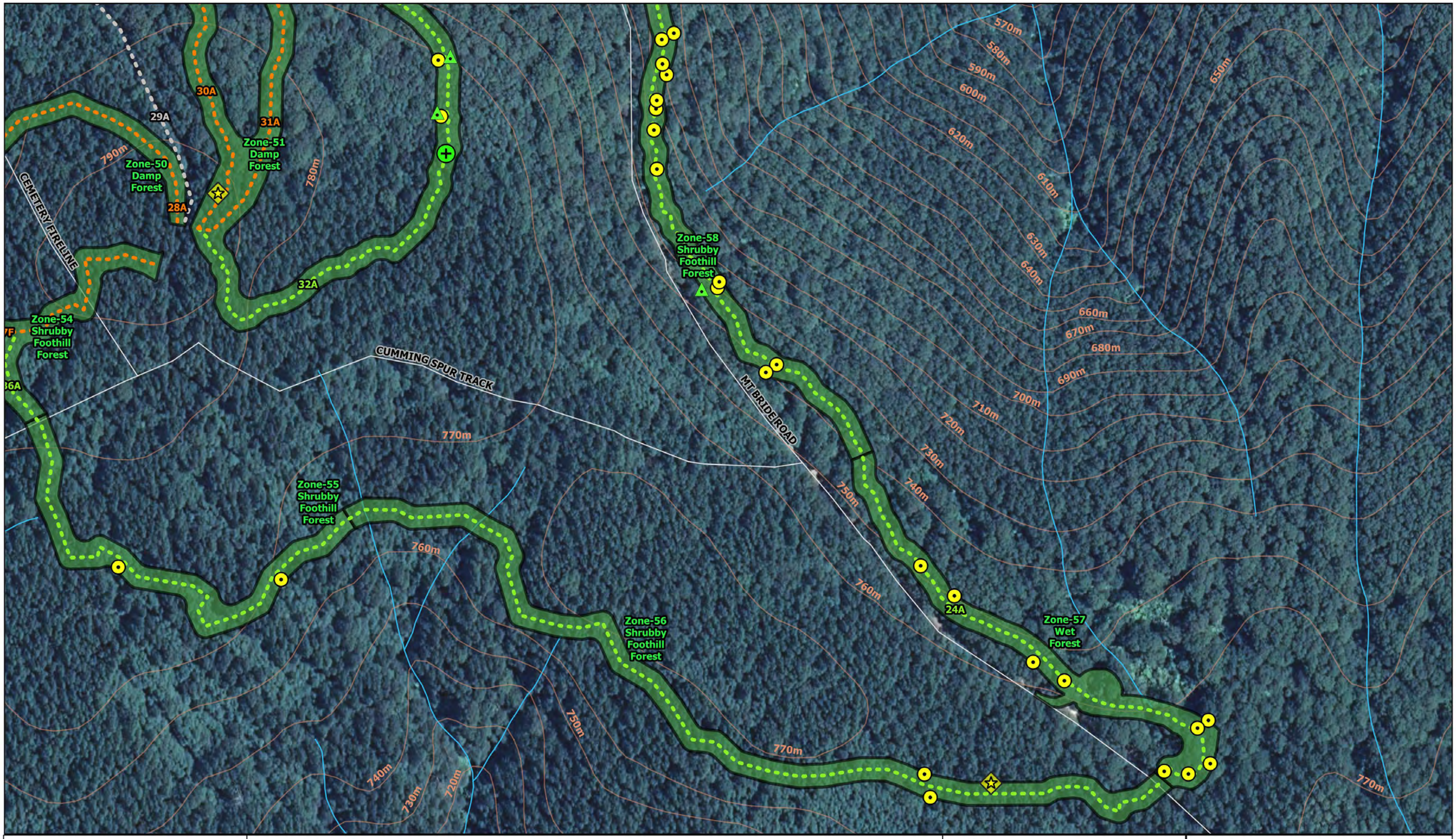
Data Source:
Aerial Photography from Google Earth
Base Map Data copyright State of Victoria
Map Program: QGIS 3.6

N

0 50 100 150 200 m

Map 6 – Mount Bride Road North

Map Series 2 – High Risk Areas, Proposed Warburton Mountain Bike Trail



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Habitat Hectare Assessment (10m corridor)

Significant Trees

- Large Tree >120cm (large hollows)
- Large Tree >120cm (small hollows)
- Large Tree >120cm (no hollows observed)
- Large Tree 90-120cm (large hollows)
- Large Tree 90-120cm (small hollows)

Trail Alignment and Ref No.

- New Trails (Assessed 2019)
- Existing Vehicle Track
- New Trails (Assessed 2017)

Details

Date: 17 October 2019
Created by: Greg James

Data Source:
Aerial Photography from Google Earth
Base Map Data copyright State of Victoria
Map Program: QGIS 3.6

N

0 40 80 120 160 m

Map 7 – Mount Bride Road South

Map Series 2 – High Risk Areas, Proposed Warburton Mountain Bike Trail

Appendix 4. Risk Assessment Matrix

The methodology of the Risk Assessment Matrix is outlined below:

1. The risk assessment starts with defining an alignment in the field that is indicative only within a 20-meter corridor to allow flexibility for realignments. The indicative alignment has sought to minimise environmental impacts as much as possible, however, further minimisation can only be achieved through analysis and detailed design and construction methods outlined in the following steps.

2. The indicative alignment is then subject to a four-tiered risk analysis based on ecological sensitivities as outlined below:

Very High	High	Moderate	Low
Sites in this category have one or more issues as listed below (predominantly unavoidable breaches or near breaches of protocols)	Sites in this category have one or more issues as listed below although no impacts on critical habitats such as Cool Temperate Rainforest, MDB Stonefly or LBP	Sites in this category have few issues in terms of breaching protocols or impacting on critical habitats, however the trail still traverses through moderate to high quality forest vegetation	Sites in this category are minimal risk as they traverse through existing cleared areas or substantial trails or vehicle tracks

The above risk categories are the starting point to identify the risks in the various sections of the trail. The risk category for each section is on the assumption that no particular design or construction mitigation measures are implemented. There are a range of risks associated with design and construction including:

- Impacts to Leadbeater's Possum including nesting sites and its foraging habitat
- Impacts to MDB Wingless Stonefly or its habitat
- Impacts to Cool Temperate Rainforest
- Impacts to habitat trees suitable for a range of hollow dependent species
- Impacts rare or threatened flora is identified
- Erosion and siltation impacts to drainage lines and waterways
- Impacts to tree root zones where minor earthworks are required to achieve a suitable trail grade
- Impacts to small dead trees (mostly in post-fire areas) that may require removal for safety reasons
- Impacts to high quality understorey vegetation

Each of these risks evaluated and then each trail section has a risk category based on the combination of risk present in these locations.

A moderate risk only applies where:

- There are no particular issues pertaining to threatened species and ecological communities and,
- Only if there are one or two other risks within the defined section of trail
- within areas of non-native vegetation

A low risk only applies where:

- the trail utilises existing walking tracks, vehicle tracks or bike tracks that can accommodate all requirements to facilitate the mountain bike trail construction or
- Where no-native understorey or significant trees are present.

3. The identified risks are then subject to 4-step assessment process outlined below:

- The severity of the risk in defined locations
- The potential environmental impacts associated with each risk
- A Risk Mitigation Design and Construction Response to each of these risks or potential impacts
- A revised risk category and justification following the prescribed risk mitigation methods

It is important to realise that the current proposed trail alignment is just the start point that a allows a more detailed design and construction process so that avoidance and minimisation of impacts can be achieved. It is also important to note that the location of mapped ecological values as represented in Appendix 1, 2 and 3 (including significant trees, nest boxes, rare flora and fauna records) are indicative only. Due to limitations of satellite reception in heavily forested environments, it is rare that a GPS points are recorded within 1m accuracy. GPS points taken in the field were generally between 2-5 metre accuracy. The same limitation applies to the trail alignment itself. These limitations emphasize the importance of determining re-alignments with mitigation solutions on the ground when it comes to construction. Depending on the section of trail being built, construction contractors will need to be supervised by expert personnel including ecologists, flora and fauna specialists, arborists and design engineers to ensure that the objectives of risk minimisation is achieved.

Table 14. Risk Assessment by Protocol

Risk of Impact without mitigation	Ecological Value	Risk to Value:	Protocols	Can the protocol be achieved?	Where can't the protocol be achieved?	Mitigation Measures where protocol cannot be achieved	Risk of Impact Following Protocols and Mitigation Measures
Very High	Cool Temperate Rainforest or Cool Temperate 'Mixed' Forest	The reduction in overall area of Cool Temperate Rainforest and Cool Temperate Mixed Forest given their current limited distribution and listing under FFG.	CTR P1 – Prior to finalising the trail alignment, field surveys are required to identify the extent of Cool Temperate Mixed Forest within the area.	Yes	na	na	**Moderate**
			CTR P2 – Avoid areas of Cool Temperate Rainforest and Cool Temperate Mixed Forest.	In Part	Habitat Zone (HZ) 1, 4, 6 and 8	CTR M1 – Minimise the length of the alignment through Cool Temperate Rainforest and Cool Temperate Mixed Forest.	
			CTR P3 – No rest stops or viewing areas are to be located within Cool Temperate Rainforest or Cool Temperate Mixed Forest.	Yes	na	na	
		The introduction and spread of Myrtle Wilt caused by damage to trees, including disturbance to the root zone will lead to the death of Myrtle Beech species.	CTR P4 – Avoid areas showing signs of Myrtle Wilt.	TBD	TBD	CTR M2 – Prior to finalising the trail alignment, undertake detailed mapping to clearly identify areas showing signs of Myrtle Wilt (Attach check list of Myrtle Wilt from DELWP as appendix).	
			CTR P5 – Avoid the drip line of Myrtle Beech within Cool Temperate Rainforest and Cool Temperate Mixed Forest.	In Part	Habitat Zone 1, 4 and 6 and some areas within Habitat zone 2, 3, 5 and 7	CTR M3 – Where areas containing Myrtle Beech cannot be avoided, minimise disturbance within the drip line of all Myrtle Beech trees using a design/engineered solution. CTR M4 – In the event of any disturbance within the root zone or to any part of Myrtle Beech trees occurs, fungicide must be immediately applied to prevent the spread of Myrtle Wilt. CTR M5 –Trail construction is to be undertaken using hand tools only within Cool Temperate Rainforest and Cool Temperate Mixed Forest.	
		The introduction of imported fill material will introduce pathogens and damage the integrity of Cool Temperate Rainforest and Cool Temperate Mixed Forest.	CTR P7 – No imported fill material (including gravel, rock and soil) is to be used within Cool Temperate Rainforest or Cool Temperate Mixed Forest.	Yes	na	CTR M6 – Where soils are damp and boggy, trail must be elevated using boardwalk or another appropriate engineered/design solution.	

Risk of Impact without mitigation	Ecological Value	Risk to Value:	Protocols	Can the protocol be achieved?	Where can't the protocol be achieved?	Mitigation Measures where protocol cannot be achieved	Risk of Impact Following Protocols and Mitigation Measures
High / Moderate	Leadbeater's Possum (LBP)	There are 3 essential components to Leadbeater's habitat which are, an appropriate food source, access to nesting hollows and dense connected vegetation to allow movement. Any impact to one of these factors will have a negative impact on the population and future viability of Leadbeater's in these areas. Creation of the trail in close proximity to Leadbeater's habitat will facilitate movement by predatory species such as foxes and cats which will increase predation and reduce population size. Removal of dense stands of mid-story vegetation, specifically Callistemon and Tea Tree species will negatively impact the movement and therefore health of Leadbeater's populations.	LBP P1 – Avoid areas of known and potential LBP habitat.	No	All areas in the vicinity of Donna Buang Road (HZ 1-13, 22-24) and Mount Tugwell (HZ 50-62)	LBP M1 – No removal of dense stands of Callistemon or Tea Tree species within potential or suitable habitat for Leadbeater's possums. LBP M2 – Where removal of vegetation cannot be avoided, the alignment must utilise existing cleared areas. LBP M3 – In State Forest where there is a stand of single age Eucalyptus sp. and midstorey (i.e. regrowth following bushfire), trees of up to 20 cm DBH may be removed. However, no midstorey is to be removed in LBP high quality habitat (within the National Park)	**Low**
			LBP P2 – Apply a 50m buffer zone around known or potential Leadbeater's colonies.	No	HZ 1-3, 9-10		
			LBP P3 – No removal of vegetation (as applied to midstorey and canopy) within potential or suitable Leadbeater's habitat. LBP M3 – No trees, including mid-storey trees of more than 10cm DBH are to be removed.	In Most Cases	Selected Areas within the north facing sections of the Yarra State Park		
		Disturbance to existing Australia National University monitoring plots will impact long term monitoring results of Leadbeater's Possum.	LBP P4 – Apply a 200m exclusion zone from the centre of all ANU monitoring plots.	Yes	na	LBP M6 – The alignment of the trail cannot result in increased visibility to existing nest boxes or occupied tree hollows.	
		The construction and ongoing use of the trail may create disturbance to Leadbeater's and increase the likelihood of human interaction and interference.	LBP P5 – No rest stops or viewing areas within 200m of LBP nest boxes or known or potential colonies.	Yes	na		
High	Mount Donna Buang Wingless Stonefly (SF)	Any disturbance to known and potential habitat of Mt Donna Buang Wingless Stonefly will result in a reduction in the current population and future viability of the species.	SF P1 – Avoid areas of known and potential habitat for Mt Donna Buang Wingless Stonefly. SF P2 – No loss of connectivity or change in hydrology patterns in know or potential habitat.	No	Habitat Zones 1-9	SF M1 – Align trail as close as possible to the verge of Mt Donna Buang Road or use existing tracks.	**Moderate**
		Ground disturbance in close proximity to surface water flowing into Wingless Stonefly habitat will negatively impact available habitat through sedimentation, water pollution, obstructions in waterways and shading of waterways. Construction during the critical life cycle stages of Wingless Stonefly will negatively impact the species.	SF P3 – No increase in sediment transport in identified areas of known or potential habitat. SP P4 – No change in solar radiation (i.e. natural light) in identified areas of known or potential habitat. SF P5 – No ground disturbance or soil compaction within 30m of known or potential habitat. SF P6 – Construction of the trail is to be undertaken between December and February.	TBD	TBD	SF M2 – Any work within the potential range of the species must minimise habitat disturbance and sedimentation by elevating the trail to cross waterways, bogs, damp areas or seasonal drainage lines within the mapped suitable habitat zone. SF M3 – Any elevated trail must be constructed to minimise ground disturbance and maintain natural light levels.	

Risk of Impact without mitigation	Ecological Value	Risk to Value:	Protocols	Can the protocol be achieved?	Where can't the protocol be achieved?	Mitigation Measures where protocol cannot be achieved	Risk of Impact Following Protocols and Mitigation Measures
High	**Native Vegetation**	A break in the canopy will increase light to the forest floor which will create changes in microclimate and have a negative impact on the ecological system.	NV P1 – Any native vegetation removal requires avoidance, minimisation and offsetting in accordance with the 'Guidelines for The Removal, Destruction or Lopping of Native Vegetation (DELWP 2017)'	Avoid (No) Minimise (Yes)	The Avoid Principle cannot be achieved without undermining the purpose of the project	NV M1 – The trail alignment is to be determined based on minimising the removal of vegetation, including mid-story and ground cover.	**Moderate**
			NV P2 – No trees, including mid-storey trees of more than 10cm DBH are to be removed.	All areas of National Park and at least 90% of the State Park	Selected Areas within the north facing sections of the Yarra State Park	NV M3 – In State Forest where there is a stand of single age Eucalyptus sp (i.e. regrowth following bushfire), trees of up to 20 cm DBH may be removed.	
			NV P3 – No vegetation is to be removed to accommodate rest stops or viewing areas in National Park.	Yes	na	NV M2 – Rest stops and viewing areas along the trail are to use existing cleared areas and breaks in vegetation to minimise vegetation removal.	
		Damage to tree roots during construction and use of the trail will negatively impact the long-term health of tree species.	NV P5 – Avoid aligning the trail within the structural root zones of all trees.	In Part	Cannot be achieved in all cases where there is greater than 20 trees per hectare	NV M3 – Where the structural root zones (defined by AS) of trees cannot be avoided, then a design solution will need to be implemented to reduce impact on tree root zones. NV M4 – Align the trail on the higher elevation side of large trees, especially on steeper side slopes as tree roots are likely to be closer to the surface on the lower side.	
		A break in vegetation connectivity at any strata layer will negatively impact movement corridors of native fauna that rely on heavy vegetation cover to move through the landscape protected from predators.	NV P6 – Avoid existing stands of dense vegetation, particularly mid-storey vegetation between 1-5m in height.	In Most Cases	Selected Areas within the north facing sections of the Yarra State Park	NV M5 – Avoid removal of mid-storey vegetation within 10m of known or probable nesting sites of native fauna within National Park.	
		A break in vegetation connectivity will create movement corridors for predatory and pest animals.		Yes	na	NV M6 – Avoid removal of mid-storey vegetation within 10m of known nesting sites of listed (within VBA) fauna species within State Forest.	
		Disturbance to the ground cover and removal of vegetation will allow introduction and spread of weed species and pathogens. This includes the spread of Myrtle Wilt and Phytophthora.	NV P8 – Avoid disturbance to the ground surface in areas known to contain invasive weeds and pathogens including Myrtle Wilt and Phytophthora.	Yes	na	NV M7 – Undertake weed and pathogen control along the trail corridor during construction in accordance with an approved CEMP.	

Risk of Impact without mitigation	Ecological Value	Risk to Value:	Protocols	Can the protocol be achieved?	Where can't the protocol be achieved?	Mitigation Measures where protocol cannot be achieved	Risk of Impact Following Protocols and Mitigation Measures
		The introduction of fill material may introduce weeds and pathogens and potentially alter pH levels of the soil which will have a negative impact on the health of the system.	NV P10 – Minimise the introduction of fill material for the construction and ongoing management of the trail. NV P11 – Any fill material introduced to the site must be certified clean and be weed and pathogen free and be of a similar pH to natural soils.	Yes	na		
		The construction and use of the trail may have negative impacts on significant native flora, including listed species.	NV P12 – Prior to the trail alignment being finalised, detailed field surveys are required to identify the likely presence of significant species or communities identified in Appendix 1.	Yes (providing there is follow up surveys during construction)	na	NV M9 – Apply an appropriate buffer to significant native flora species and communities identified in appendix 1, in consultation with the relevant public land manager.	
			NV P13 – Avoid areas known or are likely to contain significant species or communities, as identified in appendix 1, including species listed under FFG and EPBC and advisory listed.				
		Large fallen debris (>30cm DBH) is part of the natural cycle of the area and provides important habitat for local fauna and assists in soil stabilisation.	NV P5 – Avoid any removal or disturbance to large fallen timber	In Part	In all habitat zones where large logs are present (where the log score is 5)	NV M10 – Any removal of fallen timber must be to the minimum extent necessary and any material removed must be retained on site.	
High	Native Fauna	Construction and ongoing use of the trail (including night-time use) will interfere with the existing movement corridors of native fauna, including significant and listed species, which may cause displacement, impact available food sources and reduce available habitat areas.	NF P1 – Avoid all areas which are known or likely to contain significant native fauna as identified in appendix 2.	Yes	Yes	NF M1 – Apply an appropriate buffer to identified nesting sites of significant native fauna identified in appendix 2, including applying a 5m buffer to rocky outcrops with cracks and crevices. NF M2 – Apply a 50m buffer to owl nesting sites. NF M3 – Apply an appropriate buffer/visual buffer to all tree hollows. NF M4 – Apply a 20m buffer to lyrebird display mounds.	**Low/Moderate**
			NF P2 – Existing habitat trees (>40cm DBH, or hollow bearing trees) are to be avoided.	Yes	Yes		
			NF P3 – Avoid known or probable nesting sites of VBA listed species by at least 10m.	Yes	Yes		

Part 2 – Risk Category per type

Key to Table

Very High	Sites in this category have one or more issues as listed below (predominantly unavoidable breaches or near breaches of protocols)	**Moderate**	Sites in this category have few issues in terms of breaching protocols or impacting on critical habitats, however the trail still traverses through moderate to high quality forest vegetation
High	Sites in this category have one or more issues as listed below although no impacts on critical habitats such as Cool Temperate Rainforest, MDB Stonefly or LBP	**Low**	Sites in this category are minimal risk as they traverse through existing cleared areas or substantial trails or vehicle tracks

Risk Category per Item	Associated risks	Risk Mitigation/Design Response	Revised Code[2]	Reason for Revised risk
Area of high-density sub-canopy (trees between 10-25m) where trees may require removal	Impacts to the movement of LPB between canopy trees via bridging habitat provided by sub-canopy e.g. Silver Wattle, Blackwood, Pomaderris	There is limited sub-canopy within the assessment areas and the trail corridor has been sited to avoid significant areas of sub canopy. No sub-canopy trees will be removed fin the construction of the trail. Supervision and guidance by an ecologist within LBP habitats will be provided during the construction phase.	Low	This is avoidable in all cases in Habitat Areas for LBP. Therefore, impacts for this risk type is eliminated
Within assumed habitat for MDB Wingless Stonefly	Impact to the MDB Wingless Stonefly avoids buffer of known locations refer to Map 1 of Map Series 1	Manage the construction process to avoid erosion and run-off into drainage lines (refer to Appendix 1)	Low	Management of Myrtle Wilt is key to preservation of the MDB Stonefly
Within Cool Temperate Rainforest	Impact to rainforest species and the potential spread of Myrtle Wilt	Best practise Myrtle Wilt Control during construction and once the trail is opened (i.e. hygiene processes / wash down facilities) as identified in Appendix 1. Boardwalks or elevated platforms to be used within rainforest sections as indicated in section 4.4 of the Trail Construction Plan (Cox Architecture). Myrtle Beech trees to be identified with sufficient construction setback	Low	Myrtle Wilt is an uncommon occurrence in the region and will be controlled providing construction protocols are adhered to. Boardwalks or elevated platforms will minimise impacts to rainforest flora and further minimise soil disturbance that potentially leads to the spread of Myrtle Wilt. This approach ensures that any construction activity will not increase the likelihood of Myrtle Wilt spread

[2] Revised code is upon implementation of the recommended Design and Construction Response

Risk Category per Item	Associated risks	Risk Mitigation/Design Response	Revised Code[2]		Reason for Revised risk
Within areas containing a high number of large habitat trees for suitable for a range of hollow dependent species	Impacts to Tree Protection Zones where excavation or compaction is required to form the trail. Potential disturbance to hollow dependent arboreal species	In consultation with a Fauna and Tree specialist, define the exact alignment of the trail with the greatest setback distance possible from the trunks of significant trees. This includes avoiding the Structural Root Zone if excavation is greater than 600m. (**Refer to trail construction document)** No excavations deeper than 1m will occur within the Tree Protection Zone of large canopy trees. Where tree roots are unavoidable, the trail will be constructed up and over tree roots	Low to	Moderate	Given the construction width is predicted to be 1.2 to 2m and excavation will typically be less than 600m depth, there is likely to be negligible impacts to Structural Root Zones and Tree Protection Zones once significant trees are identified and the trail is appropriately setback from tree trunks. However, these mitigation measures cannot guarantee no disturbance to nesting animals within trees in proximity to the trail
Within 50m of a significant habitat tree within high probability LBP Habitat – dead or pre-1900	Disturbance to LBP nesting sites, Forest Owls and Bats	In consultation with a Fauna specialist, define the exact alignment of the trail with the greatest setback distance possible. Ensure no removal of dead or live habitat trees and no removal of sub-canopy that provides Structural movement for the LPB	Low to	Moderate	This approach will undoubtedly reduce the risk of habitat disturbance in the broad sense but is difficult to quantify in the absence of targeted surveys
Within 50m of an LBP nest box		In consultation with a Fauna specialist, define the exact alignment of the trail with the greatest setback distance possible. Ensure no removal of dead or live habitat trees and no removal of sub-canopy that provides Structural movement for the species	Low to	Moderate	As the species is an arboreal species, rarely active during the day and rarely venturing near ground level, the avoidance of impact to the sub-canopy layer is paramount. This can be easily achieved given the open canopy structure within the trail alignment
Within areas where rare or threatened flora is identified	Impact to local populations of rare or threatened flora	Addressed by avoiding direct loss through conscientious siting of the final trail in consultation with a flor specialist onsite during a seasonally appropriate period	Low to	Moderate	Threatened flora populations are sparse and can largely be avoided, however given the dense groundcover present and seasonally inconspicuous nature of some species, complete avoidance cannot be guaranteed
Within gully sections, drainage lines and waterway crossovers	Erosion, siltation, soil disturbance	Any stream crossings will need to be strictly designed with rock armouring on intermittent trails or small bridges on raised pedestals either side of the stream. These structures will ensure that any water and sediments are absorbed along the trail edge and not draining into the streams. Refer to design treatments outlined in section 4.4 Trail Construction Plan (Cox Architecture).	Low		Design treatments and construction mitigation is predicted to minimise environmental risks
Within steep sections where excavation is required, or 'switchbacks' are required to minimise the grade3	Erosion, siltation, soil disturbance	Manage the construction process to avoid erosion and run-off into drainage lines (refer to Appendix 1) and apply design treatments and construction principles outlined in the Trail Construction Plan (Cox Architecture)	Low		A mountain bike trail is ideally a series of dips and rises, often with only 5-8 m in between rises and this makes it possible to contain any erosion or water flow into small limited basins where water is retained

Risk Category per Item	Associated risks	Risk Mitigation/Design Response	Revised Code[2]		Reason for Revised risk
Within areas containing small dead trees (mostly in post-fire areas) that may require removal for safety	Impact to some habitat (mostly invertebrates)	Any small dead trees <less than 200mm diameter within 2 metres of the trail may require removal if significant defects are identified. Fell unstable trees and keep them as habitat logs within the nearby forested areas	Low to	Moderate	Recommended measures can minimise loss of dead trees but cannot avoid the loss of dead trees in all situations. However dead habitat trees suitable for LBP will be retained (non-negotiable)
Within areas of high-quality vegetation but no likely habitat for threatened species or endangered ecological communities	Impact to high quality vegetation beyond the trail width	Removal of vegetation will be to the minimum extent required, usually approximately 1.2m width, and will not exceed 2.0m width	Low to	Moderate	Design treatments and a Construction Management Plan will reduce but not eliminate risks
Within areas of limited large old trees or habitat trees in areas of lower probability LPB Habitat	Although more options to avoid are available (compared to red and orange categories) Without due consideration, impacts to Tree Protection Zones where excavation or compaction is required to form the trail. Potential disturbance to hollow dependent arboreal species	In consultation with a Fauna and Tree specialist, define the exact alignment of the trail with the greatest setback distance possible from the trunks of significant trees. This includes avoiding the Structural Root Zone if excavation is greater than 600m. No excavations deeper than 1m will occur within the Tree Protection Zone of large canopy trees. Where tree roots are unavoidable, the trail will be constructed up and over tree roots	Low		Significant trees are sparse enough across the corridor that appropriate onsite consultation will lead to minimal risk
within areas of non-native vegetation	Minimal although standard construction measures apply including marking out the trail alignment and defining no-go zones	Risk to be managed in accordance with a Construction and Environmental Management Plan (CEMP) to address all levels of risk	Low		na
within areas of existing walking tracks or vehicle tracks that can accommodate all requirements to facilitate the mountain bike trail			Low		na

Appendix 5. Flora recorded at study site

Flora species recorded in the study area during fieldwork.
X indicates general region where the species was observed
* denotes exotic species # denotes native species extended beyond natural range
r – rare in Victoria

Origin	Scientific Name	Common Name	Donna Buang East	Donna Buang West	Drop AK Sth/East	Mount Tugwell
	Acacia dealbata	Silver Wattle	x	x	x	x
	Acacia genistifolia	Spreading Wattle				x
	Acacia melanoxylon	Blackwood	x	x	x	x
	Acacia mucronata subsp. longifolia	Narrow-leaf Wattle				x
	Acacia myrtifolia	Myrtle Wattle				x
	Acacia obliquinervia	Mountain Hickory Wattle	x			
	Acacia stricta	Hop Wattle				x
	Acacia verticillata	Prickly Moses			x	x
	Acaena echinata	Sheep's Burr				x
	Acaena novae-zelandiae	Bidgee-widgee	x	x	x	x
	Acrotriche prostrata	Trailing Ground-berry			x	x
	Acrotriche serrulata	Honey-pots			x	x
	Adiantum aethiopicum	Common Maidenhair			x	x
	Anogramma leptophylla	Annual Fern		x		
*	*Anthoxanthum odoratum*	Sweet Vernal-grass				x
*	*Arctotheca calendula*	Cape weed				x
	Arthropodium strictum	Chocolate Lily				x
*	*Asparagus scandens*	Asparagus Fern				x
	Asperula gunnii	Mountain Woodruff	x	x	x	
	Asplenium bulbiferum subsp. gracillimum	Mother Spleenwort	x	x		x
	Astrotricha sp	Star-hair				x
	Australina pusilla subsp. muelleri	Shade Nettle	x	x	x	x
	Austrocynoglossum latifolium	Forest Hound's-tongue	x	x	x	
	Bauera rubioides	Wiry Bauera				x
	Bedfordia arborescens	Blanket Leaf	x	x	x	x
	Billardiera mutabilis	Common Apple-berry		x	x	x
	Blechnum cartilagineum	Gristle Fern	x	x		
	Blechnum chambersii	Lance Water-fern		x	x	
	Blechnum fluviatile	Ray Water-fern		x	x	
	Blechnum nudum	Fishbone Water-fern		x	x	

Origin	Scientific Name	Common Name	Donna Buang East	Donna Buang West	Drop AK Sth/East	Mount Tugwell
	Blechnum wattsii	Hard Water-fern	x	x	x	
	Bossiaea prostrata	Creeping Bossiaea				x
	Burchardia umbellata	Milkmaids				x
	Bursaria spinosa subsp. spinosa	Sweet Bursaria				x
	Caladenia spp.	Caladenia				x
	Callistemon pallidus	Lemon Bottlebrush	x	x		
	Calochilus robertsonii	Purple Beard-orchid				x
	Carex appressa	Tall Sedge			x	
	Cassinia aculeata subsp. aculeata	Common Cassinia		x	x	x
	Cassinia longifolia	Shiny Cassinia		x	x	x
	Chiloglottis valida	Common Bird-orchid			x	x
*	*Cirsium vulgare*	Spear Thistle			x	x
	Clematis aristata	Mountain Clematis	x	x	x	x
*	*Conium maculatum*	Hemlock				x
	Coprosma hirtella	Rough Coprosma		x	x	
	Coprosma quadrifida	Prickly Currant-bush	x	x	x	x
	Coronidium scorpioides	Button Everlasting				x
	Correa lawrenceana	Mountain Correa	x	x		
	Correa reflexa var. reflexa	Common Correa			x	x
	Corybas spp.	Helmet Orchid			x	
	Cyathea australis	Rough Tree-fern	x	x	x	x
	Cynoglossum suaveolens	Sweet Hound's-tongue			x	x
	Dampiera stricta	Blue Dampiera				x
	Deyeuxia quadriseta	Reed Bent-grass				x
	Dianella revoluta	Black-anther Flax-lily				x
	Dianella tasmanica	Tasman Flax-lily	x	x	x	x
	Dichelachne crinita	Long-hair Plume-grass			x	
	Dichondra repens	Kidney-weed			x	x
	Dicksonia antarctica	Soft Tree-fern	x	x	x	
*	*Digitalis purpurea*	Foxglove				x
	Dillwynia cinerascens	Grey Parrot-pea				x
	Dillwynia sericea	Showy Parrot-pea				x
	Drosera peltata	Pale Sundew			x	x
	Dryopoa dives	Giant Mountain Grass		x	x	
	Epacris impressa	Common Heath				x
	Eucalyptus cephalocarpa	Mealy Stringybark				x
	Eucalyptus cypellocarpa	Mountain Grey-gum		x	x	x
	Eucalyptus delegatensis subsp. delegatensis	Alpine Ash	x			

Origin	Scientific Name	Common Name	Donna Buang East	Donna Buang West	Drop AK Sth/East	Mount Tugwell
	Eucalyptus goniocalyx	Bundy				x
	Eucalyptus nitens	Shining Gum	x			
	Eucalyptus obliqua	Messmate Stringybark			x	x
	Eucalyptus ovata	Swamp Gum			x	
	Eucalyptus radiata	Narrow-leaf Peppermint	x	x	x	x
	Eucalyptus regnans	Mountain Ash	x	x	x	x
	Eucalyptus sieberi	Silvertop Ash		x	x	x
	Eucalyptus viminalis	Manna Gum		x	x	
	Exocarpos cupressiformis	Cherry Ballart				x
	Gahnia radula	Thatch Saw-sedge		x	x	x
	Gahnia sieberiana	Red-fruit Saw-sedge		x	x	
*	*Galium aparine*	Cleavers				x
	Galium binifolium	Reflexed Bedstraw		x	x	
	Galium gaudichaudii	Rough Bedstraw			x	x
	Glossodia major	Wax-lip Orchid				x
	Glycine clandestina	Twining Glycine			x	x
	Gonocarpus humilis	Shade Raspwort			x	x
	Gonocarpus micranthus	Creeping Raspwort				x
	Gonocarpus tetragynus	Common Raspwort				x
	Goodenia lanata	Trailing Goodenia			x	x
	Goodenia ovata	Hop Goodenia		x	x	x
	Grammitis billardierei	Common Finger-fern	x	x		
	Gratiola peruviana	Austral Brooklime		x		x
	Hardenbergia violacea	Purple Coral-pea				x
	Histiopteris incisa	Bat's Wing Fern	x	x	x	
	Hovea heterophylla	Common Hovea			x	x
	Hydrocotyle geraniifolia	Forest Pennywort		x	x	
	Hydrocotyle hirta	Hairy Pennywort	x	x	x	x
	Hydrocotyle laxiflora	Stinking Pennywort				x
	Hypericum gramineum spp. agg.	Small St John's Wort				x
	Hypericum japonicum	Matted St John's Wort			x	
*	*Hypochaeris glabra*	Smooth Cat's-ear		x	x	x
*	*Hypochaeris radicata*	Flatweed		x	x	x
*	*Ilex aquifolium*	English Holly				x
*	*Jacobaea vulgaris*	Ragwort		x	x	
	Kunzea leptospermoides	Yarra Burgan		x	x	x
	Lagenophora gracilis	Slender Bottle-daisy			x	x
	Lagenophora stipitata	Common Bottle-daisy				x
	Lepidosperma elatius	Tall Sword-sedge	x	x	x	

Origin	Scientific Name	Common Name	Donna Buang East	Donna Buang West	Drop AK Sth/East	Mount Tugwell
	Lepidosperma gunnii	Slender Sword-sedge				x
	Lepidosperma laterale	Variable Sword-sedge			x	x
	Leptospermum continentale	Prickly Tea-tree		x	x	x
	Leptospermum lanigerum	Woolly Tea-tree		x		
	Leucopogon virgatus	Common Beard-heath			x	x
	Lobelia rhombifolia	Branched or Tufted Lobelia				x
	Lomandra filiformis subsp. coriacea	Wattle Mat-rush			x	x
	Lomandra filiformis subsp. filiformis	Wattle Mat-rush			x	x
	Lomatia ilicifolia	Holly Lomatia				x
*	*Lonicera japonica*	Japanese Honeysuckle				x
	Mentha laxiflora	Forest Mint			x	x
	Microlaena stipoides var. stipoides	Weeping Grass	x	x	x	x
*	*Myosotis sylvatica*	Wood Forget-me-not				x
	Notelaea ligustrina	Privet Mock-olive		x	x	
	Nothofagus cunninghamii	Myrtle Beech	x	x		
	Olearia argophylla	Musk Daisy-bush	x	x	x	x
	Olearia lirata	Snowy Daisy-bush	x	x	x	x
	Olearia phlogopappa	Dusty Daisy-bush	x	x	x	
	Olearia rugosa	Wrinkled Daisy-bush		x	x	
	Opercularia varia	Variable Stinkweed		x		x
	Oxalis exilis	Shady Wood-sorrel		x	x	
	Pandorea pandorana subsp. pandorana	Wonga Vine		x	x	x
	Pelargonium inodorum	Kopata				x
	Pellaea falcata	Sickle Fern	x	x		
	Phebalium squamulosum subsp. squamulosum (r)	Forest Phebalium	x			
	Pimelea axiflora	Bootlace Bush	x	x	x	
	Pimelea humilis	Common Rice-flower				x
	Pimelea ligustrina	Tall Rice-flower			x	x
#	*Pittosporum undulatum*	Sweet Pittosporum				x
*	*Plantago coronopus*	Buck's-horn Plantain				x
	Plantago debilis	Shade Plantain	x		x	
*	*Plantago lanceolata*	Ribwort				x
	Plantago varia	Variable Plantain				x
	Platylobium formosum spp. agg.	Handsome Flat-pea			x	x

Origin	Scientific Name	Common Name	Donna Buang East	Donna Buang West	Drop AK Sth/East	Mount Tugwell
	Poa ensiformis	Sword Tussock-grass	x		x	x
	Poa labillardierei	Common Tussock-grass			x	x
	Poa tenera	Slender Tussock-grass			x	x
	Polyscias sambucifolia	Elderberry Panax	x			x
	Polyscias sambucifolia subsp. 1	Broad-leaf Panax		x		
	Polyscias sambucifolia subsp. 3	Mountain Panax		x		
	Polystichum proliferum	Mother Shield-fern	x	x	x	x
	Pomaderris aspera	Hazel Pomaderris			x	
	Pomaderris elliptica var. elliptica	Smooth Pomaderris			x	
	Poranthera microphylla	Small Poranthera			x	x
	Prostanthera lasianthos	Victorian Christmas-bush			x	
	Pteridium esculentum	Austral Bracken	x	x	x	x
	Pultenaea forsythiana	Prickly Bush-pea				x
	Pultenaea gunnii	Golden Bush-pea			x	x
	Pultenaea scabra	Rough Bush-pea				x
	Ranunculus lappaceus	Australian Buttercup	x		x	x
	Ranunculus spp.	Buttercup			x	
	Rubus parvifolius	Small-leaf Bramble			x	x
	Rytidosperma pallidum	Silvertop Wallaby-grass			x	x
	Rytidosperma racemosum var. racemosum	Slender Wallaby-grass				x
	Sambucus gaudichaudiana	White Elderberry		x	x	
	Senecio glomeratus	Annual Fireweed		x	x	x
	Senecio hispidulus	Rough Fireweed	x			
	Senecio linearifolius	Fireweed Groundsel				x
	Senecio minimus	Shrubby Fireweed		x	x	x
	Sigesbeckia orientalis subsp. orientalis	Indian Weed		x	x	
*	*Solanum mauritianum*	Wild Tobacco Tree				x
	Solanum prinophyllum	Forest Nightshade		x	x	
	Spyridium parvifolium	Dusty Miller			x	x
	Stackhousia monogyna	Creamy Stackhousia				
	Stellaria flaccida	Forest Starwort	x	x		
	Tasmannia lanceolata	Mountain Pepper	x	x	x	
	Tetrarrhena juncea	Forest Wire-grass	x	x	x	x
	Tetratheca ciliata	Pink-bells				x
	Tetratheca stenocarpa (r)	Long Pink-bells				x
	Themeda triandra	Kangaroo Grass				x

Origin	Scientific Name	Common Name	Donna Buang East	Donna Buang West	Drop AK Sth/East	Mount Tugwell
	Todea barbara	Austral King-fern	x	x		
*	*Trifolium spp.*	Clover				x
	Urtica incisa	Scrub Nettle	x	x	x	x
	Veronica calycina	Hairy Speedwell			x	
	Veronica derwentiana	Derwent Speedwell		x		
	Veronica notabilis	Forest Speedwell	x	x		
	Veronica plebeia	Trailing Speedwell				x
	Viola hederacea	Ivy-leaf Violet	x			
	Wahlenbergia spp.	Bluebell				x
	Xanthosia dissecta	Cut-leaf Xanthosia			x	x
*	*Zantedeschia aethiopica*	White Arum-lily				x
	Zieria arborescens subsp. arborescens	Stinkwood	x	x		

Appendix 6. Potentially occurring significant flora species

Table 15. Potentially occurring State and Nationally Significant fauna species

*Refers to latest VBA record within 5km of the study site ^Refers to number of VBA records within 5km of the study site

Status Code

Victorian Rare or Threatened Species (VROTS) (DEPI 2013)
CR: Critically Endangered, EN: Endangered, VU: Vulnerable
FFG Act 1988 status L: Listed

EPBC Act 1999 conservation status
EX: Extinct, CR: Critically endangered, EN: Endangered, VU: Vulnerable and CD: Conservation dependant.

EPBC	FFG	VROT	Scientific name	Common name	Last record*	No. records^	Occurrence Likelihood	Likelihood Reasoning	Likelihood of Impact	Habitat notes
		r	*Correa reflexa var. lobata*	Powelltown Correa	1977	1	Low	Low distribution across the local area	Low	Locally common in areas south-east of Melbourne. Moist, open forests, often heathy. Also heathy woodlands (Walsh and Entwisle 1999).
	L	v	*Cyathea cunninghamii*	Slender Tree-fern	2003	38	Moderate	None observed – partially suitable habitat is present	Low	Generally confined to deep gullies in wet forests (Walsh and Entwisle 1994, p. 69).
		v	*Cyathea X marcescens*	Skirted Tree-fern	2006	20	Moderate	None observed though suitable habitat is present	Low	Found in Otway Ranges, Eastern Highlands, Gippsland Highlands, East Gippsland and Tasmania including King Island. Thought to be a sterile hybrid between C. australis and C. cunninghamii and its distribution echoes that of the less common of those species, C. cunninghamii. (Walsh and Entwisle 1994).
		r	*Tetratheca stenocarpa*	Long Pink-bells	-	-	Low	None observed within no previous records in the local area	Low	Endemic in Victoria. Grows in open-forests and tall mountain forests with populations limited to the Healesville and Gembrook, the Pyrete Ranges and French Island (Walsh and Entwisle 1999, p. 127).
		r	*Pteris comans*	Netted brake	2000	11	Moderate	None observed; partially suitable habitat is present	Low	Locally abundant in shady forests of wetter regions in south-central Victoria, mainly growing on seepages, stream banks and damp flats (Walsh and Entwisle 1994, p. 54).
		r	*Acacia howittii*	Sticky Wattle	-	-	Low	Unlikely to occur unless from nearby cultivated populations	Low	Indigenous to the Tarra Valley and surrounds, central Gippsland, Victoria. It is also widely cultivated. Prefers moist forests and sheltered areas (Tame 1992, pp. 79-80).

EPBC	FFG	VROT	Scientific name	Common name	Last record*	No. records^	Occurrence Likelihood	Likelihood Reasoning	Likelihood of Impact	Habitat notes
		r	*Banksia saxifolia*	#N/A	–	–	Low	No VBA records within 150 km of the study site.	Low	Natural Populations are limited to the Grampians Ranges and Wilsons Promontory. Has been cultivated and is adaptable to cooler climates.

Appendix 7. Potentially occurring significant fauna species

Table 16. Potentially occurring State and Nationally Significant fauna species

Status Code

Migratory/Marine (EPBC Act) M1: Migratory Listed Species under the EPBC Act; M2: Marine Listed Species under the EPBC Act. **EPBC Act 1999 conservation status** EX: Extinct, CR: Critically endangered, EN: Endangered, VU: Vulnerable and CD: Conservation dependant.	**FFG Act 1988 status** L: Listed, N: Nominated, I: Invalid or ineligible and D: Delisted **Victorian Rare or Threatened Species (VROTS) (DSE 2013)** EX: Extinct, RX: Regionally Extinct, WX: Extinct in the Wild, CR: Critically Endangered, EN: Endangered, VU: Vulnerable, NT: Near Threatened, DD: Data Deficient

EPBC	FFG	VROTS	Scientific name	Common name	Last record	No. recs.	Likelihood occurrence	Likelihood Reasoning	Habitat/species notes
	L	vu	*Accipiter novaehollandiae novaehollandiae*	Grey Goshawk	2001	18	High	suitable habitat is present	The Grey Goshawk has a stronghold in Victoria; particularly the white form in the Otway Ranges, where wet forests and gullies containing Mountain Grey Gum adjoin partly cleared farmlands. They occur in lower densities in similar habitats in the Strzelecki Ranges, Gippsland Plains and Otway Plains. Elsewhere in the State they are occasionally seen in woodlands, dry forests, suburban parks and wooded farmlands {Marchant, 1993 #703}.
		nt	*Alcedo azurea*	Azure Kingfisher	2000	9	High	species may occasionally fly over but no nesting habitat is present	This species is usually found near well-vegetated wetlands. Uses root-festooned banks of fresh or tidal creeks, rivers, streams, lakes, swamps, estuaries or mangroves for perching. It forages by plunge-diving from perches to below surface of still or slow moving water, which may sometimes be only a few centimetres deep {Higgins, 1999 #5967}. Nesting occurs in small burrows in creek banks {Pizzey, 2007 #4773}.

EPBC	FFG	VROTS	Scientific name	Common name	Last record	No. recs.	Likelihood occurrence	Likelihood Reasoning	Habitat/species notes
CR	L	cr	*Anthochaera phrygia*	Regent Honeyeater	1985	2	Nil	Species is now known only from localities north of the Great Dividing Range in Victoria	Its range has contracted dramatically from its historical distribution as the species has suffered badly from broad-scale clearing and complete absence of old growth box-ironbark habitat so that now only around 100 individuals remain wild in Victoria. It is a rare vagrant to the country around Bendigo (where it was once common) and to Gippsland (where it was a regular visitor), and in most years only a handful of birds are seen in eastern Victoria — four-fifths of sightings are from just three locations: Chiltern, the Killawarra, and the Reef Hills. It is highly nomadic in its movements as determined by the need for a nectar rich diet from the flowering of eucalypts particularly Mugga Ironbark Eucalyptus sideroxylon, White Box Eucalyptus albens, Yellow Box Eucalyptus melliodora and Yellow Gum Eucalyptus leucoxylon {SWIFFT, 2017 #11947}.
			Apus pacificus	Fork-tailed Swift	2001	3	High	species is likely to forage over the study area	The Fork-tailed Swift is a migratory species occurring throughout Australia between October-April. This insectivorous species is almost entirely aerial. Occurs over inland plains, often over cliffs or beaches and also over settled areas. Feed aerially, and probably also roost aerially, although rarely seen to land {Higgins, 1999 #5967;Pizzey, 2007 #4773}.
	L	vu	*Calamanthus pyrrhopygius*	Chestnut-rumped Heathwren	#N/A	#N/A	low	habitat is forested and represents sub-optimal habitat. No local records	Found in heathy woodlands, scrublands and box/ironbark forests in coastal south east Australia {Pizzey, 2007 #4773}.
	R	nt	*Cercartetus nanus*	Eastern Pygmy-possum	1990	1	Medium	Suitable habitat is present	Sparse to locally common in wide range of vegetation on the Great Dividing Range, including western slopes and coastal plains. Found in wet and dry eucalypt forest, subalpine woodland, coastal banksia woodland and wet heath {Menkhorst, 2001 #1259}.
		nt	*Climacteris picumnus victoriae*	Brown Treecreeper (south-eastern ssp.)	2000	1	High	suitable nesting and foraging habitat is present	Occurs in eucalypt woodlands, particularly open woodland lacking a dense understorey {Higgins, 2001 #5966}. It is sedentary and nests in tree hollows within permanent territories, breeding in pairs or communally in small groups. Birds forage on tree trunks,on the ground amongst leaf litter

EPBC	FFG	VROTS	Scientific name	Common name	Last record	No. recs.	Likelihood occurrence	Likelihood Reasoning	Habitat/species notes
									and on fallen logs for ants, beetles and larvae {Higgins, 2001 #5966}.
E	L	en	*Dasyurus maculatus maculatus*	Spot-tailed Quoll	1994	1	Medium	Suitable habitat is present	The species is recorded in a range of treed habitats including tropical, subtropical and temperate rainforests, vine thickets, wet and dry sclerophyll forest, woodland and coastal scrub. In Tasmania it also occurs in heathland {Van Dyck, 2008 #5474}.
	L	en	*Engaeus curvisuturus*	Curve-tail Burrowing Cray	1983	4	High	Likely habitat exists for this species on or close to the Yarra River Floodplain. These cryptic species are rarely surveyed for so the lack of records can't discount the possibility that they exist.	This species is endemic to Victoria, Australia. Its range extends from the Mount Baw Baw region in the east, to Warburton in the west (Horwitz 1990). This is a burrowing species, with burrows found predominantly in the flood-plain, in grey clay and silty soils.
		en	*Engaeus tuberculatus*	Tubercle Burrowing Crayfish	1963	1	High	Likely habitat exists for this species within the Wet Forest EVC's within the study area. This species is often found upslope and relies on surface water runoff rather then accessing the groundwater with its burrows. These cryptic species are rarely surveyed for so the lack of records can't discount the possibility that they exist.	The species occurs in wet sclerophyll forest dominated by Eucalyptus regnans and with abundant ferns at ground level; microhabitats can be divided into flood bed and clay-dominated hill slopes. In western populations, it occurs in sympatry with Engaeus urostrictus and the two species divide the habitat finely, with E. tuberculatus occurring in type 3 burrows (independent of the water table) on the slopes above the creek bed. In easterly populations, this species is not found in sympatry with any other species of Engaeus, and it can be found in both these microhabitats. The largest male found was 33.7 mm carapace length. Mature females ranged from 14.9 to 34.6 mm carapace length. The largest non-reproductive female was 27.7 mm carapace length (Horwitz 1990).

EPBC	FFG	VROTS	Scientific name	Common name	Last record	No. recs.	Likelihood occurrence	Likelihood Reasoning	Habitat/species notes
CR	L	en	*Gymnobelideus leadbeateri*	Leadbeater's Possum	2001	21	High	Species has been recorded from the alignment Mt Donna Buang West	Found in montane wet sclerophyll forest NE. of Melbourne; outlying lowland population in swamp woodland at Yellingbo {Menkhorst, 2001 #1259}. They are most common in Mountain Ash (Eucalyptus regnans) and Shining Gum (E. nitens) forest but also inhibits some sites dominated by Alpine Ash (E. delegatensis), Snow Gum (E. pauciflora) and Mountain Swamp Gum (E. camphora). Sites at which the possum is found have three attributes in common: trees containing hollows, a predominance of smooth barked eucalypts and dense vegetation structure. {Van Dyck, 2008 #5474}.
	L	vu	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	2001	1	Medium	species may occasionally fly over but no suitable nesting sites	Occurs along the coast (especially the forested coasts of the East Gippsland Plains), on coastal islands, around coastal lakes and along some inland rivers and lakes. Catches prey on, or near the water's surface and also takes refuse from fishing boats. On land they feed from the ground on carrion or occasionally catch live prey. Builds stick-nests in tall eucalypts, particularly River Red Gum, Forest Red Gum and Southern Mahogany. Clearing of forests and woodlands along the coast, near coastal lakes, and along the Murray River, threatens this species. In the Gippsland Lakes region more than half of the known nest sites are on private lands {DSE, 2003 #4987}. Occurs across a range of forests and woodlands throughout Victoria {DSE, 2003 #4987}.
		vu	*Hirundapus caudacutus*	White-throated Needletail	2006	26	High	species is likely to forage over the study area	In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Because they are aerial, it has been stated that conventional habitat descriptions are inapplicable. In Australia, White-throated Needletails almost always forage aerially, at heights up to 'cloud level', above a wide variety of habitats ranging from heavily treed forests to open habitats, such as farmland, heathland or mudflats {Higgins, 1999 #5967}.

EPBC	FFG	VROTS	Scientific name	Common name	Last record	No. recs.	Likelihood occurrence	Likelihood Reasoning	Habitat/species notes
E	L	nt	*Isoodon obesulus obesulus*	Southern Brown Bandicoot	1999	11	High	Suitable habitat is present and recent records	The Southern Brown Bandicoot is active during both the day and night. It is found in forest, heath and shrub communities. It shelters in a nest of vegetation beneath dense cover; it eats fungi, tubers and arthropods {Menkhorst, 2001 #1259 ;Paull, 2008 #6009}.
E	L	en	*Lathamus discolor*	Swift Parrot	1978	3	Medium	species may fly through the study area while dispersing, but records are old	The Swift Parrot is a winter migrant to Victoria {Swift Parrot Recovery Team, 2001 #4502}. They arrive from their breeding areas in Tasmania, however small numbers of non-breeding birds may remain here during summer {Swift Parrot Recovery Team, 2001 #4502;Higgins, 1999 #5967}. They are nomadic, and follow the flowering of trees and psyllid infestations. In Victoria their distribution is centered on box-ironbark forests, but they are often seen in town parks and occur sporadically elsewhere in dry forests, dry woodlands and wooded farmlands. They are seldom seen in treeless areas, rainforests or wet forests {Higgins, 1999 #5967;Pizzey, 2007 #4773}. Feed mainly in winter-flowering plants, especially Red Ironbarks and ornamental trees and shrubs {Swift Parrot Recovery Team, 2001 #4502;Higgins, 1999 #5967}.
	L	vu	*Lewinia pectoralis pectoralis*	Lewin's Rail	1997	2	Low	Habitat unsuitable - no wetlands present along the alignment	Inhabits densely vegetated, fresh, brackish or saline wetlands, usually with areas of standing water. Use long tussocky grass, reeds, rushes, sedges or bracken and are occasionally found amongst tangled clumps of weeds such as Blackberries and Lantana {Marchant, 1993 #703}.
	L	vu	*Lissolepis coventryi*	Swamp Skink	1995	3	Low	May inhabit some low-lying areas along drainage lines, particularly where scrub (e.g. Kunzea sp.) occurs	Occupy cool temperate, low-lying wetlands including swamp margins, tea-tree thickets and even tidal salt-marshes. Secretive, often dwelling in dense low vegetation. Nocturnal to diurnal, shelters in burrows including those of crustaceans {Wilson, 2008 #5486}.
	L	vu	*Lophoictinia isura*	Square-tailed Kite	1979	1	High	suitable nesting and foraging habitat is present	Found in heathlands, woodlands, forests, tropical and sub tropical rainforest, timbered watercourses, hills and gorges. Nest are large and loose made of sticks 15-25m up in leafy tree. Range in coastal and sub-coastal south east Australia including Murray River region in SA. {Pizzey, 2007 #4773}

EPBC	FFG	VROTS	Scientific name	Common name	Last record	No. recs.	Likelihood occurrence	Likelihood Reasoning	Habitat/species notes
V	L	en	*Mastacomys fuscus mordicus*	Broad-toothed Rat	1977	1	Low	Habitat unsuitable – no flowing streams are present along the alignment	Habitat is characterised by high rainfall, a cool summer, cool to cold winter and moderate to dense groundcover of grasses, sedges and shrubs. Often found close to streams and steep banks where there is abundant grass and rope-rush, and where dense cover is provided by shrubs. Nests of shredded grass are built under logs and dense undergrowth {Van Dyck, 2008 #5474}.
			Merops ornatus	Rainbow Bee-eater	1979	1	Medium	species may occasionally forage but no nesting habitat	The species occurs in many types of habitat including woodland, shrubland, semi-cleared land and farmland, however it mainly occurs where eucalyptus species are dominant. It is almost entirely insectivorous and mostly occurs near to permanent water {Higgins, 1999 #5967}.
	L		*Miniopterus schreibersii GROUP*	Common Bent-wing Bat	2000	13	High	Foraging habitat is present although no potential roosting sites occur along the alignment	Includes two subspecies: Miniopterus schreibersii bassanii and Miniopterus schreibersii oceanensis. Miniopterus schreibersii bassanii occurs in rainforest, wet and dry sclerophyll forest, monsoon forest, open woodland, Melaleuca forest and open grasslands. They are cave dwellers but also use man-made constructions such as abandoned mines and road culverts {Churchill, 2008 #3973`, p. 182}. Known breeding sites in Victoria largely occur west of Heywood, Portland, Hamilton and Warrnambool. The easternmost breeding site is at Pomborneit, near Camperdown. Also found foraging within woodlands near large natural wetlands, river basins and agricultural areas {Churchill, 2008 #3973`, p. 182}. Miniopterus schreibersii oceanensis occurs along the east coast of Australia from Cape York, N. Qld to Castlemaine, Vic, predominantly east of Great Dividing Range. Habitat is rainforest, wet and dry sclerophyll forest, monsoon forest, open woodland, Melaleuca forests and open grasslands. {Churchill, 2008 #3973`}.
		nt	*Myotis macropus*	Southern Myotis	2002	49	High	Foraging habitat is present although no potential roosting sites occur along the alignment	A range of open forests in coastal northern, eastern and south-eastern Australia, preferring low-altitude vegetated areas with a strong association with streams and permanent water bodies in flat/undulating country. The species has a requirement for caves (mineshafts) or tree hollows for roosting and breeding {Churchill, 2008 #3973}.

EPBC	FFG	VROTS	Scientific name	Common name	Last record	No. recs.	Likelihood occurrence	Likelihood Reasoning	Habitat/species notes
	L	en	*Ninox connivens connivens*	Barking Owl	2000	2	High	Suitable foraging and roosting habitat is present and recent records	Occurs in dry woodlands, wooded farmlands and dry forests in the 500-800mm annual rainfall zone and extend into semi-arid areas in River Red Gum forests along the Murray River. Hollow dependent species {Higgins, 1999 #5967; Pizzey, 2007 #4773}.
	L	vu	*Ninox strenua*	Powerful Owl	2006	27	High	Suitable foraging and roosting habitat is present and many recent records	Widespread in foothill and coastal forests where they especially favour gullies with Peppermint-Manna Gum forests. Occasionally seen in wetter mountain forests, drier box-ironbark forests and woodlands, and softwood plantations. Hunts at night by flying through the forest canopy catching prey from tree branches. They nest in large holes in trees {DSE, 2004 #4990}.
		nt	*Nycticorax caledonicus hillii*	Nankeen Night Heron	2000	26	High	Species recorded within 100m of the alignment Drop AK South	The Nankeen Night Heron has a widespread distribution in wetlands throughout Australia, particularly in the north, south, and southwest. This species inhabits shorelines of lakes, rivers, estuaries, terrestrial wetlands and grasslands, particularly those sheltered by tall ground vegetation and/or trees, with shallow, slow-moving water. Breeds in colonies, usually in the crown or canopy of trees, in forks or on horizontal boughs; also in reed beds or atop shrubs. In Victoria, most numerous in the Murray River region, and in smaller numbers in more coastal/near-coastal regions {Marchant, 1990 #5613; Pizzey, 2007 #4773}.
V		vu	*Petauroides volans*	Greater Glider	NA	NA	Low	No local records although predicted to occur (PMST)	Occurs in wet sclerophyll forest on the ranges and coastal plains from near Mossman, NE. QLD to Daylesford, VIC. Favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred food tree species. Requires large tree hollows for shelter, and found in most abundance where there is a high density of tree hollows. In southern Queensland require at least 2-4 den trees for every 2ha of habitat. They are significantly vulnerable to logging and have relatively small home ranges and poor dispersal ability. In Victoria, their numbers have declined sharply in recent years {TSSC, 2016 #11733}.

EPBC	FFG	VROTS	Scientific name	Common name	Last record	No. recs.	Likelihood occurrence	Likelihood Reasoning	Habitat/species notes
	L	vu	*Phascogale tapoatafa*	Brush-tailed Phascogale	1972	1	High	suitable habitat is present	This species typically inhabits dry forest and woodland dominated by box, ironbark and stringybark eucalypts but may also occur in wetter forests {Menkhorst, 1996 #4963}. Prefers open forest with sparse groundcover, but uses habitats ranging from mallee to rainforest. The understorey and ground cover in these favoured habitats may be sparse, consisting of "scattered tussocks and forest litter" {Menkhorst, 1996 #4963}. Other characteristics of known habitat of this species include dead trees (favoured for foraging), availability of bark from the Red Stringybark (for nest material) {Menkhorst, 1996 #4963}, and a number of tree hollows with entrances as narrow as five centimetres or less (for nesting and shelter). Has disappeared from substantial areas of Victoria in recent times {Van Dyck, 2008 #5474}.
			Phascolarctos cinereus	Koala			High	Species recorded within 100m of the alignment Drop AK South. Suitable feed tree species present	#N/A
V	L	vu	*Prototroctes maraena*	Australian Grayling	2000	5	Low	Species is known from the Yarra River although no suitable habitat	This species only spends part of its life in freshwater streams, Australian Graylings migrate between freshwater streams and the ocean. Streams where this species occur tend to be clear with gravel bottoms and a variety of instream habitat such as pools and riffles. The upstream migration of this species has been effectively terminated in some rivers by dams {Allen, 2002 #5968}.
E	L	en	*Pseudomys fumeus*	Smoky Mouse	#N/A	#N/A	Medium	patchy distribution and no local records	Patchy, ephemeral populations in Victoria. Although recorded in subalpine to coastal dune areas, habitat is linked to dietary requirements. Epacrids that provide berries and flowers and legumes that provide seeds are typical of suitable habitat. Underground fungi (truffles) are important in winter while seeds and fruit are important in summer. Invertebrates are taken when available {Van Dyck, 2008 #5474}.

EPBC	FFG	VROTS	Scientific name	Common name	Last record	No. recs.	Likelihood occurrence	Likelihood Reasoning	Habitat/species notes
	L	en	*Pseudophryne bibronii*	Brown Toadlet	1962	1	Nil	Brown Toadlet now only known north of the Great Dividing Range in Victoria	Frequent dry forest, woodland, shrubland and grassland, sheltering under leaf-litter and other debris in moist soaks and depressions. Eggs are spawned in shallow burrows (or nets) under litter, in low areas, near water, that will later be flooded. Tadpoles are aquatic in ponds, flooded grassland and roadside ditches {Hero, 1991 #5583}.
		vu	*Pseudophryne semimarmorata*	Southern Toadlet	1972	1	High	Steeply incised gully lines provide high quality breeding habitat	The Southern Toadlet can be found in dry forest, woodland, shrubland, grassland and heaths. It shelters under leaf litter and other debris in moist soaks and depressions. Their eggs are spawned in shallow burrows under organic litter in low areas close to water {Hero, 1991 #5583}.
V	L	vu	*Pteropus poliocephalus*	Grey-headed Flying-fox	1982	2	Medium	Species may occasionally fly over but no known roosting camps are present	Eastern coastal Australia from Gladstone in Qld to South Gippsland and Melbourne in Vic, with rare influxes further west and south. Rarely more than 200km inland. In warmer months gathers in very large camps, usually in dense forest in gullies. Population is more dispersed in winter. Size of camps fluctuate in response to local food supplies. In south numbers fluctuate in regular pattern, being highest in late summer-autumn and lowest in winter {Menkhorst, 2001 #1259}.
	L	vu	*Rhinolophus megaphyllus megaphyllus*	Eastern Horseshoe Bat	1998	1	High	suitable habitat is present including potential roost sites	The Eastern Horseshoe Bat has a distribution mainly along coastal eastern Australia, to the east/south east of the Great Dividing Range, in a wide range of wet/dry/open/closed forest, woodland or grassland habitat, but favouring mature forest. This species largely roosts in caves or abandoned mines, but also in tree hollows, rock piles, buildings and rail tunnels, within tree roots/undercuts along waterways. Forages along tracks/waterways, avoiding large clearings. {Churchill, 2008 #3973}.
	L	nt	*Sminthopsis leucopus*	White-footed Dunnart	1978	2	Medium	marginal habitat is present and no recent records	Patchily distributed in lowland heathy woodland and forest, coastal scrub, coastal dune grassland. Constructs bark nest beneath fallen timber or dense litter {Menkhorst, 2001 #1259}.
		dd	*Spathula gourbaultae*	Planarian	1993	1	High	Species recorded within the alignment Mt Donna Buang East	Flatworms occur on the undersides of rocks and wood, in a variety of water flow conditions (Gooderham & Tsyrlin 2002).

EPBC	FFG	VROTS	Scientific name	Common name	Last record	No. recs.	Likelihood occurrence	Likelihood Reasoning	Habitat/species notes
	L	nt	*Stagonopleura guttata*	Diamond Firetail	1980	1	Low	No grassland habitat is present. Most of the area is thickly forested.	Inhabit woodlands, open forests and other lightly timbered habitats, such as farmland with remnant trees, or grasslands with scattered trees. Often occurs in vegetation along watercourses and very occasionally near settlements. Habitat usually has open or sparse understorey of shrubs, small trees or regrowth, and grass ground cover {Higgins, 2006 #5585}.
	L	en	*Tyto novaehollandiae novaehollandiae*	Masked Owl	#N/A	#N/A	High	suitable foraging and roosting habitat is present but no local records	Inhabits forests, woodlands and caves. Active in middle storey {Simpson, 2000/2001 #981}. Inhabits diverse range of wooded habitats that provide tall or dense mature trees with hollows suitable for nesting and roosting, and nearby open areas for foraging {Higgins, 1999 #5967}.
	L	vu	*Tyto tenebricosa tenebricosa*	Sooty Owl	2006	33	High	Suitable foraging and roosting habitat is present and many recent records	Occurs in tall wet forests in sheltered east and south-east facing mountain gullies, with dense understory layer. Nests on decayed debris, in hollow truck of eucalypt, up to over 30m in height, or in high cavity in cave. Range is coastal east Australia mostly upon and east of divide from Mt. Disappointment range, north of Melbourne to Conondale Range.(Pizzey and Knight 2007)

EPBC	FFG	VROTS	Scientific name	Common name	Last record	No. recs.	Likelihood occurrence	Likelihood Reasoning	Habitat/species notes
		en	*Varanus varius*	Lace Monitor	2006	11	High	Species has been recorded from Mt Donna Buang West. Foraging habitat is present but no termite nesting mounds observed within or near the alignment	Occurs in well-timbered areas, from dry woodlands to cool temperate southern forests. Species is arboreal, ascending large trees when disturbed; forages widely. Clutches of eggs are laid in arboreal or terrestrial termite mounds {Wilson, 2008 #5486}.

Appendix 8. Significant Impact Assessment for EPBC Listed Fauna

Threatened fauna species listed under the EPBC Act with a medium or high likelihood of occurring in the study area were assessed against the EPBC Act criteria for significant impacts. One Critically Endangered fauna species (Leadbeater's Possum), three Endangered species (Southern Brown Bandicoot, Swift Parrot, Smoky Mouse) and two Vulnerable species (Grey-headed Flying-fox, Greater Glider) listed under the EPBC Act have the potential to be impacted by the project and were assessed in accordance with the significant impact criteria. In the seven tables below, the general Matters of National Environmental Significance (MNES) significant impact guidelines and any specific significant impact criteria, have been utilised to determine if there will be significant impacts upon any of these six species from the proposed mountain bike trail. EPBC Listed Migratory birds are assessed as a group (Fork-tailed Swift, White-throated Needletail, Rainbow Bee-eater).

Table 17. Significant Impact Guidelines for Leadbeater's Possum

LEADBEATER'S POSSUM (Critically Endangered)					
Significant Impact Criteria	Risk to MNES Without Mitigation Measures	Likelihood of Significant Impact (No Mitigation Measures)	Specific Mitigation Measure(s)	Residual Risk to MNES With Mitigation Measures Applied	Likelihood of a Significant Impact (With Mitigation Measures Implemented)
There are NO Significant Impacts Guidelines for Leadbeater's Possum (LBP) – therefore the general guidelines for Critically Endangered/ Endangered species apply					
Matters of National Environmental Significance – Significant impact guidelines EPBC Act 1999 (General Guidelines for Endangered Species)					
Lead to a long-term decrease in the size of a population	Potential nest/den trees are present in the study area in the form of large old trees or dead stags with hollows. There are known populations in several locations in the vicinity of Mount Donna Buang Road and the Summit Road, in fact almost the	Medium	All large hollow bearing trees (dead and alive) are to be retained with no substantial works encroachment that would compromise the health and viability of such trees. No canopy or sub-canopy species are proposed to be removed within High-probability habitat (e.g. Silver Wattle, Black Wattle and immature Eucalypts) to construct the trail as this vegetation layer provides a	Although the trail alignment traverses' significant areas of confirmed habitat, application of buffers around significant trees will ensure minimal impacts.	Low

LEADBEATER'S POSSUM (Critically Endangered)					
	entire area from the Summit to the top of Kennedy Creek. Approximately 15 km of the trail corridor is considered habitat for the species. Removal of hollow-bearing trees, canopy and sub-canopy trees, may severely impact on the viability of LBP populations.		critical habitat component for the movement of the species. Any potential LBP nest trees will be identified and avoided. This includes all hollow-bearing trees, both dead and alive. A 50-m buffer will ideally apply around any potential LBP hollow bearing nest tree; however, a 10-m buffer will apply in instances where a 50-m buffer cannot be achieved. The alignment avoids the general vicinity of 21 of the 23 LBP nest boxes within the trail alignment.		
Reduce the area of occupancy of the species	Removal of hollow-bearing trees may reduce the area occupied by the LBP in the study area.	Medium	Mitigation measures above are required to ensure the species can continue to utilise the habitat in the Study Area and surrounds after the trail is constructed and operational.	None – there is proposed to be no loss of nesting trees, or continuous sub-canopy movement habitat.	Low
Fragment an existing population into two or more populations	Removal of sub-canopy or canopy in LBP habitat may isolate nest trees and fragment populations.	Medium	Mitigation measures above are required to ensure the species can continue to move between nest trees through the sub-canopy layer. Broader movement for this species will be assured through retention of sub-canopy species.	None	Low
Adversely affect habitat critical to the survival of a species	The study area supports high-quality habitat and an abundance of nesting trees.	Medium	Mitigation measures above are required to ensure the species can continue to utilise the habitat in the Study Area and surrounds after the trail is constructed and operational. No nesting trees or nest boxes will be removed.	None	Low

LEADBEATER'S POSSUM (Critically Endangered)					
Disrupt the breeding cycle of a population	There is an abundance of nest trees and 23 nest boxes in the vicinity of the trail alignment.	Medium	Mitigation measures above are required to ensure the species can continue to nest/breed in the Study Area and surrounds after the trail is constructed and operational.	None – there is proposed to be no loss of nesting trees or nest boxes. The trail will be within the general vicinity of 2 nest boxes; however, impacts on LBP are not anticipated from either construction or mountain biking.	Low
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The study area contains areas of high-quality LBP habitat, with an abundance of nest trees and canopy/ sub-canopy that provides connectivity. Construction of the trail will remove some understorey vegetation.	Medium	Mitigation measures above are required to ensure the species can continue to utilise the habitat in the Study Area and surrounds after the trail is constructed and operational. No trees or stags will be removed.	None – there is proposed to be no loss of nesting trees, or continuous sub-canopy movement habitat.	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	Unlikely Feral cats are known to prey on LBP but their extent in the study area is not likely to increase as a result of the proposed trail. Sugar Gliders *Petaurus breviceps* compete with LBP for nest hollows. The proposed trail is unlikely to increase the occurrence of Sugar Gliders.	Low	No specific mitigation measures required to mitigate this risk. Continued monitoring of nest boxes will determine if Sugar Gliders are outcompeting LBP for nesting sites.	N/A	Low

LEADBEATER'S POSSUM (Critically Endangered)					
Introduce disease that may cause the species to decline	The proposed trail is unlikely to introduce a disease that may cause this species to decline.	Low	No specific mitigation measures required to mitigate this risk.	None	Low
Interfere with the recovery of the species.	There is a draft National Recovery Plan for the LBP. The Plan focusses on the main threat to the species – decline in the extent, quality and connectivity of suitable habitat. However, as there will be no loss of hollow-bearing trees resulting from construction of the trail, the recovery of the species is unlikely to be affected.	Low	Mitigation measures outlined above should ensure the recovery of the species is not impacted.	None	Low

Table 18. Significant Impact Guidelines for Southern Brown Bandicoot

SOUTHERN BROWN BANDICOOT (Endangered)					
Significant Impact Criteria	Risk to MNES Without Mitigation Measures	Likelihood of Significant Impact (No Mitigation Measures)	Specific Mitigation Measure(s)	Residual Risk to MNES With Mitigation Measures Applied	Likelihood of a Significant Impact (With Mitigation Measures)
Under the draft referral guidelines (DSEWPaC 2011) there is high risk of a significant impact occurring to the Southern Brown Bandicoot if a proposed action will result in:					
Loss or long-term modification of suitable habitat known or likely to support the	Unlikely; Habitat for the Southern Brown Bandicoot (SBB) was identified in the study area Mount Tugwell is likely to support populations given the species prefers	Medium	The proposed trail alignment has been refined to minimise impacts to native vegetation. However, there will inevitably be the loss of some understorey vegetation in habitat areas for the SBB.	Loss of breeding, foraging and dispersal habitat is unavoidable even with mitigation measures applied;	Low

SOUTHERN BROWN BANDICOOT (Endangered)					
species of greater than 5% in patches greater than 100 ha	a mosaic of vegetation age classes as a result of fire and shrubby/heath vegetation cover that persists throughout much of this area. A VBA record has been confirmed within 1km of the Mount Tugwell assessment area. The loss of understorey vegetation representing potential SBB habitat in the vicinity of Mount Tugwell is approximately 4 ha. This includes habitat types (EVCs): Herb-rich Foothill Forest, Riparian Forest and Shrubby Foothill Forest.		Avoidance of vegetation loss in some sections of Mount Tugwell could be achieved using raised platform, especially at gully line crossings.	however, it is less than 5% of the habitat in the regional patch.	
Reduced connectivity or fragmentation of suitable habitat known to support the species that results in a distance of greater than 50 m.	Unlikely. The proposed trail will remove understorey vegetation along a linear alignment with a disturbance footprint averaging 2 m wide. SBB are able to move across open areas adjacent to understorey habitat.	Low	Minimising the construction footprint of the proposed trail to 2m will have limited fragmentation of understorey habitat.	Construction of the trail will not create a gap of more than 50 m in the understorey vegetation within SBB habitat.	Low
Matters of National Environmental Significance Significant impact guidelines EPBC Act 1999 (General Guidelines for Endangered Species)					
Lead to a long-term decrease in the size of a population	Unlikely. The size of the SBB population occupying habitats around Mount Tugwell is unknown. However, there are 11 VBA records with the most recent being from 1999.	Low	Only a small fraction of SBB habitat will be removed from a large, contiguous patch of habitat in the local region.	Potential impacts to individuals during construction.	Low

SOUTHERN BROWN BANDICOOT (Endangered)					
Reduce the area of occupancy of the species	Unlikely. The removal of understorey vegetation along the proposed trail will not reduce the area likely to be occupied by the SBB in the vicinity of Mount Tugwell.	Low	As outlined above, the trail footprint has been refined to minimise impacts to vegetation.	Potential impacts to individuals during construction.	Low
Fragment an existing population into two or more populations	Unlikely. The proposed trail will remove understorey vegetation along a linear alignment with a disturbance footprint of no greater than 2 m wide. SBB are able to move across open areas adjacent to understorey habitat.	Low	As outlined above, minimising the construction footprint of the proposed trail to 2 m will ensure no fragmentation of understory habitat.	Construction of the trail will not create a gap of more than 50 m in the understorey vegetation within SBB habitat.	Low
Adversely affect habitat critical to the survival of a species	Unlikely. The loss of a small amount of vegetation within the Study Area will not reduce breeding, foraging and dispersal habitat opportunities for the species.	Low	As outlined above, the trail footprint has been refined to minimise impacts to SBB habitat.	There will be some direct habitat losses during trail construction.	Low
Disrupt the breeding cycle of a population	Some potential for disruption. The species can breed all year round and give birth to up to four litters a year. Main breeding season is from July through to November, although this is linked to seasonal rainfall and it can vary accordingly.	Medium	Some minor habitat loss has potential to disrupt the breeding cycle of individuals; however, this is unlikely to impact the greater sub-regional population	Direct disruption to breeding will be linked with habitat loss. Timing of trail construction should avoid the breeding period	Low
Modify, destroy, remove, isolate or decrease the	Unlikely. The removal of understorey vegetation along the proposed trail is	Low	As outlined above, the trail footprint has been refined to minimise impacts to SBB habitat.	The availability and quality of SBB habitat will not be	Low

SOUTHERN BROWN BANDICOOT (Endangered)					
availability or quality of habitat to the extent that the species is likely to decline	not likely to modify the quality of SBB habitat in the vicinity of the proposed trail.			compromised in the study area despite some minor habitat losses during trail construction.	
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	The species is highly vulnerable to predation by feral species especially foxes. The creation of a linear path may allow foxes to access areas of SBB habitat around Mount Tugwell previously uninhabited by foxes. However, it is unlikely that construction of the trail will lead to an increase in fox populations.	Medium	Establish a fox and cat control program baiting program prior to trail construction within the potential habitat for the species. Maintain this as an on-going program.	Potential predation on individuals may occur however population impacts should be mitigated	Low
Introduce disease that may cause the species to decline	Disease is not listed as a threat to this species. Construction of the trail is unlikely to introduce a disease that may cause this species to decline.	Low	No specific mitigation measures required to mitigate this risk.	None	Low
Interfere with the recovery of the species.	A Draft Recovery Plan has been prepared for the Southern Brown Bandicoot. Vegetation removal and habitat loss and alteration, in addition to predation by the Red Fox, have been recognised as threatening processes for the species.	Medium	As outlined previously, the trail footprint has been refined to minimise impacts to SBB habitat. However, there are no mitigation measures that can be undertaken to reduce the risk of increased fox incursion into SBB habitat.	Construction of the proposed trail is unlikely to interfere with the recovery of the species.	Low

Table 19. Significant Impact Guidelines for Smoky Mouse

SMOKY MOUSE (Endangered)					
Significant Impact Criteria	Risk to MNES Without Mitigation Measures	Likelihood of a Significant Impact (No Mitigation Measures)	Specific Mitigation Measure(s)	Residual Risk to MNES With Mitigation Measures Applied	Likelihood of a Significant Impact (With Mitigation Measures)
There are NO Significant Impacts Guidelines for Smoky Mouse – therefore the general guidelines for Critically Endangered/ Endangered species apply					
Matters of National Environmental Significance Significant impact guidelines EPBC Act 1999 (General Guidelines for Endangered Species)					
Lead to a long-term decrease in the size of a population	Unlikely. There is no reliable data on which to base population estimates or to estimate trends in Smoky Mouse populations. The size of the Smoky Mouse population occupying habitats in the study area is unknown. There are no VBA records within 5 km of the alignment. However, the species and its habitat are predicted to occur in the study area according to the PMST. The species has a patchy distribution making it hard to predict the location of populations in the absence of targeted field surveys.	Low	Only a small fraction of potential Smoky Mouse habitat will be removed from a large, contiguous patch of habitat in the local region.	Potential impacts to individuals during construction.	Low
Reduce the area of occupancy of the species	Unlikely. The removal of understorey vegetation along the proposed trail will not reduce the area likely to be occupied by the Smoky Mouse in the study area.	Low	As outlined above, the trail footprint has been refined to minimise impacts to vegetation.	Potential impacts to individuals during construction.	Low

SMOKY MOUSE (Endangered)					
Fragment an existing population into two or more populations	Unlikely. The proposed trail will remove understorey vegetation along a linear alignment with a disturbance footprint of no greater than 2 m wide. The Smoky Mouse is known to readily move across a 30-m wide fire break.	Low	As outlined above, minimising the construction footprint of the proposed trail to 2 m will ensure no fragmentation of understory habitat.	Construction of the trail will create a gap distance known to be traversed by the Smoky Mouse.	Low
Adversely affect habitat critical to the survival of a species	Unlikely. The loss of a small amount of vegetation within the study area will not reduce breeding, foraging and dispersal habitat opportunities for the species.	Low	As outlined above, the trail footprint has been refined to avoid vegetation removal.	There will be some direct habitat losses during trail construction.	Low
Disrupt the breeding cycle of a population	Some potential for disruption. The species breeds from September to April, in small colonies where they occupy a relatively large and complex burrow system.	Medium	Some minor habitat loss has potential to disrupt the breeding cycle of individuals; however, this is unlikely to impact any sub-regional population (metapopulation). Proposed trail alignment should be inspected for Smoky Mouse burrows in areas of suitable habitat, prior to construction, and realign if burrows are detected.	Timing of trail construction should avoid the breeding period	Low
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely. Suitable habitat for the Smoky Mouse in the study area is represented by dry forest types along ridgetops, especially with a northerly aspect; e.g. Mount Tugwell. The removal of understorey vegetation along the proposed trail is not likely to reduce or modify the availability or	Low	As outlined above, the trail footprint has been refined to minimise impacts to understorey vegetation.	The availability and quality of Smoky Mouse habitat is not compromised in the study area despite some minor habitat	Low

SMOKY MOUSE (Endangered)					
	quality of habitat in the vicinity of the proposed trail.			losses during construction.	
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	The proposed trail may expose individuals to higher rates of predation when they cross areas unprotected by vegetation cover. Introduced predators include the Red Fox and Feral Cats. The creation of a linear path may allow foxes to access areas of Smoky Mouse habitat. However, it is unlikely that construction of the trail will lead to an increase in fox or cat populations.	Medium	Establish a fox and cat control program baiting program prior to trail construction within the potential habitat for the species. Maintain this as an on-going program.	Potential predation on individuals may occur however population impacts should be mitigated	Low
Introduce disease that may cause the species to decline	Disease is not listed as a threat to this species. Construction of the trail is unlikely to introduce a disease that may cause this species to decline.	Low	No specific mitigation measures required to mitigate this risk.	None	Low
Interfere with the recovery of the species.	A Draft Recovery Plan has been prepared for the Smoky Mouse. Relevant threatening processes for this species in the study area include predation by introduced species and construction of roads and tracks in forests which threaten ridge-dependent species. Roads and tracks are likely to facilitate movement of the Fox and Cat.	Medium	As outlined previously, the trail footprint has been refined to minimise impacts to ridgetop habitat. However, there are no mitigation measures that can be undertaken to reduce the risk of increased fox or cat incursion into SBB habitat.	Construction of the proposed trail is unlikely to interfere with the recovery of the species.	Low

Table 20. Significant Impact Guidelines for Swift Parrot

SWIFT PARROT (Endangered)					
Significant Impact Criteria	Risk to MNES Without Mitigation Measures	Likelihood of a Significant Impact (No Mitigation Measures)	Specific Mitigation Measure(s)	Residual Risk to MNES With Mitigation Measures Applied	Likelihood of a Significant Impact (With Mitigation Measures)
There are NO Significant Impacts Guidelines for Swift Parrot – therefore the general guidelines for Critically Endangered/ Endangered species apply					
Matters of National Environmental Significance Significant impact guidelines EPBC Act 1999 (General Guidelines for Endangered Species)					
Lead to a long-term decrease in the size of a population	Unlikely. Only marginal foraging habitat is present in the study area. No key tree species were recorded in the study area.	Low	No trees are proposed to be removed for construction of the proposed trail.	No loss of foraging habitat	Low
Reduce the area of occupancy of the species	Unlikely. The proposed trail will result only in the loss of scattered shrubs and groundstorey that are not foraging habitat for Swift Parrots.	Low	Minimise vegetation removal	N/A	Low
Fragment an existing population into two or more populations	Unlikely. The Swift Parrot is a mobile species that can easily disperse throughout the local region during its mainland migration.	Low	No specific mitigation measures required to mitigate this risk.	None	Low
Adversely affect habitat critical to the survival of a species	Unlikely Area provides potential foraging habitat only.	Low	No specific mitigation measures required to mitigate this risk.	None	Low

SWIFT PARROT (Endangered)					
Disrupt the breeding cycle of a population	Unlikely. The Swift Parrot breeds in Tasmania, so there is unlikely to be any disruption to breeding activities.	Low	No specific mitigation measures required to mitigate this risk.	None	Low
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely. The study area only provides a very small area of potential foraging habitat. The loss of any of this vegetation will not result in the species' decline.	Low	No specific mitigation measures required to mitigate this risk.	None	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	Unlikely The species is vulnerable to predation by Feral Cats. Construction of the proposed trail may facilitate ingress of Cats into previously uninhabited areas. However, it is unlikely that the proposed trail will lead to an increase in cat numbers in the study area.	Low	No specific mitigation measures required to mitigate this risk.	None	N/a– mitigation measures cannot be applied during the upgrade
Introduce disease that may cause the species to decline	Unlikely. The Swift Parrot is susceptible to Psittacine Beak and Feather Disease (PBFD). Transmission of PBFD to Swift Parrots is usually via contact with lorikeets.	Low	No specific mitigation measures required to mitigate this risk. There are no practical actions that can be identified to address this threat.	None	Low

SWIFT PARROT (Endangered)					
	Construction of the proposed trail is unlikely to increase any contact between Swift Parrots and lorikeets.				
Interfere with the recovery of the species.	The National Recovery Plan for the Swift Parrot lists clearing of native vegetation as a threat to the species. The construction of the proposed trail will result in the loss of understorey vegetation which is not foraging habitat for the Swift Parrot.	Low	Minimise vegetation removal	N/A	Low

Table 21. Significant Impact Guidelines for Grey-headed Flying-fox

GREY-HEADED FLYING-FOX (Vulnerable)					
Significant Impact Criteria	Risk to MNES Without Mitigation Measures	Likelihood of a Significant Impact (No Mitigation Measures)	Specific Mitigation Measure(s)	Residual Risk to MNES With Mitigation Measures Applied	Likelihood of Significant Impact (With Mitigation Measures)
There are NO Significant Impacts Guidelines for the Grey-headed Flying-fox – therefore the general guidelines for vulnerable species apply					
Matters of National Environmental Significance Significant impact guidelines EPBC Act 1999 (General Guidelines for Vulnerable Species)					
Lead to a long-term decrease in the size of an important population	Unlikely. Only foraging habitat is present in the study area.	Low	Minimise vegetation removal	N/A	Low

GREY-HEADED FLYING-FOX (Vulnerable)					
Reduce the area of occupancy of an important population	Unlikely. Only potential habitat has been identified. There are no camps present in the study area.	Low	Minimise vegetation removal	N/A	Low
Fragment an existing population into two or more populations	Unlikely. The GHFF is a mobile species that can move freely to forage over the study area.	Low	Minimise vegetation removal	N/A	Low
Adversely affect habitat critical to the survival of a species	Unlikely. There will be some loss of understorey shrubs but this vegetation does not constitute critical habitat.	Low	Minimise vegetation removal	N/A	Low
Disrupt the breeding cycle of an important population	Unlikely. There are no camps present in the study area.	Low	No specific mitigation measures required to mitigate this risk.	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	Unlikely. There will be some loss of shrubs for construction of the proposed trail but this loss will not constitute critical habitat	Low	Minimise vegetation removal	N/A	Low
Result in invasive species that are harmful to a vulnerable species becoming established in the	Unlikely. The project will not result in the establishment of invasive species that are harmful to the GHFF.	Low	No specific mitigation measures required to mitigate this risk.	None	Low

GREY-HEADED FLYING-FOX (Vulnerable)					
vulnerable species' habitat					
Introduce disease that may cause the species to decline	Unlikely. The proposed trail will not result in the introduction of disease that may threaten the GHFF.	Low	No specific mitigation measures required to mitigate this risk.	None	Low
Interfere with the recovery of the species.	Unlikely The project will not interfere with the recovery of the species.	Low	No specific mitigation measures required to mitigate this risk.	None	Low

Table 22. Significant Impact Guidelines for Greater Glider

GREATER GLIDER (Vulnerable)					
Significant Impact Criteria	Risk to MNES Without Mitigation Measures	Likelihood of a Significant Impact (No Mitigation Measures)	Specific Mitigation Measure(s)	Residual Risk to MNES With Mitigation Measures Applied	Likelihood of Significant Impact (Mitigation Measures)
There are NO Significant Impacts Guidelines for the Greater Glider – therefore the general guidelines for vulnerable species apply					
Matters of National Environmental Significance Significant impact guidelines EPBC Act 1999 (General Guidelines for Vulnerable Species)					
Lead to a long-term decrease in the size of an important population	Unlikely Potential nest/den trees are present in the study area represented by large old trees or dead stags with hollows. There are 46 VBA records of the Greater Glider within 5km of the study area, although the PMST predicts the species and its habitat to occur.	Medium	All large hollow bearing trees (dead and alive) are to be retained with no substantial works encroachment that would compromise the health and viability of such trees.	None – there is proposed to be no loss of nest/den trees	Low
Reduce the area of occupancy of an important population	Removal of hollow-bearing trees may reduce the area occupied by the Greater Glider in the study area.	Medium	Mitigation measures above are required to ensure the species can continue to utilise the habitat in the Study Area and surrounds after the trail is constructed and operational.	None – there is proposed to be no loss of nesting/den trees.	Low
Fragment an existing population into two or more populations	Unlikely. The Greater Glider is able to disperse across small gaps in the forest canopy or sub-canopy. The	Low	Minimise vegetation removal	N/A	Low

GREATER GLIDER (Vulnerable)					
	proposed trail is only likely to be 2 m wide.				
Adversely affect habitat critical to the survival of a species	The study area supports high-quality habitat and an abundance of nesting/den trees.	Medium	Mitigation measures above are required to ensure the species can continue to utilise the habitat in the Study Area and surrounds after the trail is constructed and operational. No nesting trees will be removed.	None	Low
Disrupt the breeding cycle of an important population	There is an abundance of nest trees in the vicinity of the trail alignment that runs through preferred habitat (e.g. Wet Forest).	Medium	Mitigation measures above are required to ensure the species can continue to nest/breed in the Study Area and surrounds after the trail is constructed and operational.	None – there is proposed to be no loss of nesting trees.	Low
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The study area contains areas of high-quality habitat for the Greater Glider, with an abundance of nest trees.	Medium	Mitigation measures above are required to ensure the species can continue to utilise the habitat in the Study Area and surrounds after the trail is constructed and operational. No trees or stags will be removed.	None – there is proposed to be no loss of hollow-bearing trees.	Low
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Unlikely There are no invasive species reported to be harmful to the Greater Glider. The construction of the trail is not likely to increase populations of native species that complete with Greater Gliders for hollows (e.g. cockatoos) or that predate gliders (e.g. large forest owls).	Low	No specific mitigation measures required to mitigate this risk.	N/A	Low

GREATER GLIDER (Vulnerable)					
Introduce disease that may cause the species to decline	Unlikely The proposed trail is unlikely to introduce a disease that may cause this species to decline.	Low	No specific mitigation measures required to mitigate this risk.	None	Low
Interfere with the recovery of the species.	There is currently no recovery plan for the Greater Glider. However, conservation advice published by the Commonwealth of Australia lists habitat loss, especially due to loss of senescent trees, as a threat to the species. However, as there will be no loss of hollow-bearing trees resulting from construction of the trail, the recovery of the species is unlikely to be affected.	Low	Mitigation measures outlined above should ensure the recovery of the species is not impacted.	None	Low

Table 23. Significant Impact Guidelines for Listed Migratory Species (Fork-tailed Swift, White-throated Needletail, Rainbow Bee-eater)

MIGRATORY BIRD SPECIES					
Significant Impact Criteria	Risk to MNES Without Mitigation Measures	Likelihood of Significant Impact (No Mitigation Measures)	Specific Mitigation Measure(s)	Residual Risk to MNES With Mitigation Measures Applied	Likelihood of a Significant Impact (With Mitigation Measures)

MIGRATORY BIRD SPECIES					
There are NO Significant Impacts Guidelines for Fork-tailed Swift, White-throated Needletail or Rainbow Bee-eater – therefore the general guidelines for listed migratory species apply					
Matters of National Environmental Significance Significant impact guidelines EPBC Act 1999 (General Guidelines for Migratory Species)					
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	Unlikely. Only foraging habitat is present in the study area, which is not considered to be 'important habitat' under the definition provided in the Guidelines. The White-throated Needletail and Fork-tailed Swift are almost exclusively aerial and so is not likely to forage over vegetation in the study area. There is not likely to be resident or breeding populations present. The proposed trail is unlikely to fragment habitat for migratory bird species; the hydrology of streams in the study area is not likely to be altered as a result of construction of the trail.	Low	Minimise vegetation removal	N/A	Low
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species	Unlikely The project will not result in the establishment of invasive species that are harmful to migratory bird species.	Low	No specific mitigation measures required to mitigate this risk.	N/A	Low
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species	Unlikely None of the migratory bird species are likely to breed in the study area. Roosting habitat (e.g. cliffs, walls, quarries) is not present. The White-throated Needletail and Fork-tailed Swift breed in Asia. There is no nesting habitat available for the Rainbow Bee-eater. Only foraging habitat for the Rainbow Bee-eater is present – of which	Low	No specific mitigation measures required to mitigate this risk.	N/A	Low

MIGRATORY BIRD SPECIES					
	only a fraction will be removed or disturbed as a result of the proposed trail.				

Appendix 9. Sample photos within the trail alignment

Image 1. Typical Montane Wet Forest understorey (Habitat Zone 6)

Image 2. Typical fern understorey in Cool Temperate Rainforest (Habitat Zone 9)

Image 3. Interface of Montane Wet Forest and Cool Temperate Rainforest dominated by Myrtle Beech (Habitat Zone 6 and 7)

Image 4. Mature Old Growth Forest west of Ben Cairn Car Park (Habitat Zone 15)

Image 5. Start of southern decent from Donna Buang Road (Habitat Zone 17)

Image 6. Mature Wet Forest (Habitat Zone 21)

Image 7 and 8. Varying forest age classes occur in the vicinity of the APM track such as young regenerating forest within Habitat Zone 26 (left of screen) and mature forest vegetation within Habitat Zone 27 (centre screen)

Image 9. One of few creek crossings that intersect the trail alignment (unnamed creek west of Dee River)

Image 10. Riparian Forest in association with Dee River (habitat zone 34)

Image 11. Fire affected vegetation near the ridge line above little joe track (near habitat zone 43)

Image 12. Exit point from existing track within Habitat Zone 45

Image 13. Long Pink Bells within Habitat Zone 45

Image 14. Post-fire understorey regeneration within habitat zone 51

Image 15. Gully crossing within Habitat Zone 52 will require some design a construction solutions to minimise earthworks

Image 16. Young forest with regenerating understorey along abandoned APM track (habitat zone 24)

Image 17. Wood fungus with host plant

Image 18. Common Bird Orchid

Appendix 10. Warburton Mountain Bike Destination: Environmental Protocols

A copy of the latest version of the Environmental Protocols (subject to being finalised and approved by all parties) is provided on the following page

Warburton Mountain Bike Destination: Environmental Protocols

Endorsed December 2019

The Warburton Mountain Bike Destination: Environmental Protocols (the Protocols) outline the environmental standards to be met in the alignment of trails.

The protocols are intended to guide the design of alignments that result in minimal environmental disturbance and ensuring that any disturbance to environmental values can be appropriately mitigated where they cannot be avoided. These protocols relate to the alignment of the trail, but include some measures relating to the construction and operation of the trail where there is a reasonable expectation that these will impact the alignment itself. It is acknowledged that further work will be undertaken to develop a Construction Environmental Management Plan and an Operations Management Plan to provide further guidance on these factors.

These protocols were developed in conjunction with species experts for Cool Temperate Rainforest, Leadbeaters Possum and Mt Donna Buang Wingless Stonefly and are the combined work of the following organisations:

- Yarra Ranges Council
- Department of Environment, Land, Water and Planning (DELWP)
- Parks Victoria
- Practical Ecology
- World Trail

The following standards and mitigation measures are based on information about the natural values that is currently known, and it is acknowledged that due to the remoteness and lack of disturbance in some of these areas, further ecological assessments, including field surveys at seasonally appropriate times of year will be required. The results of these surveys may require amendments to this document and further approval by the relevant land manager.

The protocols have been divided to provide clarity and to better define the risk to each value. However, there are sections within the landscape where these values overlap and the protocols for each individual value will need to be applied in these instances. For example, on the summit of Mount Donna Buang, there are known occurrences of Cool Temperate Rainforest, Cool Temperate Mixed Forest, Leadbeaters Possum, Mount Donna Buang Wingless Stonefly and native vegetation.

Application of the protocols:

These protocols are divided into ecological values that are present in the landscape and attempts to summarise the potential risk to these values resulting from the construction and operation of the trail. The column labelled 'Protocol' sets out the standard that should be met to completely avoid the risk to the value. However, it is acknowledged that not all standards will be realistic throughout the landscape and mitigation measures have been developed to minimise the impact to the values in these cases. There are some standards where no mitigation measures have been described and in these cases, the risk to the value is considered so high, that the protocol must be implemented.

In cases where neither the standard, nor the mitigation measure is considered possible to implement, then direct negotiations with the land managers will be required to develop an appropriate response. This may include meetings on site and consultation with values experts. Any negotiations for works that are inconsistent with these protocols must be agreed in writing by the relevant public land manager and/or Melbourne Water.

Ecological value	**Risk to value**	**Protocol**	**Mitigation measures**
Native Vegetation (NV)	A break in the canopy will increase light to the forest floor which will create changes in microclimate and have a negative impact on the ecological system.	NV P1 - Any native vegetation removal requires avoidance, minimisation and offsetting in accordance with the 'Guidelines for The Removal, Destruction or Lopping of Native Vegetation (DELWP 2017)'	NV M1 – The trail alignment is to be determined based on minimising the removal of vegetation, including mid-story and ground cover.
		NV P2 – No vegetation is to be removed to accommodate rest stops or viewing areas in National Park.	NV M2 - Rest stops and viewing areas along the trail are to use existing cleared areas and breaks in vegetation to minimise vegetation removal.
		NV P3 - No trees, including mid-storey trees of more than 10cm DBH are to be removed.	NV M3 - In State Forest where there is a stand of single age Eucalyptus sp (ie regrowth following bushfire), trees of up to 20 cm DBH may be removed.
	Damage to tree roots during construction and use of the trail will negatively impact the long-term health of tree species.	NV P4 – Avoid aligning the trail within the structural root zones of all trees.	NV M4 – Where the structural root zones (defined by AS) of trees cannot be avoided, then a design solution will need to be implemented to reduce impact on tree root zones.

Ecological value	Risk to value	Protocol	Mitigation measures
			NV M5 – Align the trail on the higher elevation side of large trees, especially on steeper side slopes as tree roots are likely to be closer to the surface on the lower side.
	A break in vegetation connectivity at any strata layer will negatively impact movement corridors of native fauna that rely on heavy vegetation cover to move through the landscape protected from predators.	NV P5 – Avoid existing stands of dense vegetation, particularly mid-storey vegetation between 1-5m in height.	NV M6 – Avoid removal of mid-storey vegetation within 10m of known or probable nesting sites of native fauna within National Park. NV M7 - Avoid removal of mid-storey vegetation within 10m of known nesting sites of listed (within VBA) fauna species within State Forest.
	A break in vegetation connectivity will create movement corridors for predatory and pest animals.		
	Disturbance to the ground cover and removal of vegetation will allow introduction and spread of weed species and pathogens. This includes the spread of Myrtle Wilt and Phytophthora.	NV P6 – Avoid disturbance to the ground surface in areas known to contain invasive weeds and pathogens including Myrtle Wilt and Phytophthora.	NV M8 – Undertake weed and pathogen control along the trail corridor during construction in accordance with an approved CEMP.
	The introduction of fill material may introduce weeds and pathogens and potentially alter pH levels of the soil which will have a negative impact on the health of	NV P7 – Minimise the introduction of fill material for the construction and ongoing management of the trail.	NV M9 – Any fill material introduced to the site must be certified clean and be weed and pathogen free and be of a similar pH to natural soils.

Ecological value	Risk to value	Protocol	Mitigation measures
	the system.		
	The construction and use of the trail may have negative impacts on significant native flora, including listed species.	NV P8 – Prior to the trail alignment being finalised, detailed field surveys are required to identify the likely presence of significant species or communities identified in appendix 1.	
		NV P9 – Avoid areas known or are likely to contain significant species or communities, as identified in appendix 1, including species listed under FFG and EPBC and advisory listed.	NV M10 – Apply an appropriate buffer to significant native flora species and communities identified in appendix 1, in consultation with the relevant public land manager.
	Large fallen debris (>30cm DBH) is part of the natural cycle of the area and provides important habitat for local fauna and assists in soil stabilisation.	NV P10 – Avoid any removal or disturbance to large fallen timber.	NV M11 – Any removal of fallen timber must be to the minimum extent necessary and any material removed must be retained on site.
Cool Temperate Rainforest (EVC 31) & Cool Temperate Mixed Forest EVC145) (CTR)	The reduction in overall area of Cool Temperate Rainforest and Cool Temperate Mixed Forest given their current limited distribution and listing under FFG.	CTR P1 – Prior to finalising the trail alignment, field surveys are required to identify the extent of Cool Temperate Mixed Forest within the area.	
		CTR P2 – Avoid areas of Cool Temperate Rainforest and Cool Temperate Mixed Forest.	CTR M1 – Minimise the length of the alignment through Cool Temperate Rainforest and Cool Temperate Mixed Forest.
		CTR P3 - No rest stops or viewing areas are to be located within Cool Temperate Rainforest or Cool Temperate Mixed Forest.	

Ecological value	Risk to value	Protocol	Mitigation measures
	The introduction and spread of Myrtle Wilt caused by damage to trees, including disturbance to the root zone will lead to the death of Myrtle Beech species.	CTR P4 – Avoid areas showing signs of Myrtle Wilt.	CTR M2 – Prior to finalising the trail alignment, undertake detailed mapping to clearly identify areas showing signs of Myrtle Wilt (Attach check list of Myrtle Wilt from DELWP as appendix).
		CTR P5 - Avoid the drip line of Myrtle Beech within Cool Temperate Rainforest and Cool Temperate Mixed Forest.	CTR M3 - Where areas containing Myrtle Beech cannot be avoided, minimise disturbance within the drip line of all Myrtle Beech trees using a design/engineered solution. CTR M4 – In the event of any disturbance within the root zone or to any part of Myrtle Beech trees occurs, fungicide must be immediately applied to prevent the spread of Myrtle Wilt.
	The introduction of imported fill material will introduce pathogens and damage the integrity of Cool Temperate Rainforest and Cool Temperate Mixed Forest.	CTR P6 – No imported fill material (including gravel, rock and soil) is to be used within Cool Temperate Rainforest or Cool Temperate Mixed Forest.	CTR M5 – Where soils are damp and boggy, trail must be elevated using boardwalk or another appropriate engineered/design solution.
	Any change to the surface hydrology will have a negative impact on the ecosystem.	CTR P7 – No excavation is to be undertaken within Cool Temperate Rainforest or Cool Temperate Mixed Forest to avoid changes to existing ground surface gradients.	CTR M6 –Trail construction is to be undertaken using hand tools only within Cool Temperate Rainforest and Cool Temperate Mixed Forest.
		CTR P8 – Avoid artificial changes to natural gradients to reduce changes to surface hydrology.	CTR M7 – A trail design approved by a suitably qualified professional should be used to reduce the potential for soil compaction and other impacts to surface hydrology over time.

Ecological value	Risk to value	Protocol	Mitigation measures
Native Fauna	Construction and ongoing use of the trail (including night-time use) will interfere with the existing movement corridors of native fauna, including significant and listed species, which may cause displacement, impact available food sources and reduce available habitat areas.	NF P1 – Avoid all areas which are known or likely to contain significant native fauna as identified in appendix 2.	NF M1 – Apply an appropriate buffer to identified nesting sites of significant native fauna identified in appendix 2, including applying a 5m buffer to rocky outcrops with cracks and crevices. NF M2 – Apply a 20m buffer to lyrebird display mounds.
		NF P2 – Existing habitat trees (>40cm DBH, or hollow bearing trees) are to be avoided.	NF M3 – Apply a 50m buffer to owl nesting sites. NF M4 – Apply an appropriate buffer/visual buffer to all tree hollows.
		NF P3 – Avoid known or probable nesting sites of VBA listed species by at least 10m.	NF M5 – Apply an appropriate buffer to identified nesting sites of significant native fauna identified in appendix 2, including applying a 5m buffer to rocky outcrops with cracks and crevices.
Leadbeater's Possum (LBP)	There are 3 essential components to leadbeaters habitat which are, an appropriate food source, access to nesting hollows and dense connected vegetation to allow movement. Any impact to one of these factors will have a negative impact on the population and future viability of Leadbeaters in these areas.	LBP P1 – Avoid areas of known and potential LBP habitat. LBP P2 – Apply a 50m buffer zone around known or potential Leadbeaters colonies.	LBP M1 - No removal of dense stands of Callistemon or Tea Tree species within potential or suitable habitat for Leadbeaters possums.

Ecological value	Risk to value	Protocol	Mitigation measures
		LBP P3 – No removal of vegetation within potential or suitable Leadbeaters habitat.	LBP M2 - Where removal of vegetation cannot be avoided, the alignment must utilise existing cleared areas.
	Creation of the trail in close proximity to Leadbeaters habitat will facilitate movement by predatory species such as foxes and cats which will increase predation and reduce population size.		
	Removal of dense stands of mid-story vegetation, specifically Callistemon and Tea Tree species will negatively impact the movement and therefore health of Leadbeaters populations.		
	Disturbance to existing Australia National University monitoring plots will impact long term monitoring results of Leadbeaters Possum.	LBP P4 – Apply a 200m exclusion zone from the centre of all ANU monitoring plots.	
	The construction and ongoing use of the trail may create disturbance to Leadbeaters and increase the likelihood of human interaction and interference.	LBP P5 - No rest stops or viewing areas within 200m of LBP nest boxes or known or potential colonies.	LBP M3 – The alignment of the trail cannot result in increased visibility to existing nest boxes or occupied tree hollows.

Ecological value	Risk to value	Protocol	Mitigation measures
Mount Donna Buang Wingless Stonefly (SF)	Any disturbance to known and potential habitat of Mt Donna Buang Wingless Stonefly will result in a reduction in the current population and future viability of the species.	SF P1 – Avoid areas of known and potential habitat for Mt Donna Buang Wingless Stonefly.	SF M1 – Align trail as close as possible to the verge of Mt Donna Buang Road or use existing tracks.
	Ground disturbance in close proximity to surface water flowing into Wingless Stonefly habitat will negatively impact available habitat through sedimentation, water pollution, obstructions in waterways and shading of waterways.	SF P2 – No loss of connectivity or change in hydrology patterns in known or potential habitat. SF P3 – No increase in sediment transport in identified areas of known or potential habitat.	SF M2 - Any work within the potential range of the species must minimise habitat disturbance and sedimentation by elevating the trail to cross waterways, bogs, damp areas or seasonal drainage lines within the mapped suitable habitat zone.
		SP P4 – No change in solar radiation (ie. natural light) in identified areas of known or potential habitat. SF P5 – No ground disturbance or soil compaction within 30m of known or potential habitat.	SF M3 – Any elevated trail must be constructed to minimise ground disturbance and maintain natural light levels.
	Construction during the critical life cycle stages of Wingless Stonefly will negatively impact the species.	SF P6 – Construction of the trail is to be undertaken between December and February.	
Water Quality (WQ)	Trail construction and ongoing use will create sedimentation, contribute to pollution in waterways and facilitate increases in weed distribution.	WQ P1 - Apply Water Act definition to determine presence and extent of waterways – ie natural channel where water regularly flows whether or not the flow is continuous or lake, lagoon, swamp or marsh. (Vegetation class can be a good indicator of presence and extent of water on site and thus	

Ecological value	Risk to value	Protocol	Mitigation measures
		whether waterway exists or not.)	
		WQ P2 – Minimise the number of water crossings.	WQ M1 - Where waterway crossing is required, identify the narrowest practicable location. WQ M2 - All waterway crossings are to be elevated (no rock armouring, no wheels crossing through the flow path).
		WQ P3 – Apply a 20m streamside buffer to minor waterways (<60ha catchment).	
		WQ P4 – Apply a 30m streamside buffer for larger waterways (>60ha catchment)	
		WQ P5 – No trails within Coranderrk Creek water supply drinking catchment.	
		WQ P6 - Implement Melbourne Water requirements for works on waterways and crossings.	
		WQ P7 – No ford crossings through waterway flow paths.	

Ecological value	Risk to value	Protocol	Mitigation measures
		WQ P8 - No creation of fish barriers in any waterways that support, or could support, native fish.	WQ M3 – Span bridges are to be used in preference to culverts wherever practical.
		WQ P9 - Avoid areas of wet or boggy ground, including areas where vegetation changes suggest such conditions may be present (ie. sedges, rushes, mosses etc.).	WQ M4 – Where wet or boggy ground is present, use suitable rock armouring to harden and reinforce the trail
Hydrological Values	Any interruption to the existing surface flows on the southern face of Mt Donna Buang will impact ecosystem health.	HV P1 – Avoid changes to surface water flows.	HV M1 – Minimise alignment through steep slopes to reduce the amount of excavation in National Park.

Appendix 11. Scenario Test Native Vegetation Loss and Offset Requirements

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: **13/12/2019**
Time of issue: **2:40 pm**

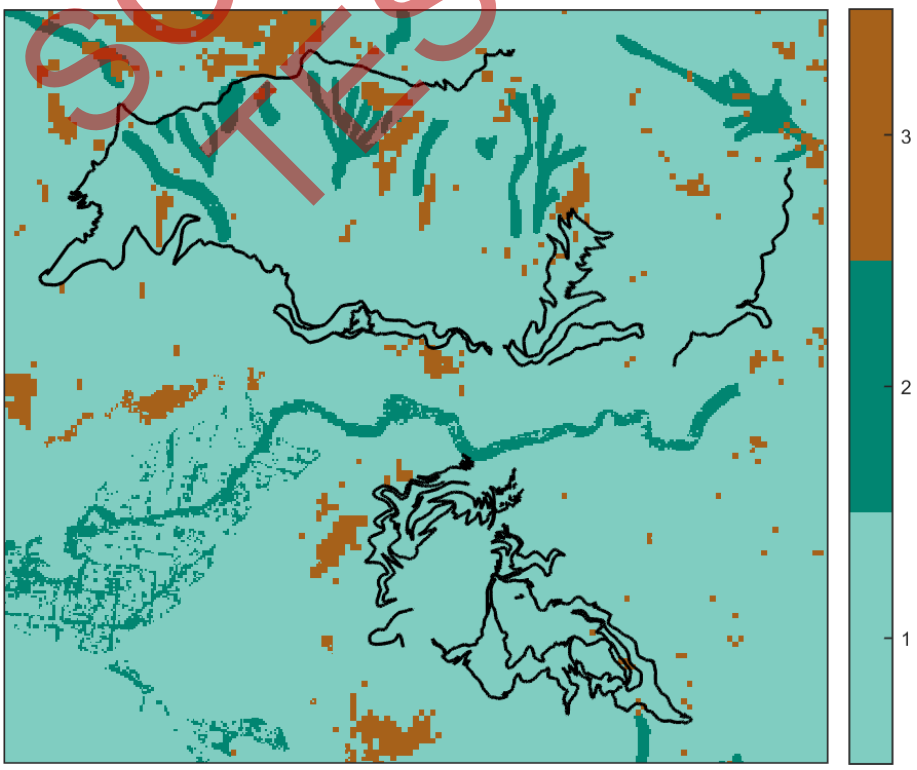
Report ID: Scenario Testing

Project ID	Warburton_MTB_Vegetation_Loss_GT_2019_12_13

Assessment pathway

Assessment pathway	**Detailed Assessment Pathway**
Extent including past and proposed	21.277 ha
Extent of past removal	0.000 ha
Extent of proposed removal	21.277 ha
No. Large trees proposed to be removed	0
Location category of proposed removal	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 (as per the statewide EVC map); and a wetland listed in the Directory of Important Wetlands of Australia.

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:

Species offset amount[1]	14.386 species units of habitat for Brickmaker's Sedge, *Gahnia grandis* 14.552 species units of habitat for Long Pink-bells, *Tetratheca stenocarpa* 10.566 species units of habitat for Fairy Lanterns, *Thismia rodwayi* 14.387 species units of habitat for Powelltown Correa, *Correa reflexa var. lobata* 7.591 species units of habitat for White Star-bush, *Asterolasia asteriscophora subsp. albiflora*
Large trees	0 trees

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 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**
1-54	Patch	hsf_0045	Least Concern	0	yes	0.400	1.231	1.231	0.703	0.803	0.888	501390 Brickmaker's Sedge *Gahnia grandis*
										0.803	0.888	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.186	0.886	503390 Fairy Lanterns *Thismia rodwayi*
										0.803	0.888	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.005	0.886	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-42	Patch	hsf_0016	Least Concern	0	yes	0.345	0.278	0.278	0.615	0.804	0.173	501390 Brickmaker's Sedge *Gahnia grandis*
										0.804	0.173	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.095	0.171	503390 Fairy Lanterns *Thismia rodwayi*
										0.804	0.173	505404 Powelltown Correa *Correa reflexa var. lobata*

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
										0.106	0.171	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-36	Patch	hsf_0023	Least Concern	0	yes	0.315	0.303	0.303	0.747	0.801	0.172	501390 Brickmaker's Sedge *Gahnia grandis*
										0.801	0.172	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.801	0.172	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.437	0.171	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-68	Patch	hsf_0045	Least Concern	0	yes	0.445	0.164	0.164	0.630	0.801	0.132	501390 Brickmaker's Sedge *Gahnia grandis*
										0.801	0.132	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.801	0.132	505404 Powelltown Correa *Correa reflexa var. lobata*
1-20	Patch	hsf_0030	Least Concern	0	yes	0.310	1.015	1.015	0.630	0.791	0.564	501390 Brickmaker's Sedge *Gahnia grandis*
										0.791	0.564	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.422	0.563	503390 Fairy Lanterns *Thismia rodwayi*
										0.791	0.564	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.527	0.563	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-22	Patch	hsf_0030	Least Concern	0	yes	0.395	1.034	1.034	0.697	0.794	0.732	501390 Brickmaker's Sedge *Gahnia grandis*
										0.653	0.733	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.237	0.731	503390 Fairy Lanterns *Thismia rodwayi*
										0.639	0.733	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.033	0.734	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-30	Patch	hsf_0029	Least Concern	0	yes	0.360	0.185	0.185	0.636	0.765	0.117	501390 Brickmaker's Sedge *Gahnia grandis*

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
										0.765	0.117	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.765	0.117	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.240	0.118	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-57	Patch	hsf_0030	Least Concern	0	yes	0.395	0.253	0.253	0.780	0.797	0.180	501390 Brickmaker's Sedge *Gahnia grandis*
										0.797	0.180	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.763	0.180	503390 Fairy Lanterns *Thismia rodwayi*
										0.797	0.180	505404 Powelltown Correa *Correa reflexa var. lobata*
1-14	Patch	hsf_0030	Least Concern	0	yes	0.355	0.063	0.063	0.694	0.789	0.040	501390 Brickmaker's Sedge *Gahnia grandis*
										0.789	0.040	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.789	0.040	505404 Powelltown Correa *Correa reflexa var. lobata*
1-13	Patch	hsf_0030	Least Concern	0	yes	0.390	0.244	0.244	0.770	0.803	0.171	501390 Brickmaker's Sedge *Gahnia grandis*
										0.803	0.171	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.638	0.171	503390 Fairy Lanterns *Thismia rodwayi*
										0.803	0.171	505404 Powelltown Correa *Correa reflexa var. lobata*
1-23	Patch	hsf_0029	Least Concern	0	yes	0.375	0.245	0.245	0.837	0.803	0.165	503354 Long Pink-bells *Tetratheca stenocarpa*
1-55	Patch	hsf_0045	Least Concern	0	yes	0.355	0.092	0.092	0.780	0.806	0.059	501390 Brickmaker's Sedge *Gahnia grandis*
										0.806	0.059	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.806	0.059	503390 Fairy Lanterns *Thismia rodwayi*
										0.806	0.059	505404 Powelltown Correa *Correa reflexa var. lobata*

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
1-58	Patch	hsf_0045	Least Concern	0	yes	0.435	0.130	0.130	0.780	0.776	0.101	501390 Brickmaker's Sedge *Gahnia grandis*
										0.776	0.101	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.776	0.101	505404 Powelltown Correa *Correa reflexa var. lobata*
1-59	Patch	hsf_0029	Least Concern	0	yes	0.370	0.073	0.073	0.780	0.795	0.049	501390 Brickmaker's Sedge *Gahnia grandis*
										0.795	0.049	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.795	0.049	505404 Powelltown Correa *Correa reflexa var. lobata*
1-63	Patch	hsf_0045	Least Concern	0	yes	0.415	0.298	0.298	0.758	0.797	0.222	501390 Brickmaker's Sedge *Gahnia grandis*
										0.797	0.222	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.784	0.222	503390 Fairy Lanterns *Thismia rodwayi*
										0.797	0.222	505404 Powelltown Correa *Correa reflexa var. lobata*
1-60	Patch	hsf_0045	Least Concern	0	yes	0.435	0.090	0.090	0.780	0.802	0.071	501390 Brickmaker's Sedge *Gahnia grandis*
										0.802	0.071	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.802	0.071	505404 Powelltown Correa *Correa reflexa var. lobata*
1-56	Patch	hsf_0045	Least Concern	0	yes	0.405	0.171	0.171	0.780	0.806	0.125	501390 Brickmaker's Sedge *Gahnia grandis*
										0.806	0.125	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.806	0.125	503390 Fairy Lanterns *Thismia rodwayi*
										0.806	0.125	505404 Powelltown Correa *Correa reflexa var. lobata*
1-26	Patch	hsf_0030	Least Concern	0	yes	0.305	0.162	0.162	0.658	0.759	0.087	501390 Brickmaker's Sedge *Gahnia grandis*
										0.759	0.087	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.206	0.087	503390 Fairy Lanterns *Thismia rodwayi*

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
										0.759	0.087	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.759	0.087	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-25	Patch	hsf_0030	Least Concern	0	yes	0.430	0.490	0.490	0.682	0.799	0.379	501390 Brickmaker's Sedge *Gahnia grandis*
										0.799	0.379	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.508	0.379	503390 Fairy Lanterns *Thismia rodwayi*
										0.799	0.379	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.296	0.378	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-5	Patch	valp0031	Endangered	0	yes	0.395	0.106	0.106	0.803	0.805	0.075	501390 Brickmaker's Sedge *Gahnia grandis*
										0.805	0.075	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.116	0.075	503390 Fairy Lanterns *Thismia rodwayi*
										0.805	0.075	505404 Powelltown Correa *Correa reflexa var. lobata*
1-16	Patch	hsf_0030	Least Concern	0	yes	0.375	0.151	0.151	0.754	0.749	0.099	501390 Brickmaker's Sedge *Gahnia grandis*
										0.749	0.099	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.426	0.100	503390 Fairy Lanterns *Thismia rodwayi*
										0.749	0.099	505404 Powelltown Correa *Correa reflexa var. lobata*
1-19	Patch	hsf_0030	Least Concern	0	yes	0.320	0.649	0.649	0.711	0.794	0.372	501390 Brickmaker's Sedge *Gahnia grandis*
										0.794	0.372	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.645	0.373	503390 Fairy Lanterns *Thismia rodwayi*
										0.794	0.372	505404 Powelltown Correa *Correa reflexa var. lobata*

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
										0.474	0.373	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-10	Patch	hsf_0030	Least Concern	0	yes	0.395	0.360	0.360	0.770	0.800	0.256	501390 Brickmaker's Sedge *Gahnia grandis*
										0.800	0.256	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.568	0.255	503390 Fairy Lanterns *Thismia rodwayi*
										0.800	0.256	505404 Powelltown Correa *Correa reflexa var. lobata*
1-15	Patch	hsf_0030	Least Concern	0	yes	0.370	0.366	0.366	0.747	0.787	0.242	501390 Brickmaker's Sedge *Gahnia grandis*
										0.787	0.242	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.270	0.244	503390 Fairy Lanterns *Thismia rodwayi*
										0.787	0.242	505404 Powelltown Correa *Correa reflexa var. lobata*
1-24	Patch	hsf_0045	Least Concern	0	yes	0.380	0.668	0.668	0.661	0.796	0.456	501390 Brickmaker's Sedge *Gahnia grandis*
										0.798	0.457	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.044	0.454	503390 Fairy Lanterns *Thismia rodwayi*
										0.556	0.457	505404 Powelltown Correa *Correa reflexa var. lobata*
1-27	Patch	hsf_0030	Least Concern	0	yes	0.365	0.521	0.521	0.784	0.768	0.336	501390 Brickmaker's Sedge *Gahnia grandis*
										0.768	0.336	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.191	0.342	503390 Fairy Lanterns *Thismia rodwayi*
										0.768	0.336	505404 Powelltown Correa *Correa reflexa var. lobata*
1-21	Patch	hsf_0030	Least Concern	0	yes	0.230	0.262	0.262	0.552	0.785	0.108	501390 Brickmaker's Sedge *Gahnia grandis*
										0.785	0.108	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.128	0.106	503390 Fairy Lanterns *Thismia rodwayi*

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
										0.785	0.108	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.335	0.107	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-41	Patch	hsf_0029	Least Concern	0	yes	0.415	0.556	0.556	0.663	0.795	0.414	501390 Brickmaker's Sedge *Gahnia grandis*
										0.795	0.414	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.391	0.413	503390 Fairy Lanterns *Thismia rodwayi*
										0.795	0.414	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.058	0.406	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-69	Patch	hsf_0045	Least Concern	0	yes	0.395	0.044	0.044	0.736	0.776	0.031	501390 Brickmaker's Sedge *Gahnia grandis*
										0.776	0.031	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.485	0.031	503390 Fairy Lanterns *Thismia rodwayi*
										0.776	0.031	505404 Powelltown Correa *Correa reflexa var. lobata*
1-44	Patch	hsf_0029	Least Concern	0	yes	0.400	0.118	0.118	0.706	0.794	0.085	501390 Brickmaker's Sedge *Gahnia grandis*
										0.794	0.085	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.330	0.085	503390 Fairy Lanterns *Thismia rodwayi*
										0.794	0.085	505404 Powelltown Correa *Correa reflexa var. lobata*
1-43	Patch	hsf_0045	Least Concern	0	yes	0.420	0.171	0.171	0.623	0.799	0.129	501390 Brickmaker's Sedge *Gahnia grandis*
										0.799	0.129	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.799	0.129	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.594	0.129	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*

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
1-31	Patch	hsf_0029	Least Concern	0	yes	0.360	0.225	0.225	0.670	0.762	0.143	501390 Brickmaker's Sedge *Gahnia grandis*
										0.762	0.143	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.762	0.143	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.458	0.143	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-29	Patch	hsf_0045	Least Concern	0	yes	0.330	0.079	0.079	0.670	0.697	0.044	501390 Brickmaker's Sedge *Gahnia grandis*
										0.697	0.044	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.697	0.044	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.224	0.045	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-70	Patch	hsf_0029	Least Concern	0	yes	0.360	0.024	0.024	0.670	0.760	0.015	501390 Brickmaker's Sedge *Gahnia grandis*
										0.760	0.015	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.760	0.015	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.206	0.015	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-47	Patch	hsf_0029	Least Concern	0	yes	0.415	0.169	0.169	0.595	0.799	0.126	501390 Brickmaker's Sedge *Gahnia grandis*
										0.799	0.126	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.799	0.126	505404 Powelltown Correa *Correa reflexa var. lobata*
1-9	Patch	valp0030	Least Concern	0	yes	0.425	0.312	0.312	0.812	0.794	0.238	501390 Brickmaker's Sedge *Gahnia grandis*
										0.794	0.238	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.181	0.239	503390 Fairy Lanterns *Thismia rodwayi*
										0.794	0.238	505404 Powelltown Correa *Correa reflexa var. lobata*

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
1-11	Patch	hsf_0030	Least Concern	0	yes	0.360	0.238	0.238	0.813	0.799	0.154	501390 Brickmaker's Sedge *Gahnia grandis*
										0.799	0.154	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.658	0.155	503390 Fairy Lanterns *Thismia rodwayi*
										0.799	0.154	505404 Powelltown Correa *Correa reflexa var. lobata*
1-50	Patch	hsf_0029	Least Concern	0	yes	0.385	0.293	0.293	0.759	0.805	0.204	501390 Brickmaker's Sedge *Gahnia grandis*
										0.805	0.204	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.342	0.203	503390 Fairy Lanterns *Thismia rodwayi*
										0.805	0.204	505404 Powelltown Correa *Correa reflexa var. lobata*
1-12	Patch	hsf_0030	Least Concern	0	yes	0.385	0.251	0.251	0.731	0.800	0.174	501390 Brickmaker's Sedge *Gahnia grandis*
										0.799	0.174	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.194	0.174	503390 Fairy Lanterns *Thismia rodwayi*
										0.799	0.174	505404 Powelltown Correa *Correa reflexa var. lobata*
1-35	Patch	hsf_0029	Least Concern	0	yes	0.325	0.334	0.334	0.772	0.795	0.195	501390 Brickmaker's Sedge *Gahnia grandis*
										0.795	0.195	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.795	0.195	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.741	0.195	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-40	Patch	hsf_0029	Least Concern	0	yes	0.370	0.221	0.221	0.707	0.796	0.147	501390 Brickmaker's Sedge *Gahnia grandis*
										0.796	0.147	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.018	0.146	503390 Fairy Lanterns *Thismia rodwayi*

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
										0.796	0.147	505404 Powelltown Correa *Correa reflexa var. lobata*
1-37	Patch	hsf_0045	Least Concern	0	yes	0.330	0.139	0.139	0.711	0.798	0.082	501390 Brickmaker's Sedge *Gahnia grandis*
										0.798	0.082	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.798	0.082	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.213	0.083	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-32	Patch	hsf_0029	Least Concern	0	yes	0.405	0.380	0.380	0.595	0.774	0.273	501390 Brickmaker's Sedge *Gahnia grandis*
										0.774	0.273	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.774	0.273	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.226	0.273	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-34	Patch	hsf_0029	Least Concern	0	yes	0.385	0.284	0.284	0.699	0.775	0.194	501390 Brickmaker's Sedge *Gahnia grandis*
										0.775	0.194	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.775	0.194	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.120	0.194	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-2	Patch	valp0039	Least Concern	0	yes	0.415	0.173	0.173	0.789	0.798	0.129	501390 Brickmaker's Sedge *Gahnia grandis*
										0.105	0.129	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.786	0.129	505404 Powelltown Correa *Correa reflexa var. lobata*
1-7	Patch	valp0038	Least Concern	0	yes	0.385	0.101	0.101	0.860	0.797	0.070	501390 Brickmaker's Sedge *Gahnia grandis*
										0.797	0.070	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.536	0.070	503390 Fairy Lanterns *Thismia rodwayi*

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
										0.797	0.070	505404 Powelltown Correa *Correa reflexa var. lobata*
1-4	Patch	valp0031	Endangered	0	yes	0.380	0.140	0.140	0.798	0.810	0.096	501390 Brickmaker's Sedge *Gahnia grandis*
										0.810	0.096	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.263	0.096	503390 Fairy Lanterns *Thismia rodwayi*
										0.810	0.096	505404 Powelltown Correa *Correa reflexa var. lobata*
1-1	Patch	valp0031	Endangered	0	yes	0.370	0.260	0.260	0.885	0.800	0.173	501390 Brickmaker's Sedge *Gahnia grandis*
										0.755	0.173	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.800	0.173	505404 Powelltown Correa *Correa reflexa var. lobata*
1-3	Patch	valp0031	Endangered	0	yes	0.375	0.249	0.249	0.785	0.804	0.168	501390 Brickmaker's Sedge *Gahnia grandis*
										0.407	0.168	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.799	0.169	505404 Powelltown Correa *Correa reflexa var. lobata*
1-6	Patch	valp0031	Endangered	0	yes	0.380	0.160	0.160	0.801	0.800	0.109	501390 Brickmaker's Sedge *Gahnia grandis*
										0.800	0.109	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.361	0.109	503390 Fairy Lanterns *Thismia rodwayi*
										0.800	0.109	505404 Powelltown Correa *Correa reflexa var. lobata*
1-8	Patch	hsf_0031	Endangered	0	yes	0.385	0.147	0.147	0.814	0.798	0.102	501390 Brickmaker's Sedge *Gahnia grandis*
										0.798	0.102	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.535	0.102	503390 Fairy Lanterns *Thismia rodwayi*
										0.798	0.102	505404 Powelltown Correa *Correa reflexa var. lobata*

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**
1-62	Patch	hsf_0029	Least Concern	0	yes	0.370	0.032	0.032	0.750	0.788	0.021	501390 Brickmaker's Sedge *Gahnia grandis*
										0.788	0.021	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.176	0.021	503390 Fairy Lanterns *Thismia rodwayi*
										0.788	0.021	505404 Powelltown Correa *Correa reflexa var. lobata*
1-51	Patch	hsf_0029	Least Concern	0	yes	0.425	0.634	0.634	0.778	0.802	0.485	501390 Brickmaker's Sedge *Gahnia grandis*
										0.802	0.485	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.696	0.485	503390 Fairy Lanterns *Thismia rodwayi*
										0.802	0.485	505404 Powelltown Correa *Correa reflexa var. lobata*
1-53	Patch	hsf_0045	Least Concern	0	yes	0.435	0.062	0.062	0.778	0.805	0.049	501390 Brickmaker's Sedge *Gahnia grandis*
										0.805	0.049	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.390	0.049	503390 Fairy Lanterns *Thismia rodwayi*
										0.805	0.049	505404 Powelltown Correa *Correa reflexa var. lobata*
1-49	Patch	hsf_0029	Least Concern	0	yes	0.430	0.469	0.469	0.737	0.795	0.362	501390 Brickmaker's Sedge *Gahnia grandis*
										0.795	0.362	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.343	0.363	503390 Fairy Lanterns *Thismia rodwayi*
										0.795	0.362	505404 Powelltown Correa *Correa reflexa var. lobata*
1-17	Patch	hsf_0030	Least Concern	0	yes	0.385	0.199	0.199	0.745	0.744	0.134	501390 Brickmaker's Sedge *Gahnia grandis*
										0.744	0.134	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.236	0.130	503390 Fairy Lanterns *Thismia rodwayi*
										0.744	0.134	505404 Powelltown Correa *Correa reflexa var. lobata*

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
1-18	Patch	hsf_0030	Least Concern	0	yes	0.330	0.685	0.685	0.689	0.781	0.403	501390 Brickmaker's Sedge *Gahnia grandis*
										0.781	0.403	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.181	0.400	503390 Fairy Lanterns *Thismia rodwayi*
										0.781	0.403	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.263	0.401	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-28	Patch	hsf_0030	Least Concern	0	yes	0.355	0.456	0.456	0.728	0.769	0.286	501390 Brickmaker's Sedge *Gahnia grandis*
										0.769	0.286	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.488	0.290	503390 Fairy Lanterns *Thismia rodwayi*
										0.769	0.286	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.201	0.279	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-65	Patch	hsf_0029	Least Concern	0	yes	0.390	0.120	0.120	0.592	0.787	0.084	501390 Brickmaker's Sedge *Gahnia grandis*
										0.787	0.084	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.113	0.085	503390 Fairy Lanterns *Thismia rodwayi*
										0.787	0.084	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.359	0.083	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-38	Patch	hsf_0045	Least Concern	0	yes	0.390	0.169	0.169	0.719	0.805	0.119	501390 Brickmaker's Sedge *Gahnia grandis*
										0.805	0.119	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.805	0.119	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.010	0.119	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*

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
1-64	Patch	hsf_0045	Least Concern	0	yes	0.435	0.625	0.625	0.731	0.785	0.485	501390 Brickmaker's Sedge *Gahnia grandis*
										0.785	0.485	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.462	0.486	503390 Fairy Lanterns *Thismia rodwayi*
										0.785	0.485	505404 Powelltown Correa *Correa reflexa var. lobata*
1-67	Patch	hsf_0045	Least Concern	0	yes	0.435	0.543	0.543	0.627	0.787	0.422	501390 Brickmaker's Sedge *Gahnia grandis*
										0.787	0.422	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.014	0.425	503390 Fairy Lanterns *Thismia rodwayi*
										0.787	0.422	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.626	0.421	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-66	Patch	hsf_0045	Least Concern	0	yes	0.425	0.319	0.319	0.588	0.793	0.243	501390 Brickmaker's Sedge *Gahnia grandis*
										0.793	0.243	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.793	0.243	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.650	0.243	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-33	Patch	hsf_0045	Least Concern	0	yes	0.305	0.424	0.424	0.692	0.789	0.231	501390 Brickmaker's Sedge *Gahnia grandis*
										0.789	0.231	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.016	0.231	503390 Fairy Lanterns *Thismia rodwayi*
										0.789	0.231	505404 Powelltown Correa *Correa reflexa var. lobata*
1-39	Patch	hsf_0045	Least Concern	0	yes	0.380	0.997	0.997	0.692	0.807	0.685	501390 Brickmaker's Sedge *Gahnia grandis*
										0.808	0.685	503354 Long Pink-bells *Tetratheca stenocarpa*

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
										0.808	0.685	505404 Powelltown Correa *Correa reflexa var. lobata*
										0.118	0.685	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*
1-46	Patch	hsf_0045	Least Concern	0	yes	0.460	0.091	0.091	0.612	0.792	0.075	501390 Brickmaker's Sedge *Gahnia grandis*
										0.792	0.075	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.792	0.075	505404 Powelltown Correa *Correa reflexa var. lobata*
1-48	Patch	hsf_0045	Least Concern	0	yes	0.425	0.072	0.072	0.620	0.791	0.055	501390 Brickmaker's Sedge *Gahnia grandis*
										0.791	0.055	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.791	0.055	505404 Powelltown Correa *Correa reflexa var. lobata*
1-61	Patch	hsf_0029	Least Concern	0	yes	0.345	0.066	0.066	0.778	0.799	0.041	501390 Brickmaker's Sedge *Gahnia grandis*
										0.799	0.041	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.193	0.041	503390 Fairy Lanterns *Thismia rodwayi*
										0.799	0.041	505404 Powelltown Correa *Correa reflexa var. lobata*
1-52	Patch	hsf_0045	Least Concern	0	yes	0.445	0.266	0.266	0.768	0.808	0.214	501390 Brickmaker's Sedge *Gahnia grandis*
										0.808	0.214	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.687	0.214	503390 Fairy Lanterns *Thismia rodwayi*
										0.808	0.214	505404 Powelltown Correa *Correa reflexa var. lobata*
1-45	Patch	hsf_0045	Least Concern	0	yes	0.430	0.376	0.376	0.634	0.789	0.289	501390 Brickmaker's Sedge *Gahnia grandis*
										0.789	0.289	503354 Long Pink-bells *Tetratheca stenocarpa*
										0.789	0.289	505404 Powelltown Correa *Correa reflexa var. lobata*

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
										0.175	0.288	505647 White Star-bush *Asterolasia asteriscophora subsp. albiflora*

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
Fairy Lanterns	*Thismia rodwayi*	503390	Vulnerable	Dispersed	Habitat importance map	0.0085
Brickmaker's Sedge	*Gahnia grandis*	501390	Vulnerable	Dispersed	Habitat importance map	0.0066
Long Pink-bells	*Tetratheca stenocarpa*	503354	Rare	Dispersed	Habitat importance map	0.0059
Powelltown Correa	*Correa reflexa var. lobata*	505404	Rare	Dispersed	Habitat importance map	0.0056
White Star-bush	*Asterolasia asteriscophora subsp. albiflora*	505647	Endangered	Dispersed	Habitat importance map	0.0051
Mountain Bird-orchid	*Chiloglottis jeanesii*	504499	Rare	Dispersed	Habitat importance map ; special site	0.0049
Nunniong Everlasting	*Ozothamnus rogersianus*	501623	Rare	Dispersed	Habitat importance map	0.0039
Tall Astelia	*Astelia australiana*	500296	Vulnerable	Dispersed	Habitat importance map	0.0037
Smoky Mouse	*Pseudomys fumeus*	11458	Endangered	Dispersed	Habitat importance map	0.0034
Toothed Leionema	*Leionema bilobum subsp. serrulatum*	505480	Rare	Dispersed	Habitat importance map	0.0033
Jungle Bristle-fern	*Cephalomanes caudatum*	502094	Rare	Dispersed	Habitat importance map	0.0031
Tree Geebung	*Persoonia arborea*	502459	Vulnerable	Dispersed	Habitat importance map ; special site	0.0031
Crisped Mitre-moss	*Distichophyllum crispulum*	506219	Rare	Dispersed	Habitat importance map	0.0029
Leadbeater's Possum	*Gymnobelideus leadbeateri*	11141	Endangered	Dispersed	Habitat importance map ; special site	0.0029
Grey Pouchwort	*Acrobolbus cinerascens*	506010	Vulnerable	Highly Localised Habitat	Habitat importance map	0.0028
Wavy Fork-moss	*Dicranoloma platycaulon*	506754	Rare	Dispersed	Habitat importance map	0.0027
Round-leaf Pomaderris	*Pomaderris vacciniifolia*	502675	Endangered	Dispersed	Habitat importance map	0.0027
Forest Sedge	*Carex alsophila*	500622	Rare	Dispersed	Habitat importance map	0.0025

Bristly Shield-fern	*Lastreopsis hispida*	501878	Rare	Dispersed	Habitat importance map	0.0025
Varied Mitrewort	*Mitrasacme polymorpha*	502211	Rare	Dispersed	Habitat importance map	0.0025
Silky Golden-tip	*Goodia pubescens*	504600	Rare	Dispersed	Habitat importance map	0.0024
Beech Finger-fern	*Notogrammitis angustifolia subsp. nothofageti*	503742	Vulnerable	Dispersed	Habitat importance map	0.0023
Small Fork-fern	*Tmesipteris parva*	503405	Rare	Dispersed	Habitat importance map	0.0021
Oval Fork-fern	*Tmesipteris ovata*	503404	Rare	Dispersed	Habitat importance map	0.0020
Large-leaf Cinnamon-wattle	*Acacia leprosa var. uninervia*	505141	Rare	Dispersed	Habitat importance map	0.0018
Errinundra Shining Gum	*Eucalyptus denticulata*	501872	Rare	Dispersed	Habitat importance map	0.0017
Leafless Pink-bells	*Tetratheca subaphylla*	503355	Rare	Dispersed	Habitat importance map	0.0014
Slender Tree-fern	*Cyathea cunninghamii*	500896	Vulnerable	Dispersed	Habitat importance map	0.0014
Mountain Bird-orchid	*Chiloglottis jeanesii*	504499	Rare	Dispersed	Top ranking map ; special site	0.0014
Brown's Mitre-moss	*Calyptrochaeta brownii*	506252	Rare	Dispersed	Habitat importance map	0.0013
Forest Phebalium	*Phebalium squamulosum subsp. squamulosum*	504817	Rare	Dispersed	Habitat importance map	0.0013
Tufted Club-sedge	*Isolepis wakefieldiana*	501789	Rare	Dispersed	Habitat importance map	0.0013
Lacy Wedge-fern	*Lindsaea microphylla*	502015	Rare	Dispersed	Habitat importance map	0.0013
Green Scentbark	*Eucalyptus fulgens*	505175	Rare	Dispersed	Habitat importance map	0.0009
Smoky Mouse	*Pseudomys fumeus*	11458	Endangered	Dispersed	Top ranking map	0.0008
Baw Baw Berry	*Wittsteinia vacciniacea*	503576	Rare	Dispersed	Habitat importance map	0.0008
Eastern Horseshoe Bat	*Rhinolophus megaphyllus megaphyllus*	11303	Vulnerable	Dispersed	Habitat importance map	0.0008
Sooty Owl	*Tyto tenebricosa tenebricosa*	10253	Vulnerable	Dispersed	Habitat importance map	0.0007
Mountain Coral Heath	*Epacris rhombifolia*	501163	Rare	Dispersed	Habitat importance map	0.0005
White Star-bush	*Asterolasia asteriscophora subsp. albiflora*	505647	Endangered	Dispersed	Top ranking map	0.0005

Tremont Bundy	*Eucalyptus aff. goniocalyx (Dandenong Ranges)*	507008	Vulnerable	Dispersed	Habitat importance map	0.0004
Greater Glider	*Petauroides volans*	11133	Vulnerable	Dispersed	Habitat importance map	0.0004
Grey Goshawk	*Accipiter novaehollandiae novaehollandiae*	10220	Vulnerable	Dispersed	Habitat importance map	0.0004
Spot-tailed Quoll	*Dasyurus maculatus maculatus*	11008	Endangered	Dispersed	Habitat importance map	0.0004
Alpine Westringia	*Westringia senifolia*	503572	Rare	Dispersed	Habitat importance map	0.0003
Powerful Owl	*Ninox strenua*	10248	Vulnerable	Dispersed	Habitat importance map	0.0003
Lace Monitor	*Varanus varius*	12283	Endangered	Dispersed	Habitat importance map	0.0003
Broad-toothed Rat	*Mastacomys fuscus mordicus*	11438	Endangered	Dispersed	Habitat importance map	0.0003
White-throated Needletail	*Hirundapus caudacutus*	10334	Vulnerable	Dispersed	Habitat importance map	0.0003
Distal-lobe Fireweed	*Senecio distalilobatus*	507028	Rare	Dispersed	Habitat importance map	0.0002
Floodplain Fireweed	*Senecio campylocarpus*	507136	Rare	Dispersed	Habitat importance map	0.0002
Mountain Banksia	*Banksia canei*	500361	Rare	Dispersed	Habitat importance map	0.0002
Australian Grayling	*Prototroctes maraena*	4686	Vulnerable	Dispersed	Habitat importance map	0.0001
Crisped Mitre-moss	*Distichophyllum crispulum*	506219	Rare	Dispersed	Top ranking map	0.0001
Square-tailed Kite	*Lophoictinia isura*	10230	Vulnerable	Dispersed	Habitat importance map	0.0001
Wiry Bossiaea	*Bossiaea cordigera*	500435	Rare	Dispersed	Habitat importance map	0.0000
Southern Barred Frog	*Mixophyes balbus*	13073	Critically endangered	Dispersed	Habitat importance map	0.0000
Veined Spear-grass	*Austrostipa rudis subsp. australis*	504940	Rare	Dispersed	Habitat importance map	0.0000
Parsley Xanthosia	*Xanthosia leiophylla*	504562	Rare	Dispersed	Habitat importance map	0.0000
Grey-headed Flying-fox	*Pteropus poliocephalus*	11280	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

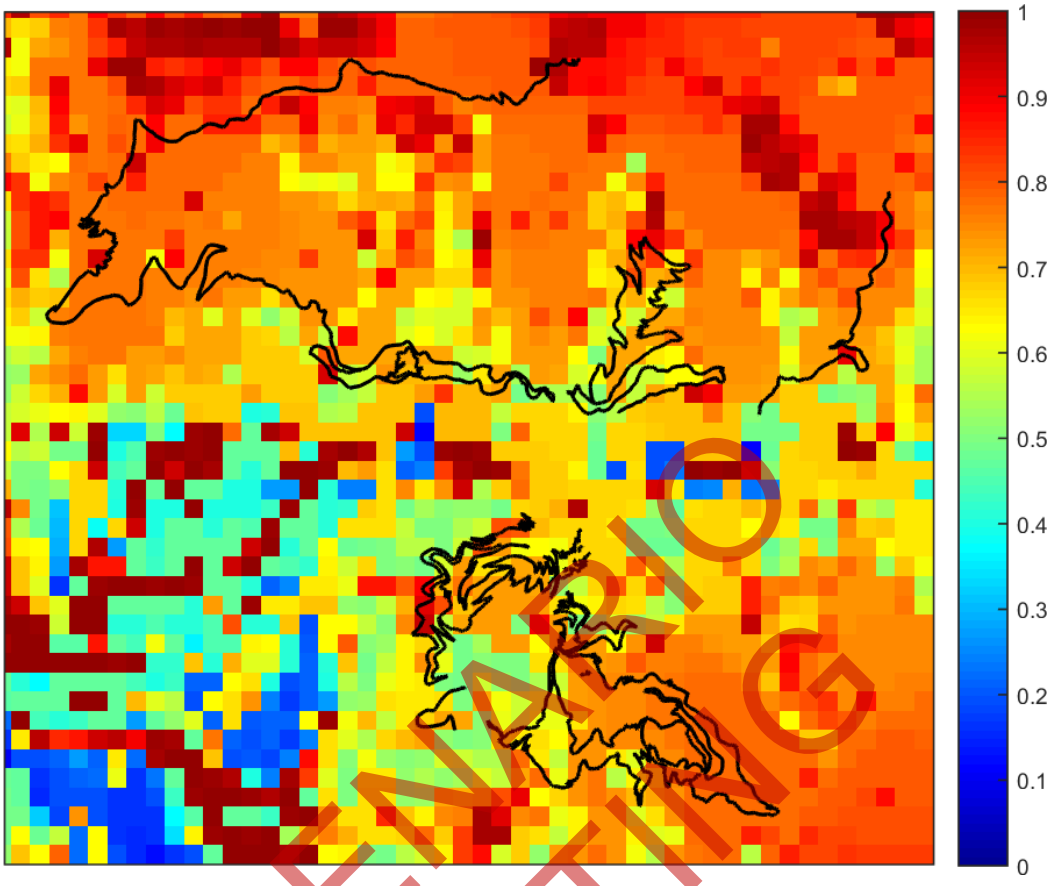
Habitat impacted

- 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.

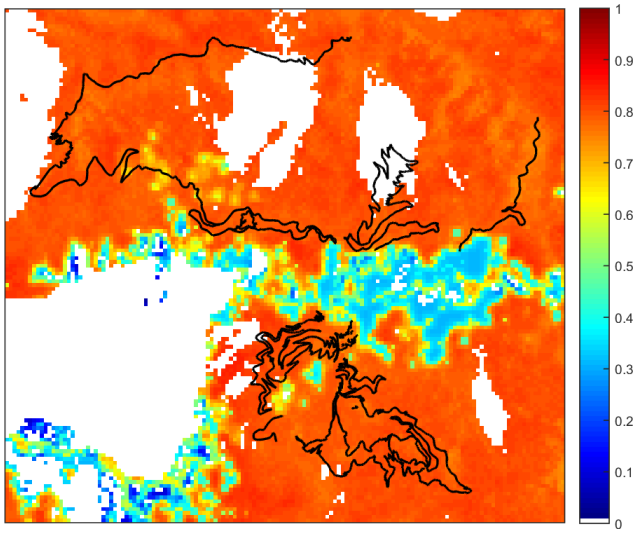
Appendix 3 – Images of mapped native vegetation

2. Strategic biodiversity values map

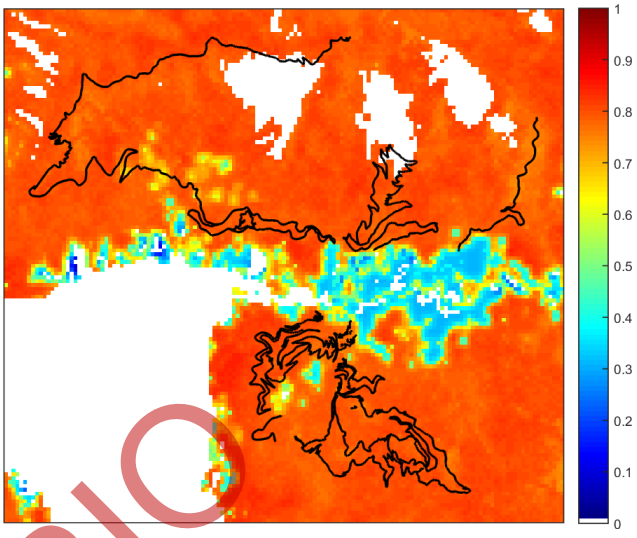


3. Habitat importance maps

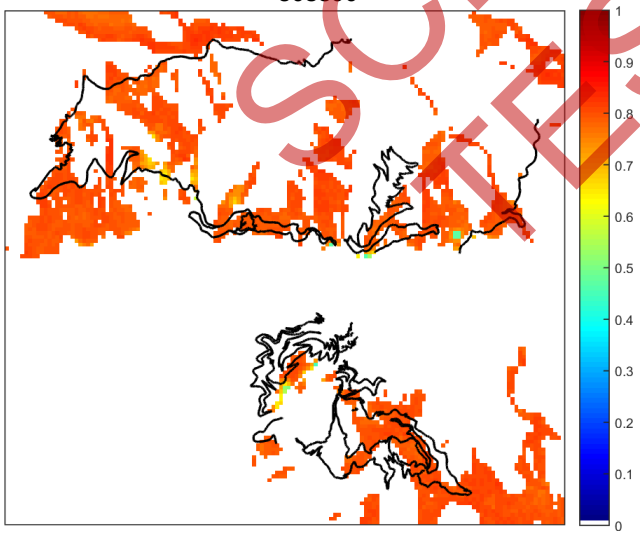
Brickmaker's Sedge
Gahnia grandis
501390



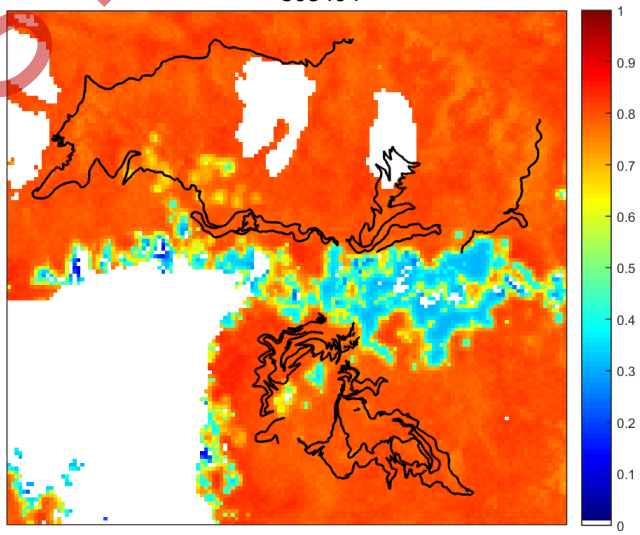
Long Pink-bells
Tetratheca stenocarpa
503354



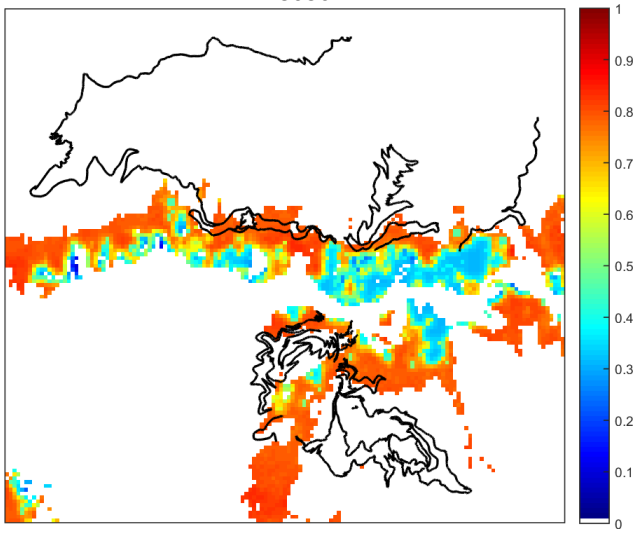
Fairy Lanterns
Thismia rodwayi
503390



Powelltown Correa
Correa reflexa var. lobata
505404



White Star-bush
Asterolasia asteriscophora subsp. albiflora
505647



Appendix 12. Report of available native vegetation credits

Report of available native vegetation credits

This report lists native vegetation credits available to purchase through the Native Vegetation Credit Register.

This report is **not evidence** that an offset has been secured. An offset is only secured when the units have been purchased and allocated to a permit or other approval and an allocated credit extract is provided by the Native Vegetation Credit Register.

Date and time: 16/12/2019 03:28 **Report ID: 2443**

What was searched for?

Species offset

Common Name (*Scientific name*)	Species habitat units
Brickmaker's Sedge *(Gahnia grandis)*	14.386
Long Pink-bells *(Tetratheca stenocarpa)*	14.552
Fairy Lanterns *(Thismia rodwayi)*	10.566
Powelltown Correa *(Correa reflexa var. lobata)*	14.387
White Star-bush *(Asterolasia asteriscophora subsp. albiflora)*	7.591
with number of large trees 0	

Details of available native vegetation credits on 16 December 2019 03:28

These sites meet all your requirements for species offsets.

Credit Site ID	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)

There are no sites listed in the Native Vegetation Credit Register that meet your offset requirements.

These sites meet some of your requirements for species offsets, you may be able to meet all your requirements across multiple sites.

Credit Site ID	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)
BBA-0670	267	Port Phillip and Westernport	Cardinia Shire	Yes	Yes	No	Contact NVOR

Species common name	Species scientific name	SHU
Brickmaker's Sedge	Gahnia grandis	20.735

Credit Site ID	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)
BBA-2871	1668	Port Phillip and Westernport	Yarra Ranges Shire	Yes	Yes	Yes	EHP

Species common name	Species scientific name	SHU
Brickmaker's Sedge	Gahnia grandis	18.467
Long Pink-bells	Tetratheca stenocarpa	18.465
Powelltown Correa	Correa reflexa var. lobata	18.465
White Star-bush	Asterolasia asteriscophora subsp. albiflora	14.376

Credit Site ID	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)
VC_CFL-0838_01	1048	Port Phillip And Westernport	Yarra Ranges Shire	Yes	Yes	No	Enviro Offset, VegLink

Species common name	Species scientific name	SHU
Brickmaker's Sedge	Gahnia grandis	15.088
Long Pink-bells	Tetratheca stenocarpa	15.088
Powelltown Correa	Correa reflexa var. lobata	15.088
White Star-bush	Asterolasia asteriscophora subsp. albiflora	14.876

These potential sites are not yet available, land owners may finalise them once a buyer is confirmed.

Credit Site ID	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)

There are no potential sites listed in the Native Vegetation Credit Register that meet your offset requirements.

LT - Large Trees *CMA - Catchment Management Authority* *LGA - Municipal District or Local Government Authority*

Next steps

If applying for approval to remove native vegetation
Attach this report to an application to remove native vegetation as evidence that your offset requirement is currently available.

If you have approval to remove native vegetation
Below are the contact details for all brokers. Contact the broker(s) listed for the credit site(s) that meet your offset requirements. These are shown in the above tables. If more than one broker or site is listed, you should get more than one quote before deciding which offset to secure.

Broker contact details

Broker Abbreviation	Broker Name	Phone	Email	Website
Abezco	Abzeco Pty. Ltd.	(03) 9431 5444	offsets@abzeco.com.au	www.abzeco.com.au
Bass Coast SC	Bass Coast Shire Council	(03) 5671 2125	d.whittington@basscoast.vic.gov.au	www.basscoast.vic.gov.au
Baw Baw SC	Baw Baw Shire Council	(03) 5624 2411	bawbaw@bawbawshire.vic.gov.au	www.bawbawshire.vic.gov.au
Bio Offsets	Biodiversity Offsets Victoria	0452 161 013	info@offsetsvictoria.com.au	www.offsetsvictoria.com.au
Contact NVOR	Native Vegetation Offset Register	136 186	nativevegetation.offsetregister@delwp.vic.gov.au	www.environment.vic.gov.au/native-vegetation
Ecocentric	Ecocentric Environmental Consulting	0410 564 139	ecocentric@me.com	Not avaliable
EHP	Ecology & Heritage Partners Pty Ltd	(03) 9377 0100	offsets@ehpartners.com.au	www.ehpartners.com.au
Enviro Offset	Enviro Offset Trading Pty Ltd	(03) 5444 0002	info@envirooffsettrading.com.au	www.envirooffsettrading.com.au
Ethos	Ethos NRM Pty Ltd	(03) 5153 0037	offsets@ethosnrm.com.au	www.ethosnrm.com.au
Nillumbik SC	Nillumbik Shire Council	(03) 9433 3316	offsets@nillumbik.vic.gov.au	www.nillumbik.vic.gov.au
TFN	Trust for Nature	8631 5888	offsets@tfn.org.au	www.trustfornature.org.au
VegLink	Vegetation Link Pty Ltd	(03) 5470 5232	offsets@vegetationlink.com.au	www.vegetationlink.com.au
Yarra Ranges SC	Yarra Ranges Shire Council	1300 368 333	biodiversityoffsets@yarraranges.vic.gov.au	www.yarraranges.vic.gov.au

For more information contact the DELWP Customer Service Centre 136 186 or the Native Vegetation Credit Register at nativevegetation.offsetregister@delwp.vic.gov.au