

# Alternatives Assessment Report

Warburton Mountain Bike Destination

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## 1.0 Introduction

### 1.1 Background

The Warburton Mountain Bike Destination (the project) is a proposed world class mountain biking destination centred around Warburton, approximately 70 kilometres east of Melbourne. A significant informal network of mountain bike trails currently exists within the region and there is evidence of increasing use of these trails by local and visiting riders. Mountain biking in this locality started around 15 years ago and was concentrated in the Yarra State Forest in the vicinity of Mount Tugwell.

Yarra Ranges Council has identified mountain biking as an opportunity for tourism growth within the region which would also support the region and the health and well-being of its residents. The project would create iconic trails eligible for International Mountain Bike Association Gold Level Ride Centre status which would position Warburton as an internationally significant mountain biking destination.

The project objectives are to:

- Facilitate tourism growth and associated positive economic and jobs growth in the Yarra Valley region
- Create iconic mountain bike trails eligible for International Mountain Bike Association Gold Ride Centre status
- Create spectacular riding experiences that have a competitive advantage over existing mountain bike destinations and leverage Warburton's beautiful township, rural valley and surrounding forested slopes
- Enhance the health and well-being of the community
- Maintain the significant biodiversity and heritage values within the project area and provide opportunities for the community to connect with and appreciate their importance.

The project was initiated in 2010 and has undergone significant design development since feasibility studies commenced in 2013. The design development process included significant stakeholder consultation and sought to create a premium tourism product whilst avoiding significant environmental impacts.

In December 2019, a referral was submitted in accordance with the *Environment Effects Act 1978*. In May 2020, the Minister for Planning decided that the project requires assessment through the preparation of an environment effects statement (EES). Subsequently scoping requirements have been issued by the Minister for Planning, indicating the matters to be addressed in the EES.

In relation to consideration of alternatives, the scoping requirements state the following:

*The EES needs to document the proponent's process that led to the preferred alternative(s) and design presented in the EES. The EES should also document and explain the proponent's assessment of feasible alternatives and their effects, including an explanation of how and why specific alternatives were selected for detailed evaluation within the EES. The EES needs to document the likely environmental effects of feasible alternatives, particularly where these offer a potential to minimise and/or avoid significant environmental effects whilst meeting the objectives of the project. The assessment of feasible alternatives and their effects is required to include:*

- *Description of alternatives considered in the project design process, including alternative track alignments and locations of track heads and site access roads;*
- *Identification of methods and environmental criteria for selection of preferred alternatives;*
- *Assessment and comparison of the technical feasibility and environmental implications of alternative options considered;*
- *The basis for selecting the proposed project layout and design, particularly where trails and trail heads are located within areas of particularly high conservation value such as within the Yarra Ranges National Park;*



- *Comparison of project benefits and impacts associated with the inclusion/exclusion of trails or trail heads within areas of particularly high conservation value; and*
- *Description of how information arising during the EES process was used to refine the preferred track alignments and other project alternatives.*

*Where appropriate, the assessment of environmental effects of design and layout alternatives is to address the matters set out in the subsequent sections of this document. The depth of investigation of alternatives should be proportionate to their potential to minimise potentially significant adverse effects as well as meet project objectives.*

This report addresses the scoping requirements with respect to alternatives. It summarises how alternatives were considered in the project development work that was undertaken pre-EES and sets out the further analysis of alternatives that has been done as part of the EES process.

The alternatives assessment considers alternative design options that can meet the overarching project objectives.

## **1.2 Objectives**

Within the setting of the above scoping requirements, the focus of the alternatives assessment is to:

- Undertake a rigorous assessment of alternative trail alignments to identify the project design that is assessed within the EES.
- Give consideration to ecological, heritage and socioeconomic factors in the determination of the network design to avoid and minimise the potential for significant environmental impacts without undermining the project objectives.

## 2.0 Methodology

### 2.1 Overview

The alternatives assessment process has involved the following parts:

- Pre-EES design development: avoidance or minimisation of potential impacts on sensitive values through an iterative design development process to establish a network design for the purposes of Project referrals.
- Identification of the benefits of inclusion of trails within the Yarra Ranges National Park
- Screening of trails to identify any 'Priority Trail Sections' that require further examination of potential alternative alignments
- Assessment of alternatives for priority trails identified through the trail screening
- Rationale for the location of other project components such as trail heads and bridges.

The methods for each of these steps are set out below and the results are presented in the subsequent sections of this report.

### 2.2 Project development pre-EES

Since the project's feasibility studies commenced in 2013, the design of the network of trails has seen a progressive development of concepts, designs and re-designs to ensure the project can be delivered in a manner that meets the project objectives, including protection of important biodiversity, heritage and socioeconomic values of the area.

The designs have been informed by a range of specialists who have investigated and advised on important biodiversity, heritage and socioeconomic constraints. Community feedback on the design and endorsement from relevant agencies has been obtained at critical design stages. These activities have resulted in the minimisation of impacts and determination of the network design that was the basis of project referrals.

The project stages and timing are listed in Table 1, with the design outputs and associated activities undertaken at each stage described in greater detail in Section 3.0 along with the associated changes that were made to the design to minimise environmental impacts.

**Table 1 Project design stages**

Timing	Project stage	Design outputs and associated activities
2013	Project feasibility	<ul style="list-style-type: none"><li>• Feasibility Study (World Trail, 2013)</li></ul>
2016	Concept design and Preliminary Master Plan	<ul style="list-style-type: none"><li>• Preliminary Master Plan (Cox Architecture, 2016)</li><li>• Ground-truthing of trail alignments</li></ul>
2018	Master planning	<ul style="list-style-type: none"><li>• Draft Master Plan (Cox Architecture, 2018)</li><li>• Community engagement and feedback</li></ul>
2018-2019	Funding and procurement	<ul style="list-style-type: none"><li>• Referred network design (including further ground-truthing of alignments) (World Trail, 2019; Yarra Ranges Council, 2020)</li></ul>

### 2.3 Benefits of trails within the Yarra Ranges National Park

TRC Tourism were engaged by Yarra Ranges Council to investigate specifically, the value of including trails within the Yarra Ranges National Park in the Warburton Mountain Bike Destination. This was in response to concerns that the benefits of trails within the National Park are outweighed by impacts.

The investigation by TRC Tourism was undertaken to better understand the essential elements of a world class trail destination and how the Warburton Mountain Bike Destination could achieve its full potential. The investigation had three parts as follows:

- Literature review to document the reported benefits of mountain bike projects
- Case studies of mountain bike trails within national parks and natural areas
- Demand modelling for the project with and without trails in the Yarra Ranges National Park to understand the differences in predicted project benefits.

The demand modelling was undertaken for the 10-year period of operations from 2022 to 2031. The three cases examined were:

- Case 1 Base Case: Full Trail Network - full development of the trail network
- Case 2 Reduced Trail Network - with no trails in the Yarra Ranges National Park
- Case 3: Reduced Trail Network – removal of Trail 1 in the Yarra Ranges National Park.

The detailed methodology and results of the study are contained in **Attachment A**

## **2.4 Trail screening to identify priority trail sections**

An important step in the alternatives assessment process involved screening of the 66 trails within the proposed network to identify trail sections that warrant further examination with respect to alternatives. The trail screening exercise was a strategic analysis based on information from existing studies, to identify trail sections that passed through locations of high sensitivity and where significant impacts on those areas may be unavoidable.

The trail screening method focused on biodiversity, heritage and socio-economic values because these are considered to be the critical aspects for which significant impacts may occur. A framework has been developed to rate each trail according to the priority for further examination of alternatives as presented in Table 2 below.

Other aspects such as surface water, visual impact, noise and air quality are considered to be less important to decision making on trail alignments and are not included in the rating framework. In the case of surface water significant design has already been undertaken to minimise waterway crossings (see Section 3.6). Additionally, whilst a considerable number of small waterways exist in the project area (many of them ephemeral), proven construction and erosion management techniques are available to avoid impacts on waterways. Furthermore, the biodiversity screening criteria considers surface water impacts potentially associated with the Mount Donna Buang Wingless Stonefly.

The potential for visual, noise or air quality impacts associated with a project of this nature (which is unobtrusive and involves few potential sources of noise and air pollution) are considered to be very low. Nevertheless, the socio-economic criteria will act as a proxy for these potential impacts by considering the proximity of the alignment to nearby residents and therefore cover issues associated with amenity.

**Table 2 Trail screening rating framework**

Priority for investigation of alternatives	Biodiversity	Heritage	Socio-economic	Approach to assessment of alternatives
Very high	<p>High likelihood of a significant effect on Cool Temperate Rainforest and/or Cool Temperate Mixed Forest FFG communities.</p> <p>AND</p> <p>High likelihood of a significant effect or significant impact on endangered or critically endangered species (e.g. Leadbeater's Possum, Mount Donna Buang Wingless Stonefly).</p> <p>OR</p> <p>Potential for greater than 1 ha of permanent impact on EVCs with very high vegetation quality scores – i.e. a VQA score greater than 0.85 (i.e. 10 km of trail)</p> <p>OR</p> <p>Trail length greater than 10 km within National Park land status.</p>	Potential for significant effects on World Heritage properties	Potential for significant effects on high density residential areas or critical community infrastructure	<p>Comparative analysis of alternative alignments to avoid and minimise impacts on key sensitive areas in consultation with relevant biodiversity specialists.</p> <p>Where impacts cannot be avoided, comparison of project benefits and impacts associated with the inclusion/exclusion of relevant trails or trail heads.</p>
High	<p>High likelihood of a significant effect on Cool Temperate Rainforest and/or Cool Temperate Mixed Forest FFG communities.</p> <p>OR</p> <p>High likelihood of a significant effect or significant impact on endangered or critically endangered species (e.g. Leadbeater's Possum, Mount Donna Buang Wingless Stonefly).</p> <p>OR</p> <p>Potential for greater than 1 ha of permanent impact on EVCs with high vegetation quality scores – i.e. a VQA score greater than 0.60 (i.e. 10 km of trail)</p> <p>OR</p> <p>Trail length greater than 5 km within National Park land status.</p>	Potential for significant effects on area containing heritage register or inventory site or is rich in aboriginal cultural heritage values	Potential for significant effects on residential locations, business interests or community facilities	<p>Comparative analysis of sections of trails where feasible to avoid and minimise impacts on key sensitive areas.</p> <p>Where impacts cannot be avoided, comparison of project benefits and impacts associated with the inclusion/exclusion of relevant trails or trail heads.</p>

Priority for investigation of alternatives	Biodiversity	Heritage	Socio-economic	Approach to assessment of alternatives
Moderate	Trail length less than 5 km within National Park land status OR Moderate likelihood of a significant effect on other significant species (e.g. rare flora) that are not threatened species. OR Potential for greater than 0.5 ha (but less than 1 ha) of permanent impact on EVCs with high vegetation quality scores – i.e. a VQA score greater than 0.60 (i.e. 5-10 km of trail)	Potential for effects on area that contains heritage overlay site or some Aboriginal cultural heritage values	Potential for effects on some residential locations, business interests or community facilities	Impact assessment and micro-siting processes to avoid and minimise impacts on key sensitive areas.
Low	Trail is outside National Park land status AND Low likelihood of a significant effect on significant species. AND Less than 0.5 ha of potential permanent impact on EVCs with high vegetation quality scores – i.e. a VQA score greater than 0.60 (i.e. 5 km of trail)	Potential for limited effects on heritage values	Potential for limited effects on residential locations, business interests or community facilities	Impact assessment and micro-siting processes to avoid and minimise impacts on key sensitive areas.

Under the framework, any trail assigned a very high or high priority would be subject to further consideration of alternatives. The options for further examination of these trails include comparative analysis with other trails that could similarly meet the project objectives or if no feasible alternative is able to be identified which meet the project objectives for a trail section, this trail section would be included in the network design for impact assessment (including a focus on mitigating the risks associated with any trails given a high or very high priority rating) as part of the EES process.

Trails assigned moderate or low priority ratings would be subject to impact assessment (and potentially further mitigation) within the EES.

The trail screening exercise has been informed by the studies and investigations described in Table 3. The available information is considered suitable for the analysis undertaken and the associated limitations and uncertainties are set out below.

**Table 3 Information used for trail screening analysis**

Aspect	Informed by:	Limitations and uncertainties:
Biodiversity	<ul style="list-style-type: none"> <li>Practical Ecology's Biodiversity Impact Assessment (Dec 2019), including: <ul style="list-style-type: none"> <li>Desktop review of biodiversity records within five kilometres of the trail alignments, including review of the Victorian Biodiversity Atlas</li> <li>Ground-truthing of approximately 150 km of trails to inspect for habitat trees, Threatened Ecological Communities (including the Cool Temperate Rainforest), mapped Leadbeater's Possum nest boxes, Mount Donna Buang Wingless Stonefly habitat</li> <li>Vegetation Quality Assessments of approximately 150 km of trails</li> <li>Desktop review of approximately 30 km of new trail, including review of modelled EVC datasets and existing biodiversity records</li> </ul> </li> <li>Biosis field surveys for the 30 km of trails not surveyed by Practical Ecology and additional trails subsequently added to the network by Yarra Ranges Council</li> <li>DELWP's Victorian Biodiversity Atlas (VBA), including the 'VBA_FLORA25, FLORA100 &amp; FLORA Restricted' and 'VBA_FAUNA25, FAUNA100 &amp; FAUNA Restricted' datasets</li> <li>DELWP's Ecological Vegetation Class (EVC2005) mapping and bioregional conservation status in the Highlands Southern Fall and Victorian Alps bioregions</li> <li>Warburton MTB Alternative Alignments WebApp, in particular land tenure, State forest zoning and hydrology.</li> </ul>	<ul style="list-style-type: none"> <li>The full extent of Cool Temperate Rainforest in the project area has not been mapped</li> </ul>
Heritage	<ul style="list-style-type: none"> <li>Biosis' Historic Survey Report (Dec 2019), which included: <ul style="list-style-type: none"> <li>A desktop review of the area, including the existing environment and land use history</li> <li>Review of known records for heritage register, inventory or overlay sites in the vicinity</li> <li>Review of previous assessments/studies undertaken in the area</li> <li>Targeted surveys to determine the likely survival of historic features and historic archaeological sites.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>CHMP 15276 is in draft form and further Complex Assessment may be required</li> </ul>

Aspect	Informed by:	Limitations and uncertainties:
	<ul style="list-style-type: none"> <li>Biosis Aboriginal cultural heritage and historic surveys of trails 41 to 66, not covered in earlier work</li> <li>Draft CHMP 15276 (Biosis, 2020)</li> <li>ACHRIS (Aboriginal Cultural Heritage Register and Information System)</li> <li>VicPlan</li> <li>Warburton MTB Alternative Alignments WebApp.</li> </ul>	
Socio-economic	<ul style="list-style-type: none"> <li>RMCG's Social Impact Assessment (Jan 2019) to understand potential amenity impacts to nearby residents</li> <li>Government land use zoning to identify proximity between receptors and the project</li> <li>Land tenure information supplied by Yarra Ranges Council</li> <li>Aerial imagery showing the locations of socioeconomic features</li> <li>Information on the usage of bushwalking trails in the vicinity of the proposed mountain bike trail network from DELWP</li> <li>Community consultation feedback</li> <li>Comparative case studies, including interviews with Tim Watson (Derby MTB) and Ben Pettman (Bay of Fires MTB network)</li> <li>Warburton MTB Alternative Alignments WebApp.</li> </ul>	<ul style="list-style-type: none"> <li>Aerial imagery used may not be completely up to date</li> </ul>

The information gaps and uncertainties will be addressed as part of the detailed EES assessments for the trail alignments that form the ultimate network design. Nevertheless, the alternatives assessment process has been informed by a wide range of studies involving both desktop reviews and detailed site inspections that provides an appropriate level of information to identify potential sensitivities that cannot be avoided and therefore identify priority trails for further examination of alternatives.

The trail screening exercise precedes the impact assessment, the impact assessment will be undertaken for the entire trail network and each trail section within it. It is at the impact assessment stage that mitigation will be designed and implemented to further avoid and minimise impacts.

## 2.5 Assessment of priority trail sections

For the priority trails identified, mapping was reviewed to investigate the possibility of moving the alignments to avoid and minimise potential impacts on key sensitivities. The results of these investigations are presented in Section 6.0. A comparative assessment was undertaken of Trail 1 and Trails 45 to 47 and this is presented in Section 7.0. The comparative assessment involved an integrated evaluation of biodiversity and habitats, surface water, groundwater and geotechnical hazards, heritage, land use and planning, heritage and transport aspects.

Where no suitable opportunities were identified to move trails, these were subject to full assessment within the EES, in line with the Scoping Requirements.

## 2.6 Rationale for the location of other project components

The trail network configuration largely dictates the preferred locations for other supporting project components such as the trail heads and bridges. The method for determining locations for other project components involved site visits to identify appropriate locations disturbed by previous use and devoid of significant constraints. The rationale for the proposed locations of these components and other project decisions are presented in Section 8.0.

## 3.0 Project Development Pre-EES

This section describes the successive design steps for of the project since feasibility studies commenced in 2013 (as outlined in Section 2.2), alongside the changes that have been made in the later design development steps to minimise potential impacts on important environmental, heritage and social values in the area.



**Figure 3-1 Key design outputs and activities during project development**

Images of the proposed trail network at each design stage are provided in **Attachment B**.

### 3.1 Feasibility Study (2013)

In 2013, World Trail was engaged to lead the delivery of a feasibility study for the development of mountain bike trails around the Warburton area. The feasibility study was co-funded by Yarra Ranges Council and Parks Victoria and included a desktop flora and fauna report by Biosis that identified environmental considerations in planning the proposed network of trails.

The feasibility study supported the development of a world class mountain bike destination in the hills surrounding Warburton and identified significant visitor economy stimulus opportunities. The feasibility study recommended the establishment of approximately 140 kilometres of trails in three zones surrounding Warburton township.

### 3.2 Preliminary Master Plan (2016)

In 2016 Yarra Ranges Council established the Warburton Mountain Bike Destination master plan project. In recognition of the land tenure and complexity of the project, a Project Reference Group (PRG) and formal project governance structure was established to oversee the design process.

Membership of the PRG included land managers, key stakeholders and funding partners. The PRG includes representatives from:

- Yarra Ranges Council
- Department of Environment, Land, Water and Planning
- Parks Victoria
- Melbourne Water
- Wurundjeri Council (brought into the PRG in 2019)
- Upper Yarra Community Enterprise.

In 2016, Cox Architecture was appointed to lead the master planning process. Working with trail design, environmental and heritage consultants they presented a concept design as part of a Preliminary Master Plan to the PRG in October 2016. The concept design was based on the following principles:

- Providing a world class mountain bike destination that delivers economic, social and health benefits to the community.



- Desktop GIS assessment of all known environmental and heritage values to enable the siting of trails away from important areas.
- Consultation with land managers, key stakeholders and community to understand sensitive areas to avoid and opportunities to use existing features.

The Preliminary Master Plan identified opportunities for trails across Mount Little Joe, Mount Tugwell, Mount Bride and Mount Donna Buang. In particular, it identified a descending trail from the Mount Donna Buang summit to Warburton township (Drop-a-K Trail or Trail 1) as a key opportunity to develop an experience unlike anything available in Australia. With over 1000 vertical metres of elevation difference and an opportunity to have a trail that is descent only, this unique product could be established as an international drawcard that would drive the visitor economy and also allow for business opportunities to transport riders between key destinations within the mountain bike network.

The design for the Mount Donna Buang descending trail in the Preliminary Master Plan sought to avoid important biodiversity values including Cool Temperate Rainforest, Leadbeater's Possum and the Mount Donna Buang Wingless Stonefly. The desktop design provided for a 36-kilometre-long trail from the summit of Mount Donna Buang to the township of Warburton.

In October 2016, the PRG endorsed the Preliminary Master Plan and the next stage of planning was commenced. This involved "ground-truthing" of the desktop alignments to ensure that the trails could be built in accordance with the project objectives with minimum impact on existing biodiversity values.

### 3.3 Ground-truthing of trail alignments (2016)

An extensive ground-truthing process was undertaken in 2016, that involved on-ground assessment of the proposed trail alignments with teams of trail designers, ecologists, heritage consultants, land managers, council officers, Wurundjeri and species experts. During the ground-truthing process, considerable care was taken to identify important values and plan for their protection. This resulted in many changes to alignments and contributed to the development of the Biodiversity Impact Assessment, Cultural Heritage Management Plan, Historic Heritage Report and construction methodologies that accompanied the project referrals.

The changes that occurred between Preliminary Master Plan designs and the subsequent designs which had been informed by ground-truthing of alignments can be found in **Attachment B**.

The ground-truthed corridor was 20 metres wide allowing for further refinement of the alignment at the time of construction to avoid impacts to important values, in consultation with appropriate environmental, species or heritage experts.

Extensive ground-truthing for the Drop-a-K Trail (Trail 1) identified a greater extent of Cool Temperate Rainforest than had been previously mapped. This created challenges as it was identified that Cool Temperate Rainforest could not be completely avoided if the trail was to proceed. Known nest sites and high probability habitat for Leadbeater's Possum, known and potential habitat for the Mount Donna Buang Wingless Stonefly, along with issues involved in remaining clear of the Melbourne Water catchment boundary close to the summit made the Drop-a-K Trail (Trail 1) a technical challenge.

Significant collaboration with land managers, species experts and ecologists was involved in finalising the alignments and designing risk mitigation strategies for the Drop-a-K Trail (Trail 1) that provided protection for important values to minimise potential impacts. The findings of the ground-truthing exercise were inputs to the development of the Draft Master Plan.

### 3.4 Draft Master Plan (2018)

In May 2018, Cox Architecture presented a Draft Master Plan with 110 kilometres of ground-truthed trails based on their earlier Preliminary Master Plan. The plan included a network of trails in the Yarra State Forest, on Mount Little Joe and Mount Tugwell, and a network of trails on the north side of Warburton, including Drop-a-K Trail (Trail 1) through the Yarra Ranges National Park.

The Draft Master Plan was informed by the extensive ground-truthing that has been undertaken and collaboration with land managers, species experts and ecologists to design risk mitigation strategies for the Drop-a-K Trail (Trail 1) that provided appropriate protection for important values to minimise potential impacts.

The PRG endorsed the Draft Master Plan in May 2018. This draft was used as a basis for community consultation throughout the following 18 months.

### **3.5 Community engagement and feedback (2018)**

Community consultation was undertaken between April and October 2018 and involved:

- 100 face-to-face meetings
- 444 online survey responses
- 350 calls, emails and letters
- Mail out to 75,000 homes
- Five public information sessions.

In response to the community feedback refinements were made to the trail alignments, including:

- Trails moved away from homes around central Warburton
- Old Warburton Cemetery avoided
- Trails through Old Warburton removed
- Old Warburton Road crossing modified
- More trails added to Mount Donna Buang
- Impact on Mount Donna Buang Wingless Stonefly and Leadbeater's Possum habitats minimised
- Use of old road cuttings and existing informal trails maximised
- Cool Temperate Rainforest protection increased.

### **3.6 Referred network design (2019)**

In 2019, working with DELWP Impact Assessment Unit (IAU), the project team elected to refer the project under the *Environment Effects Act 1978*. On advice from DELWP IAU it was determined that additional trails would need to be planned and referred, as Yarra Ranges Council and the PRG had committed to 160+ kilometre trail network at full project maturity as part of project objectives.

In March 2019 World Trail was appointed under an Early Contractor Involvement Tender to finalise the design of the trail network and construct the trails. World Trail's extensive experience in design and construction of mountain bike trails, in particular in sensitive environments provided significant benefits in finalising the design.

World Trail carried out a design review which recommended changes to:

- Better protect important values along the Drop-a-K Trail (Trail 1) by:
  - Realigning sections near the summit of Mount Donna Buang to avoid the drinking water catchment. A short section of Trail 1 was reintroduced to the drinking water catchment during the EES process in response to the findings of the biodiversity assessment and input from DELWP species experts.
  - Realigning sections near the summit to avoid Mount Donna Buang Wingless Stonefly habitat
  - Realigning sections to avoid Leadbeater's Possum nest boxes
  - Removing unnecessary switchbacks
  - Realigning sections to minimise impacts to Myrtle Beech and Cool Temperate Rainforest generally
  - Realigning trail away from historic bushwalking hut
  - Realigning trail to the eastern side of Ben Cairn to improve rider experience, avoid conflict with walkers and avoid Leadbeater's Possum nest boxes.

- Minimise water crossings by modifying trail alignments
- Better utilise previously disturbed areas (such as old 4WD trails, logging tracks, mining tracks).

Following this review, ground-truthing of all new trails and existing informal trails was undertaken.

The design review and ground-truthing informed the network design (presented within the Yarra Ranges Council, 2020, Warburton Draft Master Plan Report) which is the trail network that formed the basis of project referrals and is under consideration in this alternatives assessment (see **EES Chapter 3:Project description** for the design layout and details).

The following key changes were made between the Draft Master Plan and the referred network design:

- Increase in size of the trail network from 110 kilometres to +160 kilometres
- Removal of trails in the vicinity of Merlino Avenue in response to community concern and proximity to local residences.
- Redesign of the trail network around the settlement of Old Warburton to reduce proximity to residences and moved the Old Warburton Road crossing point away from residences. Further details are provided in Attachment C.
- Realignment of the Drop-a-K Trail (Trail 1) to:
  - Avoid Mount Donna Buang Wingless Stonefly habitat
  - Reduce intersection with Cool Temperate Rainforest
  - Completely avoid an Australian National University Leadbeater's possum monitoring site
  - Use existing disturbed footprint (old road cuttings) as much as possible
  - Bring the trail as close as practicable to Mount Donna Buang Road to leverage the existing impact area
  - Decrease length from 36 kilometres to 28 kilometres. Further details are provided in **Attachment C**.
- Addition of two challenging trails and one beginner trail within the Yarra Ranges National Park. These trails were designed and ground-truthed on the basis that key values such as Cool Temperate Rainforest, Mount Donna Buang Wingless Stonefly and Leadbeater's possum were not within the identified trail corridors and that important values could be adequately protected.
- Realignment of numerous sections of trail to avoid the need for waterway crossings.
- Identification of existing informal trails and tracks that can be used for additional trails to minimise impact by using already disturbed areas.
- Identification of opportunities for rehabilitation of existing informal trails not planned to be incorporated into the network.

### 3.7 Summary

The design development process described above led to the production of a network design that was used for the purposes of project referrals. The referred network design was prepared in response to community feedback and addressed a range of sensitivities in the project area including known biodiversity and heritage values, whilst enabling the project to meet its overarching objectives.

Images of the proposed trail network at each design stage that demonstrate the evolution of the design are provided in **Attachment B**.

The EES assesses the final mountain bike trail network based on an assumed 20 metre corridor for each trail within which the exact final trail alignment would be placed. The process for micro-siting the final trail location within the 20-metre corridor would be undertaken as part of the pre-construction activities, and is described within the **Construction Environmental Management Plan**.

## 4.0 Benefits of trails within Yarra Ranges National Park

This section summarises the benefits of mountain biking trails within the Yarra Ranges National Park as presented in Developing Warburton as a World Class Mountain Bike Destination (TRC 2021) and provided at **Attachment A**.

### 4.1 Literature review

A range of literature was reviewed to identify and document the benefits of mountain bike projects in natural areas to inform an understanding of how the Warburton Mountain Bike Destination could deliver benefits to Yarra Ranges region and to Victoria as a whole. The key benefits identified and characterised included the following:

- Community and social benefits: Providing opportunities for families and friends to enjoy time together and enhancing quality of life
- Economic benefits: Increased tourism revenues, greater business investment and enhanced property values
- Educational benefits: Providing an outdoor classroom for physical activity, sport, nature, culture and history
- Environmental benefits: Understanding of our natural heritage and stewardship of the environment
- Health and fitness benefits: Improved health and physical well-being for both individuals and communities, reduced health care costs and enhanced productivity
- Health and cultural benefits: Recognition and respect for Aboriginal culture and historical values.

Further information on the identified benefits, particularly as they relate to the use of natural areas including national parks is provided in **Attachment A**.

### 4.2 Case studies

A number of case studies were documented to demonstrate the benefits of mountain bike projects specifically within national parks and natural areas. The case studies, presented within **Attachment A** are for:

- Munda Biddi, WA
- Red Centre Adventure Ride, NT – incorporating Western MacDonnell Ranges National Park
- Thredbo, NSW – incorporating Kosciuszko National Park
- Wangetti, QLD.

### 4.3 Economic benefits

Demand modelling had been undertaken to estimate the economic benefits of the development of the Warburton Mountain Bike Destination. The results are indicative of the potential benefits from the development and operation of the trail network. The demand modelling is based on:

- estimates of annual rides/users (in different categories)
- other assumptions to quantify spending in the region.

The modelling has estimated the potential number of trail users over the 10-year period of operations from 2022 to 2031. Three cases were examined as follows:

- Case 1 Base Case – covering the full development of the trails network
- Case 2 Reduced Trail Network – with no trails in the National Park Areas.
- Case 3: Reduced Trail Network – with no Trail 1 (equivalent to network without Trails 45 to 47)

The demand modelling for trail users, was informed by the market segment profile from market surveys conducted by Instinct and Reason. The economic impacts of the trails arise from spending by visitors in the towns adjacent to the trail and other spending in the broader region, spending associated with events, the health benefits of active recreation activities and the notional value of the trails for users.

Visitors from outside the region (particularly overnight visitors) generate significant expenditure by spending on food and beverages, accommodation, recreation and other services and transport.

A detailed comparison of the economic benefits of the project with and without trails within the Yarra Ranges National Park is provided in **Attachment A**. The key findings are summarised in the sections below.

#### *Trail Use*

The modelling has identified the potential number of trail users over the 10-year period of operations from 2022 to 2031. For Case 1 (Base Case), user numbers would increase from 131,217 in 2022 to 221,454 in 2031. For Case 2 (Reduced Trails Network), user numbers would increase from 100,739 in 2022 to 140,014 in 2031. For Case 3 (Reduced Trails Network – no Trail 1), user numbers would increase from 110,909 in 2022 to 153,769 in 2031.

Around two thirds would be day visitors and one third overnight visitors. The trails would generate a significant increase in visitors to the region and provide a major boost to accommodation and food service businesses.

#### *Regional Spending*

For the Case 1 (Base Case) spending in the Yarra Ranges LGA by trail users would increase from \$28.0 million in 2022 (\$20.9 million overnights and \$7.0 million day visitors) to \$48.6 million in 2031 (\$36.7 million overnights and \$11.8 million day visitors).

For the Case 2 (Reduced Trails Network), spending in the Yarra Ranges LGA by trail users would increase from \$19.00 million in 2022 (\$12.3 million overnights and \$6.6 million day visitors) to \$28.4 million in 2031. (\$19.2 million overnights and \$8.7 million day visitors).

For Case 3 (Reduced Trails Network – no Trail 1), spending in the Yarra Ranges LGA would increase from \$21.18 million in 2022 to \$31.5 million in 2031.

Total expenditure comprises spending on trail-linked activities (including bike related expenses and other spending - food and beverage etc.) in proximity to the trails; spending on accommodation (for overnight stayers) and meals during their stay; and spending on other recreational and tourism services.

#### *Economic Impacts Construction Phase*

To model construction jobs, the cost components associated with trails and other facilities construction were used and these total \$15.090 million for Stage 1 and Stage 2.

A total of 84.1 FTE jobs (70.1 direct jobs and 14.1 indirect/induced jobs) would be generated during the construction period. The direct jobs (70.1) comprise 50.3 jobs in on-site construction and 19.8 jobs in materials/ equipment supply.

#### *Economic Impacts Operations Phase*

The operations phase economic impacts are driven by the expenditure of visitors in towns adjacent to the trail and in the broader Yarra Ranges region. A regional economic model was used to estimate the employment and income impacts of the trail.

For Case 1, the operation of the trails would generate a total of 132.7 full-time equivalent jobs in 2022 (year 1), increasing to 228.6 FTE jobs in 2031 (year 10). For Case 2, the operation of the trails would generate a total of 90.5 full-time equivalent jobs in 2022 (year 1), increasing to 133.7 FTE jobs in 2031 (year 10). For Case 3 (Reduced Trails Network – no Trail 1) operation would generate 100.5 FTE jobs in 2022 (year 1) and 148.4 FTE jobs in 2031 (year 10).

On a sector basis, the jobs (FTE- direct and indirect) generated by trail users are mainly concentrated in accommodation, food and beverage, recreational services and other visitor services, transport (including shuttles) and other retail.

#### **4.4 Summary**

The literature review and assembled case studies demonstrate many benefits of mountain bike projects. The benefits identified are closely linked with the development of mountain biking projects in natural areas, including National Parks.

Economic analysis has been undertaken to compare the relative benefits of the Warburton Mountain Bike Destination with trails in the Yarra Ranges National Park (Case 1), without trails in the Yarra Ranges National Park (Case 2) and without Trail 1 in the Yarra Ranges National Park (Case 3). The analysis predicted that exclusion of trails from within the National Park would reduce total visitor numbers in 2031 from 221,454 to 140,014, and the exclusion of Trail 1 would reduce visitor numbers to 153,769. Annual spend in 2031 within the Yarra Ranges municipality is predicted to be \$48.6 million for the full trail network, \$28.4 million for the trail network without trails in the National Park and \$31.52 million for the trail network without Trail 1. Jobs generated during the project operations phase are predicted to reduce from 228 to 133 if the trails in the National Park are excluded, and to 148 if Trail 1 is excluded.

Overall, the economic benefits of the project and project's ability to meet the project objectives are significantly increased by inclusion of trails within the National Park. Moreover, the difference in the economic modelling for the removal of all trails within the National Park (Case 2) and the removal of Trail 1 (Case 3) indicates that the removal of the alternative trails (trails 45,46 and 47) does not have a significant economic impact. Therefore, a network including Trail 1 has significantly greater economic benefits than a trail network without Trail 1.

The exclusion of trails from within the Yarra Ranges National Park (and in particular Trail 1) would not allow the Warburton Mountain Bike Destination to realise its full potential and compromise the ability to meet the project objectives. Accordingly, subject to full and detailed assessment as part of the EES process to determine that the potential biodiversity impacts to be effectively managed, Yarra Ranges Council believes trails within the Yarra Ranges National Park are warranted as part of the project because of the additional benefits they bring.

## 5.0 Trail screening to identify priority trail sections

### 5.1 Introduction

As part of the alternatives assessment for the Warburton Mountain Park Destination, trail screening was undertaken in accordance with the method presented in Section 2.0, to determine the trail sections that warrant further investigation of alternatives.

Trail screening was applied to the entire trail network of 66 trails, which was amended post referrals to add approximately 30 kilometres of trails necessary to meet the 160-kilometre threshold for Mountain Bike Association Gold Ride Centre status. Planning for these additional trails was with the philosophy of minimising additional ecological, heritage or social impacts. The new trails are situated in the Yarra State Forest and predominantly within or alongside the existing geographic footprint. By using existing disturbed areas, informal tracks, and an extension of the use of Cemetery Track the impacts of the new trails would be minimised.

A range of other modifications were made to the trail network to further avoid and minimise potential impacts. These changes were informed by field investigations and feedback from regulators and the community. In particular, a section of Trail 1 of around 458 metres was diverted into the Coranderrk Creek drinking water catchment to avoid high quality potential habitat for the Leadbeater's possum, identified in consultation with DELWP species experts. Further information is contained in **Technical Report A: Biodiversity and Habitats**. An assessment of potential risks to drinking water quality was undertaken and this is presented in **Technical Report B: Surface Water, Groundwater and Geotechnical Hazards**.

In accordance with the methodology, each of the 66 trails were given priority ratings by the biodiversity, heritage and socioeconomic specialists as follows:

- Biodiversity: Biosis who are experienced in the assessment and avoidance of biodiversity values during the design and construction of other mountain bike projects.
- Heritage: Biosis who has undertaken the previous heritage assessments for the project and has extensive knowledge of the existing constraints and values present in the area.
- Socio-economic: RMCG who has undertaken the previous socioeconomic assessments for the project and has knowledge of socioeconomic issues in relation to other mountain bike projects.

The results of these specialist assessments are summarised in the sections below, with the complete results presented in **Attachment D**, with additional detail on the biodiversity ratings provided in **Attachment E**.

### 5.2 Biodiversity

For the biodiversity trail screening assessment, the key issues driving the priority ratings were found to be records of significant species and communities and their habitat, including Leadbeater's Possum, Mount Donna Buang Wingless Stonefly and Cool Temperate Rainforest occurring in proximity to the trail alignments.

In contrast, the location of large trees (including those that are hollow bearing) was not a determining factor in the priority of issues since these will be avoided by the project during micro siting. Additionally, minor tributary crossings were not considered to be a key issue unless they were associated with significant species and communities. This is because the project is constructing raised structures over waterways and there are well established construction methods that can avoid impacts to water quality.

Maps of the key biodiversity values in proximity to the trails are presented in **Attachment F**.

One trail was assessed to be a very high priority, being Trail 1 (Drop-a-K), due to records of significant species and communities occurring between Mount Donna Buang and Ben Cairn, including Leadbeater's Possum, Mount Donna Buang Wingless Stonefly and Cool Temperate Rainforest. Accordingly, further investigations (including field inspections) were undertaken to identify an alternative to Trail 1.

As a consequence of these investigations, Trails 45, 46 and 47 were identified as an alternative that could achieve comparable benefits to Trail 1. Trails 45, 46 and 47 were also subjected to the trail screening process. Whilst each of these trails were determined to have lower ratings for biodiversity than Trail 1, they were still rated as a high priority for the examination of alternatives. Based on these results it was decided that both Trail 1 and the alternative (Trails 45, 46 and 47) would be fully assessed and compared within the EES to fully understand the relative merit of the options and to determine for each, whether potential biodiversity impacts could be effectively managed. This assessment would be undertaken for all specialist disciplines.

The trail screening process also identified two other Trails (5 and 50) as being high priority for assessment of alternatives.

In relation to Trail 5, the trail length within the Yarra Ranges National Park is the key driver of the high rating. No options have been identified outside the National Park to achieve the aims of this trail and it is not possible to reduce the length of this trail because this would in turn make it steeper (changing the trail rating from intermediate to difficult) and increase erosion risk. It is proposed to fully assess this trail within the EES and the results are contained in **Technical Report A: Biodiversity and habitats**. This assessment is proposed to determine whether the potential biodiversity impacts associated with Trail 5 can be effectively managed.

Trail 50 intersects a very small area of Cool Temperate Mixed Forest at the headwater of Calder Creek. Upstream and downstream alternatives were explored but these have denser stands of Cool Temperate Mixed Forest. Accordingly, it is proposed to fully assess this trail within the EES and the results are contained in **Technical Report A: Biodiversity and habitats**. This assessment is proposed to determine whether the potential biodiversity impacts associated with Trail 50 can be effectively managed.

The remainder of the trails were determined to be moderate or low priority. These trails are subject to full impact assessment within the EES and additional avoidance and minimisation measures would be adopted where determined to be necessary by those assessments. These would include proposed micro-siting procedures to avoid and minimise impacts on key sensitive areas during project implementation.

### 5.3 Heritage

For the heritage trail screening assessment, the key issues driving the priority ratings for historic heritage were proximity to Heritage Overlay and Victorian Heritage Inventory sites and potential for conflicts between proposed trails and gold mining artefacts, in particular remnants of tramways and water races. In relation to Aboriginal heritage, few sensitive areas have been identified and whilst some trails are in proximity to known artefacts, no direct conflicts have been identified.

Maps of the key heritage values in proximity to the trails are presented in **Attachment G**.

No trails were identified as having the potential for significant impact on Victorian Heritage Register or Victorian Heritage Inventory sites, or having the potential for significant impact on a site covered by a Heritage overlay. Accordingly, no trails were given a high priority rating from the perspective of cultural heritage.

A number of trails were, however, rated as having moderate priority in relation to historic heritage. The majority of trails given the rating, due to intersection with tramways, with some also intersecting with water races and previous sawmill sites. Mitigation measures have been identified to minimise impacts on these unlisted heritage places.

A few other trails were rated as moderate priority because of known Aboriginal cultural heritage artefacts within 80 metres of the trail alignment. None of these artefacts however, are within the designated trail corridors and so there is no need to investigate alternative alignments to avoid these Aboriginal heritage places.

All of the trails were determined to be moderate or low priority in relation to heritage aspects. Accordingly, no trails were determined to have heritage implications that would make them high priority for examination of alternatives.



Nevertheless, a range of heritage issues are encompassed in the full impact assessment presented in the EES and in particular in **Technical Report C: Cultural heritage**. Additional avoidance and minimisation measures would be adopted where determined to be necessary by the assessments. These would include proposed micro-siting procedures to avoid and minimise impacts on key sensitive areas during project implementation.

## 5.4 Socio-economic

For the socio-economic trail assessment, the key issues driving the priority ratings were found to be the intersection of proposed mountain bike trails with existing walking trails and private property (including the Warburton Golf Course) which is an operating business. In contrast, impacts on community facilities and proximity to established residential areas were not found to be critical issues in the evaluation.

Maps of the key socio-economic values in proximity to the trails are presented in **Attachment H**.

Five trails (17, 18, 19, 20 and 21) were rated as moderate due to intersecting or being on the boundary of private property. These landowners have been consulted extensively and are generally supportive of the project.

Six trails (5, 6, 11, 17, 20 and 21) were also rated as moderate because they intersect to some degree with walking trails and therefore there is potential for conflict. None of these potential impacts are particularly significant, and all are considered manageable with appropriate mitigation measures (that are already being considered). Feedback from mountain bike managers from Derby and Bay of Fires indicate that there are a low-level of trail-specific complaints that require consideration, predominately related to the safety of other recreation users. With appropriate signage and adherence of MTBA give-way principles this can be appropriately mitigated. All of the trails were determined to be moderate or low priority in relation to socio-economic aspects. Accordingly, no trails were determined to have socio-economic implications that would make them high priority for examination of alternatives.

Nevertheless, a range of socio-economic issues are encompassed in the full impact assessment presented in the EES and in particular in **Technical Report E: Socio-economic**. Additional avoidance and minimisation measures would be adopted where determined to be necessary by the assessments. These would include proposed micro-siting procedures to avoid and minimise impacts on key sensitive areas during project implementation.

## 5.5 Summary

As part of the alternatives assessment process, trail screening was undertaken to determine the trail sections for which further investigation of alternatives is warranted. Each of the trails were given priority ratings by the biodiversity, heritage and socioeconomic specialists with any trail receiving a very high or high rating for any discipline to be given further consideration with respect to alternatives.

One trail was assessed to be a very high priority, being Trail 1 (Drop-a-K), due to records of significant species and communities, including Leadbeater's possum, Mount Donna Buang Wingless Stonefly and Cool Temperate Rainforest. An alternative to Trail 1 (comprising Trails 45, 46 and 47) was identified, with these individual trails each rated high priority. Based on these results it was decided that both Trail 1 and the alternative (Trails 45, 46 and 47) would be fully assessed and compared within the EES to fully understand the relative merit of the options and to determine for each, whether potential biodiversity impacts could be effectively managed.

In relation to heritage and socio-economic aspects, all trail sections were rated as moderate or low priority with respect to further examination of alternatives. Nevertheless, heritage and socio-economic issues are addressed in the full impact assessment presented in the EES, including identification of further avoidance and minimisation measures to be adopted where determined to be necessary by the assessments.

## 6.0 Further investigation of alternatives for priority trails

### 6.1 Trail 1

Trail 1 (Drop-a-K), was assessed to be a trail of very high priority for examination of alternatives due to records of significant species and communities occurring between Mount Donna Buang and Ben Cairn. Accordingly, further investigations were undertaken to identify an alternative to Trail 1 that sought to specifically avoid or minimise interaction with Leadbeater's Possum habitat, Cool Temperate Rainforest (CTR), Cool Temperate Mixed Forest (CTMF) and Mount Donna Buang Wingless Stonefly habitat

A team consisting of trail planners (World Trail), ecologists (Biosis) and project staff (Yarra Ranges Council) used existing biodiversity data from previous studies and government datasets to explore various alternative alignments that would meet project objectives. Three trail alignments, Trails 45, 46 and 47 (see Figure 6-1 below) were identified through this process that appeared to meet project objectives while avoiding or minimising interaction with critical biodiversity values.

Ecologists from Biosis carried out additional field work to map high potential LBP habitat, CTR and CTMF in the vicinity of the concept alignments, allowing for adjustment of concept alignments prior to ground-truthing. As part of this process, consideration was given to a modification to Trail 1, whereby a two kilometre section of the trail immediately east of the Mount Donna Buang Trail Head would be located on Mount Donna Buang Road, avoiding key biodiversity sensitivities and the need to traverse the Coranderk Creek drinking water catchment. This modification was not pursued because it would significantly compromise the mountain biking tourism product, reduce project benefits and result in the project objectives not being fully met.

The establishment of the final alignments was undertaken primarily during ground-truthing in January 2021. The ground-truthing team consisted of members from Yarra Ranges Council, World Trail, Biosis, Parks Victoria and DELWP. Considerable alterations were made to the concept alignments, in collaboration with the ground-truthing team, to enable the trails to avoid or minimise critical ecology values and minimise impacts to the nearby Mount Donna Buang walking track. The minor realignment to move Trail 1 away from critical Leadbeater's Possum habitat was undertaken in June 2021. For further detail on the evolution and development of the trail alignment, see **Attachment B** and **Attachment C**.

Trails 45, 46 and 47 were also subjected to the trail screening process. Whilst each of these trails were determined to have lower ratings for biodiversity than Trail 1, they were still rated as a high priority for the examination of alternatives. Based on these results it was decided that both Trail 1 and the alternative (Trails 45, 46 and 47) would be fully assessed and compared within the EES to fully understand the relative merit of the options and to determine for each, whether potential biodiversity impacts could be effectively managed. This assessment would be undertaken for all specialist disciplines. A summary of the comparative analysis of Trail 1 and Trails 45, 46 and 47 has been provided in Section 7.0 below. Further information on Trails 45, 46 and 47 is provided in Section 6.3 below.

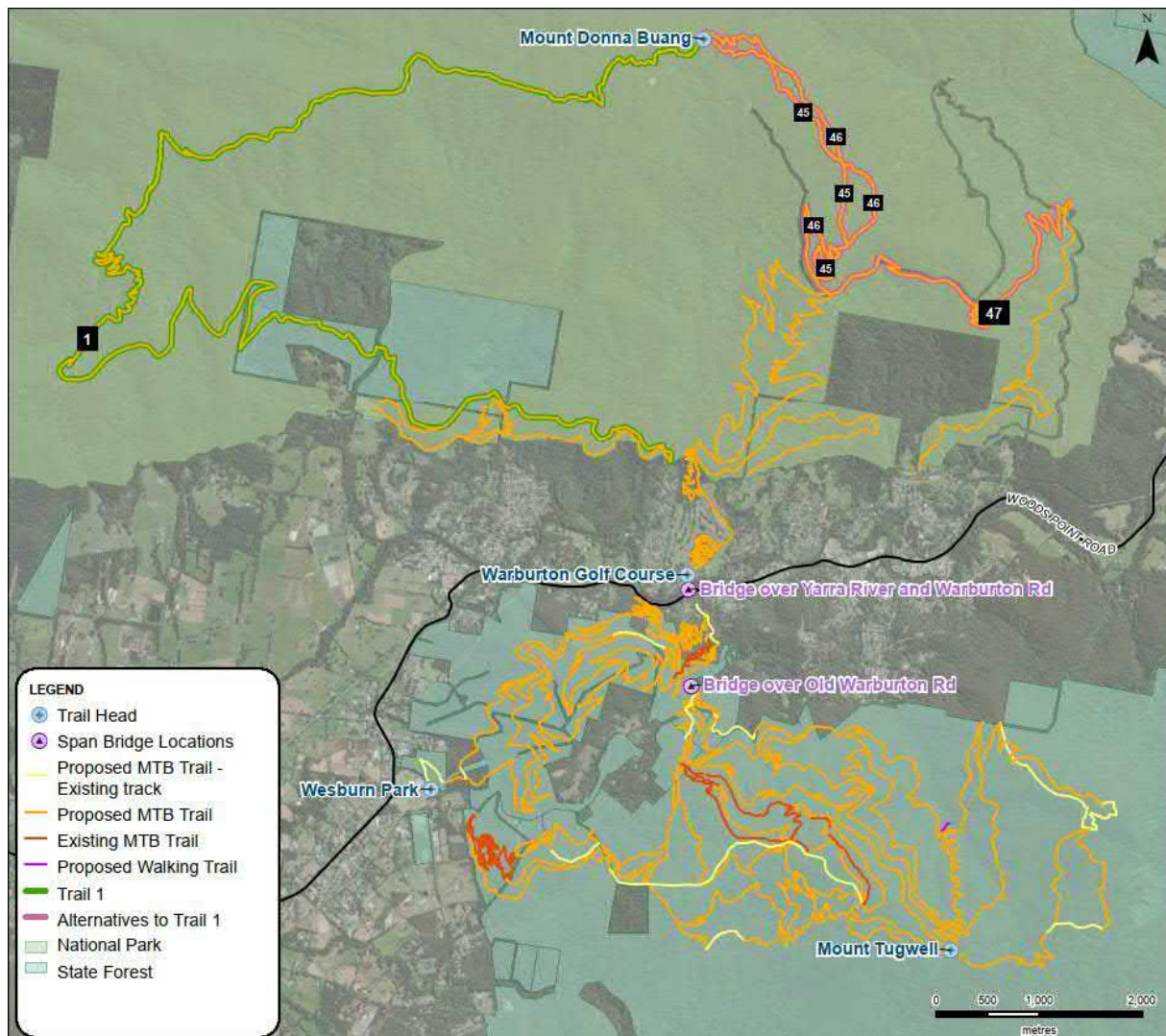
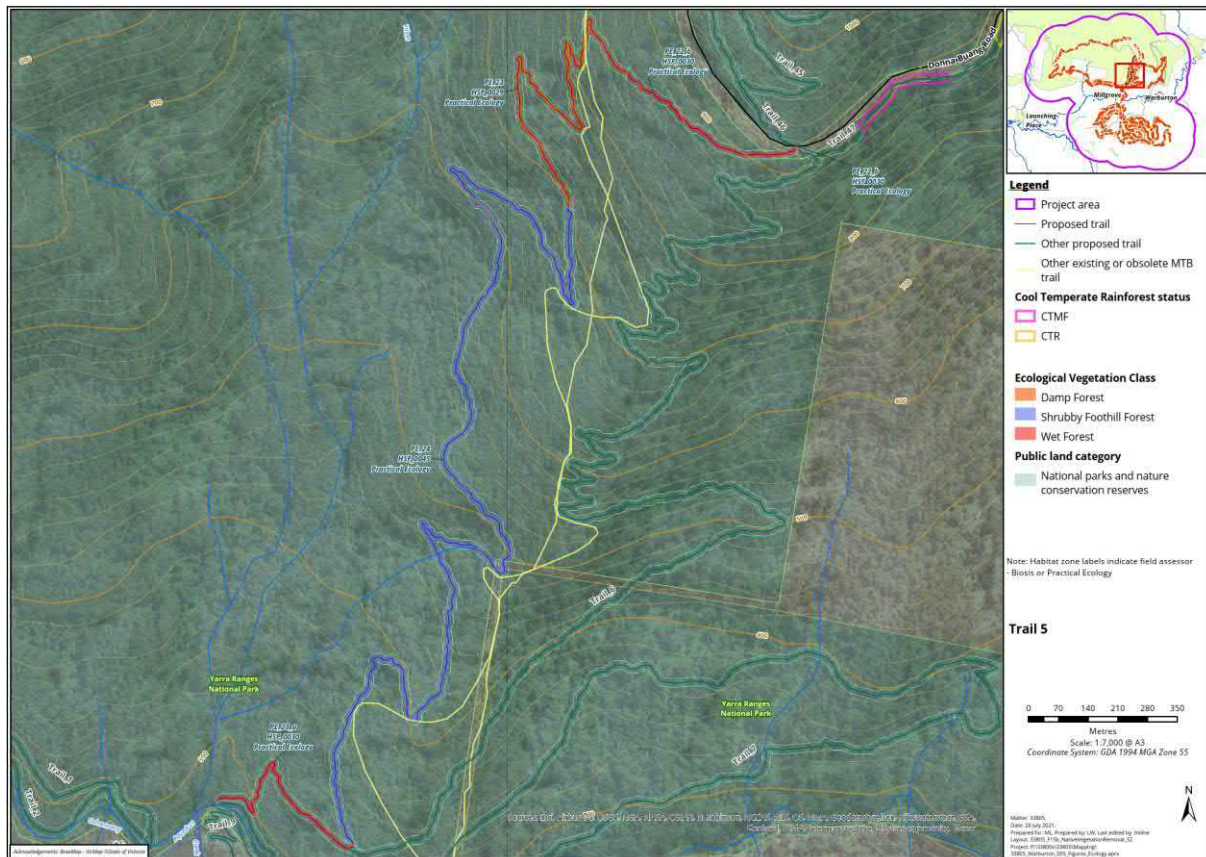


Figure 6-1 Trail 1 and Alternative to Trail 1

## 6.2 Trail 5

In relation to Trail 5, the trail length within the Yarra Ranges National Park is the key driver of the high rating. No options have been identified outside the National Park to achieve the aims of this trail and it is not possible to reduce the length of this trail because this would in turn make it steeper (changing the trail rating from intermediate to difficult) and increase erosion risk. It was proposed to fully assess this trail within the EES and the results are contained in **Technical Report A: Biodiversity and habitats**. This assessment was undertaken to determine whether the potential biodiversity impacts associated with Trail 5 can be effectively managed.





### Figure 6-2 Trail 5

### 6.3 Trails 45, 46 and 47

Trails 45, 46 and 47 were identified as an alternative that could achieve similar benefits to Trail 1. Throughout the alternatives assessment, a detailed process was followed to determine where effort should be prioritised to realign Trails 45, 46 and 47 to reduce project impacts based on a four-tiered rating system (i.e. very high, high, moderate or low priority for trail realignment).

With particular consideration to ecological values, desktop assessments and multiple field surveys were undertaken between September 2020 and February 2021 to describe the existing conditions relevant to Trails 45, 46 and 47.

Efforts have focussed on native vegetation assessment, tree assessments, investigating and developing alternative trail alignments and mitigation measures through desktop assessments, field investigations, as well as stakeholder consultation and field-based discussions with stakeholders and experts

Trails 45, 46 and 47 were also subjected to the trail screening process. Whilst each of these trails were determined to have lower ratings for biodiversity than Trail 1, they were still rated as a high priority for the examination of alternatives. Based on these results it was decided that both Trail 1 and the alternative (Trails 45, 46 and 47) would be fully assessed and compared within the EES to fully understand the relative merit of the options and to determine for each, whether potential biodiversity impacts could be effectively managed. This assessment was undertaken for all specialist disciplines.

## 6.4 Trail 50

Trail 50 intersects a very small area of Cool Temperate Mixed Forest at the headwater of Calder Creek. Upstream and downstream alternatives were explored but these have denser stands of Cool Temperate Mixed Forest (Figure 6-3). Nevertheless, a crossing point has been chosen where the relative extent of Cool Temperate Mixed Forest is low, therefore minimising the potential impact. Accordingly, it was proposed to fully assess this trail within the EES and the results are contained in

**Technical Report A: Biodiversity and habitats.** This assessment was undertaken to determine whether the potential biodiversity impacts associated with Trail 50 can be effectively managed.

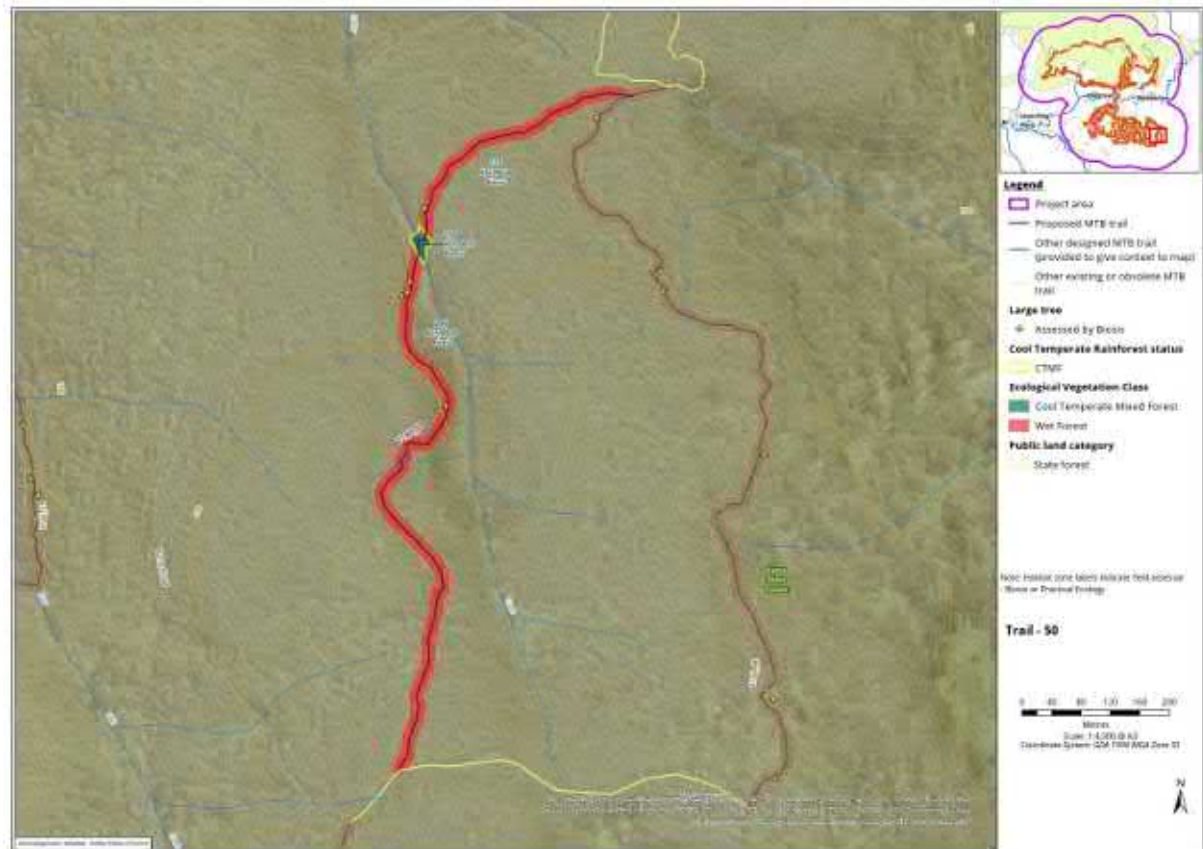


Figure 6-3 Trail 50 intersects Calder Creek

## 7.0 Comparative analysis of Trail 1 and Trails 45, 46 and 47

The comparative assessment includes the consideration of the relative benefits and the relative impacts of Trail 1 and the Trails 45 to 47. This section contains a summary of the comparative assessments undertaken by each of the technical specialists. An integrated synthesis of the results is provided in Section 7.2.

### 7.1.1 Economic benefits

The analysis contained in this section is taken from Developing Warburton as a World Class Mountain Bike Destination (TRC 2021) and provided at **Attachment A**. In relation to economic benefits, the tourism potential of the mountain bike network depends on its attractiveness to visitors. The attractiveness to visitors will influence visitor numbers, spend in the region and the numbers of jobs generated.

TRC in conjunction with Instinct and Reason has predicted that visitor numbers, spend in the region and jobs for a range of scenarios including the base case which includes Trail 1 (Case 1) and the base case without Trail 1 (Case 3).

For the purposes of the comparative analysis, the network with Trails 45 to 47 was assumed to be equivalent to the network without Trail 1. This is considered to be a reasonable assumption based on the following:

- Trail 1 is a unique experience in the network, offering a long-distance wilderness trail that traverses large sections of rainforest, visits Ben Cairn, offers unparalleled views across the Yarra Valley and crosses several significant waterways. Trails 45 to 47, although still in a National Park setting, do not have the same high level of natural attractions that provide an important motivator for visitation.
- Trail 1 has been designed to provide a wide market appeal that will help support increased diversity in mountain bike riders and appeal to the broader tourism market. The alignment was specifically developed to enable beginner riders, while remaining challenging for intermediate to advanced riders. Trails 45 to 46 are steeper and more challenging due to the topography and constraints, leading to a narrower market appeal.
- Trail 1 is considerably longer than Trails 45 to 47. The style and nature of Trail 1 will lead to an extended rider journey, with many riders likely to set aside a full day to undertake the ride. This then generates additional overnight stays, further supporting the regional economy.

**Table 4 Comparative economic assessment of Trail 1 and Trails 45, 46 and 47**

Potential impact	Trail 1	Alternative (Trails 45, 46 and 47)	Conclusion
<b>Economic benefits</b>			
Visitor numbers	The trail network with Trail 1 included is predicted to attract 221,454 visitors annually.	With removal of Trail 1 from the trail network, the project is predicted to attract 153,769 visitors.	Visitor numbers are predicted to be significantly less for the project without Trail 1.
Spend in the region	The trail network with Trail 1 included generates spend in the region of an estimated \$46.6M annually.	With removal of Trail 1 from the trail network, the project is predicted to generate spend in the region of an estimated \$31.5M annually.	Spend in the region is predicted to be significantly less for the project without Trail 1.
Jobs created	The trail network with Trail 1 included is predicted to create around 229 jobs.	With removal of Trail 1 from the trail network, the project is predicted to create around 148 jobs.	The creation of jobs is predicted to be significantly lower for the project without Trail 1.

## 7.1.2 Biodiversity and habitats

The analysis contained in this section is taken from **Technical Report A: Biodiversity and Habitats**. The length of trail through the Yarra Ranges National Park is around 2.3 kilometres more for Trail 1 than for Trails 45, 46 and 47. Trail 1 also requires removal of more native vegetation and intersects the key vegetation communities of Cool Temperate Rainforest and Cool Temperate Mixed forest for a greater distance than for the alternative. The comparative impacts for Trail 1 and the alternative (Trails 45, 46 and 47) are presented in Table 5.

**Table 5 Comparative biodiversity and habitat assessment of Trail 1 and Trails 45, 46 and 47**

Impact	Trail 1	Alternative (Trails 45, 46 and 47)	Conclusion
Trail length within National Park	18.215 km (the remaining 4.325 km of this trail is in State Forest or private land)	15.188 km (0.493 km is in the RDZ along Donna Buang Road with the National Park)	There is 2.327 km less trail in the National Park for the alternative.
Vegetation condition	Total vegetation removal is 4.855 ha as per the condition class break down below:  <u>0.164</u> ha of vegetation removal with a VQA score of $\leq 0.6$ .  <u>2.663</u> ha of vegetation removal with a VQA score of $>0.6$ and $\leq 0.85$ .  <u>2.027</u> ha of vegetation removal with a VQA score of $>0.85$ .	Total vegetation removal is 3.562 ha as per the condition class break down below:  Trail 45 = <u>0.578</u> ha of vegetation removal with a VQA score of $>0.6$ and $\leq 0.85$ & <u>0.341</u> ha of vegetation removal with a VQA score of $>0.85$  Trail 46 = <u>0.781</u> ha of vegetation removal with a VQA score of $>0.6$ and $\leq 0.85$ & <u>0.431</u> ha of vegetation removal with a VQA score of $>0.85$  Trail 47 = <u>0.566</u> ha of vegetation removal with a VQA score of $>0.6$ and $\leq 0.85$ & <u>0.864</u> ha of vegetation removal with a VQA score of $>0.85$	There is less requirement for native vegetation removal for the alternative.
Threatened ecological communities	1.870 km intersects pure Cool Temperate Rainforest  4.572 km intersected Cool Temperate Mixed Forest	0.616 km intersects pure Cool Temperate Rainforest  2.435 km intersected Cool Temperate Mixed Forest	The alternative alignment has less than half the impact of Trail 1 on Cool Temperate Rainforest  The alternative alignment has approximately half the impact of Trail 1 on Cool Temperate Mixed Forest
Key threatened species	Dense montane thicket Leadbeater's Possum habitat and translocation sites intersected by pre-July 2021 alignment – new alignment of Trail 1 from July 2021 will avoid these sites between Donna Buang Summit and Ben Cairn (very	Dense montane thicket Leadbeater's Possum habitat and translocation sites are avoided by the alternative trails, scattered areas of open thicket and associated thicket species occur near sections of Trails 45 and 46 (very	There is likely to be a comparable level of impact on threatened species habitat between Trail 1 and the alternative. However, Trail 1 would come in closer proximity to Leadbeater's Possum translocation sites between



Impact	Trail 1	Alternative (Trails 45, 46 and 47)	Conclusion
	<p>minor pruning of thicket species below Ben Cairn would be required).</p> <p>Mount Donna Buang Wingless Stonefly occurs in headwaters of tributaries that are issued from the ridges and slopes between Donna Buang summit and Ben Cairn.</p> <p>Tree Geebung occurs at montane elevations between Donna Buang Summit and Ben Cairn</p> <p>Records of Southern Greater Glider occur in proximity to Trail 1.</p>	<p>minor pruning of thicket species may be required for the alternatives).</p> <p>Mount Donna Buang Wingless Stonefly was recently confirmed in headwaters of tributaries that are issued from the ridges and slopes between Donna Buang summit and Mount Victoria (Ythan Creek and Cement Creek).</p> <p>Tree Geebung occurs at montane elevations between Donna Buang Summit and Mount Victoria.</p> <p>Records of Southern Greater Glider occur in proximity to the alternative trail alignments.</p>	<p>Donna Buang Summit and Ben Cairn.</p> <p>Construction phase noise has the potential to disturb Leadbeater's Possums during daytime denning in nest boxes and natural tree hollows. Where construction is occurring in proximity to Leadbeater's Possum translocation sites, it is proposed that trail would be hand built so that the construction noise profile would be lower. Trail building would occur during daylight hours to avoid disturbance to nocturnal activities.</p>

### 7.1.3 Surface water, groundwater and geotechnical hazards

The analysis contained in this section is taken from **Technical Report B: Surface Water, Groundwater and Geotechnical Hazards**. For both construction and operation, Trail 1 and the alternative would have similar residual impacts. The implementation of proposed mitigation measures (which include installation of bridges or boardwalks over identified waterways and rock armour for crossings over headwater channels and gullies not identified as waterways) are expected to minimise impacts. Trail 1 is situated within the Coranderk Creek catchment boundary for approximately 458 metres. It is anticipated that with mitigating factors including adequate provision of proper toilet facilities, buffer zones to the nearest tributary (200 metres) and education during construction and operation, the impact to drinking water supply would be low. The impacts for Trail 1 and the alternative (Trails 45, 46 and 47) are presented in Table 6.

**Table 6 Comparative surface water, groundwater and geotechnical hazards assessment of Trail 1 and Trails 45, 46 and 47**

Potential impact	Trail 1	Alternative (Trails 45, 46 and 47)	Conclusion
<b>Surface Water</b>			
Trail construction results in increased turbidity and sediment in waterways	<p>Total number of crossings: 166</p> <p>Number of crossings with 'high' erosion risk: 121</p>	<p>Total number of crossings: 157</p> <p>Number of crossings with 'high' erosion risk: 118</p>	<p>There are three more crossings for the trail network including Trail 1 that are classified as having a higher erosion risk.</p> <p>The residual impacts for Trail 1 and the alternative are considered to be the same when mitigation measures are implemented.</p>



Potential impact	Trail 1	Alternative (Trails 45, 46 and 47)	Conclusion																				
Changes to surface water hydrology during trail network construction: <ul style="list-style-type: none"><li>The removal of vegetation in the construction corridor may lead to increased runoff</li><li>Compaction of the trail will increase runoff</li><li>Flow may be directed down the mountain bike trail changing the flow regime.</li></ul>	Approximate length of new trails: 164.5 km Total number of crossings: 166	Approximate length of new trails: 157.5 km Total number of crossings: 157	The residual impact for Trail 1 and the alternative is considered to be the same when mitigation measures are implemented.																				
Trail being constructed crosses a waterway without a bridge or other appropriate infrastructure, resulting in sedimentation.	<table><tr><th>Measure</th><th># Crossings</th></tr><tr><td>None</td><td>54</td></tr><tr><td>Rock armour</td><td>61</td></tr><tr><td>Bridge</td><td>51</td></tr><tr><td>Total</td><td>166</td></tr></table> Mean geomorphic risk: 3.69 Number of crossings with 'high' erosion risk: 121 Number in National Parks: 32 Number in state forest: 108	Measure	# Crossings	None	54	Rock armour	61	Bridge	51	Total	166	<table><tr><th>Measure</th><th># Crossings</th></tr><tr><td>None</td><td>54</td></tr><tr><td>Rock armour</td><td>60</td></tr><tr><td>Bridge</td><td>43</td></tr><tr><td>Total</td><td>157</td></tr></table> Mean geomorphic risk: 3.71 Number of crossings with 'high' erosion risk: 118 Number in National Parks: 27 Number in state forest: 108	Measure	# Crossings	None	54	Rock armour	60	Bridge	43	Total	157	The residual impact for Trail 1 and the alternative is considered to be the same. An increased number of crossings would be located on National Park land for Trail 1.
Measure	# Crossings																						
None	54																						
Rock armour	61																						
Bridge	51																						
Total	166																						
Measure	# Crossings																						
None	54																						
Rock armour	60																						
Bridge	43																						
Total	157																						
Direct impact to waterways	Total number of crossings: 166	Total number of crossings: 157	The residual impact for Trail 1 and the alternative is considered to be the same when mitigation measures are implemented.																				
Reduced drinking water quality	Approximately 458 metres of Trail 1 is proposed within the Coranderrk Creek drinking water catchment.	None of Trails 45, 46 and 47 are proposed within the Coranderrk Creek drinking water catchment, although	Whilst the risks to drinking water quality from construction and operation of Trail 1 within the																				

Potential impact	Trail 1	Alternative (Trails 45, 46 and 47)	Conclusion
	With the adoption of the proposed mitigation measures, the risks to drinking water quality from construction and operation of Trail 1 within the Coranderrk Creek drinking water catchment were assessed to be low as per Section 11.12 and 12.8 of <b>Technical Report B: Surface Water, Groundwater and Geotechnical Hazards</b> .	they are proposed within the Cement Creek water protection catchment.	Coranderrk Creek drinking water catchment are assessed to be low, Trails 45, 46 and 47 totally avoid this catchment.
Spillage of hazardous construction material during construction resulting in degradation of downstream surface water quality	Total number of crossings: 166	Total number of crossings: 157	The residual impact for Trail 1 and the alternative is considered to be the same when mitigation measures are implemented.
Toilets and amenities at trail heads that are not sewered – septic system results in nutrient loads to surface water and waterways	Toilet facilities provided at trail heads	Toilet facilities provided at trail heads	Trail 1, Trail 45 and Trail 46 all begin at the Mount Donna Buang Trail Head and would have the same toilet and amenities.
Disturbance of contaminated ground mobilises constituents and results in the degradation of surface water.	Approximate length of new track: 164.5 km Total number of crossings: 166 Number of crossings with 'high' erosion risk: 121	Approximate length of new track: 157.5 km Total number of crossings: 157 Number of crossings with 'high' erosion risk: 118	The residual impact for Trail 1 and the alternative is considered to be the same when mitigation measures are implemented.
Yarra River Bridge impacts hydrological regime	Bridge crossing of the Yarra River	Bridge crossing of the Yarra River	The impact from the Yarra River Bridge crossing would be the same for Trail 1 and the alternative.
Trail construction may cause micro-climatic changes affecting surface water, temperature, evaporation rates and soil water content.	Approximate length of new track: 164.5 km Total number of crossings: 166	Approximate length of new track: 157.5 km Total number of crossings: 157	The residual impact for Trail 1 and the alternative is considered to be the same when mitigation measures are implemented.

Potential impact	Trail 1	Alternative (Trails 45, 46 and 47)	Conclusion																				
Trail construction encourages the funnelling and greater concentration of deer movements into waterways	Total number of crossings: 166 Number in National Parks: 32 Number in state forest: 108	Total number of crossings: 157 Number in National Parks: 27 Number in state forest: 108	The residual impact for Trail 1 and the alternative is considered to be the same when mitigation measures are implemented.																				
Trail construction and operation cause the spread of weeds and soil pathogens.	Mitigation measures for spread of weeds and soil pathogens implemented during construction	Mitigation measures for spread of weeds and soil pathogens implemented during construction	It is expected that the risk of spread will be equivalent for Trail 1 and the alternative.																				
Increased sedimentation of waterways during operation	<table><tr><th>Measure</th><th># Crossings</th></tr><tr><td>None</td><td>54</td></tr><tr><td>Rock armour</td><td>61</td></tr><tr><td>Bridge</td><td>51</td></tr><tr><td>Total</td><td>166</td></tr></table> <p>Mean geomorphic risk: 3.69 Number of crossings with 'high' erosion risk: 121</p>	Measure	# Crossings	None	54	Rock armour	61	Bridge	51	Total	166	<table><tr><th>Measure</th><th># Crossings</th></tr><tr><td>None</td><td>54</td></tr><tr><td>Rock armour</td><td>60</td></tr><tr><td>Bridge</td><td>43</td></tr><tr><td>Total</td><td>157</td></tr></table> <p>Mean geomorphic risk: 3.71 Number of crossings with 'high' erosion risk: 118</p>	Measure	# Crossings	None	54	Rock armour	60	Bridge	43	Total	157	The residual risk of increased sedimentation of waterways once the mountain bike trail is operational is similar for Trail 1 and the alternative.  Eight of the ten crossings along Trail 1 would have bridges.
Measure	# Crossings																						
None	54																						
Rock armour	61																						
Bridge	51																						
Total	166																						
Measure	# Crossings																						
None	54																						
Rock armour	60																						
Bridge	43																						
Total	157																						
Trail crosses a channel that has become a 'waterway' due to heavy rainfall or other change in hydrology, e.g. a temporary spring forms. Riders travelling through these channels may cause erosion and sedimentation in downstream surface water.	Based on spatial analysis there are ten channel crossings of this type. Based on ground-truthing it was determined that eight would have bridges, one would have rock armour and one would not require mitigation measures.	There is one channel crossing of this type. Based on ground-truthing it was determined not to require mitigation measures.	There are two channel crossings on Trail 1 that are not proposed to be elevated compared to one crossing on the alternative.  The residual impact for Trail 1 and the alternative is considered to be the same when mitigation measures are implemented.																				
Changes to surface water hydrology due to trail use	<table><tr><th>Measure</th><th># Crossings</th></tr><tr><td>None</td><td>54</td></tr><tr><td>Rock armour</td><td>61</td></tr><tr><td>Bridge</td><td>51</td></tr><tr><td>Total</td><td>166</td></tr></table>	Measure	# Crossings	None	54	Rock armour	61	Bridge	51	Total	166	<table><tr><th>Measure</th><th># Crossings</th></tr><tr><td>None</td><td>54</td></tr><tr><td>Rock armour</td><td>60</td></tr><tr><td>Bridge</td><td>43</td></tr><tr><td>Total</td><td>157</td></tr></table>	Measure	# Crossings	None	54	Rock armour	60	Bridge	43	Total	157	There is little difference in the number of crossings that are not elevated. Therefore, the impact is similar for Trail 1 and the alternative.
Measure	# Crossings																						
None	54																						
Rock armour	61																						
Bridge	51																						
Total	166																						
Measure	# Crossings																						
None	54																						
Rock armour	60																						
Bridge	43																						
Total	157																						

Potential impact	Trail 1	Alternative (Trails 45, 46 and 47)	Conclusion
Riders use bush areas around trails as toilets resulting in pathogens contaminating surface waters.	Approximate length of new track: 164.5 km Total number of crossings: 166	Approximate length of new track: 157.5 km Total number of crossings: 157	The residual impact for Trail 1 and the alternative is considered to be the same when mitigation measures are implemented.
Bike washing at trail heads with wash water with sediment reaching waterways.	Bike washing facilities provided at trail heads	Bike washing facilities provided at trail heads	The trail head infrastructure would be the same for Trail 1 and for the alternative.
Surface water management at Warburton Golf Course Trail Head.	Trail 1 terminates near the Warburton Golf Course Trail Head.	Trails 45, 46 and 47 also terminate near the Warburton Golf Course Trail Head.	Users of both Trail 1 and the alternative would access the trail head facilities at the Warburton Golf Course.  A stormwater treatment system that meets Melbourne Water standards would be adopted. Accordingly, impacts on surface water are likely to be negligible and the same for Trail 1 and the alternative.
Increase in water pollution from littering and illegal rubbish dumping.	Total number of crossings: 166	Total number of crossings: 157	Whilst littering and illegal rubbish dumping would be addressed by provision of appropriate waste management infrastructure, it is most likely to occur at the trail heads rather than along trails. Accordingly, the residual impact for Trail 1 and the alternative are considered to be the same.

#### 7.1.4 Cultural heritage

For Aboriginal heritage, there is no discernible difference between Trail 1 and Trails 45, 46 and 47. In relation to historic heritage, whilst neither Trail 1 or the alternative are expected to have significant impact on historic heritage values, the alternative to Trail 1 has less potential for impact. The comparative impacts for Trail 1 and the alternative (trails 45, 46 and 47) are presented in Table 7.

**Table 7 Comparative cultural heritage assessment of Trail 1 and Trails 45, 46 and 47**

Potential impact	Trail 1	Alternative (Trails 45, 46 and 47)	Conclusion
Cultural heritage			

Potential impact	Trail 1	Alternative (Trails 45, 46 and 47)	Conclusion
Aboriginal heritage	The location of Trail 1 is a low sensitivity area with respect to Aboriginal cultural heritage and without any recorded Aboriginal places. The results of auger testing in the area indicated homogeneous soil profiles. The trail is on the edge of a steep ridge that is difficult to access, would have contained little resource and would have poor place preservation due to natural impacts.	The location of Trails 45, 46 and 47 is also a low sensitivity area with respect to Aboriginal cultural heritage and without any recorded Aboriginal places. Similar to the Trail 1 area, the results of the auger testing indicated homogeneous soil profiles. These trails are also on the edge of a steep ridge that is difficult to access, would have contained little resource and would have poor place preservation due to natural impacts.	Trail 1 is significantly longer than Trails 45, 46 and 47 and therefore has greater potential to cause harm to unknown Aboriginal places than Trails 45, 46 and 47. However, given that all four of the trails are deemed unlikely to have Aboriginal places present, from an Aboriginal heritage perspective, there is no discernible difference between the alternatives.
Historic heritage	The location of Trail 1 is considered to be a high sensitivity area because it: <ul style="list-style-type: none"> <li>• Intersects the HO 140 area</li> <li>• Intersects two areas of archaeological sensitivity associated with hut sites</li> <li>• Intersects area of archaeological sensitivity associated with sawmill</li> <li>• Intersects water race and three tramways</li> <li>• Is in proximity to hut sites.</li> </ul>	In contrast to the location of Trail 1, the location of Trails 45, 46 and 47 is considered to be a moderate sensitivity area. Whilst trails 45 and 46 intersect the HO 140 area, Trail 47 does not intersect any known historic heritage places.	From an historic heritage perspective, whilst neither alternative would be expected to have significant impact on historic heritage values, Trails 45, 46 and 47 has less potential for impact than Trail 1.

### 7.1.5 Land use and planning

The analysis contained in this section is taken from **Technical Report D: Land Use and Planning**. The potential impacts in relation to land use and planning do not substantially differ between Trail 1 and Trails 45 to 47. Both alternatives are equally preferred. The findings of the comparative assessment are presented in Table 8.

**Table 8 Comparative land use planning assessment of Trail 1 and Trails 45, 46 and 47**

Potential impact	Trail 1	Alternative (Trails 45, 46 and 47)	Conclusion
<b>Land use and planning</b>			
Temporary change in land use as a result of construction.	Trail 1 is longer than the alternative, meaning that the minor residual impacts from temporary land occupancy	The alternative is shorter than Trail 1, resulting in less land affected by temporary occupancy.	The residual impact would not be substantially different between Trail 1 and the alternative. The difference

Potential impact	Trail 1	Alternative (Trails 45, 46 and 47)	Conclusion
	would extend to a larger area of land. The land is, however, forested land within the PCRZ and RDZ1 and is not accessed on a regular basis.	The land is within the PCRZ and RDZ1 and is not accessed on a regular basis.	relates to the length or extent of land temporarily occupied for construction, however, the difference in residual impact is minor as the area is not regularly accessed.
Potential amenity impacts during construction including visual impacts from construction equipment, noise impacts from construction works and vehicle movement, and reduced air quality from dust during construction.	Trail 1 is longer than the alternative. Therefore, there would be minor residual amenity impacts during temporary land occupancy for construction, over a larger area of land. The land is, however, forested land within the PCRZ and RDZ1 and there are no sensitive receptors.	The alternative is shorter than Trail 1, resulting in less land being subject to minor residual amenity impacts during temporary occupancy for construction. The land is within the PCRZ and RDZ1 and there are no sensitive receptors.	The residual impact would not be substantially different between Trail 1 and the alternative. The difference relates to the extent of land affected by minor residual amenity impacts during construction. This difference is insignificant given the absence of sensitive receptors in the location of the alternatives.
Permanent land use impacts as a result of the project	Trail 1 is longer than the alternative and therefore a larger amount of land currently conserved for natural assets will be impacted by a change in the use of land, introducing mountain bike riders to the area. Part of land nearby or alongside Mount Donna Buang Road would also be impacted by the change in land use and the associated impacts.	The alternative is shorter than Trail 1, resulting in a smaller area of land undergoing a change in land use. Part of land nearby or alongside Mount Donna Buang Road would also be impacted by the change in land use and the associated impacts.	The existing land use conditions of Trail 1 and the alternative are similar as the current use is as forested land as part of the Yarra Ranges National Park as well as Mount Donna Buang Road. From a land use perspective, neither Trail 1 or the alternative would be more substantially impacted, other than that Trail 1 is longer and therefore more land is affected.
Use of land for the project resulting in amenity impacts including noise, traffic and air quality impacts.	Trail 1 is longer than the alternative, meaning that the minor residual amenity impacts from permanent land use change, would affect a larger area of land. The land is, however, forested land within the PCRZ and RDZ1 and there are no sensitive receptors.	The alternative is shorter than Trail 1, resulting in less land affected by minor residual amenity impacts from permanent land use change. The land is within the PCRZ and RDZ1 and there are no sensitive receptors.	The residual impact would not be substantially different between Trail 1 and the alternative. The main difference is the length or extent of land affected by land use change. The difference in residual amenity impact is insignificant as there are no sensitive receptors. Furthermore, Trail 1 and the alternative do not pose a difference in scale or intensity of use, only that the use will be spread out on a slightly larger footprint.

Potential impact	Trail 1	Alternative (Trails 45, 46 and 47)	Conclusion
<b>Air quality</b>			
Dust impacts during construction of Visitor's Hub and trail heads	Potential dust impacts for Trail 1 were determined to be negligible to low for dust soiling and low for human health.	A similar level of residual impact is expected for Trail 1 and the alternative.	No discernible difference in level of impact between Trail 1 and the alternative.
Air quality impacts from vehicles during construction of Visitor's Hub and trail heads	Air quality impacts beyond 50m of work sites are likely to be negligible.	A similar level of residual impact is expected for Trail 1 and the alternative.	No discernible difference in level of impact between Trail 1 and the alternative.
Air quality impacts during construction of trails	Dust impacts during construction of the trails are expected to be negligible.	A similar level of residual impact is expected for Trail 1 and the alternative.	No discernible difference in level of impact between Trail 1 and the alternative.
Air emissions from vehicle traffic and shuttle buses	At the closest sensitive receptors to the project, pollutant concentrations due to vehicle traffic are likely to be negligible.  Wheel generated dust from mountain bikes using the trails are not expected to cause dust emissions discernible at sensitive receptors.	A similar level of residual impact is expected for Trail 1 and the alternative.	No discernible difference in level of impact between Trail 1 and the alternative.
Maintenance	Air quality impacts due to trail maintenance are expected to be negligible due to highly localised works, short duration and distance from receptors.	A similar level of residual impact is expected for Trail 1 and the alternative.	No discernible difference in level of impact between Trail 1 and the alternative.
Mountain biking events	Traffic Management Plans required during major mountain biking events would minimise excessive queueing and congestion which could cause an increase in vehicle emissions near the project.	A similar level of residual impact is expected for Trail 1 and the alternative.	No discernible difference in level of impact between Trail 1 and the alternative.
Erosion	Widespread erosion that results in a significant source of dust is unlikely due to the narrow design of the trails and surrounding vegetations and effective trail design and management.	A similar level of residual impact is expected for Trail 1 and the alternative.	No discernible difference in level of impact between Trail 1 and the alternative.

Potential impact	Trail 1	Alternative (Trails 45, 46 and 47)	Conclusion
<b>Visual</b>			
Location of new trails within LCT5 (Forested Slopes)	The natural vegetated character of the landscape character type would be retained.	A similar level of residual impact is expected for Trail 1 and the alternative.	No discernible difference in level of impact between Trail 1 and the alternative.
Large tree removal	No large tree removal is proposed as part of the trail construction.	A similar level of residual impact is expected for Trail 1 and the alternative.	No discernible difference in level of impact between Trail 1 and the alternative.
<b>Noise</b>			
Construction noise	Construction noise would be audible for up to six months in some locations.	A similar level of residual impact is expected for Trail 1 and the alternative.	No discernible difference in level of impact between Trail 1 and the alternative.
Operational noise	A noise barrier is proposed in the vicinity of Martyr Road, Warburton to mitigate operational noise at nearby residences.	A similar level of residual impact is expected for Trail 1 and the alternative.	No discernible difference in level of impact between Trail 1 and the alternative.
Events noise	Specific management plans would be developed for major events to ensure that potential noise effects are effectively managed.	A similar level of residual impact is expected for Trail 1 and the alternative.	No discernible difference in level of impact between Trail 1 and the alternative.

### 7.1.6 Socio-economic

The analysis contained in this section is taken from **Technical Report E: Socio-economic**. The potential socio-economic impacts do not substantially differ between Trail 1 and Trails 45 to 47. Trail 1 would have some minor impacts on residents and bushwalkers whereas the alternative would have no impacts. Given that impacts for Trail 1 would be minor, there is no strong preference. The comparative impacts for Trail 1 and the alternative (trails 45, 46 and 47) are presented in Table 9.

**Table 9 Comparative socio-economic assessment of Trail 1 and Trails 45, 46 and 47**

Potential impact	Trail 1	Alternative (Trails 45, 46 and 47)	Conclusion
Bushwalking	There are possibly up to 50 walkers a day on Mount Donna Buang. Local bushwalkers have expressed their concerns regarding increased noise, congestion and safety risks from the Warburton Mountain Bike Destination. In responding to this, trails have been moved away from existing tracks, with points of intersection minimised. Experience from	No known bushwalking occurs in the vicinity of the alternative trails.	Both trails would have minimal socio-economic impact.



Potential impact	Trail 1	Alternative (Trails 45, 46 and 47)	Conclusion
	comparable mountain bike projects in Tasmania (Derby and St Helens (Bay of Fires)) and in Bright indicate that incidences of conflict between walkers and riders have been minimal.		
Impact on residential properties	The end of Trail 1 is around 30-50m from three landholders on Sussex St. The trail is however unlikely to be in line-of-sight of these properties and usage is highly unlikely to cause any significant noise, dust, or inconvenience to residents.	No residential properties are near the alternative trails.	Both trails would have minimal socio-economic impact.

### 7.1.7 Transport

The analysis contained in this section is taken from **Technical Report F: Transport**. Traffic generation and potential transport impacts for construction and operation of Trail 1 and Trails 45, 46 and 47 are expected to be the same. Whilst each option would have different crossing points of Donna Buang Road, these are comparable from a safety perspective. The comparative impacts for Trail 1 and the alternative (Trails 45, 46 and 47) are presented in Table 10.

**Table 10 Comparative transport assessment of Trail 1 and Trails 45, 46 and 47**

Potential impact	Trail 1	Alternative (Trail 45, 46 and 47)	Conclusion
Construction	Construction of the entire project including Trail 1 would generate modest amounts of traffic that would not cause significant congestion on the road network.  Construction of bridges over the Yarra River and Old Warburton Road would cause temporary localised disruption.	In the context of the whole project, the amount of traffic generated for the construction of the alternative would not differ greatly from the traffic generated for construction of Trail 1.  The transport impacts associated with bridge construction would be unchanged for the alternative.	No discernible difference in level of impact between Trail 1 and the alternative.
Operation	Whilst visitor traffic generated by the project is within the capacity of the road network, careful management of parking will be required.  The potential for conflict between motor vehicles and cyclists at intersections between mountain bike trails	Visitor numbers are predicted to be greater for the trail network with Trail 1 or with Trails 45, 46 and 47. Nevertheless, because there is sufficient capacity in the transport network, no change is expected in operational traffic impacts (including those related to	Because of the safety challenges with the crossing of Mount Donna Buang Road associated with the alternative, Trail 1 is slightly preferred from a transport perspective.

Potential impact	Trail 1	Alternative (Trail 45, 46 and 47)	Conclusion
	<p>and roads is an important issue.</p> <p>Trail 1 involves a crossing of Donna Buang Road which has an estimated traffic volume of 1500 vehicles per day and a posted speed of 80km/h. Mitigation measures are proposed to ensure that this crossing is safe.</p>	<p>parking) for the alternative compared to Trail 1.</p> <p>The alternative to Trail 1 would also have a crossing point on Donna Buang Road to connect Trails 45 and 47. The location of this crossing is at the shuttle bus drop off point at Victoria Spur. The crossing is in a different place to that for Trail 1 and due to having a posted speed of 80km/h and compromised sight lines, substantial mitigation measures are likely to be needed to ensure safety at a crossing at this location. If following further investigation an at grade crossing is not considered desirable, a bridge crossing could be contemplated.</p>	

## 7.2 Synthesis

A comparison of Trail 1 with the alternative (Trails 45, 46 and 47) was undertaken as part of each of the technical assessments completed for the EES. The comparative analysis for each assessment was based on the residual impact of these options assuming effective implementation of the proposed mitigation measures.

Trail 1 and the alternative (Trails 45, 46 and 47) are both located within the Yarra Ranges National Park, within natural areas. These options both satisfy the project objectives of providing an iconic mountain biking experience within a wider trail network that provides a wide range of trails of different types.

Surveys of visitors to Derby, Tasmania indicate that spectacular scenery and natural values are key drivers for doing the Blue Tier and Bay of Fires mountain bike trails. For the Warburton Mountain Bike Destination, Trail 1 would be equivalent. Accordingly, because of its features including its length as a single trail with spectacular scenery, Trail 1 has potentially greater marketing potential than Trails 45, 46 and 47, although these trails also have unique characteristics.

The visitor numbers expected for a trail network containing Trail 1 are predicted to be significantly greater than for the alternative. Accordingly, the economic benefits reflected in the spending in the region and the number of jobs created are also envisaged to be greater.

The potential socio-economic and transport impacts related to the attraction of visitors were assessed to be similar. The residual impacts on traffic and parking and other recreational activities and community infrastructure would not be discernibly different, although there is a difference regarding the safety of the crossings of Donna Buang Road where Trail 1 was determined to be superior.

As both Trail 1 and the alternative are in natural environments remote from residential areas and other land uses, the land use and planning impacts were assessed to be minor and comparable.

In relation to Aboriginal heritage no discernible difference was identified between Trail 1 and the Alternative. However, in relation to historic heritage Trail 1 has a higher potential for impact due to the

known presence of a number of registered heritage sites and other unregistered artefacts. Whilst these potential impacts can be mitigated, Trails 45, 46 and 47 are slightly preferred to Trail 1 from an historic heritage perspective.

In relation to surface water, groundwater and geotechnical hazards, the potential impacts of the options were assessed to be comparable. The assessment found that both options are located in forested catchments. The main difference is that the alternative (Trails 45, 46 and 47) traverses a lower number of waterways than Trail 1 (157 compared to 166). Whilst Trail 1 has more waterway crossings than the alternative, with the implementation of the proposed mitigation measures the difference in residual impacts between the options is considered to be very small. Additionally, Trail 1 is situated within the Coranderrk Creek catchment boundary for approximately 458 metres. It is anticipated that with mitigating factors including adequate provision of proper toilet facilities, buffer zones to the nearest tributary (200 m) and education during construction and operation, the impact to drinking water supply would be overall low. From a groundwater and geotechnical perspective, both alignments are located mostly on the same geology with similar water table depths anticipated. The construction and operation of Trail 1 and the alternative would therefore have similar residual impacts.

The most significant differences between Trail 1 and Trails 45, 46 and 47 relate to biodiversity and habitats. The length of trail within the Yarra Ranges National Park is 2.327 kilometres more for Trail 1 in comparison to the alternative. A greater extent of native vegetation removal would be required for Trail 1 in comparison to the alternative. The difference is estimated to be 1.288 hectares. Additionally, Trail 1 intersects Cool Temperate Rainforest and the Cool Temperate Mixed Forest for a greater distance (approximately 6.442 kilometres for Trail 1 compared to 3.069 for the alternative). Trail 1 also comes closer to the Leadbeater's Possum translocation site between Donna Buang Summit and Ben Cairn. Noise impacts to Leadbeater's Possum translocation sites could occur during construction. The project is therefore committed to hand-building the section of the trail in proximity to Leadbeater's Possum translocation sites to minimise potential noise effects.

### 7.3 Conclusion

A trail screening process was undertaken during the project development process to investigate the need for alternative trail alignments that would ensure a network design that minimised the potential for significant environmental impact. As a result of this process the project has undertaken a comparative assessment of Trail 1 and an alternative (combination of Trails 45, 46 and 47).

The key findings of the comparative assessment are summarised below:

- **Economic benefits:** A trail network including Trail 1 has significantly greater economic benefits than a trail network without Trail 1, both in terms of tourism spend in the region and jobs created.
- **Land use and planning:** No discernible difference in residual impacts.
- **Socio-economic:** No discernible difference in residual impacts.
- **Transport:** Trail 1 is slightly preferred to the alternative due to improved safety of the crossing of Donna Buang Road.
- **Cultural heritage:** No discernible difference in residual impacts for Aboriginal heritage. A slight preference for the alternative over Trail 1 in relation to historic heritage.
- **Surface water, groundwater and geotechnical hazards:** The alternative traverses a lower number of waterways with slightly fewer crossings located within the Yarra Ranges National Park. Additionally, only Trail 1 traverses approximately 458 metres of Coranderrk Creek catchment boundary. However, it is anticipated that with the implementation of mitigation measures overall impact to drinking water quality is considered low. Therefore, with the implementation of mitigation during construction and operation, the alternative and Trail 1 would have similar residual impacts.
- **Biodiversity:** Trail 1 would traverse more of the Yarra Ranges National Park, require a greater extent of native vegetation removal, intersect a greater extent of Cool Temperate Rainforest or Cool Temperate Mixed Forest threatened ecological communities and come in closer proximity to the Leadbeater's Possum translocation site than the alternative.

The key differences between Trail 1 and the alternative (Trails 45, 46 and 47), relate to economic benefits and biodiversity and habitat. The economic analysis indicates that the project has significantly reduced economic benefit with the removal of Trail 1 due to the high attractiveness of this trail as a tourism product. The findings of the biodiversity and habitat assessment are also critical to a decision on whether Trail 1 should be adopted as part of the overall trail network (with implementation of proposed mitigation measures to address the key ecological issues) or whether the alternative should be adopted because it would avoid potential impacts associated with Trail 1 that cannot be adequately mitigated. The findings of this assessment are presented in **Chapter 8: Biodiversity and habitats** and **Technical Report A: Biodiversity and habitats**.

## 8.0 Rationale for decisions on other project components

The trail network configuration largely dictates the preferred locations for other supporting project components such as the trail heads and bridges. The rationale for the proposed locations of these components and other project decisions are presented in Table 11 below. Descriptions and locations of the key project components are presented in **Chapter 3: Project Description**.

Table 11 Rationale for decisions on other project components

Project component	Description	Rationale
Warburton Golf Course Trail Head	A new Visitor's Hub and main trail head are proposed south of Warburton Golf Course.	<p>The location of the Golf Course Trail Head was chosen because of:</p> <ul style="list-style-type: none"> <li>• Its central position and proximity to the Warburton township providing easy access to the central shopping precinct and supporting economic outcomes</li> <li>• Accessibility to the northern and southern parts of the proposed mountain bike trail network and the Lilydale-Warburton Rail Trail</li> <li>• Accessibility from Warburton Highway</li> <li>• Existing open areas where facilities could be developed, avoiding the need to remove native vegetation (<b>Technical Report A: Biodiversity and Habitats</b>, Sections 6.3 and 9.12.2)</li> <li>• Existing infrastructure and services located that can be redeveloped</li> <li>• Support from Parks Victoria and DELWP</li> <li>• Support from the Warburton Golf Course Committee (land is privately owned by the club).</li> </ul>
Wesburn Park Trail Head	The Wesburn Park Trail Head is proposed at the Wesburn Park Recreation Reserve.	<p>The location of the Wesburn Park Trail Head was chosen because of:</p> <ul style="list-style-type: none"> <li>• Accessibility to the southern parts of the proposed mountain bike trail network</li> <li>• Provides an opportunity to reduce traffic entering Warburton</li> <li>• Accessibility from Warburton Highway</li> <li>• Accessibility from the Lilydale-Warburton Rail Trail and planned Little-Yarra Trail</li> <li>• Existing wide-open areas where facilities including additional parking could be developed, avoiding the need to remove native vegetation (<b>Technical Report A: Biodiversity and Habitats</b>, Sections 6.3 and 9.12.2)</li> <li>• Supports diversification of use and utilisation of assets at Wesburn Park (in accordance with the Wesburn Park draft Master Plan)</li> <li>• Support from Parks Victoria, Melbourne Water and DELWP.</li> </ul>
Mount Tugwell Trail Head	The Mount Tugwell Trail Head is proposed at Mount Tugwell, off Mount Bride Road.	<p>The location of the Mount Tugwell Trail Head was chosen because of:</p> <ul style="list-style-type: none"> <li>• Accessibility to the southern parts of the proposed mountain bike trail network</li> </ul>

Project component	Description	Rationale
		<ul style="list-style-type: none"> <li>Identified by DELWP District as most appropriate location in the area</li> <li>Accessibility from Mount Bride Road</li> <li>Existing open areas where facilities could be developed, avoiding the need to remove significant amounts of native vegetation (<b>Technical Report A: Biodiversity and Habitats</b>, Sections 6.3 and 9.12.2)</li> <li>Support from Parks Victoria and DELWP.</li> </ul>
Mount Donna Buang Trail Head	The Mount Donna Buang Trail Head is proposed at the existing visitor node at the summit of Mount Donna Buang.	<p>The location of the Mount Donna Buang Trail Head was chosen because of:</p> <ul style="list-style-type: none"> <li>Maximising the use of existing assets (toilets, car parks, facilities) already established at the summit</li> <li>Its central position</li> <li>Accessibility to the northern parts of the proposed mountain bike trail network</li> <li>Accessibility from Mount Donna Buang Road</li> <li>Existing open areas where facilities could be developed, avoiding the need to remove native vegetation (<b>Technical Report A: Biodiversity and Habitats</b>, Sections 6.3 and 9.12.2)</li> <li>Support from Parks Victoria and DELWP.</li> </ul>
Bridge over the Yarra River	The Yarra River Bridge is proposed to be a combined suspension and truss shared use bridge approximately 121 metres long.	<p>The location of the bridge over the Yarra River was chosen because:</p> <ul style="list-style-type: none"> <li>It is able to provide direct access between the northern and southern parts of the proposed mountain bike trail network and the Lilydale-Warburton Rail Trail near the Warburton Golf Course Trail Head</li> <li>It allows mountain bikers, cyclists and pedestrians the ability to cross over the Yarra River and Warburton Highway and Dammans Road safely</li> <li>The topography allows the bridge pylons to be constructed on the crest of the existing river channel avoiding works in the river itself and effects on river flows</li> <li>Construction of the bridge would not require the removal of significant quantities of native vegetation (<b>Technical Report A: Biodiversity and Habitats</b>, Sections 6.3 and 9.12.2)</li> <li>The bridge can be constructed on land managed by Yarra Ranges Council</li> <li>Existing clearings are available on each side of the bridge that could be used as laydown areas during construction.</li> </ul>
Bridge over the Old Warburton Highway	The Old Warburton Road Bridge is proposed to be a truss-style shared use bridge approximately 23 metres long.	<p>The location of the bridge over the Old Warburton Highway was chosen because:</p> <ul style="list-style-type: none"> <li>A key driver in the location was to avoid impacts to Old Warburton residents. Previously an at-grade crossing was proposed adjacent to residential properties</li> <li>It is a logical connection point between two sections of the southern part of the proposed mountain bike trail network</li> </ul>

Project component	Description	Rationale
		<ul style="list-style-type: none"> <li>It allows mountain bikers to cross over the Old Warburton Highway Road safely</li> <li>Construction of the bridge would not require removal of significant quantities of native vegetation</li> <li>Existing clearings are available on each side of the bridge that could be used as laydown areas during construction.</li> </ul>
Shuttle bus	16 shuttles are anticipated to be provided each day (approximately every 30 minutes over 8 hours), providing capacity of up to 400 riders being delivered to each trail head.	Shuttle buses would move riders and their bikes between the trail heads at Mount Donna Buang and Mount Tugwell via the Golf Course Trail Head. The decision to use shuttle buses reduces the amount of vehicle traffic on roads in the vicinity of the project, minimising congestion and disruption of other traffic using these roads.
Waterway crossings	Elevated structures including boardwalks and low-level bridges would be used where the trail crosses over a waterway or areas of soft or boggy ground.	The elevated would enable mountain bike users to avoid and minimise impacts to waterways and associated biodiversity values. The construction methods adopted in environmentally sensitive areas would avoid excessive excavation, for example by using hydraulically driven footing installation. Span lengths of up to five metres would be used to allow the bridges to cross waterways without the need for footings within the waterways.
Site access roads	No new site access roads are proposed as part of the Warburton Mountain Bike Destination	The use of existing roads to access the Warburton Mountain Bike Destination avoids the removal of native vegetation for the construction of new roads.



## 9.0 Conclusion

Consideration of alternatives is a requirement set out in the Scoping Requirements for the Warburton Mountain Bike Destination. As the project has been under development for several years and been informed by considerable community and government agency consultation over that period, the avoidance and minimisation of impacts has received significant attention. Notwithstanding the previous work, further consideration of alternatives has been given in the EES. This report and its attachments outline the analysis that has been undertaken and the associated conclusions.

Overall, the alternatives assessment process has involved the following parts:

- Pre-EES design development: avoidance or minimisation of potential impacts on sensitive values through an iterative design development process to establish a network design for the purposes of project referrals.
- Identification of the benefits of inclusion of trails within the Yarra Ranges National Park
- Screening of trails to identify any 'Priority Trail Sections' that require further examination of potential alternative alignments.

The key findings of these investigations are summarised below.

### *Project development pre-EES*

The design development process described above led to the production of a network design that was used for the purposes of project referrals. The referred network design was prepared in response to community feedback and addressed a range of sensitivities in the project area including known biodiversity and heritage values, whilst enabling the project to meet its overarching objectives. The process was iterative with many changes being made.

The EES assesses the final mountain bike trail network based on an assumed 20 metre corridor for each trail within which the exact final trail alignment would be placed. Micro-siting the final trail location within the 20-metre corridor would be undertaken pre-construction during project implementation.

### *Benefits of trails within the Yarra Ranges National Park*

The literature review and assembled case studies demonstrate many benefits of mountain bike projects. The benefits identified are closely linked with the development of mountain biking projects in natural areas, including in some cases National Parks.

Economic analysis has been undertaken to compare the relative benefits of the Warburton Mountain Bike Destination with trails in the Yarra Ranges National Park (Case 1), without trails in the Yarra Ranges National Park (Case 2) and without Trail 1 in the Yarra Ranges National Park (Case 3). The analysis predicted that exclusion of trails from within the National Park would reduce total visitor numbers in 2031 from 221,454 to 140,014, and the exclusion of Trail 1 would reduce visitor numbers to 153,769. Annual spend in 2031 within the Yarra Ranges municipality is predicted to be \$48.6 million for the full trail network, \$28.4 million for the trail network without trails in the National Park and \$31.52 million for the trail network without Trail 1. Jobs generated during the project operations phase are predicted to reduce from 228 to 133 if the trails in the National Park are excluded, and to 148 if Trail 1 is excluded. Overall, it is concluded that exclusion of trails from the Yarra Ranges National Park would not allow the Warburton Mountain Bike Destination to realise its full potential and compromise the ability to meet the project objectives. Accordingly, subject to full and detailed assessment as part of the EES process to determine that the potential biodiversity impacts to be effectively managed, Yarra Ranges Council believes trails within the Yarra Ranges National Park are warranted as part of the project because of the additional benefits they bring.

### *Trail screening to priorities trails for further consideration of alternatives*

As part of the alternatives assessment process, trail screening was undertaken to determine the trail sections for which further investigation of alternatives is warranted. Each of the trails were given priority ratings by the biodiversity, heritage and socioeconomic specialists with any trail receiving a very high or high rating for any discipline to be given further consideration with respect to alternatives.

One trail was assessed to be a very high priority, being Trail 1 (Drop-a-K), due to records of significant species and communities, including Leadbeater's Possum, Mount Donna Buang Wingless Stonefly

and Cool Temperate Rainforest. An alternative to Trail 1 (comprising Trails 45, 46 and 47) was identified with these individual trails each rated high priority. Based on these results it was decided that both Trail 1 and the alternative (Trails 45, 46 and 47) would be fully assessed and compared within the EES to fully understand the relative merit of the options and to determine for each, whether potential biodiversity impacts could be effectively managed.

A comparative analysis of Trail 1 and Trails 45, 46 and 47 is presented in Section 7.0 of this report. This analysis determined that inclusion of Trail 1 in the trail network would provide significantly greater economic benefits but would also have potential for more significant biodiversity impacts and would be situated within the Coranderrk Creek catchment for 458 metres.

Trails 5 and 50 were also identified to be trails of high priority. No viable alternatives were identified for these trails and therefore they were recommended to be taken forward for full assessment in the EES to determine whether the potential biodiversity impacts could be effectively managed.

In relation to heritage and socio-economic aspects, all trail sections were rated as moderate or low priority with respect to further examination of alternatives. Nevertheless, heritage and socio-economic issues are addressed in the full impact assessment presented the EES including identification of further avoidance and minimisation measures to be adopted where determined to be necessary by the assessments.

## 10.0 References

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## Attachment A: Developing Warburton as a World Class Mountain Bike Destination





# Developing Warburton as a World Class Mountain Bike Destination, and Economic Feasibility Study

August 2021







This report was prepared by TRC Tourism for Yarra Ranges Council in relation to Developing Warburton as a World Class Mountain Bike Destination.

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## **Acknowledgement**

*We acknowledge the Indigenous peoples of the lands, waters and communities we work together with. We pay our respect to their cultures; and to their Elders – past, present and emerging.*

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# EXECUTIVE SUMMARY

Participation in mountain biking is growing, with desire by riders to enjoy the outdoors and experience natural attractions.

Majority of mountain bikers are beginners or intermediate level – seeking a new experience or participating in an outdoor activity with family and friends. Many intermediates are drawn to locations that contain the best experiences, even though the experiences may be blue or black standards.

There is obviously a fine balance in delivering a Mountain Bike (MTB) trail experience that is sustainable – environmentally and economically, while meeting the needs of both local communities and visitors and ensuring sufficient ongoing resources.

After development of the Warburton Mountain Bike Master Plan, the final stage prior to construction is to carefully evaluate all the potential impacts, positive and negative that the proposed trail network will create.

This report provides an overview of the impacts reviewing participation in MTBing, health and wellbeing, environmental and economic impacts. The report reviews a range of literature in best practice and provides an evaluation of existing and planned MTB experiences across Australia.

Findings reveal:

- Top reasons for undertaking MTB experience are for - Health and fitness, being outside in the open air, sightseeing, relaxation, recreation and socialization
- It is estimated that 1 million people currently participate in mountain biking, with likelihood to participate sitting around 6 million Australian adults
- Cycling activity is in the top 5 of sport and recreation activities undertaken by Australians. Over 50% of Australian households have at least one working bicycle at home
- Victorians have the highest level of cycling participation, accounting for 28.7% of all Australian cyclists

- High value – 20% of cycling participants have an income of over \$200,000 per annum
- The proposed Warburton MTB Master Plan aligns with priorities within Parks Victoria Healthy Parks, Healthy People Framework 2020
- Cycling is proven to have substantial benefits on physical and mental health and wellbeing, reducing professional medical expense and interventions.
- Mountain biking has a relatively low environmental impact, comparable to that of walkers
- Well-designed trails prevent off trail riding and unsanctioned trail development
- MTB trails provide opportunities for people to connect with and appreciate nature, resulting in increased awareness and advocacy for protection of our natural spaces
- Experiences in nature are highly desirable, demonstrated by the increase in intended conversion when an MTB experience within a national park is offered
- MTB riding is affordable for a large proportion of people
- Flow on benefits for local people and communities offering support services as trail towns and trail hubs, and improves liveability especially in regional locations
- COVID-19 is demonstrating strong uptake in outdoor recreational activities, with huge growth in Australia and globally in bicycle purchase and participation in cycling

National Parks and protected area authorities across Australia and New Zealand and elsewhere are committed to providing sustainable trail experiences, evidenced by substantial funding commitments both in the past and on the horizon in MTB trails

## Economic Impact Assessment

This report provides an economic impact assessment of the proposed Warburton MTB Trails development. The modelling is based on estimates of annual uses/users of the trails and other assumptions utilised in quantifying spending and benefits in the region.

The economic modelling has been undertaken with 2 spending assumptions of trail users and visitors:

Based on published Tourism Research Australia data (TRA), and

Based on unpublished surveys of riders and visitors at Derby in Tasmania by Xyst Pty Ltd in May 2021.

The Derby data is likely to provide a more accurate picture of expenditure for mountain biking specific destinations as it captures expenses general visitors will not incur, including specialist bike hire, shuttle bus services and bike repairs.

However, the TRA spend data is used as the primary reference due to it being published data captured in a repeatable way by a leading statistical agency.

**Attachment 1** to this report provides the same analysis undertaken with the same three cases undertaken with the Derby data for reference purposes only. It indicates a higher economic benefit due to the higher spending per visitor / rider.

**Average expenditure levels are used in the modelling for trail users (who are visitors to the region) and based on Tourism Research Australia (TRA) data for tourism visitors to the Yarra Ranges LGA.<sup>1</sup>**

The analysis is for a 10-year period of operations. Three cases are examined:

- Case 1 Base Case: Full Trails Network - covering the full development of the trails network
- Case 2 Reduced Trail Network, with no trails in the National Park Areas, and
- Case 3 with No Drop A K trail.

In modelling of trail users, we have drawn of the market segment profile from the surveys conducted by instinct and reason.<sup>2</sup>

## Trail Use

The modelling has identified the potential number of trail users over the 10-year period of operations.

- For Case 1 Base Case, user numbers would increase from 131,217 in year 1 to 221,454 in year 10
- For Case 2: Reduced Trails Network (No Trails in National Parks) , user numbers would increase from 100,739 in year 1 to 140,014 in year 10
- For Case 3: No Drop A K Trail, user numbers would increase from 110,909 in year 1 to 153,769 in year 10.

Around two thirds of trail users would be day visitors and one third overnight visitors. The trails will generate a significant increase in visitors to the region and provide a major boost to accommodation and food service businesses.

The differences are show in the following charts. Case 2 delivers lower visitor numbers compared with the Case 1 Base Case, with a difference in year 10 of around 80,000 annual users. For Case 3 visitor numbers in year 10 are around 68,000 lower than the Base Case.

## Regional Spending

For the Case 1: Base Case spending in the Yarra Ranges LGA by trail users would increase from \$28.0 million in year 1 (\$20.9 million overnights and \$7.1 million day visitors) to \$48.6 million in year 10 (\$36.7 million overnights and \$11.9 million day visitors).

<sup>1</sup> Local Government Area Profiles, 2019, Yarra Ranges (S) LGA, Tourism Research Australia

<sup>2</sup> Warburton MTB trail research -quantitative findings, instinct and reason, December 2020 P16 & Additional Findings May 2021.

For the Case 2: Reduced Trails Network (no National Park Trails), spending in the Yarra Ranges LGA by trail users would increase from \$19.1 million in year 1 (\$13.6 million overnights and \$5.5 million day visitors) to \$28.4 million in year 10 (\$21.1 million overnights and \$7.3 million day visitors).

For the Case 3: No Drop A K Trail, estimated spending in the Yarra Ranges LGA by trail users would increase from \$21.2 million in year 1 (\$15.1 million overnights and \$6.1 million day visitors) to \$31.5 million in year 10 (\$23.5 million overnights and \$8.0 million day visitors).

Total expenditure comprises:

- spending on trail-linked activities (including spending on bike related expenses and other spending - food and beverage etc.) in proximity to the trails
- spending on accommodation (for overnight stayers) and meals during their stay, and
- spending on other recreational and tourism services.

## Economic Impacts

The economic impacts of the trail's development are modelled for both the construction phase and the operations phase. The impacts are measured in terms of full-time equivalent jobs (FTE) and the increase in regional income that is generated by trail users and their spending in the region.

### Economic Impacts Construction Phase

In modelling construction jobs, the cost components that are associated with trails and other facilities construction are used, and these total \$15.1 million for Stage 1 and Stage 2.

A total of 84.1 FTE jobs (70.1 direct jobs and 14.1 indirect/induced jobs) would be generated during the construction period. The direct jobs (70.1) comprise 50.3 jobs in on-site construction and 19.8 jobs in materials/equipment supply.

The EEC Report indicates that construction of the trails would be undertaken by teams of 3-4 persons.<sup>3</sup>

### Economic Impacts Operations Phase

The operations phase economic impacts are driven by the expenditure of visitors/users in towns adjacent to the trail and in the broader Yarra Ranges region. MCA's regional economic model is used to estimate the employment and income impacts of the trail.

- For Case 1 Base Case, the operation of the trails would generate a total of 132.7 full-time equivalent jobs in year 1, increasing to 228.6 FTE jobs in year 10
- For Case 2 Reduced Network – No National Park Trails, the operation of the trails would generate a total of 90.5 full-time equivalent jobs in year 1, increasing to 131.7 FTE jobs in year 10
- For Case 3 No Drop A K, the operation of the trails would generate a total of 100.5 full-time equivalent jobs in year 1, increasing to 148.4 FTE jobs in year 10.

On a sector basis, the jobs (FTE- direct and indirect) generated by trail users are mainly concentrated in:

- accommodation
- food and beverage
- recreational services and other visitor services
- transport (including shuttles)
- other retail.

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<sup>3</sup> EES Chapter 3 – Project Description Warburton Mountain Bike Destination Project, Yarra Ranges Council P24

## Benefit Cost Analysis

The benefits and costs of the operations of the trails are analysed over a 10 -year period. The benefits are measured by:

- direct - the increase in regional income generated by trail users over a 10-year period, and
- indirect - the estimated health benefits and the trail user value.

The costs include design and planning costs, construction costs, and asset maintenance costs.

For the comparison, the present value of the benefits is calculated using 3 discount rates (4%, 7% and 10%).

A 7% discount rate is appropriate for a trail project. The BCRs including all benefits are:

- Case 1: Base Case yields a positive BCR of 7.7
- Case 2: Reduced Trail Network yields a positive BCR of 4.7
- Case 3: No Drop A K Trail yields a positive BCR of 5.2.<sup>4</sup>

If only regional income is included the BCRs are:

- Case 1 - 4.5
- Case 2 - 3.0
- Case 3 – 3.3.

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<sup>4</sup> The measured benefits include the increase in regional income, health benefits of exercise and a notional valuation of the consumer benefit of the trail.

# 1 Introduction

## A world class mountain bike destination in the heart of the Yarra Ranges.

In 2010, the concept to develop a Warburton mountain bike hub was presented as an opportunity to increase recreational, economic and health and wellbeing benefits for local people, while attracting visitors into the Yarra Ranges.

Since then, the Yarra Ranges Shire Council (YRC) has undertaken a range of feasibility studies, economic impact assessments, stakeholder and community consultation, master planning, trail design and concept development. The proposed Warburton Mountain Bike Destination Master Plan is now undergoing the Environmental Effects Statement (EES) process. The process evaluates impacts to:

- Environment, habitats and biodiversity
- Waterways and catchments
- Social, economic, amenity and land use, including transport
- Cultural heritage.

The progression of the Master Plan would see the formalisation of an existing 15km of trail, development of 164km of new mountain bike trails and supporting trail infrastructure, access and facilities. The proposed trails have been designed to cater for diversity in rider abilities and landscape experiences.

### 1.1 Study purpose

TRC Tourism has supported the YRC on the Warburton mountain bike destination journey, having previously undertaken feasibility studies and economic impact assessments.

As the proposal comes closer to realisation, TRC has now been engaged to better understand the essential elements of a world class trail destination. This study will be used to help understand what YRC needs to do in a practical sense to achieve its full potential as a mountain bike hub.

A critical question being asked is “why develop these trails in the national park?”

This study will review best practice approaches to mountain biking, particularly within a national park and natural landscape context in three phases:

- Literature review
- Case studies
- Updated demand modelling.

The study will be used to demonstrate the importance of iconic natural landscapes as an essential component of trails experiences.

## 2 Proposed Warburton MTB Trails Development

### 2.1 Project Objectives

The project involves developing a proposed world-class mountain biking destination centred around Warburton, approximately 70 kilometres north east of Melbourne. The new trails build on the existing informal network of mountain bike trails. Yarra Ranges Council has identified mountain biking as an opportunity for tourism growth within the region, which would also support the region and the health and well-being of its residents. The trails would position Warburton as an internationally significant mountain biking destination and outdoor active destination.

The project objectives are to:

- Facilitate tourism growth and associated positive economic and jobs growth in the Yarra Valley Region
- Create iconic mountain bike trails eligible for International Mountain Bike Association Gold Ride Centre status
- Create spectacular riding experiences that have a competitive advantage over existing mountain bike destinations and leverage Warburton's beautiful township, rural valley and surrounding forested slopes
- Enhance the health and well-being of the community
- Maintain the significant biodiversity and heritage values within the project area and provide opportunities for the community to connect with and appreciate their importance.<sup>5</sup>

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<sup>5</sup> EES chapter 3 – Project Description Warburton Mountain Bike Destination Project, Yarra Ranges Council . P3

### 2.2 Project Components

The project consists of approximately 186 kilometres of mountain bike trails providing a range of experiences to suit all levels of riding.

The main project components proposed are:

The proposed mountain bike trail network consists of:

- An upgrade of existing mountain bike trails - approximately 15 kilometres
- new mountain bike trails - approximately 164 kilometres
- existing vehicle roads and tracks to be incorporated into the mountain bike trail network (approximately seven kilometres).

Some of the trails are returning loops, while others are point-to-point trails. A new visitor's hub and main trail head at the Warburton Golf Course is planned, along with new trail head facilities at Mount Tugwell and Mount Donna Buang.<sup>6</sup>

### 2.3 Development Timing

The following is the staging for the development and operations of the Warburton MTB trails. Stage 2 is subject to acquiring future funding. This timing is indicative and is subject to approval processes.

<sup>6</sup> EES chapter 3 – Project Description Warburton Mountain Bike Destination Project. Yarra Ranges Council P6

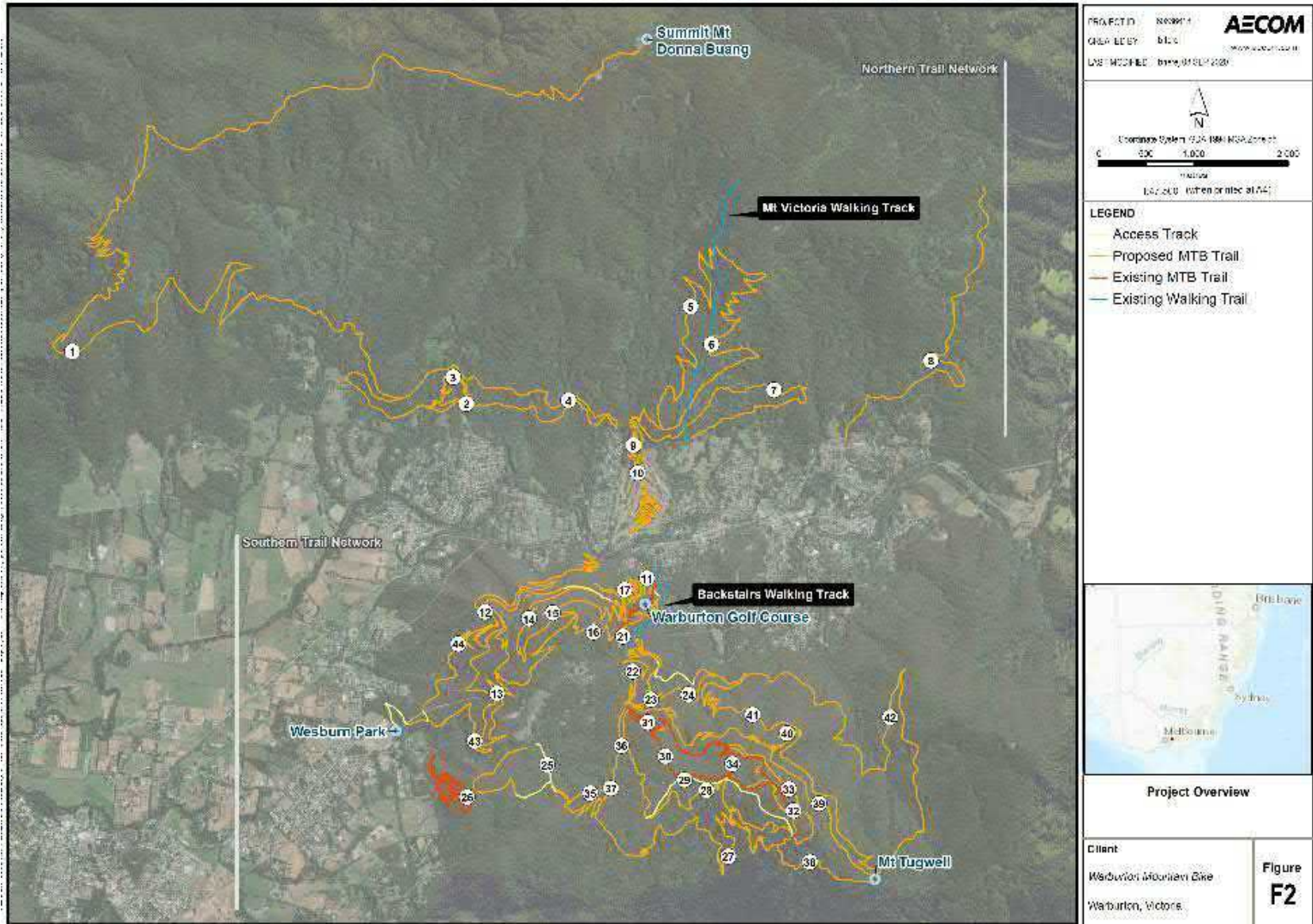
**Table 1.** Staging of Warburton Trail Development

Warburton MTB Trail	
Staging of Trail	Indicative Timing Only
<b>Construction</b>	
<b>Stage 1</b>	
Construction Stage 1 (110 kms)	Sept 2021
Section 1 35 kms	Sept 2021-Feb 2022
Section 2 35 kms	Mar 2022-Aug 2022
Section 3 35 kms	Sept 2022-Jan 2023
<b>Stage 2</b>	
Construction Stage 2 Section 4 (76 kms)	6 months
Subject to funding - indicative only	Sept 2024-Jan 2025
<b>Operations</b>	<b>Commence</b>
<b>Stage 1</b>	
Section 1 35 kms	March 2022
Section 2 35 kms	Sept 2022
Section 3 35 kms	Feb 2023
<b>Stage 2</b>	
Section 4	Feb 2025

SOURCE: YARRA RANGES SHIRE COUNCIL SEPT 2020



Figure 1. Proposed Network – Yarra Ranges MTB Network



SOURCE: EES CHAPTER 3 – PROJECT DESCRIPTION WARBURTON MOUNTAIN BIKE DESTINATION PROJECT. YARRA RANGES COUNCIL P5



## 3 Literature Review

### 3.1 Background - Warburton Mountain Bike Trail Master Plan

**Vision: To provide a world class mountain biking destination around the township of Warburton that promotes health and wellbeing, economic resilience and environmental stewardship.**

A concept presented to the YRC by local mountain bike enthusiasts in 2010, the Master Plan is built upon several success factors that Warburton already offers:

- Warburton is nestled on the Yarra River and flanked by tall mountains on either side, making it possible to create a “ride in, ride out” experience directly from town
- National park and state forest settings that provide a rich diversity in topography, scenery and natural beauty
- There is over 1000m elevation change on the north side and over 800m on the south side
- Warburton and the Yarra Valley already support tourism and further development opportunities exist
- Proximity to an international airport increases ease of travel for overseas riders
- Only 70km from Melbourne CBD and over 4 million people living within an hour’s drive
- Soil that is highly conducive to trail building, allowing trails to be more sustainable and provide a better riding experience.

The proposed new trails also present an iconic Australia first opportunity:

*‘Identified a descending trail from the Mt Donna Buang summit to Warburton Township (Drop-A-K) as a key opportunity to develop an experience unlike anything available in Australia. With over 1000 vertical metres of elevation difference and an opportunity to have a trail that is descent only, this unique product could be established as an international drawcard that would drive the visitor economy.’*

#### 3.1.1 Objectives

Incorporating 15km of existing trail upgrades and 164km of new trails, the Master Plan’s objectives are to:

- Facilitate tourism growth and associated positive economic and jobs growth in the Yarra Valley region
- Create iconic mountain bike trails eligible for International Mountain Bike Association Gold Ride Centre status
- Create spectacular riding experiences that have a competitive advantage over existing mountain bike destinations and leverage Warburton’s beautiful township, rural valley and surrounding forested slopes
- Enhance the health and well-being of the community
- Maintain the significant biodiversity and heritage values within the project area and provide opportunities for the community to connect with and appreciate their importance.

#### 3.1.2 Delivery

With recommendations for minimal impact design and construction techniques, the trail network implementation schedule is 10 years in the making:

- Project development and approval: 2020-mid 2021
- Project construction: mid 2021-end 2030
- Project operations and maintenance: staged opening from end 2021 onward.

### 3.1.3 Target markets

**Figure 2.** Target markets outlined for the Warburton mountain bike trails experience.



#### **Mountain bikers (includes residents)**

- Mostly male 35-44 years old
- Higher disposable income
- Likely to be travelling with partner and children, or with a group of 3-5 friends
- Seeking at least a half day MTB experience, complemented by other destination experiences
- Attracted to mountain biking to escape the confines of the home, work and city, connect with nature, relax, socialise, undertake a personal challenge and adventure.



#### **Families (includes residents)**

- As mountain bikers often travel with their families, they are also a target market for Warburton.
- Beginner and social trails are a great way for mountain bikers to enjoy time together with their families.



#### **Tourists / visitors**

- For non-mountain bikers, many visitors may nowadays incorporate an outdoor experience such as mountain biking into their itineraries.
- Through provision of guided experiences and bike hire, visitors will enjoy Warburton mountain biking as a way of learning about and exploring the region.



#### **Outdoor education**

- Schools are incorporating outdoor education and adventure activities as a core component of the curriculum
- With several schools located both near Warburton and further afield in Melbourne, Warburton can open new skill building opportunities and camps for outdoor education groups.

### 3.1.4 Forecast benefits

Pre-COVID impacts, the realisation of the Warburton Mountain Bike Destination was forecast to result in:

- 120 new jobs
- \$16 million in economic spend
- 40+ km of trail linking Lilydale, Yarra Glen Healesville and joining into the Lilydale Warburton Rail Trail
- Improved healthy lifestyles of local people.
- Updated demand and forecasting post-COVID is incorporated within this report.

A combined total of \$11.3M has been committed by Federal, State and Local Governments to implement Stage 1 of the Warburton trails.

### 3.1.5 Environmental Effects Statement (EES)

As per the *Environment Effects Act 1978*, procedures and requirements under section 8B(5), an Environmental Effects Statement (EES) is being prepared to assess the proposed trails within the Warburton Mountain Bike Master Plan. The EES will assess the effect the project will have on:

- Environment, habitats and biodiversity
- Waterways and catchments
- Social, economic, amenity and land use, including transport
- Cultural heritage.

To advance to the detailed design stage, conceptual alignments were carefully investigated in the field, with a 20-metre corridor ‘ground-truthed’ by walking the trail length. The design principals applied during the ground-truthing works included:

- Where practicable, align trails on old benches/old roads or other disturbance corridors, which are reasonably common in areas that have a history of mining or logging
- Minimise the use of switchback corners to minimise construction footprints
- Avoid excessively flat or steep areas
- Use the terrain to its maximum. The final shape and feel of the trail is dictated by the terrain, so any interesting shapes or features that are present in the landscape should be capitalised on where possible
- Trails designed in accordance with Australian Mountain Bike Trail Guidelines (MTBA, 2019), and International Mountain Bike Association Trail Construction Guidelines.

During the ground-truthing, a Biodiversity Impact Assessment, Environmental Risk Assessment and Cultural Heritage and values assessment were undertaken. These assessments have been submitted to inform the EES for evaluation.

Other factors considered and presented within the EES include:

- Runoff management and erosion prevention
- Utilising existing vehicle roads and tracks to be incorporated into the mountain bike trail network
- Siting and conceptual design of new visitor hub, trail heads and associated infrastructure including shuttle bus road access, car parking and trail signage
- Trail construction including upgrading of existing trails and micro-siting of new trails
- Trail types including excavation, elevation, rock and embankments and trail construction techniques including bridges
- Trail construction and implementation timeframes for use
- Anticipated trail use from 2021 to completion in 2030, including regularity and participation in events
- Environmental impact mitigation including protection of tree roots during construction, awareness of weeds species, development of a Construction Environmental Management Plan as guidance for best environmental practices during trail construction, and installation of bike washing facilities to reduce weed spread
- Trail operations incorporating workforce requirements, maintenance works, inspections and methods.

All relevant planning documentation including the EES submission is available for public viewing and interactive comments via the [www.rideyarranges.com.au](http://www.rideyarranges.com.au) website. In addition, face-to-face meetings, public forums, direct postal mail outs, emails and phone calls and online surveys have been available enabling local communities, organisations, industries and stakeholders to have their say and inform the future direction of Warburton as a world class mountain bike destination.

## 3.2 Mountain biking trends, participation and impacts

### 3.2.1 Trends

There are a number of mountain bike riding styles which have evolved since the sport began in the 1980's. Cross-country riding is the most popular style of riding due to its relative ease of participation by a broad range of users. Mature or core mountain bike riders however may seek out more adventurous trail experiences including gravity rides such as Gravity Enduro and jump and stunt focussed styles such as Freeride and Dirt Jumping.

With the continual increase of mountain bike participation by a broad range of demographics, riders can be broadly divided into core and non-core riders:

**Figure 3.** Mountain bike user definitions – non-core vs core



#### Non-core Mountain Bikers:

- Beginners
- Road bikers that occasionally ride MTB
- Families seeking safe enjoyable places to ride away from cars
- School groups (often guided by tour operators)
- Off-road bike tourers
- With increased skill, may eventuate into Core Mountain Bikers.



#### Core Mountain Bikers:

- High levels of expenditure on gear and equipment
- High amount of time spent mountain bike riding
- High willingness to travel to go mountain biking
- High likelihood of participating in competitive events.

### 3.2.2 MTB segments

Further segmenting the non-core versus core mountain bike riders is the uptake and participation in basic, intermediate and competition riding experiences.

**Figure 4.** Demographics of Basic, Intermediate and Competition riders<sup>7</sup>



#### Basic riders

- MTB is an add-on holiday experience, learning a new skill and undertaking a different experience
- Predominately female
- Over 55 years of age
- Minimal MTB experience
- May undertake as a once holiday activity
- MTB will be part of a day trip
- Participating in MTB for health and fitness and being outside in the open air



#### Intermediate riders

- MTB is part of a holiday in a natural setting
- Undertaken with family or partner
- 6-10 years riding experience
- May undertake as a twice per year holiday activity
- MTB will be part of a day trip
- Participating in MTB for health and fitness and being outside in the open air



#### Advanced or Competition riders

- MTB is a core element of the holiday
- Thrill-seeking and adventure based
- Will undertake with family or friends
- Predominately male
- 11+ years MTB experience
- Income \$150K+ pa
- May undertake 3 times or more per year as a holiday activity
- MTB will be usually part of a 2-night trip
- Participating in MTB to challenge themselves, enjoy time outside in the open air, health and fitness, thrill seeking and adventure, recreation and social connection.

<sup>7</sup> Warburton Mountain Bike Destination 2019 – Instinct and Reason

Most people mountain bike for fun and enjoyment, with only a small proportion focussed on competitions. The attractive points for mountain biking are that it enables people to choose who they ride with, generally family or close friends; it can be done anytime; it does not require a minimum level of competency (other than the ability to ride a bicycle) and allows people to choose trails to match their ability; people that may be self-conscious about their ability can choose where, when and who they ride with.<sup>8</sup>

**The combined top reasons all riders participate in MTB include:**

- Health and fitness
- Being outside in the open air
- Sightseeing
- Relaxation, recreation and socialization
- For competition riders, MTB is also about challenge and thrill seeking.<sup>9</sup>

### 3.2.3 The importance of natural environments

Nature and wildlife are highly desired complementary experiences for all mountain bike riders, especially the larger segments of basic and intermediate skilled riders. Demand testing for a Warburton MTB experience undertaken by Instinct and Reason in 2019 indicated that offering nature and wildlife experiences returned the highest conversion intention rating of all ancillary offerings (+7.3%). Providing value-add national park ranger talks also increased desirability by +5-12%.

<sup>8</sup> Warburton Mountain Bike Feasibility Study 2019

<sup>9</sup> Warburton Mountain Bike Destination 2019 – Instinct and Reason

### 3.2.4 Participation

Recent estimates on mountain bike participation suggest that around **one million** Australians engage in mountain biking activity, ranging from beginner through to competition level.<sup>10</sup>

Data on the actual participation in mountain biking in Australia is largely collated from three sources – Mountain Bike Australia's (MTBA) statistics, the *Ausplay Cycling – State of Play Report 2020* and recent research undertaken by Instinct and Reason on behalf of the Yarra Ranges Council.

During 2020, MTBA became affiliated with the broader Auscycling movement. Auscycling provides a single platform to unite all Australian cycling interests across BMX, BMX Freestyle, Cyclo-Cross, E-Sport, Mountain Bike, Para-Cycling, Road, Track and Lifestyle riding (recreational and commuter). Representing more than 52,000 members nation-wide, the vision of Auscycling is to make Australia a nation of bike riders, across all forms of cycling. Principle partners of this movement are the Federal Government's Australian Sports Commission (SportsAus) and the Australian Institute of Sports – both with the objective of growing participation in sports for physical, recreational, social and mental wellbeing.

<sup>10</sup> Warburton Mountain Bike Destination 2019 – Instinct and Reason



Figure 5. Mountain biking participation based on MTBA data<sup>11</sup>

# Mountain biking participation

## MTBA membership



- Prior to COVID-19, MTBA membership numbers reached an all-time high of 18,000. This is a growth of 59.7% in the last 5 years.
- After a small decline due to travel restrictions and lockdowns, the CEO of MTBA has recently reported member numbers have now been restored to pre-COVID levels and are continuing to rise.



## Social media

- Facebook - 39,994 followers (11% growth from FY19)
- Instagram - 23,102 followers (15% increase from FY19).
- Potential reach of 63,096 individuals.

## Clubs - nationally

- 166 clubs
- 19 schools
- 27 private promoters (MTB events) affiliated with MTBA.
- Club affiliation has grown by 29.7% in the past five years.



## Victorian clubs

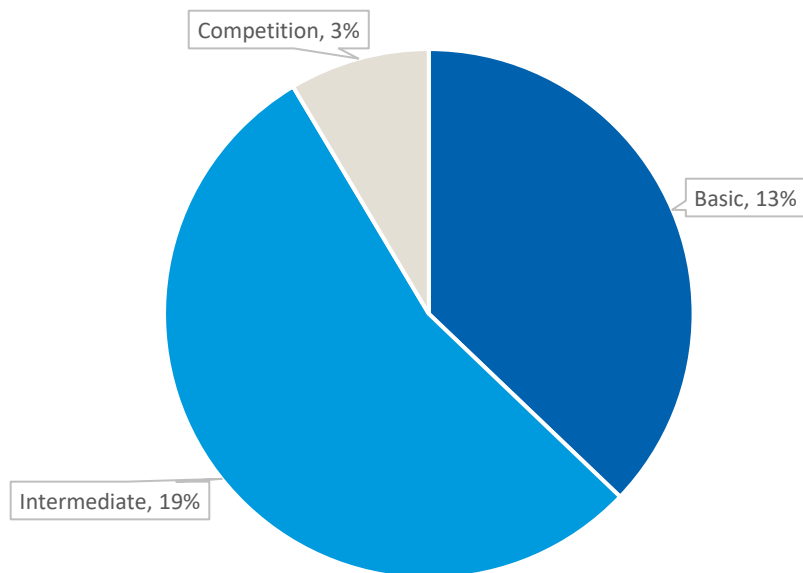
- 37 MTB clubs, this is the second largest club membership behind NSW with 53 clubs.
- 3 Victorian schools are affiliated with MTBA, behind Queensland (8 schools) and NSW (4 schools).
- 1 private promoter affiliated with MTBA, this is less than all other States and Territories other than the NT – WA has 8 MTBA listed private promoters, followed by Tasmania with 5.



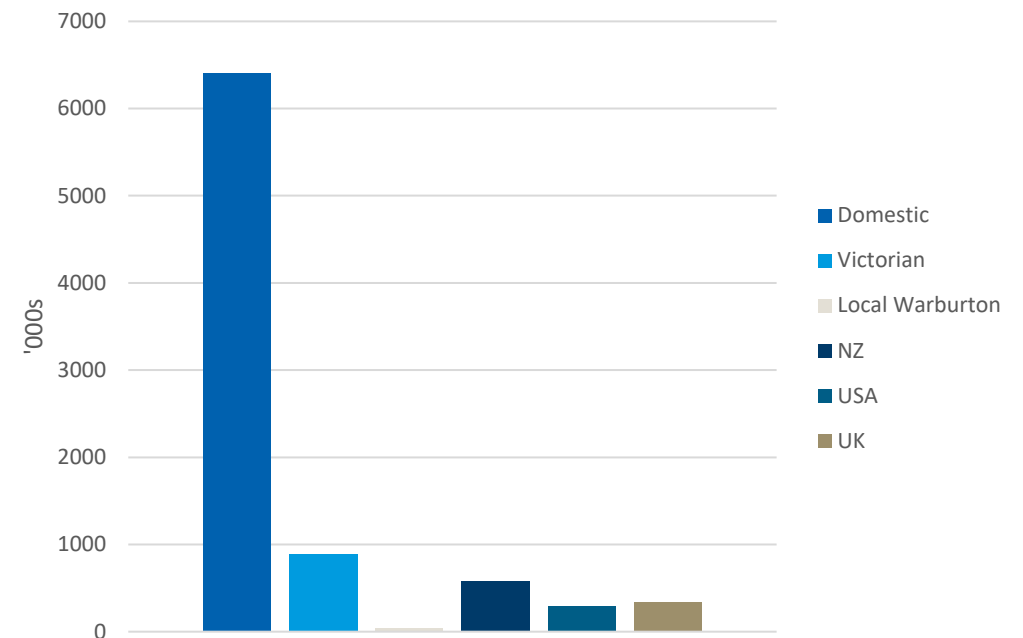
Source: Mountain Bike Australia Annual Report 2020

<sup>11</sup> Mountain Bike Australia Annual Report 2020

**Figure 6.** Category participation percentages of Australian adult (+18) mountain bike riders



**Figure 7.** Total potential Australian MTB adult market, includes international visitors to Australia and likelihood of participation in an MTB experience<sup>12</sup>



- 32% of the adult Australian population have incorporated or considered a mountain bike experience in a holiday. Of this 82% have added an MTB experience into their holiday.<sup>13</sup>

<sup>12</sup> Warburton Mountain Bike Destination 2019 – Instinct and Reason. Statistics determined pre COVID-19.

<sup>13</sup> Warburton Mountain Bike Destination 2019 – Instinct and Reason

### 3.2.5 Cycling

Clearinghouse for Sport undertake annual sport and physical recreation participation surveys, used to inform Sports Australia. Mountain biking is included within the broader cycling category. Results for cycling in the Ausplay State of Cycling Report for 2020 indicate:

**Figure 8.** Cycling participation in Australia<sup>14</sup>



<sup>14</sup> Ausplay Cycling – State of Play 2020; Ausplay National Cycling Participation Survey 2019



### 3.3 Impacts of mountain biking

The benefits of mountain biking are outlined by Mountain Bike Australia (MTBA):

- **Environmental** – greater awareness and understanding of our environments, leading towards advocacy and protection
- **Economical** – users can support complementary mountain biking experiences such as cafes, bike hire, guided tours, accommodation. Mountain biking experiences and trails support business sustainability and opportunities for new business investment and employment
- **Social** – mountain biking can also connect communities together and provide a place for family and friends to enjoy time recreationally.<sup>15</sup>

Mountain bike riding provides more than just economic, health and social and environmental benefits. MTBA, IMBA and the previously presented research suggests that mountain biking provides:

**Figure 9.** Benefits of Great Trail Experiences



<sup>15</sup> [www.mtba.org.au](http://www.mtba.org.au)

### 3.3.1 Benefits of Active Trail Use

There is great community benefit in the establishment of mountain bike trails and the promotion of outdoor activities is an essential component of healthy communities. Community pride is also a benefit from the development of MTB experiences, as members of the community are often involved in volunteering and maintenance of the track. Health and social wellbeing benefits of mountain biking include:

- promoting an appreciation for the outdoors and natural environment, creating advocates for protection of those environments
- is inclusive of all age groups and ability levels – everyone can participate
- can be undertaken at all times of the day and in almost any season
- does not consume significant maintenance resources when compared to other sporting facilities
- appeals to riders who are not comfortable riding on roads due to traffic
- promotes health and fitness within the local community.<sup>16</sup>

Mountain biking has also been utilised as a therapy for people with mental health issues, including women who are survivors of sexual abuse and assault (<https://thesacredcycle.org/>) and also people managing Post-Traumatic Stress (<https://paptsd.org/about/>).

### 3.3.2 Healthy Parks, healthy people

The concept for establishing Warburton as a mountain biking destination was a result of recommendations made in the Healthy Parks Healthy People (HPHP) framework in 2010. This framework is now a global movement, with clear evidence supporting the connection between healthy environments and positive human health and wellbeing.

Incorporated into Victorian Government policy, the Parks Victoria HPHP Framework 2020 is built on four principles that will benefit both Victorians and environments:

- The wellbeing of all societies depends on healthy ecosystems
- Parks nurture healthy ecosystems
- Contact with nature is essential for improving emotional, physical and spiritual health and wellbeing
- Parks are fundamental to economic growth and to vibrant and healthy communities.<sup>17</sup>

Relevant priorities of HPHP are in delivering:

- Sustainable natural settings and all abilities facilities that encourage and support nature play, outdoor learning, physical exercise, physical activity and recreation and social connection
- Trails and other tailored infrastructure that promote fitness and challenge
- Events and programs that promote regular participation in physical activity, resilience and positive mental health in nature and contribute to the visitor economy.

The Framework is an enabling document for the implementation of supporting plans such as:

<b>Protecting Victoria's Environment: Biodiversity 2037</b>	<ul style="list-style-type: none"><li>• Goal One: 'Victorians Value Nature'</li><li>• Increase opportunities for all Victorians to have daily connections with nature.</li><li>• Increase opportunities for all Victorians to act to protect biodiversity.</li></ul>
<ul style="list-style-type: none"><li>• Victorian Health and Wellbeing Plan 2019-23</li></ul>	<ul style="list-style-type: none"><li>• Increase active living</li><li>• Improving mental wellbeing</li><li>• Tackling climate change and its impact on health</li><li>• 'Encouraging (physical) activity to occur in natural environments (including parks) can increase people's connection with nature and catalyse actions to conserve and protect our natural environments.'</li></ul>

<sup>16</sup> Outdoor Council of Australia (2008). Australian Outdoor Adventure Activity Benefits Catalogue, <http://mountainbike.about.com>

<sup>17</sup> Healthy Parks Healthy People Framework 2020, Parks Victoria

HPHP links the symbiosis between people and natural spaces - as sources of medicine and health and wellbeing, and for the protection of the environment.

### 3.3.3 Global research

Globally, various health and social benefits have been investigated surrounding both cycling and mountain biking. Findings include:

- **Improved physical and heart health** - The British Medical Association studied 10,000 people and found that participants riding bicycles for at least 30 km per week lessened their risk of coronary heart disease by almost 50%. Mountain biking uses large muscle groups that require a lot of oxygen, which increases your heart's cardiovascular fitness by 3-7%. Regular exercise also reduces the risks of obesity and lowers body fat<sup>18</sup>
- **Less stress on the joints** – As a non-load bearing sport, mountain biking reduces the risk of injuring and stressing joints in the way running or aerobic activity might
- **Decreased risk of diseases** - Researchers at the University of North Carolina found that people who cycle for 30 minutes, 5 days a week take half as many sick days off work compared to their sedentary counterparts. Improved health leads to an improved and stronger immune system. Another study published in the European Journal of Epidemiology reported that women who exercised regularly, including cycling to work, reduced their incidence of breast cancer<sup>19</sup>
- **Decreased risk of diabetes** – The risk of type 2 diabetes is becoming more prevalent due to the lack of physical activity people are undertaking. Research in Finland found that people who cycled for more than 30 minutes per day had a 40 per cent lower risk of developing diabetes<sup>20</sup>
- **Reduced stress and positive mental health** - The vigorous demands of mountain biking stimulate your body to release natural endorphins, while also boosting serotonin, an important neurotransmitter in the brain which helps to prevent depression and anxiety. Gaining new skills and improving your mountain biking abilities also helps to build confidence and self-esteem
- **Increased brain power and cognitive function** - Researchers at Illinois University found that a 5% improvement in cardio-respiratory fitness from cycling led to an improvement of up to 15% on mental tests. This is in part due

to building brain cells in the hippocampus – the region of the brain responsible for memory. “It boosts blood flow and oxygen to the brain, which fires and regenerates receptors, explaining how exercise helps ward off Alzheimer’s”<sup>21</sup>

- **Increase bone density** - Resistance activities, such as pushing pedals, pull on the muscles, and then the muscles pull on the bone, which increases bone density. This increase may reduce the risk of osteoporosis<sup>22</sup>
- **Improved balance and coordination** - Mountain biking is a dynamic activity that requires the rider to constantly adjust to varying terrain, pitch, and elevation. Balance and coordination require the combined resources of the brain, senses, muscles and nervous system. Keeping these systems active as we get older staves off disability from aging and reduces the risk of injury from falls
- **Whole body workout** – muscle strength and flexibility are improved through all parts of your body from your legs, gluteal, abdominal core and upper body – all without going to a gym
- **Sleep better** – after a tiring ride leading to a decrease in cortisol, a hormone that keeps us awake, your body and mind will need a regenerative sleep
- **Social benefits** - Mountain biking is often a social activity shared by clubs and groups who get out to ride together. There is increasing uptakes by families and friends riding together who can enjoy the social, bonding, recreational, nature and health benefits together.<sup>23</sup> In addition, often clubs will take custodianship and care of dedicated trails through supporting working bees, trail maintenance and advocacy. This establishes a sense of community pride of the riding experience
- **Enjoy and connect with nature** – by getting off the beaten track, riders can enjoy the solitude and connection to nature, which leads to reducing stress and fostering relaxation. The benefits of being outdoors and in fresh air also supports aids in our exposure to vitamin D, while enabling riders to appreciate, advocate and protect their natural environment.<sup>24</sup>

<sup>18</sup> Harvard Medical School, The Top 5 Benefits of Cycling [www.health.harvard.edu/staying-healthy/the-top-5-benefits-of-cycling](http://www.health.harvard.edu/staying-healthy/the-top-5-benefits-of-cycling)

<sup>19</sup> 10 Benefits of Mountain Biking [www.travelbughealth.com](http://www.travelbughealth.com)

<sup>20</sup> 10 Benefits of Mountain Biking [www.travelbughealth.com](http://www.travelbughealth.com)

<sup>21</sup> 10 Benefits of Mountain Biking [www.travelbughealth.com](http://www.travelbughealth.com)

<sup>22</sup> Harvard Medical School, The Top 5 Benefits of Cycling [www.health.harvard.edu/staying-healthy/the-top-5-benefits-of-cycling](http://www.health.harvard.edu/staying-healthy/the-top-5-benefits-of-cycling)

<sup>23</sup> 10 Benefits of Mountain Biking [www.travelbughealth.com](http://www.travelbughealth.com)

<sup>24</sup> <https://www.betterhealth.vic.gov.au/health/healthyliving/cycling-health-benefits>

Additional active trail use benefits include:

- **Ride your way** - Riding can be as intense as you want, from very low intensity in the beginning or if recovering from injury or illness, built up to providing a demanding physical workout
- **Fun and enjoyment** – the adventure and buzz from coasting down hills and being outdoors establishes a healthy addiction
- **Time-efficient** – as a mode of transport, cycling replaces sedentary (sitting) time spent driving motor vehicles or using public transport with healthy exercise
- **Sense of community** - More people cycling, and walking provides additional opportunities for social interaction on the trail and at trail hubs enhancing the sense of community
- **Dedicated trails provide safer riding opportunities** - More cycling infrastructure and trails in a neighbourhood provides a safer trail network and avoids riding on the road. Children can also take advantage of dedicated trails that provide less dangerous traffic environments to cycle in.<sup>25</sup>



BENEFITS OF CYCLING SOURCE: [WWW.BLUESKYCYCLINGBLOGSPOT.COM](http://WWW.BLUESKYCYCLINGBLOGSPOT.COM)

<sup>25</sup> Department of Transport and Main Roads, Queensland Government Cycling Benefits  
[www.tmr.qld.gov.au/Travel-and-transport/Cycling/Benefits.aspx](http://www.tmr.qld.gov.au/Travel-and-transport/Cycling/Benefits.aspx)



### 3.3.4 Environmental benefits

- Well planned and constructed MTB trails and experiences provide real environmental benefit by:
- Providing relatively low environmental impact on properly designed and constructed tracks
- Encouraging eco-friendly activity on specifically designed trails and tracks
- Reducing the evolution of unsanctioned trails
- Providing a space for people to connect with and appreciate the natural environment
- Promoting sustainable tourism
- Developing partnerships between land management agencies, riders and the community
- Contributing to community-based land management activities integrated with sustainable MTB trails
- Enhancing environmental awareness, improved understanding of our natural heritage and fostering stewardship.
- Each of these benefits are synonymous with the priorities within the Healthy Parks Healthy People Framework.

**Figure 10.** MTBA has a mountain bikers code of conduct which is built on respecting natural spaces and enjoyment for all



A range of studies have been conducted over the years on the environmental impact of mountain bike use in natural areas. Findings have revealed that environmental impacts are not greatly varied from walkers using trails.

<b>Measuring Environmental Impact Mountain Bikers of Santa Cruz – Mountain Biking Impact Study</b>	<p>The Mountain Bikers of Santa Cruz Science Committee undertook extensive research and literature reviews on the impact of mountain biking environmentally. They have produced categorised Frequently Asked Questions online providing a summary of the research as well as mitigating recommendations. In short, their research found that statistically, there is no difference in induced soil erosion, excavation, ruts, trail widening, weed transfer and wildlife interaction between biking and hiking, with horse riding being far more impactful. <a href="http://mbosc.org/mtb-impact-faq/">http://mbosc.org/mtb-impact-faq/</a></p>
<b>Environmental Impacts of Mountain Biking: Science Review and Best Practices by Jeff Marion and Jeremy Wimpey</b>	<p>This literature review investigates environmental impacts and research undertaken globally. The review finds that common environmental impacts associated with recreational use of trails include:</p> <ul style="list-style-type: none"> <li>• Vegetation loss and compositional changes</li> <li>• Soil compaction</li> <li>• Erosion</li> <li>• Muddiness</li> <li>• Degraded water quality</li> <li>• Disruption of wildlife.</li> </ul> <p>Examples provided in the review of environmental research methodology and monitoring include:</p> <p><b>Environmental</b> - Thurston and Reader (2001) conducted an experimental trampling impact study involving mountain bikers and hikers in Boyne Valley Provincial Park of Ontario, Canada. The researchers measured plant density (number of stems/area), diversity (number of species present), and soil exposure (area of mineral soil exposed) before and after 500 one-way passes by bikers and hikers. Data analysis and statistical testing revealed that the impacts of hiking and biking were not significantly different for the three indicators measured. They also concluded that impacts from both hikers and bikers were spatially confined to the centreline of the lane (trail), indicating the importance of well-constructed trails and educating users to stay on trails.</p> <p><b>Wildlife</b> - Taylor and Knight (2003) investigated the interactions of wildlife and trail users (hikers and mountain bikers) at Antelope Island State Park in Utah. A hidden observer using an optical rangefinder recorded bison, mule deer, and pronghorn antelope response to an assistant who hiked or biked a section of trail. The observer then measured wildlife reactions, including alert distance, flight response, flight distance, distance fled, and distance from trail. Observations revealed that 70 percent of animals located within 330 feet (100m) of a trail were likely to flee when a trail user passed, and that wildlife exhibited statistically similar responses to mountain biking and hiking. Wildlife reacted more strongly to off-trail recreationists, suggesting that visitors should stay on trails to reduce wildlife disturbance.</p>
<b>Trail Monitoring</b>	<p>The two-key metrics in trail monitoring are User Numbers and Trail Condition:</p> <ul style="list-style-type: none"> <li>• To monitor user numbers, Australian land managers are increasingly utilising commercially available electronic counters such as the TrafX MTB counter (<a href="https://www.trafx.net">https://www.trafx.net</a>) and the Island Research Traker-Count (<a href="http://www.islandresearch.com.au">http://www.islandresearch.com.au</a>). Products such as these provide land managers with a relatively simple and reliable means of monitoring user numbers on specific trails allowing trends in trail user rates and behaviour to be better understood.</li> <li>• Photo-point monitoring is a relatively simple and useful approach to monitoring trail condition.</li> </ul>

### 3.3.5 Economic Benefits

Understanding the natural attraction of these drawcards can aid in developing future MTB experiences, noting that in many instances, riders are seeking a holistic experience beyond just the trail. There is also the opportunity to leverage from existing attractions, natural features and activities to incorporate into an exceptional MTB experience, leading to increased visitation and expenditure, longer stays, regional dispersal, additional spend from community cycling events, job creation and business/commercial development.

- **Affordability** - While only 10% of the world's population can afford a car, an estimated 80% of people can afford a bike. Cycling provides economic and independent travel and increased mobility to many groups of the population with low rates of car ownership, such as low-income earners, unemployed people, seniors and those under 18 years of age.<sup>26</sup>
- **Transport** - second only to food (18.2%), transport (15.5%) is the largest item of household expenditure in Australia. The family car costs up to 55 cents (AUD) per kilometre to run. In comparison, the cost of buying and maintaining a bike is around *one per cent* of the cost of buying and maintaining a car.<sup>27</sup>
- **Property prices** – with the popularity of trails, increased visitation, improved liveability and commercial opportunities, the desire to live in trail regions will improve property prices. This has already been proven at sites such as the Blue Derby Trail in Tasmania, a region previously suffering from unemployment, low economic opportunity and minimal property sales/prices has now resulted in a thriving population, increased employment and property prices.
- In addition to tourism related economic benefits there are also direct flow-on effects of mountain biking for bicycle retail and wholesalers, bicycle mechanics, clothing and equipment manufacturers, trail designers and builders, coaches and instructors, event management groups and support services, shuttle and tour services, and mountain biking media companies.

**Figure 11.** Economic opportunities from MTB trail towns and hubs



<sup>26</sup> Department of Transport and Main Roads, Queensland Government Cycling Benefits, Queensland Cycling Strategy

<sup>27</sup> Department of Transport and Main Roads, Queensland Government Cycling Benefits, Queensland Cycling Strategy [www.tmr.qld.gov.au/Travel-and-transport/Cycling/Benefits.aspx](http://www.tmr.qld.gov.au/Travel-and-transport/Cycling/Benefits.aspx)



**Table 2.** Commercial opportunities that have proved successful elsewhere

● <b>OPPORTUNITY</b>	● <b>DELIVERY</b>
● <b>Bike shops and repairs</b>	● Especially near trailheads. They may not sell many bikes, but accessories, consumables, repairs etc. are critical for visiting mountain bikers.
● <b>Shuttle services</b>	● In areas with good vertical elevation and gravity trails, riders will happily pay for comfortable and reliable transport back to the top of the hill.
● <b>Coffee</b>	● Bike riders of all disciplines love a good coffee shop. The closer to the trailhead, the better.
● <b>Bike hire</b>	● Most core mountain bikers are inclined to bring their own bikes, but there is still a good market segment of non-core riders looking to hire good quality mountain bikes.
● <b>Guided tours and mountain bike tuition</b>	● This opportunity does not have huge appeal for core mountain bikers, but it can be an excellent way for non-core mountain bikers to try the sport. Also, a great way for supporting solo traveller, small and large group activities, including school groups.
● <b>Bike Friendly services</b>	● Accommodation, cafes/coffee shops, places for bike service and repair. The Cyclist Welcome initiative of Far North Queensland developed a program and booklet to educate small business owners and the community on welcoming cyclists and how to be bike friendly. <a href="https://www.tablelandsfutures.com/wp-content/uploads/2015/04/BikeFriendlyBooklet-2014.pdf">https://www.tablelandsfutures.com/wp-content/uploads/2015/04/BikeFriendlyBooklet-2014.pdf</a>
● <b>Accommodation</b>	● Mountain bikers cover a wide spectrum of incomes and have wide ranging expectations for accommodation. Anyone that can cater towards cycling somehow in their accommodation offering will have a competitive advantage. This can be as simple as providing secure bike lock up facilities.
● <b>Food and Beverages</b>	● There appears to be a growing overlap with boutique food and beverage tourism segments. Breweries and wineries are popular with mountain bikers, with the increasing establishment of gourmet trails in picturesque and rural settings.
● <b>Groceries and other travel needs</b>	● During travel, visitors require basic grocery and sundries. There are opportunities to provide on trail or close to trail and trail hub conveniences.
● <b>Medial, physio and massage services</b>	● Provision to ensure ongoing health and wellbeing benefits for riders, particularly those on holidays who wish to incorporate adventure and relaxation into their travels.
● <b>First aid and on-trail support assistance</b>	● Similar to on-trail first aid and operational support provided at ski fields, there are opportunities during peak seasons and events to offer this level of support on mountain bike trails.
● <b>Other entertainment services and or experiences</b>	● For many riders, the trail is only one component of the overall experience. Riders are also looking for complementary activities and experiences that become a part of the overall journey. In addition, during events or when family and friends are travelling to support core riders, providing additional activities and experiences for non-riders will keep them engaged and, in the region, longer.

**Table 3.** Examples of mountain biking economic impacts and potential value add events

DESTINATION / TRAIL / EVENT	IMPACT
<ul style="list-style-type: none"> <li>Cape to Cape Mountain Bike, WA</li> </ul>	<ul style="list-style-type: none"> <li>The Cape to Cape Mountain Bike race in WA is touted as being Australia's largest and longest running MTB event:</li> <li>Starting in 2008, the event had 100 participants</li> <li>Attendees stayed an average of 5.6 nights in the region and had a direct spend of over \$1.9M (AUD). Of this expenditure the greatest expense items were accommodation, food and beverages, transport, and entertainment (i.e., sightseeing)</li> <li>2014 race entries increased 20% to 1,500 after the 2013</li> <li>2018 marked the events 10th Anniversary with over 1600 entrants.<sup>2829</sup></li> </ul>
Whistler, British Colombia Canada	<ul style="list-style-type: none"> <li>Attracted more than 160,000 mountain biking visitors in 2016, undertaking 533,000 rides in Whistler.</li> <li>Summer expenditure in 2006 totalled \$16.2M (CAD) and grew to \$46.6M (CAD) direct expenditure by 2016. Indirectly, broader British Columbia received \$75.9M (CAD) in revenue from mountain biking in 2016.</li> <li>389 jobs are supported in Whistler due to mountain biking, attributing for \$18.1M (CAD) worth in wages and salaries.</li> <li>The local and federal governments were supported with a combined total of \$14.1M (CAD) in taxes received from mountain biking expenditure.<sup>30</sup></li> <li>The annual Crankworx Event also contributes significantly to Whistler, known as the 'Superbowl' event of mountain biking, in 2019 it attracted over 300,000 spectators watching over 2,000 participants.<sup>31</sup></li> </ul>
<ul style="list-style-type: none"> <li>Blue Derby, Tasmania</li> </ul>	<ul style="list-style-type: none"> <li>Estimated \$30M (AUD) return on initial \$3.1M invested.</li> <li>Estimated growth from 30,000-138,000 trail visitors a year.</li> <li>Average stay of 4 to 5 nights + 5 more nights in other parts of Tasmania.</li> <li>Range of new businesses opening.<sup>32</sup></li> <li></li> <li></li> </ul>
New Zealand Rotorua	<ul style="list-style-type: none"> <li>Population of 67,000 with annual visitation of 2.5M people</li> <li>2006 Mountain Bike World Trails generated \$12.2M (NZD)</li> <li>2009 Whakarewarewa Forest Trails generated NZ \$40M (NZD)</li> <li>A 2018 Economic Impact Assessment of mountain bike riding in Rotorua found that for all riders estimated spending (direct and indirect) ranged from \$29.274M (NZD) (lower estimate) to \$47.321M (NZD) (upper estimate) annually. Spending by international and domestic visitors was centred largely around accommodation, meals and a range of MTB services, which</li> </ul>

<sup>28</sup> South West Mountain Bike Master Plan 2018

<sup>29</sup> [www.capetocapembt.com](http://www.capetocapembt.com)

<sup>30</sup> Economic Impact of Mountain Biking in Whistler 2016

<sup>31</sup> [www.crankworx.com/media/stats-and-facts/](http://www.crankworx.com/media/stats-and-facts/)

<sup>32</sup> [www.ridebluederby.com.au](http://www.ridebluederby.com.au), [www.abc.net.au/news](http://www.abc.net.au/news) [www.rdatasmania.org.au](http://www.rdatasmania.org.au)

● DESTINATION / TRAIL / EVENT	● IMPACT
	<p>include bike hire, shuttles, guides, lessons and other services. Local resident riders contribute between \$2.4M - \$3.9M (NZD) annually. Mountain biking generates 210 (lower estimate) to 340 full-time equivalent (FTE) direct and indirect jobs.<sup>33</sup></p> <ul style="list-style-type: none"> <li>● Crankworx commenced in Rotorua in 2014, quickly growing in popularity with residents and visitors alike, in 2019 the event attracted 39,000 spectators and over 1,000 participants.</li> </ul>
<ul style="list-style-type: none"> <li>● <b>Harcourt Bike Park, Victoria</b></li> </ul>	<ul style="list-style-type: none"> <li>● Opened in March 2018 with 34 km of newly constructed single track.</li> <li>● The park has eleven trails that cater to riders of all abilities from beginner to advanced. The Victorian Government provided \$1.99M (AUD) through the Regional Jobs and Infrastructure fund.</li> <li>● A Community Reference Group played an important role during the development, planning and construction of the Park.</li> <li>● The Park is managed by a volunteer committee of management.</li> <li>● The park saw an initial 31,000 riders within 6 months of opening generating \$1.6M for the local economy, well above first year forecasts. It is expected to welcome 100,000 a year within the next five years.<sup>34</sup></li> </ul>

<sup>33</sup> *Mountain Biking in Whakarewarewa Forest Economic Impact Study, Rotorua Lakes Council 2018*

<sup>34</sup> <https://www.miragenews.com/mountain-bikers-flock-to-mount-alexander-region/>

In addition, supporting social and economic benefits addresses priorities within the HPHP Framework 2020, specifically:

- Improved amenity, liveability and quality of life
- Provision of ecosystem services (e.g., clean water)
- Improved educational outcomes
- Jobs and income to regional and urban economies
- Avoided physical and mental health costs, including reduced absenteeism and greater productivity
- Employment pathways.<sup>35</sup>

### 3.4 Value of Nature Based Tourism

Nature-based tourism is leisure travel undertaken largely or solely for the purpose of enjoying natural attractions and engaging in a variety of nature-based activities – from visiting national parks, scuba diving and bushwalking to simply going to the beach.<sup>36</sup>

National parks are a large component of the ‘nature based’ offer. The term ‘national park’ is an internationally recognised and valuable brand. It is estimated that protected areas globally attract around 8 billion visitors annually and are worth \$600B(US) to local economies. Having a national park in the region / destination is a great asset and can be an important influencing factor towards motivating a visitor’s decision to come to the area.<sup>37</sup>

For Australia, recent research undertaken on regional dispersal demonstrated the value of nature-based experiences. Travelling with friends and family and the opportunity to experience nature-based offerings were identified as the two key motivations for regional travel for both domestic and international markets.<sup>38</sup>

Additional data on the number and value of nature-based tourists in Australia during 2017 includes:

- **International:** 5.2 million international visitors (two-thirds of all the international visitors to Australia), engaged in some form of nature-based tourism. They stayed 202 million nights and spent \$20B on nature-based experiences
- **Domestic:** 20.1 million domestic overnight visitors who stayed 104M nights and spent \$18.9B on nature-based experiences
- **Domestic day trip:** 23.6 million domestic day trip visitors.<sup>39</sup>

Understanding the natural attraction of these drawcards can aid in developing future MTB experiences, noting that in many instances, riders are seeking a holistic experience beyond just the trail. There is also the opportunity to leverage from existing attractions, natural features and activities to incorporate into an exceptional MTB experience, leading to increased visitation and expenditure, longer stays, regional dispersal, additional spend from community cycling events, job creation and business/commercial development.

<sup>35</sup> Healthy Parks, Healthy People Framework 2020, Parks Victoria

<sup>36</sup> Nature based tourism in Australia Manifesto – Ecotourism Australia 2017

<sup>37</sup> A Tourism Interpretive Master Plan for Ireland’s National Parks 2019

<sup>38</sup> Understanding visitor regional dispersal in Australia | Austrade 2019

<sup>39</sup> Nature based tourism in Australia Manifesto – Ecotourism Australia 2017

### 3.5 COVID 19

The following summary of impacts from COVID- 19 need to be considered by and managers and cycling destinations across Australia:

- With COVID-19 lockdowns and travel restrictions, physical activities (non-team sport) grew among adults 18+ years. Substantial year on year growth saw Australians exercising more than 3 times per week. Almost three quarters of Australian adults being active during lockdown, with the core purpose of maintaining physical health and wellbeing. People who were able to keep fit and active reported significant impacts to mental health and feelings of optimism.<sup>40</sup>
- Increased demand for nature, outdoor and regional experiences. Those previously in city lockdowns are now desperate for regional, coastal and nature experiences. Domestic visitors are avoiding big cities - 51% of are seeking coastal destinations, 34% regional destinations, only 15% are desiring a city holiday.<sup>41</sup>
- Internationally, our previous barriers of 'distance' (Australia is so far away and too big to travel around) and 'time' (time taken to travel and time to get from one destination to the next) are now our biggest drawcards. Australia is currently number one on the list of desired international travel destinations, our wide-open spaces and remote attractions are highly prized.<sup>42</sup> While international tourism is expected to take some time to recover, we do need to be prepared for anticipated international travel bubbles as borders re-open to COVID safe destinations.
- Globally, mountain bike trail counts across the United States are showing increases of 100% to over 500% compared with the same time in 2019.<sup>43</sup> Mountain bike sales in the US are 'through the roof'. NPD Sports reports a 117% increase in sales in April and May compared with 2019 numbers.<sup>44</sup>
- Online retailer Bicycles Online saw a 170% growth by Australians in mountain bike sales during April 2020, with many family purchases and first-time mountain bike rider purchases.<sup>45</sup> Supplies are not meeting demand, with

many bikes imported from Asia. Lockdowns and shipping delays are causing backlogs in Australian bike orders.<sup>46</sup>

- Tourism Research Australia have also forecast an increase in family group travel, as families reunite post travel restrictions.

These statistics demonstrate that our relationship with the outdoors is deepening, and our desire to travel more remotely and support regional communities is growing as travel restrictions are lifted. This demand has the potential to place pressure on existing visitor infrastructure and services. Careful visitor planning needs to be a high consideration with regards to regional distribution and provision of ample, safe and sustainable visitor infrastructure, amenities and experiences.



'BICYCLES ARE THE  
NEW TOILET  
PAPER' –

REPORTED SURGE  
IN BIKE SALES  
ACROSS AUSTRALIA  
CONTINUES  
DURING GLOBAL

<sup>40</sup> Ausplay State of the Nation – Early impact of COVID-19 on sport and physical activity participation August 2020

<sup>41</sup> Tourism Australia presentation – Australian Regional Tourism Convention October 2020

<sup>42</sup> Tourism Australia presentation – Australian Regional Tourism Convention October 2020

<sup>43</sup> <https://www.forbes.com/sites/timnewcomb/2020/07/13/amidst-cycling-surge-sport-of-mountain-biking-seeing-increased-sales-trail-usage/?sh=5c6c9c8c3ddf>

<sup>44</sup> <https://www.forbes.com/sites/timnewcomb/2020/07/13/amidst-cycling-surge-sport-of-mountain-biking-seeing-increased-sales-trail-usage/?sh=5c6c9c8c3ddf>

<sup>45</sup> <https://www.afr.com/policy/health-and-education/inside-the-virus-bicycle-boom-20200413-p54jea>

<sup>46</sup> [www.abc.net.au](http://www.abc.net.au) – Bikes in short supply after millions take up riding, 25 September 2020.

## 4 Case studies

Mountain biking is a rapidly growing recreational, sport and tourism activity across Victoria, Australia and globally. Mountain biking provides both residents and visitors alike with the opportunity to connect with nature in diverse environments, travel regional areas and communities and appreciate sites of natural, cultural and historical significance. Placing people in natural places has proven time and time again to provide multiple, reciprocal benefits. Mountain biking is a means of achieving this.

This is reaffirmed by a range of recent funding commitments in developing and enhancing mountain bike trails within national parks and protected natural spaces across Australia:

- PARKS 2025: Fleurieu Peninsula, South Australia mountain biking and hiking. Overall project investment: \$3 million. The Fleurieu Peninsula is well known for its mountain biking and multi-use trails, although not all are formal or within current parks or reserves
- WA - \$20 million to service existing and new bike trails to attract more visitors to national parks in Kalamunda and Mundaring in the Perth Hills, and regional WA including Albany, Denmark, Mount Barker, Plantagenet, Pemberton and Margaret River.<sup>47</sup> Funding of \$10 million has been approved and construction is underway. Total network of 100km of high-quality mountain bike trails between Wellington National Park and the town of Collie. Connects with the existing 1,000km Munda Biddi Trail
- NT - \$12M committed towards the development of the Red Centre Adventure Ride in the jointly managed Tjoritja / West MacDonnell Ranges National Park
- VIC - \$500K for the revitalisation of the Forrest Mountain Bike Park, \$500K Falls Creek Mountain Bike Park expansion, \$12 million Victorian state government funding of a multi-faceted 10-year plan to grow cycle tourism in the Victorian High Country

- ACT - \$375K for MTB trails across the region
- NSW - Thredbo Valley Track extension was recently opened. It now goes 61km in total from Dead Horse Gap to Jindabyne. The 21km extension cost \$9.8 million
- QLD – \$41.4 million for Wangetti Trail construction. The first section of trail will traverse through the Macalister Ranger National Park which is located wholly within the Wet Tropics World Heritage Area. The trail will be 94km, dual use for both walkers and mountain bike riders.<sup>48</sup>

The following section will provide more in-depth case studies of mountain bike trails within national parks and natural areas.

- Munda Biddi, WA
- Red Centre Adventure Ride, NT – incorporating Tjoritja / Western MacDonnell Ranges National Park
- Thredbo, NSW – incorporating Kosciuszko National Park
- Wangetti

<sup>47</sup> <https://www.mediastatements.wa.gov.au/Pages/McGowan/2020/08/WA-Recovery-Plan-injects-150-million-dollars-into-States-tourism-industry.aspx>

<sup>48</sup> <https://thelatzreport.com.au/news/trade/mountain-bikings-100-million-jump/>



## CASE STUDY 1. MUNDA BIDD, WA



[www.mundabindi.org.au](http://www.mundabindi.org.au)

*Meaning: 'Forest Trail' Noongar language*

**Location:** The Munda Biddi in Western Australia covers 1,000 km of multi-use track from Perth to Albany. Covering 43 sections through seven towns, national parks and reserves, it is the world's longest continuous off-road cycle track.

**Year:** Opened 2013

**Investment:** The Trail was funded through the Royalties for Regions Program (\$3M AUD) and the Department of Parks and Wildlife (\$1M AUD).

**Facilities & Experiences offered:** The trail offers a range of options from shorter family friendly day rides up to 8 km, through to multi-day rides requiring 100 km riding per day. Sections of the trail provide different experiences to cater for a range of riding levels, majority of the track is off road.

To complete the track end-to-end, 3-4 weeks is recommended, encouraging riders to stop and explore the attractions and townships along the trail.

For multi-day riders, there are options for on trail camping in either forest camps (limited facilities) or purpose-built camps with undercover sleeping shelter and amenities. Some campsites are accessible by vehicle enabling supported rides and the ability for riders to be picked up to stay in commercial accommodation options in one of the seven towns the trail passes.

Options include:

- Commercial Munda Shuttle service
- Munda guided and supported tour services
- Bike hire
- The Munda Biddi Trail Foundation offers Trip Planning and Gear Workshops and volunteer training days
- Events – In October 2020, the inaugural Munda Biddi Trail Ultra race was held, attracting 30 local WA riders. This is anticipated to grow significantly as WA state borders re-open to domestic and later international markets.



TRAIL FACILITIES

**Visitor numbers:** Estimated over 42,000 trail users annually.<sup>49</sup> Counters were installed on the trail in 2018, data has not been made publicly available.

**Construction:** Undertaken by the WA Government using prison work crews, which keeps costs down while also facilitating the skill development of individuals in the work crews. It is estimated that each kilometre of track costs approximately \$4000 per kilometre, which includes construction officer, contractors, signage and other operating costs. The trail is formed with red pea-gravel in the northern section and a combination of loamy soils and fine white sand in the south.

**Operations:** Operating costs are funded by the Royalties for Regions program, which are reported as minimal due to the well-constructed sustainable trails, involvement of volunteers and machinery being hired or leased as required. The WA Government funds equipment needs and training for volunteers. Estimated annual cost - \$1,740,000<sup>50</sup>

**Ownership / Governance / Partnerships:** The trail is managed in partnership through a Memorandum of Understanding between the not-for-profit Munda Biddi Trail Foundation, the Department of Environment and Conservation and other land managers. The Foundation formed initially in 1999 and today has the role of coordinating volunteer programs and marketing and promoting the trails and facilities. The Foundation employs three full time staff members - an Executive Officer, Community Development Officer and an Administration and Volunteer Coordinator.

#### **Benefits:**

- **Community:** A safe, long, off-road trail that can be used by local community members for cycling and walking, promoting regular exercise and healthy living. Creation of a volunteer maintenance program that has helped foster community pride.<sup>51</sup> The Foundation has reported the success of the trail is largely based on the partnerships they have as well as the commitment and support of local communities. To encourage business growth, use of the trail and advocacy, a Cycle Friendly Business Initiative was delivered. Approximately \$75,000 was spent per regional town supporting intensive engagement to grow trail awareness, advocacy and business development. As a result, more than 120 businesses are affiliated with the initiative.

- **Environmental:** Volunteers of the foundation undertake quarterly trail inspections and maintenance to ensure the trail is safe for riders and being protected from damage or negative impacts. The Foundation works together with WA Parks and Wildlife to ensure protection of the natural assets along the trail.
- **Economic:** The trail provides a flow of economic benefits to communities and businesses along its length, many of which are members of the Munda Biddi Trail Foundation's successful Cycle Friendly Business program. Total estimated annual visitor spend is at least \$17,691,784.<sup>52</sup>

#### **Visitor engagement:**

- TripAdvisor: 4.5-star rating, 'beautiful trail'
- Facebook – 4.1K followers
- Instagram – 1.5K followers, #muddabiddi 1K+ posts.

#### **LESSONS for Warburton:**

- Trail partnership between not-for-profit Munda Biddi Foundation, Department of Environment and other land managers
- Strong community focus, with quarterly volunteer programs, training incentives, Cycle Friendly business initiative, recreation and flow-on economic benefits
- Regular on-trail presence by volunteers and Parks and Wildlife maintaining and reporting on impacts
- Construction initiatives using prison work crews
- High return on investment.

<sup>49</sup> Case Study – Munda Biddi Trail – Construction Project, Nannup to Walpole, Summary Report September 2015

<sup>50</sup> Nannup Trails Hub – Potential and opportunities NBD marketing

<sup>51</sup> Case Study – Munda Biddi Trail – Construction Project, Nannup to Walpole, Summary Report September 2015

<sup>52</sup> Nannup Trails Hub – Potential and opportunities NBD marketing

## CASE STUDY 2. RED CENTRE ADVENTURE RIDE, NT



**Location:** West MacDonnell Ranges and jointly managed Tjoritja / West MacDonnell Ranges National Park, Central Australia NT. Proposed 200 km MTB trail.

**Year:** under construction (3-year timeframe)

**Investment:** \$12M funding commitment from the Northern Territory Government.

### Facilities & Experiences offered:

Proposed

- Day and multi-day rides (4-5 days)
- Guided and independent experiences, including Aboriginal led story-telling opportunities
- Options for on trail and off trail accommodation including higher end eco-camps
- Shuttle, equipment and luggage transport
- Equipment and bike hire, repair and retail
- Food and beverage supply
- Long stay parking at trailheads; and bike-friendly accommodation in Alice Springs.

**Visitor numbers:** Forecast of 31,500 riders per annum.<sup>53</sup>

**Construction:** 3-year timeframe forecast. A capital investment of \$12 million is required to construct the whole trail - \$7 million for trail construction and \$5 million for associated overnight accommodation and infrastructure.

**Ownership / Governance / Partnerships:** Potential partners and their roles in the delivery of the overall experience include:

- **Government** – trail alignment and associated infrastructure development and some management
- **Traditional Owners** – potential for experience delivery, storytelling, accommodation supply or operation, support services, trail construction and maintenance
- **Private enterprise** – potential accommodation supply or operation, tour products, support services, trail construction and maintenance.

**Operations:** The NT Parks and Wildlife Commission would be responsible for undertaking trail maintenance and management. A user fee is proposed to be charged to assist with maintenance of the trail and contribute to local Traditional Owners.

Maintenance costs are estimated at \$300,000 a year. This would require a total investment of \$15 million over 10 years.

<sup>53</sup> Red Centre Adventure Ride Concept Plan



### Benefits:

- **Cultural:** The Ride will highlight and interpret the outstanding natural features and sites of the West MacDonnell Ranges. Cultural values and stories will be an inherent part of the experience, with stories shared via a range of formats along the trail. Opportunities for Traditional Owners and local people through activities such as sharing of cultural stories, trail construction, trail management, guiding and business development opportunities.
- **Environmental:** The trail will be designed and maintained so it is environmentally sustainable and blends into the Red Centre landscape. Ground-truthing and alignment work to ensure a culturally and environmentally appropriate trail has been undertaken together with Traditional Owners and land management experts.
- **Economic:** At a proposed trail use fee of \$50 per person, and allowing for gradual increase in trail use, total revenue from trail fees over the first ten years of operation would reach around \$4.3 million assuming the trail had reached 50% of its capacity (or 15,750 users/ year) by that time (medium case). Annual spending in the region by adventure trail users would increase progressively over time. The year 10 spending is estimated at \$5.437 million for the medium case. In the operational phase the trail would generate a total of 7.8 FTE jobs in the region in year 1, increasing to 38.6 jobs in Year 10.

#### LESSONS for Warburton:

- Trail partnership between government, Traditional Owners and private sector
- A range of support and commercial services recommended along the trail, supporting Traditional Owners and local business development and employment
- Trails are being constructed to a high standard in the national parks
- Trail use fee proposed with funding returning to Traditional Owners and covering trail maintenance costs.

GROUND-TRUTHING THE TRAIL WITH TRADITIONAL OWNERS, LAND MANAGEMENT SPECIALISTS & TRAIL DESIGN AND CONSTRUCTION EXPERTS



## CASE STUDY 3. THREDBO, NSW

**Location:** Thredbo MTB Park set in Kosciuszko National Park, NSW

**Year:** 1990

**Investment:** \$9.8 million was recently invested through the Regional Growth Environment and Tourism Fund to extend the Thredbo Valley Track by a further 21 km.

**Facilities & Experiences offered:** Highest and only lift-served MTB trail in Australia, with a range of trail options from Green through to advanced level. Total of 34 km of MTB trails.

- Use of winter season ski chairlifts for Gravity rides
- Clinics and programs for kids, beginners, intermediate and advanced riders
- Retail and bike equipment rental including e-bikes
- Qualified guides
- Thredbo Alpine Village with a range of accommodation options, retail and food and beverage services
- National Park attractions and facilities
- Events – Thredbo Gravity Series.

**Visitor numbers:** Kosciuszko National Park receives approximately 2.3 million visitors per year, 800,000 of these visitors arrive to the Park in Summer to undertake walking and cycling activities. It is estimated that around 3% of all summertime visitors are utilising the MTB trails (approx. 24,000).



**Construction:** NSW National Parks and Wildlife Services has established a set Cycling Policy to guide development and enhancement of cycling trails within national parks. The criteria incorporate ecological sustainability, appropriateness of the location, provision of a quality experience for cyclists, balancing competing visitor demands, consideration of opportunities and demand for cycling across the region, including other land tenures, protection of visitor safety, availability of resources to provide and maintain the experience – this Policy has also been applied to Thredbo MTB Park.

**Ownership / Governance / Partnerships:** The Thredbo MTB Park and trail network is incorporated both within the privately operated Thredbo Alpine Village and Kosciuszko National Park.

**Operations:** Each respective land manager undertakes maintenance of relevant trails. In addition, Thredbo Alpine Village also own and operate the chairlift as a commercial venture. Entry fees into Kosciuszko National Park are around \$20 per vehicle. Thredbo is largely responsible for management of marketing and promotion of the MTB trails and the commercial activities that occur and support the trail experience.

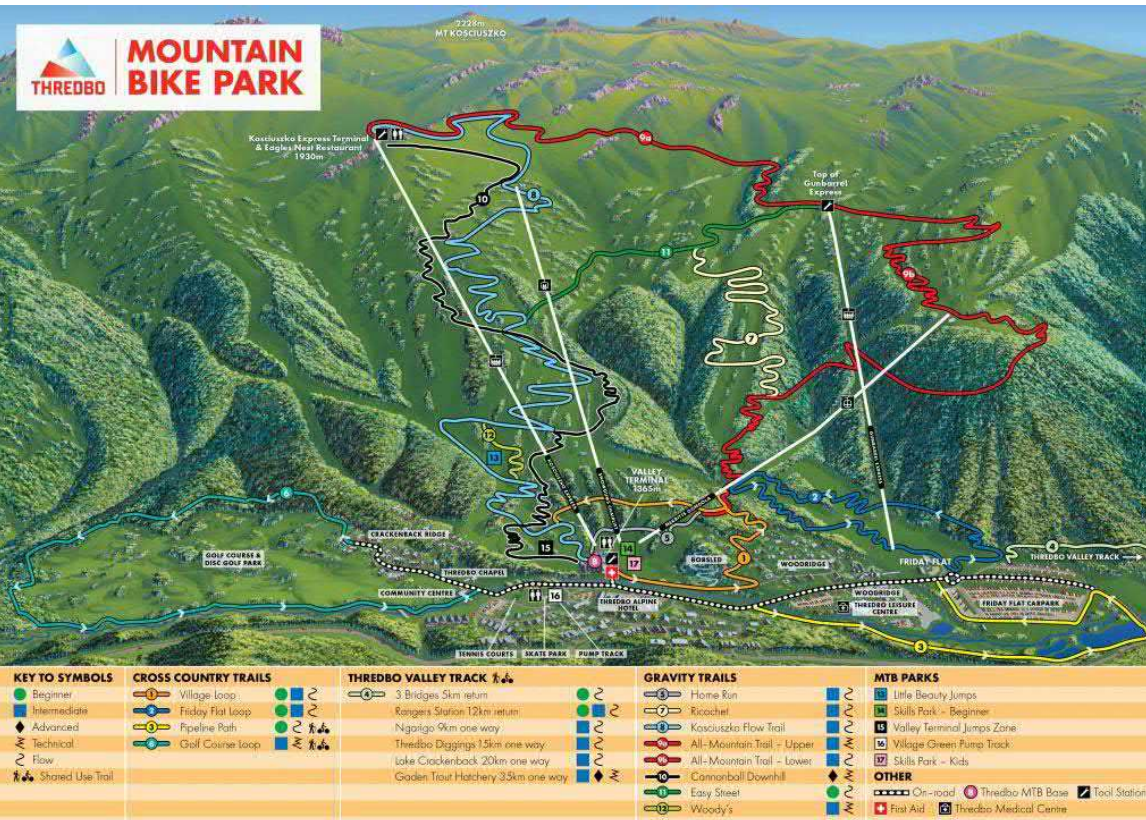
### Benefits:

- Environmental: The trails are managed through the NSW National Parks Cycling Policy criteria.
- Economic: Provision of the MTB trails and events delivers year-round economic benefits for local communities in the Snowy's, formerly known as a winter destination.
- Community – the recent extension of the trail provides new opportunities for recreation and economic development from local Snowy communities (e.g., Jindabyne).



### Visitor feedback:

- Trip Advisor – 4.5-star rating
- Trailforks – 4-star rating
- Facebook – 17K followers.



### LESSONS for Warburton:

- Continuing to improve and expand the MTB trail, further connecting to local Alpine village communities
- A long-standing private and public relationship
- Innovation in growing off peak tourism to an Alpine destination
- Trail construction in alpine areas within national parks are allowed
- Set development criteria to ensure environmental protection, visitor enjoyment and safety and adequate resourcing.



## CASE STUDY 4. WANGETTI TRAIL QLD



Wangetti, QLD

**Location:** The first section of trail will traverse through the Macalister Ranger National Park which is located wholly within Queensland's Wet Tropics World Heritage Area. The trail will be 94 km, dual use for both walkers and mountain bike riders and connect Palm Cove to Port Douglas via the Wangetti Community.

**Year:** Under construction, intended to be operational by 2022.

**Investment:** \$41.4M has been committed - \$33.4 million of State funds and \$8 million from the National Tourism Icons Program.

**Facilities & Experiences offered:** The trail may feature:

- Public campsites or privately operated low impact eco accommodation at five sites
- Potential to host events.

**Visitor numbers:** 20,000 mountain bikers estimated to use the trail annually.<sup>54</sup>

**Construction:** All facilities along the trail must be delivered in accordance with the Department of Environment and Science's Implementation Framework: Ecotourism Facilities on National Parks and in line with Best Practice Ecotourism Development Guidelines.

The Queensland Government is in the process of securing several significant environmental approvals for the delivery of the Wangetti Trail. This includes working with local authorities, Local, Federal and State Government to secure approx. 19 approvals are required for the Wangetti Trail to move forward with construction.

The trail must be delivered in accordance with the Wet Tropics Management Plan, requirements under the *Nature Conservation Act* (1992) and other environmental approval conditions.

The Queensland Government has also prepared a construction methodology manual that will guide the trail builder on the preferred infrastructure, methods and materials for building the trail within protected areas.<sup>55</sup>

<sup>54</sup> Wangetti Trail Concept Plan 2017

<sup>55</sup> <https://www.dtis.qld.gov.au/our-work/qld-ecotourism-trails/wangetti-trail>

**Ownership / Governance / Partnerships:** The collaborative model between governments, tourism operators and Traditional Owners aims to deliver long-term job and business opportunities for Traditional Owners. These opportunities extend beyond the land to all aspects of the tourism industry, for example, as rangers, guides, chefs, service staff and artists.

**Benefits:**

- **Community:** Up to 150 new local jobs will be created including opportunities to develop local skills and increase diversity of regional jobs. Liveability is forecast to improve through social, recreation and economic wellbeing benefits.
- **Economic** – modelling has suggested that the new trail experience will deliver \$300 million into the local economy.<sup>56</sup> New funding and re-investment sources to preserve, protect and present national parks and their cultural heritage. Long term job and business opportunities for Traditional Owners and their future generations, with 150 new local jobs forecast.
- **Environment:** In accordance with the Wet Tropics Management Plan, Nature Conservation Act 1992, the trail will enable better controls to limit damaging and uncontrolled activities within parks including feral animal management
- **Cultural** – by partnering with Traditional Owners, the trail will enable enhanced connection to Country whilst ensuring its protection and preservation. The trail will also support stronger appreciation and understanding of Aboriginal culture through visitor interpretation.

**LESSONS for Warburton:**

- Significant financial investment committed by State Government.
- Environmental Framework for development and Queensland Government Trail Construction Manual.
- Collaborative governance model between government, tourism operators and Traditional Owners
- Trails can be built in national parks and World Heritage Areas
- Substantial job creation and economic benefits.

<sup>56</sup> <https://www.abc.net.au/news/2020-08-04/queensland-wangetti-trail-sparks-government-rift/12522042>

## 5 Behind the Assumptions – Economic Assessment

This report provides the economic feasibility assessment based on three cases (as previously described). The three cases are options for the development of the Warburton Mountain Biking Destination aimed at providing the maximum community return while minimising the environmental and social issues that may arise.

The three cases are:

- Case 1 Base Case: Full Trails Network - covering the full development of the trails network
- Case 2 Reduced Trail Network, with no trails in the National Park Areas,
- Case 3 with no Drop A K trail.

The three cases have been developed by Yarra Ranges Shire Council – each with its own set of strengths for different user groups. It is the impact of the changes on each of the potential user groups that changes the assumed visitor patterns – leading to differing economic impact outcomes.

In deriving the assumed changes to the users and their travel / use patterns from the alternate cases, each with their set of market appeal, TRC Tourism and MCA have drawn on several sources of information. These include market research by Instinct and Reason<sup>57</sup>, industry knowledge, and unpublished survey work undertaken at Derby in Tasmania<sup>58</sup>.

<sup>57</sup> Warburton MTB Trail Market Research Instinct and Reason. 2021

### 5.1 User Spending Assumptions

- 2 separate economic impact assessments have been completed. The first using Tourism Research Australia (TRA) spending assumptions based on their published data and sources. This is the assessment that has been included in the main body of this report.
- The second assessment (**Attachment 1 to this report**) uses a higher spend rate per visitor and is based on unpublished visitor survey data undertaken by Xyst Pty Ltd at Derby in Tasmania. While the second assessment is valid and is included in this report as an appendix – it is not referenced as the impact figures due to TRA being a quoted and published data source.
- In both user spending assessments undertaken – the three trail cases as described above remain the same for comparative purposes.

### 5.2 The markets

For the purposes of modelling, and using the evidence available, we simply break the potential riders and users into the following categories:

- Expert and advanced
- Intermediate
- Novice
- Beginner
- Non-MTB riders.

<sup>58</sup> Xyst – Survey of riders at Derby 2021.

## 5.3 The Cases

**In Case 1** – the potential for a leading trail that is aimed at the intermediate market and that presents a lead in market opportunity for a hero experience offers the most attractive visitor proposition (and therefore user spending). This is because it will not frighten off novice riders, will pick up the bulk of the intermediate markets (which is the highest number of riders), and offers a world class natural experience that advanced riders will come to ride it.

Drop A K trail – included in the base case, presents 2 important elements to all markets – it is the hero trail designed for all riders, and it offers an outstanding natural experience.

A survey at Derby in Tasmania affirms this assumption.

*56% of those surveyed at Derby had done or were planning on doing the Blue Tier and/or Bay of Fires Epic Trail on their visit<sup>59</sup>.*

Drop A K trail – included in the base case, presents 2 important elements to all markets – it is the hero trail designed for all riders, and it offers an outstanding natural experience. The importance of outstanding nature is also highlighted in the survey results.

**Case 2** presents the assumed visitor numbers for the reduced trail network with no trails in the national parks. This includes the Drop A K trail which is predominantly in the national park.

*46% of those surveyed at Derby had Spectacular Nature and Scenery, and natural values as the reason for doing the trail and riding at Derby.<sup>60</sup>*

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<sup>59</sup> Derby Survey of Riders – Xyst 2021

<sup>60</sup> Derby Rider Survey – Xyst 2021.

In addition to losing the ability to undertake a world class ride in one of Victoria's icon national parks experiencing nature at its finest, this case reduces other trail options. The impact is a drop in advanced and intermediate riders – and these market segments are the ones that are most likely to spend additional nights enjoying the trails.

*10% less riders in the intermediate category and 10% less advanced and expert riders would use Warburton MTB Destination if there were no trails in the national park.<sup>61</sup>*

**Case 3** presents the proposition of some alternate trails in the national park, but with no Drop A K.

This option provides an alternative set of trails to Drop A K, but they are more aligned to advanced and intermediate riders. The market research data shows the drop is still in the advanced category, although the intermediate riders have not fallen as much (9% drop in advanced riders, 3% drop in intermediate riders).

## 5.4 Assumed Impacts on Trail Users

The reduced trails network in case 2 (no national park trails and drop) would result in lower levels of trail use by visitors from outside the region (mainly by the more experienced riders).

For estimating the impacts of these changes in the trails network, changes were made to the Case 1 Base Case and are shown in Appendix 1 of this report.

These changes would lead to a reduction in visits for the experienced categories of riders, a slower growth in user numbers and reductions in length of overnight stays.

For Case 3 - the removal of the Drop A K Trail would result in lower levels of trail use by visitors from outside the region (with reductions in all user categories, particularly Novices and Intermediates).

<sup>61</sup> Warburton MTB trail research – Instinct and Reason 2021.

Compared with the Base Case projections, these changes would lead to a reduction in visits in all rider categories, a slower growth in user numbers and likely reductions in average length of overnight stays in the region. The changes in the modelling assumptions used are outlined in Appendix 1 of this report.

Case 1 offers the highest visitor use due to the broad market appeal, the mix of trails designed to attract all riders from novice to expert, and the outstanding natural environment in which the trails (particularly Drop A K) pass through.

Case 3 offers the second highest visitor numbers due to the appeal of the national park rides and contiguous network remaining, and case 3 offers the least number of riders due to the reduction in hero products and access to an outstanding natural experience (in the minds of the consumers).

*The trail experiences (especially the Drop a Km) in the National Park account for 15% of visitation choice for the aggregated market but this hides the real impact. The advanced and expert riders want it and the loss of it reduced demand. In contrast, Beginner riders prefer not having the Drop a KM. Intermediate riders lose some interest with the loss of Drop a Km but it's the loss of the NP itself that most impacts.<sup>62</sup>*

This report provides an economic impact assessment of the development of the Warburton Mountain Bike Trails Network. The results are indicative of the potential benefits from the development and operation of the trail network. The modelling is based on estimates of annual rides/users (in different categories, and other assumptions utilised in quantifying spending in the region.<sup>63</sup>

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<sup>62</sup> Warburton MTB Destination Market Research – Instinct and Reason. 2021.

<sup>63</sup> Average spending per visitor is based on Tourism Research Data for the Yarra Ranges LGA.

The modelling has estimated the potential number of trail users over a 10-year period of operations from the completion of the trail network.

Three cases are examined:

- Case 1 Base Case: Full Trails Network - covering the full development of the trails network
- Case 2 Reduced Trail Network, with no trails in the National Park Areas, and
- Case 3 with no Drop A K trail.

In modelling of trail users, we have drawn of the market segment profile from the surveys conducted by Instinct and Reason.<sup>64</sup>

The economic impacts of the trails arise from:

- spending by these users/visitors in the towns adjacent to the trail and other spending in the broader region
- spending associated with events
- health benefits of active recreation activities, and
- a notional value of the trails for users.

Visitors from outside the region (particularly overnight visitors/users) generate significant expenditure covering:

- food and beverage
- accommodation (for overnight stayers)
- recreation and other services, and
- transport.

The economic impact analysis has been undertaken by MCA <Michael Connell & Assocs.> - economic consultants.

<sup>64</sup> Warburton MTB trail research -quantitative findings, instinct and reason, December 2020 P16 & Additional Findings May 2021.

## 6 Modelling of Trail Operations

For the economic impact assessment, the construction phase (staged over 2021 to 2024) and operations phase (from 2022) were covered. The operations phase covers trail users over the year and major state and national events that could be staged.

For operations, the modelling has estimated the potential number of trail users over the 10-year period from 2022 to 2031. Two cases are examined: Case 1 Base Case Full Network- covering the full development of the trails network; and Case 2 Reduced Network - with no trails in the National Park Areas. In modelling of trail users, the market segment profile from the surveys conducted by instinct and reason is used.<sup>65</sup>

### 6.1 Mountain Biking Participation

The recent AusPlay survey for 2019 shows that 1.4% of the Australian population participated in mountain biking or a total 289,600 nationally. This participation rate was used to estimate potential users of the Warburton MTB trails network in metro and regional areas. The MTB participation rate is similar to that for ski and snowboarding (1.3%) and around half of that for surfing (2.5%).

The participation rate for mountain biking (1.4%) has been used in the modelling of trail user numbers. At present, males dominate the activity. For the 10-year modelling of operations the participation rate was increased reflecting growth in popularity and more women likely to participate.

**Table 4.** Sport Participation in Australia (2019)

		Age							Males	Females
Activities	Total	15-17	18-24	25-34	35-44	45-54	55-64	65+	Total	Total
Estimate (000s)										
Bush walking	1,310.9	26.6	110.9	304.8	254.2	245.8	222.0	146.5	616.8	694.1
<b>Cycling</b>	<b>2,374.8</b>	<b>44.6</b>	<b>143.9</b>	<b>387.9</b>	<b>472.3</b>	<b>523.3</b>	<b>456.3</b>	<b>346.5</b>	<b>1,510.3</b>	<b>864.5</b>
<b>Mountain biking</b>	<b>289.6</b>	<b>13.0</b>	<b>13.7</b>	<b>57.0</b>	<b>81.6</b>	<b>80.1</b>	<b>34.6</b>	<b>9.8</b>	<b>245.0</b>	<b>44.6</b>
Ski & snowboard	278.8	9.3	18.1	64.1	52.6	59.8	52.5	22.3	172.1	106.7
Surfing	527.6	18.2	43.4	122.1	117.6	114.6	77.8	33.9	391.6	136.0
Participation rate (%)										
Bush walking	6.3%	3.1%	4.6%	8.0%	7.4%	7.6%	7.5%	3.6%	6.0%	6.6%
Cycling	11.5%	5.3%	6.0%	10.2%	13.8%	16.1%	15.5%	8.5%	14.8%	8.2%
<b>Mountain biking</b>	<b>1.4%</b>	<b>1.5%</b>	<b>0.6%</b>	<b>1.5%</b>	<b>2.4%</b>	<b>2.5%</b>	<b>1.2%</b>	<b>0.2%</b>	<b>2.4%</b>	<b>0.4%</b>
Ski & snowboard	1.3%	1.1%	0.8%	1.7%	1.5%	1.8%	1.8%	0.6%	1.7%	1.0%
Surfing	2.5%	2.1%	1.8%	3.2%	3.4%	3.5%	2.6%	0.8%	3.8%	1.3%

SOURCE: AUSPLAY SURVEY RESULTS JANUARY 2019 - DECEMBER 2019. RELEASED 30 APRIL 2020 (AND RE-ISSUED 24 JUNE 2020)  
[HTTPS://WWW.CLEARINGHOUSEFORSPORT.GOV.AU/RESEARCH/SMI/AUSPLAY/RESULTS/SPORT](https://www.clearinghouseforsport.gov.au/research/smi/ausplay/results/sport)



## 6.2 Modelling Assumptions

Trail users were modelled based on several assumptions. Given the proximity of the trails to Melbourne a large number of trail users will be day visitors. Potential user numbers for the trail network have been modelled based on several assumptions listed below. Modelling of events was undertaken separately.

Potential users were estimated based on population data for local government areas, with proximity affecting the likelihood of visiting and the average number of rides per year. The likelihood of visiting the trail was assumed to increase over time as recognition of the trails increase. The analysis was at a local government area level and these LGAs were then clustered into regions.

A range of assumption were utilised in modelling trail user numbers, and these are detailed in Appendix A.

## 6.3 Summary Comparison of Cases

The results for cases are detailed in the following chapters. The cases are:

1. Case 1 Base Case: Full Trails Network (Chapters 4 & 8)
2. Case 2 Reduced Trails Network (Chapter 5 & 9), and
3. Case 3 No Drop a K Trail (Chapter 6 & 10).

In summary, Case 2 Reduced Trails Network (no national park trails) would result in substantially lower levels of trail use by visitors from outside the region (in all rider categories). A smaller reduction in overall trail use occurs with Case 3 No Drop a K Trail.

The changes would lead to a reduction in visits for the experienced categories of riders, a slower growth in user numbers and reductions in length of overnight stays, compared with the Base Case.

The following charts compare the modelling results for the 3 cases. This is based on research by instinct and reason.<sup>66</sup>

For Case 2 the National Park Trails are not included. The impacts of this change have been modelled by reducing Intermediate users by 33.5%, Advanced & Expert trail users by 21.5% (compared with the Base Case), reducing Novices by 21%, and Beginners by 8%. Growth is substantially lower and there is a reduction in length of overnight stays.

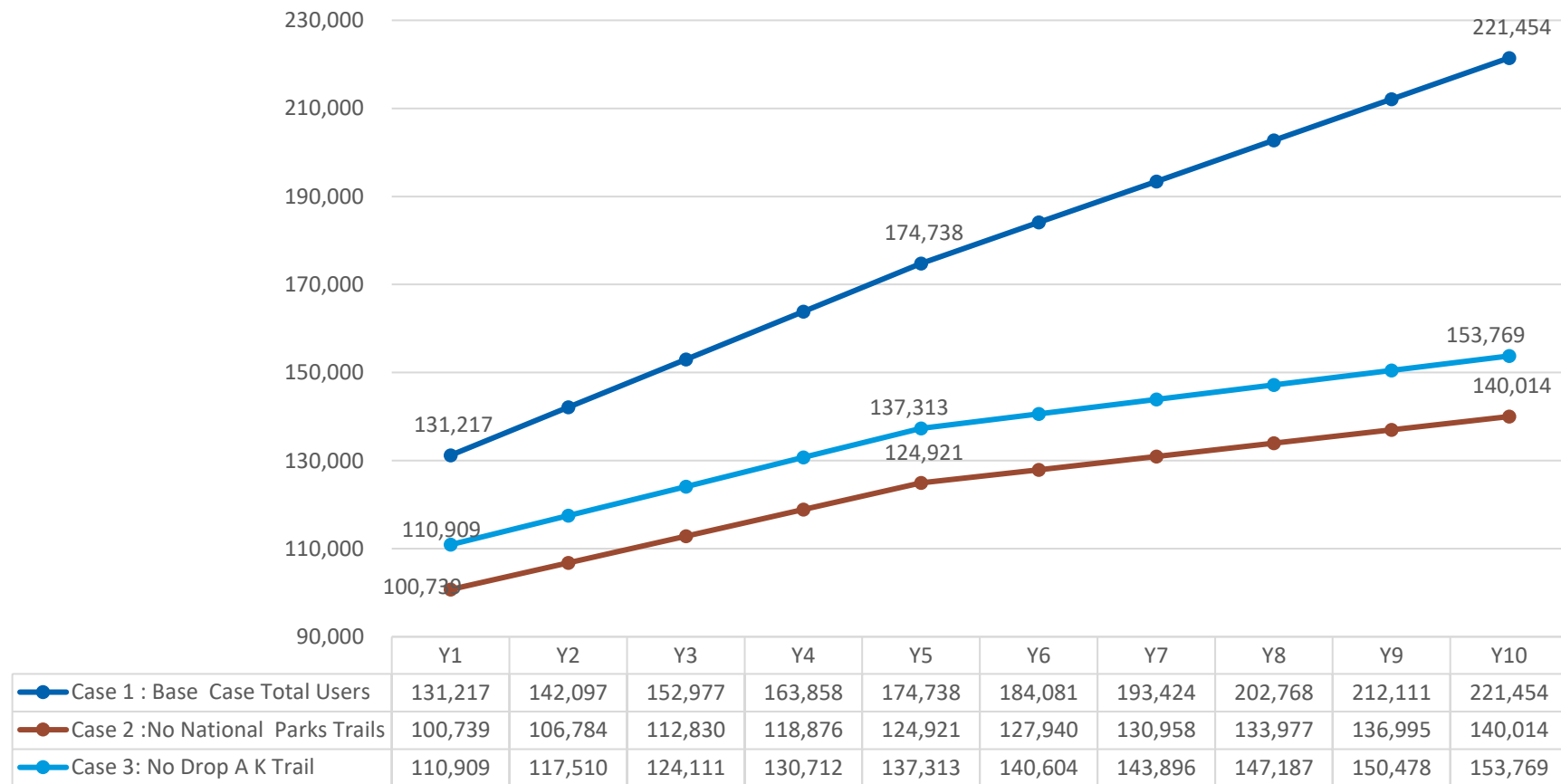
Case 3 No Drop A K Trail, has a different pattern of reductions in users (Beginners - 8%, Novices -13%, Intermediates -20%, and Advanced/Expert -8%).

This has impacts on trail users' spending in the region, jobs generated, regional income generated and benefit cost ratios (BCRs). The differences are show in the following charts. Case 2 delivers lower visitor numbers compared with the Case 1 Base Case, with a difference in year 10 of around 81,000 annual users. For Case 3 visitor numbers in year 10 are around 68,000 lower than the Base Case.

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<sup>66</sup> Warburton MTB trail research -quantitative findings, instinct and reason, December 2020 P16; Additional Findings on Drop A K Trail, May 2021.

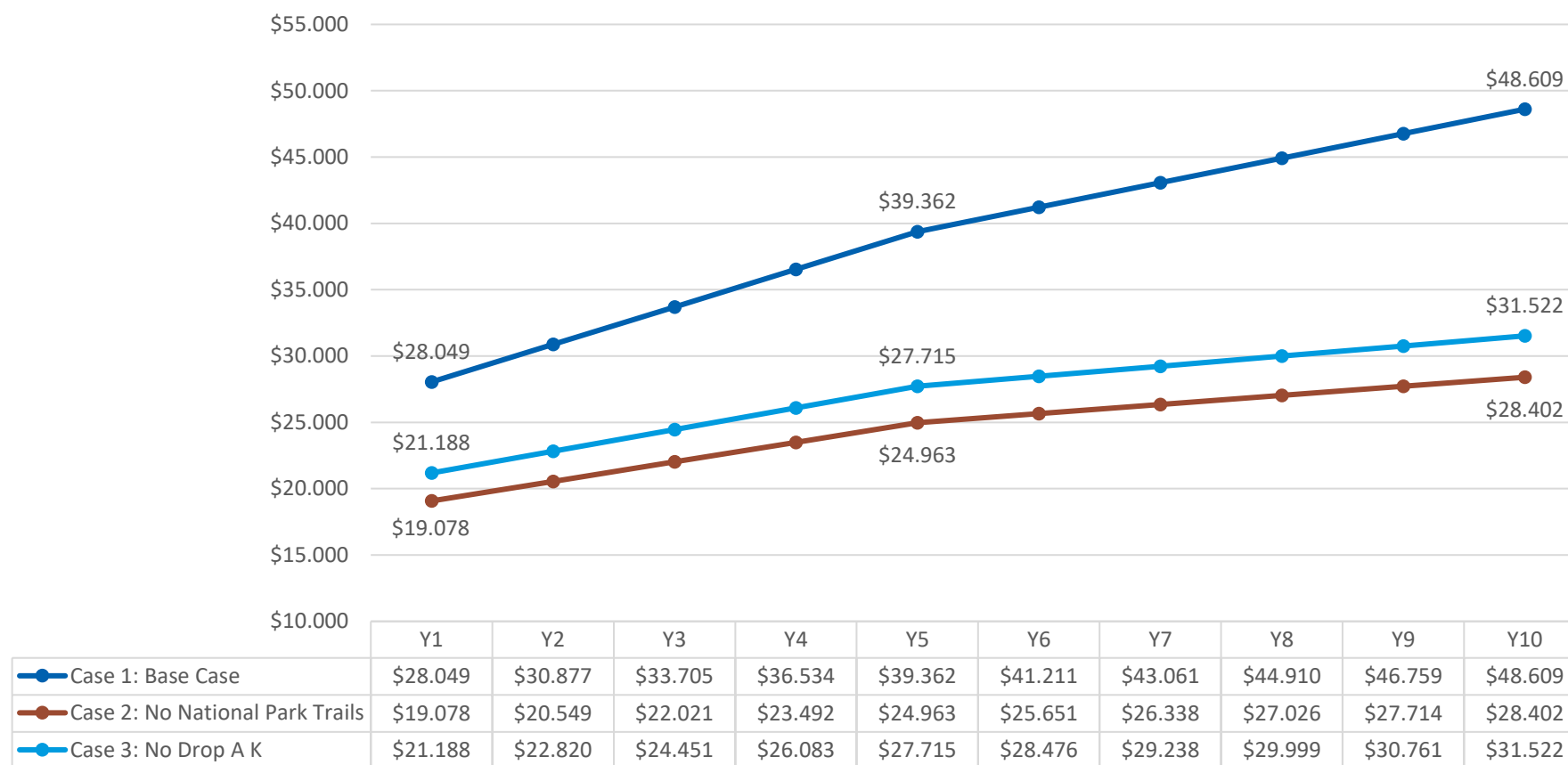
**Figure 12.** Warburton Trails Network Comparison – Estimated Trail Users Years 1-10



SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

As a consequence of the substantially lower user numbers in the categories, and a reduced length of stay, in year 10 trail user spending in the region is around \$20 million lower for Case 2 and \$17 million lower for Case 3.

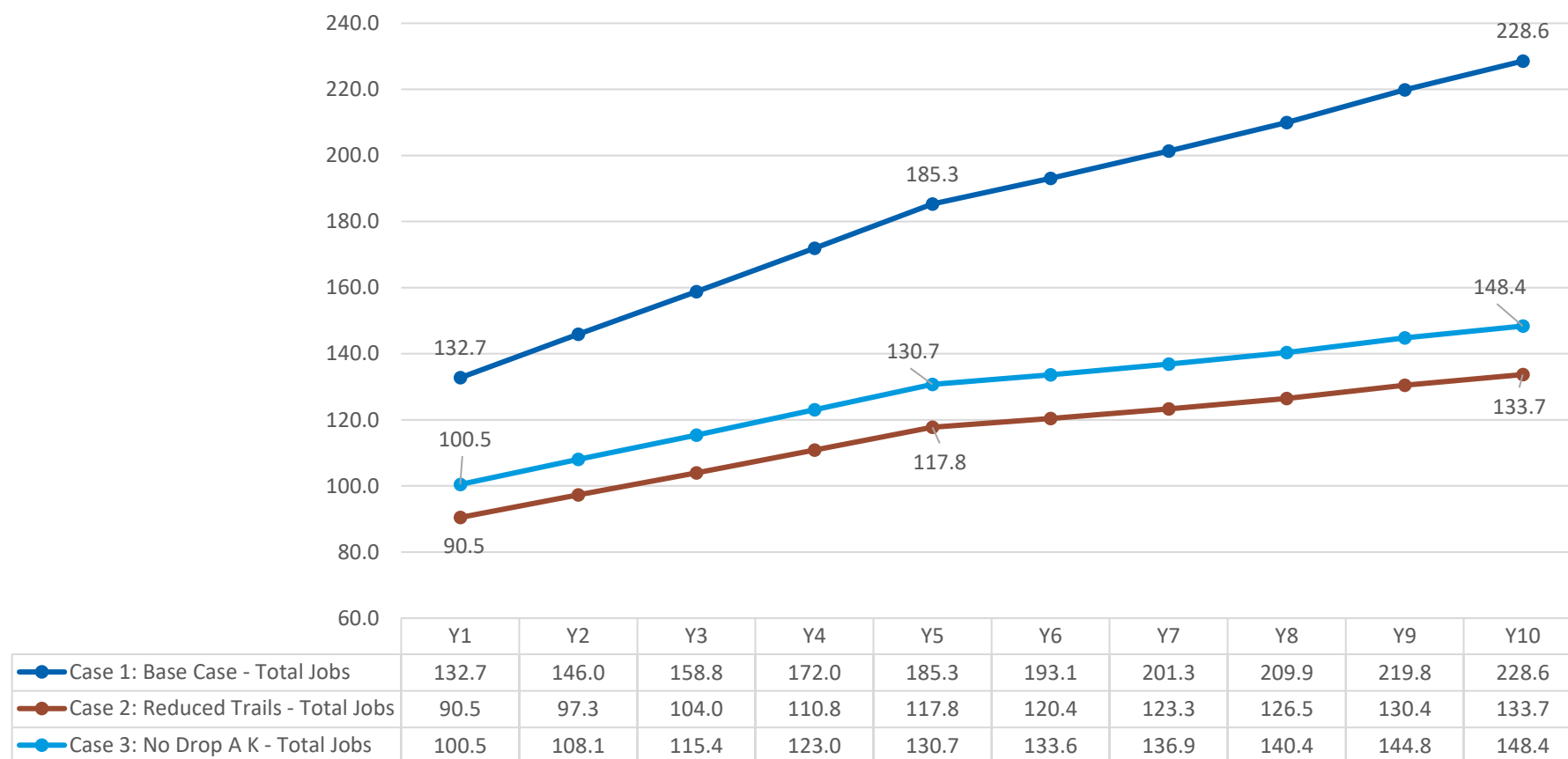
**Figure 13.** Warburton Trails Network – Spending in Region by Trail Users Years 1-10 (\$million 2021 prices)



SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

As a consequence of lower user numbers, stays and spending, the total jobs generated in the region are lower for Case 2 and Case 3. In year 10 the jobs generated in the region are around 80-90 lower compared with the Base Case (Case 1: Base Case 229 jobs; Case 2 134 jobs; and Case 3 148 jobs).

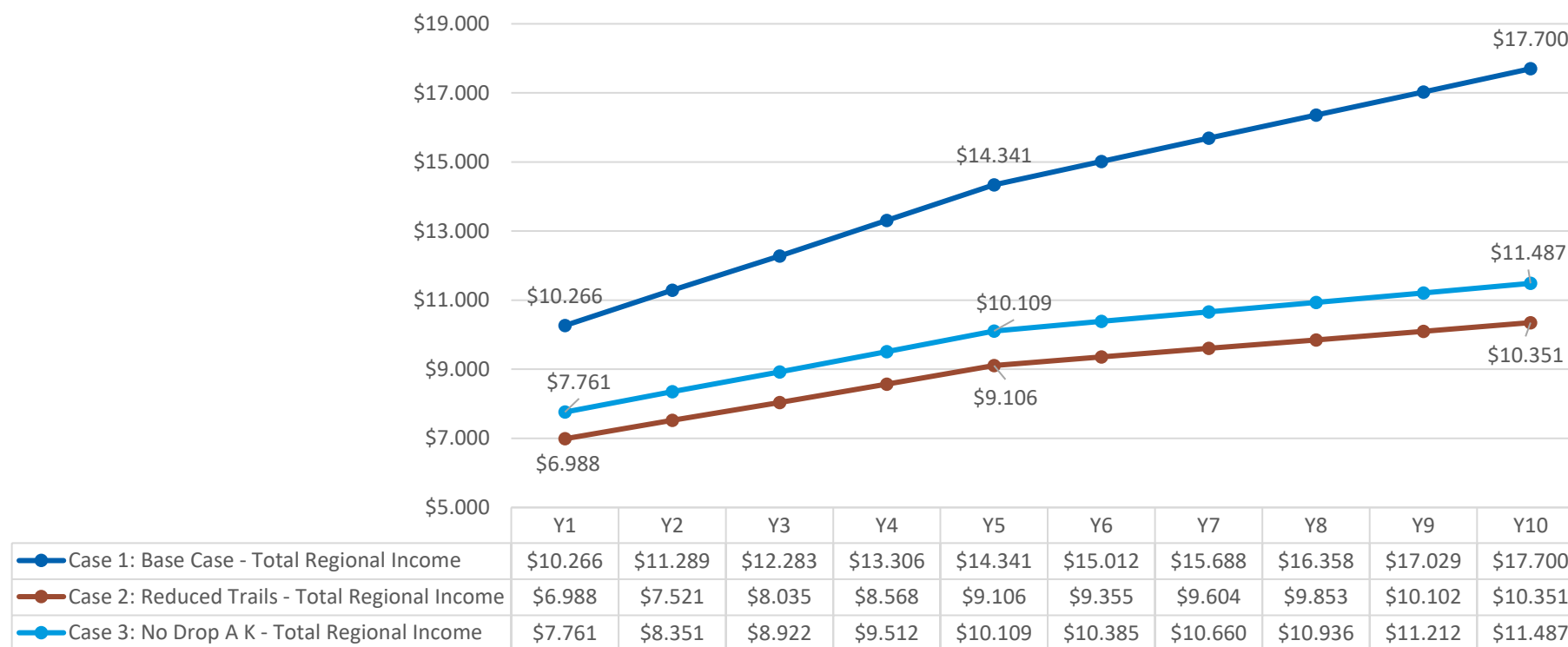
**Figure 14.** Warburton Trails Network – Total Jobs in Region Generated by Trail Users (FTE no.)



SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

With the reduced trail network and the consequent lower trail users, spending and length of stays, the regional income generated is lower than for the Base Case (Case 2 \$10.3 million in year 10; Case 3 \$11.5 million compared to Case 1 Base Case around \$17.7 million in year 10).

**Figure 15.** Warburton Trail Network – Regional Income Generated by Trail Users (\$million 2021 prices)

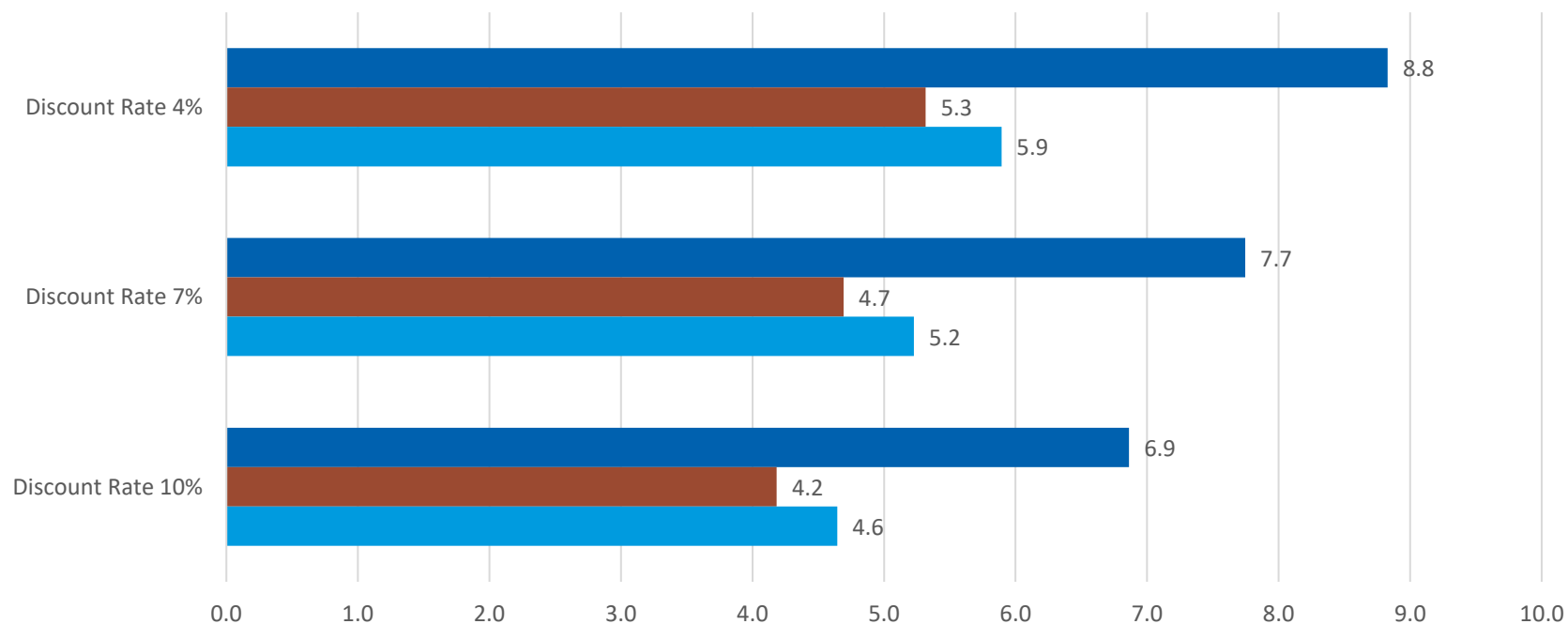


SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

The measurement of benefits includes both direct benefits (the increase in regional income) and indirect benefits (estimated health benefits and the value to users measured by a shadow price of \$15 per ride).

- For Case 2 and Case 3 the benefit cost ratios are lower than those for the Case 1 Base Case. For all benefits a 7% discount rate the BCRs are Case 1 7.7 and Case 2 5.0 and Case 3 5.2.
- If only regional income is included the BCRs are Case 1 4.5 and Case 2 3.0 and Case 3 3.3.

**Figure 16.** Benefit Cost Ratios (BCR) – Warburton Trails Development (All Benefits)

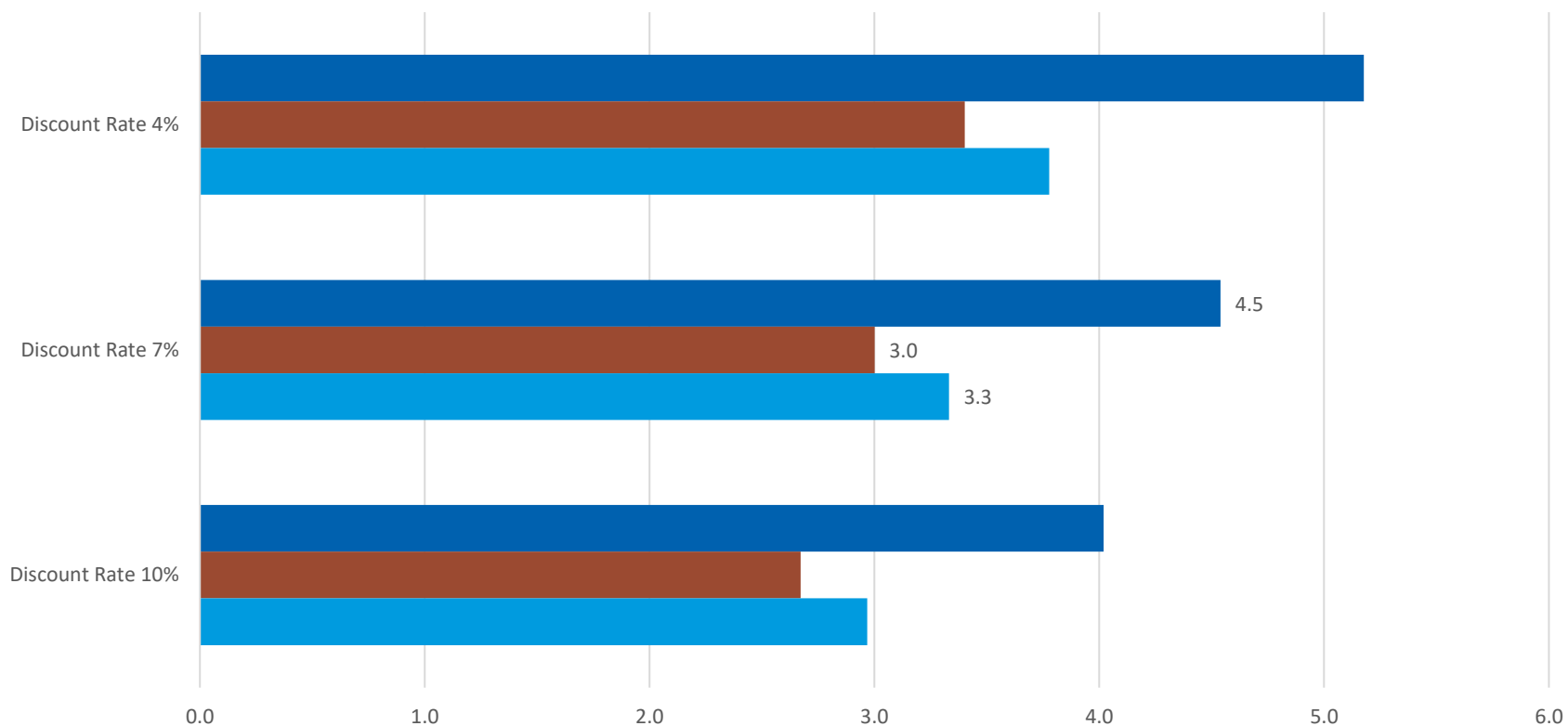


	Discount Rate 10%	Discount Rate 7%	Discount Rate 4%
■ Case 1 - Base Case BCR	6.9	7.7	8.8
■ Case 2 - Reduced Trails BCR	4.2	4.7	5.3
■ Case 3 No Drop A K Trail BCR	4.6	5.2	5.9

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.



**Figure 17.** Benefit Cost Ratios (BCR) – Warburton Trails Development (Regional Income Only)



	Discount Rate 10%	Discount Rate 7%	Discount Rate 4%
■ Case 1 - Base Case BCR	4.0	4.5	5.2
■ Case 2 - Reduced Trails BCR	2.7	3.0	3.4
■ Case 3 No Drop A K Trail BCR	3.0	3.3	3.8

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

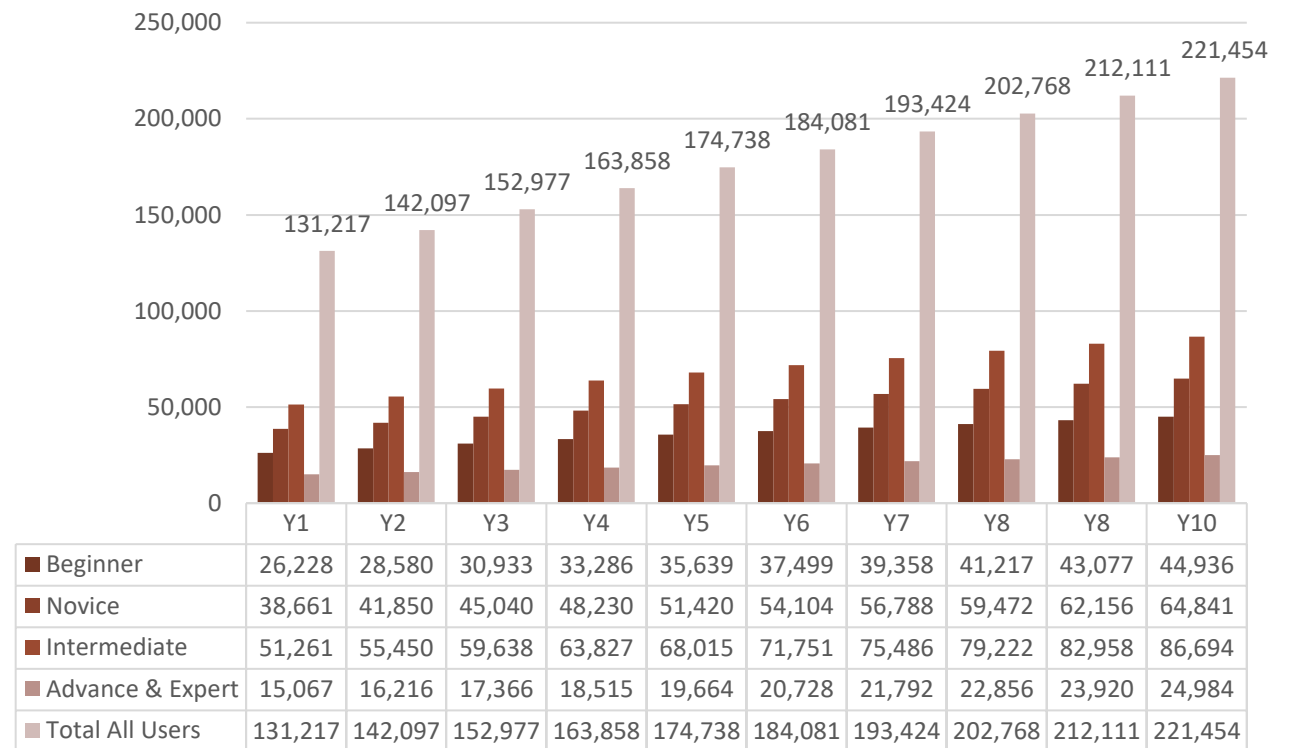
## 7 Trail Operations - Case 1: Base Case Full Trail Network – Trail Users and Spending

This chapter provides estimates of trail users and spending for Case 1 Base Case - Full Trail Network, which includes the Drop A K trail.

### Trail User Estimates

Based on the modelling of trail operations, the annual number of trail users would increase from around 131,200 in year 1 to 178,700 in year 5 and reach 221,500 in year 10. Given the proximity to the Melbourne metropolitan area, around two thirds would be day visitors and one third overnight visitors. This represents a significant increase in visitors to the region, in this specialised category of trail users. The tables below show the estimated numbers by user category (using the rider profile developed by *Instinct and Reason*).

**Figure 18.** Base Case – Trail Users by Type – 10 Years (no.)



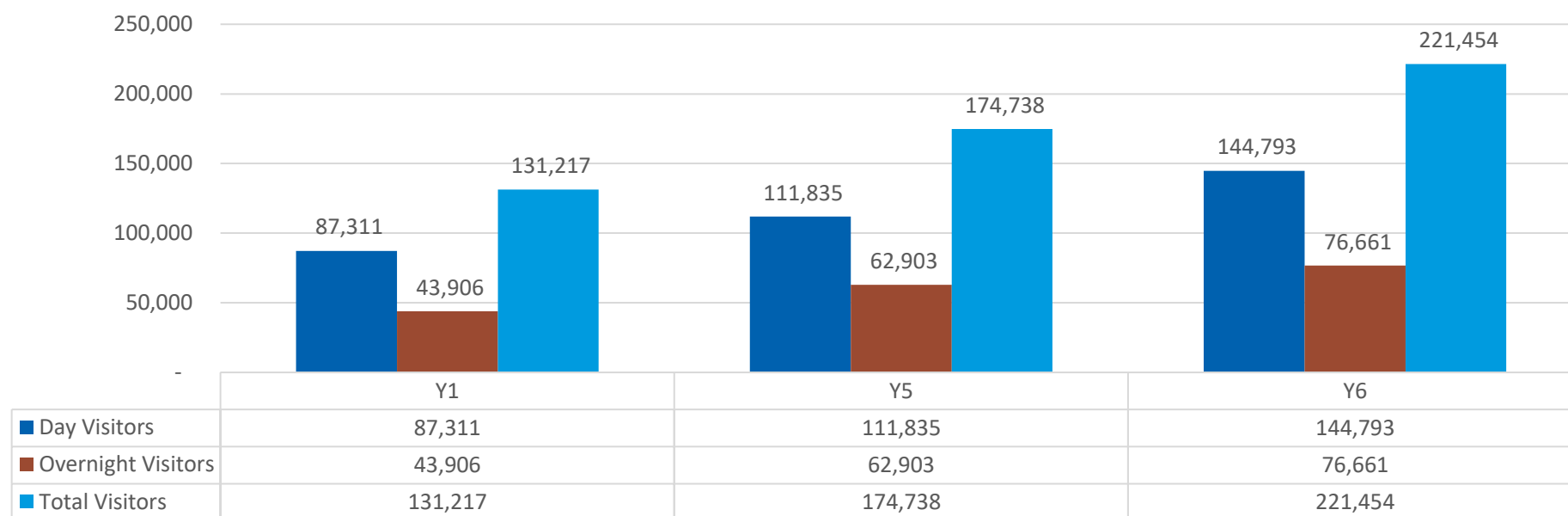
SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Table 5.** Case 1 – Base Case: Estimated Trail Users by Category

Case 1 Base Case Total Trail Users	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Beginner	26,228	28,580	30,933	33,286	35,639	37,499	39,358	41,217	43,077	44,936
Novice	38,661	41,850	45,040	48,230	51,420	54,104	56,788	59,472	62,156	64,841
Intermediate	51,261	55,450	59,638	63,827	68,015	71,751	75,486	79,222	82,958	86,694
Advance & Expert	15,067	16,216	17,366	18,515	19,664	20,728	21,792	22,856	23,920	24,984
<b>Total All Users</b>	<b>131,217</b>	<b>142,097</b>	<b>152,977</b>	<b>163,858</b>	<b>174,738</b>	<b>184,081</b>	<b>193,424</b>	<b>202,768</b>	<b>212,111</b>	<b>221,454</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Figure 19.** Case 1 – Base Case – Total Riders on Trails – Selected Years



SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

The tables below show the mix of day and overnight visitors for each of the trail user categories (for selected years).

**Table 6.** Case 1 Base Case: Total Trail Users – Day and Overnights

Case 1 Base Case	Y1			Y5			Y10		
Trail Users	Day	Overnight	Total	Day	Overnight	Total	Day	Overnight	Total
Beginner	16,418	9,810	26,228	21,345	14,294	35,639	27,501	17,435	44,936
Novice	24,460	14,201	38,661	31,574	19,846	51,420	40,694	24,146	64,841
Intermediate	36,045	15,216	51,261	45,783	22,232	68,015	59,536	27,158	86,694
Advance & Expert	10,389	4,679	15,067	13,134	6,530	19,664	17,062	7,922	24,984
<b>Total All Users</b>	<b>87,311</b>	<b>43,906</b>	<b>131,217</b>	<b>111,835</b>	<b>62,903</b>	<b>174,738</b>	<b>144,793</b>	<b>76,661</b>	<b>221,454</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Table 7.** Case 1 Base Case: Trail Users by Type by Residence Location

Trail Users	Y1			Y5			Y10		
Case 1 Base Case	Users			Users			Users		
Residence of Trail Users	Day	Overnight	Total	Day	Overnight	Total	Day	Overnight	Total
Local -Yarra Ranges (S)	26,538	0	26,538	31,641	0	31,641	42,150	0	42,150
Total Metro & Adjacent Areas	54,773	19,906	74,679	70,995	26,103	97,097	91,843	33,461	125,304
<b>Total Yarra Ranges &amp; Areas</b>	<b>81,311</b>	<b>19,906</b>	<b>101,217</b>	<b>102,635</b>	<b>26,103</b>	<b>128,738</b>	<b>133,993</b>	<b>33,461</b>	<b>167,454</b>
<b>Other</b>									
Other Regional/Intrastate	3,600	14,400	18,000	4,000	16,000	20,000	4,400	17,600	22,000
Interstate	2,400	9,600	12,000	2,800	11,200	14,000	3,200	12,800	16,000
Internationals	0	0	0	2,400	9,600	12,000	3,200	12,800	16,000
<b>Total Other</b>	<b>6,000</b>	<b>24,000</b>	<b>30,000</b>	<b>9,200</b>	<b>36,800</b>	<b>46,000</b>	<b>10,800</b>	<b>43,200</b>	<b>54,000</b>
<b>Total All Trail Users</b>	<b>87,311</b>	<b>43,906</b>	<b>131,217</b>	<b>111,835</b>	<b>62,903</b>	<b>174,738</b>	<b>144,793</b>	<b>76,661</b>	<b>221,454</b>

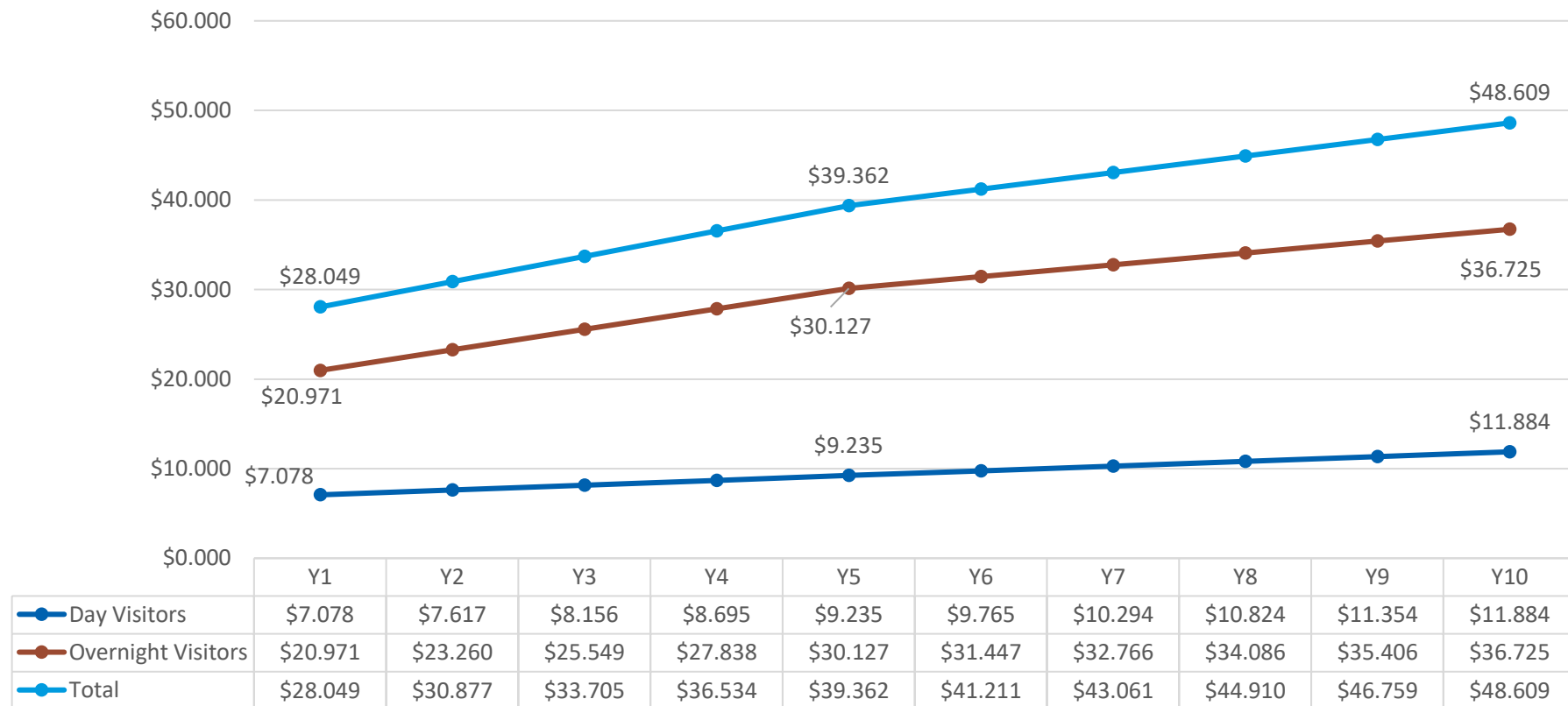
SOURCE: MCA MODELLING JANUARY 2021. OTHER REGIONAL/INTERSTATE/INTERNATIONALS = RIDES PER VISIT. NOTE 2021 POPULATION ESTIMATES ARE USED FOR 2022.

## 7.1 Spending in Region by Trail Users

Spending in the region by MTB users was analysed and estimated. The assumptions used in estimation are outlined in Appendix A. Spending estimates are based on assumed average spending per person, for each category of rider. For example, intermediate and advanced and experts spend more than beginners and novices and stay for a longer period. All spending is in constant 2021 dollars.

Estimated spending in the Yarra Ranges LGA by trail users would increase from \$28.0 million in year 1 (\$20.9 million overnights and \$7.1 million day visitors) to \$48.6 million in year 10 (\$36.7 million overnights and \$11.9 million day visitors).

**Figure 20.** Case 1 Base Case – Spending in Region by Trail Users (\$million 2021 prices)



SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

Spending was estimated for the locations that the trail users come from and is in the table below.

**Table 8.** Case 1 Base Case – Trail User Spending in the Region (\$million 2021 prices)

Case 1 Trail User Spending (\$ million 2021 prices) in Region	Y1			Y5			Y10		
Residence of Trail Users	Day	Overnight	Total	Day	Overnight	Total	Day	Overnight	Total
Yarra Ranges	\$0.950	\$0.000	\$0.950	\$1.132	\$0.000	\$1.132	\$1.508	\$0.000	\$1.508
Total Metro & Adjacent Area	\$5.513	\$9.486	\$14.999	\$7.157	\$12.439	\$19.596	\$9.265	\$15.946	\$25.211
<b>Total Yarra Ranges &amp; Areas</b>	<b>\$5.692</b>	<b>\$9.805</b>	<b>\$15.498</b>	<b>\$7.368</b>	<b>\$12.815</b>	<b>\$20.183</b>	<b>\$9.526</b>	<b>\$16.411</b>	<b>\$25.937</b>
<b>Other</b>									
Other Regional/Intrastate	\$0.367	\$6.818	\$7.186	\$0.408	\$7.576	\$7.984	\$0.449	\$8.333	\$8.782
Interstate	\$0.248	\$4.667	\$4.915	\$0.289	\$5.445	\$5.734	\$0.331	\$6.223	\$6.554
Internationals	\$0.000	\$0.000	\$0.000	\$0.248	\$4.667	\$4.915	\$0.331	\$6.223	\$6.554
<b>Total Other</b>	<b>\$0.616</b>	<b>\$11.485</b>	<b>\$12.101</b>	<b>\$0.946</b>	<b>\$17.688</b>	<b>\$18.634</b>	<b>\$1.111</b>	<b>\$20.779</b>	<b>\$21.890</b>
<b>Total All Areas</b>	<b>\$7.078</b>	<b>\$20.971</b>	<b>\$28.049</b>	<b>\$9.235</b>	<b>\$30.127</b>	<b>\$39.362</b>	<b>\$11.884</b>	<b>\$36.725</b>	<b>\$48.609</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.



## 7.2 Spending Mix

The following table shows indicative estimates of the mix of spending by category for day visitors and for overnight visitors. In year 10 trail users would be injecting \$48.6 million in the region, up from \$28.0 million in year 1.

Total expenditure comprises:

- spending on trail-linked activities (including spending on bike related expenses and other spending - food and beverage etc.) in proximity to the trails
- spending on accommodation (for overnight stayers) and meals during their stay, and
- spending on other recreational and tourism services.

While some of this spending would be serviced by existing businesses, it will encourage new businesses to service a growing visitor market. This is particularly the case with biking related spending (e.g., bike hire, guides/trainers and shuttles).

**Table 9.** Case 1 Base Case – Spending by Type (\$million – constant \$2021)

Case 1 Base Case Type of Spending (\$ million)	Share of Spending %	Y1	Y5	Y10
<b>Total Day Visitors</b>				
Food	65%	\$4.601	\$6.003	\$7.724
Bike Hire	15%	\$1.062	\$1.385	\$1.783
Guides	5%	\$0.354	\$0.462	\$0.594
Shuttle	15%	\$1.062	\$1.385	\$1.783
<b>Total Spending - Day Visitors</b>		<b>\$7.078</b>	<b>\$9.235</b>	<b>\$11.884</b>
<b>Total Overnight Visitors</b>				
Food & Accommodation	60%	\$12.583	\$18.076	\$22.035
Bike Hire	20%	\$4.194	\$6.025	\$7.345
Guides	5%	\$1.049	\$1.506	\$1.836
Shuttle	15%	\$3.146	\$4.519	\$5.509
<b>Total Spending Overnights</b>		<b>\$20.971</b>	<b>\$30.127</b>	<b>\$36.725</b>
<b>Total Users</b>				
Food & Accommodation		\$17.183	\$24.079	\$29.760
Bike Hire		\$5.256	\$7.411	\$9.128
Guides		\$1.402	\$1.968	\$2.430
Shuttle		\$4.207	\$5.904	\$7.291
<b>Total Spending Users</b>		<b>\$28.049</b>	<b>\$39.362</b>	<b>\$48.609</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## 8 Trail Operations - Case 2: Reduced Trail Network – Trail Users and Spending

This chapter provides estimates of trail users and spending for Case 2 Reduced Trails Network, with no trails in the National Park areas.

The reduced trails network (no national park trails) would result in lower levels of trail use by visitors from outside the region (mainly by the more experienced riders). These changes would lead to a reduction in visits for the experienced categories of riders, a slower growth in user numbers and reductions in length of overnight stays, compared with the Base Case.

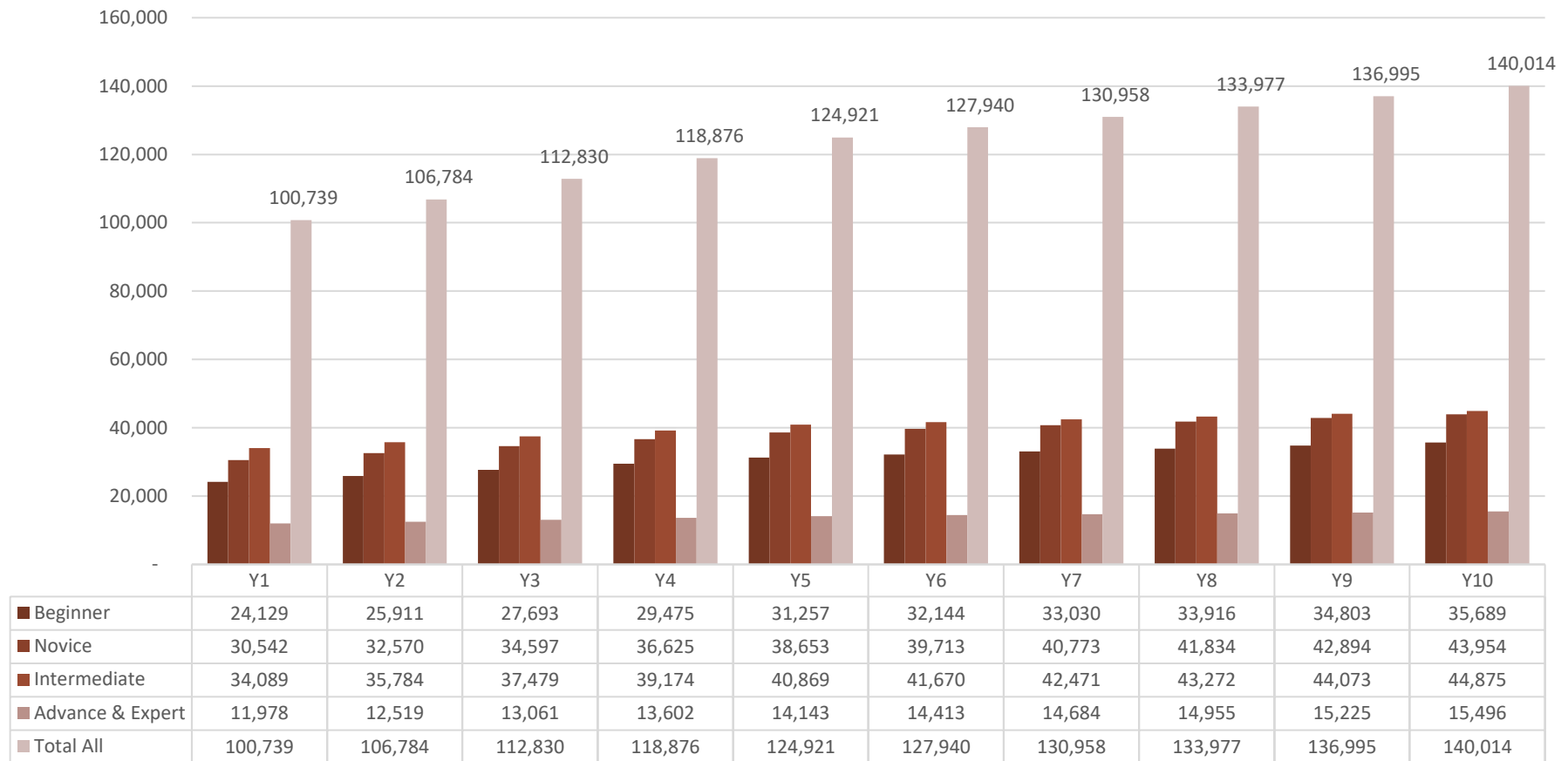
The impact of the reduced trail network was modelled based on changes in assumptions, which are outlined in Appendix A (Table A.5).

### 8.1 Trail Use Estimates

Based on the modelling of trail operations, the annual number of trail users would increase from around 100,750 in year 1 to 124,900 in year 5 and reach 140,000 in year 10. Given the proximity to the Melbourne metropolitan area, around two thirds would be day visitors and one third overnight visitors. The tables below show the estimated numbers by user category (using the rider profile developed by Instinct and Reason). The year 10 users are around 80,000 below Case 1 Base Case numbers.



**Figure 21.** Case 2 Reduced Trails Network – Trail Users by Type (no.)



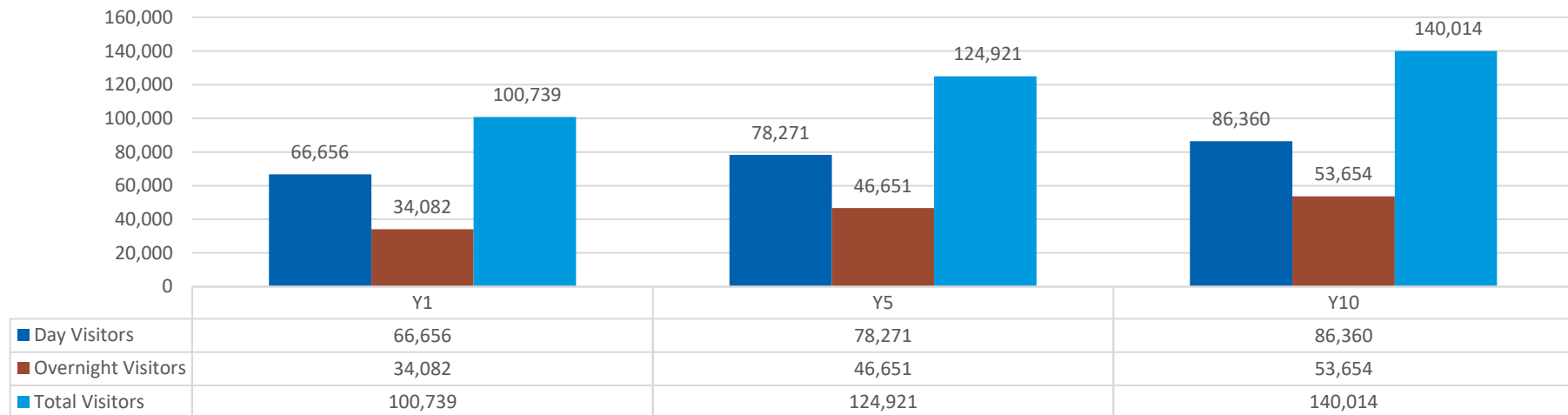
SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Table 10.** Case 2 Reduced Trails Network: Estimate Trail Users by Category

Case 2 Reduced Trails Network	Y1			Y5			Y10		
Trail Users	Day	Overnight	Total	Day	Overnight	Total	Day	Overnight	Total
Beginner	15,104	9,025	24,129	18,459	12,798	31,257	20,845	14,844	35,689
Novice	19,323	11,219	30,542	23,428	15,225	38,653	26,418	17,536	43,954
Intermediate	23,970	10,119	34,089	27,089	13,780	40,869	29,113	15,762	44,875
Advance & Expert	8,259	3,719	11,978	9,294	4,848	14,143	9,983	5,513	15,496
<b>Total All Users</b>	<b>66,656</b>	<b>34,082</b>	<b>100,739</b>	<b>78,271</b>	<b>46,651</b>	<b>124,921</b>	<b>86,360</b>	<b>53,654</b>	<b>140,014</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Figure 22.** Case 2 Reduced Trails Network – Total Riders on Trails – Selected Years



SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Table 11.** Case 2 Reduced Trails Network: Estimated Trail Users by Category

Case 2 Reduced Trails Network	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Beginner	24,129	25,911	27,693	29,475	31,257	32,144	33,030	33,916	34,803	35,689
Novice	30,542	32,570	34,597	36,625	38,653	39,713	40,773	41,834	42,894	43,954
Intermediate	34,089	35,784	37,479	39,174	40,869	41,670	42,471	43,272	44,073	44,875
Advance & Expert	11,978	12,519	13,061	13,602	14,143	14,413	14,684	14,955	15,225	15,496
<b>Total All Users</b>	<b>100,739</b>	<b>106,784</b>	<b>112,830</b>	<b>118,876</b>	<b>124,921</b>	<b>127,940</b>	<b>130,958</b>	<b>133,977</b>	<b>136,995</b>	<b>140,014</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Table 12.** Case 2 Reduced Trails Network: Trail Users by Residence Location

Case 2 Reduced Trails Network	Year 1			Year 5			Year 10		
	Users			Users			Users		
	Day	Overnight	Total	Day	Overnight	Total	Day	Overnight	Total
Local -Yarra Ranges (S)	19,520		19,520	21,721		21,721	22,695		22,695
Urban & Adjacent									
<b>Total Metro &amp; Adjacent Areas</b>	<b>42,475</b>	<b>15,436</b>	<b>57,911</b>	<b>49,408</b>	<b>18,086</b>	<b>67,495</b>	<b>55,283</b>	<b>20,127</b>	<b>75,410</b>
<b>Total Yarra Ranges &amp; Areas</b>	<b>61,995</b>	<b>15,436</b>	<b>77,430</b>	<b>71,130</b>	<b>18,086</b>	<b>89,216</b>	<b>77,978</b>	<b>20,127</b>	<b>98,105</b>
Other									
Other Regional/Intrastate	2,800	11,202	14,002	3,112	12,446	15,558	3,423	13,691	17,114
Interstate	1,861	7,445	9,306	2,171	8,686	10,857	2,482	9,926	12,408
Internationals			0	1,858	7,432	9,290	2,477	9,910	12,387
<b>Total Other</b>	<b>4,662</b>	<b>18,647</b>	<b>23,308</b>	<b>7,141</b>	<b>28,564</b>	<b>35,705</b>	<b>8,382</b>	<b>33,527</b>	<b>41,909</b>
<b>Total All Trail Users</b>	<b>66,656</b>	<b>34,082</b>	<b>100,739</b>	<b>78,271</b>	<b>46,651</b>	<b>124,921</b>	<b>86,360</b>	<b>53,654</b>	<b>140,014</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## 8.2 Spending in Region by Trail Users

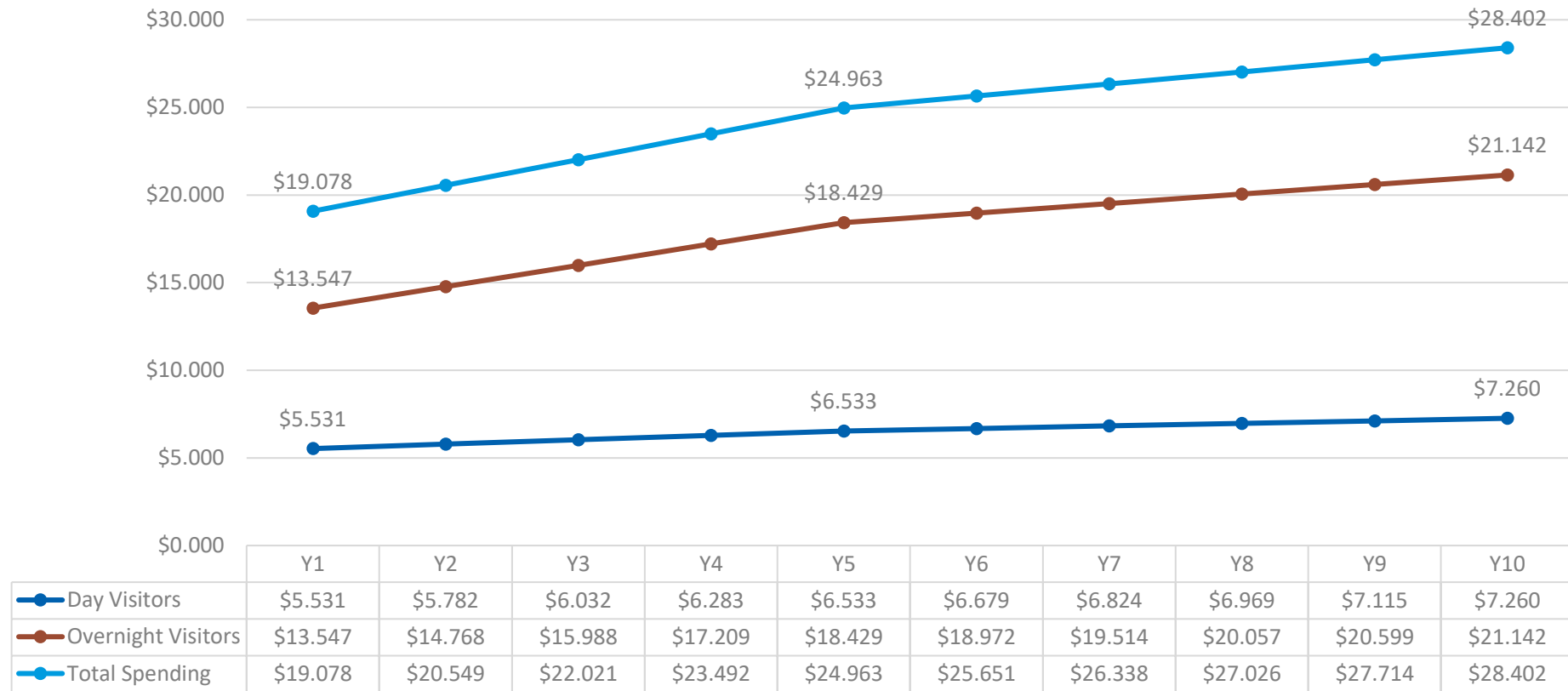
Spending in the region by MTB users was analysed and estimated. The assumptions used in estimation are outlined in Appendix A. Spending estimates are based on assumed average spending per person, for each category of rider. For example, intermediate and advanced and experts spend more than beginners and novices and stay for a longer period. All spending is in constant 2021 dollars.

Estimated spending in the Yarra Ranges LGA by trail users would increase from \$19.1 million in year 1 (\$13.6 million overnights and \$5.5 million day visitors) to \$28.4 million in year 10 (\$21.1 million overnights and \$7.3 million day visitors).



**Figure 23.**

Case 2 Reduced Trail Network – Spending in Region by Trail Users (\$million 2021 prices)



SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

Spending was estimated for the locations that the trail users come from and is in the table below.

**Table 13.** Case 2 Reduced Trails Network: Trail User Spending in the Region (\$million 2021 prices)

Case 2: Reduced Trail Network	Y1			Y5			Y10		
Residence of Trail Users	Day	Overnight	Total	Day	Overnight	Total	Day	Overnight	Total
Yarra Ranges LGA	\$0.850	\$0.000	\$0.850	\$0.946	\$0.000	\$0.946	\$0.989	\$0.000	\$0.989
Total Metro & Adjacent Areas	\$4.210	\$6.115	\$10.325	\$4.864	\$6.991	\$11.855	\$5.423	\$7.706	\$13.128
<b>Total Yarra Ranges &amp; Metro</b>	<b>\$5.060</b>	<b>\$6.115</b>	<b>\$11.175</b>	<b>\$5.810</b>	<b>\$6.991</b>	<b>\$12.802</b>	<b>\$6.411</b>	<b>\$7.706</b>	<b>\$14.117</b>
<b>Other</b>									
Other Regional	\$0.282	\$4.399	\$4.681	\$0.313	\$4.888	\$5.201	\$0.344	\$5.377	\$5.721
Interstate	\$0.190	\$3.033	\$3.223	\$0.221	\$3.538	\$3.760	\$0.253	\$4.044	\$4.297
Internationals	\$0.000	\$0.000	\$0.000	\$0.189	\$3.012	\$3.201	\$0.252	\$4.016	\$4.268
<b>Total Other</b>	<b>\$0.471</b>	<b>\$7.432</b>	<b>\$7.903</b>	<b>\$0.723</b>	<b>\$11.438</b>	<b>\$12.161</b>	<b>\$0.849</b>	<b>\$13.436</b>	<b>\$14.285</b>
<b>Total All Areas</b>	<b>\$5.531</b>	<b>\$13.547</b>	<b>\$19.078</b>	<b>\$6.533</b>	<b>\$18.429</b>	<b>\$24.963</b>	<b>\$7.260</b>	<b>\$21.142</b>	<b>\$28.402</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## 8.3 Spending Mix

The following table shows indicative estimates of the mix of spending by category for day visitors and for overnight visitors. In year 10 trail users would be injecting \$27.9 million in the region, up from \$18.9 million in year 1.

Total expenditure comprises:

- spending on trail-linked activities (including spending on bike related expenses and other spending - food and beverage etc.) in proximity to the trails
- spending on accommodation (for overnight stayers) and meals during their stay
- spending on other recreational and tourism services.

While some of this spending would be serviced by existing businesses, it will encourage new businesses to service this growth in a specialised visitor market. This is particularly the case with biking related spending (e.g., bike hire, guides/trainers and shuttles).

**Table 14.** Case 2 Reduced Trail Network: Spending Type (\$million 2021 prices)

CASE 2: REDUCED TRAIL NETWORK				
Type of Spending	Share of Spending	Y1	Y5	Y10
(\$ million)	%			
Total Day Visitors				
Food	65%	\$3,595,372	\$4,246,741	\$4,719,119
Bike Hire	15%	\$829,701	\$980,017	\$1,089,027
Guides	5%	\$276,567	\$326,672	\$363,009
Shuttle	15%	\$829,701	\$980,017	\$1,089,027
Total Spending - Day Visitors		\$5,531,341	\$6,533,448	\$7,260,182
Total Overnight Visitors				
Food & Accommodation	60%	\$8,128,239	\$11,057,597	\$12,685,031
Bike Hire	20%	\$2,709,413	\$3,685,866	\$4,228,344
Guides	5%	\$677,353	\$921,466	\$1,057,086
Shuttle	15%	\$2,032,060	\$2,764,399	\$3,171,258
Total Spending Overnights		\$13,547,065	\$18,429,327.52	\$21,141,719
Total Users				
Food & Accommodation		\$14,433,024	\$18,990,203	\$21,632,494
Bike Hire		\$3,539,114	\$4,665,883	\$5,317,371
Guides		\$953,920	\$1,248,139	\$1,420,095
Shuttle		\$2,861,761	\$3,744,416	\$4,260,285
Total Spending Users		\$19,078,406	\$24,962,776	\$28,401,901

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## 9 Trail Operations - Case 3: No Drop A K – Trail Users and Spending

This chapter provides estimates of trail users and spending for Case 3 No Drop A K Trail. This is the trails network, with the proposed Drop a Kilometre trail not included.

This would result in lower levels of trail use by visitors from outside the region (mainly by novice and intermediate riders). These changes would lead to a reduction in visits for the experienced categories of riders, a slower growth in user numbers and reductions in length of overnight stays, compared with the Base Case.

Survey research by *Instinct and Reason*, shows that an overall reduction in users (comprising Beginner – 8%; Novice-13%; Intermediate -20%; and Advanced/Expert -8%).<sup>67</sup> These reductions were applied to each of these user categories.

The impact of the removal of the Drop A K Trail were modelled based on the assumptions, which are outlined in Appendix A.

### 9.1 Trail User Estimates

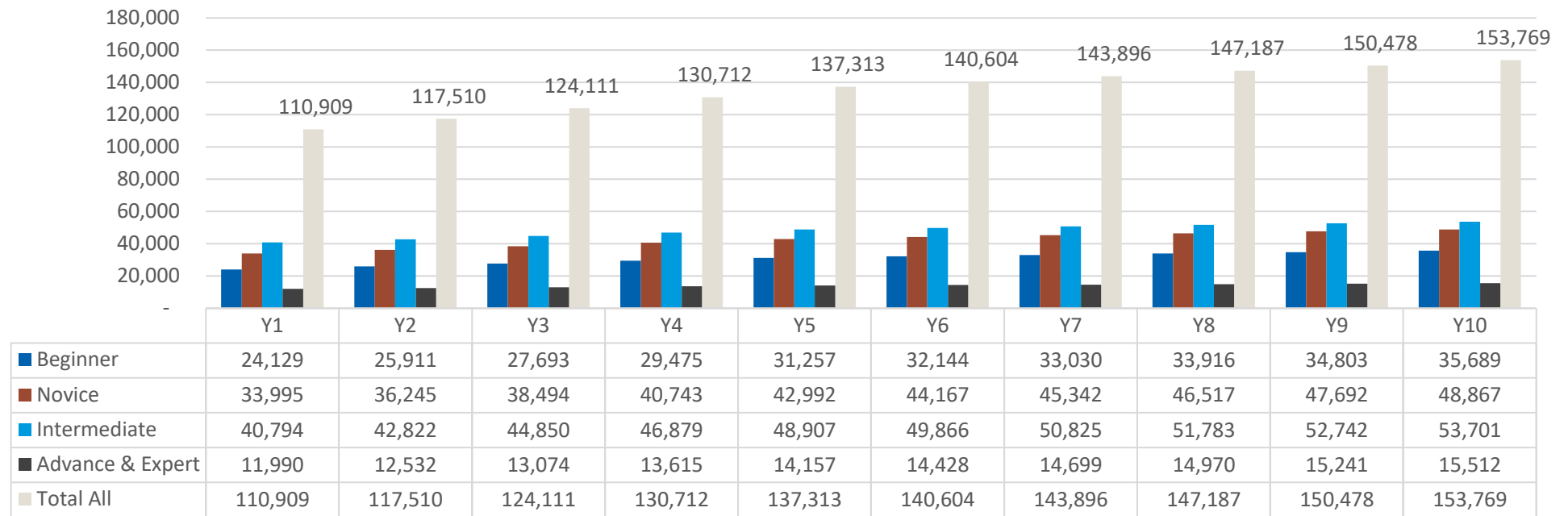
Based on the modelling of trail operations, the annual number of trail users would increase from around 110,900 in year 1 to 137,300 in year 5 and reach 153,800 in year 10. Given the proximity to the Melbourne metropolitan area, around two thirds would be day visitors and one third overnight visitors. The tables below show the estimated numbers by user category (using the rider profile developed by instinct and reason).

These user numbers are substantially below the Base Case user numbers – 21,000 lower in year 1 and around 68,000 lower in year 10.

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<sup>67</sup> Warburton MTB trail research -quantitative findings, instinct and reason, December 2020 P16 and Additional Findings May 2021.

**Figure 24.** Case 3 – No Drop A K – Trail Users by Type (no.)



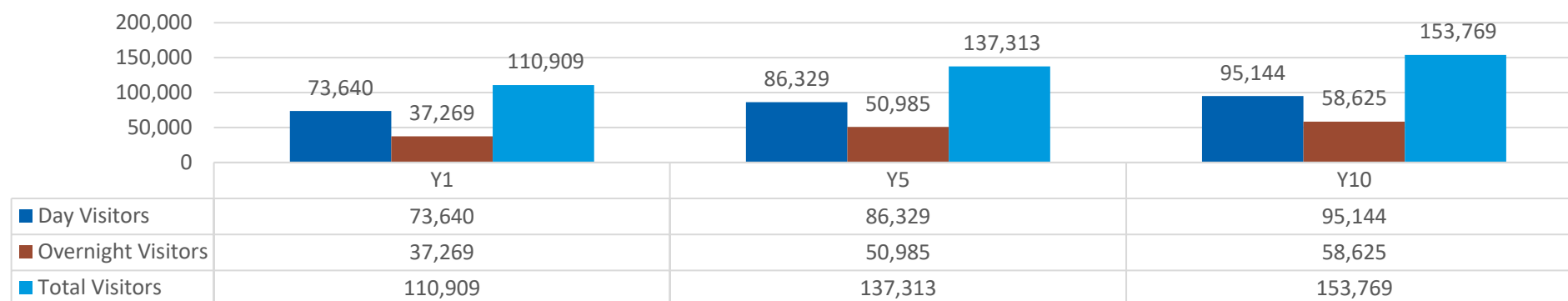
SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Table 15.** Case 3 No Drop A K: Estimated Trail Users by Category

Case 3 No Drop A K	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Beginner	24,129	25,911	27,693	29,475	31,257	32,144	33,030	33,916	34,803	35,689
Novice	33,995	36,245	38,494	40,743	42,992	44,167	45,342	46,517	47,692	48,867
Intermediate	40,794	42,822	44,850	46,879	48,907	49,866	50,825	51,783	52,742	53,701
Advance & Expert	11,990	12,532	13,074	13,615	14,157	14,428	14,699	14,970	15,241	15,512
<b>Total All Users</b>	<b>110,909</b>	<b>117,510</b>	<b>124,111</b>	<b>130,712</b>	<b>137,313</b>	<b>140,604</b>	<b>143,896</b>	<b>147,187</b>	<b>150,478</b>	<b>153,769</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Figure 25.** Case 3 No Drop A K – Total Riders on Trails – Selected Years



SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Table 16.** Case 3 No Drop A K: Estimated Trail Users by Residence Location

Case 3 No Drop A K	Year 1			Year 5			Year 10		
	Users			Users			Users		
	Day	Overnight	Total	Day	Overnight	Total	Day	Overnight	Total
Local -Yarra Ranges (S)	22,046	0	22,046	24,532	-	24,532	25,632	-	25,632
Total Metro & Adjacent Areas	46,502	16,899	63,401	53,990	19,760	73,750	60,349	21,971	82,321
<b>Total Yarra Ranges &amp; Areas</b>	<b>68,548</b>	<b>16,899</b>	<b>85,447</b>	<b>78,522</b>	<b>19,760</b>	<b>98,282</b>	<b>85,981</b>	<b>21,971</b>	<b>107,952</b>
<b>Other</b>									
Other Regional/Intrastate	3,061	12,242	15,303	3,401	13,603	17,003	3,741	14,963	18,704
Interstate	2,032	8,127	10,159	2,370	9,482	11,852	2,709	10,836	13,545
Internationals	0	0	0	2,035	8,140	10,176	2,713	10,854	13,567
<b>Total Other</b>	<b>5,092</b>	<b>20,370</b>	<b>25,462</b>	<b>7,806</b>	<b>31,225</b>	<b>39,031</b>	<b>9,163</b>	<b>36,653</b>	<b>45,817</b>
<b>Total All Trail Users</b>	<b>73,640</b>	<b>37,269</b>	<b>110,909</b>	<b>86,329</b>	<b>50,985</b>	<b>137,313</b>	<b>95,144</b>	<b>58,625</b>	<b>153,769</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

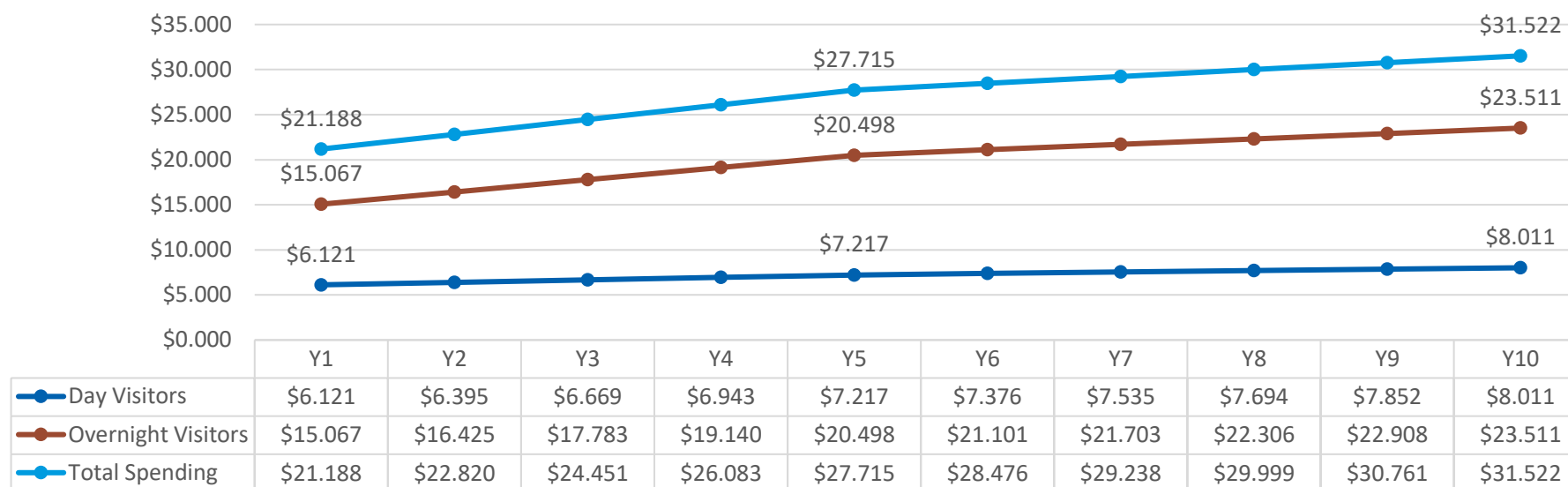


## 9.2 Spending in Region by Trail Users

Spending in the region by MTB users was analysed and estimated. The assumptions used in estimation are outlined in Appendix A. Spending estimates are based on assumed average spending per person, for each category of rider. For example, intermediate and advanced and experts spend more than beginners and novices and stay for a longer period. All spending is in constant 2021 dollars.

Estimated spending in the Yarra Ranges LGA by trail users would increase from \$21.2 million in year 1 (\$15.1 million overnights and \$6.1 million day visitors) to \$31.5 million in year 10 (\$23.5 million overnights and \$8.0 million day visitors).

**Table 17.** Case 3 No Drop A K – Spending in Region (\$million 2021 prices)



SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

Spending was estimated for the locations that the trail users come from and is in the table below.

**Table 18.** Case 3 No Drop A K: Trail User Spending in the Region (\$million 2021 prices)

Case 3 No Drop A K	Year 1			Year 5			Year 10		
Residence of Trail Users	Day	Overnight	Total	Day	Overnight	Total	Day	Overnight	Total
Yarra Ranges LGA	\$0.965	\$0.000	\$0.965	\$1.074	\$0.000	\$1.074	\$1.122	\$0.000	\$1.122
Total Metro & Adjacent Areas	\$4.638	\$6.812	\$11.450	\$5.348	\$7.772	\$13.120	\$5.955	\$8.559	\$14.514
<b>Total Yarra Ranges &amp; Areas</b>	<b>\$5.603</b>	<b>\$6.812</b>	<b>\$12.415</b>	<b>\$6.422</b>	<b>\$7.772</b>	<b>\$14.193</b>	<b>\$7.077</b>	<b>\$8.559</b>	<b>\$15.636</b>
<b>Other</b>									
Other Regional	\$0.310	\$4.892	\$5.202	\$0.344	\$5.436	\$5.780	\$0.378	\$5.979	\$6.358
Interstate	\$0.208	\$3.363	\$3.571	\$0.243	\$3.924	\$4.167	\$0.278	\$4.484	\$4.762
Internationals	\$0.000	\$0.000	\$0.000	\$0.208	\$3.367	\$3.575	\$0.278	\$4.489	\$4.767
<b>Total Other</b>	<b>\$0.518</b>	<b>\$8.255</b>	<b>\$8.773</b>	<b>\$0.795</b>	<b>\$12.726</b>	<b>\$13.521</b>	<b>\$0.934</b>	<b>\$14.952</b>	<b>\$15.886</b>
<b>Total All Areas</b>	<b>\$6.121</b>	<b>\$15.067</b>	<b>\$21.188</b>	<b>\$7.217</b>	<b>\$20.498</b>	<b>\$27.715</b>	<b>\$8.011</b>	<b>\$23.511</b>	<b>\$31.522</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## 9.3 Spending Mix

The following table shows indicative estimates of the mix of spending by category for day visitors and for overnight visitors. In year 10 trail users would be injecting \$25.6 million in the regional economy, up from \$17.4 million in year 1.

Total expenditure comprises:

- spending on trail-linked activities (including spending on bike related expenses and other spending - food and beverage etc.) in proximity to the trails
- spending on accommodation (for overnight stayers) and meals during their stay
- spending on other recreational and tourism services

While some of this spending would be serviced by existing businesses, it will encourage new businesses to service a growing visitor market. This is particularly the case with biking related spending (e.g., bike hire, guides/trainers and shuttles).

**Table 19.** Case 3 No Drop A K: Spending in the Region by Type (\$million 2021 prices)

Case 3 No Drop A K Type of Spending (\$ million)	Share of Spending %	Year 1	Year 5	Year 10
<b>Total Day Visitors</b>				
Food	65%	\$3.978	\$4.691	\$5.207
Bike Hire	15%	\$0.918	\$1.083	\$1.202
Guides	5%	\$0.306	\$0.361	\$0.401
Shuttle	15%	\$0.918	\$1.083	\$1.202
<b>Total Spending - Day Visitors</b>		<b>\$6.121</b>	<b>\$7.217</b>	<b>\$8.011</b>
<b>Total Overnight Visitors</b>				
Food & Accommodation	60%	\$9.040	\$12.299	\$14.107
Bike Hire	20%	\$3.013	\$4.100	\$4.702
Guides	5%	\$0.753	\$1.025	\$1.176
Shuttle	15%	\$2.260	\$3.075	\$3.527
<b>Total Spending Overnights</b>		<b>\$15.067</b>	<b>\$20.498</b>	<b>\$23.511</b>
<b>Total Users</b>				
Food & Accommodation		\$16.032	\$21.089	\$24.016
Bike Hire		\$3.932	\$5.182	\$5.904
Guides		\$1.059	\$1.386	\$1.576
Shuttle		\$3.178	\$4.157	\$4.728
<b>Total Spending Users</b>		<b>\$21.188</b>	<b>\$27.715</b>	<b>\$31.522</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## 10 Economic Impacts of Warburton MTB Trails – Construction Phase

The economic impacts of the trail developments are modelled for both the construction phase and the operations phases.

The impacts are measured in terms of:

- full time equivalent jobs (FTE)
- the increase in regional income that is generated by trail users and their spending in the region.<sup>68</sup>

This section covers the construction phase impacts.

A significant number of jobs and an increase in regional income will be generated during the construction phase of the project.

### 10.1 Construction Costs

In modelling construction jobs, we used the cost components that are associated with trails and other facilities construction, and these total \$15.090 million for Stage 1 and Stage 2

**Table 20.** Construction Costs – Warburton Trails Project (\$2020)

Staging of Trail	Timing	Costs
Construction		(\$2020)
<b>Stage 1</b>		
<b>Trail Construction Stage 1 (110 kms)</b>	<b>Sept .2021</b>	
Section 1 35 kms	Sept 2021-Feb 2022	\$1,400,000
Section 2 35 kms	Mar 2022-Aug 2022	\$1,400,000
Section 3 35 kms	Sept 2022-Jan 2023	\$1,400,000
<b>Total</b>		<b>\$4,200,000</b>
<b>Other Infrastructure - Stage 1</b>		
Main Bridge Warby Highway		\$2,000,000
Bridge- Old Warby Highway		\$400,000
Trail Heads		\$1,500,000
Minor Bridges, trail infrastructures & boardwalks		\$2,000,000
Final design work		\$450,000
Signage, fencing, environmental works		\$750,000
<b>Total Other</b>		<b>\$7,100,000</b>
<b>Stage 1 Cost</b>		<b>\$11,300,000</b>
<b>Stage 2</b>		
Construction Stage 2 Section 4 (76 kms)	Sept 2024-Jan 2025	\$3,040,000
Other Infrastructure – Stage 2		\$750,000
<b>Stage 2 Cost</b>		<b>\$3,790,000</b>
<Subject to funding - indicative only>		
<b>Total Project Cost</b>		<b>\$15,090,000</b>

SOURCE: YARRA RANGES COUNCIL JULY 2021. AN ADDITIONAL \$2 MILLION IS BEING SPENT ON DESIGN, STUDIES AND PLANNING APPROVAL COSTS.

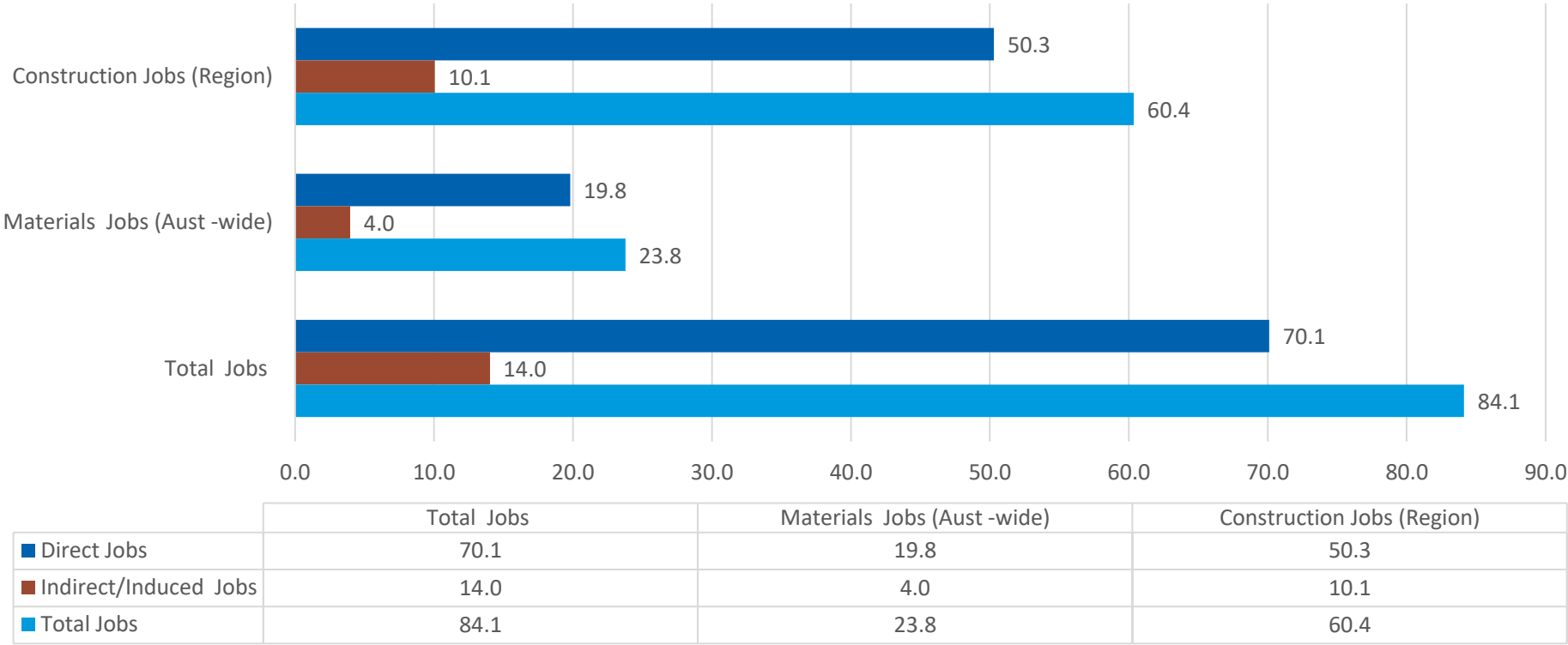
<sup>68</sup> Regional income is the total net income generated from the activity and covers wages and salaries of employees and profits of businesses within the region. It includes income generated directly within the business and indirect income, which is generated in other regional businesses (wages and profits) from the Developing Warburton as a World Class Mountain Bike Destination, and Economic Feasibility Study | Three Case Economic Impact Assessment – Spend Assumption 1 (TRA)

multiplier impacts of employee spending on the region. In the modelling of income generated, income tax and GST on spending, are both treated as leakages from the region.

## 10.2 Jobs Generated

A total of 84.1 FTE jobs (70.1 direct jobs and 14.1 indirect/induced jobs) would be generated during the construction period. The direct jobs comprise 50.3 jobs in on-site construction and 19.8 jobs in materials/equipment supply. The EES Report indicates that construction of the trails would be undertaken by teams of 3-4 persons.<sup>69</sup>

**Figure 26.** Warburton Trails Construction (Stages 1 and 2) – Total FTE Jobs (no.)



SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

<sup>69</sup> EES Report Chapter 3 – Project Description Warburton Mountain Bike Destination Project, Yarra Ranges Council P24

**Table 21.** Warburton Trails Stage 1 Construction FTE Jobs (no.)

Warburton Trail Construction Jobs	Direct Jobs	Indirect/Induced Jobs	Total Jobs
<b>Stage 1 - Trail</b>			
Construction Jobs (Region)	14.0	2.8	16.8
Materials Jobs (Aust -wide)	5.5	1.1	6.6
<b>Total Jobs - Construction Phase</b>	<b>19.5</b>	<b>3.9</b>	<b>23.4</b>
<b>Stage 1 - Infrastructure</b>			
Construction Jobs (Region)	23.7	4.7	28.4
Materials Jobs (Aust -wide)	9.3	1.9	11.2
<b>Total Jobs - Construction Phase</b>	<b>33.0</b>	<b>6.6</b>	<b>39.6</b>
<b>Total Stage 1</b>			
Construction Jobs (Region)	37.7	7.5	45.2
Materials Jobs (Aust -wide)	14.8	3.0	17.8
<b>Total Jobs - Construction Phase</b>	<b>52.5</b>	<b>10.5</b>	<b>63.0</b>

SOURCE: MCA MODELLING &amp; ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

**Table 22.** Warburton Trails Stage 2 Construction FTE Jobs Generated (no.)

Warburton Trail Construction Jobs	Direct Jobs	Indirect/Induced Jobs	Total Jobs
<b>Stage 2 - Trail</b>			
Construction Jobs (Region)	10.1	2.0	12.2
Materials Jobs (Aust -wide)	4.0	0.8	4.8
<b>Total Jobs - Construction Phase</b>	<b>14.1</b>	<b>2.8</b>	<b>16.9</b>
<b>Stage 2 - Infrastructure</b>			
Construction Jobs (Region)	2.5	0.5	3.0
Materials Jobs (Aust -wide)	1.0	0.2	1.2
<b>Total Jobs - Construction Phase</b>	<b>3.5</b>	<b>0.7</b>	<b>4.2</b>
<b>Total Stage 2</b>			
Construction Jobs (Region)	12.6	2.5	15.2
Materials Jobs (Aust -wide)	5.0	1.0	6.0
<b>Total Jobs - Construction Phase</b>	<b>17.6</b>	<b>3.5</b>	<b>21.1</b>

SOURCE: MCA MODELLING &amp; ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

## 10.3 Regional Income

Construction will provide a boost to regional income - a total of \$9.054 million over Stage 1 and Stage 2. This assumes that most of the construction workforce will be from the Warburton/Yarra Ranges LGA and adjacent areas.

**Table 23.** Warburton Trails Construction Regional Income Generated (\$million – 2021 prices)

Warburton Trail Construction Regional Income	Direct Regional Income	Indirect/Induced Income	Total Regional Income
<b>Stage 1 - Total</b>			
Regional Income	\$5.650	\$1.130	\$6.780
<b>Stage 2 -Total</b>			
Regional Income	\$1.895	\$0.379	\$2.274
<b>Total Project</b>			
<b>Regional Income</b>	<b>\$7.545</b>	<b>\$1.509</b>	<b>\$9.054</b>

SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.



# 11 Operations Phase - Case 1: Base Case Operations Phase – Regional Economic Impacts

The operations phase regional economic impacts of the trails are driven by the expenditure of visitors/users in towns adjacent to the trail and in the broader region.

MCA's regional economic model is used to estimate the employment and income impacts of the trail. The model allocates spending across relevant industry sectors and takes account of the significant shares of the gross spending by visitors/users, which leaks out of the region.<sup>70</sup>

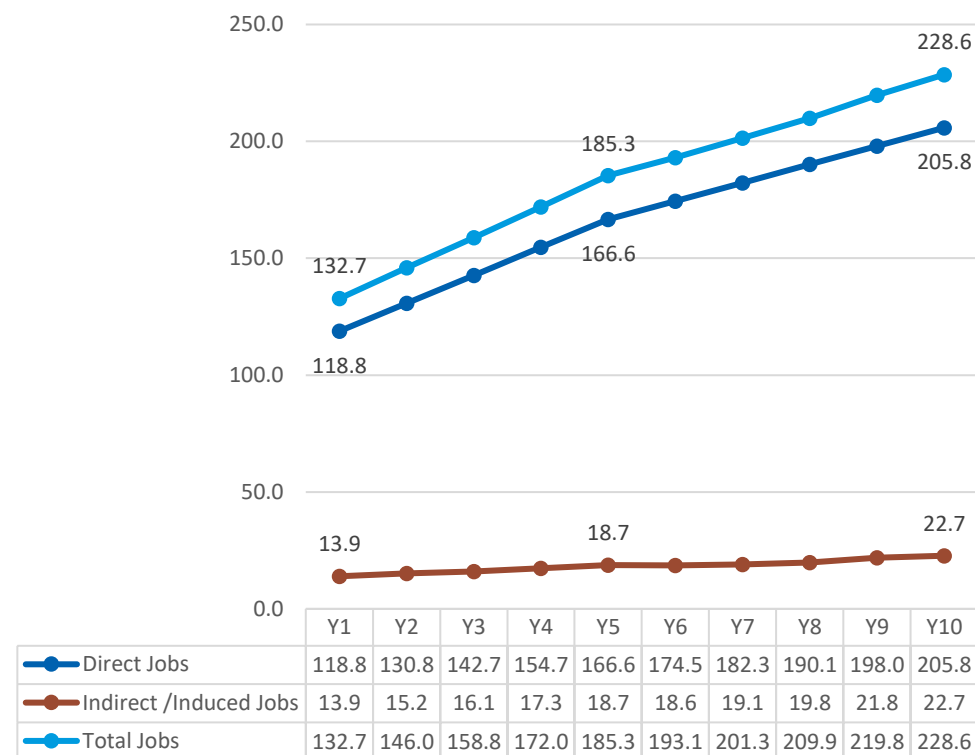
## 11.1 Employment Impacts – Jobs Generated

The charts and tables below show the increase in jobs in the region generated by each of the user/visitor groups. In summary:

- The operation of the trails would generate a total of 132.7 full-time equivalent jobs in year 1, increasing to 228.6 FTE jobs in year 10
- Of the direct jobs in year 10, day visitors would account for 51.6 FTE jobs, overnight visitors for 205.8 FTE jobs
- An events program would create an equivalent of 13.8 FTE additional jobs in year 10 (see Appendix B).

**Figure 27.**

Case 1 Base Case Jobs Generated by Trail Operations (FTE no.)

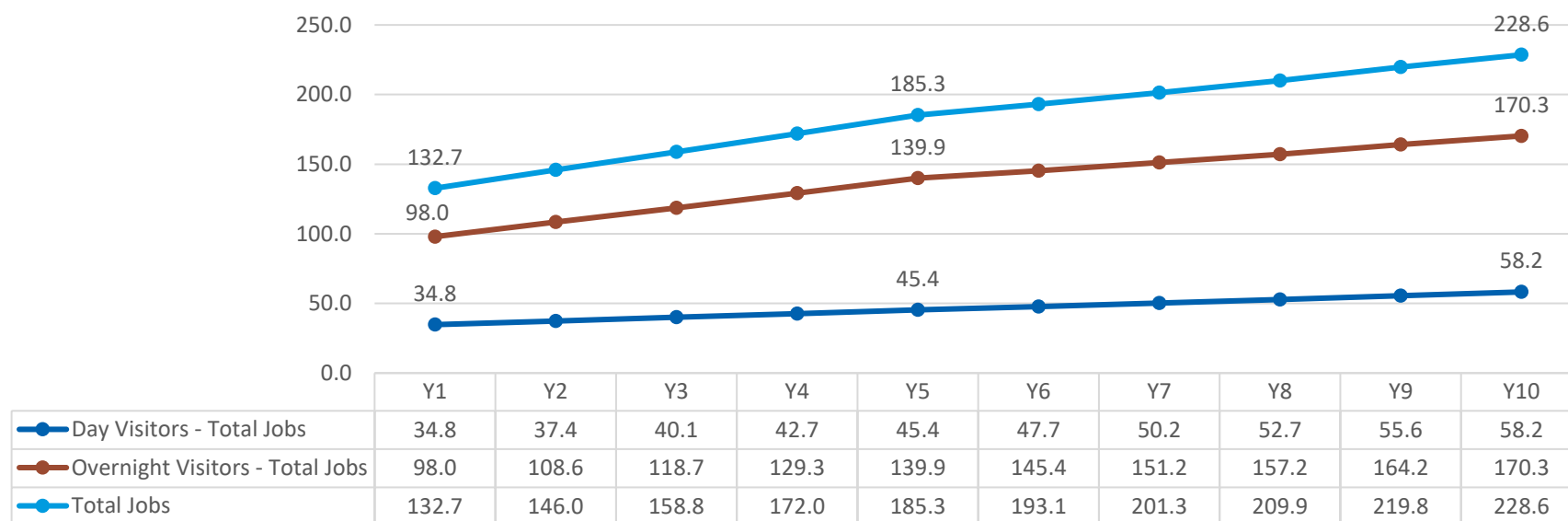


SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

<sup>70</sup> The spending by trail users is not the economic impact and does not represent the increase in regional income. There is a major leakage of this spending out of the region due to : the GST (10%); and a significant component of the value of services and products purchased by visitors comes from outside the region (e.g., food ingredients, soft drinks, beer , consumer products

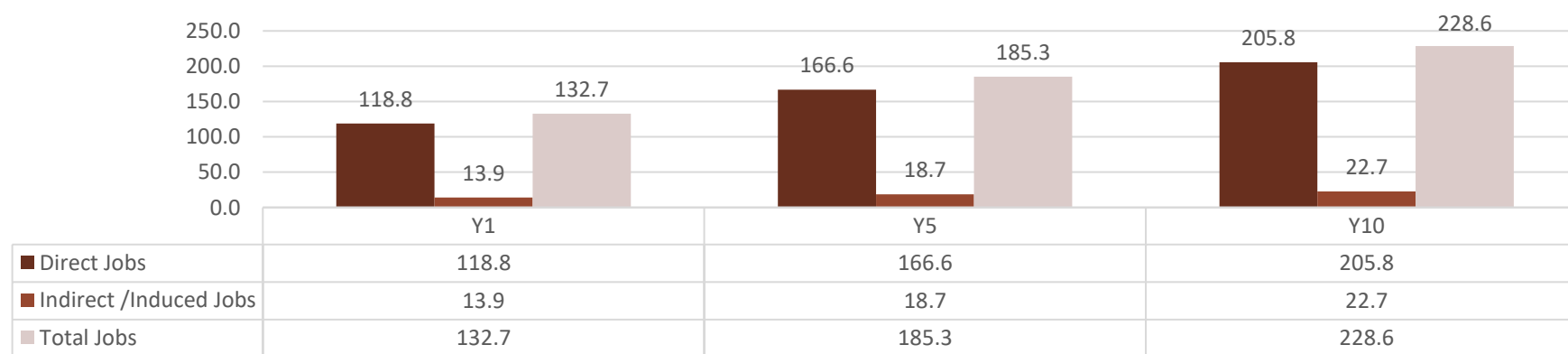
bought etc.). The model takes account of these leakages and estimates employment impacts and the increase in regional income.

**Figure 28.** Case 1 Base Case Total Jobs Generated by Trail Operations (FTE no.)



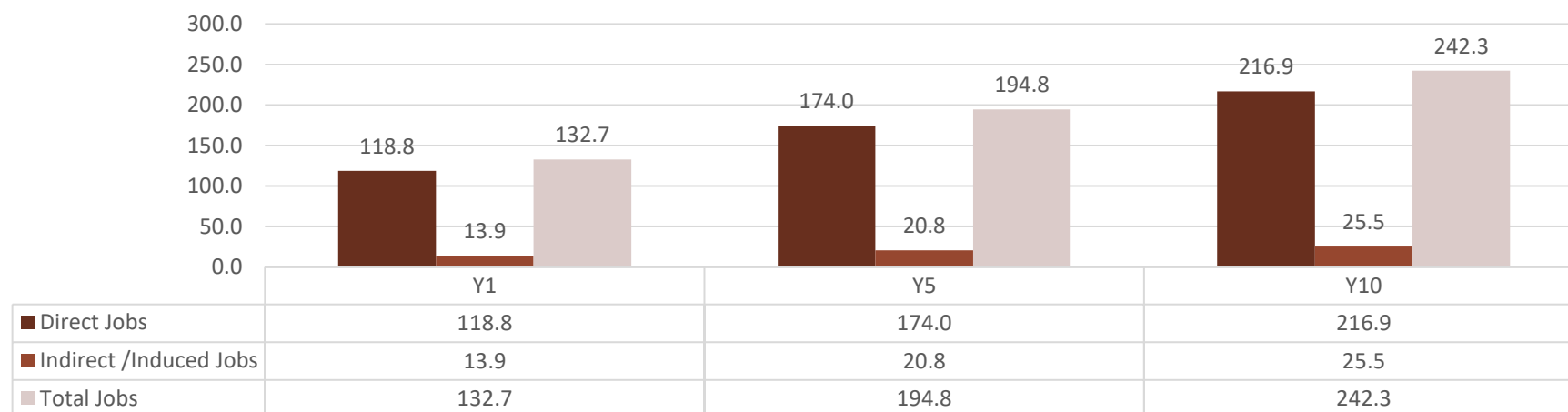
SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

**Figure 29.** Case 1 Base Case Jobs Generated by Trail Operations (no events) (FTE no.)



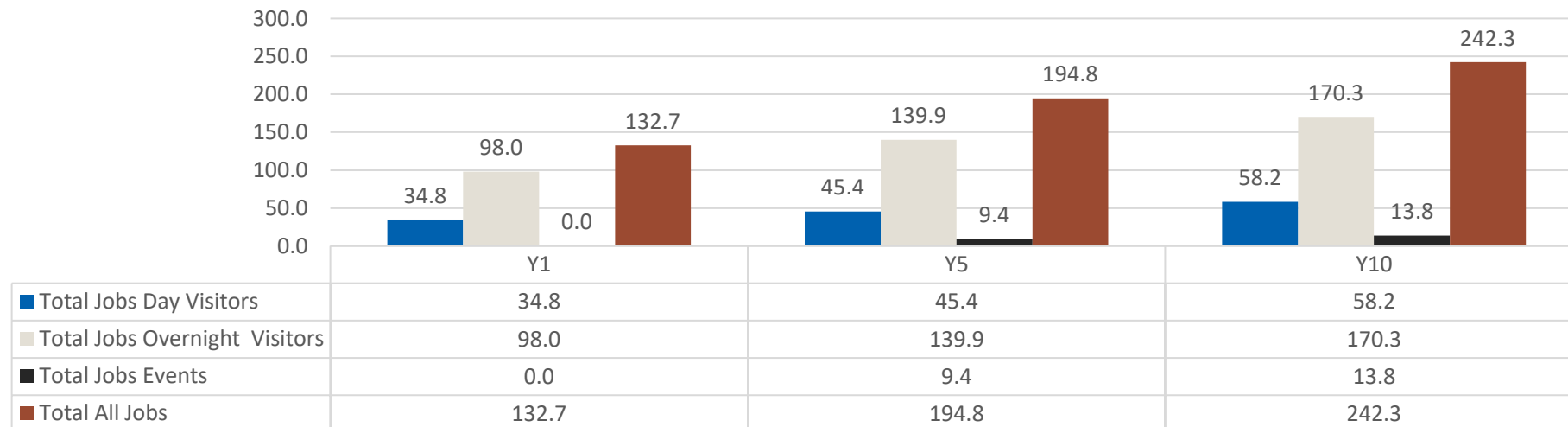
SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

**Table 24.** Case 1 Base Case Jobs Generated by Trail Operations (with events) FTE no.)



SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

**Figure 30.** Case 1 Base Case Jobs Generated by Trail Operations (with events) (FTE no.)



SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

**Table 25.** Case 1 Base Case Jobs Generated by Trail Operations (no events) (FTE no.)

Case 1 Base Case Jobs Generated (FTE)	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
<b>Day Visitors – Trail Users</b>										
Direct Jobs	30.7	33.1	35.4	37.8	40.1	42.4	44.7	47.0	49.3	51.6
Indirect/Induced	4.0	4.3	4.7	4.9	5.3	5.3	5.5	5.7	6.3	6.6
<b>Total Jobs - Day Visitors</b>	<b>34.8</b>	<b>37.4</b>	<b>40.1</b>	<b>42.7</b>	<b>45.4</b>	<b>47.7</b>	<b>50.2</b>	<b>52.7</b>	<b>55.6</b>	<b>58.2</b>
<b>Overnight Visitors – Trail Users</b>										
Direct Jobs	88.1	97.7	107.3	116.9	126.5	132.0	137.6	143.1	148.7	154.2
Indirect/Induced	9.9	10.9	11.4	12.4	13.4	13.3	13.6	14.1	15.5	16.1
<b>Total Jobs - Overnight Visitors</b>	<b>98.0</b>	<b>108.6</b>	<b>118.7</b>	<b>129.3</b>	<b>139.9</b>	<b>145.4</b>	<b>151.2</b>	<b>157.2</b>	<b>164.2</b>	<b>170.3</b>
<b>Total Visitors – Trail Users</b>										
Direct Jobs	118.8	130.8	142.7	154.7	166.6	174.5	182.3	190.1	198.0	205.8
Indirect/Induced	13.9	15.2	16.1	17.3	18.7	18.6	19.1	19.8	21.8	22.7
<b>Total All Jobs</b>	<b>132.7</b>	<b>146.0</b>	<b>158.8</b>	<b>172.0</b>	<b>185.3</b>	<b>193.1</b>	<b>201.3</b>	<b>209.9</b>	<b>219.8</b>	<b>228.6</b>

SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

**Table 26.** Case 1 Base Case Total Jobs Generated by Trails Operations (with events)  
(FTE no.)

Operations: Jobs Generated by Trail Users/Visitors	Y1	Y5	Y10
<b>Day Users/Visitors</b>			
Direct Jobs	30.7	40.1	51.6
Indirect/Induced Jobs	4.0	5.3	6.6
<b>Total Jobs</b>	<b>34.8</b>	<b>45.4</b>	<b>58.2</b>
<b>Overnight User/Visitors</b>			
Direct Jobs	88.1	126.5	154.2
Indirect/Induced Jobs	9.9	13.4	16.1
<b>Total Jobs</b>	<b>98.0</b>	<b>139.9</b>	<b>170.3</b>
<b>Events</b>			
Direct Jobs	0	7.4	11.1
Indirect/Induced Jobs	0	2.1	2.7
<b>Total Jobs</b>	<b>0</b>	<b>9.4</b>	<b>13.8</b>
<b>Total All Users/Visitors (no events)</b>			
Direct Jobs	118.8	166.6	205.8
Indirect/Induced Jobs	13.9	18.7	22.7
<b>Total Jobs</b>	<b>132.7</b>	<b>185.3</b>	<b>228.6</b>
<b>Total All Users/Visitors (with events)</b>			
Direct Jobs	118.8	174.0	216.9
Indirect/Induced Jobs	13.9	20.8	25.5
<b>Total Jobs</b>	<b>132.7</b>	<b>194.8</b>	<b>242.3</b>

SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

## 11.2 Jobs by Industry

On a sector basis, the jobs (FTE- direct and indirect) generated by trail users are mainly concentrated in:

- accommodation
- food and beverage
- recreational services and other visitor services
- transport (including shuttles)
- other retail.

The development of the trails will see the development of local MTB service industry. The industry analysis highlights that total full time equivalent (FTE) jobs generated by trail users in year 10 would be in:

- recreation services/other services (MTB hire, guides, equipment etc.) 55.6 jobs
- transport (including shuttles and other transport) 21.9 FTE jobs
- accommodation 61.2 jobs
- food and beverage 65.6 jobs.

The follow table shows estimates for day visitors and overnight visitors.

**Table 27.** Case 1 Base Case Total Jobs Generated by Trail Operations y Industry (no events) (FTE no.)

Case 1 Base Case	Year 1	Year 5	Year 10
All Jobs			
<b>Day Visitors</b>			
Accommodation	0.0	0.0	0.0
Food & Beverage	12.1	15.7	20.2
Other retail	3.6	4.7	6.1
Health	0.3	0.5	0.6
Transportation	4.1	5.4	6.9
Communication	0.1	0.1	0.2
Recreation Services/Other Services	13.8	18.0	23.2
Education	0.2	0.3	0.3
Miscellaneous	0.5	0.6	0.8
<b>Total</b>	<b>34.8</b>	<b>45.4</b>	<b>58.2</b>
<b>Overnight Visitors</b>			
Accommodation	35.0	50.2	61.2
Food & Beverage	26.1	37.3	45.4
Other retail	6.9	9.8	12.0
Health	0.8	1.1	1.3
Transportation	8.6	12.3	14.9
Communication	0.3	0.4	0.5
Recreation Services/Other Services	18.6	26.6	32.4
Education	0.5	0.6	0.8
Miscellaneous	1.1	1.5	1.9
<b>Total</b>	<b>98.0</b>	<b>139.9</b>	<b>170.3</b>
<b>Total All Jobs (No Events)</b>			
Accommodation	35.0	50.2	61.2
Food & Beverage	38.1	53.0	65.6
Other Retail	10.6	14.6	18.0
Health	1.2	1.5	1.9
Transportation	12.8	17.7	21.9
Communication	0.4	0.5	0.7
Recreation Services/Other Services	32.5	44.7	55.6
Education	0.7	0.9	1.1
Miscellaneous	1.6	2.2	2.7
<b>Total All Jobs</b>	<b>132.7</b>	<b>185.3</b>	<b>228.6</b>

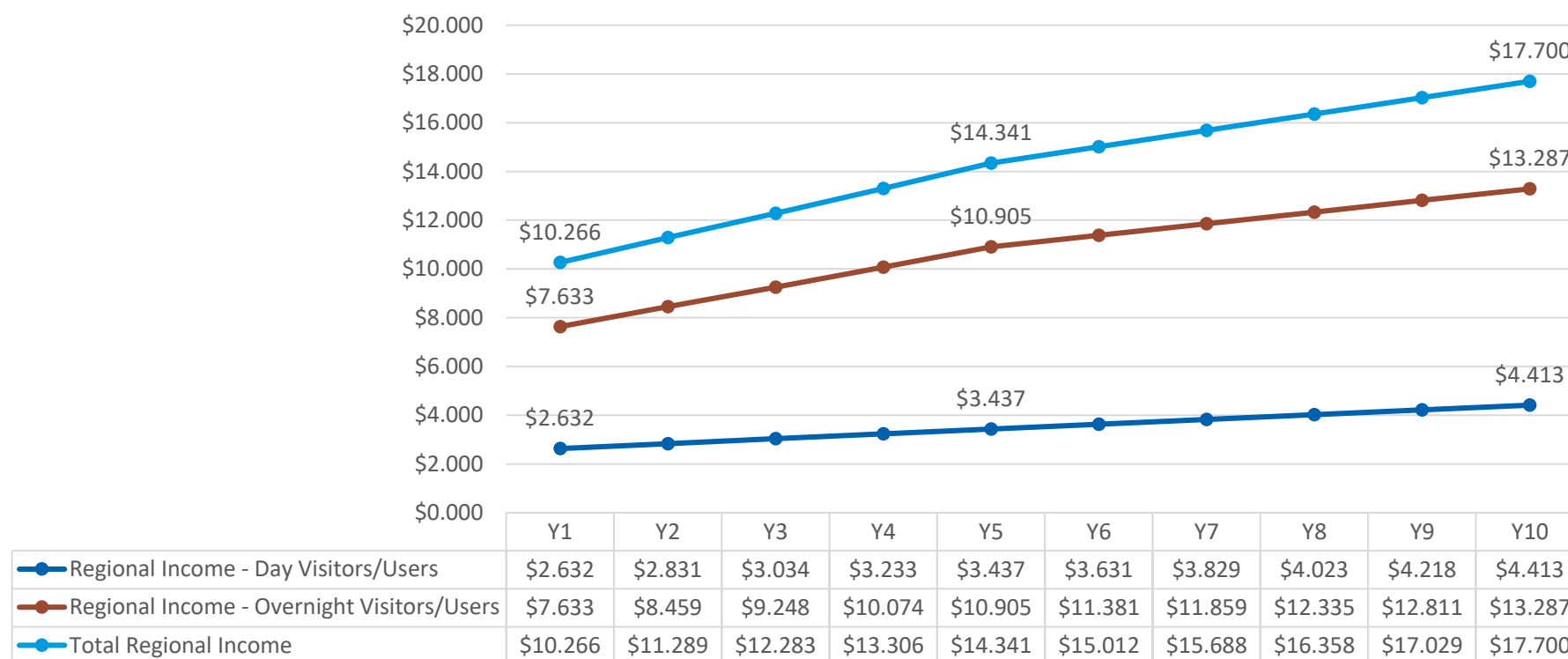
SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

## 11.3 Regional Income Impacts

The increase in regional income (in constant 2021 prices) generated annually by the operation of the trails and visitor/user spending totals around \$10.3 million in year 1, increasing to \$17.7 million in year 10.<sup>71</sup>

The increase in income (direct and indirect/induced) generated by day visitors/users (including locals and other users) is \$2.6 million in year 1 and \$4.4 million in year 10. Overnight users/visitors boost total regional income by \$7.6 million in year 1 and \$13.3 million in year 10.

**Table 28.** Case 1 Base Case – Regional Income Generated (\$ million 2021 prices)



SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

<sup>71</sup> Regional income is the total net income generated from the activity and covers wages and salaries of employees and profits of businesses within the region. It includes income generated directly within the business and indirect income, which is generated in other regional businesses (wages and profits) from the multiplier impacts of employee spending on the region. In the modelling of income generated, income tax and GST on spending, are both treated as leakages from the region.



**Table 29.** Case 1 Base Case Regional Income Generated (\$million 2021 prices)

Case 1 Base Case Regional Income \$ million (2020 prices)	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total 10 Years
<b>Day Visitors</b>											
Direct Income	\$2.328	\$2.506	\$2.683	\$2.860	\$3.038	\$3.212	\$3.386	\$3.561	\$3.735	\$3.909	\$31.218
Indirect/Induced	\$0.304	\$0.325	\$0.351	\$0.372	\$0.399	\$0.419	\$0.442	\$0.463	\$0.483	\$0.504	\$4.063
<b>Total Income</b>	<b>\$2.632</b>	<b>\$2.831</b>	<b>\$3.034</b>	<b>\$3.233</b>	<b>\$3.437</b>	<b>\$3.631</b>	<b>\$3.829</b>	<b>\$4.023</b>	<b>\$4.218</b>	<b>\$4.413</b>	<b>\$35.281</b>
<b>Overnight Visitors</b>											
Direct Income	\$6.889	\$7.641	\$8.393	\$9.145	\$9.897	\$10.330	\$10.764	\$11.197	\$11.631	\$12.064	\$97.951
Indirect/Induced	\$0.744	\$0.818	\$0.855	\$0.929	\$1.008	\$1.050	\$1.095	\$1.138	\$1.180	\$1.223	\$10.041
<b>Total Income</b>	<b>\$7.633</b>	<b>\$8.459</b>	<b>\$9.248</b>	<b>\$10.074</b>	<b>\$10.905</b>	<b>\$11.381</b>	<b>\$11.859</b>	<b>\$12.335</b>	<b>\$12.811</b>	<b>\$13.287</b>	<b>\$107.992</b>
<b>Total Visitors</b>											
Direct Income	\$9.217	\$10.147	\$11.076	\$12.005	\$12.935	\$13.542	\$14.150	\$14.758	\$15.366	\$15.973	\$129.168
Indirect/Induced	\$1.048	\$1.143	\$1.207	\$1.301	\$1.407	\$1.470	\$1.538	\$1.601	\$1.663	\$1.726	\$14.104
<b>Total Income</b>	<b>\$10.266</b>	<b>\$11.289</b>	<b>\$12.283</b>	<b>\$13.306</b>	<b>\$14.341</b>	<b>\$15.012</b>	<b>\$15.688</b>	<b>\$16.358</b>	<b>\$17.029</b>	<b>\$17.700</b>	<b>\$143.272</b>

SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

Total regional income over 10 years for all visitors is \$143.3 million.

**Table 30.** Case 1 Base Case Increase in Regional Income – Total 10 Years (\$million 2021 prices)

Regional Income Total 10 Years	Day Visitors/Users \$m	Overnight Visitors/Users \$m	Total Visitors/Users \$m
Direct Income	\$31.218	\$97.951	\$129.168
Indirect/Induced Income	\$4.063	\$10.041	\$14.104
<b>Total Income</b>	<b>\$35.281</b>	<b>\$107.992</b>	<b>\$143.272</b>

SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

## 11.4 Benefit Cost Analysis

The benefits and costs of the Warburton MTB Trails are analysed for a 10-year period.

### 11.4.1 Trail Costs – 10 Years

The estimated construction cost of the trails is \$17.1 million (Stage 1 & 2), and 10-year maintenance costs are \$4.8 million for a total 10-year cost of \$21.9 million. See Appendix D for details.

### 11.4.2 Measuring Benefits – 10 Years

The measured benefits of the Warburton MTB Trails comprise the increase in regional income generated by trail users, the health benefits, and a notional consumer value to users of the trails.

#### Increase in Regional Income

The increase in regional income generated by trail users spending over a 10-year period totals \$143.3 million (in constant \$2021 prices).

**Table 31.** Case 1 Base Case Regional Income Generated by Trail Users (\$m 2021 prices)

Regional Income Total 10 Years	Day Visitors/Users \$m	Overnight Visitors/Users \$m	Total Visitors/Users \$m
Direct Income	\$31.218	\$97.951	\$129.168
Indirect /Induced \Income	\$4.063	\$10.041	\$14.104
<b>Total Income</b>	<b>\$35.281</b>	<b>\$107.992</b>	<b>\$143.272</b>

SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

#### Health Benefits

A report by Marsden Jacobs Associates indicates that exercise of cycling/active walking in Victorian Parks has net healthcare benefits (in terms of avoided health costs) of \$15 per hour in terms of a reduction in lifetime health costs (adjusted for injury).<sup>72</sup>

Healthcare benefits are measured as the net (adjusted for injury) avoided costs to the national healthcare system (private costs and government costs) attributable to nature-based outdoor activity.

- For the analysis of these trails, we have assumed an average cycle period of 2.5 hours for beginners & novices and 4 hours for advanced and experts (and average of \$10 per hour). Health benefits are measured for Victorian users only (i.e., residents of Yarra Ranges LGA, Melbourne Metro area and regional Victoria).
- This indirect health benefit is estimated at \$47.1 million (in constant prices \$2021) over the 10-year period or an average of \$4.7 million per year.

<sup>72</sup> Victoria's Nature-Based Outdoor Economy- Key Estimates and Recommendations, Marsden Jacobs Associates, January 2016 P10 & 21.

**Table 32.** Case 1 Base Case Health Benefits Estimates (\$ million 2021 prices)

Case 1 Base Case Ave Hours	Health Benefits Valuation	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total 10 Years
2.5	Beginner	\$0.656	\$0.715	\$0.773	\$0.832	\$0.891	\$0.937	\$0.984	\$1.030	\$1.077	\$1.123	\$9.019
2.5	Novice	\$0.967	\$1.046	\$1.126	\$1.206	\$1.285	\$1.353	\$1.420	\$1.487	\$1.554	\$1.621	\$13.064
4	Intermediate	\$2.050	\$2.218	\$2.386	\$2.553	\$2.721	\$2.870	\$3.019	\$3.169	\$3.318	\$3.468	\$27.772
4	Advance & Expert	\$0.603	\$0.649	\$0.695	\$0.741	\$0.787	\$0.829	\$0.872	\$0.914	\$0.957	\$0.999	\$8.044
	<b>Total All</b>	<b>\$4.275</b>	<b>\$4.627</b>	<b>\$4.979</b>	<b>\$5.332</b>	<b>\$5.684</b>	<b>\$5.989</b>	<b>\$6.295</b>	<b>\$6.600</b>	<b>\$6.906</b>	<b>\$7.212</b>	<b>\$57.899</b>
4	Interstate & Internationals	\$0.480	\$0.820	\$0.920	\$0.980	\$1.040	\$1.100	\$1.160	\$1.220	\$1.280	\$1.280	\$10.280
	<b>Total ( less interstate. &amp; internationals)</b>	<b>\$3.795</b>	<b>\$3.807</b>	<b>\$4.059</b>	<b>\$4.352</b>	<b>\$4.644</b>	<b>\$4.889</b>	<b>\$5.135</b>	<b>\$5.380</b>	<b>\$5.626</b>	<b>\$5.932</b>	<b>\$47.619</b>

SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

## Consumer User Valuation

In the modelling we have assumed that there are no charges for the use of the trail. However, a valuation can be placed on the experience based on a shadow price or notional charge (what a person may be willing to pay). For the trail we have assumed it to be \$15 per trail ride. This benefit measure totals \$26.7 million (constant prices \$2021) over 10 years for all trail users or an average of \$2.6 million per year.

**Table 33.** Case 1 Base Case Consumer Value Estimates (\$million 2021 prices)

Case 1 Base Case Consumer Value \$ million 2021 prices	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total 10 Years
Beginner	\$0.393	\$0.429	\$0.464	\$0.499	\$0.535	\$0.562	\$0.590	\$0.618	\$0.646	\$0.674	\$5.411
Novice	\$0.580	\$0.628	\$0.676	\$0.723	\$0.771	\$0.812	\$0.852	\$0.892	\$0.932	\$0.973	\$7.838
Intermediate	\$0.769	\$0.832	\$0.895	\$0.957	\$1.020	\$1.076	\$1.132	\$1.188	\$1.244	\$1.300	\$10.415
Advance & Expert	\$0.226	\$0.243	\$0.260	\$0.278	\$0.295	\$0.311	\$0.327	\$0.343	\$0.359	\$0.375	\$3.017
<b>Total All</b>	<b>\$1.968</b>	<b>\$2.131</b>	<b>\$2.295</b>	<b>\$2.458</b>	<b>\$2.621</b>	<b>\$2.761</b>	<b>\$2.901</b>	<b>\$3.042</b>	<b>\$3.182</b>	<b>\$3.322</b>	<b>\$26.681</b>

SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

### 11.4.3 Benefit Cost Analysis

#### All Benefits

The following table and chart show the benefits and costs of the operations of the trails over a 10-year period. The benefits are measured by:

- the increase in regional income generated by trail users over a 10-year period
- the estimated health benefits
- the user value.

The costs include:

- design and planning
- construction costs
- asset maintenance costs.

For the comparison, the present value of the benefits is calculated using 3 discount rates (4%, 7% and 10%).

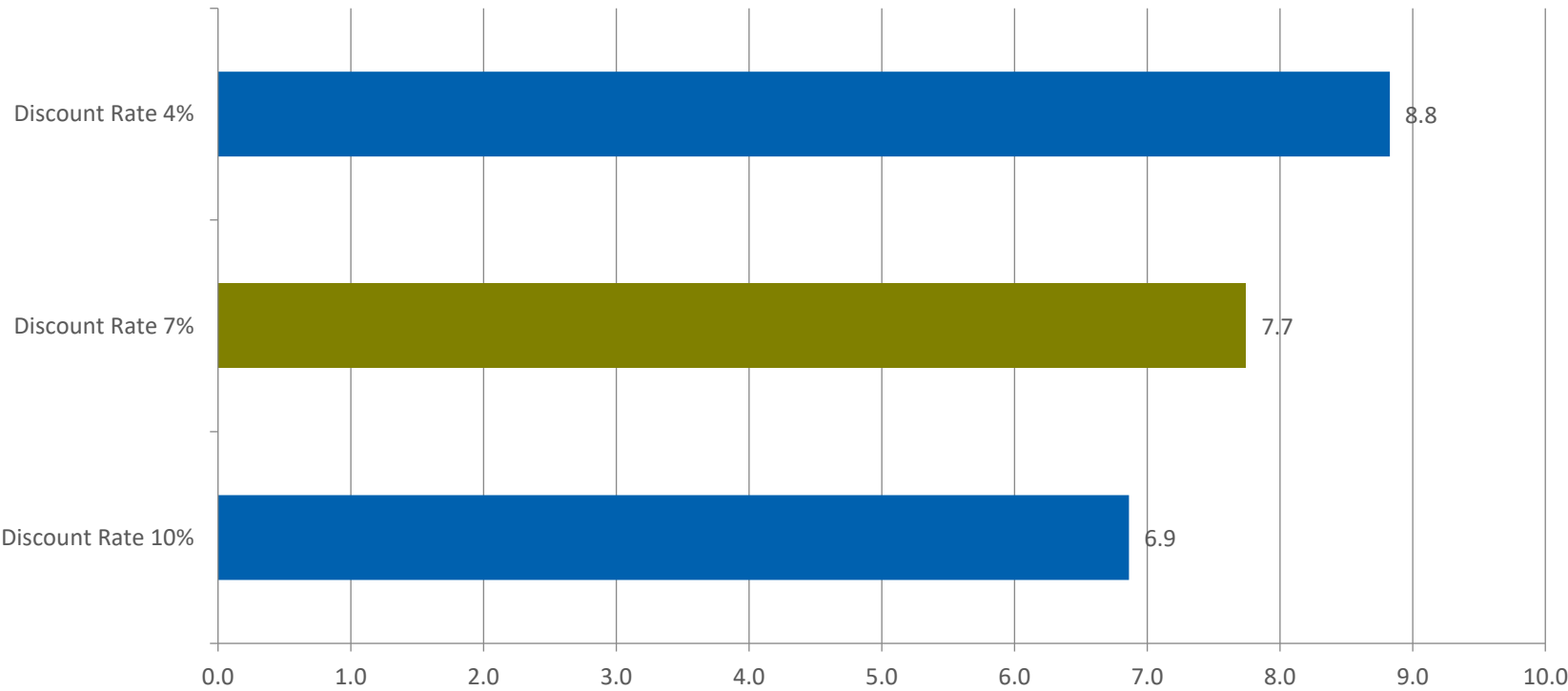
**Table 34.** Case 1 Base Case Benefits and Cost Analysis – 10 Years (Constant 2021 prices)

Case 1 Base Case Total Project	Discount Rate	Discount Rate	Discount Rate
Regional Cost Benefit (\$2021 prices) Period : 10 Years	4%	7%	10%
<b>Trail Extension</b>			
Design, Development and Planning Costs	\$2,000,000	\$2,000,000	\$2,000,000
Capital Costs Trails & Infrastructure 2020 (\$)	\$17,090,000	\$17,090,000	\$17,090,000
Costs - Maintenance (10 years)	\$4,797,500	\$4,797,500	\$4,797,500
Costs - Depreciation (10 Years) 2%			
<b>Total Costs</b>	<b>\$21,887,500</b>	<b>\$21,887,500</b>	<b>\$21,887,500</b>
Direct Benefits (users) (10 years)			
Regional Income Increase	\$143,272,395	\$143,272,395	\$143,272,395
Health Benefits (Vic Users)	\$47,619,295	\$47,619,295	\$47,619,295
User Value (shadow user price)	\$26,680,891	\$26,680,891	\$26,680,891
<b>Total Benefits</b>	<b>\$219,572,581</b>	<b>\$219,572,581</b>	<b>\$219,572,581</b>
<b>Total Benefits (\$) Present Value</b>	<b>\$193,220,035</b>	<b>\$169,521,629</b>	<b>\$150,197,040</b>
Net Present Value (\$) Total Benefits	\$171,332,535	\$147,634,129	\$128,309,540
<b>Benefit Cost Ratio (BCR- All Benefits)</b>	<b>8.8</b>	<b>7.7</b>	<b>6.9</b>
NPV/Cost	7.8	6.7	5.9
<b>Regional Income Only (PV)</b>	<b>\$123,649,870</b>	<b>\$108,421,959</b>	<b>\$96,007,532</b>
<b>BCR (Regional Income only)</b>	<b>5.2</b>	<b>4.5</b>	<b>4.0</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. NOTE: DIRECT BENEFITS ARE THE VALUE TO USERS OF A FACILITY; USUALLY THIS IS MEASURE BY USER PAYMENTS/FEES. IN THIS CASE THERE ARE NO USER CHARGES FOR THE TRAIL AND A SHADOW PRICE HAS BEEN APPLIED (\$15 PER RIDE) AS A MEASURE OF USER VALUE. THEREFORE, BENEFITS ARE THE INCREASE IN REGIONAL INCOME GENERATED BY VISITOR SPENDING, THE HEALTH BENEFITS OF EXERCISE ACTIVITY AND THE USER VALUE.

The chart below compares Benefit Cost Ratios (BCR) for the 3 discount rates. For a trail project a 7% discount rate is appropriate, and the project yields a positive BCR of 7.7. The present value of total benefits generated by the investment are 7.7 times the total costs of the project over a 10-year period. If only the increase in regional income is include in the benefits, the BCR is 4.5 (for a 7% discount rate).

**Figure 31.** Case 1 Base Case Benefits Cost Ratio (BCR – All Benefits) Warburton Trail Development



SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

## 12 Operations Phase - Case 2: Reduced Trail Network Operations Phase – Regional Economic Impacts

The operations phase regional economic impacts of the trails are driven by the expenditure of visitors/users in towns adjacent to the trail and in the broader region.

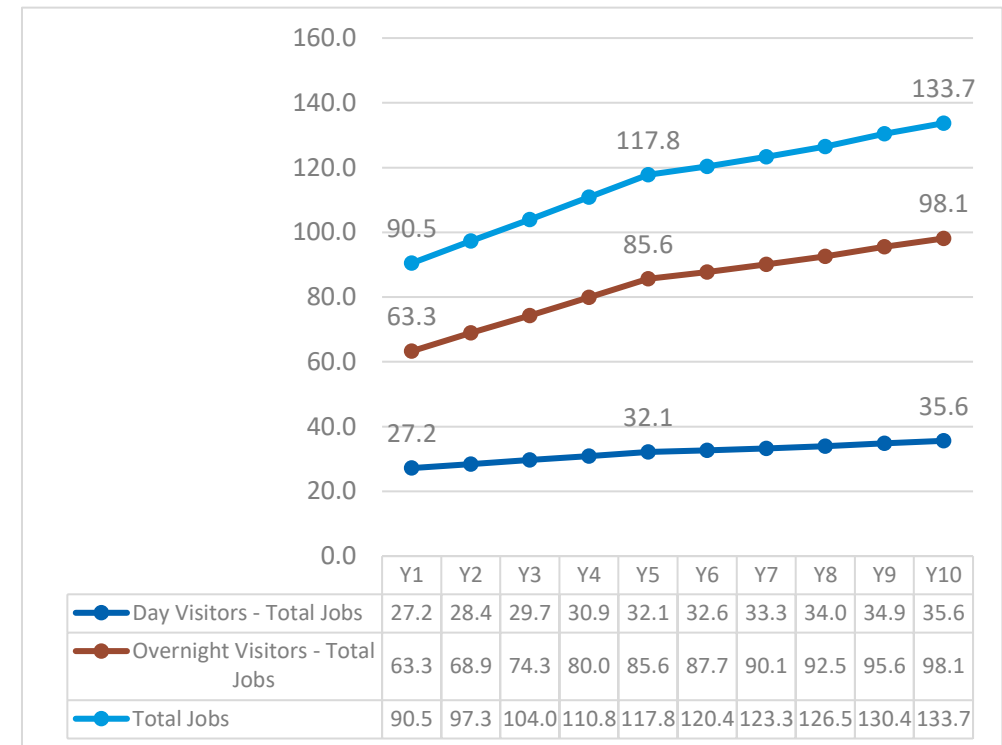
MCA's regional economic model is used to estimate the employment and income impacts of the trail. The model allocates spending across relevant industry sectors and takes account of the significant shares of the gross spending by visitors/users, which leaks out of the region.<sup>73</sup>

### 12.1 Employment Impacts – Jobs Generated

The charts and tables below show the increase in jobs in the region generated by each of the user/visitor groups.

- The operation of the trails would generate a total of 90.5 full-time equivalent jobs in year 1, increasing to 133.7 FTE jobs in year 10.
- Of the direct jobs in 2031 (year 10), day visitors would account for 42.7 FTE jobs, overnight visitors for 89.2 FTE jobs.
- An events program would create an equivalent of 13.8 FTE additional jobs in 2031 (see Appendix B).
- 
- 
- 

**Figure 32.** Case 2 Reduced Trails Network Jobs Generated by Trail Operations (no events) (FTE no.)



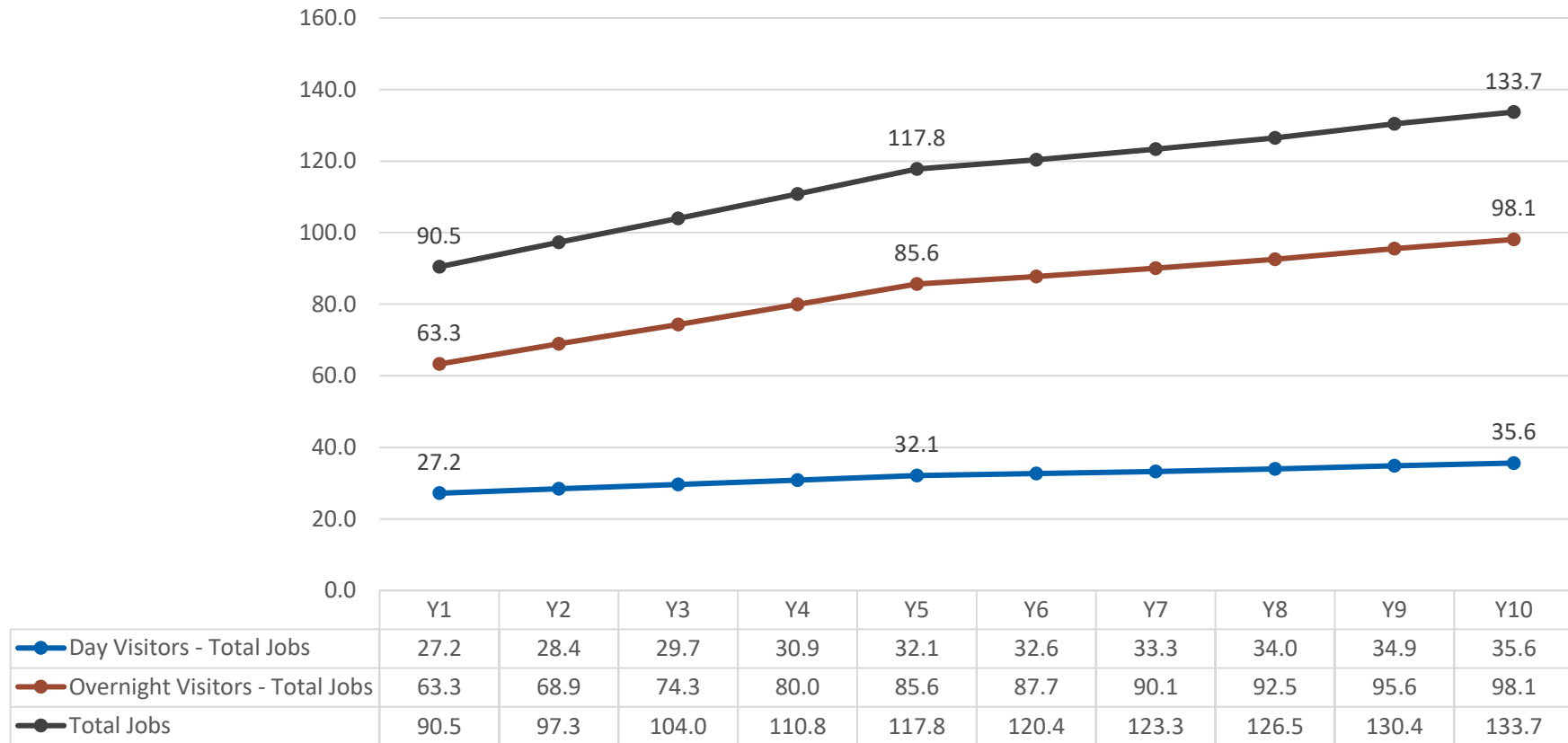
SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

<sup>73</sup> The spending by trail users is not the economic impact and does not represent the increase in regional income. There is a major leakage of this spending out of the region due to: the GST (10%); and a significant component of the value of services and products purchased by visitors comes from outside the region (e.g., food ingredients, soft drinks, beer, consumer products bought etc.). The model takes account of these leakages and estimates employment impacts and the increase in regional income.

Developing Warburton as a World Class Mountain Bike Destination, and Economic Feasibility Study | Three Case Economic Impact Assessment – Spend Assumption 1 (TRA)



**Figure 33.** Case 2 Reduced Trails Network Total Jobs Generated by Trail Operations (no events) (FTE no.)



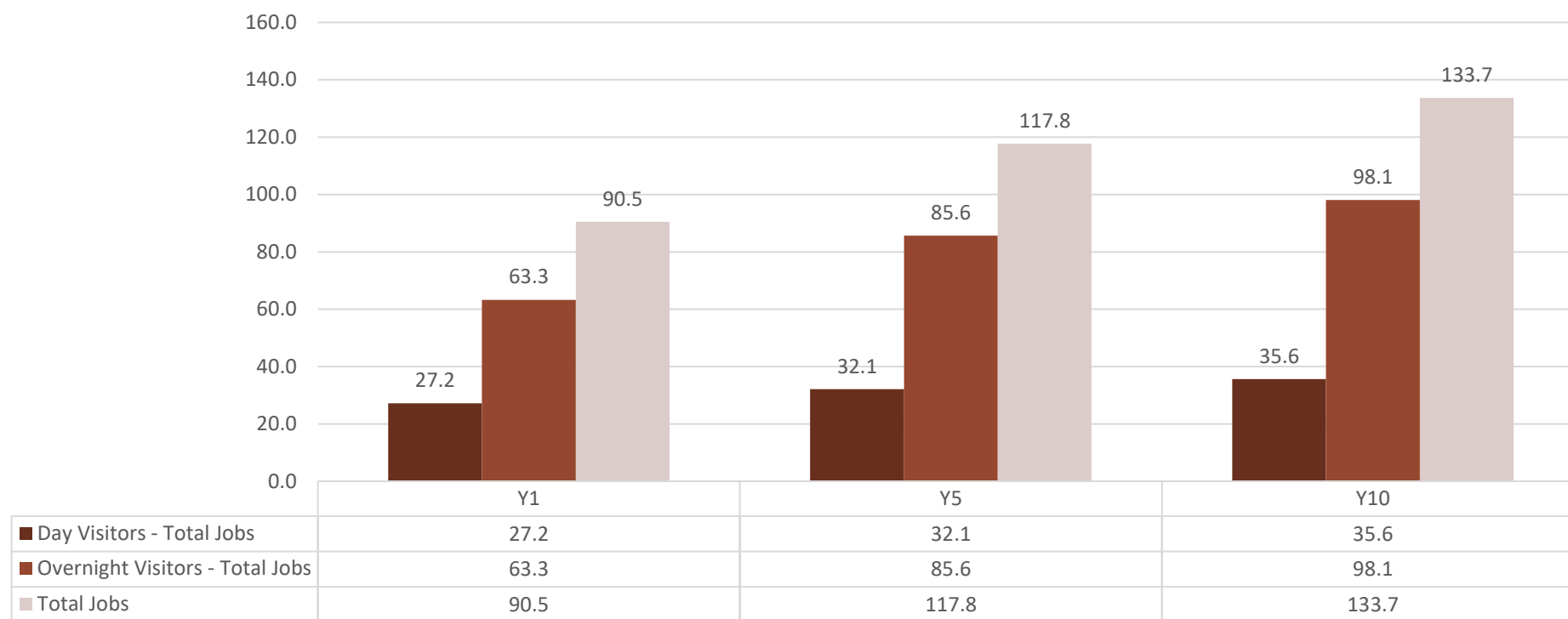
- Source: MCA modelling & estimates, July 2021. Note some differences due to rounding

**Table 35.** Case 2 Reduced Trails Network Jobs Generated by Trail Operations (no events) (FTE no.)

<b>Jobs Generated (FTE)</b>	<b>Y1</b>	<b>Y2</b>	<b>Y3</b>	<b>Y4</b>	<b>Y5</b>	<b>Y6</b>	<b>Y7</b>	<b>Y8</b>	<b>Y9</b>	<b>Y10</b>
<b>Day Visitors – Trail Users</b>										
Direct Jobs	24.0	25.1	26.2	27.3	28.4	29.0	29.6	30.3	30.9	31.5
Indirect/Induced	3.2	3.3	3.4	3.6	3.7	3.6	3.6	3.7	4.0	4.1
<b>Total Jobs - Day Visitors</b>	<b>27.2</b>	<b>28.4</b>	<b>29.7</b>	<b>30.9</b>	<b>32.1</b>	<b>32.6</b>	<b>33.3</b>	<b>34.0</b>	<b>34.9</b>	<b>35.6</b>
<b>Overnight Visitors – Trail Users</b>										
Direct Jobs	56.9	62.0	67.1	72.3	77.4	79.7	81.9	84.2	86.5	88.8
Indirect/Induced	6.4	6.9	7.2	7.7	8.3	8.1	8.1	8.3	9.1	9.3
<b>Total Jobs - Overnight Visitors</b>	<b>63.3</b>	<b>68.9</b>	<b>74.3</b>	<b>80.0</b>	<b>85.6</b>	<b>87.7</b>	<b>90.1</b>	<b>92.5</b>	<b>95.6</b>	<b>98.1</b>
<b>Total Visitors – Trail Users</b>										
Direct Jobs	80.9	87.1	93.3	99.5	105.8	108.7	111.6	114.5	117.4	120.3
Indirect/Induced	9.6	10.2	10.6	11.3	12.0	11.7	11.7	12.0	13.0	13.4
<b>Total All Jobs</b>	<b>90.5</b>	<b>97.3</b>	<b>104.0</b>	<b>110.8</b>	<b>117.8</b>	<b>120.4</b>	<b>123.3</b>	<b>126.5</b>	<b>130.4</b>	<b>133.7</b>

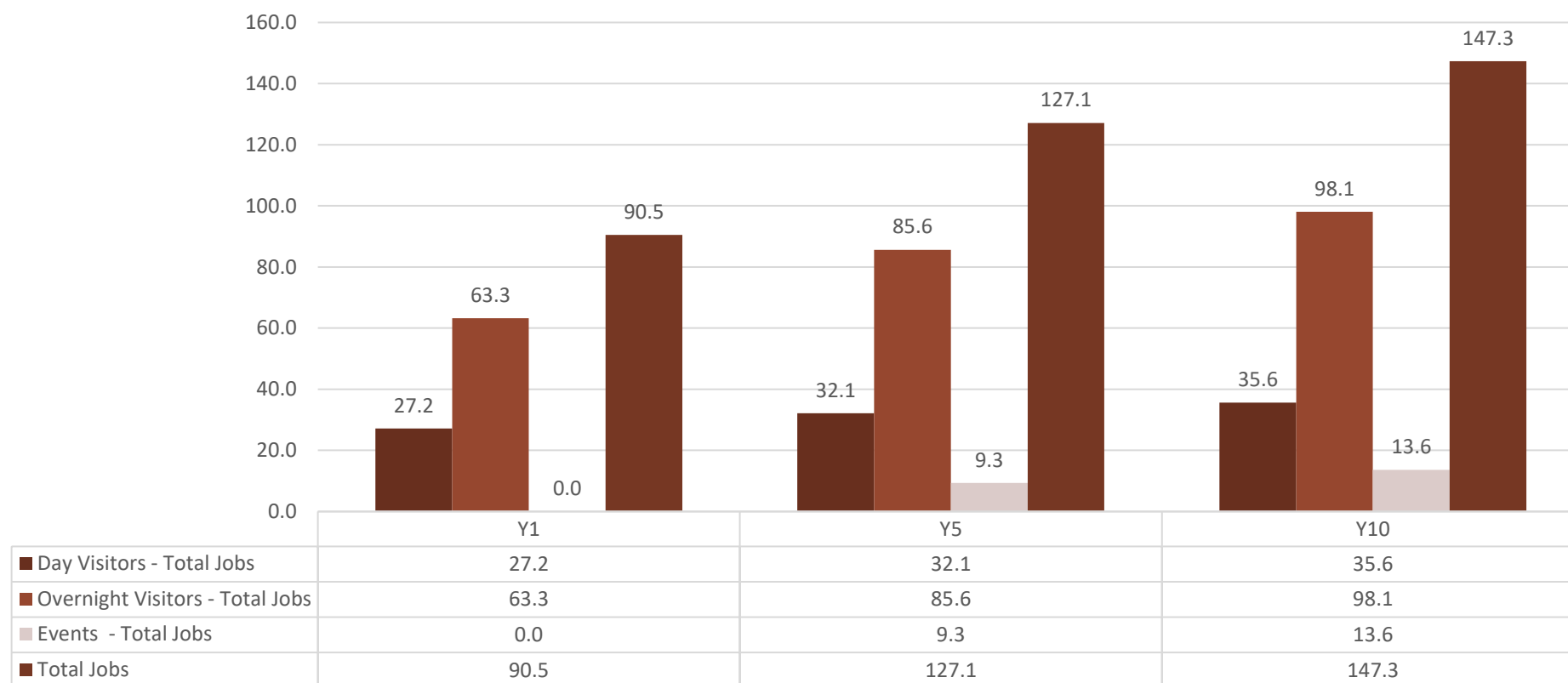
SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

**Figure 34.** Case 2 Reduced Trails Network Total Jobs (no events) (FTE no.)



SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

**Figure 35.** Case 2 Reduced Trails Network Total Jobs (with events) (FTE no.)



SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

**Table 36.** Case 2 Reduced Trails Network Total Jobs Generated by Trails Operations (FTE no.)

Case 2 Operations: Jobs Generated by Trail Users/Visitors	Year 1	Year 5	Year 10
<b>Day Users/Visitors</b>			
Direct Jobs	24.0	28.4	31.5
Indirect/Induced Jobs	3.2	3.7	4.1
<b>Total Jobs</b>	<b>27.2</b>	<b>32.1</b>	<b>35.6</b>
<b>Overnight User/Visitors</b>			
Direct Jobs	56.9	77.4	88.8
Indirect/Induced Jobs	6.4	8.3	9.3
<b>Total Jobs</b>	<b>63.3</b>	<b>85.6</b>	<b>98.1</b>
<b>Events</b>			
Direct Jobs	0	7.4	11.1
Indirect/Induced Jobs	0	1.9	2.5
<b>Total Jobs</b>	<b>0</b>	<b>9.3</b>	<b>13.6</b>
<b>Total All Users/Visitors (no events)</b>			
Direct Jobs	80.9	105.8	120.3
Indirect/Induced Jobs	9.6	12.0	13.4
<b>Total Jobs</b>	<b>90.5</b>	<b>117.8</b>	<b>133.7</b>
<b>Total All Users/Visitors (with events)</b>			
Direct Jobs	80.9	113.1	131.4
Indirect/Induced Jobs	9.6	13.9	15.9
<b>Total Jobs</b>	<b>90.5</b>	<b>127.1</b>	<b>147.3</b>

SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

## 12.2 Jobs by Industry

On a sector basis, the jobs (FTE - direct and indirect) generated by trail users are mainly concentrated in:

- accommodation
- food and beverage
- recreational services and other visitor services
- transport (including shuttles)
- other retail.

The following table shows estimates for day visitors and overnight visitors.

The development of the trails will see the development of local MTB service industry. The industry analysis highlights that total full time equivalent (FTE) jobs generated by trail users in year 10 would be in:

- recreation services/other services (MTB hire, guides, equipment etc.) 32.8 jobs (year 10)
- transport (including shuttles) 12.8 FTE jobs
- accommodation 35.3 jobs
- food and beverage 38.5 jobs.
- 

**Table 37.** Case 2 Reduced Trails Network Total Jobs Generated by Industry (no events) (FTE no.)

Case 2 No National Park Trails	Year 1	Year 5	Year 10
<b>All Jobs</b>			
<b>Day Visitors</b>			
Accommodation	0.0	0.0	0.0
Food & Beverage	9.4	11.1	12.4
Other retail	<b>2.8</b>	<b>3.4</b>	<b>3.7</b>
Health	0.3	0.3	0.3
Transportation	3.2	3.8	4.2
Communication	0.1	0.1	0.1
Recreation Services/Other Services	10.8	12.8	14.2
Education	0.2	0.2	0.2
Miscellaneous	0.4	0.4	0.5
<b>Total</b>	<b>27.2</b>	<b>32.1</b>	<b>35.6</b>
<b>Overnight Visitors</b>			
Accommodation	22.6	30.7	35.3
Food & Beverage	16.8	22.8	26.1
Other retail	4.5	6.0	6.9
Health	0.5	0.7	0.8
Transportation	5.6	7.5	8.6
Communication	0.2	0.2	0.3
Recreation Services/Other Services	12.0	16.3	18.7
Education	0.3	0.4	0.4
Miscellaneous	0.7	1.0	1.1
<b>Total</b>	<b>63.3</b>	<b>85.6</b>	<b>98.1</b>
<b>Total All Jobs</b>			
Accommodation	22.6	30.7	35.3
Food & Beverage	26.3	33.9	38.5
Other Retail	7.3	9.4	10.6
Health	0.8	1.0	1.1
Transportation	8.8	11.3	12.8
Communication	0.3	0.3	0.4
Recreation Services/Other Services	22.8	29.1	32.8
Education	0.5	0.6	0.6
Miscellaneous	1.1	1.4	1.6
<b>Total</b>	<b>90.5</b>	<b>117.8</b>	<b>133.7</b>

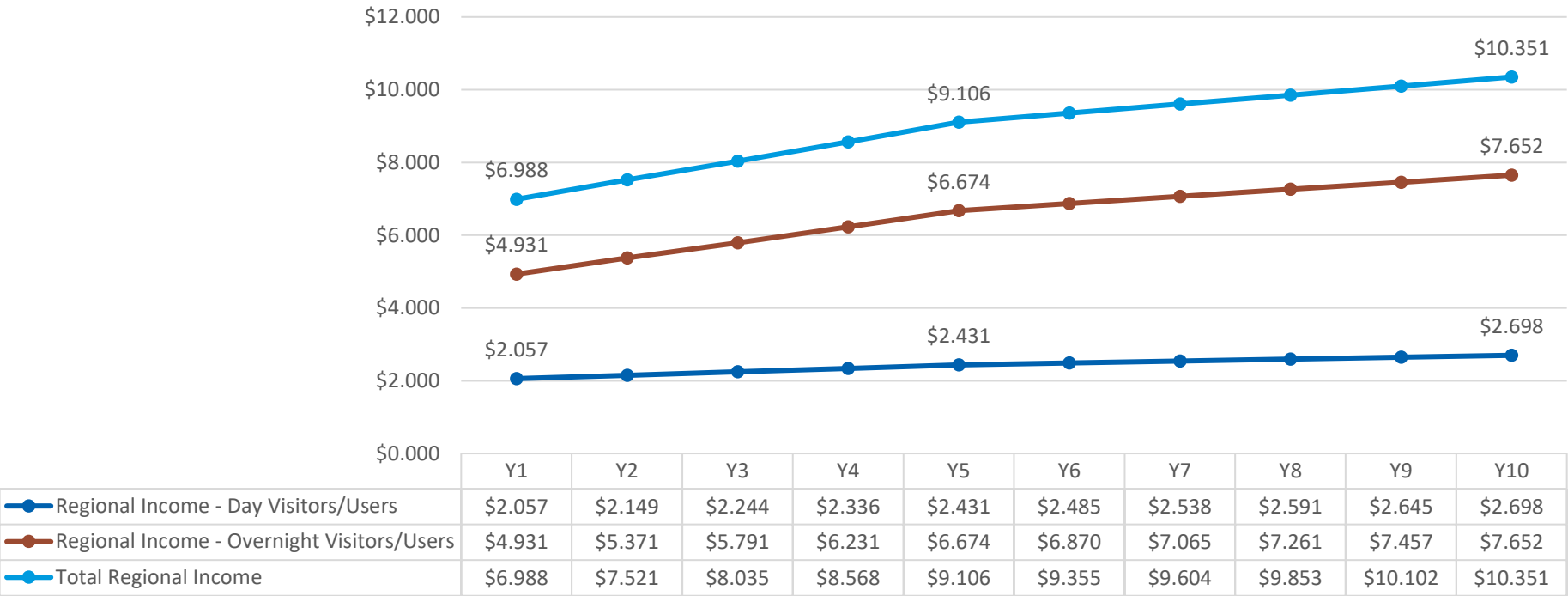
SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

### 12.3 Regional Income Impacts

The increase in regional income (in constant 2021 prices) generated annually by the operation of the trails and visitor/user spending totals \$6.9 million in year 1, increasing to \$10.4 million in year 10.<sup>74</sup>

The increase in income (direct and indirect/induced) generated by day visitors/users (including locals and other users) is \$2.1 million in year 1 and \$2.7 million in year 10. Overnight users/visitors boost total regional income by \$4.9 million in year 1 and \$7.7 million in year 10.

**Figure 36.** Case 2 Reduced Trails Network Regional Income Generated (\$million 2021 prices)

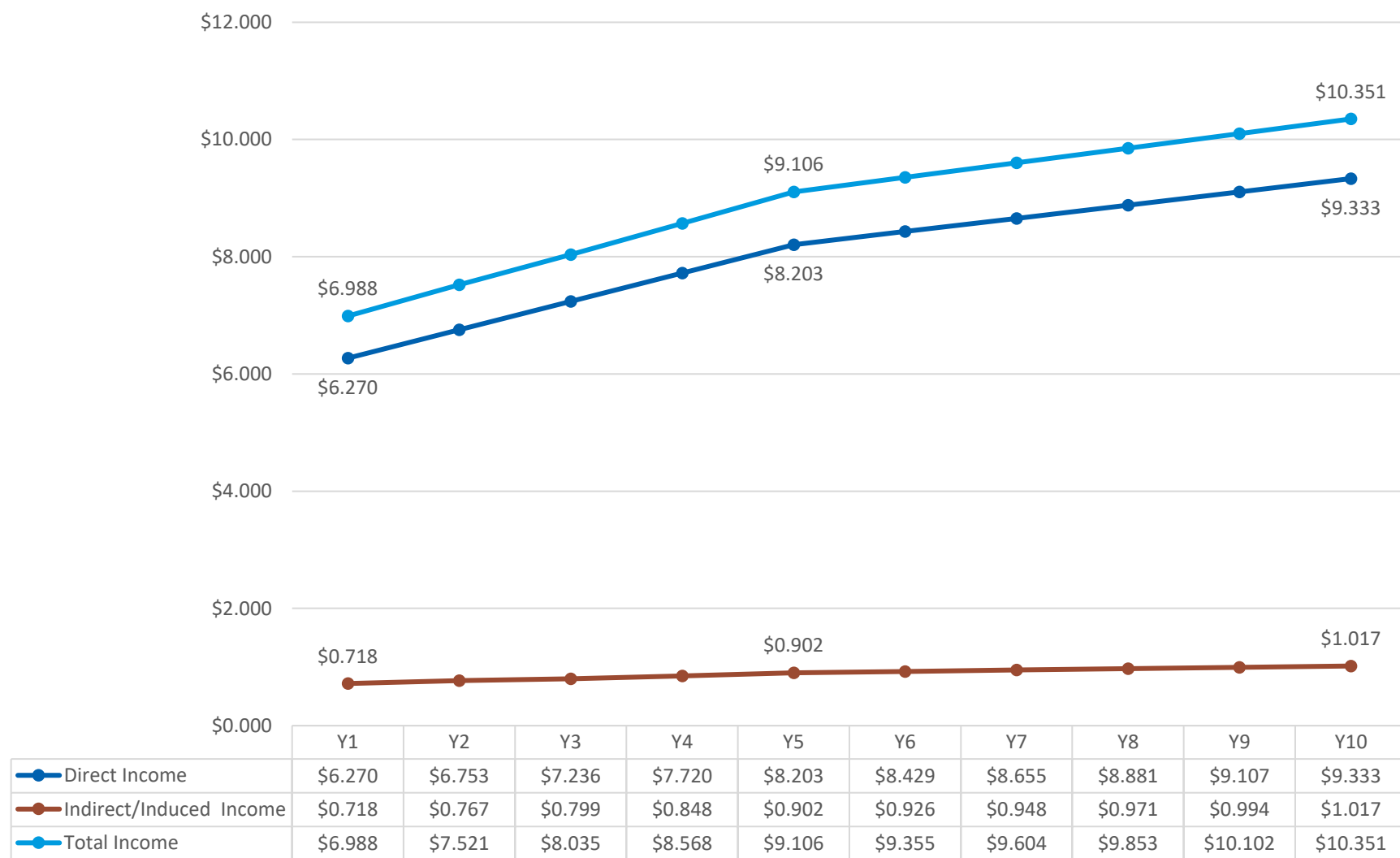


SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

<sup>74</sup> Regional income is the total net income generated from the activity and covers wages and salaries of employees and profits of businesses within the region. It includes income generated directly within the business and indirect income, which is generated in other regional businesses (wages and profits) from the multiplier impacts of employee spending on the region. In the modelling of income generated income tax and GST on spending, are both treated as leakages from the region.



**Figure 37.** Case 2 Reduced Trails Network Regional Income Generated (\$million 2021 prices)



SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

**Table 38.** Case 2 Reduced Trails Network Regional Income Generated (\$million 2021 prices)

Case 2 Regional Income \$ million (2021 prices)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total 10 Years
<b>Day Visitors</b>											
Direct Income	\$1.820	\$1.902	\$1.984	\$2.067	\$2.149	\$2.197	\$2.245	\$2.293	\$2.340	\$2.388	\$21.385
Indirect/Induced	\$0.238	\$0.247	\$0.260	\$0.270	\$0.282	\$0.288	\$0.293	\$0.299	\$0.304	\$0.310	\$2.791
<b>Total Income</b>	<b>\$2.057</b>	<b>\$2.149</b>	<b>\$2.244</b>	<b>\$2.336</b>	<b>\$2.431</b>	<b>\$2.485</b>	<b>\$2.538</b>	<b>\$2.591</b>	<b>\$2.645</b>	<b>\$2.698</b>	<b>\$24.176</b>
<b>Overnight Visitors</b>											
Direct Income	\$4.450	\$4.851	\$5.252	\$5.653	\$6.054	\$6.232	\$6.410	\$6.589	\$6.767	\$6.945	\$59.204
Indirect/Induced	\$0.481	\$0.520	\$0.539	\$0.578	\$0.620	\$0.638	\$0.655	\$0.672	\$0.690	\$0.707	\$6.101
<b>Total Income</b>	<b>\$4.931</b>	<b>\$5.371</b>	<b>\$5.791</b>	<b>\$6.231</b>	<b>\$6.674</b>	<b>\$6.870</b>	<b>\$7.065</b>	<b>\$7.261</b>	<b>\$7.457</b>	<b>\$7.652</b>	<b>\$65.305</b>
<b>Total Visitors</b>											
Direct Income	\$6.270	\$6.753	\$7.236	\$7.720	\$8.203	\$8.429	\$8.655	\$8.881	\$9.107	\$9.333	\$80.589
Indirect/Induced	\$0.718	\$0.767	\$0.799	\$0.848	\$0.902	\$0.926	\$0.948	\$0.971	\$0.994	\$1.017	\$8.892
<b>Total Income</b>	<b>\$6.988</b>	<b>\$7.521</b>	<b>\$8.035</b>	<b>\$8.568</b>	<b>\$9.106</b>	<b>\$9.355</b>	<b>\$9.604</b>	<b>\$9.853</b>	<b>\$10.102</b>	<b>\$10.351</b>	<b>\$89.481</b>

SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

Total regional income over 10 years for all visitors accounted for a total of \$89.5 million.

**Table 39.** Case 2 Reduced Trail Network Regional Income Generated 10 Years (\$million 2021 prices)

Case 2 Regional Income	Day Visitors/Users	Overnight Visitors/Users	Total Visitors/Users
Total 10 Years	\$m	\$m	\$m
Direct Income	\$21.385	\$59.204	\$80.589
Indirect/Induced Income	\$2.791	\$6.101	\$8.892
<b>Total Income</b>	<b>\$24.176</b>	<b>\$65.305</b>	<b>\$89.481</b>

SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

## 12.4 Benefit Cost Analysis Case 2 Reduced Trail Network

The benefits and costs of the Warburton MTB Trails are analysed for a 10-year period.

### 12.4.1 Trail Costs 10 Years

The estimated construction cost of the trails is \$17.1 million (Stage 1 & 2), and 10-year maintenance costs are \$4.8 million for a total 10-year cost of \$21.9 million (see Appendix D).<sup>75</sup>

### 12.4.2 Measuring Benefits – 10 Years

The measured benefits of the Warburton MTB Trails comprise the increase in regional income generated by trail users, the health benefits, and a notional consumer value to users of the trails.

#### Increase in Regional income

The increase in regional income generated by trail users spending over a 10-year period totals \$89.5 million (in constant \$2021 prices).

**Table 40.** Case 2 Reduced Trails Network Regional Income Generated by Trail Users (\$million 2021 prices)

Case 2 Regional Income Total 10 Years	Day Visitors/Users \$m	Overnight Visitors/Users \$m	Total Visitors/Users \$m
Direct Income	\$21.385	\$59.204	\$80.589
Indirect/Induced Income	\$2.791	\$6.101	\$8.892
Total Regional Income	\$24.176	\$65.305	\$89.481

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

### Health Benefits

A report by Marsden Jacobs Associates indicates that exercise of cycling/active walking in Victorian Parks has net healthcare benefits (in terms of avoided health costs) of \$15 per hour in terms of a reduction in lifetime health costs (adjusted for injury).<sup>76</sup>

Healthcare benefits are measured as the net (adjusted for injury) avoided costs to the national healthcare system (private costs and government costs) attributable to nature-based outdoor activity.

- For the analysis of these trails, we have assumed an average cycle period of 2.5 hours for beginners & novices (and average of \$10 per hour) and 4 hours for advanced and experts. Health benefits are measured for Victorian users only (i.e., residents of Yarra Ranges LGA, Melbourne Metro area and regional Victoria).
- This indirect health benefit is estimated at \$31.5 **million** (in constant prices \$2021) over the 10-year period or an average of \$3.1 million per year.

<sup>75</sup> Yarra Ranges Council September 2020

<sup>76</sup> Victoria's Nature-Based Outdoor Economy- Key Estimates and Recommendations, Marsden Jacobs Associates, January 2016 P10 & 21.

**Table 41.** Case 2 Reduced Trails Network Health Benefit Estimates (\$million 2021 prices)

Case 2	Health Benefits Valuation	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total 10 Years
Ave hours	\$ million 2021 prices											
2.5	Beginner	\$0.603	\$0.648	\$0.692	\$0.737	\$0.781	\$0.804	\$0.826	\$0.848	\$0.870	\$0.892	\$7.701
2.5	Novice	\$0.764	\$0.814	\$0.865	\$0.916	\$0.966	\$0.993	\$1.019	\$1.046	\$1.072	\$1.099	\$9.554
4	Intermediate	\$1.364	\$1.431	\$1.499	\$1.567	\$1.635	\$1.667	\$1.699	\$1.731	\$1.763	\$1.795	\$16.150
4	Advance & Expert	\$0.479	\$0.501	\$0.522	\$0.544	\$0.566	\$0.577	\$0.587	\$0.598	\$0.609	\$0.620	\$5.603
	<b>Total All</b>	<b>\$3.209</b>	<b>\$3.394</b>	<b>\$3.579</b>	<b>\$3.764</b>	<b>\$3.948</b>	<b>\$4.040</b>	<b>\$4.131</b>	<b>\$4.223</b>	<b>\$4.314</b>	<b>\$4.406</b>	<b>\$39.008</b>
4	Interstate & Internationals	\$0.372	\$0.481	\$0.589	\$0.697	\$0.806	\$0.843	\$0.880	\$0.917	\$0.955	\$0.992	\$7.533
	<b>Total less interstate &amp; internationals</b>	<b>\$2.837</b>	<b>\$2.914</b>	<b>\$2.990</b>	<b>\$3.066</b>	<b>\$3.142</b>	<b>\$3.197</b>	<b>\$3.251</b>	<b>\$3.305</b>	<b>\$3.360</b>	<b>\$3.414</b>	<b>\$31.476</b>

SOURCE: MCA MODELLING &amp; ESTIMATES, JULY 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

### Consumer/User Valuation

In the modelling we have assumed that there are no charges for the use of the trail. However, a valuation can be placed on the experience based on a shadow price or notional charge (what a person may be willing to pay). For the trail we have assumed it to be \$15 per trail ride. This benefit measure totals \$18.5 million (constant prices \$2021) over 10 years for all trail users or an average of \$1.8 million per year.

**Table 42.** Case 2 Reduced Trail Network Consumer Value Estimates (\$million 2021 prices)

Case 2: Reduced Trail Network	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total 10 Years
Consumer Value \$ million 2021 prices											
Beginner	\$0.362	\$0.389	\$0.415	\$0.442	\$0.469	\$0.482	\$0.495	\$0.509	\$0.522	\$0.535	\$4.621
Novice	\$0.458	\$0.489	\$0.519	\$0.549	\$0.580	\$0.596	\$0.612	\$0.628	\$0.643	\$0.659	\$5.732
Intermediate	\$0.511	\$0.537	\$0.562	\$0.588	\$0.613	\$0.625	\$0.637	\$0.649	\$0.661	\$0.673	\$6.056
Advance & Expert	\$0.180	\$0.188	\$0.196	\$0.204	\$0.212	\$0.216	\$0.220	\$0.224	\$0.228	\$0.232	\$2.101
<b>Total All</b>	<b>\$1.511</b>	<b>\$1.602</b>	<b>\$1.692</b>	<b>\$1.783</b>	<b>\$1.874</b>	<b>\$1.919</b>	<b>\$1.964</b>	<b>\$2.010</b>	<b>\$2.055</b>	<b>\$2.100</b>	<b>\$18.511</b>

SOURCE: MCA MODELLING &amp; ESTIMATES, JULY 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

12.4.3 Benefit Cost Analysis

All Benefits

The following table 41 and figure 37 show the benefits and costs of the operations of the trails over a 10-year period. The benefits are measured by:

- the increase in regional income generated by trail users over a 10-year period
- the estimated health benefits
- the user value.

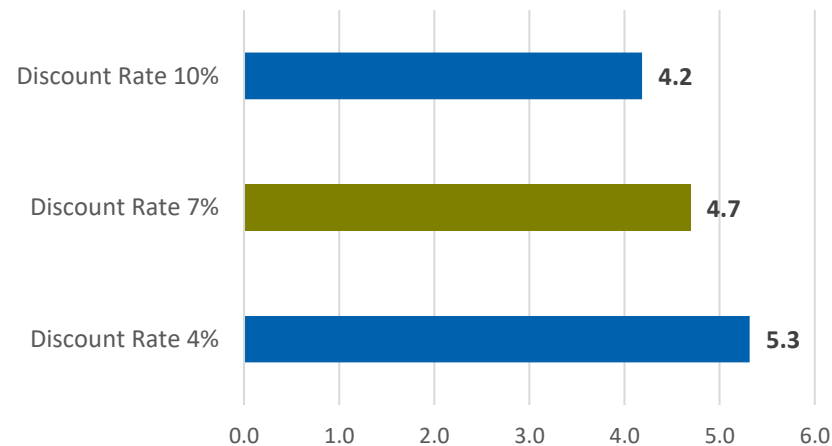
The costs include:

- design and planning
- construction costs
- asset maintenance costs.

For the comparison, the present value of the benefits is calculated using 3 discount rates (4%, 7% and 10%).

The chart below compares Benefit Cost Ratios (BCR) for the 3 discount rates. For a trail project a 7% discount rate is appropriate, and the project yields a positive BCR of 4.7. The present value of total benefits generated by the investment are 4.7 times the total costs of the project over a 10-year period. If only the direct regional benefit of increase in regional income is included in the benefits, the BCR is 3.0 (for a 7% discount rate).

**Figure 38.** Case 2 Reduced Trails Network Benefit Cost Ratio (BCR- All Benefits) Warburton Trail Development



SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

**Table 43.** Case 2 Reduced Trails Network Benefits and Cost Analysis 10 Years (Constant prices \$2021)

Case 2 Reduce Trail Network Total Project	Discount Rate	Discount Rate	Discount Rate
Regional Cost Benefit (\$2021 prices) Period : 10Years	4%	7%	10%
<b>Trail Extension</b>			
Design, Development and Planning Costs	\$2,000,000	\$2,000,000	\$2,000,000
Capital Costs Trails & Infrastructure 2020 (\$)	\$17,090,000	\$17,090,000	\$17,090,000
Costs - Maintenance (10 years)	\$4,797,500	\$4,797,500	\$4,797,500
<b>Total Costs</b>	<b>\$21,887,500</b>	<b>\$21,887,500</b>	<b>\$21,887,500</b>
<b>Benefits (users) (10 years)</b>			
Regional Income Increase	\$89,480,846	\$89,480,846	\$89,480,846
Health Benefits (Vic Users)	\$31,475,768	\$31,475,768	\$31,475,768
User Value (shadow user price)	\$18,510,519	\$18,510,519	\$18,510,519
<b>Total Benefits</b>	<b>\$139,467,133</b>	<b>\$139,467,133</b>	<b>\$139,467,133</b>
<b>Total Benefits (\$) Present Value</b>	<b>\$116,368,001</b>	<b>\$102,702,209</b>	<b>\$91,585,820</b>
<b>Net Present Value (\$) Total Benefits</b>	<b>\$94,480,501</b>	<b>\$80,814,709</b>	<b>\$69,698,320</b>
<b>Benefit Cost Ratio (BCR - All Benefits)</b>	<b>5.3</b>	<b>4.7</b>	<b>4.2</b>
NPV/Cost	4.3	3.7	3.2
<b>Regional Income Only (PV)</b>	<b>\$74,464,097</b>	<b>\$65,675,785</b>	<b>\$58,481,289</b>
<b>BCR (Regional Income only)</b>	<b>3.4</b>	<b>3.0</b>	<b>2.7</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. NOTE: DIRECT BENEFITS ARE THE VALUE TO USERS OF A FACILITY; USUALLY THIS IS MEASURE BY USER PAYMENTS/FEES. IN THIS CASE THERE ARE NO USER CHARGES FOR THE TRAIL AND A SHADOW PRICE HAS BEEN APPLIED (\$15 PER RIDE) AS A MEASURE OF USER VALUE. THEREFORE, BENEFITS ARE THE INCREASE IN REGIONAL INCOME GENERATED BY VISITOR SPENDING, THE HEALTH BENEFITS OF EXERCISE ACTIVITY AND THE USER VALUE.

## 13 Operations Phase -

### Case 3 No Drop A K Trail Operations Phase – Regional Economic Impacts

The operations phase regional economic impacts of the trails are driven by the expenditure of visitors/users in towns adjacent to the trail and in the broader region. This analysis is for the trail network with no Drop A K trail.

MCA's regional economic model is used to estimate the employment and income impacts of the trail. The model allocates spending across relevant industry sectors and takes account of the significant shares of the gross spending by visitors/users, which leaks out of the region.<sup>77</sup>

#### 13.1 Employment Impacts

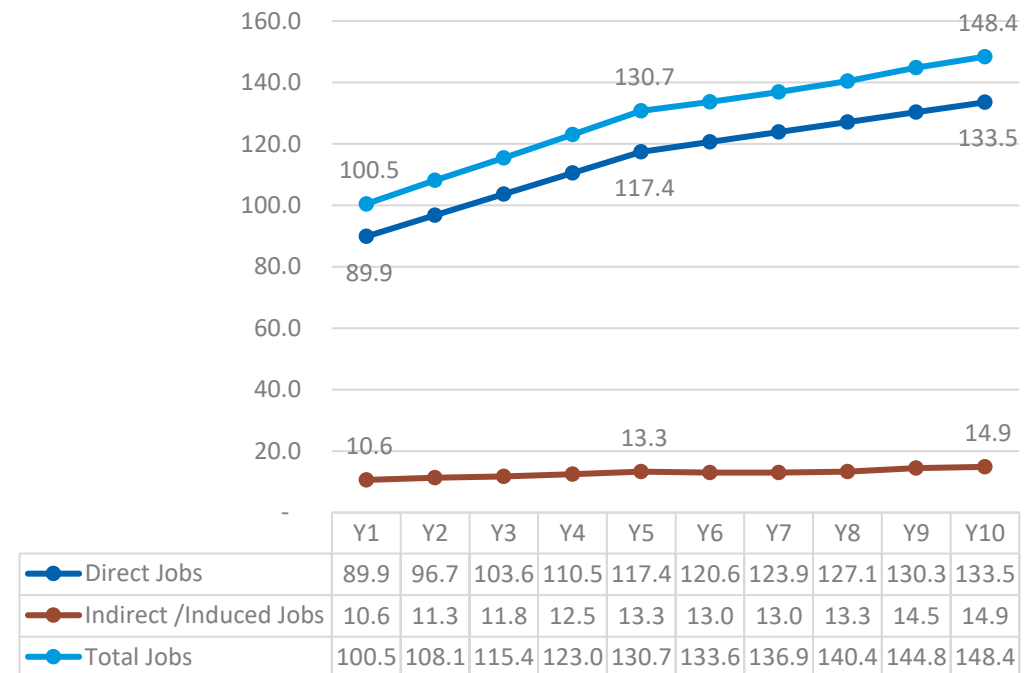
The charts and tables below show the increase in jobs in the region generated by each of the user/visitor groups.

- The operation of the trails would generate a total of 100.5 full-time equivalent jobs in year 1, increasing to 148.4 FTE jobs in year 10.
- Of the direct jobs in year 10, day visitors would account for 39.3 FTE jobs, overnight visitors for 109.1 jobs.
- An events program would create an equivalent of 13.5 FTE additional jobs in year 10 (see Appendix B).
- 

**Figure 39.**

(FTE no.)

Case 3 No Drop A K Jobs Generated by Trail Operations (no events)



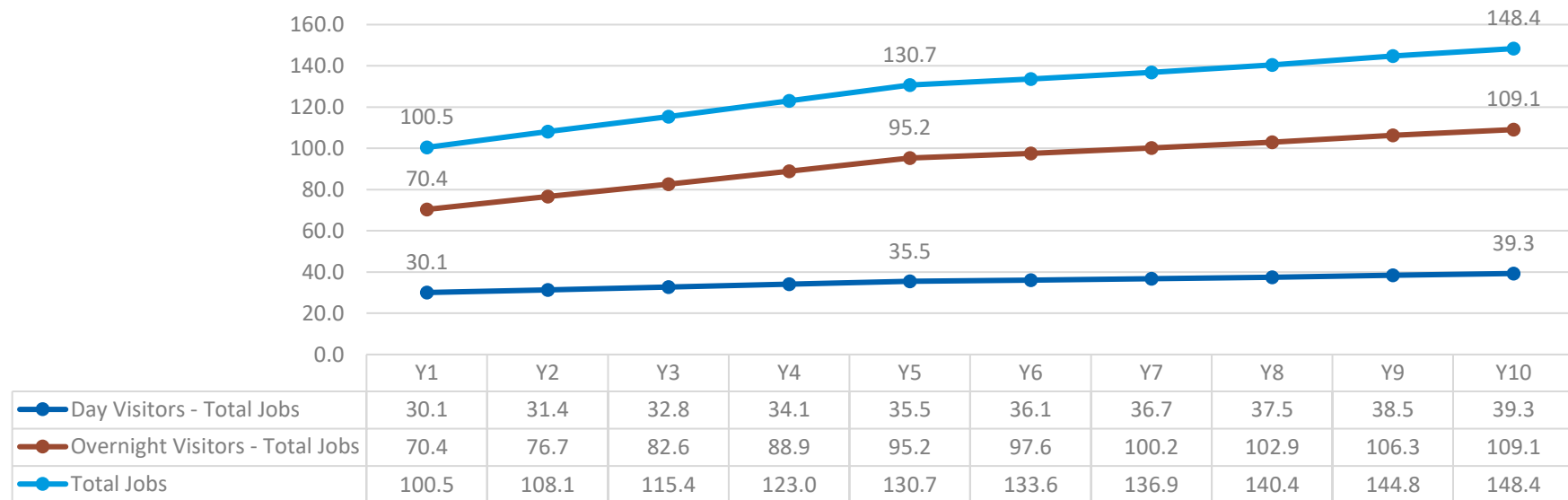
SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING

<sup>77</sup> The spending by trail users is not the economic impact and does not represent the increase in regional income. There is a major leakage of this spending out of the region due to: the GST (10%); and a

significant component of the value of services and products purchased by visitors comes from outside the region (e.g., food ingredients, soft drinks, beer, consumer products bought etc.). The model takes account of these leakages and estimates employment impacts and the increase in regional income.



**Figure 40.** Case 3 No Drop A K Trail Total Jobs Generated (no events) (FTE no.)



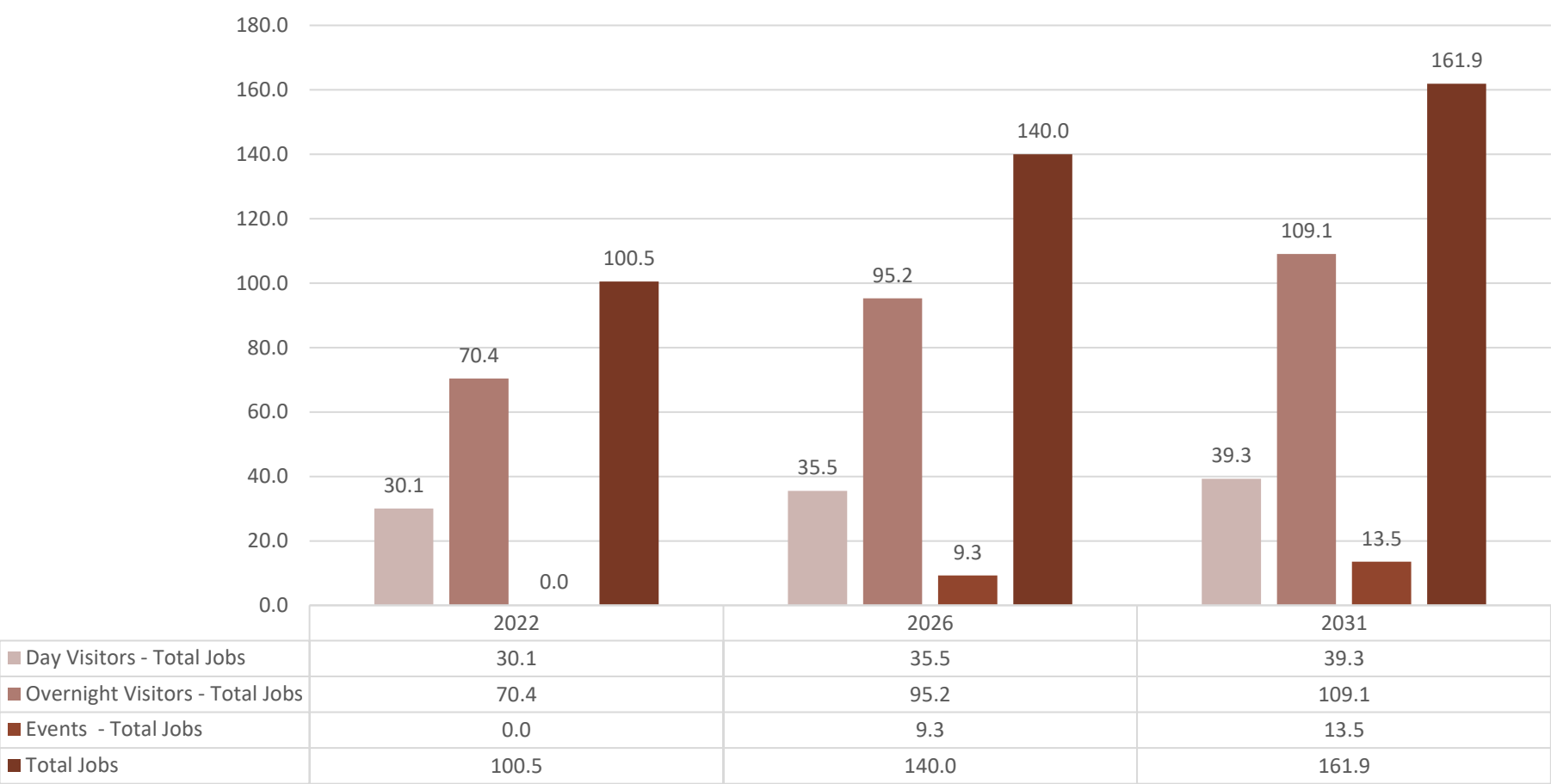
SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Table 44.** Case 3 No Drop A K Trail Jobs Generated by Trail Operations (no events) (FTE no.)

Jobs Generated (FTE)	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
<b>Day Visitors – Trail Users</b>										
Direct Jobs	26.6	27.8	29.0	30.2	31.4	32.0	32.7	33.4	34.1	34.8
Indirect/Induced	3.5	3.6	3.8	3.9	4.1	4.0	4.0	4.1	4.4	4.5
<b>Total Jobs - Day Visitors</b>	<b>30.1</b>	<b>31.4</b>	<b>32.8</b>	<b>34.1</b>	<b>35.5</b>	<b>36.1</b>	<b>36.7</b>	<b>37.5</b>	<b>38.5</b>	<b>39.3</b>
<b>Overnight Visitors – Trail Users</b>										
Direct Jobs	63.3	69.0	74.7	80.4	86.1	88.6	91.1	93.7	96.2	98.7
Indirect/Induced	7.1	7.7	8.0	8.6	9.2	9.0	9.0	9.3	10.1	10.4
<b>Total Jobs - Overnight Visitors</b>	<b>70.4</b>	<b>76.7</b>	<b>82.6</b>	<b>88.9</b>	<b>95.2</b>	<b>97.6</b>	<b>100.2</b>	<b>102.9</b>	<b>106.3</b>	<b>109.1</b>
<b>Total Visitors – Trail Users</b>										
Direct Jobs	89.9	96.7	103.6	110.5	117.4	120.6	123.9	127.1	130.3	133.5
Indirect/Induced	10.6	11.3	11.8	12.5	13.3	13.0	13.0	13.3	14.5	14.9
<b>Total All Jobs</b>	<b>100.5</b>	<b>108.1</b>	<b>115.4</b>	<b>123.0</b>	<b>130.7</b>	<b>133.6</b>	<b>136.9</b>	<b>140.4</b>	<b>144.8</b>	<b>148.4</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Figure 41.** Case 3 No Drop A K Trail Total Job (with events) (FTE no.)



SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Table 45.** Case 3 No Drop A K Total Jobs Generated by Trail Operations (FTE no.)

Case 3: No Drop A K Trail	Year 1	Year 5	Year 10
<b>Day Users/Visitors</b>			
Direct Jobs	26.6	31.4	34.8
Indirect/Induced Jobs	3.5	4.1	4.5
<b>Total Jobs</b>	<b>30.1</b>	<b>35.5</b>	<b>39.3</b>
<b>Overnight User/Visitors</b>			
Direct Jobs	63.3	86.1	98.7
Indirect/Induced Jobs	7.1	9.2	10.4
<b>Total Jobs</b>	<b>70.4</b>	<b>95.2</b>	<b>109.1</b>
<b>Events</b>			
Direct Jobs	0	7.4	11.1
Indirect/Induced Jobs	0	1.9	2.5
<b>Total Jobs</b>	<b>0</b>	<b>9.3</b>	<b>13.5</b>
<b>Total All Users/Visitors (no events)</b>			
Direct Jobs	89.9	117.4	133.5
Indirect/Induced Jobs	10.6	13.3	14.9
<b>Total Jobs</b>	<b>100.5</b>	<b>130.7</b>	<b>148.4</b>
<b>Total All Users/Visitors (with events)</b>			
Direct Jobs	89.9	124.8	144.5
Indirect/Induced Jobs	10.6	15.2	17.4
<b>Total Jobs</b>	<b>100.5</b>	<b>140.0</b>	<b>161.9</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## 13.2 Jobs by Industry

On a sector basis, the jobs (FTE- direct and indirect) generated by trail users are mainly concentrated in:

- accommodation
- food and beverage
- recreational services and other visitor services
- transport (including shuttles)
- other retail.

The following table shows estimates for day visitors and overnight visitors.

The development of the trails will see the development of local MTB service industry. The industry analysis highlights that total full time equivalent (FTE) jobs generated by trail users in year 10 would be in:

- recreation services/other services (MTB hire, guides, equipment etc.) 36.4 jobs
- transport (including shuttles) 14.2 FTE jobs
- accommodation 39.2 jobs
- food and beverage 42.7 jobs.
- 
- 

**Table 46.** No Drop A K Trail Total Jobs Generated by Industry (no events) (FTE no.)

Case 3 No National Park Trails	Year 1	Year 5	Year 10
All Jobs			
<b>Day Visitors</b>			
Accommodation	0.0	0.0	0.0
Food & Beverage	10.4	12.3	13.6
Other retail	3.1	3.7	4.1
Health	0.3	0.4	0.4
Transportation	3.6	4.2	4.7
Communication	0.1	0.1	0.1
Recreation Services/Other Services	12.0	14.1	15.6
Education	0.2	0.2	0.2
Miscellaneous	0.4	0.5	0.5
<b>Total</b>	<b>30.1</b>	<b>35.5</b>	<b>39.3</b>
<b>Overnight Visitors</b>			
Accommodation	25.1	34.2	39.2
Food & Beverage	18.7	25.4	29.0
Other retail	5.0	6.7	7.7
Health	0.6	0.7	0.8
Transportation	6.2	8.4	9.6
Communication	0.2	0.3	0.3
Recreation Services/Other Services	13.4	18.1	20.8
Education	0.3	0.4	0.5
Miscellaneous	0.8	1.1	1.2
<b>Total</b>	<b>70.4</b>	<b>95.2</b>	<b>109.1</b>
<b>Total All Jobs</b>			
Accommodation	25.1	34.2	39.2
Food & Beverage	29.1	37.7	42.7
Other Retail	8.1	10.4	11.8
Health	0.9	1.1	1.2
Transportation	9.8	12.6	14.2
Communication	0.3	0.4	0.4
Recreation Services/Other Services	25.3	32.2	36.4
Education	0.5	0.6	0.7
Miscellaneous	1.2	1.6	1.7
<b>Total</b>	<b>100.5</b>	<b>130.7</b>	<b>148.4</b>

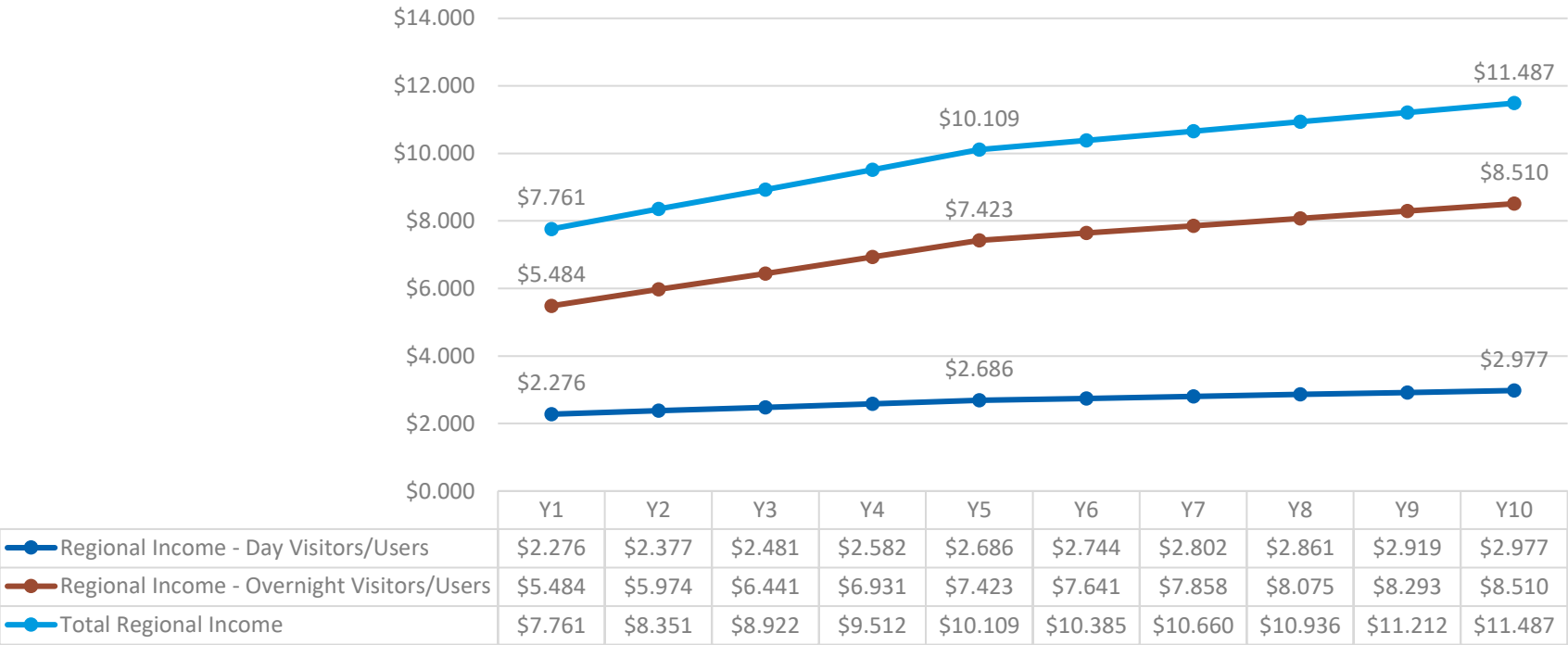
SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

# 1.1 Regional Income Impacts

The increase in regional income (in constant 2021 prices) generated annually by the operation of the trails and visitor/user spending totals \$6.4 million in year 1, increasing to \$9.4 million in year 10.<sup>78</sup>

The increase in income (direct and indirect/induced) generated by day visitors/users (including locals and other users) is \$2.3 million in year 1 and \$2.9 million in year 10. Overnight users/visitors boost total regional income by \$4.1 million in year 1 and \$6.4 million in 2031.

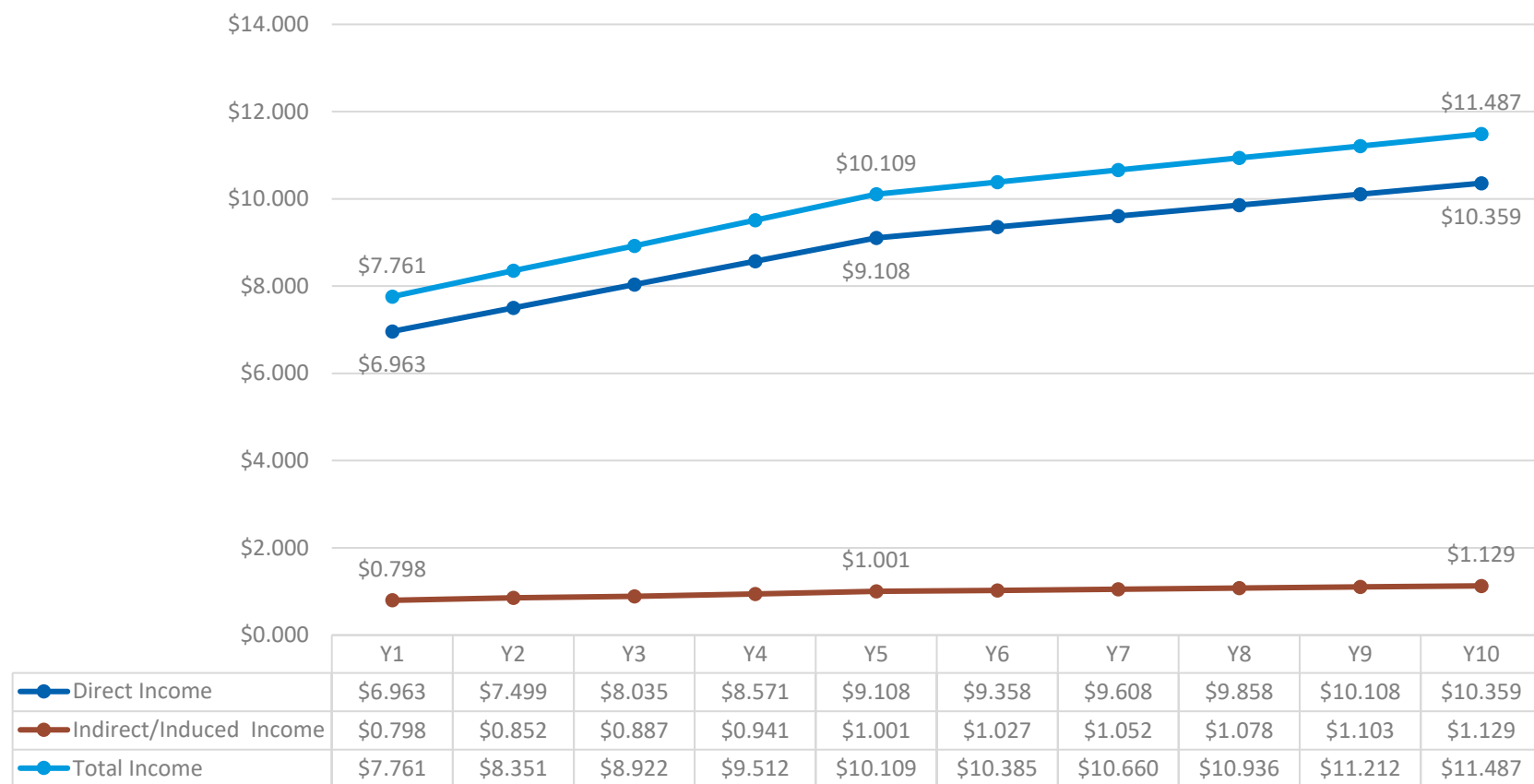
**Figure 42.** Case 3 No Drop A K Trail Regional Income Generated (\$million 2021 prices)



SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

<sup>78</sup> Regional income is the total net income generated from the activity and covers wages and salaries of employees and profits of businesses within the region. It includes income generated directly within the business and indirect income, which is generated in other regional businesses (wages and profits) from the multiplier impacts of employee spending on the region. In the modelling of income generated income tax and GST on spending, are both treated as leakages from the region.

**Figure 43.** Case 3 No Drop A K Trail – Regional Income Generated (\$million 2021 prices)



SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Table 47.** Case 3 No Drop A K Regional Income Generated (\$million 2021 prices)

Case 3 Regional Income\$ million (2021 prices)	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total 10 Years
<b>Day Visitors</b>											
Direct Income	\$2.013	\$2.104	\$2.194	\$2.284	\$2.374	\$2.426	\$2.479	\$2.531	\$2.583	\$2.635	\$23.622
Indirect/Induced	\$0.263	\$0.274	\$0.287	\$0.298	\$0.312	\$0.318	\$0.324	\$0.330	\$0.336	\$0.342	\$3.083
<b>Total Income</b>	<b>\$2.276</b>	<b>\$2.377</b>	<b>\$2.481</b>	<b>\$2.582</b>	<b>\$2.686</b>	<b>\$2.744</b>	<b>\$2.802</b>	<b>\$2.861</b>	<b>\$2.919</b>	<b>\$2.977</b>	<b>\$26.706</b>
<b>Overnight Visitors</b>											
Direct Income	\$4.950	\$5.396	\$5.842	\$6.288	\$6.734	\$6.932	\$7.129	\$7.327	\$7.525	\$7.723	\$65.845
Indirect/Induced	\$0.535	\$0.578	\$0.599	\$0.643	\$0.690	\$0.709	\$0.728	\$0.748	\$0.767	\$0.786	\$6.784
<b>Total Income</b>	<b>\$5.484</b>	<b>\$5.974</b>	<b>\$6.441</b>	<b>\$6.931</b>	<b>\$7.423</b>	<b>\$7.641</b>	<b>\$7.858</b>	<b>\$8.075</b>	<b>\$8.293</b>	<b>\$8.510</b>	<b>\$72.629</b>
<b>Total Visitors</b>											
Direct Income	\$6.963	\$7.499	\$8.035	\$8.571	\$9.108	\$9.358	\$9.608	\$9.858	\$10.108	\$10.359	\$89.468
Indirect/Induced	\$0.798	\$0.852	\$0.887	\$0.941	\$1.001	\$1.027	\$1.052	\$1.078	\$1.103	\$1.129	\$9.867
<b>Total Income</b>	<b>\$7.761</b>	<b>\$8.351</b>	<b>\$8.922</b>	<b>\$9.512</b>	<b>\$10.109</b>	<b>\$10.385</b>	<b>\$10.660</b>	<b>\$10.936</b>	<b>\$11.212</b>	<b>\$11.487</b>	<b>\$99.335</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

Over 10 years all trail users boosted regional income by \$99.335 million .

**Table 48.** Case 3 No Drop A K Trail Regional Income Generated 10 Years (\$million 2021 prices)

Case 2 Regional Income Total 10 Years	Day Visitors/Users \$m	Overnight Visitors/Users \$m	Total Visitors/Users \$m
Direct Income	\$23.622	\$65.845	\$89.468
Indirect/Induced Income	\$3.083	\$6.784	\$9.867
<b>Total Income</b>	<b>\$26.706</b>	<b>\$72.629</b>	<b>\$99.335</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.



## 1.2 Cost Benefit Analysis Case 3 No Drop A K Trail

The benefits and costs of the Warburton MTB Trails are analysed for a 10-year period.

### 13.2.1 Trail Costs 10 Years

The estimated construction cost of the trails is \$17.1 million (Stage 1 & 2), and 10-year maintenance costs are \$4.8 million for a total 10-year cost of \$21.9 million (see Appendix D).

#### Increase in Regional Income

The increase in regional income generated by trail users spending over a 10-year period totals \$81.360 million (in constant \$2021 prices).

**Table 49.** Case 3 No Drop A K Trail Regional Income Generated by Trail Users (\$million 2021 prices)

Case 2 Regional Income	Day Visitors/Users	Overnight Visitors/Users	Total Visitors/Users
Total 10 Years	\$m	\$m	\$m
Direct Income	\$23.622	\$65.845	\$89.468
Indirect/Induced Income	\$3.083	\$6.784	\$9.867
<b>Total Regional Income</b>	<b>\$26.706</b>	<b>\$72.629</b>	<b>\$99.335</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

#### Health Benefits

A report by Marsden Jacobs Associates indicates that exercise of cycling/active walking in Victorian Parks has net healthcare benefits (in terms of avoided health costs) of \$15 per hour in terms of a reduction in lifetime health costs (adjusted for injury).<sup>79</sup>

Healthcare benefits are measured as the net (adjusted for injury) avoided costs to the national healthcare system (private costs and government costs) attributable to nature-based outdoor activity.

- For the analysis of these trails, we have assumed an average cycle period of 2.5 hours for beginners & novices (and average of \$10 per hour) and 4 hours for advanced and experts. Health benefits are measured for Victorian users only (i.e., residents of Yarra Ranges LGA, Melbourne Metro area and regional Victoria).
- This indirect health benefit is estimated at \$42.1 million (in constant prices \$2021) over the 10-year period or an average of \$4.2 million per year.

<sup>79</sup> Victoria's Nature-Based Outdoor Economy- Key Estimates and Recommendations, Marsden Jacobs Associates, January 2016 P10 & 21.

**Table 50.** Case 3 No Drop A K Health Benefit Estimates (\$million 2021 prices)

Case 3	Health Benefits Valuation	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total 10 Years
Ave hours	\$ million 2020 prices											
2.5	Beginner	\$0.603	\$0.648	\$0.692	\$0.737	\$0.781	\$0.804	\$0.826	\$0.848	\$0.870	\$0.892	\$7.701
2.5	Novice	\$0.850	\$0.906	\$0.962	\$1.019	\$1.075	\$1.104	\$1.134	\$1.163	\$1.192	\$1.222	\$10.626
4	Intermediate	\$1.632	\$1.713	\$1.794	\$1.875	\$1.956	\$1.995	\$2.033	\$2.071	\$2.110	\$2.148	\$19.327
4	Advance & Expert	\$0.480	\$0.501	\$0.523	\$0.545	\$0.566	\$0.577	\$0.588	\$0.599	\$0.610	\$0.620	\$5.609
	<b>Total All</b>	<b>\$3.564</b>	<b>\$3.768</b>	<b>\$3.972</b>	<b>\$4.175</b>	<b>\$4.379</b>	<b>\$4.480</b>	<b>\$4.580</b>	<b>\$4.681</b>	<b>\$4.782</b>	<b>\$4.882</b>	<b>\$43.263</b>
4	Interstate & Internationals	\$0.406	\$0.525	\$0.644	\$0.762	\$0.881	\$0.922	\$0.962	\$1.003	\$1.044	\$1.085	\$8.234
	<b>Total less interstate &amp; internationals</b>	<b>\$3.158</b>	<b>\$3.243</b>	<b>\$3.328</b>	<b>\$3.413</b>	<b>\$3.498</b>	<b>\$3.558</b>	<b>\$3.618</b>	<b>\$3.678</b>	<b>\$3.738</b>	<b>\$3.798</b>	<b>\$35.029</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## Consumer/User Valuation

In the modelling we have assumed that there are no charges for the use of the trail. However, a valuation can be placed on the experience based on a shadow price or notional charge (what a person may be willing to pay). For the trail we have assumed it to be \$15 per trail ride. This benefit measure totals \$22.1 million (constant prices \$2021) over 10 years for all trail users or an average of \$2.2 million per year.

**Table 51.** Case 3 No Drop A K Trail Consumer Value Estimates (\$million 2021 prices)

Case 3 Consumer Value \$ million 2020 prices	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total 10 Years
Beginner	\$0.362	\$0.389	\$0.415	\$0.442	\$0.469	\$0.482	\$0.495	\$0.509	\$0.522	\$0.535	\$4.621
Novice	\$0.510	\$0.544	\$0.577	\$0.611	\$0.645	\$0.663	\$0.680	\$0.698	\$0.715	\$0.733	\$6.376
Intermediate	\$0.612	\$0.642	\$0.673	\$0.703	\$0.734	\$0.748	\$0.762	\$0.777	\$0.791	\$0.806	\$7.248
Advance & Expert	\$0.180	\$0.188	\$0.196	\$0.204	\$0.212	\$0.216	\$0.220	\$0.225	\$0.229	\$0.233	\$2.103
<b>Total All</b>	<b>\$1.664</b>	<b>\$1.763</b>	<b>\$1.862</b>	<b>\$1.961</b>	<b>\$2.060</b>	<b>\$2.109</b>	<b>\$2.158</b>	<b>\$2.208</b>	<b>\$2.257</b>	<b>\$2.307</b>	<b>\$20.347</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## 13.2.2 Cost Benefit Analysis

### All Benefits

The following table and chart show the benefits and costs of the operations of the trails over a 10-year period. The benefits are measured by:

- the increase in regional income generated by trail users over a 10-year period
- the estimated health benefits
- the user value.

The costs include:

- design and planning
- construction costs
- asset maintenance costs.

For the comparison, the present value of the benefits is calculated using 3 discount rates (4%, 7% and 10%).

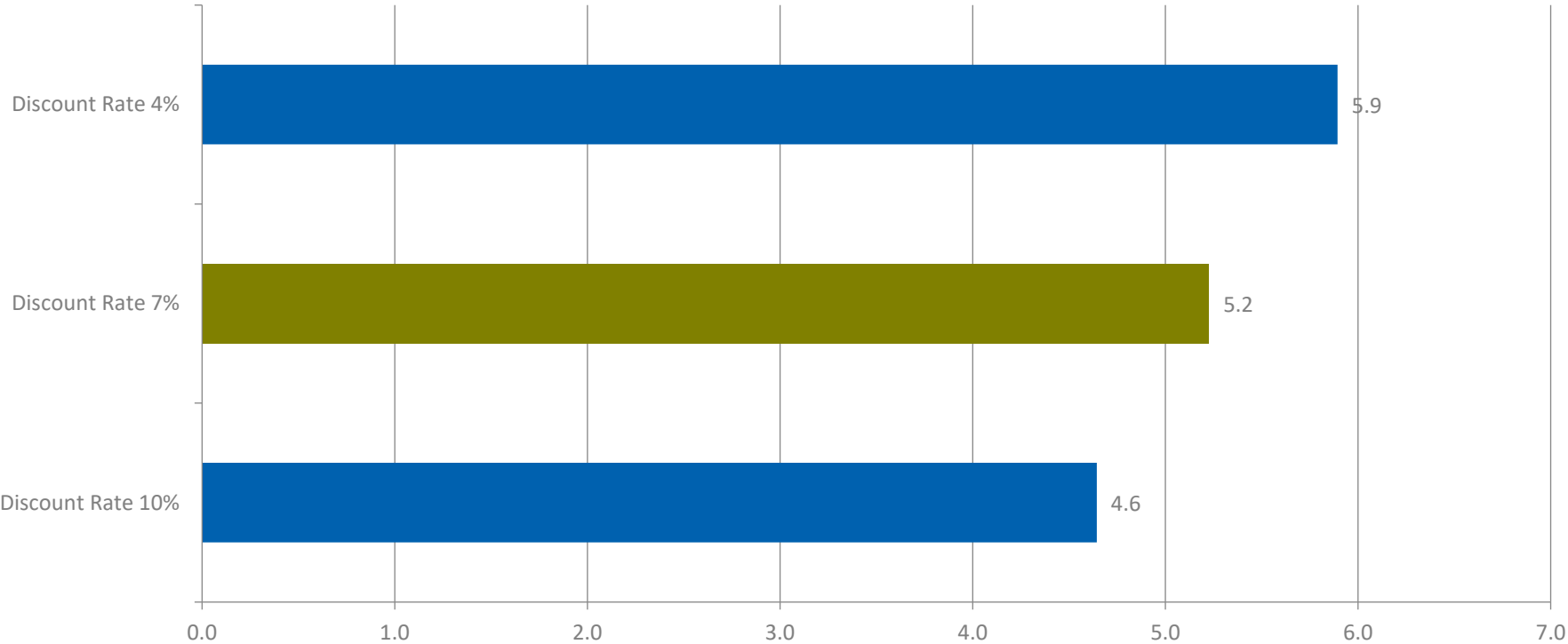
**Table 52.** Case 3 No Drop A K Trail Benefits and Cost Analysis 10 Years (Constant 202 prices)

Case 3 No Drop A K Trail Total Project	Discount Rate	Discount Rate	Discount Rate
Regional Cost Benefit (\$2021 prices) Period : 10Years	4%	7%	10%
<b>Trail Extension</b>			
Design, Development and Planning Costs	\$2,000,000	\$2,000,000	\$2,000,000
Capital Costs Trails & Infrastructure 2020 (\$)	\$17,090,000	\$17,090,000	\$17,090,000
Costs - Maintenance (10 years)	\$4,797,500	\$4,797,500	\$4,797,500
<b>Total Costs</b>	<b>\$21,887,500</b>	<b>\$21,887,500</b>	<b>\$21,887,500</b>
<b>Benefits (users) (10 years)</b>			
Regional Income Increase	\$99,334,711	\$99,334,711	\$99,334,711
Health Benefits (Vic Users)	<b>\$35,028,607</b>	<b>\$35,028,607</b>	<b>\$35,028,607</b>
User Value (shadow user price)	\$20,347,339	\$20,347,339	\$20,347,339
<b>Total Benefits</b>	<b>\$154,710,656</b>	<b>\$154,710,656</b>	<b>\$154,710,656</b>
<b>Total Benefits (\$) Present Value</b>	<b>\$128,985,934</b>	\$114,397,967	<b>\$101,635,957</b>
Net Present Value (\$) Total Benefits	\$107,098,434	\$92,510,467	\$79,748,457
<b>Benefit Cost Ratio (BCR – All Benefits)</b>	<b>5.9</b>	<b>5.2</b>	<b>4.6</b>
NPV/Cost	4.9	4.2	3.6
<b>Regional Income Only</b>			
<b>Regional Income Only (PV)</b>	<b>\$82,670,806</b>	\$72,926,567	<b>\$64,956,741</b>
<b>BCR (Regional Income only)</b>	<b>3.8</b>	<b>3.3</b>	<b>3.0</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. NOTE: DIRECT BENEFITS ARE THE VALUE TO USERS OF A FACILITY; USUALLY THIS IS MEASURE BY USER PAYMENTS/FEES. IN THIS CASE THERE ARE NO USER CHARGES FOR THE TRAIL AND A SHADOW PRICE HAS BEEN APPLIED (\$15 PER RIDE) AS A MEASURE OF USER VALUE. THEREFORE, BENEFITS ARE THE INCREASE IN REGIONAL INCOME GENERATED BY VISITOR SPENDING, THE HEALTH BENEFITS OF EXERCISE ACTIVITY AND THE USER VALUE.

The chart below compares Benefit Cost Ratios (BCR) for the 3 discount rates (for all trail benefits). For a trail project a 7% discount rate is appropriate, and the project yields a positive BCR of 5.2. The present value of total benefits generated by the investment are 5.2 times the total costs of the project over a 10-year period. If only the direct regional benefit of increase in regional income is included, the BCR is 3.3 (for a 7% discount rate).

**Figure 44.** Case 3 No Drop A K Benefit Cost Analysis (BCR) (all benefits)



SOURCE: MCA MODELLING & ESTIMATES, JULY 2021

# 14 Conclusion

## 14.1 Insights

### 14.1.1 Participation

- Top reasons for undertaking MTB experience are for - Health and fitness, being outside in the open air, sightseeing, relaxation, recreation and socialization.
- It is estimated that 1 million people currently participate in mountain biking. Actual likelihood to participate in mountain biking during a holiday experience grows to 6 million Australian adults.
- Membership to mountain bike clubs and MTBA has continued to grow year after year, covering youth and adults from beginner to competition riders.
- The school and event markets are potential areas of growth for Victoria, who rates behind several other states who have higher representation in these sectors.
- Majority of MTB participants are either beginners (13%) older riders looking to undertake a new experience; and intermediate riders (19%) who are undertake recreational activities together with their families.
- 60% of Australians participate in cycling activities at least once per week
- 56% of Australians have at least one bicycle at home in working order
- Cycling is in the Top 5 most popular sports undertaken by Australians
- Victorians have the highest level of cycling participation, accounting for 28.7% of all Australian cyclists
- High value – 20% of cycling participants have an income of over \$200,000 per annum.

### 14.1.2 Health and wellbeing impacts

- Mountain biking trails with national parks and natural spaces can facilitate the delivering of commitments within the Parks Victoria Healthy Parks Healthy People Framework 2020, Protecting Victoria's Environment: Biodiversity 2037 and Victorian Health and Wellbeing Plan 2019-23.
- Cycling is proven to have substantial benefits on physical and mental health and wellbeing, reducing professional medical expense and interventions.

### 14.1.3 Environmental benefits

- Cycling supports green transport initiatives and safer off-road options.
- Mountain biking has a relatively low environmental impact. Well-designed trails prevent off trail riding and unsanctioned trail development.
- MTB trails provide opportunities for people to connect with and appreciate nature, resulting in increased awareness and advocacy for protection of our natural spaces.
- Experiences in nature are highly desirable, demonstrated by the increase in intended conversion when an MTB experience within a national park and the value-add of a park ranger talk were offered.
- International and national Code of Conducts exist for mountain bikers, incorporating the importance of environmental respect and Leave No Trace principles.
- There are a range of technologies available to monitor the impact of riders on trails.

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#### 14.1.4 Economic benefits

- Participation affordability
- Reduced transport costs through Green Transport initiatives
- Improved property prices and liveability benefits
- Flow on benefits for local people and communities offering support services as trail towns and trail hubs.
- Events are also an opportunity to draw awareness and attract increased participation on MTB trails
- Nature based tourism and experiences within national parks are proven to increase visitation and economic benefits for protected area management and local communities.
- COVID-19 is demonstrating strong uptake in outdoor recreational activities, with huge growth in Australia and globally in bicycle purchase and participation in cycling.

National Parks and protected areas are committed to providing sustainable trail experiences, evidenced by substantial funding commitments both in the past and on the horizon in MTB trails.

The economic benefits of the full development of the planned Warburton MTB project outweigh the benefits of the reduced project.

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## REFERENCES

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## APPENDIX A MODELLING AND SPENDING ASSUMPTIONS

### MODELLING ASSUMPTIONS

**Table 53.** Trail Use Modelling Assumptions

Modelling	Description	Source
Population Data	Population projections by LGA 2021 to 2031. Note 2021 estimates are assumed to apply for year 1, when Stage 1 trail becomes operational.	Victoria in Future 2019 (VIF2019) projections by LGA, June 2019
Mountain Bike Participants	Estimate for LGAs based on 1.4% participation rate for year 2. (AusPlay Survey 2019) Assumed increase to 1.5% 2026; and 1.7% in year 10.	Participation rate: 1.4% AusPlay Survey Results January 2019 - December 2019. Released 30 April 2020 (and re-issued 24 June 2020) Assumed increases with MTB becoming more popular as a sport/recreation activity.
Participant Types	<b>Categories</b> <ul style="list-style-type: none"> <li>• Beginner</li> <li>• Novice</li> <li>• Intermediate</li> <li>• Advance &amp; Expert</li> </ul> Shares applied to all regional groupings to provide estimates of number of riders by type. <b>(See Table A.2 )</b>	Based on I & R survey data Report Page 16
Catchment Areas for Trails	Based on clustering of LGAs into regions	Clusters based on LGA locations
Interstate /internationals/other regional/intrastate	Numbers are assumed and increase over time	MCa assumptions
Likelihood of visiting the trails	% of MTB participants that would visit the Warburton Trails. <ul style="list-style-type: none"> <li>• Differences in assumptions for regions are based on proximity.</li> <li>• Likelihood of visiting trails increases as trails network is extended.</li> </ul> <b>(see Table A.3)</b>	MCa assumptions
Number of uses of trails per year (Ave rides per year)	Assumptions based on proximity to trails. Adjacent areas and eastern metropolitan areas would have more average rides. Average annual rides are assumed for each local government area/cluster.	MCa assumptions

Modelling	Description	Source
Interstate /internationals/other regionals. Intrastate (Ave rides per visit = 2)	Assumes they are mainly overnight visitors (80%) and use trails over 2 days = average 2 rides during stay.	MCA assumptions
International visitors	Covid-19 limitations on international visitors in 2022. Assumes zero in year 1; increasing to 6000 in 2026; and 8000 in year 10.	MCA assumptions
Spending in Region	Base on average spending rates (see Table A.4)	

SOURCE: MCA MODELLING ASSUMPTIONS, JULY 2021

The assumptions users in modelling Case 2: Reduced Trails Network are in Table A.5.

**Table 54.** Trail User Categories

Experience Level	Total (n=702) 100%	Melbourne (n=302) 43%	Rest of Vic (n=100) 14%	Sydney (n=200) 28%	New Zealand (n=100) 14%
Beginner	23%	22%	23%	23%	25%
Novice	30%	33%	33%	30%	27%
Intermediate	36%	36%	34%	35%	39%
Advanced & Expert	11%	10%	10%	13%	9%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

SOURCE: WARBURTON MTB TRAIL ADDITIONAL RESEARCH -QUANTITATIVE FINDINGS, INSTINCT AND REASON, MAY 2021

**Table 55.** Trail Use Assumptions Base Case – Likely to Visit and Type of Visit

Regions	Visit Trails			Type of Visit	
	Likely Visit	Likely Visit	Likely Visit	Overnight visit	Day Visit
	Year 1	Year 5	Year 10		
<b>Local -Yarra Ranges</b>					
Beginner	75%	80%	90%	0%	100%
Novice	75%	80%	90%	0%	100%
Intermediate	75%	80%	90%	0%	100%
Advance & Expert	75%	80%	90%	0%	100%
<b>Adjacent Regional</b>					
Beginner	60%	60 %	60 %	20%	80%
Novice	60%	60 %	60 %	20%	80%
Intermediate	60%	60 %	60 %	20%	80%
Advance & Expert	60%	60 %	60 %	20%	80%
<b>Adjacent Urban</b>					
Beginner	50%	55 %	60 %	20%	80%
Novice	50%	55 %	60 %	20%	80%
Intermediate	50%	55 %	60 %	20%	80%
Advance & Expert	50%	55 %	60 %	20%	80%
<b>Eastern Suburbs</b>					
Beginner	50%	.55 %	55 %	30%	70%
Novice	50%	.55 %	55 %	30%	70%
Intermediate	50%	.55 %	55 %	30%	70%
Advance & Expert	50%	.55 %	55 %	30%	70%
<b>Northern Suburbs</b>					
Beginner	40%	45 %	45 %	30%	70%
Novice	40%	45 %	45 %	30%	70%
Intermediate	40%	45 %	45 %	30%	70%
Advance & Expert	40%	45 %	45 %	30%	70%
<b>Other - West</b>	20%	25%	25 %	40%	60%
Beginner	20%	25%	25 %	40%	60%
Novice	20%	25%	25 %	40%	60%
Intermediate	20%	25%	25 %	40%	60%
Advance & Expert	20%	25%	25 %	40%	60%
<b>South East</b>					

Regions	Visit Trails			Type of Visit	
	Likely Visit	Likely Visit	Likely Visit	Overnight visit	Day Visit
	Year 1	Year 5	Year 10		
Beginner	30%	30%	40%	30%	70%
Novice	30%	30%	40%	30%	70%
Intermediate	30%	30%	40%	30%	70%
Advance & Expert	30%	30%	40%	30%	70%
<b>Other Regional/Intrastate</b>					
Beginner	100%	100%	100%	80%	20%
Novice	100%	100%	100%	80%	20%
Intermediate	100%	100%	100%	80%	20%
Advance & Expert	100%	100%	100%	80%	20%
<b>Interstate</b>					
Beginner	100%	100%	100%	80%	20%
Novice	100%	100%	100%	80%	20%
Intermediate	100%	100%	100%	80%	20%
Advance & Expert	100%	100%	100%	80%	20%
<b>Internationals</b>					
Beginner	100%	100%	100%	80%	20%
Novice	100%	100%	100%	80%	20%
Intermediate	100%	100%	100%	80%	20%
Advance & Expert	100%	100%	100%	80%	20%

SOURCE: MCA MODELLING ASSUMPTIONS, JULY 2021

## SPENDING ASSUMPTIONS

Assumptions are based on a combination of TRA 2019 data for Yarra Ranges Shire and experience with other MTB trail networks.

- Overnight spend: \$167 (TRA data average spend); \$217 is a simple average of \$167 average spend for domestic overnight visitors and spend per night commercial accommodation (\$245). Intermediates and advance & expert spend more on average
- Assumed that intermediates and advance & expert riders stay an average of 3 nights and beginners and novices an average of 2 nights.

**Table 56.** Spending Assumptions

			Case 1 : Base Case	Case 2: Reduce Trails Network	Case 3 : No Drop A K Trail
Modelling Assumptions	Day	Overnight	Duration Stay - Overnights	Duration Stay - Overnights	Duration Stay - Overnights
Spending	Ave Spend	Ave Spend	Ave Nights	Ave Nights	Ave Nights
<b>Yarra Ranges (\$)</b>					
Beginner	\$30	\$167	na	na	na
Novice	\$30	\$167	na	na	na
Intermediate	\$50	\$217	na	na	na
Advance & Expert	\$50	\$217	na	na	na
<b>Adjacent Urban</b>					
Beginner	\$88	\$167	2	1.5	1.5
Novice	\$88	\$167	2	1.5	1.5
Intermediate	\$120	\$217	3	2.5	2.5
Advance & Expert	\$120	\$217	3	2.5	2.5
<b>Eastern Suburbs</b>					
Beginner	\$88	\$167	2	1.5	1.5
Novice	\$88	\$167	2	1.5	1.5
Intermediate	\$120	\$217	3	2.5	2.5
Advance & Expert	\$120	\$217	3	2.5	2.5
<b>Northern Suburbs</b>					
Beginner	\$88	\$167	2	1.5	1.5
Novice	\$88	\$167	2	1.5	1.5
Intermediate	\$120	\$217	3	2.5	2.5
Advance & Expert	\$120	\$217	3	2.5	2.5
<b>Other - including West</b>					
Beginner	\$88	\$167	2	1.5	1.5
Novice	\$88	\$167	2	1.5	1.5
Intermediate	\$120	\$217	3	2.5	2.5
Advance & Expert	\$120	\$217	3	2.5	2.5

			Case 1 : Base Case	Case 2: Reduce Trails Network	Case 3 : No Drop A K Trail
Modelling Assumptions	Day	Overnight	Duration Stay - Overnights	Duration Stay - Overnights	Duration Stay - Overnights
Spending	Ave Spend	Ave Spend	Ave Nights	Ave Nights	Ave Nights
<b>South East</b>					
Beginner	\$88	\$167	2	1.5	1.5
Novice	\$88	\$167	2	1.5	1.5
Intermediate	\$120	\$217	3	2.5	2.5
Advance & Expert	\$120	\$217	3	2.5	2.5
<b>Adjacent Regional</b>					
Beginner	\$50	\$167	2	1.5	1.5
Novice	\$50	\$167	2	1.5	1.5
Intermediate	\$88	\$217	3	2.5	2.5
Advance & Expert	\$88	\$217	3	2.5	2.5
<b>Other Regional</b>					
Beginner	\$88	\$167	2	1.5	1.5
Novice	\$88	\$167	2	1.5	1.5
Intermediate	\$120	\$217	3	2.5	2.5
Advance & Expert	\$120	\$217	3	2.5	2.5
<b>Interstate</b>					
Beginner	\$88	\$167	2	1.5	1.5
Novice	\$88	\$167	2	1.5	1.5
Intermediate	\$120	\$217	3	2.5	2.5
Advance & Expert	\$120	\$217	3	2.5	2.5
<b>Internationals</b>					
Beginner	\$88	\$167	2	1.5	1.5
Novice	\$88	\$167	2	1.5	1.5
Intermediate	\$120	\$217	3	2.5	2.5
Advance & Expert	\$120	\$217	3	2.5	2.5

SOURCE: MCA MODELLING ASSUMPTIONS, JULY 2021 & TRA SPENDING DATA

## Case 2 Reduced Trail Network – Modelling Assumptions

The reduced trails network (no national park trails and drop) would result in lower levels of trail use by visitors from outside the region (mainly by the more experienced riders).

For estimating the impacts of these changes in the trails network, the following changes were made for the Case 2 modelling. These were based on the findings of the instinct and reason surveys (December 2020 & May 2021) in relation to impacts of removing all National Park Trails .

These changes would lead to a reduction in visits for the experienced categories of riders, a slower growth in user numbers and reductions in length of overnight stays. The changes in the modelling assumptions used are outlined in the following table.

**Table 57.** Case 2 Reduced Trail Network Assumptions

Case 2: Reduced Trails Network – No National Park Trails		
Changes to Modelling Assumptions	Adjustment	
MTB Participation rate	Held at 2019 population average of participation rate of 1.4% In base case the rate was increased to 2026 1.5%; and 2031 1.7% .	MCa assumption
Likely to visit Warburton Trails	Visit rate (%) held at year 1 level in year 5 and year 10 for Intermediate and Advance & Expert categories	MCa assumption
Yarra Ranges Locals	No change in users due to proximity to trails	
Reduction in Trail User Visits	Covers: metro, regional, intrastate and internationals (Reductions on Base Case)	
Beginner	Reduce trail user numbers by 8%	Composite: I and R survey findings May 2021 & I and R survey findings December 2020 <sup>80</sup>
Novice	Reduce trail user numbers by 21%	
Intermediate	Reduce trail user numbers by 33.5%	
Advance & Expert	Reduce trail user numbers by 21.5%	
Overnight Stays (Ave)	Reductions on Base Case	
Beginner	Reduce from 2 nights to 1.5 nights stay	MCa assumptions
Novice	Reduce from 2 nights to 1.5 nights stay	
Intermediate	Reduce from 3 nights to 2.5 nights stay	
Advance & Expert	Reduce from 3 nights to 2.5 nights stay	

SOURCE: MCA MODELLING, JULY 2021

<sup>80</sup> Warburton MTB trail research - quantitative findings, instinct and reason, December 2020 ; Warburton MTB trail additional research -quantitative findings, instinct and reason, May 2021  
[Developing Warburton as a World Class Mountain Bike Destination, and Economic Feasibility Study](#) | Three Case Economic Impact Assessment – Spend Assumption 1 (TRA)



### Case 3 No Drop A K Modelling Assumptions

The removal of the Drop A K Trail would result in lower levels of trail use by visitors from outside the region (with reductions in all user categories, particularly Novices and Intermediates). For estimating the impacts of these changes in the trails network, the following changes were made for the Case 3 modelling. These were based on the findings of the *instinct and reason* survey (May 2021) in relation to impacts of removing National Park Trails. Compared with the Base Case projections, these changes would lead to a reduction in visits in all rider categories, a slower growth in user numbers and likely reductions in average length of overnight stays in the region. The changes in the modelling assumptions used are outlined in the following table.

**Table 58.** Case 3 No Drop A Trail Assumptions

Case 3 : No Drop A K Trail		
Changes to Modelling Assumptions	Adjustment	
MTB Participation rate	Held at 2019 population average of participation rate of 1.4% In base case the rate was increased to 2026 1.5%; and 2031 1.7% .	MCa assumption
Likely to visit Warburton Trails	Visit rate (%) held at year 1 level in year 5 and year 10 for Intermediate and Advance & Expert categories	MCa assumption
Yarra Ranges Locals	No change in users due to proximity to trails	
<b>Reduction in Trail User Visits</b>	<b>Covers: metro, regional , intrastate and internationals (Reductions on Base Case)</b>	
Beginner	Reduce trail user numbers by 8%	I and R survey findings May 2021 <sup>81</sup>
Novice	Reduce trail user numbers by 13%	
Intermediate	Reduce trail user numbers by 20%	
Advance & Expert	Reduce trail user numbers by 8%	
<b>Overnight Stays</b>	<b>Reductions on Base Case</b>	
Beginner	Reduce from 2 nights to 1.5 nights stay	MCa assumptions
Novice	Reduce from 2 nights to 1.5 nights stay	
Intermediate	Reduce from 3 nights to 2.5 nights stay	
Advance & Expert	Reduce from 3 nights to 2.5 nights stay	

SOURCE: MCA MODELLING, JULY 2021

<sup>81</sup> Warburton MTB trail additional research -quantitative findings, instinct and reason, May 2021

## APPENDIX B - EVENT ANALYSIS

The follow shows the modelling of major events and associated spending in the region. It is assumed that events held are: 1 event is held in year 2; 2 in year 3; 4 in years 4-5; and 6 events in years 7-10. All are assumed to attract 300 participants and additional spectators/accompanying persons of 2 per participant. Total spending by participants and spectators/accompanying persons increases from \$777,600 in year 2 to \$2.333 million from year 7 onwards.<sup>82</sup>

**Table 59.** Assumptions Used in Modelling Events

Event Modelling	Assumptions
<b>Events &amp; Participants</b>	<b>All Events are 3 days</b>
Number of Events (per year)	Year 1 = 0; Year 2=2; Years 4-5=4 ; Years 6-10 =6 All 3 -day events
Number of participants	Ave. 300 per event
Accompanying Persons/Spectators	Average 2 per participant
<b>Visitor types</b>	
Day Visitors	20%
Overnight visitors	80% Stay = 3 nights; assume twin share
<b>Spending</b>	
Day visitors (average per person)	\$120 per day (constant prices \$2020)
Overnight Visitors (average per person)	\$300 per day (constant prices \$2020)

SOURCE: MCA MODELLING & ESTIMATES, SEPT 2020

**Table 60.** Spending in Region from Trails Events Years 1 to 10 (estimates)

Events	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<b>10 Year Analysis</b>										
<b>No. Events</b>	0	2	4	4	4	6	6	6	6	6
<b>Participants</b>										
Participants per event		300	300	300	300	300	300	300	300	300
<b>Total participants</b>	0	600	1200	1200	1200	1800	1800	1800	1800	1800
<b>Accompanying persons</b> (Ave 2 per participant)	0	1200	2400	2400	2400	3600	3600	3600	3600	3600
<b>Total Participants &amp; Accompanying Persons</b>	<b>0</b>	<b>1800</b>	<b>3600</b>	<b>3600</b>	<b>3600</b>	<b>5400</b>	<b>5400</b>	<b>5400</b>	<b>5400</b>	<b>5400</b>
<b>Visitor Types</b>										
Day visitors (20%)	0	360	720	720	720	1080	1080	1080	1080	1080
Overnight visitors (80%)	0	1440	2880	2880	2880	4320	4320	4320	4320	4320
Stay overnight (3 nights)	<b>0</b>	<b>4320</b>	<b>8640</b>	<b>8640</b>	<b>8640</b>	<b>12960</b>	<b>12960</b>	<b>12960</b>	<b>12960</b>	<b>12960</b>
Room nights	<b>0</b>	<b>2160</b>	<b>4320</b>	<b>4320</b>	<b>4320</b>	<b>6480</b>	<b>6480</b>	<b>6480</b>	<b>6480</b>	<b>6480</b>

<sup>82</sup> Spending is in constant prices - 2020 dollars

Events	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<b>10 Year Analysis</b>										
(Assume Twin Share)										
<b>Spending in Region (\$ 2021 prices)</b>										
<b>Day Visitors</b>	\$0	\$129,600	\$259,200	\$259,200	\$259,200	\$388,800	\$388,800	\$388,800	\$388,800	\$388,800
<b>Overnight visitors</b>	\$0	\$648,000	\$1,296,000	\$1,296,000	\$1,296,000	\$1,944,000	\$1,944,000	\$1,944,000	\$1,944,000	\$1,944,000
<b>Total Spending</b>	<b>\$0</b>	<b>\$777,600</b>	<b>\$1,555,200</b>	<b>\$1,555,200</b>	<b>\$1,555,200</b>	<b>\$2,332,800</b>	<b>\$2,332,800</b>	<b>\$2,332,800</b>	<b>\$2,332,800</b>	<b>\$2,332,800</b>

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021

The jobs generated increase from 5.9 FTE (2 events) to 13.6 FTE (6 events) as the number of events are increased. By their nature events are made of a larger number of short term and casual jobs which aggregate to the annual full time equivalent jobs. One of the advantages of events is that they put the trail network on the map for intermediate and advanced & expert users.

**Table 61.** Total Jobs Generated by Events (FTE Number)

Jobs Generate by Events	Year 1	Year 2	Year 3-5	Year 6-10
<b>Events</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>6</b>
Accommodation	0.0	1.6	3.1	4.6
Food & Beverage	0.0	1.6	3.0	4.4
Other Retail	0.0	0.6	0.7	1.0
Health	0.0	0.2	0.2	0.2
Transportation	0.0	0.3	0.3	0.4
Communication	0.0	0	0.0	0.0
Recreation Services/Other Services	0.0	1.1	1.8	2.6
Education	0.0	0.1	0.1	0.1
Miscellaneous Services	0.0	0.2	0.2	0.3
<b>Total</b>	<b>0.0</b>	<b>5.9</b>	<b>9.3</b>	<b>13.6</b>

SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## APPENDIX C – CATCHMENT AREA REGIONS

The following table shows the LGAs that are included in each of the catchment areas.

**Table 62.** LGAs in catchment areas

Region	LGAs
<b>Local - Yarra Ranges</b>	Yarra Ranges (S)
<b>Adjacent Regional</b>	Baw Baw (S) Mansfield (S) Murrindindi (S)
<b>Adjacent Urban</b>	Cardinia (S) Casey (C) Knox (C) Maroondah (C) Nillumbik (S)
<b>Eastern Suburbs</b>	Boroondara (C) Manningham (C) Monash (C) Stonnington (C) Whitehorse (C) Yarra (C)
<b>Northern Suburbs</b>	Banyule (C) Darebin (C) Whittlesea (C)
<b>Other &amp; West</b>	Brimbank (C) Hobsons Bay (C) Hume (C) Maribyrnong (C) Melbourne (C) Melton (C) Moonee Valley (C) Wyndham (C)
<b>South East</b>	Bayside (C) Frankston (C) Glen Eira (C) Greater Dandenong (C) Kingston (C) (Vic.) Mornington Peninsula (S)

## APPENDIX D PROJECT CAPITAL COSTS

The following are the construction and maintenance costs for the trail network.

**Table 63.** Total Costs Stage 1 and Stage 1 and 2 Warburton Trails Project – 10 Years (constant prices \$2021)

Summary - 10 Years	Trail Development <\$ 2020 Prices>
Design, Development and Planning Costs	\$2,000,000
<b>Project Cost Stage 1</b>	
<b>Construction</b>	
Trail Construction (105kms)	\$4,200,000
Other Infrastructure	\$7,100,000
<b>Total Construction</b>	<b>\$11,300,000</b>
<b>Maintenance</b>	
<b>Trails</b>	
Annual Maintenance Cost (\$2000 per km – 105 kms) <sup>83</sup>	\$210,000
<b>Total (10 years)</b>	<b>\$2,100,000</b>
<b>Other Infrastructure</b>	
Annual Maintenance Cost (1.5% of cost)	\$106,500
<b>Total (10 years)</b>	<b>\$1,065,000</b>
<b>Total Maintenance Cost (10 Years)</b>	<b>\$3,165,000</b>
<b>Total Project Costs Stage 1 (10 Years)</b>	
<b>Total Construction &amp; Maintenance (Stage 1)</b>	<b>\$14,465,000</b>
<b>Project Cost Stage 2</b>	
<b>Construction</b>	
Trail Construction (76kms)	\$3,040,000
Other Infrastructure	\$750,000
<b>Total Construction</b>	<b>\$3,790,000</b>
<b>Maintenance</b>	
<b>Trails</b>	
Annual Maintenance Cost (\$2000 per km – 76 kms) <sup>84</sup>	\$152,000
<b>Total (10 years)</b>	<b>\$1,520,000</b>
<b>Other Infrastructure</b>	

<sup>83</sup> TRAIL MAINTENANCE COST \$2000 PER KM/YEAR . WARBURTON DRAFT MASTER PLAN REPORT, JANUARY 2020, YARRA RANGES COUNCIL

<sup>84</sup> TRAIL MAINTENANCE COST \$2000 PER KM/YEAR . WARBURTON DRAFT MASTER PLAN REPORT, JANUARY 2020, YARRA RANGES COUNCIL

Summary - 10 Years	Trail Development <\$ 2020 Prices>
Annual Maintenance Cost (1.5% of cost)	\$11,250
<b>Total (10 years)</b>	<b>\$112,500</b>
<b>Total Maintenance Cost (10 Years)</b>	<b>\$1,632,500</b>
<b>Total Project Costs Stage 2 (10 Years)</b>	
<b>Total Construction &amp; Maintenance (Stage 2)</b>	<b>\$5,422,500</b>
<b>Project Cost Development &amp; Stage 1 &amp; 2</b>	
<b>Construction</b>	
Design, Development and Planning Costs	\$2,000,000
Trail Construction Trails	\$7,240,000
Infrastructure Costs	\$7,850,000
<b>Total Construction</b>	<b>\$17,090,000</b>
<b>Maintenance</b>	
Trails	\$3,620,000
Other Infrastructure	\$1,177,500
Total Maintenance (10 Years)	<b>\$4,797,500</b>
<b>Total Project Costs 10 Years</b>	
<b>Total Design, Construction &amp; Maintenance</b>	<b>\$21,887,500</b>

SOURCE: YARRA RANGES COUNCIL SEPTEMBER 2020





# Attachment 1

## Warburton MTB Destination Economic Impact Assessment Spend Assumption 2 – Derby (Xyst) Survey Data

Three Case Economic Impact Assessment  
– Spend Assumption 2 (XYST Spend Data)



**Yarra  
Ranges  
Council**

August 2021



This report was prepared by TRC Tourism for Yarra Ranges Shire Council in relation to the development of Warburton MTB Destination. It provides an Economic Impact Assessment for 3 Cases and average expenditure data is based on a combination of mountain biker survey data (XYST Survey 2021) and the Tourism Research Australia LGA Profile for Yarra Ranges.

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### ACKNOWLEDGEMENT

We acknowledge the Indigenous peoples of the lands, waters and communities we work together with. We pay our respects to their cultures; and to their Elders – past, present and emerging.

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# Executive Summary

This report provides an economic impact assessment of the proposed Warburton MTB Trails development using the spending assumptions based on unpublished survey data from Derby undertaken by Xyst Pty Ltd. The modelling is based on estimates of annual uses/users of the trails and other assumptions utilised in quantifying spending and benefits in the region.

This report is an attachment to the main report – ‘**Developing Warburton as a World Class Mountain Bike Destination, and Economic Feasibility Study.**’

It is attached due to the nature of the data being used in the assumptions. The unpublished survey data used in this attachment is felt to reflect user and visitor spending more accurately in mountain bike destinations, but it has not been published.

Accordingly, the TRA spend data is used as the main body of economic work, with this attachment included as a reference document.

**Average expenditure levels are used in the modelling for trail users (who are visitors to the region) and based on mountain bike survey data from Derby in Tasmania, Tourism Research Australia (TRA) data for tourism visitors to the Yarra Ranges LGA.<sup>1</sup>**

The analysis is for a 10-year period of operations. Three cases are examined:

- Case 1 Base Case: Full Trails Network - covering the full development of the trails network
- Case 2 Reduced Trail Network, with no trails in the National Park Areas,
- Case 3 with No Drop A K trail.

In modelling of trail users, we have drawn of the market segment profile from the surveys conducted by instinct and reason.<sup>2</sup>

**The Warburton Trails will generate substantial positive economic benefits for the Yarra Ranges LGA during the construction phase and in the operations phase.**

## 1.1 Trails Use

The modelling has identified the potential number of trail users over a 10-year period of operations.

- For Case 1 Base Case Full Trails Network, user numbers would increase from 131,217 in year1 to 221,454 in year 10.
- For Case 2: Reduced Trails Network (no national park trails) , user numbers would increase from around 110,700 in year 1 to 140,000 in year 10.
- For Case 3: No Drop A K Trail, user numbers would increase from around 110,900 in year 1 to 153,800 in year 10.

Around two thirds of trail users would be day visitors and one third overnight visitors. The trails will generate a significant increase in visitors to the region and provide a major boost to accommodation and food service businesses.

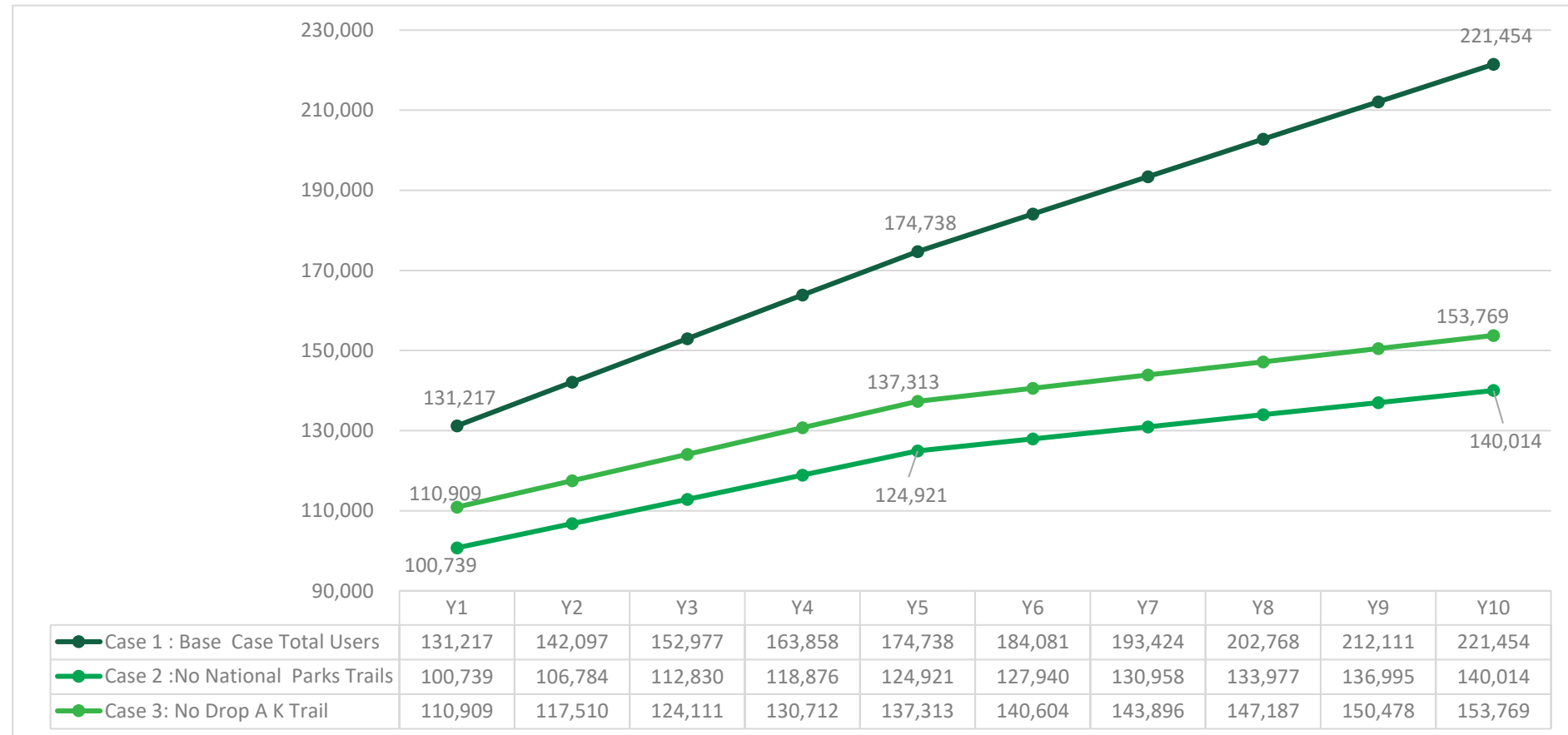
The differences are show in the following charts. Case 2 delivers significantly lower visitor numbers compared with the Case 1 Base Case, with a difference in year 10 of around 81,000 annual users. For Case 3, visitor numbers in year 10 are around 68,000 lower than the Base Case.

**These differences have impacts on trail users, spending in the region, jobs generated, regional income generated and benefit cost ratios (BCRs).**

<sup>1</sup> Local Government Area Profiles, 2019, Yarra Ranges (S) LGA, Tourism Research Australia . Mountain Bikers, Derby Tasmania Survey Data, XYST May 2021

<sup>2</sup> Warburton MTB trail research -quantitative findings, instinct and reason, December 2020 P16 & Additional Findings May 2021.

**Figure 1.** Warburton Trails Network – Total Trail Users Years 1-10



SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## 1.2 Regional Spending

For **Case 1: Base Case Full Trails Network** - estimated spending in the Yarra Ranges LGA by trail users would increase from \$31.1 million in year 1 (\$24.2 million overnights and \$6.8 million day visitors) to \$55.0 million in 2031 ( \$43.7 million overnights and \$11.4 million day visitors).

For **Case 2: Reduced Trails Network (no National Park Trails)** - estimated spending in the Yarra Ranges LGA by trail users would increase from \$19.9 million in year 1 (\$14.6 million overnights and \$5.3 million day visitors) to \$30.7 million in 2031 (\$23.8 million overnights and \$6.9 million day visitors).

For **Case 3: Case 3 No Drop A K Trail**- estimated spending in the Yarra Ranges LGA by trail users would increase from \$21.9 million in year 1 ( \$16.1 million overnights and \$5.8 million day visitors) to \$33.9 million in year 10 ( \$26.3 million overnights and \$7.6 million day visitors).

Total expenditure comprises:

- spending on trail-linked activities (including spending on bike related expenses and other spending - food and beverage etc.) in proximity to the trails
- spending on accommodation (for overnight stayers) and meals during their stay
- spending on other recreational and tourism services.

## 1.3 Economic Impacts

The economic impacts of the trail's development are modelled for both the construction phase and the operations phase. The impacts are measured in terms of full-time equivalent jobs (FTE) and the increase in regional income that is generated by trail users and their spending in the region.

## 1.4 Constructions Phase

In modelling construction jobs, the cost components that are associated with trails and other facilities construction are used, and these total \$15.1 million for Stage 1 and Stage 2.

A total of 84.1 FTE jobs (70.1 direct jobs and 14.1 indirect/induced jobs) would be generated during the construction period. The direct jobs (70.1) comprise 50.3 jobs in on-site construction and 19.8 jobs in materials/equipment supply.

The EEC Report indicates that construction of the trails would be undertaken by teams of 3-4 persons.<sup>3</sup>

## 1.5 Operations Phase

The operations phase economic impacts are driven by the expenditure of visitors/users in towns adjacent to the trail and in the broader Yarra Ranges region. MCA's regional economic model is used to estimate the employment and income impacts of the trail.

- For Case 1 Base Case, the operation of the trails would generate a total of 146.9 full-time equivalent jobs in year 1, increasing to 258.2 FTE jobs in year 10.
- For Case 2 Reduced Network – No National Park Trails, the operation of the trails would generate a total of 94.4 full-time equivalent jobs in year 1, increasing to 144.6 FTE jobs in year 10.
- For Case 3 No Drop A K, the operation of the trails would generate a total of 104.0 full-time equivalent jobs in year 1, increasing to 159.2 FTE jobs in year 10.

On a sector basis, the jobs (FTE- direct and indirect) generated by trail users are mainly concentrated in:

- accommodation
- food and beverage
- recreational services and other visitor services
- transport (including shuttles)
- other retail.

---

<sup>3</sup> EES Chapter 3 – Project Description Warburton Mountain Bike Destination Project, Yarra Ranges Council  
P24



## 1.6 Benefit Cost Analysis

The benefits and costs of the operations of the trails are analysed over a 10 -year period. The benefits are measured by:

- direct - the increase in regional income generated by trail users over a 10-year period
- indirect - the estimated health benefits and the trail user value.

The costs include design and planning costs, construction costs, and asset maintenance costs.

For the comparison, the present value of the benefits is calculated using 3 discount rates (4%, 7% and 10%).

A 7% discount rate is appropriate for a trail project. The BCRs including all benefits are:

- Case 1: Base Case yields a positive BCR of 8.2
- Case 2 : Reduced Trail Network yields a positive BCR of 4.9
- Case 3: No Drop A K Trail yields a positive BCR of 5.4.<sup>4</sup>

If only regional income is included the BCRs are:

Case 1 - 4.9

Case 2 - 3.2

Case 3 - 3.5.

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<sup>4</sup> The measured benefits include the increase in regional income, health benefits of exercise and a notional valuation of the consumer benefit of the trail.

## 2 Introduction

This report provides an economic impact assessment of the development of the Warburton Mountain Bike Trails Network. The results are indicative of the potential benefits from the development and operation of the trail network. The modelling is based on estimates of annual rides/users (in different categories, and other assumptions utilised in quantifying spending in the region.<sup>5</sup>

The modelling has estimated the potential number of trail users over a 10-year period of operations from the completion of the trail network.

Three cases are examined:

- Case 1 Base Case: Full Trails Network - covering the full development of the trails network
- Case 2 Reduced Trail Network, with no trails in the National Park Areas
- Case 3 with no Drop A K trail.

In modelling of trail users, we have drawn of the market segment profile from the surveys conducted by Instinct and Reason.<sup>6</sup>

The economic impacts of the trails arise from:

- spending by these users/visitors in the towns adjacent to the trail and other spending in the broader region
- spending associated with events
- health benefits of active recreation activities
- a notional value of the trails for users.

Visitors from outside the region (particularly overnight visitors/users) generate significant expenditure covering:

- food and beverage
- accommodation (for overnight stayers)
- recreation and other services
- transport.

Average spending per user has been estimated using a combination of LGA level tourist data and the findings of a survey of mountain bikers using trails in Derby Tasmania.

The economic impact analysis has been undertaken by MCA <Michael Connell & Assocs.> - economic consultants.

---

<sup>5</sup> Average spending per visitor is based on Tourism Research Data for the Yarra Ranges LGA.

<sup>6</sup> Warburton MTB trail research -quantitative findings, instinct and reason, December 2020 P16 & Additional Findings May 2021.

## 3 Warburton MTB Trails Development

### 3.1 Project Objectives

The project involves developing a proposed world-class mountain biking destination centred around Warburton, approximately 70 kilometres north east of Melbourne. The new trails build on the existing informal network of mountain bike trails. Yarra Ranges Council has identified mountain biking as an opportunity for tourism growth within the region, which would also support the region and the health and well-being of its residents. The trails would position Warburton as an internationally significant mountain biking destination and outdoor active destination.

The project objectives are to:

- Facilitate tourism growth and associated positive economic and jobs growth in the Yarra Valley Region
- Create iconic mountain bike trails eligible for International Mountain Bike Association Gold Ride Centre status
- Create spectacular riding experiences that have a competitive advantage over existing mountain bike destinations and leverage Warburton's beautiful township, rural valley and surrounding forested slopes
- Enhance the health and well-being of the community
- Maintain the significant biodiversity and heritage values within the project area and provide opportunities for the community to connect with and appreciate their importance.<sup>7</sup>

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<sup>7</sup> EES chapter 3 – Project Description Warburton Mountain Bike Destination Project, Yarra Ranges Council . P3

### 3.2 Project Components

The project consists of approximately 186 kilometres of mountain bike trails providing a range of experiences to suit all levels of riding.

The main project components proposed are:

The proposed mountain bike trail network consists of:

- An upgrade of existing mountain bike trails - approximately 15 kilometres
- new mountain bike trails - approximately 164 kilometres
- existing vehicle roads and tracks to be incorporated into the mountain bike trail network (approximately seven kilometres).

Some of the trails are returning loops, while others are point-to-point trails. A new visitor's hub and main trail head at the Warburton Golf Course is planned, along with new trail head facilities at Mount Tugwell and Mount Donna Buang.<sup>8</sup>

<sup>8</sup> EES chapter 3 – Project Description Warburton Mountain Bike Destination Project. Yarra Ranges Council P6



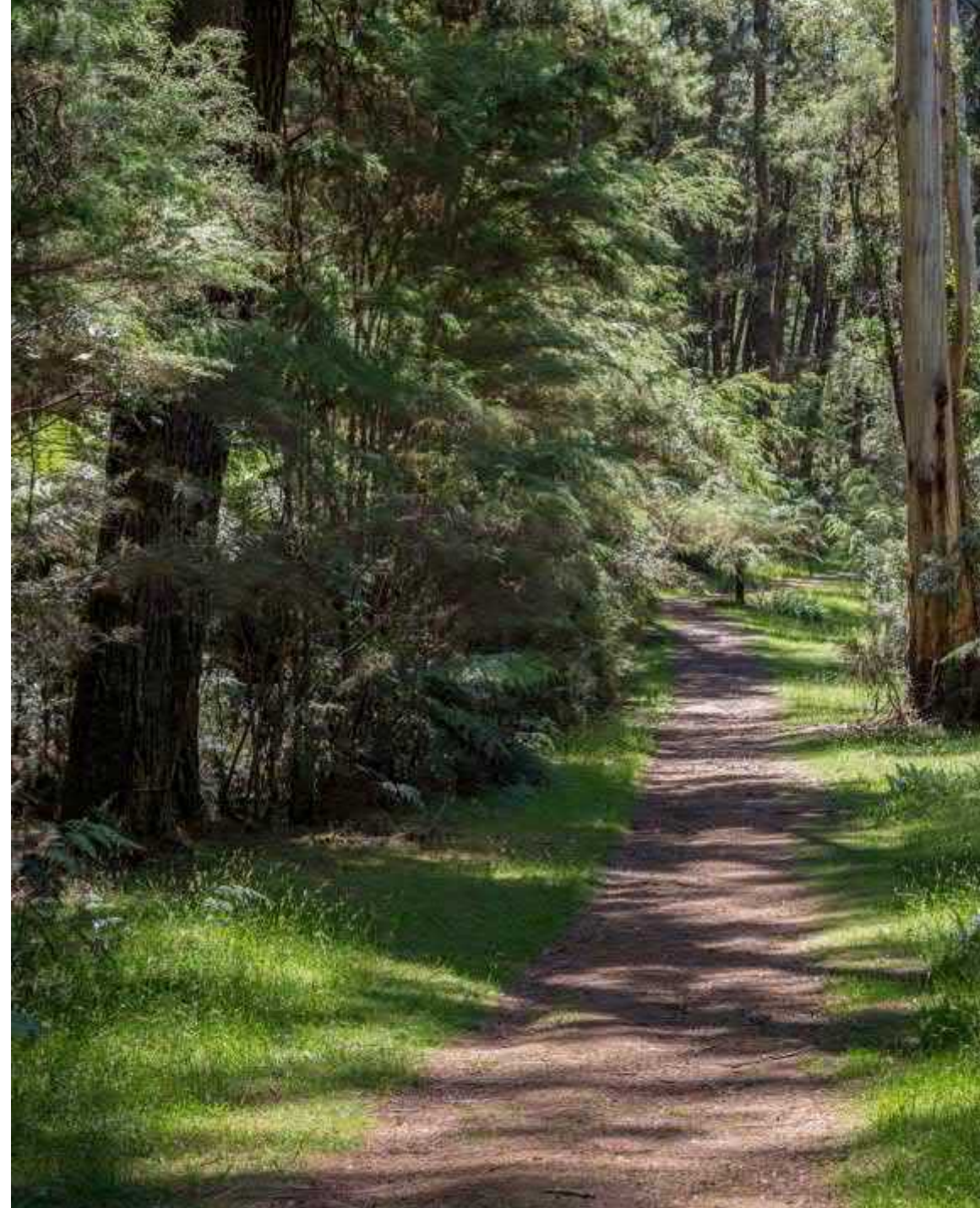
### 3.3 Development Timing

The following is the staging for the development and operations of the Warburton MTB trails. Stage 2 is subject to acquiring future funding. This timing is indicative and is subject to approval processes.

**Table 1.** Staging of Warburton Trail Development

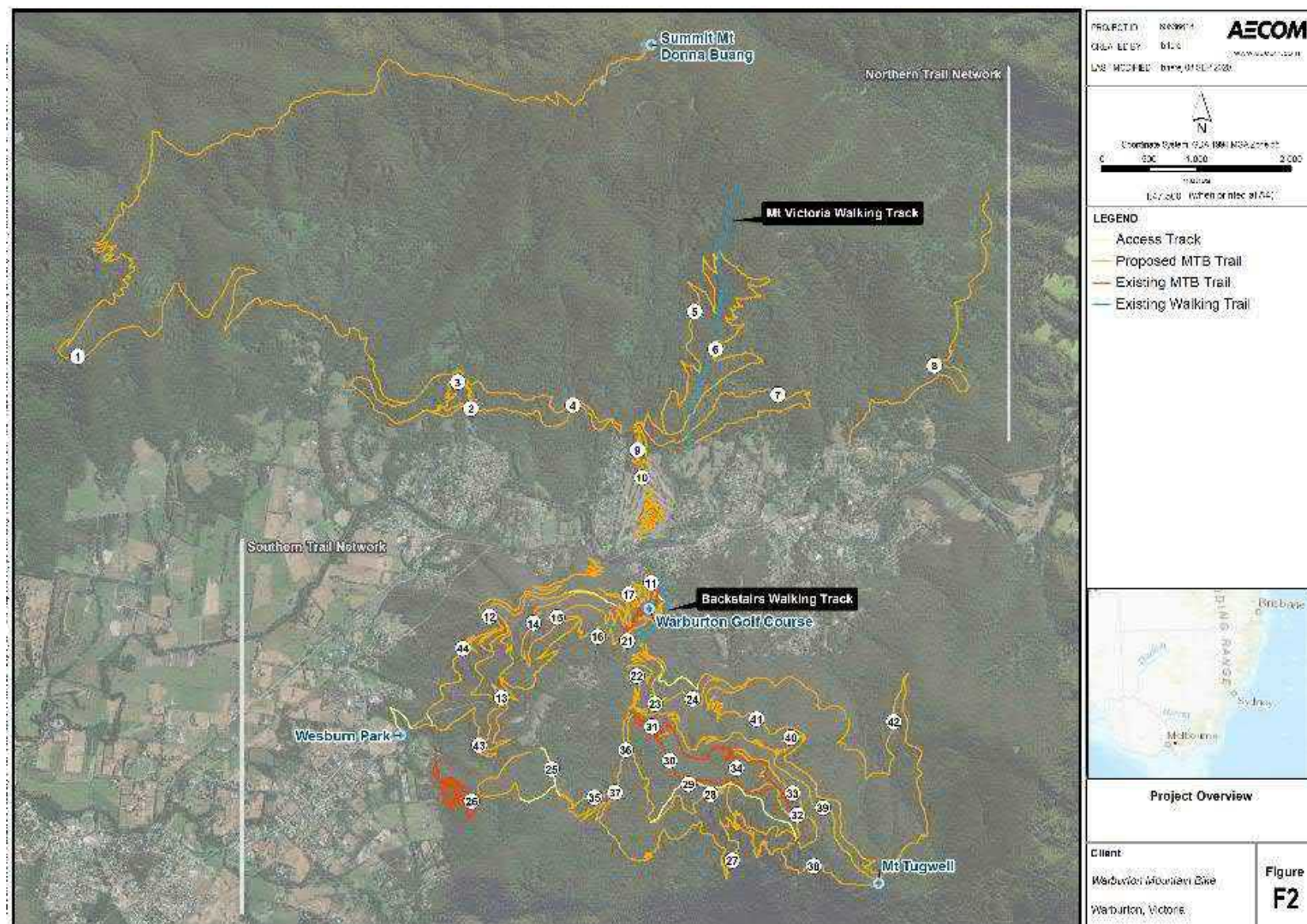
Warburton MTB Trail	
Staging of Trail	Indicative Timing Only
<b>Construction</b>	
<b>Stage 1</b>	
Construction Stage 1 (110 kms)	Sept 2021
Section 1 35 kms	Sept 2021-Feb 2022
Section 2 35 kms	Mar 2022-Aug 2022
Section 3 35 kms	Sept 2022-Jan 2023
<b>Stage 2</b>	
Construction Stage 2 Section 4 (76 kms)	6 months
Subject to funding - indicative only	Sept 2024-Jan 2025
<b>Operations</b>	
<b>Stage 1</b>	
Section 1 35 kms	March 2022
Section 2 35 kms	Sept 2022
Section 3 35 kms	Feb 2023
<b>Stage 2</b>	
Section 4	Feb.2025

SOURCE: YARRA RANGES SHIRE COUNCIL SEPTEMBER 2020





**Figure 2.** Proposed Network – Yarra Ranges MTB Network



SOURCE: EES CHAPTER 3 – PROJECT DESCRIPTION WARBURTON MOUNTAIN BIKE DESTINATION PROJECT. YARRA RANGES COUNCIL P5

## 4 Modelling of Trail Operations

For the economic impact assessment, the construction phase (staged over a three-year period) and operations phase from year 1 of trails completion were covered. The operations phase covers trail users over the year. An assessment was also made of potential major state and national events that could be staged.

For operations, the modelling has estimated the potential number of trail users over a 10-year period. Three cases are examined:

- *Case 1 Base Case Full Network* - covering the full development of the trails network
- *Case 2 Reduced Trail Network* - with no trails in the National Park Areas
- *Case 3 No Drop A K Trail* included.

In modelling of trail users, the market segment profiles from the surveys conducted by research company Instinct and Reason are used.<sup>9</sup>

### 4.1 Mountain Biking Participation

The recent AusPlay survey for 2019 shows that 1.4% of the Australian population participated in mountain biking or a total 289,600 nationally. This participation rate was used to estimate potential users of the Warburton MTB trails network in metro and regional areas. The MTB participation rate is similar to that for ski and snowboarding (1.3%) and around half of that for surfing (2.5%).

The participation rate for mountain biking (1.4%) has been used in the modelling of trail user numbers. At present, males dominate the activity. For the 10-year modelling of operations the participation rate was increased reflecting growth in popularity and more women likely to participate.

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<sup>9</sup> Warburton MTB trail research -quantitative findings, instinct and reason, December 2020. P16; Additional Findings on Drop A K Trail , May 2021.

**Table 2.** Sport Participation in Australia (2019)

		Age							Males	Females
Activities	Total	15-17	18-24	25-34	35-44	45-54	55-64	65+	Total	Total
<b>Estimate (000s)</b>										
Bush walking	1,310.9	26.6	110.9	304.8	254.2	245.8	222.0	146.5	616.8	694.1
<b>Cycling</b>	<b>2,374.8</b>	<b>44.6</b>	<b>143.9</b>	<b>387.9</b>	<b>472.3</b>	<b>523.3</b>	<b>456.3</b>	<b>346.5</b>	<b>1,510.3</b>	<b>864.5</b>
<b>Mountain biking</b>	<b>289.6</b>	<b>13.0</b>	<b>13.7</b>	<b>57.0</b>	<b>81.6</b>	<b>80.1</b>	<b>34.6</b>	<b>9.8</b>	<b>245.0</b>	<b>44.6</b>
Ski & snowboard	278.8	9.3	18.1	64.1	52.6	59.8	52.5	22.3	172.1	106.7
Surfing	527.6	18.2	43.4	122.1	117.6	114.6	77.8	33.9	391.6	136.0
<b>Participation rate (%)</b>										
Bush walking	6.3%	3.1%	4.6%	8.0%	7.4%	7.6%	7.5%	3.6%	6.0%	6.6%
Cycling	11.5%	5.3%	6.0%	10.2%	13.8%	16.1%	15.5%	8.5%	14.8%	8.2%
<b>Mountain biking</b>	<b>1.4%</b>	<b>1.5%</b>	<b>0.6%</b>	<b>1.5%</b>	<b>2.4%</b>	<b>2.5%</b>	<b>1.2%</b>	<b>0.2%</b>	<b>2.4%</b>	<b>0.4%</b>
Ski & snowboard	1.3%	1.1%	0.8%	1.7%	1.5%	1.8%	1.8%	0.6%	1.7%	1.0%
Surfing	2.5%	2.1%	1.8%	3.2%	3.4%	3.5%	2.6%	0.8%	3.8%	1.3%

SOURCE: AUSPLAY SURVEY RESULTS JANUARY 2019 - DECEMBER 2019. RELEASED 30 APRIL 2020 (AND RE-ISSUED 24 JUNE 2020)

[HTTPS://WWW.CLEARINGHOUSEFORSPORT.GOV.AU/RESEARCH/SMI/AUSPLAY/RESULTS/SPORT](https://www.clearinghouseforsport.gov.au/research/smi/ausplay/results/sport)

## 4.2 Modelling Assumptions

Trail users were modelled based on several assumptions. Given the proximity of the trails to Melbourne a large number of trail users will be day visitors. Potential user numbers for the trail network have been modelled based on several assumptions listed below. Modelling of events was undertaken separately.

Potential users were estimated based on population data for local government areas, with proximity affecting the likelihood of visiting and the average number of rides per year. The likelihood of visiting the trail was assumed to increase over time as recognition of the trails increase. The analysis was at a local government area level and these LGAs were then clustered into regions.

A range of assumption were utilised in modelling trail user numbers, and these are detailed in Appendix A.

## 4.3 Summary Comparison of Cases

The results for cases are detailed in the following chapters. The cases are:

1. Case 1 Base Case: Full Trails Network (Chapters 4 & 8)
2. Case 2 Reduced Trails Network (Chapter 5 & 9)
3. Case 3 No Drop a K Trail (Chapter 6 & 10 ).

In summary, Case 2 Reduced Trails Network (no national park trails) would result in substantially lower levels of trail use by visitors from outside the region (in all rider categories). For Case 3 No Drop a K Trail the impact is not as great.

The changes would lead to a reduction in visits for the experienced categories of riders, a slower growth in user numbers and reductions in length of overnight stays, compared with the Base Case.

The following charts compare the modelling results for the 3 cases. The change in users is based on research by instinct and reason.<sup>10</sup>

For Case 2 the National Park Trails are not included. The impacts of this change have been modelled by reducing Intermediate users by 33.5% , Advanced & Expert trail users by 21.5% (compared with the Base Case), reducing Novices by 21%, and Beginners by 8%.

Case 3 No Drop A K Trail, has a different pattern of reductions in users (Beginners -8%, Novices -13%, Intermediates -20%, and Advanced/Expert -8%).

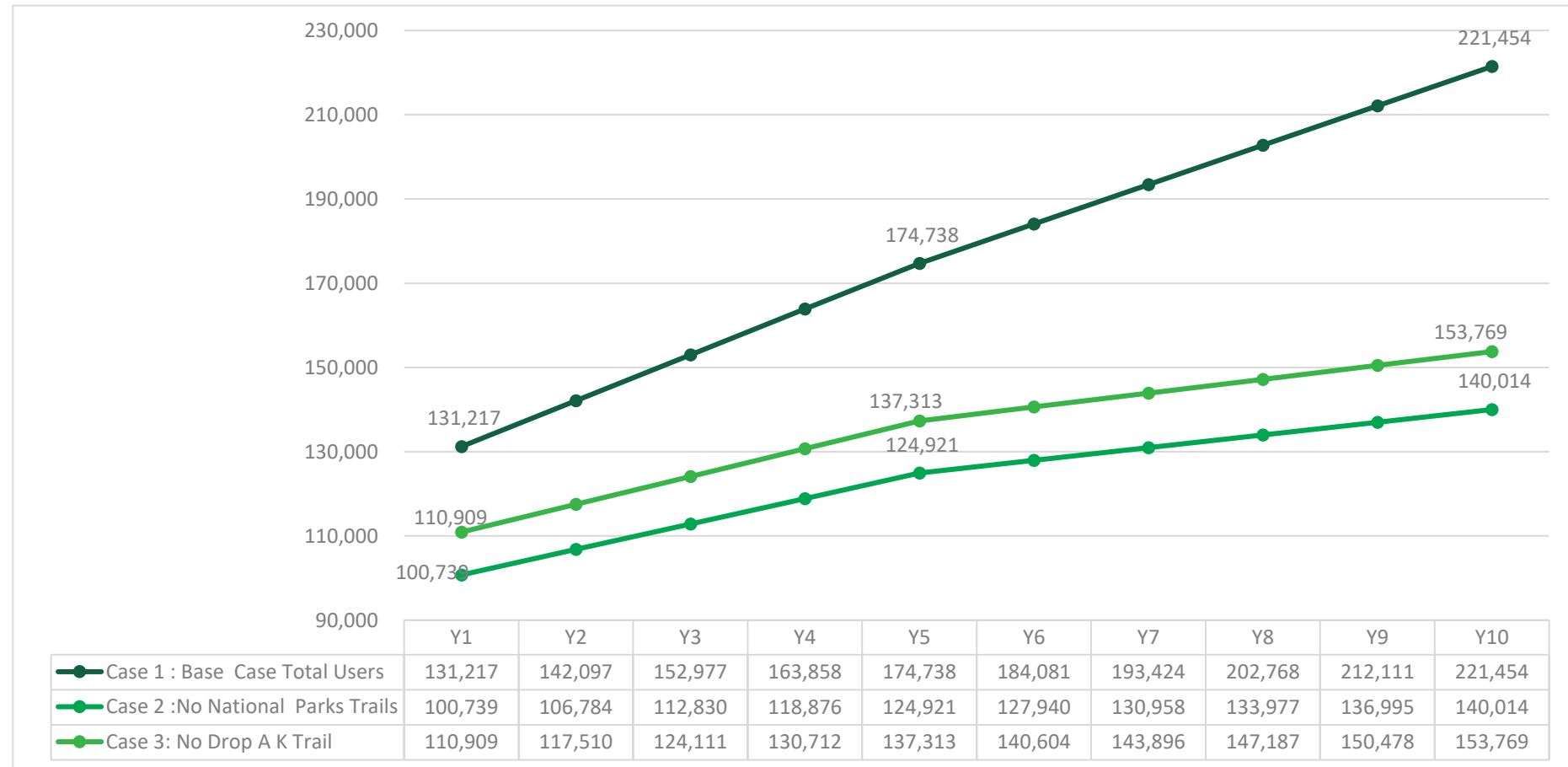
The number of trail users is substantially lower and there is a reduction in length of overnight stays, for both cases.

The changes have impacts on trail users' spending in the region, jobs generated, regional income generated and benefit cost ratios (BCRs). The differences are show in the following charts. Case 2 delivers lower visitor numbers compared with the Case 1 Base Case, with a difference in year 10 of around 81,000 annual users. For Case 3 visitor numbers in year 10 are around 68,000 lower than the Base Case.

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<sup>10</sup> Warburton MTB trail research -quantitative findings, instinct and reason, December 2020 P16; Additional Findings on Drop A K Trail , May 2021.

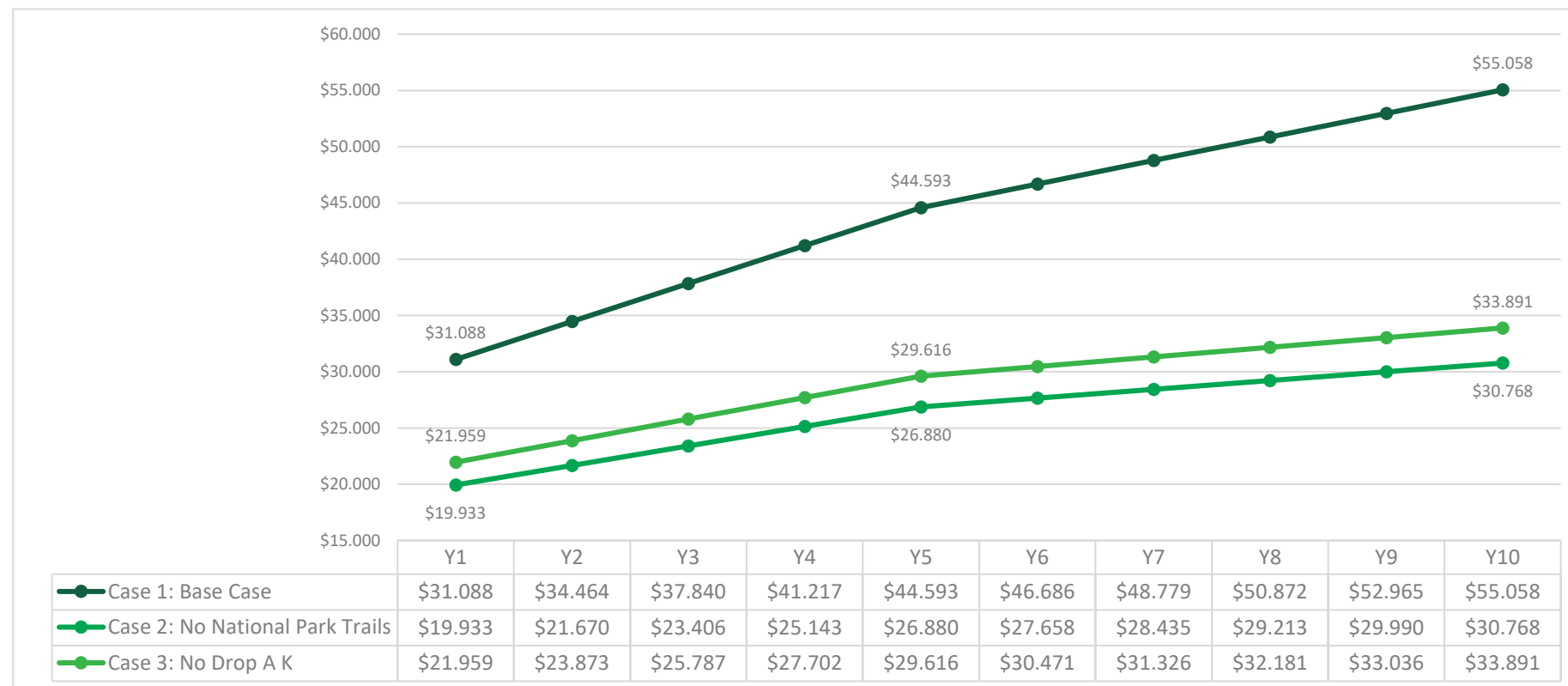
**Figure 3.** Warburton Trails Network Comparison – Estimated Trail Users Years 1-10



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

As a consequence of the substantially lower user numbers in the categories, and a reduced length of stay, in year 10 trail user spending in the region is around \$24 million lower for Case 2 and \$21 million lower for Case 3.

**Figure 4.** Warburton Trails Network – Spending in Region by Trail Users Years 1-10 (\$million 2021 prices)

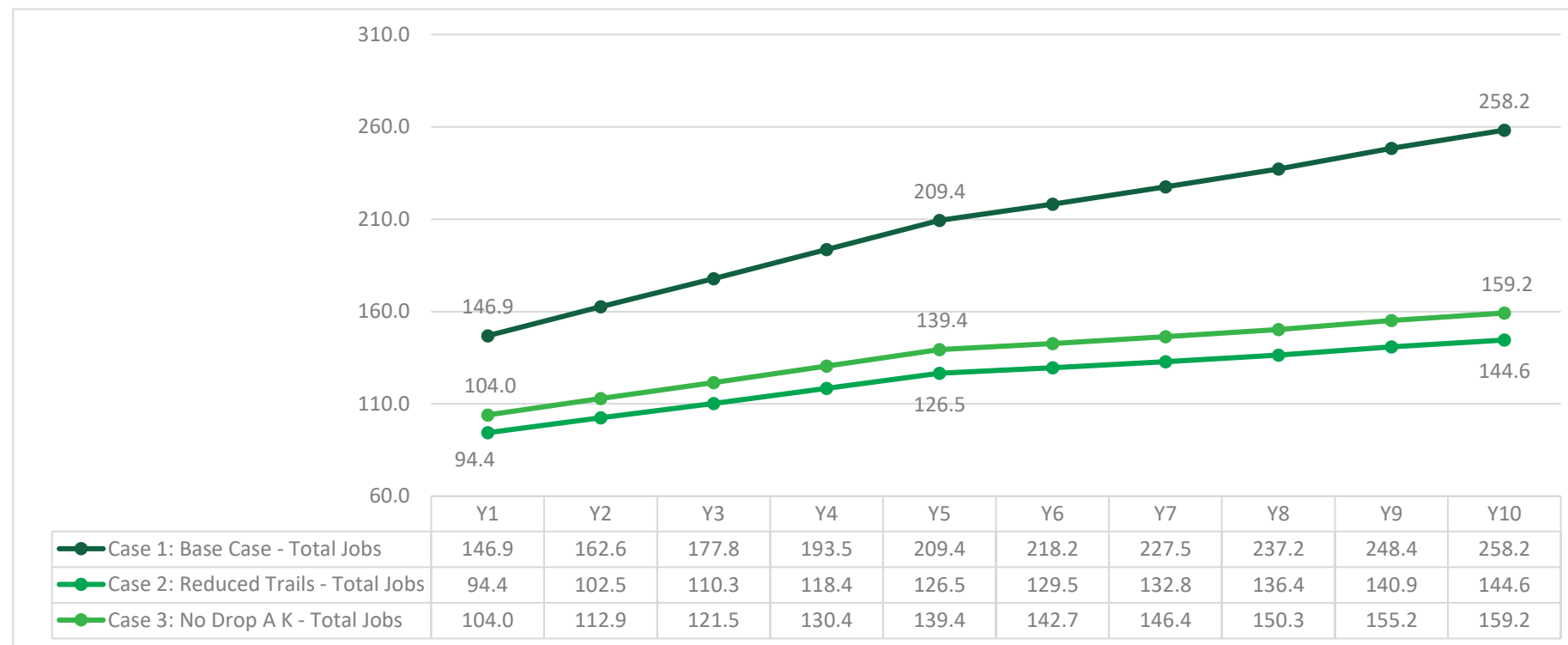


SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

As a consequence of lower user numbers, stays and spending, the total jobs generated in the region are lower for Case 2 and Case 3. In year 10 the jobs generated in the region are around 80-100 lower compared with the Base Case (Case 1: Base Case 258 jobs; Case 2 144 jobs; and Case 3 159 jobs).



**Figure 5.** Warburton Trails Network – Total Jobs in Region Generated by Trail Users (FTE no.)

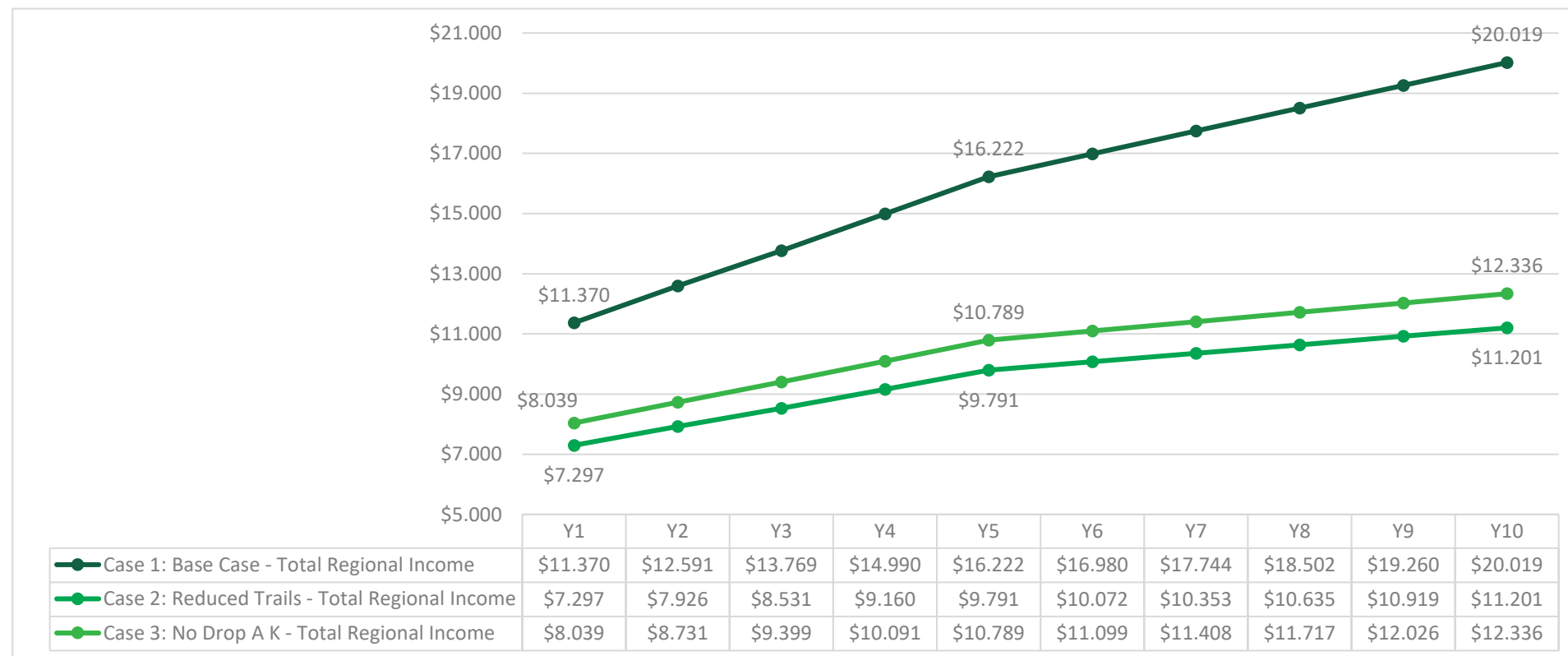


SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

With the reduced trail network and the consequent lower trail users, spending and length of stays, the regional income generated is lower than for the Base Case (Case 2 \$11.2 million in year 10; Case 3 \$12.3 million compared to Case 1 Base Case around \$20.0 million in year 10).



**Figure 6.** Warburton Trail Network – Regional Income Generated by Trail Users (\$million 2021 prices)

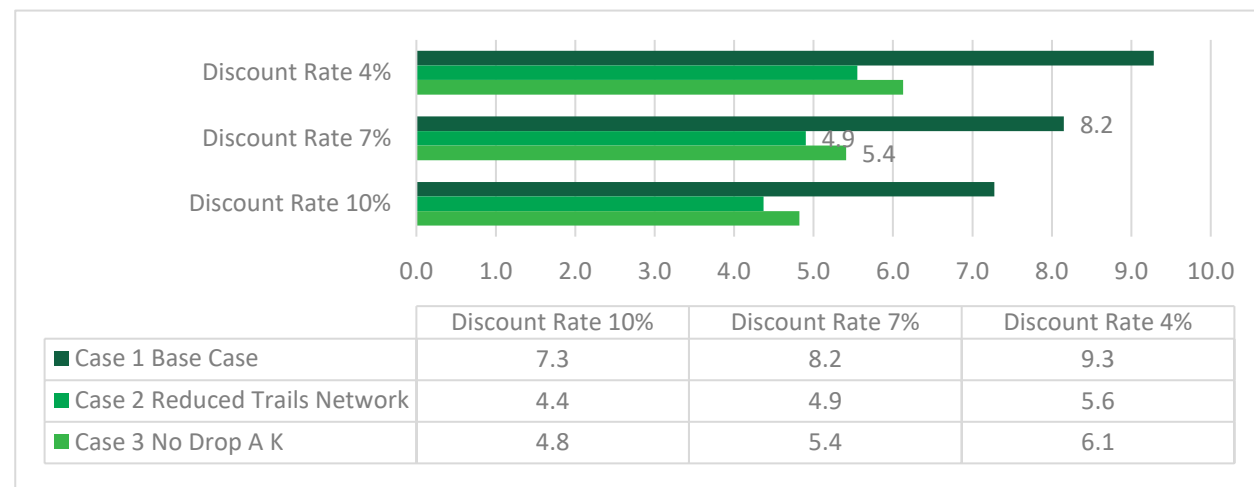


SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

The measurement of benefits includes both direct benefits (the increase in regional income) and indirect benefits (estimated health benefits and the value to users measured by a shadow price of \$15 per ride).

- For Case 2 and Case 3 the benefit cost ratios are lower than those for the Case 1 Base Case. For all benefits a 7% discount rate the BCRs are Case 1 8.2 and Case 2 4.9 and Case 3 5.4.
- If only regional income is included the BCRs are Case 1 4.9 and Case 2 3.2 and Case 3 3.5.

**Figure 7.** Benefit Cost Ratios (BCR) – Warburton Trails Development (All Benefits)



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Figure 8.** Benefit Cost Ratios (BCR) – Warburton Trails Development (Regional Income Only)



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

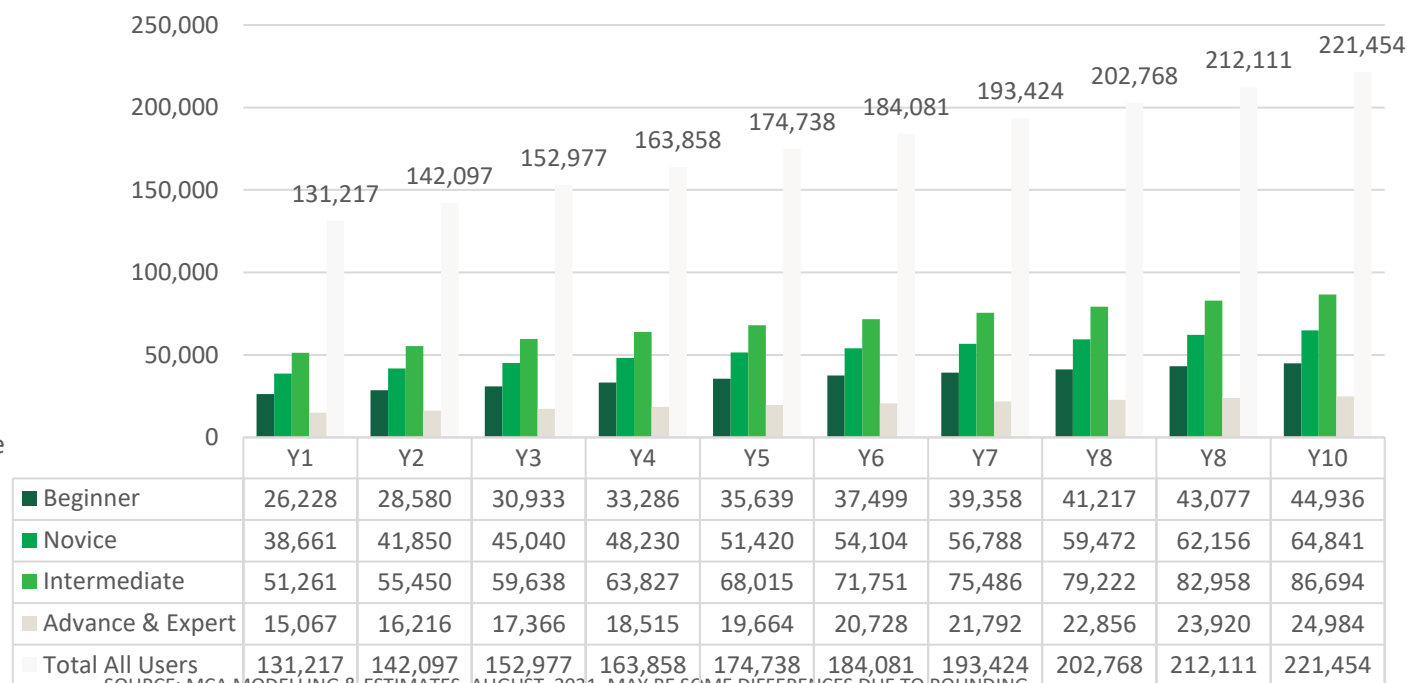
## 5 Case 1: Base Case Full Trail Network – Trail Users and Spending

This chapter provides estimates of trail users and spending for Case 1 Base Case - Full Trail Network, which includes trails in the National Park and the Drop A K trail.

### 5.1 Trail User Estimates

Based on the modelling of trail operations, the annual number of trail users would increase from around 131,200 in year 1 to 178,700 in year 5 and reach 221,500 in year 10. Given the proximity to the Melbourne metropolitan area, around two thirds would be day visitors and one third overnight visitors. This represents a significant increase in visitors to the region, in this specialised category of trail users. The tables below show the estimated numbers by user category (using the rider profile developed by *Instinct and Reason*).

**Figure 9.** Base Case – Trail Users by Type – 10 Years (no.)



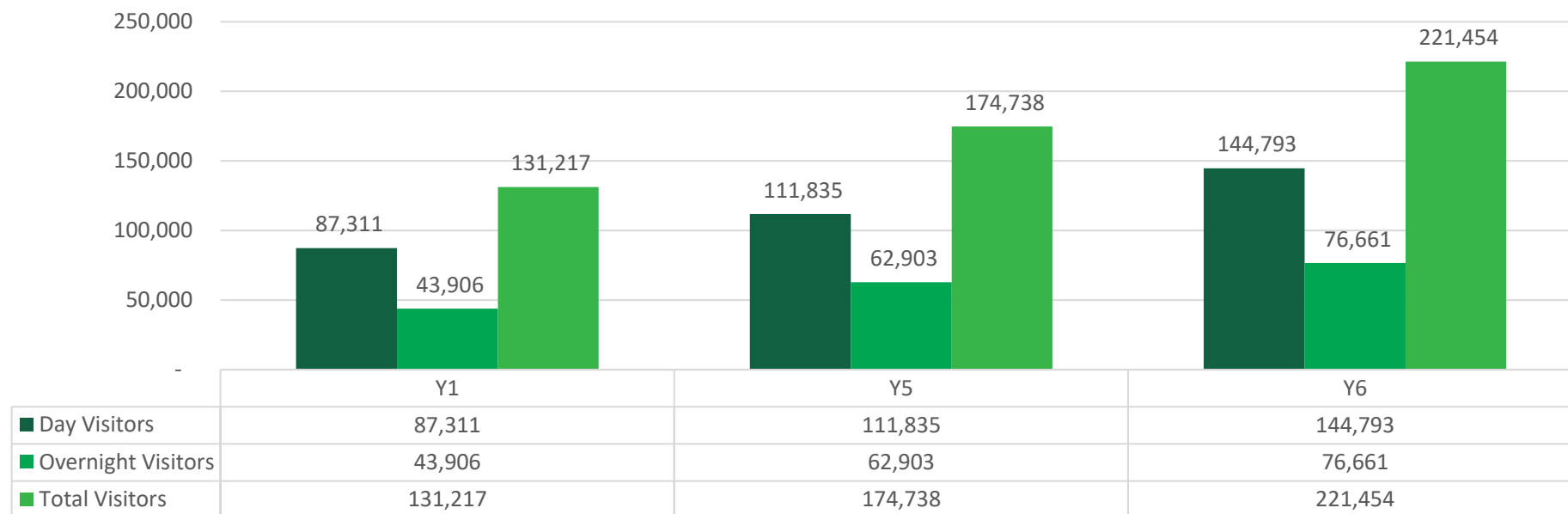
SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Table 3.** Case 1 – Base Case: Estimated Trail Users by Category

Case 1 Base Case Total Trail Users	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Beginner	26,228	28,580	30,933	33,286	35,639	37,499	39,358	41,217	43,077	44,936
Novice	38,661	41,850	45,040	48,230	51,420	54,104	56,788	59,472	62,156	64,841
Intermediate	51,261	55,450	59,638	63,827	68,015	71,751	75,486	79,222	82,958	86,694
Advance & Expert	15,067	16,216	17,366	18,515	19,664	20,728	21,792	22,856	23,920	24,984
<b>Total All Users</b>	<b>131,217</b>	<b>142,097</b>	<b>152,977</b>	<b>163,858</b>	<b>174,738</b>	<b>184,081</b>	<b>193,424</b>	<b>202,768</b>	<b>212,111</b>	<b>221,454</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Figure 10.** Case 1 – Base Case – Total Riders on Trails – Selected Years



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

The tables below show the mix of day and overnight visitors for each of the trail user categories (for selected years).

**Table 4.** Case 1 Base Case: Total Trail Users – Day and Overnights

Case 1 Base Case	Y1			Y5			Y10		
Trail Users	Day	Overnight	Total	Day	Overnight	Total	Day	Overnight	Total
Beginner	16,418	9,810	26,228	21,345	14,294	35,639	27,501	17,435	44,936
Novice	24,460	14,201	38,661	31,574	19,846	51,420	40,694	24,146	64,841
Intermediate	36,045	15,216	51,261	45,783	22,232	68,015	59,536	27,158	86,694
Advance & Expert	10,389	4,679	15,067	13,134	6,530	19,664	17,062	7,922	24,984
<b>Total All Users</b>	<b>87,311</b>	<b>43,906</b>	<b>131,217</b>	<b>111,835</b>	<b>62,903</b>	<b>174,738</b>	<b>144,793</b>	<b>76,661</b>	<b>221,454</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Table 5.** Case 1 Base Case: Trail Users by Type by Residence Location

Trail Users	Y1			Y5			Y10		
Case 1 Base Case	Users			Users			Users		
Residence of Trail Users	Day	Overnight	Total	Day	Overnight	Total	Day	Overnight	Total
Local -Yarra Ranges (S)	26,538	0	26,538	31,641	0	31,641	42,150	0	42,150
Total Metro & Adjacent Areas	54,773	19,906	74,679	70,995	26,103	97,097	91,843	33,461	125,304
<b>Total Yarra Ranges &amp; Areas</b>	<b>81,311</b>	<b>19,906</b>	<b>101,217</b>	<b>102,635</b>	<b>26,103</b>	<b>128,738</b>	<b>133,993</b>	<b>33,461</b>	<b>167,454</b>
<b>Other</b>									
Other Regional/Intrastate	3,600	14,400	18,000	4,000	16,000	20,000	4,400	17,600	22,000
Interstate	2,400	9,600	12,000	2,800	11,200	14,000	3,200	12,800	16,000
Internationals	0	0	0	2,400	9,600	12,000	3,200	12,800	16,000
<b>Total Other</b>	<b>6,000</b>	<b>24,000</b>	<b>30,000</b>	<b>9,200</b>	<b>36,800</b>	<b>46,000</b>	<b>10,800</b>	<b>43,200</b>	<b>54,000</b>
<b>Total All Trail Users</b>	<b>87,311</b>	<b>43,906</b>	<b>131,217</b>	<b>111,835</b>	<b>62,903</b>	<b>174,738</b>	<b>144,793</b>	<b>76,661</b>	<b>221,454</b>

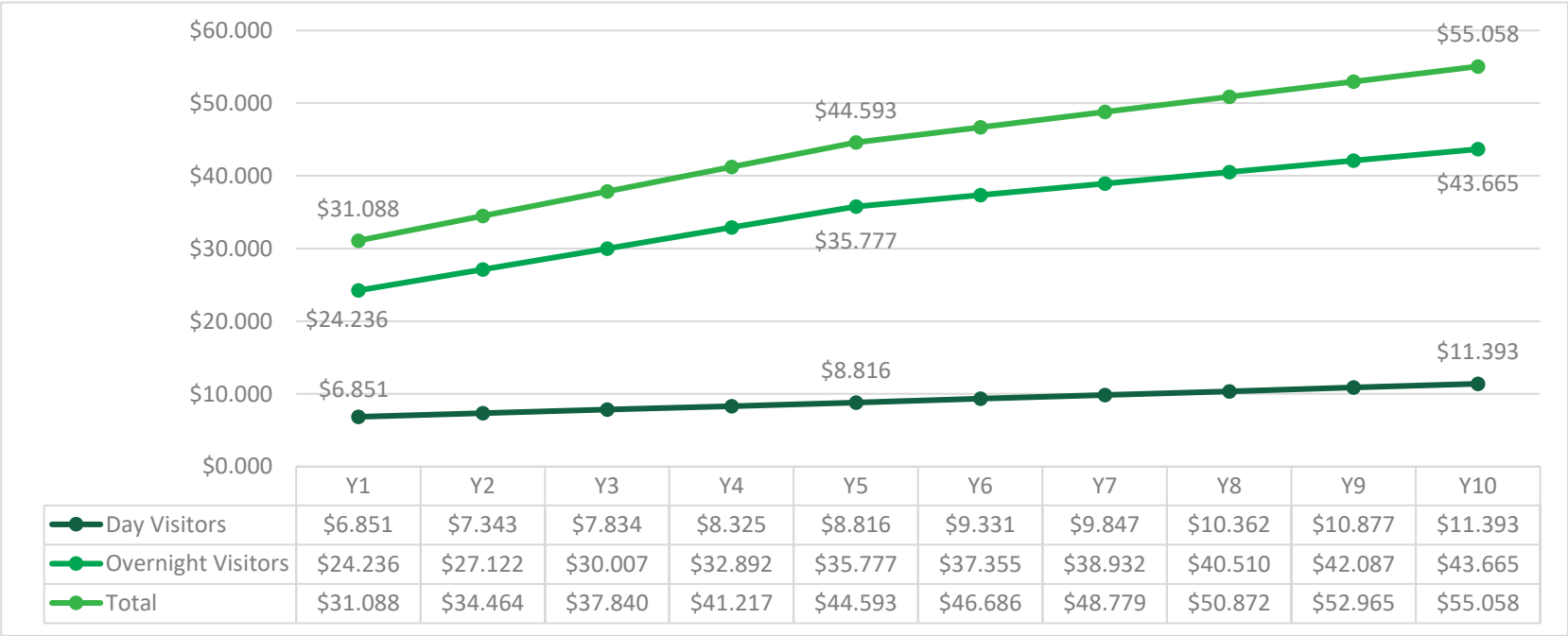
SOURCE: MCA MODELLING AUGUST 2021 . OTHER REGIONAL/INTERSTATE/INTERNATIONALS = RIDES PER VISIT. NOTE 2021 POPULATION ESTIMATES ARE USED FOR 2022.

## 5.2 Spending in Region by Trail Users

Spending in the region by MTB users was analysed and estimated. The assumptions used in estimation are outlined in Appendix A. Spending estimates are based on assumed average spending per person, for each category of rider. For example, intermediate and advanced and experts spend more than beginners and novices and stay for a longer period. All spending is in constant 2021 dollars.

Estimated spending in the Yarra Ranges LGA by trail users would increase from \$31.1 million in year 1 (\$24.2 million overnights and \$6.8 million day visitors) to \$55.0 million in year 10 (\$43.6 million overnights and \$11.4 million day visitors).

**Figure 11.** Case 1 Base Case – Spending in Region by Trail Users (\$million 2021 prices)



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

Spending was estimated for the locations that the trail users come from and is in the table below.

**Table 6.** Case 1 Base Case – Trail User Spending in the Region (\$million 2021 prices)

Case 1 Base Case	Year 1			Year 5			Year 10		
Residence of Trail Users	Day	Overnight	Total	Day	Overnight	Total	Day	Overnight	Total
Yarra Ranges	\$1.759	\$0.000	\$1.759	\$2.098	\$0.000	\$2.098	\$2.795	\$0.000	\$2.795
Total Metro & Adjacent Area	\$4.590	\$10.521	\$15.111	\$5.949	\$13.797	\$19.746	\$7.696	\$17.687	\$25.383
<b>Total Yarra Ranges &amp; Areas</b>	\$6.349	\$10.521	\$16.871	\$8.047	\$13.797	\$21.844	\$10.491	\$17.687	\$28.177
<b>Other</b>									
Other Regional/Intrastate	\$0.302	\$7.590	\$7.892	\$0.336	\$8.433	\$8.769	\$0.370	\$9.276	\$9.646
Interstate	\$0.200	\$6.125	\$6.325	\$0.233	\$7.146	\$7.379	\$0.266	\$8.167	\$8.433
Internationals	\$0.000	\$0.000	\$0.000	\$0.200	\$6.401	\$6.601	\$0.266	\$8.535	\$8.801
<b>Total Other</b>	\$0.502	\$13.715	\$14.217	\$0.769	\$21.980	\$22.749	\$0.902	\$25.978	\$26.880
<b>Total All Areas</b>	<b>\$6.851</b>	<b>\$24.236</b>	<b>\$31.088</b>	<b>\$8.816</b>	<b>\$35.777</b>	<b>\$44.593</b>	<b>\$11.393</b>	<b>\$43.665</b>	<b>\$55.058</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.



### 5.3 Spending Mix

The following table shows indicative estimates of the mix of spending by category for day visitors and for overnight visitors. In year 10 trail users would be injecting \$55.0 million in the region, up from \$31.1 million in year 1.

Total expenditure comprises:

- spending on trail-linked activities (including spending on bike related expenses and other spending - food and beverage etc.) in proximity to the trails,
- spending on accommodation (for overnight stayers) and meals during their stay, and
- spending on other recreational and tourism services.

While some of this spending would be serviced by existing businesses, it will encourage new businesses to service a growing visitor market. This is particularly the case with biking related spending (e.g., bike hire, guides/trainers and shuttles).

**Table 7.** Case 1 Base Case – Spending by Type (\$million – constant \$2021)

Case 1 Base Case Type of Spending (\$ million)	Share of Spending %	Year 1	Year 5	Year 10
<b>Total Day Visitors</b>				
Food	65%	\$4.453	\$5.730	\$7.405
Bike Hire	15%	\$1.028	\$1.322	\$1.709
Guides	5%	\$0.343	\$0.441	\$0.570
Shuttle	15%	\$1.028	\$1.322	\$1.709
<b>Total Spending - Day Visitors</b>		\$6.851	\$8.816	\$11.393
<b>Total Overnight Visitors</b>				
Food & Accommodation	60%	\$14.542	\$21.466	\$26.199
Bike Hire	20%	\$4.847	\$7.155	\$8.733
Guides	5%	\$1.212	\$1.789	\$2.183
Shuttle	15%	\$3.635	\$5.367	\$6.550
<b>Total Spending Overnights</b>		\$24.236	\$35.777	\$43.665
<b>Total Users</b>				
Food & Accommodation		\$18.995	\$27.197	\$33.604
Bike Hire		\$5.875	\$8.478	\$10.442
Guides		\$1.554	\$2.230	\$2.753
Shuttle		\$4.663	\$6.689	\$8.259
<b>Total Spending Users</b>		\$31.088	\$44.593	\$55.058

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## 6 Case 2: Reduced Trail Network (No National Park) – Trail Users and Spending

This chapter provides estimates of trail users and spending for Case 2 Reduced Trails Network, with no trails in the National Park areas.

The reduced trails network (no national park trails) would result in lower levels of trail use by visitors from outside the region (mainly by the more experienced riders). These changes would lead to a reduction in visits for the experienced categories of riders, a slower growth in user numbers and reductions in length of overnight stays, compared with the Base Case.

The impact of the reduced trail network was that modelled based on changes in assumptions, which are outlined in Appendix A (Table A.7).

Survey research by *Instinct and Reason*, indicates an overall reduction in users (comprising Beginner – 8%; Novice-21%; Intermediate -33.5%; and Advanced/Expert -21.5%).<sup>11</sup> These reductions were applied to each of these user categories.

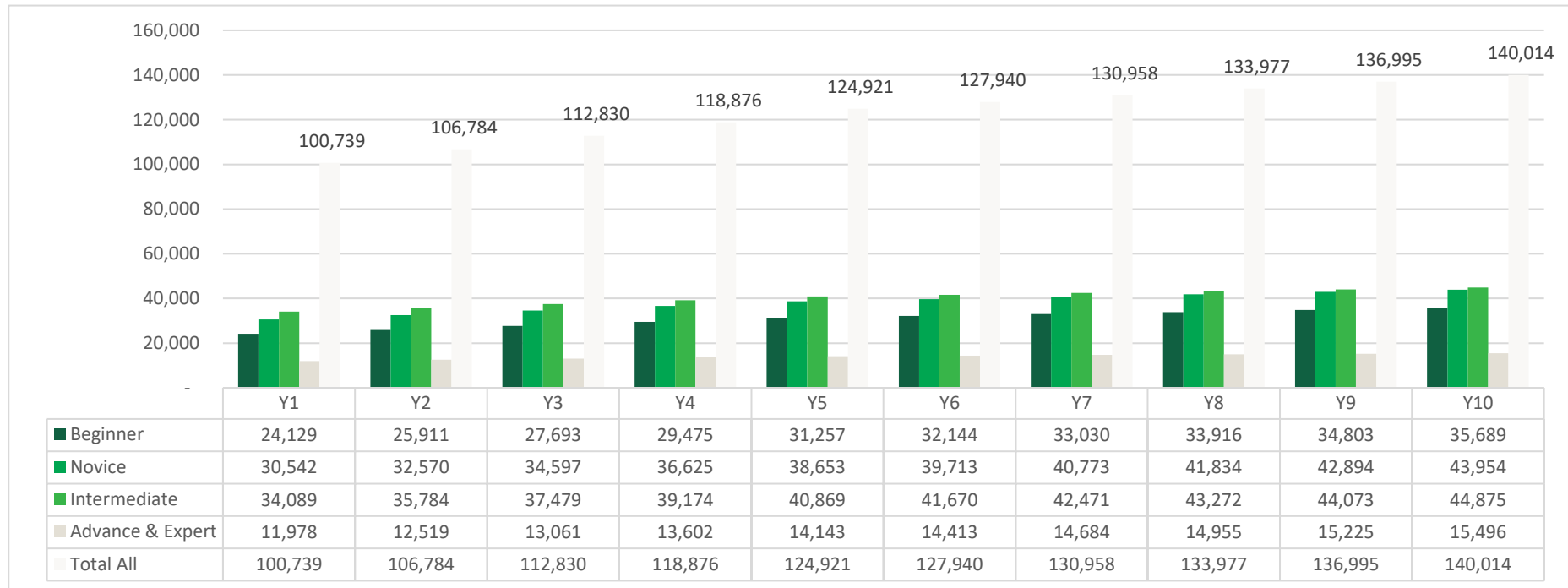
### 6.1 Trail Use Estimates

Based on the modelling of trail operations, the annual number of trail users would increase from around 100,750 in year 1 to 124,900 in year 5 and reach 140,000 in year 10. Given the proximity to the Melbourne metropolitan area, around two thirds would be day visitors and one third overnight visitors. The tables below show the estimated numbers by user category (using the rider profile developed by Instinct and Reason). The year 10 users are around 81,000 below Case 1 Base Case numbers.

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<sup>11</sup> Warburton MTB trail research -quantitative findings, instinct and reason, December 2020 P16 and Additional Findings May 2021.

**Figure 12.** Case 2 Reduced Trails Network – Trail Users by Type (no.)



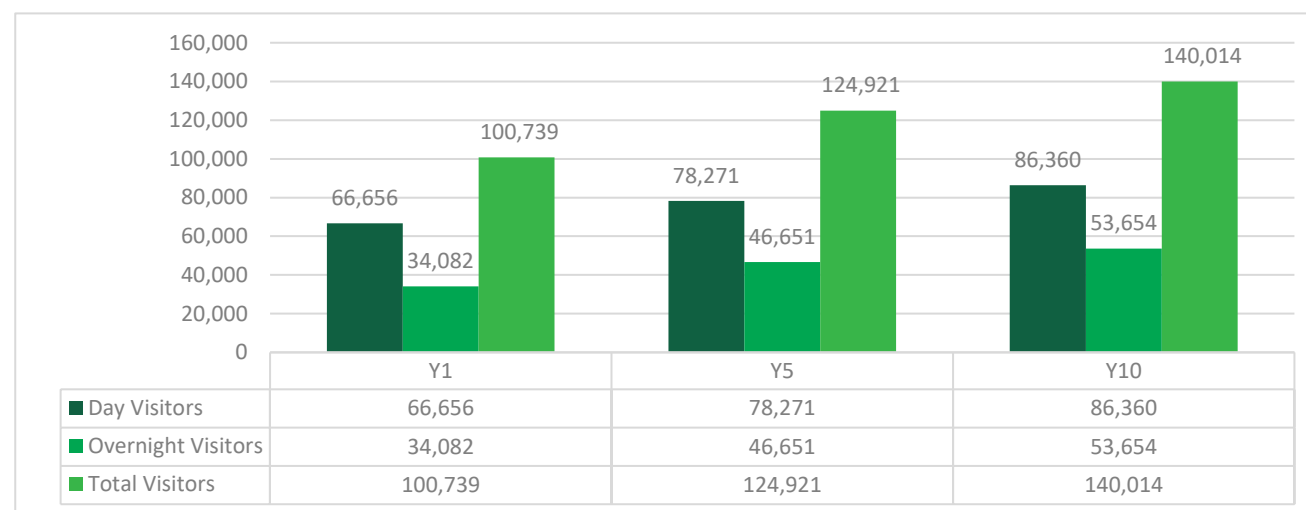
SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Table 8.** Case 2 Reduced Trails Network: Estimate Trail Users by Category

Case 2 Reduced Trails Network	Year 1			Year 5			Year 10		
Trail Users	Day	Overnight	Total	Day	Overnight	Total	Day	Overnight	Total
Beginner	15,104	9,025	24,129	18,459	12,798	31,257	20,845	14,844	35,689
Novice	19,323	11,219	30,542	23,428	15,225	38,653	26,418	17,536	43,954
Intermediate	23,970	10,119	34,089	27,089	13,780	40,869	29,113	15,762	44,875
Advance & Expert	8,259	3,719	11,978	9,294	4,848	14,143	9,983	5,513	15,496
<b>Total All Users</b>	<b>66,656</b>	<b>34,082</b>	<b>100,739</b>	<b>78,271</b>	<b>46,651</b>	<b>124,921</b>	<b>86,360</b>	<b>53,654</b>	<b>140,014</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Figure 13.** Case 2 Reduced Trails Network – Total Riders on Trails – Selected Years



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Table 9.** Case 2 Reduced Trails Network: Estimated Trail Users by Category

Case 2 Reduced Trails Network	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Beginner	24,129	25,911	27,693	29,475	31,257	32,144	33,030	33,916	34,803	35,689
Novice	30,542	32,570	34,597	36,625	38,653	39,713	40,773	41,834	42,894	43,954
Intermediate	34,089	35,784	37,479	39,174	40,869	41,670	42,471	43,272	44,073	44,875
Advance & Expert	11,978	12,519	13,061	13,602	14,143	14,413	14,684	14,955	15,225	15,496
<b>Total All Users</b>	<b>100,739</b>	<b>106,784</b>	<b>112,830</b>	<b>118,876</b>	<b>124,921</b>	<b>127,940</b>	<b>130,958</b>	<b>133,977</b>	<b>136,995</b>	<b>140,014</b>

SOURCE: MCA MODELLING &amp; ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Table 10.** Case 2 Reduced Trails Network: Trail Users by Residence Location

Case 2 Reduced Trails Network	Year 1			Year 5			Year 10		
	Users			Users			Users		
	Day	Overnight	Total	Day	Overnight	Total	Day	Overnight	Total
Local -Yarra Ranges (S)	19,520	0	19,520	21,721		21,721	22,695		22,695
<b>Urban &amp; Adjacent</b>									
<b>Total Metro &amp; Adjacent Areas</b>	<b>42,475</b>	<b>15,436</b>	<b>57,911</b>	<b>49,408</b>	<b>18,086</b>	<b>67,495</b>	<b>55,283</b>	<b>20,127</b>	<b>75,410</b>
<b>Total Yarra Ranges &amp; Areas</b>	<b>61,995</b>	<b>15,436</b>	<b>77,430</b>	<b>71,130</b>	<b>18,086</b>	<b>89,216</b>	<b>77,978</b>	<b>20,127</b>	<b>98,105</b>
<b>Other</b>									
Other Regional/Intrastate	2,800	11,202	14,002	3,112	12,446	15,558	3,423	13,691	17,114
Interstate	1,861	7,445	9,306	2,171	8,686	10,857	2,482	9,926	12,408
Internationals				1,858	7,432	9,290	2,477	9,910	12,387
<b>Total Other</b>	<b>4,662</b>	<b>18,647</b>	<b>23,308</b>	<b>7,141</b>	<b>28,564</b>	<b>35,705</b>	<b>8,382</b>	<b>33,527</b>	<b>41,909</b>
<b>Total All Trail Users</b>	<b>66,656</b>	<b>34,082</b>	<b>100,739</b>	<b>78,271</b>	<b>46,651</b>	<b>124,921</b>	<b>86,360</b>	<b>53,654</b>	<b>140,014</b>

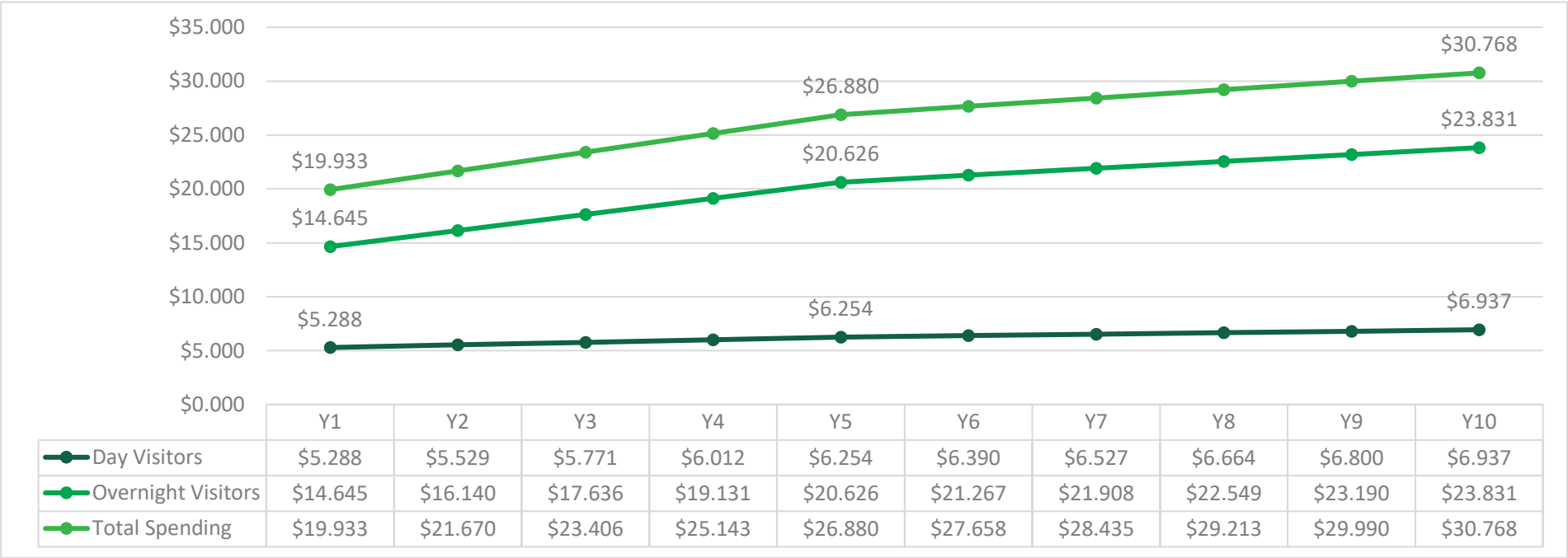
SOURCE: MCA MODELLING &amp; ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## 6.2 Spending in Region by Trail Users

Spending in the region by MTB users was analysed and estimated. The assumptions used in estimation are outlined in Appendix A. Spending estimates are based on assumed average spending per person, for each category of rider. For example, intermediate and advanced and experts spend more than beginners and novices and stay for a longer period. All spending is in constant 2021 dollars.

Estimated spending in the Yarra Ranges LGA by trail users would increase from \$19.9 million in year 1 (\$14.6 million overnights and \$5.3 million day visitors) to \$30.8 million in 2031 ( \$23.8 million overnights and \$6.9 million day visitors).

**Figure 14.** Case 2 Reduced Trail Network – Spending in Region by Trail Users (\$million 2021 prices)



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

Spending was estimated for the locations that the trail users come from and is in the table below.

**Table 11.** Case 2 Reduced Trails Network: Trail User Spending in the Region (\$million 2021 prices)

Case 2 : Reduced Trail Network	Y1			Y5			Y10		
Residence of Trail Users	Day	Overnight	Total	Day	Overnight	Total	Day	Overnight	Total
Yarra Ranges LGA	\$1.294	\$0.000	\$1.294	\$1.440	\$0.000	\$1.440	\$1.505	\$0.000	\$1.505
Total Metro & Adjacent Areas	\$3.599	\$6.352	\$9.951	\$4.210	\$7.363	\$11.573	\$4.724	\$8.160	\$12.884
<b>Total Yarra Ranges &amp; Metro</b>	<b>\$4.893</b>	<b>\$6.352</b>	<b>\$11.246</b>	<b>\$5.650</b>	<b>\$7.363</b>	<b>\$13.013</b>	<b>\$6.229</b>	<b>\$8.160</b>	<b>\$14.388</b>
<b>Other</b>									
Other Regional	\$0.238	\$4.592	\$4.830	\$0.264	\$5.102	\$5.367	\$0.291	\$5.613	\$5.903
Interstate	\$0.157	\$3.701	\$3.857	\$0.183	\$4.318	\$4.500	\$0.209	\$4.934	\$5.143
Internationals	\$0.000	\$0.000	\$0.000	\$0.157	\$3.843	\$4.000	\$0.209	\$5.125	\$5.333
<b>Total Other</b>	<b>\$0.394</b>	<b>\$8.293</b>	<b>\$8.687</b>	<b>\$0.603</b>	<b>\$13.263</b>	<b>\$13.867</b>	<b>\$0.708</b>	<b>\$15.671</b>	<b>\$16.380</b>
<b>Total All Areas</b>	<b>\$5.288</b>	<b>\$14.645</b>	<b>\$19.933</b>	<b>\$6.254</b>	<b>\$20.626</b>	<b>\$26.880</b>	<b>\$6.937</b>	<b>\$23.831</b>	<b>\$30.768</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## 6.3 Spending Mix

The following table shows indicative estimates of the mix of spending by category for day visitors and for overnight visitors. In year 10 trail users would be injecting \$30.8 million in the region, up from \$19.9 million in year 1.

Total expenditure comprises:

- spending on trail-linked activities (including spending on bike related expenses and other spending - food and beverage etc.) in proximity to the trails
- spending on accommodation (for overnight stayers) and meals during their stay
- spending on other recreational and tourism services.

While some of this spending would be serviced by existing businesses, it will encourage new businesses to service this growth in a specialised visitor market. This is particularly the case with biking related spending (e.g., bike hire, guides/trainers and shuttles).



**Table 12.** Case 2 Reduced Trail Network: Spending Type (\$million 2021 prices)

CASE 2 : REDUCED TRAIL NETWORK				
Type of Spending	Share of Spending	Year 1	Year 5	Year 10
(\$ million)	%			
Total Day Visitors				
Food	65%	\$3.437	\$4.065	\$4.509
Bike Hire	15%	\$0.793	\$0.938	\$1.041
Guides	5%	\$0.264	\$0.313	\$0.347
Shuttle	15%	\$0.793	\$0.938	\$1.041
Total Spending - Day Visitors		\$5.288	\$6.254	\$6.937
Total Overnight Visitors				
Food & Accommodation	60%	\$8.787	\$12.376	\$14.299
Bike Hire	20%	\$2.929	\$4.125	\$4.766
Guides	5%	\$0.732	\$1.031	\$1.192
Shuttle	15%	\$2.197	\$3.094	\$3.575
Total Spending Overnights		\$14.645	\$20.626	\$23.831
Total Users				
Food & Accommodation		\$15.153	\$20.566	\$23.574
Bike Hire		\$3.722	\$5.063	\$5.807
Guides		\$0.997	\$1.344	\$1.538
Shuttle		\$2.990	\$4.032	\$4.615
Total Spending Users		\$19.933	\$26.880	\$30.768

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## 7 Case 3: No Drop A K Trail – Trail Users and Spending

This chapter provides estimates of trail users and spending for Case 3 No Drop A K Trail. This is the trails network, with the proposed Drop a Kilometre trail not included.

This would result in lower levels of trail use by visitors from outside the region (mainly by novice and intermediate riders). These changes would lead to a reduction in visits for the experienced categories of riders, a slower growth in user numbers and reductions in length of overnight stays, compared with the Base Case.

Survey research by *Instinct and Reason*, indicates an overall reduction in users (comprising Beginner – 8%; Novice-13%; Intermediate -20%; and Advanced/Expert -8%).<sup>12</sup> These reductions were applied to each of these user categories.

The impact of the removal of the Drop A K Trail were modelled based on the assumptions, which are outlined in Appendix A (Table A.8).

### 7.1 Trail User Estimates

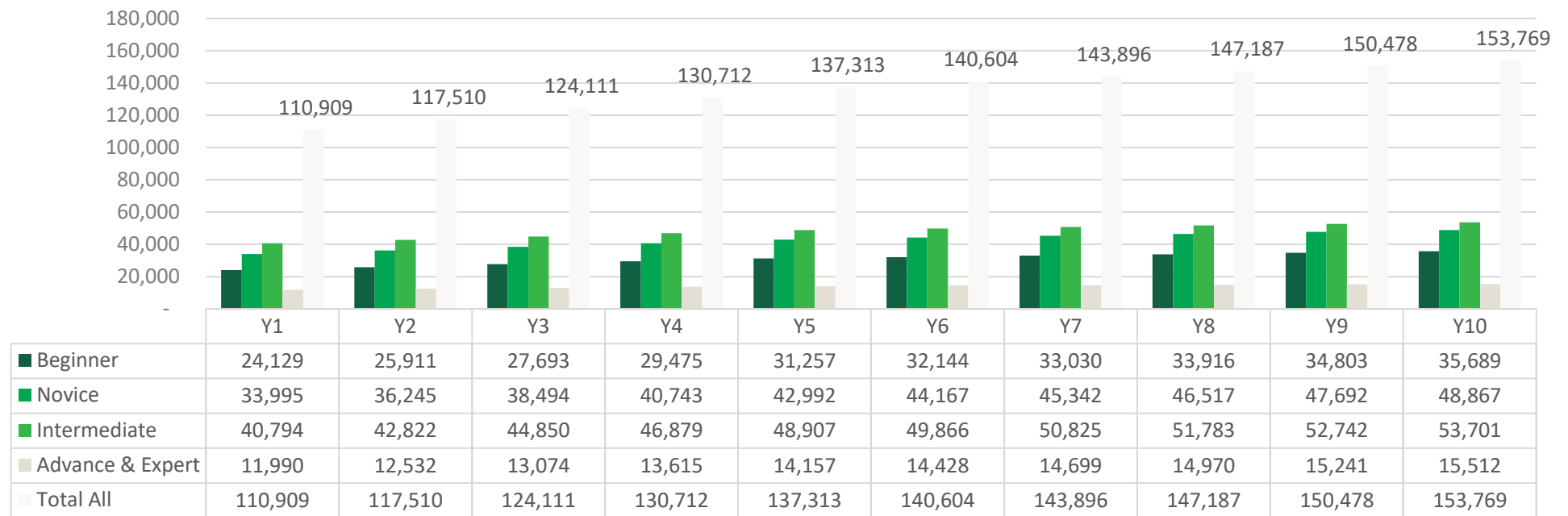
Based on the modelling of trail operations, the annual number of trail users would increase from around 110,900 in year 1 to 137,300 in year 5 and reach 153,800 in year 10. Given the proximity to the Melbourne metropolitan area, around two thirds would be day visitors and one third overnight visitors. The tables below show the estimated numbers by user category (using the rider profile developed by instinct and reason).

These user numbers are substantially below the Base Case user numbers – 20,000 lower in year 1 and around 68,000 lower in year 10.

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<sup>12</sup> Warburton MTB trail research -quantitative findings, instinct and reason, December 2020 P16 and Additional Findings May 2021.

**Figure 15.** Case 3 – No Drop A K – Trail Users by Type (no.)



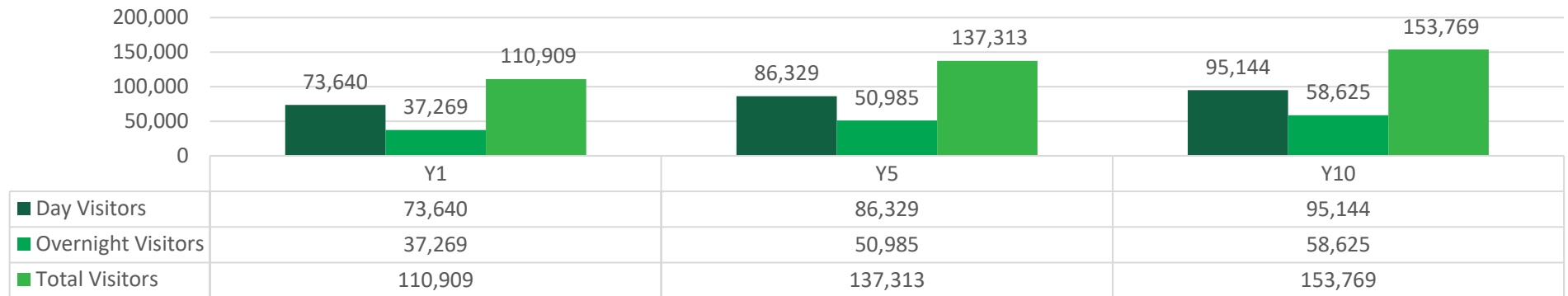
SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Table 13.** Case 3 No Drop A K: Estimated Trail Users by Category

Case 3 No Drop A K	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Beginner	24,129	25,911	27,693	29,475	31,257	32,144	33,030	33,916	34,803	35,689
Novice	33,995	36,245	38,494	40,743	42,992	44,167	45,342	46,517	47,692	48,867
Intermediate	40,794	42,822	44,850	46,879	48,907	49,866	50,825	51,783	52,742	53,701
Advance & Expert	11,990	12,532	13,074	13,615	14,157	14,428	14,699	14,970	15,241	15,512
<b>Total All Users</b>	<b>110,909</b>	<b>117,510</b>	<b>124,111</b>	<b>130,712</b>	<b>137,313</b>	<b>140,604</b>	<b>143,896</b>	<b>147,187</b>	<b>150,478</b>	<b>153,769</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Figure 16.** Case 3 No Drop A K – Total Riders on Trails – Selected Years



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Table 14.** Case 3 No Drop A K: Estimated Trail Users by Residence Location

Case 3 No Drop A K	Year 1			Year 5			Year 10		
	Users			Users			Users		
	Day	Overnight	Total	Day	Overnight	Total	Day	Overnight	Total
Local -Yarra Ranges (S)	22,046	0	22,046	24,532	-	24,532	25,632	-	25,632
Total Metro & Adjacent Areas	46,502	16,899	63,401	53,990	19,760	73,750	60,349	21,971	82,321
<b>Total Yarra Ranges &amp; Areas</b>	<b>68,548</b>	<b>16,899</b>	<b>85,447</b>	<b>78,522</b>	<b>19,760</b>	<b>98,282</b>	<b>85,981</b>	<b>21,971</b>	<b>107,952</b>
<b>Other</b>									
Other Regional/Intrastate	3,061	12,242	15,303	3,401	13,603	17,003	3,741	14,963	18,704
Interstate	2,032	8,127	10,159	2,370	9,482	11,852	2,709	10,836	13,545
Internationals	0	0	0	2,035	8,140	10,176	2,713	10,854	13,567
<b>Total Other</b>	<b>5,092</b>	<b>20,370</b>	<b>25,462</b>	<b>7,806</b>	<b>31,225</b>	<b>39,031</b>	<b>9,163</b>	<b>36,653</b>	<b>45,817</b>
<b>Total All Trail Users</b>	<b>73,640</b>	<b>37,269</b>	<b>110,909</b>	<b>86,329</b>	<b>50,985</b>	<b>137,313</b>	<b>95,144</b>	<b>58,625</b>	<b>153,769</b>

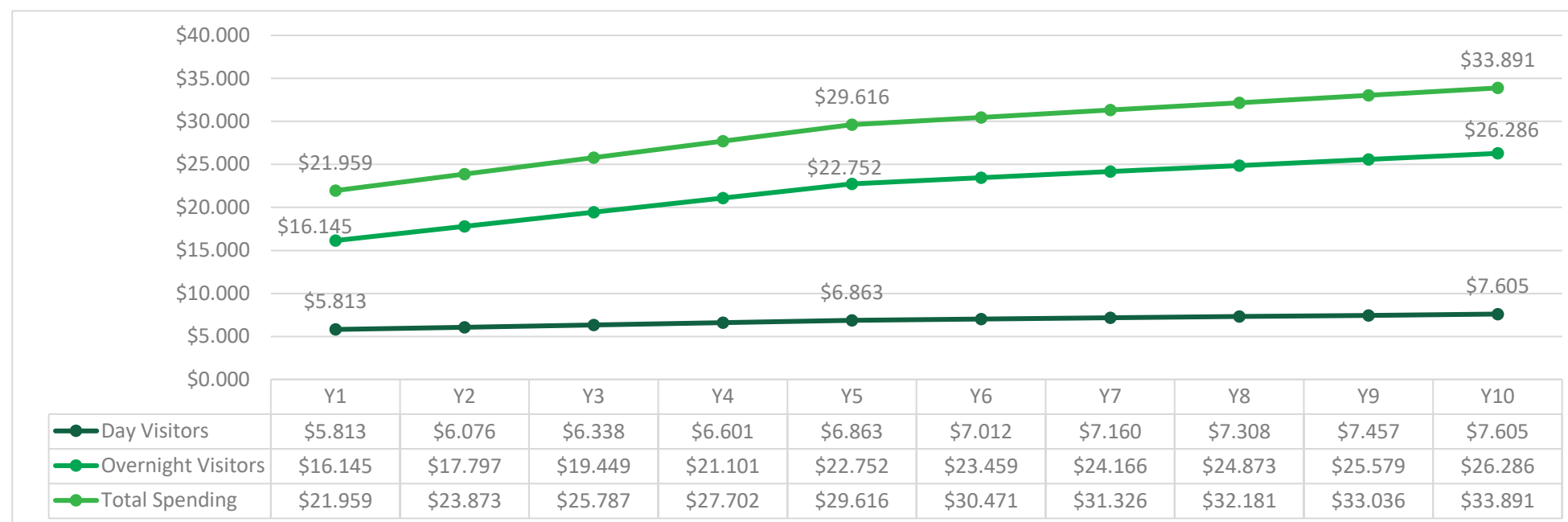
SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## 7.2 Spending in Region by Trail Users

Spending in the region by MTB users was analysed and estimated. The assumptions used in estimation are outlined in Appendix A. Spending estimates are based on assumed average spending per person, for each category of rider. For example, intermediate and advanced and experts spend more than beginners and novices and stay for a longer period. All spending is in constant 2021 dollars.

Estimated spending in the Yarra Ranges LGA by trail users would increase from \$21.9 million in year 1 (\$16.1 million overnights and \$5.8 million day visitors) to \$33.9 million in year 10 (\$26.3 million overnights and \$7.6 million day visitors).

**Table 15.** Case 3 No Drop A K – Spending in Region (\$million 2021 prices)



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

Spending was estimated for the locations that the trail users come from and is in the table below.

**Table 16.** Case 3 No Drop A K: Trail User Spending in the Region (\$million 2021 prices)

Case 3 No Drop A K	Year 1			Year 5			Year 10		
Residence of Trail Users	Day	Overnight	Total	Day	Overnight	Total	Day	Overnight	Total
Yarra Ranges LGA	\$1.462	\$0.000	\$1.462	\$1.626	\$0.000	\$1.626	\$1.699	\$0.000	\$1.699
Total Metro & Adjacent Areas	\$3.923	\$7.008	\$10.931	\$4.580	\$8.106	\$12.686	\$5.135	\$8.975	\$14.110
<b>Total Yarra Ranges &amp; Areas</b>	<b>\$5.384</b>	<b>\$7.008</b>	<b>\$12.393</b>	<b>\$6.207</b>	<b>\$8.106</b>	<b>\$14.313</b>	<b>\$6.834</b>	<b>\$8.975</b>	<b>\$15.809</b>
<b>Other</b>									
Other Regional	\$0.259	\$5.057	\$5.316	\$0.288	\$5.619	\$5.907	\$0.316	\$6.181	\$6.498
Interstate	\$0.170	\$4.079	\$4.250	\$0.199	\$4.759	\$4.958	\$0.227	\$5.439	\$5.666
Internationals	\$0.000	\$0.000	\$0.000	\$0.171	\$4.268	\$4.438	\$0.227	\$5.691	\$5.918
<b>Total Other</b>	<b>\$0.429</b>	<b>\$9.137</b>	<b>\$9.566</b>	<b>\$0.657</b>	<b>\$14.647</b>	<b>\$15.303</b>	<b>\$0.771</b>	<b>\$17.311</b>	<b>\$18.082</b>
<b>Total All Areas</b>	<b>\$5.813</b>	<b>\$16.145</b>	<b>\$21.959</b>	<b>\$6.863</b>	<b>\$22.752</b>	<b>\$29.616</b>	<b>\$7.605</b>	<b>\$26.286</b>	<b>\$33.891</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## 7.3 Spending Mix

The following table shows indicative estimates of the mix of spending by category for day visitors and for overnight visitors. In year 10 trail users would be injecting \$33.9 million in the regional economy, up from \$21.9 million in year 1.

Total expenditure comprises:

- spending on trail-linked activities (including spending on bike related expenses and other spending - food and beverage etc.) in proximity to the trails
- spending on accommodation (for overnight stayers) and meals during their stay
- spending on other recreational and tourism services

While some of this spending would be serviced by existing businesses, it will encourage new businesses to service a growing visitor market. This is particularly the case with biking related spending (e.g., bike hire, guides/trainers and shuttles).

**Table 17.** Case 3 No Drop A K: Spending in the Region by Type (\$million 2021 prices)

Case 3 No Drop A K Type of Spending (\$ million)	Share of Spending	Year 1	Year 5	Year 10
	%			
Total Day Visitors				
Food	65%	\$3.779	\$4.461	\$4.943
Bike Hire	15%	\$0.872	\$1.030	\$1.141
Guides	5%	\$0.291	\$0.343	\$0.380
Shuttle	15%	\$0.872	\$1.030	\$1.141
Total Spending - Day Visitors		\$5.813	\$6.863	\$7.605
Total Overnight Visitors				
Food & Accommodation	60%	\$9.687	\$13.651	\$15.772
Bike Hire	20%	\$3.229	\$4.550	\$5.257
Guides	5%	\$0.807	\$1.138	\$1.314
Shuttle	15%	\$2.422	\$3.413	\$3.943
Total Spending Overnights		\$16.145	\$22.752	\$26.286
Total Users				
Food & Accommodation		\$16.695	\$22.663	\$25.972
Bike Hire		\$4.101	\$5.580	\$6.398
Guides		\$1.098	\$1.481	\$1.695
Shuttle		\$3.294	\$4.442	\$5.084
Total Spending Users		\$21.959	\$29.616	\$33.891

SOURCE: MCA MODELLING & ESTIMATES, JULY 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.



## 8 Economic Impacts of Warburton MTB Trails – Construction Phase

The economic impacts of the trail developments are modelled for both the construction phase and the operations phases.

The impacts are measured in terms of:

- full time equivalent jobs (FTE)
- the increase in regional income that is generated by trail users and their spending in the region.<sup>13</sup>

This section covers the construction phase impacts.

A significant number of jobs and an increase in regional income will be generated during the construction phase of the project.

### 8.1 Construction Costs

In modelling construction jobs, we used the cost components that are associated with trails and other facilities construction, and these total \$15.090 million for Stage 1 and Stage 2

**Table 18.** Construction Costs – Warburton Trails Project (\$2020)

Staging of Trail	Timing	Costs
Construction		(\$2020)
<b>STAGE 1</b>		
<b>Trail Construction Stage 1 ( 110 kms)</b>	<b>Sept .2021</b>	
Section 1 35 kms	Sept 2021-Feb 2022	\$1,400,000
Section 2 35 kms	Mar 2022-Aug 2022	\$1,400,000
Section 3 35 kms	Sept 2022-Jan 2023	\$1,400,000
<b>Total</b>		<b>\$4,200,000</b>
<b>Other Infrastructure - Stage 1</b>		
Main Bridge Warby Highway		\$2,000,000
Bridge- Old Warby Highway		\$400,000
Trail Heads		\$1,500,000
Minor Bridges, trail infrastructures & boardwalks		\$2,000,000
Final design work		\$450,000
Signage, fencing, environmental works		\$750,000
<b>Total Other</b>		<b>\$7,100,000</b>
<b>Stage 1 Cost</b>		<b>\$11,300,000</b>
<b>STAGE 2</b>		
Construction Stage 2 Section 4 (76 kms)	Sept 2024-Jan 2025	\$3,040,000
Other Infrastructure – Stage 2		\$750,000
<b>Stage 2 Cost</b>		<b>\$3,790,000</b>
<Subject to funding - indicative only>		
<b>Total Project Cost</b>		<b>\$15,090,000</b>

SOURCE: YARRA RANGES COUNCIL SEPTEMBER 2020. AN ADDITIONAL \$2 MILLION IS BEING SPENT ON DESIGN, STUDIES AND PLANNING APPROVAL COSTS.

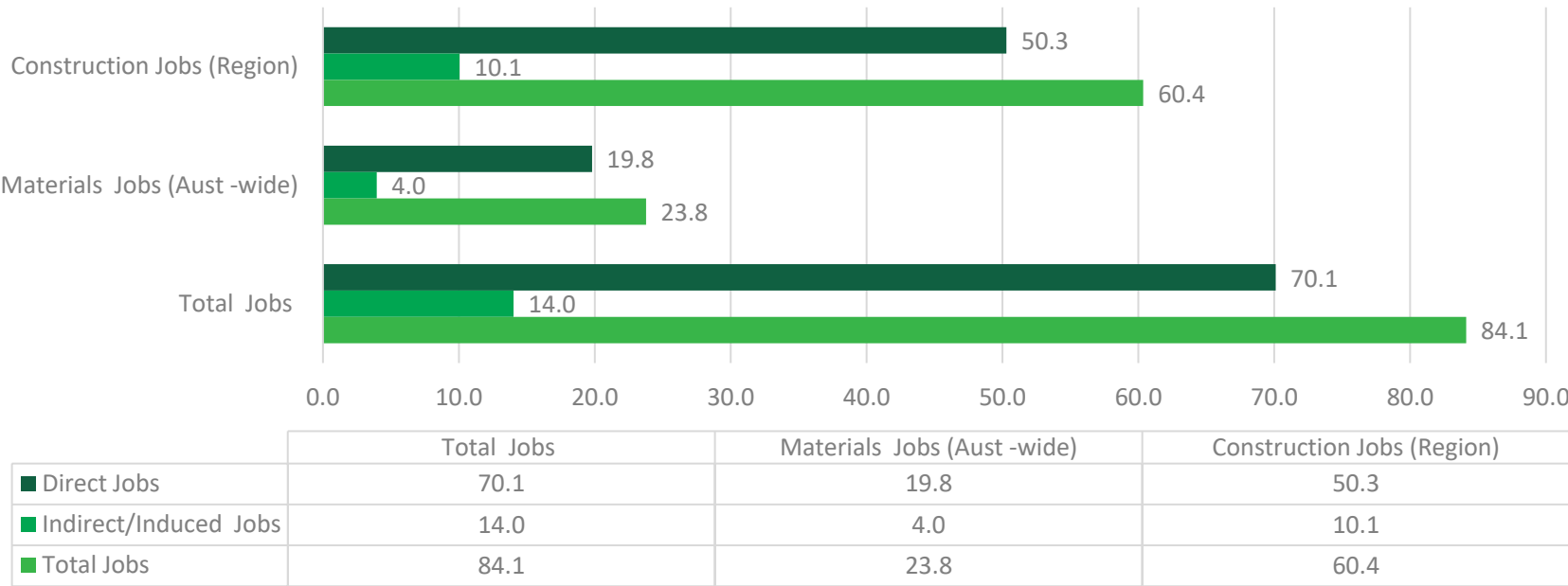
<sup>13</sup> Regional income is the total net income generated from the activity and covers wages and salaries of employees and profits of businesses within the region. It includes income generated directly within the business and indirect income, which is generated in other regional businesses (wages and profits) from the multiplier impacts of employee spending on the region. In the

modelling of income generated, income tax and GST on spending, are both treated as leakages from the region.

## 8.2 Jobs Generated

A total of 84.1 FTE jobs (70.1 direct jobs and 14.1 indirect/induced jobs) would be generated during the construction period. The direct jobs comprise 50.3 jobs in on-site construction and 19.8 jobs in materials/equipment supply. The EES Report indicates that construction of the trails would be undertaken by teams of 3-4 persons.<sup>14</sup>

**Figure 17.** Warburton Trails Construction (Stages 1 and 2) – Total FTE Jobs (no.)



SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

<sup>14</sup> EES Report Chapter 3 – Project Description Warburton Mountain Bike Destination Project, Yarra Ranges Council P24

**Table 19.** Warburton Trails Stage 1 Construction FTE Jobs (no.)

Warburton Trail Construction Jobs	Direct Jobs	Indirect/Induced Jobs	Total Jobs
<b>Stage 1 - Trail</b>			
Construction Jobs (Region)	14.0	2.8	16.8
Materials Jobs (Aust -wide)	5.5	1.1	6.6
<b>Total Jobs - Construction Phase</b>	<b>19.5</b>	<b>3.9</b>	<b>23.4</b>
<b>Stage 1 - Infrastructure</b>			
Construction Jobs (Region)	23.7	4.7	28.4
Materials Jobs (Aust -wide)	9.3	1.9	11.2
<b>Total Jobs - Construction Phase</b>	<b>33.0</b>	<b>6.6</b>	<b>39.6</b>
<b>Total Stage 1</b>			
Construction Jobs (Region)	37.7	7.5	45.2
Materials Jobs (Aust -wide)	14.8	3.0	17.8
<b>Total Jobs - Construction Phase</b>	<b>52.5</b>	<b>10.5</b>	<b>63.0</b>

SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

**Table 20.** Warburton Trails Stage 2 Construction FTE Jobs Generated (no.)

Warburton Trail Construction Jobs	Direct Jobs	Indirect/Induced Jobs	Total Jobs
<b>Stage 2 - Trail</b>			
Construction Jobs (Region)	10.1	2.0	12.2
Materials Jobs (Aust -wide)	4.0	0.8	4.8
<b>Total Jobs - Construction Phase</b>	<b>14.1</b>	<b>2.8</b>	<b>16.9</b>
<b>Stage 2 - Infrastructure</b>			
Construction Jobs (Region)	2.5	0.5	3.0
Materials Jobs (Aust -wide)	1.0	0.2	1.2
<b>Total Jobs - Construction Phase</b>	<b>3.5</b>	<b>0.7</b>	<b>4.2</b>
<b>Total Stage 2</b>			
Construction Jobs (Region)	12.6	2.5	15.2
Materials Jobs (Aust -wide)	5.0	1.0	6.0
<b>Total Jobs - Construction Phase</b>	<b>17.6</b>	<b>3.5</b>	<b>21.1</b>

SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

## 8.3 Regional Income

Construction will provide a boost to regional income - a total of \$9.054 million over Stage 1 and Stage 2. This assumes that most of the construction workforce will be from the Warburton/Yarra Ranges LGA and adjacent areas.

**Table 21.** Warburton Trails Construction Regional Income Generated (\$million – 2021 prices)

Warburton Trail Construction Regional Income	Direct Regional Income	Indirect/Induced Income	Total Regional Income
<b>Stage 1 - Total</b>			
Regional Income	\$5.650	\$1.130	\$6.780
<b>Stage 2 -Total</b>			
Regional Income	\$1.895	\$0.379	\$2.274
<b>Total Project</b>			
Regional Income	\$7.545	\$1.509	\$9.054

SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. NOTE SOME DIFFERENCES DUE TO ROUNDING.

## 9 Case 1: Base Case Operations Phase – Regional Economic Impacts

The operations phase regional economic impacts of the trails are driven by the expenditure of visitors/users in towns adjacent to the trail and in the broader region.

MCA's regional economic model is used to estimate the employment and income impacts of the trail. The model allocates spending across relevant industry sectors and takes account of the significant shares of the gross spending by visitors/users, which leaks out of the region.<sup>15</sup>

### 9.1 Employment Impacts – Jobs Generated

The charts and tables below show the increase in jobs in the region generated by each of the user/visitor groups. In summary:

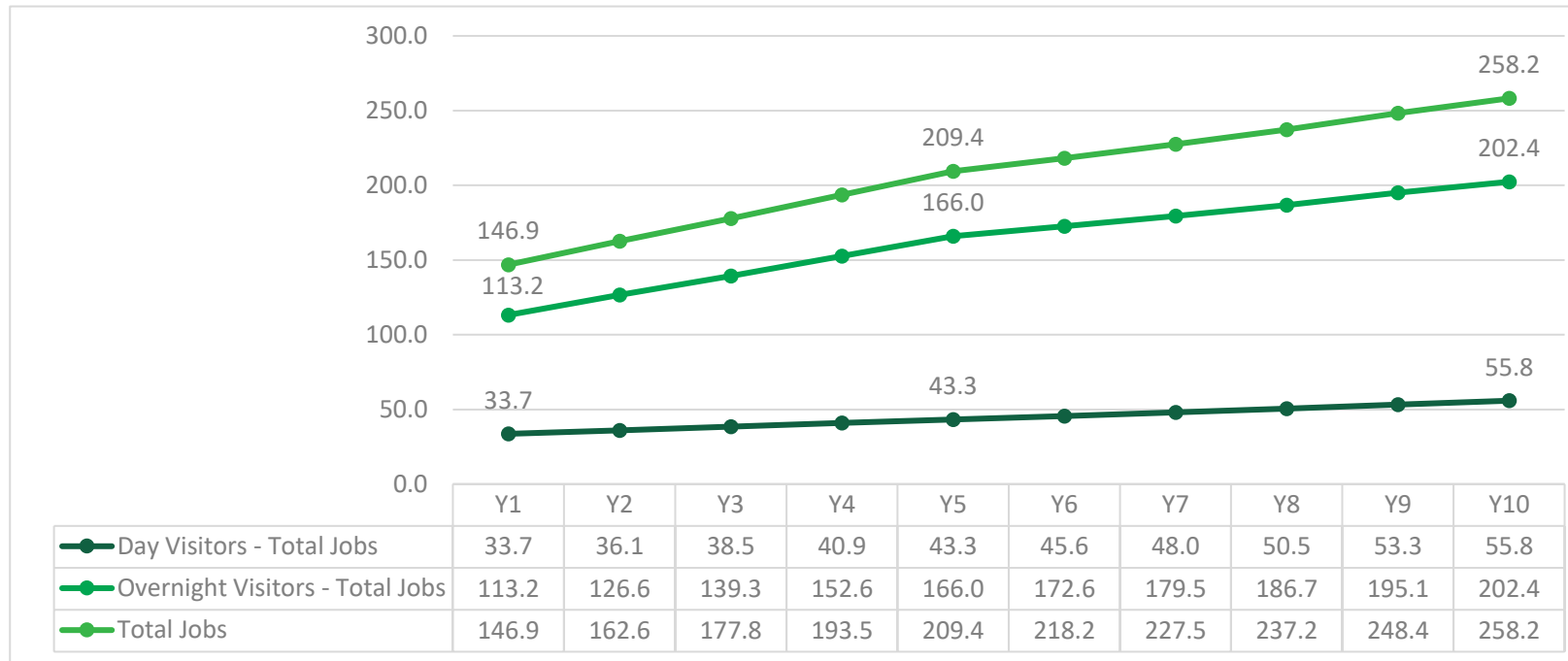
- The operation of the trails (no events) would generate a total of 146.9 full-time equivalent jobs in year 1, increasing to 258.2 FTE jobs in year 10.
- Of the total jobs in year 10, day visitors would account for 55.8 FTE jobs, overnight visitors for 202.4 FTE jobs.
- An events program would create an equivalent of 13.8 FTE additional jobs in year 10 for a total of 272 FTE jobs (see Appendix B).

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<sup>15</sup> The spending by trail users is not the economic impact and does not represent the increase in regional income. There is a major leakage of this spending out of the region due to: the GST (10%); and a significant component of the value of services and products purchased by visitors comes from outside the region (e.g., food ingredients, soft drinks, beer, consumer

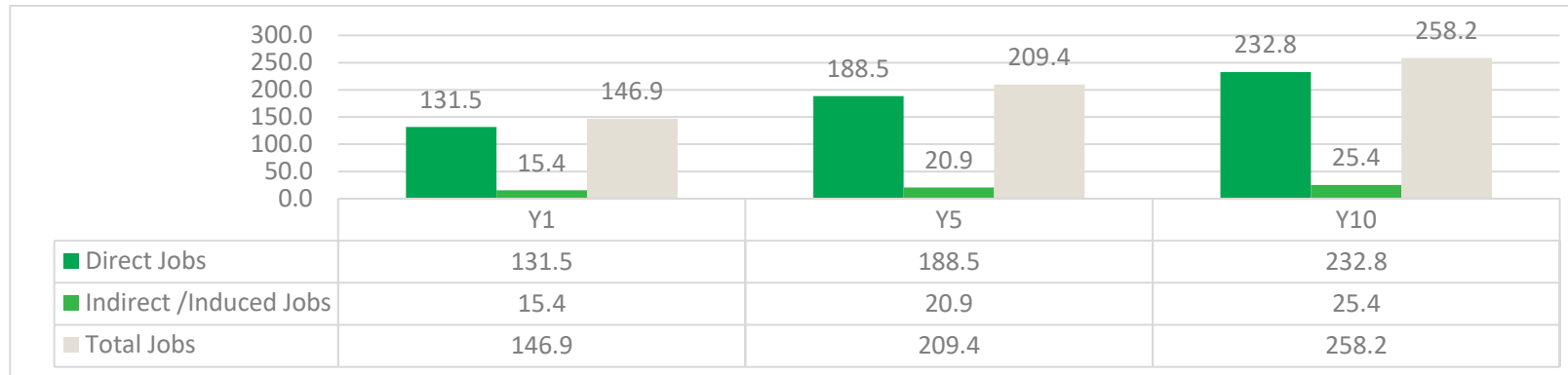
products bought etc.). The model takes account of these leakages and estimates employment impacts and the increase in regional income.

**Figure 18.** Case 1 Base Case Jobs Generated by Trail Operations (FTE no.)



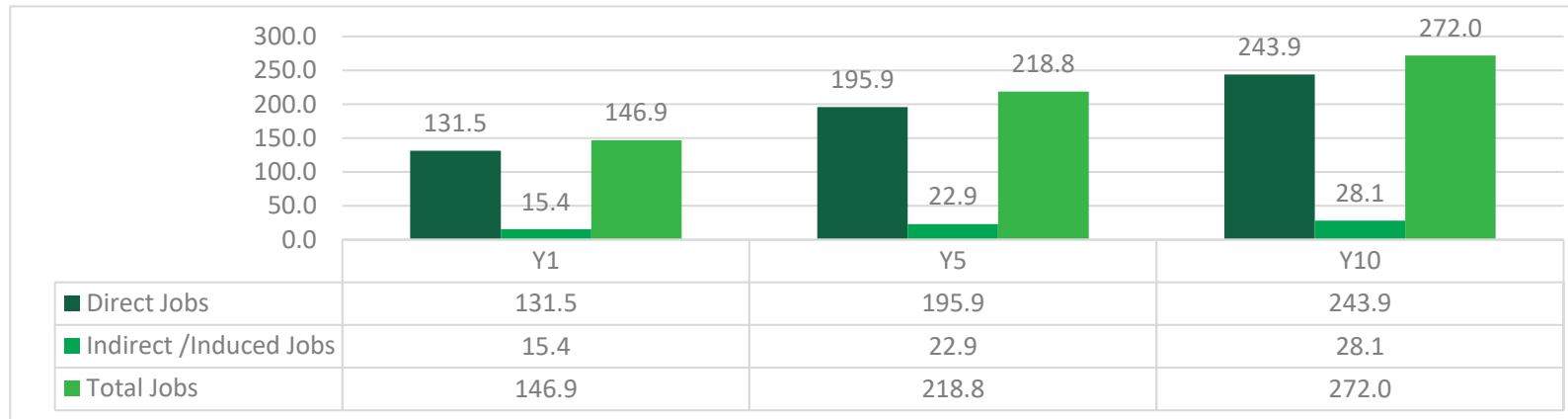
SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Figure 19.** Case 1 Base Case Jobs Generated by Trail Operations (no events) (FTE no.)



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021 NOTE SOME DIFFERENCES DUE TO ROUNDING.

**Figure 20.** Case 1 Base Case Jobs Generated by Trail Operations (with events) (FTE no.)



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021 NOTE SOME DIFFERENCES DUE TO ROUNDING.

**Table 22.** Case 1 Base Case Jobs Generated by Trail Operations (no events) (FTE no.)

Case 1. BASE CASE - Jobs Generated (FTE)	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Day Visitors – Trail Users										
Direct Jobs	29.8	31.9	34.0	36.2	38.3	40.5	42.8	45.0	47.3	49.5
Indirect/Induced	3.9	4.2	4.5	4.7	5.0	5.1	5.2	5.5	6.0	6.3
<b>Total Jobs - Day Visitors</b>	<b>33.7</b>	<b>36.1</b>	<b>38.5</b>	<b>40.9</b>	<b>43.3</b>	<b>45.6</b>	<b>48.0</b>	<b>50.5</b>	<b>53.3</b>	<b>55.8</b>
Overnight Visitors – Trail Users										
Direct Jobs	101.8	113.9	126.0	138.1	150.2	156.8	163.5	170.1	176.7	183.3
Indirect/Induced	11.5	12.7	13.3	14.5	15.8	15.7	16.0	16.6	18.3	19.0
<b>Total Jobs - Overnight Visitors</b>	<b>113.2</b>	<b>126.6</b>	<b>139.3</b>	<b>152.6</b>	<b>166.0</b>	<b>172.6</b>	<b>179.5</b>	<b>186.7</b>	<b>195.1</b>	<b>202.4</b>
Total Visitors – Trail Users										
Direct Jobs	131.5	145.8	160.0	174.3	188.5	197.4	206.2	215.1	224.0	232.8
Indirect/Induced	15.4	16.8	17.8	19.2	20.9	20.8	21.2	22.1	24.4	25.4
<b>Total All Jobs</b>	<b>146.9</b>	<b>162.6</b>	<b>177.8</b>	<b>193.5</b>	<b>209.4</b>	<b>218.2</b>	<b>227.5</b>	<b>237.2</b>	<b>248.4</b>	<b>258.2</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021 NOTE SOME DIFFERENCES DUE TO ROUNDING.



**Table 23.** Case 1 Base Case Total Jobs Generated by Trails Operations (with events) (FTE no.)

Operations: Jobs Generated by Trail Users/Visitors	Y1	Y5	Y10
<b>Day Users/Visitors</b>			
Direct Jobs	29.8	38.3	49.5
Indirect/Induced Jobs	3.9	5.0	6.3
<b>Total Jobs</b>	<b>33.7</b>	<b>43.3</b>	<b>55.8</b>
<b>Overnight User/Visitors</b>			
Direct Jobs	101.8	150.2	183.3
Indirect/Induced Jobs	11.5	15.8	19.0
<b>Total Jobs</b>	<b>113.2</b>	<b>166.0</b>	<b>202.4</b>
<b>Events</b>			
Direct Jobs	0	7.4	11.1
Indirect/Induced Jobs	0	2.1	2.7
<b>Total Jobs</b>	<b>0</b>	<b>9.4</b>	<b>13.8</b>
<b>Total All Users/Visitors (no events)</b>			
Direct Jobs	131.5	188.5	232.8
Indirect/Induced Jobs	15.4	20.9	25.4
<b>Total Jobs</b>	<b>146.9</b>	<b>209.4</b>	<b>258.2</b>
<b>Total All Users/Visitors (with events)</b>			
Direct Jobs	131.5	195.9	243.9
Indirect/Induced Jobs	15.4	23.0	28.1
<b>Total Jobs</b>	<b>146.9</b>	<b>218.9</b>	<b>272.0</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

## 9.2 Jobs by Industry

On a sector basis, the jobs (FTE- direct and indirect) generated by trail users are mainly concentrated in:

- accommodation
- food and beverage
- recreational services and other visitor services
- transport (including shuttles), and
- other retail.

The creation of the trails will see the development of local MTB service industry. The industry analysis highlights that total full time equivalent (FTE) jobs generated by trail users in year 10 would be in:

- recreation services/other services (MTB hire, guides, equipment etc.) 60.7 jobs
- transport (including shuttles and other transport) 24.4 jobs
- accommodation 72.8 jobs
- food and beverage 73.3 jobs.

The follow table shows estimates for day visitors and overnight visitors (no events).

**Table 24.** Case 1 Base Case Total Jobs Generated by Trail Operations y Industry (no events) (FTE no.)

Case 1 Base Case –ALL JOBS	Year 1	Year 5	Year 10
<b>Day Visitors</b>			
Accommodation	0.0	0.0	0.0
Food & Beverage	11.7	15.0	19.4
Other retail	3.5	4.5	5.8
Health	0.3	0.4	0.5
Transportation	4.0	5.2	6.6
Communication	0.1	0.1	0.2
Recreation Services/Other Services	13.4	17.2	22.2
Education	0.2	0.2	0.3
Miscellaneous	0.5	0.6	0.8
<b>Total</b>	<b>33.7</b>	<b>43.3</b>	<b>55.8</b>
<b>Overnight Visitors</b>			
Accommodation	40.4	59.7	72.8
Food & Beverage	30.1	44.2	53.9
Other retail	8.0	11.7	14.2
Health	0.9	1.3	1.6
Transportation	10.0	14.6	17.8
Communication	0.3	0.5	0.6
Recreation Services/Other Services	21.5	31.6	38.5
Education	0.5	0.7	0.9
Miscellaneous	1.3	1.8	2.2
<b>Total</b>	<b>113.2</b>	<b>166.0</b>	<b>202.4</b>
<b>Total All Jobs (No Events)</b>			
Accommodation	40.4	59.7	72.8
Food & Beverage	41.8	59.2	73.3
Other Retail	11.5	16.2	20.0
Health	1.3	1.7	2.1
Transportation	14.0	19.7	24.4
Communication	0.4	0.6	0.7
Recreation Services/Other Services	34.9	48.8	60.7
Education	0.7	1.0	1.2
Miscellaneous	1.8	2.4	3.0
<b>Total All Jobs</b>	<b>146.9</b>	<b>209.4</b>	<b>258.2</b>

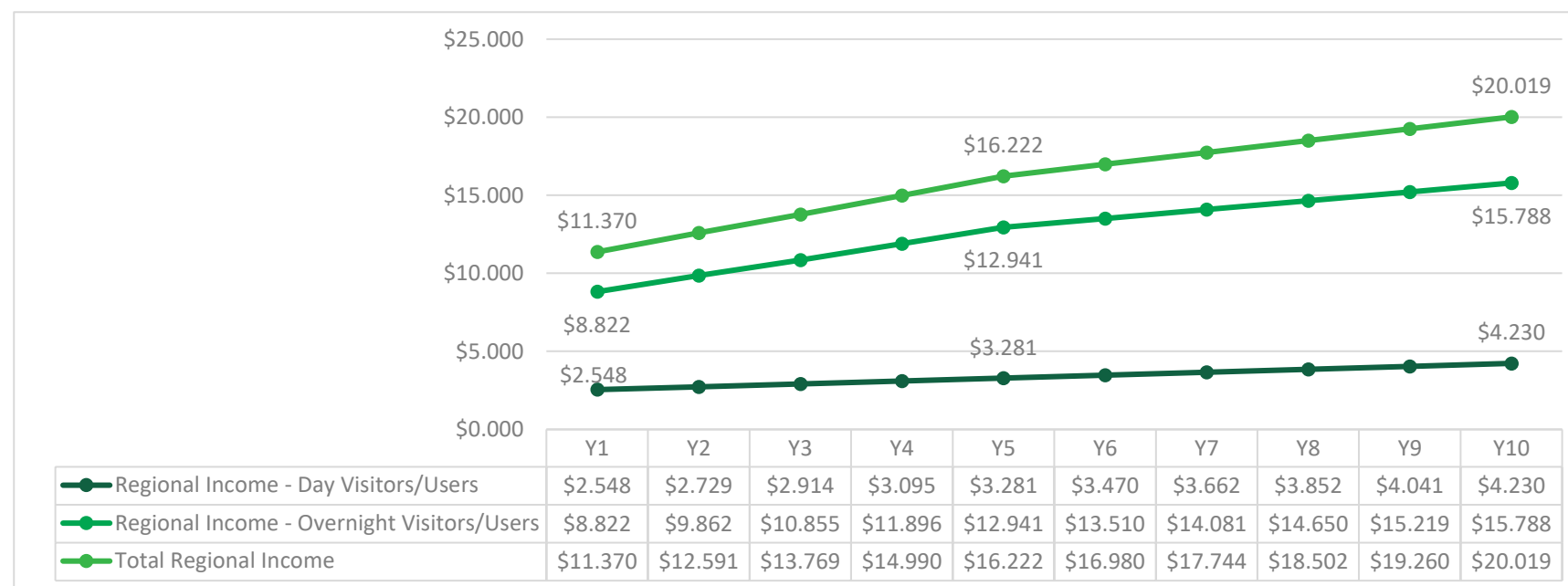
SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

## 9.3 Regional Income Impacts

The increase in regional income (in constant 2021 prices) generated annually by the operation of the trails and visitor/user spending totals around \$11.4 million in year 1, increasing to \$20.0 million in year 10.<sup>16</sup>

The increase in income (direct and indirect/induced) generated by day visitors/users (including locals and other users) is \$2.5 million in year 1 and \$4.2 million in year 10. Overnight users/visitors boost total regional income by \$8.8 million in year 1 and \$15.8 million in year 10.

**Table 25.** Case 1 Base Case – Regional Income Generated (no events) (\$ million 2021 prices)



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

<sup>16</sup> Regional income is the total net income generated from the activity and covers wages and salaries of employees and profits of businesses within the region. It includes income generated directly within the business and indirect income, which is generated in other regional businesses (wages and profits) from the multiplier impacts of employee spending on the region. In the modelling of income generated, income tax and GST on spending, are both treated as leakages from the region.

**Table 26.** Case 1 Base Case Regional Income Generated (\$million 2021 prices)

CASE 1. BASE CASE Regional Income \$ million (2020 prices)	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total 10 Years
<b>Day Visitors</b>											
Direct Income	\$2.254	\$2.415	\$2.577	\$2.738	\$2.900	\$3.069	\$3.239	\$3.409	\$3.578	\$3.748	\$29.927
Indirect/Induced	\$0.294	\$0.313	\$0.338	\$0.356	\$0.381	\$0.401	\$0.423	\$0.443	\$0.463	\$0.483	\$3.895
<b>Total Income</b>	<b>\$2.548</b>	<b>\$2.729</b>	<b>\$2.914</b>	<b>\$3.095</b>	<b>\$3.281</b>	<b>\$3.470</b>	<b>\$3.662</b>	<b>\$3.852</b>	<b>\$4.041</b>	<b>\$4.230</b>	<b>\$33.822</b>
<b>Overnight Visitors</b>											
Direct Income	\$7.962	\$8.909	\$9.857	\$10.805	\$11.753	\$12.271	\$12.789	\$13.307	\$13.826	\$14.344	\$115.824
Indirect/Induced	\$0.860	\$0.953	\$0.998	\$1.090	\$1.188	\$1.239	\$1.292	\$1.343	\$1.394	\$1.444	\$11.801
<b>Total Income</b>	<b>\$8.822</b>	<b>\$9.862</b>	<b>\$10.855</b>	<b>\$11.896</b>	<b>\$12.941</b>	<b>\$13.510</b>	<b>\$14.081</b>	<b>\$14.650</b>	<b>\$15.219</b>	<b>\$15.788</b>	<b>\$127.625</b>
<b>Total Visitors</b>											
Direct Income	\$10.215	\$11.325	\$12.434	\$13.543	\$14.653	\$15.341	\$16.028	\$16.716	\$17.404	\$18.092	\$145.751
Indirect/Induced	\$1.155	\$1.266	\$1.335	\$1.447	\$1.569	\$1.640	\$1.715	\$1.786	\$1.856	\$1.927	\$15.696
<b>Total Income</b>	<b>\$11.370</b>	<b>\$12.591</b>	<b>\$13.769</b>	<b>\$14.990</b>	<b>\$16.222</b>	<b>\$16.980</b>	<b>\$17.744</b>	<b>\$18.502</b>	<b>\$19.260</b>	<b>\$20.019</b>	<b>\$161.447</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

Total regional income over 10 years for all visitors is \$161.5 million.

**Table 27.** Case 1 Base Case Increase in Regional Income – Total 10 Years (\$million 2021 prices)

Regional Income Total 10 Years	Day Visitors/Users \$m	Overnight Visitors/Users \$m	Total Visitors/Users \$m
Direct Income	\$29.927	\$115.824	\$145.751
Indirect/Induced Income	\$3.895	\$11.801	\$15.696
<b>Total Income</b>	<b>\$33.822</b>	<b>\$127.625</b>	<b>\$161.447</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

## 9.4 Benefit Cost Analysis

The benefits and costs of the Warburton MTB Trails are analysed for a 10-year period.

### 9.4.1 Trail Costs – 10 Years

The estimated construction cost of the trails is \$17.1 million (Stage 1 & 2), and 10-year maintenance costs are \$4.8 million for a total 10-year cost of \$21.9 million. See Appendix D for details.

### 9.4.2 Measuring Benefits – 10 Years

The measured benefits of the Warburton MTB Trails comprise the increase in regional income generated by trail users, the health benefits, and a notional consumer value to users of the trails.

#### Increase in Regional Income

The increase in regional income generated by trail users spending over a 10-year period totals \$161.4 million (in constant \$2021 prices).

**Table 28.** Case 1 Base Case Regional Income Generated by Trail Users (\$m 2021 prices)

Regional Income Total 10 Years	Day Visitors/Users \$m	Overnight Visitors/Users \$m	Total Visitors/Users \$m
Direct Income	\$29.927	\$115.824	\$145.751
Indirect/Induced Income	\$3.895	\$11.801	\$15.696
<b>Total Income</b>	<b>\$33.822</b>	<b>\$127.625</b>	<b>\$161.447</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021 NOTE SOME DIFFERENCES DUE TO ROUNDING.

#### Health Benefits

A report by Marsden Jacobs Associates indicates that exercise of cycling/active walking in Victorian Parks has net healthcare benefits (in terms of avoided health costs) of \$15 per hour in terms of a reduction in lifetime health costs (adjusted for injury).<sup>17</sup>

Healthcare benefits are measured as the net (adjusted for injury) avoided costs to the national healthcare system (private costs and government costs) attributable to nature-based outdoor activity.

- For the analysis of these trails, we have assumed an average cycle period of 2.5 hours for beginners & novices and 4 hours for advanced and experts (and average of \$10 per hour). Health benefits are measured for Victorian users only (i.e., residents of Yarra Ranges LGA, Melbourne Metro area and regional Victoria).
- This indirect health benefit is estimated at \$48.2 million (in constant prices \$2021) over the 10-year period or an average of \$4.8 million per year.

<sup>17</sup> Victoria's Nature-Based Outdoor Economy- Key Estimates and Recommendations, Marsden Jacobs Associates, January 2016 P10 & 21.

**Table 29.** Case 1 Base Case Health Benefits Estimates (\$ million 2021 prices)

Case 1. Base Case Health Benefits Valuation		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total 10 Years
Ave hours	Standard											
2.5	Beginner	\$0.656	\$0.715	\$0.773	\$0.832	\$0.891	\$0.937	\$0.984	\$1.030	\$1.077	\$1.123	\$9.019
2.5	Novice	\$0.967	\$1.046	\$1.126	\$1.206	\$1.285	\$1.353	\$1.420	\$1.487	\$1.554	\$1.621	\$13.064
4	Intermediate	\$2.050	\$2.218	\$2.386	\$2.553	\$2.721	\$2.870	\$3.019	\$3.169	\$3.318	\$3.468	\$27.772
4	Advance & Expert	\$0.603	\$0.649	\$0.695	\$0.741	\$0.787	\$0.829	\$0.872	\$0.914	\$0.957	\$0.999	\$8.044
13	<b>Total All</b>	\$4.275	\$4.627	\$4.979	\$5.332	\$5.684	\$5.989	\$6.295	\$6.600	\$6.906	\$7.212	\$57.899
4	<b>Interstate &amp; Internationals</b>	<b>\$0.480</b>	<b>\$0.620</b>	<b>\$0.760</b>	<b>\$0.900</b>	<b>\$1.040</b>	<b>\$1.088</b>	<b>\$1.136</b>	<b>\$1.184</b>	<b>\$1.232</b>	<b>\$1.280</b>	<b>\$9.720</b>
	<b>Total ( less interstate &amp; internationals)</b>	<b>\$3.795</b>	<b>\$4.007</b>	<b>\$4.219</b>	<b>\$4.432</b>	<b>\$4.644</b>	<b>\$4.901</b>	<b>\$5.159</b>	<b>\$5.416</b>	<b>\$5.674</b>	<b>\$5.932</b>	<b>\$48.179</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

## Consumer User Valuation

In the modelling we have assumed that there are no charges for the use of the trail. However, a valuation can be placed on the experience based on a shadow price or notional charge (what a person may be willing to pay). For the trail we have assumed it to be \$15 per trail ride. This benefit measure totals \$26.7 million (constant prices \$2021) over 10 years for all trail users or an average of \$2.6 million per year.

**Table 30.** Case 1 Base Case Consumer Value Estimates (\$million 2021 prices)

Case 1 Base Case Consumer Value \$ million 2021 prices	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total 10 Years
Beginner	\$0.393	\$0.429	\$0.464	\$0.499	\$0.535	\$0.562	\$0.590	\$0.618	\$0.646	\$0.674	\$5.411
Novice	\$0.580	\$0.628	\$0.676	\$0.723	\$0.771	\$0.812	\$0.852	\$0.892	\$0.932	\$0.973	\$7.838
Intermediate	\$0.769	\$0.832	\$0.895	\$0.957	\$1.020	\$1.076	\$1.132	\$1.188	\$1.244	\$1.300	\$10.415
Advance & Expert	\$0.226	\$0.243	\$0.260	\$0.278	\$0.295	\$0.311	\$0.327	\$0.343	\$0.359	\$0.375	\$3.017
<b>Total All</b>	<b>\$1.968</b>	<b>\$2.131</b>	<b>\$2.295</b>	<b>\$2.458</b>	<b>\$2.621</b>	<b>\$2.761</b>	<b>\$2.901</b>	<b>\$3.042</b>	<b>\$3.182</b>	<b>\$3.322</b>	<b>\$26.681</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

## 9.4.3 Benefit Cost Analysis

### All Benefits

The following table and chart show the benefits and costs of the operations of the trails over a 10-year period. The benefits are measured by:

- the increase in regional income generated by trail users over a 10-year period
- the estimated health benefits
- the user value.

The costs include:

- design and planning
- construction costs
- asset maintenance costs.

For the comparison, the present value of the benefits is calculated using 3 discount rates (4%, 7% and 10%).

**Table 31.** Case 1 Base Case Benefits and Cost Analysis – 10 Years (Constant 2021 prices)

Case 1. Base Case - Total Project	Discount Rate	Discount Rate	Discount Rate
Regional Cost Benefit (\$2021 prices) Period : 10Years	4%	7%	10%
<b>Trail Costs</b>			
Design, Development and Planning Costs	\$2,000,000	\$2,000,000	\$2,000,000
Capital Costs Trails & Infrastructure 2020 (\$)	\$17,090,000	\$17,090,000	\$17,090,000
Costs - Maintenance (10 years)	\$4,797,500	\$4,797,500	\$4,797,500
<b>Total Costs</b>	<b>\$21,887,500</b>	<b>\$21,887,500</b>	<b>\$21,887,500</b>
<b>Direct Benefits (users) (10 years)</b>			
Regional Income Increase	\$161,446,933	\$161,446,933	\$161,446,933
Health Benefits (Vic Users)	\$48,179,295	\$48,179,295	\$48,179,295
User Value (shadow user price)	\$26,680,891	\$26,680,891	\$26,680,891
<b>Total Benefits</b>	<b>\$236,307,119</b>	<b>\$236,307,119</b>	<b>\$236,307,119</b>
<b>Total Benefits (\$) Present Value</b>	<b>\$203,137,640</b>	<b>\$178,426,071</b>	<b>\$159,255,993</b>
<b>Net Present Value (\$) Total Benefits</b>	<b>\$181,250,140</b>	<b>\$156,538,571</b>	<b>\$137,368,493</b>
<b>Benefit Cost Ratio (BCR- All Benefits)</b>	<b>9.3</b>	<b>8.2</b>	<b>7.3</b>
NPV/Cost	8.3	7.2	6.3
<b>Regional Income Only (PV)</b>	<b>\$133,567,475</b>	<b>\$117,326,401</b>	<b>\$105,066,485</b>
<b>BCR (Regional Income only)</b>	<b>5.6</b>	<b>4.9</b>	<b>4.4</b>

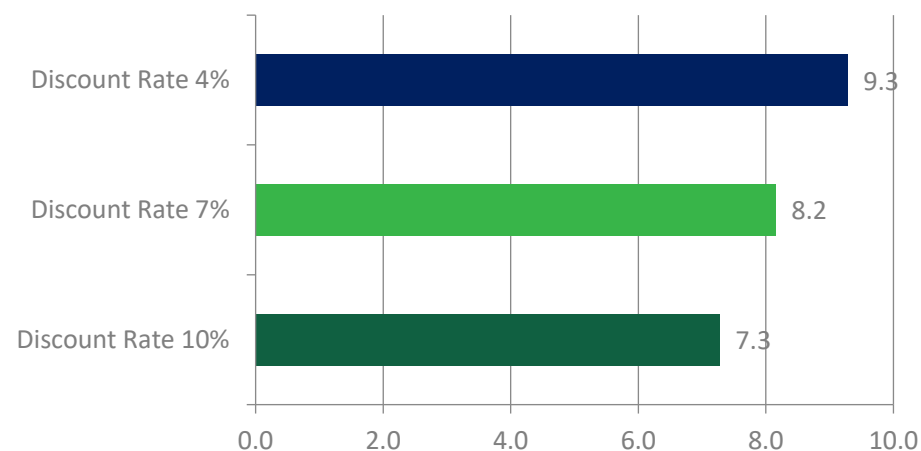
SOURCE: MCA MODELLING & ESTIMATES,AUGUST 2021. NOTE: DIRECT BENEFITS ARE THE VALUE TO USERS OF A FACILITY; USUALLY THIS IS MEASURE BY USER PAYMENTS/FEES. IN THIS CASE THERE ARE NO USER CHARGES FOR THE TRAIL AND A SHADOW PRICE HAS BEEN APPLIED (\$15 PER RIDE) AS A MEASURE OF USER VALUE. THEREFORE, BENEFITS ARE THE INCREASE IN REGIONAL INCOME GENERATED BY VISITOR SPENDING, THE HEALTH BENEFITS OF EXERCISE ACTIVITY AND THE USER VALUE.



The chart below compares Benefit Cost Ratios (BCR) for the 3 discount rates. For a trail project a 7% discount rate is appropriate, and the project yields a positive BCR of 8.2. The present value of total benefits generated by the investment are 8.2 times the total costs of the project over a 10-year period.

If only the increase in regional income is include in the benefits, the BCR is 4.9 (for a 7% discount rate).

**Figure 21.** Case 1 Base Case Benefits Cost Ratio (BCR – All Benefits) Warburton Trail Development



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021.

## 10Case 2: Reduced Trail Network Operations Phase – Regional Economic Impacts

The operations phase regional economic impacts of the trails are driven by the expenditure of visitors/users in towns adjacent to the trail and in the broader region.

MCA's regional economic model is used to estimate the employment and income impacts of the trail. The model allocates spending across relevant industry sectors and takes account of the significant shares of the gross spending by visitors/users, which leaks out of the region.<sup>18</sup>

### 10.1 Employment Impacts – Jobs Generated

The charts and tables below show the increase in jobs in the region generated by each of the user/visitor groups.

- The operation of the trails would generate a total of 94.4 full-time equivalent jobs in year 1, increasing to 144.6 FTE jobs in year 10.
- Of the total jobs in year 10, day visitors would account for 34.0 FTE jobs, overnight visitors for 110.5 FTE jobs.
- An events program would create an equivalent of 13.8 FTE additional jobs in 2031 (see Appendix B).

<sup>18</sup> The spending by trail users is not the economic impact and does not represent the increase in regional income. There is a major leakage of this spending out of the region due to: the GST (10%); and a significant component of the value of services and products purchased by visitors comes from outside the region (e.g., food ingredients, soft drinks, beer, consumer

**Figure 22.** Case 2 Reduced Trails Network Jobs Generated by Trail Operations (no events) (FTE no.)



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

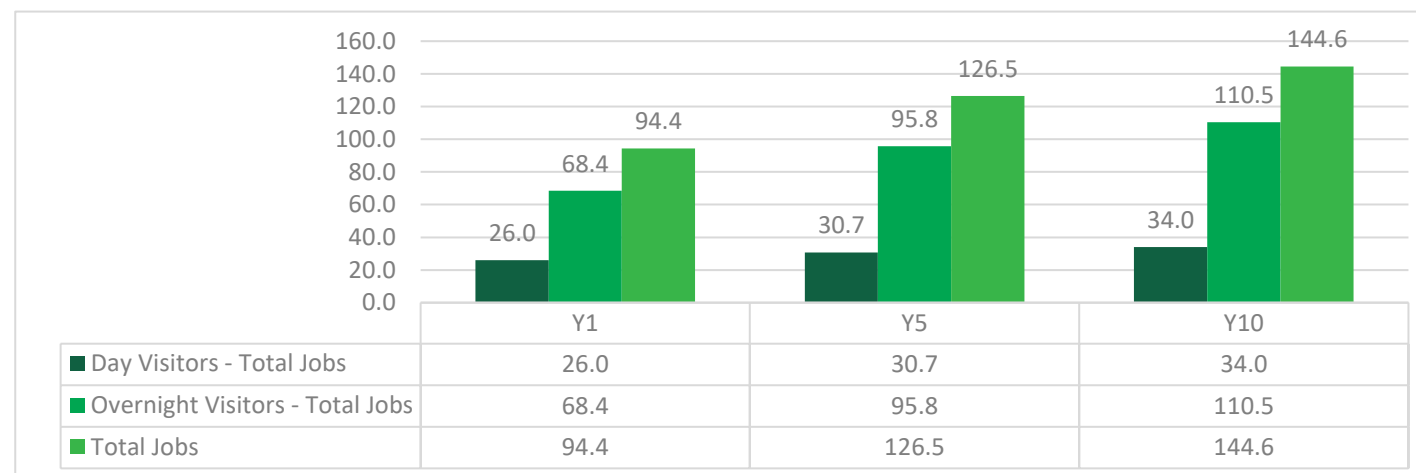
products bought etc.). The model takes account of these leakages and estimates employment impacts and the increase in regional income.

**Table 32.** Case 2 Reduced Trails Network Jobs Generated by Trail Operations (no events) (FTE no.)

Jobs Generated (FTE)	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
<b>Day Visitors – Trail Users</b>										
Direct Jobs	23.0	24.0	25.1	26.1	27.2	27.8	28.4	28.9	29.5	30.1
Indirect/Induced	3.0	3.2	3.3	3.4	3.6	3.5	3.4	3.5	3.8	3.9
<b>Total Jobs - Day Visitors</b>	<b>26.0</b>	<b>27.2</b>	<b>28.4</b>	<b>29.5</b>	<b>30.7</b>	<b>31.2</b>	<b>31.8</b>	<b>32.5</b>	<b>33.3</b>	<b>34.0</b>
<b>Overnight Visitors – Trail Users</b>										
Direct Jobs	61.5	67.8	74.0	80.3	86.6	89.3	92.0	94.7	97.4	100.1
Indirect/Induced	6.9	7.6	7.9	8.5	9.2	9.0	9.1	9.3	10.2	10.5
<b>Total Jobs - Overnight Visitors</b>	<b>68.4</b>	<b>75.3</b>	<b>81.9</b>	<b>88.8</b>	<b>95.8</b>	<b>98.3</b>	<b>101.0</b>	<b>104.0</b>	<b>107.5</b>	<b>110.5</b>
<b>Total Visitors – Trail Users</b>										
Direct Jobs	84.5	91.8	99.1	106.4	113.8	117.1	120.3	123.6	126.9	130.2
Indirect/Induced	9.9	10.7	11.2	11.9	12.7	12.5	12.5	12.8	14.0	14.4
<b>Total All Jobs</b>	<b>94.4</b>	<b>102.5</b>	<b>110.3</b>	<b>118.4</b>	<b>126.5</b>	<b>129.5</b>	<b>132.8</b>	<b>136.4</b>	<b>140.9</b>	<b>144.6</b>

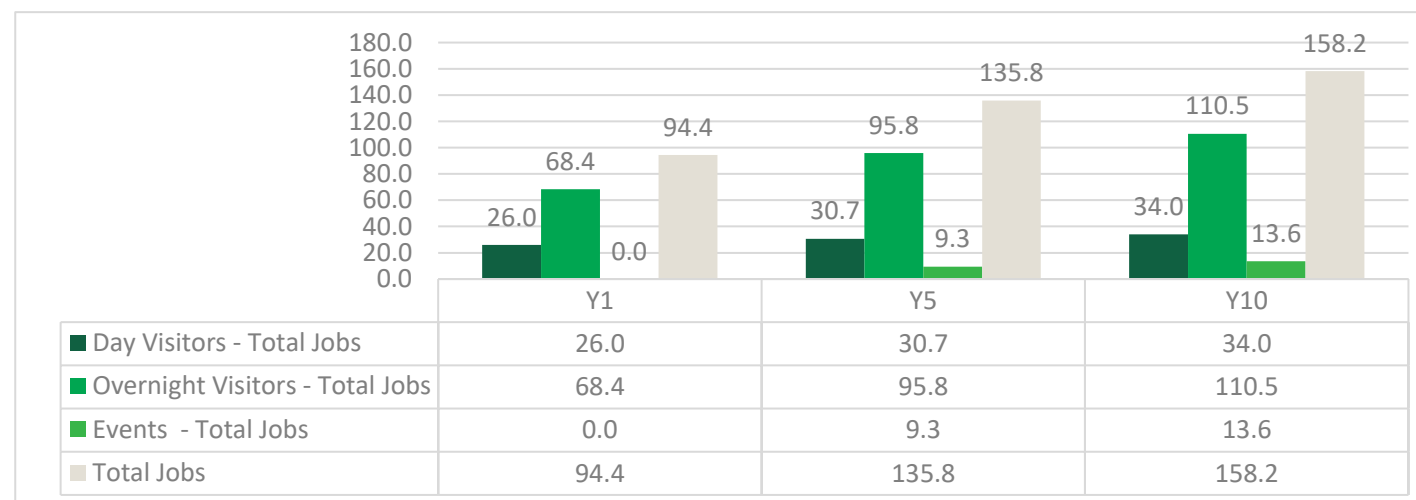
SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

**Figure 23.** Case 2 Reduced Trails Network Total Jobs (no events) (FTE no.)



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

**Figure 24.** Case 2 Reduced Trails Network Total Jobs (with events) (FTE no.)



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

**Table 33.** Case 2 Reduced Trails Network Total Jobs Generated by Trails Operations (FTE no.)

Case 2 Operations: Jobs Generated by Trail Users/Visitors	Year 1	Year 5	Year 10
<b>Day Users/Visitors</b>			
Direct Jobs	23.0	27.2	30.1
Indirect/Induced Jobs	3.0	3.6	3.9
<b>Total Jobs</b>	<b>26.0</b>	<b>30.7</b>	<b>34.0</b>
<b>Overnight User/Visitors</b>			
Direct Jobs	61.5	86.6	100.1
Indirect/Induced Jobs	6.9	9.2	10.5
<b>Total Jobs</b>	<b>68.4</b>	<b>95.8</b>	<b>110.5</b>
<b>Events</b>			
Direct Jobs	0.0	7.4	11.1
Indirect/Induced Jobs	0.0	1.9	2.5
<b>Total Jobs</b>	<b>0.0</b>	<b>9.3</b>	<b>13.6</b>
<b>Total All Users/Visitors (no events)</b>			
Direct Jobs	84.5	113.8	130.2
Indirect/Induced Jobs	9.9	12.7	14.4
<b>Total Jobs</b>	<b>94.4</b>	<b>126.5</b>	<b>144.6</b>
<b>Total All Users/Visitors (with events)</b>			
Direct Jobs	84.5	121.1	141.3
Indirect/Induced Jobs	9.9	14.7	16.9
<b>Total Jobs</b>	<b>94.4</b>	<b>135.8</b>	<b>158.2</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

## 10.2 Jobs by Industry

On a sector basis, the jobs (FTE - direct and indirect) generated by trail users are mainly concentrated in:

- accommodation
- food and beverage
- recreational services and other visitor services
- transport (including shuttles)
- other retail.

The following table shows estimates for day visitors and overnight visitors.

The development of the trails will see the development of local MTB service industry. The industry analysis highlights that total full time equivalent (FTE) jobs generated by trail users in year 10 would be in:

- recreation services/other services (MTB hire, guides, equipment etc.) 34.6 jobs (year 10)
- transport (including shuttles) 13.7 FTE jobs
- accommodation 39.7 jobs, and
- food and beverage 41.2 jobs.

**Table 34.** Case 2 Reduced Trails Network Total Jobs Generated by Industry (no events) (FTE no.)

Case 2 Reduced trail network- Jobs	Year 1	Year 5	Year 10
<b>Day Visitors</b>			
Accommodation	0.0	0.0	0.0
Food & Beverage	9.0	10.7	11.8
Other retail	<b>2.7</b>	<b>3.2</b>	<b>3.5</b>
Health	0.3	0.3	0.3
Transportation	3.1	3.7	4.1
Communication	0.1	0.1	0.1
Recreation Services/Other Services	10.3	12.2	13.5
Education	0.1	0.2	0.2
Miscellaneous	0.4	0.4	0.5
<b>Total</b>	<b>26.0</b>	<b>30.7</b>	<b>34.0</b>
<b>Overnight Visitors</b>			
Accommodation	24.4	34.4	39.7
Food & Beverage	18.2	25.5	29.4
Other retail	4.8	6.7	7.8
Health	0.6	0.7	0.9
Transportation	6.0	8.4	9.7
Communication	0.2	0.3	0.3
Recreation Services/Other Services	13.0	18.2	21.0
Education	0.3	0.4	0.5
Miscellaneous	0.8	1.1	1.2
<b>Total</b>	<b>68.4</b>	<b>95.8</b>	<b>110.5</b>
<b>Total All Jobs</b>			
Accommodation	24.4	34.4	39.7
Food & Beverage	27.2	36.2	41.2
Other Retail	7.6	9.9	11.3
Health	0.8	1.1	1.2
Transportation	9.1	12.1	13.7
Communication	0.3	0.4	0.4
Recreation Services/Other Services	23.3	30.4	34.6
Education	0.5	0.6	0.7
Miscellaneous	1.2	1.5	1.7
<b>Total</b>	<b>94.4</b>	<b>126.5</b>	<b>144.6</b>

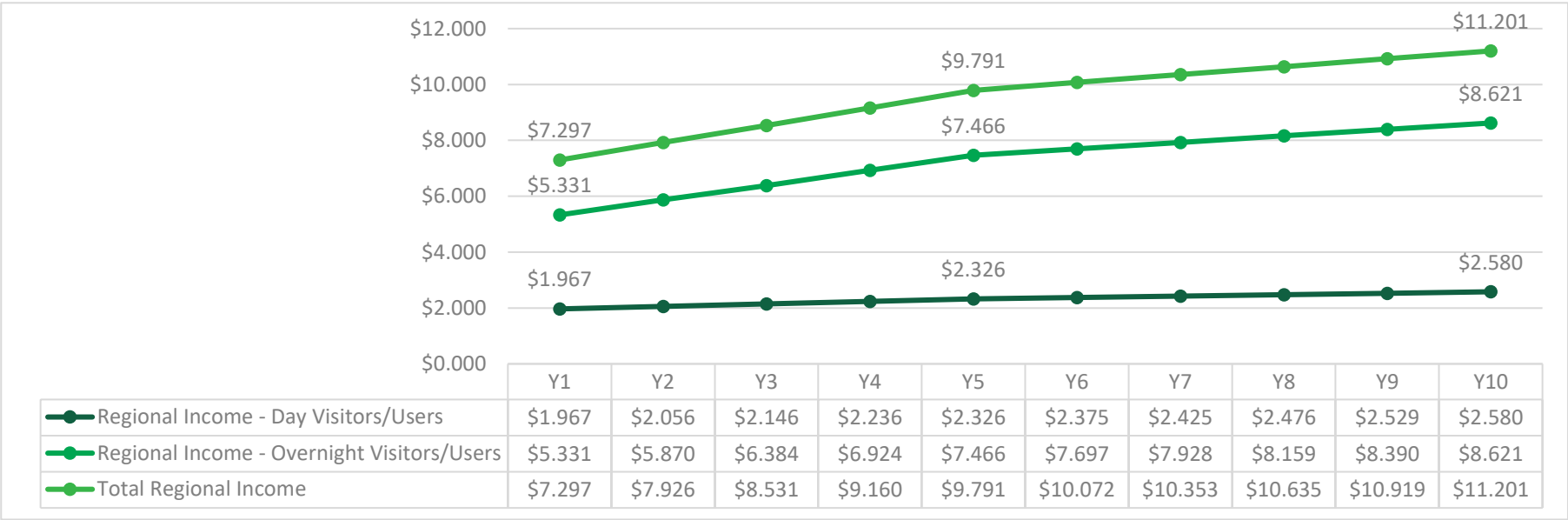
SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

### 10.3 Regional Income Impacts

The increase in regional income (in constant 2021 prices) generated annually by the operation of the trails and visitor/user spending totals \$7.3 million in year 1, increasing to \$11.2 million in year 10.<sup>19</sup>

The increase in income (direct and indirect/induced) generated by day visitors/users (including locals and other users) is around \$2.0 million in year 1 and \$2.6 million in year 10. Overnight users/visitors boost total regional income by \$5.3 million in year 1 and \$8.6 million in year 10. Overnight users/visitors boost total regional income by \$5.3 million in year 1 and \$8.6 million in year 10.

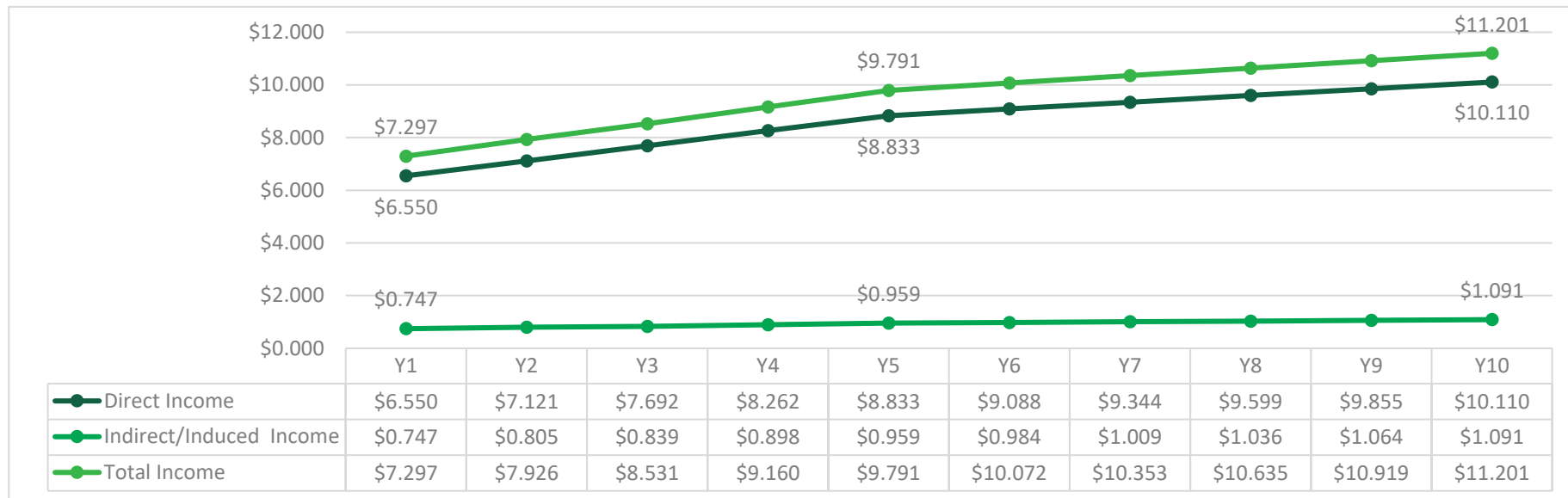
Figure 25. Case 2 Reduced Trails Network Regional Income Generated (\$million 2021 prices)



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

<sup>19</sup> Regional income is the total net income generated from the activity and covers wages and salaries of employees and profits of businesses within the region. It includes income generated directly within the business and indirect income, which is generated in other regional businesses (wages and profits) from the multiplier impacts of employee spending on the region. In the modelling of income generated income tax and GST on spending, are both treated as leakages from the region.

**Figure 26.** Case 2 Reduced Trails Network Regional Income Generated  
(\$million 2021 prices)



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.



**Table 35.** Case 2 Reduced Trails Network Regional Income Generated  
(\$million 2021 prices)

Case 2. Regional Income \$ million (2021 prices)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total 10 Years
<b>Day Visitors</b>											
Direct Income	\$1.739	\$1.819	\$1.898	\$1.978	\$2.057	\$2.102	\$2.147	\$2.192	\$2.237	\$2.282	\$20.451
Indirect/Induced	\$0.227	\$0.238	\$0.248	\$0.258	\$0.269	\$0.273	\$0.278	\$0.284	\$0.292	\$0.298	\$2.666
<b>Total Income</b>	<b>\$1.967</b>	<b>\$2.056</b>	<b>\$2.146</b>	<b>\$2.236</b>	<b>\$2.326</b>	<b>\$2.375</b>	<b>\$2.425</b>	<b>\$2.476</b>	<b>\$2.529</b>	<b>\$2.580</b>	<b>\$23.117</b>
<b>Overnight Visitors</b>											
Direct Income	\$4.811	\$5.302	\$5.793	\$6.285	\$6.776	\$6.986	\$7.197	\$7.407	\$7.618	\$7.828	\$66.004
Indirect/Induced	\$0.520	\$0.568	\$0.591	\$0.639	\$0.690	\$0.710	\$0.731	\$0.752	\$0.772	\$0.793	\$6.766
<b>Total Income</b>	<b>\$5.331</b>	<b>\$5.870</b>	<b>\$6.384</b>	<b>\$6.924</b>	<b>\$7.466</b>	<b>\$7.697</b>	<b>\$7.928</b>	<b>\$8.159</b>	<b>\$8.390</b>	<b>\$8.621</b>	<b>\$72.769</b>
<b>Total Visitors</b>											
Direct Income	\$6.550	\$7.121	\$7.692	\$8.262	\$8.833	\$9.088	\$9.344	\$9.599	\$9.855	\$10.110	\$86.455
Indirect/Induced	\$0.747	\$0.805	\$0.839	\$0.898	\$0.959	\$0.984	\$1.009	\$1.036	\$1.064	\$1.091	\$9.431
<b>Total Income</b>	<b>\$7.297</b>	<b>\$7.926</b>	<b>\$8.531</b>	<b>\$9.160</b>	<b>\$9.791</b>	<b>\$10.072</b>	<b>\$10.353</b>	<b>\$10.635</b>	<b>\$10.919</b>	<b>\$11.201</b>	<b>\$95.886</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

Total regional income over 10 years for all visitors accounted for a total of \$95.9 million.

**Table 36.** Case 2 Reduced Trail Network Regional Income Generated 10 Years  
(\$million 2021 prices)

Case 2 Regional Income Total 10 Years	Day Visitors/Users \$m	Overnight Visitors/Users \$m	Total Visitors/Users \$m
Direct Income	\$20.451	\$66.004	\$86.455
Indirect/Induced Income	\$2.666	\$6.766	\$9.431
<b>Total Income</b>	<b>\$23.117</b>	<b>\$72.769</b>	<b>\$95.886</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

## 10.4 Benefit Cost Analysis Case 2 Reduced Trail Network

The benefits and costs of the Warburton MTB Trails are analysed for a 10-year period.

### 10.4.1 Trail Costs 10 Years

The estimated construction cost of the trails is \$17.1 million (Stage 1 & 2), and 10-year maintenance costs are \$4.8 million for a total 10-year cost of \$21.9 million (see Appendix D).<sup>20</sup>

### 10.4.2 Measuring Benefits – 10 Years

The measured benefits of the Warburton MTB Trails comprise the increase in regional income generated by trail users, the health benefits, and a notional consumer value to users of the trails.

#### Increase in Regional income

The increase in regional income generated by trail users spending over a 10-year period totals \$89.5 million (in constant \$2021 prices).

**Table 37.** Case 2 Reduced Trails Network Regional Income Generated by Trail Users (\$million 2021 prices)

Case 2 Regional Income Total 10 Years	Day Visitors/Users \$m	Overnight Visitors/Users \$m	Total Visitors/Users \$m
Direct Income	\$20.451	\$66.004	\$86.455
Indirect/Induced Income	\$2.666	\$6.766	\$9.431
<b>Total Regional Income</b>	<b>\$23.117</b>	<b>\$72.769</b>	<b>\$95.886</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

#### Health Benefits

<sup>20</sup> Yarra Ranges Council September 2020

A report by Marsden Jacobs Associates indicates that exercise of cycling/active walking in Victorian Parks has net healthcare benefits (in terms of avoided health costs) of \$15 per hour in terms of a reduction in lifetime health costs (adjusted for injury).<sup>21</sup>

Healthcare benefits are measured as the net (adjusted for injury) avoided costs to the national healthcare system (private costs and government costs) attributable to nature-based outdoor activity.

- For the analysis of these trails, we have assumed an average cycle period of 2.5 hours for beginners & novices (and average of \$10 per hour) and 4 hours for advanced and experts. Health benefits are measured for Victorian users only (i.e., residents of Yarra Ranges LGA, Melbourne Metro area and regional Victoria).
- This indirect health benefit is estimated at \$31.5 million (in constant prices \$2021) over the 10-year period or an average of \$3.1 million per year.

### 10.4.3 Benefit Cost Analysis

#### All Benefits

The following table and chart show the benefits and costs of the operations of the trails over a 10-year period. The benefits are measured by:

- the increase in regional income generated by trail users over a 10-year period
- the estimated health benefits
- the user value.

The costs include:

- design and planning
- construction costs
- asset maintenance costs.

For the comparison, the present value of the benefits is calculated using 3 discount rates (4%, 7% and 10%).

<sup>21</sup> Victoria's Nature-Based Outdoor Economy- Key Estimates and Recommendations, Marsden Jacobs Associates, January 2016 P10 & 21.

**Table 38.** Case 2 Reduced Trails Network Health Benefit Estimates (\$million 2021 prices)

Case 2 Health Benefits Valuation		Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total 10 Years
Ave hours	\$ million 2021 prices											
2.5	Beginner	\$0.603	\$0.648	\$0.692	\$0.737	\$0.781	\$0.804	\$0.826	\$0.848	\$0.870	\$0.892	\$7.701
2.5	Novice	\$0.764	\$0.814	\$0.865	\$0.916	\$0.966	\$0.993	\$1.019	\$1.046	\$1.072	\$1.099	\$9.554
4	Intermediate	\$1.364	\$1.431	\$1.499	\$1.567	\$1.635	\$1.667	\$1.699	\$1.731	\$1.763	\$1.795	\$16.150
4	Advance & Expert	\$0.479	\$0.501	\$0.522	\$0.544	\$0.566	\$0.577	\$0.587	\$0.598	\$0.609	\$0.620	\$5.603
	<b>Total All</b>	<b>\$3.209</b>	<b>\$3.394</b>	<b>\$3.579</b>	<b>\$3.764</b>	<b>\$3.948</b>	<b>\$4.040</b>	<b>\$4.131</b>	<b>\$4.223</b>	<b>\$4.314</b>	<b>\$4.406</b>	<b>\$39.008</b>
4	Interstate & Internationals	\$0.372	\$0.481	\$0.589	\$0.697	\$0.806	\$0.843	\$0.880	\$0.917	\$0.955	\$0.992	\$7.533
	<b>Total less interstate &amp; internationals</b>	<b>\$2.837</b>	<b>\$2.914</b>	<b>\$2.990</b>	<b>\$3.066</b>	<b>\$3.142</b>	<b>\$3.197</b>	<b>\$3.251</b>	<b>\$3.305</b>	<b>\$3.360</b>	<b>\$3.414</b>	<b>\$31.476</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

### Consumer/User Valuation

In the modelling we have assumed that there are no charges for the use of the trail. However, a valuation can be placed on the experience based on a shadow price or notional charge (what a person may be willing to pay). For the trail we have assumed it to be \$15 per trail ride. This benefit measure totals \$18.5 million (constant prices \$2021) over 10 years for all trail users or an average of \$1.8 million per year.

**Table 39.** Case 2 Reduced Trail Network Consumer Value Estimates (\$million 2021 prices)

Case 2: Reduced Trail Network	Year										
Consumer Value   \$ million 2021 prices	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total 10 Years
Beginner	\$0.362	\$0.389	\$0.415	\$0.442	\$0.469	\$0.482	\$0.495	\$0.509	\$0.522	\$0.535	\$4.621
Novice	\$0.458	\$0.489	\$0.519	\$0.549	\$0.580	\$0.596	\$0.612	\$0.628	\$0.643	\$0.659	\$5.732
Intermediate	\$0.511	\$0.537	\$0.562	\$0.588	\$0.613	\$0.625	\$0.637	\$0.649	\$0.661	\$0.673	\$6.056
Advance & Expert	\$0.180	\$0.188	\$0.196	\$0.204	\$0.212	\$0.216	\$0.220	\$0.224	\$0.228	\$0.232	\$2.101
<b>Total All</b>	<b>\$1.511</b>	<b>\$1.602</b>	<b>\$1.692</b>	<b>\$1.783</b>	<b>\$1.874</b>	<b>\$1.919</b>	<b>\$1.964</b>	<b>\$2.010</b>	<b>\$2.055</b>	<b>\$2.100</b>	<b>\$18.511</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

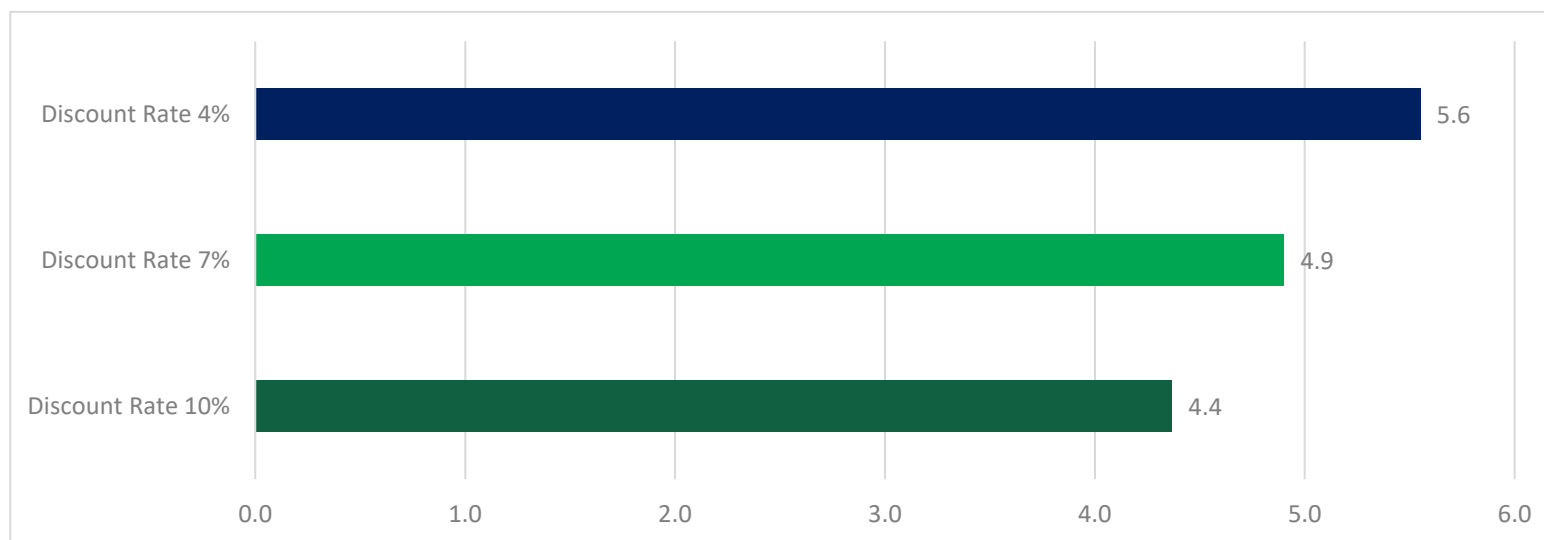
**Table 40.** Case 2 Reduced Trails Network Benefits and Cost Analysis 10 Years (Constant prices \$2021)

Case 2 Reduce Trail Network Total Project	Discount Rate	Discount Rate	Discount Rate
Regional Cost Benefit (\$2021 prices)   Period : 10Years	4%	7%	10%
<b>Trail Costs</b>			
Design, Development and Planning Costs	\$2,000,000	\$2,000,000	\$2,000,000
Capital Costs Trails & Infrastructure 2020 (\$)	\$17,090,000	\$17,090,000	\$17,090,000
Costs - Maintenance (10 years)	\$4,797,500	\$4,797,500	\$4,797,500
<b>Total Costs</b>	<b>\$21,887,500</b>	<b>\$21,887,500</b>	<b>\$21,887,500</b>
<b>Benefits (users) (10 years)</b>			
Regional Income Increase	\$95,886,257	\$95,886,257	\$95,886,257
Health Benefits (Vic Users)	\$31,475,768	\$31,475,768	\$31,475,768
User Value (shadow user price)	\$18,510,519	\$18,510,519	\$18,510,519
<b>Total Benefits</b>	<b>\$145,872,544</b>	<b>\$145,872,544</b>	<b>\$145,872,544</b>
<b>Total Benefits (\$) Present Value</b>	<b>\$121,523,467</b>	<b>\$107,280,265</b>	<b>\$95,625,119</b>
<b>Net Present Value (\$) Total Benefits</b>	<b>\$99,635,967</b>	<b>\$85,392,765</b>	<b>\$73,737,619</b>
<b>Benefit Cost Ratio (BCR - All Benefits)</b>	<b>5.6</b>	<b>4.9</b>	<b>4.4</b>
NPV/Cost	4.6	3.9	3.4
<b>Regional Income Only (PV)</b>	<b>\$79,709,563</b>	<b>\$70,253,841</b>	<b>\$62,520,588</b>
<b>BCR (Regional Income only)</b>	<b>3.6</b>	<b>3.2</b>	<b>2.9</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE: DIRECT BENEFITS ARE THE VALUE TO USERS OF A FACILITY; USUALLY THIS IS MEASURE BY USER PAYMENTS/FEEs. IN THIS CASE THERE ARE NO USER CHARGES FOR THE TRAIL AND A SHADOW PRICE HAS BEEN APPLIED (\$15 PER RIDE) AS A MEASURE OF USER VALUE. THEREFORE, BENEFITS ARE THE INCREASE IN REGIONAL INCOME GENERATED BY VISITOR SPENDING, THE HEALTH BENEFITS OF EXERCISE ACTIVITY AND THE USER VALUE.

The chart below compares Benefit Cost Ratios (BCR) for the 3 discount rates. For a trail project a 7% discount rate is appropriate, and the project yields a positive BCR of 4.9. The present value of total benefits generated by the investment are 4.9 times the total costs of the project over a 10-year period. If only the direct regional benefit of increase in regional income is included in the benefits, the BCR is 3.2 (for a 7% discount rate).

**Figure 27.** Case 2 Reduced Trails Network Benefit Cost Ratio (BCR- All Benefits) Warburton Trail Development



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021

## 11 Case 3 No Drop A K Trail Operations Phase – Regional Economic Impacts

The operations phase regional economic impacts of the trails are driven by the expenditure of visitors/users in towns adjacent to the trail and in the broader region. This analysis is for the trail network with no Drop A K trail.

MCA's regional economic model is used to estimate the employment and income impacts of the trail. The model allocates spending across relevant industry sectors and takes account of the significant shares of the gross spending by visitors/users, which leaks out of the region.<sup>22</sup>

### 11.1 Employment Impacts

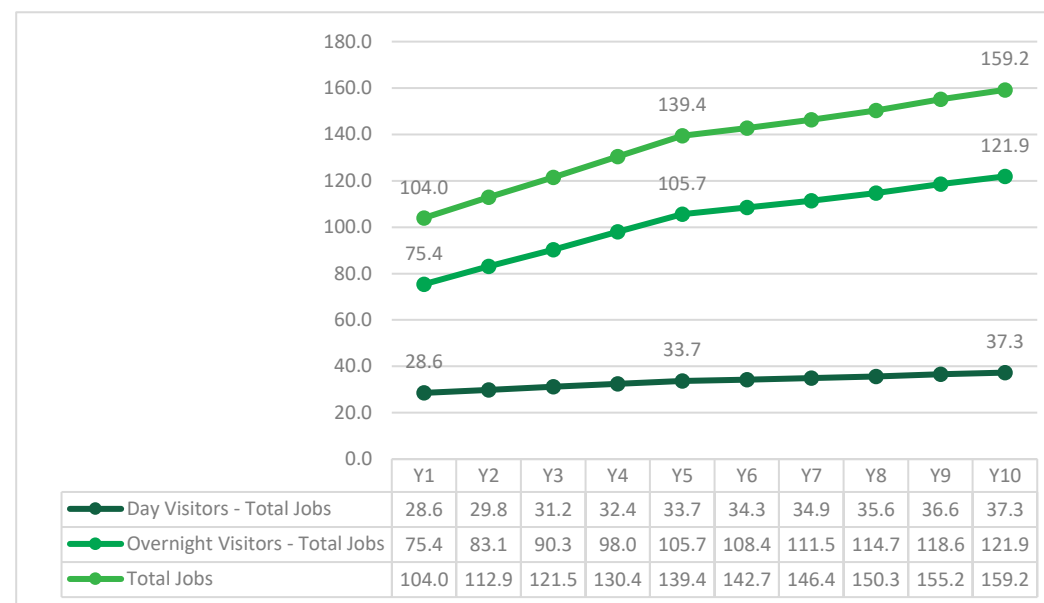
The charts and tables below show the increase in jobs in the region generated by each of the user/visitor groups.

- The operation of the trails would generate a total of 104.0 full-time equivalent jobs in year 1, increasing to 159.2 FTE jobs in year 10.
- Of the total jobs in year 10, day visitors would account for 37.3 FTE jobs, overnight visitors for 121.9 jobs.

An events program would create an equivalent of 13.5 FTE additional jobs in year 10 (see Appendix B).

<sup>22</sup> The spending by trail users is not the economic impact and does not represent the increase in regional income. There is a major leakage of this spending out of the region due to: the GST (10%); and a significant component of the value of services and products purchased by visitors comes from outside the region (e.g., food ingredients, soft drinks, beer, consumer

**Figure 28.**Case 3 No Drop A K Total Jobs Generated by Trail Operations (no events) (FTE no.)



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE SOME DIFFERENCES DUE TO ROUNDING.

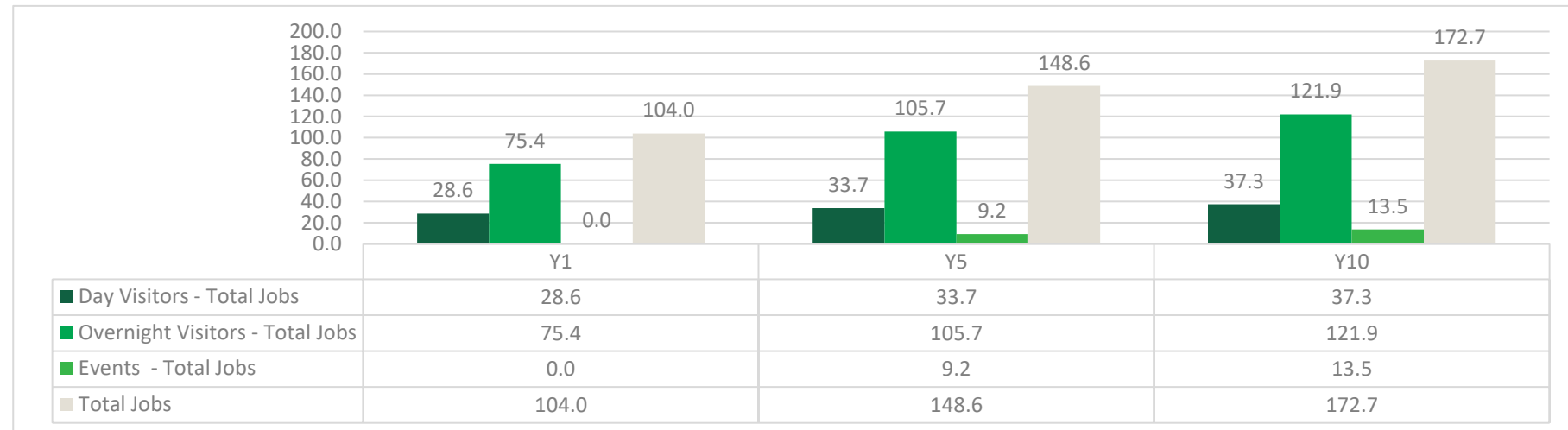
products bought etc.). The model takes account of these leakages and estimates employment impacts and the increase in regional income.

**Table 41.** Case 3 No Drop A K Trail Jobs Generated by Trail Operations (no events) (FTE no.)

Jobs Generated (FTE)	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
<b>Day Visitors – Trail Users</b>										
Direct Jobs	25.3	26.4	27.5	28.7	29.8	30.5	31.1	31.7	32.4	33.0
Indirect/Induced	3.3	3.4	3.6	3.8	3.9	3.8	3.8	3.9	4.2	4.3
<b>Total Jobs - Day Visitors</b>	<b>28.6</b>	<b>29.8</b>	<b>31.2</b>	<b>32.4</b>	<b>33.7</b>	<b>34.3</b>	<b>34.9</b>	<b>35.6</b>	<b>36.6</b>	<b>37.3</b>
<b>Overnight Visitors – Trail Users</b>										
Direct Jobs	67.8	74.7	81.7	88.6	95.5	98.5	101.5	104.4	107.4	110.4
Indirect/Induced	7.6	8.3	8.7	9.4	10.1	9.9	10.0	10.3	11.2	11.5
<b>Total Jobs - Overnight Visitors</b>	<b>75.4</b>	<b>83.1</b>	<b>90.3</b>	<b>98.0</b>	<b>105.7</b>	<b>108.4</b>	<b>111.5</b>	<b>114.7</b>	<b>118.6</b>	<b>121.9</b>
<b>Total Visitors – Trail Users</b>										
Direct Jobs	93.0	101.1	109.2	117.3	125.3	129.0	132.6	136.2	139.8	143.4
Indirect/Induced	10.9	11.8	12.3	13.1	14.1	13.8	13.8	14.1	15.4	15.8
<b>Total All Jobs</b>	<b>104.0</b>	<b>112.9</b>	<b>121.5</b>	<b>130.4</b>	<b>139.4</b>	<b>142.7</b>	<b>146.4</b>	<b>150.3</b>	<b>155.2</b>	<b>159.2</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Figure 29.** Case 3 No Drop A K Trail Total Job (with events) (FTE no.)



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Table 42.** Case 3 No Drop A K Total Jobs Generated by Trail Operations (FTE no.)

Case 3: No Drop A K Trail	Year 1	Year 5	Year 10
<b>Day Users/Visitors</b>			
Direct Jobs	25.3	29.8	33.0
Indirect/Induced Jobs	3.3	3.9	4.3
<b>Total Jobs</b>	<b>28.6</b>	<b>33.7</b>	<b>37.3</b>
<b>Overnight User/Visitors</b>			
Direct Jobs	67.8	95.5	110.4
Indirect/Induced Jobs	7.6	10.1	11.5
<b>Total Jobs</b>	<b>75.4</b>	<b>105.7</b>	<b>121.9</b>
<b>Events</b>			
Direct Jobs	0	7.4	11.1
Indirect/Induced Jobs	0	1.9	2.5
<b>Total Jobs</b>	<b>0</b>	<b>9.3</b>	<b>13.5</b>
<b>Total All Users/Visitors (no events)</b>			
Direct Jobs	93.0	125.3	143.4
Indirect/Induced Jobs	10.9	14.1	15.8
<b>Total Jobs</b>	<b>104.0</b>	<b>139.4</b>	<b>159.2</b>
<b>Total All Users/Visitors (with events)</b>			
Direct Jobs	93.0	132.7	154.5
Indirect/Induced Jobs	10.9	15.9	18.2
<b>Total Jobs</b>	<b>104.0</b>	<b>148.6</b>	<b>172.7</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## 11.2 Jobs by Industry

On a sector basis, the jobs (FTE- direct and indirect) generated by trail users are mainly concentrated in:

- accommodation
- food and beverage
- recreational services and other visitor services
- transport (including shuttles)
- other retail.

The following table shows estimates for day visitors and overnight visitors.

The development of the trails will see the development of local MTB service industry. The industry analysis highlights that total full time equivalent (FTE) jobs generated by trail users in year 10 would be in:

- recreation services/other services (MTB hire, guides, equipment etc.) 38.0 jobs
- transport (including shuttles) 15.1 FTE jobs
- accommodation 43.8 jobs,
- food and beverage 45.4 jobs.



**Table 43.** No Drop A K Trail Total Jobs Generated by Industry (no events) (FTE no.)

Case 3 No National Park Trails	Year 1	Year 5	Year 10
All Jobs			
<b>Day Visitors</b>			
Accommodation	0.0	0.0	0.0
Food & Beverage	9.9	11.7	12.9
Other retail	3.0	3.5	3.9
Health	0.3	0.3	0.4
Transportation	3.4	4.0	4.4
Communication	0.1	0.1	0.1
Recreation Services/Other Services	11.4	13.4	14.8
Education	0.2	0.2	0.2
Miscellaneous	0.4	0.5	0.5
<b>Total</b>	<b>28.6</b>	<b>33.7</b>	<b>37.3</b>
<b>Overnight Visitors</b>			
Accommodation	26.9	37.9	43.8
Food & Beverage	20.1	28.1	32.5
Other retail	5.3	7.4	8.6
Health	0.6	0.8	0.9
Transportation	6.7	9.3	10.7
Communication	0.2	0.3	0.3
Recreation Services/Other Services	14.4	20.1	23.2
Education	0.4	0.5	0.5
Miscellaneous	0.9	1.2	1.3
<b>Total</b>	<b>75.4</b>	<b>105.7</b>	<b>121.9</b>
<b>Total All Jobs</b>			
Accommodation	26.9	37.9	43.8
Food & Beverage	30.0	39.8	45.4
Other Retail	8.3	11.0	12.4
Health	0.9	1.2	1.3
Transportation	10.1	13.3	15.1
Communication	0.3	0.4	0.5
Recreation Services/Other Services	25.7	33.5	38.0
Education	0.5	0.7	0.7
Miscellaneous	1.3	1.6	1.8
<b>Total</b>	<b>104.0</b>	<b>139.4</b>	<b>159.2</b>

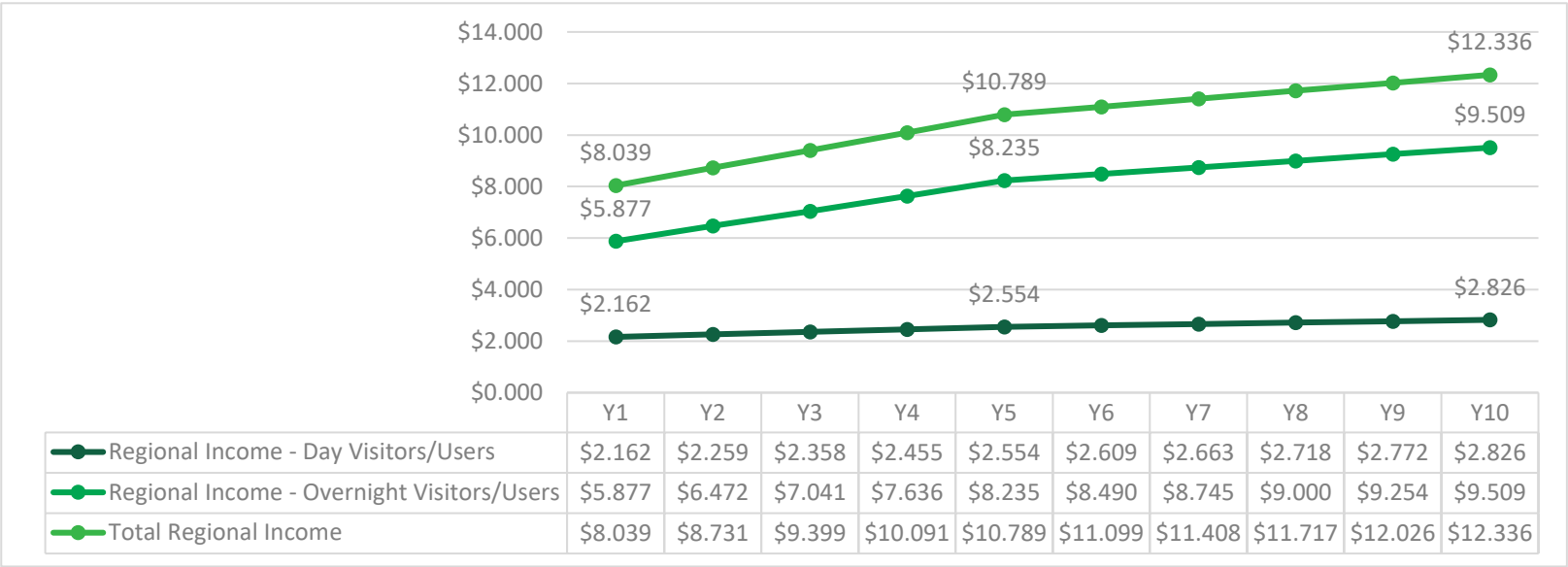
SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

### 11.3 Regional Income Impacts

The increase in regional income (in constant 2021 prices) generated annually by the operation of the trails and visitor/user spending totals \$8.0 million in year 1, increasing to \$12.3 million in year 10.<sup>23</sup>

The increase in income (direct and indirect/induced) generated by day visitors/users (including locals and other users) is \$2.1 million in year 1 and \$2.8 million in year 10. Overnight users/visitors boost total regional income by \$5.9 million in year 1 and \$9.5 million in 2031.

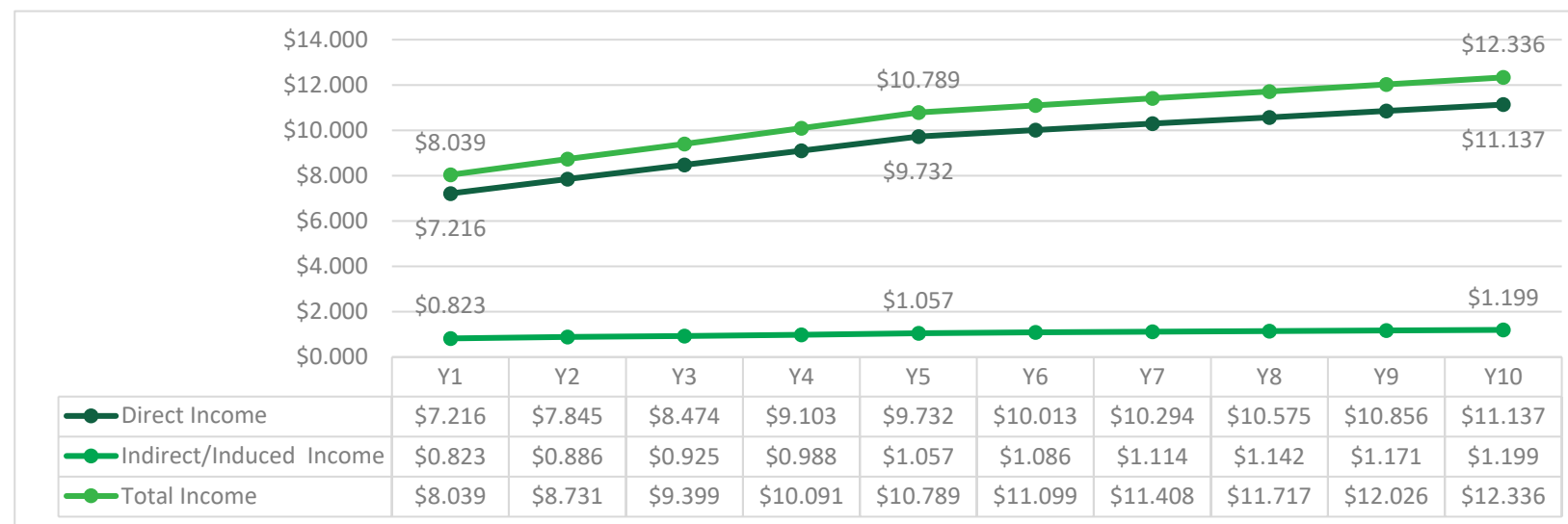
**Figure 30.** Case 3 No Drop A K Trail Regional Income Generated (\$million 2021 prices)



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

<sup>23</sup> Regional income is the total net income generated from the activity and covers wages and salaries of employees and profits of businesses within the region. It includes income generated directly within the business and indirect income, which is generated in other regional businesses (wages and profits) from the multiplier impacts of employee spending on the region. In the modelling of income generated income tax and GST on spending, are both treated as leakages from the region.

**Figure 31.** Case 3 No Drop A K Trail – Regional Income Generated (\$million 2021 prices)



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

**Table 44.** Case 3 No Drop A K Regional Income Generated (\$million 2021 prices)

Case 3. Regional Income \$ million (2021 prices)	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total 10 Years
<b>Day Visitors</b>											
Direct Income	\$1.912	\$1.999	\$2.085	\$2.171	\$2.258	\$2.307	\$2.355	\$2.404	\$2.453	\$2.502	\$22.446
Indirect/Induced	\$0.250	\$0.260	\$0.273	\$0.283	\$0.297	\$0.302	\$0.308	\$0.313	\$0.319	\$0.325	\$2.930
<b>Total Income</b>	<b>\$2.162</b>	<b>\$2.259</b>	<b>\$2.358</b>	<b>\$2.455</b>	<b>\$2.554</b>	<b>\$2.609</b>	<b>\$2.663</b>	<b>\$2.718</b>	<b>\$2.772</b>	<b>\$2.826</b>	<b>\$25.375</b>
<b>Overnight Visitors</b>											
Direct Income	\$5.304	\$5.846	\$6.389	\$6.932	\$7.474	\$7.706	\$7.939	\$8.171	\$8.403	\$8.635	\$72.798
Indirect/Induced	\$0.573	\$0.626	\$0.652	\$0.705	\$0.761	\$0.784	\$0.806	\$0.829	\$0.852	\$0.874	\$7.461
<b>Total Income</b>	<b>\$5.877</b>	<b>\$6.472</b>	<b>\$7.041</b>	<b>\$7.636</b>	<b>\$8.235</b>	<b>\$8.490</b>	<b>\$8.745</b>	<b>\$9.000</b>	<b>\$9.254</b>	<b>\$9.509</b>	<b>\$80.259</b>
<b>Total Visitors</b>											
Direct Income	\$7.216	\$7.845	\$8.474	\$9.103	\$9.732	\$10.013	\$10.294	\$10.575	\$10.856	\$11.137	\$95.244
Indirect/Induced	\$0.823	\$0.886	\$0.925	\$0.988	\$1.057	\$1.086	\$1.114	\$1.142	\$1.171	\$1.199	\$10.391
<b>Total Income</b>	<b>\$8.039</b>	<b>\$8.731</b>	<b>\$9.399</b>	<b>\$10.091</b>	<b>\$10.789</b>	<b>\$11.099</b>	<b>\$11.408</b>	<b>\$11.717</b>	<b>\$12.026</b>	<b>\$12.336</b>	<b>\$105.634</b>

SOURCE: MCA MODELLING & ESTIMATES,AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

Over 10 years all trail users boosted regional income by \$105.6 million.

**Table 45.** Case 3 No Drop A K Trail Regional Income Generated 10 Years (\$million 2021 prices)

Case 2 Regional Income Total 10 Years	Day Visitors/Users \$m	Overnight Visitors/Users \$m	Total Visitors/Users \$m
Direct Income	\$22.446	\$72.798	\$95.244
Indirect/Induced Income	\$2.930	\$7.461	\$10.391
<b>Total Income</b>	<b>\$25.375</b>	<b>\$80.259</b>	<b>\$105.634</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## 11.4 Cost Benefit Analysis Case 3 No Drop A K Trail

The benefits and costs of the Warburton MTB Trails are analysed for a 10-year period.

### 11.4.1 Trail Costs 10 Years

The estimated construction cost of the trails is \$17.1 million (Stage 1 & 2), and 10-year maintenance costs are \$4.8 million for a total 10-year cost of \$21.9 million (see Appendix D).

### Increase in Regional Income

The increase in regional income generated by trail users spending over a 10-year period totals \$105.634 million (in constant \$2021 prices).

**Table 46.** Case 3 No Drop A K Trail Regional Income Generated by Trail Users (\$million 2021 prices)

Case 2 Regional Income	Day Visitors/Users	Overnight Visitors/Users	Total Visitors/Users
Total 10 Years	\$m	\$m	\$m
Direct Income	\$22.446	\$72.798	\$95.244
Indirect/ Induced Income	\$2.930	\$7.461	\$10.391
<b>Total Regional Income</b>	<b>\$25.375</b>	<b>\$80.259</b>	<b>\$105.634</b>

SOURCE: MCA MODELLING & ESTIMATES,AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

### Health Benefits

A report by Marsden Jacobs Associates indicates that exercise of cycling/active walking in Victorian Parks has net healthcare benefits (in terms of avoided health costs) of \$15 per hour in terms of a reduction in lifetime health costs (adjusted for injury).<sup>24</sup>

Healthcare benefits are measured as the net (adjusted for injury) avoided costs to the national healthcare system (private costs and government costs) attributable to nature-based outdoor activity.

- For the analysis of these trails, we have assumed an average cycle period of 2.5 hours for beginners & novices (and average of \$10 per hour) and 4 hours for advanced and experts. Health benefits are measured for Victorian users only (i.e., residents of Yarra Ranges LGA, Melbourne Metro area and regional Victoria).
- This indirect health benefit is estimated at \$35.0 million (in constant prices \$2021) over the 10-year period or an average of \$3.5 million per year.

<sup>24</sup> Victoria's Nature-Based Outdoor Economy- Key Estimates and Recommendations, Marsden Jacobs Associates, January 2016 P10 & 21.

**Table 47.** Case 3 No Drop A K Health Benefit Estimates (\$million 2021 prices)

Case 3 Health Benefits Valuation		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total 10 Years
Ave hours	\$ million 2020 prices											
2.5	Beginner	\$0.603	\$0.648	\$0.692	\$0.737	\$0.781	\$0.804	\$0.826	\$0.848	\$0.870	\$0.892	\$7.701
2.5	Novice	\$0.850	\$0.906	\$0.962	\$1.019	\$1.075	\$1.104	\$1.134	\$1.163	\$1.192	\$1.222	\$10.626
4	Intermediate	\$1.632	\$1.713	\$1.794	\$1.875	\$1.956	\$1.995	\$2.033	\$2.071	\$2.110	\$2.148	\$19.327
4	Advance & Expert	\$0.480	\$0.501	\$0.523	\$0.545	\$0.566	\$0.577	\$0.588	\$0.599	\$0.610	\$0.620	\$5.609
	<b>Total All</b>	<b>\$3.564</b>	<b>\$3.768</b>	<b>\$3.972</b>	<b>\$4.175</b>	<b>\$4.379</b>	<b>\$4.480</b>	<b>\$4.580</b>	<b>\$4.681</b>	<b>\$4.782</b>	<b>\$4.882</b>	<b>\$43.263</b>
4	Interstate & Internationals	\$0.406	\$0.525	\$0.644	\$0.762	\$0.881	\$0.922	\$0.962	\$1.003	\$1.044	\$1.085	\$8.234
	<b>Total less interstate &amp; internationals</b>	<b>\$3.158</b>	<b>\$3.243</b>	<b>\$3.328</b>	<b>\$3.413</b>	<b>\$3.498</b>	<b>\$3.558</b>	<b>\$3.618</b>	<b>\$3.678</b>	<b>\$3.738</b>	<b>\$3.798</b>	<b>\$35.029</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## Consumer/User Valuation

In the modelling we have assumed that there are no charges for the use of the trail. However, a valuation can be placed on the experience based on a shadow price or notional charge (what a person may be willing to pay). For the trail we have assumed it to be \$15 per trail ride. This benefit measure totals \$20.347 million (constant prices \$2021) over 10 years for all trail users or an average of \$2.2 million per year.

**Table 48.** Case 3 No Drop A K Trail Consumer Value Estimates (\$million 2021 prices)

Case 3. Consumer Value	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total 10 Years
\$ million 2020 prices											
Beginner	\$0.362	\$0.389	\$0.415	\$0.442	\$0.469	\$0.482	\$0.495	\$0.509	\$0.522	\$0.535	\$4.621
Novice	\$0.510	\$0.544	\$0.577	\$0.611	\$0.645	\$0.663	\$0.680	\$0.698	\$0.715	\$0.733	\$6.376
Intermediate	\$0.612	\$0.642	\$0.673	\$0.703	\$0.734	\$0.748	\$0.762	\$0.777	\$0.791	\$0.806	\$7.248
Advance & Expert	\$0.180	\$0.188	\$0.196	\$0.204	\$0.212	\$0.216	\$0.220	\$0.225	\$0.229	\$0.233	\$2.103
<b>Total All</b>	<b>\$1.664</b>	<b>\$1.763</b>	<b>\$1.862</b>	<b>\$1.961</b>	<b>\$2.060</b>	<b>\$2.109</b>	<b>\$2.158</b>	<b>\$2.208</b>	<b>\$2.257</b>	<b>\$2.307</b>	<b>\$20.347</b>

SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## 11.4.2 Cost Benefit Analysis

### All Benefits

The following table and chart show the benefits and costs of the operations of the trails over a 10-year period. The benefits are measured by:

- the increase in regional income generated by trail users over a 10-year period
- the estimated health benefits
- the user value.

The costs include:

- design and planning
- construction costs
- asset maintenance costs.

For the comparison, the present value of the benefits is calculated using 3 discount rates (4%, 7% and 10%).

**Table 49.** Case 3 No Drop A K Trail Benefits and Cost Analysis 10 Years (Constant 202 prices)

Case 3 No Drop A K Trail	Discount Rate	Discount Rate	Discount Rate
Total Project - Regional Cost Benefit (\$2021 prices)	4%	7%	10%
Period : 10Years			
<b>Trail Costs</b>			
Design, Development and Planning Costs	\$2,000,000	\$2,000,000	\$2,000,000
Capital Costs Trails & Infrastructure 2020 (\$)	\$17,090,000	\$17,090,000	\$17,090,000
Costs - Maintenance (10 years)	\$4,797,500	\$4,797,500	\$4,797,500
<b>Total Costs</b>	<b>\$21,887,500</b>	<b>\$21,887,500</b>	<b>\$21,887,500</b>
<b>Benefits (users) (10 years)</b>			
Regional Income Increase	\$105,634,261	\$105,634,261	\$105,634,261
Health Benefits (Vic Users)	\$35,028,607	\$35,028,607	\$35,028,607
User Value (shadow user price)	\$20,347,339	\$20,347,339	\$20,347,339
<b>Total Benefits</b>	<b>\$161,010,206</b>	<b>\$161,010,206</b>	<b>\$161,010,206</b>
<b>Total Benefits (\$) Present Value</b>	<b>\$134,138,721</b>	<b>\$118,419,702</b>	<b>\$105,558,902</b>
<b>Net Present Value (\$) Total Benefits</b>	<b>\$112,251,221</b>	<b>\$96,532,202</b>	<b>\$83,671,402</b>
<b>Benefit Cost Ratio (BCR – All Benefits)</b>	<b>6.1</b>	<b>5.4</b>	<b>4.8</b>
NPV/Cost	5.1	4.4	3.8
<b>Regional Income Only</b>			
<b>Regional Income Only (PV)</b>	<b>\$87,813,593</b>	<b>\$77,396,807</b>	<b>\$68,879,686</b>
<b>BCR (Regional Income only)</b>	<b>4.0</b>	<b>3.5</b>	<b>3.1</b>

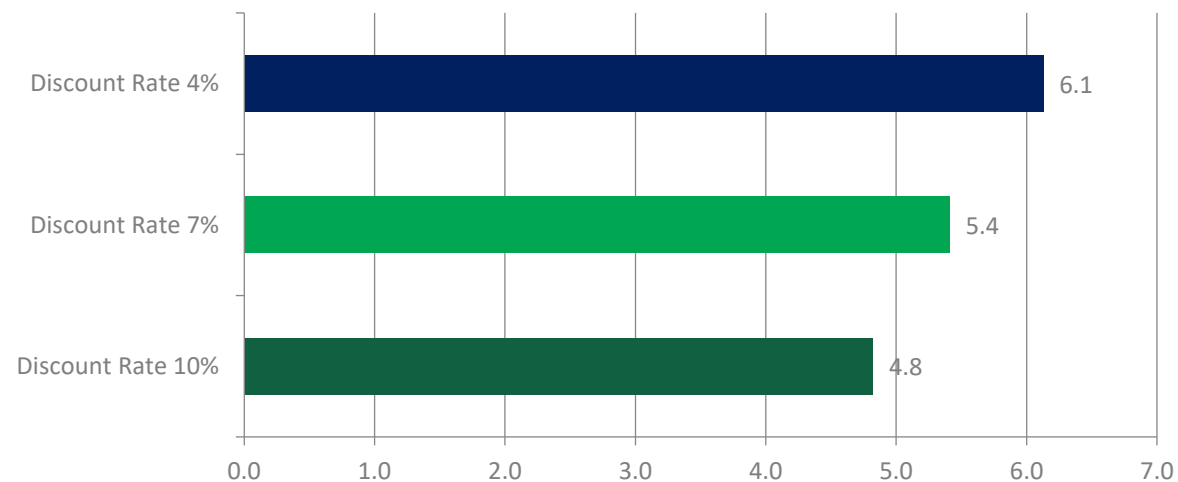
SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021. NOTE: DIRECT BENEFITS ARE THE VALUE TO USERS OF A FACILITY; USUALLY THIS IS MEASURE BY USER PAYMENTS/FEES. IN THIS CASE THERE ARE NO USER CHARGES FOR THE TRAIL AND A SHADOW PRICE HAS BEEN APPLIED (\$15 PER RIDE) AS A MEASURE OF USER VALUE. THEREFORE, BENEFITS ARE THE INCREASE IN REGIONAL INCOME GENERATED BY VISITOR SPENDING, THE HEALTH BENEFITS OF EXERCISE ACTIVITY AND THE USER VALUE.

The chart below compares Benefit Cost Ratios (BCR) for the 3 discount rates (for all trail benefits). For a trail project a 7% discount rate is appropriate, and the project yields a positive BCR of 5.4. The present value of total benefits generated by the investment are 5.4 times the total costs of the project over a 10-year period.

If only the direct benefit of an increase in regional income is included, the BCR is 3.5 (for a 7% discount rate).



**Figure 32.** Case 3 No Drop A K Benefit Cost Analysis (BCR) (all benefits)



SOURCE: MCA MODELLING & ESTIMATES, AUGUST 2021

## 12 References

- AusPlay Survey Results January 2019 - December 2019. Released 30 April 2020 (and re-issued 24 June 2020)  
<https://www.clearinghouseforsport.gov.au/research/smi/ausplay/results/sport>
- EES Chapter 3 – Project Description Warburton Mountain Bike Destination Project, Yarra Ranges Council
- Local Government Area Profiles, 2019 , Yarra Ranges (S) LGA, Tourism Research Australia
- Mountain Bikers, Derby Tasmania Survey Data, XYST May 2021
- Moving Forward The Role Of Domestic Travel In Australia's Tourism Recovery August 2020, Tourism Research Australia
- Warburton Mountain Bike Destination, Final Report May 2019, Instinct and Reason
- Warburton MTB trail research -quantitative findings, instinct and reason, December 2020
- Warburton MTB trail additional research -quantitative findings, instinct and reason, May 2021
- Victoria in Future 2019 (VIF2019) projections by LGA, June 2019
- Victoria's Nature-Based Outdoor Economy- Key Estimates and Recommendations, Marsden Jacobs Associates, January 2016



## Appendices



## APPENDIX A – MODELLING ASSUMPTIONS

Table A.1 Trail Use Modelling Assumptions

Modelling	Description	Source
<b>Population Data</b>	Population projections by LGA 2021 to 2031. Note 2021 estimates are assumed to apply for year 1, when Stage 1 trail becomes operational.	Victoria in Future 2019 (VIF2019) projections by LGA, June 2019
<b>Mountain Bike Participants</b>	Estimate for LGAs based on 1.4% participation rate for year 2. (AusPlay Survey 2019) Assumed increase to 1.5% 2026; and 1.7% in year 10.	Participation rate: 1.4% AusPlay Survey Results January 2019 - December 2019. Released 30 April 2020 (and re-issued 24 June 2020) Assumed increases with MTB becoming more popular as a sport/recreation activity.
<b>Participant Types</b>	<b>Categories</b> <ul style="list-style-type: none"> <li>• Beginner</li> <li>• Novice</li> <li>• Intermediate</li> <li>• Advance &amp; Expert</li> </ul> Shares applied to all regional groupings to provide estimates of number of riders by type. <b>(See Table A.2 )</b>	Based on I & R survey data Report Page 16
<b>Catchment Areas for Trails</b>	Based on clustering of LGAs into regions	Clusters based on LGA locations
<b>Interstate /internationals/other regional/intrastate</b>	Numbers are assumed and increase over time	MCa assumptions
<b>Likelihood of visiting the trails</b>	% of MTB participants that would visit the Warburton Trails. <b>(see Table A.3)</b> <ul style="list-style-type: none"> <li>• Differences in assumptions for regions are based on proximity.</li> <li>• Likelihood of visiting trails increases as trails network is extended.</li> </ul>	MCa assumptions
<b>Number of uses of trails per year (Ave rides per year)</b>	Assumptions based on proximity to trails. Adjacent areas and eastern metropolitan areas would have more average rides. Average annual rides are assumed for each local government area/cluster.	MCa assumptions
<b>Interstate /internationals/other regionals. Intrastate (Ave rides per visit = 2)</b>	Assumes they are mainly overnight visitors (80%) and use trails over 2 days = average 2 rides during stay.	MCa assumptions
<b>International visitors</b>	Covid-19 limitations on international visitors in 2022. Assumes zero in year 1; increasing to 6000 in 2026; and 8000 in year 10.	MCa assumptions
<b>Spending in Region</b>	Base on average spending rates <b>(see Table A.4)</b>	

SOURCE: MCA MODELLING ASSUMPTIONS, JULY 2021

The assumptions users in modelling Case 2: Reduced Trails Network are in Table A.5.

**Table A.2** Trail User Categories

Experience Level	Total (n=702) 100%	Melbourne (n=302) 43%	Rest of Vic (n=100) 14%	Sydney (n=200) 28%	New Zealand (n=100) 14%
Beginner	23%	22%	23%	23%	25%
Novice	30%	33%	33%	30%	27%
Intermediate	36%	36%	34%	35%	39%
Advanced & Expert	11%	10%	10%	13%	9%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

SOURCE: WARBURTON MTB TRAIL ADDITIONAL RESEARCH -QUANTITATIVE FINDINGS, INSTINCT AND REASON, MAY 2021

**Table A.3** Trail Use Assumptions Base Case – Likely to Visit and Type of Visit

Regions	Visit Trails			Type of Visit	
	Likely Visit	Likely Visit	Likely Visit	Overnight visit	Day Visit
	Year 1	Year 5	Year 10		
<b>Local -Yarra Ranges</b>					
Beginner	75%	80%	90%	0%	100%
Novice	75%	80%	90%	0%	100%
Intermediate	75%	80%	90%	0%	100%
Advance & Expert	75%	80%	90%	0%	100%
<b>Adjacent Regional</b>					
Beginner	60%	60 %	60 %	20%	80%
Novice	60%	60 %	60 %	20%	80%
Intermediate	60%	60 %	60 %	20%	80%
Advance & Expert	60%	60 %	60 %	20%	80%
<b>Adjacent Urban</b>					
Beginner	50%	55 %	60 %	20%	80%
Novice	50%	55 %	60 %	20%	80%
Intermediate	50%	55 %	60 %	20%	80%
Advance & Expert	50%	55 %	60 %	20%	80%
<b>Eastern Suburbs</b>					
Beginner	50%	.55 %	55 %	30%	70%
Novice	50%	.55 %	55 %	30%	70%
Intermediate	50%	.55 %	55 %	30%	70%
Advance & Expert	50%	.55 %	55 %	30%	70%
<b>Northern Suburbs</b>					
Beginner	40%	45 %	45 %	30%	70%
Novice	40%	45 %	45 %	30%	70%
Intermediate	40%	45 %	45 %	30%	70%
Advance & Expert	40%	45 %	45 %	30%	70%

Regions	Visit Trails			Type of Visit	
	Likely Visit	Likely Visit	Likely Visit	Overnight visit	Day Visit
	Year 1	Year 5	Year 10		
<b>Other - West</b>	20%	25%	25 %	40%	60%
Beginner	20%	25%	25 %	40%	60%
Novice	20%	25%	25 %	40%	60%
Intermediate	20%	25%	25 %	40%	60%
Advance & Expert	20%	25%	25 %	40%	60%
<b>South East</b>					
Beginner	30%	30%	40%	30%	70%
Novice	30%	30%	40%	30%	70%
Intermediate	30%	30%	40%	30%	70%
Advance & Expert	30%	30%	40%	30%	70%
<b>Other Regional/Intrastate</b>					
Beginner	100%	100%	100%	80%	20%
Novice	100%	100%	100%	80%	20%
Intermediate	100%	100%	100%	80%	20%
Advance & Expert	100%	100%	100%	80%	20%
<b>Interstate</b>					
Beginner	100%	100%	100%	80%	20%
Novice	100%	100%	100%	80%	20%
Intermediate	100%	100%	100%	80%	20%
Advance & Expert	100%	100%	100%	80%	20%
<b>Internationals</b>					
Beginner	100%	100%	100%	80%	20%
Novice	100%	100%	100%	80%	20%
Intermediate	100%	100%	100%	80%	20%
Advance & Expert	100%	100%	100%	80%	20%

SOURCE: MCA MODELLING ASSUMPTIONS, JULY 2021

## 12.1 Spending Assumptions

Average spending assumptions have been derived from a survey of users of MTB trails in Derby Tasmania and a review of TRA average spending (2019) for Yarra Ranges LGA.<sup>25</sup> The spend numbers are weighted average totals for each rider category based on the spend pattern of each rider type. In particular, the percentage of riders that rent bikes and/or use shuttles. For example, Beginners and Novices are more likely to rent bikes compared with Intermediates and Advance & Experts. A very high percentage of interstate and internationals in all categories would rent bikes. Most locals are likely to have their own bike. Spending mix includes accommodation (overnights); bike hire; shuttle and meal – food & drinks.

Table A.4 Spending Assumptions

Modelling Assumptions	All Cases		Case 1 : Base Case	Case 2: Reduce Trails Network	Case 3 : No Drop A K Trail
	Day	Overnight	Duration Stay - Overnights	Duration Stay - Overnights	Duration Stay - Overnights
Spending	Ave Spend	Ave Spend	Ave Nights	Ave Nights	Ave Nights
<b>Yarra Ranges (S)</b>					
Beginner	\$66	\$230	na	na	na
Novice	\$66	\$230	na	na	na
Intermediate	\$66	\$204	na	na	na
Advance & Expert	\$66	\$204	na	na	na
<b>Metropolitan Areas</b>					
Beginner	\$93	\$230	2	1.5	1.5
Novice	\$93	\$230	2	1.5	1.5
Intermediate	\$73	\$204	3	2.5	2.5
Advance & Expert	\$73	\$204	3	2.5	2.5
<b>Adjacent Regional</b>					
Beginner	\$93	\$230	2	1.5	1.5
Novice	\$93	\$230	2	1.5	1.5
Intermediate	\$73	\$204	3	2.5	2.5
Advance & Expert	\$73	\$204	3	2.5	2.5

<sup>25</sup> ESTIMATES DERIVED FROM MOUNTAIN BIKERS, DERBY TASMANIA SURVEY DATA, XYST MAY 2021; AND LOCAL GOVERNMENT AREA PROFILES, 2019, YARRA RANGES (S) LGA, TOURISM RESEARCH AUSTRALIA



Modelling Assumptions	All Cases		Case 1 : Base Case	Case 2: Reduce Trails Network	Case 3 : No Drop A K Trail
	Day	Overnight	Duration Stay - Overnights	Duration Stay - Overnights	Duration Stay - Overnights
Spending	Ave Spend	Ave Spend	Ave Nights	Ave Nights	Ave Nights
<b>Other Regional</b>					
Beginner	\$93	\$230	2	1.5	1.5
Novice	\$93	\$230	2	1.5	1.5
Intermediate	\$73	\$204	3	2.5	2.5
Advance & Expert	\$73	\$204	3	2.5	2.5
<b>Interstate</b>					
Beginner	\$93	\$253	2	1.5	1.5
Novice	\$93	\$253	2	1.5	1.5
Intermediate	\$73	\$261	3	2.5	2.5
Advance & Expert	\$73	\$261	3	2.5	2.5
<b>Internationals</b>					
Beginner	\$93	\$256	2	1.5	1.5
Novice	\$73	\$278	2	1.5	1.5
Intermediate	\$73	\$278	3	2.5	2.5
Advance & Expert	\$93	\$256	3	2.5	2.5

SOURCE: MCA MODELLING ASSUMPTIONS, JULY 2021. BASED ON XYST SURVEY DATA (MAY 2021); AND TRA DATA (2019) FOR YARRA RANGES LGA.

## Case 2 Reduced Trail Network – Modelling Assumptions

The reduced trails network (no national park trails and drop) would result in lower levels of trail use by visitors from outside the region (mainly by the more experienced riders).

For estimating the impacts of these changes in the trails network, the following changes were made for the Case 2 modelling. These were based on the findings of the instinct and reason surveys (December 2020 & May 2021) in relation to impacts of removing all National Park Trails.

These changes would lead to a reduction in visits for the experienced categories of riders, a slower growth in user numbers and reductions in length of overnight stays. The changes in the modelling assumptions used are outlined in the following table.

Table A.5 Case 2 Reduced Trail Network Assumptions

Case 2: Reduced Trails Network – No National Park Trails		
Changes to Modelling Assumptions	Adjustment	
MTB Participation rate	Held at 2019 population average of participation rate of 1.4% In base case the rate was increased to 2026 1.5%; and 2031 1.7% .	MCa assumption
Likely to visit Warburton Trails	Visit rate (%) held at year 1 level in year 5 and year 10 for Intermediate and Advance & Expert categories	MCa assumption
Yarra Ranges Locals	No change in users due to proximity to trails	
Reduction in Trail User Visits	Covers : metro , regional , intrastate and internationals (Reductions on Base Case)	
Beginner	Reduce trail user numbers by 8%	Composite: I and R survey findings May 2021 & I and R survey findings December 202026
Novice	Reduce trail user numbers by 21%	
Intermediate	Reduce trail user numbers by 33.5%	
Advance & Expert	Reduce trail user numbers by 21.5%	
Overnight Stays (Ave)	Reductions on Base Case	
Beginner	Reduce from 2 nights to 1.5 nights stay	MCa assumptions
Novice	Reduce from 2 nights to 1.5 nights stay	
Intermediate	Reduce from 3 nights to 2.5 nights stay	
Advance & Expert	Reduce from 3 nights to 2.5 nights stay	

SOURCE: MCA MODELLING, JULY 2021

<sup>26</sup> Warburton MTB trail research - quantitative findings, instinct and reason, December 2020 ; Warburton MTB trail additional research -quantitative findings, instinct and reason, May 2021

### Case 3 No Drop A K Modelling Assumptions

The removal of the Drop A K Trail would result in lower levels of trail use by visitors from outside the region (with reductions in all user categories, particularly Novices and Intermediates). For estimating the impacts of these changes in the trails network, the following changes were made for the Case 3 modelling. These were based on the findings of the *instinct and reason* survey (May 2021) in relation to impacts of removing National Park Trails. Compared with the Base Case projections, these changes would lead to a reduction in visits in all rider categories, a slower growth in user numbers and likely reductions in average length of overnight stays in the region. The changes in the modelling assumptions used are outlined in the following table.

**Table A.6** Case 3 No Drop A Trail Assumptions

Case 3 : No Drop A K Trail		
Changes to Modelling Assumptions	Adjustment	
MTB Participation rate	Held at 2019 population average of participation rate of 1.4% In base case the rate was increased to 2026 1.5%; and 2031 1.7% .	MCa assumption
Likely to visit Warburton Trails	Visit rate (%) held at year 1 level in year 5 and year 10 for Intermediate and Advance & Expert categories	MCa assumption
Yarra Ranges Locals	No change in users due to proximity to trails	
<b>Reduction in Trail User Visits</b>	<b>Covers : metro , regional , intrastate and internationals (Reductions on Base Case)</b>	
Beginner	Reduce trail user numbers by 8%	I and R survey findings May 2021 <sup>27</sup>
Novice	Reduce trail user numbers by 13%	
Intermediate	Reduce trail user numbers by 20%	
Advance & Expert	Reduce trail user numbers by 8%	
<b>Overnight Stays</b>	<b>Reductions on Base Case</b>	
Beginner	Reduce from 2 nights to 1.5 nights stay	MCa assumptions
Novice	Reduce from 2 nights to 1.5 nights stay	
Intermediate	Reduce from 3 nights to 2.5 nights stay	
Advance & Expert	Reduce from 3 nights to 2.5 nights stay	

SOURCE: MCA MODELLING, JULY 2021

<sup>27</sup> Warburton MTB trail additional research -quantitative findings, instinct and reason, May 2021

## APPENDIX B – EVENT ANALYSIS

The follow shows the modelling of major events and associated spending in the region. It is assumed that events held are: 1 event is held in year 2; 2 in year 3; 4 in years 4-5; and 6 events in years 7-10. All are assumed to attract 300 participants and additional spectators/accompanying persons of 2 per participant. Total spending by participants and spectators/accompanying persons increases from \$777,600 in year 2 to \$2.333 million from year 7 onwards.<sup>28</sup>

**Table B.1** Assumptions Used in Modelling Events

Event Modelling	Assumptions
<b>Events &amp; Participants</b>	<b>All Events are 3 days</b>
Number of Events (per year)	Year 1 = 0; Year 2=2; Years 4-5=4 ; Years 6-10 =6 All 3 -day events
Number of participants	Ave. 300 per event
Accompanying Persons/Spectators	Average 2 per participant
<b>Visitor types</b>	
Day Visitors	20%
Overnight visitors	80% Stay = 3 nights; assume twin share
<b>Spending</b>	
Day visitors (average per person)	\$120 per day (constant prices \$2020)
Overnight Visitors (average per person)	\$300 per day (constant prices \$2020)

SOURCE: MCA MODELLING & ESTIMATES, SEPT 2020

<sup>28</sup> Spending is in constant prices - 2020 dollars

Table B.2 Spending in Region from Trails Events Years 1 to 10 (estimates)

Events – 10 year analysis	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
No. Events	0	2	4	4	4	6	6	6	6	6
<b>Participants</b>										
Participants per event		300	300	300	300	300	300	300	300	300
Total participants	0	600	1200	1200	1200	1800	1800	1800	1800	1800
Accompanying persons										
(Ave 2 per participant)	0	1200	2400	2400	2400	3600	3600	3600	3600	3600
Total Participants & Accompanying Persons	0	1800	3600	3600	3600	5400	5400	5400	5400	5400
<b>Visitor Types</b>										
Day visitors (20%)	0	360	720	720	720	1080	1080	1080	1080	1080
Overnight visitors (80%)	0	1440	2880	2880	2880	4320	4320	4320	4320	4320
Stay overnight (3 nights)	0	4320	8640	8640	8640	12960	12960	12960	12960	12960
Room nights (Assume Twin Share)	0	2160	4320	4320	4320	6480	6480	6480	6480	6480
<b>Spending in Region (\$ 2021 prices)</b>										
Day Visitors	\$0	\$129,600	\$259,200	\$259,200	\$259,200	\$388,800	\$388,800	\$388,800	\$388,800	\$388,800
Overnight visitors	\$0	\$648,000	\$1,296,000	\$1,296,000	\$1,296,000	\$1,944,000	\$1,944,000	\$1,944,000	\$1,944,000	\$1,944,000
Total Spending	\$0	\$777,600	\$1,555,200	\$1,555,200	\$1,555,200	\$2,332,800	\$2,332,800	\$2,332,800	\$2,332,800	\$2,332,800

SOURCE: MCA MODELLING &amp; ESTIMATES, JULY 2021

The jobs generated increase from 5.9 FTE (2 events) to 13.6 FTE (6 events) as the number of events are increased. By their nature events are made of a larger number of short term and casual jobs which aggregate to the annual full time equivalent jobs. One of the advantages of events is that they put the trail network on the map for intermediate and advanced & expert users.

**Table B.3** Total Jobs Generated by Events (FTE Number)

Jobs Generate by Events	Year 1	Year 2	Year 3-5	Year 6-10
<b>Events</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>6</b>
Accommodation	0.0	1.6	3.1	4.6
Food & Beverage	0.0	1.6	3.0	4.4
Other Retail	0.0	0.6	0.7	1.0
Health	0.0	0.2	0.2	0.2
Transportation	0.0	0.3	0.3	0.4
Communication	0.0	0	0.0	0.0
Recreation Services/Other Services	0.0	1.1	1.8	2.6
Education	0.0	0.1	0.1	0.1
Miscellaneous Services	0.0	0.2	0.2	0.3
<b>Total</b>	<b>0.0</b>	<b>5.9</b>	<b>9.3</b>	<b>13.6</b>

SOURCE: MCA MODELLING & ESTIMATES, SEPTEMBER 2020. MAY BE SOME DIFFERENCES DUE TO ROUNDING.

## APPENDIX C – CATCHMENT AREA REGIONS

The following table shows the LGAs that are included in each of the catchment areas.

Region	LGAs
<b>Local - Yarra Ranges</b>	Yarra Ranges (S)
<b>Adjacent Regional</b>	Baw Baw (S) Mansfield (S) Murrindindi (S)
<b>Adjacent Urban</b>	Cardinia (S) Casey (C) Knox (C) Maroondah (C) Nillumbik (S)
<b>Eastern Suburbs</b>	Boroondara (C) Manningham (C) Monash (C) Stonnington (C) Whitehorse (C) Yarra (C)
<b>Northern Suburbs</b>	Banyule (C) Darebin (C) Whittlesea (C)
<b>Other &amp; West</b>	Brimbank (C) Hobsons Bay (C) Hume (C) Maribyrnong (C) Melbourne (C) Melton (C) Moonee Valley (C) Wyndham (C)
<b>South East</b>	Bayside (C) Frankston (C) Glen Eira (C) Greater Dandenong (C) Kingston (C) (Vic.) Mornington Peninsula (S)

## APPENDIX D – PROJECT CAPITAL COSTS

The following are the construction and maintenance costs for the trail network.

**Table D.1** Total Costs Stage 1 and Stage 1 and 2 Warburton Trails Project – 10 Years (constant prices \$2021)

Summary - 10 Years	Trail Development <\$ 2020 Prices>
Design, Development and Planning Costs	\$2,000,000
<b>Project Cost Stage 1</b>	
<b>Construction</b>	
Trail Construction (105kms)	\$4,200,000
Other Infrastructure	\$7,100,000
<b>Total Construction</b>	<b>\$11,300,000</b>
<b>Maintenance</b>	
<b>Trails</b>	
Annual Maintenance Cost (\$2000 per km – 105 kms) <sup>29</sup>	\$210,000
<b>Total (10 years)</b>	<b>\$2,100,000</b>
<b>Other Infrastructure</b>	
Annual Maintenance Cost (1.5% of cost)	\$106,500
<b>Total (10 years)</b>	<b>\$1,065,000</b>
<b>Total Maintenance Cost (10 Years)</b>	<b>\$3,165,000</b>
<b>Total Project Costs Stage 1 (10 Years)</b>	
<b>Total Construction &amp; Maintenance (Stage 1)</b>	<b>\$14,465,000</b>
<b>Project Cost Stage 2</b>	
<b>Construction</b>	
Trail Construction (76kms)	\$3,040,000
Other Infrastructure	\$750,000
<b>Total Construction</b>	<b>\$3,790,000</b>

<sup>29</sup> TRAIL MAINTENANCE COST \$2000 PER KM/YEAR . WARBURTON DRAFT MASTER PLAN REPORT, JANUARY 2020, YARRA RANGES COUNCIL



Summary - 10 Years	Trail Development <\$ 2020 Prices>
<b>Maintenance</b>	
<b>Trails</b>	
Annual Maintenance Cost (\$2000 per km – 76 kms) <sup>30</sup>	\$152,000
<b>Total (10 years)</b>	<b>\$1,520,000</b>
<b>Other Infrastructure</b>	
Annual Maintenance Cost (1.5% of cost)	\$11,250
<b>Total (10 years)</b>	<b>\$112,500</b>
<b>Total Maintenance Cost (10 Years)</b>	<b>\$1,632,500</b>
<b>Total Project Costs Stage 2 (10 Years)</b>	
<b>Total Construction &amp; Maintenance (Stage 2)</b>	<b>\$5,422,500</b>
<b>Project Cost Development &amp; Stage 1 &amp; 2</b>	
<b>Construction</b>	
Design, Development and Planning Costs	\$2,000,000
Trail Construction Trails	\$7,240,000
Infrastructure Costs	\$7,850,000
<b>Total Construction</b>	<b>\$17,090,000</b>
<b>Maintenance</b>	
Trails	\$3,620,000
Other Infrastructure	\$1,177,500
Total Maintenance (10 Years)	<b>\$4,797,500</b>
<b>Total Project Costs 10 Years</b>	
<b>Total Design, Construction &amp; Maintenance</b>	<b>\$21,887,500</b>

SOURCE: YARRA RANGES COUNCIL SEPTEMBER 2020

<sup>30</sup> TRAIL MAINTENANCE COST \$2000 PER KM/YEAR . WARBURTON DRAFT MASTER PLAN REPORT, JANUARY 2020, YARRA RANGES COUNCIL



[www.trctourism.com](http://www.trctourism.com)

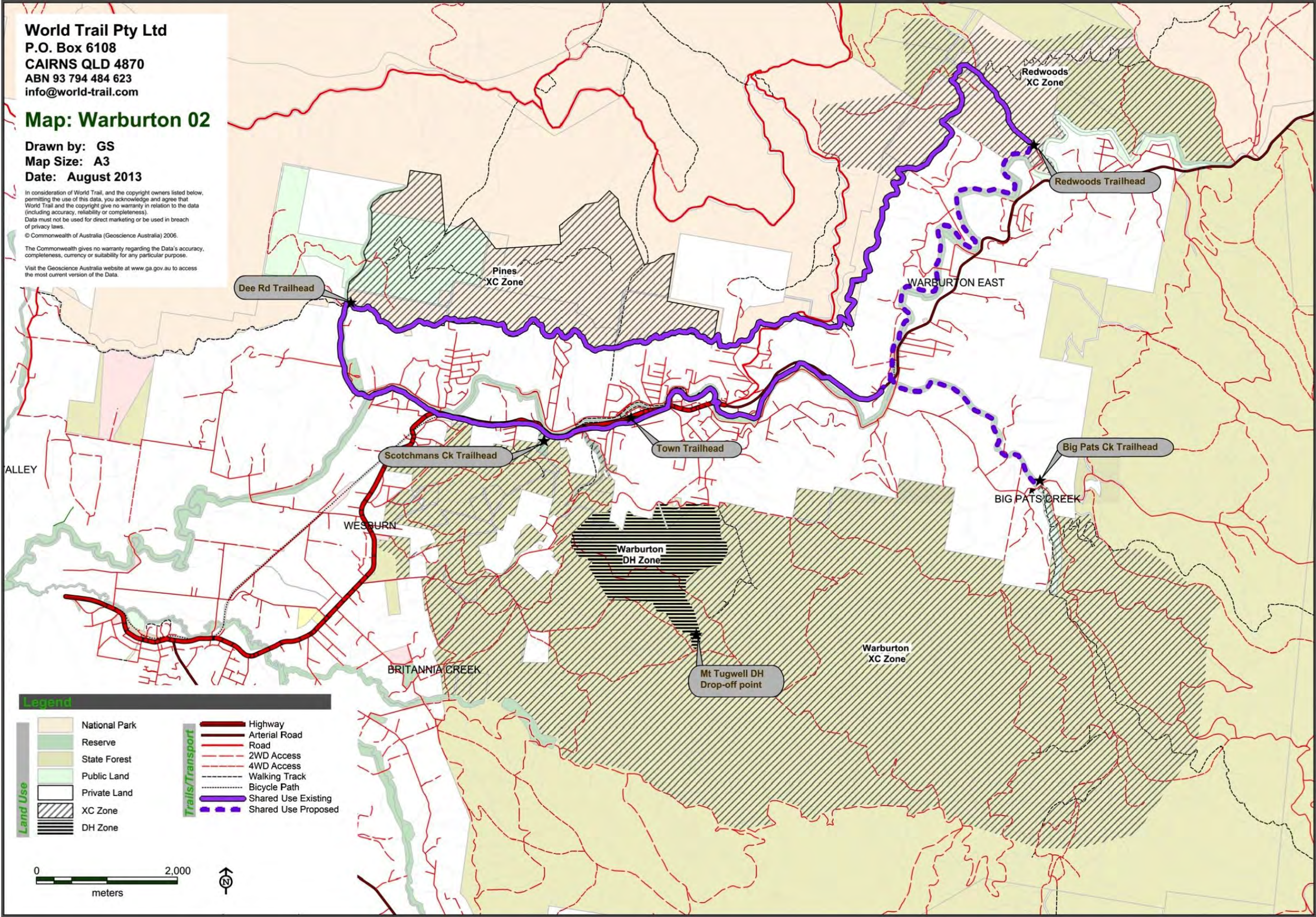


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## Attachment B: Trail alignments at each design stage



Overview of proposed mountain bike trail zones and shared use circuit



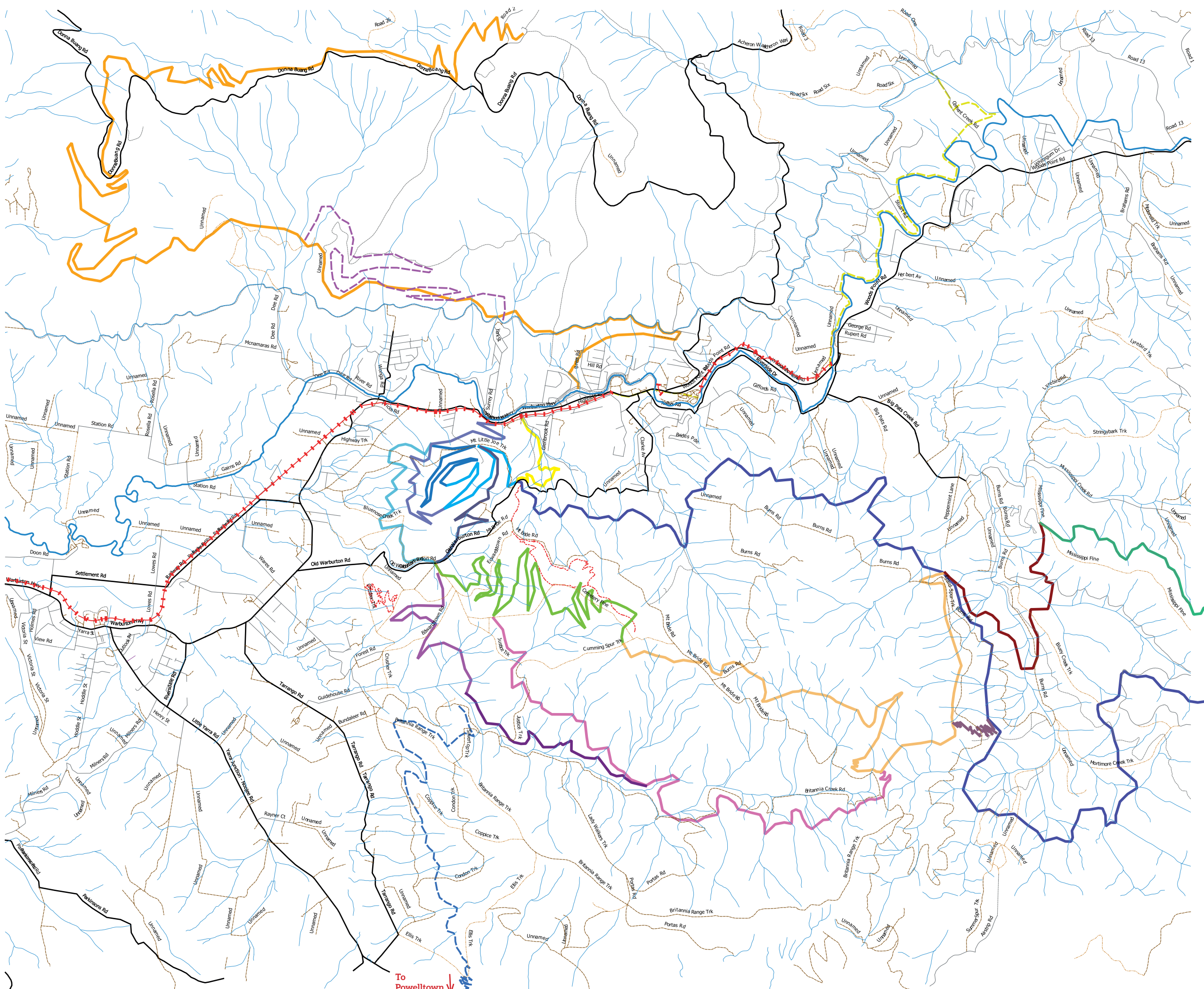


# Preliminary Master Plan 2016

## Proposed & Existing Trails

- EXISTING TRACKS
- ++ RAIL TRAIL
- AQUEDUCT CLIMB
- DROP A K\*
- RICHARDS TRAMWAY
- 300 CONTOUR
- TUGWELL CONTOUR
- 400 CONTOUR
- BRITANNIA CAVES LINK
- BRITANNIA LOOP
- BRITANNIA LINK
- TUGWELL FLOW
- ELEVATOR
- YANKEE JIM LINK
- LITTLE JOE CLIMB
- YANKEE JIM RETURN
- LITTLE JOE FLOW

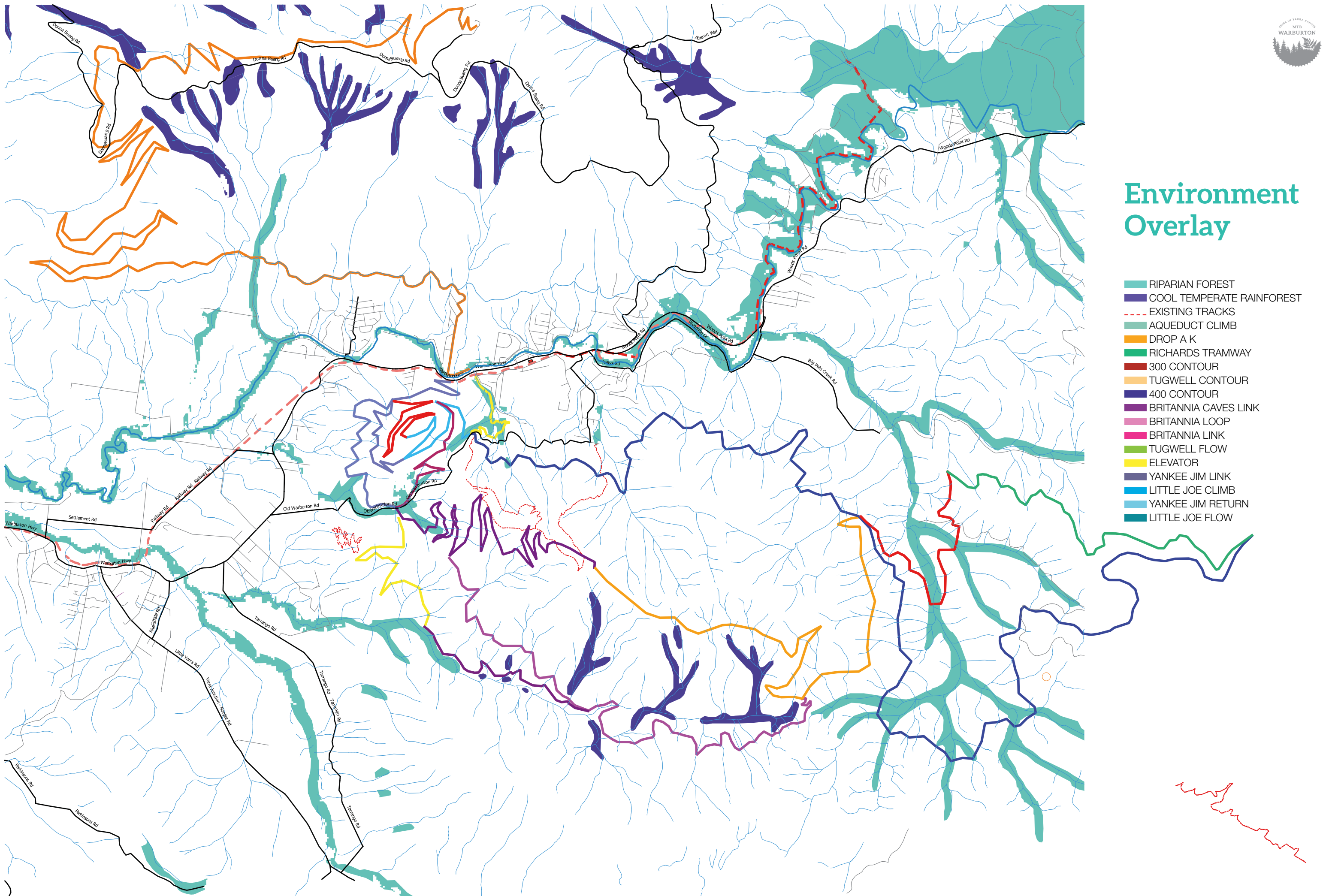
\* The section of 'Drop a K' south of the O'Shannassy Aqueduct is subject to Melbourne Water final approval.





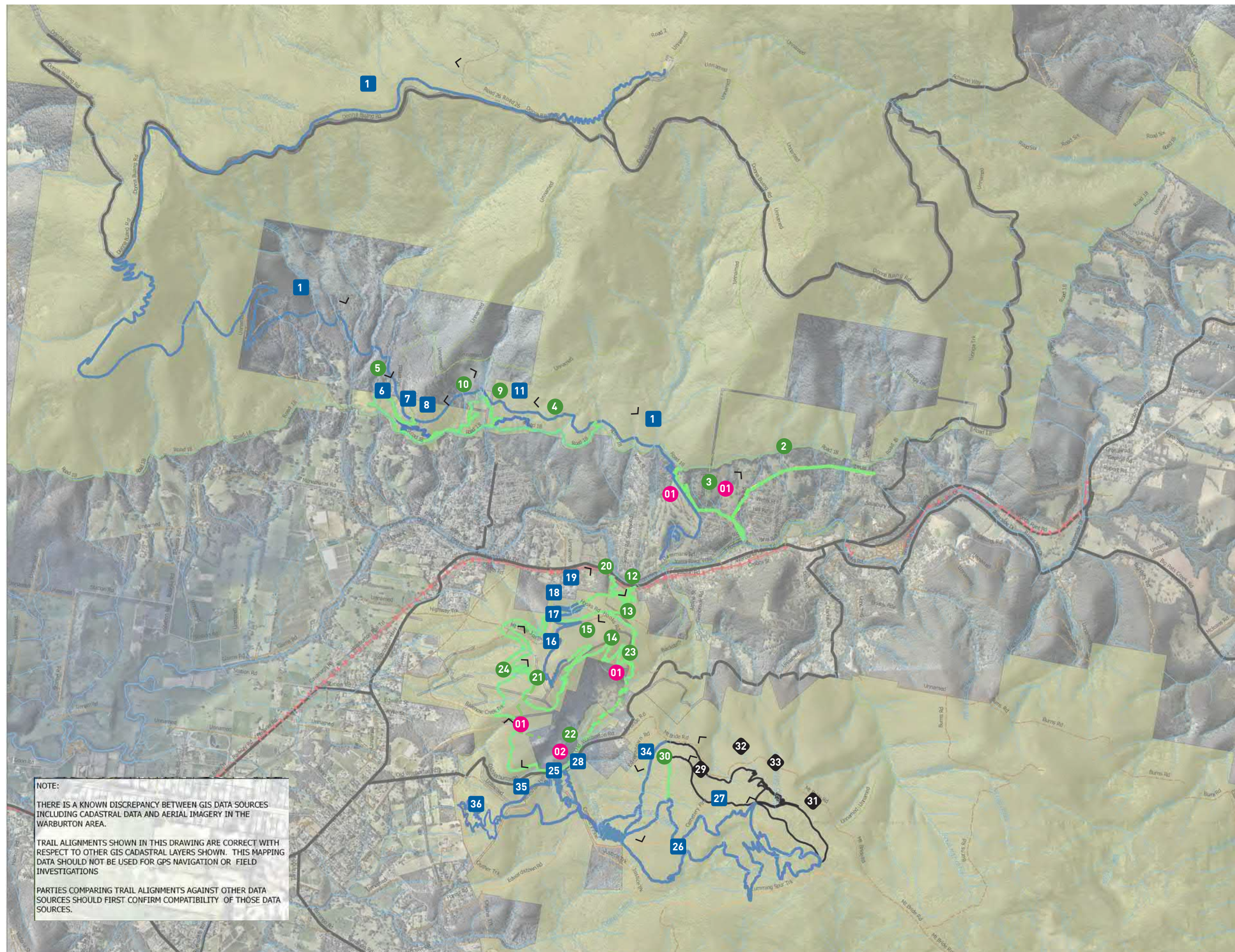
# Environment Overlay

- RIPARIAN FOREST
- COOL TEMPERATE RAINFOREST
- EXISTING TRACKS
- AQUEDUCT CLIMB
- DROP A K
- RICHARDS TRAMWAY
- 300 CONTOUR
- TUGWELL CONTOUR
- 400 CONTOUR
- BRITANNIA CAVES LINK
- BRITANNIA LOOP
- BRITANNIA LINK
- TUGWELL FLOW
- ELEVATOR
- YANKEE JIM LINK
- LITTLE JOE CLIMB
- YANKEE JIM RETURN
- LITTLE JOE FLOW





# First Draft Master Plan 2018



## Donna Buang Zone

- 1 Epic Alpine Descent
- 2 Ascending Climb
- 3 Ascending Climb
- 4 Cross Country
- 5 Cross Country
- 6 Cross Country
- 7 Cross Country
- 8 Cross Country
- 9 Cross Country
- 10 Cross Country
- 11 Cross Country

## Mt Little Joe Zone

- 12 Ascending Climb
- 13 Ascending Climb
- 14 Ascending Climb
- 15 Ascending Climb
- 16 Flow Trail
- 17 Flow Trail
- 18 Flow Trail
- 19 Flow Trail
- 20 Flow Trail
- 21 Cross Country
- 22 Cross Country
- 23 Cross Country
- 24 Flow Trail

## Mt Tugwell Zone

- 25 Ascending Climb
- 26 Ascending Climb
- 27 Flow Trail
- 28 Flow Trail
- 29 All Mountain
- 30 Disused Fireroad
- 31 All Mountain
- 32 All Mountain
- 33 All Mountain
- 34 All Mountain
- 35 Cross Country
- 36 Cross Country

- 01 The project team are currently investigating alternate alignments around Old Warburton and the ascending trails between Merlino Ave and the O'Shannassy Aqueduct trail to minimise impact on local residents
- 02 A detailed survey of the Old Warburton Cemetery will be undertaken and the trails realigned to avoid this important heritage area

## IMBA Trail Difficulty Rating

- Easy
- Intermediate
- ◆ Difficult







# Second Draft Master Plan 2019

Mt Victoria Walking Track

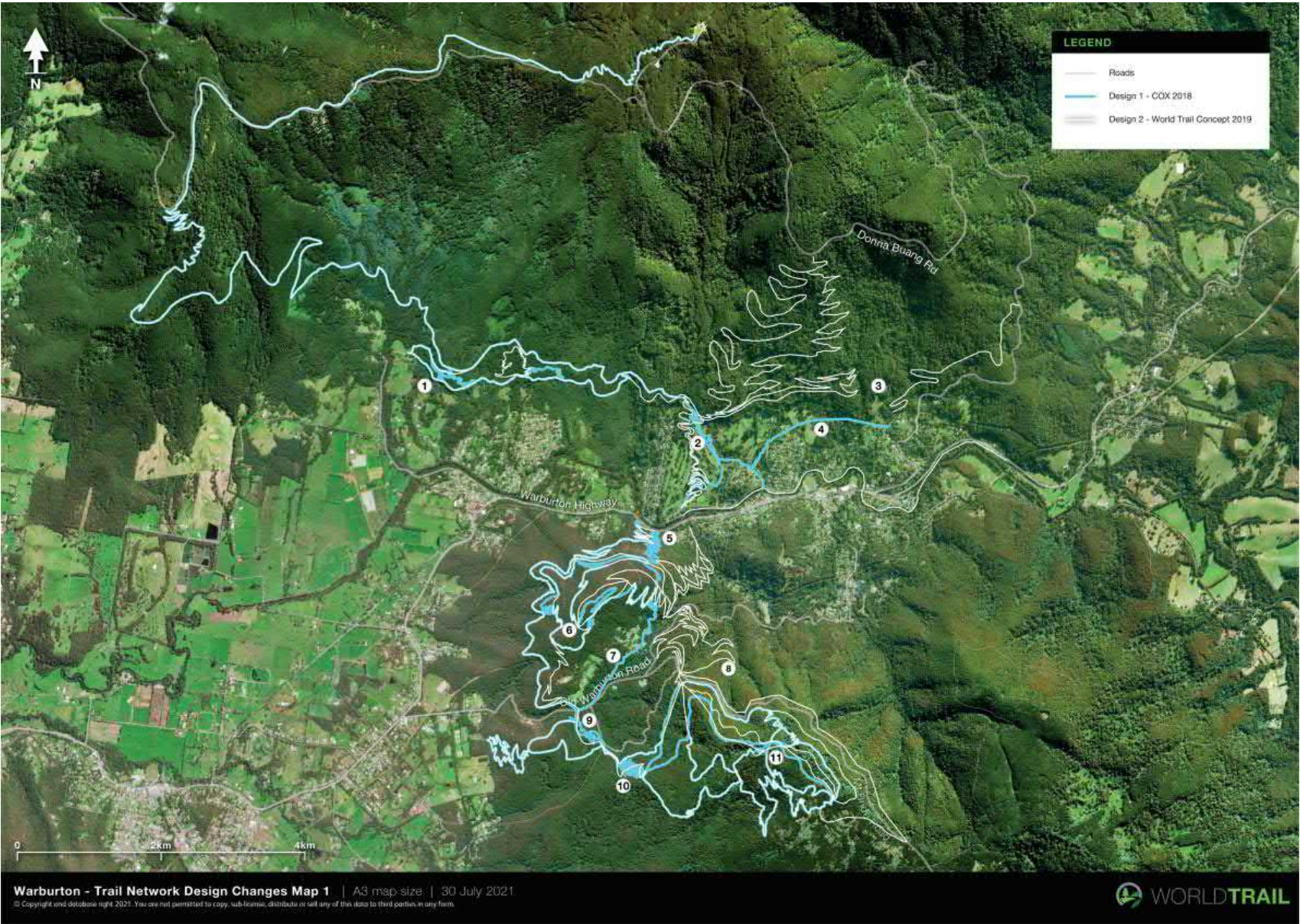
Backstairs Walking Track

## LEGEND

- Access Track
- Proposed MTB Trail
- Existing MTB Trail
- Obsolete MTB Trail
- Existing Walking Trail



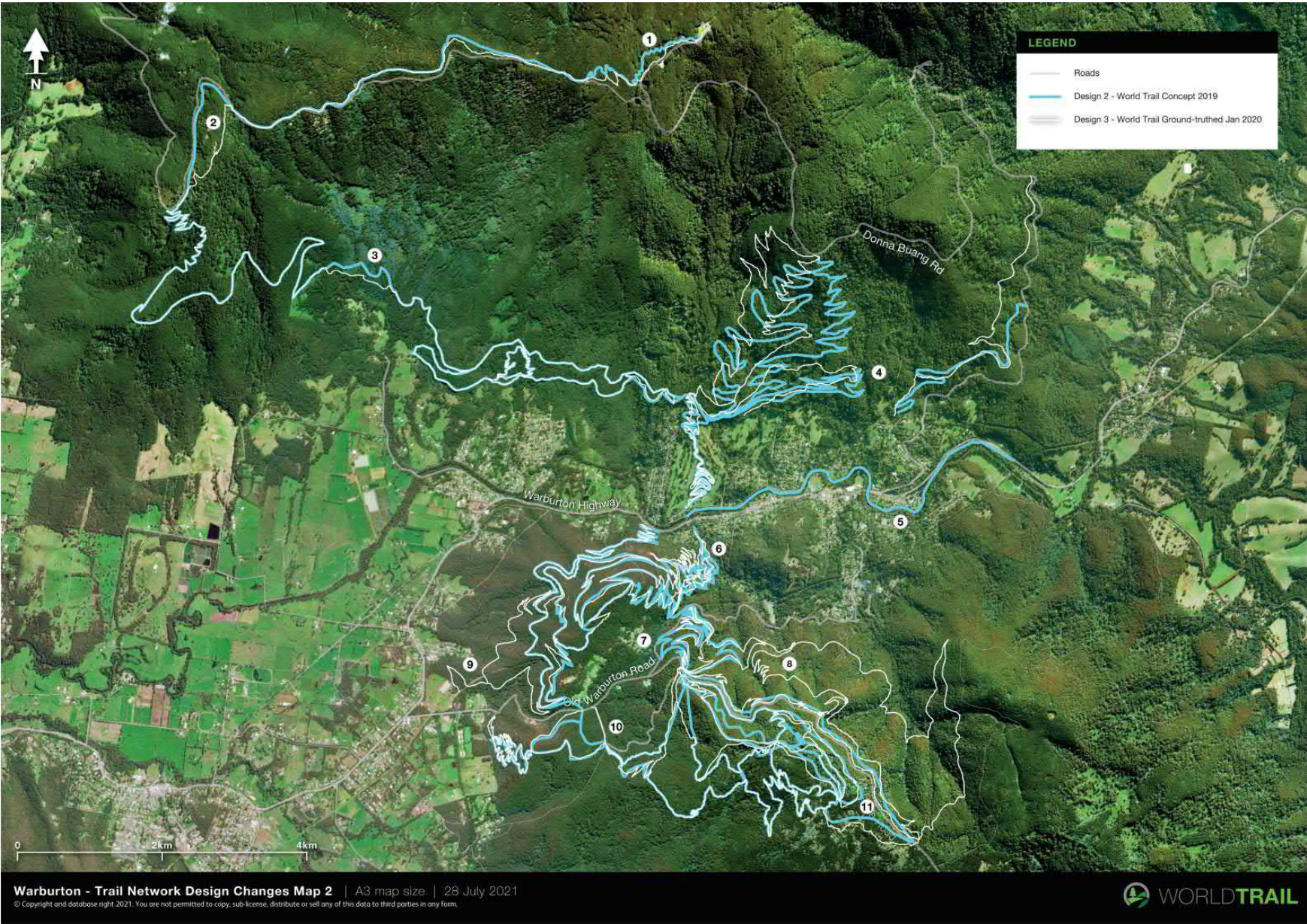
## Attachment C: Maps showing trail modifications to reduce impacts



**Table 12: Trail Network Design Changes – map 1**

Change No.	Change Description	Rationale for Change
1.	A number of trails removed near Dee Rd/O'Shannassy Aqueduct.	<ul style="list-style-type: none"> <li>Not aligned with current market trends/expectations.</li> </ul>
	New concept developed for trail alignment through golf course.	<ul style="list-style-type: none"> <li>Consultation with golf club lead to improved concept.</li> </ul>
	A number of new descending trails from Mount Donna Buang Rd added.	<ul style="list-style-type: none"> <li>Better alignment with market trends/expectations.</li> <li>Improves viability of shuttle route on north side.</li> </ul>
	Removal of trails through urban area near Marlino Ave.	<ul style="list-style-type: none"> <li>Not feasible due to private property/road intersections.</li> </ul>
	Main descending trail from Mount Little Joe moved to the east to finish at Polly Grey Reserve.	<ul style="list-style-type: none"> <li>Not enough space to fit climb and descent in narrow corridor fronting onto the rail trail.</li> <li>Some existing informal MTB trails already in the corridor of public land heading down into Polly Grey reserve which could be utilised.</li> <li>Allows the main descents coming off Mount Tugwell to be realigned eastward, away from Old Warburton.</li> </ul>
	Minor changes and realignments to trails around the west/northwest/southwest and summit of Mount Little Joe.	<ul style="list-style-type: none"> <li>Realignments to improve views from summit.</li> <li>Realignments to improve flow and add flexibility to trail experience – i.e. more loops.</li> </ul>
	Removal of trail through Old Warburton.	<ul style="list-style-type: none"> <li>Local residents opposed to trail through this area.</li> </ul>
	New trails added on east (low) side of Mount Bride Rd	<ul style="list-style-type: none"> <li>Moves the crossing point of Old Warburton Rd away from the residences located in Old Warburton.</li> <li>Enables better alignment down to Polly Grey reserve.</li> <li>Better alignment with market trends/expectations – more descents, including Easy descent from summit to base.</li> </ul>
	Removal of trail within proximity to historic cemetery.	<ul style="list-style-type: none"> <li>Protection of heritage</li> </ul>
	Modification of climbing trail to reduce stacked switchbacks	<ul style="list-style-type: none"> <li>Improvements to rider experience</li> </ul>
	Minor changes and realignments to trails towards the summit of Mount Little Joe.	<ul style="list-style-type: none"> <li>Improves utilisation of existing informal MTB trails</li> <li>Better alignment with market trends/expectations.</li> </ul>
	River trail connection to East Warburton added	<ul style="list-style-type: none"> <li>Utilises largely existing trails</li> <li>Provides community connections</li> </ul>

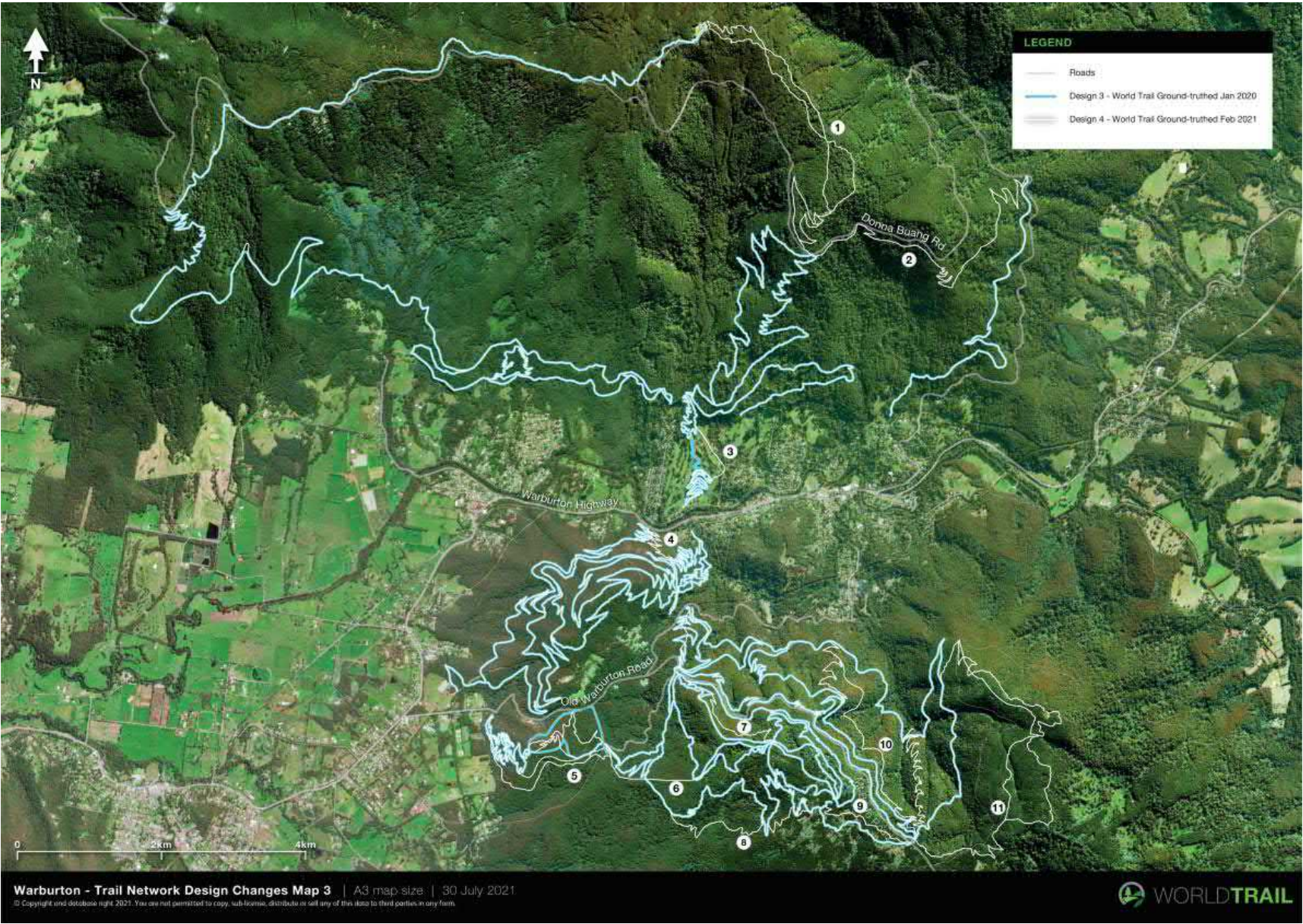






**Table 13: Trail Network Design Changes – map 2**

Change No.	Change Description	Rationale for Change
1.	Realignments along top portion of Drop-a-K, before crossing Mount Donna Buang Rd.	<ul style="list-style-type: none"> <li>• Move trail out of water catchment.</li> <li>• Move trail away from historic bushwalking hut.</li> <li>• Realignments to avoid Leadbeater's Possum and Wingless Stonefly habitat.</li> </ul>
2.	Realignment to eastern side of Ben Cairn.	<ul style="list-style-type: none"> <li>• Improves rider experience.</li> <li>• Realignments to avoid Leadbeater's Possum habitat.</li> </ul>
3.	Minor trail alignment.	<ul style="list-style-type: none"> <li>• Avoidance of private property.</li> </ul>
4.	Minor changes to position of trails above O'Shannassy Aqueduct due to change from concept to ground-truthed alignments.	<ul style="list-style-type: none"> <li>• Ground-truthing responds to actual conditions and opportunities on the ground.</li> </ul>
5.	River trail removed	<ul style="list-style-type: none"> <li>• Largely already exists.</li> <li>• Opportunities to improve this trail exist outside of the MTB project.</li> </ul>
6.	Minor changes to position of trails approaching Polly Grey reserve due to change from concept to ground-truthed alignments.	<ul style="list-style-type: none"> <li>• Ground-truthing responds to actual conditions and opportunities on the ground.</li> </ul>
7.	Minor realignment of trails near Old Warburton township, to move the trails away from local residences.	<ul style="list-style-type: none"> <li>• Local residents opposed to trails through this area.</li> </ul>
8.	New trails added to east/northeast of Mount Bride Rd	<ul style="list-style-type: none"> <li>• Better alignment with market trends/expectations – more descents, addition of a long wilderness trail on the flanks of Mount Bride.</li> </ul>
9.	New trails added connecting Mount Little Joe trail network into Wesburn Recreation Reserve.	<ul style="list-style-type: none"> <li>• Wesburn Recreation Reserve identified as potential secondary trail head, event space and possible outdoor education precinct.</li> </ul>
10.	Minor realignment of proposed trail connecting to Hey Hey My My trail.	<ul style="list-style-type: none"> <li>• Reduces amount of climbing.</li> <li>• Uses an existing road near Old Warburton community instead of building new trail.</li> </ul>
11.	Minor changes to position of trails around summit of Mount Tugwell due to change from concept to ground-truthed alignments.	<ul style="list-style-type: none"> <li>• Ground-truthing responds to actual conditions and opportunities on the ground.</li> </ul>





**Table 14: Trail Network Design Changes – map 3**

Change No.	Change Description	Rationale for Change
1.	New trails added to eastern ridgeline from Mount Donna Buang summit to Mount Victoria.	<ul style="list-style-type: none"> <li>Trails identified as possible alternative to Drop-a-K.</li> <li>Provide connection from the summit down to other trails below Mount Donna Buang Rd.</li> <li>Improves viability of shuttle route on north side.</li> </ul>
2.	New trail added below Mount Donna Buang Rd.	<ul style="list-style-type: none"> <li>Trails identified as possible alternative to Drop-a-K.</li> <li>Provides connection to another trail further down, making a continuous descent from the summit of Mount Donna Buang all the way to main trail head, via Easy/Intermediate trails.</li> <li>Improves viability of shuttle route on north side.</li> </ul>
3.	Minor realignment of golf course trails	<ul style="list-style-type: none"> <li>Response to discussions with golf club.</li> </ul>
4.	Addition of new trail on north side of Mount Little Joe	<ul style="list-style-type: none"> <li>Contingency exit trail in case access across private property near Polly Grey reserve is not permitted.</li> </ul>
5.	Addition of new trails in Hey Hey My My area.	<ul style="list-style-type: none"> <li>Better activation of Wesburn precinct.</li> <li>Allows for continuous descent all the way from summit of Mount Tugwell down into Wesburn Recreation Reserve.</li> </ul>
6.	Inclusion of lower part of Cemetery Track.	<ul style="list-style-type: none"> <li>Lower, heavily eroded part of Cemetery Track identified as possible location for Extreme (double black diamond) trail – this segment not well represented in product mix.</li> </ul>
7.	New descending trail added on upper portion of Mount Tugwell.	<ul style="list-style-type: none"> <li>Improves utilisation and spacing of trails on Mount Tugwell.</li> <li>Offers better mix of machine-built trails vs. hand-built trails.</li> </ul>
8.	New short, direct climbing trails added	<ul style="list-style-type: none"> <li>Adds in opportunities for Difficult, optional A-line style climbs to reward experienced riders.</li> <li>Potential usage by E-bike riders.</li> <li>Better alignment with market trends/expectations.</li> </ul>
9.	New linkage between summit of Mount Tugwell and proposed trail head on Mount Bride Rd.	<ul style="list-style-type: none"> <li>Improves rider circulation – previously there was only one trail providing this connection, meaning it would need to be dual direction.</li> </ul>
10.	New descending trails below Mount Bride	<ul style="list-style-type: none"> <li>Improves utilisation and spacing of trails on Mount Tugwell.</li> <li>Better alignment with market trends/expectations.</li> </ul>

Change No.	Change Description	Rationale for Change
11.	New wilderness trails around Mount Bride	<ul style="list-style-type: none"><li>• Better alignment with market trends/expectations.</li><li>• Utilises some existing old roads/tracks</li><li>• Connects to potential camping area</li></ul>





**Table 15: Trail Network Design Changes - – map 4**

Change No.	Change Description	Rationale for Change
1.	Realignment of first portion of Drop-a-K.	<ul style="list-style-type: none"> <li>Avoidance of Leadbeater's Possum habitat and nest boxes.</li> <li>Avoidance of Wingless Stonefly habitat.</li> </ul>
2.	Minor realignment of Drop-a-K approaching crossing of Mount Donna Buang Rd.	<ul style="list-style-type: none"> <li>Avoidance of Leadbeater's Possum habitat and nest boxes.</li> </ul>
3.	Minor realignment of trail near Old Warburton Rd	<ul style="list-style-type: none"> <li>Local residents opposed to trail through this area.</li> </ul>

## Attachment D: Trail screening results

Trail Screening Results - Warburton

Trail ID	Trail Length (m)	Trail Difficulty	Trail Description	Biodiversity	Heritage	Soci-economic	Biodiversity Comments	Aboriginal Cultural Heritage Comments	Historical Heritage Comments	Socio-economic Comments
1	22260	Intermediate	Nicknamed Droppa K. Descends from the summit of Mt Donna Buang to the O'Shannassy Aqueduct. First 8.5km is hand constructed, gently downhill, passing through Cool Temperate Rainforests, with frequent boardwalk sections. The final remaining 19.5km is slightly steeper, constantly descending. Key features include the summit of Mt Donna Buang, cool temperate rainforests and myrtle beech trees and the large rock outcrop called Ben Cairn.	High Priority	Moderate Priority	Low Priority	Significant species & communities - Leadbeaters Possum, Mount DB Stonefly, Southern Greater Glider, Tree Geebung Persoonia arborea, Forest Phebalium Phebalium squamulosum subsp. squamulosum and Mountain Bird-orchid Chiloglottis jeanesii records in proximity to trail, PE mapping of Cool Temperate Rainforest TEC Land mgt/conservation priority - within Yarra Ranges NP and State Forest Other values - Endangered and Least concern EVC(s) impacted, Kennedy Crk, McKenzie Crk, Dee River, Walker Crk, Stockdales Crk, Dirty Gully Crk and minor tributary crossings. Priority rationale - trail realignments/design changes likely to be required to avoid (or further minimise) impacts on threatened species/communities between Mt D-B and Ben Cairn.	Low sensitivity area: No recorded places or potential	High sensitivity area: Within HO 140 area Intersects two areas of archaeological sensitivity associated with hut sites Intersects area of archaeological sensitivity associated with sawmill Intersects water race and three tramways Proximity to hut sites	1. Trail end (1s) in proximity (30-50m) of three landholders on Sussex St. The trail is however unlikely to be in line-of-sight of properties and usage is highly unlikely to cause any significant noise/dust/inconvenience to residents 2. Upgrade of facilities at Mount Donna Buang likely to have net positive effect for access and safety benefiting communities and visitors
2	4534	Intermediate	Mostly flat trail running parallel to O'Shannassy Aqueduct from the top of the Golf Course to Dee Rd car park and then climbing up to meet trail 1 (Droppa K).	Low Priority	Moderate Priority	Low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within Yarra Ranges NP Other values - Least concern EVC(s) impacted, minor tributary crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: No recorded places or potential	Moderate sensitivity area: Intersects area of archaeological sensitivity associated with MMBW works site Intersects two tramways	1. Trail commences (2a) at end of 1s. Runs adjacent to Sussex St (40m away) for approx 60m. 2 properties in proximity, but unlikely to be in line-of-sight of properties and usage is unlikely to cause any significant noise/dust/inconvenience to residents
3	2580	Intermediate	Loop trail located between trail 1 and 2. Roughly 50% climbing and 50% descending.	Low Priority	Moderate Priority	Low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest, road reserves & Yarra Ranges NP Other values - Least concern EVC(s) impacted, Walkers Crk & minor tributary crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: No recorded places or potential	Moderate sensitivity area: Intersects tramway	1. Trail isolated from any landholders, businesses or bushwalking sites. No discernible socio-economic impacts
4	92	Intermediate	Short climbing link between trail 2 and 1.	Low Priority	Low Priority	Low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within Yarra Ranges NP Other values - Least concern EVC(s) impacted, no waterway crossings Priority rationale - site level impacts for this short section of trail to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: No recorded places or potential	Low sensitivity area: No recorded places or potential	1. Trail isolated from any landholders, businesses or bushwalking sites. No discernible socio-economic impacts
5	5586	Intermediate/ Difficult	Gravity trail from Mt Donna Buang Rd down to O'Shannassy Aqueduct.	Low Priority	Low Priority	Moderate Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within Yarra Ranges NP Other values - Least concern EVC(s) impacted, minor tributary crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: No recorded places or potential	Moderate sensitivity area: Proximity to VHI sawmill and tramway site	1. 5a intersects proposed Mt Victoria / Donna Buang Walk Track realignment at two points. 2. Several local bushwalkers have raised safety concerns about proposed trails (Mt Victoria and Mt Tugwell) across the community consultation process. 3. It is estimated usage of the Mt Victoria / Donna Buang Walk Track would peak at approx 50 per day. This would be concentrated on weekends. 4. Evidence from comparable trails (Bay of Fires and Bright) indicates that a handful of complaints are made by bushwalkers annually, though no serious safety incidents have been reported. 5. It is assessed that the two intersections on this trail may temporarily affect bushwalkers' confidence in accessing the Mt Victoria / Donna Buang Walk Track. But signage and implementation of the IMBD trail principles (riders giving way to walkers) should minimise safety risks and not produce a substantive socio-economic impact
6	4700	Difficult	Gravity trail from Mt Donna Buang Rd down to O'Shannassy Aqueduct.	Low Priority	Low Priority	Moderate Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within Yarra Ranges NP & road reserves Other values - Least concern EVC(s) impacted, minor tributary crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: No recorded places or potential	Low sensitivity area: No recorded places or potential	1. As above, 6a intersects proposed Mt Victoria / Donna Buang Walk Track realignment at two points. 2. Several local bushwalkers have raised safety concerns about proposed trails (Mt Victoria and Mt Tugwell) across the community consultation process. 3. It is estimated usage of the Mt Victoria / Donna Buang Walk Track would peak at approx 50 per day. This would be concentrated on weekends. 4. Evidence from comparable trails (Bay of Fires and Bright) indicates that a handful of complaints are made by bushwalkers annually, though no serious safety incidents have been reported. 5. It is assessed that the two intersections on this trail may temporarily affect bushwalkers' confidence in accessing the Mt Victoria / Donna Buang Walk Track. But signage and implementation of the IMBD trail principles (riders giving way to walkers) should minimise safety risks and not produce a substantive socio-economic impact
7	4006	Easy/ Intermediate	Loop trail, starting and finishing on O'Shannassy Aqueduct.	Moderate Priority	Low Priority	Low Priority	Significant species & comms - Old LBP records (1960s) at eastern end of alignment, no PE significant species records or notes Land mgt/conservation priority - within Yarra Ranges NP & road reserves Other values - Least concern EVC(s) impacted, minor tributary crossings Priority rationale - impacts on LBP habitat may need to be managed through realignments at eastern end of this trail, habitat assessment may be required to inform design changes (i.e. check habitat suitability given age of LBP records)	Low sensitivity area: No recorded places or potential	Moderate sensitivity area: Proximity to VHI sawmill and tramway site	1. Trail isolated from any landholders, businesses or bushwalking sites. 2. Trail 7 does begin and end at O'Shannassy Aqueduct, meaning riders will interact with walkers, horse riders and bike riders using O'Shannassy Aqueduct Trail. Given this is already a shared space impact on other users likely to limited. The Adueduct trail is a wide path that can accommodate shared use, with few reported indidents bewteen cyclists and other users. Current usage on trail may peak around 500 per day
8	4888	Easy	Easy descending trail from Mt Donna Buang Rd down to O'Shannassy Aqueduct.	Moderate Priority	Low Priority	Low Priority	Significant species & comms - records of vulnerable Tree Geebung (Persoonia arborea) in proximity to northern end of trail, no PE significant species records or notes Land mgt/conservation priority - within Yarra Ranges NP & road reserves Other values - Least concern EVC(s) impacted, Rocky Crk, Anderson Crk & minor tributary crossings Priority rationale - presence of threatened woody species may require micro-siting and minor trail realignments/design changes at higher elevations	Low sensitivity area: No recorded places or potential	Low sensitivity area: No recorded places or potential	1. Trail finish on O'Shannassy Aqueduct, meaning riders increase bike usage along Aqueduct trail alongside walkers, horse riders. As above, given this is already a shared space impact on other users likely to limited. The Adueduct trail is a wide path that can accommodate shared use, with few reported indidents bewteen cyclists and other users. Current usage on trail may peak around 500 per day 2. Trail finishes approximately 100m from two properties on Yuonga Rd and Piedmont Ave, which are already in vicinity of Aqueduct Trail and unlikely to be further impacted by riders completing Trail 8.



9	1975	Easy	Loop trail located on private property above golf course.	Moderate Priority	Moderate Priority	Low Priority	DESKTOP ONLY BY PE Significant species & comms - no VBA records in proximity to trail, desktop assessment only by PE so onground values to be confirmed by Biosis Land mgt/conservation priority - within golfcourse (freehold?) Other values - Least concern EVC(s) impacted, no waterway crossings Priority rationale - site level impacts to be assessed by Biosis and this will inform the need for trail realignments/design changes. Acknowledging further assessment is required, it is not expected that these trails will contain habitat for LBP, MDB stonefly, CTR.	Low sensitivity area: No recorded places or potential	High sensitivity area: Intersects VHI sawmill and tramway site Intersects area of potential	1. Trail loops in vicinity of Warburton Golf Club (at its closest, approximately 90m), but Golf Club members unlikely to be affected by trail loop.
10	3804	Easy	Golf course loop. Concept only.	Moderate Priority	Moderate Priority	Moderate Priority	DESKTOP ONLY BY PE Significant species & comms - no VBA records in proximity to trail, desktop assessment only by PE so onground values to be confirmed by Biosis Land mgt/conservation priority - within golfcourse (freehold?) Other values - Least concern EVC(s) impacted, no waterway crossings Priority rationale - site level impacts to be assessed by Biosis and this will inform the need for trail realignments/design changes. Acknowledging further assessment is required, it is not expected that these trails will contain habitat for LBP, MDB stonefly, CTR.	Low sensitivity area: Complex testing (CHMP 15276) undertaken in proximity after area of potential recorded, no places found and potential resolved	High sensitivity area: Intersects VHI sawmill and tramway site Intersects area of potential associated with sawmill	1. Trail loop will intersect Warburton Golf Course, starting and finishing at Clubhouse. 2. There are approximately 200 Golf Club members currently, with fewer active members using the course on a monthly basis. 3. Usage of Trail 10 will likely cause some discontent among Golf Club members, but appropriate consultation and shared use investment may benefit Club long-term
11	5806	Easy	First loop on Mt Little Joe. Starts on rail trail. Finishes at bottom of Backstairs Track.	Low Priority	Moderate Priority	Moderate Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within Natural Features Reserve, State Forest (SMZ), CoM area and Freehold land Other values - Least concern EVC(s) impacted, minor tributary crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Moderate sensitivity area: Proximity to VAHR 8022-0023 (80m from sensitivity buffer)	Moderate sensitivity area: Within HO 214 area	1. Trail commences on Rail Trail and intersects Little Joes Backstairs Loop at two locations. 2. It is estimated local usage of the Little Joes' Loop would peak at 40 per day (on a weekend), supplemented by a peak of approximately 80 bushwalkers visiting per day. 4. Evidence from comparable trails (Bay of Fires and Bright) indicates that a handful of complaints are made by bushwalkers annually, though no serious safety incidents have been reported. 5. It is assessed that the two intersections on this trail may temporarily affect bushwalkers' confidence in accessing the walking Loop. But signage and implementation of the IMBD trail principles (riders giving way to walkers) should minimise safety risks and not produce a substantive socio-economic impact 6. Trail finishes in proximity of 60m of one adjacent landholder, who has been consulted and supports trail development
12	2829	Easy	Second loop on Mt Little Joe. Traverses western side of Mt Little Joe. Starts and finishes on trail 11.	Low Priority	Low Priority	Low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ) Other values - Least concern EVC(s) impacted, Ballarat Gully Crk & minor tributary crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: No recorded places or potential	Low sensitivity area: No recorded places or potential	1. Trail 12 intersects Highway Walking Track once and Little Joes' Backstairs Loop once. 2. It is assessed that the two intersections on this trail may temporarily affect bushwalkers' confidence in accessing the walking trails. But signage and implementation of the IMBD trail principles (riders giving way to walkers) should minimise safety risks and not produce a substantive socio-economic impact
13	4488	Easy	Third loop on Mt Little Joe. Starts and finished on trail 12. Provides access to Old Warburton Rd via the existing access track, plus connections down into Wesburn.	Low Priority	Low Priority	low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ) Other values - Least concern EVC(s) impacted, Ballarat Gully Crk, Yankee Jim Crk & minor tributary crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: No recorded places or potential	Moderate sensitivity area: Proximity to area of archaeological potential and tramway site	1. Trail passes approximately 170m away from one residential property, though this any usage is extremely unlikely to affect resident. 2. Trail (13a) intersects Bluenose Creek at two locations, though usage of this track for bushwalking is significantly lower than other tracks, and impact is therefore assessed as negligible.
14	4720	Easy/ Intermediate	Loop to summit of Mt Little Joe. Starts on trail 13 and finishes on trail 11. Traverses the eastern and western faces of Mt Little Joe and provides access to proposed Mt Little Joe viewing platform and trails 15 and 16.	Low Priority	Low Priority	Moderate Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ) Other values - Least concern EVC(s) impacted, minor tributary crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: No recorded places or potential	Low sensitivity area: No recorded places or potential	1. Trail intersects Little Joes Backstairs Loop Trail at four locations (across 14e and 14f). 2. It is estimated local usage of the Little Joes' Loop would peak at 40 per day (on a weekend), supplemented by a peak of approximately 80 bushwalkers visiting per day. 4. Evidence from comparable trails (Bay of Fires and Bright) indicates that a handful of complaints are made by bushwalkers annually, though no serious safety incidents have been reported. 5. It is assessed that the four intersections on this trail may temporarily affect bushwalkers' confidence in accessing the walking Loop. But signage and implementation of the IMBD trail principles (riders giving way to walkers) should minimise safety risks and not produce a substantive socio-economic impact
15	1921	Intermediate	Descending trail on the north/east face of Mt Little Joe. Starts on trail 14. Finishes on trail 11.	Low Priority	Low Priority	Low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ) Other values - Least concern EVC(s) impacted, no waterway crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: No recorded places or potential	Low sensitivity area: No recorded places or potential	1. Trail isolated from any landholders, businesses or bushwalking sites. No discernible socio-economic impacts
16	1549	Difficult	Descending trail on the east face of Mt Little Joe. Starts on Trail 14. Finshes at Backstairs trail junction.	Low Priority	Low Priority	Low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ) Other values - Least concern EVC(s) impacted, no waterway crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: No recorded places or potential	Low sensitivity area: No recorded places or potential	1. Trail isolated from any landholders, businesses. 2. Trail concludes at Backstairs Trail juncture, meaning appropriate measures will be required to minimise any risk to walkers and other trail users
17	2606	Easy	Climbing link trail from Warburton Chalet into trail network. Starts at the chalet and finishes on Trail 11.	Moderate Priority	Low Priority	Moderate Priority	DESKTOP ONLY BY PE Significant species & comms - no VBA records in proximity to trail, desktop assessment only by PE so onground values to be confirmed by Biosis Land mgt/conservation priority - within State Forest (SMZ) Other values - Least concern EVC(s) impacted, no waterway crossings Priority rationale - site level impacts to be assessed by Biosis and this will inform the need for trail realignments/design changes. Acknowledging further assessment is required, it is not expected that these trails will contain habitat for LBP, MDB stonefly, CTR.	Low sensitivity area: No recorded places or potential	Low sensitivity area: No recorded places or potential	1. Trail intersects private property, agreed with landholder 2. Trail intersects Little Joes Backstairs Loop at one location.
18	805	Difficult	Descending trail through Backstairs corridor. Starts at Backstairs junction. Finishes on trail 20.	Low Priority	Low Priority	Moderate Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ) and freehold land Other values - Least concern EVC(s) impacted, no waterway crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: No recorded places or potential	Low sensitivity area: No recorded places or potential	1. Intersects private property, agreed with landholder. 2. There are no notable socio-economic impacts beyond necessary arrangements required with identified landowner

19	794	Intermediate	Descending trail through Backstairs corridor. Starts at Backstairs junction. Finishes on trail 20.	Low Priority	Low Priority	Moderate Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ) and freehold land Other values - Least concern EVC(s) impacted, no waterway crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: No recorded places or potential	Moderate sensitivity area: Proximity to tramway site Proximity to HO 214 area	1. Intersects private property, agreed with landholder. 2. There are no notable socio-economic impacts beyond necessary arrangements required with identified landowner
20	1431	Intermediate	Descending trail through Backstairs corridor.	Moderate Priority	Moderate Priority	Moderate Priority	Significant species & comms - Powerful Owl records present along Backstairs/Scotchmans Crk, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ) and freehold land Other values - Least concern EVC(s) impacted, minor tributary crossings Priority rationale - Threatened forest owl roost/nest sites may need consideration along the lower section of this trail near riparian zones/gullies, minor trail realignments/design changes may be required if owl habitat is identified	Low sensitivity area: No recorded places or potential	Moderate sensitivity area: Proximity to tramway site Proximity to HO 214 area	1. Intersects private property, agreed with landholder. 2. There are no notable socio-economic impacts beyond necessary arrangements required with identified landowner 3. Trail intersects Little Joes Backstairs Loop at one location.
21	503	Easy	Access trail between Backstairs junction and vehicle access track. Mostly flat.	Low Priority	Low Priority	Moderate Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ) Other values - Least concern EVC(s) impacted, no waterway crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: No recorded places or potential	Low sensitivity area: No recorded places or potential	1. Intersects private property, agreed with landholder. 2. There are no notable socio-economic impacts beyond necessary arrangements required with identified landowner 3. Trail intersects Little Joes Backstairs Loop at one location.
22	2790	Intermediate	Climbing trail from Old Warburton Rd up to Edwardstown Rd.	Low Priority	Moderate Priority	Low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ) Other values - Least concern EVC(s) impacted, no waterway crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: No recorded places or potential	Moderate sensitivity area: Intersects water race site and tramway site Proximity to area of archaeological potential associated with Lady Hopetoun Mine site	1. Trail isolated from any landholders, businesses or bushwalking sites. Some residents of Old Warburton have indicated concerns about the impacts of the trails locally (character, amenity), but this track in isolation does have any discernible socio-economic impacts
23	1305	Intermediate	Descending trail from Edwardstown Rd to Old Warburton Rd.	Low Priority	Moderate Priority	Low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ) Other values - Least concern EVC(s) impacted, minor tributary crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: No recorded places or potential	Moderate sensitivity area: Intersects water race site Proximity to area of archaeological potential associated with Lady Hopetoun Mine site	1. Trail isolated from any landholders, businesses or bushwalking sites. Some residents of Old Warburton have indicated concerns about the impacts of the trails locally (character, amenity), but this track in isolation does have any discernible socio-economic impacts
24	2647	Easy	Descending trail from Edwardstown Rd to Old Warburton Rd.	Low Priority	Moderate Priority	Low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ) and freehold land Other values - Least concern EVC(s) impacted, minor tributary crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: No recorded places or potential	Moderate sensitivity area: Intersects water race site and tramway site	1. Trail isolated from any landholders, businesses or bushwalking sites. Some residents of Old Warburton have indicated concerns about the impacts of the trails locally (character, amenity), but this track in isolation does have any discernible socio-economic impacts
25	2321	Intermediate	<b>OBSOLETE TRAIL:</b> Link trail from Old Warburton Rd to Hey Hey My My.	Low Priority	Moderate Priority	Low Priority	Significant species & comms - Common Bent-wing Bat records close to this alignment but no roosting habitat (caves/adits) documented near trail - species may forage in forest habitats, no PE significant species records or notes Land mgt/conservation priority - within Yarra Ranges NP Other values - Least concern EVC(s) impacted, minor tributary crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes, no specific realignments required for Common Bent-wing Bat	Moderate sensitivity area: Proximity to VAHR 8022-0019 (within 50m buffer)	Moderate sensitivity area: Intersects two areas of archaeological sensitivity associated with Yankee Jim mine Intersects area of archaeological sensitivity associated with cemetery Intersects area of archaeological potential associated with Laudehr tramway Old Warburton Intersects tramway Proximity to two tramways	1. Trail isolated from any landholders, businesses or bushwalking sites. Some residents of Old Warburton have indicated concerns about the impacts of the trails locally (character, amenity), but this track in isolation does have any discernible socio-economic impacts
26	5144	Intermediate	Existing MTB trail - Hey Hey My My	Low Priority	Low Priority	Low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ), existing MTB trail Other values - Least concern EVC(s) impacted, minor tributary crossings Priority rationale - existing MTB trail	Low sensitivity area: No recorded places or potential	Low sensitivity area: No recorded places or potential	1. Increased usage on existing track unlikely to have any socio-economic impact
27	7526	Intermediate	Main climbing trail to summit of Mt Tugwell.	Low Priority	Moderate Priority	Low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ and GMZ) Other values - Least concern EVC(s) impacted, Tugwell Crk and minor tributary crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: No recorded places or potential	Moderate sensitivity area: Intersects tramway site Intersects area of archaeological potential associated with Laudehr tramway Old Warburton	1. Trail intersects Cumming Spur Track at two points (27e), though recreational usage is less than more popular local tracks. Impact on other users deemed negligible with appropriate shared-space mitigation measures
28	4636	Intermediate	Descending trail from summit of Mt Tugwell. Finishes at Edwardstown Rd.	Low Priority	Low Priority	Low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ and GMZ) Other values - Least concern EVC(s) impacted, Tugwell Crk, Cemetery Crk and minor tributary crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: No recorded places or potential	Low sensitivity area: No recorded places or potential	1. Trail isolated from any landholders, businesses or bushwalking sites. Establishment of trail head at Mt Tugwell unlikely to have net socio-economic cost locally
29	2084	Difficult	A-line style jump track using top portion of Cemetery Track, before finishing on trail 28.	Low Priority	Low Priority	Low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ and GMZ) Other values - Least concern EVC(s) impacted, no waterway crossings Priority rationale - existing trail, site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: No recorded places or potential	Low sensitivity area: No recorded places or potential	1. Approximate usage of Cemetery Track currently unknown, though assumed to be limited. 2. Trail isolated from any landholders, businesses or bushwalking sites. Establishment of trail head at Mt Tugwell unlikely to have net socio-economic cost locally 2. Impacts on other track users is the only socio-economic variable related to this trail. The assumed impact is therefore low.
30	3031	Difficult	Gravity descent from summit of Mt Tugwell using mix of new and existing MTB trails (Top Track). Finishes at Edwardstown Rd.	Low Priority	Low Priority	Low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ and GMZ) Other values - Least concern EVC(s) impacted, minor tributary crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: No recorded places or potential	Low sensitivity area: No recorded places or potential	1. Trail isolated from any landholders, businesses or bushwalking sites. Establishment of trail head at Mt Tugwell unlikely to have net socio-economic cost locally

31	580	Difficult	Alternate end section on 30.	Low Priority	Low Priority	Low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ) Other values - Least concern EVC(s) impacted, minor tributary crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: —No recorded places or potential	Low sensitivity area: —No recorded places or potential	1. Trail isolated from any landholders, businesses or bushwalking sites. Some residents of Old Warburton have indicated concerns about the impacts of the trails locally (character, amenity), but this track in isolation does have any discernible socio-economic impacts
32	1665	Difficult	Gravity descent from summit of Mt Tugwell using mix of new and existing MTB trails. Finishes on trail 33.	Low Priority	Moderate Priority	Low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ and GMZ) Other values - Least concern EVC(s) impacted, minor tributary crossings Priority rationale - proposed and existing trail, site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: —No recorded places or potential	Moderate sensitivity area: —Intersects tramway site	1. Trail isolated from any landholders, businesses or bushwalking sites. Some residents of Old Warburton have indicated concerns about the impacts of the trails locally (character, amenity), but this track in isolation does have any discernible socio-economic impacts
33	3266	Intermediate	Gravity descent from summit of Mt Tugwell using mix of new and existing MTB trails (Matt's Track). Finishes at Edwardstown Rd.	Low Priority	Moderate Priority	Low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ and GMZ) Other values - Least concern EVC(s) impacted, Scotchmans Creek (upper reach) and minor tributary crossings Priority rationale - proposed and existing trail, site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Moderate sensitivity area: —Proximity to VAHR 8022-0027 (19m to sensitivity buffer)	Low sensitivity area: —No recorded places or potential	1. Trail isolated from any landholders, businesses or bushwalking sites. Some residents of Old Warburton have indicated concerns about the impacts of the trails locally (character, amenity), but this track in isolation does have any discernible socio-economic impacts. Increased usage of existing MTB trail (Matt's Track) unlikely to generate new socio-economic impact.
34	645	Difficult	Link trail between trails 30 and 32.	Low Priority	Low Priority	Low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ) Other values - Least concern EVC(s) impacted, no waterway crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: —No recorded places or potential	Low sensitivity area: —No recorded places or potential	1. Trail isolated from any landholders, businesses or bushwalking sites. Some residents of Old Warburton have indicated concerns about the impacts of the trails locally (character, amenity), but this track in isolation does have any discernible socio-economic impacts. Increased usage of existing MTB trail (Matt's Track) unlikely to generate new socio-economic impact.
35	1707	Intermediate	Link trail from Edwardstown Rd to Mineshaft Hill area.	Low Priority	Moderate Priority	Low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ ) Other values - Least concern EVC(s) impacted, Mann Crk, Cemetery Crk and minor tributary crossings Priority rationale - proposed and existing trail, site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: —No recorded places or potential	Moderate sensitivity area: —Intersects tramway site —Intersects area of archaeological potential associated with Laudehr tramway Old Warburton	1. Trail isolated from any landholders, businesses or bushwalking sites. Some residents of Old Warburton have indicated concerns about the impacts of the trails locally (character, amenity), but this track in isolation does have any discernible socio-economic impacts. Increased usage of existing MTB trail (Matt's Track) unlikely to generate new socio-economic impact.
36	149	Intermediate	Link trail between trails 28 and 35.	Low Priority	Low Priority	Low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ) Other values - Least concern EVC(s) impacted, no waterway crossings Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: —No recorded places or potential	Low sensitivity area: —No recorded places or potential	1. Trail isolated from any landholders, businesses or other trail users. No discernible socio-economic impacts
37	416	Intermediate	Link trail between trails 27 and 35.	Low Priority	Low Priority	Low Priority	Significant species & comms - no VBA records in proximity to trail, no PE significant species records or notes Land mgt/conservation priority - within State Forest (SMZ) Other values - Least concern EVC(s) impacted, Cemetery Crk crossing Priority rationale - site level impacts to be managed through standard mitigation without the need for significant trail realignments/design changes	Low sensitivity area: —No recorded places or potential	Low sensitivity area: —No recorded places or potential	1. Trail isolated from any landholders, businesses or other trail users. No discernible socio-economic impacts
38	1575	Intermediate	Link trail between summit of Mt Tugwell and Mt Tugwell trailhead.	Moderate Priority	Moderate Priority	Low Priority	Significant species & comms - LBP records, SPZ buffers nearby, no PE significant species records or notes Land mgt/conservation priority - within State Forest (GMZ and near SPZ) Other values - Least concern EVC(s) impacted, minor tributary crossings Priority rationale - trail realignments/design changes may be required near SPZ/LBP habitat at south east end of trail.	Moderate sensitivity area: —Proximity to VAHR 8022-0027 (60m to sensitivity buffer)	Low sensitivity area: —No recorded places or potential	1. Trail isolated from any landholders, businesses or bushwalking sites. Establishment of trail head at Mt Tugwell unlikely to have net socio-economic cost locally
39	5273	Easy/ Intermediate	Long climbing trail, from Edwardstown Rd to Mt Tugwell trailhead, running parallel just below Mt Bride Rd, finishing at Mt Tugwell trailhead.	Moderate Priority	Moderate Priority	Low Priority	Significant species & comms - LBP records, SPZ buffers nearby, no PE significant species records or notes Land mgt/conservation priority - within State Forest (GMZ and near SPZ) Other values - Least concern EVC(s) impacted, minor tributary crossings Priority rationale - trail realignments/design changes may be required near SPZ/LBP habitat at south east end of trail (upper section).	Low sensitivity area: —No recorded places or potential	Moderate sensitivity area: —Intersects tramway site	1. Trail isolated from any landholders, businesses or bushwalking sites. Establishment of trail head at Mt Tugwell unlikely to have net socio-economic cost locally
40	1109	Easy	Link trail between trails 40 and 42.	Moderate Priority	Moderate Priority	Low Priority	DESKTOP ONLY BY PE Significant species & comms - no VBA records in proximity to trail, desktop assessment only by PE so onground values to be confirmed by Biosis Land mgt/conservation priority - within State Forest (SMZ) Other values - Least concern EVC(s) impacted, no waterway crossings Priority rationale - site level impacts to be assessed by Biosis and this will inform the need for trail realignments/design changes. Acknowledging further assessment is required, it is not expected that these trails will contain habitat for LBP, MDB stonefly, CTR.	Low sensitivity area, no survey undertaken: —No recorded places or potential	Moderate sensitivity area: —Intersects tramway site	1. Trail isolated from any landholders, businesses or other trail users. No discernible socio-economic impacts
41	5848	Easy	Long descending trail from Mt Tugwell trailhead, running parallel below Mt Bride Rd, finishing on trail 24.	Moderate Priority	Moderate Priority	Low Priority	DESKTOP ONLY BY PE Significant species & comms - no VBA records in proximity to trail, desktop assessment only by PE so onground values to be confirmed by Biosis Land mgt/conservation priority - within State Forest (SMZ & GMZ, close to SPZ at south-east end) Other values - Least concern EVC(s) impacted, minor tributary crossings Priority rationale - site level impacts to be assessed by Biosis and this will inform the need for trail realignments/design changes. Acknowledging further assessment is required, it is not expected that these trails will contain habitat for LBP, MDB stonefly, CTR.	Low sensitivity area, no survey undertaken: —No recorded places or potential	Moderate sensitivity area, no survey undertaken —Intersects tramway site	1. Trail isolated from any landholders, businesses or other trail users. No discernible socio-economic impacts
42	6701	Intermediate/Difficult	Long descending trail from Mt Tugwell trailhead wrapping around onto Mt Bride. Finishes on trail 41.	Moderate Priority	Moderate Priority	Low Priority	DESKTOP ONLY BY PE Significant species & comms - Sooty Owl and Burrowing Crayfish records in proximity to trail, desktop assessment only by PE so onground values to be confirmed by Biosis Land mgt/conservation priority - within State Forest (SMZ & GMZ, close to SPZ at south-east end) Other values - Least concern EVC(s) impacted, Four Mile Crk, Calder Crk and minor tributary crossings Priority rationale - site level impacts to be assessed by Biosis and this will inform the need for trail realignments/design changes. Acknowledging further assessment is required, it is not expected that these trails will contain habitat for LBP, MDB stonefly, CTR.	Low sensitivity area, no survey undertaken: —No recorded places or potential	Moderate sensitivity area, no survey undertaken —Intersects water race and tramway site	1. Trail isolated from any landholders, businesses or bushwalking sites. Establishment of trail head at Mt Tugwell unlikely to have net socio-economic cost locally



43	2479	Easy	Gentle descending trail into Wesburn Recreation Reserve. Uses portion of old tramway.	Moderate Priority	Moderate Priority	Moderate Priority	DESKTOP ONLY BY PE Significant species & comms - Southern Greater Glider and Sooty Owl records in proximity to trail, desktop assessment only by PE so onground values to be confirmed by Biosis Land mgt/conservation priority - within State Forest (SMZ and GMZ) and freehold land Other values - Least concern EVC(s) impacted, Yankee Jim Crk crossings Priority rationale - site level impacts to be assessed by Biosis and this will inform the need for trail realignments/design changes. Acknowledging further assessment is required, it is not expected that these trails will contain habitat for LBP, MDB stonefly, CTR.	Low sensitivity area, no survey undertaken: - <del>No</del> recorded places or potential	Moderate sensitivity area, no survey undertaken - <del>Intersects</del> tramway site	1. Trail (43B) passes within 120m of resident landholders on Wylie St, though extremely unlikely to have any impact (safety, noise, amenity). 2. Shared use along Old Tramway will require appropriate mitigation measures which should minimise risk of recreation users 3. Increased usage of recreation reserve may have some minor impact - increase usage of existing facilities.
44	2592	Easy	Climbing trail out of Wesburn Recreation Reserve.	Moderate Priority	Moderate Priority	Low Priority	DESKTOP ONLY BY PE Significant species & comms - no VBA records in proximity to trail, desktop assessment only by PE so onground values to be confirmed by Biosis Land mgt/conservation priority - within State Forest (SMZ and GMZ) and freehold land Other values - Least concern EVC(s) impacted, Bluenose Creek Crk crossings Priority rationale - site level impacts to be assessed by Biosis and this will inform the need for trail realignments/design changes. Acknowledging further assessment is required, it is not expected that these trails will contain habitat for LBP, MDB stonefly, CTR.	Low sensitivity area, no survey undertaken: - <del>No</del> recorded places or potential	Moderate sensitivity area, no survey undertaken - <del>Intersects</del> tramway site	1. Trail isolated from any residential properties, businesses or other trail users. No discernible socio-economic impacts
45	4057	Difficult	Commences at the summit of Mt Donna Buang, moderate with steep sections it flows down the southern fall of the ridgeline joining up with Trails 5 & 6.	High Priority	Moderate Priority	Low Priority	<b>Comments:</b> LBP, Mount DB Stonefly, Southern Greater Glider, Tree Geebung, Forest Phebalium and Mountain Bird-orchid records/habitat in proximity to trail <b>Alternatives:</b> Trails 45 has been designed in response to Trail 1 very high ranking and has been subject to detailed on-ground alignment responses to minimise impacts on thrt spp and communities.	Low sensitivity area, no survey undertaken: - <del>No</del> recorded places or potential	Moderate sensitivity area, upper 500m surveyed - <del>Within</del> HO 140	1. Trail isolated from any landholders, businesses or bushwalking sites. No discernible socio-economic impacts
46	5510	Easy / Intermediate	Commences at the summit of Mt Donna Buang, moderate with steep sections winds down the northern fall of the ridgeline, under Mt Victoria, joining up with Trails 5 & 6.	High Priority	Moderate Priority	Low Priority	<b>Comments:</b> LBP, Mount DB Stonefly, Southern Greater Glider, Tree Geebung, Forest Phebalium and Mountain Bird-orchid records/habitat in proximity to trail <b>Alternatives:</b> Trails 46 has been designed in response to Trail 1 very high ranking and has been subject to detailed on-ground alignment responses to minimise impacts on thrt spp and communities.	No recorded places or potential	Moderate sensitivity area, 500m surveyed - <del>Within</del> HO 140	1. Trail isolated from any landholders, businesses or bushwalking sites. No discernible socio-economic impacts
47	5616	Easy	Commences at Mt Donna Buang Rd, moderate with steep sections, joining up with Trail 8.	High Priority	Low Priority	Low Priority	<b>Comments:</b> LBP, Mount DB Stonefly, Southern Greater Glider, Tree Geebung, Forest Phebalium and Mountain Bird-orchid records/habitat in proximity to trail <b>Alternatives:</b> Trails 47 has been designed in response to Trail 1 very high ranking and has been subject to detailed on-ground alignment responses to minimise impacts on thrt spp and communities.	Low sensitivity area, no survey undertaken:	Low sensitivity area - <del>No</del> recorded or potential sites	1. Trail isolated from any landholders, businesses or bushwalking sites. No discernible socio-economic impacts
48	1283	Intermediate	Forms a loop between the summit of Mt Tugwell and the Mt Tugwell trailhead on Mt Bridge Rd.	Moderate Priority	Moderate Priority	Low Priority	<b>Comments:</b> LBP records, SPZ buffers nearby <b>Alternatives:</b> SPZs to be avoided, large trees to be avoided - Low likelihood of a significant effect on significant species.	Moderate sensitivity area: - <del>Proximity</del> to VAHR 8022-0027 (20m to sensitivity buffer)	Low sensitivity area - <del>No</del> recorded or potential sites	1. Trail isolated from any landholders, businesses or bushwalking sites. No discernible socio-economic impacts
49	7036	Difficult	Climbs to the top of Mt Bride, before a flowing descent and short climb to reach Groom Hill. Descends from Groom Hill to eventually merge onto Trail 42.	Moderate Priority	Moderate Priority	Low Priority	<b>Comments:</b> LBP records, SPZ buffers intersected <b>Alternatives:</b> Access through SPZs to be on existing track, large trees to be avoided - Low likelihood of a significant effect on significant species.	Low sensitivity area, no survey undertaken:	Moderate sensitivity area - <del>Berman's</del> Mill 50 m off trail	1. Trail isolated from any landholders, businesses or bushwalking sites. No discernible socio-economic impacts
50	2820	Intermediate/Difficult	Less challenging option to Trail 49, avoiding summits of Mt Bride and Groom Hill, eventually merging onto Trail 49.	High Priority	Low Priority	Low Priority	<b>Comments:</b> LBP records, SPZ buffers nearby <b>Alternatives:</b> Trail intersects a very small area of CTMF in headwater of Calder Creek. Upstream and downstream alternatives were explored but these have denser stands of CTMF. Myrtle Beech drip lines can be avoided at proposed crossing point. SPZs to be avoided, large trees to be avoided - Low likelihood of a significant effect on significant species.	No recorded places or potential	Low sensitivity area, no survey undertaken - <del>No</del> recorded or potential sites	1. Trail isolated from any landholders, businesses or bushwalking sites. No discernible socio-economic impacts
51	2882	Difficult	Descending trail starting at Mt Tugwell shuttle drop-off on Mt Bride Rd and finishes on Trail 42.	Low Priority	Low Priority	Low Priority	<b>Comments:</b> Sooty Owl record nearby <b>Alternatives:</b> Large trees to be avoided - Low likelihood of a significant effect on significant species.	Low sensitivity area, no survey undertaken:	Low sensitivity area, no survey undertaken - <del>No</del> recorded or potential sites	1. Trail isolated from any landholders, businesses or bushwalking sites. No discernible socio-economic impacts
52	3707	Intermediate	Starts at Mt Tugwell shuttle drop-off and merges onto Trail 42, 4 km and 400 m of descent	Moderate Priority	Low Priority	Low Priority	<b>Comments:</b> LBP and Sooty Owl records, SPZ buffers nearby <b>Alternatives:</b> SPZs to be avoided, large trees to be avoided - Low likelihood of a significant effect on significant species.	No recorded places or potential	Low sensitivity area - <del>No</del> recorded or potential sites	1. Trail isolated from any landholders, businesses or bushwalking sites. No discernible socio-economic impacts
53	1320	Easy / Intermediate	Short descending link trail, starting at junction of 40 and 41, and dropping down onto 52.	Low Priority	Low Priority	Low Priority	<b>Comments:</b> no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting <b>Alternatives:</b> No response required	Low sensitivity area, no survey undertaken:	Low sensitivity area, no survey undertaken - <del>No</del> recorded or potential sites	1. Trail isolated from any landholders, businesses or bushwalking sites. No discernible socio-economic impacts
54	1170	Extreme	Continues from Trail 29, repurposes the steep and deeply eroded lower section of Cemetary Track.	Low Priority	Moderate Priority	Low Priority	<b>Comments:</b> no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting <b>Alternatives:</b> No response required, majority of trail uses existing 4WD track	No recorded places or potential	Moderate sensitivity area, no survey undertaken - <del>Intersects</del> tramway site	1. Trail isolated from any landholders, businesses or bushwalking sites. No discernible socio-economic impacts
55	1946	Extreme	Starts at shuttle drop-off and junction at Edwardstown Rd and Cemetary Track, descends down to Crusher Track next to the end of Hey Hey My My in Wesburn.	Low Priority	Low Priority	Low Priority	<b>Comments:</b> Common Bent-wing Bat VBA records nearby <b>Alternatives:</b> Low likelihood of a significant effect on significant species, bat roosting habitat not observed	Low sensitivity area, no survey undertaken:	Low sensitivity area - <del>No</del> recorded or potential sites	1. Trail isolated from any landholders, businesses or bushwalking sites. No discernible socio-economic impacts
56	1598	Difficult	Climbing trail that short cuts some of the more meandering parts of Trail 27.	Moderate Priority	Moderate Priority	Low Priority	<b>Comments:</b> no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting <b>Alternatives:</b> No response required, majority of trail uses existing 4WD track	No recorded places or potential	Moderate sensitivity area, no survey undertaken - <del>Intersects</del> tramway site	1. Trail isolated from any landholders, businesses or bushwalking sites. No discernible socio-economic impacts
57	713	Difficult	Climbing trail that short cuts some of the more meandering parts of Trail 27.	Moderate Priority	Low Priority	Low Priority	<b>Comments:</b> no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting <b>Alternatives:</b> No response required	Low sensitivity area, no survey undertaken:	Low sensitivity area, no survey undertaken - <del>No</del> recorded or potential sites	1. Trail isolated from any landholders, businesses or bushwalking sites. No discernible socio-economic impacts
58	211	Difficult	Climbing trail that short cuts some of the more meandering parts of Trail 27.	Moderate Priority	Low Priority	Low Priority	<b>Comments:</b> no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting <b>Alternatives:</b> No response required	No recorded places or potential	Low sensitivity area, no survey undertaken - <del>No</del> recorded or potential sites	1. Trail isolated from any landholders, businesses or bushwalking sites. No discernible socio-economic impacts
59	136		Short walking track down to La La Falls from Trail 42, riders would be encouraged to park their bikes at the top and walk down.	Low Priority	Moderate Priority	Low Priority	<b>Comments:</b> no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting <b>Alternatives:</b> No response required, connection to La La Falls Walking Track	Low sensitivity area, no survey undertaken:	Moderate sensitivity area, no survey undertaken - <del>Intersects</del> tramway site and near aqueduct	1. Trail isolated from any landholders, businesses or bushwalking sites. No discernible socio-economic impacts
60	529	Difficult	Climbing trail near Old Warburton as an optional A-line climb on Trail 22, follows an existing management vehicle track.		Moderate Priority	Low Priority	No response required. Existing access track.	No recorded places or potential	Moderate sensitivity area - <del>Intersects</del> tramway site aqueduct and near Evans Reward mine	1. Trail isolated from any landholders, businesses or bushwalking sites. No discernible socio-economic impacts



## Attachment E: Detailed biodiversity trail screening results

Warburton Mountain Bike Destination – EES Alternative Trail Screening Framework results – 12 April 2021, Biosis Pty Ltd. See method in separate document

Overall rank		National Park length (km)		Vegetation condition impact area (ha)				Threatened communities			Threatened species		Alternatives
Trail #	VH, H, M, L	National Park	Highest rank (GIS)	<=0.6	>0.6 and <=0.85	>0.85	Highest rank (GIS)	Intersect CTR/CTMF length (km)	Highest rank (GIS)	Subjective rank	Comments	Subjective rank	Response
1	Very high	18.215	VH	0.00	2.22	0.00	H	6.380	VH	H	LBP, Mount DB Stonefly, Southern Greater Glider, Tree Geebung, Forest Phebalium and Mountain Bird-orchid records/habitat in proximity to trail	H	Trails 45, 46 and 47 have been designed in response to Trail 1 very high ranking
2	Moderate	4.512	M	0.00	0.45	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
3	Moderate	2.387	M	0.00	0.26	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
4	Moderate	0.092	M	0.00	0.01	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
5	High	5.480	H	0.05	0.50	0.00	M	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	Trail length in NP is driver of High ranking. This trail length is required to meet IMBA trail grade standard and to avoid steeper grades and reduce erosion risk for a trail of this grade.
6	Moderate	4.611	M	0.00	0.46	0.01	M	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
7	Moderate	3.971	M	0.07	0.08	0.25	M	0	L	L	Old LBP records (1960s) at eastern end of alignment, no PE significant species records or notes	L	No response required

Overall rank		National Park length (km)		Vegetation condition impact area (ha)				Threatened communities			Threatened species		Alternatives
Trail #	VH, H, M, L	National Park	Highest rank (GIS)	<=0.6	>0.6 and <=0.85	>0.85	Highest rank (GIS)	Intersect CTR/CTMF length (km)	Highest rank (GIS)	Subjective rank	Comments	Subjective rank	Response
8	Moderate	4.680	M	0.00	0.49	0.00	L	0	L	L	Records of vulnerable Tree Geebung (Persoonia arborea) in proximity to northern end of trail	M	Micro-siting or design response only.
9	Moderate	0.130	M	0.00	0.20	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
10	Low	0	L	0.00	0.29	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
11	Moderate	0	L	0.00	0.53	0.00	M	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
12	Low	0	L	0.00	0.28	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
13	Low	0	L	0.00	0.45	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
14	Low	0	L	0.00	0.47	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
15	Low	0	L	0.00	0.19	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required

Overall rank		National Park length (km)		Vegetation condition impact area (ha)				Threatened communities			Threatened species		Alternatives
Trail #	VH, H, M, L	National Park	Highest rank (GIS)	<=0.6	>0.6 and <=0.85	>0.85	Highest rank (GIS)	Intersect CTR/CTMF length (km)	Highest rank (GIS)	Subjective rank	Comments	Subjective rank	Response
16	Low	0	L	0.00	0.14	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
17	Low	0	L	0.00	0.26	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
18	Low	0	L	0.00	0.02	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
19	Low	0	L	0.00	0.04	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
20	Low	0	L	0.00	0.09	0.00	L	0	L	L	Powerful Owl VBA records along Backstairs / Scotchmans Crk	L	Large trees to be avoided therefore low likelihood of a significant effect on significant species.
21	Low	0	L	0.00	0.05	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
22	Moderate	0	L	0.00	0.00	0.28	M	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
23	Moderate	0	L	0.00	0.05	0.08	M	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required

Overall rank		National Park length (km)		Vegetation condition impact area (ha)				Threatened communities			Threatened species		Alternatives
Trail #	VH, H, M, L	National Park	Highest rank (GIS)	<=0.6	>0.6 and <=0.85	>0.85	Highest rank (GIS)	Intersect CTR/CTMF length (km)	Highest rank (GIS)	Subjective rank	Comments	Subjective rank	Response
24	Moderate	0	L	0.00	0.11	0.09	M	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
25	Low	0	L	0.00	0.14	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
26	N/A												No response required, existing Hey Hey My My MTB trail
27	Moderate	0	L	0.00	0.61	0.13	M	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
28	Moderate	0	L	0.00	0.20	0.26	M	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
29	N/A												No response required. Existing 4WD track
30	Low	0	L	0.00	0.12	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
31	Low	0	L	0.00	0.02	0.00	M	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required



Overall rank		National Park length (km)		Vegetation condition impact area (ha)				Threatened communities			Threatened species		Alternatives
Trail #	VH, H, M, L	National Park	Highest rank (GIS)	<=0.6	>0.6 and <=0.85	>0.85	Highest rank (GIS)	Intersect CTR/CTMF length (km)	Highest rank (GIS)	Subjective rank	Comments	Subjective rank	Response
32	Moderate	0	L	0.00	0.00	0.05	M	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
33	Moderate	0	L	0.00	0.10	0.09	M	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
34	N/A												No response required. Existing MTB trail
35	Moderate	0	L	0.00	0.08	0.09	M	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
36	Moderate	0	L	0.00	0.01	0.00	M	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
37	Moderate	0	L	0.00	0.04	0.00	M	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
38	Moderate	0	L	0.00	0.16	0.00	M	0	L	L	LBP records, SPZ buffers nearby	L	SPZs to be avoided, large trees to be avoided - Low likelihood of a significant effect on significant species.
39	Moderate	0	L	0.00	0.29	0.24	M	0	L	L	LBP records, SPZ buffers nearby	L	SPZs to be avoided, large trees to be avoided - Low likelihood of a significant effect on significant species.

Overall rank		National Park length (km)		Vegetation condition impact area (ha)				Threatened communities			Threatened species		Alternatives
Trail #	VH, H, M, L	National Park	Highest rank (GIS)	<=0.6	>0.6 and <=0.85	>0.85	Highest rank (GIS)	Intersect CTR/CTMF length (km)	Highest rank (GIS)	Subjective rank	Comments	Subjective rank	Response
40	Low	0	L	0.00	0.11	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
41	Moderate	0	L	0.00	0.46	0.12	M	0	L	L	LBP records, SPZ buffers nearby	L	SPZs to be avoided, large trees to be avoided - Low likelihood of a significant effect on significant species.
42	Moderate	0	L	0.00	0.51	0.16	M	0	L	L	LBP and Sooty Owl records, SPZ buffers nearby	L	SPZs to be avoided, large trees to be avoided - Low likelihood of a significant effect on significant species.
43	Low	0	L	0.00	0.18	0.00	L	0	L	L	Southern Greater Glider records nearby	L	Large trees to be avoided - Low likelihood of a significant effect on significant species.
44	Low	0	L	0.00	0.25	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
45	High	4.058	M	0.00	0.29	0.11	M	1.306	VH	H	LBP, Mount DB Stonefly, Southern Greater Glider, Tree Geebung, Forest Phebalium and Mountain Bird-orchid records/habitat in proximity to trail	H	Trails 45 has been designed in response to Trail 1 very high ranking and has been subject to detailed on-ground alignment responses to minimise impacts on thrt spp and communities.

Overall rank		National Park length (km)		Vegetation condition impact area (ha)				Threatened communities			Threatened species		Alternatives
Trail #	VH, H, M, L	National Park	Highest rank (GIS)	<=0.6	>0.6 and <=0.85	>0.85	Highest rank (GIS)	Intersect CTR/CTMF length (km)	Highest rank (GIS)	Subjective rank	Comments	Subjective rank	Response
46	High	5.505	H	0.00	0.36	0.19	M	0.868	VH	H	LBP, Mount DB Stonefly, Southern Greater Glider, Tree Geebung, Forest Phebalium and Mountain Bird-orchid records/habitat in proximity to trail	H	Trails 46 has been designed in response to Trail 1 very high ranking and has been subject to detailed on-ground alignment responses to minimise impacts on thrt spp and communities.
47	High	5.132	H	0.00	0.24	0.32	M	0.877	VH	H	LBP, Mount DB Stonefly, Southern Greater Glider, Tree Geebung, Forest Phebalium and Mountain Bird-orchid records/habitat in proximity to trail	H	Trails 47 has been designed in response to Trail 1 very high ranking and has been subject to detailed on-ground alignment responses to minimise impacts on thrt spp and communities.
48	Moderate	0	L	0.00	0.00	0.13	M	0	L	L	LBP records, SPZ buffers nearby	L	SPZs to be avoided, large trees to be avoided - Low likelihood of a significant effect on significant species.
49	Moderate	0	L	0.00	0.25	0.32	M	0	L	L	LBP records, SPZ buffers intersected	L	Access through SPZs to be on existing track, large trees to be avoided - Low likelihood of a significant effect on significant species.

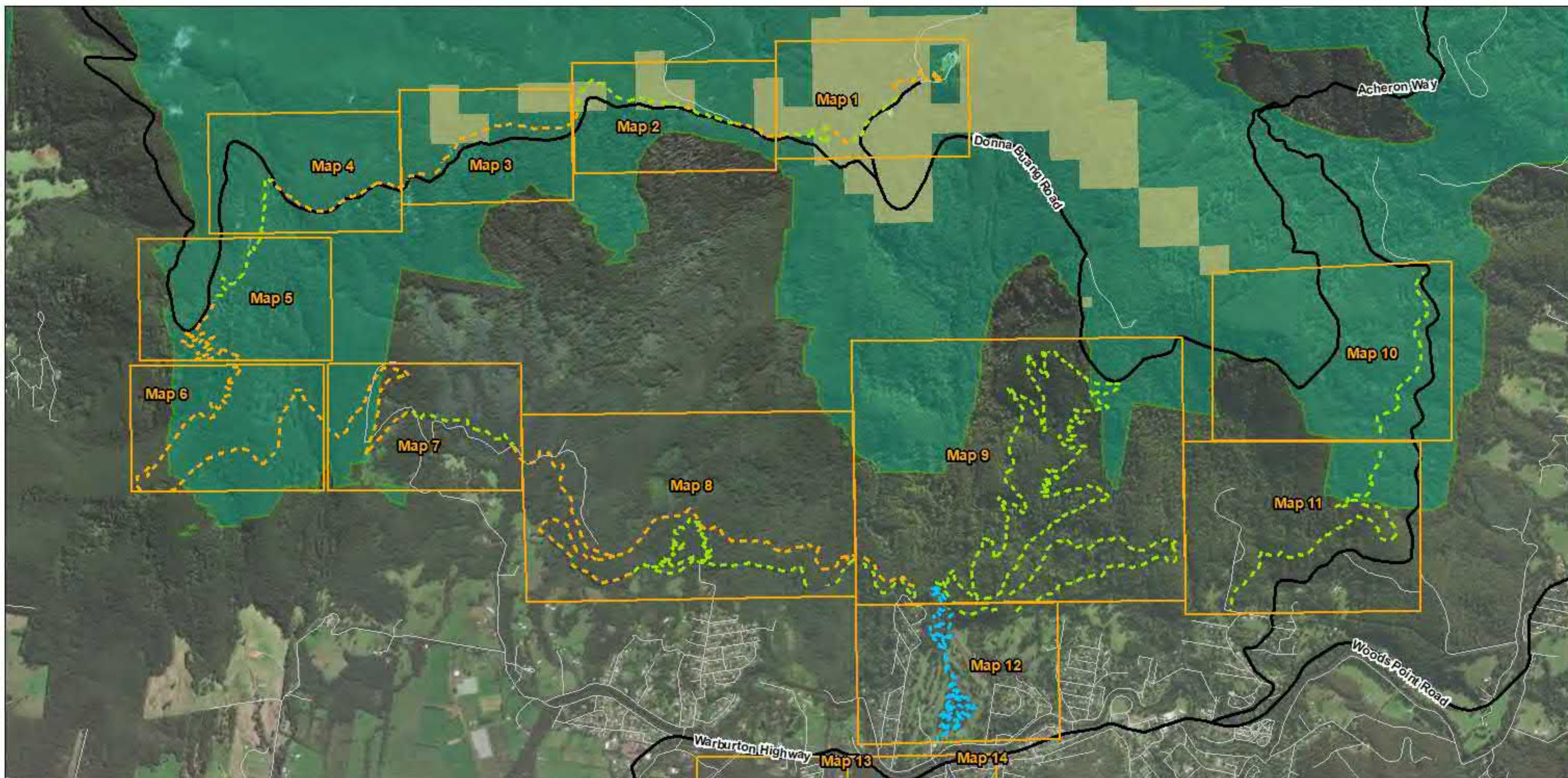
Overall rank		National Park length (km)		Vegetation condition impact area (ha)				Threatened communities			Threatened species		Alternatives
Trail #	VH, H, M, L	National Park	Highest rank (GIS)	<=0.6	>0.6 and <=0.85	>0.85	Highest rank (GIS)	Intersect CTR/CTMF length (km)	Highest rank (GIS)	Subjective rank	Comments	Subjective rank	Response
50	High	0	L	0.00	0.00	0.12	M	0.039	VH	H	LBP records, SPZ buffers nearby	L	Trail intersects a very small area of CTMF in headwater of Calder Creek. Upstream and downstream alternatives were explored but these have denser stands of CTMF. Myrtle Beech drip lines can be avoided at proposed crossing point. SPZs to be avoided, large trees to be avoided - Low likelihood of a significant effect on significant species.
51	Low	0	L	0.00	0.29	0.00	L	0	L	L	Sooty Owl record nearby	L	Large trees to be avoided - Low likelihood of a significant effect on significant species.
52	Moderate	0	L	0.00	0.24	0.13	M	0	L	L	LBP and Sooty Owl records, SPZ buffers nearby	L	SPZs to be avoided, large trees to be avoided - Low likelihood of a significant effect on significant species.
53	Low	0	L	0.00	0.13	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
54	Low	0	L	0.00	0.02	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required, majority of trail uses existing 4WD track

Overall rank		National Park length (km)		Vegetation condition impact area (ha)				Threatened communities			Threatened species		Alternatives
Trail #	VH, H, M, L	National Park	Highest rank (GIS)	<=0.6	>0.6 and <=0.85	>0.85	Highest rank (GIS)	Intersect CTR/CTMF length (km)	Highest rank (GIS)	Subjective rank	Comments	Subjective rank	Response
55	Low	0	L	0.00	0.20	0.00	L	0	L	L	Common Bent-wing Bat VBA records nearby	L	Low likelihood of a significant effect on significant species, bat roosting habitat not observed
56	Moderate	0	L	0.00	0.08	0.03	M	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required, one third of trail uses existing 4WD track
57	Moderate	0	L	0.00	0.00	0.07	M	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
58	Moderate	0	L	0.00	0.00	0.02	M	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
59	Low	0	L	0.00	0.01	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required, connection to La La Falls Walking Track
60	N/A												No response required. Existing access track
61	Low	0	L	0.00	0.16	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
62	Low	0	L	0.00	0.07	0.00	L	0	L	L	Common Bent-wing Bat VBA records nearby	L	Low likelihood of a significant effect on significant species, bat roosting habitat not observed

Overall rank		National Park length (km)		Vegetation condition impact area (ha)				Threatened communities			Threatened species		Alternatives
Trail #	VH, H, M, L	National Park	Highest rank (GIS)	<=0.6	>0.6 and <=0.85	>0.85	Highest rank (GIS)	Intersect CTR/CTMF length (km)	Highest rank (GIS)	Subjective rank	Comments	Subjective rank	Response
63	Low	0	L	0.00	0.19	0.00	L	0	L	L	Common Bent-wing Bat VBA records nearby	L	Low likelihood of a significant effect on significant species, bat roosting habitat not observed, one third of trail uses existing 4WD track
64	Low	0	L	0.00	0.08	0.00	L	0	L	L	Common Bent-wing Bat VBA records nearby	L	Low likelihood of a significant effect on significant species, bat roosting habitat not observed
65	Low	0	L	0.00	0.14	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required
66	Low	0	L	0.00	0.03	0.00	L	0	L	L	no VBA records in proximity to trail, no significant species records or notes, or impacts can be managed through micro-siting	L	No response required

## Attachment F: Biodiversity maps





#### Legend

- Map Reference
- Modelled Habitat for MDB Wingless Stonefly
- LBP high probability habitat

#### Trail Alignment and Ref No.

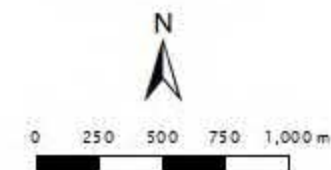
- New Trails - Desktop (Dec 2019)
- New Trails (Assessed 2019)
- New Trails (Assessed 2017)
- Existing Trail
- Existing Vehicle Track

#### Details

Date: 10/12/2019  
Version: 2

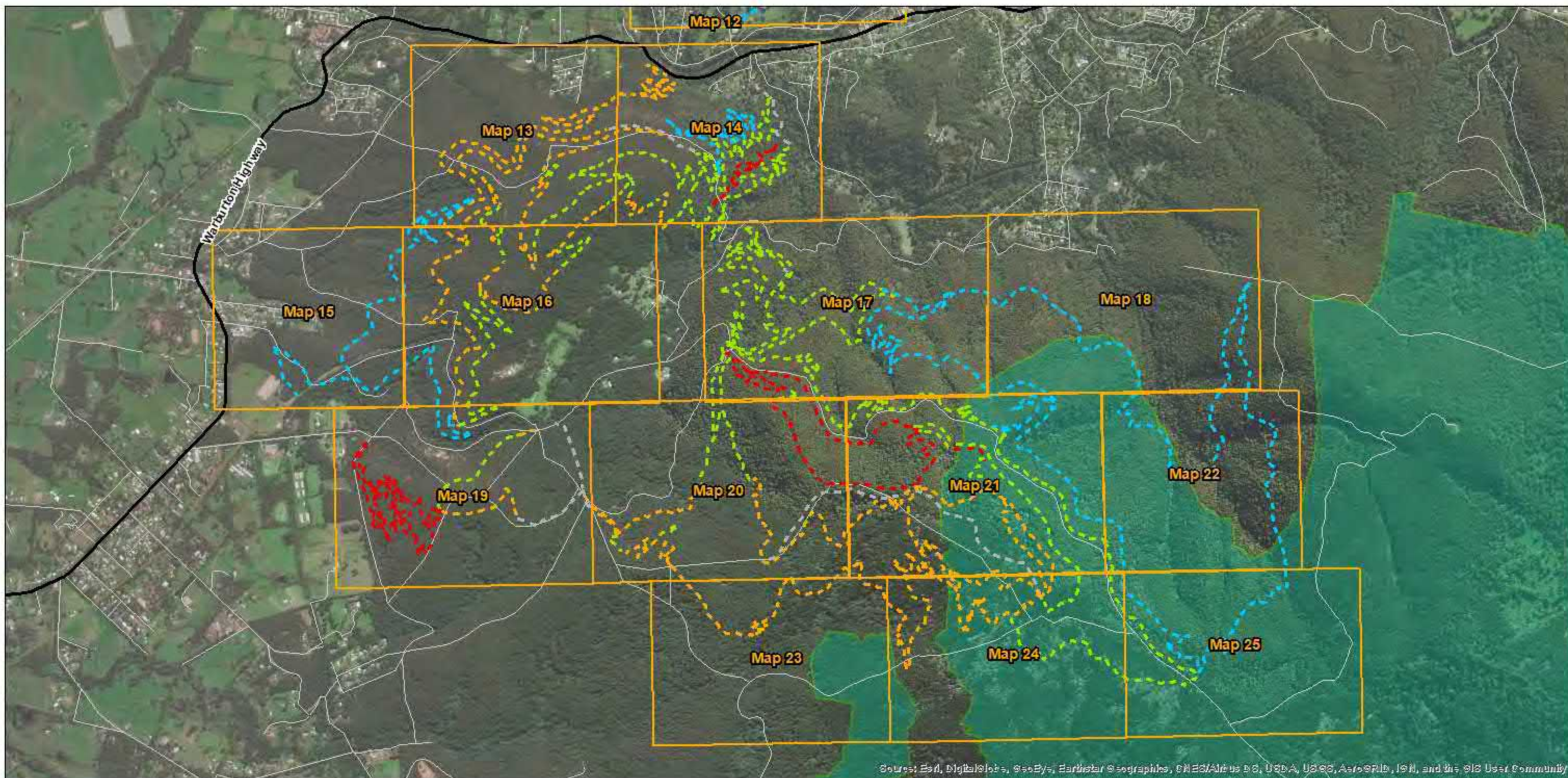
Data Source:  
Base map data Copyright ©  
The State of Victoria.

#### Overview Map A – Mount Donna Buang Summit to Golf Course



Scale 1:30,000 (Page size A3)





#### Legend

- Map Reference
- Modelled Habitat for MDB Wingless Stonefly
- LBP high probability habitat

#### Trail Alignment and Ref No.

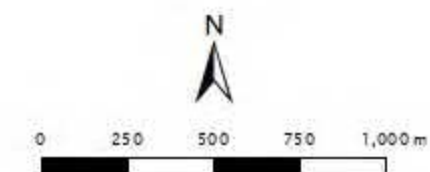
- New Trails - Desktop (Dec 2019)
- New Trails (Assessed 2019)
- New Trails (Assessed 2017)
- Existing Trail
- Existing Vehicle Track

#### Details

Date: 10/12/2019  
Version: 2

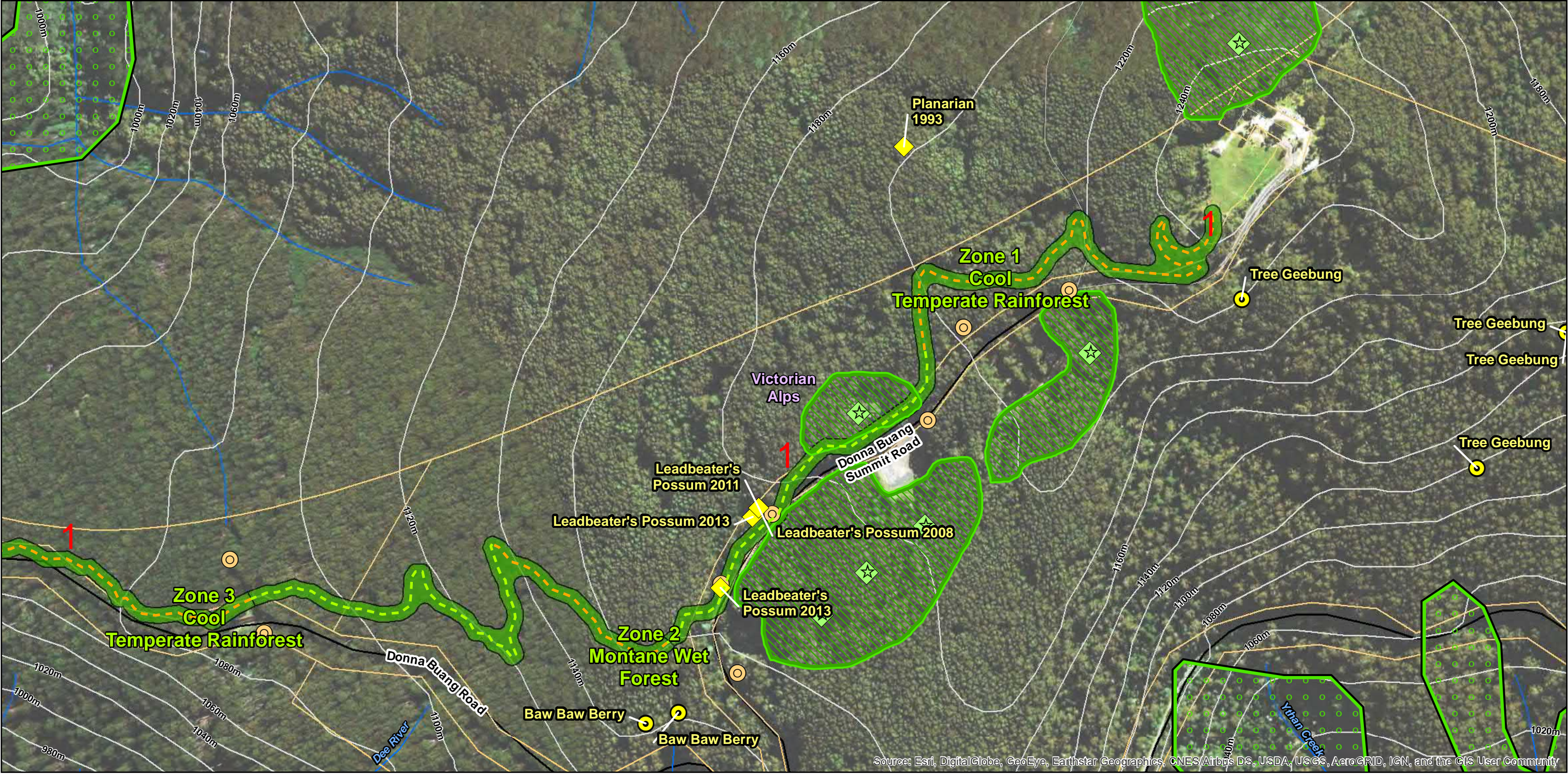
Data Source:  
Base map data Copyright ©  
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#### Overview Map B – Warburton Rail Trail to Mount Tugwell



Scale 1:22,000 (Page size A3)







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**Legend**

Parcel

Threatened Fauna VBA

Threatened Flora VBA

Leadbeater's Possum nest boxes

Cool Temperate Rainforest (Modelled)

Bioregion boundary

Habitat Hectare Assessment (10m corridor)

MDB Stonefly buffer zones

MDB Stonefly locations

**Trail Alignment and Ref No.**

New Trails (Assessed 2019)

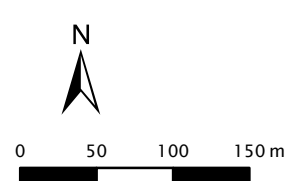
New Trails (Assessed 2017)

**Details**  
Date: 10/12/2019  
Version: 2

Data Source:  
Base map data Copyright ©  
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**Map 1 –  
Summit to Donna Buang Road**

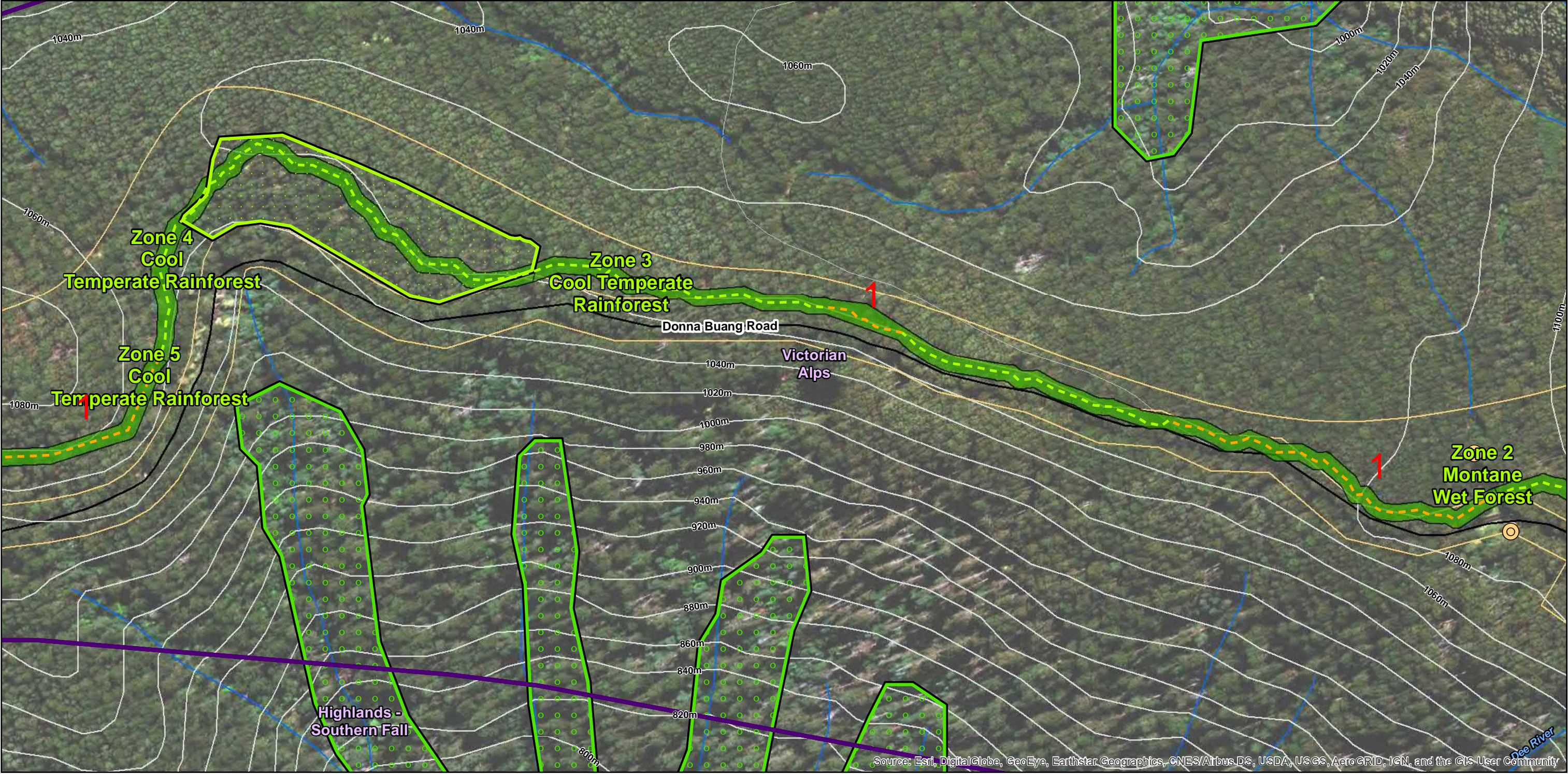
**Map Series 1 – Proposed  
Warburton Mountain BikeTrail**




0 50 100 150 m

Scale 1:4,940 (Page size A3)










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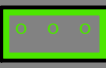
**Disclaimer**  
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**Legend**

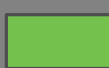
 Parcel

 Leadbeater's Possum nest boxes


 Predominantly Rainforest (Ground truthed)


 Cool Temperate Rainforest (Modelled)

 Bioregion boundary

 Habitat Hectare Assessment (10m corridor)

**Trail Alignment and Ref No.**

 New Trails (Assessed 2019)

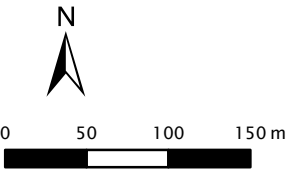
 New Trails (Assessed 2017)

**Details**  
Date: 10/12/2019  
Version: 2

Data Source:  
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**Map 2 –  
Donna Buang Road East**

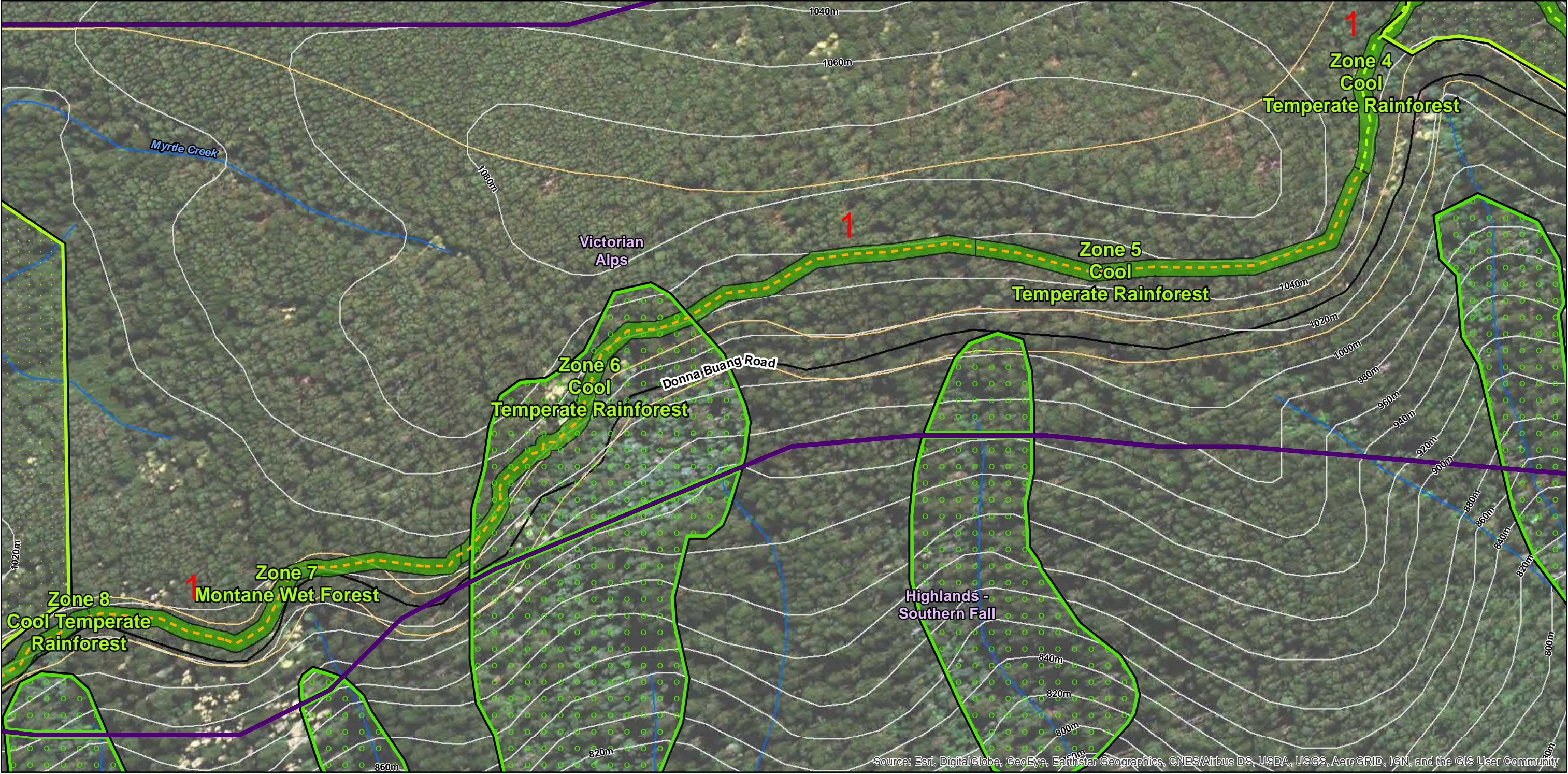
**Map Series 1 – Proposed  
Warburton Mountain Bike Trail**



0 50 100 150 m

Scale 1:4,620 (Page size A3)












  
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**Legend**


 Parcel	 Habitat Hectare Assessment (10m corridor)
 Predominantly Rainforest (Ground truthed)	<b>Trail Alignment and Ref No.</b>
 Cool Temperate Rainforest (Modelled)	 New Trails (Assessed 2019)
 Bioregion boundary	 New Trails (Assessed 2017)

**Details**  
Date: 10/12/2019  
Version: 2

Data Source:  
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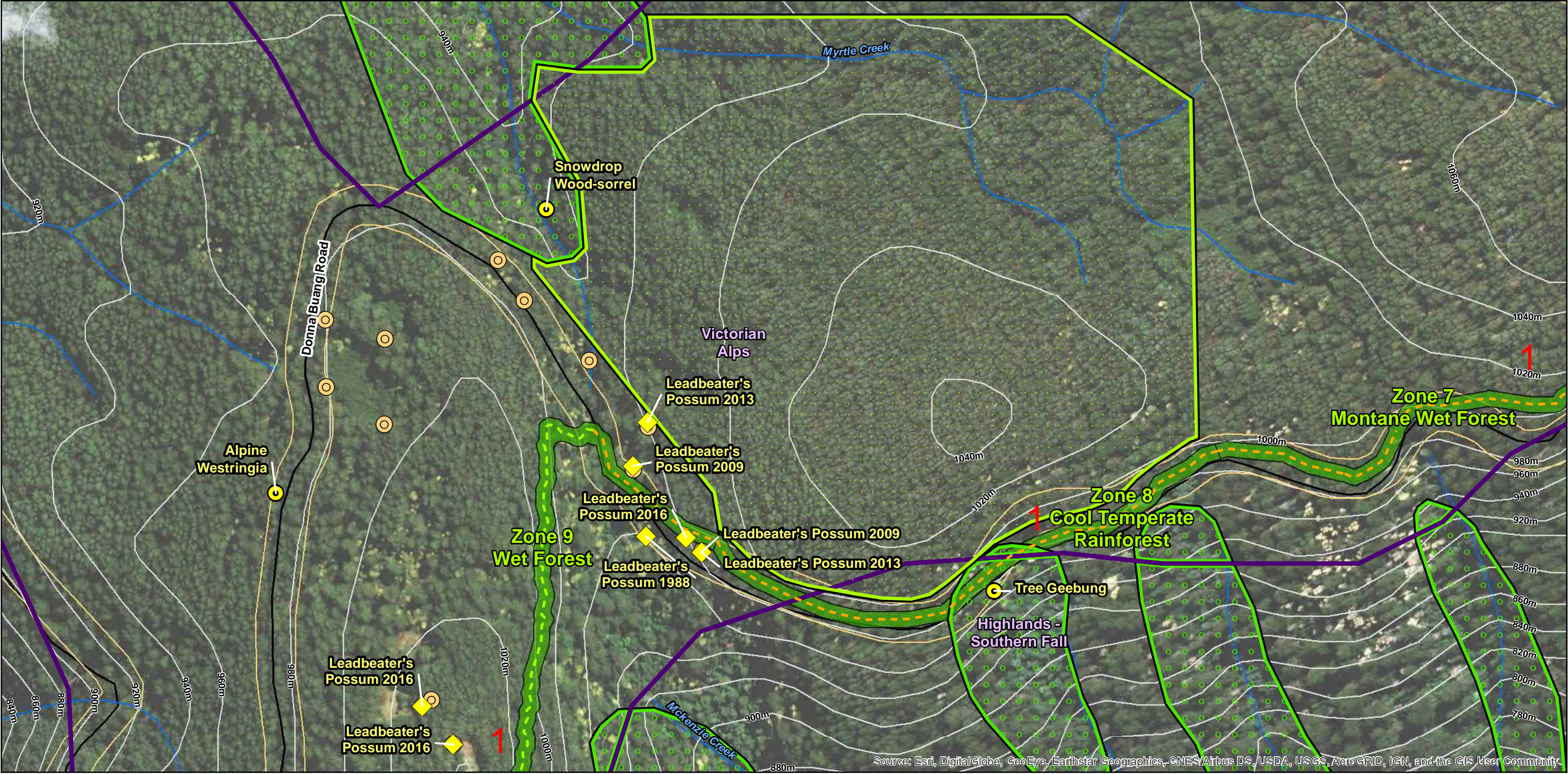
**Map 3 –  
Donna Buang Central**

**Map Series 1 – Proposed  
Warburton Mountain Bike Trail**

  
0 50 100 150 m

Scale 1:4,720 (Page size A3)





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**Legend**

Parcel

Threatened Fauna VBA

Threatened Flora VBA

Leadbeater's Possum nest boxes

Predominantly Rainforest (Ground truthed)

Cool Temperate Rainforest (Modelled)

Bioregion boundary

Habitat Hectare Assessment (10m corridor)

**Trail Alignment and Ref No.**

New Trails (Assessed 2019)

New Trails (Assessed 2017)

**Details**  
Date: 10/12/2019  
Version: 2

Data Source:  
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**Map 4 –  
Donna Buang Road West**

**Map Series 1 – Proposed  
Warburton Mountain Bike Trail**

N

0 50 100 150 m

Scale

1:4,990

(Page size A3)






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




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**Legend**




Parcel




Threatened Flora VBA



Cool Temperate Rainforest (Modelled)




Bioregion boundary




Habitat Hectare Assessment (10m corridor)

**Trail Alignment and Ref No.**



New Trails (Assessed 2019)




New Trails (Assessed 2017)

**Details**  
Date: 10/12/2019  
Version: 2

Data Source:  
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**Map 5 –  
Ben Cairn Region**

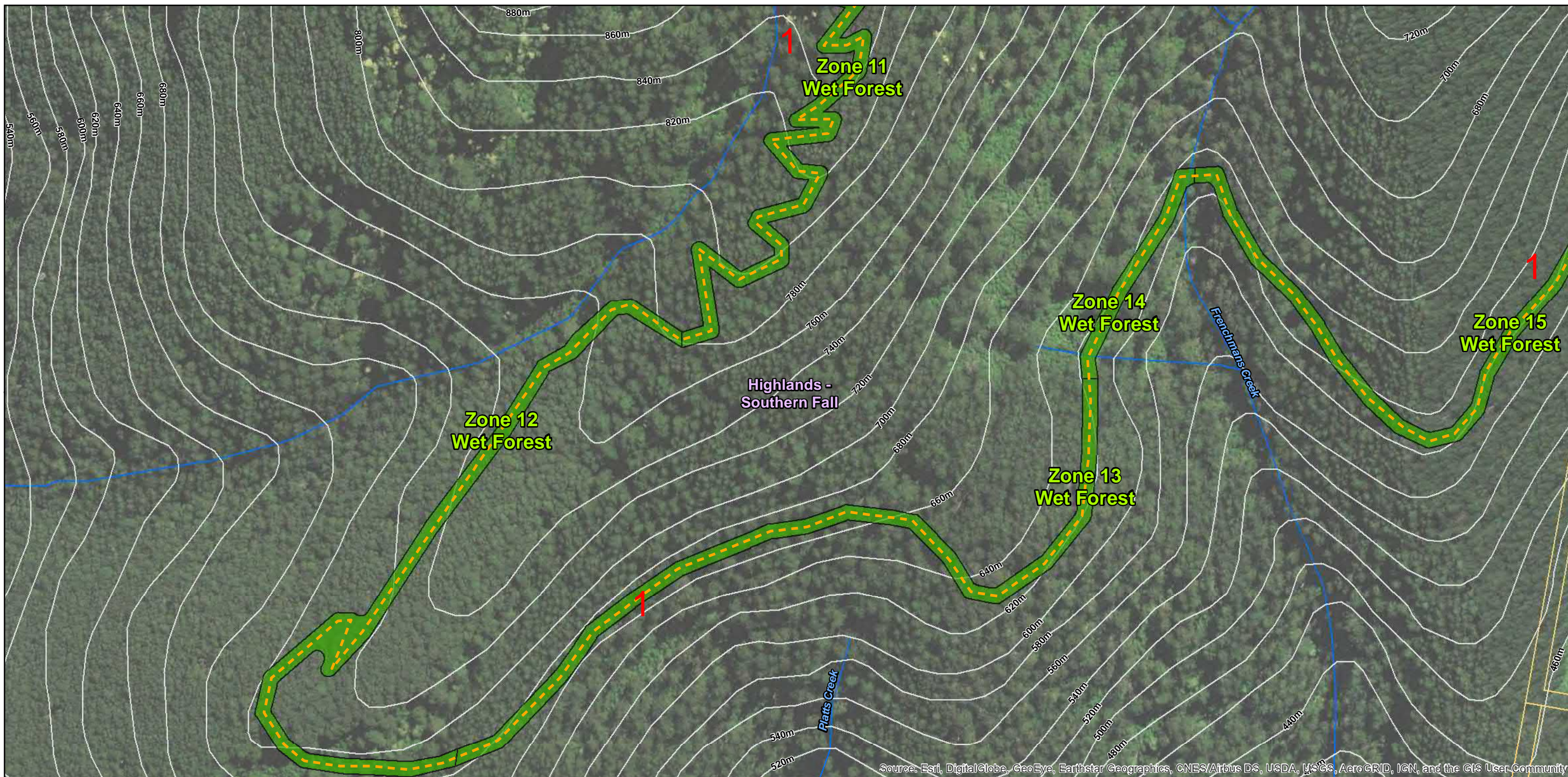
**Map Series 1 – Proposed  
Warburton Mountain Bike Trail**




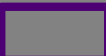

0 50 100 150 m

Scale 1:5,045 (Page size A3)






**Legend**

-  Parcel
-  Bioregion boundary
-  Habitat Hectare Assessment (10m corridor)

**Trail Alignment and Ref No.**

-  New Trails (Assessed 2017)

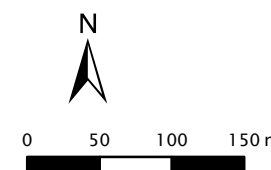
**Details**

Date: 10/12/2019  
 Version: 2

Data Source:  
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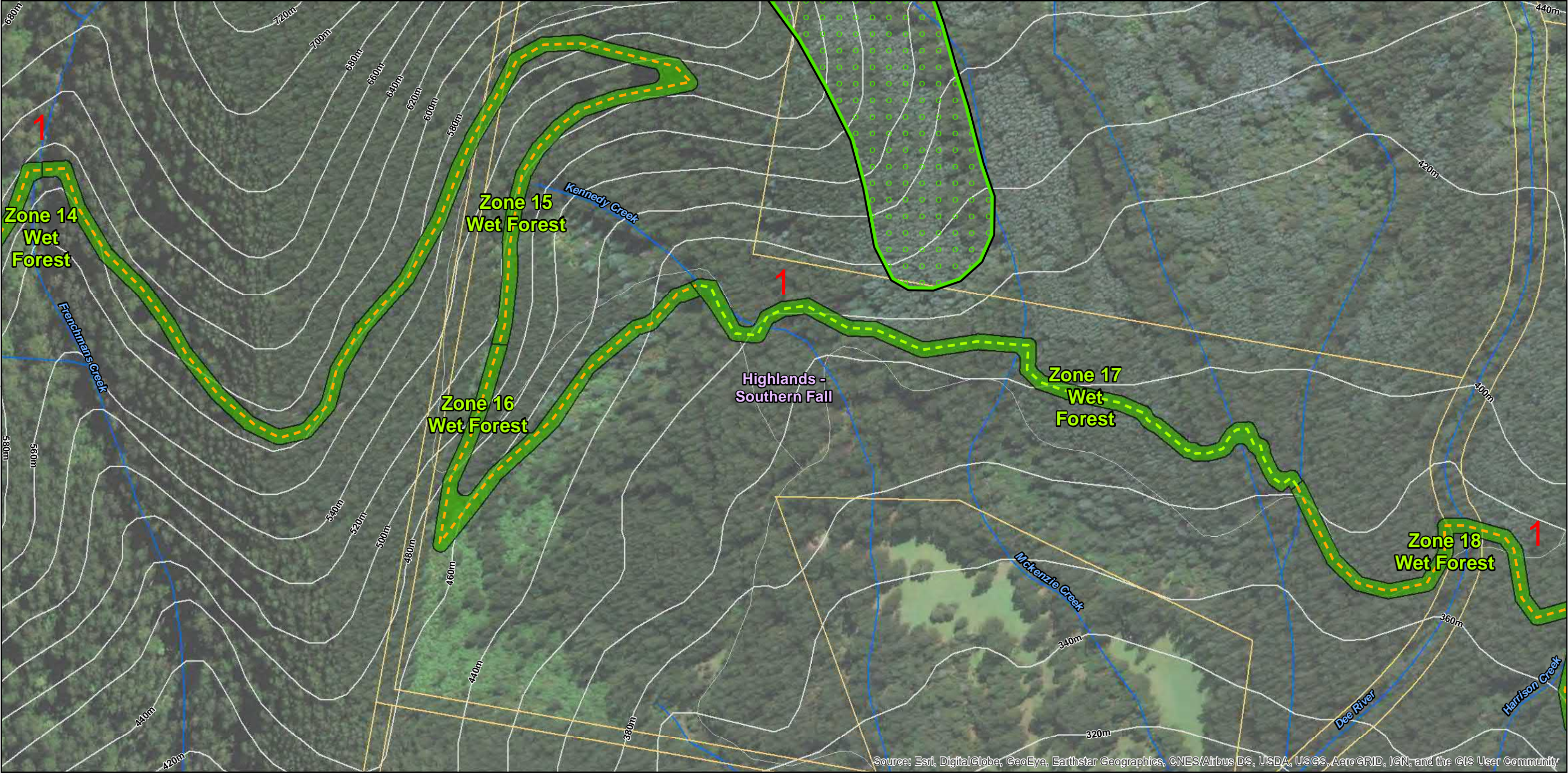
**Map 6 –**  
**South of Ben Cairn**

**Map Series 1 – Proposed**  
**Warburton Mountain Bike Trail**



Scale 1:5,220 (Page size A3)





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**Legend**

- Parcel
- Cool Temperate Rainforest (Modelled)
- Bioregion boundary
- Habitat Hectare Assessment (10m corridor)

**Trail Alignment and Ref No.**

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

**Details**  
Date: 10/12/2019  
Version: 2

Data Source:  
Base map data Copyright © The State of Victoria.

**Map 7 – APM Access Track**

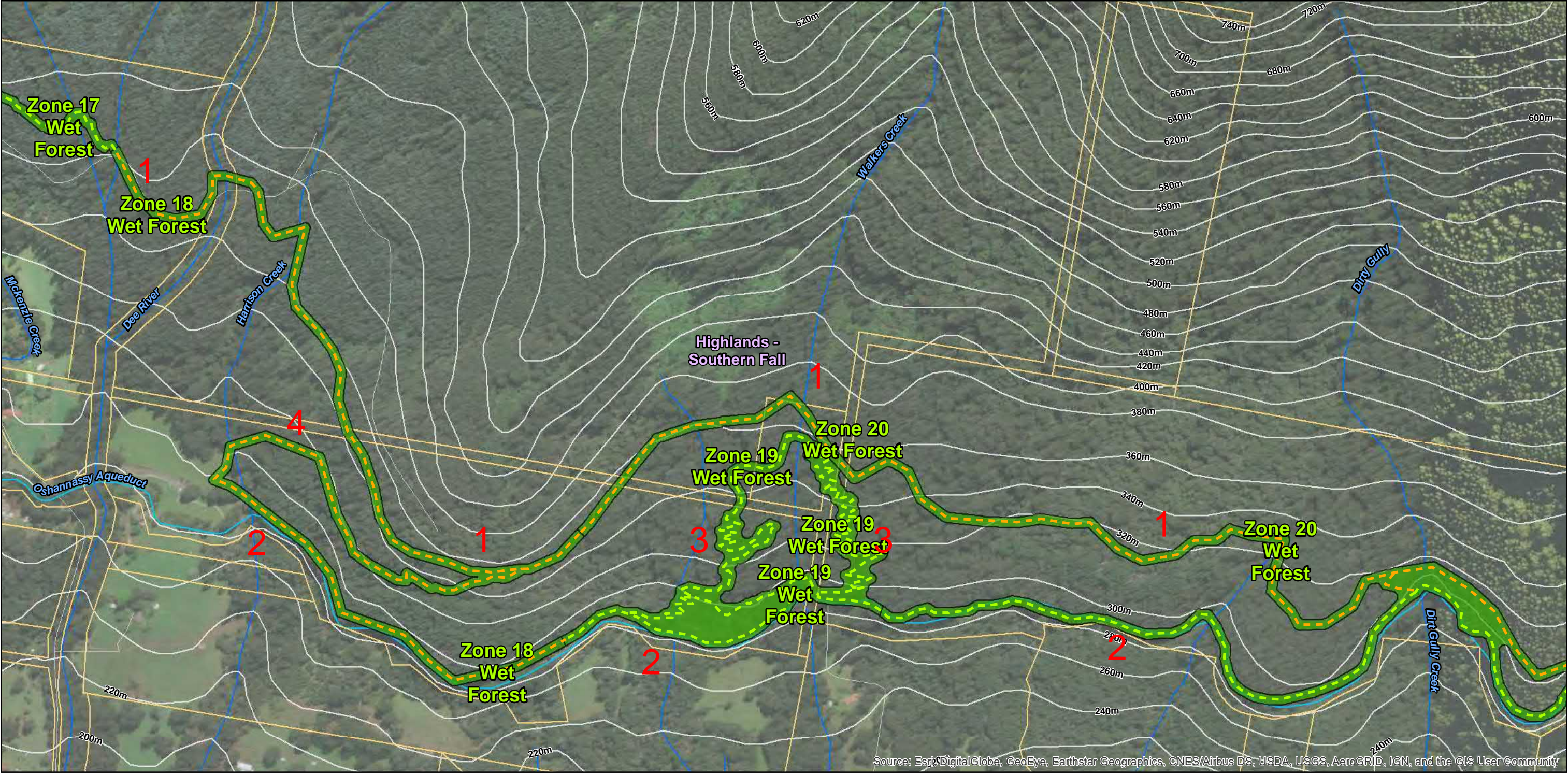
**Map Series 1 – Proposed Warburton Mountain Bike Trail**

N

0 50 100 150 m

Scale 1:5,150 (Page size A3)





**Legend**

- Parcel
- Bioregion boundary
- Habitat Hectare Assessment (10m corridor)
- New Trails (Assessed 2017)
- New Trails (Assessed 2019)

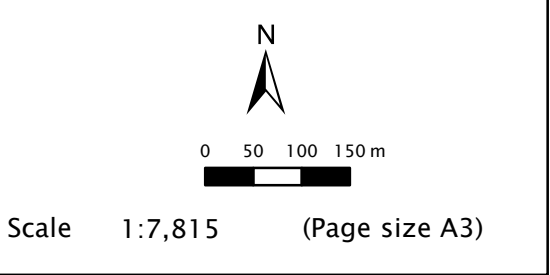
**Trail Alignment and Ref No.**

**Details**  
Date: 10/12/2019  
Version: 2

Data Source:  
Base map data Copyright ©  
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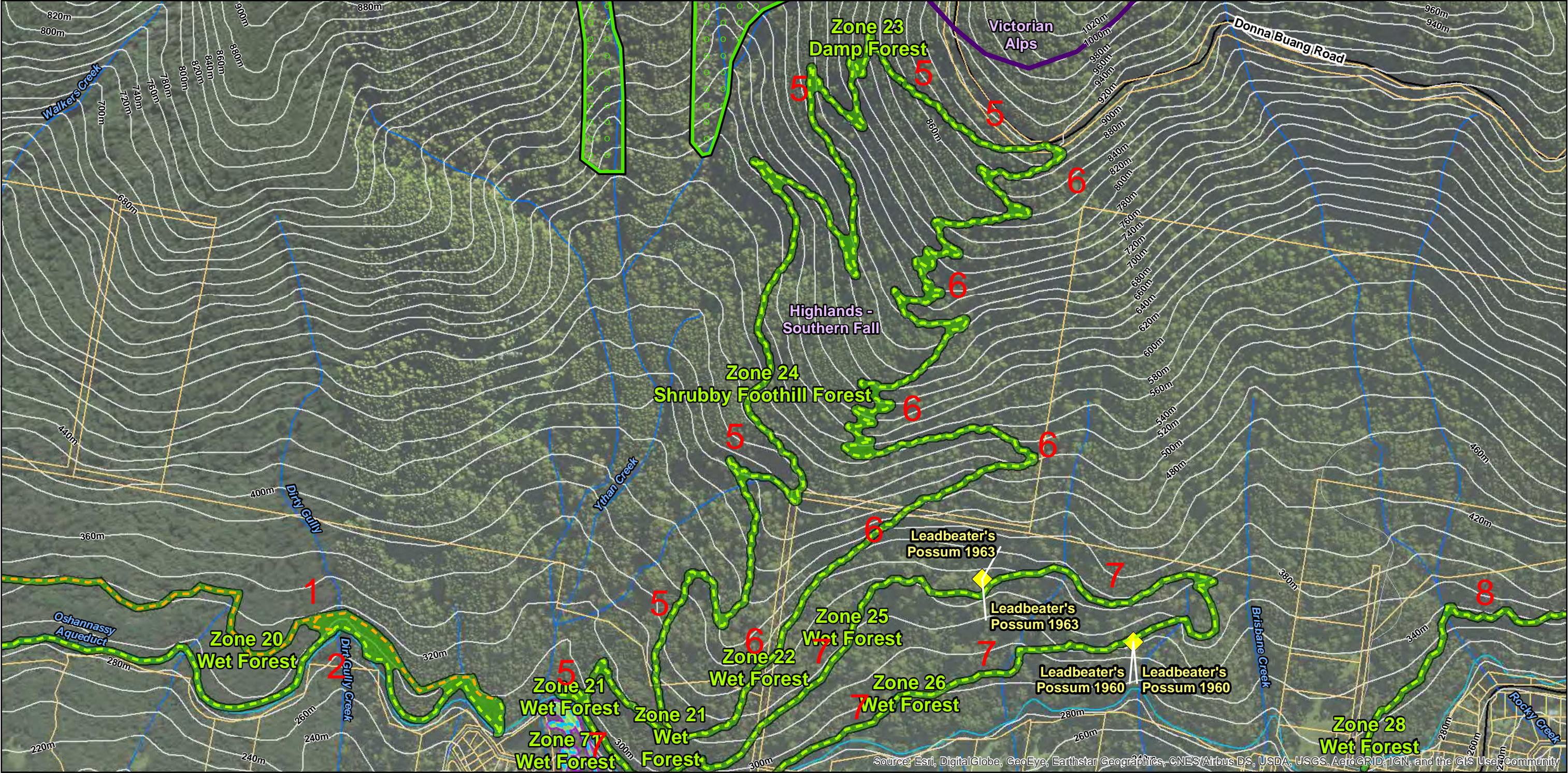
**Map 8 –  
O'Shannassy Aqueduct**

**Map Series 1 – Proposed  
Warburton Mountain Bike Trail**



Scale 1:7,815 (Page size A3)





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**Legend**

- Parcel
- Threatened Fauna VBA
- Cool Temperate Rainforest (Modelled)
- Bioregion boundary
- Habitat Hectare Assessment (10m corridor)
- Desktop Assessment (10m corridor)

**Trail Alignment and Ref No.**

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

**Details**  
Date: 10/12/2019  
Version: 2

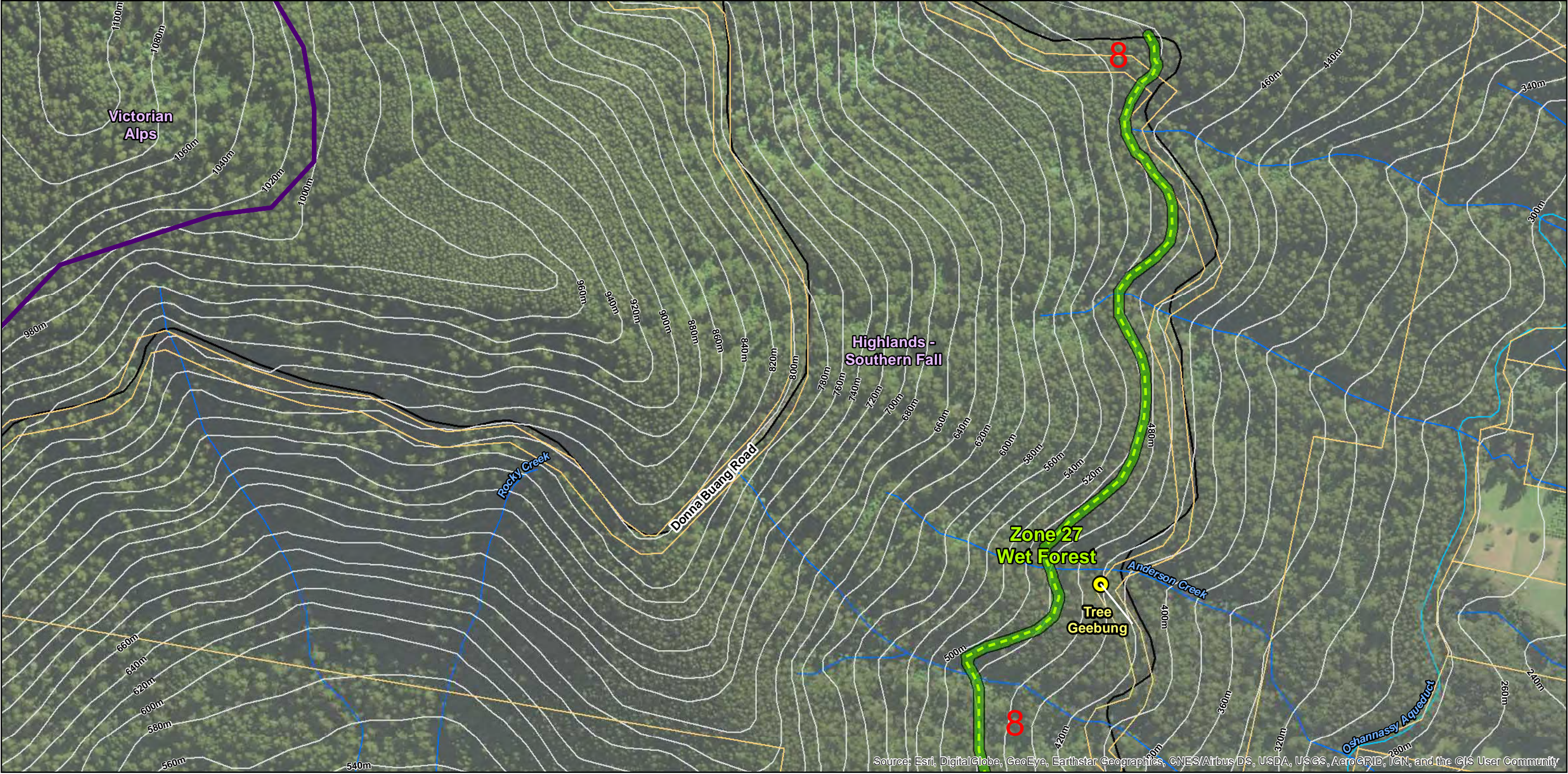
Data Source:  
Base map data Copyright © The State of Victoria.

**Map 9 – Donna Buang Road to Aqueduct Link**

**Map Series 1 – Proposed Warburton Mountain Bike Trail**

Scale 1:10,945 (Page size A3)





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

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**Legend**

-  Parcel
-  Threatened Flora VBA
-  Bioregion boundary
-  Habitat Hectare Assessment (10m corridor)

**Trail Alignment and Ref No.**


-  New Trails (Assessed 2019)

**Details**  
Date: 10/12/2019  
Version: 2

Data Source:  
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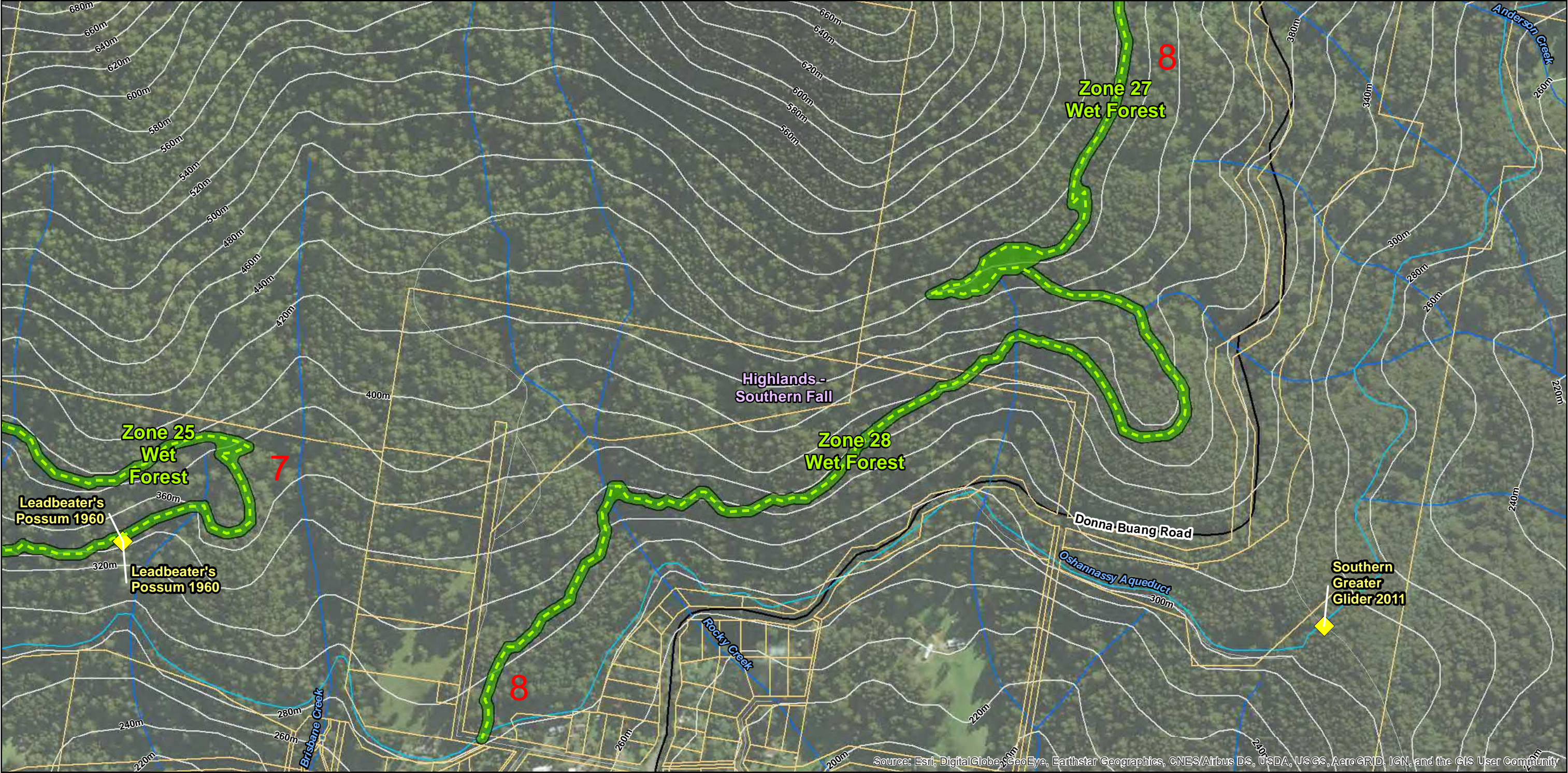
**Map 10 –  
Yuonga Track North**

**Map Series 1 – Proposed  
Warburton Mountain Bike Trail**

  
0 50 100 150 m

Scale 1:7,335 (Page size A3)





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**Legend**

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

**Trail Alignment and Ref No.**

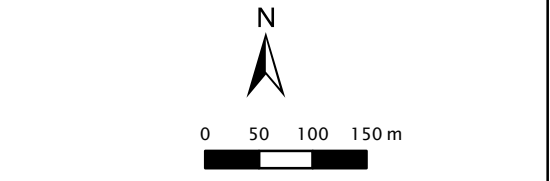
- New Trails (Assessed 2019)

**Details**  
Date: 10/12/2019  
Version: 2

Data Source:  
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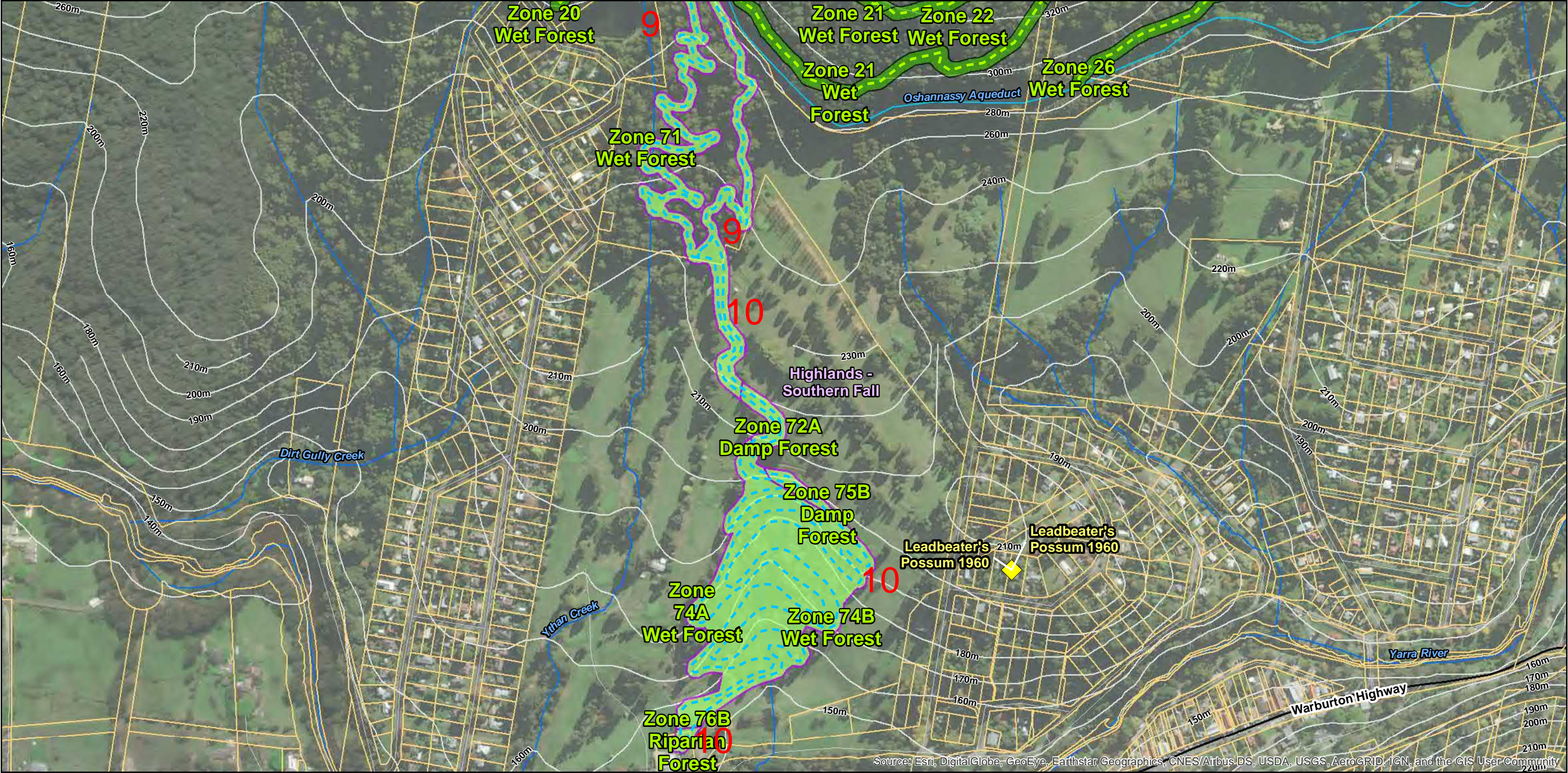
**Map 11 –  
Yuonga Track South**

**Map Series 1 – Proposed  
Warburton Mountain Bike Trail**

  
0 50 100 150 m

Scale 1:7,015 (Page size A3)





**Legend**

- Parcel
- Threatened Fauna VBA
- Bioregion boundary
- Habitat Hectare Assessment (10m corridor)
- Desktop Assessment (10m corridor)

**Trail Alignment and Ref No.**

- New Trails - Desktop (Dec 2019)
- New Trails (Assessed 2019)

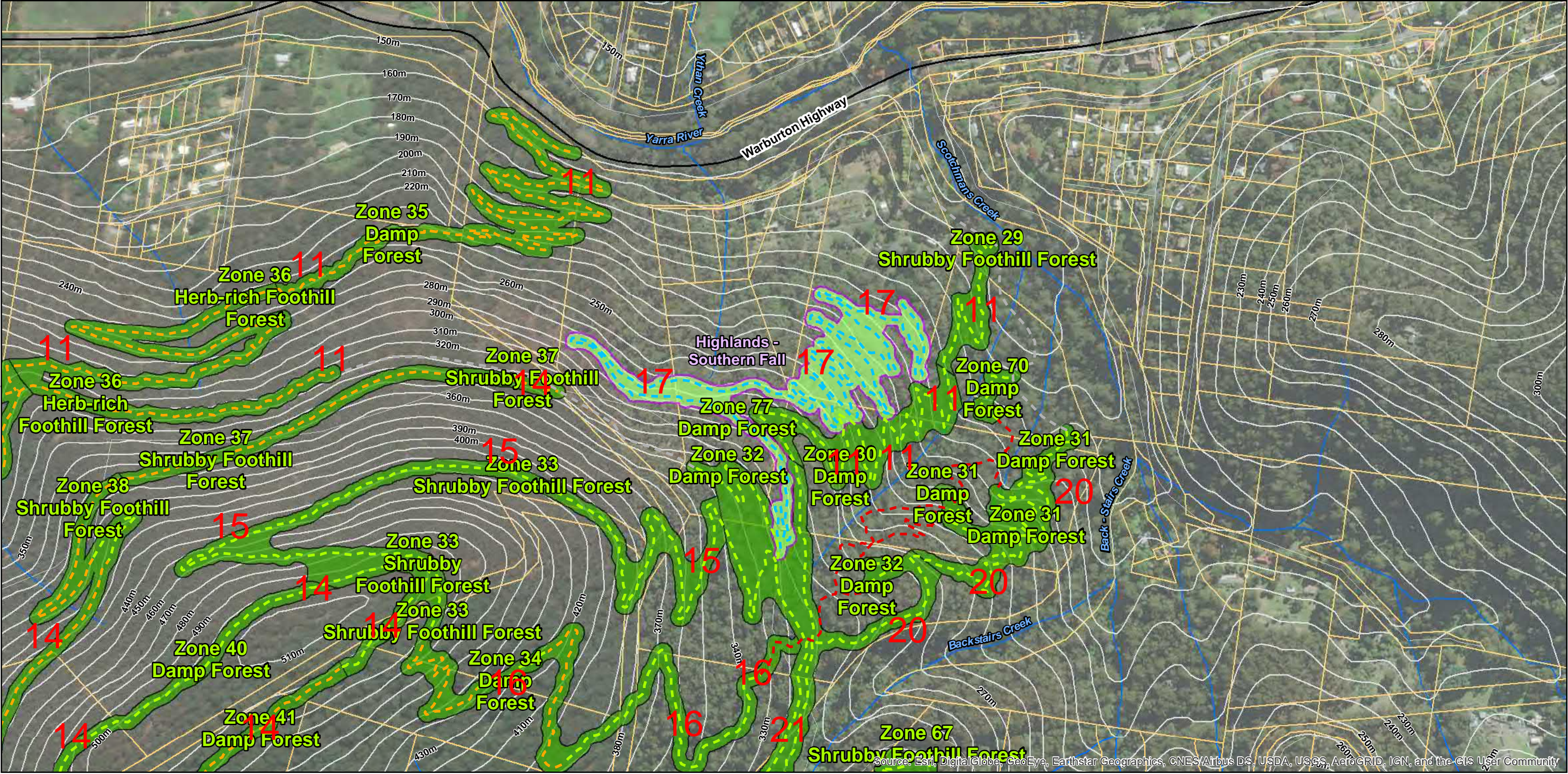
**Details**  
Date: 10/12/2019  
Version: 2

Data Source:  
Base map data Copyright © The State of Victoria.









**Legend**

- Parcel
- Bioregion boundary
- Habitat Hectare Assessment (10m corridor)
- Desktop Assessment (10m corridor)

**Trail Alignment and Ref No.**

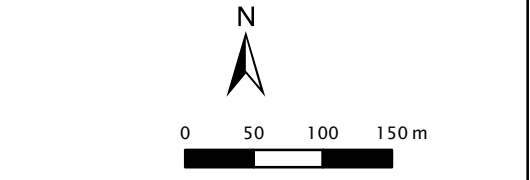
- New Trails - Desktop (Dec 2019)
- New Trails (Assessed 2019)
- New Trails (Assessed 2017)
- Existing Trail
- Existing Vehicle Track

**Details**  
Date: 10/12/2019  
Version: 2

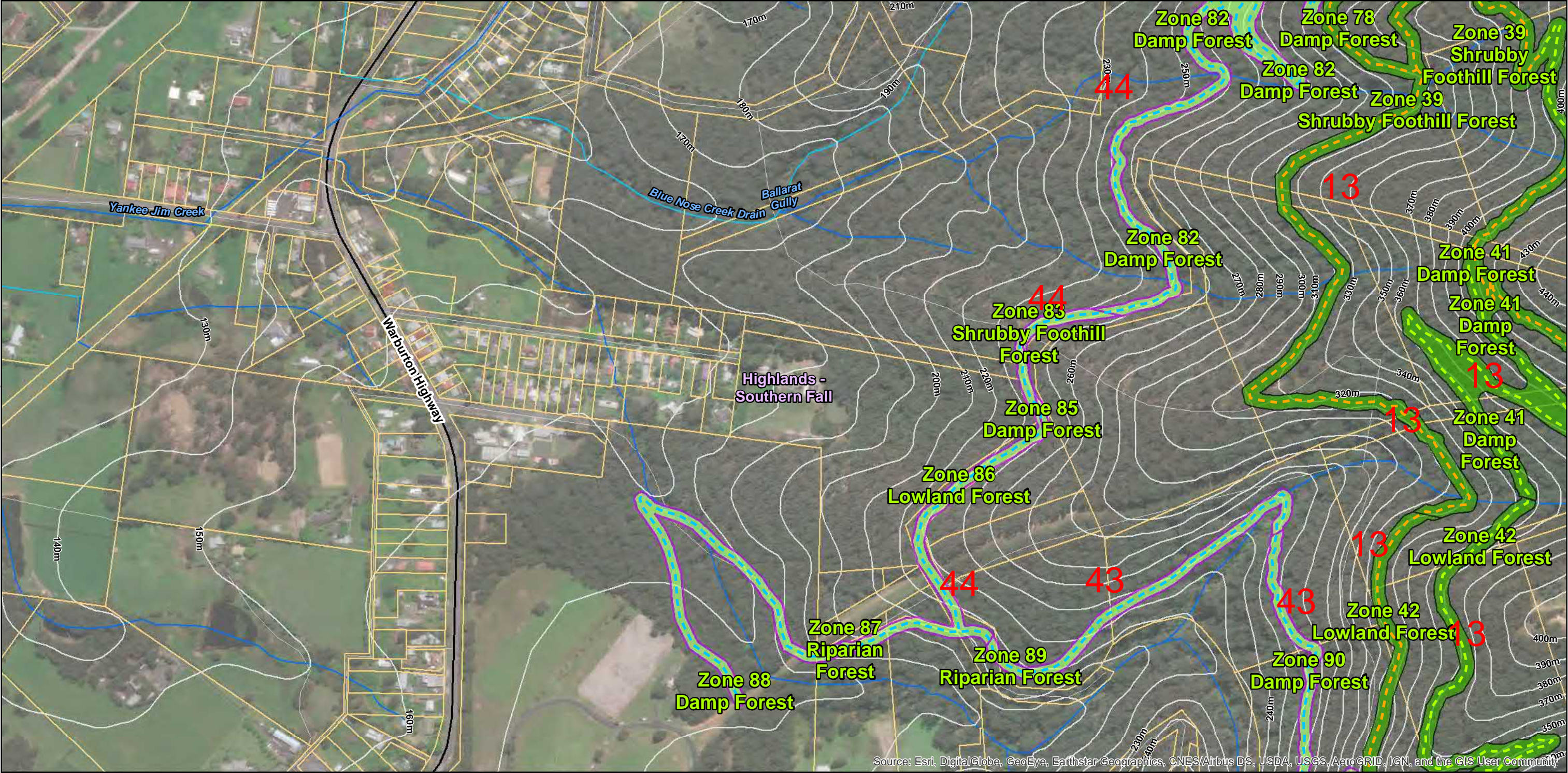
Data Source:  
Base map data Copyright © The State of Victoria.

**Map 14 –  
Mount Little Joe – Backstairs Track**

**Map Series 1 – Proposed  
Warburton Mountain Bike Trail**

  
Scale 1:5,475 (Page size A3)





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**Legend**

- Parcel
- Bioregion boundary
- Habitat Hectare Assessment (10m corridor)
- Desktop Assessment (10m corridor)

**Trail Alignment and Ref No.**

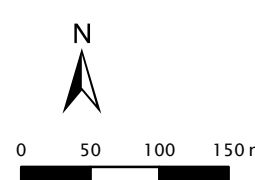
- New Trails - Desktop (Dec 2019)
- New Trails (Assessed 2019)
- New Trails (Assessed 2017)

**Details**  
Date: 10/12/2019  
Version: 2

Data Source:  
Base map data Copyright © The State of Victoria.

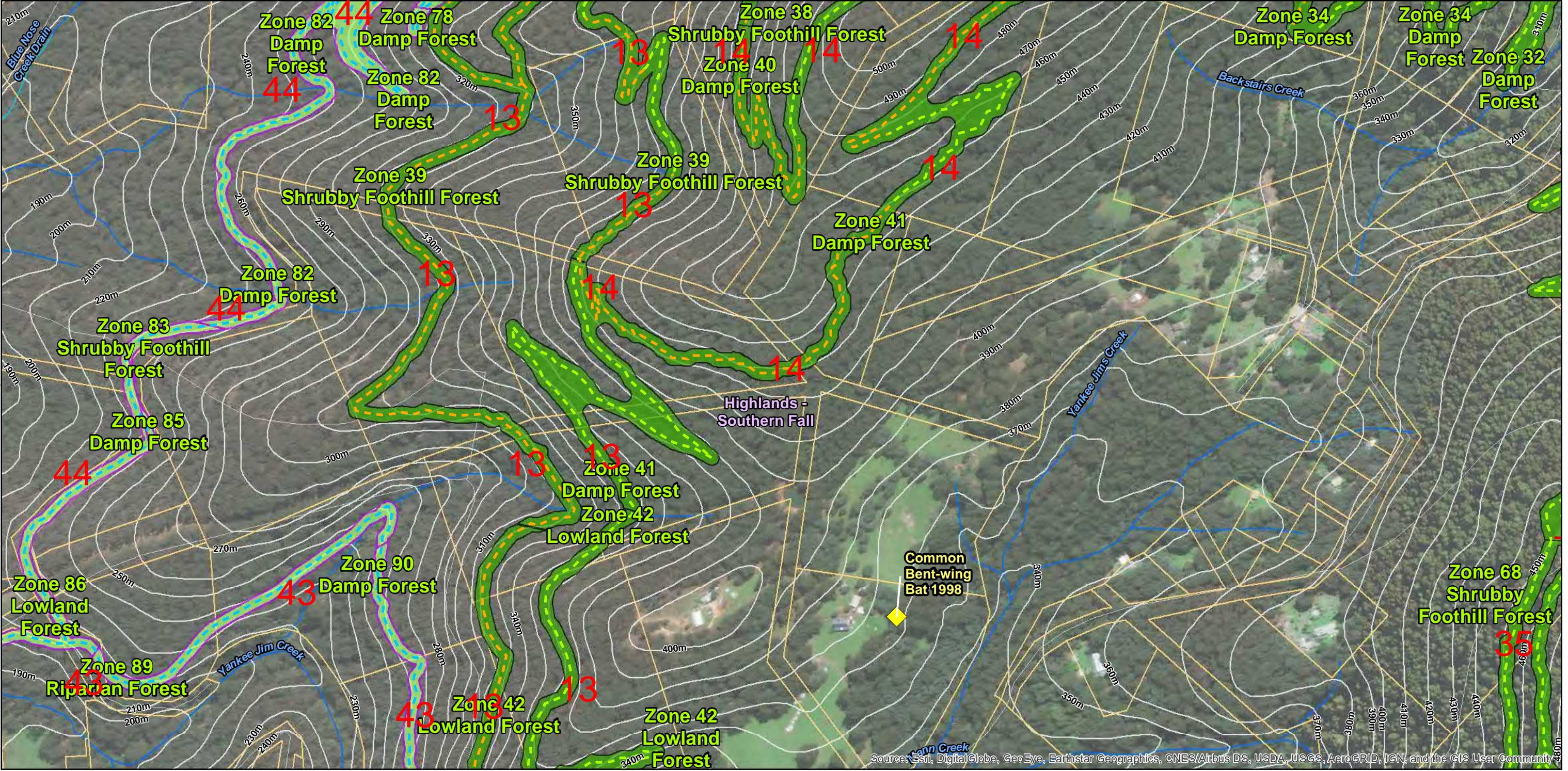
**Map 15 –  
Wesburn Climb**


**Map Series 1 – Proposed  
Warburton Mountain Bike Trail**

  
0 50 100 150 m

Scale 1:5,465 (Page size A3)







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**Legend**

- Parcel
- Threatened Fauna VBA
- Bioregion boundary
- Habitat Hectare Assessment (10m corridor)
- Desktop Assessment (10m corridor)

**Trail Alignment and Ref No.**

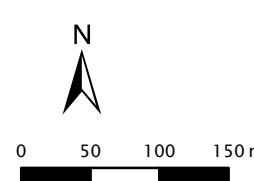
- New Trails - Desktop (Dec 2019)
- New Trails (Assessed 2019)
- New Trails (Assessed 2017)
- Existing Trail

**Details**  
Date: 10/12/2019  
Version: 2

Data Source:  
Base map data Copyright © The State of Victoria.

**Map 16 –  
Mount Little Joe West**

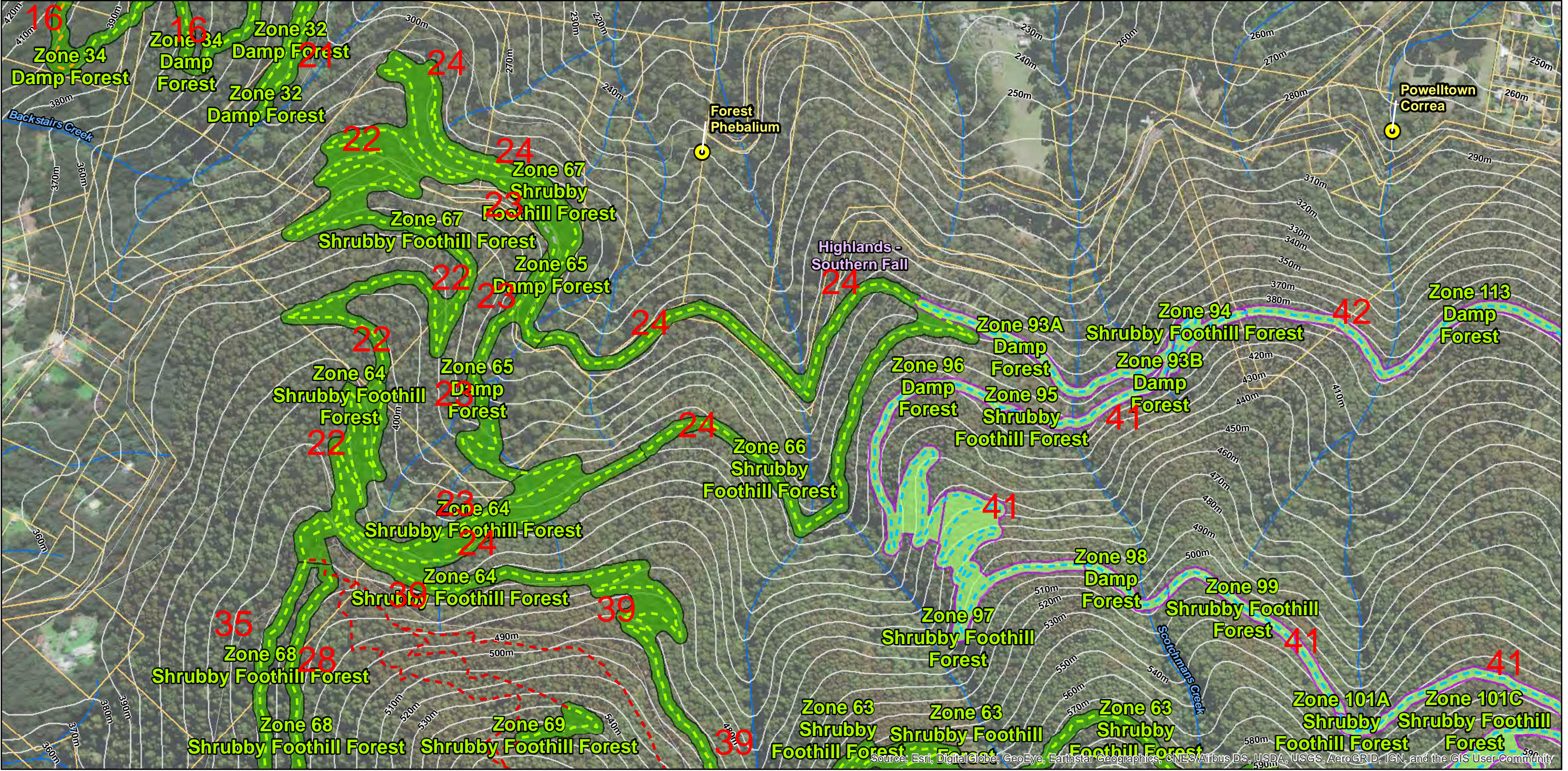
**Map Series 1 – Proposed  
Warburton Mountain Bike Trail**




0 50 100 150 m

Scale 1:5,465 (Page size A3)










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**Legend**


 Parcel


 Threatened Flora VBA


 Bioregion boundary


 Habitat Hectare Assessment (10m corridor)


**Trail Alignment and Ref No.**


 New Trails - Desktop (Dec 2019)

 New Trails (Assessed 2019)

 New Trails (Assessed 2017)

 Desktop Assessment (10m corridor)

 Existing Trail

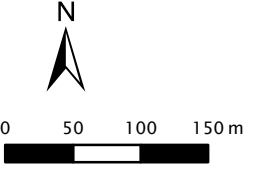
 Existing Vehicle Track

**Details**  
Date: 10/12/2019  
Version: 2

Data Source:  
Base map data Copyright © The State of Victoria.

**Map 17 –  
Mount Little Joe Central**

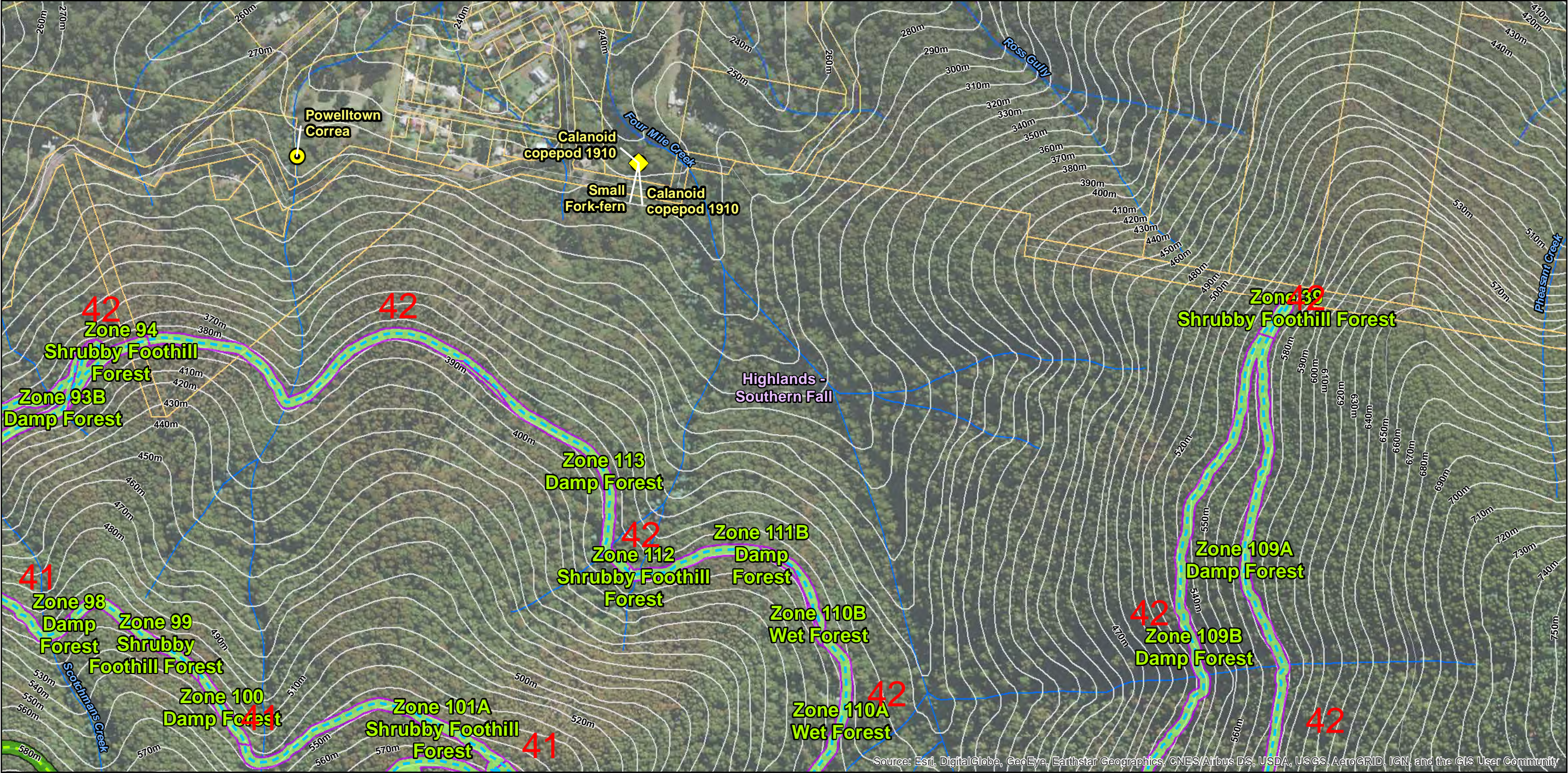
**Map Series 1 – Proposed  
Warburton Mountain Bike Trail**



0 50 100 150 m

Scale 1:5,575 (Page size A3)





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**Legend**

Parcel

Threatened Fauna VBA

Threatened Flora VBA

Bioregion boundary

Habitat Hectare Assessment (10m corridor)

Desktop Assessment (10m corridor)

**Trail Alignment and Ref No.**

New Trails - Desktop (Dec 2019)

New Trails (Assessed 2019)

**Details**  
Date: 10/12/2019  
Version: 2

Data Source:  
Base map data Copyright © The State of Victoria.

Map 18 -  
Mount Little Joe East

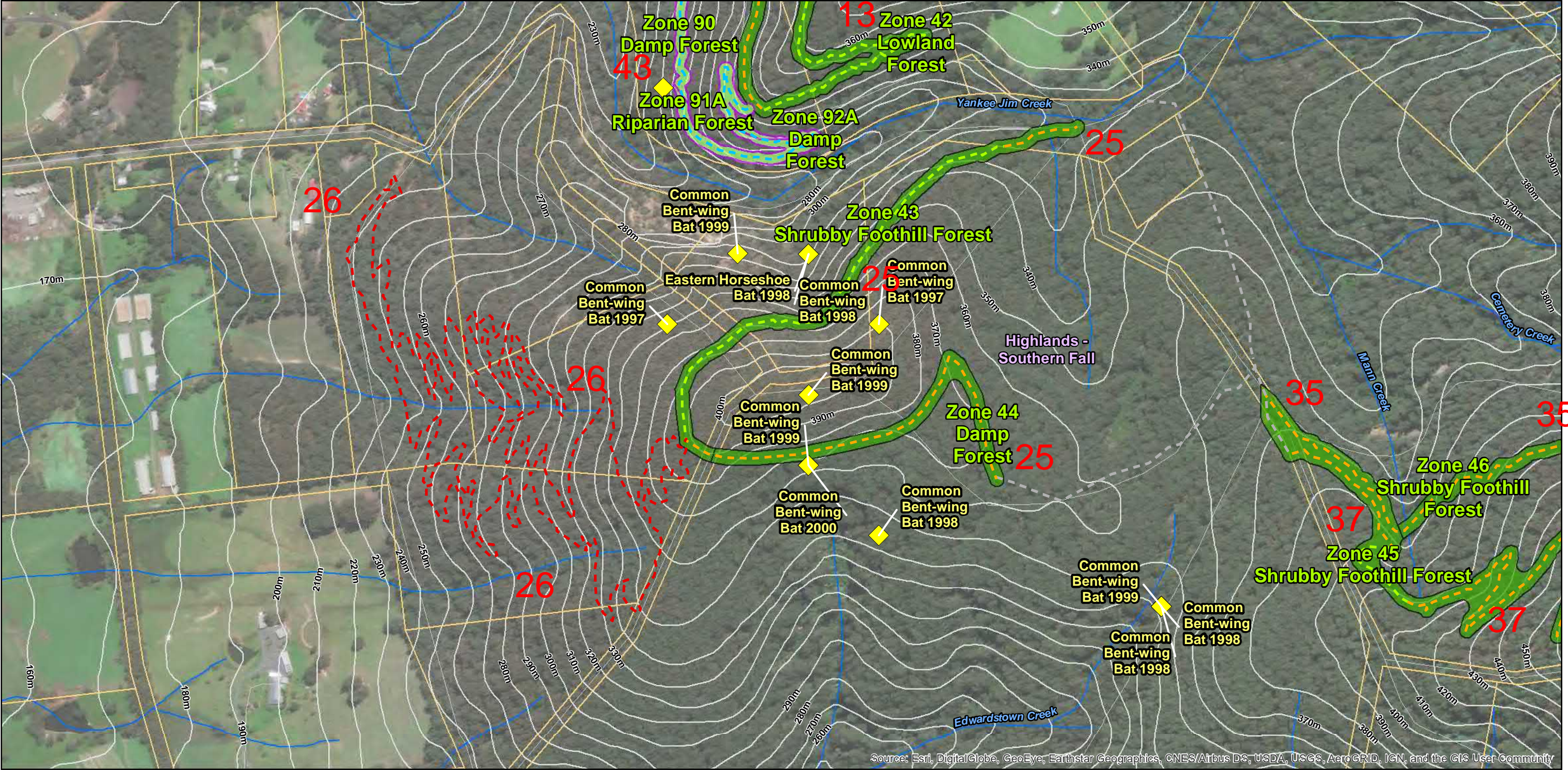
Map Series 1 - Proposed  
Warburton Mountain Bike Trail

N

0 50 100 150 m

Scale 1:5,540 (Page size A3)





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



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**Legend**

Parcel

Threatened Fauna VBA

Bioregion boundary

Habitat Hectare Assessment (10m corridor)

Desktop Assessment (10m corridor)

**Trail Alignment and Ref No.**

New Trails - Desktop (Dec 2019)

New Trails (Assessed 2019)

New Trails (Assessed 2017)

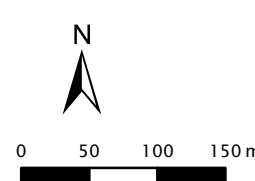
Existing Trail

Existing Vehicle Track

**Details**  
Date: 10/12/2019  
Version: 2  
  
Data Source:  
Base map data Copyright © The State of Victoria.

**Map 19 –  
Crusher Track Link**

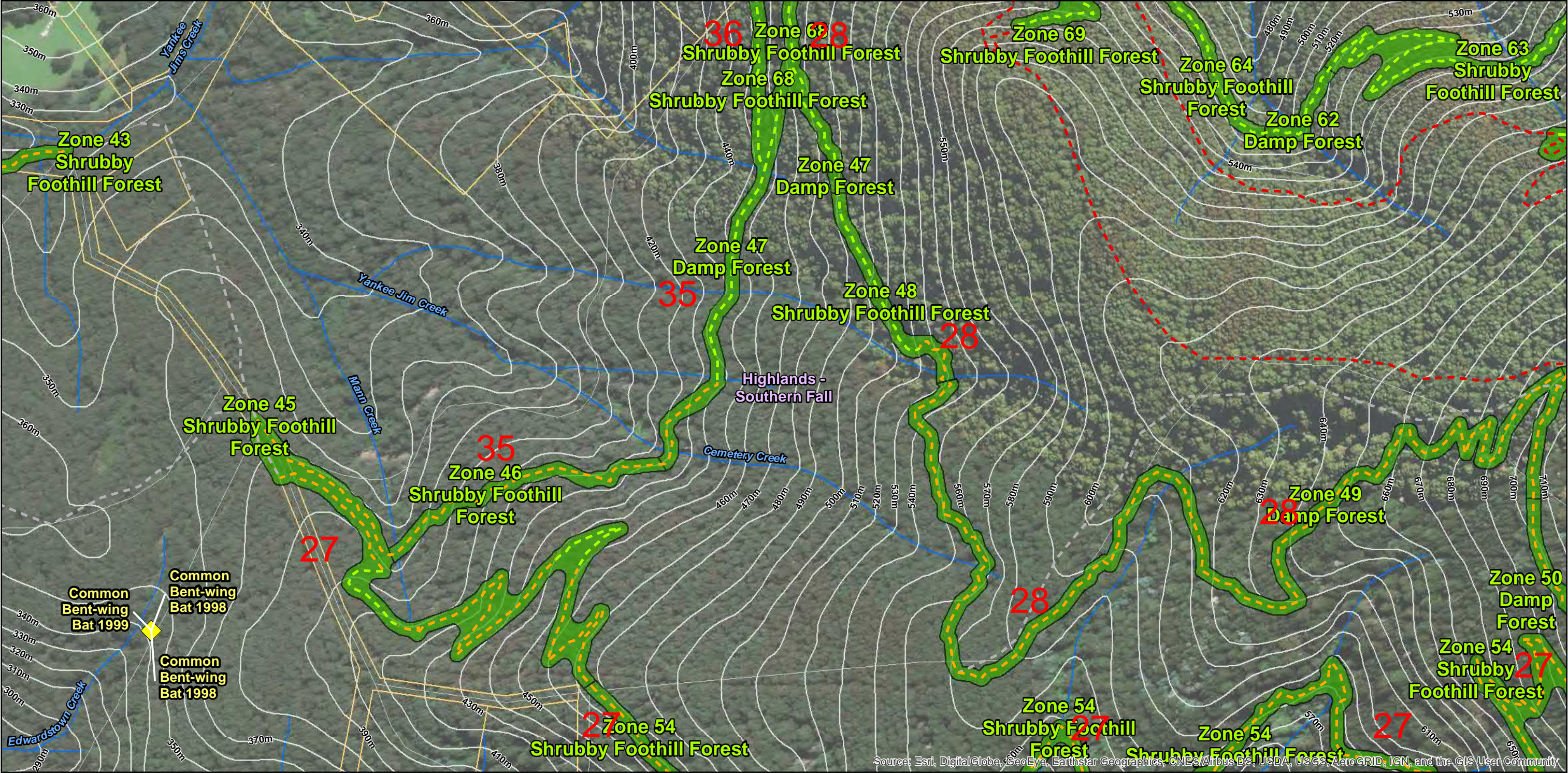
**Map Series 1 – Proposed  
Warburton Mountain Bike Trail**



0 50 100 150 m

Scale 1:5,540 (Page size A3)





**Legend**

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

**Trail Alignment and Ref No.**

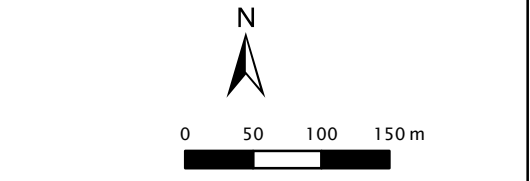
- New Trails (Assessed 2019)
- New Trails (Assessed 2017)
- Existing Trail
- Existing Vehicle Track

**Details**  
Date: 10/12/2019  
Version: 2

Data Source:  
Base map data Copyright © The State of Victoria.

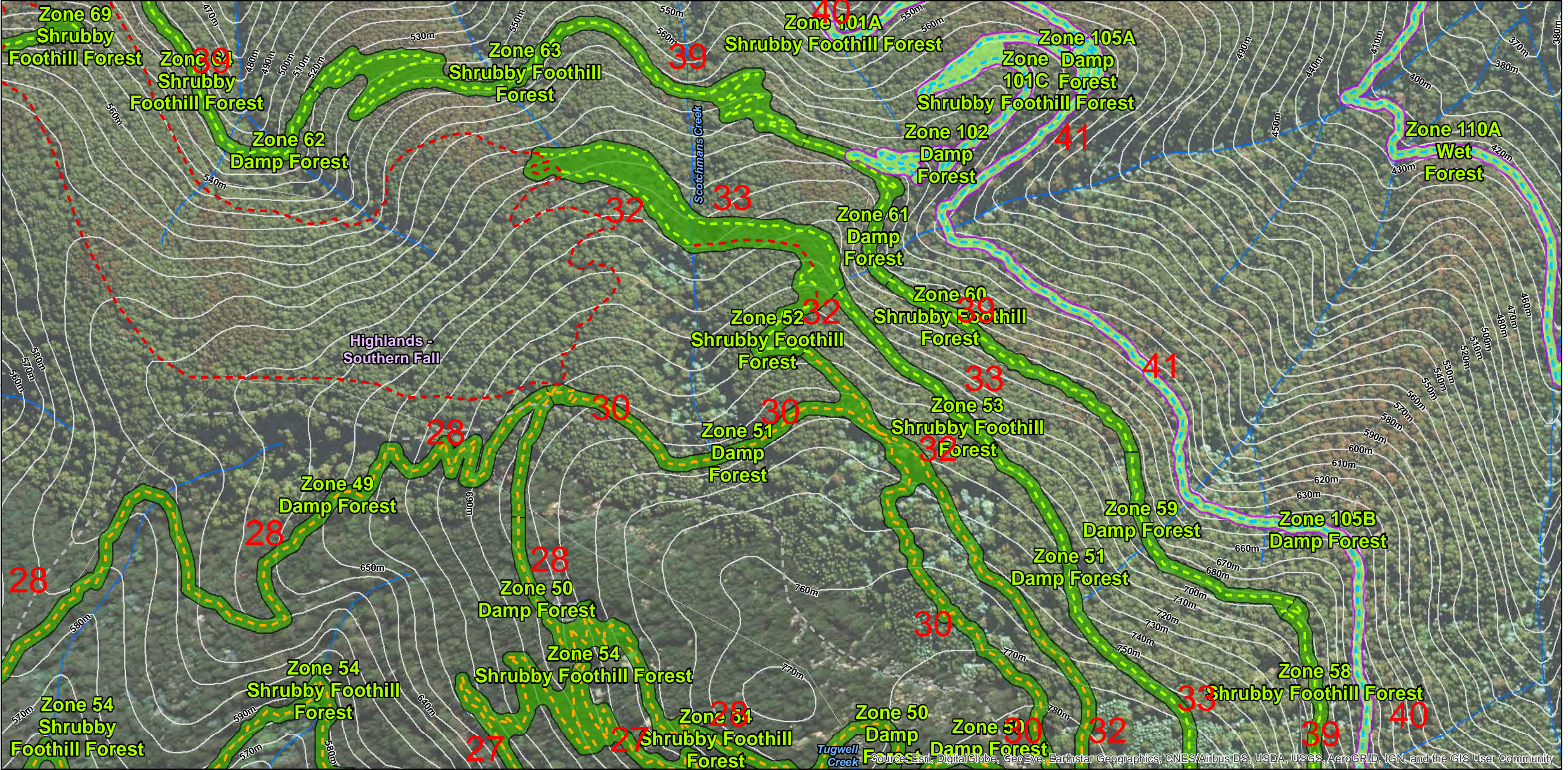
Map 20 –  
Mount Tugwell Cemetery Fireline

Map Series 1 – Proposed  
Warburton Mountain Bike Trail



Scale 1:5,540 (Page size A3)







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**Legend**

- Parcel
- Bioregion boundary
- Habitat Hectare Assessment (10m corridor)
- Desktop Assessment (10m corridor)

**Trail Alignment and Ref No.**

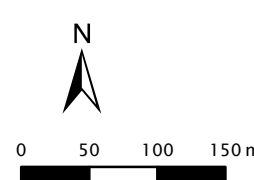
- New Trails - Desktop (Dec 2019)
- New Trails (Assessed 2019)
- New Trails (Assessed 2017)
- Existing Trail
- Existing Vehicle Track

**Details**  
Date: 10/12/2019  
Version: 2

Data Source:  
Base map data Copyright © The State of Victoria.

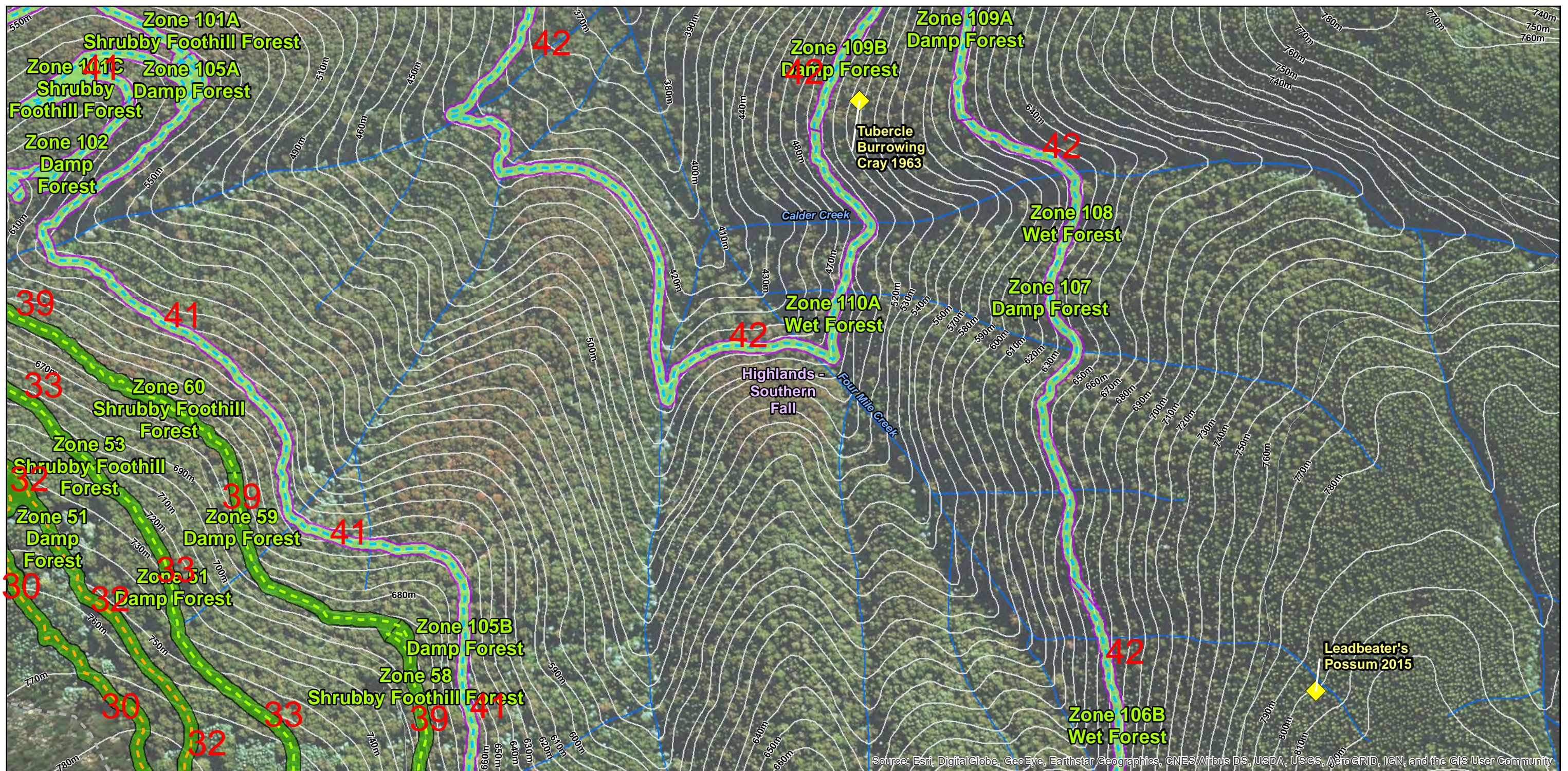
**Map 21 - Cemetery Fireline East**

**Map Series 1 - Proposed Warburton Mountain Bike Trail**



Scale 1:5,540 (Page size A3)





#### Legend

- Parcel
- Threatened Fauna VBA
- Bioregion boundary
- Habitat Hectare Assessment (10m corridor)
- Desktop Assessment (10m corridor)

#### Trail Alignment and Ref No.

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

#### Details

Date: 10/12/2019  
Version: 2

Data Source:  
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The State of Victoria.

#### Map 22 – La La Falls Region

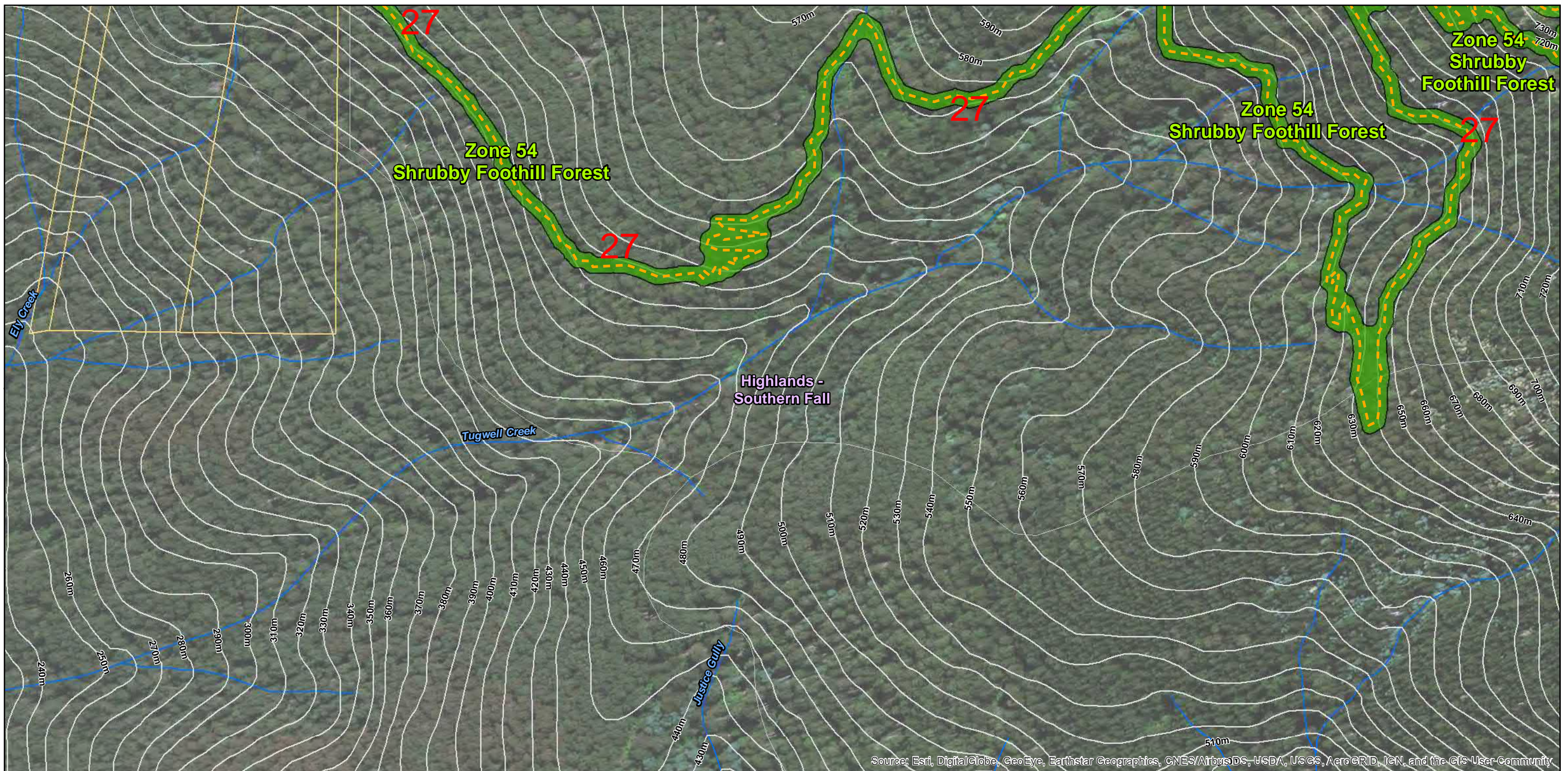
#### Map Series 1 – Proposed Warburton Mountain Bike Trail



0 50 100 150 m

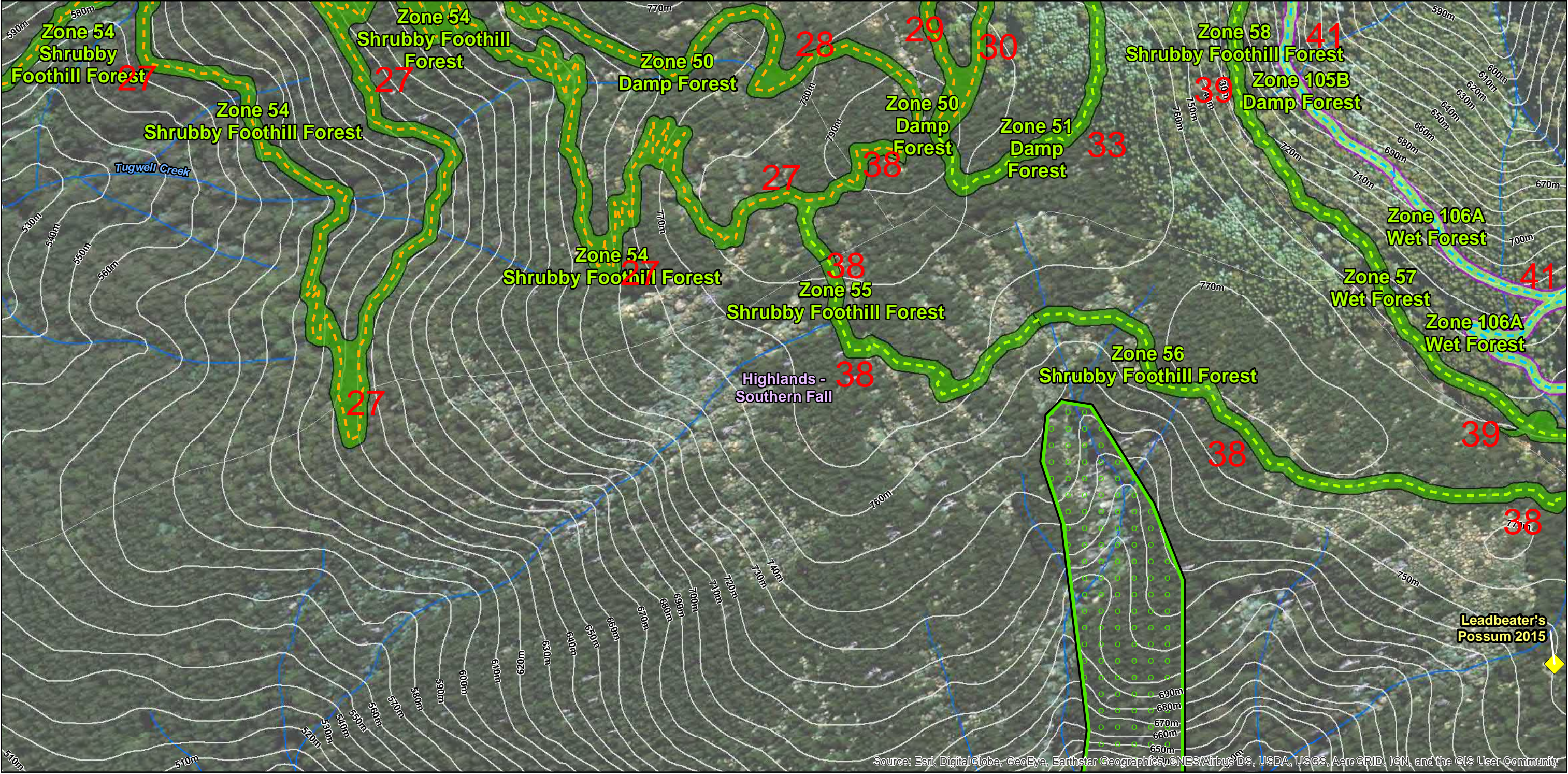
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**Legend**

- Parcel
- Cool Temperate Rainforest (Modelled)
- Bioregion boundary
- Habitat Hectare Assessment (10m corridor)
- Desktop Assessment (10m corridor)

**Trail Alignment and Ref No.**

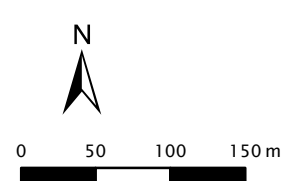
- New Trails - Desktop (Dec 2019)
- New Trails (Assessed 2019)
- New Trails (Assessed 2017)
- Existing Vehicle Track

**Details**  
Date: 10/12/2019  
Version: 2

Data Source:  
Base map data Copyright © The State of Victoria.

**Map 24 –  
Cumming Spur Track East**

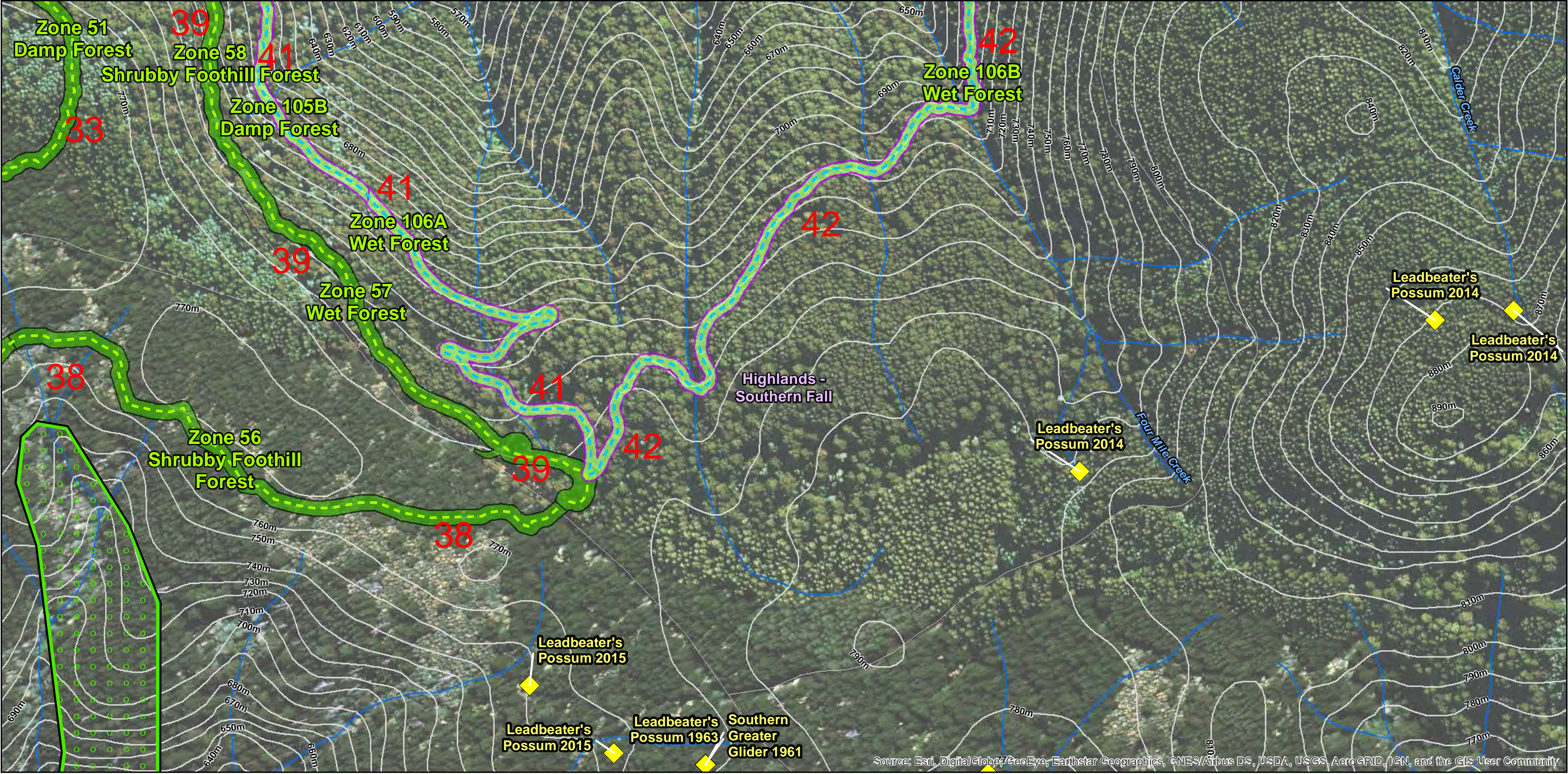
**Map Series 1 – Proposed  
Warburton Mountain Bike Trail**



0 50 100 150 m

Scale 1:5,055 (Page size A3)





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**Legend**

Parcel

Threatened Fauna VBA

Cool Temperate Rainforest (Modelled)

Bioregion boundary

Habitat Hectare Assessment (10m corridor)

Desktop Assessment (10m corridor)

**Trail Alignment and Ref No.**

New Trails - Desktop (Dec 2019)

**Details**  
Date: 10/12/2019  
Version: 2

Data Source:  
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Map 25 -  
Mount Bride Road South East

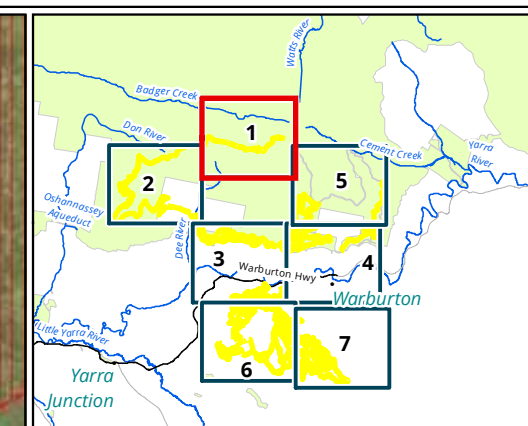
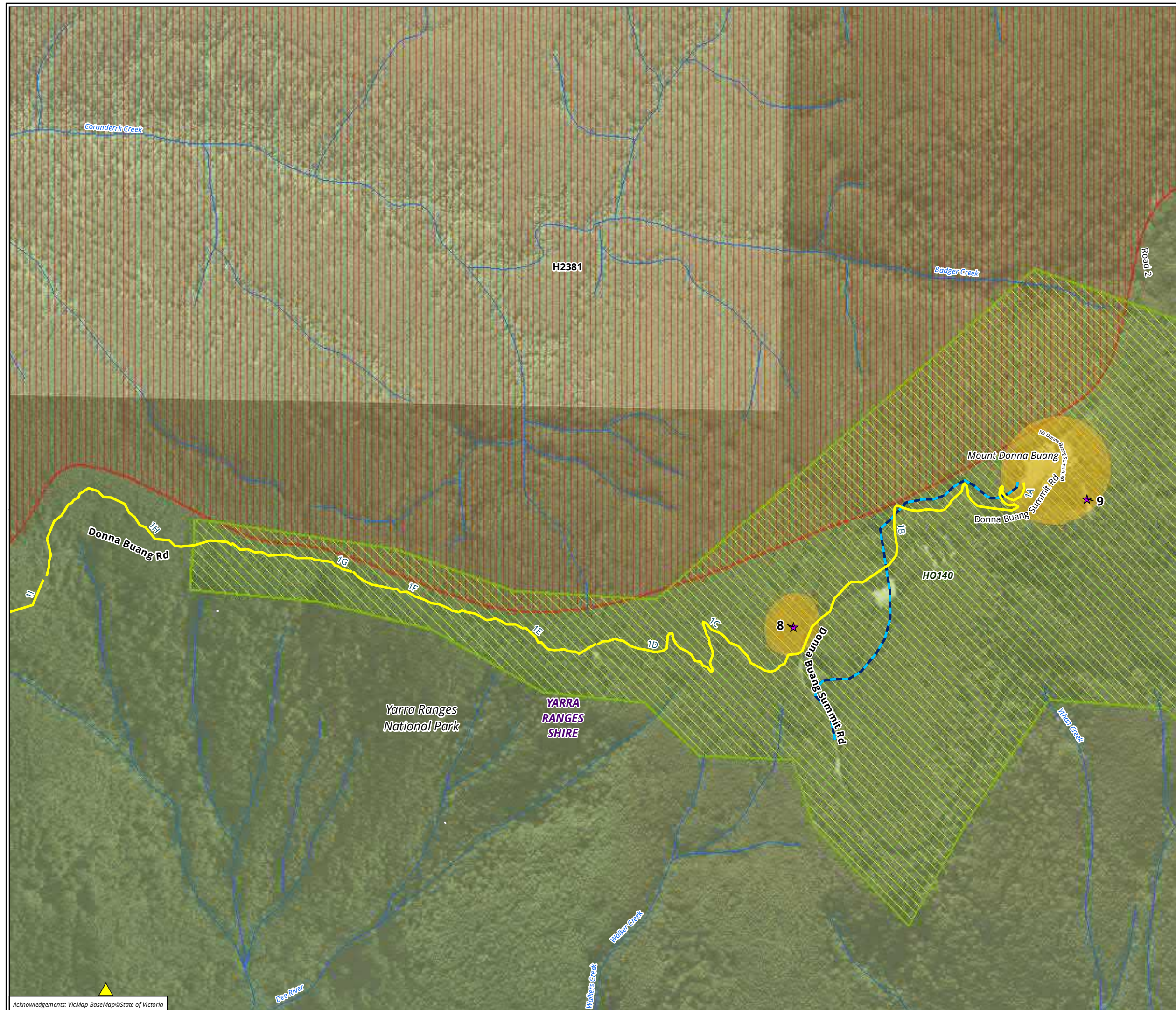
Map Series 1 - Proposed  
Warburton Mountain Bike Trail

Scale 1:5,055 (Page size A3)



## Attachment G: Heritage maps

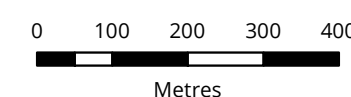




### Legend

- Proposed tracks and trails
- ★ 8 MWC Hut site
- ★ 9 SCV Hut site
- 10. Former water race
- ▲ Sawmill
- Former tram way
- Area of archeological sensitivity
- Heritage overlay
- Victoria Heritage Register site
- River or stream
- National Park or Reserve

**Figure 3.1 Areas of archaeological and heritage sensitivity**

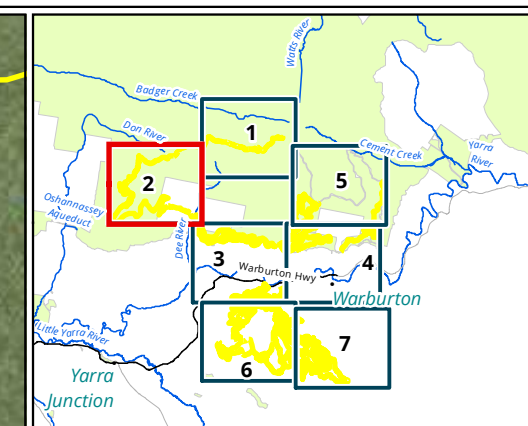
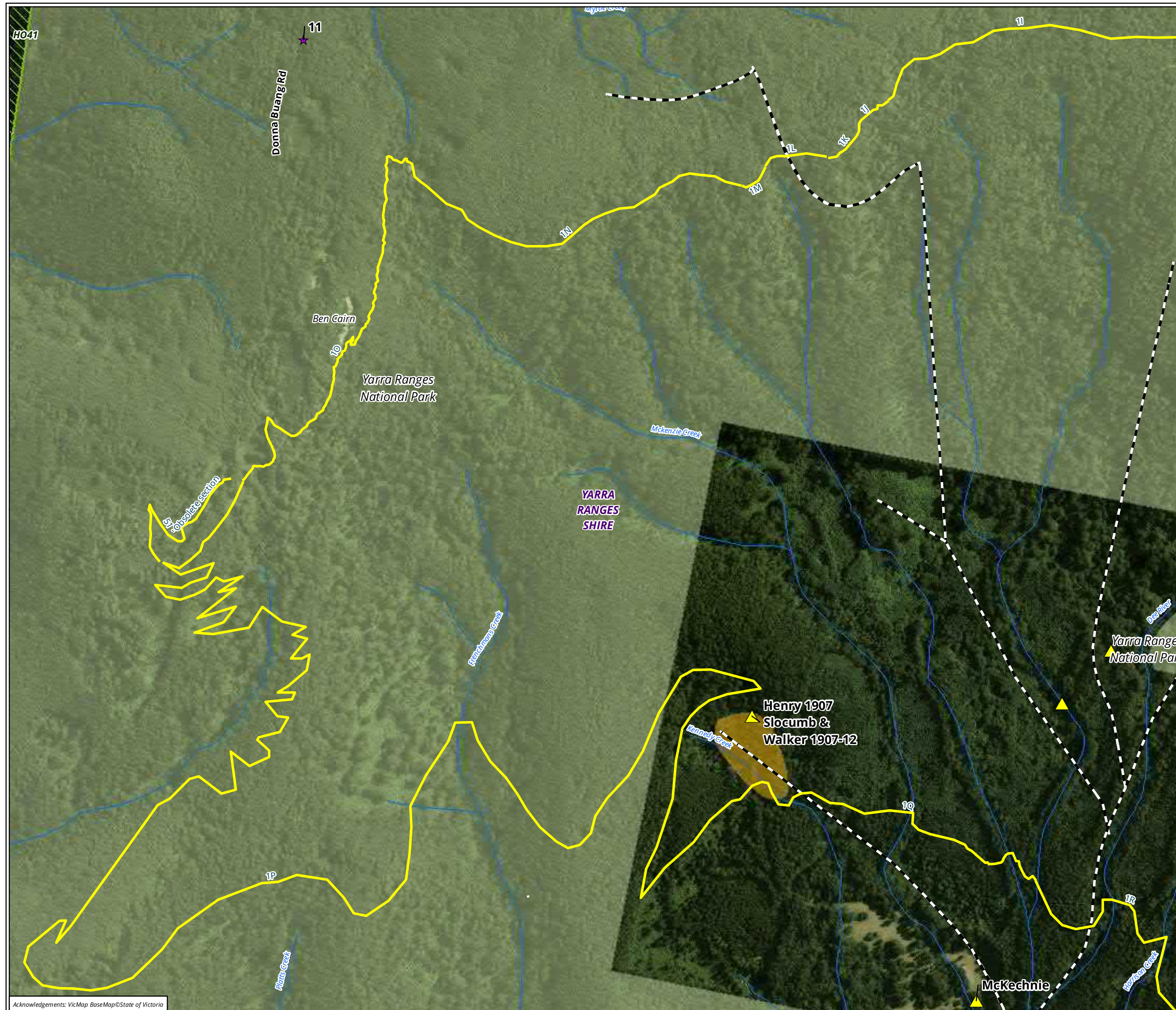


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Coordinate System: GDA 1994 VICGRID94



Matter: 27956,  
Date: 20 November 2019,  
Checked by: GV, Drawn by: SKM, Last edited by: smitchell  
Location: P:\27900s\27956\Mapping\27956\_F3\_Identified\_heritage\_places.mxd





# Legend

- Proposed tracks and trails
- 11 CRB Hut site
- Sawmill
- Former tram way
- Area of archeological sensitivity
- Heritage overlay
- River or stream
- National Park or Reserve

**Figure 3.2 Areas of archaeological and heritage sensitivity**

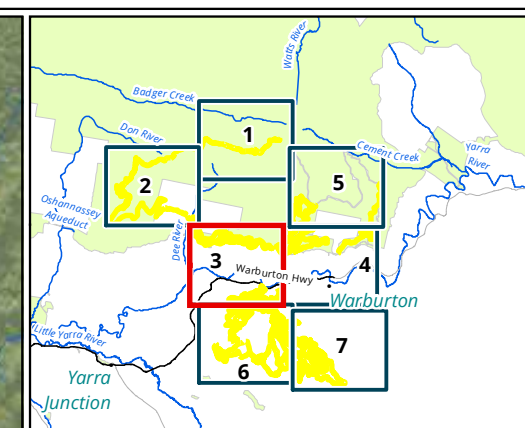
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Metres

Scale: 1:10,000 @ A3  
Coordinate System: GDA 1994 VICGRID94



Matter: 27956,  
Date: 20 November 2019,  
Checked by: GV, Drawn by: SKM, Last edited by: smitchell  
Location: P:\27900s\27956\Mapping\27956\_F3\_Identified\_heritage\_places.mxd





### Legend

- Proposed tracks and trails
- ★ 12 MMBW works site
- ★ 13 H8022-0111 O'Shannassy aqueduct sawmill and tramway site
- ▲ Sawmill
- ▲ 14. Anderson Sawmill site
- Former tram way
- Area of archeological sensitivity
- Heritage overlay
- Victoria Heritage Inventory site
- watercourse\_channel
- River or stream
- National Park or Reserve

**Figure 3.3 Areas of archaeological and heritage sensitivity**

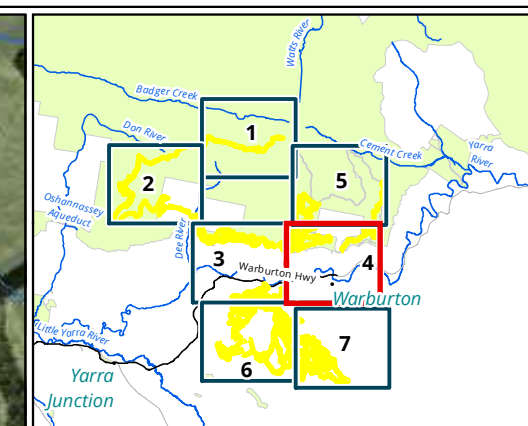
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Metres

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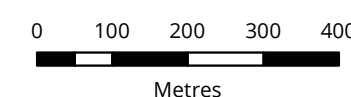




### Legend

- Proposed tracks and trails
- ▲ Sawmill
- - - Former tram way
- Area of archeological sensitivity
- Heritage overlay
- Victoria Heritage Register site
- watercourse\_channel
- River or stream
- National Park or Reserve

**Figure 3.4 Areas of archaeological and heritage sensitivity**

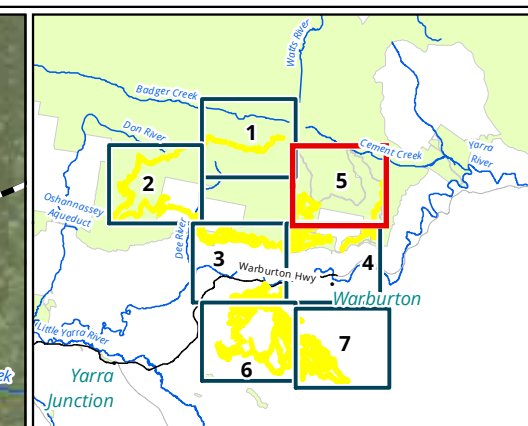
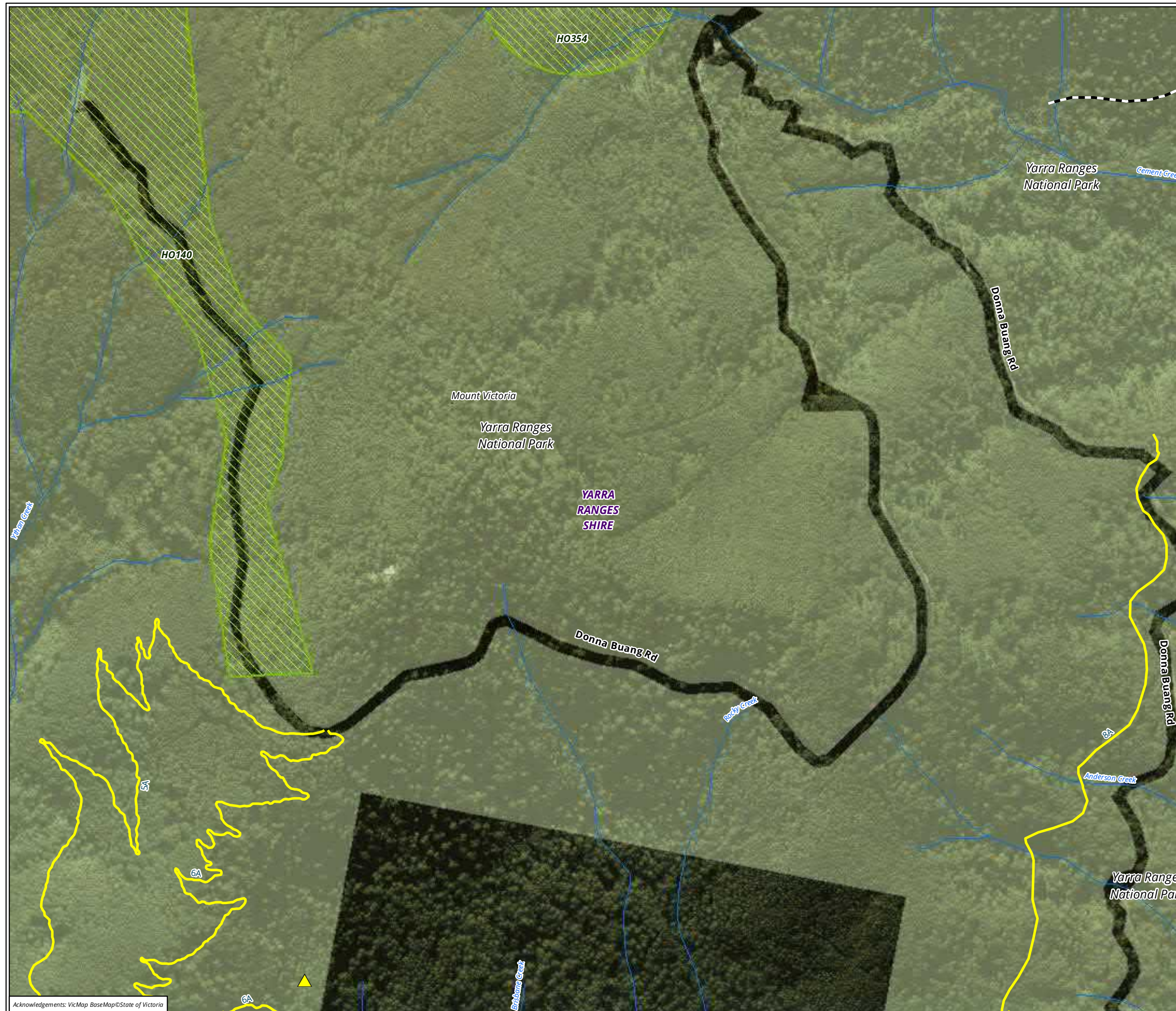


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Matter: 27956,  
Date: 20 November 2019,  
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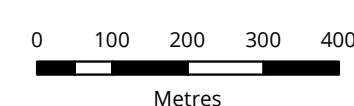




### Legend

- Proposed tracks and trails
- ▲ Sawmill
- - - Former tram way
- ▨ Heritage overlay
- River or stream
- National Park or Reserve

**Figure 3.5 Areas of archaeological and heritage sensitivity**

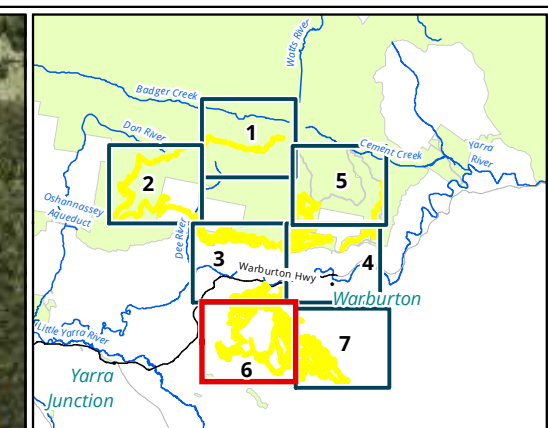
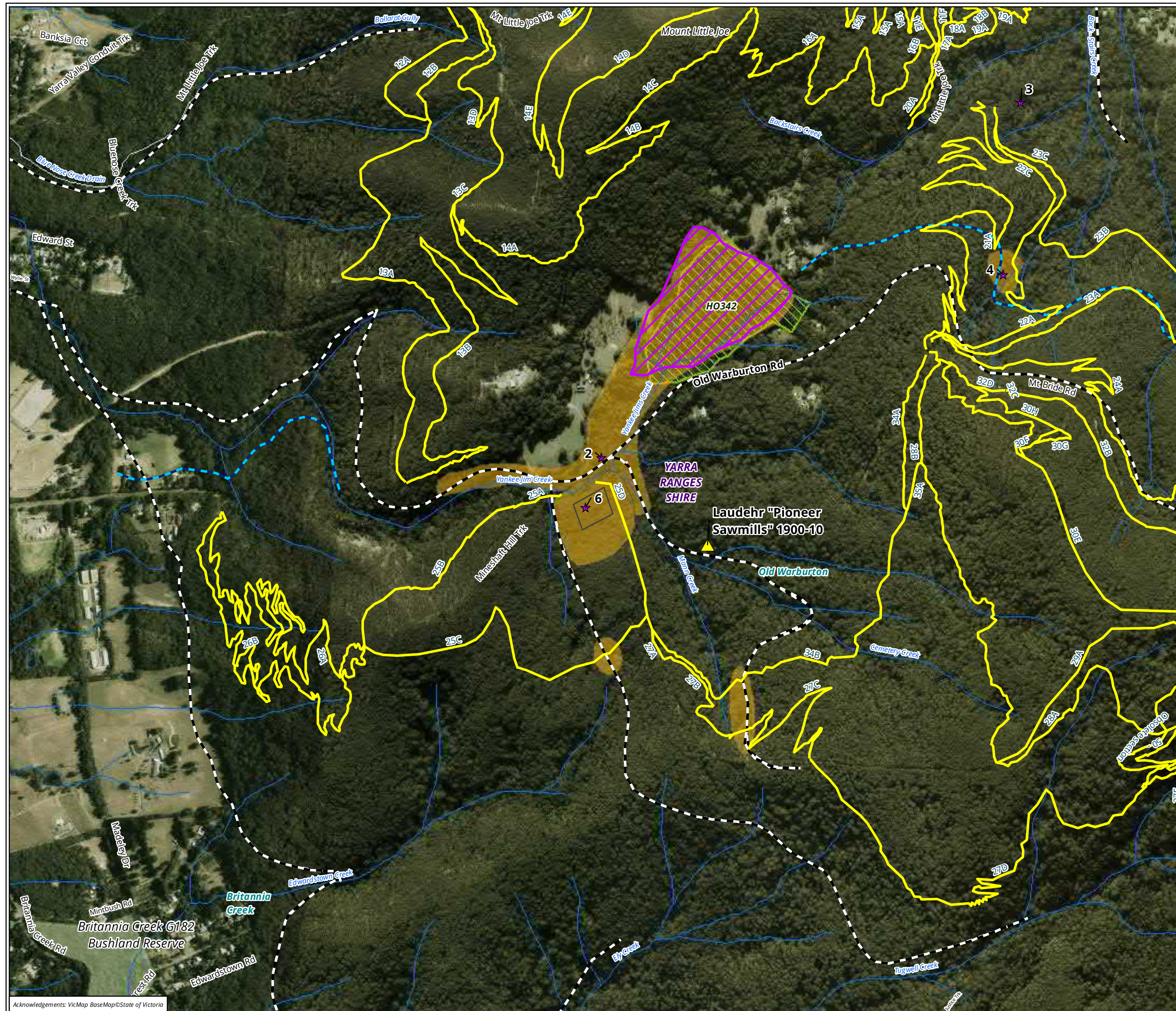


Scale: 1:10,000 @ A3  
Coordinate System: GDA 1994 VICGRID94



Matter: 27956,  
Date: 20 November 2019,  
Checked by: GV, Drawn by: SKM, Last edited by: smitchell  
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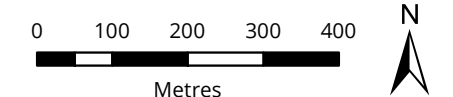




### Legend

- Proposed tracks and trails
- 2 Yankee Jim Mine
- 3 Evans Reward Mine
- 4 Lady Hopetoun Mine
- 6 Old Warburton Cemetery
- 10. Former water race
- Heritage place
- Sawmill
- Former tram way
- Area of archeological sensitivity
- Heritage overlay
- River or stream
- Drain
- National Park or Reserve

**Figure 3.6 Areas of archaeological and heritage sensitivity**

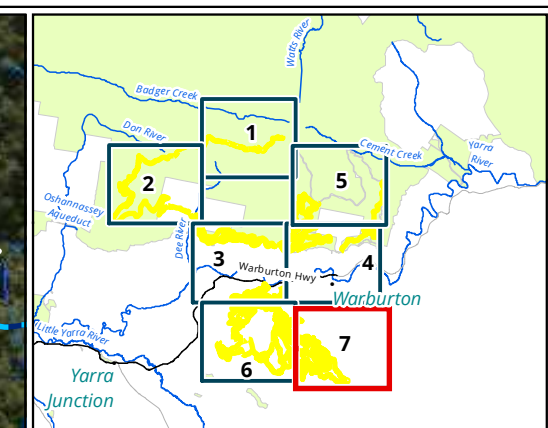
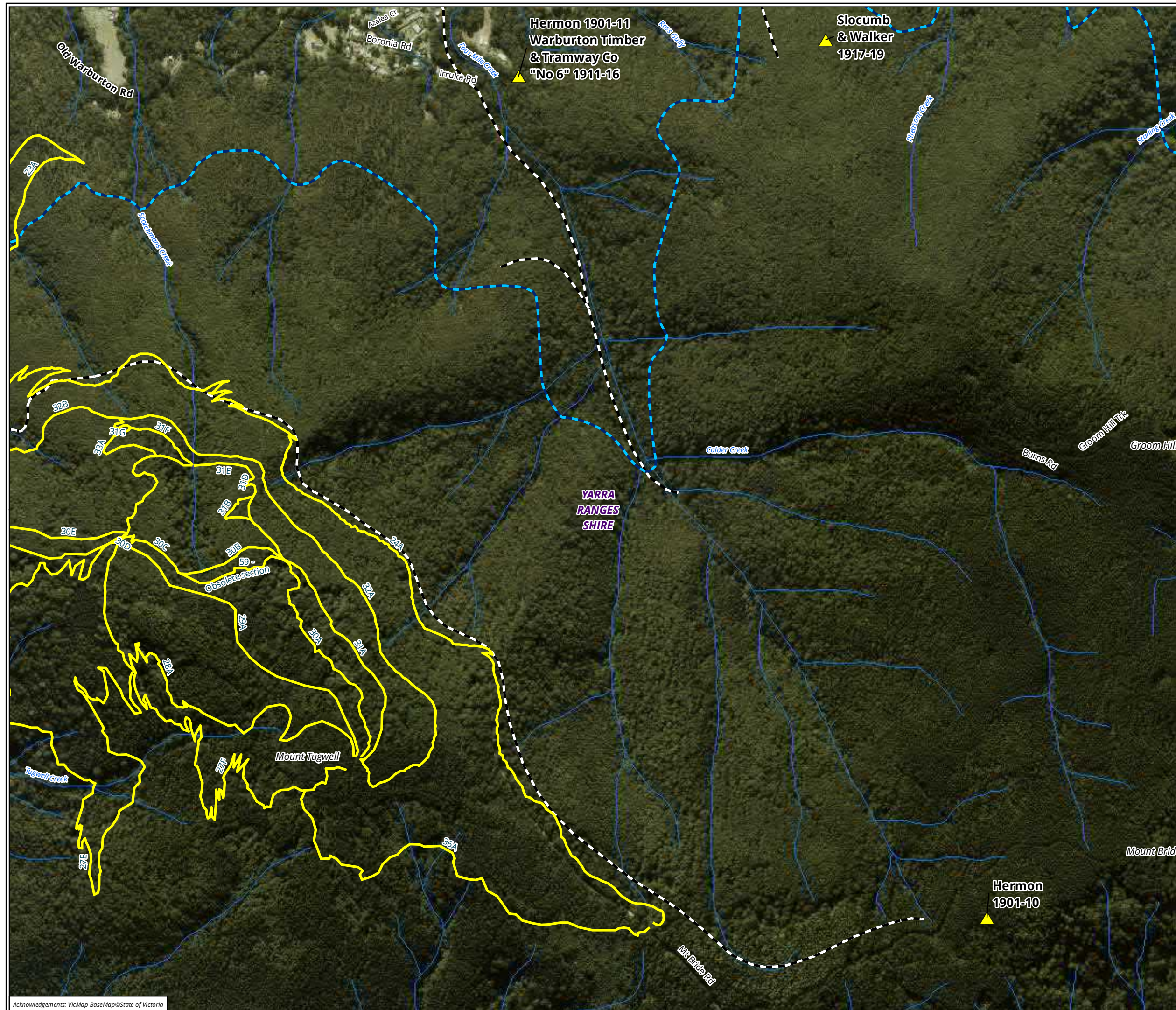


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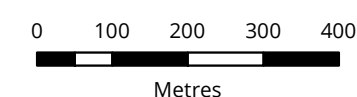




### Legend

- Proposed tracks and trails
- - - 10. Former water race
- ▲ Sawmill
- - - Former tram way
- River or stream

**Figure 3.7 Areas of archaeological and heritage sensitivity**



Scale: 1:10,000 @ A3  
Coordinate System: GDA 1994 VICGRID94



Matter: 27956,  
Date: 20 November 2019,  
Checked by: GV, Drawn by: SKM, Last edited by: smitchell  
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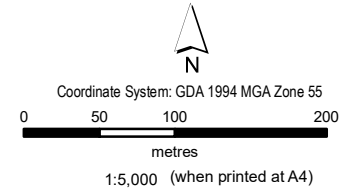


## Attachment H: Socio-economic maps

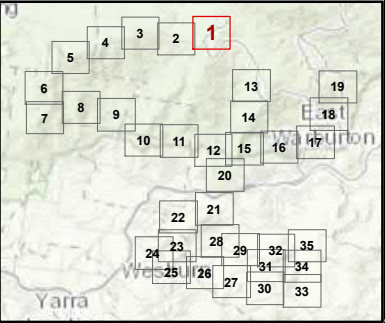
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**LEGEND**  
— Proposed MTB Trail  
□ Cadastre



**Project Overview**

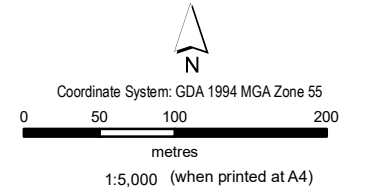
<b>Client</b> <i>Warburton Mountain Bike</i> Warburton, Victoria	<b>Figure</b> <b>1</b>
--	---------------------------



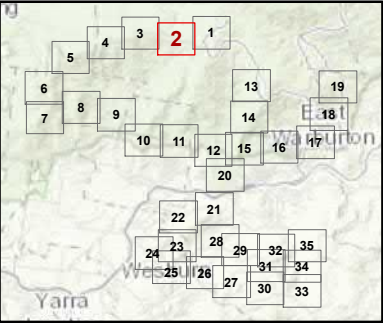
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**LEGEND**  
— Proposed MTB Trail  
□ Cadastre

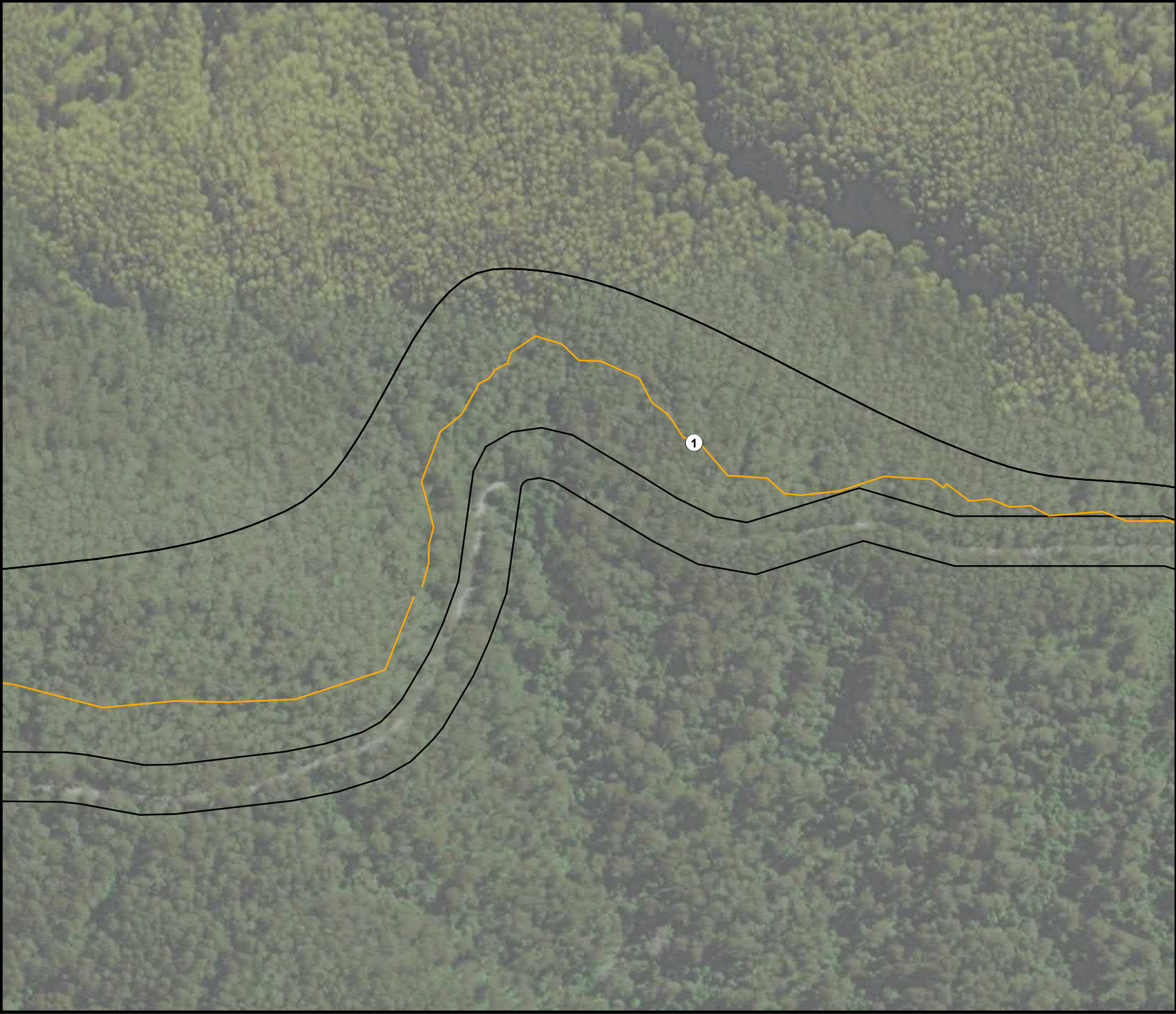


**Project Overview**

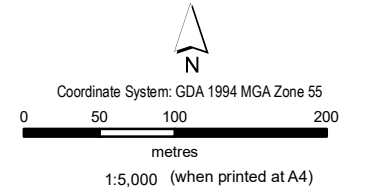
<b>Client</b> <i>Warburton Mountain Bike</i> Warburton, Victoria	<b>Figure</b> <b>2</b>
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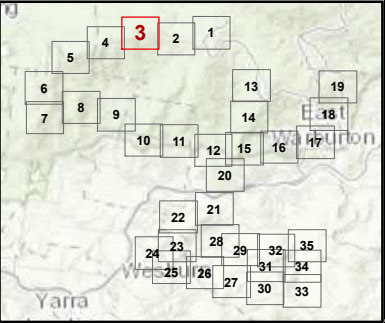
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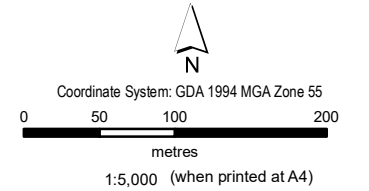


**Project Overview**

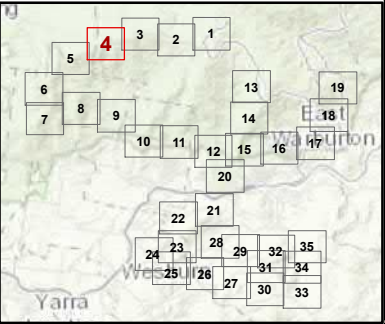
<b>Client</b>	<b>Figure</b>
Warburton Mountain Bike	3
Warburton, Victoria	



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- LEGEND**
- Proposed MTB Trail
  - Cadastre



**Project Overview**

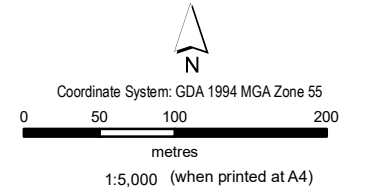
<b>Client</b>	<b>Figure</b>
Warburton Mountain Bike	4
Warburton, Victoria	



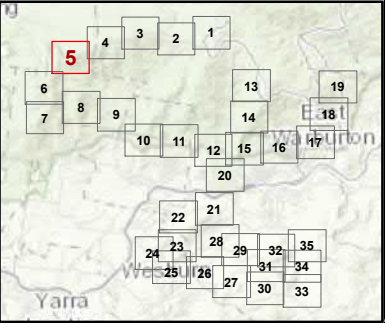
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**LEGEND**  
— Proposed MTB Trail  
□ Cadastre

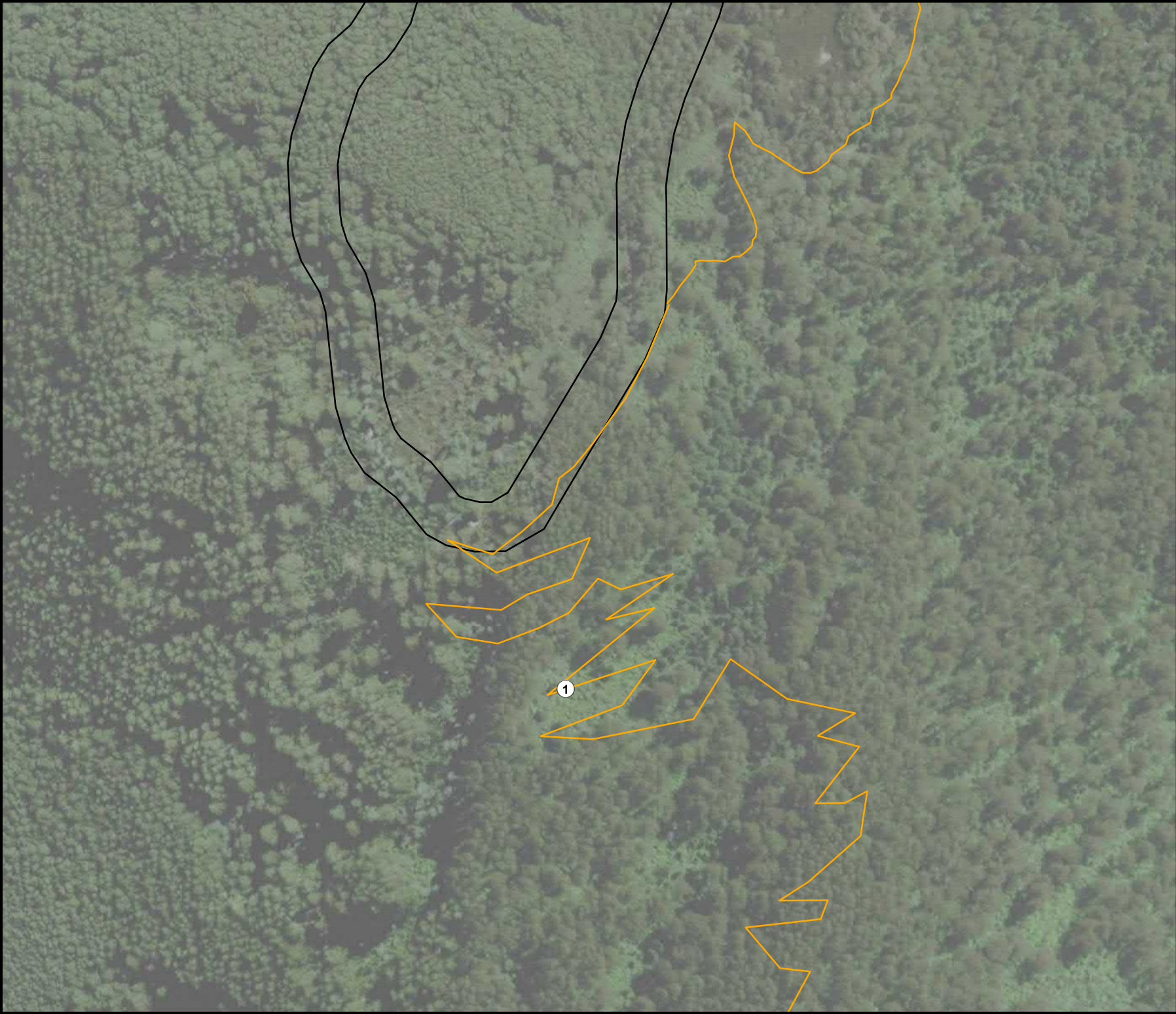


**Project Overview**

<b>Client</b> Warburton Mountain Bike Warburton, Victoria	<b>Figure</b> 5
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<div>LEGEND</div> <div>  Proposed MTB Trail </div> <div>  Cadastre </div>	
<div>  </div> <div>Project Overview</div>	
<div>Client</div> <div>Warburton Mountain Bike</div> <div>Warburton, Victoria</div>	<div>Figure</div> <div>6</div>




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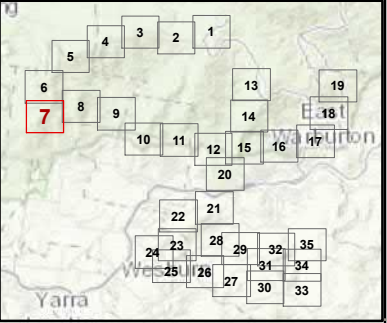
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1:5,000 (when printed at A4)

LEGEND

Proposed MTB Trail

Cadastre



Project Overview

Client

Warburton Mountain Bike

Warburton, Victoria

Figure

7

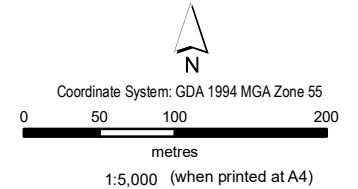
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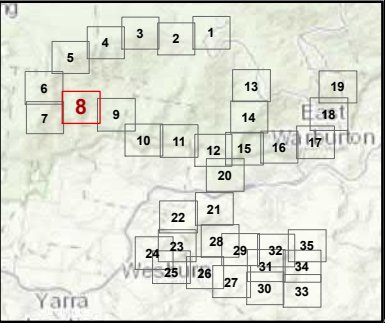
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- LEGEND**
- Proposed MTB Trail
  - ▭ Cadastre



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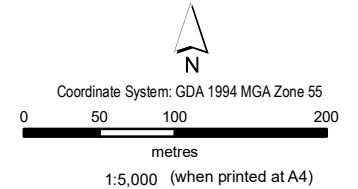
<b>Client</b>	<b>Figure</b>
Warburton Mountain Bike	8
Warburton, Victoria	



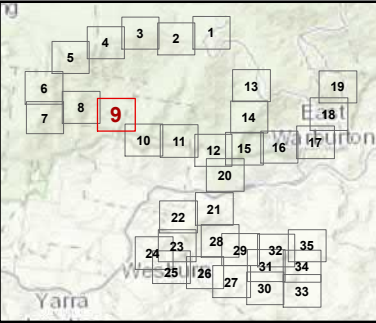
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— Proposed MTB Trail  
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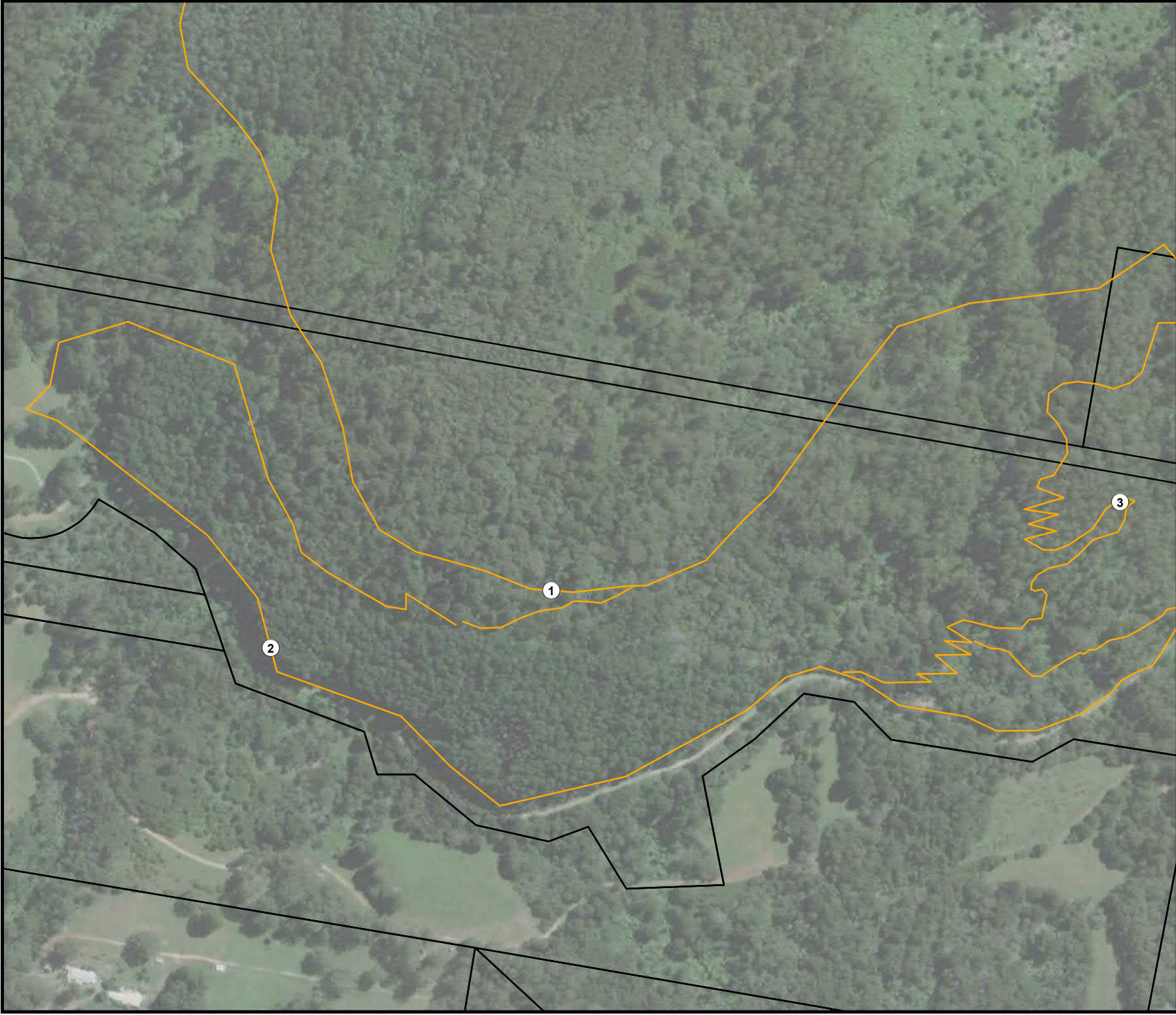


**Project Overview**

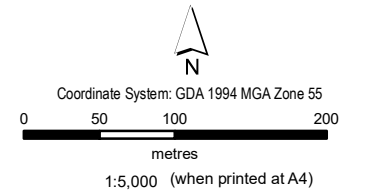
<b>Client</b> <i>Warburton Mountain Bike</i> Warburton, Victoria	<b>Figure</b> <b>9</b>
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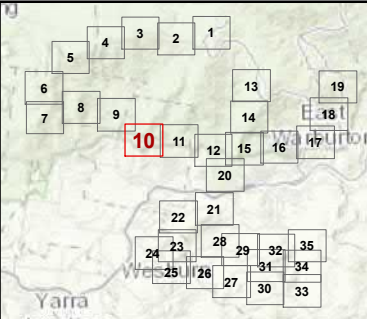
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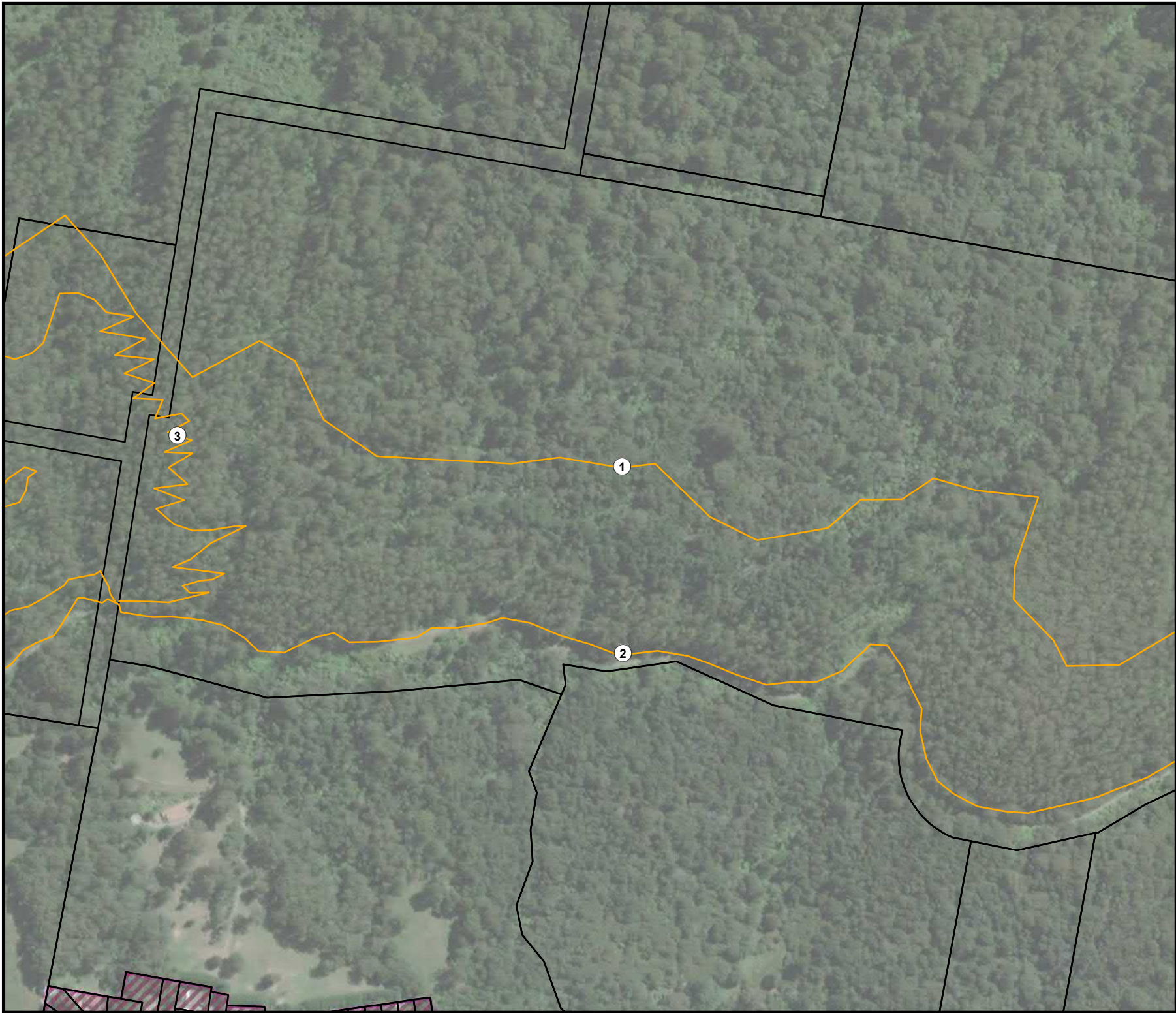
- LEGEND**
- Proposed MTB Trail
  - Cadastre



Project Overview	
Client	Figure
Warburton Mountain Bike	10
Warburton, Victoria	

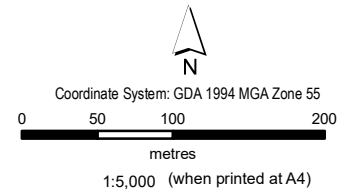


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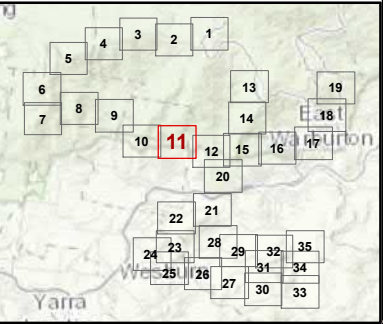


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- LEGEND**
- Proposed MTB Trail
  - Cadastre
  - Planning Zone**
  - Residential Zone Land



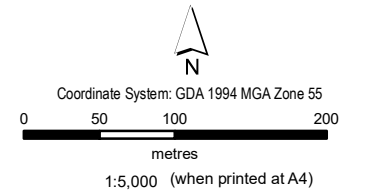
Project Overview	
Client	Figure
Warburton Mountain Bike	11
Warburton, Victoria	



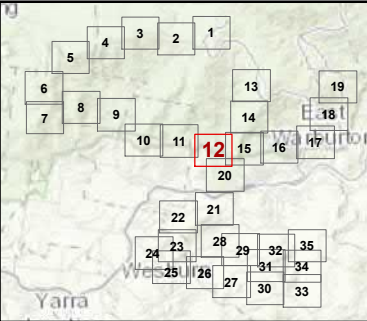
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- LEGEND**
- Proposed MTB Trail
  - Private Property Directly Impacted by the Project
  - Cadastre
  - Planning Zone**
  - Residential Zone Land



**Project Overview**

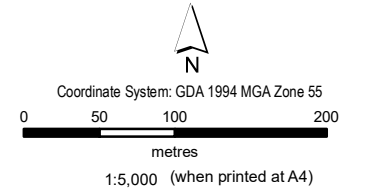
<b>Client</b>	<b>Figure</b>
Warburton Mountain Bike	12
Warburton, Victoria	



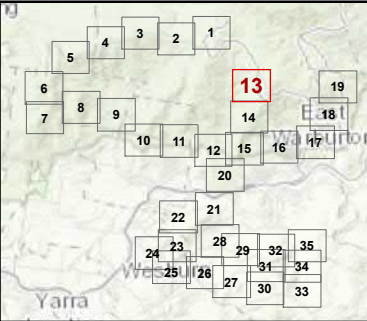
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- LEGEND**
- Proposed MTB Trail
  - Existing Walking Trail
  - Cadastre

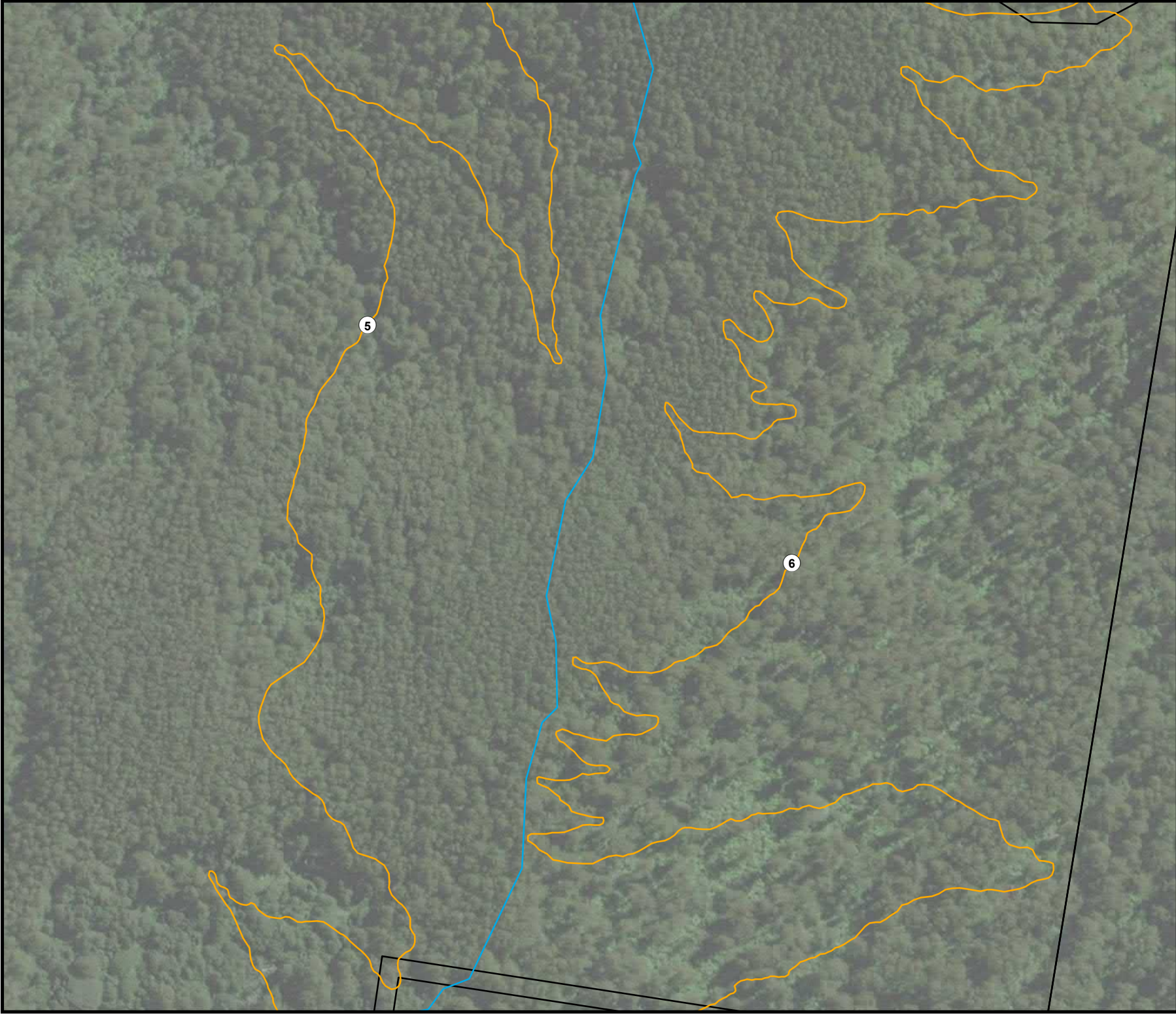


**Project Overview**

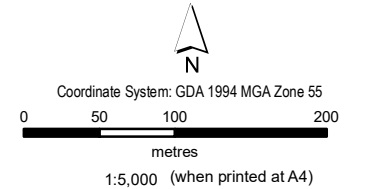
<b>Client</b>	<b>Figure</b>
Warburton Mountain Bike	13
Warburton, Victoria	



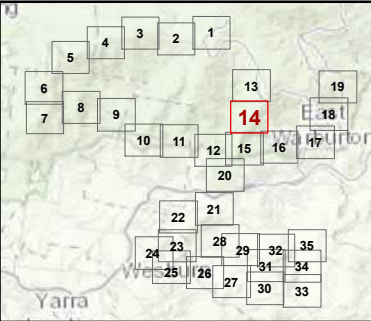
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- LEGEND**
- Proposed MTB Trail
  - Existing Walking Trail
  - Cadastre

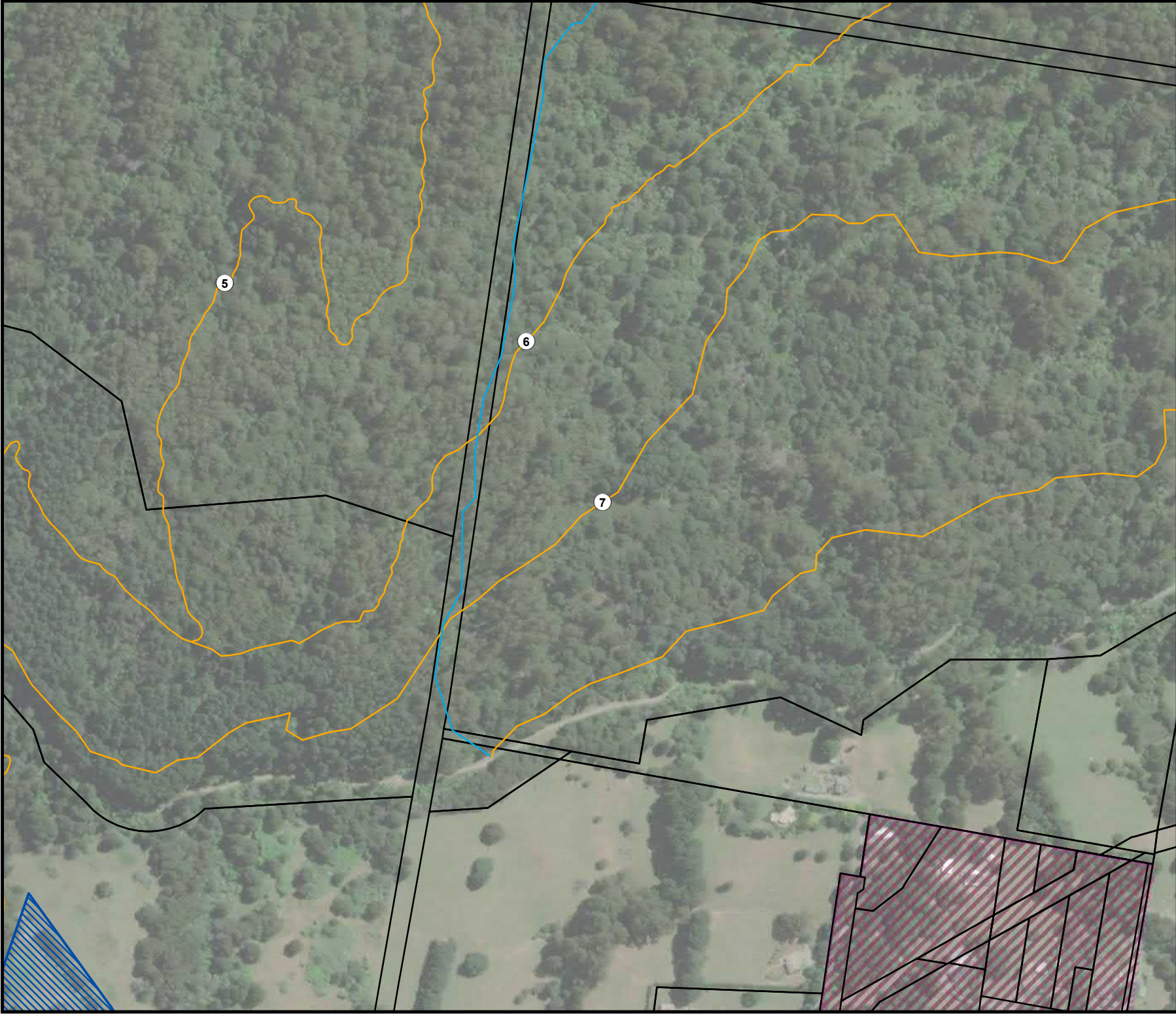


**Project Overview**

<b>Client</b> Warburton Mountain Bike Warburton, Victoria	<b>Figure</b> 14
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Coordinate System: GDA 1994 MGA Zone 55


050100200


metres


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LEGEND


Proposed MTB Trail

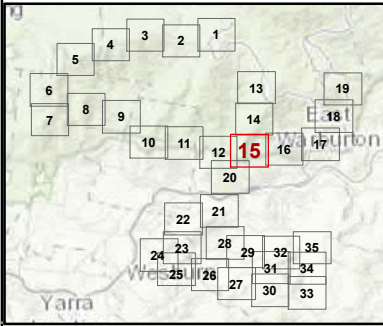
Existing Walking Trail

Private Property Directly Impacted by the Project

Cadastre

Planning Zone

Residential Zone Land



Project Overview

Client

Warburton Mountain Bike

Warburton, Victoria

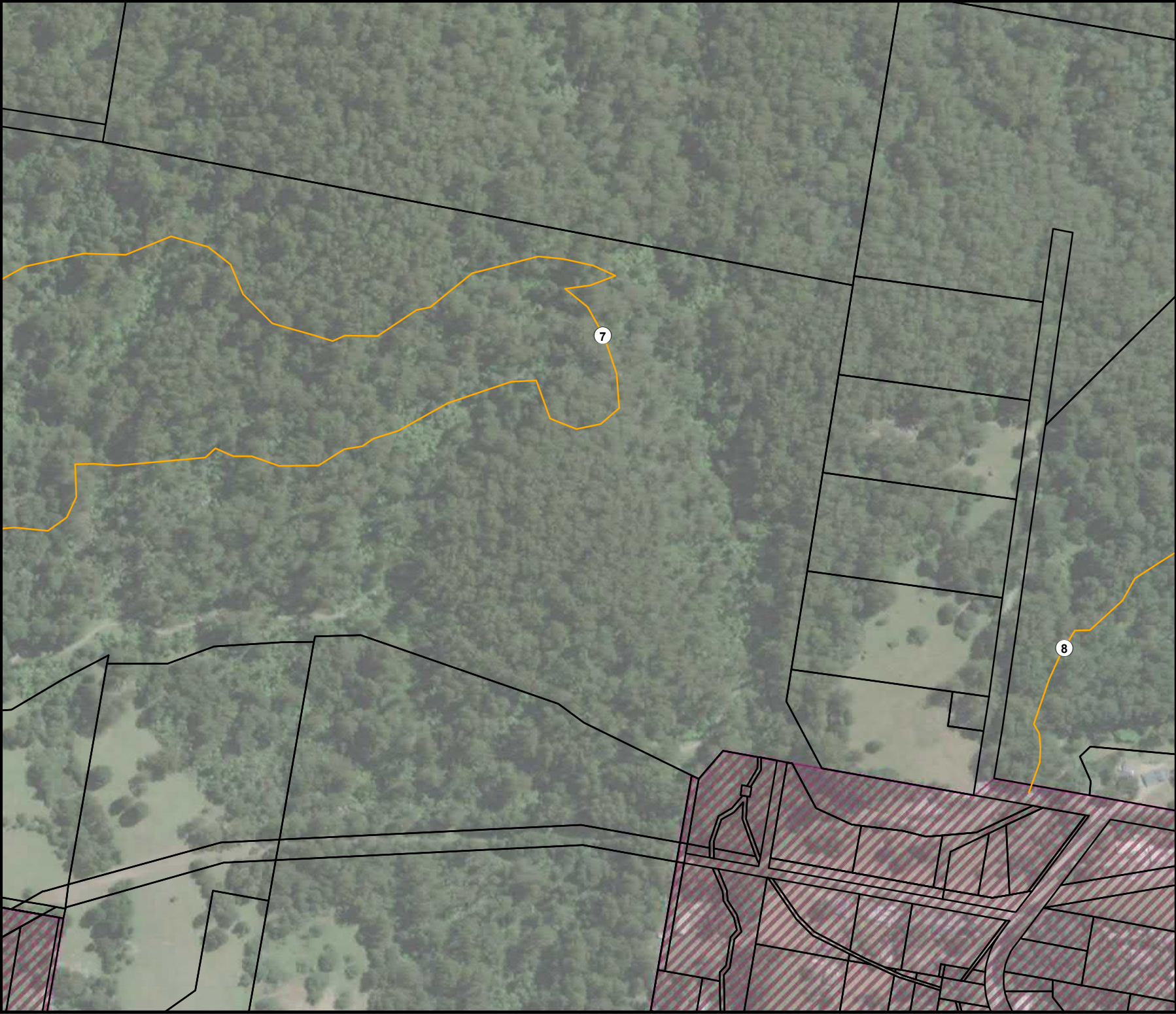
Figure

15

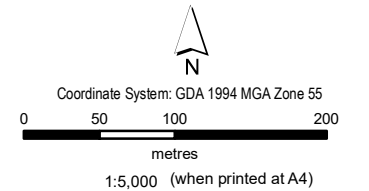
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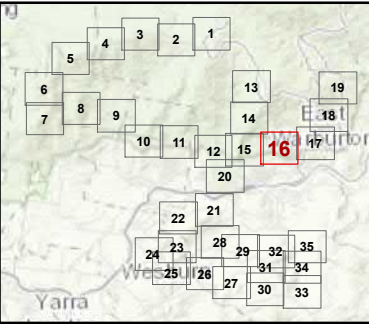
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- LEGEND**
- Proposed MTB Trail
  - Cadastre
  - Planning Zone**
  - Residential Zone Land



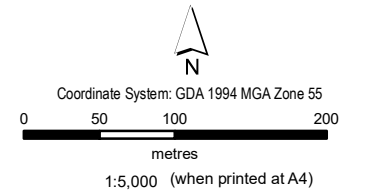
Project Overview	
Client	Figure
Warburton Mountain Bike	16
Warburton, Victoria	



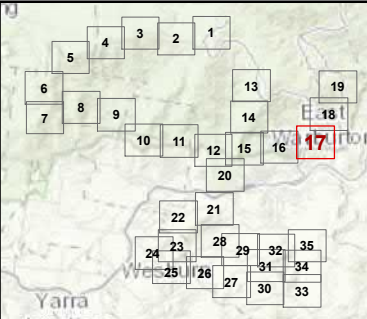
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- LEGEND**
- Proposed MTB Trail
  - Cadastre
  - Planning Zone**
  - Residential Zone Land



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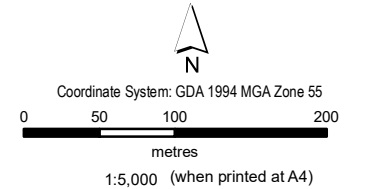
<b>Client</b>	<b>Figure</b>
Warburton Mountain Bike	17
Warburton, Victoria	



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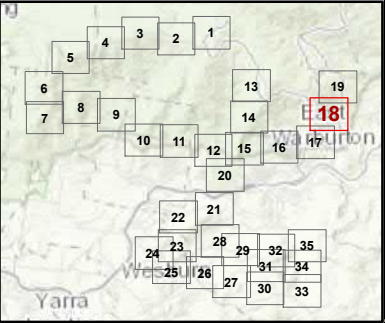
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**LEGEND**

— Proposed MTB Trail

▭ Cadastre



**Project Overview**

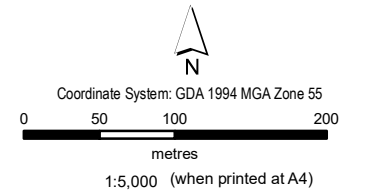
<b>Client</b> <i>Warburton Mountain Bike</i> Warburton, Victoria	<b>Figure</b> <b>18</b>
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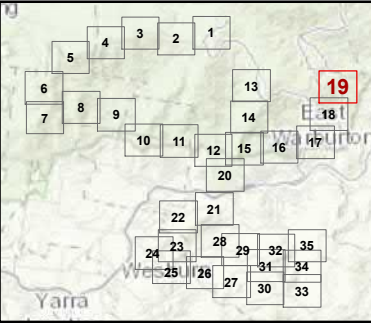
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**LEGEND**

— Proposed MTB Trail

▭ Cadastre

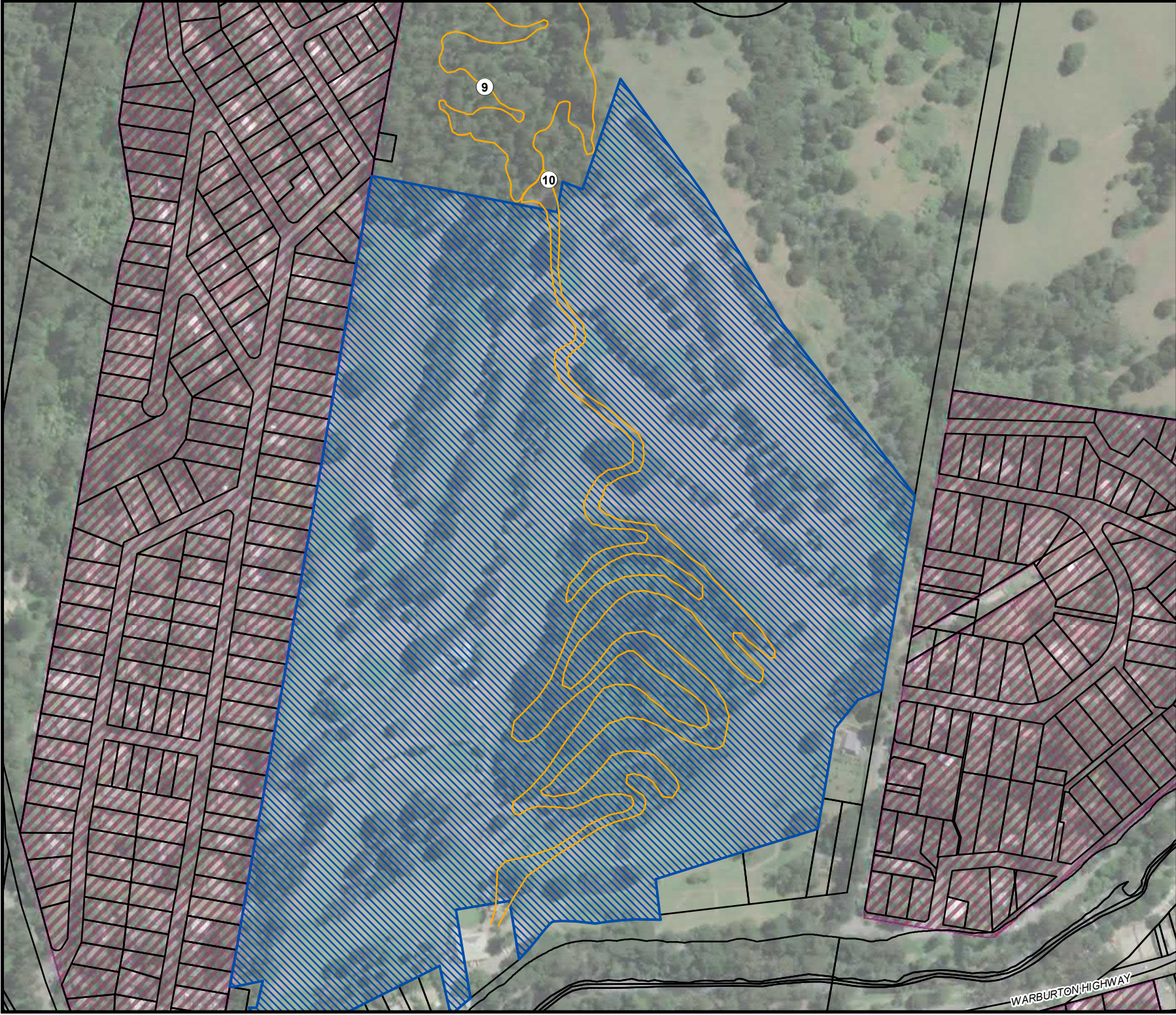


**Project Overview**

<b>Client</b> <i>Warburton Mountain Bike</i> Warburton, Victoria	<b>Figure</b> <b>19</b>
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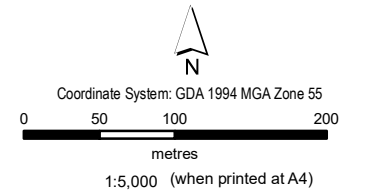


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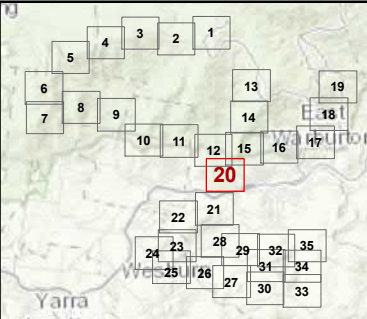


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- LEGEND**
- Proposed MTB Trail
  - Private Property Directly Impacted by the Project
  - Cadastre
  - Planning Zone**
  - Residential Zone Land



Project Overview	
Client	Warburton Mountain Bike
	Warburton, Victoria
	Figure 20




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Coordinate System: GDA 1994 MGA Zone 55


050100200


metres


1:5,000 (when printed at A4)


LEGEND


 Access Track

 Proposed MTB Trail


 Existing MTB Trail

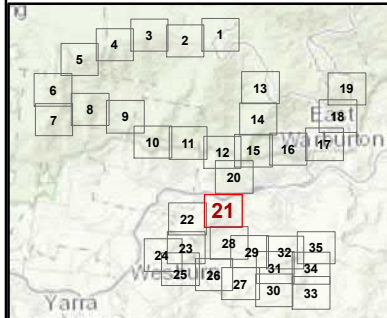
 Existing Walking Trail

 Private Property Directly Impacted by the Project

 Cadastre

Planning Zone

 Residential Zone Land



Project Overview

Client

Warburton Mountain Bike

Warburton, Victoria

Figure

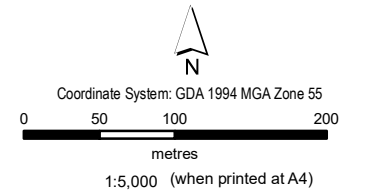
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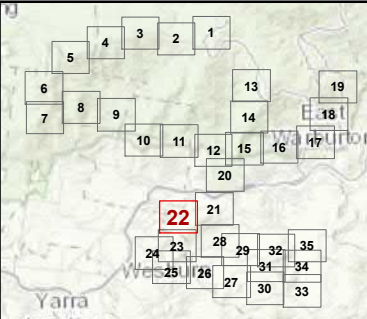
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**LEGEND**  
— Proposed MTB Trail  
▭ Cadastre



**Project Overview**

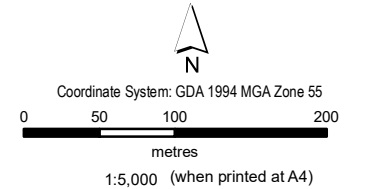
<b>Client</b> Warburton Mountain Bike Warburton, Victoria	<b>Figure</b> <b>22</b>
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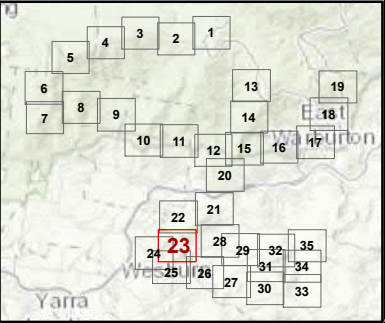
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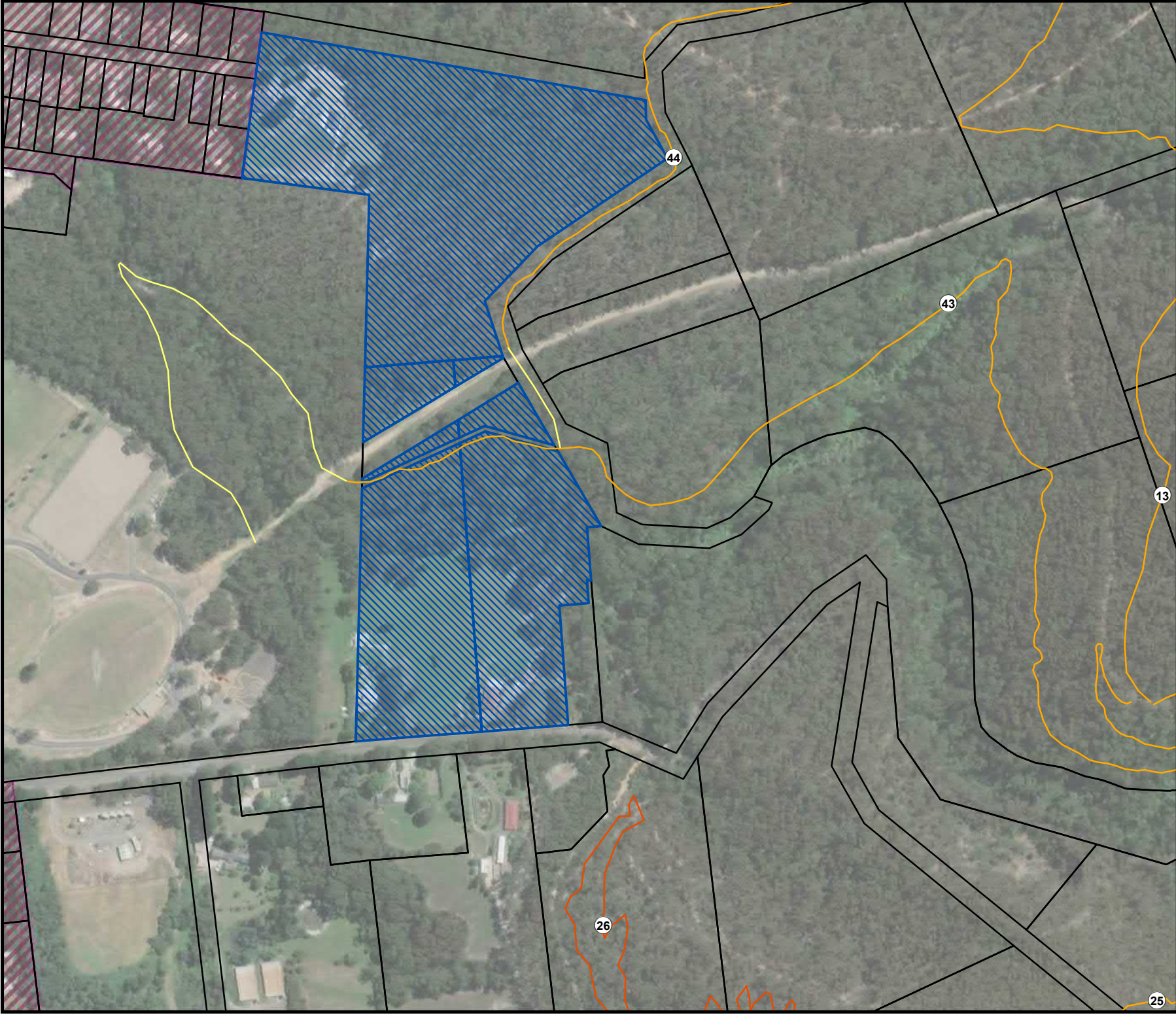
- LEGEND**
- Access Track
  - Proposed MTB Trail
  - Cadastre



Project Overview	
Client	Figure 23
Warburton Mountain Bike	
Warburton, Victoria	




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
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metres


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LEGEND

 Access Track


 Proposed MTB Trail

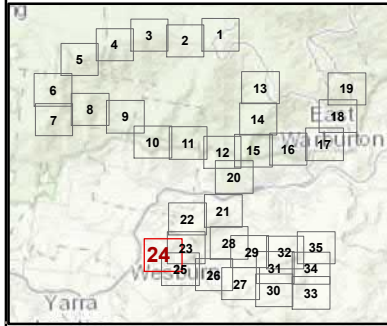
 Existing MTB Trail

 Private Property Directly Impacted by the Project

 Cadastre

Planning Zone

 Residential Zone Land



Project Overview

Client

Warburton Mountain Bike

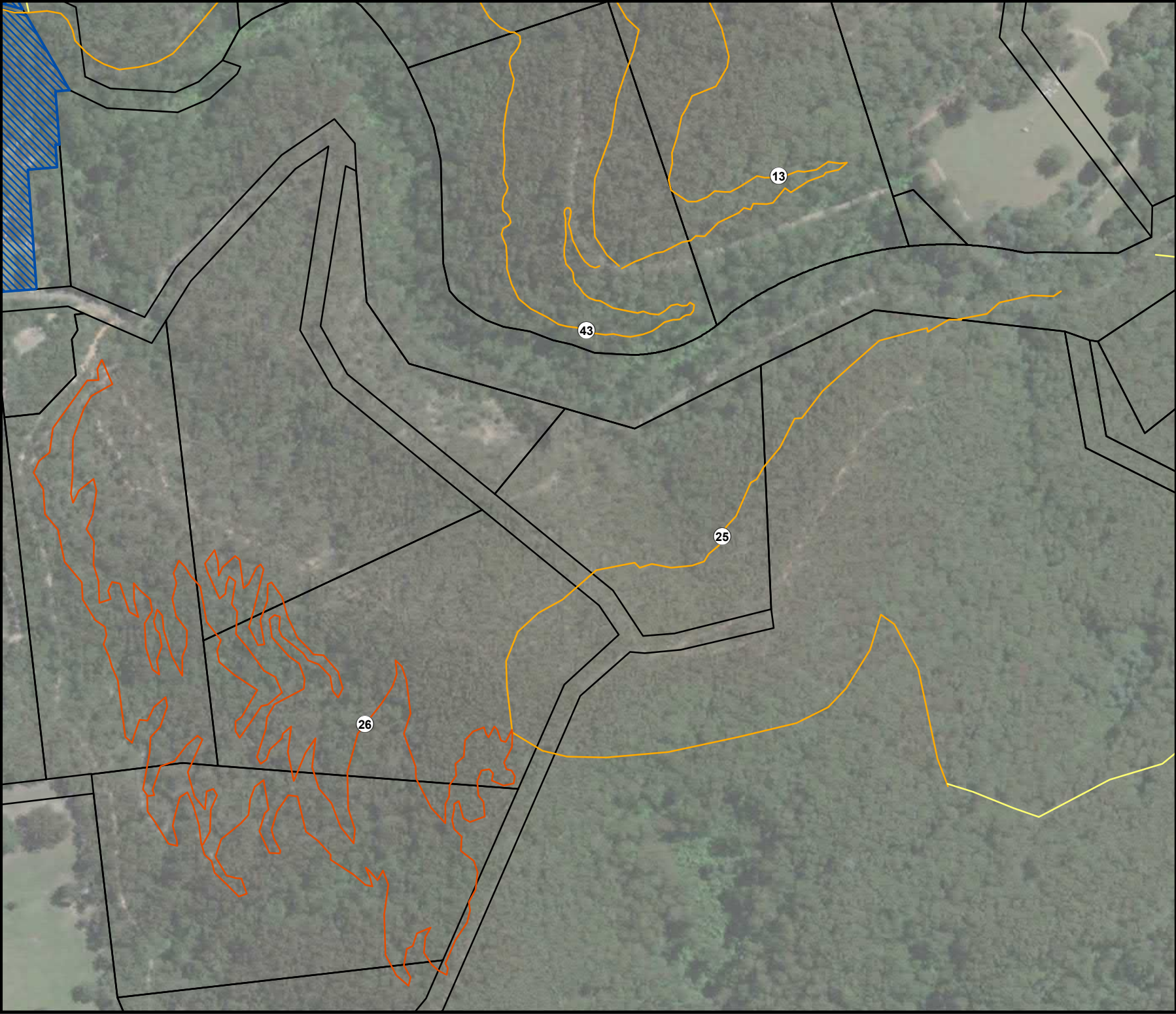
Warburton, Victoria

Figure

24



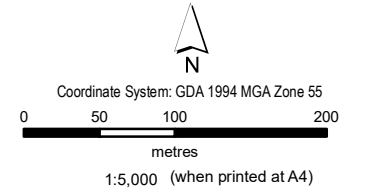
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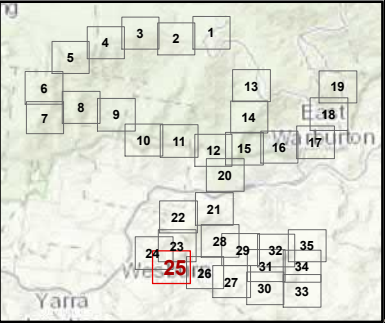
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- LEGEND**
- Access Track
  - Proposed MTB Trail
  - Existing MTB Trail
  - Private Property Directly Impacted by the Project
  - Cadastre



**Project Overview**

**Client**  
Warburton Mountain Bike  
Warburton, Victoria

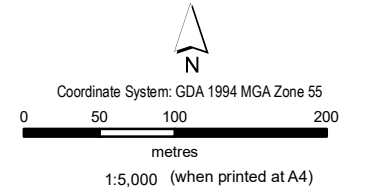
**Figure**  
**25**



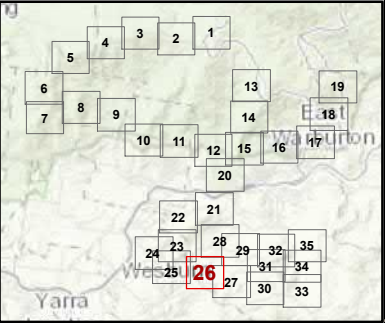
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- LEGEND**
- Access Track
  - Proposed MTB Trail
  - Cadastre



**Project Overview**

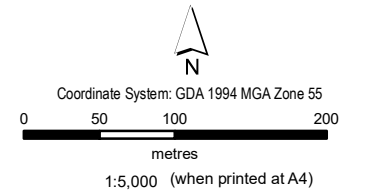
<b>Client</b>	<b>Figure</b>
Warburton Mountain Bike	26
Warburton, Victoria	



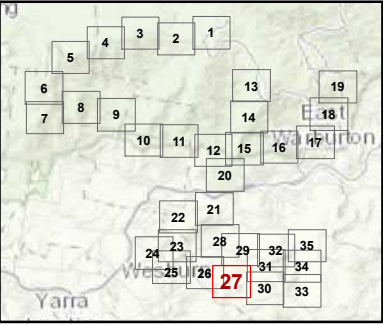
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- LEGEND**
- Access Track
  - Proposed MTB Trail
  - Existing MTB Trail
  - Cadastre



**Project Overview**

<b>Client</b> Warburton Mountain Bike Warburton, Victoria	<b>Figure</b> 27
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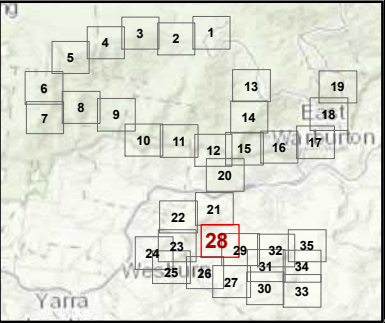
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metres

1:5,000 (when printed at A4)

- LEGEND**
- Access Track
  - Proposed MTB Trail
  - Existing MTB Trail
  - Cadastre



**Project Overview**

<b>Client</b> Warburton Mountain Bike Warburton, Victoria	<b>Figure</b> <b>28</b>
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Coordinate System: GDA 1994 MGA Zone 55


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metres


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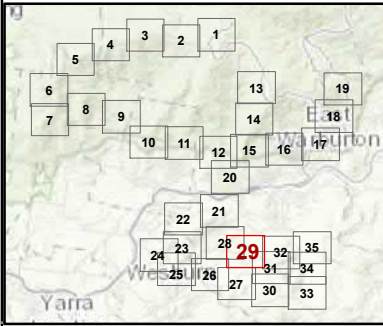
LEGEND

 Access Track

 Proposed MTB Trail

 Existing MTB Trail

 Cadastre



Project Overview

Client

Warburton Mountain Bike

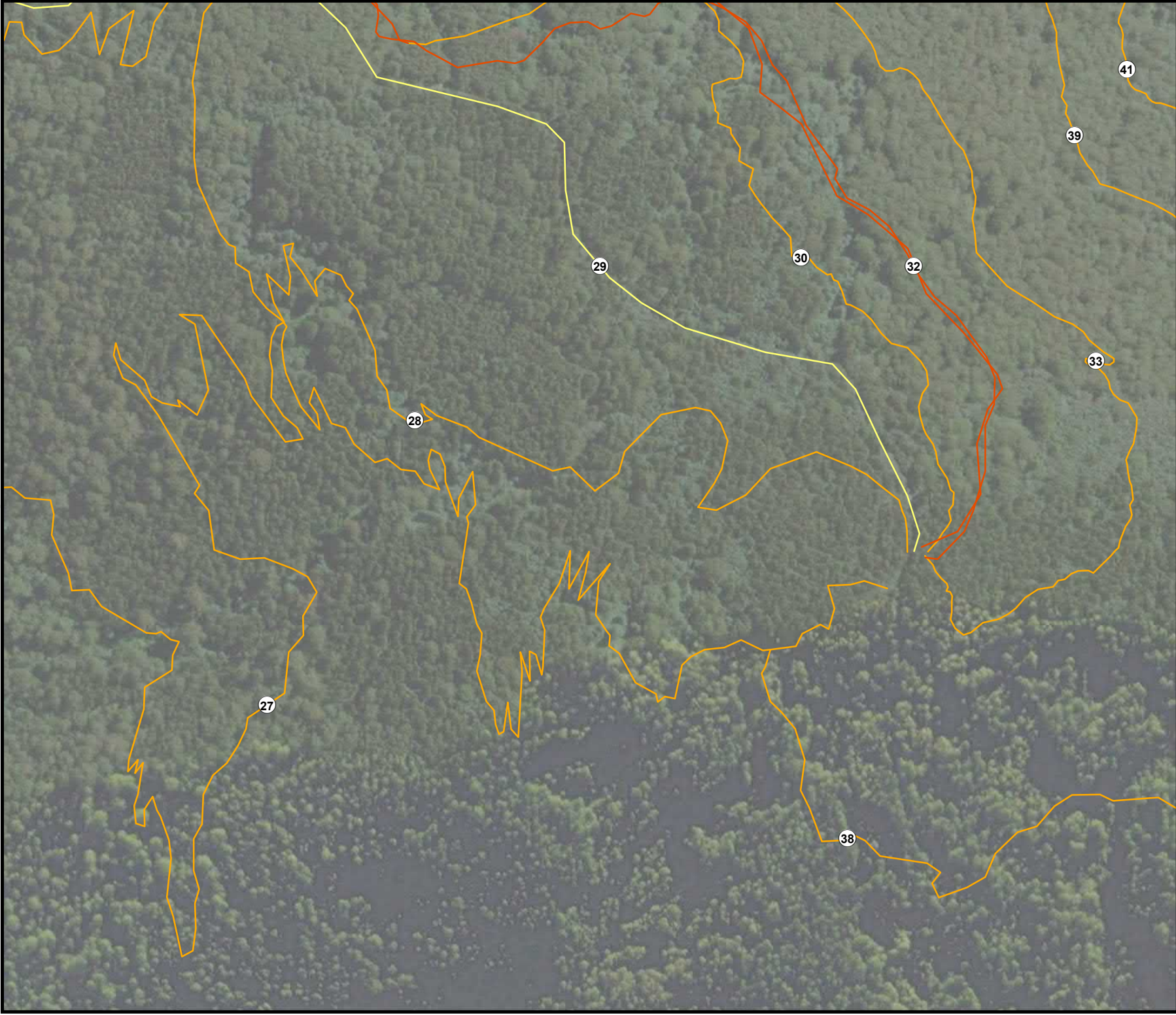
Warburton, Victoria

Figure

29




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Coordinate System: GDA 1994 MGA Zone 55

0

50

100

200

metres

1:5,000 (when printed at A4)

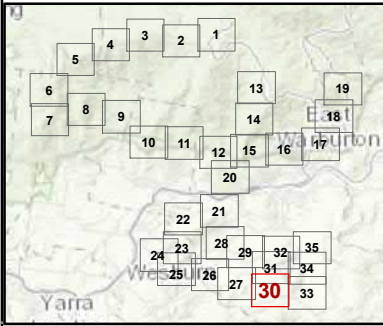
LEGEND

Access Track

Proposed MTB Trail

Existing MTB Trail

Cadastre



Project Overview

Client

Warburton Mountain Bike

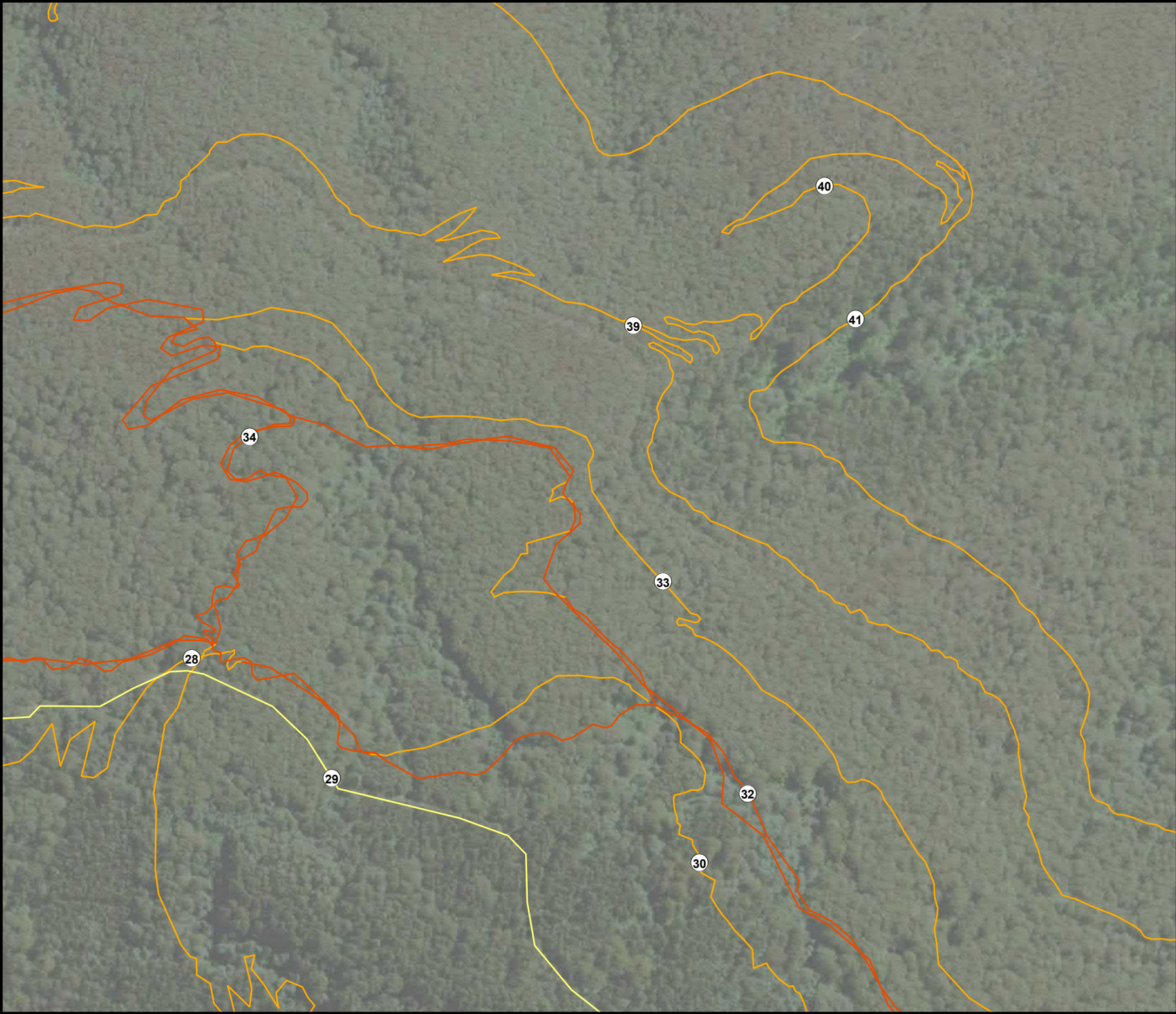
Warburton, Victoria

Figure

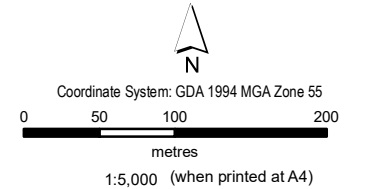
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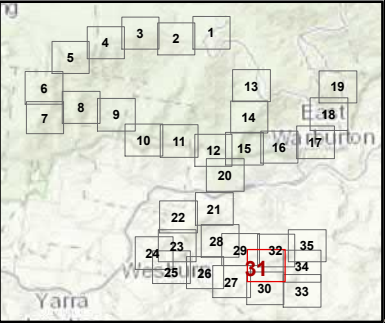
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- LEGEND**
- Access Track
  - Proposed MTB Trail
  - Existing MTB Trail
  - Cadastre



**Project Overview**

<b>Client</b>	<b>Figure</b>
Warburton Mountain Bike	31
Warburton, Victoria	



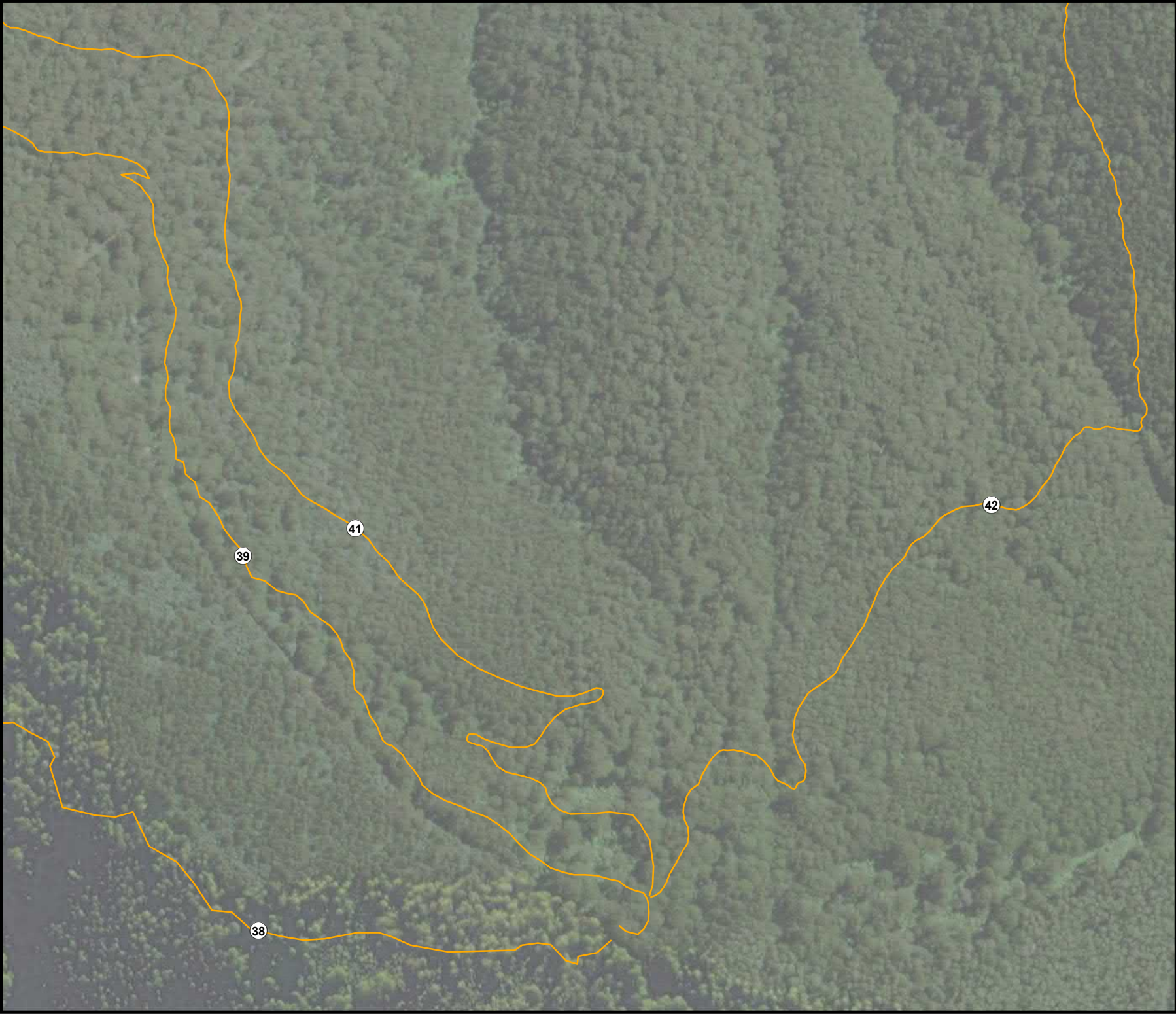
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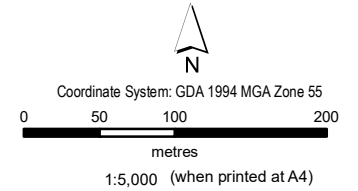
<p>PROJECT ID 60636618</p> <p>CREATED BY brierej</p> <p>LAST MODIFIED brierej 28 OCT 2020</p>		<p><b>AECOM</b></p> <p>www.aecom.com</p>	
<p>N</p> <p>Coordinate System: GDA 1994 MGA Zone 55</p> <p>0 50 100 200</p> <p>metres</p> <p>1:5,000 (when printed at A4)</p>			
<p><b>LEGEND</b></p> <p>— Proposed MTB Trail</p> <p>— Existing MTB Trail</p> <p>□ Cadastre</p>			
<p><b>Project Overview</b></p>			
<p><b>Client</b></p> <p>Warburton Mountain Bike</p> <p>Warburton, Victoria</p>		<p><b>Figure</b></p> <p><b>32</b></p>	



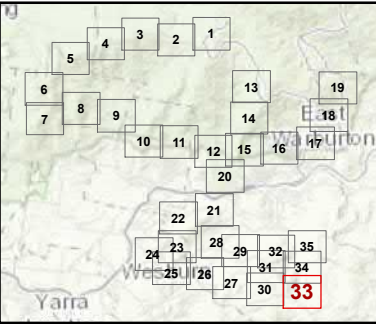
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**LEGEND**  
— Proposed MTB Trail  
□ Cadastre



**Project Overview**

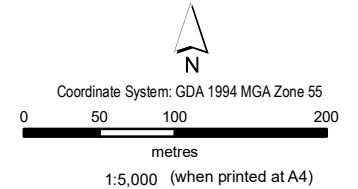
<b>Client</b> Warburton Mountain Bike Warburton, Victoria	<b>Figure</b> 33
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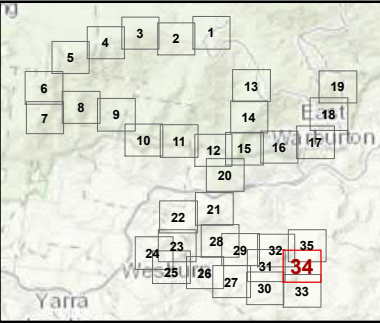
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- LEGEND**
- Proposed MTB Trail
  - Cadastre



**Project Overview**

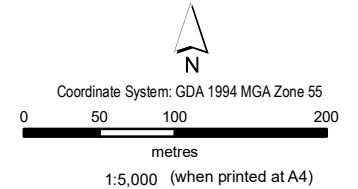
<b>Client</b>	<b>Figure</b>
Warburton Mountain Bike	34
Warburton, Victoria	



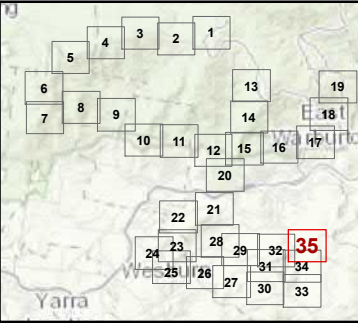
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- LEGEND**
- Proposed MTB Trail
  - Cadastre



**Project Overview**

<b>Client</b>	<b>Figure</b>
Warburton Mountain Bike	35
Warburton, Victoria	