

WARBURTON MOUNTAIN BIKE FEASIBILITY STUDY

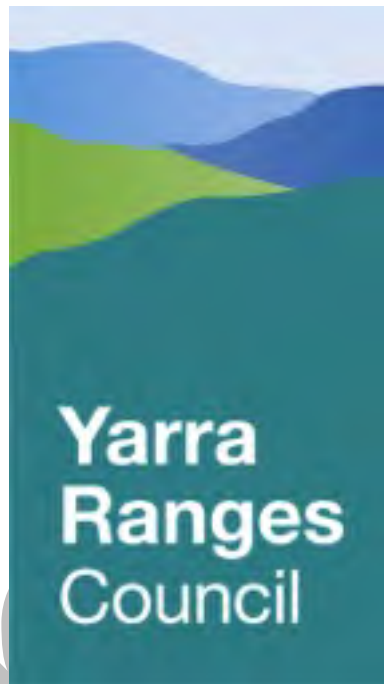
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**PREPARED BY WORLD TRAIL
FOR YARRA RANGES COUNCIL
NOVEMBER 2013**

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EXECUTIVE SUMMARY

Introduction

World Trail was engaged by Yarra Ranges Council in May 2013 to undertake a feasibility study. The main objective of the study is:

‘To investigate the feasibility of developing Warburton as a mountain biking destination in Victoria.’

Underlying this objective is the need to create new economic stimuli and job opportunities in Warburton. The development of a mountain biking trail network is proposed as one method by which this could be achieved. This report investigates the size of the mountain bike tourism market in Australia, looks at some other mountain biking destinations that have set benchmarks for mountain bike tourism, explores the suitability of Warburton for mountain biking, defines what a mountain biking trail network at Warburton might look like and cost to construct and provides some projections on potential visitation and economic benefits.

Situation Analysis

Currently, Yarra Valley and Dandenong Ranges achieves tourism visitation of 3.4 million domestic day visitors annually. This visitation focuses on food and wine and other themes. Nature-based and adventure tourism is not strongly represented in the area.

The proposal to construct a world-class mountain biking trail network in Warburton offers the opportunity to draw new visitor demographics to Warburton that are currently not visiting the area, as well as increasing the length of stay for existing visitors by offering a new activity. Anecdotal evidence suggests that themes such as gourmet food and wine connect well with mountain bikers, providing good opportunities for cross-promotion and capitalizing on the region’s strengths.

The report looks at a number of known, popular mountain bike tourism ‘benchmarks’ from which two key messages emerge:

- Mountain bike trails are a viable tourism attraction and can provide a significant economic stimulus to the local economy;
- The economic stimulus of mountain bike trails is significantly boosted by mountain biking events.

Of the mountain biking ‘benchmarks’ discussed, most of them fit the classic description of a ‘mountain biking destination’. In fact, in considering these various destinations, they can be categorised into two different groups – mountain biking *destinations* and mountain biking *facilities*.

With the construction of a high quality, extensive mountain biking trail network, Warburton has the potential to fill both niches. Warburton has the tourism infrastructure, the self-contained village atmosphere, enough separation from Melbourne and the terrain, scenery and topography to become a world-class mountain biking destination. Yet, it is close



enough to Melbourne's heavily populated eastern suburbs that mountain bikers can use it for their weekly social and recreational rides.

Sixteen different Government policies or strategies are identified in the report, including examples from local and State Government, which provide support for the development of Warburton as a mountain biking destination. These policies or strategies acknowledge that mountain biking is a valid use of public land, that it provides many benefits to society and, most importantly in this project, that it can provide a real economic stimulus when properly managed and planned for.

The development of mountain biking trails at Warburton aligns with YRC policies for improving community wellbeing, fostering nature based recreation tourism and developing the local economy whilst improving the environmental sustainability of the region. The project also links to key recreation plans including Council's Recreation and Open Space Strategy for encouraging healthy and active lifestyles and resilient communities.

Demand and Market Analysis

In looking at the feasibility of Warburton as mountain biking destination, two questions must be asked:

- What is the target market for mountain bike tourism?
- Is there a demand for a new mountain biking destination in Victoria?

This section of the report explores these issues in detail. It discusses mountain biking participation in Australia, noting the difficulties in estimating the number of mountain bikers in Australia. While it is difficult to estimate the size of the market, many destinations around Australia, including Victoria, are successfully attracting large numbers of mountain bikers for recreational riding and competitive events.

In order for a mountain biking destination to be successful, it is critical that visiting mountain bikers are contributing to the local economy. This requires that there are suitable spending opportunities for mountain bikers and that they have the willingness/ability to spend money. Anecdotally, mountain bikers are thought to be well educated and with relatively high levels of disposable income. The report presents the results of a survey conducted as part of the study, which shows that mountain bikers:

- Are estimated to spend, on average, \$4,167 annually on their sport;
- Would be likely to visit bars, cafes or restaurants in conjunction with a ride;
- Would be prepared to pay for the use of a commercial shuttle service;
- Are likely to go on 1-4 mountain biking holidays per year, generally of 1-2 nights duration and with 2-5 companions, spending, on average, \$1,200 on a typical mountain biking holiday;
- Have an average combined household income of approximately \$117,150;
- Would be likely to stay in local accommodation when visiting the proposed trail network;
- Are prepared to travel greater than 4 hours to go mountain biking on a weekend.



As to how far these riders will travel to pursue their sport, this report identifies the following catchment areas:

1. A large proportion of mountain bikers residing in the eastern suburbs of Melbourne should be capable of reaching Warburton within 60 minutes driving, making it a feasible option for the regular weekday/after-work ride scenario;
2. All of metropolitan Melbourne, plus many large regional cities such as Geelong, Bendigo, Ballarat, Shepparton and even parts of Gippsland fall within 2 hours drive from Warburton, making it a viable option for the weekend ride scenario for mountain bikers residing within this area;
3. Virtually all of Victoria and parts of southern NSW fall within 5 hours drive from Warburton, making it a viable option for the mountain biking holiday scenario for mountain bikers residing within this area.

The demand for mountain biking trails is a function of the size of the target market, the frequency with which the target market participates in the sport and the number of mountain biking trails/networks/destinations/facilities available within close proximity to the target market.

There are a number of pieces of information that point to an increasing and unmet demand for mountain biking trails at Warburton. There is a demonstrated lack of facilities available within the surrounding region, increasing pressure on the few formal facilities available locally and an ongoing problem with the construction of 'informal' trails. Conversely, there is a growing trend away from organised sports towards non-organised sports like mountain biking and continual growth in the usage of established mountain biking destinations like Mt Buller and Forrest.

Site Analysis

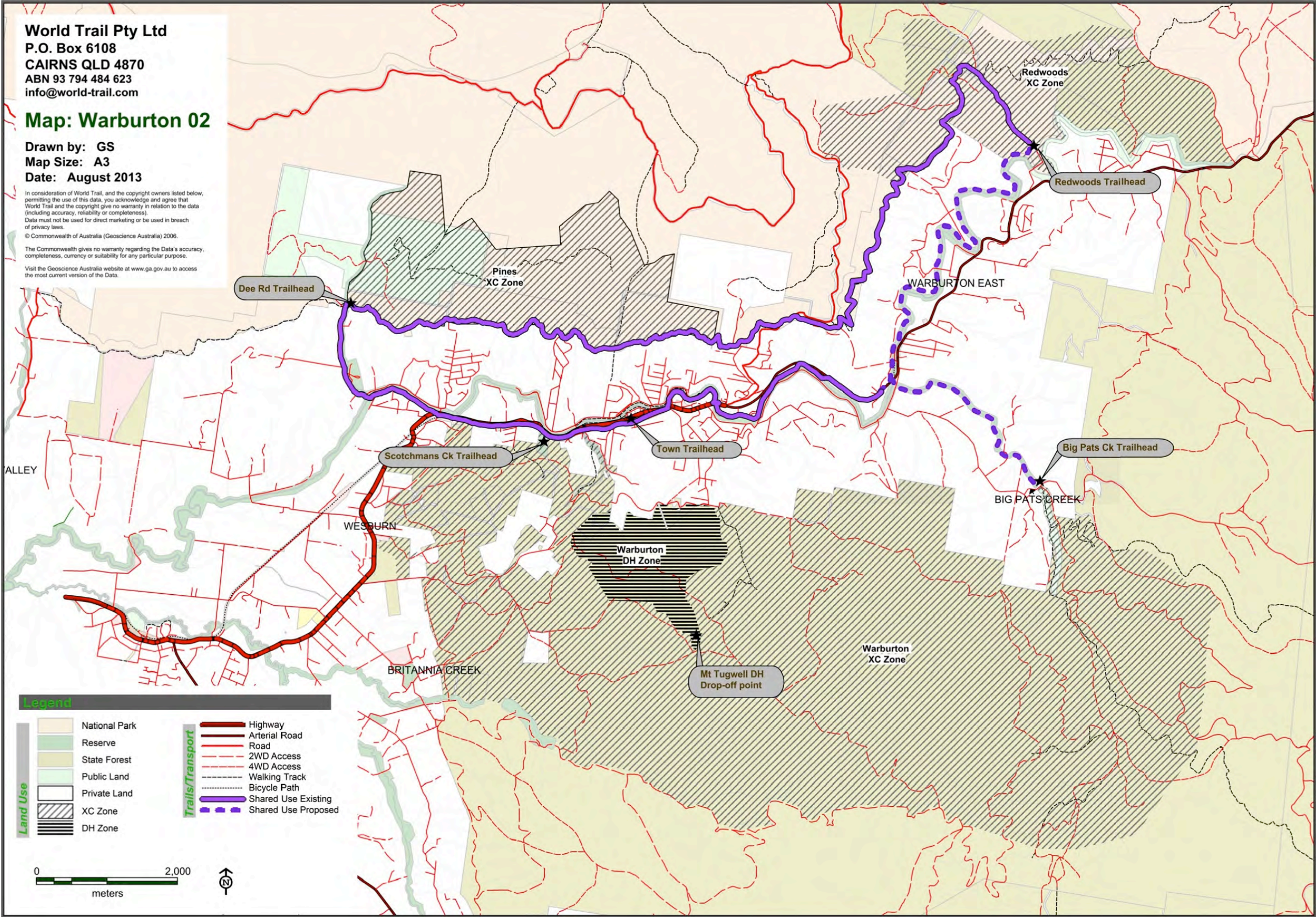
This section of the report defines the attributes required for a successful trail network and then presents some broad conceptual ideas for the development of a trail network at Warburton.

This report identifies and describes four separate 'zones' for the development of 62km – 97.5km of new mountain bike trails, creating total network of 106km - 146km of mountain bike trails. This includes a significant amount of dedicated, purpose designed and built mountain biking singletrack and a 'shared-use' walking and cycling track that will connect Warburton, East Warburton and Millgrove and provide access to the four zones via the existing Lilydale to Warburton Rail Trail and O'Shannassy Aqueduct. The map on the next page shows these four separate zones and the shared use circuit. The trails within the four zones will accommodate a range of different disciplines of mountain biking, including cross-country, all mountain/freeride, downhill and dirt jump/pump track riding.

The target percentage of singletrack for each zone has been determined by taking into account the proposed target users, the extent of existing trails within the zone that could conceivably be incorporated into the final proposed trail network and the likelihood that the zone will be used for cross-country racing (which dictates the need for a percentage of wider trails for overtaking and feeding purposes).



Overview of proposed mountain bike trail zones and shared use circuit



Issues and Opportunities

This chapter of the report firstly looks at the economic impacts of the proposed future development of mountain biking trails at Warburton. Secondly, it explores the environmental values of the study area, and the likely environmental impacts if the trail network is to be developed. Thirdly, it takes a broad look at other issues and opportunities presented by the proposed development of mountain bike trails.

Key findings include:

- In the first full year of completion, it is estimated that the trail network at Warburton could attract 130,000 mountain bike visitors (120,000 day visitors and 10,000 overnight visitors).
- Official tourism visitation figures show that domestic day visitors spend approximately \$77 per trip, and domestic overnight visitors spend \$130 per night. Applying these spending rates to the projected visitation figures, equates to a total direct economic benefit of \$12.59 million per annum.
- The indirect economic benefit is estimated at \$11.08 million per annum.
- The total economic benefit is therefore estimated at \$23.67 million per annum.
- The project will support up to 175 jobs (FTE's) in Warburton.
- The study area covers a variety of ecological communities and provides habitat for many species of flora and fauna. Constructing a mountain bike trail network needs to be done in an environmentally sensitive manner. Even though native vegetation will be impacted by the project, a number of measures to mitigate the environmental impacts can be implemented – most importantly, focussing trail construction in areas of lesser conservation significance. A well designed, constructed, managed and maintained mountain bike trail should help protect significant native vegetation. The full report discusses a number of measures to mitigate these environmental impacts.

Development and Cost Plan

The process moving forward towards development and completion of a successful trail network in Warburton includes the following steps:

- Planning phase:
 - Development of Trails Master Plan (including ground-truthing and ensuring trails are located in areas of lower environmental values);
 - Obtaining permits and approvals;
 - Development of branding, marketing and signage plan;
 - Development of trailhead designs;
 - Construction tender process;
- Construction phase.

In total, the planning phase may take up to 12 months and the construction phase up to 24 months, although there are many variables and decisions that could affect these timelines. While each trail can theoretically be opened as it is completed (staged plan of delivery), it will take approximately three years to develop the entire trail network, if fully funded.

The planning costs are estimated at between \$230,000 - \$260,000.

Construction costs are estimated at between \$2.9 – \$4.2 million.



Once operational, it is estimated that the ongoing cost to properly maintain and manage the trail network is between \$200,000 – \$270,000 annually. These ongoing costs will need to be borne by the three agencies involved with the project – YRC, PV or DEPI – in some kind of agreed partnership. The question of how much of the ongoing operational costs should be borne by each agency will need to be discussed and resolved by these three agencies.

A number of methods to recover some of these ongoing operational costs are identified and discussed in the full report, but the feasibility of these methods, and the extent to which they will contribute to cost recovery, will require further investigation.

As the completed trail network is expected to have an overall economic impact of \$23.67 million annually, the annual operational costs should not be considered a significant impediment to the project.

It is recommended that YRC take overall responsibility for communication and promotion, the operational program, generating funding and fostering partnerships with PV and DEPI, the Yarra Ranges Mountain Bikers and other interest groups.



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ABBREVIATIONS

Yarra Ranges Council	YRC
Project Steering Group	PSG
Parks Victoria	PV
Department of Environment and Primary Industries	DEPI
Sport and Recreation Victoria	SRV
Yarra Ranges Mountain Bikers	YRMTB
International Mountain Bicycling Association	IMBA
Mountain Bike Australia	MTBA
Cycling Australia	CA
Union Cycliste Internationale	UCI
Trail Difficulty Rating System	TDRS
Visitor Information Centre	VIC
Cross-country	XC
Downhill	DH
Four Cross	4X



INTRODUCTION



In April 2013, Yarra Ranges Council (YRC) released a tender seeking the services of a consultant to undertake a feasibility study investigating the possibility of making Warburton a regional mountain biking destination in Victoria.

World Trail was awarded the contract in May 2013 and commenced working on the project in late May 2013.

The main objective of the project is:

'To investigate the feasibility of developing Warburton as a mountain biking destination in Victoria.'

Underlying this objective is the need to create new economic stimuli and job opportunities in Warburton. The development of a mountain biking trail network is proposed as one method by which this could be achieved. This report will investigate the size of the mountain bike tourism market in Australia, look at some other mountain biking destinations that have set benchmarks, explore the suitability of Warburton for mountain biking, define what a mountain biking trail network at Warburton might look like and cost to construct and provide some projections on potential visitation and economic benefits.

The Warburton Mountain Bike Feasibility Study is led by YRC's Recreation Services department. A Project Steering Group (PSG) has been convened, with the following representatives:

- Yarra Ranges Council – Councillor representative;
- Yarra Ranges Council – Recreation Services;
- Yarra Ranges Council – Economic Development;
- Yarra Ranges Council – Parks and Bushland;
- Parks Victoria (PV);
- Department of Environment and Primary Industries (DEPI);
- Sport and Recreation Victoria (SRV);
- Yarra Ranges Mountain Bikers (YRMTB);
- Warburton community interest representatives.

Other affected stakeholders include:

- Local traders;
- Accommodation providers;
- Cycling groups;
- Businesses;
- Peak sporting bodies;
- Adjacent municipalities;
- Lake Mountain Alpine Resort;
- IMBA (International Mountain Biking Association);
- Warburton Advancement League;
- Upper Yarra River Reserves Committee;
- Friends of the Lilydale-Warburton Rail Trail;
- WYLD;
- Melbourne Water;



- CFA;
- SES;
- Sporting Shooters Association;
- Vic Forests;
- My Environment – Warburton;
- Yarra Valley and Dandenong Regional Marketing – Tourism Sector;
- Warburton Chamber of Commerce – Local Traders;
- Visitor Information Centre;
- Community Enterprise Bendigo Bank;
- Crocket Group – Regarding the Edgewater Development;
- Yarra Ranges Council Facilities Management – Regarding Caravan Development;
- Local Bike Shops in Yarra Ranges.

This report is comprised of five chapters, each relating to a specific area of the proposed development of mountain biking trails at Warburton. These five chapters are:

- Chapter 1 – Situation Analysis;
- Chapter 2 – Demand and Market Analysis;
- Chapter 3 – Site Analysis;
- Chapter 4 – Issues and Opportunities;
- Chapter 5 – Development and Cost Plan.

An appendix is provided at the end of this report and includes information that is considered as important supporting information.



CHAPTER 1 SITUATION ANALYSIS



1.1 MOUNTAIN BIKING

1.1.1 WHAT IS MOUNTAIN BIKING?

Mountain biking can be defined as *‘the sport of riding bicycles off-road, often over rough terrain, using specially designed mountain bikes’¹*. Although bicycles had been ridden off-road all over the world for many years, competitive mountain biking is widely acknowledged to have originated in Marin County, California, USA, in the 1970’s.

Since it began, mountain biking has grown enormously, simultaneously evolving into a number of different disciplines and moving from being a fringe, extreme sport to a mainstream activity. The 1996 Olympic Games in Atlanta, USA, was the first time that mountain biking was included in the Games, a major milestone in the sport gaining mainstream recognition.

The main disciplines of mountain biking are:

- Cross-country;
- Downhill;
- All mountain / endure;
- Dirt jump/pump track riding;
- Trials.

Cross-country mountain biking is the most popular discipline of mountain biking by far, and represents the broadest number of participants. See Appendix 1 for a detailed description of each of these disciplines.

Mountain biking provides many benefits to society, including:

- Mountain biking has a relatively low environmental impact – on properly designed and constructed singletrack, the impact of mountain bikes on the surface of trails is very small (about the same as walking). The majority of the impacts are caused by the removal of native vegetation during the construction of the trails, which also displaces native fauna habitat. This can be minimised through careful design and locating trails in areas that have low conservation values. Furthermore, the maintenance of mountain bike trails doesn’t consume many resources compared to many other sporting facilities;
- Mountain biking promotes health and fitness – cycling is an excellent, low impact form of cardiovascular exercise;
- Mountain biking promotes an appreciation for the outdoors and the natural environment. By exposing people to natural environments for recreational purposes, they become advocates for protection of those environments;
- Mountain biking is inclusive of all age groups. While some aspects of the sport have a strong appeal to youth, the main age group engaging in mountain biking is 20-40 year olds. Unlike many other sports, mountain biking can also be undertaken together by families. Cycling generally can be undertaken into old age and mountain biking in particular, (on easier and less demanding trails) may appeal to many older riders who are not comfortable riding on roads due to traffic;

¹ Wikipedia 2013.



- Mountain biking can be undertaken at all times of the day and in almost any season. Australia's climate is relatively mild and most mountain bikers are happy to ride year round. Night riding is also growing in popularity, facilitated by improvements in lighting technology. Many social groups will undertake a weekly after-work ride at say 6 or 7pm. In summer daylight savings time lights are not required, but outside of daylight savings it is necessary to use lights;
- Mountain biking appeals to an increasing number of people that are not attracted to traditional, structured or team sports. Possible motivators include:
 - The opportunity for solitude and the ability to undertake mountain biking solo;
 - The unstructured nature of mountain biking – there are no fees or charges to go riding, no set times, no requirement for umpires or referees or a certain number of participants;
 - The opportunity to spend time in the natural environment;
 - Low physical impact – mountain biking, and cycling generally, has a reasonably low impact on the body and allows riders to set their own pace and level of exertion;
- Mountain biking is an accessible sport for people of all income levels – While it is possible to spend large amounts of money on mountain bikes and equipment, the only real requirements for mountain biking are possessing a bike and a helmet. Modern mountain bikes provide excellent value for money and represent a relatively low barrier to entry to someone looking to get into the sport;
- Mountain biking can be a tourism attraction – in some instances, mountain bike tourism has been instrumental in revitalising the economies of rural areas in Europe and North America. In some of the earliest examples of mountain biking tourism destinations, the trails were built by locals for themselves to ride, but over time word of mouth began to attract more and more mountain bikers. Now mountain biking is a known tourism segment, and destinations are investing significant amounts of money into trails and associated infrastructure to attract mountain bikers. This is a key driver for this project and will be discussed in further detail later in this report.



1.1.2 EXISTING MOUNTAIN BIKING TRAILS IN THE YARRA RANGES

The Yarra Ranges has a strong reputation amongst the Victorian cycling community. It's hills and mountains offer a myriad of cycling opportunities for all types of cyclists.

Table 1 below lists some of the known mountain biking trails/networks in and around the Yarra Ranges. This is not an exhaustive list. There are many more trails used for mountain biking, formal and informal, in and around the Yarra Ranges, but these appear to be the most well known. Note that most of these have formal status – that is, they have been formally approved by the land manager. Map 1 on the next page shows the locations of these trails/networks.

Table 1. Details of mountain biking trails in and around the Yarra Ranges

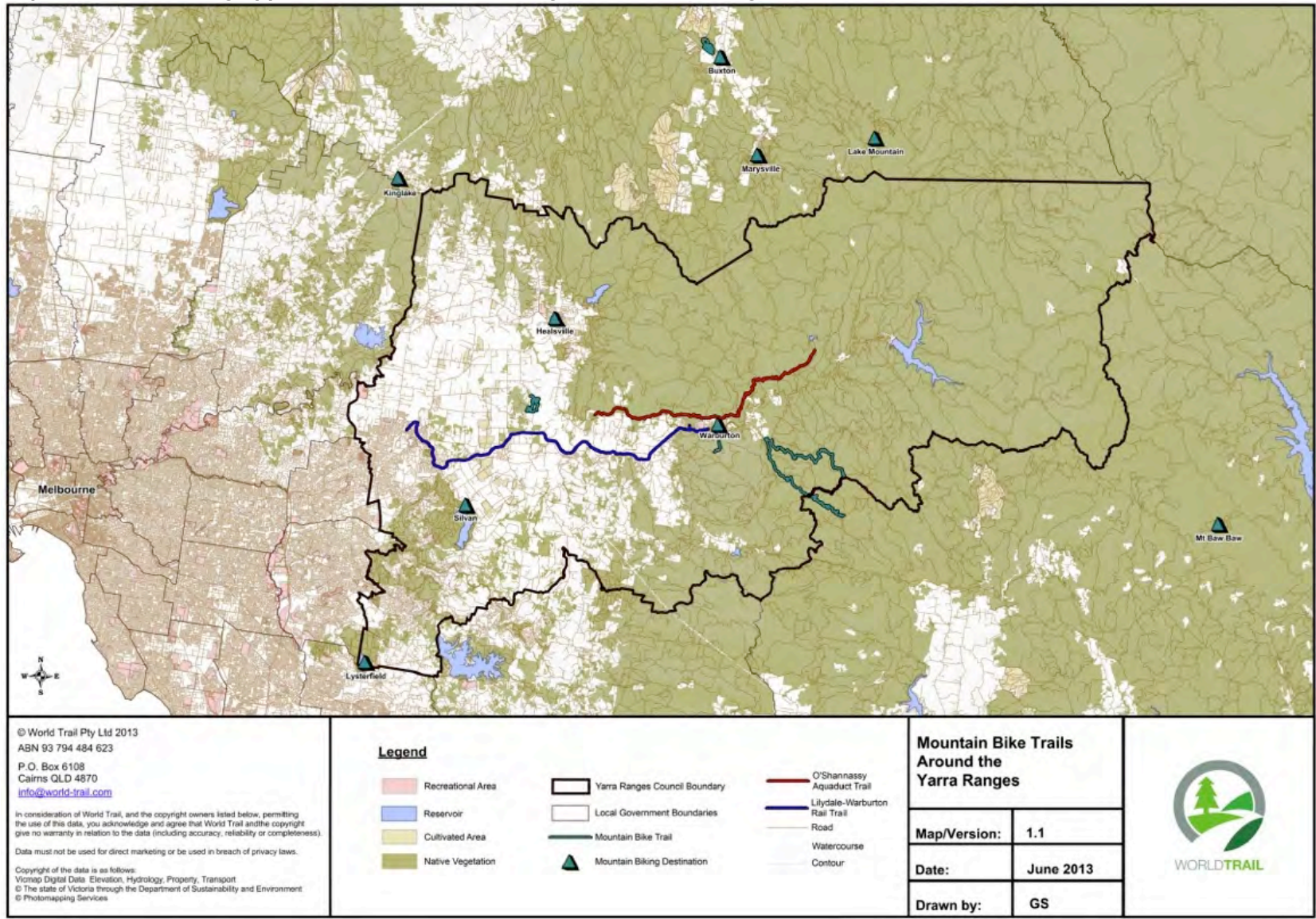
Location	Trail Types	Trail Difficulty	Approximate distance	Status	Data Source
Buxton	Cross-country	Intermediate	12-15km	Formal	World Trail GPS data
Healesville	Range of cross-country and downhill	Varied	<10km	Informal	Strava ²
Kinglake	Down hill	Difficult	1.7km	Formal	Strava
Lake Mountain	Cross-country	Intermediate	10-15km	Formal	Lake Mountain MTB trail map
Lilydale-Warburton Rail Trail	Shared use	Easy	42km	Formal	YRMTB GPS data
Lysterfield	Cross-country	Easy to Intermediate	>20km	Formal	Internet
Marysville	Shared use	Easy	6km	Formal	Marysville Trail Map
Mt Baw Baw	Cross-country and downhill	Easy to Difficult	10km+	Formal	Mt Baw Baw MTB trail map
O'Shannassy Aqueduct Trail	Shared use	Easy	32km	Formal	YRMTB GPS data / Government GIS website
Silvan	Range of cross-country and downhill	Intermediate to difficult	Unknown	Informal	Strava
Warramate	Cross country	Intermediate to difficult	12km	Formal	World Trail GPS data
Warburton	Cross-country	Unknown	40km	Informal	YRMTB GPS data
	Downhill	Unknown	1.75km	Informal	Strava

Although they do not represent the typical, ideal mountain biking trail (i.e. singletrack), the Lilydale-Warburton Rail Trail and the O'Shannassy Aqueduct are included here, as they do fit into the classification of mountain biking trails as Very Easy or Easy trails and are suitable for beginners and families.

² Strava is a social media website and mobile application that is used to track athletic activity using GPS.



Map 1. Mountain biking opportunities in the Yarra Ranges and surrounding areas



1.2 MOUNTAIN BIKING AND TOURISM

1.2.1 TOURISM IN THE YARRA VALLEY AND WarBURTON TODAY

Warburton sits at the upper end of the Yarra Valley. Indeed, the Yarra River for which the valley is named has its headwaters just east of Warburton and flows through Warburton and onwards towards Melbourne.

Warburton has a well-established tourism industry, and is geographically situated in, and nearby to, areas that receive significant levels of tourism visitation. It is located within the region defined as the Yarra Valley and Dandenong Ranges³. Official tourism visitation statistics⁴ for the Yarra Valley and Dandenong Ranges include:

- 3.4 million domestic day visitors annually;
- 685,000 domestic overnight visitors, with an average length of stay of 2.4 nights;
- 26,800 international overnight visitors.

According to the *Regional Tourism Action Plan 2009-2012* (Tourism Victoria, 2009) consumers identify food and wine, wildlife, boutique accommodation, parks and gardens, indulgence and romance as the main themes for the Yarra Valley and Dandenong Ranges, which are also the most common themes used in the marketing of this region.

Significant tourism attractions near Warburton include:

- The Healesville Sanctuary;
- RACV Healesville Country Club and golf course (80+ room facility);
- Yarra Glen and Healesville racecourses;
- A significant number of wineries, associated restaurants and wine tours (there are more than 80 wineries in the region);
- Local restaurants, cafes and hotels;
- A range of farmers markets and farm-gate food providers;
- Art galleries and related experiences, including Tarrawarra Gallery;
- Health and day spas;
- The nearby Yarra Ranges National Park and Yarra State Forest.

In addition, a future spa and accommodation resort called Edgewater is proposed to be constructed on the old Sanitarium building site in Warburton.

Warburton has a busy events calendar, with a wide range of events for a range of different interests. These include:

- Warburton Up and Running – Annual fun run which typically attracts 500-1000 people;
- Oxfam Melbourne Trailwalk – Annual walking event to raise money for Oxfam. Runs over 48 hours and uses the Warburton Golf Course as a major staging point before ending at Wesburn;
- ECOSS Festival – Annual sustainability festival;

³ Tourism Victoria divides Victoria into different regions that reflect the geographic location and the product strengths of each region.

⁴ *Travel to the Yarra Valley and Dandenong Ranges – Year Ended March 2013*, Yarra Ranges Regional Marketing Ltd (www.yrrml.com.au)



- Warburton Film Festival – Annual three day film festival, now in approximately its 20th year;
- Harmony Festival – Bi-annual peace/ harmony/music festival;
- Nordic Festival – Bi-annual Nordic themed festival;
- Christmas – Annual Christmas celebration featuring, Santa, bands and music, community choirs, monster raffle draw. Hundreds attend, mostly locals;
- Annual Easter Fundraiser at Warburton Caravan Park – Busiest weekend of the year at the caravan park with live music, Easter Bunny, etc;
- Springfest – Annual single day event at Warburton Primary School with rides, stalls, entertainment, attracts over 1000+ attendees;
- Many more smaller events, fairs and markets.

Visitation is concentrated around weekends and events. Visitation strengths are family-friendly day trippers, picnics by the river, hikers and walkers, cyclists (mountain bikers, road cyclists and rail trail riders), motorcyclists (both road and trail bike riders), campers, fishermen and snow play visitors (winter only). The Visitor Information Centre reports about 60% of visitors from Melbourne, 20-30% of visitors from interstate and the remaining balance of visitors from overseas.⁵

While the official tourism visitation figures indicate that tourism visitation to the Warburton region is already quite high, anecdotally, it appears that much of the visitation is to the lower parts of Yarra Valley, rather than Warburton itself, and is likely driven by the themes of food and wine and indulgence.

The proposal to construct a dedicated, purpose built mountain biking trail network at Warburton will offer a new tourism attraction, complementing the other significant tourism attractions, operators and events in the region. The trails will likely appeal to the visitors that are already visiting the Yarra Valley, providing a reason for them to extend their stay longer. As such, the proposed mountain biking trails have the opportunity to leverage this existing visitation and to add significant value to the local and regional tourism offering.

More importantly, the trails may also attract a new demographic that is not currently visiting the Yarra Valley in significant numbers – dedicated, core mountain bikers. Mountain bike tourism, as will be discussed in the following section, is a growing tourism segment that has proven to be capable of drawing new tourism spending to rural and regional areas that possess the right attributes and good trails.

The opportunity of this project to the local and regional economy is significant. As visitors to Warburton generally attend a number of other tourist attractions in the Yarra Valley and Dandenong Ranges as part of a day trip or a weekend, there are also significant opportunities to partner with the major wineries, restaurants, accommodation and tourist operators in the area to offer special packages and cross-promotion deals.

⁵ Event and visitation information provided by Paul Jackson, manager of www.warburtoninfo.com, the official website for information for Warburton.



1.2.2 MOUNTAIN BIKING DESTINATION BENCHMARKS

The proposal to build a network of mountain biking trails at Warburton to attract increased tourism visitation did not come out of nowhere. All over the world, mountain biking tourism is gaining momentum, with many destinations using mountain biking as a driver to attract new tourism visitation.

In preparation for this Feasibility Study, several members of YRMTB undertook some preliminary research work to 'benchmark' some known mountain biking destinations within Victoria and South Australia.

These destinations included:

- Forrest, southwest Victoria;
- Castlemaine, central Victoria;
- Woodend, central Victoria;
- Bright, central Victoria;
- Melrose, South Australia.

At each destination members of YRMTB met with and interviewed local business operators to try to ascertain the importance of cycle tourism to their business. The nature of the information collected is qualitative, but provides a valuable insight into the economic contributions mountain biking makes in these regional towns.

The following pages provide a brief discussion about each of the destinations visited by YRMTB during the benchmarking exercise. Additional research and information has been supplied by World Trail to bolster the findings of YRMTB. In particular, World Trail has provided additional information about Mt Buller and Mt Stirling Alpine Resort, Bright, the You Yangs and Rotorua in New Zealand. While there are many well-documented mountain bike tourism success stories from the USA, Canada, Scotland, Wales and parts of Europe, this report has chosen to focus on more local destinations, on the basis that they provide a more realistic picture of the potential mountain biking tourism market that Warburton could tap into.

The full YRMTB benchmarking report is provided in Appendix 2. Interviews and research was conducted by John Baldwin, John Wright and Andrew and Lisa Swann.



1.2.2.1 Forrest, Victoria

Forrest is approximately two hours drive from Melbourne. It has approximately 60km of dedicated, formalized singletrack, all signposted and maintained formally by DEPI. It is well known to the mountain biking community and a popular destination for recreational riding and events. The trails at Forrest were constructed over a three-four year period leading up to 2007/2008. The funding was provided by the Victorian State Government, under a program called the New Future for the Otways, which looked at providing economic stimuli to many former timber harvesting areas in the Otway hinterland through tourism initiatives. The Forrest mountain bike trails were one such tourism initiative. It is estimated that the initial investment in the trails and the associated infrastructure (trailheads, signage, toilets, picnic tables etc.) was around \$600,000⁶ (excluding any ongoing maintenance costs). Colac Otway Shire estimates around 22,000 mountain bikers visit the trails annually.

YRMTB members interviewed the operators of the Corner Store (bike shop and café), the Forrest Guest House (guesthouse) and the Forrest Brewing Company (boutique brewery).

Key findings included:

- 50% of The Corner Store's annual trade occurs over the summer months;
- 20-25% of business at The Forrest Guest House is "biking customers";
- 40-50% of the Forrest Brewing Company's business is "bike related". The operators estimate that, on average, each mountain bike rider spends \$200 per weekend;
- 110 beds are available for visitors in Forrest;
- Three major mountain bike events per year - Otway Odyssey, Forrest Festival and Forrest 6 Hour;
- The Corner Store and the Forrest Brewing Company are new businesses that were established specifically to cater to mountain bikers. The Forrest Brewing Company has recently purchased the old timber mill (no longer operational) and has plans to develop the site in the near future.

Additional World Trail research reveals that there are fourteen 'mountain bike friendly' accommodation options listed on the official 'Ride Forrest' website (www.rideforrest.com.au). These range from cabins at the local caravan park, bed and breakfast type options at the Forrest Guesthouse through to large group accommodation in the self-contained refurbished church. Like the Forrest Brewing Company and the Corner Store, many of these are newly available for renting, catering specifically to the mountain biking market and are particularly relevant, as they are a direct response to the construction of, and ongoing investment in, the mountain biking trails. These new businesses, whether accommodation, retail or hospitality show the success of the trails as an economic stimulus to the town.

Another way to measure the impact of the trails is to look at businesses whose operation spans the construction of the trails. Two such businesses are the Forrest Guesthouse and the Forrest Caravan Park. Although YRMTB interviewed the current owners of the guesthouse, these owners have only been in possession of the guesthouse for less than

⁶ Personal communication with the former project manager employed by DEPI.



six months. World Trail contacted one of the previous owners, Pete Owen, to try to understand the impact that the construction of the trails had on the business. He reported that the trails had “wholeheartedly and undoubtedly” increased their visitation and that the construction of the trails and resulting increases in visitation “saved our business”.

The operator of the Forrest Caravan Park also reported a similar story. When they took over the park nine years ago, it was very quiet. Since the trail network was completed around five or six years ago, their occupancy rates have increased substantially, with each year continuing to grow. She reported that the visitation is greatest in summer, but that they have mountain bikers visiting right throughout the year.

Forrest also hosts one of the biggest mountain biking races in Australia – the Otway Odyssey. This race began in 2008, after the trail network was largely completed. It is organised by Rapid Ascent, a private event management company that specialises in mountain biking and other adventure-based events. Table 2 below shows the event participation over the six years it has been run. Few other mountain bike events achieve such consistently large numbers. When considering that most competitors bring companions and stay overnight, the annual economic impact of the event is impressive.

Table 2. Otway Odyssey Event Participation (figures courtesy of Rapid Ascent)

Year	15km Race Entrants	50km Race Entrants	100km Race Entrants	Total Entrants	% Change (from previous year)
2008	100	250	1000	1350	-
2009	125	500	1000	1625	+20.3%
2010	153	547	1011	1711	+5.3%
2011	189	574	1014	1777	+3.8%
2012	159	808	809	1776	0.0%
2013	142	853	815	1810	+1.0%

Rapid Ascent’s official race report for the 2012 event estimates that:

- Each competitor spent on average \$391 over the race weekend;
- Pre-event visitation (competitors and spectators) = 6,961;
- Event day visitation (competitors and spectators) = 6,446;
- Spending:
 - Accommodation \$156;
 - Petrol \$72;
 - Meals \$99;
 - Sponsor products in expo \$24;
 - Food at expo \$19;
 - Tourist Activity \$21;
- Total Direct Economic Impact to Region as a result of the race: \$3,864,090.

Figure 1 and Figure 2 on the next page show two of Forrest’s most well known trails.



Figure 1. Rock armoured section on Red Carpet



Figure 2. Berm section on Marriner's Run



1.2.2.2 Castlemaine, Victoria

Castlemaine has long been popular with the mountain biking community, with plenty of flowing and technical singletrack throughout the surrounding forests. Unfortunately, little of the available trails are formalised, so signage and trail maps are lacking and maintenance is ad hoc, done by local volunteers on a sporadic basis. Castlemaine lies on the route of the Goldfields Trail, a 200km (approximately) long walking and cycling trail through Victoria's goldfields regions. The Goldfields Trail includes sections of singletrack for mountain bikers, some of it near Castlemaine. There are also some formalised downhill trails at Mt Tarrengower, about 20km from Castlemaine.

YRMTB members interviewed the owners/operators of Cycle Concepts (bike shop), Big 4 Castlemaine Gardens (caravan park) and Castlemaine Central Cabin and Van Park (caravan park).

Key findings included:

- During mountain biking events, occupancy rates at local accommodation increase dramatically. The owner/operator of Castlemaine Central Cabin & Van Park stated that 80-90% of their accommodation is booked up by mountain bikers during events. She noted that these visitors also patronize local restaurants and cafés, contributing to the local economy in many ways;
- Castlemaine has recognised the benefits of all tourism-based income and sees cycling as an important part of this.

Figure 3, Figure 4 and Figure 5 following show typical mountain biking around Castlemaine.

Figure 3. Trail riding at Castlemaine



Figure 4. Typical native forest around Castlemaine



Figure 5. Mountain biking at nearby Mt. Tarrengower



1.2.2.3 Woodend, Victoria

Woodend is a small regional town about 70km from Melbourne. Like Castlemaine, it lies on the Melbourne to Bendigo rail line, easily accessible by train from Melbourne. Over the past ten years, local mountain biking enthusiasts have constructed singletracks throughout the nearby Wombat State Forest. In recent years the land manager, DEPI, has actually embraced some of these trails, despite their informal beginnings. The most popular trail, generally referred to simply as 'the Fingerpost Loop' (due to the main trailhead on Fingerpost Rd) is about 18-20km. It has been formally endorsed by DEPI. In total, it is estimated that there is about 50km of singletrack in the area, both formal and informal.

YRMTB members interviewed the owners/operators of Woodend Cycles (bike shop), the Holgate Brewery (bar, brewery and restaurant), the Village Larder (café) and the Victoria Hotel (bar and restaurant).

Key findings included:

- The owner/operator from Woodend Cycles estimates around 300 mountain bike riders per week travel from Melbourne to ride the trails in the Wombat State Forest;
- Two major mountain biking events, the Wombat 100 and the Wombat 24hr are held on Wombat State Forest trails. These two events are extremely popular;
- The owner/operator of the Holgate Brewery has at least one group of regular mountain bikers that frequent on a weekly basis and believes that cycling is a noticeable activity around the town;
- The owner/operator of the Village Larder estimates that, during bike events, 10-15% of his revenue comes from cyclists. He sees a small amount of regular bike-related business on any given week and notes that cyclists are good patrons;
- The owner/operator of the Victoria Hotel estimates that, during bike events, 20-30% of his revenue comes from cyclists;
- The owner/operator of Bourkie's Bakehouse estimates that 20% of midweek business is from cyclists and approximately 70% of her weekend business is from cyclists.

The Wombat State Forest hosts the annual Wombat 100 mountain bike race, a 100km cross-country endurance race. World Trail contacted Maximum Adventure, the event organisers, to discuss the event. They reported that they have run the event now for the past five years. Participation started at about 700 riders and soon increased to about 1000, where it seems to have steadied. They report an excellent working relationship with the local club, the owners of the conference and event venue which is used as the staging area (it lies adjacent to the Wombat State Forest) and the land manager DEPI.

DEPI's local officers reported that a number of trails, including the 'Fingerpost Rd Loop' have been formally endorsed and approved by the Department. Although some limited funding was received for the Fingerpost Rd Loop (based on recommendations contained in a previous audit report prepared by World Trail), there is generally no funding or budget allocation for DEPI to undertake any works on the trails. Instead, DEPI has handed over the responsibility for the day-to-day maintenance of the trails to the local club (Wombat Mountain Bike Club), with any more serious maintenance or improvements (bridge construction, chainsawing, machine work) provided on an as-needs basis by DEPI. This



arrangement seems to be working well. DEPI also provide some very minor funding support for materials and tools for the club where possible.

Figure 6 below shows the typical character of the Woodend trails.

Figure 6. The 'Fingerpost Loop', Wombat Forest, Woodend



1.2.2.4 Bright, Victoria

The township of Bright in northeast Victoria is well known to cyclist of all kinds. It has long been synonymous with road cycling – the Tour of Bright is a long running and prestigious road cycling race, renowned for its high mountains and stunning alpine scenery. The Murray to Mountains Rail Trail, arguably the most popular rail trail in Australia, finishes at Bright and provides a huge contribution to the local economy. In addition, although less well known, the town is serviced by many kilometres of excellent mountain biking singletrack, much of it informal currently. A short drive from Bright are Beechworth and Mt Beauty and Falls Creek, all of which have (or are developing) formalized mountain biking trails.

YRMTB interviewed the owners/operators of CyclePath (bike shop). Key findings included:

- There are over 200km of trails (singletrack and fire roads) accessible from Bright;
- Being an established tourism destination, the town copes well with events and is geared towards sharp spikes in visitation caused by events. The inconvenience caused by events to locals is accepted as tourism is important to the local economy.

World Trail also obtained a report looking into the economic impact of cycle tourism in northeast Victoria, commissioned by the Alpine Shire Council in 2011. This report reviewed a number of different reports and data sources across Australia and internationally to try to quantify the importance of cycle tourism to northeast Victoria (defined as Alpine Shire, Indigo Shire and the Rural City of Wangaratta). More specifically, the authors of the report, SGS Economics and Planning, developed and calibrated a model, which can be applied in any municipality or region of Victoria to estimate the total contribution of cycle tourism in that jurisdiction. They then applied that model to northeast Victoria.

Some key statistics that are relevant to this project are shown in Table 3 below.

Table 3. Length of stay and spend by cycle tourists in northeast Victoria

Input	Estimated Value for North East Victoria
a) The annual number of days spent by visitors whose primary trip purpose is recreational cycling.	59,900
b) The daily value of expenditure by visitors whose primary trip purpose is recreational cycling.	\$250
c) The annual number of days spent by visitors whose primary trip purpose is attending a cycling event.	8,000
d) The daily value of expenditure by visitors whose primary trip purpose is attending a cycling event.	\$167
TOTAL VISITOR SPEND = (a*b)+(c*d)	\$16,311,000



Finally, this report found that:

'The initial stimulus introduced into the NE Victorian regional economy collectively adds to \$17.4 M p.a. These stimuli are experienced primarily in the tourism industry with only small proportions in the professional and business services and construction industries.'

When flow-on effects are incorporated, this stimulus translates to a combined regional economic contribution of:

- *Regional output/ income \$24.4 M p.a.*
- *Regional value added \$12.1 M p.a.*
- *157 full time equivalent jobs.'*

Figure 7 below shows a mountain biking trail located in pine plantation near Bright.

Figure 7. Typical mountain bike trail at Bright



1.2.2.5 Mt Buller And Mt Stirling Alpine Resort, Victoria

The Mt Buller and Mt Stirling Alpine Resort Management Board embarked on a program to construct mountain bike trails in 2006 with the preparation of a concept plan. Their goal was to attract increased visitation to the resort in the non-winter period. Construction of trails began in the summer of 2007/2008 and has continued every year since then. In total, the resort has invested over \$1.3 million on trail development since 2007/2008.

World Trail has obtained two valuable metrics that can be used to measure visitation and success of the trails at Mt Buller – trail counter data and participation in the signature mountain biking event, Bike Buller.

A trail counter was installed in the summer of 2009/2010 on the trail called Gang Gangs, one of the most popular trails in the resort, and one of the closest to the village. While other counters have been installed on other trails as they have been completed, the trail counter on Gang Gangs provides the best picture of visitation as it has been in place longest. Note that the numbers provided are for the period from January 1st to April 30th. While this corresponds to the busiest period of usage, it does not obviously pick up all the possible usage throughout the non-winter season (i.e. November to June). It should be remembered that these figures do not account for any usage of the downhill trails, which are not currently being monitored for usage, but are very popular with downhill mountain bikers.

Bike Buller is an event run by Rapid Ascent at Mt Buller. It has been held every summer since 2008/2009. Table 4 below shows the trail counter data for Gang Gangs and the participation in Bike Buller.

Table 4. Mt Buller visitation and event participation

Stage	Summer	Length of New Trail Constructed	Trail Count ⁷	% Change (from previous year)	Bike Buller Participation	% Change (from previous year)
1	2007/2008	9.6km	-	-	-	-
2	2008/2009	2.9km	-	-	252	-
3	2009/2010	9.0km	2,497	-	428	+70%
4	2010/2011	3.5km	4,386	+ 76%	455	+6%
5	2011/2012	2.3km	7,736	+ 68%	663	+46%
6	2012/2013	3.0km	7,890	+ 7% ⁸	691	+4%
	TOTAL⁹	30.3km				

⁷ Data collected on Gang Gangs trail, from 1st January to 30th April each year.

⁸ Bushfires forced the closure of Mt Stirling for 3-4 week period in February 2013. This is believed to have caused a resulting drop in visitation.

⁹ 30.3km of singletrack has been constructed over the six years of construction, but the actual rideable trail network, which includes some pre-existing fire roads, is much longer, probably closer to 50-60km in total.



There are a number of businesses that are now operating successfully over the summer period to service the mountain biking market at Mt Buller. These include a number of accommodation providers that have marketed themselves directly towards the mountain bike market, a bike shop providing retail, bike hire and servicing/repairs, a number of tour operators offering a range of tour options including 'skills clinics', a shuttle bus service from the base of Mt Buller back up to the village and a number of cafes/restaurants.

With a very small local population of riders, the trail counter data is very significant, as it is almost entirely comprised of non-local riders – i.e. mountain bike tourists! At approximately three hours drive from Melbourne, this data indicates that mountain bikers are willing to travel if the quality of the trails on offer is good enough. Anecdotally, World Trail is aware of many large groups of interstate mountain bikers that visit Mt Buller every summer for up to a week at a time.

Figure 8 below and Figure 9 and Figure 10 on the next page give an indication of the terrain and scenery at Mt Buller.

Figure 8. Medusa climb, Mt Buller



Figure 9. Clancy's Run, Mt Buller



Figure 10. River crossing on Delatite Trail



1.2.2.6 You Yangs Regional Park, Victoria

The You Yangs Regional Park is approximately 60km southwest of Melbourne and 25km north of Geelong. It is the preferred mountain biking location for many Melbourne based mountain bikers, particularly those that live in the growth corridors to the west and southwest of Melbourne.

The park offers over 40km of purpose built singletrack, with trails for cross-country and downhill, covering the range of difficulty ratings from Easy to Extreme.

Parks Victoria have installed trail counters on many of the trails throughout the park to record usage. According to Park Victoria personnel at the park, in 2002, the first year that the You Yangs Regional Park opened its gates to mountain bikers, the park had about 83,000 visitors, about 5,000 of who were estimated to be mountain bikers. In 2012, the park had about 280,000 visitors, about 125,000 of whom are estimated to be mountain bikers. In fact, one trail, Cressy Descent, records about 3,500 mountain bikers per month¹⁰.

World Trail believes that the You Yangs Regional Park, along with Lysterfield Lake Park (located in the southeastern suburbs of Melbourne), are probably the two busiest mountain biking destinations in Australia. Lysterfield also records usage via track counters and they estimate mountain biking visitation to be around 150,000 mountain bikers annually.

Despite their undoubted popularity, the You Yangs and Lysterfield represent a very different scenario to the other destinations that have been included in this benchmarking exercise. While both are very popular for mountain biking, they are not really thought of as 'mountain biking tourism destinations' in their own right. World Trail believes that this is due to a number of factors:

1. Neither park is close to any established 'tourism nodes'. The parks are surrounded by farmland or residential streets. Riders generally drive to the park, park their car within the park and leave directly from the park afterwards;
2. Given their proximity to Melbourne, both parks are viable options for weekly rides. As such, they occupy a different 'mindset' for many riders, more akin to the local football oval than a mountain biking destination where a rider would spend an entire weekend. Indeed, World Trail believes that a large percentage of the high trail counts achieved at both parks is attributable to regular, weekly group rides. Both parks are commonly used for after-work or night-time group rides, some organised by mountain biking clubs, some by local bike shops and some just social groups;
3. The overall size of the trail network at both parks is reasonably small. This means that riders can cover most of the trails in one ride. It also lends itself well to the more casual, weekly drop-in ride.

Figure 11 on the next page shows a new section of climbing trail at the You Yangs.

¹⁰ These figures are based on statistics collected by trail counters deployed throughout the trail network. Each 'count' on a trail counter represents a single pass by a single rider. It does not necessarily represent actual unique visitors, as many visitors may be riding the same trail multiple times during the same visit.



Figure 11. New section of trail in the Stockyards section, You Yangs



1.2.2.7 Melrose, South Australia

Melrose is a small town in the Southern Flinders Ranges of South Australia, located about 265km north of Adelaide. It has made a name for itself as a unique mountain biking destination in recent years, developing a wide ranging network of trails, some even encompassing private property. There are approximately 80km of trails in the area: 30 km in Melrose and 50 km in nearby Bartagunyah. The Mawson Trail, a 900 km mountain bike and walking trail from Adelaide to Blinman in the north, also passes through Melrose, attracting another category of cyclists to the town.

The main cycling event held in Melrose is the Melrose Fat Tyre Festival, which is billed as a low-key celebration of mountain biking culture. It attracts over 250 people per year, during which the limited accommodation is booked out and the local food outlets struggle to meet the demand. While these event visitation spikes can be difficult for the local businesses to service, overall, mountain biking is seen as hugely beneficial to the town.

YRMTB members interviewed the owners/operators of Bluey's Blundstones (café and accommodation), Over the Edge Sports (bike shop and café) and Melrose General Store (service station, general store and café).

Key findings included:

- The owner/operator of Bluey Blundstone's estimates that overall, 50% of business is related to biking customers. During mountain biking events, business is "huge" – they double their opening hours to cater to the demand. She also believes that bike riders bring lots of money into the town and are great for business;
- Over the Edge describe themselves as a high-end, boutique bike shop that aims to be a 'destination' bike store. Bike hire and bike repairs and servicing form a large proportion of their business. While they did not provide any figures, they claim to sell "lots of bikes" and that during events, "business goes crazy";
- The owner/operator of Melrose General Store says that it is hard to estimate a figure, but that bike riders make a solid contribution to his business. He sees many riders passing through and lots of bikes on cars entering town. He recently prepared lunches for a group of 160 riders passing through town while travelling the Mawson Trail.

Figure 12, Figure 13 and Figure 14 illustrate the Melrose riding experience.

Figure 12. Riding at Melrose



Figure 13. Melrose Fat Tyre Festival advertising



Figure 14. Local store, Melrose



1.2.2.8 Rotorua, New Zealand

Rotorua is moderate sized town in the centre of New Zealand's north island. It is about two hours drive south of Auckland, New Zealand's largest city and the main arrival point for overseas visitors. In 2006 Rotorua hosted the UCI Mountain Biking World Championships, a key event that helped to put it 'on the map' for the mountain biking community. Since then, it's reputation as a great mountain biking destination has grown. This reputation is largely due to the excellent and extensive network of mountain biking and other recreational trails in the nearby Whakarewarewa Forest.

A study published in March 2010 looked at the economic value of these trails to the Rotorua community. This study is titled 'Recreational Use and Economic Impact of Whakarewarewa Forest – 2009 Update' and was prepared for the Rotorua District Council's Economic Development Unit by APR Consultants Ltd.

Key findings of the report are that *'mountain biking has been the primary driver of growth, accounting for most of the recreational growth over the past two years'* and that in 2009, mountain biker expenditure in the local economy totaled \$8,662,300. Table 5 below shows the estimated visitation to the Whakarewarewa Forest for various different recreational activities from 2005 to 2009.

Table 5. Recreational visitation to Whakarewarewa Forest, Rotorua

Recreational Activity	2005 Visitation	2007 Visitation	2009 Visitation	% Change (2005-2009)
Mountain biking	55,000	85,000	101,800	+ 85.1%
Walking	85,000	85,000	88,500	+ 4.1%
Organised bush walks	50,000	57,000	58,000	+ 16.0%
Running	46,000	46,000	46,600	+ 1.3%
Horse riding	3,000	3,000	3,030	+ 1.0%
Other	5,000	6,000	6,110	+ 22.2%
Total	244,000	282,000	304,040	+ 24.6%

Interestingly, the report also notes that Australians account for 33% of the international visitors to Rotorua. With direct flights available from Sydney to Rotorua, it makes an easy, satisfying and cost-effective destination for Australian mountain bikers. This fact has not been lost on the New Zealand tourism industry – Rotorua has been advertising in Australian mountain biking magazines for many years now. Figure 15 on the next page shows an advertisement for the riderotorua.com website from the December 2009 edition of Australian Mountain Bike magazine.



Figure 15. Rotorua magazine advertisement



1.3 POLICY REVIEW

This section looks at existing government documents that provide policy direction, guidance or support for the project. These may include management plans, policies and strategies. These various different documents are grouped as National, State or Local policies and provide a policy context and framework from around Australia.

Document	Key Quotes/Comments
NATIONAL	
NSW Mountain Biking Strategy September 2011 Office of Environment and Heritage	<p>The publication of the <i>NSW Mountain Biking Strategy</i> represents an important step forward for the sport of mountain biking in NSW. Over 1000 submissions were received from members of the public during the drafting of the strategy, supporting more access for mountain bikers. This comprehensive strategy:</p> <p><i>'...outlines what planning requirements will be needed for any new trails, specifies track design requirements and highlights a small number of priority projects. It also encourages continued partnerships between the NPWS and mountain biking groups to improve and maintain mountain biking tracks and adopts a code of conduct so all visitors can enjoy their time in our parks.'</i></p> <p>The strategy outlines forty-one new directions relating to mountain biking in parks and puts forward the following vision:</p> <p><i>'Excellence in mountain biking is a normal part of recreation management in NSW national parks and reserves, where high quality mountain biking experiences are provided in an ecologically and socially sustainable manner across the landscape, and where riders are advocates for parks acknowledging that the NPWS provides some of the best mountain biking experiences in NSW.'</i></p> <p>This strategy is an acknowledgement that mountain biking is a legitimate and appropriate form of recreation in parks, provided that it is managed in an environmentally sustainable way.</p>
STATE	
Victoria's Nature-Based Tourism Strategy 2008-2012 2008 Tourism Victoria	<p>This document was the key guiding strategy for the nature-based tourism industry in Victoria when it was published in 2008. It was developed with extensive consultation with government and industry stakeholders. The strategy states that, in order for Victoria to develop more successful nature based tourism destinations and experiences, it needs to fill currently existing gaps in attractions, access, activities, amenities and accommodation (the five A's). The purpose of the strategy is to facilitate growth in Victoria's offerings of nature-based tourism experiences that will attract high yielding visitors. While it is no longer current, it provides some useful high-level policy directions and contextual information.</p> <p>A key aspect of the strategy of relevance to this project is the stated aim:</p> <p><i>'...to position Victoria as Australia's premier mountain biking destination'.</i></p> <p>It also provides some useful definitions, including the following definition of nature-based tourism as:</p> <p><i>'...tourism that relies on experiences directly related to natural attractions. The five types of identified nature-based tourism are ecotourism, adventure tourism, extractive tourism (e.g. fishing), wildlife tourism and nature retreats.'</i></p> <p>Cycling and mountain biking fall into the adventure tourism segment, which is defined as:</p> <p><i>'Adventure tourism can be distinguished from other types of NBT based on three factors:</i></p> <ul style="list-style-type: none"> <i>• An element or perception of risk in the tourism experience;</i> <i>• Higher levels of physical exertion by the participant;</i>



	<ul style="list-style-type: none"> • <i>A need for certain specialised skills to participate successfully and safely in the activity.'</i>
Victorian Trails Strategy 2005-2010 2004 Parks Victoria	<p>At the time of its publication, the Victorian Trails Strategy was the key guiding document for trail development in Victoria. Although it is now out of date, it remains relevant as no updated version of the policy has yet been released. It is not clear if this strategy will be reviewed, as other policies and strategies (e.g. Victoria's Nature-Based Tourism Strategy and Victoria's Cycle Tourism Action Plan) effectively supersede parts of it.</p> <p>One of the main aspects of relevance to this project is an action to:</p> <p><i>'Develop identified and industry-approved mountain biking trail opportunities both in and around Melbourne and regional areas.'</i></p> <p>The motivation for the action above is an inherent recognition that there is a need to increase the current supply, distribution, management and provision of opportunities for mountain biking.</p>
Regional Tourism Action Plan 2009–2012 2009 Tourism Victoria	<p>The Regional Tourism Action Plan 2009-2012 (RTAP) aims to chart a clear course of action to respond to the various challenges impacting tourism growth in regional Victoria. It lists the various regions and provides actions and directions to guide the development of the tourism industry in those regions.</p> <p>Warburton falls within the Yarra Valley and Dandenong Ranges region. The Plan lists the following action (among others) as a priority project for the region:</p> <p><i>'Nature-based and adventure tourism infrastructure and product including walking and bicycle trails to capitalise on the region's natural assets.'</i></p>
Public Land Mountain Bike Guidelines May 2013 Parks Victoria	<p>This publication was published in 2013 and was prepared by PV in collaboration with DEPI and other stakeholders. The purpose of the guidelines is to assist public land managers to manage mountain biking as an appropriate and sustainable activity on public land. They provide advice on how to assess, plan and develop mountain bike opportunities in a sustainable manner. While the guidelines are primarily intended to be a tool for the land manager, they provide many points that are relevant to this project. A key item within the guidelines that is relevant to this project is a set of seven guiding principles to assist in the assessment or planning of mountain biking opportunities. These seven guiding principles are:</p> <ol style="list-style-type: none"> 1. <i>'Mountain biking is an appropriate activity on many areas of public land and provides visitors with opportunities to enjoy being physically active and interacting with nature.'</i> 2. <i>'Mountain bike opportunities cannot be provided on all areas of public land and demand will be considered in a regional context, including consideration of any economic benefits at a local or regional level.'</i> 3. <i>'Public land managers will work with the mountain bike community to ensure that mountain bike opportunities meet the range of experiences sought by riders, where appropriate.'</i> 4. <i>'Public land managers will facilitate access, where appropriate, for mountain biking through the provision of suitable facilities.'</i> 5. <i>'The provision of mountain bike facilities will consider the impact of mountain bike activities on public land environmental and cultural values, and will consider the needs of other public land users. Protection of these values will potentially foster a greater appreciation of these values in the areas where mountain bikers ride.'</i> 6. <i>'Public land managers will seek the support and assistance of the mountain bike community, other key stakeholders and interested parties in the planning, delivery, maintenance and ongoing resourcing of mountain bike opportunities. Mountain bike opportunities will only be provided where they are sustainable in a financial and resource sense. Where possible, preference will be given to mountain bike experiences that utilise appropriate existing tracks.'</i> 7. <i>'Trails, or sections of trails, used for mountain biking that are considered unsuitable, unnecessarily duplicate trails or have an unacceptable level of impact on public land values will be closed and rehabilitated. Such management actions will be communicated to, and undertaken in consultation with, the mountain biking and wider community.'</i>



	<p>These guiding principles should also be applied throughout this project. While this project is being driven by the Yarra Ranges Council, many of the trails proposed will be located on land managed by PV and DEPI. As such, they will be subject to testing against these principles. The guidelines also define the current legal status of mountain biking on lands managed by PV and DEPI as:</p> <p><i>‘...cycling (including mountain biking) is allowed on all public roads managed by DEPI and PV and on many management vehicle only tracks, subject to specific requirements in the park/forest management plan. There are also a number of areas that have specifically designed mountain bike tracks, and a number of areas where existing tracks, although not specifically designed for mountain biking, can be legally used.’</i></p>
<p>Victoria’s Cycle Tourism Action Plan 2011 – 2015</p> <p>2011</p> <p>Tourism Victoria</p>	<p>This government plan was developed by Tourism Victoria to guide the development and growth of cycle tourism in Victoria, with the goal of positioning Victoria as the leading state for cycle tourism. The following statement, taken from the Plan, clearly outlines this vision and the means by which it will be achieved:</p> <p><i>‘Our vision is for Melbourne and Victoria to be the premier cycling destination in Australia. We will achieve this vision by:</i></p> <ul style="list-style-type: none"> <i>• Attracting major cycling events to Melbourne and regional Victoria.</i> <i>• Capitalising on our existing strengths of diverse experiences, captivating and unique natural landscapes, creative villages within close proximity to each other, access to numerous trails and a climate and terrain that is conducive to a variety of cycling activities.</i> <i>• Facilitating investment in mountain biking infrastructure and events.</i> <i>• Positioning Melbourne as the cycling capital of Australia and the gateway to regional Victoria’s cycling experiences.</i> <i>• Positioning regional Victoria as the premier destination for cycling trails and road cycling.’</i>
<p>Forest Notes: Mountain Bike Riding in State Forest</p> <p>August 2003</p> <p>Department of Sustainability and Environment</p>	<p>While this document is almost ten years old, it is still in circulation and is still available through the Department’s website: www.dse.vic.gov.au.</p> <p>It deals specifically with mountain biking in State forests throughout Victoria. It states that mountain biking is permitted on all roads, but not on walking tracks or ‘off formed vehicle tracks’. It discusses the permitting scenarios for events and promotes a code of conduct for mountain bikers.</p> <p>Finally, it explains the classification system¹¹ used to rate trails. This two-tier system rates skill level (basic, moderate, intermediate or advanced) and fitness (low, average, high or endurance). It is assumed that this document will be removed from circulation as soon as the new <i>Public Land Mountain Biking Guidelines</i> are endorsed and publicly released.</p>
LOCAL	
<p>Dandenong Ranges Gardens Draft Strategic Management Plan</p> <p>April 2013</p> <p>Parks Victoria</p>	<p>The purpose of this document is to provide a strategic framework and clear direction for the management of seven properties of significant botanic, heritage and tourism value located within the Dandenong Ranges, over the next 15 years.</p> <p>One of the gardens, the R.J. Hamer Arboretum, located in Olinda, is relevant to this project in that it currently provides some informal mountain biking opportunities. While the plan doesn’t quantify current levels of use for mountain biking, it does provide an opening for mountain biking opportunities within the Arboretum to be formalized in the future. Within the chapter on the R.J. Hamer Arboretum, under the heading ‘<i>Strategic Directions</i>’, and the sub-heading ‘<i>Visitor Experience and Tourism</i>’ is the following statement:</p> <p><i>‘Investigate options to provide recreational management zones in the arboretum with sustainable and equitable access for dog walking, horse riding, and mountain bike riding as examples.’</i></p>

¹¹ This classification system is not supported by World Trail. The Trail Difficulty Rating System (TDRS) developed by IMBA is the preferred system to rate trail difficulty.



<p>Yarra Ranges Council Mountain Bike Discussion Paper</p> <p>April 2014</p> <p>Yarra Ranges Council</p>	<p>The principal objective of this council discussion paper is to:</p> <p><i>‘...define the circumstances under which Council will endorse the use of mountain bikes on land for which it is legally the responsible manager’. Yarra Ranges Council aims to provide a diverse range of safe and sustainable mountain bike experiences and manage these whilst working in partnership with riders and other agencies.’</i></p> <p>So, primarily the paper is a tool to help Council personnel make good decisions about where/how/when mountain biking should be allowed, by providing a list of questions that should be asked during the decision making process.</p> <p>The paper also provides background on the sport of mountain biking, including benefits and impacts and a discussion of other venues around Victoria. It provides a good discussion about the situation within the Yarra Ranges Shire and frames the problem in terms of supply and demand – i.e. the demand for mountain biking significantly exceeds the available opportunities.</p> <p>It acknowledges that available Council managed lands are small in size and highly fragmented and that they may best be used for trail hubs, with links to PV or DEPI managed land. It also provides some guidance on trail design and construction, trail difficulty ratings and signage.</p> <p>A flow chart from this policy document is provided in Appendix 3. This flow chart is intended to provide guidance for council staff when dealing with mountain biking activities on council land.</p>
<p>Yarra Ranges Council Mountain Bike Procedures</p> <p>April 2014</p> <p>Yarra Ranges Council</p>	<p>The principal objective of this Procedure is to clearly guide developments of new mountain biking opportunities and to respond to existing unauthorised trails on Council managed land in Yarra Ranges Shire. It provides a clear step by step procedure to formally develop and endorse mountain biking trails within the Yarra Ranges Shire.</p> <p>Appendix 5.3 includes a flow chart taken from the <i>Yarra Ranges Council Mountain Bike Procedures</i>, which shows these steps graphically. It is included in this report as it provides a useful checklist to test the trail network that will be proposed by this project.</p>
<p>Vision 2020</p> <p>2008</p> <p>Yarra Ranges Council</p>	<p>Vision 2020 provides Yarra Ranges Council with a framework to guide decisions and actions to meet community aspirations and ensure a healthy and sustainable future. All Council’s strategies stem from this Vision.</p> <p>The Warburton Mountain Bike Feasibility Study project aligns with the following themes from Vision 2020:</p> <ul style="list-style-type: none"> • <i>Strong Healthy and Connected Communities;</i> • <i>Local Economy and Tourism; and</i> • <i>A Safe and Accessible Shire.</i>
<p>Yarra Ranges Community Health and Wellbeing Plan 2013 - 15</p> <p>2013</p> <p>Yarra Ranges Council</p>	<p>The Yarra Ranges Community Wellbeing Plan 2010-2013 (Council’s municipal public health plan) provides an overarching policy framework to guide the ways in which Council works, both individually and in partnership, to plan for enhanced health and wellbeing across the municipality.</p> <p>The priority area which is supported by the Warburton Mountain Bike Destination project is:</p> <ul style="list-style-type: none"> • <i>Engage in a range of social inclusion and cohesion activities.</i>
<p>Yarra Ranges Hike and Bike Plan</p> <p>2005</p> <p>Yarra Ranges Council</p>	<p>The Warburton Mountain Bike Feasibility Study is strongly linked and supported by the objectives of the Hike and Bike Plan. Warburton is currently linked to the main arterial of the shared use trail network in the Yarra Ranges, the Lilydale to Warburton Rail Trail. The western terminus of the rail trail is the Lilydale train station. Visitors can travel by train from around Melbourne to Lilydale, and then continue on to Warburton via the rail trail. This public transport accessibility is a major attractor for Warburton being a destination for mountain biking in Victoria and supports sustainable travel initiatives. Other projects in the Hike and Bike Plan that support this project include linking the Warburton Rail Trail to the O’Shannassey Aqueduct and the potential of a future trail along the Coranderk Aqueduct that would connect Warburton to Healesville.</p>



<p>Economic Development Strategy</p> <p>2012</p> <p>Yarra Ranges Council</p>	<p>The Economic Development Strategy is the overarching framework for building and strengthening the Yarra Ranges local economy and communities.</p> <p>The strategy includes a set of directions and actions and consolidates Council tourism and economic strategies under one umbrella document.</p> <p>The Warburton Mountain Bike Feasibility Study aligns with the following key principals of the Economic Development Strategy:</p> <ul style="list-style-type: none"> • <i>Stronger focus on cultural and environmental tourism;</i> • <i>Increase the profile of festivals and events across the Shire; and</i> • <i>Improve the built, natural, social and economic infrastructure in townships.</i>
<p>Tourism and Action Policy</p> <p>2008</p> <p>Yarra Ranges Council</p>	<p>The Tourism and Action Policy defines Council's role in supporting the tourism industry. It assists Council in its decisions on new tourism proposals or developments and defines the roles of those bodies responsible for marketing the region, its products, and the industry in general.</p> <p>The Warburton Mountain Bike Feasibility Study project aligns with the following key measures of the Tourism and Action Policy:</p> <ul style="list-style-type: none"> • <i>Policy supports nature based recreation and tourism activities in Yarra Ranges;</i> • <i>Ensure that the social and economic benefits of tourism are recognised and realized;</i> • <i>Sustainable development of tourism is balanced with environmental, cultural and heritage values, and community lifestyle, supported by the planning scheme;</i> • <i>Attract investment in sustainable tourism development and encourage appropriate growth of the existing tourism industry;</i> • <i>Facilitate constructive, collaborative working relationships between Government, industry associations and business groups that support sustainable tourism.</i>
<p>Environment Strategy</p> <p>2008</p> <p>Yarra Ranges Council</p>	<p>The Environment Strategy provides the overarching framework to guide future activities by Council, community and others in managing the environment.</p> <p>Key measures relevant to the Warburton Mountain Bike Feasibility Study include:</p> <ul style="list-style-type: none"> • <i>Integrate ecological sustainable development in planning;</i> • <i>Tourism and recreation activities to be complementary to the protection and enhancement of natural assets;</i> • <i>Use energy and renewable sources with no or low emissions;</i> • <i>Integrate water sensitive urban design in planning.</i>



1.4 SITUATION ANALYSIS SUMMARY

Yarra Valley and Dandenong Ranges currently achieves tourism visitation of:

- 3.4 million domestic day visitors annually;
- 685,000 domestic overnight visitors, with an average length of stay of 2.4 nights;
- 26,800 international overnight visitors.

While these statistics indicate that tourism is an important and strong industry in the Yarra Valley, much of this tourism activity is centred around the lower parts of the valley and focuses on food and wine and other themes. Nature-based and adventure tourism is not strongly represented in the area.

The proposal to construct a world-class mountain biking trail network in Warburton offers the opportunity to draw new visitor demographics to Warburton that are currently not visiting the area, as well as increasing the length of stay for existing visitors by offering a new activity. Anecdotal evidence suggests that themes such as gourmet food and wine connect well with mountain bikers, providing good opportunities for cross-promotion and capitalizing on the region's strengths.

Having looked at a number of known, popular mountain biking trail networks, two key messages emerged:

- Mountain bike trails are a viable tourism attraction and can provide a significant economic stimulus to the local economy;
- The economic stimulus of mountain bike trails is significantly boosted by mountain biking events.

Of the mountain biking 'benchmarks' discussed, most of them fit the classic description of a 'mountain biking destination', except for the You Yangs. In fact, in considering these various destinations, it seems useful to categorise them into two different groups – mountain biking *destinations* and mountain biking *facilities*. Forrest, Castlemaine, Woodend, Bright, Melrose, Mt Buller and Rotorua are all examples of the former, while the You Yangs (and also Lysterfield Lake Park which was not included in the benchmarking exercise, but is located within the Yarra Ranges Shire) are all examples of the latter.

Table 6 on the next page lists the attributes that define these two different categories.



Table 6. Mountain Biking Facilities vs Mountain Biking Destinations

Mountain Bike Facilities	Mountain Bike Destinations
Close to major population centres	May be somewhat removed or isolated from major population centres
Minimal/limited tourism infrastructure	High level of tourism infrastructure – accommodation, restaurants, cafes, retail outlets and other attractions.
Drive to trailhead, ride, drive home	Self-contained, compact village. Once you arrive, you can leave the car at home. Ride to trails, ride/walk to the pub.
Ability to host large mountain biking events, but typically no supporting tourism infrastructure necessary for multi-day events or festivals.	Ability to host large mountain biking events and festivals – range of accommodation available, open spaces for staging areas and camping, local support.
Attract high levels of visitation, but believed to be casual, regular, drop-in riders	Attract high levels of visitation, but believed to be more concentrated around events, peak tourism seasons.
Short visits. Riders don't generally linger after their ride.	Longer visits, including overnight stays, with greater potential for economic impact. Riders happy to linger after their ride.
Small likelihood of bringing non-riding companions (friends/family).	High likelihood of bringing non-riding companions (friends/family).
High level of use by local mountain bikers.	High level of use by visiting mountain bikers.
Lower spending yields per rider. Riders may buy petrol at nearby service stations, food/coffee from nearby cafes.	Higher spending yields per rider. Riders may rent accommodation in the area, eat breakfast, lunch and dinner at local restaurants, shop at retail outlets, buy petrol, hire local tour operators etc.

This categorization of mountain biking trail networks is a useful tool to help describe why some mountain biking trail networks are more successful than others in a tourism sense, but it has not been researched and is not definitive or without exception. Forrest, for example, is undoubtedly a mountain biking destination, yet it still only has a relatively low level of tourism infrastructure (although mountain biking has, and is continuing, to provide the impetus for increased levels of infrastructure).

The most important thing about this approach is that, with the construction of a high quality, extensive mountain biking trail network, Warburton has the potential to fill both niches. It has the tourism infrastructure, the self-contained village atmosphere, enough separation from Melbourne and the terrain, scenery and topography to become a world-class mountain biking destination. On the other hand, it is close enough to Melbourne (and especially the heavily populated eastern suburbs) that it can still fit the role of mountain biking facility, with local mountain bikers using it for their weekly Tuesday or Thursday night, social, recreational group ride.

This chapter also identified sixteen different Government policies or strategies, including examples from local and State Governments that provide support on some level for the development of Warburton as a mountain biking destination. Generally speaking, this support is not directly related to Warburton per se. Rather it is an acknowledgement of the principals underlying this project – that mountain biking is a valid use of public land, that it



provides many benefits to society and, most importantly in this project, that it can provide a real economic stimulus when properly managed and planned for.

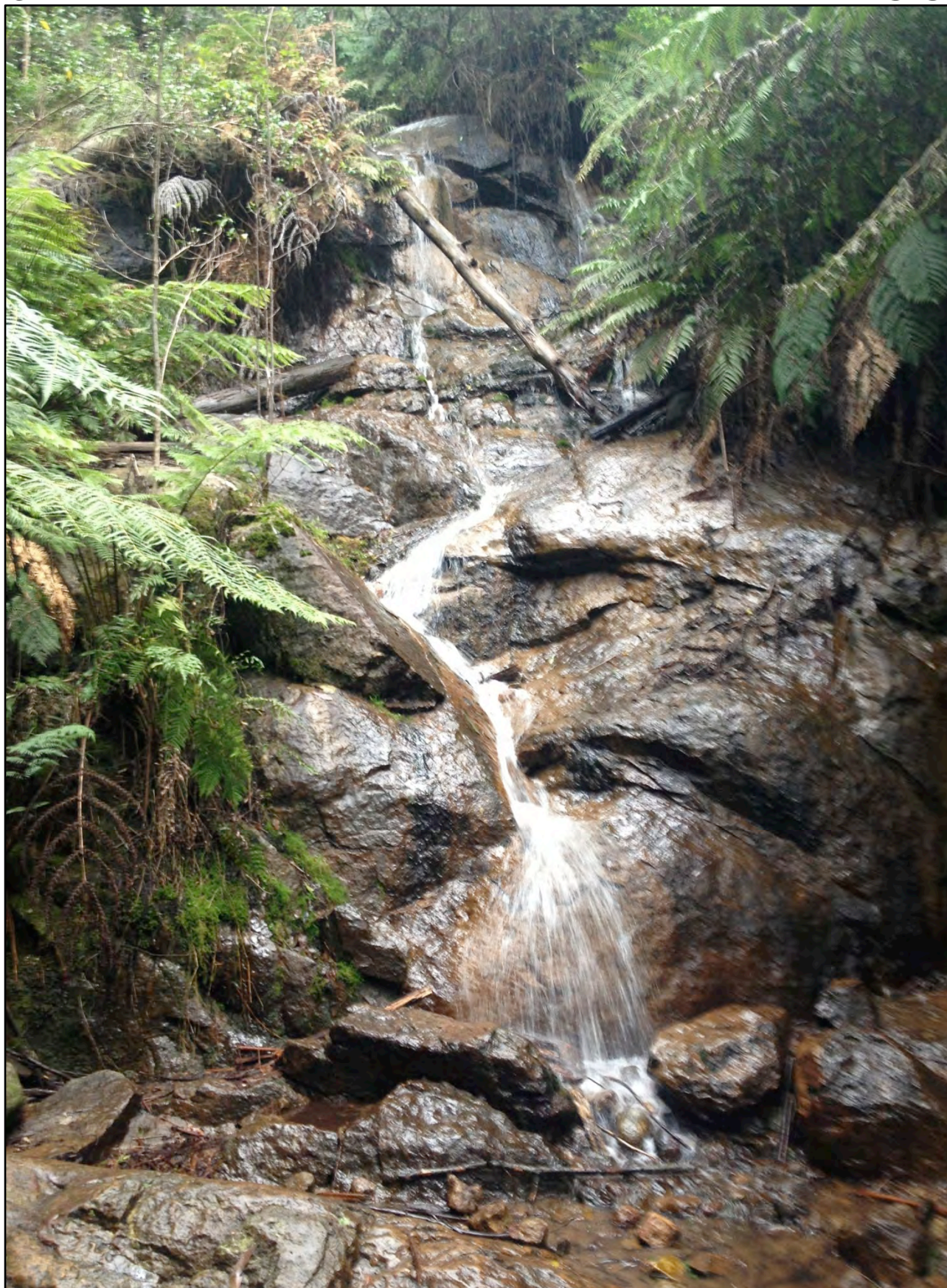
In the local context, the Warburton Mountain Bike Feasibility Study aligns with YRC policies for improving community wellbeing, developing the local economy and improving the environmental sustainability of the region. The project also links to key recreation plans for encouraging healthy and active lifestyles and resilient communities.

Key strategic measures identified in these plans that support the Warburton Mountain Bike Feasibility Study include:

- Developing strong, healthy and connected communities;
- A strategy plan for trail development that connects to open space, education and commercial precincts, to public transport and broader recreation participation opportunities;
- Attracting investment in sustainable nature based tourism development and encouraging appropriate growth of the existing tourism industry;
- Facilitating constructive, collaborative working relationships between Government, industry associations and business groups that support sustainable tourism.



CHAPTER 2 DEMAND AND MARKET ANALYSIS



2.1 PROJECT CONSULTATION

2.1.1 PREVIOUS CONSULTATION – Warburton Integrated Cycling Hub

Although the idea of developing Warburton as a cycling destination had been around for some time, in late 2010 the idea began to gain momentum. At the time, a number of individuals, local traders and mountain bikers began discussing the opportunity of ‘re-branding’ Warburton as a cycling destination. In particular, they envisioned Warburton as an ‘Integrated Cycling Hub’ and formed the Warburton Integrated Cycling Hub Focus Group (the ‘focus group’), including representatives from:

- PV;
- Shire of Yarra Ranges;
- Department of Sustainability and Environment (now DEPI);
- Warburton Advancement League;
- Rail Trails Australia;
- Mountain Bike Australia;
- Yarra Valley Cycles;
- Cog Café;
- Warby Riders;
- Friends of the Lilydale to Warburton Rail Trail;
- Yarra Ranges Region Marketing;
- Local residents;
- Mountain biking community.

The purpose of the focus group was identified as:

“To develop Australia’s first fully integrated cycling hub, providing appropriate and sustainable experiences for the entire cycling community, within the Warburton and Yarra Valley communities¹².”

Listed among the focus group’s key objectives were:

- To integrate all forms and skill levels of cycling within the area of Warburton and the Yarra Valley;
- To plan and develop appropriate trail infrastructure to support and develop new cycling experiences;
- To market and promote Warburton as a cycling destination;
- To develop Warburton as a centre of excellence for cycling in Victoria.

The focus group estimated that the development of Warburton as a cycling hub would be *“completed within 5 years and cost approximately \$15M - \$20M¹³”*.

¹² ‘Terms of Reference’, Warburton Integrated Cycling Hub Focus Group

¹³ ‘Warburton Fully Integrated Cycling Hub Brief for Tourism’, Warburton Integrated Cycling Hub Focus Group



Documentation

PV, who were one of the key drivers of the Warburton Integrated Cycling Hub, provided World Trail with approximately 28 electronic files that documented the various focus group meetings and outputs in 2010 and 2011. Documents included meeting agenda items, several versions of the project's terms of reference, some basic benchmarking exercises, basic maps, lists of key stakeholders and notes from discussions about the benefits of mountain biking.

Overall, the documentation shows that the work of the focus group appears to have been the catalyst for much of the current plan to develop Warburton as a cycling destination.

Focus Group Recommendations

The focus group identified many benefits of Warburton as a cycling destination, and cited the inclusion of the 'Warburton Integrated Cycling Hub' in the Tourism Investment Case, and the development of the (then) proposed state-wide mountain biking strategy as highly relevant to developing mountain bike trails within the region.

Included in the documents reviewed was an un-dated document titled *Warburton Fully Integrated Cycling Hub Feasibility Study*. This document proposed the development of a feasibility study that would outline:

"...the proposal, demand analysis, costs, revenues and opportunities that exist within Warburton for the development of a fully integrated cycling hub"

A second document titled 'Warburton Mountain Bike Destination Feasibility/Brief' drafted in early 2011 goes on to list the proposed methodology to complete this feasibility study. The methodology described in this document appears to have been the basis for the brief for this feasibility study.

Previous Field Assessments

A document titled *Warburton Draft Trails Mapping* listed distances for proposed trail alignments north and south of Warburton. Within this document, 8 individual trails were listed as potential alignments on the Mt Donna Buang (north) side of Warburton (totalling 78km), and 9 trails were listed on the Mt Bride/State Forest (south) side of Warburton (totalling 41.5km).

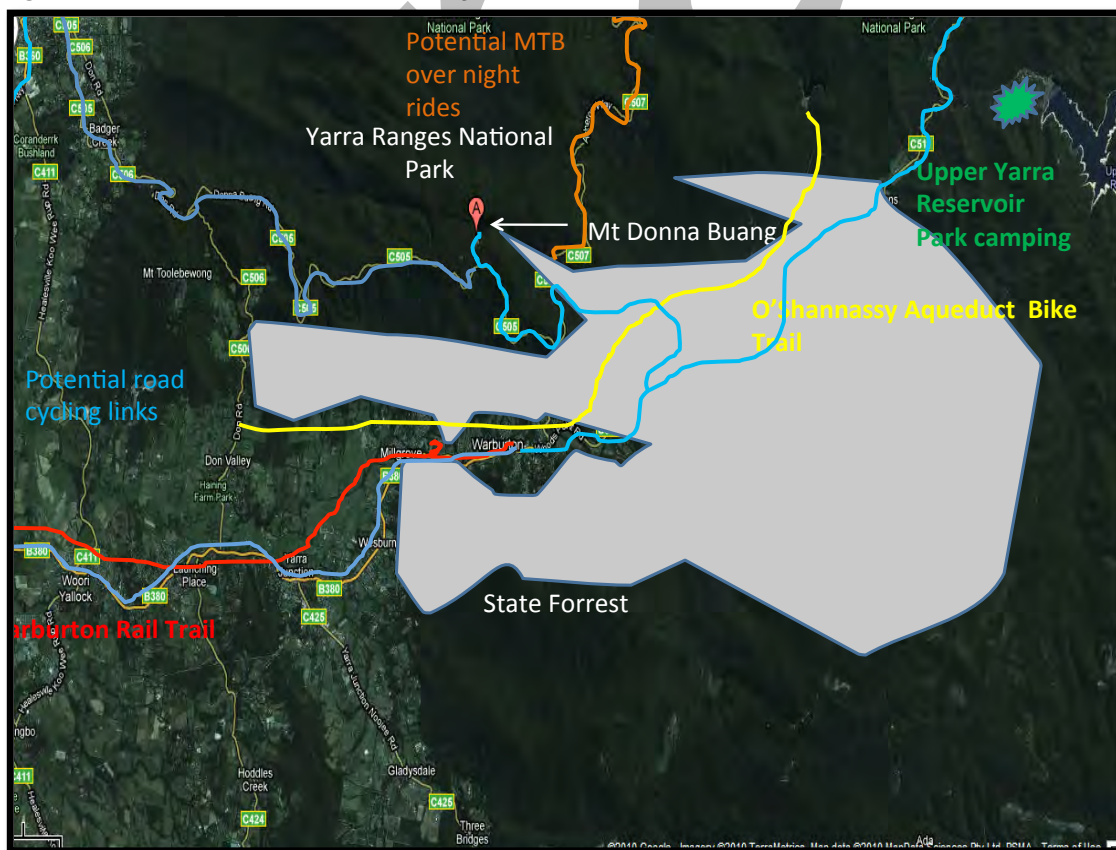
A GPS unit was purchased for use in the Warburton region specifically for mountain biking projects, however it is unclear whether the purpose-bought GPS was used to identify the alignments north and south of Warburton or whether this was simply a desktop exercise. Two basic maps (see Figure 16 and Figure 17 on the next page) were found that showed proposed development *regions* for mountain bike trails. Unfortunately these maps do not illustrate the location of the alignments listed in the *Warburton Draft Trails Mapping* file.



Figure 16. Mountain Bike Trails Study Area 1



Figure 17. Mountain Bike Trails Study Area 2



Two further maps outlining areas of significant flora and fauna were also produced in March 2011 by the focus group (see Figure 18 and Figure 19 below).

Figure 18. Fauna Map (Yellow = Least Concern, Red = Endangered, Orange = Vulnerable, Green = Depleted EVC)

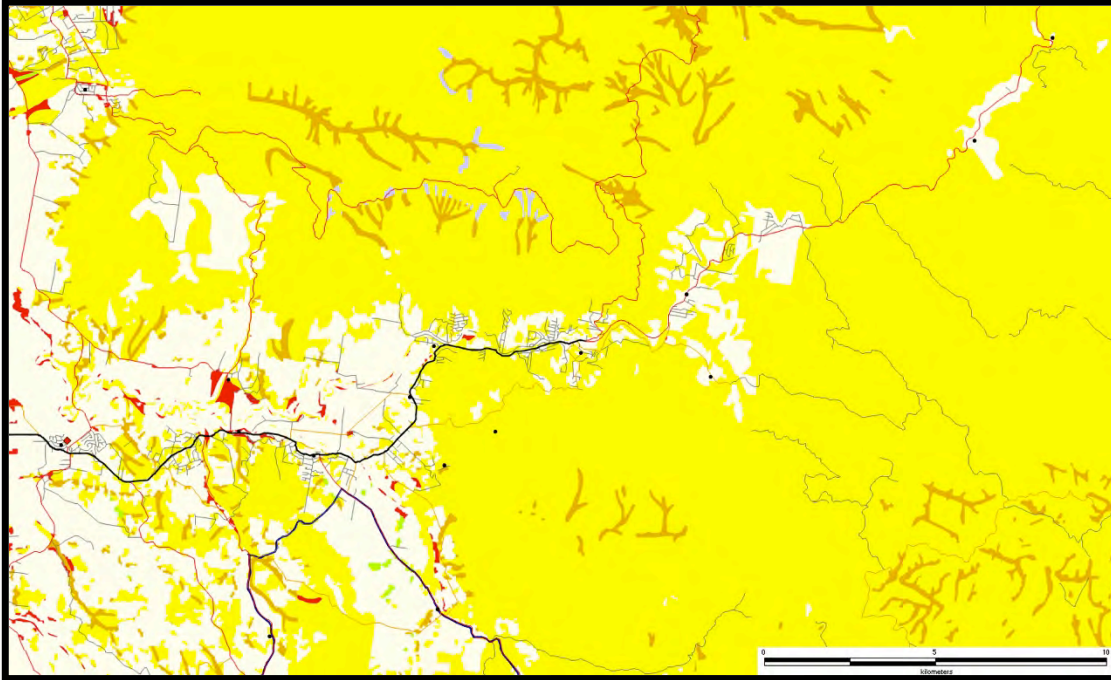
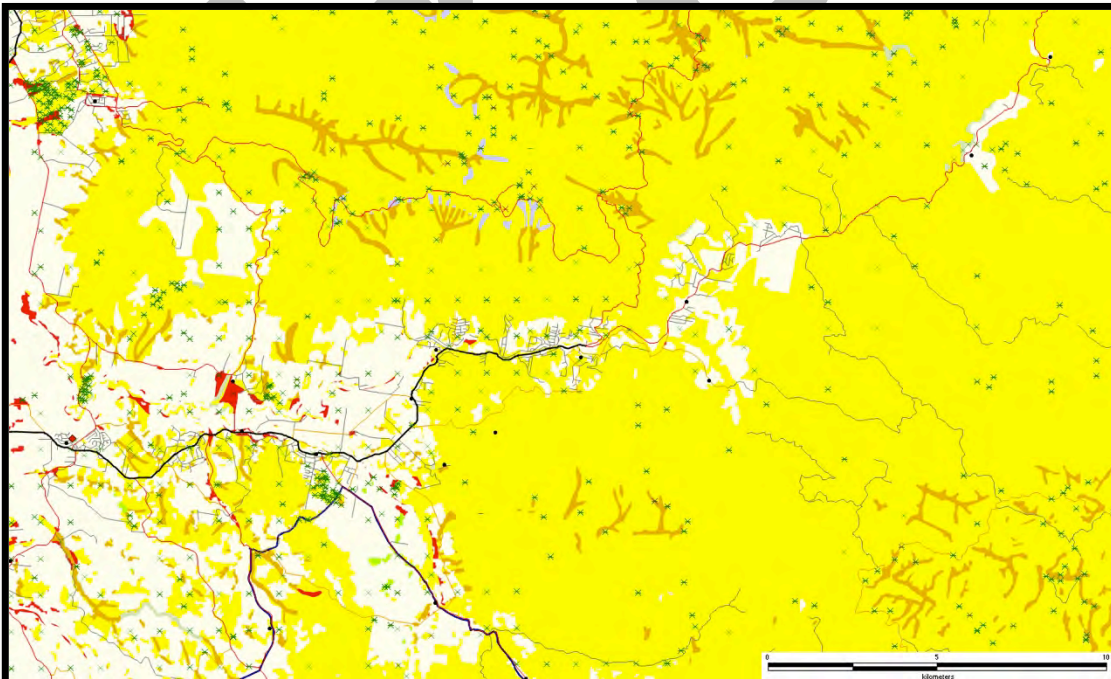


Figure 19. Flora Map (No legend provided)



In summary, the work of the focus group appears to have resulted in the following outcomes:

- The establishment of the YRMTB. Local mountain bikers were counselled to form an organised group so that they could apply for funding and provide an organized, legitimate vessel to represent the desires and concerns of the mountain biking community;
- Applications being made for funding, which were successful, allowing this feasibility study to be formally commissioned.

One key difference is that the current project is exploring only mountain biking opportunities, whereas the original Warburton Integrated Cycling Hub idea was inclusive of all types of cycling.



2.1.2 2013 CONSULTATION

The key consultative mechanism used throughout this project has been the Project Steering Group. This group is comprised of members of the YRC, YRMTB, PV, DEPI, SRV and representatives of the local business community. This group has met on a monthly basis throughout the project's duration to review progress and provide direction.

In addition to the regular meetings of the steering group, World Trail also met separately with PV and DEPI. These two stakeholders are considered key stakeholders as they are the managers of the two large parcels of public land around Warburton that could be used for mountain biking trail development. PV is responsible for managing the Yarra Ranges National Park, which lies predominantly to the north of Warburton and takes in Mt Donna Buang, while DEPI is responsible for managing the Yarra State Forest, which lies predominantly to the south of Warburton and takes in Mt Little Joe, Mt Bride and Mt Tugwell. Given that Yarra Ranges Council does not manage any large tracts of suitable land in the vicinity of Warburton, it is almost certain that any future trail development that may arise out of this project will need to be located on either PV or DEPI land.

Meetings with DEPI and PV were held to discuss the potential of developing trails on their respective estates, with the express aim of determining any 'no go zones'. A 'no go zone' is defined as any area that should be avoided by trails. The reasons for avoiding such areas include:

- Operational reasons – land is used for some other operational purpose. E.g. timber harvesting, water catchments;
- Environmental or cultural heritage reasons – the environmental or cultural heritage values of a particular area are significant. E.g. a rare or threatened species of flora or fauna is found only in a certain area;
- Visitor experience reasons – sometimes it is best to provide separate areas for separate visitor groups.

In effect, the only real areas that were identified through these meetings as 'no go zones' were the water catchment areas to which public access is restricted anyway. These lie mostly to the north of Warburton and are probably too far away to be of much value to the project. It should be noted that both agencies expressed concerns about the potential management and maintenance of the proposed trails, and in particular, how these tasks will be resourced. Both agencies expressed interest in exploring options for how the usage of the trails can generate revenue that can be put back into the ongoing management of those trails.

Throughout the project, World Trail also met with a range of local stakeholders including:

- A number of local business owners, all of whom expressed an interest in the project and indicated their support;
- Local mountain bikers – although YRMTB were formally represented on the PSG, World Trail also met with a number of local riders to discuss the project. Again, all were supportive of the project;
- Trail builders – World Trail met with one of the local mountain bikers that has been responsible for some of the 'informal' trails that have been constructed in the Mt Bride area. He was very supportive of the project and keen to see Warburton developed as a



mountain biking destination. This pro-active and positive attitude is at odds with the attitudes of some other 'trail builders' who are keen to keep their trails secret, known only to a select few.

Finally, the key mechanism by which this project has attempted to gain community input is the survey. This survey was completed by approximately 1,300 people, a huge and unqualified success for a project of this nature. While the survey was very successful in reaching out to the mountain biking and cycling community, it was less successful in reaching out to the non-cycling, local Warburton community. This is not a major drawback, as the survey was really designed to capture data from, and about, mountain bikers, but it should be acknowledged. As this project moves forward beyond this current feasibility stage, the next step will be to design and map out the actual trail network. At this step, a greater level of community consultation may be required.



2.2 SURVEY RESULTS

World Trail conducted an on-line survey between Wednesday 19th June, and Sunday 7th July 2013 to assess support for the potential development of mountain bike trails in the Warburton area and to collect demographic, spending and riding data from the mountain biking community. The survey attracted a total of 1,306 responses and provides an overwhelming amount of support for the proposed development.

The survey was set up using an on-line survey tool called Survey Monkey. It was promoted and distributed through the following means:

- On World Trail's Facebook page, which has a following of over 2,300 people, mostly mountain bikers;
- On the Facebook and web pages for the Australian mountain bike magazine, Flow;
- On Rotorburn, an on-line forum for mountain bikers;
- On YRMTB's Facebook page;
- Through YRC's community engagement department.

The survey consisted of 39 questions, 36 of which were multiple-choice. The remaining three questions allowed respondents to make comments on various aspects of the project. The survey was broken into five different sections that assessed the respondents':

1. Level of participation in the sport of cycling, including preferred cycling disciplines and riding habits;
2. Level of participation specifically in the sport of mountain biking, including questions about their preferences for trail types, trail difficulty, event participation and their expectations when visiting a trail network;
3. Mountain bike tourism habits. In this section respondents answered questions that help to establish the catchment area for mountain bike tourism in Warburton and contribute data to an economic case for mountain bike visitation;
4. Level of current annual visitation to Warburton and anticipated changes to this visitation pattern should the proposed trail network be completed;
5. General demographic information to assist in defining the target market for users.

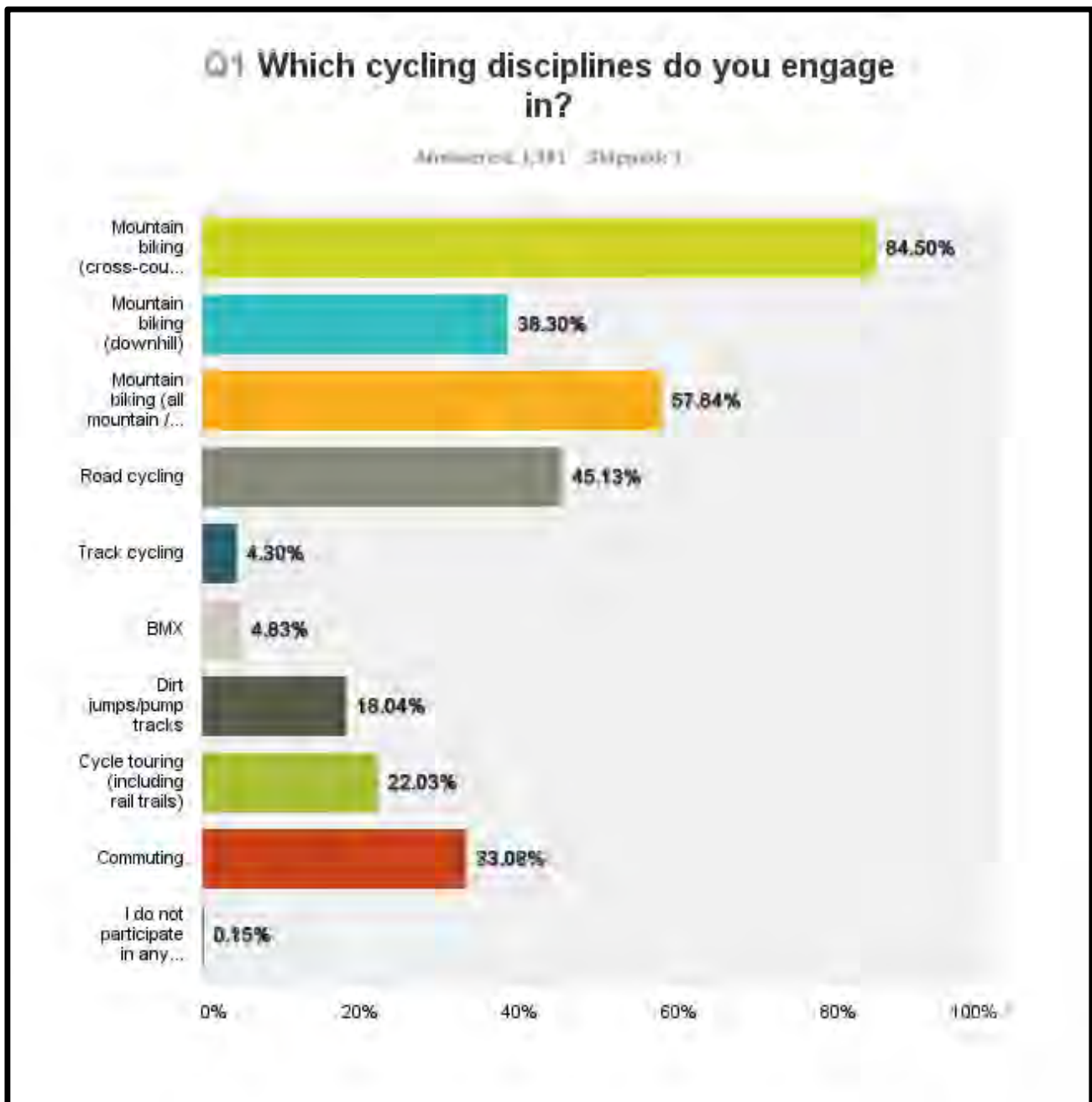
The following pages contain the results for each individual question. A brief description of the reasoning behind each question and how it relates to the other questions has been provided, along with a summary of how these results will affect the proposed development of mountain bike trails around Warburton. Appendix 4 provides the full answers to the three open-ended questions.

The Survey Monkey tool provides numerous tools to assist in the analysis of the results. One of these tools is the ability to 'filter' the results. For example, say 50 people answered yes to question A. Using the filter tool, we can then focus on this group of 50 people, to see how they answered other questions, excluding all people that answered no. More specifically, if we wanted to see how Warburton residents specifically answered the survey, we can filter the results based on the answer to Question 35.



2.2.1 PARTICIPATION IN THE SPORT OF CYCLING

2.2.1.1 Question 1



Question 1 was designed to provide a picture of the respondents' riding preferences. Answers to this question provide some guidance on the preferences of mountain bikers (cross-country vs. downhill vs. all mountain etc.) that can be used to help design a meaningful trail network that will meet the needs of the mountain biking community.

Perhaps the most significant point to take from Question 1 is that 99.85% of respondents participate in some form of cycling. This means that the survey had excellent distribution to the cycling community, but did not reach many people outside of the sport – for example, local, non-cycling residents of Warburton.

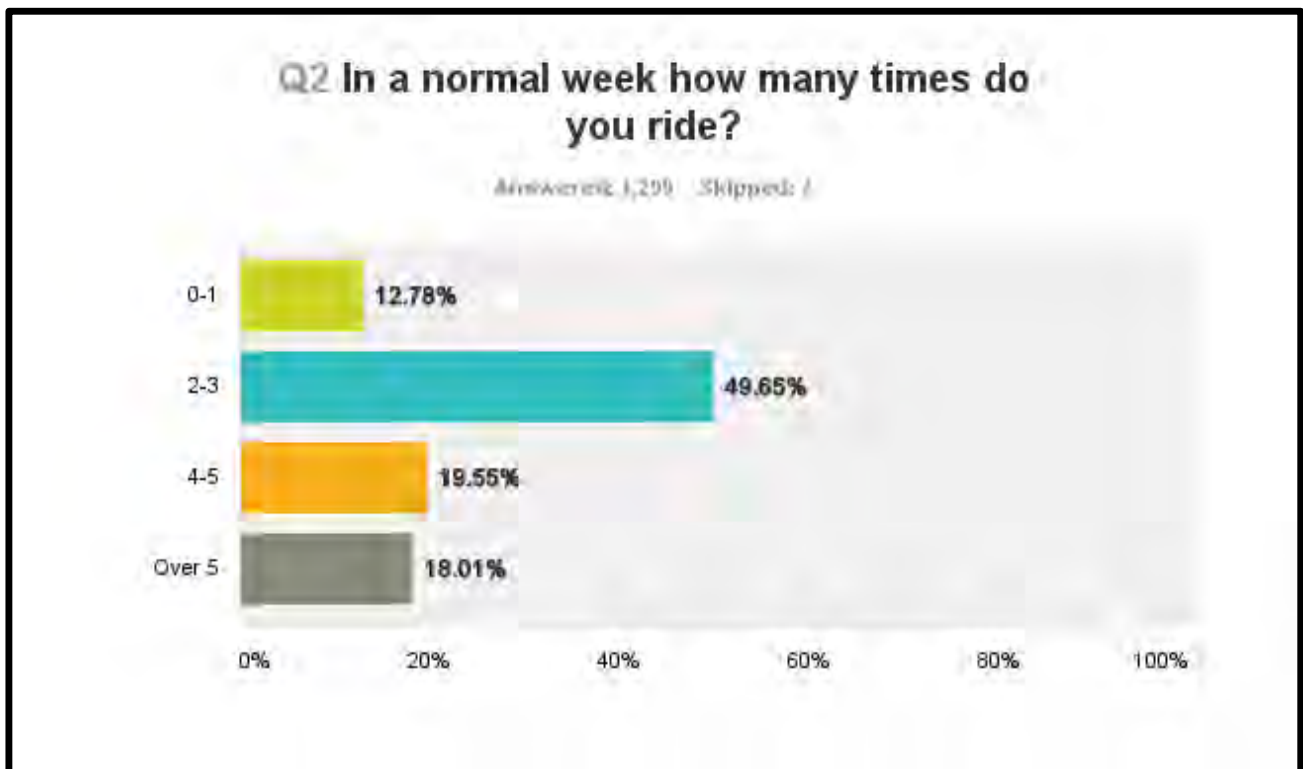


Amongst those surveyed, the most popular cycling discipline is cross-country mountain biking (84.5%), followed by all mountain/freeride mountain biking (57.64%), road cycling (45.13%) and downhill mountain biking (38.3%).

draft



2.2.1.2 Question 2

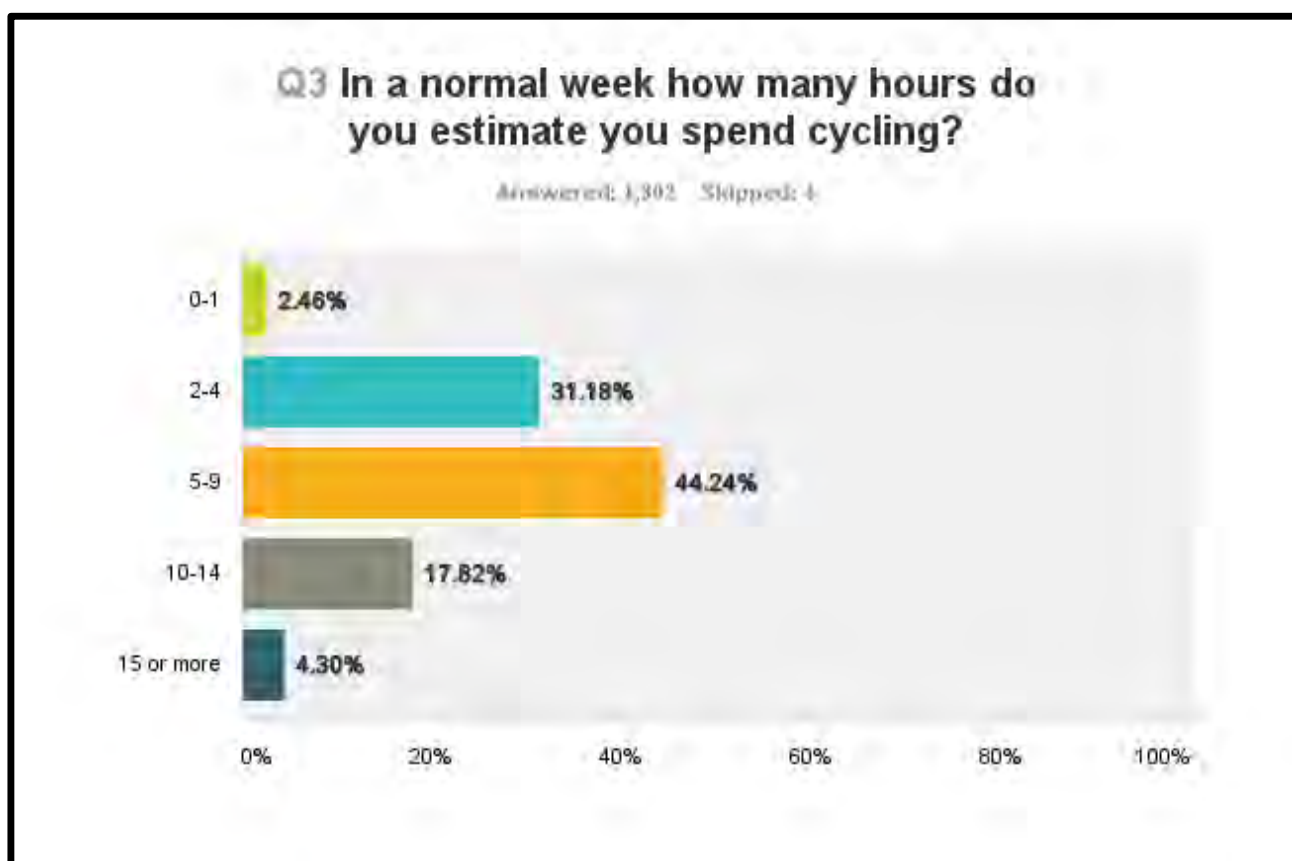


Whilst question 2 is clearly designed to establish the frequency of respondents' participation in the sport of cycling, it can also be used in conjunction with answers to Questions 6 and 7 to estimate likely visitation to the proposed trail network. That is, Questions 6 and 7 establish where the riders are coming from, and Question 2 establishes how often they are likely to come.

The majority of riders are participating in some form of cycling 2-3 times per week. Extrapolating the answers to this question, we can estimate that the 1,299 people who answered this question undertake over 4,000 rides per week between them.



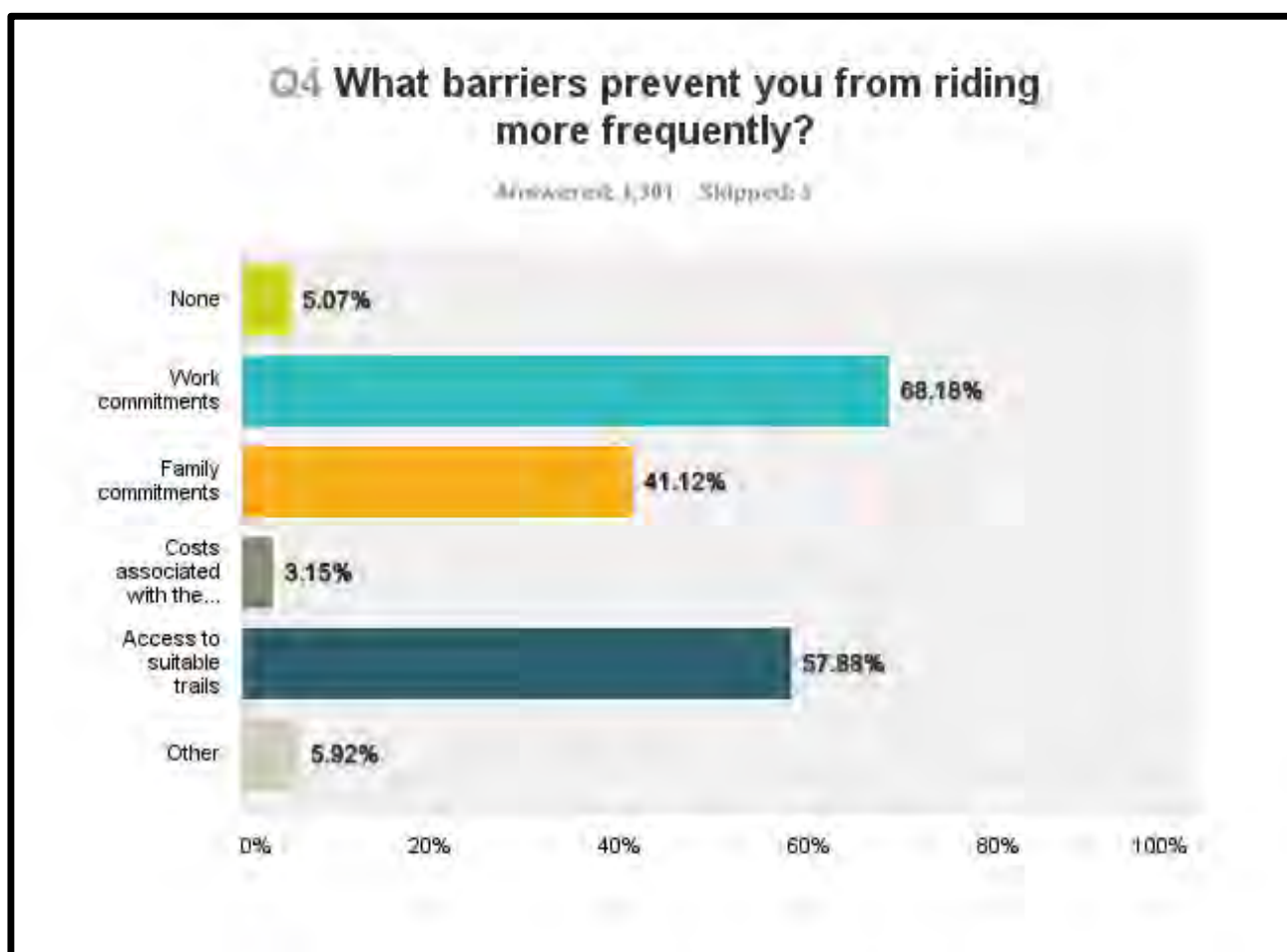
2.2.1.3 Question 3



Responses to question 3 indicate that 71% of the 1,302 respondents ride 2-9 hours per week. Using data collected in Question 2 we know that 600 of these people are riding 2-3 times per week to achieve this 'time on the bike'.



2.2.1.4 Question 4



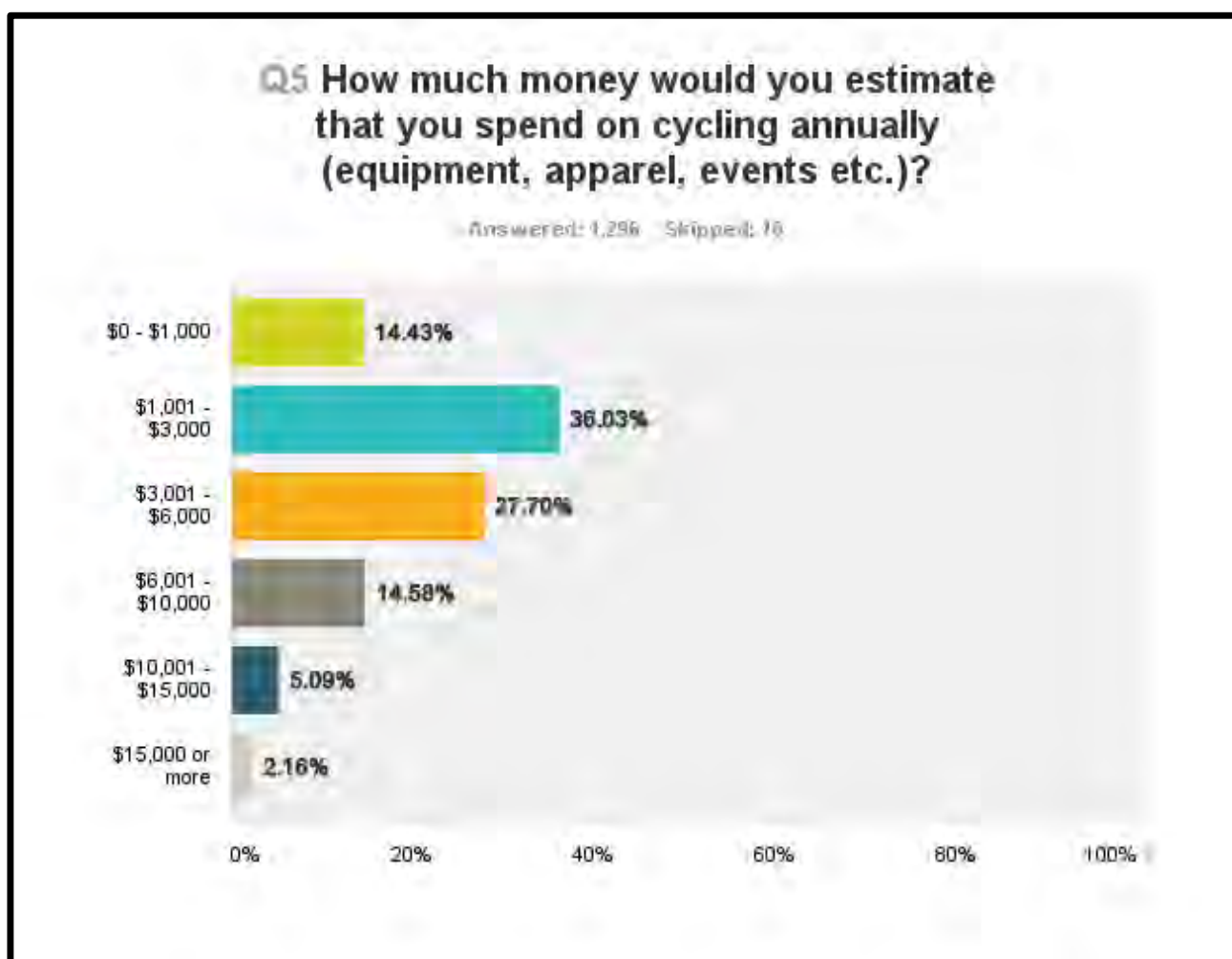
One of the key reasons Question 4 was included in this survey was to establish whether people felt there were sufficient trails to meet their requirements – that is, does the demand for mountain biking trails outstrip demand? A significant 58% of riders selected access to trails as a barrier to riding more frequently.

Of particular note for assessing the demographic of the cyclists who responded to this survey, only 3.15% of people cited 'costs associated with the sport' as a barrier to participation. This is despite respondents declaring in the following question (question 5) that they spend an average of \$4,167 each on cycling annually. This reflects the statement made previously that mountain biking presents relatively few barriers to entry.

While work and family commitments also poled strongly, addressing social issues is beyond the scope of this project.



2.2.1.5 Question 5



Question 5 tries to quantify the amount of money that respondents spend on cycling each year. The greatest response was in the category of \$1,001 and \$3,000 per year (36.03%).

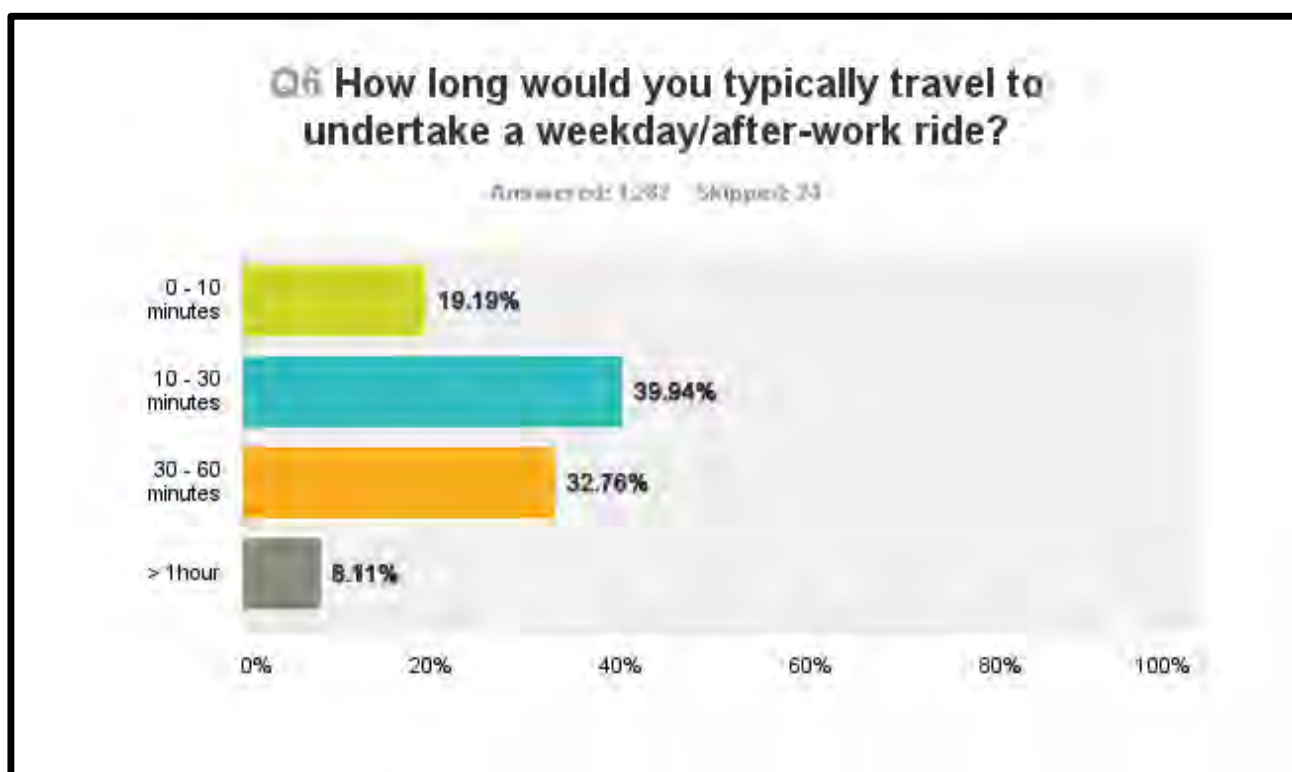
Using the median value for each spending band¹⁴ (i.e. the median of the \$1,001 - \$3,000 band is \$1,500), it is possible to estimate the overall spending of the respondents to this survey. In total, the 1,296 people who answered this question spend a combined amount of approximately \$5,400,000 per year on the sport of cycling.

Dividing this total by the number of respondents (1,296), it is estimated that cyclists spend an average of \$4,167 per year.

¹⁴ With the exception of the highest value band '\$15,000 or more'. For this band, a value of \$15,000 is used.



2.2.1.6 Question 6



Question 6 aims to determine the catchment area for *weekday*¹⁵ usage of the proposed trail developments at Warburton – that is, is Warburton close enough to Melbourne to be a realistic destination for the weekly, organized, after-work group ride? Answers indicate that approximately 72.7% of people would typically travel 10-60 minutes to participate in cycling after work.

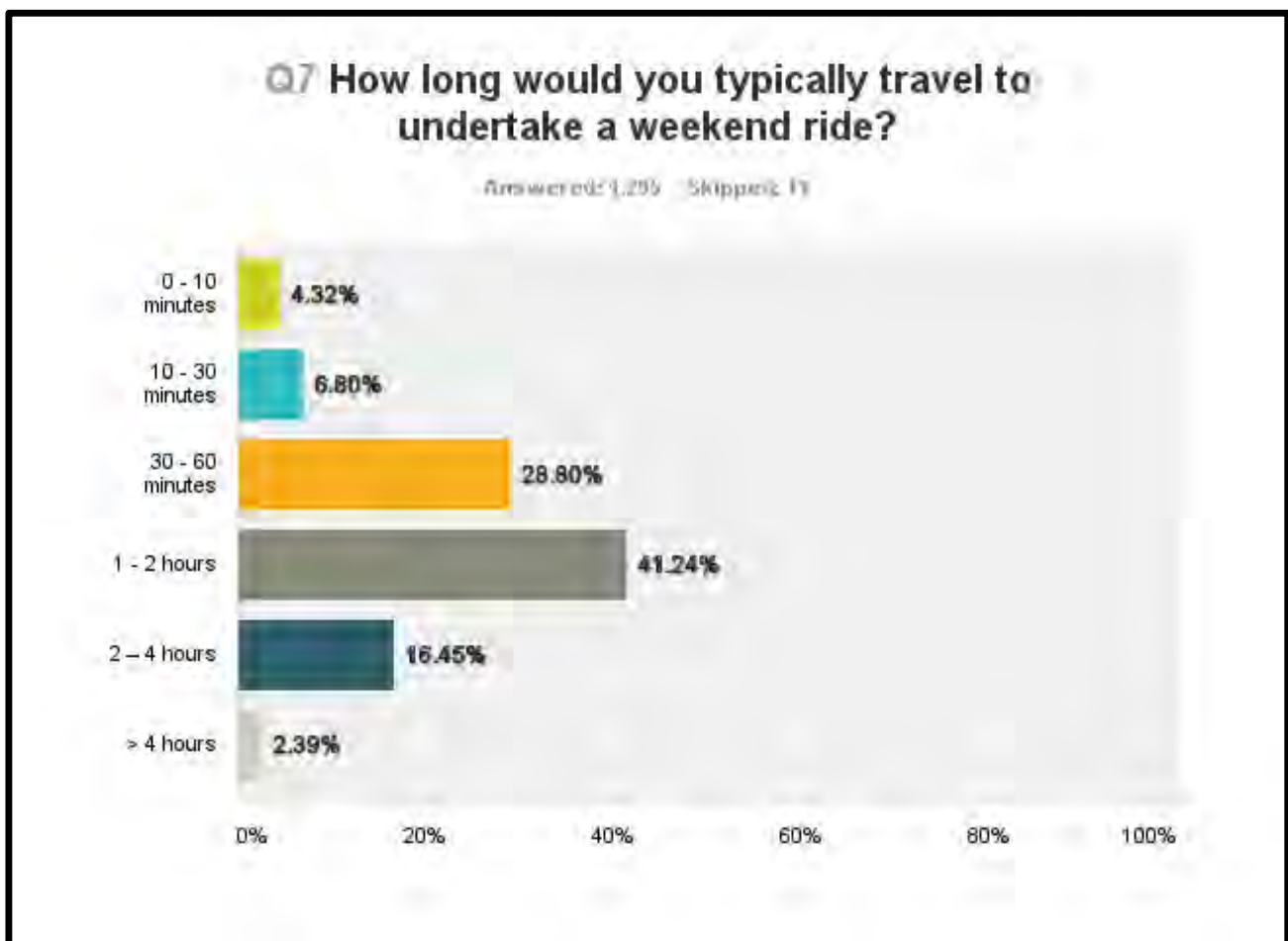
Assuming that most people would travel this 10-60 minutes in a car, and using 60km/h as the average speed¹⁶, this translates to a maximum distance of approximately 60km from Warburton.

¹⁵ Based on the notion that there are two distinct markets for weekday vs. weekend mountain bike visitors..

¹⁶ 60km/h is used as a likely average speed for travel into Warburton, taking into account local speed restrictions, lack of freeway access to Warburton and traffic.



2.2.1.7 Question 7

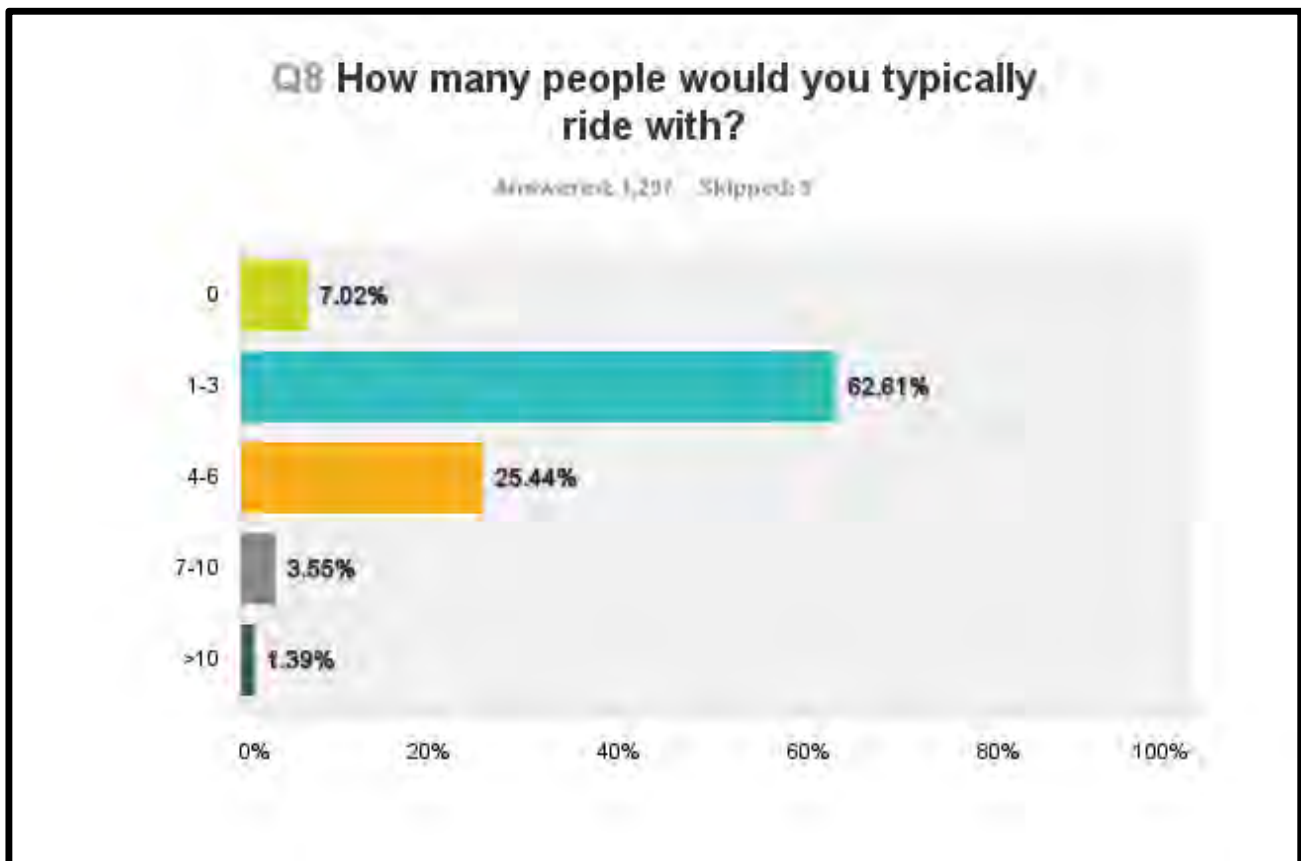


Question 7 aims to determine the catchment area for typical *weekend* usage of the proposed trail developments at Warburton. Answers to this question indicate that users will travel significant distances to ride on weekends – much further than they would for a typical weekday ride.

Note that respondents to this question may be interpreting this question in different ways. Some respondents may undertake a regular weekend ride at a set destination with the same group of friends (similar to the idea of the weekday after-work ride) while others may regularly pack the car on a Saturday morning and head off to explore a new destination – Forrest one week, Castlemaine the next, Warburton the week after. The former group would presumably be less likely to travel long distances than the latter. While both groups are important for the overall visitation to the proposed trail network, the latter group can be thought of as ‘mountain bike tourists’ moreso than the former.



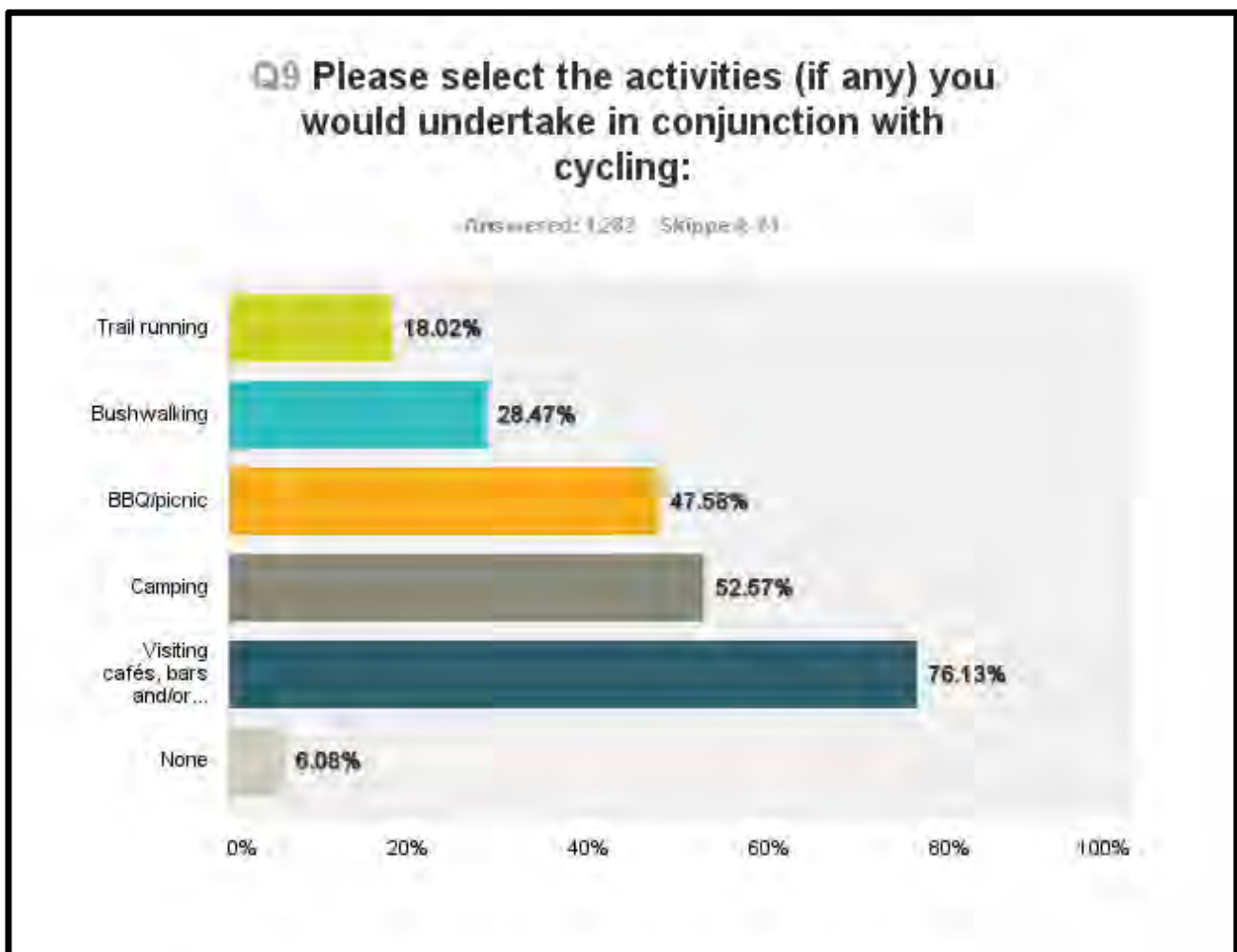
2.2.1.8 Question 8



Question 8 indicates that 62% of riders choose to participate in the sport of cycling with 1-3 other people. Based on this, it is reasonable to assume that many of the estimates made around typical user numbers can be used as 'worst case' figures, and that actual visitation will likely be higher due to users 'bringing a friend'.



2.2.1.9 Question 9



Although it is a common sight to see large groups of cyclists at cafes around Melbourne, Question 9 attempts to quantify this and clearly establishes that 975 of the 1,282 people who completed this survey would visit cafes, bars or restaurants in conjunction with cycling.

Data from question 9 will support the development of infrastructure and commercial opportunities in Warburton should the proposed trail network be developed.

Whilst it is easy to look at the above results and consider what other activities riders *will* participate in, it is worth noting that very few (only 6%) *will not* participate in any other activities.



2.2.2 PARTICIPATION IN THE SPORT OF MOUNTAIN BIKING

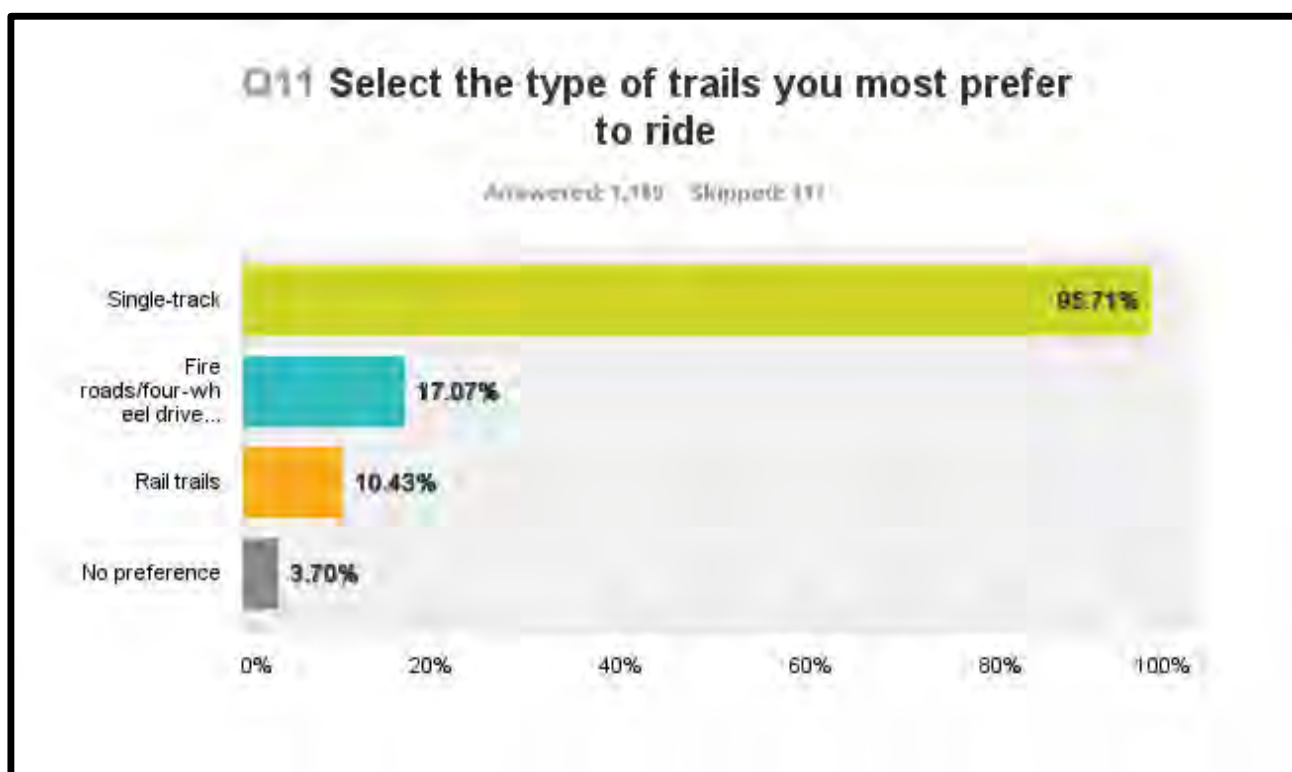
2.2.2.1 Question 10



Question 10 was placed at the beginning of this section to 'filter' respondents, as this section and the next relate solely to mountain biking. The 6% of people who undertook this survey and answered no to this question skipped forward to Question 25. This ensures that this section is only answered by people that participate in the sport of mountain biking.



2.2.2.2 Question 11



Question 11 assists to guide the development of the proposed trail network. Responses indicate a clear and overwhelming preference for single-track.



2.2.2.3 Question 12



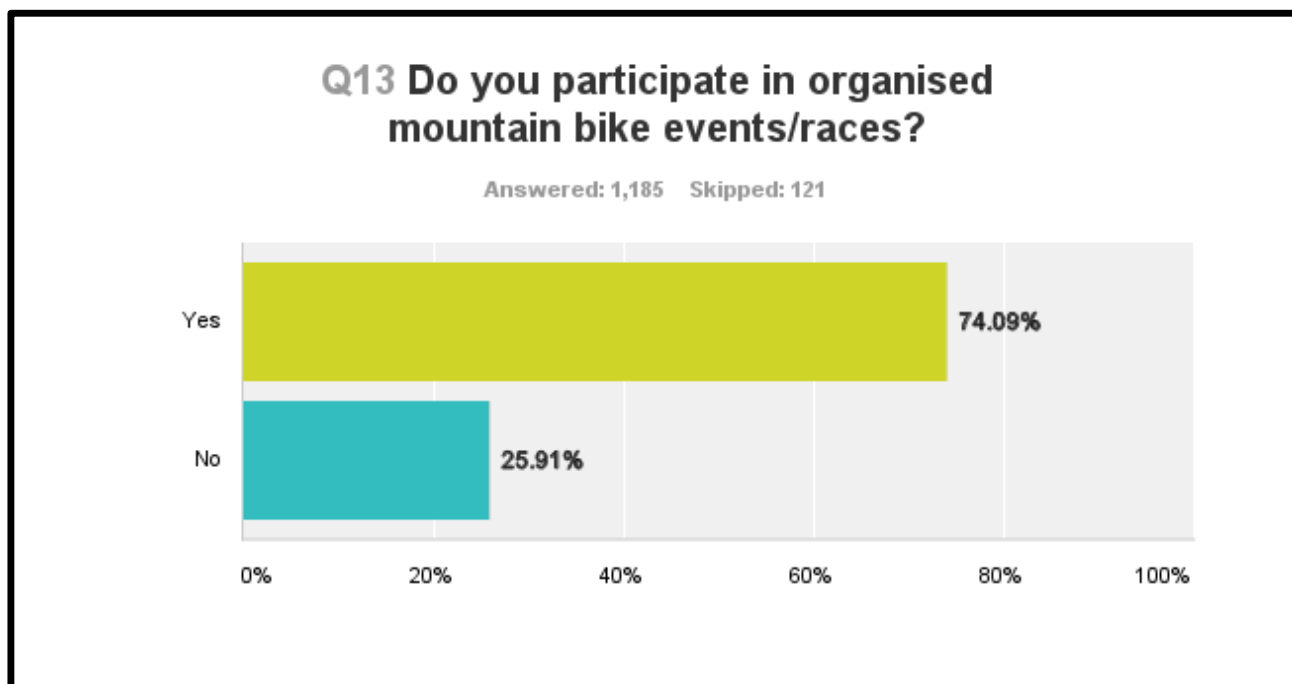
Answers to Question 12 will assist designers to meet the needs of all users when planning the proposed trail network. From the responses received, there is a clear preference for both intermediate and difficult trails.

Typically, trail counters and observations of usage at other destinations suggest that 'intermediate' trails are the most popular.

Note that the answer options did not include a detailed description of each trail difficulty rating and relies on respondents' perception and understanding of what each difficulty rating entails. Respondents' answers also rely on them making a realistic assessment of their own ability.



2.2.2.4 Question 13



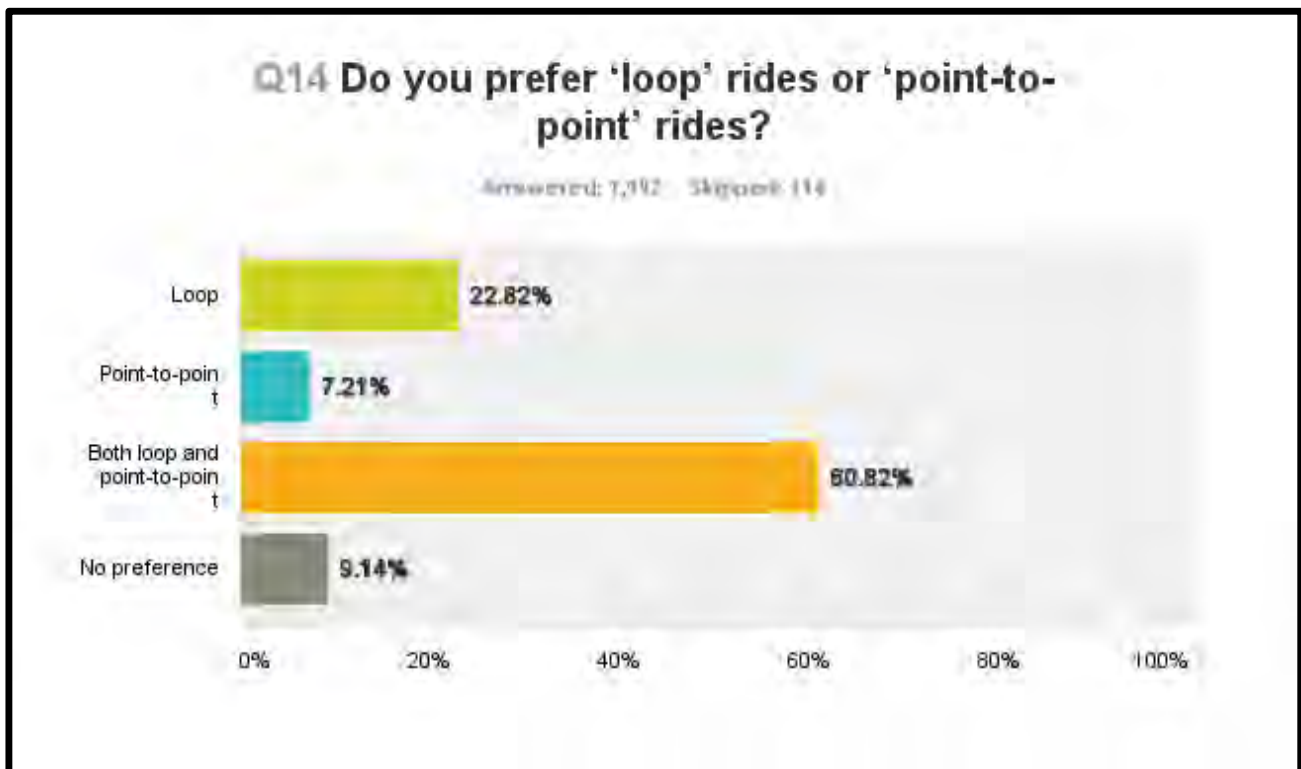
Question 13 was included to gain an understanding of how many of the respondents were likely to participate in races. Events can provide a significant stimulus to local economies and can also help to put destinations ‘on the map’ and draw visitors from further away.

Results show that approximately three quarters of respondents participate in mountain biking events. This is an encouraging number given that approximately 80% of respondents live either within the Yarra Ranges Shire or metropolitan Melbourne (see Question 35) and would likely fall within the catchment area for an iconic mountain biking event.

Whilst this question identifies support for events, it does not specify the types of events that respondents participate in. To provide a more accurate estimate for participation in different event types, answers to Question 13 can be compared to the cycling discipline preference identified in Question 1.



2.2.2.5 Question 14

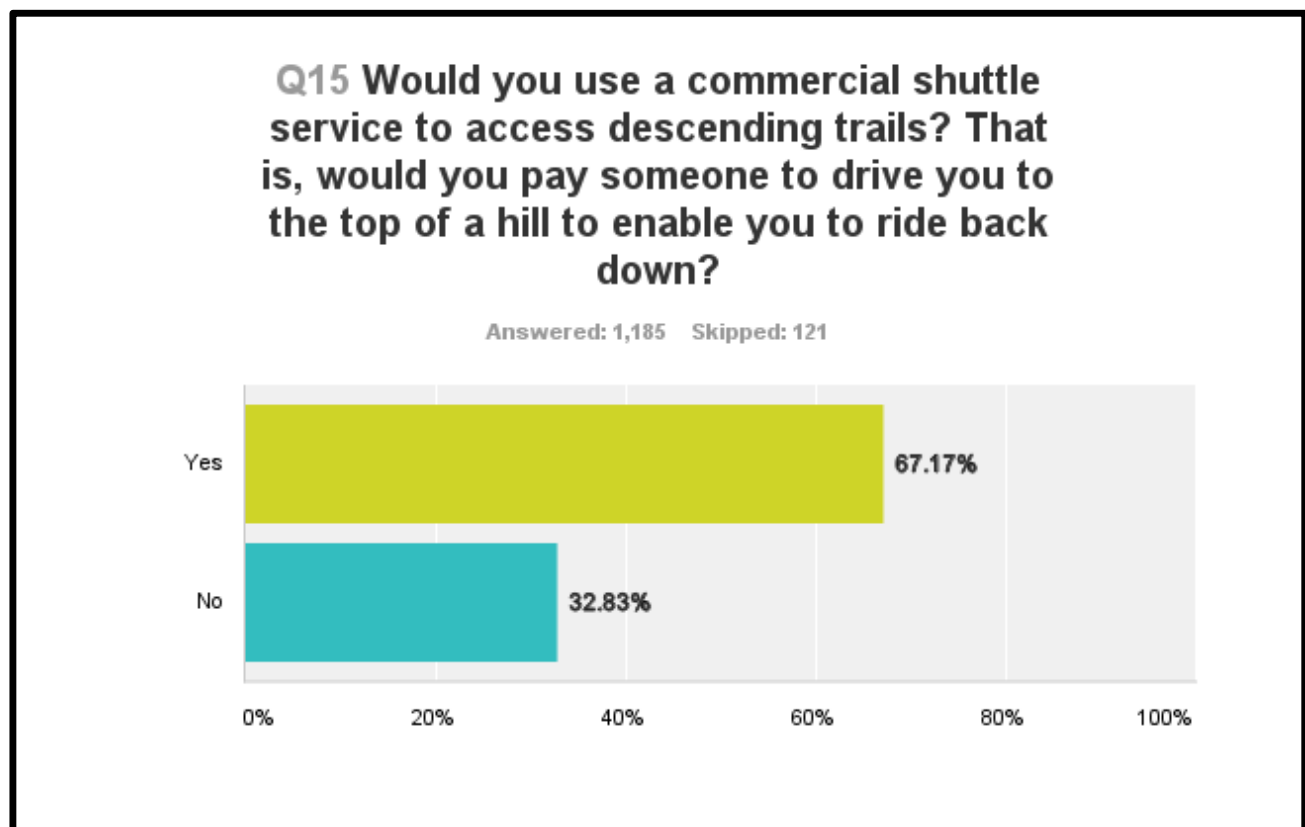


Question 14 aims to establish preferences for either loop or point-to-point trails. Results do not show an overwhelming preference for either one or the other, but show a strong support for a mixture of both.

The response that is easily neglected when considering this data is the fact that such a small percentage of people have no preference at all. In other words, they would rather have a mixture of trails, than have all loop or all point-to-point.



2.2.2.6 Question 15



Question 15 was included in the survey to ascertain support for a commercial shuttle operation. The majority of respondents declared that they would use such a service, however it is important to note that the question did not include any information about the likely cost for this type of service. Should a commercial service be developed in Warburton, successful businesses elsewhere may be used as a guide to price the service appropriately.

In the previous question (Question 14), support for only point-to-point trails was smallest, with only 7.21% of respondents selecting this answer. At first, this may appear to contradict the support shown in Question 15 above for a shuttle services. However, based on the responses received regarding cycling disciplines, trail difficulty and trail type, a key benefit of a shuttle service is the ability to transport riders to the highest point of a trail network, from where they would select the return route that best suits their preferred disciplines, namely cross-country, all-mountain or downhill.



2.2.2.7 Question 16



Question 16 once again investigates commercial opportunities for local businesses that might be supported by the development of a mountain bike trail network. In particular, it asks whether people would hire bikes when travelling to a mountain bike destination.

Many cyclists are passionate about the bikes they choose to ride, and as such it was not a great surprise to see that most people indicated a preference for taking their own bike. Despite this however, 234 of the 1,186 people who answered this question *would* hire a bike when travelling to a mountain bike destination, indicating that bike hire as a commercial opportunity warrants further investigation.

It should be acknowledged that this question was quite broad in that it did not specify bike types, costs or level of equipment that hirers might seek.



2.2.2.8 Question 17

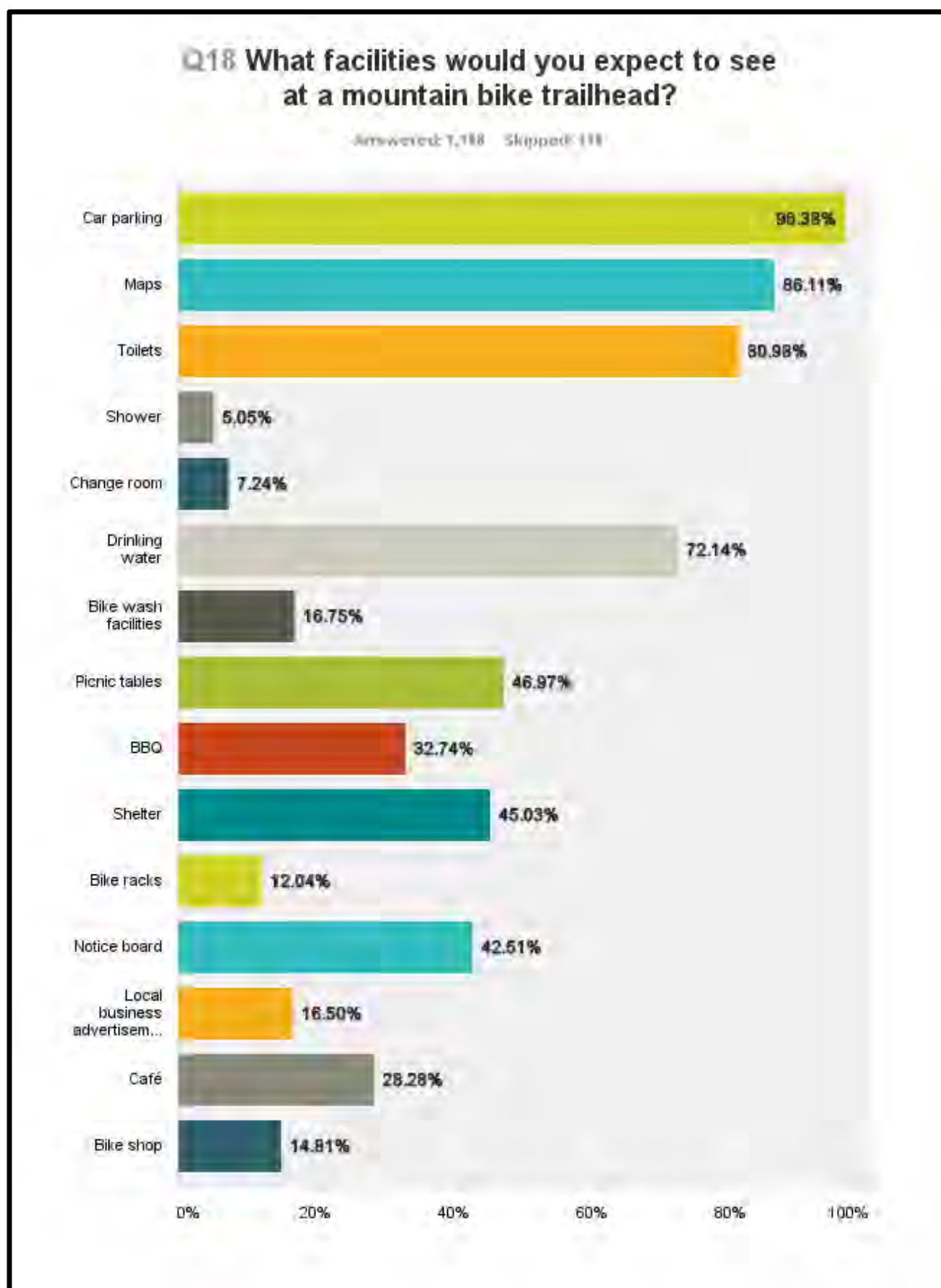


Question 17 posed an oft-debated question surrounding mountain bike trail networks – should trails be one-way or dual-direction?

64% of people favoured one-way trails whilst the majority of the remainder had no preference. These results support World Trail's preference for one-way trails. The key benefits of one-way trails are the mitigation of head-on collisions, better visitor experiences and more sustainable trail construction methods.



2.2.2.9 Question 18



Responses to question 18 included a 'wish list' for the ultimate trailhead, but rather than asking what respondents *want*, it asks what they *expect*. This is an important distinction as it helps to determine what facilities are 'essential' for a trailhead and what facilities are 'nice to have'.

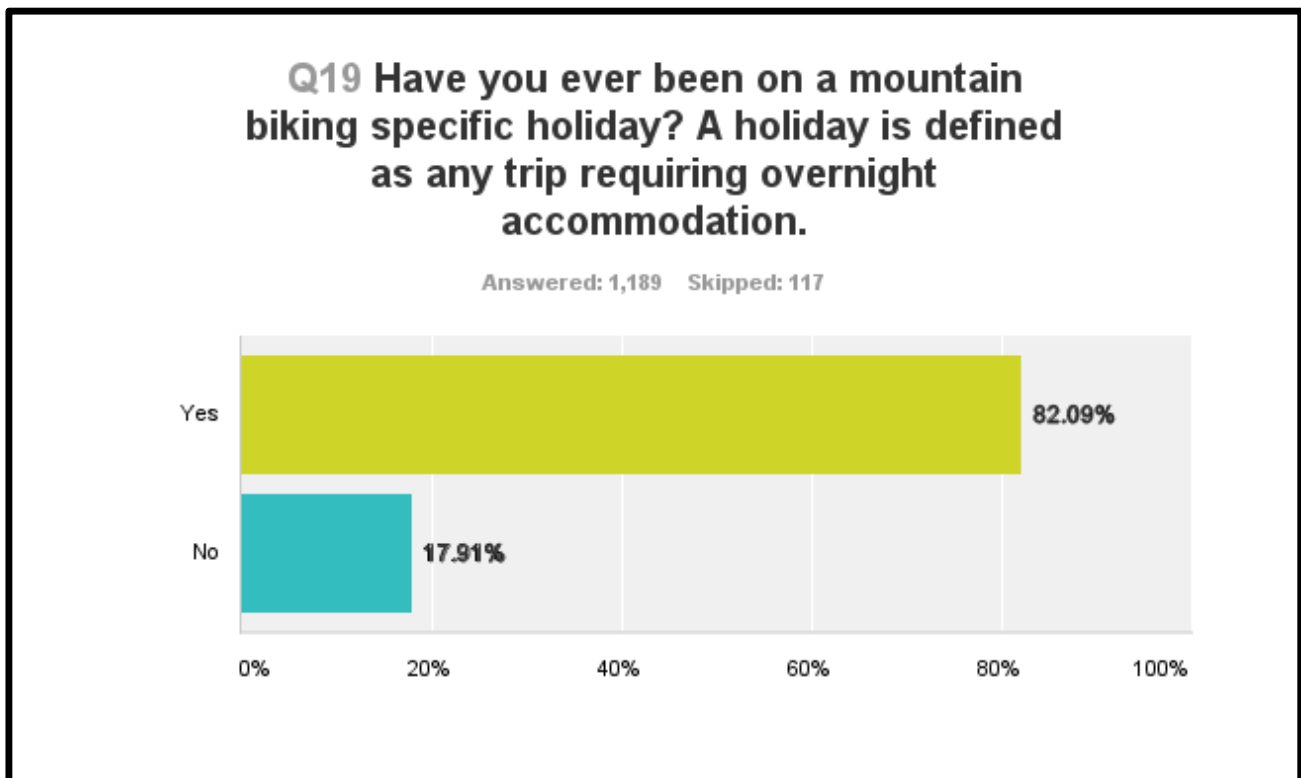
For the purpose of assessing this data, we have broken responses down as follows:

- Essential (50-100% of respondents expect to see these at a trail head):
 - Car parking;
 - Maps;
 - Toilets;
 - Drinking water;
- Preferred (30-49% of respondents expect to see these at a trail head):
 - Picnic tables;
 - BBQ's;
 - Shelter;
 - Notice boards;
- Nice to have, but not necessary (<29% of respondents expect to see these at a trail head):
 - Shower;
 - Change room;
 - Bike wash facilities;
 - Bike racks;
 - Local business advertisements;
 - Cafés (note – as established in question 9, access to cafés is important, however they do not need to be located at the trail head);
 - Bike shop.



2.2.3 MOUNTAIN BIKE TOURISM

2.2.3.1 Question 19

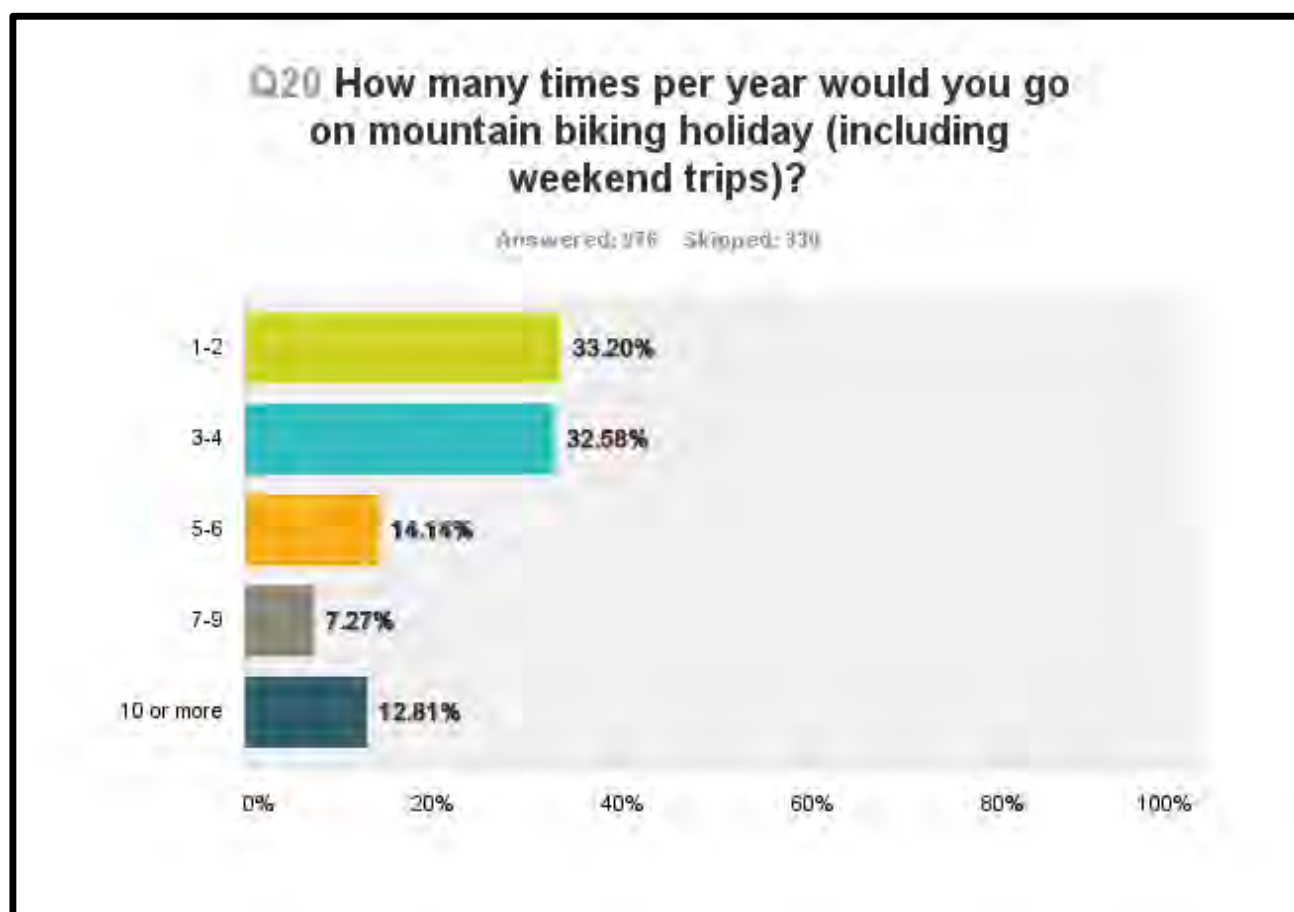


Earlier in the survey, Question 10 acted as a filter for non-mountain bikers to skip non-relevant sections. Question 19 again provides another filter – respondents that answered no to this question, skipped forward to Question 25.

The results to question 19 showed that a significant 82.09% of the 1,189 people who responded to this question had in fact taken a mountain bike specific holiday.



2.2.3.2 Question 20



Question 20 gives us an idea of how often people typically take a mountain bike holiday each year. Answers to this question can be used in conjunction with the Question 21 to estimate the average number of nights that respondents spend on mountain biking holidays per year. These figures will assist in providing insight into tourism opportunities for Warburton.



2.2.3.3 Question 21

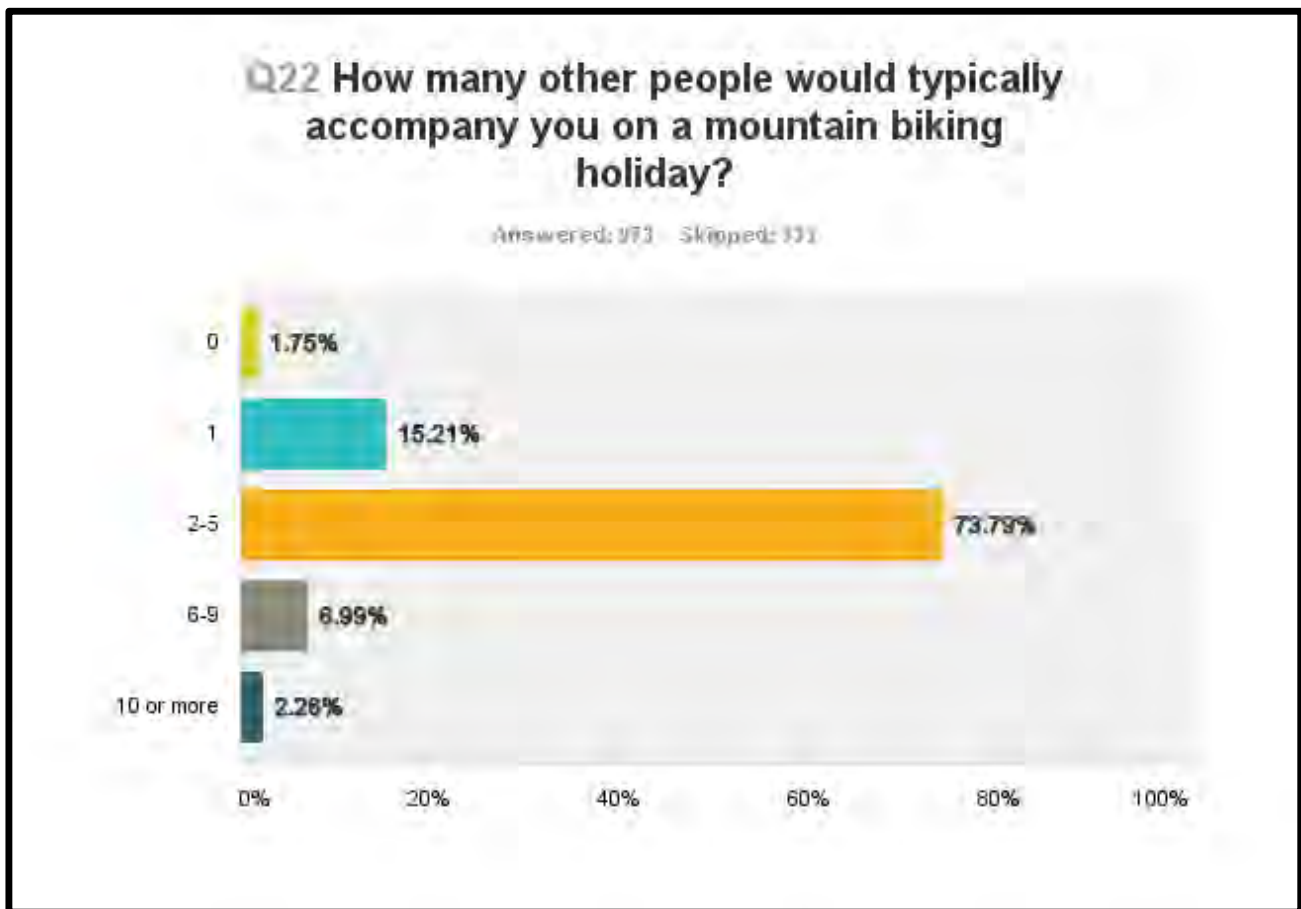


An important aspect of mountain bike tourism is the number of ‘bed nights’ that visitors will spend when visiting their destination.

72.9% of respondents to this question selected 1-2 nights as the length of stay for a typical mountain biking holiday – most likely a typical weekend getaway. Based on an average of 1.5 nights each, the respondents contribute 1065 bed nights during each weekend holiday. The 23% of respondents who selected ‘3-5’ nights (an average of 4 nights each) would contribute 896 bed nights during one holiday, however it is assumed that they would holiday less frequently.



2.2.3.4 Question 22



A common factor discussed when considering mountain bike tourism is the number of people that will accompany riders on their trip. Often, not all members of the group will ride, despite mountain bike trails being the primary reason behind the selection of their destination.

Responses to Question 22 confirm that 73.79% of people will bring 2-5 people with them when taking a mountain bike holiday.



2.2.3.5 Question 23



Question 23 will assist to determine a catchment area for Warburton as a mountain bike tourism destination. This question allowed for multiple responses, in other words, people could select that they would drive up to five hours within Australia and/or, fly overseas to take a mountain biking holiday. This question has similarities to Question 6 and 7, which tried to ascertain how far people would travel for a weekday and weekend ride respectively.

The most significant response is that people consider driving up to 5 hours as no barrier. Perhaps the most significant aspect of all responses however, is that that people will go to great lengths to travel for their sport, with the lowest response being the option that requires the least amount of effort, 'drive up to 2 hours'.

It is also interesting that more people would currently choose to fly overseas for a mountain biking holiday than fly within Australia for a mountain biking holiday.



2.2.3.6 Question 24



While these responses do not break down expenses into things like bed nights, travel expenses, meals etc., it does continue to support the economic case for mountain bike tourism when used in conjunction with the questions earlier in this section.

As for question 4, it is possible to add up the responses, using the median value for each spending band¹⁷ (i.e. the median of the \$3,00 - \$6,000 band is \$4,500). In total, the 972 people who answered this question spend a combined amount of approximately \$1,167,000 on a typical mountain biking holiday.

Dividing this total by the number of respondents (972), it is estimated that a typical mountain biking holiday costs around \$1,200.

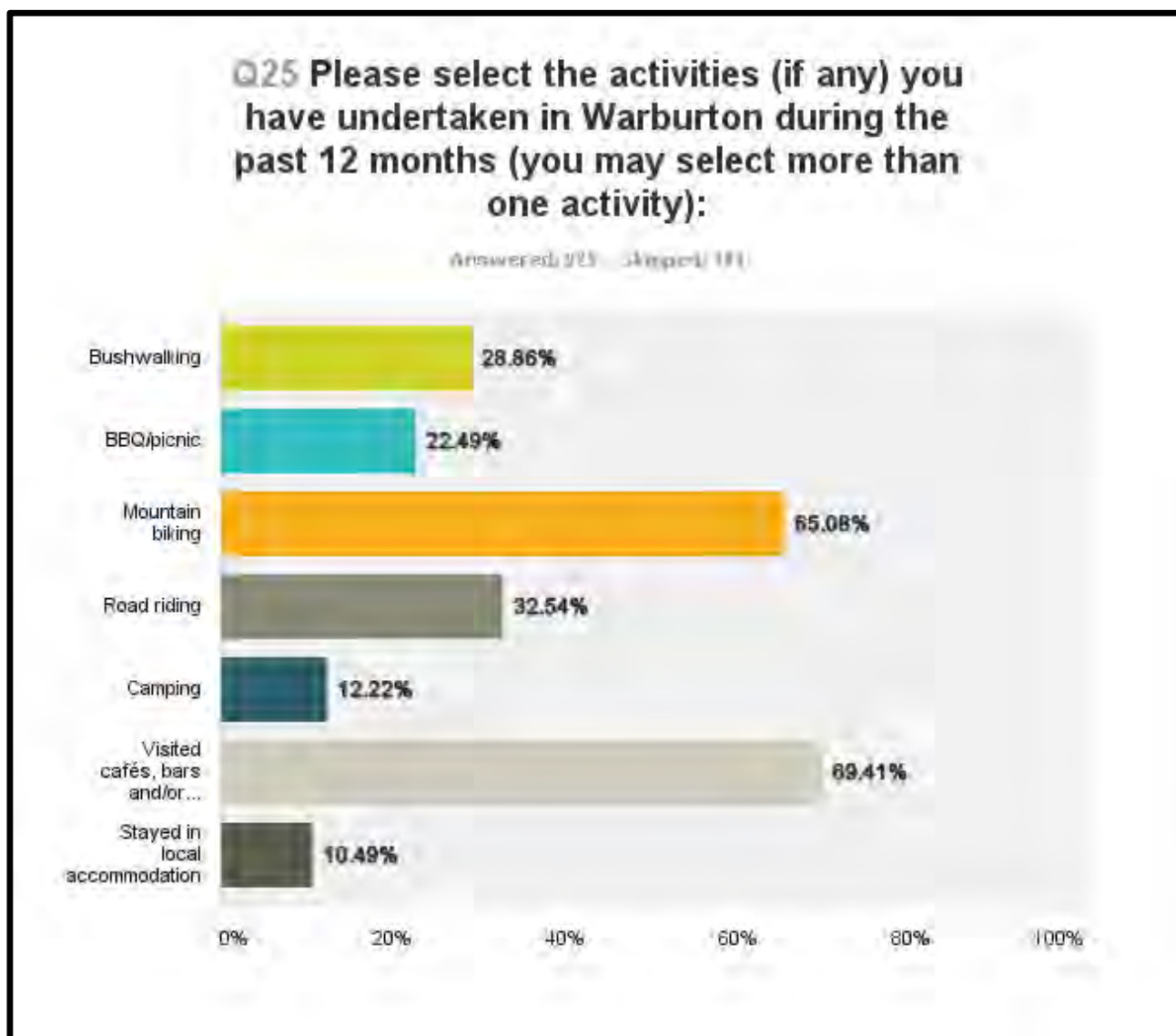
¹⁷ With the exception of the highest value band '\$6,000 or more'. For this band, a value of \$6,000 is used.



2.2.4 WARBURTON

This section seeks to determine the reasons people currently visit Warburton and the frequency of those visits (including seasonal visitation). It goes on to introduce the subject of the proposed mountain bike trails in Warburton, and to clarify whether those trails would change their current visitation habits.

2.2.4.1 Question 25

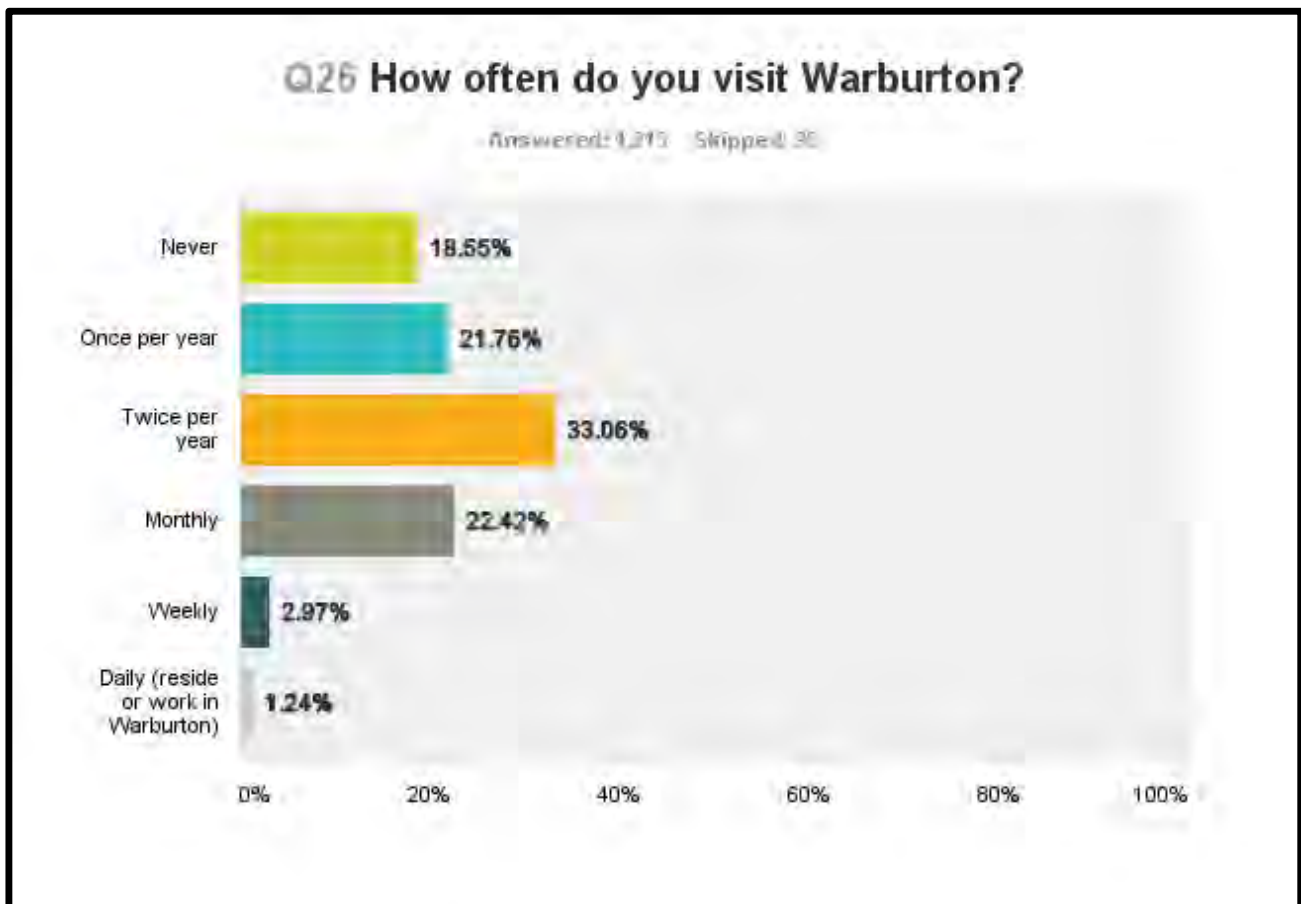


Question 25 above lists the activities respondents are currently undertake when visiting Warburton. The responses of most interest are:

1. Relatively few people currently stay in local accommodation;
2. There is an existing cycling culture (both road riding and mountain biking). The 65% recorded for mountain biking is extremely interesting, as there are currently no formally recognised mountain biking trails available in Warburton;
3. Cafés, restaurants and/or bars continue to be a popular choice for cyclists.



2.2.4.2 Question 26

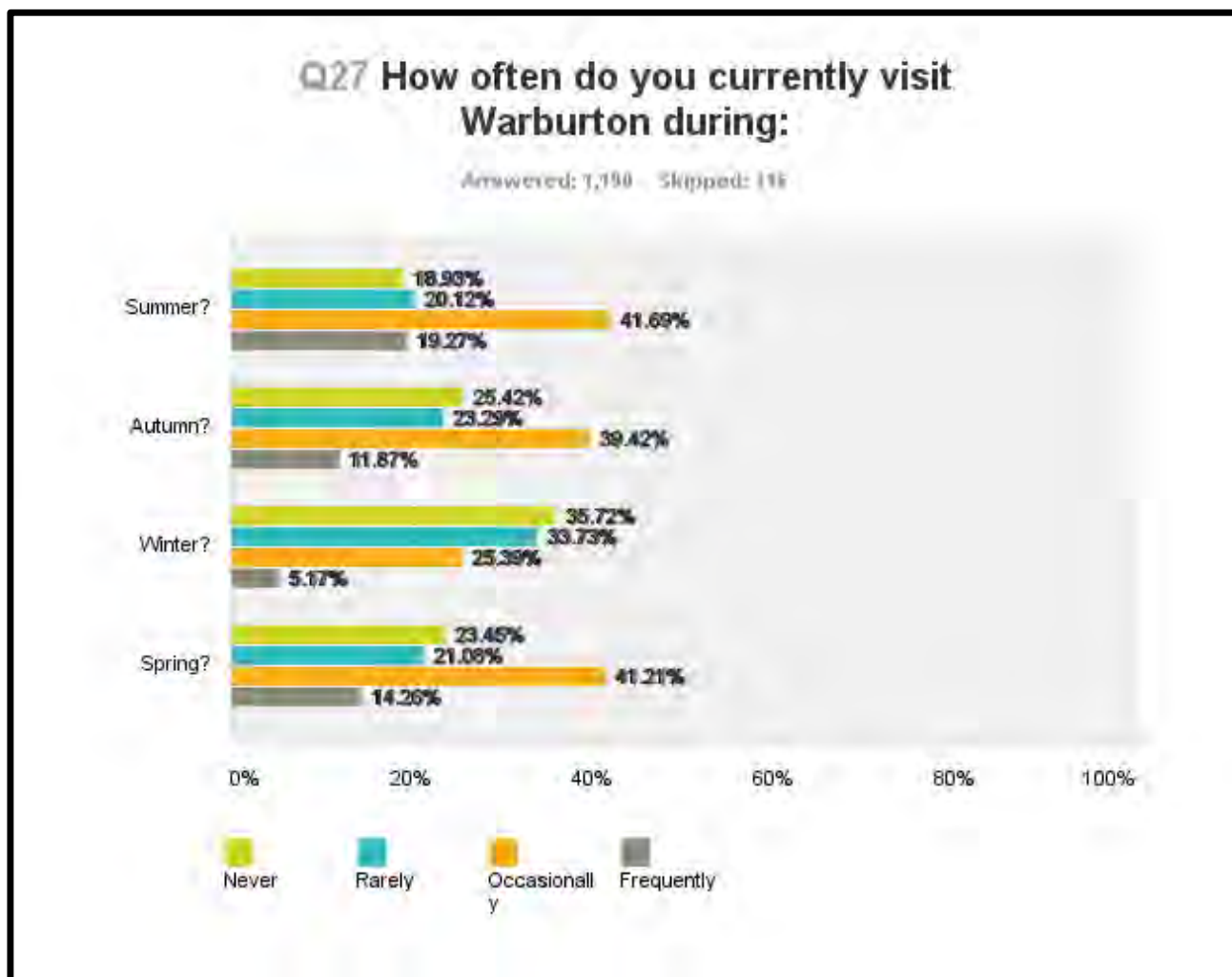


Question 26 asks how often people currently visit Warburton. This is simply to establish current general visitation, with the most popular answer being 'twice per year' at 33.06%.

For the purpose of calculating anticipated changes to these habits, comparing Question 27 and 28 will provide a more detailed picture as visitation has been broken down seasonally.



2.2.4.3 Question 27

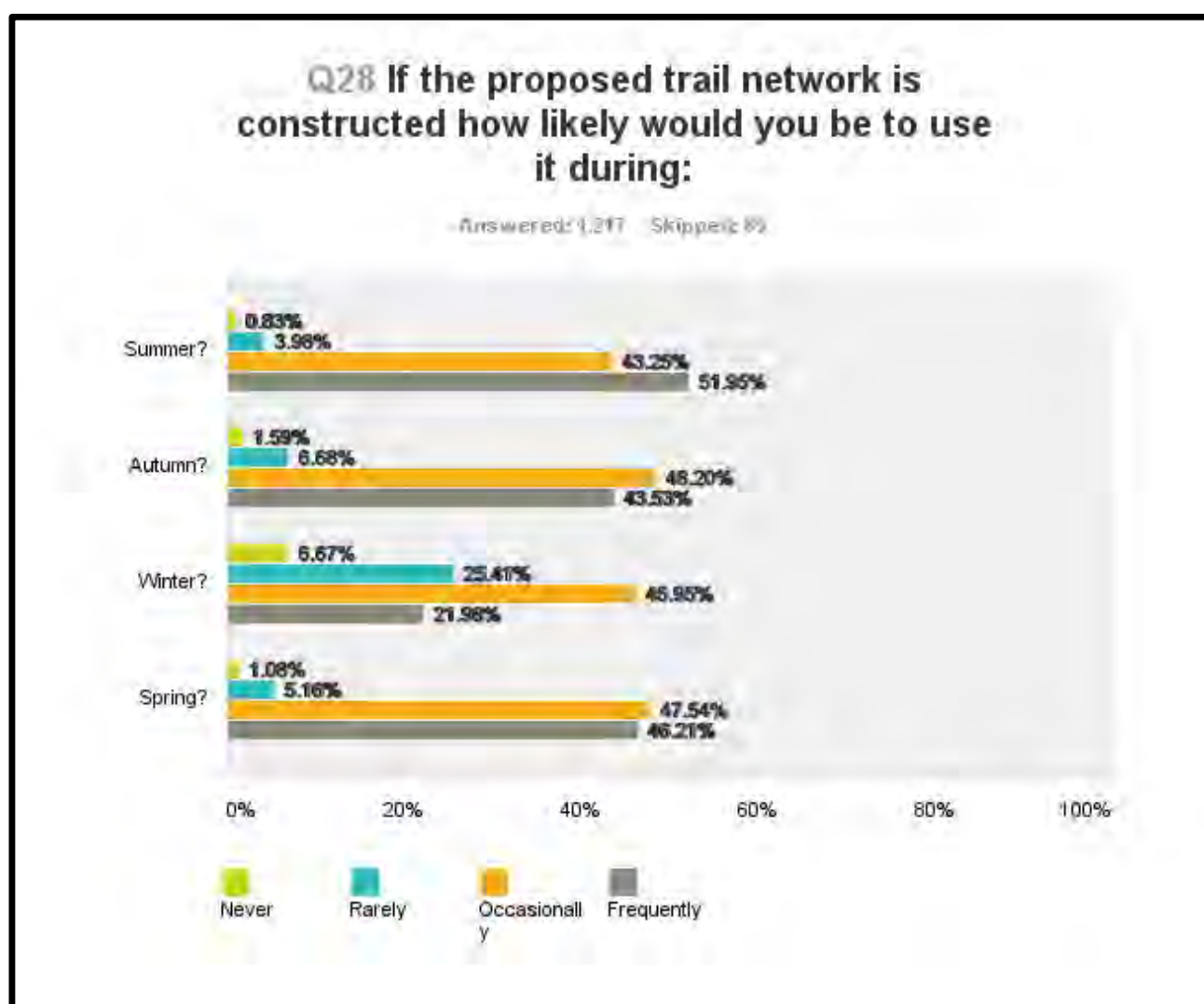


As indicated above, tourism in Warburton currently fluctuates throughout the year, peaking in summer and bottoming out during winter. This 'seasonality' provides difficulties and lack of certainty for local tourism operators.

The purpose of this question was to collect the base data for comparison with answers to the following question.



2.2.4.4 Question 28



Question 28 asks respondents to estimate how often they believe they would visit Warburton if the proposed mountain bike trails were constructed. The responses above show that the likelihood of respondents visiting Warburton has increased significantly.

A comparison of Question 27 and 28 is provided in Table 7 below.

Table 7. Comparison of Questions 27 and 28

	Never		Rarely		Occasionally		Frequently	
	Current (without MTB trails)	Future (with MTB trails)	Current (without MTB trails)	Future (with MTB trails)	Current (without MTB trails)	Future (with MTB trails)	Current (without MTB trails)	Future (with MTB trails)
Summer	18.93%	0.83%	20.12%	3.98%	41.69%	43.25%	19.27%	51.95%
Autumn	25.42%	1.59%	23.29%	6.68%	39.42%	48.20%	11.87%	43.53%
Winter	35.72%	6.67%	33.73%	25.41%	25.39%	45.95%	5.17%	21.98%
Spring	23.45%	1.08%	21.08%	5.16%	41.21%	47.54%	14.26%	46.21%



The most important findings revealed by this comparison are:

1. The construction of the proposed trails has a very noticeable change on people's likely visitation patterns to Warburton. The number of people that *never* or *rarely* visit Warburton will decrease substantially with the construction of the proposed trails, while the number of people that *occasionally* or *frequently* visit Warburton will increase substantially. This effect is most noticeable at the extreme ends – that is, the '*never*' and '*frequent*' visitors;
2. The number of people who *never* visit Warburton will decrease significantly across all seasons if the proposed mountain biking trails are constructed;
3. The number of people who *frequently* visit Warburton will increase significantly across all seasons if the proposed mountain biking trails are constructed;
4. The seasonality of visitation to Warburton will remain even with the construction of the mountain bike trails, however the volume of winter visits is likely to be greater. This should help to provide some certainty for local tourism operators.



2.2.4.5 Question 29

Question 29 was an open-ended question that asked people to type in their favourite area to ride in Warburton at present.

597 people answered the question, while 709 skipped it.

The intention of this question was to simply try to capture as much information about people's current riding habits in Warburton and where there may be existing (informal) mountain biking trails.

Of the 597 answers actually entered into the survey, all included variations or combinations of the following:

- Acheron Way;
- Ada River;
- Ada Tree;
- Big Pats Creek;
- Fire trails;
- La La Falls;
- Lilydale - Warburton Rail Trail;
- Local DH trails - Mt Bride Rd, La La Falls, Old Warburton Rd;
- Mineshaft Hill;
- Mt Bride Rd area;
- Mt Donna Buang;
- Mt Little Joe;
- O'Shannassy Aqueduct;
- Silvan;
- Smythes Creek Rd;
- Starlings Gap Rail Trail;
- Tracks off Old Warburton Rd;
- Tramways;
- Warramate;
- Yarra State Forest.

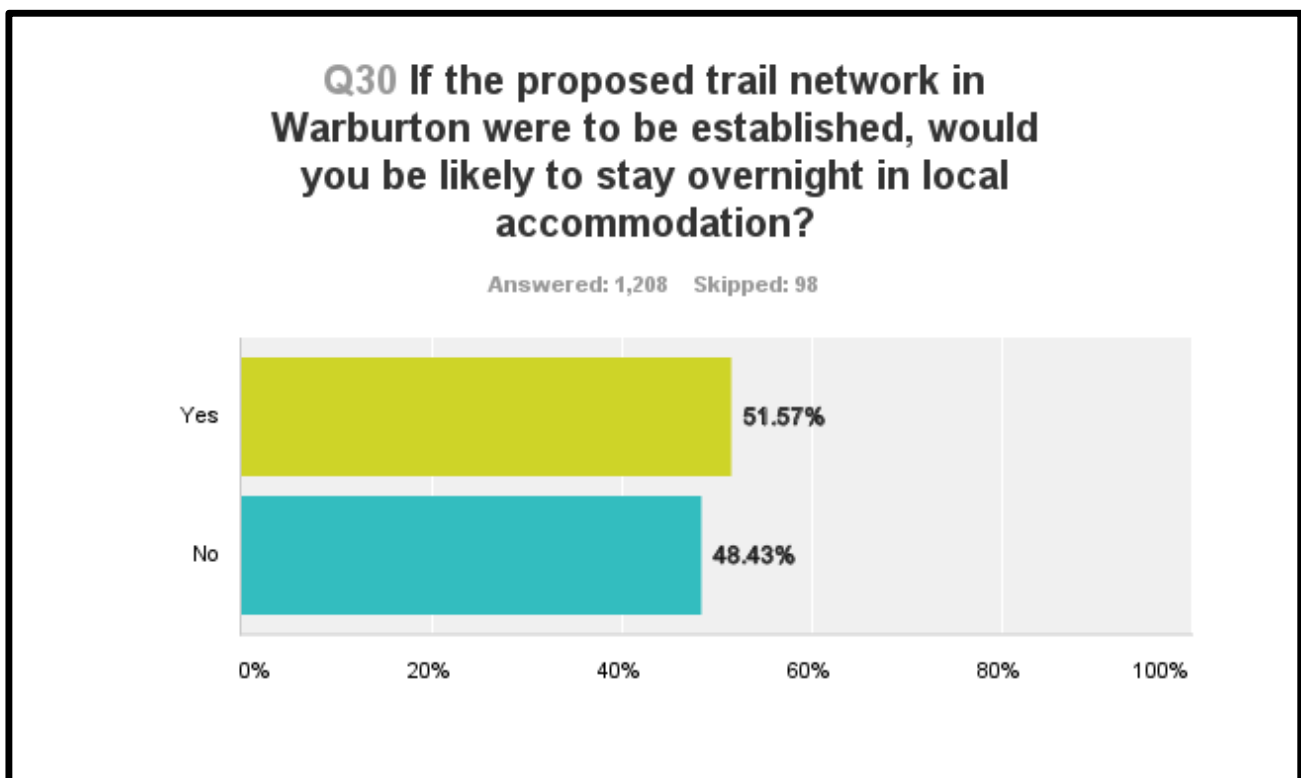
The answers also reveal two opposing viewpoints amongst mountain bikers:

- Many mountain bikers that answered the survey had the common perception that there are no mountain biking specific singletracks in Warburton currently;
- On the other hand, there appeared to be a good awareness of the downhill trails (despite their informal status) amongst a certain segment of the mountain bike community.

The full, unedited answers to this question can be found in Appendix 4.



2.2.4.6 Question 30

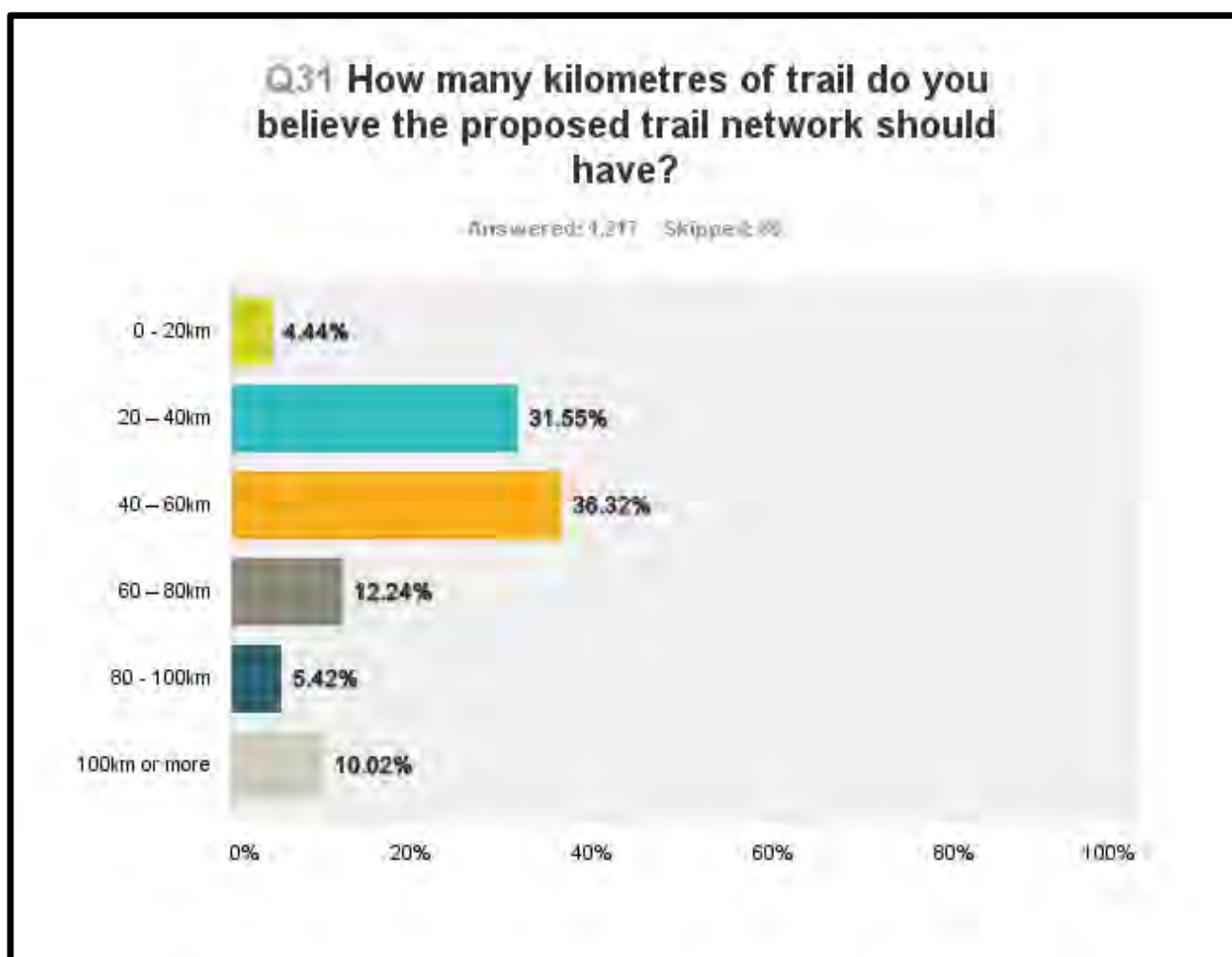


Question 30 asks whether respondents would be likely to stay overnight in local accommodation following the construction of the proposed mountain bike trails in Warburton. 51.57% (623 of 1,208 people) declared that they would.

Of the 623 people who would likely stay in accommodation to utilise mountain bike trails, 504 had declared in Question 25 that they had not stayed in accommodation in Warburton during the past 12 months. This data makes a strong case for increased visitation and overnight stays in Warburton with the construction of the proposed trail network.



2.2.4.7 Question 31



Question 31 asks how many kilometres of purpose-built mountain bike trail people would like to see constructed in the Warburton area. This broadly indicates community expectations for the size of the proposed network.

The above data should not be used as the sole basis for deciding the size of the overall trail network, as it does not take into consideration preferred disciplines. For example, a downhill rider will select a smaller overall network size (e.g. 0-20km) as their preferred trails are relatively short. They would however prefer comparatively more downhill trails be constructed within the network than a cross-country rider. Network size and trail type will be dictated more by the user types and the distance requirements for each of these users to enjoy an optimal experience.



2.2.4.8 Question 32



Question 32 clearly identifies strong support for the development of a mountain bike trail network in Warburton.



2.2.4.9 Question 33

Question 33 was an open-ended question where respondents were asked to type in any factors that may prevent them from using the proposed trail network at Warburton.

501 people answered the question, while 805 skipped it.

The most common themes to emerge were:

- Bad weather;
- Cost;
- Distance/time;
- Family/work commitments;
- Fees/charges to ride trails;
- Lack of facilities - toilets, camping, hospitality, car parking, signage;
- Lack of shuttle service or shuttle-able road;
- No barriers;
- Potentially too many riders;
- Trails not hard enough;
- Trails poorly designed or built;
- Trails poorly maintained.

‘None’ was a common response – i.e. there are no barriers – while many other people cited external barriers such as time, family/work commitments etc. A substantial number of people also cited ‘bad weather’ as a potential barrier.

It should be remembered that these are not comments on the current level of trails/infrastructure but hypothetical barriers that might prevent people from visiting Warburton to use the proposed trail network if it is constructed.

The full, unedited answers to this question can be found in Appendix 4.



2.2.4.10 Question 34

Question 34 was another open-ended question, this time asking people for other comments or suggestions regarding the proposed development of a trail network at Warburton.

819 people skipped the question and 487 people responded.

The comments were generally very positive. Common answers/themes were:

- Existing trails should not be altered or modified;
- Great location, with excellent potential due to natural terrain, scenery and proximity to Melbourne;
- Let the local riders have input into design and construction of new trails;
- There should be easy/family friendly trails;
- Trails should be difficult and highly technical;
- Trails should be located close to town;
- Trails should be single-direction;
- Trails should be suitable for all weather conditions;
- Trails should connect to the rail trail and aqueduct.

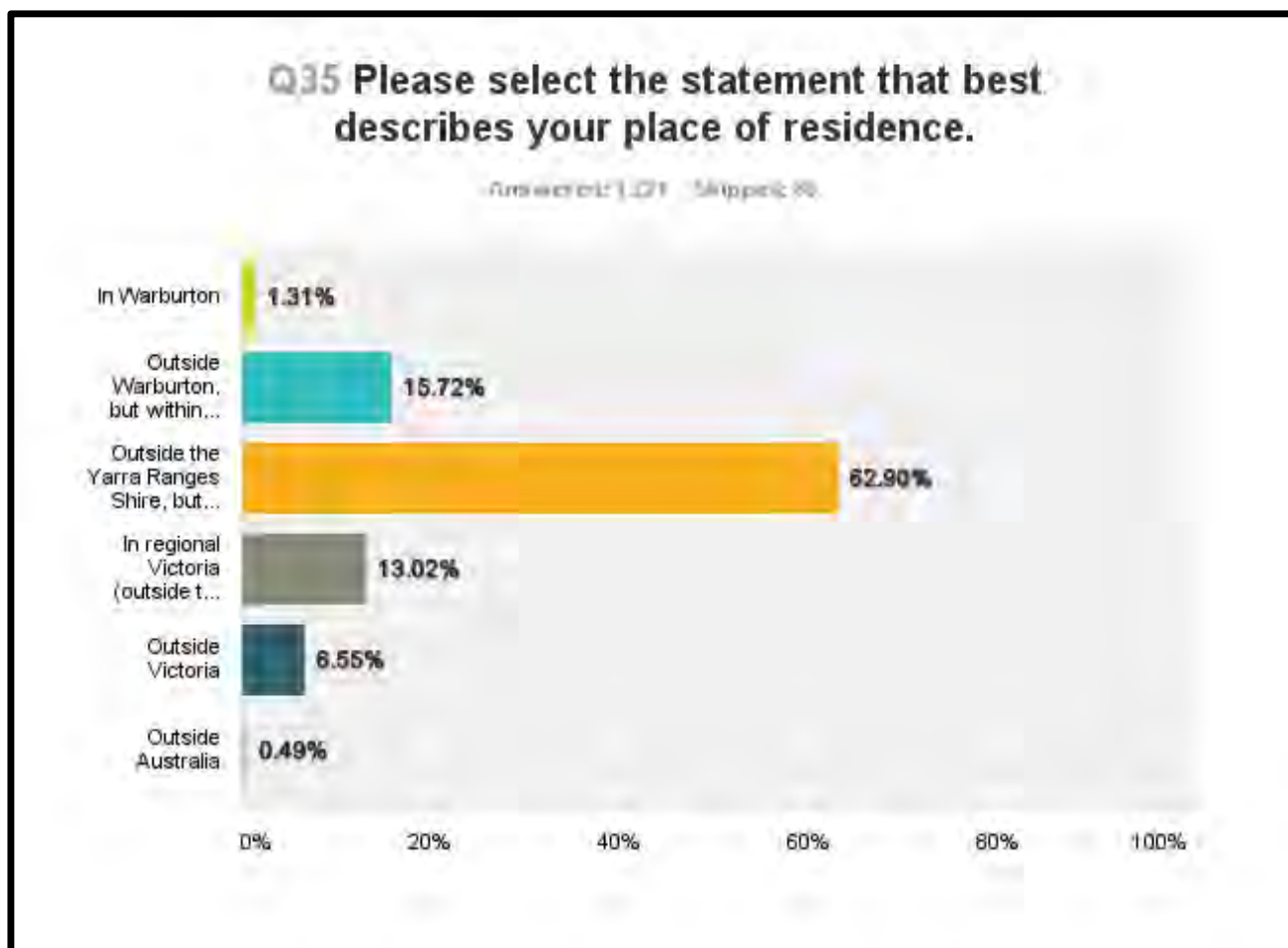
The full, unedited answers to this question can be found in Appendix 4.



2.2.6 DEMOGRAPHIC INFORMATION

This section provides us with some basic demographic information for respondents, including place of residence, income, marital status, age and gender. Many similar surveys have been undertaken in the past that have found similar conclusions.

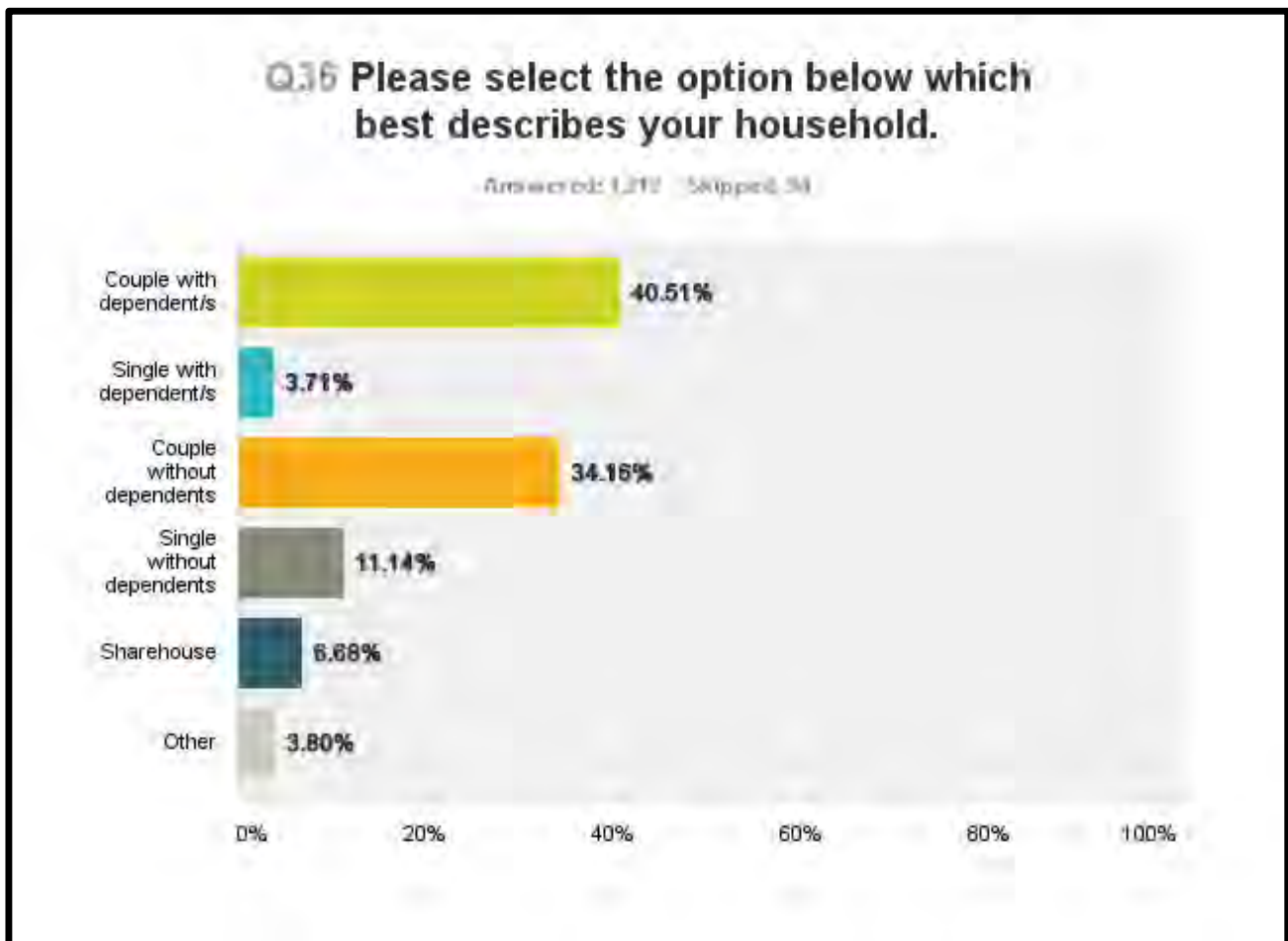
2.2.6.1 Question 35



Question 35 asks where respondents reside. This has important implications when compared with answers to questions 6, 7 and 23, which aim to determine a catchment area for mountain bike visitation.



2.2.6.2 Question 36



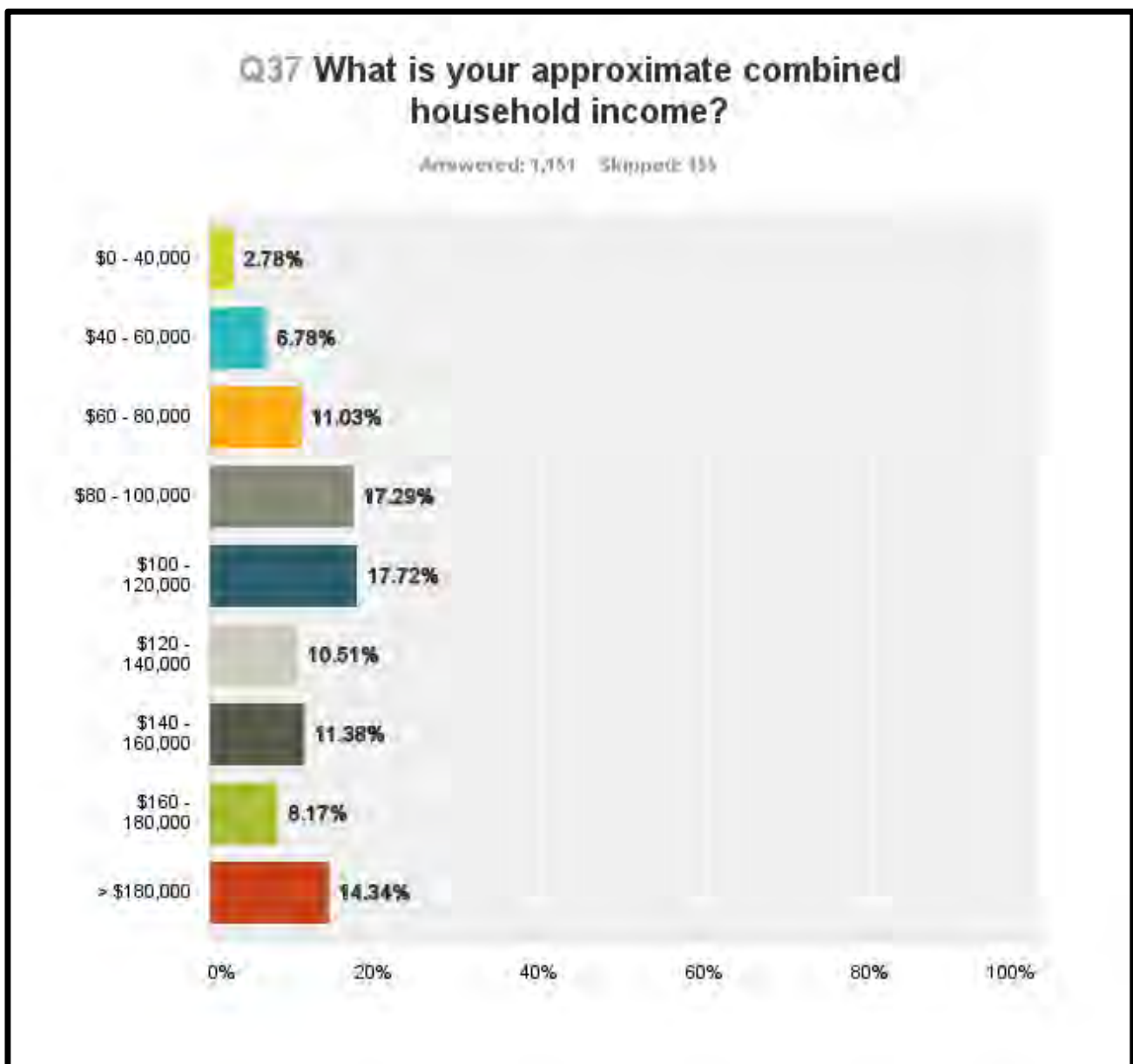
Question 36 asks for the best description of the respondents' household, in particular their relationship status and whether they have dependants.

Answers to this question show that the most common respondents (40.51%) were couples with children, followed by couples without children (34.16%).

Demographic questions within this survey are high level and do not aim to collect detailed information such as the age of the respondents children. However the data above does suggest that couples and families will form a significant portion of the target market.



2.2.6.3 Question 37



Earlier in this survey, it was established that only 2.91% of respondents believed that cost was not a barrier for them to participate in the sport of cycling (Question 4). This was despite respondents spending an average of \$4,167 each on cycling per year (Question 5). Interpreting the data, it appears that, either cyclists earn enough money not to worry about the costs, or they happily make sacrifices in other aspects of their lives to enable them to participate.

Answers to Question 37 show a reasonable spread of household incomes, but don't provide any indication of how many people may be contributing to this income. By filtering the data according to the responses in Question 36, the following is revealed:

- Over 70% of couples have a combined income of over \$100,000;
- Approximately 36% of singles have an income of over \$100,000, but most singles earn between \$40,000 and \$120,000;



- There is a significant number of households with a combined income of greater than \$180,000.

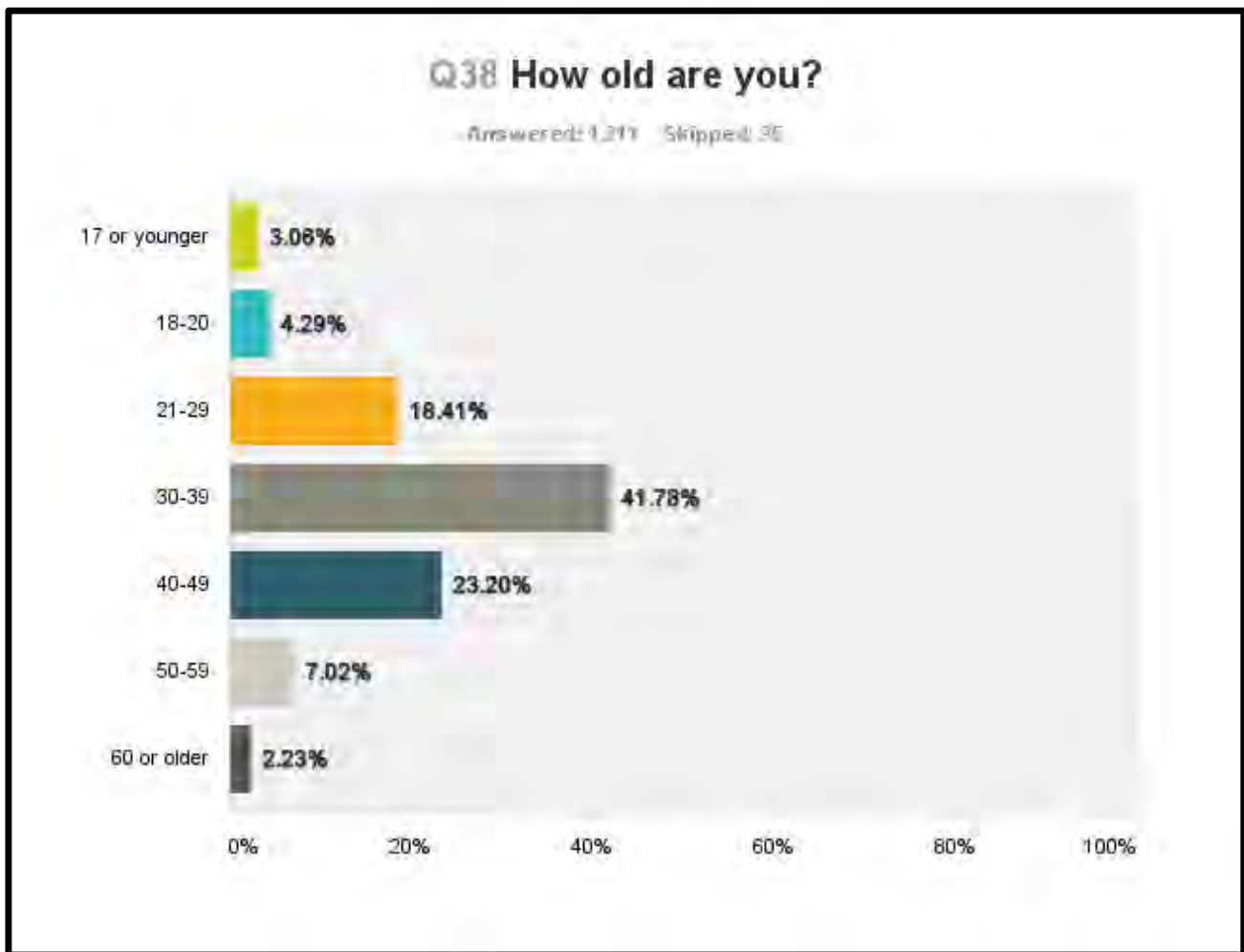
Finally, as per previous questions, this data can be used to calculate the total approximate household income of all the respondents to the survey, and an average household income. Using the median value for each income band¹⁸ (i.e. the median of the \$100,000 - \$120,000 band is \$110,000), the 1,151 people who answered this question have a combined household income of approximately \$134,840,000.

Dividing this total by the number of respondents (1,151), it is estimated that the average household income of all the respondents to the survey is \$117,150.

¹⁸ With the exception of the highest value band '\$180,000 or more'. For this band, a value of \$180,000 is used.



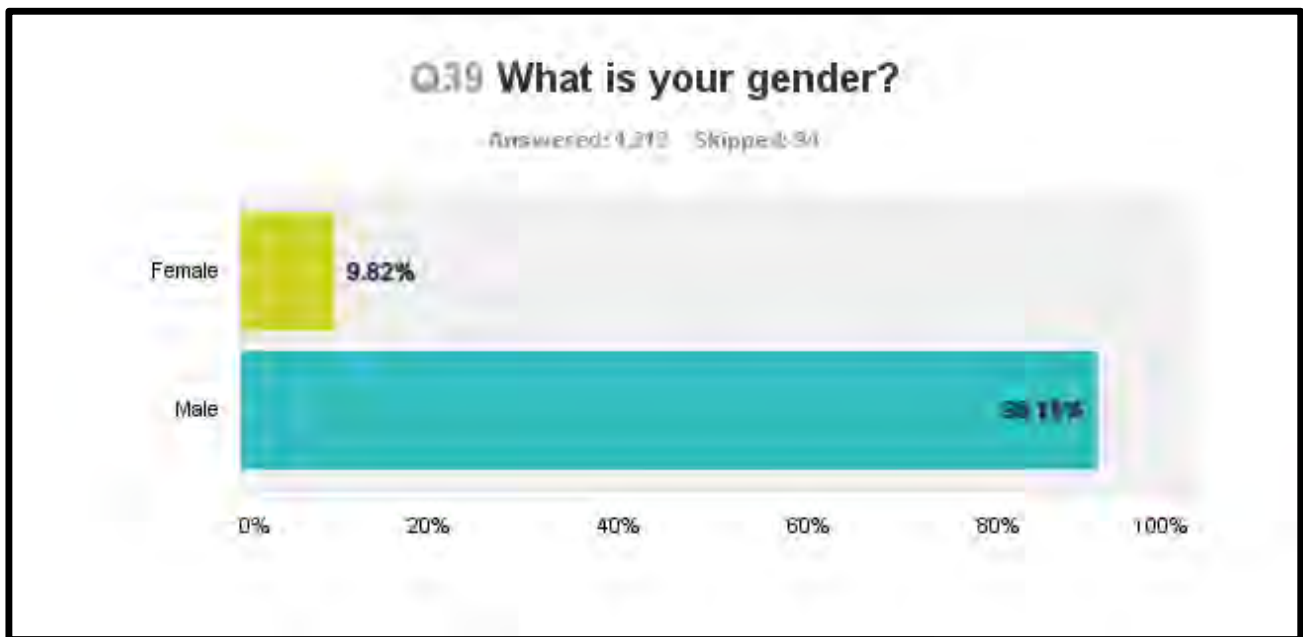
2.2.6.4 Question 38



Question 38 asks respondents to select the age bracket that they fall within. The most common age bracket was 30-39 years old (506 of the 1,211 respondents). This is consistent with similar surveys conducted previously and tells us that the majority of mountain bikers are mature adults who choose to maintain an active lifestyle in the outdoors.



2.2.6.5 Question 39



1,093 (90.18%) of the respondents to this survey were male and 119 (9.82%) were female. This is roughly consistent with participation numbers in popular mountain bike events such as the Kona Odyssey where females make up approximately 9-10% of the 18-49 year old field.



2.3 PARTICIPATION IN THE SPORT OF MOUNTAIN BIKING

People have been riding bikes off-road in Australia for a long time – after all, bicycles have been around longer than asphalt roads – but the sport of mountain biking only really took hold in Australia in the 1990's. With so much open space and a relatively conducive climate, Australia is well suited to the sport of mountain biking and, following the trend seen elsewhere in the world, mountain biking has grown strongly in Australia.

The Sydney 2000 Olympic Games and the Melbourne 2006 Commonwealth Games were major milestones for the growth of mountain biking in Australia – two occasions when mountain biking has been thrust into the Australian sporting mainstream. Since then, it has earned its place in the mainstream sporting culture of Australia and has become widely accepted amongst land managers as a legitimate recreational use of public land.

While anecdotally mountain biking appears to be growing, it is difficult to estimate just how popular it actually is. Due to its unstructured and geographically diffuse nature it is difficult to quantify exactly how popular mountain biking is in Australia. Unlike sports like football and cricket, which take place on purpose-built facilities with recognized clubs and competitions, mountain biking can be done at anytime, with any number of participants, in almost any location. This makes it extremely difficult to track how many people are actually engaging in the sport.

To date, there appear to be no comprehensive studies looking at overall participation in the sport of mountain biking in Australia. There are, however, numerous sources of information that, looked at together, help to paint a picture of mountain biking's popularity in Australia.

MTBA is the peak body for the mountain biking in Australia. It is linked to CA and the UCI, the international governing body for cycling. In its 2012 annual report, MTBA listed 8531 members in the 2012 financial year, a 13.5% increase from the previous year. Membership provides insurance, allows members to compete in MTBA affiliated/organised events and to earn points that are recognised by the UCI.

MTBA's relatively small membership base is not a good indication of the overall participation in mountain biking in Australia for a number of reasons:

1. Competitive mountain biking is thought to be only the tip of the iceberg in terms of actual participation. A large proportion of mountain bikers have little or no interest in competing and so have no need to hold an MTBA licence;
2. A significant percentage of mountain bikers that do compete in competitive events, do not necessarily hold an MTBA licence. Many of the larger mountain biking events today are being run by private event management companies as one-off events and don't require competitors to hold an MTBA licence. Furthermore, MTBA offers a 'day licence' at MTBA events, which only cover the licence holder for that given event.
3. While it is possible to join a mountain biking club and not be an MTBA member, it is thought that, like other popular outdoor sports such as surfing, rock climbing and so on, the majority of participants don't belong to clubs.



In 2010 the Australian Government's annual survey of sporting participation, 'Participation in Exercise, Recreation and Sport', ranked cycling (defined to include all types of cycling) fourth in terms of participation for all sports across Australia, with a participation rate of approximately 14%. The survey also found that participation in cycling had grown by 45% since the survey began in 2001, with the 2010 participation rate in cycling at the highest level in ten years. Unfortunately this study didn't break down cycling into the various disciplines (road, track, BMX, mountain biking etc.).

One study that did attempt to break cycling down further, was released in 2000 by the Australian Bureau of Statistics, titled '*Leisure and Cultural Participation*'. It looked at outdoor recreation trends in Tasmania and found that 4.2% of respondents in the study had been mountain biking in the twelve months prior to the study.

One measure that can be used as an indicator of the popularity of mountain biking is that of bicycle sales, and in particular, mountain biking sales. The Cycling Promotion Fund's publication '*Bicycle Sales 2009*' states that:

'Australian Bureau of Statistics figures show that for the tenth year in succession, Australians have purchased more bicycles than cars, purchasing 1,154,077 bicycles in 2009.'

'In the ten year period since 2000, over 11,000,000 bikes have been sold in Australia, 2,000,000 greater than the car industry.'

The annual report by Bicycle Industries Australia, titled '*The Bicycle Industry in Australia 2011/12*,' estimates the bicycle industry economic worth at approximately \$1.1 billion.

The Australian Bike Industry Report 2006 reports that 69% of bicycles sold in that year were mountain bikes (around 800,000 mountain bikes). However, it should be noted that many of these bikes, although classified as 'mountain bikes', are at the very low end of the market and will possibly never be ridden off-road (many people purchase mountain bikes for commuting and general urban riding). Despite this, if even 10% of the 800,000 mountain bikes sold annually are ridden off-road, then about 80,000 bikes are being sold annually for the purpose of mountain biking.

Looking at all these figures holistically, there appears to be a large, and growing, base of cyclists participating in the sport of mountain biking. This growth in mountain biking appears to part of a larger trend away from organised sports¹⁹. Recent publications by the Australian Sports Commission²⁰ explore this trend, noting that participation in many organised sports is in decline, while non-organised sports are growing in popularity. Reasons cited for this shift include:

- Organised sports focus too heavily on competition rather than fun and enjoyment;

¹⁹ Organised sports are those that require dedicated facilities, with a minimum number of participants, referees etc. and generally have a competitive focus. Non-organised sports are those that can be done more or less anywhere and anytime with any number of participants.

²⁰ *The Future of Australian Sport*, Australian Sports Commission and CSIRO, April 2013; *Market Segmentation for Sport Participation*, Australian Sports Commission, March 2013.



- Organised sports choose teams on the basis of talent rather friendship groups;
- Organised sports lack flexibility around scheduling;
- Organised sports provide limited opportunities for people with poor sporting competency;
- Many adolescents report being self-conscious about poor sporting ability and find organised sporting environments intimidating and humiliating.

Mountain biking is the antithesis of all these things – most people ride for fun and enjoyment, with only a small proportion focussed on competition; people choose their own riding groups, generally close friends; it can be done anytime; it doesn't 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 who, where and when they ride.



2.4 MOUNTAIN BIKING TRENDS IN YARRA RANGES

Using the Survey Monkey tool, the results of the survey were filtered to look only at the answers given by those people that reside within the Yarra Ranges. Generally speaking, the responses given by the residents of the Yarra Ranges Shire were similar to those given overall, which can be thought of as being generally representative of the Victorian mountain biking community²¹.

Table 8 on the next page highlights those questions where residents of the Yarra Ranges Shire responded in a way that was deemed to be significantly different to the overall response.

²¹ Of the 1,300 respondents to the survey, only about 7% reside outside Victoria. Also, note that about 6% of respondents do not participate in mountain biking. Presumably these respondents had other motives for answering the survey – e.g. local residents, parents/partners of mountain bikers etc.



Table 8. Survey responses from Yarra Ranges residents

Question Number	Question	Overall response	Residents of Yarra Ranges Shire	Comment
1	Which cycling disciplines do you engage in?	<ul style="list-style-type: none"> 22% selected cycle touring (including rail trails); 33% selected commuting. 	<ul style="list-style-type: none"> 30% selected cycle touring (including rail trails); 19% selected commuting. 	Residents of the Yarra Ranges are more interested in cycle touring (and rail trail riding) and less interested in commuting, than the overall mountain biking community.
7	How long would you typically travel to undertake a weekend ride?	<ul style="list-style-type: none"> 41% selected 1-2 hours. 	<ul style="list-style-type: none"> 31% selected 1-2 hours. 	Local riders are less willing to travel longer distances to go for a ride than the rest of the mountain biking population.
9	Please select the activities (if any) you would undertake in conjunction with cycling	<ul style="list-style-type: none"> 28% selected bushwalking. 	<ul style="list-style-type: none"> 39% selected bushwalking. 	Local riders are interested in other outdoor activities like bushwalking.
10	Do you participate in the sport of mountain biking?	<ul style="list-style-type: none"> 6% selected no. 	<ul style="list-style-type: none"> 10% selected no. 	While this question was just a filter it is significant because it shows a larger proportion of non-riding respondents than the overall response.
11	Select the type of trails you most prefer to ride	<ul style="list-style-type: none"> 17% selected fire roads/four-wheel drive trails. 10% selected rail trails. 	<ul style="list-style-type: none"> 27% selected fire roads/four-wheel drive trails. 16% selected rail trails. 	This indicates that local riders are more interested in riding on fire roads/four-wheel drive trails and rail trails than the rest of the mountain biking population.
25	Please select the activities (if any) you have undertaken in Warburton during the past 12 months (you may select more than one activity)	<ul style="list-style-type: none"> 29% selected bushwalking; 22% selected BBQ/picnic; 65% selected mountain biking; 69% selected visited cafes, bars and/or restaurants. 	<ul style="list-style-type: none"> 45% selected bushwalking; 33% selected BBQ/picnic; 72% selected mountain biking; 80% selected visited cafes, bars and/or restaurants. 	This question shows some interesting differences between residents of the Yarra Ranges and the rest of the mountain biking population in relation to their visits to Warburton. One of the key themes is that residents of the Yarra Ranges seem to have a greater affinity for outdoor activity and that they visit Warburton for a range of activities.
26	How often do you visit Warburton?	<ul style="list-style-type: none"> 19% selected never; 22% selected once per year; 33% selected twice per year; 22% selected monthly; 3% selected weekly; 	<ul style="list-style-type: none"> 1% selected never; 8% selected once per year; 26% selected twice per year; 46% selected monthly; 11% selected 	This is an expected variance – those that live within the Yarra Ranges are much closer to Warburton, and more likely to visit. Other questions related to frequency of visits (e.g. question 27 and 28)



		<ul style="list-style-type: none"> 1% selected daily. 	<ul style="list-style-type: none"> weekly; 7% selected daily. 	showed similar patterns.
30	If the proposed trail network in Warburton were to be established, would you be likely to stay overnight in local accommodation?	<ul style="list-style-type: none"> 52% selected yes. 	<ul style="list-style-type: none"> 27% selected yes. 	Again, this is an expected variance. Residents of the Yarra Ranges live close to Warburton, so would be more likely to undertake day trips rather than overnight stays.
36	Please select the option below which best describes your household.	<ul style="list-style-type: none"> 40% selected couple with dependents; 34% selected couple without dependents. 	<ul style="list-style-type: none"> 44% selected couple with dependents; 30% selected couple without dependents. 	Responses indicate that in the Yarra Ranges there are slightly more couples with dependents and fewer couples without, than the rest of the mountain biking community. This suggests that there is a stronger family focus for mountain bikers in the Yarra Ranges.
37	What is your approximate combined household income?	<ul style="list-style-type: none"> 3% selected \$0-40,000; 7% selected \$40 – 60,000; 11% selected \$60 – 80,000; 17% selected \$80 – 100,000; 18% selected \$100 – 120,000; 11% selected \$120 – 140,000; 11% selected \$140 – 160,000; 8% selected \$160 – 180,000; 14% selected > \$180,000. 	<ul style="list-style-type: none"> 4% selected \$0-40,000; 11% selected \$40 – 60,000; 12% selected \$60 – 80,000; 18% selected \$80 – 100,000; 19% selected \$100 – 120,000; 7% selected \$120 – 140,000; 12% selected \$140 – 160,000; 5% selected \$160 – 180,000; 11% selected > \$180,000. 	Results suggest that within the Yarra Ranges, there are more people on low wages (less than \$100,000) and fewer people on high wages (greater than \$100,000), than the general mountain biking community.
38	How old are you?	<ul style="list-style-type: none"> 4% selected 18-20; 18% selected 21-29; 42% selected 30-39; 23% selected 40-49; 7% selected 50-59; 2% selected 60 or older. 	<ul style="list-style-type: none"> 9% selected 18-20; 20% selected 21-29; 32% selected 30-39; 19% selected 40-49; 10% selected 50-59; 7% selected 60 or older. 	This question shows some interesting variances in terms of age. The key themes of interest are that there are more respondents in the younger and older age groups and fewer in the middle age groups, when comparing the responses of the Yarra Ranges residents to those of the rest of the mountain biking community.
39	What is your gender?	<ul style="list-style-type: none"> 10% selected female; 90% selected male. 	<ul style="list-style-type: none"> 12% selected female; 88% selected male. 	This shows there were slightly more female respondents amongst the Yarra Ranges residents than the overall respondents.



2.5 CYCLING EXPERIENCES IN THE YARRA RANGES

In an attempt to gauge the interest in cycling generally in the Yarra Ranges and surrounding regions, a list of local and nearby cycling clubs was compiled. These clubs were contacted and asked to provide their membership base. Table 9 below lists the clubs, their cycling interests and number of members.

Table 9. Local cycling clubs

Club/Group Name	Cycling Genre	Membership Base
Blackburn Cycling Club	Road riding	No response provided
Dirt Riders Mountain Bike Club	Mountain biking	100 members
Eastern Vets Cycling Club	Road riding	300 members
Eastfield BMX Club	BMX	71 members
Fat Tyre Flyers	Mountain biking	No response provided
Knox Bicycle Touring Club Inc	Cycle touring (recreational cycling on bike paths and roads)	30 members
Lilydale BMX Club	BMX	45 members
Lysterfield District Trail Riders	Mountain biking	176 members
Middle Distance Bicycle Club	Cycle touring (bike rides every Sunday of 60-160km over undulating to hilly roads)	No response provided
Yarra Ranges Mountain Bikers	Mountain biking	62 members

This data above indicates a reasonably healthy level of membership in formal cycling clubs in, or near, the Yarra Ranges area. Of course many of the riders that use the various roads, mountain bike trails and rail trails of the Yarra Ranges come from outside the immediate area and may not belong to any of the organizations listed above.

There is a strong road cycling community that is active within the Yarra Ranges and surrounding areas. Some of the popular routes/roads used by road cyclists are listed below:

- Mountain Highway from the Basin to Sassafras;
- Mt Dandenong Tourist Rd from Upper Ferntree Gully to Montrose;
- Heidelberg-Kinglake Rd;
- Mt Donna Buang ascent (from Warburton);
- Lake Mountain ascent (from Marysville);
- Mt Baw Baw ascent (from Noojee or Warragul);



- The Acheron Way (although a portion is unsealed).

In particular, it is worth noting that the Acheron Way, which links Warburton with the townships of Narbethong and Marysville includes a currently unsealed section of approximately 13km. Sealing this section of road would create an ideal loop for road cyclists – Warburton to Narbethong to Marysville to Lake Mountain to Reefton and back to Warburton. This loop is approximately 126km long, encompasses beautiful mountain scenery and moderately quiet roads, and provides some challenging climbs. While road cycling is clearly outside the main scope of this project, the sealing of the Acheron Way was mentioned by many cyclists throughout the course of this project and should be investigated further for the potential tourism benefits it could provide.

There is also a small, but growing, demand for road cycling on dirt roads, although most road riders have a strong preference for sealed roads. Fuelled by the current growth in the European-style cycling discipline of cyclocross, some riders are discovering that dirt roads can be ridden on a road bike, a mountain bike, a touring bike or even a hybrid and provide a more peaceful and safer alternative to busier sealed roads. Over the past year or two, the 'back road' up Mt Donna Buang has become popular with road and cyclocross riders during winter. This road is closed to vehicles during winter and is regularly covered with snow, providing a challenging, wilderness type experience for these enthusiasts.

The Lilydale-Warburton Rail Trail is also an extremely popular cycling facility located within the Yarra Ranges. It is a key off-road cycling and pedestrian corridor, used primarily for recreational cycling (and walking and horse riding) but also for commuting.

Bicycle Network Victoria, Victoria's peak cycling advocacy body, conducts an annual survey of usage on this rail trail for the YRC. Their most recent survey report provides the following contextual information about the rail trail:

'Considered one of Australia's best Rail Trails, the Lilydale-Warburton Rail Trail travels from the outskirts of the Melbourne suburbs through a bushy corridor to come out into an open rural landscape with picturesque views of the Yarra Ranges in the distance.

The Trail begins at the end of the metropolitan rail network, Lilydale and travels for 40km to the resort town of Warburton, nestled in the mountains.

Recent improvements to the rail trail include opening of the long awaited "Red Bridge" over the 6 lane Maroondah Highway at Lilydale and completion of the link back to Lilydale railway station. Traffic lights are also now operational at York Rd, Mt Evelyn.

Most of the original station platforms are still present with replica station signage, however many station buildings have been lost through time. The Station building at Yarra Junction is the original building from Lilydale Station and is now a museum.'



The most recent survey of the rail trail was conducted on Sunday 11 November 2012. Table 10 below shows the results of this survey.

Table 10. Users on the Lilydale-Warburton Rail Trail, 11th November 2012²²

Mode	Site 5682: Lilydale-Warburton Trail/ Mt. Evelyn Aqueduct Trail, Mount Evelyn	Site 5685: Lilydale-Warburton Trail/ Scotchman's Creek Path, Warburton	Total	Percentage of Users
Bikes	203	249	452	86%
Runners	2	6	8	2%
Dog Walkers	9	14	23	4%
Walkers	16	25	41	8%
Other	0	0	0	0%
Total	230	294	524	

Looking at the figures in this table, the first point of relevance is that 86% of the users of the Lilydale-Warburton Rail Trail are cyclists. What the figures don't reveal however, is that the majority of the users only access small portions of the trail and thus the numbers above are not considered an accurate reflection of overall usage. In fact, YRC estimate that overall annual usage of the trail is in the vicinity of 150,000-200,000 users.

Usage of the Lilydale-Warburton Rail Trail doesn't tell us much about mountain biking and it should be noted that, while there is some crossover between users of rail trails and mountain bike trails, rail trail riding is very different to true mountain biking. It is included here simply to show the popularity of the trail locally and to help paint a picture of the current cycling patterns that are occurring in the Yarra Ranges Shire.

²² *Super Sunday Report Shire of Yarra Ranges*, Bicycle Network Victoria, 2012.



2.6 DEMAND AND MARKET ANALYSIS SUMMARY

In looking at the feasibility of mountain biking trails as a tourism destination, two questions must be asked:

- What is the target market for mountain bike tourism?
- Is there a demand for a new mountain biking destination in Victoria?

This chapter has explored these issues in details and the key outcomes are summarised below.

What is the target market for the Warburton Mountain Bike Trails?

Mountain bikers. We know from the survey that the most popular discipline of mountain biking is cross-country (85%), followed by all mountain / freeride (58%) and then downhill (38%). The trail development should ideally provide opportunities for all these disciplines.

The survey also reveals the following statistics about the proposed target market:

- Likely to ride 2-3 times per week, totalling between 5 and 9 hours of riding;
- Likely to ride with 1-3 others;
- Likely to participate in organised mountain bike events or races (although the frequency of such participation is not known);
- More likely to take their own bike to a mountain bike destination than to hire one;
- Likely to reside in metropolitan Melbourne (although a world-class destination would be capable of attracting visitors from interstate and even overseas);
- Likely to live in a household defined as 'couple with dependents';
- Likely to be aged between 30-39 and male.

What is the size of the target market?

This section explored mountain biking participation in Australia, in particular noting some of the difficulties in estimating the number of mountain bikers in Australia. While it is difficult to estimate the size of the market, we know that many destinations around Australia, including Victoria, are successfully attracting large numbers of mountain bikers for recreational riding and competitive events.

Does the target market have the willingness/ability to spend money?

In order for a destination to be successful, it is critical that the visiting mountain bikers are contributing to the local economy. This requires that there are suitable spending opportunities for mountain bikers and that they have the willingness/ability to spend money. Anecdotally, mountain bikers are thought to be well educated and with relatively high levels of disposable income. The results of the survey support this, particularly the following points:

- Mountain bikers are estimated to spend, on average, \$4,167 annually on their sport;
- Would be likely to visit bars, cafes or restaurants in conjunction with a ride;
- Would be prepared to pay for the use of a commercial shuttle service;
- Would be likely to go on 1-4 mountain biking holidays per year, generally of 1-2 nights duration and with 2-5 companions, spending, on average, \$1,200 on a typical mountain biking holiday;
- Mountain bikers average a combined household income of approximately \$117,150;



- Would likely to stay in local accommodation when visiting the proposed trail network.

Is the target market located within a suitable proximity to the proposed destination?

Three questions in the survey asked respondents about how far they would typically travel to go riding, under a number of scenarios.

Question 6 asked respondents how long they would typically travel to undertake a weekday/after-work ride. 40% selected '10-30 minutes' and 33% selected '30-60 minutes'.

Question 7 asked respondents how long they would typically travel to undertake a weekend ride. 29% selected '30-60 minutes' and 41% selected '1-2 hours'.

Question 23 asked respondents how far they would typically travel from their home residence for a mountain biking holiday. 72% selected 'Drive up to 5 hours'.

Converting these time durations into distances²³, it is possible to produce a map showing the 'catchment area' for the proposed Warburton Mountain Bike Trails, where the catchment area represents the area in which the majority of the potential trail users reside.

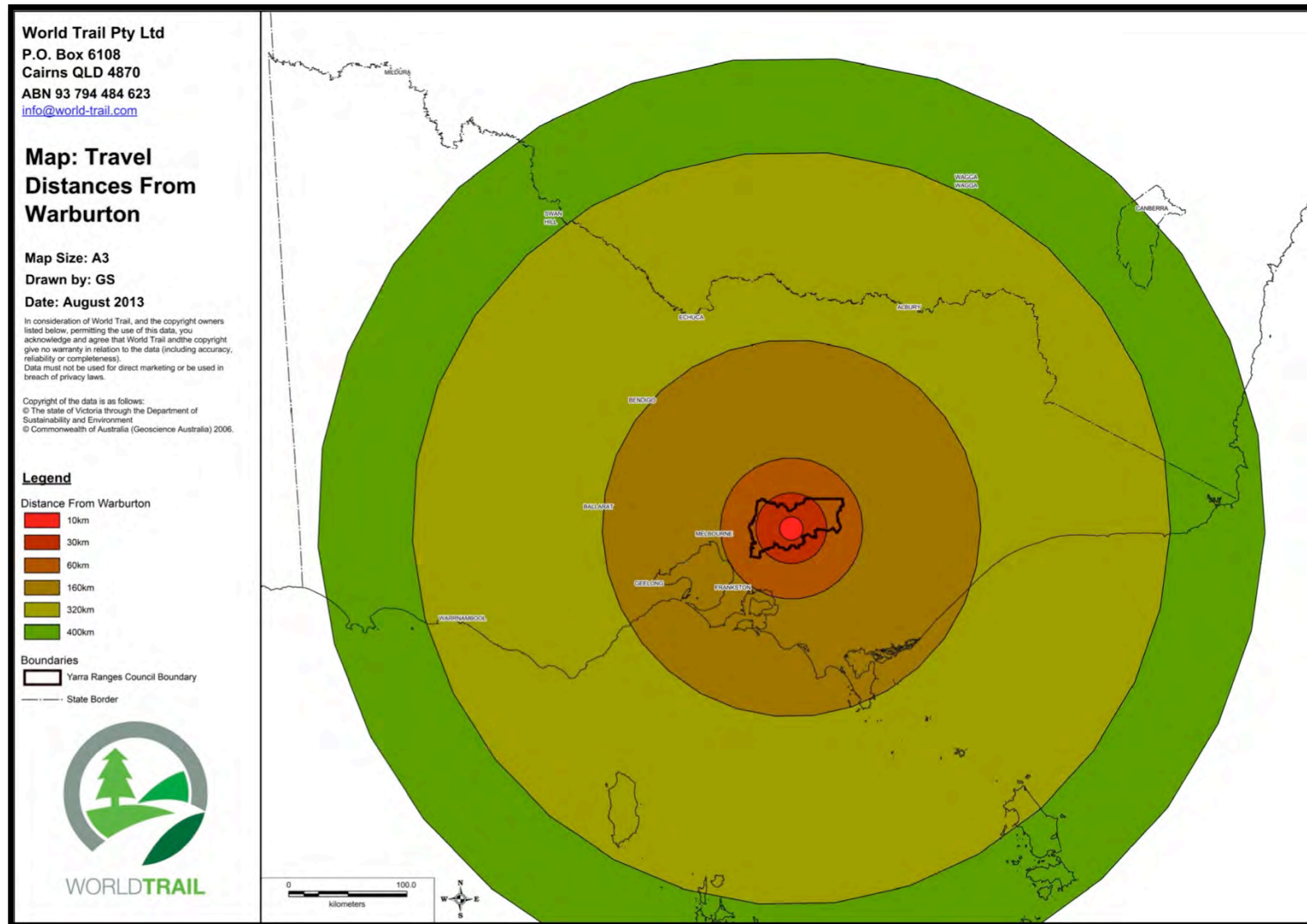
Map 2 on the next page shows a series of coloured rings radiating outwards from Warburton. The 10km ring corresponds to 10 minutes travelling by car; the 30km ring corresponds to 30 minutes travelling by car; the 60km ring corresponds to 60 minutes travelling by car; the 160km ring corresponds to 2 hours travelling by car; the 320km ring corresponds to 4 hours travelling by car and; the 400km ring corresponds to 5 hours travelling by car.

Obviously there are a number of limitations to this map, but it shows that:

1. A large proportion of mountain bikers residing in the eastern suburbs of Melbourne should be capable of reaching Warburton within 60 minutes driving, making it a feasible option for the regular weekday/after-work ride scenario;
2. All of metropolitan Melbourne, plus many large regional cities such as Geelong, Bendigo, Ballarat, Shepparton and even parts of Gippsland fall within 2 hours drive from Warburton, making it a viable option for the weekend ride scenario for mountain bikers residing within this area;
3. Virtually all of Victoria and parts of southern NSW fall within 5 hours drive from Warburton, making it a viable option for the mountain biking holiday scenario for mountain bikers residing within this area.

²³ Assuming that most people will travel by car, short time durations (up to 60km) were converted to distance based on an approximate travelling speed of 60km/h and longer time durations (greater than 60km) were converted to distance based on an approximate travelling speed of 80km/h.



Map 2. Travel distances from Warburton

The demand for mountain biking trails is a function of the size of the target market, the frequency with which the target market participates in the sport and the number of mountain biking trails/networks/destinations/facilities available within close proximity to the target market.

The size of the target market has been discussed frequently in this report and is difficult to estimate accurately. The frequency with which mountain bikers ride has also been discussed – the survey revealing that most mountain bikers are likely to ride 2-3 times per week, totalling between 5 and 9 hours of riding. In the Situation Analysis, a map was provided showing the local mountain biking destinations/facilities, both formal and informal.

There are a number of pieces of information that point to an increasing and unmet demand for mountain biking trails:

- Continual growth in the usage of mountain biking trails at Mt Buller, Lysterfield, the Yarra Ranges. These three destinations are chosen in particular because they all rely on trail counters to collect usage data and have provided World Trail with recent data;
- Lysterfield Regional Park, in the south of the Yarra Ranges Shire, has over 150,000 mountain bike visitors per year, a staggering level of usage and probably the busiest mountain biking trail network in Australia. It now has a successful bike shop and café called Trailmix – further evidence of the high level of visitation and spending habits of mountain bikers²⁴. Unfortunately, it appears that Lysterfield may be suffering from too much usage. Regular riders report ongoing problems with the trails caused by too many riders and usage of trails during wet weather, increasing crowding on the trails and lack of car parking spaces. Many experienced mountain bikers no longer ride at Lysterfield because many of the trails have become too easy, as less experienced riders have modified or constructed new trails around difficult sections. Being a small park, the overall distance of trails available is limited to about 20km, with little room for expansion. Furthermore, the topography of the park is quite flat and low-lying, less than ideal terrain for mountain biking. Despite these problems, usage continues to grow, perhaps driven more by beginners than experienced riders and providing an important ‘nursery’ for future enthusiasts to learn the sport and hone their skills.
- The number of ‘informal’ trails being constructed without land manager approval. Close to Warburton, these include the informal downhill trails in the Mt Bride Road area and Warramate Hills Reserve. These trails have been constructed by small numbers of mountain biking enthusiasts, generally in secret, without land manager approval. While the trails may not always meet modern standards for best-practice sustainable trail design, the investment in time and the sheer volume of labour required to construct these trails is impressive and is a testament to the fact that the needs of mountain bikers are not being provided for elsewhere. Builders risk fines and having their hard work destroyed or shut down by land managers when discovered, which shows that there continues to be an unmet demand for good mountain biking trails.
- New trails are continually being constructed in regional areas. Places like Forrest, Beechworth, Creswick, Castlemaine and Albury are continuing to develop new formalised trail networks. This growth is showing no sign of abating yet, suggesting that the development of new trail networks is in turn growing the target market. This has been seen in many locations. For example, many of the local residents of Forrest were

²⁴ It should be noted that a large volume of business also comes from non-mountain bikers visiting the park.



not mountain bikers prior to the development of the trail network there. Since the trails have been constructed, many local residents have purchased mountain bikes for themselves or their families and are discovering the sport for themselves.

- Finally, Question 4 of the survey asked respondents what barriers prevented them from riding more frequently. 58% of respondents cited 'Access to suitable trails' as a barrier to riding more frequently.

Finally, YRC recently produced a report titled '*The Demand for Recreation and Open Space*' which looked at the current usage and demand for recreation opportunities and open spaces in the Yarra Ranges Shire and tried to predict future trends. Several aspects of this report are relevant:

- **'Implications for demand:**
The demographic profile has implications for providing recreation and open space. Key points include:
 - *Catering for the high percentage of young people who use a range of both organised sporting facilities (i.e. playing fields, sports courts) and unstructured open space and facilities (i.e. skate and BMX facilities, half courts, play spaces, etc.).*
 - *Providing a mix of activity spaces that encourage family participation including trails, social recreation parks, sports reserves, bushland reserves and public plazas.*
 - *Ensuring that young people have access to open space and recreational facilities, i.e. close to public transport, safe pedestrian and bicycle access.*
 - *Planning and providing accessible recreation opportunities for the ageing population.*
 - *Planning to support sport and recreation opportunities should be inclusive and are financially accessible to all community members.*
 - *Providing a range of flexible sport and recreation opportunities to suit the needs of residents with limited recreation time.*
 - *Ensuring adequate distribution of open space and recreation services and facilities for the municipality's dispersed communities that is supported by multiple transport options.'*
- *'The unique differences of Yarra Ranges communities and urban and rural areas will require a different mix of recreation facilities and open spaces.'*
- *'Key points include:*
 - *Sport and recreation participation trends in the Yarra Ranges reinforce general state and national trends for major participation sports and non-organised physical activities.*
 - *There is a high level of participation in non-organised physical activity including those activities incidental to every day living e.g. walking and cycling.*
 - *Extreme sports are increasing in popularity and have a growing demand for access to bushland, open spaces and facilities. Yarra Ranges bushland areas are opportunities to provide for these activities.'*



In summary, the points presented here suggest that there is sufficient demand for the proposed mountain biking trail network at Warburton. There is a demonstrated lack of facilities available within the surrounding region, increasing pressure on the few formal facilities available locally and an ongoing problem with the construction of 'informal' trails. Conversely, there is a growing trend away from organised sports towards non-organised sports like mountain biking and continual growth in the usage of established mountain biking destinations like Mt Buller and Forrest.

draft



CHAPTER 3 SITE ANALYSIS



3.1 ATTRIBUTES OF A SUCCESSFUL MOUNTAIN BIKING DESTINATION

What attributes must be present if the proposed mountain biking trail network at Warburton is to be successful?

Firstly, success must be defined. Broadly speaking, there are two elements to success – patronage and spending. That is, to be successful, this project needs to firstly attract mountain bike visitors to Warburton and secondly those visitors need to have opportunities to spend money.

In order to attract mountain bikers, their needs and expectations need to be met (and hopefully exceeded). These needs and expectations relate primarily to the trail network and the experience it provides, but secondarily to the supporting infrastructure and services that help to facilitate an enjoyable mountain biking trip to Warburton – car parking, trailhead, visitor information, signage and all the other aspects of a successful tourism destination.

In order for mountain bikers to spend money in Warburton, the trail network needs to focus visitation in Warburton and the business community needs to open its doors to the mountain biking community and ensure that they offer products and services that will be valued by mountain bikers.

The survey conducted as part of this project provides an excellent insight into what the mountain biking community wants and expects. With approximately 1,300 respondents, this survey well and truly provides a robust and representative sample of the local mountain biking community.

The following sections discuss the required attributes for a successful mountain biking destination.



3.1.1 TRAIL ATTRIBUTES

3.1.1.1 Trails For All Disciplines Of Mountain Biking

The proposed trail network should provide opportunities for all types of mountain bikers, thus appealing to the broadest possible target market.

Question 1 of the survey asked the question “Which cycling disciplines do you engage in?” Responses were:

- Mountain biking (cross-country): 84.50% (1,101)
- Mountain biking (all mountain / freeride): 57.64% (751)
- Mountain biking (downhill): 38.30% (499)
- Cycle touring (including rail trails): 22.03% (287)
- Dirt jumps/pump tracks: 18.04% (235)²⁵

On the basis of this, the proposed Warburton mountain bike trail network should include trail opportunities for cross-country mountain biking, all-mountain / freeride mountain biking, downhill mountain biking, cycle touring (in this case, defined as cycle touring on unsealed roads and tracks, such as rail trails, aqueducts and fire roads) and dirt jump / pump track riding.

Cycle touring is not used in the traditional long distance, self-sufficient, racks and panniers, sense of the term. In this document, cycle touring is used to describe the usage by mountain bikers of the Lilydale-Warburton Rail Trail, the O’Shanessy Aqueduct and some of the unsealed forest roads around Warburton. These types of trails correspond to the lowest end of the mountain biking difficulty rating spectrum, and are important in terms of the overall product offering, as they may be popular with learners and children.

The proportion of trails for each of these disciplines should correspond approximately to the popularity of these disciplines, as indicated by the responses to the question.

This approach is supported by observations of successful mountain biking destinations worldwide, which commonly seek to provide opportunities for all mountain biking disciplines.

²⁵ Note that only the mountain biking related disciplines have been shown here.



3.1.1.2 Singletrack

Mountain bikers everywhere seek singletrack – narrow trails, generally less than 1m wide, where riders must ride in single file. It is the key defining aspect of a ‘mountain biking trail’.

This preference was confirmed by the survey. Question 11 asked riders to indicate their preferred track types. Responses were:

- Single-track: 95.71% (1,138)
- Fire roads/four-wheel drive trails: 17.07% (203)
- Rail trails: 10.43% (124)

This question demonstrates an overwhelming preference for singletrack. This preference is true across the three core mountain biking disciplines – cross-country, all-mountain/freeride and downhill – while the usage of rail trails and fire roads is suitable for families, children and learners. Note that it is accepted practice on cross-country routes or loops, that portions of singletrack may be broken up by short sections of wider fire roads or four-wheel drive trails. In fact, these wider sections are important in race situations for overtaking, and in recreational situations they provide a good chance to rest, eat/drink and chat.



3.1.1.3 All Trails To Be Given Trail Difficulty Ratings

All the proposed mountain biking trails should be given a trail difficulty rating. IMBA has designed a Trail Difficulty Rating System (TDRS), based on the trail difficulty rating system used for ski trails.

This system allows trails to be categorized as Very Easy, Easy, Intermediate, Difficult or Extreme. Using key parameters such as width, surface, obstacles and style, trails can be rated for difficulty. For example, an 'Easy' trail should be 91cm wide or wider and should have a smooth, firm surface (possibly using an imported crushed rock surface), whereas an 'Intermediate' trail should be 61cm wide or wider and should have a mostly stable surface.

The rating should be signposted at the start of the trail and also used on any maps or brochures relating to the trail. Trail difficulty ratings provide trail users with a quick, intuitive system to inform them about the difficulty posed by the trail ahead, enabling them to make an informed decision about whether to attempt the trail.






The benefits of using a trail difficulty rating system are:

- Risk management – the use of a rating system is a key risk management technique as it allows riders to make an informed decision about whether they should attempt a trail or not, based on their own skills and ability, thus minimising the exposure of riders to inappropriate and unexpected risks;
- Visitor management – visitors are likely to enjoy themselves more if they feel safe and in control. The use of a TDRS puts this decision in their hands, ensuring inexperienced riders can choose easier trails and experienced riders can choose harder trails.

Table 11 on the next page shows the criteria that are used to calculate a trail difficulty rating in the IMBA TDRS. It should be understood that this system is not a standard (like an Australian Standard) and should only be used as a guide. The final decision for rating trails belongs with the land manager.



Table 11. IMBA Trail Difficulty Rating System

Rating	Very Easy	Easy	Intermediate	Difficult	Extreme
Symbol					
Description	<p>Likely to be a fire road or wide single track with a gentle gradient, smooth surface and free of obstacles.</p> <p>Frequent encounters are likely with other cyclists, walkers, runners and horse riders.</p>	<p>Likely to be a combination of fire road or wide single track with a gentle gradient, smooth surface and relatively free of obstacles.</p> <p>Short sections may exceed these criteria.</p> <p>Frequent encounters are likely with other cyclists, walkers, runners and horse riders.</p>	<p>Likely to be a single trail with moderate gradients, variable surface and obstacles.</p> <p>Dual use or preferred use</p> <p>Optional lines desirable</p>	<p>Likely to be a challenging single trail with steep gradients, variable surface and many obstacles.</p> <p>Single use and direction</p> <p>Optional lines</p> <p>XC, DH or trials</p>	<p>Extremely difficult trails will incorporate very steep gradients, highly variable surface and unavoidable, severe obstacles. Single use and direction</p> <p>Optional lines</p> <p>XC, DH or trials</p>
Trail Width	2100mm plus or minus 900mm	900mm plus or minus 300mm for tread or bridges.	600mm plus or minus 300mm for tread or bridges.	300mm plus or minus 150mm for tread and bridges. Structures can vary.	150mm plus or minus 100mm for tread or bridges. Structures can vary.
Trail Surface	Hardened or smooth.	Mostly firm and stable.	Possible sections of rocky or loose tread.	Variable and challenging.	Widely variable and unpredictable.
Average Trail Grade	<p>Climbs and descents are mostly shallow.</p> <p>Less than 5% average.</p>	<p>Climbs and descents are mostly shallow, but may include some moderately steep sections.</p> <p>7% or less average.</p>	<p>Mostly moderate gradients but may include steep sections.</p> <p>10% or less average.</p>	<p>Contains steeper descents or climbs.</p> <p>20% or less average.</p>	<p>Expect prolonged steep, loose and rocky descents or climbs.</p> <p>20% or greater average</p>
Maximum Trail Grade	Max 10%	Max 15%	Max 20% or greater	Max 20% or greater	Max 40% or greater
Level of Trail Exposure	Firm and level fall zone to either side of trail corridor	Exposure to either side of trail corridor includes downward slopes of up to 10%	Exposure to either side of trail corridor includes downward slopes of up to 20%	Exposure to either side of trail corridor includes steep downward slopes or freefall	Exposure to either side of trail corridor includes steep downward slopes or freefall



Natural Obstacles and Technical Trail Features (TTFs)	No obstacles.				
		Unavoidable obstacles to 50mm (2") high, such as logs, roots and rocks.	Unavoidable, rollable obstacles to 200mm (8") high, such as logs, roots and rocks.	Unavoidable obstacles to 380mm (15") high, such as logs, roots, rocks, drop-offs or constructed obstacles.	Large, committing and unavoidable obstacles to 380mm (15") high.
		Avoidable, rollable obstacles may be present.	Avoidable obstacles to 600mm may be present.	Avoidable obstacles to 1200mm may be present.	Avoidable obstacles to 1200mm may be present.
		Unavoidable bridges 900mm wide.	Unavoidable bridges 600mm wide.	Unavoidable bridges 600mm wide.	Unavoidable bridges 600mm or narrower.
		Short sections may exceed criteria.	Width of deck is half the height.	Width of deck is half the height.	Width of bridges is unpredictable.
			Short sections may exceed criteria.	Short sections may exceed criteria.	Short sections may exceed criteria.



3.1.1.4 Trails For All Abilities

For a mountain biking destination to be successful, it must appeal to the broadest possible target market and this means providing riding opportunities for riders of all ability levels. It must offer something for novice mountain bikers, experienced mountain bikers and everyone in between.

While many people believe that it is the 'high risk, high skill' or 'extreme' trails that attract visitation, in World Trail's experience the majority of riders are looking for beginner to intermediate trails and it is always the beginner and intermediate trails that attract the most usage. It is still important to have some of the 'high risk, high skill' trails, as it is these that will gain exposure in mountain biking magazines and websites and help to 'spread the word'. The key consideration however, is that beginner and intermediate trails will receive the highest numbers of users.

The survey asked for respondents to indicate their preferred level of difficulty in a trail. Responses were:

- Very Easy (IMBA rating: white circle): 1.93% (23)
- Easy (IMBA rating: green circle): 9.89% (118)
- Intermediate (IMBA rating: blue square): 70.33% (839)
- Difficult (IMBA rating: black diamond): 70.49% (841)
- Extreme (IMBA rating: double black diamond): 25.98% (310)

Interestingly, the two most popular responses were Intermediate and Difficult. This is at odds with World Trail's field observations of known mountain biking destinations, where the most popular trails (as measured by trail counters) are usually trails rated Easy or Intermediate. This discrepancy is possibly due to the following three factors:

1. Due to its distribution primarily through mountain biking social media, the survey targeted 'core' mountain biking enthusiasts with preferences for more difficult trails, whereas in reality, trails are used by many non 'core' riders, who typically prefer easier trails;
2. A potential 'knee jerk' reaction against places like Lysterfield, that is commonly criticised by core enthusiasts as being too easy;
3. A lack of understanding of the trail difficulty rating system, combined with an over-estimation of rider's actual abilities.

The preferences provided to this question should be used to inform the overall design of the trail network.



3.1.1.5 Loops And Point-To-Point Rides

Both loop trails and point-to-point rides have their usefulness in a mountain biking trail network. Preferences may also reflect preferred mountain biking disciplines – downhill riders are used to point-to-point trails, generally using a vehicle or other means to get back to the top of the trail for each run down, whereas cross-country riders would generally ride looped trails.

The survey asked respondents to indicate their preference. Results were:

- Loop: 22.82% (272)
- Point-to-point: 7.21% (86)
- Both loop and point-to-point: 60.82% (725)
- No preference: 9.14% (109)

Reponses to this question suggest that there should be both point-to-point and loop trails included in the final proposed trail network.



3.1.1.6 Single-Direction Or Dual-Direction Trails

Mountain biking trails can be recommended for travel in one direction or both directions – referred to as single-direction or dual-direction respectively.

In the survey, respondents were asked to indicate their preference for single-direction or dual-direction.

- Single-direction: 64.03% (762)
- Dual-direction: 7.06% (84)
- No preference: 28.91% (344)

The responses provide overwhelming support for single-direction trails. This is supported by World Trail's own experience and knowledge of trail design. Single-direction trails provide a better visitor experience, are safer (as they eliminate the potential for head-on collision between riders) and can be built more cost-effectively to be sustainable. It is also a good traffic management technique – interactions with other riders are far less frequent on single-direction trails than on dual-direction trails.

Dual-direction trails are suitable for Very Easy trails where there are low gradients, greater widths to allow passing, and long sight lines. The Lilydale-Warburton Rail Trail is a good example of a Very Easy trail.

The majority of the trails in the final proposed trail network should be single-direction trails.



3.1.1.7 Trail Network Size

The size of the proposed trail network is a key consideration during this early feasibility stage. Obviously, the larger the trail network, the greater the cost to construct and maintain, but also the more attractive it becomes to the mountain biking community²⁶.

One key consideration is to make the trail network larger than the average mountain biker is capable of riding in one single day, forcing riders to either stay overnight or to come back again. The size at which a trail network becomes too large for the average rider to be able to ride in one day is referred to by World Trail as the tipping point. It is not possible to provide a single number that equates to the tipping point because every location is different and the distance that an average mountain biker can conceivably cover in one day depends on factors such as elevation, technical difficulty, climate and so on. That said, the tipping point is generally somewhere between 30 – 50km of trails. The aspiration should also be to build trails that are so good that riders want to ride them again and again and again, over and over, not just once. Quality is equally important as quantity.

In a sense then, bigger is better, but just how big should the trail network be? After all, trails cost money to construct and maintain, and this money will have to come from somewhere if this project is to proceed.

The survey asked respondents how many kilometres of trail the proposed trail network should have. Answers were:

- 0 - 20km: 4.44% (54)
- 20 – 40km: 31.55% (384)
- 40 – 60km: 36.32% (442)
- 60 – 80km: 12.24% (149)
- 80 - 100km: 5.42% (66)
- 100km or more: 10.02% (122)

The most common response to this question was '40-60km'. What isn't clear from the question is whether respondents interpreted this to mean 'the overall length of the proposed trail network', or the 'overall length of singletrack'.

Based on the survey results to this question, knowledge of other destinations, the stated aim of the project to create a world-class mountain biking destination and observations of other mountain biking destinations, World Trail believes that it should be interpreted as meaning 'overall length of singletrack', and that therefore, the proposed trail network should feature between over 60km of singletrack.

²⁶ Assuming that all the trails are well designed and constructed and provide the right type of experience for the target users.



3.1.1.8 Trail Signage

Signage is an important component of a successful trail network. It is important for risk management reasons, but also for ensuring a good visitor experience. Signage performs a number of functions:

1. It enables riders to navigate their way throughout the trail network without getting lost;
2. It enables riders to choose appropriate trails based on their skill level (all trails should be signposted with the trail difficulty rating);
3. It promotes good 'traffic management' by directing riders in the correct direction;
4. It can be used as a tool for educating trail users about trail etiquette, local flora, fauna, culture or history or other subjects.

There a number of different types of signs that are typically used throughout trail network, each with a slightly different function. These different signage types are discussed in more detail below and should be incorporated into the proposed mountain biking trail network for Warburton.



Trailhead Signs

As the name suggests, a trailhead sign should be installed at the main trailhead to inform trail users of all aspects relating to the use of the trails. These signs are an important risk management tool in communicating specific information that will enable users to make informed decisions about which trails to ride, based on their ability, skills and time available. The signs also detail important information that will assist users and rescuers in the case of an emergency.

Trailhead Signs should be easy to read and visually appealing, professionally designed and generally as large as possible. As a minimum requirement, a Trailhead Sign should include the following information:

- A map of the trail network;
- Trail names, distances and difficulty ratings for each trail;
- Trail etiquette (e.g. IMBA Rules of the Trail);
- Safety information;
- What to bring / wear;
- Emergency / mobile phone reception points;
- Emergency contact information.

Many mountain biking destinations also produce a printed trail map that users can take with them on their ride. The trail map would generally have the same information and format as a trailhead sign. It is intended as an overview of the entire trail network. Figure 20 below shows an example of a trailhead sign used in Forrest.

Figure 20. Trailhead Sign in Forrest, Victoria



Decision Point Signs

Decision Point Signs are placed at the start of every trail to inform riders that they are leaving the current trail and are about to embark on a new trail. The Decision Point Sign should provide sufficient information to make a decision as to whether they want to attempt the new trail, or whether they would prefer to remain on the current trail.

Decision Point Signs should include the following information:

1. The name of the new trail departing from that point;
2. An arrow indicating the direction of the new trail;
3. The difficulty symbol of the new trail (i.e. green circle, blue square, black diamond);
4. A small map showing the trail user's current location (i.e. you are here).

Decision Point Signs are recommended at the start of all trails as these are the points at which the trail user needs to make an informed decision about which trail to choose. This is an important risk management consideration, as choosing the wrong trail may commit the trail user to a longer or more difficult trail than they are capable of. By including a trail map and the other information recommended at each decision point, the user is given all the information they need to make an informed decision.

Decision Point Signs are not as large as a Trailhead Sign, but should be larger than a Waymarker.



Waymarkers

A Waymarker is a simple bollard or post with symbols on it to guide trail users in the correct direction at any point of uncertainty where it may not be entirely clear where the trail goes. Examples of where a Waymarker should be used include:

- Where a mountain bike trail crosses a road or four-wheel drive track – there is no need to signpost the name of the road or four-wheel drive track because it is not intended for use by mountain bikers, but there is a need to provide direction and reassurance for mountain bikers at this point to ensure they follow the mountain biking trail;
- Where there have been no signs for a substantial distance – if there have been no intersections or signs for, say, 2km, it might be prudent to place a waymarker beside the trail with a 'straight ahead' arrow, just to reassure riders they are still on the correct trail;
- Where a new trail branches off from another trail – the new trail should have a Decision Point Sign, but the current, continuing trail should have a waymarker to advise the rider that the trail they have been using continues as well.

Waymarkers can also be used to signify the wrong direction of travel, by using an 'X'. For example, where a cross-country trail crosses over a downhill trail, or merges with a flow track, it may be wise to place Waymarkers suitably with 'X' symbols to discourage riders from going the wrong way. It is also good practice to place 'X' symbols on the backs of any Waymarkers, just as extra advice to riders that may travel in the wrong direction.



3.1.1.9 Trail Names

All the trails should be given names. Not only does naming trails aid in navigation (a name is essential to enable a rider to locate him/herself on a map), but it is also important from a marketing perspective. Riders will identify the trails by name when discussing them with other riders, and a name can convey a lot of hidden meaning and mythology within it that can help to build the reputation of a trail in the minds of other potential visitors. Names give each trail its own identity and are invaluable in marketing the trail network and helping to build the culture around the trail network.

Names may follow a particular theme, may reflect local stories, culture, environment or local personalities. They should ideally resonate with mountain bikers and be simple, short and unique. The responsibility for naming the trails rests with the land manager. The naming of the proposed trails may also provide opportunities to attract local sponsorship. One idea that has been used successfully elsewhere is that a local business could buy the naming rights to a trail.

Many mountain biking destinations use numbers as well as names. Each trail has both a name and a number, but out on the ground only the numbers are used on the signs, and riders follow the numbers to navigate around. The main benefit of this is that a single number takes up less space than a whole trail name, meaning that signage costs are reduced. Although the use of numbers is practical and can work, World Trail believes that it detracts from the overall culture and identity of the trail network. While it may simplify signage requirements, it is a missed opportunity to build the mythology and culture of the trails.

A further extension of naming trails is to develop individual icons, symbols or pictograms for each trail. This technique was first used by World Trail at Mt Buller, with the famous 'Stonefly' trail. The stonefly is an insect that lives in the alpine streams around Mt Buller and Mt Stirling, and was chosen as the name for an iconic 10km cross-country loop trail in the resort. The name was chosen in part because it lent itself well to creating a visual 'pictogram' (see Figure 21 on the next page).

This pictogram was designed to be clear and striking, easy to see from a distance and cheap and easy to reproduce (two colour tones only) for signage. Pictograms are small, square symbols that fit easily on a narrow bollard or post, taking up less space than the name of the trail, and therefore reducing the need for large signs and complicated printing requirements.

These pictograms, as well as having practical benefits for signage, are an excellent marketing tool – the pictogram is essentially a logo for the trail and can be used in collateral for marketing and promotion. These pictograms should be used on any signs, maps or marketing material and help to create a vibrant identity for each trail that resonates in the minds and stories of the people that ride the trail.

In addition to having individual symbols or pictograms for each trail, World Trail recommends developing a specific logo to be used on all signs and all collateral relating to



the proposed Warburton mountain biking trails. An identifiable trail network logo can assist in the marketing of the trails, and also identifies any official mountain bike trails.

Figure 21. Stonefly pictogram



3.1.1.10 Trail Surfacing

Mountain bike trails are generally of two surface types – natural soil or an imported, surfacing material such as fine crushed rock or gravel.

World Trail generally recommends the use of fine crushed rock surfaces on trails for less experienced riders, as it helps to level out the undulations of the trail surface and provide a more uniform and predictable surface. It can also provide better traction than a natural soil surface (although this depends on the local soils and the type of fine crushed rock used). If using a surfacing material, care needs to be taken to choose the correct type of surfacing material, to ensure that it is not 'loose' and 'skatey' as this can be very disconcerting for inexperienced riders. World Trail generally recommends the use of some type of fine crushed rock for the surface of all trails rated as 'Very Easy' and sometimes on trails rated as 'Easy'. A good example of this is the Lilydale to Warburton Rail Trail, which features a fine crushed rock surface that is hard-wearing and reasonably smooth.

In contrast to beginner riders, most experienced mountain bikers have a strong preference to ride on natural soil surfaced trails and hence, trails rated as Intermediate, Difficult or Extreme should generally be natural soil trails. Despite this, there are circumstances where crushed rock might be used on trails for more experienced riders:

- In poor soils. Some soil types are more susceptible to soil migration (erosion). In such soils, the use of crushed rock can improve the performance of the trail with regard to soil erosion. It is important to note that the addition of crushed rock to the surface of a trail does not in itself guarantee that a trail won't erode. The ability of a trail to resist the erosive forces of water and trail users is more a function of its design and how well it sheds water, than the surface material of the trail. While crushed rock surfacing may resist erosion longer than a natural surface, it is no replacement for sustainable trail design;
- In soils that can be slippery or dangerous when wet. Heavy clay soils can be great for summer usage, being hard and smooth, but in winter can become exceedingly slippery and dangerous;
- In very popular or heavily trafficked areas. Trails that receive heavy usage (by walkers or riders) are subject to compaction, the process whereby the weight of the trail users causes the centre of the trail tread to compact and sink, causing the centre of the trail to become lower than the sides of the trail. A properly laid and compacted crushed rock surface will resist compaction better than many soils, provided that it is properly compacted at the time it is laid.

In summary, fine crushed rock and other surfacing materials can improve the sustainability and the amenity of a trail if combined with sustainable design principles.



3.1.1.11 Environmentally Sustainable Trails

With careful planning and good trail design and construction processes, it is possible to have mountain bike trails and good environmental outcomes on the same parcel of land.

The largest environmental impact of a mountain biking trail occurs at the construction stage, when vegetation is cleared to create the trail. This impact, when factored over the entire length and width of the trail can be significant, displacing native vegetation and animal habitat. The most important way to minimize this environmental impact is to ensure that any proposed new trail is carefully aligned to minimize impacts to flora and fauna communities of high conservation significance. In other words, construct trails in places that have low environmental values, and avoid places with high conservation significance.

Once a trail has been constructed, the use and ongoing existence of that trail can also have environmental impacts. The main impact is the movement of soil from the trail tread to the surrounding environment. This process is called erosion, and is facilitated by water and usage of the trail.

There are a number of design and construction principles that, if implemented during the initial development of a trail, can minimize erosion. These principles include the rolling contours concept, outslope, the half rule, the 10% average guideline and the use of frequent grade reversals. These are explained in more detail below:

- **The Rolling Contours Concept** – The trail should be built on a side slope, aligned along the contours of the hillside, with the lowest gradient possible and with frequent undulations. Trails built in this style, roll along the contours, hence the name ‘rolling contours’;
- **Outslope** – The trail should be outsloped. That is, it should slope gently (no more than 5%) down towards the lower, outside edge of the trail. This allows water flowing down the hillside to shed across the trail, rather than being channelled along the trail. It should not be too steeply outsloped, as this can create an uncomfortable feeling for users;
- **The Half Rule** – The Half Rule states that the trail gradient shouldn’t exceed half of the gradient of the hillside along which the trail traverses. If the trail gradient does exceed half the side slope gradient, it is considered a fall-line trail. Instead of shedding across the trail, water will run along the trail, displacing soil and causing erosion. For example, if the gradient of the side slope is 20%, the maximum allowable trail gradient would be 10%;
- **The 10% Average Guideline** – The 10% Average Guideline was first coined by IMBA and states that, generally, an average trail grade of ten per cent or less is the most sustainable. Trails with average gradients in excess of this are more likely to become eroded. This is a general guideline – exceptions to the rule can be sustainable, and depend on factors like local soils, geology, climate etc.



- **Frequent Grade Reversals** – Grade reversals are ‘dips’ and ‘crests’ on a trail. They are the point at which the trail gradient reverses or changes from down to up (or up to down depending on the direction of travel). Grade reversals are essential for sustainability as they create barriers to prevent water from flowing along the trail, where the ‘dip’ becomes a drainage outlet for water. They also help to give a trail a dynamic feel and are a fundamental component that helps to set mountain biking trails apart from walking tracks and roads. Figure 22 below illustrates this concept well – the photo is taken from atop a crest on the trail, looking down into a grade reversal. Looking further along the trail, it is punctuated by constant undulations, with the gradient constantly changing. Figure 23 on the following page further demonstrates the concept of a grade reversal.

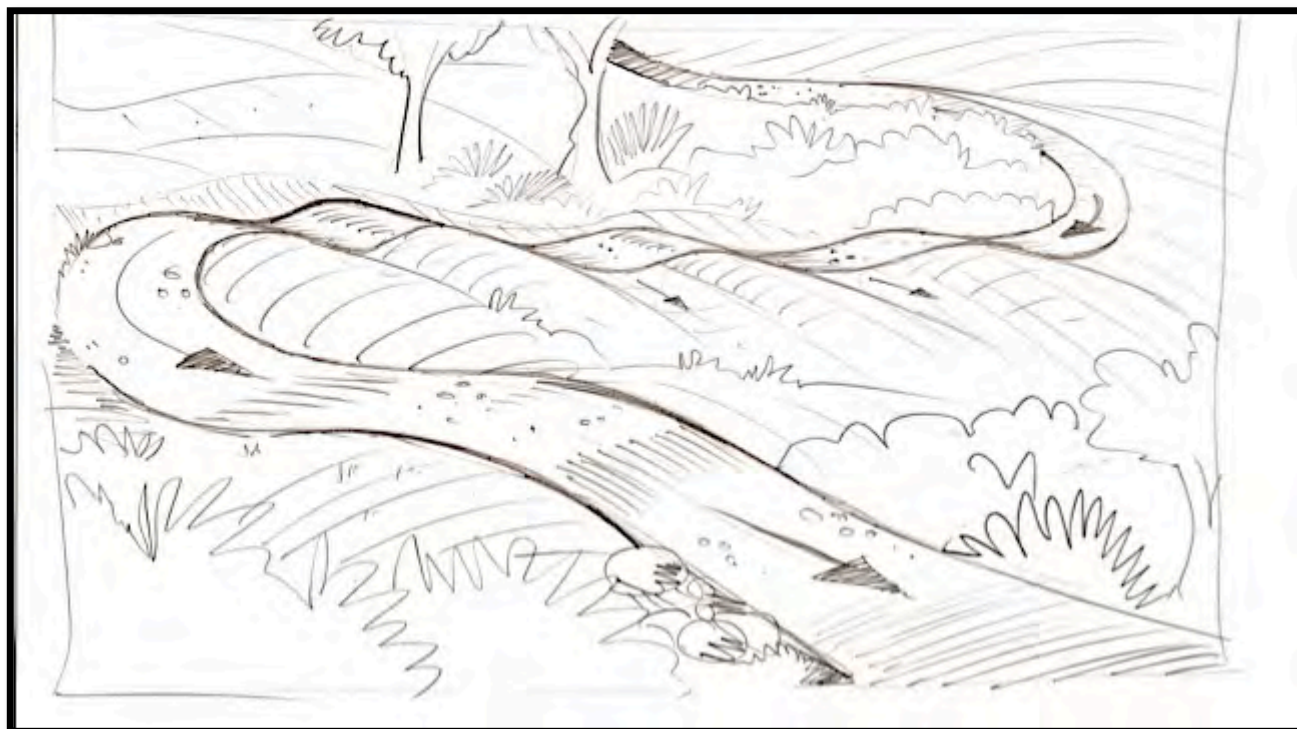
These guidelines and many others are extensively covered in the well-known and highly recommended IMBA trail-building books:

- ‘Trail Solutions: IMBA’s Guide to Building Sweet Single-track’;
- ‘Managing Mountain Biking: IMBA’s Guide to Providing Great Riding’.

Figure 22. Rolling contour mountain biking trail with grade reversals



Figure 23. Sketch of a rolling contour mountain biking trail



3.1.1.12 Other Trail Attributes

In addition to those trail attributes discussed in the previous sections, there are some other attributes that must be present in the final proposed Warburton mountain bike trail network. These include:

- The ability to access the top of the downhill and all-mountain / freeride trails by vehicle on a safe, well maintained road, with a well-defined and safe drop-off point close to the start of the actual trails. Ideally, a commercial shuttle service would fill this role, reducing the number of cars accessing the drop-off point and also generating economic stimuli for Warburton;
- The inclusion of some 'all-season' trails that are suitable for usage year round, regardless of weather. The survey showed that people intend to visit Warburton in winter to ride the proposed trails, so at least a portion of the trails need to be designed and constructed for sustainable usage during winter. More and more destinations are choosing to temporarily close trails after heavy rainfall, so as to prevent unnecessary damage to the trails. This is a valid management technique, but ideally there should be a small number of trails that are constructed so as to be useable even after heavy rain;
- Trails must be close to the centre of town. By having the trail network close to the centre of Warburton, two outcomes are facilitated – maximum opportunities to spend money at the cafes, restaurants and retail stores; maximum convenience for people staying or parking in the centre of town. The trails at Forrest in southwest Victoria provide a good example of what not to do. At Forrest there are two separate trailheads – one in town itself and the other in the Yaugher forest to the immediate north of town. As most visitors to Forrest arrive from the north, many choose to park at the Yaugher trailhead, go for a ride, then leave without actually going into the centre of Forrest;
- The trail network should be designed to allow day-to-day recreational riding while also facilitating competitive mountain bike events. That is, trails should comply with existing national and international guidelines for competitive course design, but should appeal to recreational riders as well. For cross-country racing, the trails should offer the flexibility of multiple course configurations, provide overtaking opportunities at the required intervals and should generally be wider and easier close to the trailhead;
- Integration with the Lilydale - Warburton Rail Trail and the O'Shannasse Aqueduct Trail. These shared-use trails are key assets for cycling in Warburton and form excellent east-west cycling corridors from the centre of Warburton. The mountain biking trails should make use and link to these existing shared-use trails wherever possible.



3.1.2 SUPPORTING INFRASTRUCTURE AND EXPERIENCES

The previous section explored what trail-related attributes were necessary for the Warburton mountain biking trails to be successful.

This section explores what other non trail-related attributes are necessary for success.

3.1.2.1 Trailhead

A trailhead serves many purposes:

1. It is the starting and finishing point for all non-local riders. As such it is the place where friends will meet to begin their ride and where they socialise afterwards. It is also a location that can be signposted or advertised so that travelling mountain bikers can find it easily;
2. It is the key information point about the trails. Signage must adequately convey all the necessary safety and risk information about the trails, but also provide enough guidance that riders can plan their ride before leaving the trailhead;
3. It should provide the essential pre-ride needs of mountain bikers – water, toilets, information and car parking. In addition however, it should encourage positive social use of the site. Many riders will have non-riding companions who may want to wait at the trailhead, so the trailhead should be an enjoyable place to wait, which means considering additional infrastructure such as seating, shelters, landscaping etc;
4. It is a safe place to leave a vehicle while riding.

In the survey, World Trail asked respondents what facilities they would expect to see at a trailhead. Responses were:

• Car parking:	96.38% (1,145)
• Maps:	86.11% (1,023)
• Toilets:	80.98% (962)
• Shower:	5.05% (60)
• Change room:	7.24% (86)
• Drinking water:	72.14% (857)
• Bike wash facilities:	16.75% (199)
• Picnic tables:	46.97% (558)
• BBQ:	32.74% (389)
• Shelter:	45.03% (535)
• Bike racks:	12.04% (143)
• Notice board:	42.51% (505)
• Local business advertisements:	16.50% (196)
• Café:	28.28% (336)
• Bike shop:	14.81% (176)



Based on the survey answers, it is possible to devise three categories of trailhead facilities:

1. **Essential Facilities** (50-100% of respondents expect to see these facilities at a trail head):
 - a. Car parking;
 - b. Maps;
 - c. Toilets;
 - d. Drinking water;
2. **Preferred Facilities** (30-49% of respondents expect to see these facilities at a trail head):
 - a. Picnic tables;
 - b. BBQ's;
 - c. Shelter;
 - d. Notice boards;
3. **Optional Facilities** (<29% of respondents expect to see these facilities at a trail head):
 - a. Shower;
 - b. Change room;
 - c. Bike wash facilities;
 - d. Bike racks;
 - e. Local business advertisements;
 - f. Cafés;
 - g. Bike shop.

The location for the trailhead is also a critical success factor. This will be discussed further in this document.



3.1.2.2 Activities For Non-Riding Companions

The provision of non-mountain biking related activities for non-riding companions is an important factor for the success of a mountain biking destination, especially if it is to attract significant overnight visitation.

In any given family, it is likely that not all members of the family share the same interest in mountain biking. Therefore, for a family to choose to holiday at a mountain biking destination, there would need to be other activities available that would satisfy the needs of the non-riding members of the family.

While the survey didn't directly ask about how often mountain bikers are accompanied by non-riding companions, the survey results do provide some insights into this:

- Question 8 asked respondents how many people they typically ride with. Based on the answers provided, the average size of a group of mountain bikers is 4. If a group of four mountain bikers was visiting Warburton for a mountain bike ride, it is highly likely that at least one of the four members of the group might bring along a non-riding companion – family member, partner etc;
- Question 22 asked respondents to estimate how many other people would typically accompany them on a mountain biking holiday. Based on the answers provided, on average, most respondents would be accompanied by 3.5 other people on a mountain biking holiday. While the question was not explicit as to whether these other people were riders or non-riders, it can be assumed that at least some of them would be non-riding family members;
- Question 36 asked about people's households. It revealed that approximately 44% of respondents had children and that approximately 75% of respondents had partners. On this basis it is also likely that on at least some visits, riders might be joined by non-riding family members.

Fortunately, Warburton has many other tourist attractions and appealing activities available across the Yarra Valley and Dandenong Ranges region. This is an advantage that many other destinations are not able to achieve. Attractions include: Yarra Valley food and wine district, the Yarra Valley Railway, Healesville Sanctuary, Museums and Performance Arts venues, the Seville Water Play and Yarra Glen Adventure Playground.



3.1.2.3 Range Of Accommodation Options

The results from question 37 of the survey showed that mountain bikers typically have a wide range of household incomes. Question 24 also established that the range of spending on mountain bike holidays varies from \$0 - \$6,000 or more, with the average cost of a mountain biking holiday being approximately \$1,200. This range suggests that mountain bikers' preferences for accommodation and other tourist services vary widely.

It is important therefore, that the range of available accommodation options reflect this, from cheap camping right up to five star luxury.

While many mountain bikers have an affinity for the outdoors, that does not mean that all mountain bikers want to go camping or have the necessary equipment to do so. Certainly camping is a very popular option, but many other mountain bikers look forward to luxury accommodation and fine dining after a day on the bike.

Warburton does not have a large volume of accommodation options available. In fact, there are a total of 1224 possible bed nights. This is made up of 286 rooms + 130 campsites, at 44 different accommodation options.

The proposed Edgewater development of the old Sanitarium factory site will add significantly to the accommodation in Warburton with the planned construction of 98 new luxury apartments. This particular development is aimed at the boutique/luxury end of the market end, satisfying one segment of the increased accommodation demand that this project will bring, but there will remain many opportunities for new investment in accommodation in Warburton.



3.1.2.4 Provision Of Information

It is important that potential visitors to Warburton are able to easily obtain information about the trails (and all things related, such as car parking, accommodation, food etc.) both before and during their visit.

Typically, pre-trip information would be sourced from the Internet, with most mountain biking destinations offering dedicated webpages focussed on providing potential visitors with adequate information. Examples of this include:

- Forrest, Victoria: www.rideforrest.com.au
- Mt Buller, Victoria: www.mtbuller.com.au/Summer/
- Atherton Tablelands, Queensland: www.cairnstrails.com
- Rotorua, New Zealand: www.riderotorua.com
- 7 Stanes, Scotland: www.7stanesmountainbiking.com
- Whistler Blackcomb, Canada: www.bike.whistlerblackcomb.com

Such websites offer practical information about trails, trail maps, up-to-date advice about weather and trail closures, how to get there, upcoming events etc., but can also provide advice about local accommodation, hospitality and retail stores.

Once visitors arrive, they often still need access to information. While many people now have access to the internet via smartphones and can thus access the dedicated visitor webpage, the ideal scenario is to have designated, manned information point for visitors. Warburton already has a Visitor Information Centre (VIC) in the centre of town. The VIC is staffed during business hours and provides information to visitors about activities and local businesses servicing the tourism industry. Ideally, if the proposed Warburton mountain biking trail network is developed, the VIC would be designated as the formal information point for the mountain biking trails too, with staff trained about mountain biking and provided with all the necessary collateral (e.g. trail maps). The use of the VIC also provides an opportunity to sell merchandise relating to the trail network, thus raising revenue that would help to support the ongoing management and maintenance of the trails.



3.1.2.5 Mountain Bike Friendly Tourism

While Warburton already has an established tourism industry, the influx of mountain bikers that would occur as a result of the proposed mountain bike trail network would create a number of opportunities:

1. Opportunities for new businesses to become established;
2. Opportunities for existing businesses to grow and diversify;
3. Increased volume for existing accommodation and hospitality providers.

In order to ensure that the existing tourism industry is prepared for the likely shift in the visitor demographic, a capacity building program should be undertaken to improve the capacity of the local tourism industry. This approach has been taken in many of the most successful overseas examples of mountain biking destinations, on the basis that, in order for a mountain biking destination to be successful, trails are only half of the equation – the tourism industry provides the other half. While land managers can build, maintain and manage a trail network, it needs the support of the private sector to provide all the supporting tourism services and infrastructure.

In general, the needs of mountain bikers are not much different to other visitors, but there may be some small specific requirements that could make all the difference between having mountain biking customers and not having mountain biking customers. For accommodation providers it may be as simple as providing a secure place to store bikes, a dedicated place to wash dirty bikes and the provision of trail maps and mountain biking videos. For cafes and restaurants, the provision of bike racks and outside seating and providing healthy, energy-based foods might assist in targeting mountain bikers.

Local businesses may need to look at other successful destinations to see how the tourism community has maximised its appeal to cyclists and be prepared to invest in order to implement similar changes.



3.3 WARBURTON MOUNTAIN BIKE TRAIL NETWORK

The previous sections described all the attributes that are required for a mountain biking destination to be successful. This section attempts to define what the proposed network of mountain bike trails at Warburton might look like, identifies suitable parcels of land for trail development and attempts to identify the advantages/disadvantages of each.

3.3.1 SITE DESCRIPTION

The town of Warburton sits astride the Yarra River, in a valley that runs roughly east-west. The township is centred in the base of the valley, but spreads a short way up on both sides of the valley. Generally speaking, the river flats along the base of the valley have largely been cleared and developed for agriculture or residential purposes, with the majority of the forested areas occurring higher up on the surrounding hillsides.

Broadly speaking, the land available for mountain biking can be considered as two separate parcels:

- The north side of the river;
- The south side of the river.

The northern side of the river is characterised by Mt Donna Buang, which dominates the skyline above Warburton. At approximately 1250m above sea level, this mountain is regularly dusted with snow and, although it has no chairlifts or skiing infrastructure, is popular with day trippers in winter for snow play. Being such a tall mountain, so close to Warburton, the flanks of the mountain are expectedly very steep with a southerly aspect which translates into a dark, wet landscape during winter. The vegetation on this side is typically quite dense and could be described as wet sclerophyll forest or temperate rainforest. The land available for potential development of mountain biking trails on the north side of the valley is predominantly part of the Yarra Ranges National Park, managed by PV, although there are some small sections of other types of crown land available too.

The O'Shannassy Aqueduct is also located on the northern side of the valley. It starts to the east of Warburton near Reefton, and runs along a steady contour westward for approximately 30km, where it finishes on Don Rd. It passes just to the north of Warburton, on the lower flanks of Mt Donna Buang, but about 140m higher up the valley than the main street of town. Designed to deliver drinking water to Melbourne, the aqueduct was a marvel of human ingenuity, engineering and labour when it was constructed in the early 1900's. Since being decommissioned in the 1990's and replaced with an underground and more direct pipeline, the service road running beside the aqueduct has been opened up for cycling and walking and has become quite popular. Under the IMBA TDRS, the aqueduct trail would likely rate as Very Easy and is a unique product in a mountain biking sense – a beautiful trail, meandering through dense mountain forests on an almost completely flat, hardened, crushed-rock surface. The only steep sections at all occur where the aqueduct was piped underground – in these locations the trail deviates onto steeper fire trails for short periods, but soon returns to the flat gentle gradient beside the aqueduct.

Further to the north of Warburton are vast areas of water catchment areas that are closed to public access. Even if access were allowable in these areas, they have limited



usefulness to this project, being located to the north of Mt Donna Buang and too far away from Warburton. There are also water catchments to the east of Warburton, near Reefton, but again, these areas are considered too far away from Warburton to be useful.

On the southern side of the river the landscape rises more gently than the northern side, although it also features some significant peaks – Mt Little Joe at about 515m above sea level, Mt Bride at 898m above sea level and Mt Tugwell at 796m above sea level. Being on the southern side of the valley, the land in this area has a northerly aspect and consequently has a generally more open vegetation structure – best described as Eucalypt woodlands with an understorey of grasses and shrubs.

The vast majority of land in this area is part of the Yarra State Forest, managed by DEPI. Historically, this area has been managed for forestry purposes, although forestry has declined significantly in recent times.

On both sides of the valley, freehold land surrounding town forms a barrier to accessing the areas of public land available for trail development. This exacerbates the problem of getting riders from the trailhead to the trails, as it is preferable not to have riders using roads at all.

Figures 24 – 30 on the following pages illustrate some of the typical scenery around Warburton.



Figure 24. Warburton Main Street (Mt Little Joe seen in background)



Figure 25. Lilydale to Warburton Rail Trail with Visitor Information Centre behind

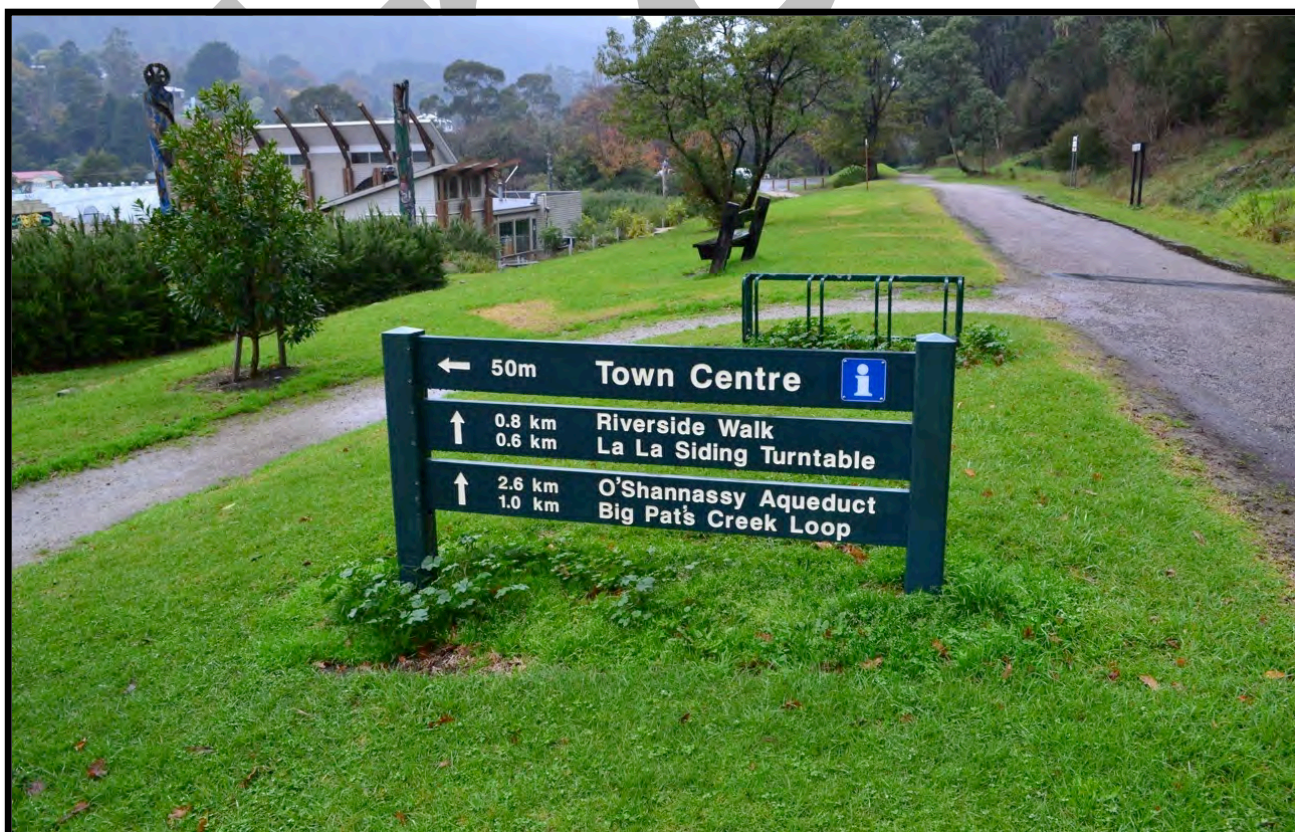


Figure 26. Riding the East Warburton shared-use trail



Figure 27. Warburton River Trail



Figure 28. O'Shannassy Aqueduct



Figure 29. Bridge on the O'Shanassy Aqueduct



Figure 30. Redwoods (Cement Creek Rd)



3.3.2 PROPOSED TRAILHEAD AND EVENT LOCATIONS

The ideal location for a trailhead is:

- Close to the centre of the town;
- Immediately adjacent to the trail network, providing access to the trail network without the need for riders to use the local road network;
- On public land available for development.

A number of trailhead locations have been identified – one main, central trailhead and five smaller trailheads.

These trailhead locations are shown in Map 3 on the following page. Table 12 on the following page provides further details about each site.



Map 3. Overview of proposed mountain bike trail zones and shared use circuit

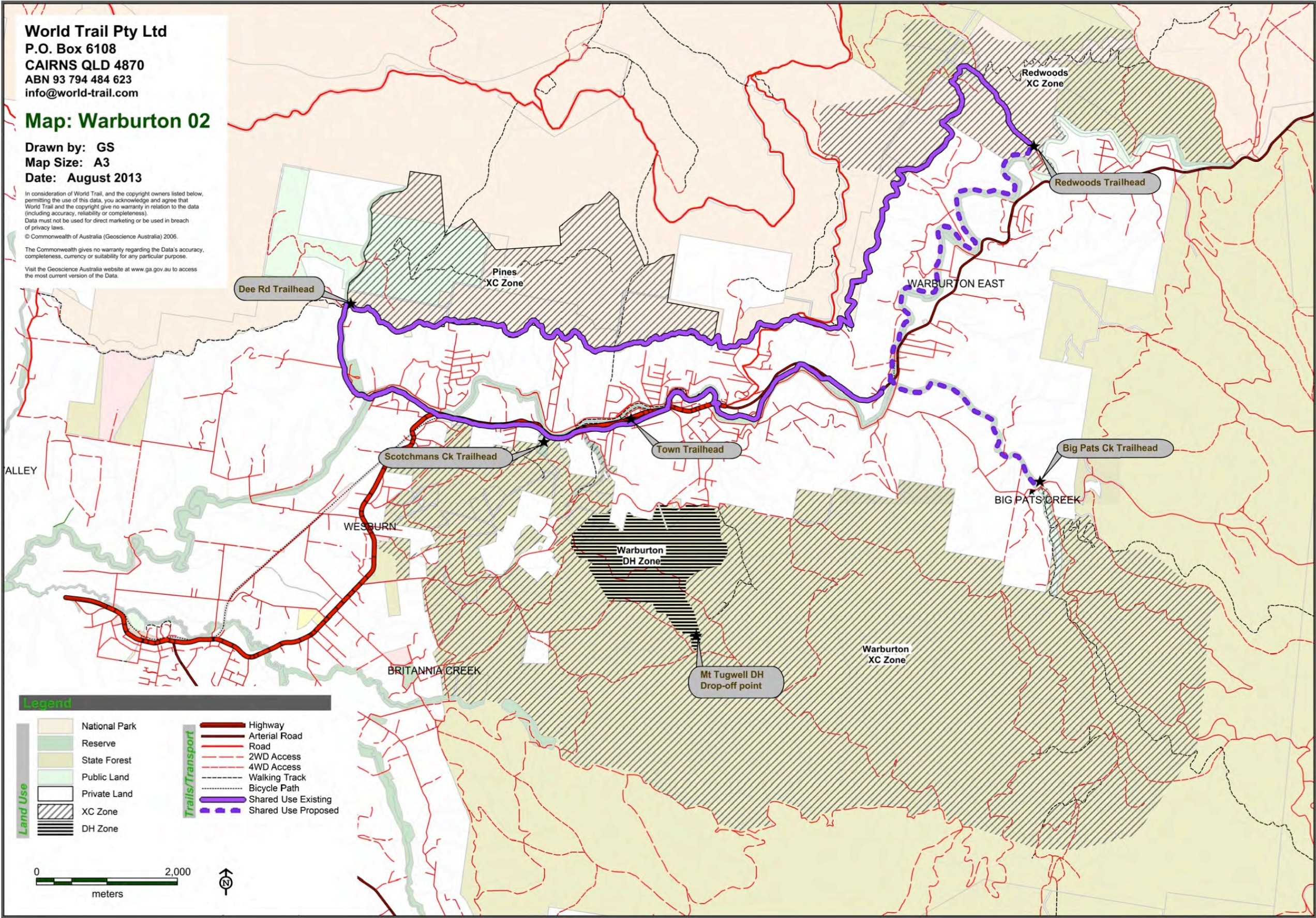


Table 12. Proposed trailhead locations

Trailhead Name	Location	Required Facilities	Key Features	Land Owner / Manager
Town Trailhead	Located in the centre of Warburton, behind the Visitor Information Centre and adjacent to Cog Bike Shop and Cafe	a. Car parking b. Maps c. Toilets d. Drinking water e. Picnic tables f. BBQ's g. Shelter h. Notice boards	<ul style="list-style-type: none"> Located on the Lilydale to Warburton Rail Trail Close to Warburton shops Close to the Yarra River Access to the proposed mountain bike trails is via the rail trail Existing car parking area, with room for future expansion and landscaping 	Yarra Ranges Council
Scotchman's Creek Trailhead	Located on Scotchmans Creek Rd, just off the Warburton Highway.	a. Car parking b. Maps c. Toilets d. Drinking water	<ul style="list-style-type: none"> Located on the Lilydale to Warburton Rail Trail Reasonably close to Warburton shops Close to the Yarra River Provides immediate access into the proposed mountain bike trails 	Yarra Ranges Council
Dee Road Trailhead	Located at the northern end of Dee Rd in Millgrove	a. Car parking b. Maps c. Toilets d. Drinking water	<ul style="list-style-type: none"> Great views over the Warburton and Yarra valleys Provides immediate access into the proposed shared-use and mountain bike trails Existing car parking area with room for future expansion 	Parks Victoria
Redwoods Trailhead	Located on Cement Creek Rd, about 850m off the Warburton Highway in East Warburton	a. Car parking b. Maps c. Toilets d. Drinking water	<ul style="list-style-type: none"> Magnificent stand of Redwood trees Provides immediate access into the proposed shared-use and mountain bike trails 	Parks Victoria



Big Pat's Creek Trailhead	Located on Smyth Creek Rd, just near the corner with Big Pats Creek Rd	a. Car parking b. Maps c. Toilets d. Drinking water	<ul style="list-style-type: none"> • Small existing car parking space • Trailhead for the 'Walk into History' (although there is no signage in place currently). • Provides immediate access into the proposed shared-use trails • Possible finish point for long-distance mountain biking descent from Mt Bride. 	Department of Environment and Primary Industries
Mt Tugwell DH Drop-off Point	Located at the intersection of Mount Bride Rd and Cemetery Track	a. Car parking b. Maps c. Toilets d. Drinking water	<ul style="list-style-type: none"> • Not a trailhead per se, but a shuttle drop-off point for downhill and all-mountain trails. • Provides immediate access into the mountain bike trails. 	Department of Environment and Primary Industries

Figures 31 – 33 show some of the proposed trailheads.

Figure 31. Town Trailhead



Figure 32. Scotchman's Creek Trailhead



Figure 33. Dee Road Trailhead



Events

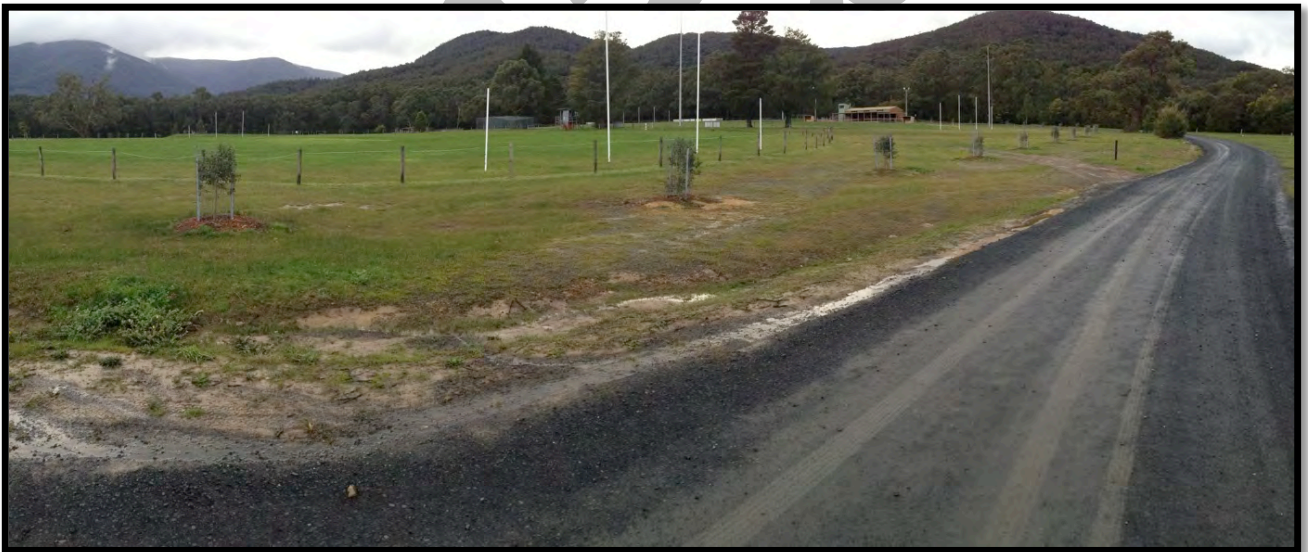
Ideally, the trailhead would also provide a large, flat, cleared site that can be used for staging large-scale mountain biking events. However, none of the sites that were identified as possible trailheads in this project are big enough to host any large events.

Instead, two suitable event sites were identified separate from the proposed trailhead sites. These two sites are Wesburn Park in Wesburn and the Warburton football oval.

This scenario of having separate trailheads and event spaces, while not preferred, is proven to work in other destinations. The Otway Odyssey, one of the largest mountain biking events in Australia, is held on the trail network at Forrest in Victoria and uses the Yaughter Recreation Reserve (the local football/cricket oval) as a staging area, despite it not being one of the formal trailheads for the trail network.

Wesburn Park would be an excellent event staging area. It has two football/cricket ovals, formalised equestrian events spaces, netball courts, open space for general recreation, as well as toilets, change rooms, club rooms etc. It is adjacent to the forested areas on the western side of Mt Little Joe, providing direct access into the proposed mountain bike trail network. It is not proposed as one of the formal trailheads however, as it is on the western side of Warburton and would therefore intercept Melbourne-based mountain bike visitors before they reach Warburton. Figure 34 below shows Wesburn Park.

Figure 34. Wesburn Park



The Warburton football oval reserve is centrally located in the centre of Warburton. It would also be an excellent event staging area. The Warburton shared-use trails beside the Yarra run through this reserve and could provide a connection between the oval and the proper mountain biking trails, but there would be significant logistical issues to be overcome if it were to be used as an event space. There is also a large open space between the football oval, the river and the Edgewater development, which currently appears to be under-utilised. This large space, if available, could be investigated as a potential trailhead, event space, or even as a possible location for a dirt jump/pump track



park. It is believed that this space may be earmarked for development as part of the Edgewater development.

draft



3.3.3 MOUNTAIN BIKE TRAIL DEVELOPMENT ZONES

After spending considerable time in the field investigating the areas available for potential trail development, World Trail has developed a concept that will best showcase the diverse landscapes and environments Warburton has to offer and that will maximise mountain biking visitation to the area. This concept can be described as a core mountain biking development zone with smaller 'satellite' zones, linked via a backbone of shared-use recreational pathways.

In total there are four proposed mountain bike trail development zones. These are:

1. Warburton XC Zone;
2. Warburton DH Zone;
3. Pines XC Zone;
4. Redwoods XC Zone.

Each zone can be seen in Map 3 on page 140. Each of these zones is discussed separately in the following pages.

This concept of a *'core mountain biking development zone with smaller 'satellite' zones, linked via a backbone of shared-use recreational pathways'* follows a precedent set by the most revered mountain biking destination of all – Whistler, British Columbia, Canada.

Whistler is most famous for the Whistler Mountain Bike Park, a user-pays, chairlift accessed trail network predominantly for downhill/all mountain riding. While the bike park is the most well known aspect of Whistler's bike scene, there are a number of other aspects that make Whistler such an amazing mountain biking destination:

1. Firstly, there is 'the Valley Trail', a mostly concrete and asphalt, 3-4m wide, shared-use trail that meanders throughout the valley, linking the main population/accommodation/activity centres and providing off-road access to the mountain bike trails;
2. Secondly, there are some longer, easier cross-country mountain biking trails that utilise old logging roads through the mountains (e.g. the Flank Trail);
3. Thirdly, the largest and most diverse range of trails are the Whistler Valley Mountain Bike Trails. These are the true mountain biking singletracks, mostly built by core enthusiasts, that Whistler first became known for. These trails are mostly cross-country and range from Easy to Extreme, from 1 hour to 7 hours. There are some downhill trails, but the majority of the true downhill is in the Whistler Mountain Bike Park. (e.g. Kill Me Thrill Me, Comfortably Numb);
4. Fourthly, there are a number of small municipal 'bike parks' in and around the Whistler valley, providing dirt jumps, pump tracks, trials, skill development trails and children's trails.


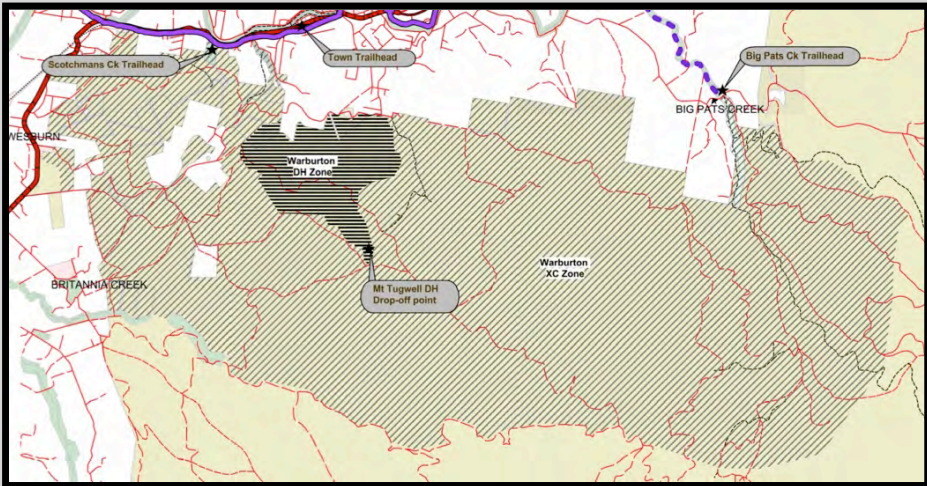


The concept of four different trail development zones around Warburton provides many benefits, including:

- The geographic separation of the mountain bike trail development zones makes it harder for a rider to complete all the trails in a single day, thus promoting longer stays and repeat visitation – that is, it extends the tipping point;
- The different zones all provide different trail experiences. New visitors will feel overwhelmed with choices and a sense of exploration as they visit each of the proposed trail development zones;
- It allows for some separation of the different disciplines and even different skill levels at different sites. This is useful from a risk management perspective, where it is not desirable to have beginner mountain bikers attempting extremely difficult downhill trails;
- The different zones all showcase different environments. Some provide views, some tall, shady, dark forests, native versus exotic forests and so on;
- It allows for flexibility in different weather conditions. If it is hot, riders may choose to ride in the Redwoods or Pines, where it is cool and shady. If it is wet, the Warburton XC Zone will offer drier and warmer conditions;
- It allows flexibility for events. That is, it provides many different options for event organisers, while at the same time offering other opportunities if one particular zone is being used for a competitive event.



3.3.3.1 Warburton XC Zone

MTB Discipline	Cross-country
Difficulty Level	Easy, Intermediate, Difficult 
Approximate Distance of Trails	40-50km (including both existing trails [singletrack, fire roads, four-wheel drive trails] and proposed new trails)
Trailhead/s	Town Trailhead, Scotchmans Creek Trailhead, Big Pat's Creek Trailhead
Key Features	Mt Little Joe, Mt Tugwell and Mt Bride
Lowest Elevation	155m above sea level (Scotchmans Creek Trailhead)
Highest Elevation	898m above sea level (Mt Bride)
Vertical Elevation Range	Approximately 740m
Land Tenure	Yarra State Forest, managed by Department of Environment and Primary Industries
Reference Map	
General Description	The Warburton XC Zone is proposed as the main development area for mountain biking trails. It is located in Yarra State Forest to the immediate south of




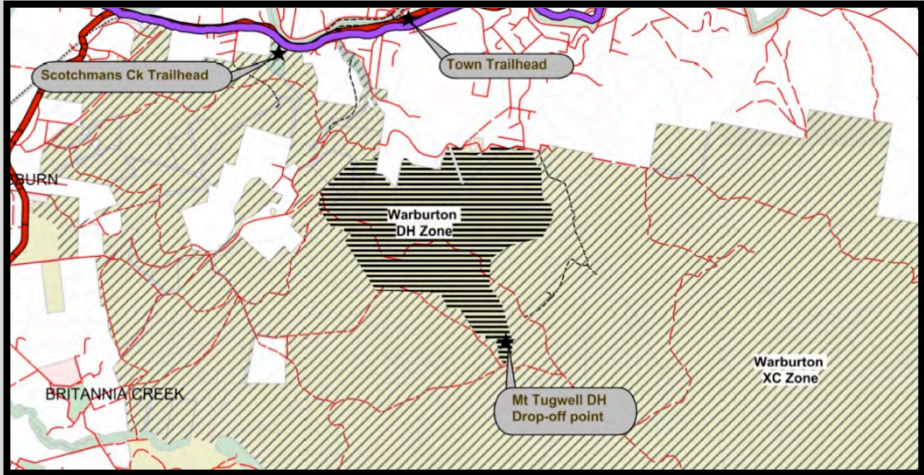
	<p>Warburton.</p> <p>This zone is isolated from the centre of township by a large area of suburban development comprising roads and free hold properties, except for two locations. One of these is a corridor of land coming down Scotchman's Creek to the proposed Scotchman's Creek Trailhead and the other is about 400m west along the Lilydale to Warburton Rail Trail from Scotchman's Creek Trailhead, where the forest comes right down to the edge of the rail trail. These two areas will form critical corridors in this proposed trail development zone, as they create an opportunity to move mountain bikers to and from the trailheads and into the forest.</p> <p>This zone will include a significant proportion of trails to be developed on Mt Little Joe, with possible 'event links' to Wesburn Park. Mt Little Joe, being so close to Warburton, is considered a critical area for trail development.</p> <p>Other opportunities include:</p> <ul style="list-style-type: none"> • Possible linkages to the top of Mt Tugwell, creating opportunities to link into the downhill and all mountain trails located in the Warburton DH Zone; • Possible linkage through to Big Pat's Creek Trailhead, via a long-distance descending trail from Mt Bride. <p>This area has been extensively used for forestry in the past and has a multitude of old logging tracks, fire roads and even some old tramways. During fieldwork, no cliffs, major watercourses or other impediments to trail construction were identified.</p>
Advantages	<ul style="list-style-type: none"> • Very close to Warburton; • Mostly northerly aspect, with plenty of sunlight and open vegetation; • Plenty of vertical elevation; • Good topography, vegetation and soils for trail construction. • Formerly harvested for timber, meaning that there are likely to be numerous old logging roads and less significant environmental values.
Disadvantages	<ul style="list-style-type: none"> • A number of roads pass through the area, such as Old Warburton Highway and Mt Bride Rd. Crossing these roads will be necessary. Crossing points will need to be carefully chosen to provide maximum visibility and signposted adequately; • A Melbourne Water underground pipeline passes through the area, which will need to be carefully investigated with regard to tenure; • Heavily used by motorbikes and four-wheel drives currently.



Photos



3.3.3.2 Warburton DH Zone

MTB Discipline	Downhill and all-mountain
Difficulty Level	Intermediate, Difficult, Extreme 
Approximate Distance of Trails	10-20km (including both existing trails [approximately 5-6km of informal downhill trails] and proposed new trails)
Trailhead/s	Mt Tugwell DH Drop-off Point
Key Features	Mt Tugwell
Lowest Elevation	295m above sea level (finish of the existing La La Falls informal downhill trail on Irruka Rd)
Highest Elevation	796m above sea level (Mt Tugwell)
Vertical Elevation Range	Approximately 500m
Land Tenure	Yarra State Forest, managed by Department of Environment and Primary Industries
Reference Map	
General Description	Nestled within the larger Warburton XC Zone, the Warburton DH Zone is proposed to cater to the thrill-seeking enthusiasts of the downhill and all-mountain disciplines.





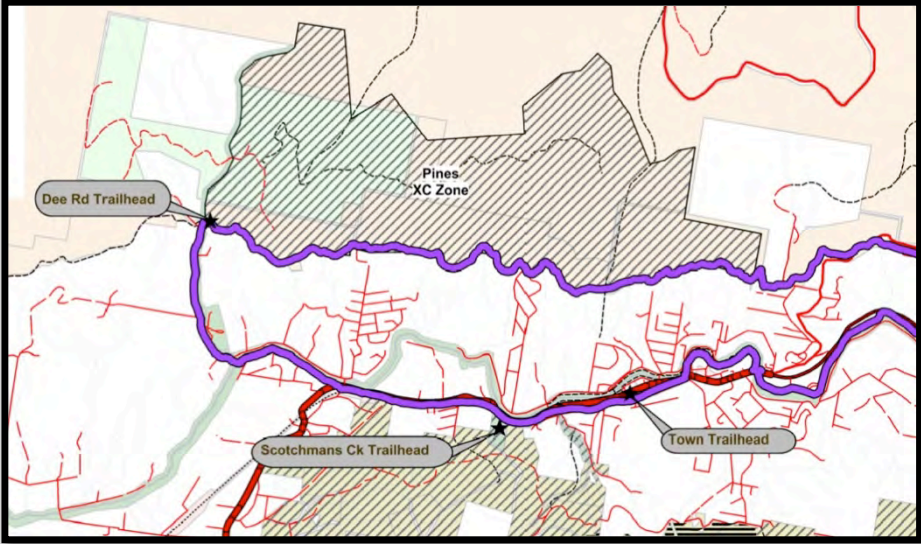
	<p>This zone currently has at least two existing, informal trails, constructed by local enthusiasts. These trails are accessed from the drop-off point near the junction of Mt Bride Rd and Cemetery Track, which is located close to the top of Mt Tugwell.</p> <p>Mt Bride Rd, which provides vehicle access to the drop-off point, is in relatively good condition and does not carry large volumes of traffic. Some future upgrades of this road and the drop-off point will be required to facilitate trail developments within this zone.</p> <p>As with the Warburton XC Zone, the vegetation, soils and topography appear to be conducive to easy trail construction, and no major impediments were observed.</p>
Advantages	<ul style="list-style-type: none"> • Relatively close to Warburton; • Relatively quiet shuttle road with minimal traffic; • Plenty of vertical elevation; • Good topography, vegetation and soils for trail construction.
Disadvantages	<ul style="list-style-type: none"> • One of the existing informal trails (La La Falls DH) currently crosses over Mt Bride Rd. The crossing point is on a blind corner, presenting significant risks to trail users; • Mt Bride Rd passes through the middle of the zone, posing risk issues wherever any trails cross; • The two existing informal trails finish in different locations. The current pick-up point at the bottom of the La La Falls DH trail is on Irruka Rd at the small parking area for the La La Falls walking trail. This parking area is too small for large volumes of traffic and is directly adjacent to a private residence. An alternative pick-up site will need to be identified if this zone is to be further developed for mountain biking; • This zone does not extend right down into the Warburton township itself. While there will be cross-country trails returning down into the main township via the Mt Little Joe/Scotchmans Creek Trailhead area, these will most likely be unappealing to downhill enthusiasts. Unfortunately, it was not possible to identify any corridors of suitable land that would enable a downhill trail to finish any closer to the centre of Warburton.



Photos



3.3.3.3 Pines XC Zone

MTB Discipline	Cross-country
Difficulty Level	Easy, Intermediate  
Approximate Distance of Trails	10-20km (including both existing trails [if present and suitable] and proposed new trails)
Trailhead/s	Dee Road Trailhead
Key Features	O'Shannassy Aqueduct
Lowest Elevation	295m above sea level (Dee Road Trailhead)
Highest Elevation	600m above sea level
Vertical Elevation Range	Approximately 305m
Land Tenure	Yarra Ranges National Park, managed by Parks Victoria
Reference Map	





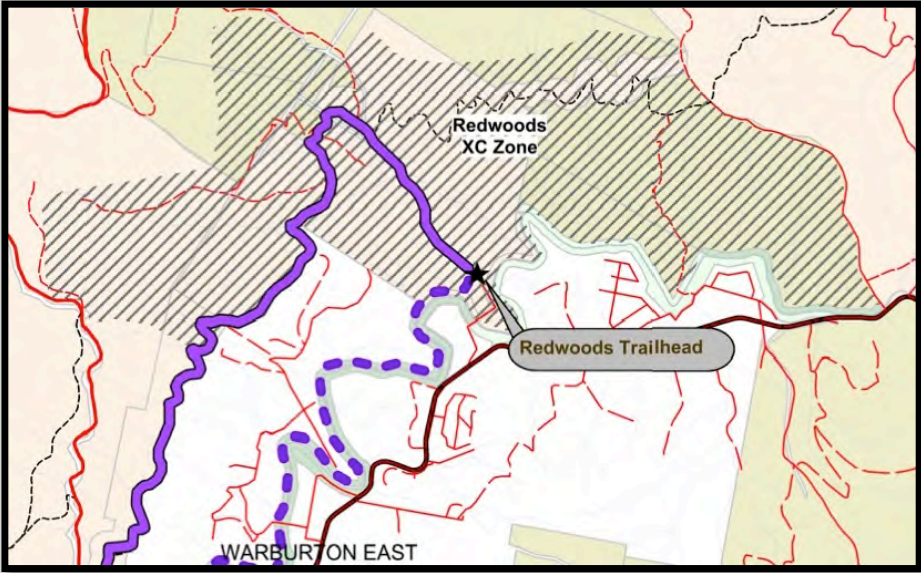
General Description	<p>The Pines XC Zone is proposed as the second development area for cross-country mountain biking trails. It is located in Yarra Ranges National Park, about 4-5km to the west of Warburton.</p> <p>The main access point to the Pines XC Zone is via the Dee Road Trailhead. Dee Road turns off the Warburton Highway approximately 3km west of Warburton at Millgrove.</p> <p>Large stands of exotic pine trees were planted in this area to stabilise the soil above the O'Shannassy Aqueduct and characterise the area now. Beneath the canopy of these tall, old trees, the vegetation structure is very open, with a minimal shrub/ground layer, making for easy trail construction conditions. Evidence of old tramways and diversion drains were observed throughout this area.</p> <p>Important linkages to/from the Pines XC Zone are:</p> <ul style="list-style-type: none"> • Access to the Redwoods XC Zone via O'Shannassy's Aqueduct; • Access to the Warburton XC Zone by following Dee Road, river trails near Millgrove and the Lilydale-Warburton Rail Trail to Scotchmans Creek Trailhead; • Access from Warburton township via the O'Shannassy Aqueduct or the Lilydale to Warburton Rail Trail to Millgrove, followed by Dee Rd. <p>This zone is contained within a large parcel of land which appears to have been used for timber harvesting until recent times. Although it has a southerly aspect and is located on the southern flanks of Mt Donna Buang, there is a large, relatively flat and open basin directly above the Dee Rd Trailhead, which appears to offer good prospects for trail construction.</p>
Advantages	<ul style="list-style-type: none"> • Existing trailhead, with car parking, signage, picnic tables; • Pleasant aspect, with good views over the Yarra Valley; • Interesting landscape, with the exotic pine trees offering a different experience to the typical Eucalypt forests elsewhere; • Linkages east and west along the O'Shanassy Aqueduct.
Disadvantages	<ul style="list-style-type: none"> • Located on the western side of Warburton. As most visitors will travel to Warburton from the west, it is possible that some visitors may visit this site without reaching Warburton. For this reason, the trail development at this site should be restricted in size.




Photos



3.3.3.4 Redwoods XC Zone

MTB Discipline	Cross-country
Difficulty Level	Easy, Intermediate  
Approximate Distance of Trails	10-20km (including both existing trails [if present and suitable] and proposed new trails)
Trailhead/s	Redwoods Trailhead
Key Features	Redwood forest, O'Shannassy Aqueduct
Lowest Elevation	203m above sea level (Approximately 700m east of the Redwoods Trailhead)
Highest Elevation	463m above sea level
Vertical Elevation Range	Approximately 260m
Land Tenure	Yarra Ranges National Park, managed by Parks Victoria and Yarra State Forest, managed by Department of Environment and Primary Industries.
Reference Map	



General Description	<p>The Redwoods XC Zone straddles the boundary between Yarra Ranges National Park and Yarra State Forest. It is located approximately 8km by road from Warburton.</p> <p>The defining feature of this site is the large stand of Californian Redwood trees (<i>Sequoia sempervirens</i>), the world's tallest tree specie. Although presumably planted for forestry purposes, the stand of Redwoods has been incorporated into the Yarra Ranges National Park and so will never be harvested. It is a stunning visitor site, offering a unique experience. Beneath the canopy, there is almost no vegetation, only a thick, soft carpet of leaves. With the trees planted in rows, there is plenty of space between the rows for trail development.</p> <p>Important linkages to the Redwoods XC Zone are:</p> <ul style="list-style-type: none"> • Linkage to the Pines XC Zone via O'Shannassy Aqueduct; • Linkage to Warburton via O'Shannassy Aqueduct or the proposed shared-use circuit. • Linkage to Big Pat's Creek Trailhead, via the proposed shared-use circuit including the side trail to Big Pat's Creek. <p>The topography in this zone is good for trail building, with a gentle southward slope and aspect.</p>
Advantages	<ul style="list-style-type: none"> • Unique visitor experience that is currently under-utilised and under-promoted; • Small, existing car parking area, but plenty of cleared, open space for a larger car park directly south of the Redwoods; • Located to the east of Warburton, this zone may appeal to people staying in East Warburton and spread economic benefits further eastward into East Warburton and Reefton.
Disadvantages	<ul style="list-style-type: none"> • Two different land tenures will require cooperation across two different land managers (PV and DEPI).
Photos	



draft

3.3.4 SHARED-USE CIRCUIT

Warburton has a number of existing shared-use trails:

- Lilydale to Warburton Rail Trail;
- O'Shannassy Aqueduct;
- Warburton River Trails.

These trails can also be considered as mountain biking trails. They don't offer the typical, exciting, singletrack experience that most core enthusiasts are looking for, but, if assessed against the IMBA Trail Difficulty Rating System, would typically rate as Very Easy or Easy. As has already been discussed, the inclusion of Very Easy and Easy trails is important to ensure that families and novice riders are catered for within the proposed network of mountain biking trails.

These existing shared-use trails do not currently link together well. The O'Shannassy Aqueduct in particular is isolated from the centre of Warburton by a vertical height difference of about 140m, which makes for a very steep ride up from the main street. Additionally, there is no dedicated off-road trail linkage, so riders are forced to ride on roads. The Warburton River Trails run along both sides of the Yarra, offering a nice walking/cycling experience close to town. The Lilydale to Warburton Rail Trail and the Warburton River Trails do not technically join up, but are very close to each other and they could easily be linked via signage.

It should be noted that the Warburton River Trails are currently classified as shared-use (according to signage along the trails) but do not meet minimum standards for usage by cyclists – in places the trail is too narrow for cycling and in other places there are staircases. Generally though, they are suitable for shared usage, being reasonably flat with long sight-lines.

Map 3 on page 140 shows a concept for a proposed shared-use circuit. This concept provides the missing linkages between the Lilydale to Warburton Rail Trail, Warburton River Trails and the O'Shannassy Aqueduct, to create a loop of approximately 33km in length. This circuit also provides the critical off-road access link between the four proposed mountain bike development zones.

The proposed shared-use circuit can be described as follows:

1. From the Town Trailhead, the shared-use circuit follows the Lilydale to Warburton Rail Trail east for 0.5km. At this point the trail terminates on the Warburton Highway.
2. Crossing the road, the proposed shared-use circuit then follows the Warburton River Trail eastward, following the southern bank of the river. It follows this existing Warburton River Trail past the football oval, behind the old Sanitarium factory (currently being redeveloped into luxury accommodation), east through the caravan park, upstream (east) for the next few kms, leaving the riverside and crossing the main road (now called the Woods Point Rd), beside the road for a short distance, before ending abruptly on the verge of the road.



3. The shared-use circuit would then continue on a proposed new section of trail beside the Yarra River, all the way to the Redwoods Trailhead (on Cement Creek Rd), a distance of approximately 6.5km. The actual route for this new section of trail will need careful investigation with regard to land tenures and environmental values. In Map: Warburton 01 this new section of trail can be seen as a dashed line along the northern bank of the river, all the way through to Cement Creek Rd, but further investigations into this proposed section of trail should also give consideration to use of the southern side of the river. Furthermore, this proposed new section of the shared-use circuit crosses over Hazelwood Rd. This road climbs up gently and steadily from the river towards the Redwoods Trailhead, providing a possible alternative route if the preferred riverside alignment is not possible beyond Hazelwood Rd.
4. From the Redwoods Trailhead (adjacent to the proposed Redwoods XC Zone) the shared-use circuit continues by following Cement Creek Rd north for about 1.2km. This is one of only two sections of road included in this entire loop. This section climbs gently at a gradient of about 6%. It is a dirt road, in reasonable condition, but may need some minor re-surfacing/re-profiling works to improve drainage. The road was closed due to fallen trees at the time of fieldwork.
5. At the junction with the O'Shannassy Aqueduct trail, the shared-use circuit turns west and follows the aqueduct all the way back to Warburton. The O'Shannassy Aqueduct Trail offers a number of entry/exit points near Warburton:
 - Crossing the Acheron Way;
 - Yuonga Road (which actually has a small formalised trailhead already);
 - Sussex Street;
 - Dee Road.

Riders may choose to exit at any of these points, but the proposed shared-use circuit continues to follow the O'Shannassy Aqueduct trail all the way to the Dee Road Trailhead (adjacent to the proposed Pines XC Zone), an existing trailhead servicing the O'Shannassy Aqueduct.

6. From the Dee Road Trailhead, the shared-use circuit heads down Dee Road for about 1.5km (the second section of road in the entire loop) until crossing the Yarra River. On the other side of the river, the shared-use circuit turns left onto an existing shared-use trail, which runs along the riverbank for 0.7km. At the end of this section of existing trail, a new section of trail is proposed, which would continue upstream, following the southern bank for another 0.5km to the junction of Dee Road and Warburton Highway.
7. Crossing the highway, the shared-use circuit turns left onto the Lilydale to Warburton Rail Trail, following it for the final remaining 3km back to the Town Trailhead.

This shared-use circuit is a critical component of this project. Not only is it a stand-alone product that will appeal to families, novice mountain bikers, walkers, cycle tourists and local residents, but it is the trail backbone that connects all the proposed mountain biking development zones.



The key features of this proposed loop are:

- Total length: 33km;
- New trail required to be constructed: 7km;
- Amount of road included in the loop: 2.7km;
- Average slope: 5.9%;
- Dual direction, shared use;
- Provides a pedestrian/cycling connection between Warburton and East Warburton;
- Passes adjacent to the proposed Edgewater development and the caravan park, two of the largest accommodation providers in Warburton;
- Links to all of the proposed mountain bike trail development zones and most of the trailheads.

Ideally, this loop would be given its own name, such as the Warburton Valley Loop, even though it uses sections of the existing Lilydale to Warburton Rail Trail and the O'Shannassy Aqueduct. This would create a unique identity for this trail and would also help in simplifying the directions for riders to reach the proposed mountain bike trail development zones.

An additional shared-use trail linkage is also proposed to connect to Big Pat's Creek. This linkage would start on the proposed shared-use circuit just near the junction of Woods Point Rd and Riverside Drive and follow Big Pat's Creek upstream for approximately 2.9km to the proposed Big Pat's Creek Trailhead. The proposed alignment for this trail is within the riverside reserve for Big Pat's Creek, although this will require further investigation with regard to land tenures and environmental values.

The key features of this shared-use linkage to Big Pat's Creek are:

- Total length: 3km;
- New trail required to be constructed: 3km;
- Dual direction, shared use;
- Creates an off-road Linkage to the Big Pat's Creek Trailhead;
- An existing multi-day walk, 'Walk into History', starts at Big Pat's Creek. This shared-use trail linkage would effectively increase the length of this trail, allowing walkers to start/finish their walk in Warburton;
- An existing former logging tramway, Richards Tramway, starts/finishes at Big Pat's Creek. This disused tramway is not currently being used or maintained, and could be developed for mountain biking usage;
- The proposed Warburton XC Zone extends all the way to Big Pat's Creek. It is envisaged that there may be some long descending mountain biking trails that finish at Big Pat's Creek. This linkage will allow riders to ride back to Warburton safely without using the road network.



3.3.5 DIRT JUMP/PUMP TRACK PARK

In the survey, approximately 18% of respondents indicated that they participate in dirt jump / pump track riding. While there are many enthusiasts that enjoy these types of trails in their own right, they also play an important development and progression role for new riders, especially young riders. Riders are able to hone their skills on these trails, in a safe, controlled environment, before venturing out onto more remote and challenging trails. To that end, it would be recommended to include some 'skill development trails' in the same space as any dirt jumps and pump tracks. 'Skill development trails' include features like log rides, berms, rollers, rock gardens and more that are designed to mimic natural features found on trails, thus providing an opportunity for riders to learn skills that will be used on real trails.

Such a facility has obvious similarities to a skate park, and in fact, would be well suited to be co-located with a skate park.

This form of mountain biking has the smallest infrastructure requirement in terms of space, requiring only small amounts of flat land. Ideally, a location would be identified close to the Town Trailhead that could accommodate some professionally designed and built dirt jumps, pump tracks and skill development trails. Proximity to the main trailhead is important – some riders may choose to play on the pump track while they wait for friends to arrive; some family members may choose to stay and play on the dirt jumps, pump tracks and skill development trails while other family members ride the cross-country or downhill trails.

The only two locations that were identified as being suitable for a dirt jump / pump track park were:

1. The gravel overflow car park behind the Visitor Information Centre, to the immediate east of the Cog Café car park²⁷;
2. The large un-used space between the football oval, Yarra River and the old Sanitarium factory.

There are other opportunities on land along the Lilydale to Warburton Rail Trail, however these are not in Warburton.

²⁷ At the time of writing, this area is being considered for the development of a skate park.



Some outstanding examples of these facilities around the world include:

- Gorge Rd Jump Park, Queenstown, New Zealand. This facility is famous for being one of the largest and best maintained jump parks in the world. It is open to the public and free to use. It hosts some extremely popular events, sponsored by the likes of Red Bull. See Figure 35 below.

Figure 35. Gorge Rd Jump Park, Queenstown, New Zealand



(image courtesy of www.queenstownmtb.co.nz)

- Valmont Bike Park, Colorado, USA. This municipal park is one of the best examples of a suburban bike park. The 40-acre property features amenities for a wide range of riding styles and skill levels – not just dirt jumps and pump tracks. Features include a cyclocross course, pump track, dual slalom lines and a slopestyle course. The park also includes cross-country trails, skill-building areas, a toddler playground, an event plaza, restrooms and car parking. Over five years in the planning, the park opened in



2011 and is estimated to have cost over US\$1 million. Being much larger than anything that could be constructed in Warburton, it may serve better as an aspirational model of what is achievable, with ongoing investment over a sustained period of time. Figure 36 below provides a good indication of how extensive the park is.

Figure 36. Valmont Bike Park Trail Map



3.4 SITE ANALYSIS SUMMARY

Based on the discussions presented throughout this chapter, Table 13 below summarises the trail development that would be required.

Table 13. Trail Development Summary

Trail Development Zone	Target Users	Proposed Distance of Trails (km)	Target Percentage of Singletrack	Existing Trails To Be Incorporated (km)	New Trails To Be Constructed (km)
Warburton XC Zone	Cross-country	40 – 50	75%	10 – 12.5	30 – 37.5
Warburton DH Zone	Downhill, all mountain/freeride	10 – 20	100%	6	4 – 14
Pines XC Zone	Cross-country	10 – 20	90%	1 – 2	9 – 18
Redwoods XC Zone	Cross-country	10 – 20	90%	1 – 2	9 – 18
Shared-use Circuit (including link to Big Pat's Creek)	Cyclists, walkers	36	0%	26	10
Total		106 – 146		44 – 48.5	62 – 97.5

Note that the target percentage of singletrack shown above has been determined by taking into account the proposed target users, the extent of existing trails within the zone that could conceivably be incorporated into the final proposed trail network and the likelihood that the zone will be used for cross-country racing (which dictates the need for a percentage of wider trails for overtaking and feeding purposes).

In addition to the trails shown above, the development of a dirt jump / pump track park is also proposed. It is not included in the table above, as such a facility is not measured in terms of singletrack or kilometres of trail, but in terms of square metres.



CHAPTER 4 ISSUES AND OPPORTUNITIES



This chapter firstly looks at the economic impacts of the proposed future development of mountain biking trails at Warburton. Secondly, it explores the environmental values of the study area, and the likely environmental impacts if the trail network is to be developed. Thirdly, it takes a broad look at issues and opportunities presented by the proposed development of mountain bike trails, grouping them into seven different themes as follows:

1. Access and Connectivity;
2. Land Use/Tenure;
3. Environmental Sustainability;
4. Trails and Infrastructure;
5. Social and Economic Impacts;
6. Management and Maintenance;
7. Funding.

Some of the identified issues and opportunities are relevant to multiple themes, but have been placed into the theme that seems most relevant.



4.1 ECONOMIC IMPACT

World Trail engaged Adventure Types to undertake a preliminary assessment of the economic impact of the proposed development of a mountain biking trail network at Warburton. Adventure Types is one of Australia's leading adventure tourism consultancies offering a range of services to assist clients in leveraging the growing potential in adventure and active lifestyle tourism. They work with clients ranging from national, state and regional tourism authorities through to councils, boards and tourism businesses wanting to specifically target the active adventure traveller or hone their existing adventure tourism offering.

The main findings of the Adventure Types report are summarized below. The full report is provided in Appendix 5.

- In the first full year of completion, it is estimated that the trail network at Warburton could attract 130,000 mountain bike visitors (120,000 day visitors and 10,000 overnight visitors). This estimate is based on comparisons with other similar mountain biking facilities/destinations and taking into consideration the estimated size of the proposed Warburton mountain biking trail network.
- Official tourism visitation figures show that domestic day visitors spend approximately \$77 per trip, and domestic overnight visitors spend \$130 per night. Applying these spending rates to the projected visitation figures, equates to a total direct economic benefit of \$12.59 million per annum.
- The indirect economic benefit is estimated at \$11.08 million per annum.
- The total economic benefit is therefore estimated at \$23.67 million per annum.
- The project will support up to 175 jobs (FTE's) in Warburton.

These economic projections are based on a number of assumptions and standard economic multipliers and should be treated as an indication of what might be achievable if the project is implemented to the full extent outlined by this report and to the highest standards of quality for trail construction and mountain biking experience.

The Adventure Types report focuses on the economic impacts associated with the ongoing operation of the trail network and the spending habits of visitors that come to ride the trails, but doesn't give much consideration to the economic impact that the construction phase will have on the local economy. Using REMPLAN economic modelling software, YRC personnel were able to model the economic benefits provided during the construction phase of the proposed development of trails, based on an input construction cost of \$3.948 million (discussed in more detail later in this document).

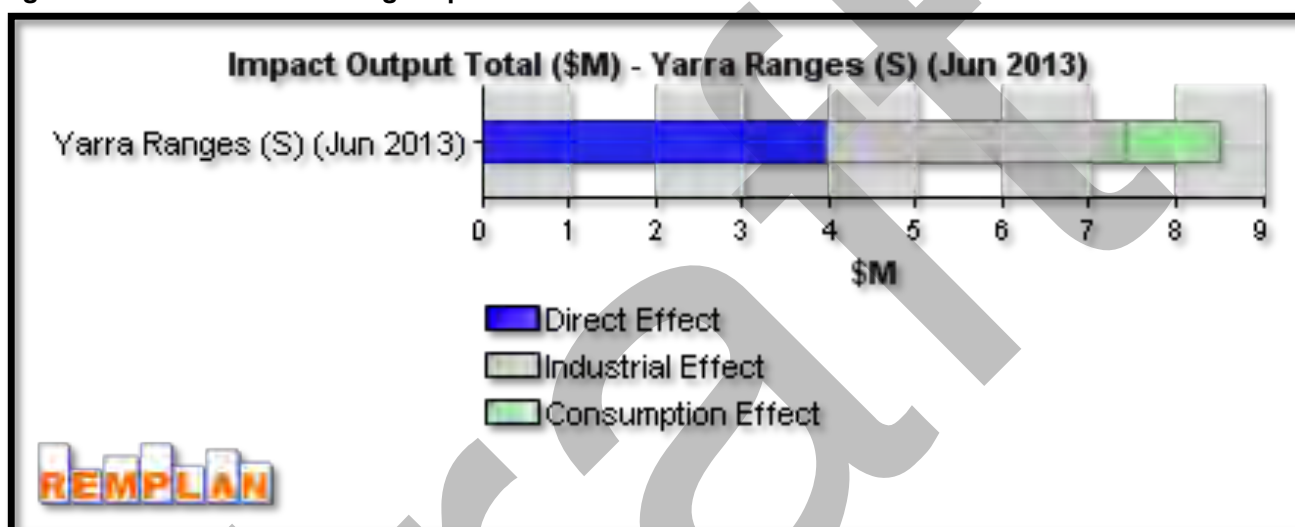
The modelling shows that this construction project will introduce a positive \$8.9 million impact on the local economy during the construction phase.



This \$8.9 million impact is comprised of three components, as shown in Figure 37 below:

- The direct effect – that is, the direct impact of the \$3.948 million construction cost being spent in the local economy;
- The industrial effect – industrial effects include multiple rounds of flow-on effects, as servicing sectors increase their own output and demand for local goods and services in response to the direct change caused by the direct positive input into the economy;
- The consumption effect – the direct and indirect economic impacts above also create a tertiary level of new income into the economy. This in turn leads to greater local consumption.

Figure 37. REMPLAN modelling outputs



It should be noted that these figures are only “true” local economic benefit if and when the work is undertaken by local contractors. Regardless of this, the figures are nonetheless a useful guide to show that there are positive direct and indirect benefits from this expenditure, especially if local procurement is pursued as part of the project.

Finally, the economic benefits of a \$3.948 million construction project can be measured in jobs created. From a direct increase in output of \$3.948 million, the corresponding creation of direct jobs is estimated at 11 jobs. Furthermore REMPLAN models the direct wages and salaries increase that these new jobs creates and estimates that these flow-on effects in terms of local purchases of goods and services will equate to a further 15 jobs due to the indirect expenditure that 11 direct jobs could generate by their introduction into the economy.



4.2 ENVIRONMENTAL IMPACT

Biosis Pty Ltd was commissioned by World Trail Pty Ltd to undertake a preliminary desktop flora and fauna assessment of the areas proposed for the development of mountain biking trails as part of this project.

Biosis Pty Ltd is a consulting firm providing consulting services in the areas of ecology and cultural heritage. Biosis provide independent and credible advice, from technical specialists including anthropologists, aquatic ecologists, archaeologists, botanists, GIS specialists and zoologists.

The main findings of the Biosis report are summarized below. The full report is provided in Appendix 6.

'Ecological values

A thorough search of flora and fauna databases and modelled vegetation mapping was conducted in order to provide a high-level summary of the ecological values that may be present within the study area. This report assesses the likelihood that species identified in database searches will occur within the study area. Database searches and modelled vegetation mapping identified the following key values in the broader study area:

- The study area is dominated by relatively high quality intact native vegetation. Department of Environment and Primary Industries (DEPI) mapping indicates that seven ecological vegetation classes (EVCs) and one EVC complex may be present including Damp Forest, Wet Forest, Cool Temperate Rainforest, Riparian Forest, Lowland Forest, Herbrich Foot-hill Forest, Shrubby Foothill Forest and Riparian Scrub/Swampy Riparian Woodland Complex.*
- NaturePrint mapping indicates that the study area is part of a broader area of native vegetation that makes a significant contribution to Victoria's Biodiversity, based on the abundance and diversity of threatened species records and high habitat connectivity values.*
- Vegetation mapping indicates that the FFG Act listed Cool Temperate Rainforest Community is likely to be present in some moist sheltered gullies.*
- 28 threatened flora species are likely to be present within the study area.*
- 21 threatened fauna species are likely to be present within the study area, including a number of species that could potentially be impacted by the construction of the proposed trail.*

Government legislation and policy

An assessment of the project in relation to key biodiversity legislation and policy is provided and summarized below. Note that reforms to the native vegetation permitted clearing regulations are underway and are due to be introduced in September. They will include amendments to clauses in the Victorian Planning Provisions in all planning schemes in Victoria and to Victoria's Native Vegetation Management Framework. For more information on these reforms refer to www.depi.vic.gov.au/nativevegetation.



Legislation / Policy	Relevant ecological feature on site	Notes
EPBC Act	Leadbeater's Possum is known to occur within the study area. Southern Brown Bandicoot, Greyheaded Flying-fox, Macquarie Perch and Tall Astelia likely to be present.	Proposed trail should avoid core habitat and reserves for the Leadbeater's Possum and ensure that canopy connectivity is not impacted by the proposed trail in order to avoid impacting on this species. A field assessment should be undertaken to assess the habitat values within the proposed alignment and to determine the extent of any potential impacts on these listed species.
FFG Act	The listed Cool Temperate Rainforest community is likely to be present. Protected flora species are likely to be present.	Survey is required to confirm the presence of threatened species and communities. The study area is on public land and a permit would be required if any impact is proposed on FFG Act listed values.
Planning & Environment Act	Intact native vegetation present on site	Any removal of native vegetation will require a planning permit, including permission to lop or remove native vegetation. Permit application needs to address relevant overlays including Environmental Significance Overlays and Bushfire Management Overlays. Survey required to determine the impact of the trails on native vegetation.
Water Act	Designated waterways within study area	Works on waterways permit required for all crossings of designated waterways.
SEPP	Waterways within the study area	Water quality monitoring not required provided sediment controls are implemented.

Note: Guidance provided in this report does not constitute legal advice.

Recommendations

The information presented in this report should be incorporated into the next phase of design for the project in order to minimise impacts on flora and fauna. The primary measure to reduce impacts to biodiversity values within the study area is to minimise removal of native vegetation and terrestrial and aquatic habitat.

The following steps could be incorporated into the design phase to minimise the impact of the trails on flora and fauna:

- Trails should utilise previously disturbed areas and existing trails wherever possible. These areas will typically contain lower value native vegetation and have a lower likelihood of threatened species being present.
- Where possible the trail alignment should avoid the removal of trees, particularly large old trees containing a diversity of hollows.
- Ensure that canopy connectivity is not impacted by the construction of the trail, which is of particular importance for the Leadbeater's Possum. This includes



midstorey canopy connectivity (e.g. dense thicket along waterways and areas containing a midstorey dominated by Acacia spp.).

- *Ensure that the Leadbeater's Possum reserve system is not impacted by the construction of the trail.*
- *Use sensitive construction techniques that minimise disturbance such as elevated platforms over areas of sensitivity and the use of equipment that minimises construction impacts beyond the trail footprint.*
- *Designs should seek to avoid waterways, low lying damp areas and wet gullies. These habitats are sensitive to disturbance and sedimentation associated with construction can impact on aquatic habitats and species.*
- *Avoid gullies that may contain the FFG Act listed Cool Temperate Rainforest community.*
- *Undertake a micro-siting survey to refine the location of the final trail alignment in order to avoid areas of ecological sensitivity.*

Further Survey

As the impacts of the proposed mountain bike trail is likely to be quite small and localised relative to the overall size of the study area a detailed field survey of the entire area would not be feasible. Rather, a targeted field assessment of areas outlined in future trail designs that integrate the findings of this desktop assessment could be undertaken to accurately assess the impact of the proposed trail alignment on threatened species, determine the presence of threatened vegetation communities and quantify any associated vegetation losses according to Net Gain policy. For some rare and cryptic threatened species and communities targeted survey may be required to determine potential impacts. Our previous experience with the assessment of similar trails has been that early field assessment of proposed trail alignments can be valuable in identifying and avoiding areas of sensitivity.'



4.3 ISSUES AND OPPORTUNITIES

4.3.1 ACCESS AND CONNECTIVITY

Issues	Opportunities
<ul style="list-style-type: none"> The proposed mountain bike trails will occasionally have to cross over (or follow) roads, creating potential hazards for cyclists. While the final design of the trails can be tailored to minimize these crossings and ensure they are located in safe locations with good visibility, it will not be possible to eliminate them altogether. 	<ul style="list-style-type: none"> Investigate the feasibility of creating shared use trail linkages to East Warburton, Big Pats Creek, Cement Creek Rd and alongside Dee Road in Millgrove, as per the concept for a 'shared-use circuit' as outlined in the Site Analysis.
<ul style="list-style-type: none"> The main road into Warburton, the Warburton Highway, can be congested at peak times. This may deter visitation. It also poses significant risks if large-scale evacuation is required, e.g. bushfire. 	<ul style="list-style-type: none"> The implementation of the 'shared-use circuit' concept as outlined in the Site Analysis will create a safe, off-road pathway for local residents between adjacent localities e.g. Warburton and East Warburton. This will have enormous benefit to the local community, creating increased opportunities for recreation, exercise and commuting.
<ul style="list-style-type: none"> There is currently no connectivity between the existing shared use trails, e.g. Lilydale to Warburton Rail Trail and O'Shannassy Aqueduct. 	<ul style="list-style-type: none"> The implementation of the 'shared-use circuit' concept as outlined in the Site Analysis, utilises sections of existing shared-use trails (Lilydale to Warburton Rail Trail and the O'Shannassy Aqueduct), to bolster the overall marketable trail network and achieve 'bang-for-buck'. In fact, approximately only 7km of new trail is required to be constructed in order to achieve the approximate 33km length of the proposed shared-use circuit.
<ul style="list-style-type: none"> Private properties form a barrier between central parts of Warburton and the forested areas proposed for mountain bike trail development. This limits opportunities for trailhead locations, as it is important that riders do not have to ride along existing roads between the trailhead and the trails themselves. 	<ul style="list-style-type: none"> Erect signage on roads warning motorists of cyclists at any points where trails cross over roads. Erect signage on trails warning cyclists of approaching road crossings.
<ul style="list-style-type: none"> Where the Warburton Highway crosses the Yarra River between Warburton and East Warburton, the existing road bridge has no footpath or shoulder. It is not viable or safe in its current form to be used as a crossing for any of the proposed trails. 	<ul style="list-style-type: none"> Promote the trail network's off-road linkage to key accommodation sites, enabling riders to ride right from the door of their accommodation, similar to the notion of 'ski in, ski out' access promoted by some ski resorts.
<ul style="list-style-type: none"> Yarra Ranges Council's endorsed Hike and Bike Plan recommends future trail developments to link Warburton and Healesville as a long-term goal. This project is currently unfunded. 	<ul style="list-style-type: none"> Market the proposed trail network as being accessible via public transport. Riders can catch the train to Lilydale and access the network via the Lilydale to Warburton Rail Trail.
<ul style="list-style-type: none"> Dee Road is proposed to be used for a short section of the 'shared-use circuit'. It is not ideal to use a road in any circumstances, and Dee Road is quite steep. Ideally, an alternative would be found which would remove the need to use this road. 	<ul style="list-style-type: none"> Develop a signage plan that incorporates trailhead signage, way finding signage, interpretative and educational signage, a code of conduct, a Warburton mountain bike trails logo and design specifications.



- The Warburton River Trails (which run along both sides of the Yarra River in the vicinity of the Warburton business district) are defined as 'shared-use' trails, but do not meet minimum accepted industry criteria for shared-use trails. While they are generally suitable for shared-use, in some places they are too narrow to allow safe passing or have stairs, preventing safe usage by cyclists. The trail heading upstream through the caravan park, on the northern side of the river from the Warburton Highway, is the best example with good widths, low gradients and long sight-lines. These river trails are very popular with locals and tourists, generally pedestrians, and would need to be modified if they were to be opened up and promoted for mountain bike usage.
- Local buses are not capable of taking bikes on board. If mountain bike tourism is to become a key industry in Warburton, this will need to be rectified. Buses are also the only form of mass public transport to Warburton from Lilydale (the outermost terminal of the metropolitan railway system). They are also the only form of public transport within the Warburton valley area.
- Promote the ability to 'park and ride'. Each of the mountain biking zones proposed within the trail network would be accessible by bike from the centre of Warburton, enabling visiting mountain bikers to park their car in Warburton.
- Engage the local community in discussion about the benefits of the proposed project, emphasising the improved opportunities for safe, off-road pedestrian and cyclist access, recreation and business opportunities linked to mountain bike tourism.



4.3.2 LAND USE/TENURE

Issues	Opportunities
<ul style="list-style-type: none"> Proposed trail network crosses different land tenures, each with different objectives. Mountain biking may not match the primary objective of the land tenure. 	<ul style="list-style-type: none"> Create a memorandum of understanding between YRC, PV and DEPI, outlining responsibilities for construction, maintenance and the ongoing management of the trails. This could possibly include a schedule of understanding and may also address responsibilities for funding, permits and approvals.
<ul style="list-style-type: none"> Process to gain approval for new trails is not clear and may vary across different land tenures. 	<ul style="list-style-type: none"> The Victorian government has recently released the Public Land Mountain Bike Guidelines. These guidelines are intended to provide guidance to land managers <i>'to manage mountain biking as an appropriate and sustainable activity on public land. The guidelines also provide advice on how to assess, plan and develop mountain bike opportunities in a sustainable manner'</i>. Formal adoption of the guidelines by the Yarra Ranges Council is recommended, with future development of mountain bike trails carried out in-line with the guidelines.
<ul style="list-style-type: none"> It is not clear whose responsibility it is to manage the approval process for new trails. i.e. Council or land manager. 	<ul style="list-style-type: none"> Work with private developers to identify opportunities for mountain bike tourism facilities e.g. accommodation on private land adjacent to trails.
<ul style="list-style-type: none"> Trails within the proposed network may need to pass close to private property. Landowners may object to the development of trails on the grounds that it will impact on their privacy. The best response to this issue is to ensure that any proposed new trails are aligned in such a way as to maintain a reasonable buffer from private property. 	<ul style="list-style-type: none"> Engage Vic Roads in relation to bridge safety issue. As the main thoroughfare between Warburton and East Warburton, the Warburton Highway is used by pedestrians, cyclists and motorists, but provides no separate pathway for pedestrians and cyclists, or even a sealed shoulder. This project may provide a catalyst to engage Vic Roads on this issue and undertake an investigation of the possible solutions to this issue.
<ul style="list-style-type: none"> Locating property boundaries in the field can be problematic e.g. Some land holders extend their fences beyond their boundary, or fail to erect fences. An example of this is east of Wesburn Park, where the available land for the development of mountain bike trails could not be clearly determined. 	<ul style="list-style-type: none"> Engage Melbourne Water as a key partner in this project. Melbourne Water has a strong operational presence in the areas proposed for the development of mountain bike trails. In fact, an underground pipeline passes through many areas proposed for trail development, supplying water to Melbourne. It is likely that Melbourne Water will need to approve some trail developments, so they should be engaged and consulted early to ensure they are supportive of the project.
<ul style="list-style-type: none"> A large proportion of the trail network is located within State Forest. The legislation governing State Forest allows for timber harvesting, which would have a detrimental impact on the proposed trail network. While there are no current plans to harvest any of the areas that are proposed under this project for trail development, it is possible that some areas could be harvested in the future. 	<ul style="list-style-type: none"> Engage the Upper Yarra River Reserves Committee of Management as a key partner in this project. The riparian areas along the Yarra River in and around Warburton are managed by the Upper Yarra River Reserves Committee of Management. As some of these areas are proposed to form part of the shared-use circuit, it is essential that they are involved and consulted. This project may provide a catalyst and some funding to have some parts of the existing



- The majority of the proposed trail network is located in State Forest or National Park. Both land tenures are subject to fire management regimes that include planned fuel reduction burns. Such fuel reduction burns will require temporary closure of any mountain bike trails, with appropriate notifications being posted/communicated to trail users.

shared use trails along the river improved and upgraded.

- Undertake an internal council audit to clarify property boundaries that border onto areas of proposed mountain bike trail development. In particular:
 - North of Dee Road trailhead;
 - Mt Little Joe, including Wesburn Park, Scotchmans Creek, Old Warburton Hwy;
 - Either side of the Yarra River from Warburton to Cement Creek Road;
 - The reserve through which Big Pat's Creek runs.



4.3.3 ENVIRONMENTAL SUSTAINABILITY

Issues	Opportunities
<ul style="list-style-type: none"> The small number of existing mountain biking trails in the Warburton area do not appear to comply with best practice guidelines for environmentally sustainable trails. 	<ul style="list-style-type: none"> Build increased environmental awareness and empathy for the natural environment, by providing a new opportunity (mountain biking) for people to enjoy the natural environment. There is a well-known linkage between environmental awareness and outdoor recreation opportunities.
<ul style="list-style-type: none"> The construction of the proposed trail network will impact on native vegetation, which can also cause the displacement of native fauna. Thus this project has the potential to impact on a wide range of ecological communities and species of flora and fauna, some of which may be rare, threatened or endangered. The alignments of any proposed new trails should therefore be carefully determined to ensure that they avoid impacting on rare, threatened or endangered species or communities of flora or fauna. 	<ul style="list-style-type: none"> Reduce reliance on motor vehicles through an increased use of shared use trails. Promote sustainable travel options, decrease reliance on cars and encourage healthy and active communities and environment.
<ul style="list-style-type: none"> Of particular concern is the potential that the proposed trails could impact on Leadbeater's Possum, a high profile and highly threatened species that is recorded within the study area. Care should be taken to avoid any known habitat areas for Leadbeater's Possum. 	<ul style="list-style-type: none"> Develop interpretive signage to be installed around the proposed trail network to increase the awareness of local history, environment, habitat and heritage.
<ul style="list-style-type: none"> The ongoing use of trails can cause some environmental issues, although much less so than trail construction and most of these issues can be resolved through good trail design and construction and good management practices. These issues include: <ul style="list-style-type: none"> Potential for weeds to be spread into new areas by mountain bikes; Potential for erosion if trails are poorly designed; Potential for trails to be damaged during wet weather; Potential for trails to be widened or modified by users. 	<ul style="list-style-type: none"> Develop a comprehensive trail maintenance program to ensure trails remain in good condition.
<ul style="list-style-type: none"> There is a perception amongst parts of the community that mountain biking has high environmental impacts, often caused by confusion between mountain biking and motorbike riding. In many examples elsewhere, negative community perceptions towards mountain biking have disappeared once trails are constructed and are being actively used and maintained. These perceptions are thought to be caused by a general lack of understanding of the sport of mountain biking. 	<ul style="list-style-type: none"> Prepare best practice guidelines for environmentally sustainable mountain biking trail construction and ensure that all trail construction adheres to them.
	<ul style="list-style-type: none"> Close and rehabilitate trails within the study area that are unsustainable, illegal, or duplicated (that is, two trails running parallel that start and finish in the same locations).



4.3.4 TRAILS AND INFRASTRUCTURE

Issues	Opportunities
<ul style="list-style-type: none"> Limited space available in the centre of Warburton for a large trailhead and event space. 	<ul style="list-style-type: none"> Prepare a detailed trail master plan based on the concepts outlined in this project, which considers a staged implementation and includes development guidelines to ensure the delivery of a world-class facility and makes provision for future growth. This master plan would include a detailed assessment of all existing trails, to determine their inclusion in the final proposed trail network, based on their environmental sustainability, risk and the type of mountain bike experience provided.
<ul style="list-style-type: none"> Bridge on Woods Point Road between Warburton and East Warburton does not provide a separate shoulder for pedestrians or cyclists. 	<ul style="list-style-type: none"> Prepare a detailed plan for the development of trailheads and associated infrastructure, including car parking, landscaping, BBQ's, picnic facilities, toilets, water, shelter etc. Consider this objective in current Warburton visitor node for rail trail project.
<ul style="list-style-type: none"> Nearest hospital emergency ward is approximately 30 minutes away by road. 	<ul style="list-style-type: none"> Explore the feasibility of using Wesburn Park or the Warburton football oval as potential event spaces. Warburton football oval and Wesburn Reserve are the obvious candidates for event staging areas, but are not proposed to be developed as formal trailheads. Alternatively, some private properties that lie adjacent to the proposed areas of trail development could be used as event spaces. This should be assessed and discussed with landowners prior to the development of a trail master plan, on the basis that the trail network could subsequently be designed to facilitate future events based on usage of a particular event space.
<ul style="list-style-type: none"> There is a limited amount of tourist accommodation currently available in Warburton. 	<ul style="list-style-type: none"> Convene a Warburton based mountain bike trail committee, including local riders, YRC and land managers to provide input to the design, construction and ongoing maintenance of trails. Specifically, the focus of this committee would be on on-ground trail issues. This could possibly be achieved through a focus group rather than formal committee, but the essential aim is to ensure that local riders have some control and ownership of the trails, with input into any decisions relating to trail design and construction.
<ul style="list-style-type: none"> There are no designated, formal pick-up and drop-off points for riders using the existing DH trails. The current pick-up point at the bottom of the main downhill trail is in a residential area, with minimal space for vehicles. 	<ul style="list-style-type: none"> Identify cycle touring routes connecting Big Pats Creek to Powelltown (approximately 11km in a straight line). While the proposed Warburton XC zone extends all the way to Big Pat's Creek and it is likely that purpose built singletracks will extend to this trailhead, there is a good opportunity to identify a route through to Powelltown on existing forest roads that can be promoted to novice mountain bikers, cycle tourers and even cyclocross riders. While not mountain biking per se, there is a small demand for this type of riding and it would help to spread some of the economic benefits of this project to Powelltown.



- If too constrained by financial, social or environmental pressures, the proposed network may not achieve its goal of becoming a world-class mountain biking destination.
- Local mountain bikers that have constructed informal DH trail in the Mt Bride may be resistant to change and oppose further development of mountain bike trails in this area.
- Existing, informal mountain biking trails have not been constructed with land manager permission and are thus not formally endorsed by the land manager. These existing trails, especially the downhill trails, are quite popular but have no formal facilities, such as a trailhead.



4.3.5 SOCIAL AND ECONOMIC IMPACTS

Issues	Opportunities
<ul style="list-style-type: none"> The construction of the proposed mountain biking trails and associated infrastructure will require considerable financial investment. No funding is currently available for this. 	<ul style="list-style-type: none"> Once completed, the mountain bike trail network at Warburton is projected to attract 120,000 days trippers and 10,000 overnight visitors per annum, creating a total economic benefit of \$23.67 million in its first full year of operation²⁸. This is expected to create: <ul style="list-style-type: none"> Opportunities for new businesses to service the mountain bike community; Opportunities for existing businesses to expand/diversify; Up to 175 jobs (FTE's); Increased demand for local accommodation.
<ul style="list-style-type: none"> The level of support within the local community for the development of mountain bike trails at Warburton is not known. 	<ul style="list-style-type: none"> Work with local tourism operators to build capacity to service the mountain bike market, especially in the accommodation sector.
<ul style="list-style-type: none"> Some segments of the local community may not be supportive of the financial investment required to develop mountain bike trails at Warburton. 	<ul style="list-style-type: none"> Engage with the local community to build support for the project. This might include the circulation of the final report from this project for public review and community workshops. Without the support of the local community, especially the local business operators, the project will fail. Emphasise the value that the proposed trails will have for local residents – the proposed trails will improve access between Warburton and East Warburton, provide new opportunities for access to the natural environment, create new jobs and provide an exciting new recreational opportunity.
<ul style="list-style-type: none"> Land managers/council may face an increased risk of litigation due to users being injured on the formal trail network. There a range of risk management techniques that can be implemented to reduce this risk, but some residual risk will always remain. 	<ul style="list-style-type: none"> Work with YRMTB to increase membership and improve their capacity to contribute to ongoing maintenance of the trails.
<ul style="list-style-type: none"> Local tourism industry operators may not be familiar with the sport of mountain biking and the particular needs of this demographic, making them poorly equipped to capitalize on these new economic opportunities. 	<ul style="list-style-type: none"> Expand nature-based opportunities and increase 'access' to the outdoors (eco-tourism).
<ul style="list-style-type: none"> Large mountain biking events can be disruptive to the local community and can damage trails and other infrastructure. 	<ul style="list-style-type: none"> Develop programs to encourage local non-riders, especially young people such as school children, to try mountain biking. Emphasize that mountain biking is inclusive of all ages, genders and abilities.

²⁸ Refer to Economic Impact Statement provided by Adventure Types – see Appendix 5.



- The current lack of accommodation in Warburton may be a limiting factor for overnight visitation.
- Work with other tourism attractions and providers within the region to package mountain biking up with other tourism opportunities/experiences/attractions.
- Events:
 - Work with event organisers to develop high profile and iconic mountain biking events for the proposed Warburton mountain bike trails;
 - Ensure that event organisers provide appropriate financial security to cover damage that may be caused to trails or other infrastructure;
 - Ensure that a portion of income from events is contributed towards trail maintenance;
 - Consider allowing other types of events, such as trail running and long distance, mass-participation walks (i.e. Oxfam) to use the proposed mountain biking trail network.
- Develop a marketing and branding program for the mountain bike trails that utilizes professional photography and video to showcase Warburton and its trails.
- Develop a program to monitor trail usage using trail counters and report this information back to stakeholders.
- Employ experienced local trail builders to build and maintain the trail network in partnership with interest groups that have qualifications in mountain bike trail development.
- Approach established tour operators from other areas to encourage them to expand their operation into the Warburton area.
- Work with the local residents, land managers and the local business community to identify opportunities to capture revenue from visiting mountain bikers that can be put back into trail maintenance.
- Properties located close to trails may potentially increase in value.
- Project is comparable in value to Yarra Valley Tourist Rail Link and Precinct project concept in the Upper Yarra.



4.3.6 MANAGEMENT AND MAINTENANCE

Issues	Opportunities
<ul style="list-style-type: none"> As the trail network crosses different land tenures, it may not be clear who has the primary responsibility for management and maintenance. 	<ul style="list-style-type: none"> Educate trail users on appropriate trail etiquette and behavior, especially on shared use trails.
<ul style="list-style-type: none"> Land managers struggle to maintain the existing network of trails. How will the maintenance of new trails be resourced? The ongoing cost of maintaining the proposed new trails will need to be considered, with additional funding provided for land managers. 	<ul style="list-style-type: none"> Develop a trail closure program to advise registered users of trail closures caused by scheduled maintenance, wet weather or events. There are many ways through which such a scheme could be managed – physical signage at trailheads, websites, social media, smart phone applications etc.
<ul style="list-style-type: none"> Extremely wet weather may require temporary trail closures to protect the trails from damage. 	<ul style="list-style-type: none"> Work with Government agencies to develop a state-wide mountain biking tourism and destination strategy.
<ul style="list-style-type: none"> Increased visitation to Warburton may complicate fire and emergency management procedures. 	<ul style="list-style-type: none"> Develop a website dedicated to the Warburton mountain biking trails, including links to accommodation and other service providers.
<ul style="list-style-type: none"> Illegal users such as horses, 4WD's or motorbikes can damage trails and impose a hazard to legitimate users. Enforcement activities are rarely carried out. 	<ul style="list-style-type: none"> Develop a consistent and comprehensive signage system for the proposed trails, including the development of a trail map. The sale of trail maps is one way that other destinations have captured some direct revenue from trail visitation.
<ul style="list-style-type: none"> Shared use trails are intended for walkers and cyclists only. There is a potential for conflict between these two users, if clear protocols are not developed and communicated. 	<ul style="list-style-type: none"> Develop and implement a Trail Maintenance Plan, that includes routine trail inspections/audits, regular maintenance activities and community working bees to ensure trails remain in suitable condition and comply with the published trail difficulty rating.
<ul style="list-style-type: none"> If trails are not constructed initially to best practice for environmental sustainability, the ongoing maintenance burden will be substantially increased. 	<ul style="list-style-type: none"> Plan regular community trail working bees to provide an opportunity for local riders to contribute to the trail maintenance and thus gain some ownership of trails.
	<ul style="list-style-type: none"> Develop a Memorandum of Understanding between YRC, DEPI, PV, YRMTB and any other relevant groups/bodies outlining maintenance and management responsibilities for the proposed mountain bike trail network.



4.3.7 FUNDING

Issues	Opportunities
<ul style="list-style-type: none"> The construction of the proposed trail network is likely to cost around \$2.9 – 4.2 million²⁹. Ongoing maintenance and operation costs are estimated at \$200,000 – 270,000 annually³⁰, mostly wages for dedicated management and maintenance staff. While Government funding is often available for projects such as this in the initial infrastructure building phase, ongoing funding is harder to source. 	<ul style="list-style-type: none"> Discuss funding opportunities with other Government agencies and local stakeholders. Investigate further the methods for cost recovery. These may include: <ul style="list-style-type: none"> Providing opportunities for local businesses to become official 'Warburton Mountain Bike Trail Network Service Providers' in return for a fee; Formal fundraising by YRMTB and other local organisations such as the Warburton Advancement League, Chamber of Commerce etc.; Donation boxes placed in local businesses; Membership of a local 'friends group' such as YRMTB; Sponsorship of trails – naming rights or strategic advertising placement on trail signage can also be sold to individual businesses; Sale of merchandise – t-shirts, trail maps, water bottles; Events – events can be run by private event management companies or local, non-profit groups (YRMTB, mountain biking clubs, etc.), but whether private or public, should pay a proportion of each competitor's entry fee towards trail maintenance; Tariffs on local traders – should the benefits of this project be as large as estimated, there is a reasonable expectation that local traders should also contribute towards the trail maintenance.

²⁹ Construction costs are explored in Chapter 5.

³⁰ Operational costs are explored in Chapter 5.



CHAPTER 5 DEVELOPMENT AND COST PLAN



This chapter outlines the steps and processes involved to move this project forward towards implementation.

It provides cost estimates for the development of the trail network as outlined previously, in the Site Analysis.

All the forward planning scenarios and timeframes presented in this report are subject to YRC choosing to proceed with this project, and assume that any community consultation, councillor decisions, negotiations with land managers (DEPI and PV) about funding, maintenance responsibilities etc. or other discussions relating to this feasibility study have been completed and resolved.

The costings and planning scenarios presented here are based on the proposed trail network distances presented in the Site Analysis. They are summarised again here in Table 14 below.

Table 14. Trail Development Summary

Trail Development Zone	Target Users	Proposed Distance of Trails (km)	Target Percentage of Singletrack	Existing Trails To Be Incorporated (km)	New Trails To Be Constructed (km)
Warburton XC Zone	Cross-country	40 – 50	75%	10 – 12.5	30 – 37.5
Warburton DH Zone	Downhill, all mountain/freeride	10 – 20	100%	6	4 – 14
Pines XC Zone	Cross-country	10 – 20	90%	1 – 2	9 – 18
Redwoods XC Zone	Cross-country	10 – 20	90%	1 – 2	9 – 18
Shared-use Circuit (including link to Big Pat's Creek)	Cyclists, walkers	36	0%	26	10
Total		106 – 146		44 – 48.5	62 – 97.5



5.1 PLANNING PHASE

5.1.1 DEVELOPMENT OF TRAILS MASTER PLAN

While this project has explored the feasibility of constructing a purpose-built mountain biking network at Warburton and has developed some high level concepts of what the trail network might look like, it has not provided a thorough exploration of the on-ground alignment of the proposed trails.

The development of a Trails Master Plan is the next logical step towards implementation of the proposed mountain bike trail network. It represents the detailed design phase, whereas this feasibility study can be thought of as an investigation of feasibility and the development of some preliminary conceptual designs.

The development of a Trails Master Plan involves the following steps:

1. Preparation of conceptual layouts for each zone showing approximate trail alignments – Warburton XC Zone, Warburton DH Zone, Redwoods XC Zone and the Pines XC Zone. The conceptual layout should be realistic and take into account the terrain, topography, vegetation and intended users of each zone and should identify any existing trails to be retained. For each zone, the conceptual layout should identify the number of trails and then provide the intended difficulty level and length for each trail. The conceptual layout for each zone should be endorsed by YRC and other relevant stakeholders (PV, DEPI, YRMTB etc.) before moving forward to the next step.
2. Ground-truthing – Ground-truthing is the process by which the final proposed alignment of a trail is determined on the ground. Ground-truthing is done using a GPS and clinometer (to measure gradient) and keeping in mind the intended difficulty rating of the trail. It is at this point that local environmental conditions are assessed and the trail is designed accordingly. For example, if there is a creek to be crossed, the alignment is chosen so as to cross the creek at the narrowest point, or if there is a known habitat area for an endangered mammal (such as Leadbeater's Possum), the trail is aligned so as to avoid the habitat area. Engaging external consultants with ecological and cultural heritage expertise is recommended at this stage to help ensure that the ground-truthed trail alignments avoid areas of high ecological or cultural heritage significance. Once complete, the trail is mapped by GPS and marked in the field using coloured flagging tape. During this step, any existing trails to be retained should be inspected and any changes/modifications determined and mapped out.
3. Preparation of final report – the Trails Master Plan should be a stand-alone document that maps out the entire proposed trail network. It should show detailed maps showing the exact, ground-truthed alignment of every trail in every zone and include accurate lengths for every trail.

The development of a Trail Master Plan is a time consuming process, but is critical in ensuring overall success for the final proposed trail network. It involves detailed on-ground assessments of existing trails and painstaking investigations to determine the alignment of proposed new trails (ground-truthing). Depending on the environmental conditions



encountered (steepness, vegetation density), ground-truthing productivity rates for experienced trail designers range between 2km and 10km per day. That is, in difficult conditions it may only be achievable to ground-truth 2km of trail per day, but in good conditions, 10km per day may be achievable. Based on field observations, around 6km of ground-truthed trail per day should be achievable at Warburton. This means that ground-truthing alone should take between 10 and 16 working days (not allowing for any delays due to weather or other causes). Allowing for the time to produce the preceding conceptual layouts and the post ground-truthing production of the final report, the preparation of a Trails Master Plan could take up to 4-6 months.



5.1.2 OBTAINING PERMITS AND APPROVALS

Once the Trails Master Plan is complete, the next step is to obtain all necessary permits and approvals required prior to construction. This may include planning permits, working on waterways permits, cultural heritage approvals and so on. YRC should seek its own planning advice on what permits and approvals are required.

The Trails Master Plan will form the primary document when seeking approvals and permits. By engaging external ecological and cultural heritage experts during the ground-truthing stage, it can be shown that the final trail alignments proposed in the Trails Master Plan minimize impacts on areas of high ecological or cultural heritage significance.

The GPS track logs of all proposed trails, recorded during ground-truthing, can be submitted to any relevant authorities for their own internal investigations. In seeking approvals and permits to construct any of the trails proposed herein, World Trail advises that approval be sought for construction of the trail within a 20m wide corridor (i.e. 10m either side of the ground-truthed alignment). This 20m wide corridor is required to provide flexibility for the trail builders to respond to any unforeseen circumstances that may occur. For example, prior to construction, it may appear that the soil is deep and excavation will be easy, but once construction commences, it soon becomes apparent that there is a large slab of rock just beneath the surface.

Depending on the processes that YRC are required to go through to obtain all relevant permits and approvals, this stage could take 3-6 months. In order to expedite this process, it may be possible to commence the planning process while the Trails Master Plan is still being developed.



5.1.3 BRANDING, MARKETING AND SIGNAGE

In this project, success will be measured by how many people come to Warburton to ride the trails. Branding and marketing are essential factors in spreading the word about the trails and getting the Warburton trail network into the minds of potential future visitors. While word-of-mouth, mountain biking media and social media can be relied upon to help get the message out there, they need to be backed up by a well thought out brand and logo and a targeted marketing campaign.

Signage is also an important consideration for risk management and visitor experience. It is essential to ensure visitors have a good experience – trails and trailheads must be easy to find, information about the trails must be clearly presented allowing riders to easily choose trails of the appropriate style and difficulty level. It is essential that visitors have a good time to encourage repeat visitation and help ensure good word of mouth – signage will be an important factor in this.

These aspects should be considered early on, during the planning phase. World Trail would recommend engaging the services of a consultancy with expertise in advertising, branding and graphic design to assist in the development of a branding and marketing plan.

This process can happen independently so it is not considered a critical issue in relation to timing.



5.1.4 TRAILHEAD DESIGN

The locations of the proposed six trailheads was determined in the Site Analysis. During the development of the Trails Master Plan this should be reviewed, as it is likely that the trail network could change considerably during this stage.

The six trailhead sites will all require works to improve amenity and ambience. World Trail recommends engaging the services of qualified landscape architects to undertake this process – firstly, determining what level of facilities will be provided at each of the six trailhead sites and secondly, to prepare detailed design specifications and costings for each.

This process could be undertaken simultaneously with the Trails Master Plan.



5.1.5 TENDERING FOR CONSTRUCTION

Having completed a Trails Master Plan, a branding and marketing plan and detailed designs for each of the trailheads and obtained all relevant permits and approvals, Yarra Ranges Council will be in a position to put out tenders for the construction of the proposed mountain bike trail network and associated works such as trailheads³¹.

The Trails Master Plan will again be integral document to this phase, forming the specifications for a construction tender. It provides distances, difficulty ratings and should also provide advice about construction standards and techniques.

Typically the tender process can take some months to resolve, from start to finish. Council will have personnel that are experienced in the preparation of tenders, and with the Trails Master Plan forming the specifications part of any tender, preparation of tender documents should take less than 1 month to complete.

Typically, a tender of this size would allow tenderers up to 1-2 months to prepare. It would generally include a mandatory site visit and meeting to go over the details of the tender.

The assessment and choice of preferred tenderer may take 1-2 weeks, possibly longer if there is a follow-up interview, as is common practice.

In all, the tender process may take 3-4 months to complete.

³¹ Assuming funding for the project has been secured.



5.2 CONSTRUCTION PHASE

There are several construction scenarios that can be used to construct the proposed network of mountain biking trails at Warburton:

1. Full Professional Construction – Under this scenario, a professional trail design and construction company such as World Trail would undertake all construction work. To ensure the proposed trail network is implemented to the highest professional standard, full professional construction is strongly recommended. All price and productivity estimates provided for construction in this document will be based on this scenario;
2. Professional Supervision Only – Under this scenario a professional trail designer would be engaged to supervise a construction team supplied by the YRC – either paid personnel or volunteers. Under this scenario, the actual progress of construction is likely to be much slower than that achieved under the full professional scenario. The wages of any YRC personnel and the costs of sourcing and managing volunteers should also be considered under this scenario;
3. No Professional Involvement – Under this scenario, YRC would undertake the entire construction project on their own, sourcing their own labour (either their own in-house personnel or volunteers) and supervising all construction themselves;
4. Combination Approach – A fourth scenario is to engage a professional trail design and construction company such as World Trail to undertake the most difficult technical aspects of construction and use volunteers or in-house personnel to construct the more generic sections of trail.

Typically, most professional trail builders use teams of 4-5 people, usually comprised of the following personnel:

- 1 x trail designer;
- 1 x machine operator;
- 2-3 x trail labourers.

An experienced team, with suitable equipment, should be capable of constructing approximately 120m of finished mountain bike trail per day at Warburton³².

With between 62 and 97.5km of new trails to be constructed (and not taking into account the different construction techniques required for shared-use trails versus mountain biking singletrack), this equates to 515 – 810 working days for a single construction team. With approximately 260 working days in a normal year (excluding weekends and public holidays), this is a 2-3 year construction project, not accounting for wet weather or any delays that could occur³³.

There are many ways this program could be sped up. Firstly, operating two or more teams would obviously translate into higher productivity rates, halving the projected number of working days required. Secondly, many trail builders seek to work 9-10 hour days, thus

³² Based on an 8 hour day, in moderately dense vegetation, with minimally rocky soils, under good weather conditions and the construction of a 1m wide, partial-bench, natural surface mountain biking trail, rated Easy to Intermediate.

³³ Given Warburton's moderately high rainfall and cold winter, it would be advisable to cease construction activities during winter.



increasing the daily productivity rate. Thirdly, it may also be possible to work a six day week – obviously working on weekends is not ideal from a visitor perspective, but any trails under construction would be closed anyway and the sooner trails are completed the sooner they can be opened. That is, there will be an imperative to have trails completed sooner rather than later so that the Warburton mountain bike trails can be ‘open for business’.

Trail features and infrastructure such as bridges, boardwalks, rock armouring, berms, jumps, rollers and drops all take time to construct. The more features, the less lineal metres of trail can be built per day. Hence, trails that are feature-heavy (e.g. downhill trails, flow-down trails) will take longer to build than standard, rolling-contour cross-country trails.

Taking all this into account, it should be possible with two construction teams running simultaneously to construct the trail network within 1-2 years, depending on the final length of the proposed trail network. This should be revisited in the Trails Master Plan, which will finalise the exact lengths of trails, thus allowing for more accurate construction scheduling.

Many other mountain biking destinations in Australia group the construction of new trails into stages, which might coincide with particular climatic seasons – e.g. the summer season in alpine areas, the dry season in tropical areas. In Warburton it should be possible to construct trails for up to nine months of the year, avoiding the wettest winter months. As such, there is no explicit need to construct trails in stages per se.

Rather, trails should simply be constructed in priority order. The priority order of trails would be determined during the Trails Master Plan, but should consider the following factors:

1. Iconic trails, likely to attract publicity and increase visitation, should be given high priority;
2. Trails close to the trailheads should be given high priority;
3. The Warburton XC Zone and Warburton DH Zone should be prioritised above the Redwoods XC Zone and Pines XC Zone;
4. Trails that provide access to other trails should be given high priority;
5. The shared-use circuit should be given high priority;
6. Any trails proposed to be used by any planned events should be given high priority.

Breaking the trail construction down into stages can also be done for funding reasons. For example, funding can be applied for in smaller components according to a staged construction program.

As a trail is completed, World Trail recommends keeping it closed for a period of up to two months, allowing the soil to settle and consolidate. The opening of any new trails should also be used as an opportunity to promote the project.



5.3 OPERATIONAL PHASE

Once all trails have been constructed and the trail network is technically complete, the operational phase begins. With the construction phase taking 1-2 years, it will be a slow build towards full completion, with trails being opened as they are completed.

The operational phase will have a number of roles/functions/duties that need to be fulfilled by YRC and the other agencies (Parks Victoria, Department of Environment and Primary Industries) in order to ensure the trail network operates to its fullest capacity and attracts maximum usage. These roles/functions/duties can be loosely described as maintenance and management.



5.3.1 MAINTENANCE

Maintenance is a critical function. Trails must be designed and constructed according to best practice for environmental sustainability, thus minimising, but not eliminating, the maintenance burden. As with any asset, the proper care and maintenance of that asset is critical to ensure its longevity and maximum usage.

Maintenance of the proposed mountain bike trails is important for the following reasons:

1. To achieve maximum usage by the intended users;
2. To make trails last as long as possible;
3. To ensure that trails do not become dangerous to the users;
4. To exercise the land manager's duty of care to provide a safe environment for users;
5. To minimize the legal liability to the land manager.

While the maintenance burden can be minimised through good design and construction and clever management of the trails, there will always be a residual maintenance burden. Maintenance of trails is required to limit physical changes that occur to trails over time. These physical changes can be due to naturally occurring processes or the impacts of trail users. Some of these changes are minor and unimportant and don't affect the experience, functionality or safety of the trails. Other changes have more significant impacts and can have a drastic effect on the experience, functionality or safety of the trails. Some typical changes that may occur are listed below.

1. The accumulation of organic material (leaves, twigs, bark etc.) on the surface of the trails. In the heavily forested areas surrounding Warburton the accumulation of organic material on the trails is likely to be considerable. After heavy winds or storms, trees and branches may also fall on trails and require considerable resources to clear. A moderate amount of leaf litter is acceptable on the surface of trails, as it can slow the flow of water, thus protecting the actual trail surface, and it can also provide an enjoyable riding surface and a natural appearance. However, large sticks, branches or trees must be removed as soon as possible. Such items pose a hazard to the trail users and can also provide cause for users to detour around them, widening the trail or creating a new route.
2. Encroachment of surrounding vegetation into the trail corridor. The trail corridor³⁴ should be kept clear of any encroaching vegetation. Although heavy trail use tends to discourage heavy vegetation growth within trail corridors, over time vegetation lining the trail is likely to grow into the trail corridor. On trails that are rarely used, new plants can even become established in the trail tread itself. This vegetation poses a number of problems:
 - It can be dangerous to users if it protrudes into the trail corridor near eye height;
 - It can be annoying to trail users, detracting from the overall trail experience;
 - Some vegetation can be sharp or hard and can be painful to brush against;
 - It can block the line of sight for trail users;

³⁴ Defined as the three-dimensional space above the trail, through which a trail user passes. The trail corridor should be as wide as the trail and high enough to accommodate the intended trail users (generally 2-3m for mountain bikers).



- It can push riders towards the outside edge of the trail, instead of the middle part of the trail. This part of the trail is often less stable than the middle and can lead to potential slumping of the lower batter.
3. Water damage – While the implementation of sustainable trail construction techniques and erosion prevention measures should minimise the potential for water to damage trails, extreme rainfall events can, due to the sheer volume of water, overcome some of these erosion prevention measures, eroding the trail surface and batters. Trails should be inspected for water damage after excessively heavy rainfall events.
 4. Compaction of trails leading to a ‘cupped’ or concave trail profile – Over time, the trail profile can become ‘cupped’ or concaved. This ‘cupping’ is caused by two things:
 - The downward force applied by the tyres of mountain bikes or the feet of walkers causing the soil to compact in the middle of the trail;
 - The flow of water and the impact of trail users causing organic material to migrate towards the lower edges of the trail, where it accumulates, causing the edge of the trail to become higher than the middle of the trail.
 5. Blocked grade reversals – Grade reversals are a key sustainability feature and should be incorporated into all the proposed trails. A grade reversal is essentially a point where the trail changes from downhill to uphill. Any water flowing downhill along the trail reaches the grade reversal and is forced off the trail. At the lowest point of the grade reversal, the edge of the trail should be scalloped out to ensure that there is a wide, clear outlet for the water. This outlet must be kept clear of organic material (leaves, bark, sticks) and soil in order for it to continue functioning properly. This is a key maintenance task, as any organic material that falls anywhere on the trail will eventually be pushed towards the grade reversal outlet by the action of water and trail users. This is an ongoing and essential maintenance task. No matter how well constructed the trail is, in time the grade reversals will become clogged with organic material and soil. How quickly this occurs depends on the surface material of the trail, the amount of usage the trail receives, the volume and frequency of rainfall and even the surrounding vegetation.
 6. Damage to signage – Signage plays an important role in risk management. Unfortunately, it is subject to damage, through both natural and human causes. Natural causes include branches/limbs of trees falling and damaging signs, bushfires, strong winds etc. In urban areas, signage is often likely to suffer from vandalism. Typically, signage may be defaced or graffitied, damaged or even stolen. As it forms a key tool in communicating the potential risks to trail users, it is important that the signage is maintained so that it remains clear and legible.

The above points are just some of the changes that can occur to trails over time. This is not an exhaustive list. The actions of water, wind, animals (e.g. deer which are prolific throughout the area) and trail users are difficult to predict over long periods of time, hence the need to monitor and inspect the trails regularly.



Once the proposed trail network has been established, it is recommended that a dedicated trail maintenance plan be produced and implemented. There are two main components of a thorough trail maintenance plan:

- Routine trail inspections;
- Trail maintenance works.

The objective of these routine trail inspections is to identify any problems or changes to the trails that need to be repaired. Any problems that are identified then form the basis for ongoing maintenance works. Routine trail inspections need to be undertaken regularly to be effective. The exact frequency of these inspections should be determined based on the available resources and the length of the trail network, but each trail should probably be inspected monthly *as a minimum*. Following storms, heavy rain, or strong winds, additional inspections should be undertaken. YRMTB could undertake this role, under the terms of an MOU. A formalised inspection schedule could be determined, with YRMTB members undertaking regular, rostered inspections and submitting a formal inspection report afterwards.

Following a routine trail inspection, if any trail maintenance works are identified, they should be classified as either urgent or non-urgent.

Trail maintenance work might be considered urgent if:

- It poses a significant safety risk;
- It is likely to lead to further and significant damage if not rectified;
- It makes the trail un-usable.

Urgent maintenance items should be repaired immediately. If an urgent problem cannot be rectified immediately, then the trail should be closed until it can be rectified.

Non-urgent maintenance items can be undertaken on pre-determined, scheduled maintenance days. Such days could even be open to volunteers from the local mountain bike community.

When carrying out any trail maintenance works, either urgent or non-urgent, all necessary safety precautions should be taken. Appropriate personal protective equipment (PPE) should be used for all works. Any tasks requiring machinery operation (excavator, chainsaw etc.) must only be undertaken by suitably qualified and licenced individuals. All works should be undertaken to a thorough, professional, industry level standard.

There are some management measures that can be implemented to minimise the maintenance burden. These include:

1. ***Close the trails during and after periods of heavy rain***

This policy has been implemented at other locations throughout Australia to good effect. Reducing traffic on the trails during and after times of heavy rain will be highly beneficial to the longevity and condition of the trails.



2. Enforce a strict policy of ‘no unauthorized trail modifications’ and remove or repair any such modifications immediately

Although users are to be encouraged to take ownership of the trails and to undertake maintenance, any additions or modifications to the trails are to be removed immediately. Such user built modifications are often poorly constructed and may change the intended difficulty of a trail, resulting in increased risks for users.

3. Any modifications/maintenance to the track should only be conducted by authorised person/s

Modifications to the trails may be required in the future to improve the user experience or address safety and/or maintenance concerns. Modifications should only be made by authorized people with the necessary skills and experience to ensure trails remain safe and fit for the purpose for which they were designed and constructed for.

4. Require event organisers to repair trail damage caused by the event

While events are important for overall visitation, events should be subject to clear rules about damage to trails, with a bond held to ensure any rectification works are undertaken post event.

The role of maintenance will be critical to the ongoing success of the project and needs to be fully resourced from the outset. As the proposed trail network crosses land tenures (YRC, PV and DEPI) there will be some work required to figure out who will be responsible for the maintenance of the trails. There are two basic models:

- All maintenance undertaken by one agency, regardless of tenure. The most logical agency to fill this role would be YRC, as they are the proponent of this project. Under this model, YRC would have a dedicated trail maintenance team that would work on all the trails, regardless of tenure.
- Maintenance undertaken according to land tenure. Under this model, PV would maintain the trails on their land, DEPI the trails on their land and YRC the trails on their land. Each agency would therefore have their own trail maintenance team, responsible for looking after the trails on their own land.

Regardless of the chosen model, an MOU or other agreement will be required to define the responsibilities for each agency and to ensure that maintenance is undertaken to the same high level across each land tenure.

Ideally, maintenance personnel will have had an on-ground role during the construction of the trails. This ensures that maintenance staff have been skilled-up by the chosen contractor and have some personal ownership of the trails.



5.3.2 MANAGEMENT

In addition to the maintenance of the trails, the operation of the trails will also require some oversight and management from YRC. This management role would include the following functions:

- Coordinate/organise events – events may be run by private event management companies or by local non-profit organisations, such as YRMTB or a mountain bike club. Either way, a council officer will be required to coordinate and assist in the organisation of the event – securing permits, finding a suitable staging area, determining an appropriate date etc.;
- Manage website and social media – a dedicated website will be required for the proposed trail network, providing a trail map, descriptions, ratings and information about each trail, information about signage, safety, climate, where to stay, upcoming events, races, working bees, fund raisers etc. Maintenance of the website will require ongoing support from YRC. In addition to a website, the usage of Twitter, Facebook and other forms of social media should be considered. These modern media provide excellent marketing opportunities, but also provide good ways to communicate with users – users may be able to sign up to these different media to receive updates about trail closures (for example, due to heavy rain or planned maintenance activities) and other events;
- Coordinate maintenance – while roles and responsibilities for maintenance works and routine inspections should be defined by an MOU, there is likely to be a ‘back of house’ role for a YRC officer to coordinate community working bees, liaise with the various land managers and YRMTB and generally ensure that all trails are being maintained to a high standard;
- Liaise with the local community and business community – it is expected that the business community may need to engage with council from time to time about this project and the ongoing use of the trails. In particular, it will be important from time to time to liaise with local traders to discuss event scheduling and to assist local businesses to build their capacity to service the mountain bike tourism market;
- Make decisions relating to trail closures – in some mountain biking destinations, rainfall events over a certain threshold amount trigger automatic closure of trails. Any such decisions need to be communicated to users, through electronic media (website, Facebook etc.) but also through signage at trailheads;
- Manage budgets, funding and revenue sources – depending on the maintenance model chosen, there may be a role for YRC to provide funding to PV and DEPI to undertake maintenance. Furthermore, the ongoing management of the trails will have a significant cost, and YRC should seek ways to offset this cost, through grants, fundraising and other measures.



5.4 IMPLEMENTATION SCHEDULE

Table 15 below shows an achievable implementation schedule for the project. The top part of the table shows items that form part of the 'critical path' – these are items that must be completed in sequence before the next item can commence. They are shown with a diagonal cross-hatching. The bottom part of the table shows items that are not part of the critical path. These are still important, but their timing is less critical.

Table 15. Implementation Schedule

	Duration (months)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Preparation of Trails Master Plan	6																																				
Obtaining permits and approvals	3																																				
Tender process	3																																				
Construction Phase	24																																				
Project Completion	-																																				
Preparation of Branding, Marketing and Signage Plan	12																																				
Preparation of trailhead designs	6																																				

Essentially, the project could be implemented within 36 months, if funding were secured. This assumes many factors and should be treated as a guide only.

5.5 COST ESTIMATES

Table 16 below provides a cost estimate summary for this project moving forward. It is divided into 'Planning Phase', 'Construction Phase' and 'Operational Phase'.

Table 16. Cost Summary

Phase	Item	Estimated Cost		Notes
		Low Distance Scenario	High Distance Scenario	
Planning Phase (pre-construction)	Development of Trail Master Plan (including ground-truthing of all trails and community consultation)	\$60,000.00	\$75,000.00	Estimate that 20-25 days fieldwork will be required, plus considerable office time to pull together report.
	External consultants to provide ecological and cultural heritage advice during ground-truthing stage.	\$50,000.00	\$65,000.00	This item could possibly be incorporated into the Trail Master Plan, as it is during the Master Planning that this advice would be required.
	Preparation of planning applications	Internal council costs	Internal council costs	
	Branding, marketing and signage	\$100,000.00	\$100,000.00	
	Trailhead design	\$20,000.00	\$20,000.00	
	Sub-total	\$230,000.00	\$260,000.00	
Construction Phase	Cross-country trails	\$1,440,000.00	\$2,205,000.00	Based on approximate costs of \$30/m
	Downhill trails	\$160,000.00	\$560,000.00	Based on approximate costs of \$40/m
	Shared-use trails	\$700,000.00	\$700,000.00	Based on approximate costs of \$70/m
	Additional trail infrastructure (rock armouring, drainage, surfacing, bridges, boardwalks etc).	\$115,000.00	\$173,250.00	Based on an estimate of an additional 5% of the capital costs of constructing the trails.

	Pump track zone	\$60,000.00	\$60,000.00	Based on a total size of approximately 20m x 30m = 600m ² . Pump tracks and dirt jumps typically cost around \$100 per square metre, including all materials, machinery and labour.
	Trailhead construction	\$200,000.00	\$200,000.00	
	Signage fabrication and installation	\$50,000.00	\$50,000.00	
Sub-total		\$2,725,000.00	\$3,948,250.00	
Total Planning and Construction Costs		\$2,955,000.00	\$4,208,250.00	
Operational Phase	Maintenance	\$136,250.00	\$197,412.50	Maintenance costs are typically estimated at 5% of the capital cost. There are various maintenance models which may apply.
	Events	\$20,000.00	\$20,000.00	This could be financial or in-kind support for private event promoters, or council could seek to run their own events.
	Management costs	\$50,000.00	\$50,000.00	Some council support will be required to maintain websites, coordinate events, coordinate maintenance, manage social media aspects, work with the local business and mountain biking community and enforce possible weather related trail closures.
Sub-total		\$206,250.00	\$267,412.50	

In relation to the cost estimates on the previous pages please note:

- The cost estimates for the Trails Master Plan and the construction phase are within World Trail's core expertise and should be considered as reasonably accurate estimates. All other cost estimates should be thought of as 'budget allocations' rather than accurate cost estimates. They have not been tested in any way and are not based on actual quotes. YRC should investigate each item more fully, and where relevant, obtain quotes, before moving forward;
- A contingency of 5% of the capital cost of the trails has been included to cover additional trail infrastructure such as bridges, boardwalks, rock armouring, drainage, trail surfacing and so on. While this estimate is based on typical project costs, it may be prudent to consider increasing this amount to 10%, given that Warburton is typically quite wet and may therefore require more infrastructure than normal to deal with wet areas;
- The cost estimate for the 'pump track zone' is based on an overall size of about 600m² (20m x 30m). This is a fairly modestly sized facility, which is not really in keeping with the 'world-class' standard aimed for on this project. A larger and more extensive facility would be preferred, but may be difficult to achieve given the lack of suitable land in the centre of Warburton. While the standard cost of \$100 per square metre includes all labour, machinery and materials (mostly soil) required to create the pump track/dirt jumps, it doesn't include any landscaping, which is often overlooked in the creation of these types of facilities, and can easily eclipse the cost of the dirt jumps/pump track. Considering all these factors, ideally a larger site would be found and the \$60,000 allowance for this item would be doubled, tripled or quadrupled;
- While the \$200,000 estimate for trailheads is considerable, this is another area that could possibly benefit from further funding. Landscaping and infrastructure such as toilets and shelters can be expensive;
- The estimate of 5% of the capital cost of the trails, as an estimate of maintenance costs, should be used with caution. Typically the trail construction industry works off a range of 2-7% for maintenance, but this is a flawed approach, as trails with a high capital cost may be built to a higher standard and require minimal maintenance. For example, a trail in an extremely wet environment that is built with a high volume of rock armouring will cost a lot to construct, but will require minimal maintenance. A trail built poorly and cheaply, will in turn have a higher maintenance burden. Instead, costs per metre of trail might be a more useful metric. Mt Buller Resort Management estimate that they spend about 720 man hours annually maintaining about 40km of trail, at a cost of about \$36,000 (based on \$50/hour including all associated on-costs). This equates to approximately \$900 per kilometre of trail, which equates to only about 3% of the capital cost of the trails. Even still, while this may be accurate at one location, it is not immediately transferable to another destination. The maintenance burden depends on vegetation, rainfall, usage, types of trails, number of features, soils, geology, events and so on.
- No allowances or estimates have been made for road or civil infrastructure that may be required. This may include a new pedestrian/cyclist bridge over the Yarra River near East Warburton, crossing infrastructure within Warburton and extensive road markings and signage throughout the study area;
- GST is not included in any of these estimates.



5.6 COST RECOVERY

Clearly, this project will require a significant funding investment to implement. This project is unfunded currently, so YRC will need to identify possible funding sources before moving forward. While significant, there are many precedents where State and Federal Governments have provided similar funding for meritorious projects that can show significant benefits. While the total planning and construction costs are estimated at between \$2.95 – 4.21 million, the overall economic impact (direct and indirect) of the completed trail network is estimated at \$23.67 million annually, suggesting that the cost of construction will be recovered in the first year of operation alone.

In some ways, the ongoing, operational costs of between \$200,000 – \$270,000 annually are more important, as these are not likely to be covered by any one-off funding grants for the construction of the trails. Rather, these ongoing costs will need to be borne by the three agencies involved with the project – YRC, PV or DEPI – in some kind of agreed partnership. The question of how much of the ongoing operational costs should be borne by each agency will need to be discussed and resolved by these three agencies, but should take into consideration the following points:

- The project will have a significant positive financial impact on the local Warburton community, bringing substantial new economic stimuli into the local economy and providing new employment opportunities;
- The project's projected economic impact of \$23.67 million annually has state-wide significance and will boost Victoria's profile nationally and internationally for nature-based and adventure tourism. Given the potential boost this project will provide to tourism, health and fitness and sport and recreation locally, it may be reasonable to discuss funding opportunities with the State Government agencies responsible for these portfolio areas;
- While YRC is the project manager for this feasibility study, the initial project began with PV. PV also provided two-thirds of the funding for this feasibility study;
- The project aligns perfectly with the recently released Public Land Mountain Biking Guidelines, a joint PV/DEPI publication;
- The bulk of the trail network will be located within land managed by DEPI and PV, while the main trailhead is likely to be on YRC land. With a completed trail master plan in place, the exact extent of trails on each agency's land will be known, allowing a more accurate assessment and discussion of the proportional allocation of operational costs;
- All three agencies are ultimately funded by government and taxes. The project demonstrates a significant positive financial impact, with a fairly small ongoing operational cost. As such, splitting the operational costs proportionally across the three agencies minimises the burden on any one agency.

While the question of who will provide funding to maintain and manage the trails through the operational phase remains unanswered, ideally, the ongoing, operational costs of the mountain biking trails would be self-funded. That is, the ongoing usage of the mountain bike trails will generate revenue that can be put back into the management and maintenance of the trails. However, the question of how to capture revenue from mountain bike tourism is a difficult one, grappled with by many destinations worldwide. While there is no doubt that mountain biking tourism can generate significant economic benefits, the



capture of direct revenue by land managers and local authorities is a difficult prospect – rather the benefits accrue to the local independent business operators.

A common suggestion is that riders should pay a fee to access the trails. While this ‘user pays’ model has some merit, the problem lies not with the riders’ willingness to pay (as seen in the survey earlier, many mountain bikers have high income levels and are willing to spend money on their sport), but with how such a fee is to be collected in a cost-effective manner. With the exception of private mountain bike parks and some ski resorts, typically there is no single entry point to a trail network, so the notion of a ‘trail fee’ is almost impossible to implement or to collect in a cost effective manner. Instead, it might be more realistic to target a variety of different methods by which funding might be raised on an ongoing basis.

The following suggestions should be investigated further as possible fundraising opportunities:

- Official ‘Warburton Mountain Bike Trail Network Service Providers’ – local traders could pay a fee to be designated as an official provider of a certain service. In return, they would be assured of exclusive use of the term ‘official provider’ for that particular service and be promoted via the official ‘Warburton Mountain Bike Trail Website’ on the trailmap and on any trailhead signage. Examples of official service providers include bike shop, mountain biker shuttle service (that is, to transport riders to the top of the downhill trails or to the satellite trailheads), transportation from Melbourne (including possible airport transfers for incoming interstate or overseas visitors), preferred ‘mountain bike friendly’ accommodation providers and so on;
- Formal fundraising by YRMTB and other local organisations such as the Warburton Advancement League, Chamber of Commerce etc. This could be through film nights (for example, incorporating a mountain bike film category into the local film festival), barbecue fundraisers, weekly local races and so on;
- Donation boxes throughout local businesses – businesses that draw significant custom from the mountain bike trails could encourage patrons to donate additional funds to the ongoing maintenance of trails;
- Membership of a local ‘friends group’ – YRMTB is already set up and is doing a good job of advocating for better trail access. With the development of the Warburton mountain bike trail network, there is an opportunity to expand this role. Firstly, it would be suggested that members pay a fee to join, with a portion of that fee being provided back to YRC for ongoing maintenance. Secondly, YRMTB membership would require certain commitments to attend working bees and ongoing trail inspections. Thirdly, there would need to be incentives provided by YRC or local businesses to encourage membership of the group;
- Sponsorship of trails – naming rights or strategic advertising placement on trail signage can also be sold to individual businesses. These businesses could be local cafes, restaurants or other businesses, but could also be bike industry businesses, such as suppliers, importers, manufacturers;
- Sale of merchandise – t-shirts, trail maps, water bottles. While merchandise sales is not considered a large revenue source, the sale of trail maps is becoming a more common proposition. Instead of giving away printed maps, some destinations have produced high quality fabric trail maps. These are waterproof, tear proof and virtually



indestructible and become a souvenir after the ride is over. These trail maps are sold in local businesses, with all funds put back into the trail network;

- Events – as discussed many times, events are an important aspect of the overall visitation strategy, putting the destination on the map and providing a large stimulus boost. Events can be run by private event management companies or local, non-profit groups (YRMTB, mountain biking clubs, etc.), but whether private or public, should pay a proportion of each competitor's entry fee towards trail maintenance;
- Tariffs on local traders – should the benefits of this project be as large as estimated, there is a reasonable expectation that local traders should also contribute towards the trail maintenance. This would not likely be a popular measure and may be difficult to implement.



5.7 DEVELOPMENT AND COST PLAN SUMMARY

In summary, the process moving forward towards completion includes the following steps:

- Planning phase:
 - Development of Trails Master Plan (including ground-truthing and ensuring trails are located in areas of lower environmental values);
 - Obtaining permits and approvals;
 - Development of branding, marketing and signage plan;
 - Development of trailhead designs;
 - Construction tender process;
- Construction phase.

In total, the planning phase may take up to 12 months and the construction phase up to 24 months, although there are many variables and decisions that could affect these timelines. While each trail can theoretically be opened as it is completed, it will take approximately three years to develop the entire trail network.

The planning costs are estimated at between \$230,000 - \$260,000.

Construction costs are estimated at between \$2.9 – \$4.2 million.

Once operational, it is estimated that the ongoing cost to properly maintain and manage the trail network is between \$200,000 – \$270,000 annually.

While a number of methods to recover some of the ongoing operational costs have been discussed, this area needs further exploration. Ideally, some revenue will be recovered through a variety of means, with the remaining shortfall in ongoing operational costs shared between agencies. Given that the project is expected to have an overall economic impact of \$23.67 million annually, the annual operational costs should not be considered a significant impediment to the project.



APPENDICES



APPENDIX 1 – DISCIPLINES OF MOUNTAIN BIKING

Cross-country – Cross-country mountain biking is the oldest discipline within the sport and is analogous to cross-country running or skiing. It involves riding across all types of terrain and slopes. Participants may be seeking thrills, fitness or the opportunity to enjoy nature. Specialised cross-country mountain bikes are lightweight, with many gears, including extremely low gearing for steep hills and generally have front suspension and possibly rear suspension. Cross-country trails are similar to walking trails – narrow singletrack corridors through the bush, only slightly wider than a set of handlebars, although they can be as wide as a vehicle trail. Cross-country racing consists of a number of formats:

- Olympic format – the most traditional form of cross-country race, consisting of multiple laps (the number of laps depends on the skill category) of a 4-6km loop. Each lap generally takes in a wide variety of terrain, with climbs, descents and numerous technical features;
- Short course format – this is a relatively new format, comprising of a 500-1000m loop with numerous technical features. This format is generally intended to provide good spectating and media opportunities and races are intended to be short, fast and intense;
- Marathon format – this format has shown huge growth in recent years. Courses may comprise of a set distance (50km or 100km are popular) or a set duration (8, 12 or 24 hours are popular), with either shorter, multiple laps or longer, single laps.

Downhill – Analogous to downhill skiing, downhill mountain biking is a speed-oriented sport, where participants start at the top of the hill and ride down. As downhill bikes are not designed for riding up hills, transport is required to get riders and their bikes back to the top of the hill. Downhill bikes have both front and rear suspension, are heavy and generally have fewer gears than cross-country bikes. As downhill often involves high speeds and crashes are more common, participants wear full-face helmets and extensive body armour to protect themselves. Downhill trails are generally more technically difficult than cross-country trails and may include drop-offs, jumps, narrow bridges, rough terrain and steep gradients. Due to the high speeds, heavy bikes and rider preferences for steep gradients, downhill trails are more subject to erosion than cross-country trails. Careful design and construction, including close attention to gradients and corners is essential to reduce the environmental impacts of downhill trails. Downhill trails are by definition point to point trails, require a fairly large amount of space and clearly require a downhill slope, with access top and bottom. Freeride is a closely related discipline. It is primarily about going downhill, but is largely a non-competitive discipline. There are some high-profile competitive events, but these emphasise advanced level mountain biking, creative riding, extreme manoeuvres and high risks instead of just who is the fastest rider to the bottom. Freeride bikes are similar to downhill bikes – heavy, robust and with front and rear suspension.

All-mountain / Enduro – This category is difficult to define, borrowing elements from all disciplines. All-mountain / enduro is primarily focussed with descending, but doesn't focus on speed and steepness as much as downhill per se. Competitive events in this category typically include long descents with some uphill sections, which typically are not timed. Riders win based on their cumulative time for all the descending sections. All-mountain /



endure bikes typically feature front and rear suspension, but are typically not as heavy as downhill bikes. It is showing very strong growth at the moment and seems to be running in parallel with the evolution of modern mountain bikes. Similar to cross-country mountain biking, all-mountain / enduro riding requires an ethos of self-sufficiency and preparedness and an affinity for wilderness and exploring back-country areas.

Dirt jump/pump track riding – This discipline borrows heavily from BMX, and could equally be considered as a non-competitive discipline of BMX – indeed dirt jumps and pump tracks can be ridden on BMX or mountain bikes. This discipline tends to appeal strongly to younger people and has strong urban focus. Dirt jumps and pump tracks are both highly modified track types, entirely constructed from dirt/soil/aggregate. Dirt jumps are large mounded jumps built up above the natural ground surface. The jumps often feature a gap between the take-off and landing points. Pump tracks are short circuit tracks, featuring rollable dirt mounds and berms in series. They are designed to be ridden without pedalling, riders generating speed by pumping the bike – i.e. pushing the bike down into the dips and pulling the bike up over the mounds. Any mountain bike or BMX bike can be used on pump tracks, but dirt jump bikes are usually heavily built to withstand jumping, usually have front suspension only and may have fewer gears than cross-country bikes.

Trials – Trials is a relatively unpopular discipline that involves manoeuvring the bike over an obstacle course without putting a foot down. Courses usually combine natural and man-made features. Trials bikes look more like BMX bikes than mountain bikes, with very small low seats, small wheels, small frames and large volume tyres and do not have suspension. The primary skills required for trials are balance and the ability to ‘hop’ the bike up onto obstacles that are too large or steep to be able to pedal or roll onto. Trials courses typically don’t require much space and are great for spectators, but the sport itself is not very popular.



APPENDIX 2 – YRMTB BENCHMARKING REPORT

BENCHMARKING SURVEY REPORT

FOR

WARBURTON CYCLING HUB FEASIBILITY STUDY



**SURVEY AND REPORT BY YRMTB
MEMBERS**



Introduction

Yarra Ranges Mountain Bikers (YRMTB) members have undertaken a benchmarking survey to aid the Warburton Cycling Hub feasibility study. The purpose of the survey was to study the positive effects of cycling tourism on local businesses and communities. The basis of this survey was to speak to the owners of businesses in country towns in Victoria and South Australia where road cycling or mountain biking is a popular activity. A town may become a biking destination due to the roads and scenery in the area appealing to road cyclists, or the presence of purpose-built MTB singletrack which mountain bikers crave.

Our interviewers asked questions about the nature of each business, the proportion of business related to cycling tourism, the trails and events in the area, as well as asking for general thoughts and comments. The overall response towards bike riders and the benefits they bring to businesses was very positive.

It is worth noting that every town is different, and we only interviewed business owners in four towns: Forrest, Castlemaine and Woodend in Victoria, and Melrose in SA. Some towns are already popular tourist destinations, with or without cycling tourism. As a result cycling tourism has a less visible effect on businesses in these already busy towns, compared to Forrest where the little town has been transformed by the investment in mountainbike trails which has become a huge attraction to the town.

During the course of the interviews, YRMTB was directed to a document developed by Tourism Victoria: *Victoria's Cycle Tourism Action Plan 2011-2015*. This document contains much material which is relevant to the Warburton Cycling Hub feasibility study. A copy will be attached.

The interviews were conducted by John Baldwin (YRMTB secretary) and John Wright (YRMTB general member).

This report was compiled and edited by John Wright.

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Forrest is a small country town located in Victoria's Otway Ranges. Thanks to its network of flowing, handmade singletrack, it has become one of the premier mountain bike destinations in Australia.

Three businesses were interviewed for the benchmarking survey.

The Corner Store

Address: corner of Blundy St & Station St in Forrest

Owner: Norm Douglas

phone: 03 5236 6571

email: shop@thecornerstoreforrest.com.au

web: www.thecornerstoreforrest.com.au/

The Corner Store is a bike shop and cafe. The shop sells new bikes, clothing and accessories, and also offers bikes for hire.

Although a bike shop, not all business is bike-related. Passing traffic also contributes to the business. Norm mentioned that 50% of the annual trade occurs over the summer months. The bike-related trade gives local business owners the confidence to begin or expand their business.

Three major mountain bike events are held in Forrest. These are the Otway Odyssey, the Forrest Festival and the Forrest 6 Hour. Norm says the town cannot cope with large events such as these, due to a shortage of accommodation and other services. Even the sewerage system can't handle the volume. There is not even a place in town for riders to fill a water bottle. These issues highlight the need for good services and infrastructure in a biking destination.

The trails in Forrest consist of 60km of flowing singletrack that is signposted, well marked and well mapped. In Norm's view, the only other mountain biking location that comes close to Forrest is Mt Buller. As a town surrounded by trails, Forrest is unique, quite unlike places such as the You Yangs or Lysterfield. Riders come to stay in the town's accommodation, buy their food and drink, and ride.

The Otways area is also great for road riding. The compact area offers good hillclimbs, great scenery, and safe roads, since the windy roads ensure that cars do not travel at high speed. The Gran Fondo road cycling event held in the area has made many riders realize that the Otways is a great place for road riding, too.

Norm said they are seeing more and more touring riders or bikepackers. This is another type of rider, typically aged in their 50s, riding regardless of the weather in large groups. They arrive in town with credit card in hand, ready to spend.

One thing the town is missing is a more kid friendly riding experience such as BMX tracks or a pump track.

Norm says that the Forrest MTB trails attract more visitors than the Otway Fly treetop walk, a tourist attraction that has had a high level of financial investment. In fact as a tourist attraction in the area, the trails are second only to the Great Ocean Road in terms of visitor numbers.

Norm says the town has grown and benefitted more broadly thanks to the bike trails and entrepreneurial local business owners. There are more employment opportunities for young people thanks to the bike-related businesses. Initially there were local people who were against the bikes, but Norm hears less and less objection as people realize the benefits and see the town doing well. Norm contends that bikes are a boost for the viability of small country towns.



The Forrest Guest House

Address: 16 Grant Street, Forrest

Owners: Pete and Emma

phone: 03 5236 6446

email: info@forrestaccommodation.com.au

The Forrest Guest House is located on the main road through town. It has 7 rooms for accommodation and also offers coffee and light lunches. The business has been owned by Pete and Emma since December 2012.

Emma says “bikes are great.” She approximates that biking customers make up 20 to 25% of their business. They plan to make the cafe and guest house very bike friendly. She gave an example of a group of 13 bike riders from Cairns in north Queensland who travelled to Forrest specifically to ride the trails. They stayed for 10 days and rode every day. Emma says the mountain biking demographic are ready and willing to spend money when on a riding trip.

Emma says Forrest needs more general tourist attractions in town to cater for the partners and families of mountain bikers. She believes these things will come as the town develops, and the local council is supportive of such development.

Forrest Brewing Company

Address: Forrest-Apollo Bay Road, Forrest

Owners: Matt and Sharon Bradshaw

phone: 03 5236 6170

email: info@forrestbrewing.com.au

web: www.forrestbrewing.com.au

The Forrest Brewing Company is a microbrewery, café and self-described “mountain bike hangout”, on the main road through Forrest. Matt and Sharon rebuilt and renovated the old general store into what we see today. Some government grant money was used. They set up the business specifically because of the existence of the bike trails in Forrest and the potential for bike-related business.

Sharon estimates that 40 to 50% of business per annum is related to the bikes. They also get a lot of business from passing traffic. On the weekends, they are constantly serving mountain biking customers. She says that the bike riders provide a good reliable core of business for every weekend. Sharon says that on average, one rider would spend \$200 for a weekend of riding. They buy breakfast, lunch and dinner, coffee, beer, and accommodation. The shop offers a hearty “MTB slice” among other cakes. There is also a map of the trails on the side wall of the shop.

Visitors come to Forrest from far and wide. Sharon mentions Cairns and Brisbane. Many people pass through from South Australia on their way to Melbourne, and international tourists visit too.

Sharon says there are 110 beds in town available for visitors. Events of 200-300 riders are perfect for Forrest to cope with, but bigger events like the Otway Odyssey are too big. Forrest does not have enough facilities. At the café, they serve as many people as they can, but can't keep up with the demand. Some riders in events get accommodation elsewhere, come to the event, then leave.

Sharon would like to see more trails at Forrest including other forms of biking such as downhill and BMX. She would also like to see upgrades, changes and additions to the existing trails. She sees trail maintenance as an ongoing issue. Volunteers do some maintenance. Also, more facilities, such as showers for bikers, are needed.



Melrose is the oldest town in South Australia's Flinders Ranges, 265 km north of Adelaide. It serves a rural community but is also a pleasant holiday destination. For our benchmarking survey, the local bike shop, a cafe/guesthouse and the general store were interviewed.

Bluey Blundstone's

Address: 30/32 Stuart St, Melrose SA

Contact: Samantha

phone: 03 5236 6170

email: gday@blueyblundstones.com.au

web: www.blueyblundstones.com.au

Bluey Blundstone's in Melrose is a coffee shop that also offers quality rustic-style B&B accommodation. The business caters for the many bike riders that come to the area to ride the trail.

In terms of business, our contact Samantha estimates that overall, 50% of business is related to biking customers. Every week is different, but there is always plenty of bike-related business. They see many riders coming from Adelaide for a session on the trails. Melrose is a small town of 200 residents in a popular tourism area so there is plenty of general tourist traffic too.

During events, Samantha says business is "huge". They double their opening hours to cope with demand. There is enough accommodation to cope with events, with everything from camping sites to top-end bed & breakfast available.

Samantha says bike riders are "absolutely brilliant," great for business, they are very respectful and bring lots of money into the town. She says that Bluey's and other businesses in town have learned what riders require and now all seek to meet these needs.

Over the Edge Sports

Address: 6 Stuart Street, Melrose SA

Contact: Kerri Lee and Richard Bruce

phone: 08 8666 2222

email: ote@otesports.com.au

web: otesports.com.au/home/

Over the Edge Sports (OTE) is a high-end, "boutique" bike shop, something of a surprise in a small country town such as Melrose. The shop specializes in mountain bikes but sells all types of bikes as well as accessories, merino wool clothing, and coffee. OTE is the only Australian seller of Knolly bikes which sell for \$4-5000 plus. The store also sells OTE branded merchandise. Kerri says that being in a small country town they realize the need to diversify and be a "destination" bike shop.

Being a bike shop, 100% of their business is related to bikes and riders. Bike hire is a big part of business, as well as bike repairs and servicing. And despite being a boutique bike shop in a relatively remote location, they sell "lots of bikes". During events held in the area, business goes crazy.

Kerri describes the local trails as "mostly cross country". There are approximately 80 kilometres of trails in the area: 30 km in Melrose and 50 km in nearby Bartagunyah. The trails are mostly on privately owned land, and efforts are currently being made to link the two areas. Summer in Melrose is often too hot for riding, with temperatures reaching 50°C.

The area is also popular for road riding. A "Movember" fund-raising ride occurs each year too. The



Mawson Trail, a 900 km mountain bike and walking trail from Adelaide to Blinman in the north, also passes through Melrose, so this brings another category of riders to the town.

The main cycling event held in Melrose is the Fat Tyre Festival, a celebration of off-road biking and especially unusual bikes. This popular event attracts approximately 250 people every year. There are a few other events held at Melrose including an 18 Hour endurance race.

Being a small town, Melrose struggles to cope during the larger events. There is a lack of accommodation - many visitors need to camp. As the town has only two pubs for meals, there can be a very long wait for dinner. Catering services are also used during events.

Kerri says that facilities for riders need to improve, too. She says the toilets and showers need to be upgraded.

Melrose General Store

Address: 24 Stuart St, Melrose, SA

Contact: David Downs

phone: 08 8666 2057

The Melrose General Store provides basics such as food, groceries, fuel and BBQ gas. The café offers both take-away or dine-in service. The owner David took over the business at the beginning of 2012, and is currently gearing up to section off part of the cafe to keep it open later for riders and general tourists. The store also sells maps of the MTB trails.

David says the store gets quite busy at different times due to bikes. He recently prepared over 50 lunches in 2.5 hours when 160 riders passed through town while travelling the Mawson Trail. This tour was run by Bike SA. David reports the riders and crew on the tour were all very happy with the response to the group from the town. There is also a community group which helps organize catering etc when needed.

David says it's hard to estimate, but bike riders make a solid contribution to his business. He sees lots of riders passing through, lots of bikes carried on cars as people arrive or depart. Some stay overnight, some stay a few days. David says Melrose has many events on during Easter in particular, and at this time all accommodation is booked out 12 months in advance.

Overall, David says the town is all in favour of mountain bikes, the Fat Tyre Festival and the contribution made to the town by bike riders. It all works very very well.



Castlemaine is a small city in Victoria's Goldfields region, about 120 km north-west from Melbourne.

For our benchmarking survey, a bike shop and two caravan parks were interviewed.

Cycle Concepts

Address: 28 Hargraves Street Castlemaine VIC

Contact: Jason Toland

phone: 03 5470 5868

web: cycleconceptscastlemaine.com.au

Cycle Concepts is a bike store in Castlemaine selling new bikes of all types as well as bike repairs and servicing, accessories, clothing, helmets and footwear. Their website claims first-hand knowledge of the best local road riding and mountain biking.

The owner, Jason, said local business-people are delighted to have the economic benefits brought to the area by biking events, although it was hard to quantify exactly how much effect such events had on his business. Accommodation in particular is at a premium when events are held.

Events held in the area include a 6 hour endurance race and Interwinter MTB Race run by the Rocky Riders, a local MTB club. There is also the Race the Train event where bike riders are challenged to race against a steam train from Castlemaine to Maldon. The annual Great Victoria Bike Ride finished in Castlemaine in 2012.

In terms of trails in the area, there is the Goldfields Track which runs 200 km from Bendigo to Ballarat and passes through Castlemaine. In nearby Maldon there is the Mt Tarrengower downhill track, where state level Downhill events are hosted. There are many "pirate" mountain bike trails in the area – Rocky Riders club members are working with land managers to develop trails.

Overall, Jason says that Castlemaine as a town has recognized the benefits of all tourism-based income and sees cycling as an important part of this - more and more cyclists are seen in town on any weekend.

Big 4 Castlemaine Gardens

Address: 1 Doran Ave, Castlemaine VIC

Contact: Claire Height

phone: 03 5472 1125

Castlemaine Central Cabin & Van Park

Address: 101 Barker Street, Castlemaine VIC

Contact: Linda Hilder

phone: 03 5472 2160

These two caravan parks offer a variety of accommodation options including cabins, cottages, and caravan or camping sites. Both are close to the centre of town.

Being in a popular town in a popular tourist area, most of the visitors to these parks are regular tourists. However, Claire says she notices a small amount of business generated by the local cycling events, and sees the biking visitors as a largely untapped market. Linda estimated that during events, 80-90% of the accommodation at Castlemaine Central Cabin & Van Park is booked. Linda is aware of 2 or 3 annual biking events, and says that most cycling tourists would patronize local restaurants and cafés.

Both Linda and Claire see bike tourism as a positive for their businesses. Claire says she is looking to engage further with local bike clubs and cycling groups in order to increase their share of the revenue opportunity that bike riders represent.



Woodend is a nineteenth century resort town, 70 km from the centre of Melbourne. The nearby Wombat State Forest is home to 50km of mountainbike singletrack, and road cycling is also popular in the area.

The local bike shop and a few of the local cafés were the subject of benchmarking interviews.

Woodend Cycles

Address: Shop 15, 19th Hole Shopping Centre, 130 High St, Woodend

Contact: Dave Green

phone: 03 5427 2662

email: info@woodendcycles.com.au

web: www.woodendcycles.com.au

Woodend Cycles is another bike shop offering new bikes, bike hire, parts and repairs, and free advice about the local trails and road rides. Dave says that road cycling is extremely popular in the Woodend/Mt Macedon area, and he estimates around 300 MTB riders per week travel from Melbourne to ride the trails in the Wombat State Forest.

The Wombat 100, a 100 km cross-country marathon and one of Victoria's premier events, and the Wombat 24 hour endurance race are also held on the Wombat State Forest trails. These two are very popular annual events attracting large numbers of riders of all ages and skill levels.

The MAD Ride (Melbourne Autumn Daytour) starts and finishes in Woodend and has been running for 30 years. It is very popular and offers three road routes of up to 120km as well as a 65km MTB course.

Dave says the town copes very well with the influx of riders during events as well as at other times. Accommodation is heavily booked during events.

Mat Rasti, part manager at the **Holgate Brewery** in Woodend (www.holgatebrewhouse.com, ph. 03 5427 2510), says that cycling is noticeably popular in town, but sometimes difficult to tell which of his clients are cyclists. He knows of one group of 8 riders who frequent the brewery on Thursday nights.

Another restaurant in Woodend is **The Village Larder** (ph. 03 5427 3399). Owner Ben Oost is aware of the road and MTB cycling activity in the area including organized events, and sees riders in his restaurant. He estimates that during cycling events, 10-15% of his business is bike related, and sees a small amount of regular bike-related business in any given week. He says riders are a good group to have as clients; they spend reasonable amounts of money when visiting.

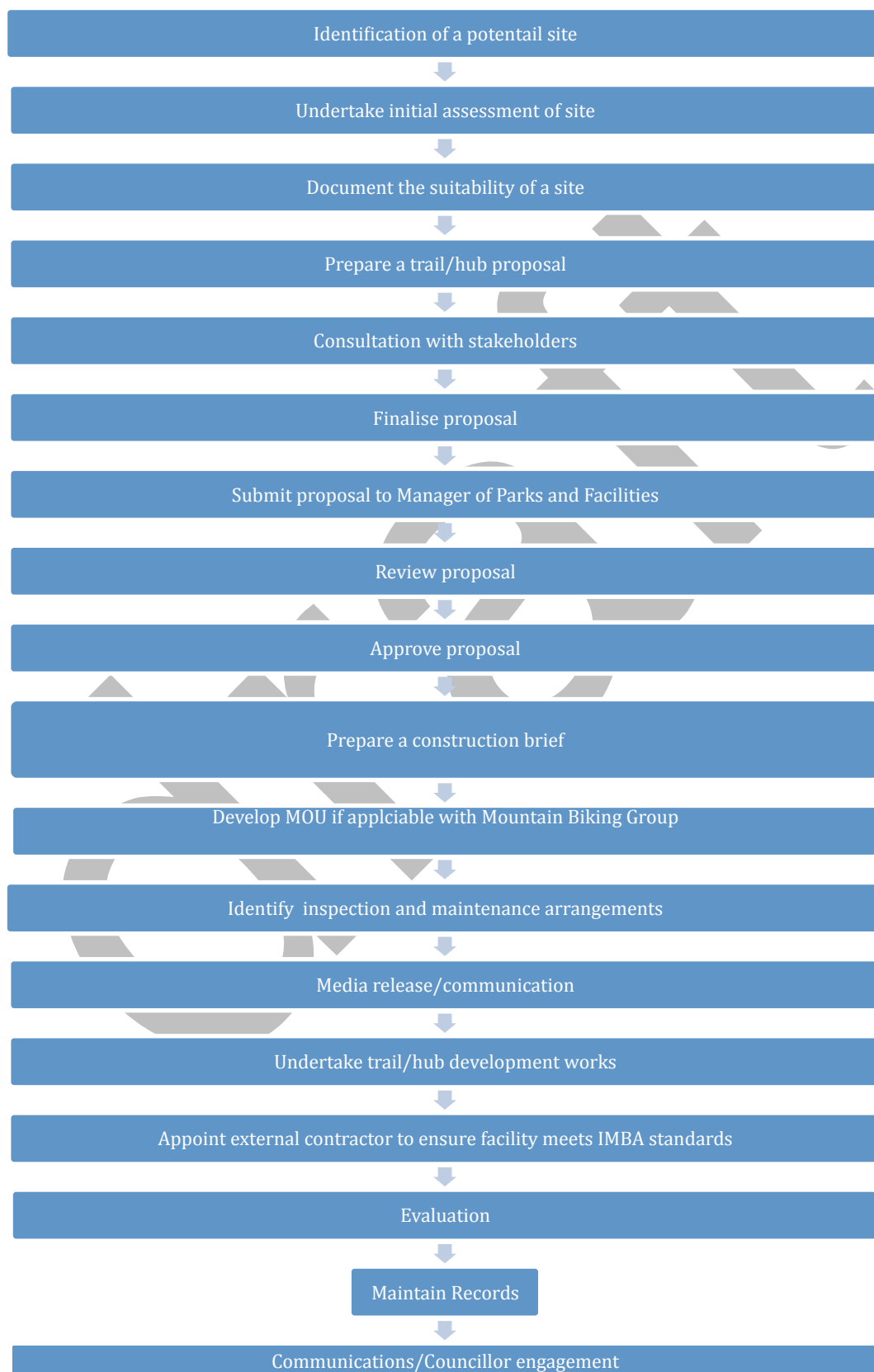
Darryl Davidson is owner of the **Victoria Hotel** (ph. 03 5427 2721), a bar, bistro and bottle shop in Woodend. Darryl says that the town is very receptive to all forms of tourist-based income, and has observed the positive effect the mountain bike trails and events have had on the town. He estimates that 20-30% of his business comes from bike riders during events. He also notes that accommodation tends to be "light on" during bike events.

Bourkie's Bakehouse (www.bourkies.com.au, ph. 03 5427 2486) is a popular stopping place for riders of all types. Our contact Leanne Radcliffe says Bourkie's serves many cyclists: during the week 20% of her clientele are cyclists, and on the weekend that figures rises to 70%.

Leanne is aware of some of the bike events held in the area and is very enthusiastic in her response regarding cyclists. She says that the town copes well with cycling tourism of all types, except that there is a lack of non-B&B-style accommodation in the area.



APPENDIX 3 – FLOW CHART FROM YARRA RANGES COUNCIL MOUNTAIN BIKE PROCEDURES



APPENDIX 4 – FULL ANSWERS TO OPEN-ENDED SURVEY QUESTIONS

QUESTION 29

The full answers to Question 29 are provided below, listed in alphabetic order. These have not been corrected or modified in any way.

- A certain locally maintained downhill track near a waterfall
- Acheron Way
- Acheron Way
- Ada River
- Ada Tree and O'shannassy aqueduct trail
- adventure riding on fire trails looking for something more challenging.
- All
- All areas as its a fantastic town & very beautiful all times of year.
- All available trails
- All of it
- All of it
- All of Warburton
- Along rail trail, OShanneseay aqueduct, Donna buang
- Along the river.
- Am trail
- Any where
- anywhere
- anywhere thats fun.
- aqua duct
- Aqua duct trail
- aquaduct and tracks off old warby road
- aquaduct trail
- Aquaduct trail and single track
- Aquaduct trail,
- Aqueduct and Mt Little Joe
- Aqueduct trail
- Aqueduct trail
- Aqueduct trial is a nice area but does not really cater to MTB needs. I don't go to Warburton to Mtb currently
- Aqueduct up Donna Buang
- Aqueduct, rail trail, would ride single track if it was more known/accessible
- Areas around the rail trail and the DH tracks
- areas off mt donna buang rd
- Around the river bank and up mt donnabuang
- back road up to Donna Buang. Rail trail Main Donna Buang road
- Behind old warburton rd and towards Reefton
- Between Silvan and Warburton
- Between Warburton and Healesville--over by the park land.
- Big Pats Creek
- big pats creek
- Big pats creek decent
- Big pats creek tramways
- Big Pats/ Smythes Creeks Rd, Starlings Gap Rail Trail, O'Shanassy Aqueduct Trail, Warburton Trail, Yarra State Forest generally.
- Bike trail
- C..t track.
- Cross country loops
- Currently just use the rail trail
- DH MTB tracks.
- Dh track
- dh track
- Dh track la la falls
- dh tracks
- Dh tracks
- DH Tracks
- DH tracks
- DH Tracks
- dh tracks
- Dh trail
- Dh trails
- Dh trails
- DH Trails
- dh trails
- Dh trails
- Dh trails
- Dh trails
- DH Trails
- DH trails - mount bride rd
- DH trails above Lala falls
- DH trails.
- Did not know there were trails there, but the cat is curios now
- didn't know there were trails
- Directly out of Warbuton, road bike up Donna Buang. Warramate on the MTB for a bit further away
- Don Road
- Don Road and Snow road to the summit and back to Warby. Don't know the MTB trails out there
- don,t have one. every place i've rode is good
- Don't have one
- Don't know of any at this time.
- Don't know road names but up to ridge line on southern side of town
- Don't ride there.
- Don't ride, as not sure where the trails are...
- Donna
- donna buang
- Donna Buang
- donna buang
- Donna Buang
- Donna Buang



- Donna Buang
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- Donna Buang
- Donna buang
- Donna Buang
- Donna buang
- Donna Buang
- Donna Buang Rail trail Big Pat's creek to Yarra Junction Upper Yarra dam Aquaduct
- Donna Buang Warby Trail
- Donna Buang - both sides. Werrimate. Buxton MTB park. The roads in the area
- Donna Buang - Healesville Road
- Donna Buang (Road)
- Donna Buang & Acheron Way
- Donna Buang climb
- Donna Buang on a road bike and Reefton Spur
- Donna buang rd
- Donna Buang Rd
- donna buang ride
- Donna Buang Road
- Donna Buang Road
- Donna Buang road
- Donna Buang road climb. And rail trail.
- Donna Buang road ride
- Donna buang road ride and reefton spur maryesville achron way road loop
- Donna Buang- on the road O'Shanessy Aqueduct- on the mtb I'm not familiar with any mtb trails out there.
- donna buang, acheron way etc
- Donna buang, old warby road, rail trail to lilydale
- Donna Buang, Reefton Spur
- Donna Buang, she's a tough mistress
- donna buang, upper yarra dam. link trails to the o'shannassy trail would be a winner.
- Donna bueng
- Donna Huang, don rd
- Donna on roadie.
- Dont go out that side on Melbourne currently
- Dont have one
- Dont know any area
- Down Hill tracks.
- Down hill trails
- Down hill trails in Warby are SMOKING!!!!!!!!!!!!!!
- Downhill
- Downhill
- Downhill
- Downhill mountain bike tracks
- Downhill runs off McBride rf
- downhill track
- Downhill track
- Downhill Track
- Downhill tracks
- downhill tracks
- Downhill trail network
- Downhill Trails
- Downhill Trails
- downhill trails
- Downhill trails
- Downhill trails
- Downhill Trails
- downhill trails
- Downhill trails near Cemetery track
- Downhill trails off old warburton hwy
- east warby dh trails
- every where really.
- every whwere
- existing trail network
- Fire roads.
- fire trails to the south
- Forest on right just before town
- GENOVA ITALY
- Granton short
- Gruyere
- Have never ridden there
- Have never ridden warby, yet
- Have not ridden at warburton.
- Have only done Mt Donna Buang climb on my road bike. Not aware of any MTB trails
- have only done trail running there
- Have only ridden the rail trail
- Have only ridden Warburton Rail trail
- have only riden the rail trail at present
- Haven't been there before
- Haven't ridden mountain bike there yet ... need trails!!
- Haven't ridden there
- havent riden at Warburton as yet
- Hills
- I am only aware of the rail trail from Lilydale
- I attempted to find MTB trials a few times while camping @ the caravan park - could not find :-)
- Ride along the river is nice but boring :-)
- I don't have a favourite.
- I dont ride there presently
- I follow the other guys.
- I have never been riding there but would definitely if there were tracks built.
- I have only been on the rail trail. I have heard of the O'Shanassey Aqueduct and would like to ride that trail. I'm unaware of any other trails in the area.
- I have only done the rail trail from lilydale to Warburton
- I have only ridden rail trails in Warburton so far
- I have young kids that love the warby trail. I ride with some friends in the bush on 4wd drive tracks and on the aqueduct
- I haven't ridden there.
- I haven't...yet.



- I heard there is some sweet dh tracks there, but i cannot find them. riding the rail trail with the cousins on the xc bike was pretty fun tho.
- I live 30 mins from Warburton. Currently I mostly MTB at Lysterfield.
- I love the downhill tracks!!! So much fun. I haven't had a chance to ride the freeride track yet but if Matt built it I'm sure it'll be awesome.
- I love the trail, and the aqueduct.
- i only know the rail trail
- I've just ridden along the rail trail and up the mountain on a trip with my girlfriend. Rail Trail was quite boring.
- I've only ridden the rail trail. Wasn't aware there was single track.
- Illegal one's
- im living over seas but i know the area and some trials in the area already its a great place
- in the hills
- jesse bears dh trail. the main trail "conan" is for gumbies.
- La la
- La La falls
- La la falls
- La la falls
- La la falls
- la la falls
- la la falls
- La La Falls
- La la falls
- La La Falls / Flow track
- La La Falls area
- La La falls DH track - known throughout Australian as one of the best riding spots we have.
- La la falls dh track and mt bride dh track
- la la falls DH track.
- La la falls Dh tracks
- La La Falls DH trails
- La la falls downhill track
- La la falls downhill track and mount bride downhill track
- La La falls downhill tracks
- La La falls track on mount bride
- Lake Mountain
- Lala Falls
- Lala falls
- Lala Falls
- Lala falls and original DH
- lala Falls D/H Track
- Lala falls DH
- Lala Falls Dh track Mt bride Dh / Jumps track
- lala falls probably the best track in victoria
- Launching Place to My Donna Buang
- Layla falls/ mt bride
- Like going up Mt Donna Buang on the dirt road
- Lillydale-Warburton rail trail and O'Sheanessy Aqueduct trail.
- lilydale - warburton rail trail
- Lilydale rail trail
- Lilydale to Warbarton - O'Shannasay's Aqueduct trail and... <http://ridewithgps.com/routes/2360744>
- Lilydale to Warburton rail trail
- Lilydale to Warburton rail trail, although I am getting bored of it. Need something more technical!
- Lilydale to Warburton Trail + Mt Donna Buang
- Lilydale to Warby rail trail Aqueduct trail
- Lilydale Warburton Rail Trail
- lilydale-warburton rail trail
- little joe
- Lilydale-Warburton rail trail plus O'Shannessy aqueduct
- mainly do road riding and love the donna summit-lake mountain loop
- Mainly the rail trail.
- Matt's tracks downhill
- Mine Shaft Hill, Mt Bride
- Mineshaft hill
- mostly the rail trail
- Mount Bride
- Mount Bride
- Mount Bride
- mount bride and mount donna buang wesburn to reeften pub on the dirt bike
- Mount Donna Buang
- Mount Donna Buang
- Mountain bike trails.
- Mt baw baw, lake mtn
- Mt Bride
- mt bride
- Mt bride
- mt bride
- Mt bride
- Mt Bride DH tracks
- Mt Bride DH, mineshaft hill xc, and Mt Donna Buang road.
- Mt Bride downhill trail
- mt bride old warbuton road
- mt bride rd
- Mt bride rd Area
- Mt Bride track
- Mt bride, mine shaft hill and the oshannessy aqueduct...
- mt bride? (matt's tracks)
- Mt Bride.
- Mt Bride/La La Falls DH trails
- Mt D b and rail trail.
- Mt dona Buang.. and local trails
- Mt donna
- Mt Donna bang . Tracks near mt bride and mine shaft hill
- MT Donna Buang
- Mt Donna Buang
- Mt Donna Buang
- Mt Donna Buang
- mt donna buang
- Mt Donna buang
- Mt Donna Buang
- Mt Donna buang
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- Mt Donna Buang
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- Mt Donna Buang
- Mt Donna Buang
- Mt Donna Buang
- Mt Donna Buang
- Mt Donna Buang
- Mt Donna Buang
- Mt Donna Buang rail trail
- Mt Donna Buang dirt road
- Mt Donna buang gets some tread left on it (road bike tho) couple of exploring MTB rides with mates, but majority of MTB was done in rail trail due to lack of single track or decent ones.
- Mt Donna buang loop via aqueduct up don rd to summit. Big Pats creek, aqueduct trail
- Mt donna buang on my road bike
- Mt Donna Buang on the road. Anywhere on the mtb
- Mt Donna Buang Rd
- Mt Donna Buang road climb and also up the back way on the mountain bikes
- mt donna buang road ride
- Mt Donna Buang, Don Rd and the Lilydale-warburton Rail Trail
- Mt Donna Buang, O'Shannassy aqueduct, Big Pat creek area
- Mt Donna Buang, Reefton Spur
- Mt Donna buang, road riding to the summit. Rail trail ride.
- Mt Donna climb
- Mt Donna, the rail trail and sealed and unsealed roads in the area
- Mt Donnabuang
- Mt Little Joe
- Mt. Donna Buang
- Mt. Donna Buang (Both road and dirt sides)
- Mtb trails off Old Warburton Road and fire roads around there. I also ride up mt Donna Buang a few times a year
- My bride dh track
- My place, hot trails PRIVATE
- N/a
- N/A
- n/a
- N/A
- N/A
- na
- NA
- na
- NA
- Na - currently do not ride in Warburton.
- Narbethong
- Near La la fals.
- Near the river.
- Need to visit.
- Never Been
- Never ridden in Warburton before, but would love some more great DH trails so I don't have to travel to Mt. Buller each weekend.
- Never ridden there
- Never ridden there
- nil
- No knowledge of any trails in Warburton so I do not ride there.
- No preference
- No preference, no decent all mountain/Dh or free ride.
- Noen so far
- none
- None
- None
- None
- none
- None
- none
- None
- North
- Not been there
- Not overly familiar - Mt Donna Buang is obviously HUGE, I liked the aqueduct trail but it was rather pedestrian / entry level, which goes with the terrain I guess (boom tish) - favourite areas would generally be rolling cross country style tracks, with some hills but not enormous hills
- not sure
- Not sure of the area name
- not sure of the name.. the big hill where the dh trails are
- Not sure of the trail name, but it has the movable kicker jump called Conan... and branches off to a flow track, or a technical downhill one
- not sure. like any
- Nowhere
- nowhere at the moment
- shannassy trail, Mt little Joe
- Shannassy Aqueduct track
- O'Shanassy Aqueduct Track
- O'Shanassy Aqueduct
- O'Shanassy Aqueduct Trail
- O'Shanassy aqueduct trail & also Mnt Donna Buang
- O'Shannassy Aqueduct
- O'Shannassy Aqueduct Track
- O'Shannassy Aqueduct trail
- O'Shannassy Aqueduct
- o'shannassy aqueduct trail
- O'shannassy aqueduct trail
- O'Shannassy Aqueduct
- O'shannassy Aqueduct
- O'Shaunassy trail
- Off old warburton road
- Old aqueduct and rail trail
- Old warburton hwy side of the range.
- old warburton rd dh tracks



- the rail trail in the past but given the
at buxton, there must be loads of
- aquaduct and Mt Donna Buang.
uck ride on sealed/dirt roads: up Don rd
hing Place to Donna Buang summit and
ware of other trails (except for Aquaduct
- berland Junction and up to Donna
- se it as a gateway to other areas. Eg;
uring towards Baw Baw, Eildon etc.
rramate F&F reserve nearby.
- Rail trail. Donna Buang.
 - Rail trails
 - Rail trails & roads
 - Rail trails and associated single track
 - Rail trails, the bike paths through the towns
 - railtrail, mt donna buang
 - Rather not say
 - raul trail
 - Rd ride up Donna or out to reefton and lake
mountain
 - Reefton Spur; Warburton Trail; Surrounding
 - Refton spur
 - Ride the rail trail from time to time. Also rid
around Silvan.
 - Ride to Warburton at least once a week from
Everlyn and loop around the town. Told I ne
ride the aquaduct but that is the next step.
 - River and La La
 - river trails & aquaduct
 - Riverview Rd - camping grounds - Donna B
Aquaduct trail - Reefton - Anywhere around
Warburton is good!
 - Road
 - Road
 - road and rail trail
 - Road Bike- To reefton and back. Also Donn
MTB- Dont know the names of tracks /roads
know where to ride or go
 - Road climb of Donna Buang
 - Road climb up Donna
 - Road cycling around the region
 - Road ride
 - Road ride to up Donna bang
 - Road ride up Donna Buang via Old Warbur
and Riverside Drive.
 - Road Riding start point to ride Lake Mount

- Silvan trails
- Silvan, Warburton, Macclesfield
- single track
- singletrack
- So many good rides from Warby. Rode a loop on Sunday from Warby to McMahon's Creek to Noojee to Powelltown and then back to Warby. In the warmer months, I like to ride my road bike to Lake Mountain and Donna.
- Southern Mountains surrounding Warburton.
- State park. Around la la falls carpark
- technical x-country trails in surrounding areas: - Warramate reserve (Wandin) - Silvan - Smith's Gully - Buxton - the Rail Trail & climb to Donna Buang is a great distance training ride but not rewarding MTB trails.
- That DH trails
- That hill what's it called ... Warramate?
- the bits where no one goes
- the DH tracks mostly
- The DH trail
- The DH trails
- The DH trails off Old Warburton road
- The DH trails that finish near La La Falls.
- The downhill mountain bike trails
- the downhill track
- The downhill track
- The downhill tracks
- The downhill tracks out the back of town
- The downhill trails
- The downhill trails
- The Downhill Trails (When Clear)
- The Downhill trails.
- The existing MTB trails
- The hill
- The hills
- The illegal downhill trails + dirt biking on fore roads and access tracks
- The La la falls track, and the old Downhill track, from the top of the fire road, to the car park at the bottom (near the end of the dirt road).
- The main downhill trails (can't remember the exact location)
- The mountains
- The old fire roads and the now disused downhill trail or any trail with good single track
- The one stop spot mate, you know it ;) dh
- The rail trail
- The rail trail
- the rail trail
- The rail trail
- The rail trail
- The rail trail and Mt Donna Buang
- The rail trail and single track of to the side
- The rail trail from Mt Evelyn. The Lilydale to Mt Evelyn needs work.
- the rail trail is the only trail I can find info on. PLEASE build single track- fast, flowing, a couple of good rock gardens, a few jumps. PLEASE IF YOU BUILD IT WE WILL RIDE IT.
- The rail trail. As a casual affair.
- The single track out the back of the Warby trail.
- The single trails and aqueduct loop for training
- The trail between Warburton and Yarra junction
- the upper Yarra walking track - the owners of DR-MTB and Ridgeline MTB have done a fair amount of maintenance over time on UYWT, Richard's Tramway and other trails in the area
- The Warburton rail trail
- The Warby rail trail
- There are no real ones
- There are several however due to the status of these trails I will reserve my right not like to comment on specifics.
- through the town and rail trail....I don't know of any mtn biking trails
- top of the aqueduct road
- Trail
- trail
- Trail
- Trails
- Trails
- Trails in the hills up behind Cog
- Tram trails. And Don Road
- Tramways
- Unknown
- Unsure as I have not yet rode in Warburton.
- Unsure of name
- Up Mount Donna Buang
- Up Mt Donnabuang.
- Warbi Trail
- Warburton
- warburton
- warburton bike trail
- Warburton downhill trails
- Warburton is the closest place for me to ride with good terrain, Lysterfield is too flat and boring for DH. The trails I ride there tend to be steep...
- Warburton rail trail
- Warburton rail trail
- Warburton Rail Trail
- Warburton Rail Trail
- Warburton Rail Trail and O'Shannasey Aqueduct trail. Not familiar with MTB trails in the area. Ride Silvan trails mostly as they are on my 'back door'.
- Warburton Rail Trail and the climb up Mt Donna Buang.
- Warburton Rail Trail and Warburton Hwy to Upper Yarra Dam
- WARBURTON TRAIL
- Warburton trail
- Warburton trail
- Warburton Trail & River walk.
- Warburton trail cause I haven't found anything else
- Warburton trail from Lilydale and Donna Buang.
- Warburton trail
- warby DH
- Warby DH
- Warby dh tracks
- Warby DH trails
- Warby dh trails, off Mt Bride
- Warby or aqueduct trail - not sure of any others?



- warby rail trail
- Warby rail trail. Unaware of XC trails in area although I am aware the Yarra Ranges MTB group are working on this.
- Warby Trail
- Warby trail
- Warby trail
- Warby trail Ride up mt donn Aqueduct trail (o'shannesy)
- Warby, Silvan
- Warramate

- Warramate
- Warramate
- Warramate
- Warramate hills
- warturton rail trail
- Went with friend not sure what trail is called
- Wes burn,
- yarra trails
- yeah well mmm

QUESTION 33

The full answers to Question 33 are provided below, listed in alphabetic order. These have not been corrected or modified in any way.

- - if the trail network is too 'pedestrian', I'll find other technical areas to enjoy. - if it's initially too busy I'll wait until the new-trail-hype dies down after a year or so. - lack of winter drainage
- "Dumbing-down" of trails. Large density of riders on trails.
- 1. If local accommodation and food becomes expensive 2. If Accessibility of trail is not public use.
- poor track design and maintenance causing constant mud, erosion and tracks that become too wide because of this (like Lysterfield) 2. some trails need to be single direction so descending beginners don't wipe out everyone else 3.no toilet
- A bike trail recommendation website/information. A growing sport with its location based needs. Really needs a one off site or map.
- A rainy day, maybe.
- Absence of a campsite for tents, caravans or value cabins with bunks. No pub or cafe or restaurants within walking distance.
- Access to a car to get me there and/or public transport.
- Any charge or membership required before use. If the type of trails aren't appealing.
- Apprehension from locals/greenies/bushwalkers.
- Availability of suitable accomodation
- Availability to ride, availability of shuttles or a push up track (DH)
- Bad design. Wrong surface
- Bad drainage, would not ride to prevent trail damage.
- Bad weather
- Bad weather
- Bad weather
- bad weather
- Bad weather - deep mud - bushfires
- bad weather - heavy rain.
- Bad weather and trails may be un-rideable over winter.
- bad weather and wet tracks
- Badly designed or unmaintained trails.
- badweather
- Being too Muddy in winters, Lack of maps/directions Needs to have easier trails and harder trails for a wide range of riding abilities,
- Boring trails Short trails Crowded trails
- boring trails, not challenging enough
- Boring trails, poor maintenance
- Broken bones.
- broken leg
- Bush fires
- Busy with a young family
- Cancelled flight or a broken car as I'd be visiting from NSW
- cant think of any.
- Car parking - and access roads - and good maps
- Car parks. Wanting to explore more trail options and getting fined.
- Carpark
- Charge to use trails Lack of consultation with real mountain bikers leading to trails designed by councillors: See disused skateboard halfpipes in nearly every Melbourne suburb - this is evidence of this approach
- Cheap transport of gear between accommodations
- Closures during winter are a pain. However, given many trails close over winter, if Warbie can stay open it could be a great destinations.
- cold and snow, It would be better in the warmer weather
- Cold weather
- Commitments in Sydney
- commitments other than riding.
- Cost
- Cost
- cost of pertol
- Crowds or cost potential
- currently living in Adelaide for work purposes
- Days of extreme poor weather
- Decent transport to access Warburton. Public transport with bikes is difficult
- Difficult to access via public transport that allows bikes.
- Difficulty level too high. Trails not well maintained. Lack of signage/maps.
- Difficulty of access, range of standards



- Difficulty to access Insufficient variety of trails - all standards need to be avail
- Distance
- Distance
- Distance - I live 70km's away, but I am currently traveling that far or further to regularly ride at places like You Yangs, lysterfield... Not enough variety of trails - or no more 'advanced' trails.
- Distance (from Ballarat) and family commitments. If there are enough things for non-riding family to do in the area (including, in my case, disability accessible facilities), Warburton would be a definite overnight trip destination.
- Distance away from home
- Distance from Canberra
- Distance from current residence
- Distance from home
- Distance from home and having to drive through Melbourne to get there
- Distance from home and traffic
- Distance from home would limit being able to use on regular basis. However if trails established it then becomes another MTB destination for me to try and visit
- distance from home, quality of trail
- Distance from home.
- Distance from home. I live in N.S.W
- distance from melbourne
- distance from my current location
- Distance from my home to Warbuton
- Distance from the trail
- distance from Warburton
- Distance I live from warbuton and weather
- distance to get there, facilities,
- distance to Warburton from Melbourne
- Distance, I live in NSW
- Distance, quality, maintenance of tracks.
- Distance! I live in NSW.
- Distance.
- Don't know
- Don't make downhill tracks too easy or like giant bmx tracks.
- Drainage issues on trails in winter if issues are not resolved as we do not want erosion problems
- drainage of trails is of high importance or trails that do not access large area's of " flat water pooling"
- Drainage. Wombat Forest 18km MTB track used to have poor drainage, which meant it wasn't good to MTB for 4-5 mo per year. However, in 2013 it's had crushed rock inserted into boggy trail parts, and is much pleasanter to ride. You Yangs has good natural drainage, and is usually good to ride 1-2 days after 15mm rain.
- Ease of access from public transport.
- work/family/life balance - integrating picnic area such as at lysterfield park helps this A LOT.
- Ease of access in wet weather
- Easy tracks,
- entry fee
- excess rain, time limitations
- extreme weather
- Extremely wet weather. Quality of the trail network; for example if it is made out of gravel, I won't ride it.
- Family comittments
- Family commitments
- Family commitments
- Family commitments
- Family commitments.
- family stuff
- family, work commitments
- Family/children obstructing trails
- Far from home
- Fees, as there are many great places to ride for free.
- Fees. Not technical / wide range of skill level.
- Fire danger in summer.
- For me lack of double diamond. But it is important 2 have good balance & variety of single track with a to b lines that offer progression to develop skills. You need some trail that are ride only, some one way only, some trails that are shared use & some that are walkers only. No point in having serious double diamond or free ride trails if you have walkers on them.
- Gravel
- Greenies
- Half a job done? (lysterfield) Must have good signage.
- Having enough spare time to get there,
- having to use busy road to get to trail. poor route descriptions/designation
- Health!
- Holiday..next
- Horse riders and motorbike riders using trails designed for mtbs
- I can't imagine any factors would prevent me from riding in Warburton except a life threatening illness!
- I currently live in Brisbane, so the distance would make it hard to get there. I have family at Gembrook who ride MTB, so would come down specifically to see them and go to the Warburton Trails with them.
- I don't own a car, so just relying on PT or mates to get up there.
- I have no legs
- I have to get there by car, so if I didn't have a car...
- I have trails where I live but I reckon the more the better. I would go once or twice a year.
- I like long rides, so if the trails weren't extensive enough (e.g. sub 40km), then it probably wouldn't be worth my while making the trip to ride them.
- I live in NSW so visits would not be as frequent as I would like, but my parents live close to Warburton, so it would probably mean I visited them more!
- I would be far less likely to use it if the natural dh nature of the two main downhill tracks was not retained. Needs to be single track, technical, fast. Understand the need to take into consideration factors such as erosion and other environmental concerns however the technicality of the existing trails would have to be preserved otherwise I would no longer go.



- I would ride in Warburton a lot less if there were less gravity fed trails.
- I'm keen for any development of the trail network around Warburton
- I'm too old!
- If a network is established, nothing would prevent me from riding in the area.
- If budget does not allow for maintenance and tracks deteriorate quickly
- If it becomes water logged in winter. Fire danger in summer.
- If it didn't include DH specific double black runs and private or commercial shuttle access.
- If it is lame like copperhead at mt buller or built by idiots who dont ride and dont understand how to build fun interesting and exciting trails.
- if it is lame, no go.
- If it is made too easy and like a shared path / rail trail then I wouldn't bother riding it.
- if it is more rail trail
- if it takes away from access to the 4wd community
- If it was not well constructed and subsequently it became to muddy in winter
- If it was purely for downhillers I would not use it.
- If it was to hard to find, so far I haven't found the xc sections
- If it were too sanitised and not interesting enough I would not bother going
- if it's too short or not well maintained
- If its isolated and not supported with infrastructure . Toilets, showers, cafe etc
- If its not challenging enough I would just go to the other trails in the area
- If motorbikes are using the trails. Potentially dangerous and they destroy the trails.
- If my car were to break down
- If poor weather, or away racing somewhere else.
- If the trail is too short, the drive will not be justified. If the trail does not handle wet weather well, it would need to be closed, this can be frustrating. If the trail is too easy, then it will not attract more experienced riders. If the trail is too easy and lacks variety, then visits will be in-frequent
- If the trail network isn't worth the drive. i.e.. not extensive enough, poor quality. Or if my friends don't like it for some reason.
- If the trail were not constructed correctly it would be closed half the time and would be too much of a travel risk to maybe not be able to ride when you get there.
- If the trails are heavily manmade or technically unchallenging.
- If the trails are just made for beginners
- If the trails are made too easy. Many of the purpose built trails in Australia start off great (ie: when their legality is questionable) and then lose all their appeal once councils employ trail builders to come in (ie: Stromlow, Kinglake, You Yangs downhill trails are almost never ridden except for racing and even then these events are poorly attended). If the council buys into the need for proper DH MTB facilities they need to appreciate that they cannot build a 'trail for all abilities' - at least not for DH. better to build two tracks, one easy, one hard.
- If the trails are majority hard black trails.
- If the trails are poorly built.
- If the trails are to flat for my downhill bike
- If the trails are too difficult, or don't have enough variety.
- If the trails aren't good
- if the trails did not meet my requirements
- If the trails were made very wide and boring
- If the trails weren't up to scratch I wouldn't go - this means too easy, too boring, badly drained etc. The quality of the trails and scenery/terrain is by far the most important factor and everything else is a bonus (but it does help). Don't make us pay to ride, this would stop us coming- we would rather spend our money in the bakeries and pubs in town.
- If there are no Downhill trails.
- If there are no good tracks
- If there are not enough interesting and technically challenging trails
- If there is any widespread local opposition If there is any significant negative impact on the native flora and fauna Bad behaviour from riders and/or their company
- if there was no gravity trails that you can shuttle. you can xc anywhere
- if they are over-sanitised and too easy, losing their "mountainbike" ie: no need to turn them into rail trails
- If they were not interesting/technical options within the trail network. If they did not drain well during wetter months.
- If they're not built!
- If trail is too easy/boring or poorly designed and maintained.
- If trails are poorly constructed,if trails are too wet during winter I would not use them, only in winter.
- If trails are too easy. dual direction trails due to risk of head on collision
- If you make it too 'sustainable' please world trail, build something that is still fun, but not too council friendly I can't stand your dumb downed trails. For example, take coperhead, something like that would be suitable for Beginners and Advanced Riders if it contained more lines that were hittable at slow and faster speeds without the unneeded dangers (specifically placed rocks, trees and sand trail)
- If you wreck the trails like at kinglake and Mt Buller
- Inapprpriate design for the area (trails should be capable of being ridden in wetter months), mtb park designs such as lysterfield tend to have less appeal compared to trail networks that are more community integrated and linked via bike paths/rail trail (think Bright and surrounds)
- Inclement weather
- Inclement weather, if the trails didn't provide for intermediate levels of skill.
- Inclement weather, lack of accommodation
- injury



- 230



- none
- None
- none
- None
- None
- none
- None that come to mind
- none that I can think of.
- None, I would visit a lot more
- None, would be an amazing location!
- None. I live 30 minutes away and would frequently travel to warbuton to use these trails.
- None. Just make it great, technical trails with jumps, also basic stuff to get beginners there grow the sport
- none. none whatsoever. i welcome it
- Not as good as Lysterfield which is easier to access Trails to difficult to ride on a xc bike
- Not being able to get dad to get me there, apart from that, it's only 30 mins away so it's my local track
- Not built well and/or sustainably
- Not challenging or diverse enough.
- not designed with wet weather riding in mind. too much crushed rock. too much double track. not enough natural trail.
- not difficult enough and not enough challenging things to push you're self on
- Not enough downhill. Crowds.
- Not enough facilities, if there are no toilets, shelter and parking nearby then that would probably have an impact on cyclists there, they would also need to have a good mix of trails, from beginner to advanced, I have friends with a wide variety of skills so would be good to accommodate all levels.
- not enough single track. Poorly signposted. (junctions, direction & distances)
- Not enough track (less than 15km) No car parking
- Not good drainage for wet riding.
- not having a bike for any reason
- Not having a good variety of trails. Need to make the drive worth while etc. Green, Blue, Black and double Black trails
- not having capable bike to ride
- Not long enough overall or exciting enough to make the 2 hours drive worth it.
- Not so much weather but condition of trails and how they cope with water. I live nearly 2 hours from Warburton, almost the same distance as Forrest. They would want to be either a great network or fun individual trails for me to go reguarly. MOstplaces I ride are about an hour away.
- Not sufficient single-track,
- Not using natural dirt
- Nothing
- Nothing
- Nothing. If they had more trails there I would go there more often.
- Only bad weather
- Only barrier would be my own time availability.
- only if it gets heavily saturated during the wet months
- Only the weather
- Other event commitments.
- Other than available free time none.
- other than work nothing.
- Parking the van, and winter mud conditions
- Point to Point track would make it less appealing
- Poor access, poor signage and unsafe parking facilities
- poor maintenance of trails. negative attitudes from local hippies/bogans, over run by wankers from melbourne, limited parking in the township.
- Poor of facilities, trail heads need to be within easy drive to township
- Poor signage and time!
- poor surfacing making the tracks feel like they are going to disintegrate under my wheels; overly undulating loops - i can get those in other locations, i'd rather climb for 30-60 mins for a good long decent in a place like Warby; getting speeding tickets on the road from Lillydale with all of the stupid speed limit changes;
- Poor track construction Over designed for safety rather challenge (Button is awesome.)
- Poor trail design and poor maintenance
- Poor trail maintenance (cutting back of foliage, adequate rainwater drainage)
- Poor trail marking and no grading on the trails poor maps.
- Poor weather, poor trail condition, lack of suitable trails for mixed ability groups, insufficient parking, lack of amenities, lack of local cafe's, lack of trail marking and maps.
- poorly built trails
- Poorly constructed/maintained
- Poorly made tracks such as kinglake, copperhead. or anything with non natural dirt's placed for so called "sustainability" , Poor conditions , Frequent track closures
- Poorly maintained trail. Poorly signed trail.
- Poorly maintained. Poorly planned. Lack of trail features.
- prohibitive costs / too many people / track condition
- public transport
- Public transport links
- Purely travel time, other then that nothing
- Quadraplegia
- Quality
- Quality and difficulty of the trails.
- Quality and Length. It needs to be worth driving from the city to Warburton for the day. Use Smiths Gully as an example of well built trails.
- Quality and quantity of trails, wet weather suitability of trails.
- Quality of the trails , need to have lots of jumps and berms .
- Quality of the trails. Would only travel there if they were worth it.
- quality of trails
- Quality of trails. Must have easy climbs, long descents and flow.



- QUALITY OF TRAILS/LEVEL OF TECHNICAL DIFFICULTY
- rain
- Rain. It's wet at Warburton a lot, isn't it?
- Rain/mud, boggy trails (which may be unavoidable in winter)
- Rangers. Winter weather.
- road accessibility, and there needs to be a variety of trails
- SAFETY AND SECURITY FOR THE RIDERS AND THE FAMILY especially small kids.
- School
- Secure and safe parking area. singletrack without clear directional markings.
- Secure car parking
- Shuttle access
- Shuttle turn around, drainage on the trail/water run off
- shuttles
- Sickness/death
- Simple trails. Typical World Trail tracks. Track need line choices and tabletop jumps.
- since I live in Sydney there would have to be sufficient variety, quality and distance to the trail to justify the travel
- Slippery clay in many areas during winter
- Sloppy, muddy trails.
- Small network only. Too flat.
- State forest means multi-use trails !
- Stop riding. Or trails not suited to various levels.
- Studies
- Technical level. Wet muddy tracks
- The amount of rubbish that riders leave behind. Don't get me wrong I love mountain biking, I've raced 3 national series and have multiple sponsors, but we seriously leave a lot of rubbish out on the trails
- The cold and wet in the winters.
- The construction of over groomed or unchallenging trails would definitely turn me off using them. It would be a wholly wasted & expensive exercise to both the population of Warburton, council & the mountain biking community if there was a focus on creating a network that predominantly catered to the lowest common denominator. A huge number of such trails are already in place at Warburton, but given the large volume of dedicated mtbers in Victoria, yet the distinct absence of a genuine facility in close proximity to Melbourne which offers a weekend getaway options in a community setting, if the proposal were to go ahead it would be a genuinely fantastic opportunity & reap big rewards for the township- from the health benefits it brings to the community through to the financial gains & increased exposure for this great pocket of Victoria!
- The crime around Warburton has been a bit of a problem. Not sure what you guys can do about that though.
- The hills are gnarly!
- The missus
- The network has been built by riders. This should be left to the people who know how they want their trails. If you want to build trails. Go to somewhere else in warby. People treasure these trails.
- The only thing that would prevent trail use, would be trail conditions due to rain or other environmental factors.
- the trails are fireroads with vehicle access as well
- The trails need to be a good quality. By which i mean, well built, challenging in terms of length and difficulty, and be rideable year round, not just when it is dry.
- The trails need to be designed for all weather. Also point to point shuttlable trails for DH and AM riding are of most value.
- The trails need to have variety and be well mapped and sustainable. It needs to hold up the additional rain the eastern suburbs get.
- The very cold and wet weather that is more common in June and July.
- The weather
- There would be none if World Trail have anything to do with it.
- There's no chance this year as I have no chance of any MTB trip for reasons beyond my control> When I do go there it will be to link it with other places to ride out of Melbourne.
- Time
- Time
- Time
- Time
- Time
- time
- Time and permission from the boss (wife)
- Time availability
- Time constraints
- Time constraints
- Time constraints
- time due to work committments
- time restrictions
- Time restrictions due to new child - that's all
- Time to get there and back home.
- Time to get there, ease of access to the trail network. Warbuton does get pretty crowded on weekends etc.
- time, transport
- Time, weather, transport
- Time/work.
- To much climbing up hill.
- to steep
- Too advanced
- Too easy
- Too little single track.
- Too many horses, with unskilled horseriders who can't control them. The horses freak out around bikes, which scares me. I don't like L-W rail trail for this reason.
- too much uphill riding
- Too much uphill to access down hill
- Too short and too easy fire road lame trails.
- Too technical



- too wet in winter at times
- too wet, no one to ride with (i dont like to ride dh alone)
- Track condition from weather or track mantience. Make the trails all weather trails
- Track design and materials used to surface the tracks
- Tracks being raced on or not closed during excessive rain. Similar disaster at Lysterfeild and now its only a shadow of what it was due mainly to the races in the winter. Some tracks gone from fast to very slow rutted water holes. Forest and Geelong clubs are the bench mark for track management/ control
- Trail design, and gaulity. If the trails are not good in winter I probably would'nt visit much. If they are anything like Buxton though, I think it will be very popular as the existing township has better infrastructure
- trail quality
- Trail surface is too slippery for xc- copperhead. King lake dh Gets blown out over winter
- trails being poorly designed or boring to ride.
- Trails in bad condition. Lack of facilities/ ease of locating trails
- Trails not built to appropriate standards... if this is going to be done (and I hope it is) look to Forrest as the example to follow
- Trails not catering for experienced mtb riders. I.e too easy
- Trails not interesting or fun enough
- Trails that are too plain and don't challenge you.
- Trails that don't challenge me, poor design or lack of maintenance.
- Trails that would be too easy, like Lysterfield.
- Trails the more resemble bmx/walking trails then mountain bike trails. Boring and unexciting trails that dont use the natral features of the area.
- Trails which are not challenging or fun.
- Trails will need to be well maintained.
- Travel
- Travel distance to get there
- Travel distance to get to Warburton. It would be a holiday trip.
- travel time (Melb southern suburbs)
- Travel time from Geelong
- Travel time of 2.5 hours. If there is a high level of accom. This may be over come.
- Travel time to and from
- Travel time to the trails from prahran.
- TRAVEL TIME TO TRAILHEAD
- Travel to/from.
- Typical boring world trail tracks
- Uni work Distance
- uninspiring trail. BAD weather
- Unsealed areas
- Unsealed or rough track (if on my road bike)
- unsuitable trails. not aggressive enough. no flow.
- Vehicle access. Need to be able to park near by.
- Very wet conditions. If the trails are too easy.
- Very wet weather
- Warburton Highway traffic
- weather
- Weather
- Weather
- Weather
- Weather
- Weather - it would need good drainage to avoid being damaged. Lack of technical difficulty - needs to have black trails with 'B-lines'
- Weather affecting track conditions see below. Other than that nothing would stop us from riding there, looking forward to seeing it come to life, very exciting.
- weather and fire and crap tracks
- Weather and trail conditions
- Weather and trail conditions.
- Weather conditions so the drain on singletrack should be pretty good seeing all that rain recently
- Weather conditions, mud, etc
- weather, too difficult track, fees, family & work committments
- Weather, trail conditions
- Weather, Trail Conditions.
- Weather.
- weather. Trails should be made to cope with rain
- weather.... fire trail access
- Weather/climate. Needs to be well drained if any wet weather riding is done on single track. Distance to the trail.
- Weather/mud
- Wet weather
- Wet weather - it needs to be drained well.
- Wet weather and trail conditions. Steepnees of climbing trails
- Wet weather and trail conditions. Being 1.5 hrs away.
- Wet weather conditions
- Wet weather, only to look after the trails though
- Wet weather. Not enough varied MTB singlerack
- Wet, muddy tracks
- Winter and weather conditions. Family commitments
- Winter drainage would likely be the main issue. But if trails designed properly, hopefully year round riding possible.
- WInter/too wet
- Work
- Work
- Work
- Work
- Work & Weather
- Work commitments
- Work commitments, family
- Work commitments.
- Work commitments. Weather - I don't like riding wet trails. It wrecks them.
- Work, and cost.
- Would have to be very good single track trail with other facilities at the trailhead or wouldn't drive the extra distance



- You will do a repeat of king lake dh track and make the current trails bad which in turn would not make me want to ride these trails any more

draft



QUESTION 34

The full answers to Question 34 are provided below, listed in alphabetic order. These have not been corrected or modified in any way.

- - keep it tight & technical and they will come.
Trails in the Victoria that currently attract 'enthusiasts' show that the tighter the single trail, including climb & descend combinations, the more long-term challenge is offered to riders.
- 1 or 2 DH tracks and all mountain trails rather than cross country due to the steep terrain
- 1. Ensure the design is winter friendly, or at least some of the tracks are so you don't end up with complete closure during winter/spring. 2. Integrate the trails into the community. Look at how Bright, Melrose and Forrest have achieved this. 3. Family friendly is best - we often travel to ride and the kids come along too (and we meet up with friends with kids). We choose places that allow the kids to ride as well, so rail trails, easy sections of beginner level singletrack and off-road bike path options are important, as is easy access to other activities/attractions the area has to offer
- Only use an experienced public space design company/person 2. experienced trail designers 3. hurry up please - "talk doesn't cook rice"
- 1/ Keep trails directional. 2/ Maybe have a trail that is winter proof (from water, mud etc) to allow for all year riding.
- 3 loops, 1 beginner/intermediate 1 experienced, 1 downhill. copy some nz trails
- A diverse range of trails from flowy jump lines to technical is key. Good signage is also important!
- A downhill park with a monthly shuttle day and I would buy a membership for sure!
- a easy circuit for beginners starting out
- A few steeper and technical tracks would be appreciated.
- A good variety of trails to get lots of different people involved and able to enjoy them
- A great initiative
- A great way to get the community active and bump up weekend numbers for tourism and trade in Warburton. I hope it goes ahead, I know I will be Keen to increase the number of visits I make to Warburton each year if there is a good trail network
- A mix of degree of difficulty. Tie in with aqueduct trail
- A range of track difficulties, rather than just one loop
- a range of tracks for all skills, in both single and dual directions, linking all to a carpark, a kiosk or cafe there would thrive on weekends
- About time
- advertise the proposed mountain bike tours for all levels of riders from beginner to expert.
- After spending a great deal of time traveling (with working/living/biking holidays) in NZ (Queenstown, Wanaka, Rotorua) and Canada (Whistler, Fernie, Banff and Canmore) - I highly recommend that you look to some of these places for inspiration. I as a rider welcome the idea of a proposed development of trails in Warburton - and know that I am not alone. There is a huge community of Victorian bikers who currently choose to live/work/ride overseas in Canada and NZ because there just hasn't been much in the way of legal and fun trails to ride in Victoria.
- All weather trails would be of most benefit to the local community. Well signposted.
- Always excited to hear about more possibilities for places to ride.
- any new tracks built will be fine, but please do not alter tracks that are currently there
- Any trails would be a bonus with some dedicated downhill runs and easy shuttles.
- Appropriate trail ratings - use Stromlo rating as an example, not Lysterfield
- As above.
- As I have seen prior work by world trail at both kinglake and mt buller (copper head). I appreciate all the hard work that goes into these trails, I'm writing from my own personal opinion and experience here. The only issues I have would be concerning the trail surface used and the technicality of the proposed trails. I found in the dry peak riding months at both the locations mentioned above the surface was way too skatey even on the big bikes. This was not an issue in the wet though. This is only a precautionary statement as I know how much the riders in the yarra ranges area love the loamy dirt that packs down like concrete that is already available right under their feet! It would be a shame to lose this valuable aspect and appealing recourse that potentially could be ridden by thousands of riders if these plans gain momentum to artificially placed dirt. Also I love your prior trails for flow but as technicality was concerned I really didn't enjoy them. So more rocks rocks rocks!!!! Or even just utilise all the natural rock gardens in the area!!! Thanks world trail team ! :)
- As I have. Lived all my 60 years in Warburton and worked all my life I am very excited by this or opals Have lived and worked in Warburton all my life (60years) and this proposal would be the best thing to happen to the town in years
- As long as current trails stay the same there will be no problems
- As much single track as possible, hold regular events using the trails to attract more users, who then spread the word about how good it is.
- Attracting local and media interest.
Communication through MTB links and interest areas to promote awareness on the developments of the trail network



- Awesome idea and hope it goes ahead. Make it as good as buller and I'll be there every weekend!
- Awesome idea!
- Awesome idea.. take a good look at Forrest in the Otways.. really awesome riding and location.
- Awesome potential for a great trail network. Could be as good as Makera Peak in Wellington NZ if you use the mountain.
- Awesome trails is all u need, have a look at smithfield near cairns. If you make a couple of short course but make so you can mix them then you get a lot variety. 4 different 8 km singletrack will make for says of fun !.
- Ban horses.
- Based on a recent trip to Rotorua, this would be an excellent reference point on which to base the planning of the trail network, it's management, integration into and utilisation of the surrounding environment and potential growth over time. It is also in some respects an example of how it can both engage well and poorly with local businesses.
- Bike access from town if distant
- Bike polo or multi use courts nearby could/ would also attract a wider range of people and riders!
- Bike race events, support local bike shop, advertise facilities
- Bollards to keep the motorbikes off the trails. Good signage from the township with track classifications. A sign welcoming mountain bike riders when they enter the town.
- Bring it on. Look forward to seeing you get started
- Build a central 'hub' for riders with facilities, parking, food, great coffee, free water, for before and after a ride.
- Build a network that includes a world class XCO racing / training course that could be used in rounds of the Victorian and Australian championships.
- build extensive, quality, sustainable singletrack trails and warburton will become a significant mtb hub due to proximity to melbourne and inherent beauty of the area. Benefits to the local community will be significant.
- build it
- Build it and they will come
- Build it and they will come
- Build it and they will come!
- Build it and they will come!
- Build it and they will come.
- Build it and they will come. Riders will always travel for good trails
- build it and they will come. what a fantastic place to create a mountainbike haven
- Build it close to the caravan park to attract greater numbers to the area and promote the caravan park as accomodation for riders to meet each other and take on trails together
- Burms, jumps, single trails, endurance events
- Cafe / bike shop works well together.
- Cafe is a requirement in order to get families involved, which is good for future development of sport.
- Camping ground
- can't wait
- Can't wait for some more of your awesome trails closer to Melbourne!
- Can't wait!
- carpark security surveillance.
- Check out woodhill mt bike park in Auckland. A great set of trails maintained by group of enthusiasts. Tracks have fun names & named after local businesses where sponsored which facilitates their promotion.
- Close consultation with the local community and their inclusion in the development, creation and maintenance of the trails Start on a smaller scale with the main trails first and develop plans to expand or create additional trails later depending on interest and feedback
- conect to Healesville
- Congrats on getting this far. Have been helping others lobby for a long time
- construction of another, legal, well maintained series of MTB tracks close to melbourne would be fantastic, the ideal would be if the area presented an alternative to established areas such as Lysterfield, You Yangs, Wombat etc in times when weather conditions precluded the use of these other areas.
- Could it be connected to the Dandenong Ranges and then back to Lysterfield trails? Cycle touring opportunities to link war burton to Marysville would be amazing
- Create an exciting mountain bike environment like the you yangs however ensure the start area is located close to the town and cafes to ensure people don't just come and go for a ride without staying for a coffee and food... mountain bikers are an educated and generally wealthy group who have a love of nature and desire to explore the bush but in an exciting manner... they would bring a great vibe and lots of business to Warburton area. ensure its all so designed to accommodate races ie 24 hour or distance races and downhill events....
- Cycling tourism is booming and its clear that Warburton has all the geographical advantages and topography to build a world class MTB destination
- Decent technical component on trails.
- Design it to be more technical than a huck fest like kinglake. Take a look at Queenstown.
- DH track down Mt DB, using the tar road for shuttling. I'd be there regularly for that.
- DH track is a must!
- Dh tracks with shuttlesssss a downhill race kinda track with rocky steep parts and loose, rough parts. and a FR style track with big berms, wallrides, north shore drops, tabletops, big doubles and maybe even a whailetail. that'd be sick, id ride it



every weekend. Victoria needs some real freeride trails

- Dh trails 1st built
- Dirt Art !!!
- Do it
- Do it
- do it
- Do it !
- Do it and we will come!! All weather trails are important
- do it now
- Do it now!!!
- do it quick. mountain biking is very popular
- Do it right the first time. Trails for everyone so elite can have there trails and novice riders can ride then also progress. Skills area is also great for groups.
- Do it right, first time, don't rush and consult with the public. A lot.
- Do It Right. "Build it and they will come".
- Do it well and the people will come, and bring money to the town. It is a beautiful little part of australia, it should be developed and promoted as a mountain bike destination!
- Do it!
- Do it!
- Do it! Ask the cafes at red hill hiw much business they get from MTBers and there's no trailhead and most of the trails are sem-legal. I work in a bike shop on the peninsula and our customers love to travel to ride mtbs - forrest, You Yangs - Warby will be closer
- Do it! Great little place, hills on the door step and plenty of cafes. Nice walks for The family beside the river. Build some trails and I will be there every other weekend.
- DO IT!!
- do it!!!
- Do It!!!!
- Do it.
- Do not make the track like sand. Look at kinglake, it looks incredible, but in reality it's just scary to ride as it's way too fast and intimidating. Plenty of tracks (take ben lomand forest, queenstown for example) are able to maintain a natural dirt condition that has a good balance of fun and sustainability.
- Do not under any circumstances remove any existing trails, wether they are DH or XC. The current trails are some of, if not the very best in Victoria.
- don't change the existing Downhill trails without permission of current builders. Except New downhill trails would be awesome.
- don't have bmx track like gravel on trails and jumps as it is very slippery
- DON'T PUT GRAVEL DOWN!! NO ROCK ARMOURING!!! START ON THE HILL NOT A FLAT!! USE THE WHOLE HILL!!LEAVE EXISTING TRACKS AS IS!!!!!!!
- Dont do it or lose a lot of business from mtb riders
- Dont do it. Its not fair on people who have worked on it. Go make another BMX track like kinglake somewhere else.
- Down Hill track would be cool similar to Shepherds Trail in Kinglake and a track similar to Copperhead at Mt buller
- Downhill and Advanced trails to improve your skills and options for lessons to improve riding
- downhill and gravity enduro trails.
- Downhill trails
- Downhill, Downhill, Downhill!
- Drainage to maintain trail condition. Kid loop which is flatish with mtb obstacles - Berms, jumps, roots etc.
- Easily accessible, must have a push up track or access to a shuttle track (DH), nearby toilets and drinking water would be very useful as well.
- easy to understand trail signage/maps and ample car parking is critical
- Effective marketing.
- employ a professional trail builder, go visit Rotorua or Taupo in NZ and learn from their mistakes.
- Ensure good signage, access for cars and safe access for bikes
- Ensure the trails cater for all types of the sport.
- Ensure traffic goes through town so they have a chance to stop and spend money
- Excited!
- Expect more tourism generated than for Forrest
- Fantastic idea!
- Fantastic idea. MTB is a growing sport and people will support good trails.
- Fantastic. Make it happen!
- Feel free to contact me if you want further opinions. I run a cycling club, Cycling Victoria Off Road.
- Flow jump trails like whistler a line. People fly around the world to ride that track.
- Flow trail with lift access
- Flowing single track is suitable and fun for everyone. More adventurous tracks can be built as offshoots
- Follow examples from around the world. mountain biking is major contributor to emerging tourism and rural economic growth. Just go I. The web sites from the UK and access the public studies done over there!!!
- Forest in Victoria has become a strongly supported destination and is much further from Melbourne than Warburton
- Fragile mountain soils mean it would be expected that some trails would be closed over the wetter months. This is OK but needs to be able to be enforced to minimise erosion and costs associated with trail maintenance. Trailheads need the minimum of facilities but shelter is important as need to be able to escape the elements on occasion ie: caught out in bad weather, waiting for mates to do the car shuffle, etc. Thought should also be given to providing a remote shelter. I'm thinking - somewhere out of the wind, elements etc that could be a destination for day rides, shelter for lunch in bad weather rides, may also double as a



checkpoint for stage rides fondos etc or as an evacuation point for medical emergencies (helicopter access). Thought may also be given to overnight accommodation similar to which you would expect to find in NZ back country. Q: What could be better than 3 day cycle tour through the Great Dividing Range staying in huts? A: A five day cycle tour through the Great Dividing Range staying in huts.

- From the maps I've seen of the area, there seems to be a fair amount of fire road access(I haven't driven any of them, though). Would it be possible to link a shuttle road to, or near a high feature for more gravity assisted riding: eg Downhill, free riding and the ever increasingly popular 'gravity-enduro'. There is already loads of XC trails all over vic, but with more people buying longer travel bikes, it would be awesome to have a few more 'friendly' and less intimidating trails. This would also encourage more people into our awesome sport.
- Full on DH/FR tracks with big gaps, berms and really flowy. Maybe a pump track/DJs?
- Fun flowy signle track
- Get communities involved. I help out once a month trail building @ Lysterfield. Only a small percentage of riders do contribute. The more involved the more we change attitudes & the more people take ownership in care for the environment & such facilities. Whistler in British Columbia is a good example. I dispair when i see people dump there rubbish at the outside carparks at Lysterfield, there has even been hard household rubbish. I don't live close 2 Warburton or Lysterfield (wish I did)but I would be willing to volunteer my time 2 shovel dirt to develop trails in around Warburton
- Get going!!!
- Get it done!!
- Get on board.
- Get on it. Make Damo cut his dreds to give him more credibility!
- get rider feedback for proposed trails, so the tracks are fun and used
- get shuttles
- Get started now before I'm to old!!
- Get the support of the community
- Get to it, can't wait to ride them.
- get world trail in to help design
- Give difficulty options for the same route
- Go ahead and make a nice trail
- go ahead with it
- Go for it
- go for it
- Go for it - this is the best idea I've heard for a long time.
- Go for it!
- Go for it.
- Go for it.
- Go to it, we'll be there shortly.
- Go to Queenstown for inspiration, make good trails, ensure great atmosphere, get locals excited.
- good drainage would trump lysty and youies which are both closed at present because of rain.
- Good linkage with other areas. Long interesting and challenging climbs.
- Good Luck
- Good luck. Really hope this comes through!
- good luck....
- Good map system
- Good maps. We weather friendly.
- Good parking / meeting point Various trails of all kinds to spread the load of riders Pay as you go rope tow
- Good shuttle roads.
- Good signage and maps needed Trails need a range of difficulty levels from blue to black to encourage serious MTB riders , Victoria has enough rail trail but not a lot of dedicated MTB singletrack.
- Good signage, cafe, bike wash
- Good wayfinding.
- Great idea, will be a terrific facilityand bring more business to the area.
- Great idea, will encourage a lot of people to visit the area, makes the journey from the west worthwhile.
- Great idea!
- Great idea!
- Great idea! It'd be awesome to see it happen and I'd definitely come with my crew of mtb friends :)
- Great idea. Excellent location. I race dh and enduro but the smart money is to make long gradual downhill runs that are fun on any bike.
- Great initiative in a beautiful location. Go for it!
- Have a cor technical park that combines cross country and downhill (utilising the existing DH trail) and link it to a rail trail
- Have a look at Forrest trails.
- Have a look at the new trails put in at old mans valley in Hornsby NSW & put heaps of cool challenges like it has done. Must have jumps, drop offs, bridges, water features, rock gardens & heaps of burms. Oh and a rock Shute or 3 and wall rides
- Have a variety of trails. Jumps, berms, rocks, roots, flow and raw trails.
- Have paper maps avaiable. Woodend is a good example of a place with many trails but I only go with a mate because there are no maps to follow. Forest is a great example of a place that has maps to use therefore go often.
- have plenty of flowing single track
- Have the bottom of the trail, link straight to the town so you can ride right into town. Get local eateries to have bike racks outside. Maybe a bike path around/through the town so riders don't impede pedestrians.
- Have the network start from town so folks can stay in town and ride off. Build single track and the people will come, see NZ examples. Don't forget the kids, skill building bmx and pump style tracks are the go. Not too far from town OR provide quality camping.



- Hopefully would trail doesn't just smash out a standard lap that they have built every where else
- hurry up
- Hurry up
- Hurry up
- I believe it will encourage many Melburnians to visit on weekends, and will no doubt be excellent for the local community.
- I believe warburton is a great area for mountain biking to grow due to proximity to Melbourne yet the feeling of being out in the country without sacrificing the cafe culture and luxuries wives need.
- I have just spent 2 days in Rotorua in NZ for mountain biking. So good will take the family there in December. There was transport up the hill, great trails catering for everyone from expert to beginner, good food and coffee at the base, good quality bikes for hire (though I took my own bike). It was busy. It is a great model for how to make a MTB park work. Get the ground drainage right, or else will have to close after it rains.
- I just did the survey but one thing I thought was important. You ask about time spent on the bike. In my opinion the survey does not sufficiently differentiate bw people who commute on their bike and those who use it for exercise/recreation. I ride every day to commute (30 min per day) but I only ride recreationally maybe every fortnight but than for 4-5-6 hours... The average of the two may not be very useful for your purpose? Cheers V
- I listed 100k + for length purely because any dedicated single track would be brilliant. Look at what NZ are doing and the impacts there. It's a no brainer.
- I live in Lilydale and would love to have a local trail network as proposed. I've ridden at many destinations around Victoria, I'm willing to travel and know that many other riders would travel to Warburton if there were enough good quality trails built. 10 or 15 km won't cut it. Singletrack trails of varying difficulty are vital. Loops or point to point. Bring it on, it will be a great boost for Warburton.
- I look forward to having somewhere closer than Buller to ride also that's a destination.
- I love the trails currently in place, but understand that there is no official body put in place to maintain them. Having a company such as World Trail work in Warburton would be a great step forward in the development as mountain biking as a sport, and would be an asset to the Warburton area, it's people and local businesses.
- I ride the warby trail 2+ times per year - but I'd come out more regularly to ride MTB specific trails - particularly if there was variety. This generally involves at a minimum buying lunch locally or including some other tourism type activities.
- i think it would be a great idea i would love to see a network of trails that range from kids through to DH and would be great to link up the current DH trail up there as it is difficult to access without shuttling
- I think it would be very good for the town in general it needs something like this.
- I think it's a great idea and will be well used if the trails are decent. I think it's important to have input from all types of mountain bikers (XC,DH ect.) for the design & build of the trails.
- I think it's a great idea.
- I think it's a great initiative
- I think it's an awesome idea.
- I think more trails would be a fantastic addition to the valley. i live in Mount Evelyn, but some good cross country/all mountain trails would certainly make me come out to warby more often
- I would love to see all of the melbourne mtb community jump behind projects like these. e.g.. Promotion and so on
- I would love to see more trails!!!
- I would run cycle tours and organise mtb holidays in warburton due to its history (tramways) and proximity to Melbourne. Currently discussing this with depi
- I would use Rotorua, New Zealand as a template. I have traveled a lot and believe they have a great system in place. Also contact the IMBA about sustainable trail building. Damian Auton at Cog Bike Cafe. He is a great resource and a great ambassador for cycling. I pretty excited about the potential riding opportunities. Good luck and thank you.
- I'd like to see it sooner or later. There are only a couple of spots in SE: Lysterfield and Red Hill (Dandenongs - nor really official single track) - when these sports are closed next step is You Yangs only.
- I'm excited about trails
- I'm not sure where the proposed network is exactly, but I'd like to see MTB trails that go all the way to the top of Donna Buang. I think that trails like that would have an epic feel to them that would attract many riders. There wouldn't be any other trails near Melbourne that would have that level of vertical climbing and descending. It would be a real draw card and differentiator to trails local to Melbourne and would encourage people travelling to the area, just like they do for the road climb up Donna.
- I've already seen 3 car crashes on Mt Bride road, all involving mountain bikers, and them all doing stupid things. I.E "testing" out their 4dw drifting abilities around blind corners... with people in the tray.
- I've seen how a good trail network can transform an area in the UK. Warburton is in a good position in terms of distance from Melbourne, and if the trails are built to a decent and challenging standard then the area is in a good position to take advantage of the tourism that mountain bikers can generate.
- if all goes ahead it would be great to have a website with trail map, local attractions and relevant information etc



- If berms are to be built they need to be made so as not to encourage braking just before exiting, a clear smooth open exit, no technical straight after, this should help with brake ruts in berms. Go to Buxton to see very good example on how to present berm structure and go to Lysterfield to see how not to try and fix or build tracks [some are unbelievable]
- If it drains better than lysterfield, I may have to re-think my lazy winter riding habits
- If it is anything like lysterfield or better than it will be used by many many people.
- If it were to go ahead make the trails a few K's away from the town. I'm sure the last thing the locals want is large gatherings of dirty mountain bikers gathering on the main street on regular occasions!
- if its going to be done it needs to be a fairly large scale because theres plenty of small scale trail networks around. Lets go bigger than buller.
- If World Trail are used for the design and implementation ... I think you're on the right track!!
- If you build it they will come
- If you build it they will come.
- If you build it, we will come.
- If your going to do this, do it properly!
- im excited about the development, the more the merrier and the sooner the better.
- Improve on existing shuttle trails
- Incorporate townships along the route. For instance, 30kms of trail, then a town.
- Increase trail networks with more sealed roads leading to the network.
- Integrate cross country, free ride and downhill to cater for all levels and styles which share a common trail head with parking and facilities.
- Introduce signposting early even while trail work under construction publish maps to Garmin Maps website Run a series of events throughout the year
- Is the trails are fun and challenging, people will come ride them and buy lots of pie and coffee.
- It is a great idea and does much for the local area. We have travelled to Buxton, Bright, Beechworth, Albury, Forrest plus more and love riding new trails and exploring new areas.
- It is an ideal location. Close to melb for day trippers, but far enough to have people stay overnight. All services and facilities, inc cafes accom etc are so close plus the possibilities of trailhead where people can ride to from acco and cafes is great. As a great area for cycling in general with the mountains and rail trail. Warbie has the potential to become a major tourist destination.
- It is important to have a variety of trails for people of different skill levels this includes, single direction and multi direction trails. Long loops or tracks which join nicely to make long loops are good for experienced riders. Also making sure that the highest elevation in the area is used is important to me.
- It really needs cheap transport of gear between accommodations to make it a feasible family holiday option - it has SO much to offer, I hope this becomes a reality
- It should probably be closed all winter to avoid hazards and trail damage - the tracks in the area can be very treacherous to ride on when wet.
- It shouldn't be created at the expense of other park/forests users such as 4wd/horse/trail bike
- it will be great I can't wait to ride there!
- it would be a great idea and easy access from eastern suburbs
- It would be a great thing for the area. Reasonably low environmental impact. Generally community and environmentally minded people. Growing sport/passtime.
- It would be a positive development for the township, bringing people and in turn revenue and also a step forward for the continued development of Mountain Biking in Victoria
- It would be an excellent idea welcomed by thousands of Melburnians who only have Lysterfield currently as an accessible trail network. Warburton has the facilities, environment and accessibility. Great initiative! Please get going
- It would be awesome to have another mountain biking destination not too far from Melbourne, like Beechworth, Woodend and the Yungas. Those three places have really boomed since embracing mountain biking.
- It would be good if the trail network could be accessed by trails from the rail trail. The ability to ride to the trails from the Warburton caravan park would also be good.
- It would be good to have a pump track or skills park
- It would be nice to have a link to the metro area to the East so riders can get there by bike without needing to ride on the road.
- It would certainly attract me to visit Warburton, I would likely to bring my family and make weekend of it.
- It's a fantastic idea that would definitely benefit the area, provided the trail system is well designed and built.
- It's a great spot with some of the best road bike riding in Australia and great mountain biking. It's a pretty well kept secret. Access to a dedicated XC/single track/ firetrail loop would be a big draw for local and interstate guests. The ability to hire MTBs at the cog means people can travel with 1 bike eg road and hire mountain bike to hit trails
- It's a nice area and you have a great canvas to work with. It would be great if you can learn from Lysterfield's downside - the washout and general poor conditions of the trails after the rain. Think about where the water falls when it rains.
- It's already there! lets make it official and improve it!
- It's an awesome idea. It will no doubt bring tourism and money to the community. If excited correctly it will most likely bring international riders. Warbie is a



great thing for Australia and what we need more of. Good luck and go for it!

- It's awesome can't wait to give them a go. I love riding a variety of trails
- It's about time! It's the perfect spot to create a trail network, it will be great for the local area and its much closer than the You Yangs. I work in the cycling industry myself and the feedback I continually get is that Lysterfield is too boring, but the You Yangs are too far. I personally don't think you would need to go crazy in terms of facilities, just build the trails and people will come. Thanks
- It's got to have good singletrack to be worth it. There's lots of loop trails where we generally ride. Point to point trails are quite unique and provide a sense of satisfaction. There are trails at Buxton and Lake Mountain and Warrandyte and Christmas Hills. Linking them with singletrack would be awesome. Otherwise, a variety of types of trails would be great. Forrest is great for just that reason. World Trails build some great trails but a bit of variety please. we are starting to feel like you've only got one way of building them.
- just do it
- Just do it :-) if road cycling is the new golf, then mountain biking is the new road cycling
- Just do it, the area needs it and the local community would surely benefit.
- Just do it!!! Look at Forrest, Bright, Buller. It brings a great demographic into the area that has a high disposable income, and a relaxed and friendly attitude.
- Just do it. Mountain biking is a fast growing sport and more trails around the metro fringe are needed. We regularly travel to Canada to ride and are always blown away by the mountain biking culture that exists over there and that's because they have the facilities and community support to make it happen. Put warbuton on the mountain bike map. Will be brilliant,
- Just do it
- Just make it fun and flowy!
- just make it happen
- Keep as much of the trails as u can single track. long steep and technical dh trails and fast and flowy xc trails. try and avoid trails that look more like freeways than mountain bike trails.
- Keep it tight, start within 20km of tightly routed trails that criss cross to allow multiple routes, with expansion plans to extend to 60km. Set up a mtb club and hold fun races, host regional events and invite regional clubs to participate in friendly competition. Examine the ratio of easy to difficult trails at Forest, get that balance. Segregate family trails from technical trails. Way mark some routes to ensure safety of users (avoid collisions of riders down versus up). Create a toddlers trail around the picnic area so parents can watch from afar. Introduce obstacles such as bridges, rock gardens log hops contained in a skills area. Hold local competitions to name the trail routes when ready and host a grand opening day, get local business

support in advance (bike shop, mobile coffee, use local scout group, etc), ensure there is a robust trail maintenance plan with costs, leverage local building material and plant hire companies.

- keep proposed trails well sign posted to prevent accidents with dirt bike riders in the mount bride area
- Keep the existing DH trails, work around them. Warby is loved for its flow and natural terrain
- Keep the same tracks that are there but just rebuild them if needed. And add more tracks
- kid friendly trail, pump and skills track. Dad won't get to go if the rest of the family cannot play too
- Land Managers - embrace it. It will generate trade and revenue for your area.
- Learn from you yangs and don't be risk averse or no one will end up coming to ride the trails except rookies and they already have lysterfield for beginners
- Learning from the success of the trail build at Buxton and the facilities at Lysterfield. It would be great to establish an annual race such as a six hour enduro.
- Leave building decisions up to the riders, don't wreck what we have built over the years, DH MTB'ers are a fantastic community who care deeply about the natural environment and are not a bunch of crazy degenerates.
- Leave existing trails alone
- leave the current dh tracks as they are, however more dh tracks would be great
- leave the current trails, and add heaps more!
- legalise the DH tracks
- Let locals build
- Let the local, and present MTB community Have a 90% say on the final outcome of the tracks and trails... we understand that you have standards and requirements.. but it has to be made for the riders.. not for the government who thinks its right,, I 100% guarantee there will be plenty of volunteers to assist in the completion of this project and produce one of Australia's premiere MTB zones
- Let the locals build the trails just supply appropriate equipment
- like the Buxton course, a range of trails from easy to difficult from single to firetrail, linking with existing fire trail or rail or aqueduct trails, one way tracks, think Lysterfield - flowy fun singles, buxton - single tk climbs and dips, Lake Mountain - I find this too tech & slow/rocky but some like it, I like the grassy 4wd ski trails tho in summer, views at a highpoint, maybe even a kids/beginners course near trailhead that's pretty basic without too much climb or tech, enough trail for a good 2hr ride (with options of extenders, links and bail outs), rubbish free joint, open 365 days, composting enviro loos, café offering frequent flyers 10th coffee free, some tricks/berms/jumps stuff, good map that can be smart phone loaded with contours, distances, grades, ph coverage area on trails, landing area closeby for ambulance/helicopter evac,
- LINK TO EXISTING RAIL FACILITIES



- link Warburton Rail Trail with Aqueduct Trail
 - long steady descents up, and long fun descents down would be just as popular as the dh trails if they were good
 - Look at whistler, moab and other bike destinations.
 - Look forward to riding the trails :)
 - Looking forward to riding it. Good luck with the project if it goes ahead.
 - Loop trails with war button as hub sounds ideal. If world trail are doing the trails riders will definitely travel to ride them
 - Lots and lots of single track with multiple car parks and starting points
 - Lots of berms Good parking is a must
 - Lots of burms and smooth flowing single tracks would be sweet!
 - Lots of community consultation, engage local business, model the economic benefits, use OS experiences (Rotorua, Mt. William, Whistler)
 - Lots of riders feedback. as a survey involves.
 - Lysterfield and forrest trails are great
 - Make an awesome downhill jump track like a-line whistler and I'll come for sure!!
 - Make it a preference that the tracks are directional - that is people travel in one direction. Before you build tracks get over to NZ / Rotorua and see how tracks should be constructed.
 - Make it big, there is such a untapped area of big mountain's in this area.
 - Make it happen and legalise all the tracks NO One is allowed to mention
 - Make it happen please!
 - Make it happen. Needs to be many more ride areas set up for people to enjoy
 - Make it like lost lake in whistler, amazing xc trails
 - Make it long! Put in a Trailmix shop/cafe.
 - Make it to vic series race std and hold a vic round, big numbers approx 200 riders plus there crew big money spinner for small towns
 - Make it unique and the people will come
 - make long, interesting, technical trails please :)
 - Make more dh tracks and don't pussy out on the jumps
 - Make sure it can cater for events (eg 24 and marathon or enduro or even downhill). Skills area also a draw card.
 - Make sure its built properly.
 - Make sure that horses are NOT permitted, they are the biggest problem with cycling the Warburton Trail. The pollution they create is disgusting and it is an insult to expect other trail users to put up with walking/cycling over piles of manure.
 - Make sure there is enough technical trails. There are to many easy trails at Lysterfield Park where I currently ride and there need to be places in the eastern suburbs of Melbourne where competent riders can test their skills. You Yangs is a fantastic example of this.
 - Make them all weather like uk trail parks
 - Make trails all weather, have sufficient facilities
 - many types of trails, easy-hard XC, allMtn, and a downhill trail. also a dirt jump line would be good,
- possibility of shuttles, linkable trails to make varied loops
- May be a positive to make it accesible from the warburton rail trail so that people can join the two activities.
 - Maybe have a map to mark local businesses (fruit growers, etc) an artists who have shopfront and have these mapped out on a "bike trail" ?
 - Micro breweries seem to work well...Forrest/Beechworth.
 - More ammenities such as toilets
 - More downhill tracks and pump tracks.
 - more mtb trail development anywhere is a good thing!
 - More the better
 - More trails are always good. If they are build right then the people will come - don't cut corners on the design or construction.
 - More trails would get me there more often.
 - Most MTB riders are self sufficient. You Yangs is a great model, where riders bring everything they need, but love it when the occasional coffee van is present. The quality of riding is such that I will drive 1:15 hours on a Sunday morning to ride 30km, and do it every couple of weeks.
 - Mountain bike trails encourage the riders and new to riding in the surrounding areas a place to ride safely, enabling them to develop their skills, socialise with like minded people and add tourism potential to the area.
 - Mountain bikers will travel far and wide to ride fun trails. My group regularly travel 3 hrs to ride You Yangs....but, the trails have to be worth it. Focus on building a few high quality trails rather than many trails that are watered down.
 - Mountain biking is a growing sport, we love to have a variety of tracks to ride. At tracks near cafes etc we always spend money, having family activities available near the tracks is a huge advantage. Bike shops and a Mtb club could also help.
 - mt buller has a great trail network
 - Mtb brings money in terms of cafes and restaurants. Road biking doesn't. Ask Lake Mt if you want confirmation. Every time we go to Warby we always visit the bakery at least once. Also Mtb has less erosion issues than bush walking as the track is narrower. Would love to see Warburton legalised!
 - Multiple downhill runs
 - Must Do!!!!
 - My dream...Australia..for ever
 - My suggestion is Go ahead with it. As an Ex pro Mountain Biker, resident and business owner (Design agency) in Warburton I think it will be a positive addition to the area. The area can cater for it and it done effectively the Environmental impact would be minimal. Great addition to the area.
 - na
 - Natural trails
 - Need flowy, fun trails that can be ridden in most weather conditions and make you want to come back and ride again similar to Forrest and the



networks in Lake Mountain and Buxton. Trails would be a huge benefit to Warburton, I haven't travelled out there in about 9 years but grew up not too far away in Gembrook.

- Need to consider sustainable trail design and responsible management. There needs to be some all weather type trails recognising that there will be trails that won't cope with wet weather and user numbers. We have seen the effect at Lysterfield and Youies of passive management in extreme weather allowing trails to deteriorate in the past. Buchan and Lake Mountain is probably a good example of sustainable trail design in the outer east.
- Need to have both "A" and "B" lines. Many areas fall into the trap of having trails that are essentially roads or trails that are too difficult to take family/beginners on. EG Forrest has great intermediate trails but no kids trails. Mt Buller is all advanced with no intermediate options. Rail trails are great for kids but boring for advanced riders. It's hard to get the mix right.
- Needs a skill area, lots of a&b lines. Heaps of single
- Needs to be single use trail ie MTB only otherwise could be issues
- needs to link with both the Warburton rail trail & the O'Shannessy Aqueduct trail
- Nice flowy tracks as always, if higher speed/fun downhills should be one way.
- Nil
- nil
- No
- no
- No
- NO
- no
- No
- No
- No
- No
- No
- no
- no
- NO
- No
- No access for motor vehicles except emergency services
- No gravel on jumps
- No, but it sounds great.
- no, sounds dope bruz YIEWWW
- No.
- No.
- no.
- None
- None
- None, very excited about these prospects.
- Novice families need safe green trails, and are probably best segregated from serious MTBers. Intermediate trails are needed to challenge folks and develop skills. Enthusiasts like black diamond level difficulty. You can have log-overs and jumps,

but allow a B-line for less confident riders, to have widest appeal. Toilet access, covered shelter and BBQs are nice, but quality of trail ride is of foremost importance. Using existing fire access trails may help extend the distance one can ride in a day, for challenge and diversity.

- Once it has been developed link it up with other townships around the area such as Gembrook.
- Ongoing trail maintenance will need to be budgeted for by relevant authority.
- please build it
- Please build more downhill tracks and some all mountain trails
- Please contact the Yarra Ranges Mtbers club, Yarra very cycles as we too would love to have some input and would be right behind it... peace out... Ashley Swann
- please do it
- please do it!!
- Please ensure trails have optional lines for different ability levels. It would be great to see trails and facilities that could accommodate mountain bike competition and events.
- Please go ahead and do it! Warburton has great scenery, is a great place to stay and deserves more friendly, health-conscious visitors.
- Please hurry up and do it and make it fun!
- please include a mixture of challenging features in an all mountain trail
- Please incorporate the existing downhill trails there! I'd also like to see trails that can be accessed as close to or in town as possible
- Please just do it...
- Please keep the DH tracks as singletrack rather than massively wide like places like Kinglake.
- please listen to the local trail builders, they know what is best and what local riders want from their trails. The rest will follow and lead to a successful mountainbike destination.
- Please look at the positive benefits from the Mt Buller investments.
- Please make it happen, it has worked at places like you Yangs and Lysterfield and the area of Warburton is much more suited to have mountain biking due to terrain and the township.
- Please make more trails.
- please make sure it's not bound by some access costs. open free and family friendly. And off-course the sooner we get WT tracks up here the better!
- Please share your knowledge. Set up a sister Club. "Red Hill Riders" Work together to improve trail advocacy
- Please start now :)
- Point to point trails that form huge loop even if it means utilising roads/fire roads
- Prefer all-mountain type trails. Not particularly fond of the gravel trail surface material that World Trail has adopted at Lysterfield comm games trail or Buller Copperhead trail. But love the trails otherwise.
- provide trails for all skill levels! :)



- Proximity to Melbourne would be a huge draw card.. Much closer than alpine also makes day trips more likely
- Pump track please
- quality over quantity
- Question 31: would depend on riding options & km of trails. (Caravan park or camp ground)
- Rail Trail users likely to use MTB network if advertised (knowledge), signposted and safe. That would allow people to stay extra nights in Warburton.
- remember to factor in maintenance costs! don't make the mistake mt buller made by making the trail far too technically difficult for most people. at the very least, have B lines.
- requires specific mtb parking as gets busy on weekends
- Review of proposed trails by potential users
- Secure car parking at the trail head is needed near a café if possible. EG Smiths Gully Technical sections Black Diamond or double black should have a detour option for the elderly gentlemen like me age 57
- See previous point.
- Seek input from local mountain bike riders - there is probably a good chance that there would be a lot of guys willing to attend working bees etc for trail construction and/or maintenance.
- short loops, long loops
- should be for community use not just exclusive mountain bike, so trial running, walk options have to think holistically, Has to have hills, should have an annual event and a club associated with it.
- Signpost it for morons
- single track
- Some AM loop trails (with medium sized features) as well as dedicated DH trails. Also tabletops for the big jumps rather than gaps (like Whistler).
- Some type of shuttle on weekends from the city something like the north south track in Tasmania. 20 minutes or more of fast technical descending.
- sooner is better
- Sooner the better and a bikepacking loop using the old log tramways would be excellent
- sounds awesome! ive never been to Warby, but hear very good things about it, plus its close to Melbourne- be perfect for a camping mtb weekend away!
- Sounds awesome! I would suggest possibly looking at somewhere like Tathra in NSW in regards to the positive impact that there MTB trail network has had on their community.
- Sounds awesome. What a great location. I'm sure it will have a positive affect on the area.
- Sounds good, tracks need to be really tight to keep the motorbike riders of them
- Sounds like a fantastic idea - I really hope it goes ahead. Looking forward to visiting for a ride!
- Sounds like a great idea!
- Sounds like a great idea.
- speak to clubs or people who run events to see what they think works because the events have the biggest economic impact
- Start work now
- Stop asking so many questions and do it!! ;-)
- Support the local trail builders
- Take a look at the development of the DH trail at Kinglake as a good example.
- Tell me as soon as there ready to ride!!!
- That the trails are built to IMBA standard
- the current trails in and around the warburton area are excellent and would b good to see more off them but not change the ones that are ther already
- The key is to make it worthwhile for serious riders to venture out. I'd say 2-3 hours ride time for a competent cyclist should be the aim, as there is nothing worse than riding laps of a short loop (<1hr).
- The more trails the better!
- The more trails the merrier! I personally love riding Forrest but it's too long to drive from Melbourne to ride more frequently. Warbuton has a great community atmosphere that i believe would provide a great foundation for a great MTB facility easily accessible from Melbourne.
- The mountain bike trails in Warburton are great, and there is a great community of people who frequently ride there. Thanks very much for allowing this to be.
- The shuttle road needs to be better maintained, sing posted trail heads, keep motorbikes and 4x4's out of the bike specific areas, park infrastructure (tables, map, toilet, etc) May need to address the state forest area coding- i.e hunting is permitted in the area to my knowledge (i am pro hunting but see the need to keep the two separate) would be VERY UN-excited if world trail/Glenn Jacobs was to do the downhill tracks- it should be done by locals, at the very least, they should have a large input and say about what goes on
- The terrain would allow for some epic climbs and then awesome descents. It is the ideal location and could become a mtb mecca.
- The trails at Kowen Forest/Sparrow Hill in the ACT are worth a look, a common trailhead has a range of loops suitable for all skill levels, with good on-track signage of each loop.
- The trails need to be of a high standard with multiple levels of difficulty to get people to travel to them. Similar to the you yangs. Make the most of Mount Donnabuang.
- the use of animal tracks are often the best riding tracks.
- The Warburton area is very much like the Mt Wellington area near Hobart. It may be a good idea to see who built those trails and learn from their experiences.
- there are some awesome DH trails in the Warby area. i would really hope that any new development in the area does not negativelt affect these much loved trails. they are some of the best DH trails in



VIC and my fear is that they may be sanitized and made safer/boring..

- There needs to be a variety of tracks and difficulty levels to cater for all disciplines of riding .
- There should be a variety of trails with A and B lines and all large jumps should be tabletops not doubles
- Think would be nice if employed some people !
- This is a fantastic idea. It's about time!
- This is a great idea. Current Mountain biking areas in and around Melbourne are heavily overused, this will take some of the overuse away leading to better experiences at all Melbourne MTB destinations. Warburton is dead (or dying), this can resuscitate it and if the community embraces it hopefully bring it back to life.
- This is a real long shot but when driving to Warburton I have always thought the distance/terrain from say Lilydale would make the area very appealing to road cyclists, but they need dedicated lanes - it would cost a lot, but hundreds and hundreds of people would follow.
- This is a very positive plan for the Yarra Valley. We need to get across to the 'doubters' the low impact and sustainability of well constructed MTB trail and the flow on effect for businesses and equally importantly, the positive impact of the youth in the area.
- This is fantastic idea. A purpose built and maintained trail network in this region will have a positive benefit to the community and the sport.
- This would be a really great MTB destination that can be reached in a day trip or overnight trip from Melbourne. Really looking forward to these trails getting built
- To be joined with the existing Lilydale/Warburton trail. Some crazy people would ride the whole way do a bit of XC and come back.
- to make it family friendly, have maps, and a cafe
- To ride downhill/freeride, you need a shuttle service or good car access. The youyongs fails in this regard. Look how popular Rotorua NZ is. they run a shuttle service with 3 buses in a city of only 60,000 people. Melbourne is 4 million!
- Tracks to be built with sufficient drainage to be weather resistant enough to be rideable all year around like Forrest Mountain Bike park.
- Trail head near town so can go get something to eat
- Trailhead within riding distance of township would be great. Allows you to stay in town, ride to trails, ride back to food/accom in town. Eg; Forrest in Otways, VIC.
- trails features like jumps and berms are essential to make a desirable riding destination
- Trails for both intermediate and experienced riders would be ideal, also a skills area if possible. Good signage at the trailhead is always welcome.
- Trails should be linked and have good signage/maps
- Try and keep it natural, don't use dirt that washes away and is super slippery (i.e. that native dirt on

the lala falls tracks is amazing), variation is key (especially from other parks i.e. differ it from other WT built areas).

- Try to make them as user friendly for all skill levels
- Use local knowledge to help find suitable areas to make trails
- Use the single tracks that already link the towns of Warby, Reefton & Powertown.
- Utilise existing trails to build an wide ranging network of trails to ease pressure of use. ensure trails are designed to minimise erosion/damage through use, and have a budget allocated to maintain trails. This is a fantastic initiative
- Varied difficulty
- Variety of terrain from beginner loops to advanced
- Victoria desperately needs some Descent descending trails in the eastern suburbs. Some flow trails and more all mountain trails would be amazing. We have plenty of xc trails around already. I think if it could be built close to town so you could start and finish in town that would be amazing and would naturally make people buy food etc from the shops as they finish the ride.
- Warburton is a beautiful location for trails, all of that gravity and natural bush. It's a great little relaxed town that would get visited by me more often with mtb trails there.
- Warburton is perfectly placed to become a real mountain bike destination. Great topo. Beautiful surroundings. Yarra valley for accommodation. Please make this happen!!!
- Warby is already a hard-core road cycling mecca. Last week, I discovered that the dirt roads around Warby offer massive scope for XC and CX style riding. Warby has all of the ingredients to become one of the top cycling destinations in Australia. I really hope the trail network is developed and that Warby goes through the roof in popularity amongst cyclists of all types.
- Water stations and tyre brushes to prevent the spread of noxious weeds
- We are so far behind Canada and New Zealand it sucks, and the thing is you can ride all year round here. But you need to make decent trails with lots of flow not crappy ones like Mount Buller.
- We need more gravity fed trails in both Victoria and Australia. I think Warburton would be perfect for those trails.
- We used to visit Warburton frequently before kids. A weekend away now involves a riding option for me + something for the kids. Warburton is a spectacular spot which would return to our go to list if this goes ahead. We often spend weekends in Forrest but it is further from Melbourne & not nearly as beautiful. Buxton has great great trails but not a lot else for the rest of the family, if we go there we stay in Healesville. Warburton has the accom & catering set up ready to go.
- Well signed tracks, including warnings of up coming difficult sections and jumps. Easy access to parking. It's a good day trip from Melbourne.
- Where possible, keep the existing trails



- Whilst wouldn't stay overnight in area would stop for food & drink.
- wide range of trail standards
- Will provide another great activity for young people, and attract more visitors who enjoy our beautiful environment.
- Wooo! Bring it on!
- world class enduro would be nice
- WORLD TRAIL TRACKS ARE AWESOME!... AND I LOVE CHATTING WITH GLEN WHEN I SEEN HIM.
- Would be a great town to visit and red for a weekend
- Would be awesome to have trails of all levels so it can cater for all sorts of riders, and also potentially races.
- Would be great thank.
- Would be great to have this kind of trail. Doing an overnight trip which used Buxton lake mountain and war button would be a good weekend for sure!
- Would be keen to help out on dig weekends. Keen as for Warby to get some sick tracks made by World Trail, as long as they keep the existing downhill tracks in a similar condition and don't make them flat easy tracks.
- Would definitely get more riders there and more use of the town
- Would increase people into the region - only other decent trails are at Lysterfield - or You Yangs
- YES PLEASE!! The more the better!
- You have a great shuttle road. Please build an all mountain flow track with lots of table tops not doubles . More like the whlister tracks and less like king lake dh. A better version of copper head !
- You should start work straight away! Aim for gold standard - VIC has already got some great MTB venues so it needs to be good. There is definitely room in the market for another high quality venue though. Mountain bikers love to go and ride new (quality) trails and destinations. A genuine adventuresome long trail loop would be awesome - something that requires an overnight camp in a remote bush setting and returns back to the start on the second day. Sort of like a designated 2day/1night bikepacking loop that could be done in a weekend. Should be a challenge, something to aspire to - min 6 hours of riding each day



APPENDIX 5 – MOUNTAIN BIKING IN WARBURTON AN ECONOMIC IMPACT ASSESSMENT

draft





MOUNTAIN BIKING IN WARBURTON

AN ECONOMIC IMPACT ASSESSMENT

OVERVIEW: ASSESSMENT OF ECONOMIC BENEFITS

The development of mountain bike trails in Warburton will provide economic benefits for the region.

The economic impact in this report is shown for:

- During the 2-3 year construction period.
- During the first full year of operation of the trails.

The economic benefit of the construction and first year of operation of mountain bike trails at Warburton is calculated at \$23.67 million

CURRENT STATE

Current visitation data is based on 'Travel to the Yarra Valley and Dandenong Ranges: Year Ended March 2013', published by Yarra Valley and the Dandenongs Marketing ¹.

Whilst Warburton is a specific area within the Yarra Valley and Dandenong Ranges there is no hard data available that isolates Warburton from the greater region.

CURRENT VISITOR NUMBERS

- 685,000 domestic overnight visitors, with an average stay of 2.4 bed nights totalling almost 1.7 million nights. 81% were intrastate visitors, 19% were interstate
- 26,800 international overnight visitors
- 3.4 million domestic daytrip visitors

CURRENT EXPENDITURE

- Domestic overnight visitors spend \$300 per trip and average \$130 per night
- International overnight visitors spend \$829 per trip and average \$60 per night
- Domestic daytrip visitors spend \$77 per trip

CURRENT VISITOR ACTIVITY

- Almost 47% of domestic overnight visitors travelled for 'Holiday or leisure', and 43% 'Visiting friends or relatives'
- 52% of International overnight visitors were 'Visiting friends or relatives', followed by 33% for 'Holiday/pleasure'
- 47% of day trippers cited 'Eat out at restaurants' as their main activity, followed by 'Visit friends and relatives' (35%) and 'General sight seeing' (22%)

¹ <http://yrrml.com.au/wp-content/uploads/Yarra-Valley-and-Dandenong-Ranges-YE-Mar-13-11.pdf>

CURRENT CYCLING ACTIVITY

World Trail's survey results, Internet research and anecdotal evidence suggests that the area currently support a diverse range of cycling activity, including:

1. Rail trails; demand for which is met with the Lilydale – Warburton Rail trail
2. Road cycling; demand for which is met for example by Donna Buang, Lake Mountain and throughout the Dandenong Ranges
3. BMX; demand for which is met by two tracks and their associated organised clubs one each at Eastfield and Lilydale
4. Mountain biking; demand for which is partially met by infrastructure including aqueducts and rail trail (catering for riders of the lowest skill levels) and informal cross-country and downhill single-track. This last is impossible to accurately quantify though clandestine single track in the region is considered to be extensive.

DISCUSSION

Noteworthy is the region-wide average of 2.4 bed nights per person. This is commensurate with the data collected in the World Trail survey, which indicated that 96% of those taking mountain biking holidays spend an average of 2.1 bed nights per person.

Equally, survey results suggest those who stay overnight on a mountain biking holiday spend on average \$750. Both the daytrip and overnight spends used in the assessment of the economic impact of proposed Warburton trails are supported by the survey results which report high rates of patronage of cafés, restaurants and bars in conjunction with mountain biking visitation.

RELEVANT CASE STUDIES

The strength of mountain biking as a recreation and tourism draw card can be seen in many areas, both domestically and internationally, in which mountain biking has proved to serve an important niche tourism role.

LOCATION / NAME	PROXIMITY TO POPULATION CENTRE	PRODUCT	VISITOR MARKET (majority)	VISITATION STATS (annual)	NOTES
You Yangs, Victoria	1 hour	50km open dirt roads, single track, downhill	Day trip	125,000	No accommodation / facilities
Lysterfield, Victoria	30 minutes	20km fire trail, single track, jumps	Day trip	150,000	No accommodation / limited facilities
Mount Buller, Victoria	3.5 hours	Extensive lifted downhill, flow, single track	Overnight	28,900	Alpine resort
Forrest, Victoria	2.5 hours	60km, single track, shared-use	Overnight	22,000	Some daytrippers
Stromlo, Canberra, ACT	20 minutes (Canberra centre)	50km single track, downhill, fire trail	Day trip	50,000	No facilities on site, essentially within city
Whistler, BC, Canada	2.5 hours (Vancouver)	200km lifted downhill; 100km flow, single track; jumps	Overnight	80,000 * (first record statistic)	*2003 figure. Whistler now records 1.3 million visitation in green season outnumbering white season. We have taken conservative Year One figure for this assessment.
Rotorua, New Zealand	30 mins (Rotorua) 2.5 hours (Auckland)	100km+ single track, flow	Overnight	100,000	
WARBURTON	1.5 hour	40-80km mixed grade mountain bike trails including XC and DH	Daytrip with significant O/N	130,000*	*Estimated based on comparisons and contextual considerations split to 120,000 day trip + 10,000 O/N

WHISTLER

The original lift-accessed mountain biking destination, driven by the Whistler-Blackcomb resort but with extensive community support and engagement. Initial growth in visitation was sharp, with 80,000 mountain bike visitors in 2003 increasing to 250,000 by 2008. Summer visitation has now overtaken winter visitation – in 2009 there were 1.3 million summer visitors and the majority of that growth occurred in the mountain biking market, which has overtaken the traditional summer activity of golf².

Nearest major population centre: Vancouver, 600,000, two hours distant.

FORREST

Located in the Otway Ranges in eastern Victoria, Forrest is a small town of 200 residents that suffered severe economic downturn with the cessation of the local logging industry. In response, in 2007 the Forrest Mountain Bike Trails were constructed. Now more than 22,000 riders use the 60km network of trails in the Forrest area annually. The trails host several major cycling events such as the Forrest Festival, which includes a mountain bike event, and the Otway Odyssey, considered one of the most gruelling one-day mountain bike events in the world. The trail development has been credited with facilitating the social and economic transformation of Forrest³.

Nearest major centre: Melbourne, 4.25 million, three hours distant.

YOU YANGS

The You Yangs is a multi-purpose State Park to the north west of Melbourne. The park, recognised for the quality of its product, contains 50km of dedicated mountain bike trails catering for all levels from open dirt roads to single track and downhill. Trails at the You Yangs support 125,000 bike visitors a year all of which is day visitation⁴.

Nearest major centre: Melbourne, 4.25 million, one hour distant.

LYSTERFIELD

Located in a State Park south-east of Melbourne, the trails were originally developed informally and, therefore, without long-term sustainability in mind. The trails have suffered from high use and poor maintenance. Electronic counters have recorded in excess of 150,000 cycle passes during the year. The experience of Lysterfield provides compelling evidence for regional demand. Indicative of demand outstripping supply, permits for groups of 50 or more must be obtained at all times, whilst even small groups (15-50) must obtain a permit during wet months⁵.

Nearest major centre: Melbourne, 4.25 million, 30 minutes distant.

MOUNT STROMLO

Over 50,000 riders per year make use of the trails located only a short distance from the Australian Capital. The trails benefited greatly from that visibility generated by staging the 2009 UCI Mountain Bike & Trials World Championships.

Nearest major centre: Canberra, 367,000, 20 minutes distant.

ROTORUA

Extensive single-track located in the North Island of New Zealand that attracts strong international visitation. Rotorua supports 100,000 mountain bike visits a year and the economic contribution is well documented at NZD10.2 million⁶.

Nearest major centre: Rotorua, 56,000, 30 minutes distant.

MT BULLER

Predominantly an overnight destination located in an established Alpine resort, the green season at Mt Buller is growing significantly. Mountain bike visitation numbers are now at 28,900 between the navigable months, December to April⁷.

² <http://events.whistler.com/About-Whistler/Statistics-And-Research/>

³ http://www.colacotway.vic.gov.au/Page/Page.asp?Page_Id=3827&h=1

⁴ <http://parkweb.vic.gov.au/about-us/news/thats-a-wrap-you-yangs-flood-recovery-complete>

⁵ <http://lysterfieldmtb.com/wp-content/uploads/2011/05/LDTR-Strategy-DRAFT.pdf>

⁶ http://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=10779299

⁷ http://www.mtbuller.com.au/uploads/file/Community_Forum_Presentation_8_May_2012_Part_2.pdf

ECONOMIC BENEFITS

Economic benefits will be realised in two phases, an initial phase constituting the construction of the trails followed by an operational phase.

CONSTRUCTION BENEFITS

The \$2.5 million forecast to be spent over the 2-3 years of construction will provide a significant direct boost to the economic activity in the region during this phase.

OPERATIONAL IMPACTS

Tourism expenditure is any expenditure as a result of visitation by tourists to a specific region. It comprises two related channels; direct and indirect expenditure.

Direct expenditure is the easiest to quantify in that it refers to the immediate expenditure made by tourists during their visit to the area.

Additionally, operational costs for the trails include maintenance, event staging and management costs. These figures have been supplied by World Trail.

Indirect expenditure is more complicated though no less important. Indirect expenditure is the up-stream effect of tourism demand on businesses which provide goods and services to the tourism industry. Thus it constitutes expenditure by other industries not in direct contact with tourists. For example, an employee of a café that services mountain bike tourists uses a portion of their income to purchase further goods and services in the local area. This is considered indirect expenditure.

The annual additional expenditure in Warburton as a result of the development of the trail network in the year of completion is provided below.

DIRECT IMPACT

- 120,000 daytrip mountain bike visitors⁸ x \$77 spend per visit = \$9.24 million
- 10,000 overnight mountain bike visitors⁹ x \$130 spend per person per night x 2.4 nights = \$3.12 million
- Operational costs = \$228,777.50

Total Direct Economic Benefit $\$9.24 + \$3.12 + 229,000 = \$12.59$ million¹⁰

INDIRECT IMPACT:

$\$12.59 \text{ million} \times .88 = \11.08 million

TOTAL ECONOMIC BENEFIT: \$12.59 + \$11.08 = \$23.67 MILLION

EMPLOYMENT

The project will also support a number of jobs in Warburton. Jobs are measured as full time employees (FTEs) and include both direct and indirect jobs supported by the trail developments.

- Direct expenditure of \$12.59 million supports 135 FTEs¹¹
- Indirect expenditure of \$11.08 million supports 40 FTEs¹²

TOTAL OPERATIONAL FTES SUPPORTED: 175

⁸ Projected visitation figures are modeled on relevant case studies and consultation with stakeholders

⁹ Projected visitation figures are modeled on relevant case studies and consultation with stakeholders

¹⁰ Every dollar spent by tourists in Warburton creates a further \$0.88 in indirect expenditure ('Tourism's Contribution to the Australian Economy, 1997-98 to 2011-12' Tourism Research Australia, 2010)

¹¹ Every \$1 million of direct tourism expenditure supports 10.7 FTE jobs ('Tourism's Contribution to the Australian Economy, 1997-98 to 2011-12' Tourism Research Australia, 2010)

¹² Every \$1 million of indirect tourism expenditure supports 3.6 FTE jobs ('Tourism's Contribution to the Australian Economy, 1997-98 to 2011-12' Tourism Research Australia, 2010)

DISCUSSION

Warburton as a centre of mountain bike tourism presents a unique proposition for economic development. Due to its accessible location and existing tourism infrastructure, Warburton's mountain bike trails will attract both overnight and daytrip visitation. As such the Warburton offering represents a combination of successful destinations the likes of Forrest (high rates of overnight visitation) and the You Yangs (primarily a daytrip destination).

Therefore, there are three types of users who will contribute to increased economic activity;

- Visitors who stay overnight and would not have come to Warburton were the mountain bike trails not constructed;
- Day visitors who would not have come to Warburton without the trails;
- And existing visitors who extend their stay due to mountain biking.

The increased expenditure will provide significant economic stimulus to the community, particularly in terms of accommodation and food service. An increased length of stay in existing markets combined with new destination mountain bike markets will improve occupancy rates and may also result in investment in new accommodation infrastructure to meet increased and new demand.

Existing operators in the region will also stand to benefit considerably from the increase in visitation. They are likely to capitalise on this opportunity and provide additional services, products and experiences for the mountain bike riders.

The trails present an opportunity for entrepreneurs to develop new products and services to meet the needs of visiting mountain bikers. Examples of which could include bike sales, service and hire; guiding and tours; bike skills courses; events, shuttles and transport; targeted mountain bike friendly accommodation, new food and beverage opportunities, and retail offerings.

World Trail's survey¹³ results indicate some of the growth opportunities, including:

- Bike hire - 20% of respondents would hire a bike. At an estimated cost of \$30 for ½ day (commensurate with fees charged by Mt Buller), suggest estimated bike hire revenue as \$780,000.
- Shuttle use - 67% of respondents would pay for a shuttle service from the bottom to the top of the mountain. At an estimated cost of \$30 per day (again commensurate with a similar service run by Mt Buller) suggest estimated shuttle revenue of \$2.34 million.

EVENTS

Events play a critical role in developing a mountain biking destination. Not only do they increase visitation through participants and support crews, events also function as key marketing tools that position a trail as a destination worthy of visitation.

For example, the Kona Odyssey event one-day mountain bike marathon held in Forrest contributed \$2 million to the local economy in 2013, attracting 1,800 participants, with associated crew and spectators raising the number of attendees to 4,000.

Bearing in mind the importance of events, this economic impact data modeled for trails at Warburton is based upon the expectation of one major event (participants up to 600) and two minor events (100 each). These figures are conservative due to a very busy annual mountain bike event calendar.

Correlating these participation figures with the financials of the Kona Odyssey suggests an expenditure event surge in Warburton would be valued at approximately \$800,000.

¹³ Survey Monkey, June 2013

ASSUMPTIONS

The following assumptions were made in the process of constructing the economic impact model for the proposed mountain bike trails at Warburton;

- The expenditure habits of mountain bikers is the same as current visitors
- The trail network is implemented and rolled out as planned.
- The trail network is supported by a suitable targeted marketing strategy.
- Three events are held annually, including a marque event.
- There is no cost to the user for accessing the trail network.
- Local businesses adapt to growth opportunities and support users of the trail network.
- There is adequate access to the trail network through public transport, though it is assumed the majority of users will access the trail network with their own vehicles.
- The quality of the trail network is protected by a structured maintenance plan.
- The trails are well marked and signposted.
- Every dollar spent by tourists in Warburton creates a further \$0.88 in indirect expenditure (Tourism Research Australia, 2013)
- Every \$1 million of direct tourism expenditure supports 10.7 FTE jobs (Tourism Research Australia, 2013).
- Every \$1 million of direct tourism expenditure supports 3.6 FTE jobs (Tourism Research Australia, 2013).
- Year 1 Warburton accommodation capacity will not change.

APPENDIX

Following is a snapshot of the current service provision in Warburton relevant to the economic impact statement.

WARBURTON ACCOMMODATION

1224 possible bed nights
286 rooms + 130 campsites
44 accommodation options

1. Warburton Motel 12 rooms / 26 people
2. Forget Me Not Cottages 4 cottages / 8 people
3. Charnwood Cottages 2 cottages / 4 people
4. Gundalee Cottages 1 bed / 2 people
5. River Haven - 5 beds/8 people
6. Cloudhill 2 beds/4 people
7. Cedar Chalet 3 beds/5 people
8. Ferny Glade 4 beds/6 people
9. Yumbara Mountain Retreat 2 beds/4 people
10. Vintage Escape in the Yarra Valley 4 beds/7 people
11. Birchwood Manor 12 beds / 15 people
12. Warburton Holiday Cottage 4 beds/8 people
13. Currawong Holiday House 6 beds / 8 people
14. Willows at Warburton 5 beds / 10 people
15. Web Spa Cottage 6 beds / 8 people
16. Pythia House 2 beds / 4 people
17. Balblair House 9 beds/ 12 people
18. Cottage on the Yarra 4 beds / 4 people
19. Kelly's Cottage 2 beds / 4 people
20. Annie's Escape 3 beds / 4 people
21. Bingarra Retreat 5 beds / 8 people
22. Warburton Whitehouse 1 bed/ 2 people
23. Karalice House 6 beds / 7 people
24. Valley Ride Accommodation 5 beds/ 8 people
25. Casa Valeri 1 bed/2 people
26. Sleepy Wombat Cottage 1 bed / 2 people
27. Riverside 8 beds/12 people
28. Glenbrook Cottage 5 beds/6 people
29. Wattletree Cottage 12 beds/ 15 people
30. Hazelwood Studio 2 beds/ 4 people
31. Hilldale Coattages 9 beds / 14 people
32. Wonga Heights 1 bed / 2 people
33. Eve Lyn's Guesthouse (?) 2 bedroom / 4 people
34. Warburton Alpine retreat 33 rooms / 80 people
35. Warburton Arrabri Lodge 33 rooms / 190 people (servicing groups)
36. Oscars on the Yarra 21 rooms / 42 people

37. Warburton Lodge 19 rooms / 48 people
38. Glencragie Cottages 3 cottages / 12 people
39. Hazelwood Cottage 7 room / 15 people
40. The Keepers Cottages / Fineleg 1 bed/2 people
41. The Loft Cottage 3 bedroom / 8 people
42. Warburton Whitehouse B&B 1 room / 2 people
43. Karalice House 3 rooms / 8 people
44. Warburton Caravan Park
4 standard cabins (20 people), 2 ensuite cabins (10 people), 2 ensuite cabins open (10 people), 4 ensuite cabins 2bed (10 people), lodge (10 people)
TOTAL: 60 people
PLUS 130 campsites (incl power and non-power) – 520 people

REF: STAYZ.com.au + <http://www.warburtoninfo.com> + individual websites cross-referenced against other booking sites.

TOURISM SERVICES

RESTAURANTS & CAFES

1. Riverview Cafe and Wine Bar
2. Warburton Bakery
3. Patchwork Teahouse
4. Warburton Curry Club
5. Cog Bike Cafe
6. Lavender Cottage Tea Rooms
7. Little Joe Woodfired Pizza
8. The Old Tea Shop
9. Rainbow Ice Cream Shop
10. Rayners Stone Fruit Orchard & Cafe
11. Warburton Pantry
12. Wild Thyme Cafe
13. Alpine Retreat
14. CJs Pizza Cafe
15. Good Food Room
16. Crundish Cafe
17. Deli-icious
18. Three Sugars

TOUR PROVIDERS

1. Warburton trails Bike Tour
2. Cog Bike Cafe
3. Wellbeing Holidays
4. Australian & Coastal Mountain Tours
5. Habitat Tree Eco Tours
6. MelTours (bike)

HEALTH & WELLBEING

1. Warburton Yoga & Mindfulness
2. Massage By The River
3. Yoga and Pilates at the BayTree

RETAIL

1. Earth bazaar
2. Village Greens
3. Newsagency
4. Pharmacy
5. Quality Meats (butcher)
6. IGA Supermarket
7. Gainsborough
8. Freds Milk Bar
9. St Vinnies
10. Chookhouse
11. Bookshop
12. Second Hand
13. Lace and Things
14. Yarra Valley Showcase
15. Lotus Rooms
16. Polish Jester
17. Fine By Nature
18. Red Mud Hut
19. Sassy Soap
20. Shell Service Station
21. Gotta bee Sweet
22. Gladysdale Bakehouse

MARKETS

1. Warburton Produce and Artisans Market
1st Sunday of the Month
2. Warburton Community Market
2nd Sunday of the month

OTHER RECREATION PROVIDERS

1. Warburton Golf Course
2. Upper Yarra Arts Centre

A Feb 2012 Yarra Ranges report states that there are 18 Retail Businesses in Warburton (http://www.yarraranges.vic.gov.au/files/a984f7ae-53d8-475c-bba2-a05b00b03b11/Community_Snapshot_Warburton_McMahons_Creek_Reefton.pdf)



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APPENDIX 6 – WARBURTON BIKE TRAIL FEASIBILITY STUDY: DESKTOP FLORA AND FAUNA ASSESSMENT

draft





Warburton Bike Trail Feasibility Study: Desktop Flora and Fauna Assessment

FINAL REPORT

Prepared for World Trail Pty Ltd.

11 September 2013

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Summary

Biosis Pty Ltd was commissioned by World Trail Pty Ltd to undertake a preliminary desktop flora and fauna assessment of an area of public land located near Warburton, Victoria. A mountain bike trail is proposed to be developed within the area. The study area is located near Warburton and approximately 60 km east of the Melbourne CBD (Figure 1).

Ecological values

A thorough search of flora and fauna databases and modelled vegetation mapping was conducted in order to provide a high-level summary of the ecological values that may be present within the study area. This report assesses the likelihood that species identified in database searches will occur within the study area. Database searches and modelled vegetation mapping identified the following key values in the broader study area:

- The study area is dominated by relatively high quality intact native vegetation. Department of Environment and Primary Industries (DEPI) mapping indicates that seven ecological vegetation classes (EVCs) and one EVC complex may be present including Damp Forest, Wet Forest, Cool Temperate Rainforest, Riparian Forest, Lowland Forest, Herbrich Foot-hill Forest, Shrubby Foothill Forest and Riparian Scrub/Swampy Riparian Woodland Complex.
- NaturePrint mapping indicates that the study area is part of a broader area of native vegetation that makes a significant contribution to Victoria's Biodiversity, based on the abundance and diversity of threatened species records and high habitat connectivity values.
- Vegetation mapping indicates that the FFG Act listed Cool Temperate Rainforest Community is likely to be present in some moist sheltered gullies.
- 28 threatened flora species are likely to be present within the study area.
- 21 threatened fauna species are likely to be present within the study area, including a number of species that could potentially be impacted by the construction of the proposed trail.

Government legislation and policy

An assessment of the project in relation to key biodiversity legislation and policy is provided and summarised below. Note that reforms to the native vegetation permitted clearing regulations are underway and are due to be introduced in September. They will include amendments to clauses in the Victorian Planning Provisions in all planning schemes in Victoria and to Victoria's Native Vegetation Management Framework. For more information on these reforms refer to www.depi.vic.gov.au/nativevegetation.

Legislation / Policy	Relevant ecological feature on site	Notes
EPBC Act	Leadbeater's Possum is known to occur within the study area. Southern Brown Bandicoot, Grey-headed Flying-fox, Macquarie Perch and Tall Astelia likely to be present	Proposed trail should avoid core habitat and reserves for the Leadbeater's Possum and ensure that canopy connectivity is not impacted by the proposed trail in order to avoid impacting on this species. A field assessment should be undertaken to assess the habitat values within the proposed alignment and to determine the extent of any potential impacts on these listed species.

Legislation / Policy	Relevant ecological feature on site	Notes
FFG Act	The listed Cool Temperate Rainforest community is likely to be present. Protected flora species are likely to be present.	Survey is required to confirm the presence of threatened species and communities. The study area is on public land and a permit would be required if any impact is proposed on FFG Act listed values.
Planning & Environment Act	Intact native vegetation present on site.	Any removal of native vegetation will require a planning permit, including permission to lop or remove native vegetation. Permit application needs to address relevant overlays including Environmental Significance Overlays and Bushfire Management Overlays. Survey required to determine the impact of the trails on native vegetation.
Water Act	Designated waterways within study area	Works on waterways permit required for all crossings of designated waterways.
SEPP	Waterways within the study area	Water quality monitoring not required provided sediment controls are implemented.

Note: Guidance provided in this report does not constitute legal advice.

Recommendations

The information presented in this report should be incorporated into the next phase of design for the project in order to minimise impacts on flora and fauna. The primary measure to reduce impacts to biodiversity values within the study area is to minimise removal of native vegetation and terrestrial and aquatic habitat. The following steps could be incorporated into the design phase to minimise the impact of the trails on flora and fauna:

- Trails should utilise previously disturbed areas and existing trails wherever possible. These areas will typically contain lower value native vegetation and have a lower likelihood of threatened species being present.
- Where possible the trail alignment should avoid the removal of trees, particularly large old trees containing a diversity of hollows.
- Ensure that canopy connectivity is not impacted by the construction of the trail, which is of particular importance for the Leadbeater's Possum. This includes midstorey canopy connectivity (e.g. dense thicket along waterways and areas containing a midstorey dominated by *Acacia* spp.).
- Ensure that the Leadbeater's Possum reserve system is not impacted by the construction of the trail.
- Use sensitive construction techniques that minimise disturbance such as elevated platforms over areas of sensitivity and the use of equipment that minimises construction impacts beyond the trail footprint.
- Designs should seek to avoid waterways, low lying damp areas and wet gullies. These habitats are sensitive to disturbance and sedimentation associated with construction can impact on aquatic habitats and species.

- Avoid gullies that may contain the FFG Act listed Cool Temperate Rainforest community.
- Undertake a micro-siting survey to refine the location of the final trail alignment in order to avoid areas of ecological sensitivity.

Further Survey

As the impacts of the proposed mountain bike trail is likely to be quite small and localised relative to the overall size of the study area a detailed field survey of the entire area would not be feasible. Rather, a targeted field assessment of areas outlined in future trail designs that integrate the findings of this desktop assessment could be undertaken to accurately assess the impact of the proposed trail alignment on threatened species, determine the presence of threatened vegetation communities and quantify any associated vegetation losses according to Net Gain policy. For some rare and cryptic threatened species and communities targeted survey may be required to determine potential impacts. Our previous experience with the assessment of similar trails has been that early field assessment of proposed trail alignments can be valuable in identifying and avoiding areas of sensitivity.

1. Introduction

1.1 Project background

Biosis Pty Ltd was commissioned by World Trail Pty Ltd to undertake a preliminary desktop flora and fauna assessment of an area of public land located near Warburton, Victoria (Figure 1). A mountain bike trail is proposed to be developed within the area.

1.2 Scope of assessment

The objectives of this desktop investigation are to:

- Review databases relating to flora and terrestrial fauna issues relevant to the study area, including the Victorian Biodiversity Atlas (VBA), Victorian Flora Information System (FIS), and EPBC Act Protected Matters Search Tool.
- Review the DEPI Biodiversity Interactive Map to determine likely Ecological Vegetation Classes present.
- Assess the potential for the study area to support habitat for threatened species.
- Identify the potential implications of state and federal biodiversity legislation and local policy and planning approvals relevant to the project.
- Recommend any further assessments of the study area that may be required (such as Net Gain impact / offset assessment or targeted searches for listed species).

1.3 Location of the study area

The study area is located near Warburton and approximately 60 km east of the Melbourne CBD (Figure 1).

The study area is within the:

- Shire of Yarra Ranges.
- Highlands Southern Fall Bioregion
- Port Phillip and Westernport, and West Gippsland Catchment Management Authorities (CMA)
- Melbourne Water and Yarra Valley Water management areas.

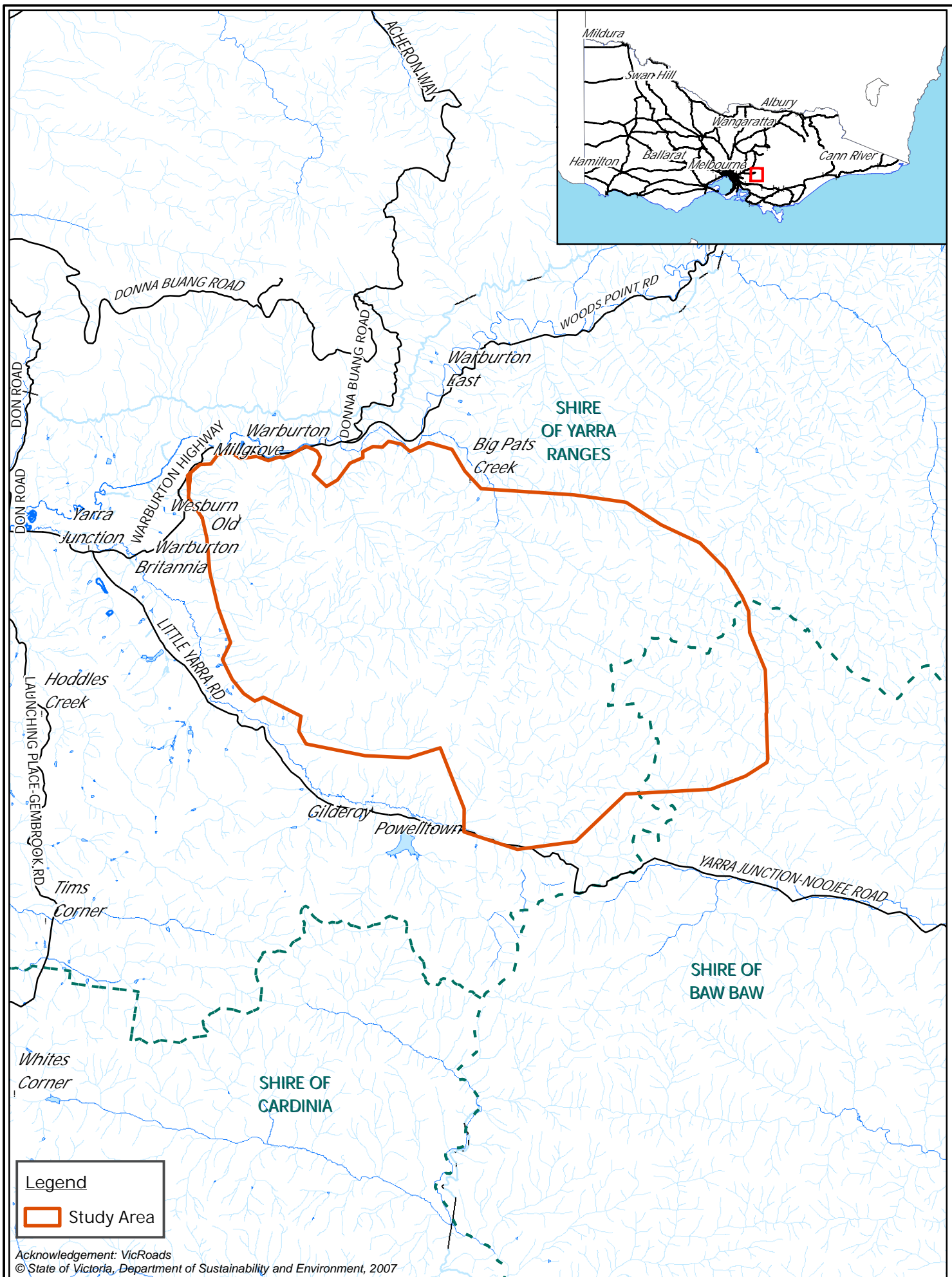


Figure 1: Location of the Study Area - Warburton, Victoria

2. Methods

2.1 Literature and database review

In order to provide a context for the study site, information about flora and fauna from within 5 km of the study area (the 'local area') was obtained from relevant public databases. Records from the following databases were collated and reviewed:

- Flora Information System which includes records from the Victorian Biodiversity Atlas 'VBA_FLORA25, FLORA100 & FLORA Restricted' August 2012 © The State of Victoria, Department of Environment and Primary Industries (DEPI). The contribution of the Royal Botanical Gardens Melbourne to the database is acknowledged.
- Victorian Biodiversity Atlas 'VBA_FAUNA25, FAUNA100 & FAUNA Restricted' August 2012 © The State of Victoria,
- DEPI Biodiversity Interactive Map (BIM)
- Protected Matters Search Tool of the Australian Government Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) for matters protected by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Other sources of biodiversity information:

- DEPI NaturePrint; accessed through the Biodiversity Interactive Map
- Biosis records that have been submitted to DEPI and Melbourne Water but do not yet appear on the VBA, FIS or MWF)

2.2 Definitions of significance

2.2.1 Species and ecological communities

The significance of a species or community is determined by its listing as rare or threatened under Commonwealth or State legislation / policy. The sources used to categorise significance of species and communities in this report are summarised below in Table 1.

Table 1: Criteria for determining significance of species & ecological communities

Significance	
National	Listed as threatened (critically endangered, endangered, vulnerable or conservation dependent) under the Environment Protection and Biodiversity Conservation Act 1999
State	Listed as threatened (critically endangered, endangered, vulnerable) or rare for flora species, in Victoria on a DEPI Advisory List (DSE 2005, 2013a) Listed as threatened under the Flora and Fauna Guarantee Act 1988

Fauna species listed as near threatened or data deficient are listed in Appendix 2, however in accordance with advice from DEPI these fauna species are not considered to be at the same level of risk as higher categories of threat. These species are generally not discussed in detail in this report.

2.2.2 NaturePrint areas

Areas of conservation significance were formerly documented in the DEPI Biodiversity Interactive Map as Biosites ranked as significant at national, state and regional levels. DEPI have advised that the Biosite reports are obsolete and their replacement layer on the Biodiversity Interactive Map is now NaturePrint which identifies areas that contribute most to protecting a range of biodiversity values and identifies their relative contribution.

2.3 Likelihood of occurrence

The likelihood of occurrence is a broad categorisation used by Biosis to indicate the potential for a species to occur within the site: it is based on expert opinion and implies the relative value of a site for a particular species.

The likelihood of species occurring within the site is ranked as negligible, low, medium or high. The rationale for the rank assigned is provided for each species in Appendix 1 (flora) and Appendix 2 (fauna).

Species which have at least medium likelihood of occurrence are given further consideration in this report.

2.4 Qualifications

Flora and fauna databases provide records of flora and fauna that have been recorded in an area at some stage in the past. These records range from recent to old and have varying levels of spatial accuracy. Database records give a broad indication of the species that are likely to be present in an area. They do not provide an exhaustive list of the threatened flora and fauna in the region.

Vegetation mapping provided by DEPI is based on a mixture of modeled and ground truthed data. It is intended to give an indication of the vegetation patterns across a landscape and is not intended for use at small spatial scales. This mapping should be used as a guide only and more detailed survey would be required to determine the precise boundaries of vegetation types.

2.5 Legislation and policy

The implications for the project were assessed in relation to key biodiversity legislation and policy including:

- Matters listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act); associated policy statements, significant impacts guidelines, listing advice and key threatening processes
- Threatened taxa, communities and threatening processes listed under Section 10 of the *Flora & Fauna Guarantee Act 1988* (FFG Act); associated action statements and listing advice
- Victoria's Native Vegetation Management – a Framework for Action (the Framework; DNRE 2002).
- Native Vegetation Management Plans prepared by Catchment Management Authorities
- *Planning and Environment Act 1987* – specifically Clauses 12.01-2, 52.17 and 66.02 and Overlays in the relevant Planning Scheme
- Noxious weeds and pest animals lists under the *Catchment and Land Protection Act 1994* (CaLP Act)
- *Wildlife Act 1975* and associated Regulations
- *Water Act 1989*
- *Environment Protection Act 1971*: State Environmental Protection Policy (Waters of Victoria) 2003.

2.6 Mapping

Mapping has been produced using a Geographic Information System (GIS). Electronic GIS files which contain our flora and fauna spatial data are available to incorporate into design concept plans. However this mapping is not sufficiently precise for detailed design purposes.

3. Results

The following presents results of the desktop flora and fauna assessment.

3.1 Vegetation and habitat

DEPI's modelled EVC mapping shows that seven EVC's and one EVC Complex are likely to occur within the study area (Figure 2). The area also contains a large number of rivers, streams and drainage lines that may provide habitat for aquatic species. The following includes a general description of the vegetation and fauna habitat predicted to occur within the study area based on the data reviewed.

Damp forest (EVC 29) is dominated by a tall eucalypt tree layer to 30 m tall over a medium to tall dense shrub layer of broadleaved species typical of wet forest mixed with elements from dry forest types. The ground layer includes herbs and grasses as well as a variety of moisture-dependent ferns including occasional tree ferns. Damp forest has a bioregional conservation status of 'least concern' within the Highlands - Southern Fall Bioregion.

Wet Forest (EVC 30) is typically restricted to protected sites in gullies and on southern aspects of hills and mountains where rainfall is high and cloud cover at ground level is frequent. It is characterised by a tall eucalypt overstorey to 30 m with scattered understorey trees over a tall broad-leaved shrubby understorey and a moist, shaded, fern-rich ground layer that is usually dominated by tree-ferns. Wet Forest has a bioregional conservation status of 'least concern' within the Highlands - Southern Fall Bioregion.

Cool Temperate Rainforest (EVC 31) is a closed forest to 25 m tall. It contains a canopy dominated by Myrtle Beech *Nothofagus cunninghamii* and Southern Sassafras *Atherosperma moschatum* with occasional emergent eucalypts. It occurs in high rainfall areas protected from fire within Wet Forest. The understorey characterised by tree ferns and a rich epiphytic flora. The ground layer is dominated by a diversity of ground ferns. Cool Temperate Rainforest has a bioregional conservation status of 'Endangered' within the Highlands - Southern Fall Bioregion.

Riparian Forest (EVC 18) is a tall forest typically found along river banks and associated alluvial terraces with occasional occurrences in the heads of gullies leading into creeks and rivers. The soil is fertile alluvium, regularly inundated and permanently moist. Dominated by tall eucalypts to 30 m tall, but also has an open to sparse secondary tree layer of wattles and scattered dense patches of shrubs, ferns, grasses and herbs. Riparian Forest has a bioregional conservation status of 'least concern' within the Highlands - Southern Fall Bioregion.

Lowland Forest (EVC 16) is a Eucalypt forest to 25 m tall on relatively fertile, moderately well-drained soils in areas of relatively high rainfall. It is characterised by the diversity of life forms and species in the understorey including a range of shrubs, grasses and herbs. Lowland Forest has a bioregional conservation status of 'least concern' within the Highlands - Southern Fall Bioregion.

Shrubby Foothill Forest (EVC 45) occurs on ridges and mainly on southern and eastern slopes in association with Damp Forest or Wet Forest on moderately fertile soils and at a range of elevations. The overstorey is a medium eucalypt forest to 25 m tall over an understorey characterised by a distinctive middle strata dominated by a diversity of narrow-leaved shrubs and a paucity of ferns, graminoids and herbs in the ground stratum. Shrubby Foothill Forest has a bioregional conservation status of 'least concern' within the Highlands - Southern Fall Bioregion.

Herb-rich Foothill Forest (EVC 23) typically occupies easterly and southerly aspects mainly on lower slopes and in gullies. A medium to tall open forest to 25 m tall with a large shrub or understorey tree layer over a sparse to dense medium shrub layer. A high cover and diversity of herbs and grasses in the ground layer which characterises this EVC. Herb-rich Foot-hill Forest has a bioregional conservation status of 'least concern' within the Highlands - Southern Fall Bioregion.

Riparian Scrub/Swampy Riparian woodland Complex is a vegetation type that retains characters of the Riparian Scrub and Swampy Riparian Woodland EVCs at spatial scales that are difficult to differentiate at the scale of mapping provided by DEPI. The EVCs within this community could be more accurately assessed during a site visit.

Rivers and water courses are present within the study area. The study area contains rivers, such as the Ada River, numerous creeks, smaller tributaries and drainage lines.

Modified Vegetation appears to be present in a small proportion of the study area. Aerial photography for the site indicates that the study area is likely to contain some small areas of modified agricultural or peri-urban land. This area is likely to have retained some of the characteristics of the nearby indigenous vegetation but is likely to be significantly disturbed by past agriculture or development. These areas may be characterised by a high proportion of introduced species with smaller patches of indigenous vegetation.

3.2 Landscape context

The study area falls within the Yarra State Forest which is part of a larger area of contiguous vegetation within Victoria's Central Highlands, encompassing the Yarra Ranges National Park to the north of the study area, Bunyip State Park to the south and a number of state forest areas such as the Latrobe State Forest and Noojee State forest to the east.

The study area has a history of disturbance from logging over the past century or more but the vegetation remains largely intact and large areas of high quality native vegetation exist in the study area. DEPI's 'Natureprint' mapping layer shows that the study area contains vegetation that makes a high contribution to Victoria's Biodiversity which is largely based on the diversity and abundance of rare and threatened species combined with high habitat connectivity values.

A number of threatened fauna species are known to occur within the broader study area, including threatened large forest owls and the EPBC-listed Leadbeater's Possum. DEPI have declared a Leadbeater's Possum reserve system across the range of the species. Several of these reserves are located within and adjacent to the study area. The GIS data for these reserves has restricted access and the map depicted in Figure 4 was prepared by DEPI.

3.3 Significant species and ecological communities

3.3.1 EPBC Act, FFG Act & DEPI Advisory listed species

Lists of significant species recorded or predicted to occur within 5 km of the study area or from the relevant catchment (aquatic species) are provided in Appendix 1 (flora) and Appendix 2 (fauna) and are displayed in Figure 3 (Flora) and Figure 4 (Fauna). An assessment of the likelihood of these species occurring in the study area and an indication of where within the site (i.e. which habitats or features of relevance to the species) is included.

A total of 29 significant flora species and 21 significant fauna species have a medium or higher likelihood of occurring within the broader study area, however many of these species are unlikely to be impacted by the construction of a mountain bike trail. A summary of those significant species more likely to be impacted by the proposed mountain bike trail is provided in Table 2.

Table 2: Summary of significant species most likely to occur in the study area

Species name	Area of value within the study area
EPBC Act listed species	
Fauna	
Leadbeater's Possum	This species is known to occur within the study area and several reserves have been set aside within the study area for this species (Figure 5). Areas of damp and wet forest with a midstory dominated by <i>Acacia</i> spp. are likely to be of particular importance, however the species should be assumed present throughout and appropriate measures implemented to avoid impacts to this species. The reserves should be avoided.
Southern Brown Bandicoot	Areas with a heathy understorey.
Macquarie Perch	Potential habitat occurs in the Little Yarra River within and

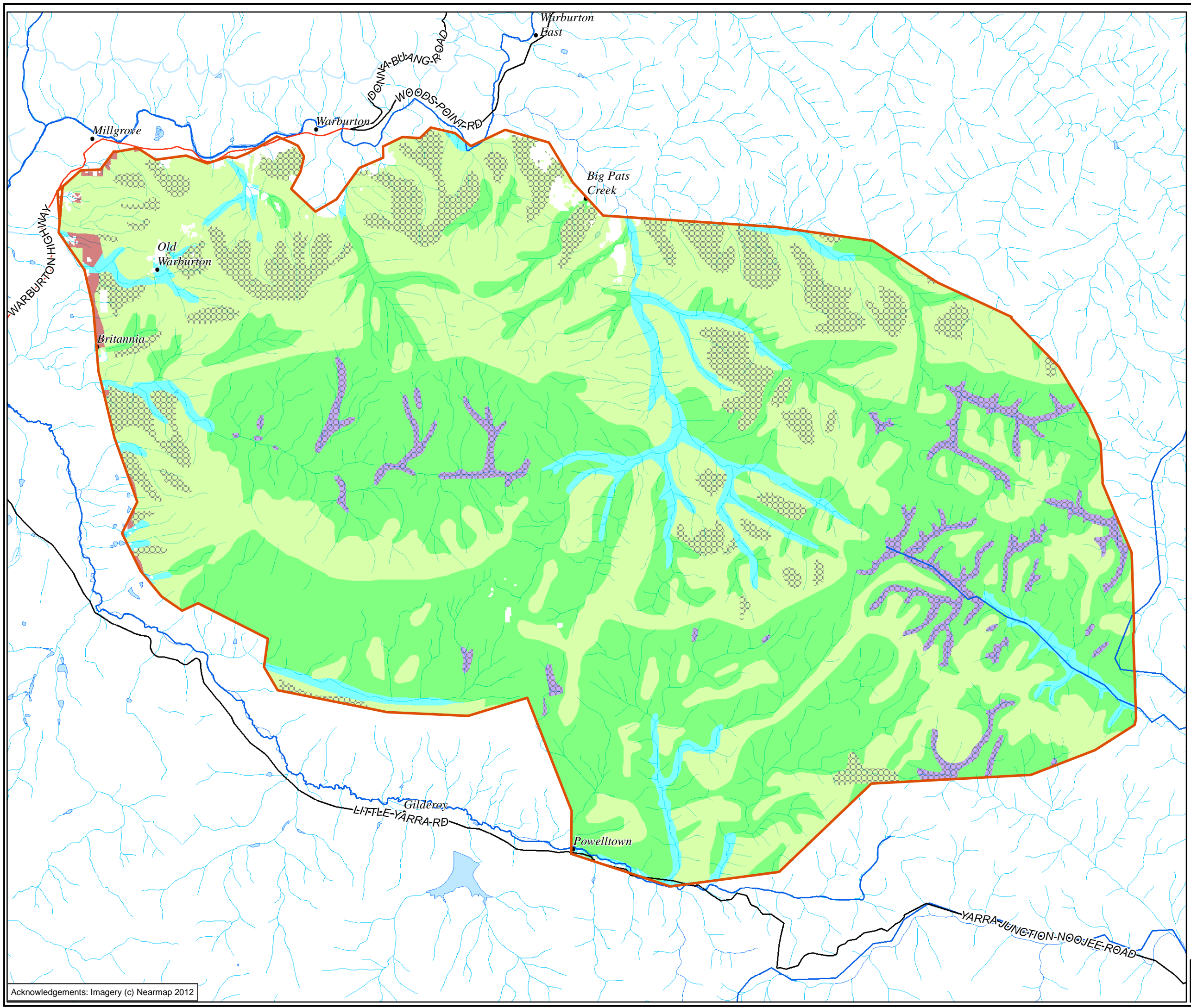
Species name	Area of value within the study area
	downstream of the study area.
Flora	
Tall Astelia	Cool temperate rainforest.
FFG Act / DEPI Advisory List species	
Fauna	
Broad-toothed Rat	Areas dominated by sedges and grass tussocks within close proximity to drainage lines.
White-footed Dunnart	Drier vegetation types associated with ridgelines.
Lace Monitor	Known to occur within the study area, likely to occur throughout. Utilises coarse woody debris.
Brown Toadlet	Damp and occasionally inundated areas.
Curve-tail Burrowing Crayfish, Gippsland Burrowing Crayfish, Tubercle Burrowing Crayfish, Dandenong Burrowing Crayfish and Foothill Burrowing Crayfish.	Multiple species of <i>Engaeus</i> are likely to occur within damp and occasionally inundated areas within the study area.
Flora	
Upper Yarra Swamp-gum	Poorly-drained clay-loam soils near rivers usually at high altitudes
Silurian Leek-orchid	Dry foothill forest with shrubby understorey.
Fairy Lanterns	Deep organic loamy soil in damp forests
Jungle Bristle-fern	Humid rainforests, growing on tree ferns especially the Rough Treefern
Beech Finger-fern	On tree branches and trunks, especially soft tree-ferns, on logs and rocks in sheltered gullies of wet forest in the Central Highlands
Tree Geebung	Moist to wet mountain gullies and forests
21 state listed 'rare' flora species	See Appendix 1 for full details

3.3.2 Significant ecological communities

The EPBC listed 'Alpine Sphagnum Bogs and Associated Fens' community is predicted to occur within 5 km of the study area. This community is typically found at elevations above 1600 m above seal level and is not likely to occur within the study area.

Mapping of vegetation communities listed under the FFG Act provided by DEPI indicates that the listed Cool Temperate Rainforest community occurs within the study area. This community is largely consistent with the

Cool Temperate Rainforest EVC which DEPI mapping predicts will occur in moist sheltered gullies within the study area.



Legend

Study Area

EVC

- 16 Lowland Forest
- 17 Riparian Scrub/Swampy Riparian Woodland Complex
- 18 Riparian Forest
- 23 Herb-rich Foothill Forest
- 29 Damp Forest
- 30 Wet Forest
- 31 Cool Temperate Rainforest
- 45 Shrubby Foothill Forest

Figure 2: Ecological vegetation classes within the study area, Warburton, Victoria

0 1 2 3
Kilometers
Scale: 1:58,000 @ A3
Coordinate System: GDA 1994 MGA Zone 55

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Biosis Pty Ltd
Ballarat, Brisbane, Canberra, Melbourne, Sydney, Wangaratta & Wollongong

Acknowledgements: Imagery (c) Nearmap 2012

Matter: 16539
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Checked by: RDS. Drawn by: PMA. Last edited by: pangas
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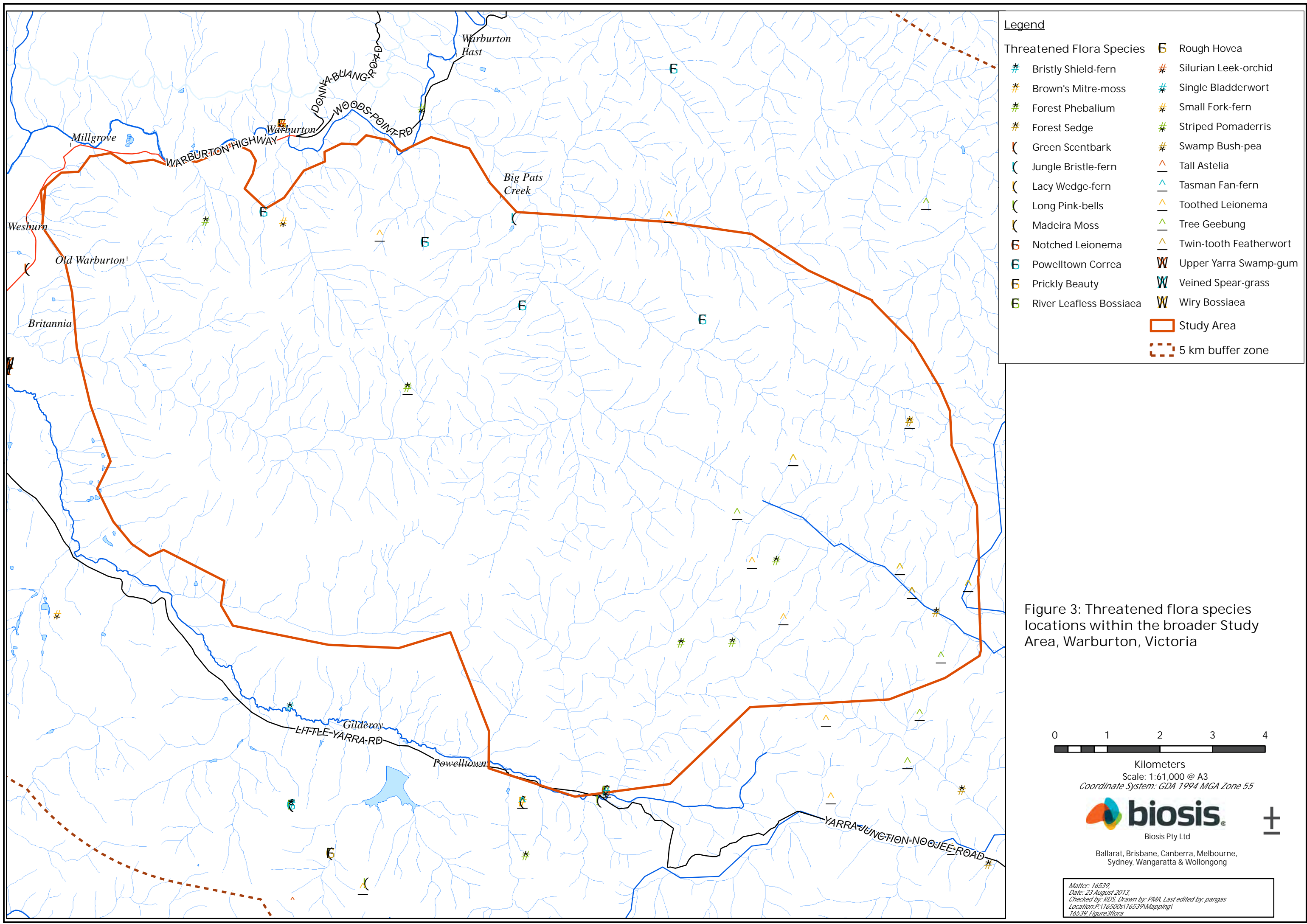
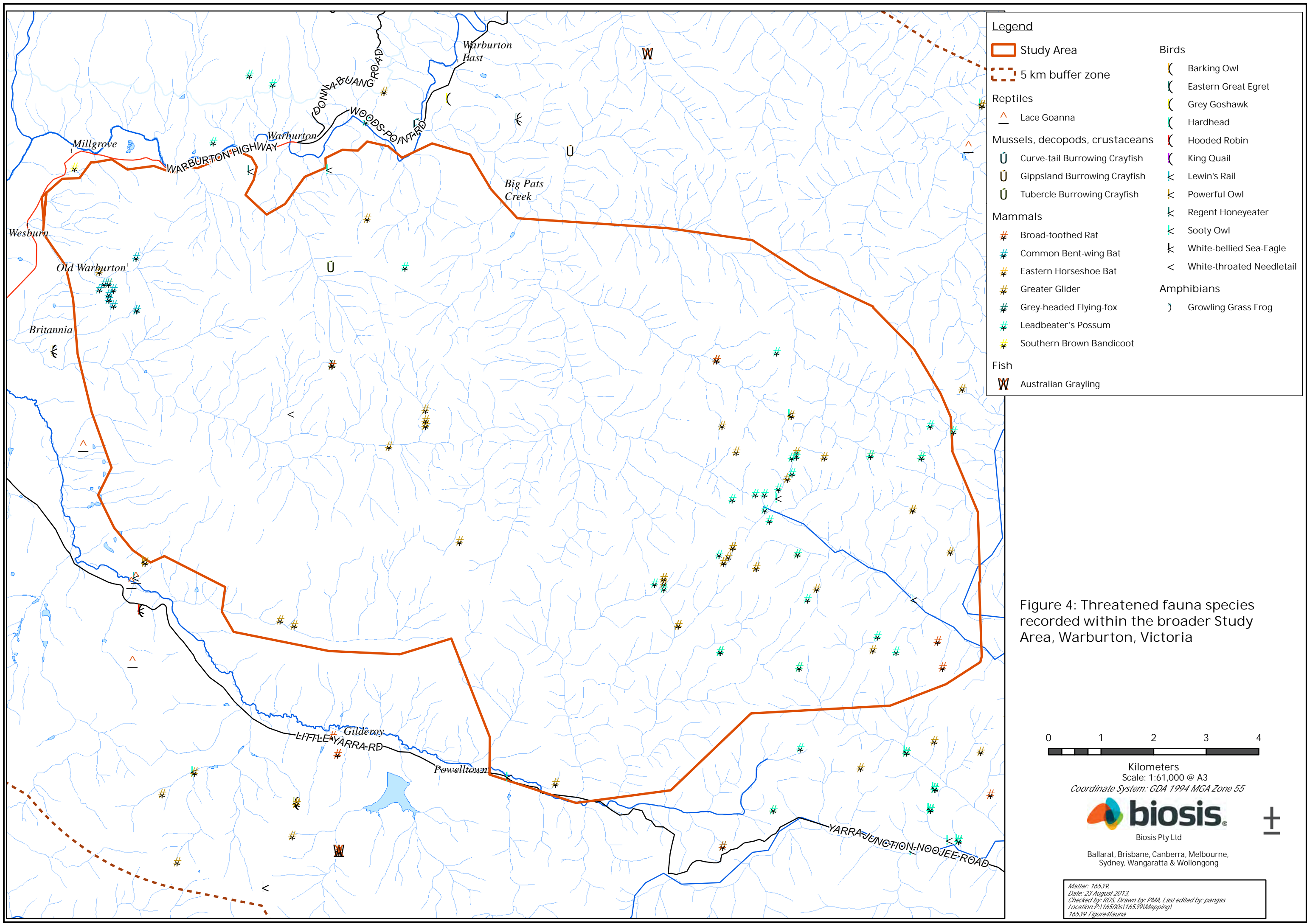


Figure 3: Threatened flora species locations within the broader Study Area, Warburton, Victoria



Legend

Study Area

5 km buffer zone

Reptiles

^ Lace Goanna

Mussels, decopods, crustaceans

U Curve-tail Burrowing Crayfish

U Gippsland Burrowing Crayfish

U Tubercle Burrowing Crayfish

Mammals

Broad-toothed Rat

Common Bent-wing Bat

Eastern Horseshoe Bat

Greater Glider

Grey-headed Flying-fox

Leadbeater's Possum

Southern Brown Bandicoot

Fish

W Australian Grayling

Birds

(Barking Owl

(Eastern Great Egret

(Grey Goshawk

(Hardhead

(Hooded Robin

(King Quail

< Lewin's Rail

< Powerful Owl

< Regent Honeyeater

< Sooty Owl

< White-bellied Sea-Eagle

< White-throated Needletail

Amphibians

) Growling Grass Frog

Figure 4: Threatened fauna species recorded within the broader Study Area, Warburton, Victoria

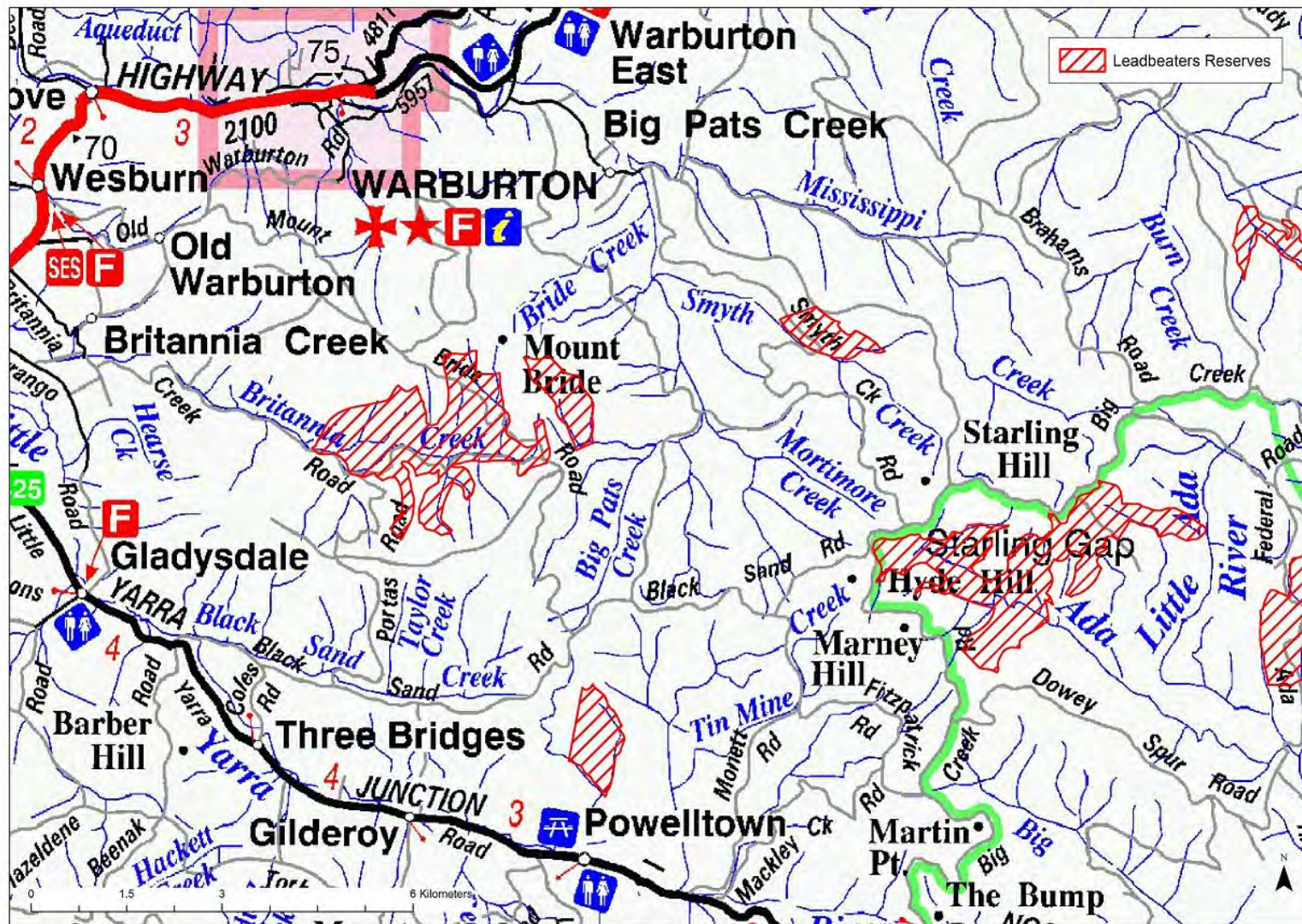


Kilometers
Scale: 1:61,000 @ A3
Coordinate System: GDA 1994 MGA Zone 55



Matter: 16539
Date: 23 August 2013
Checked by: RDS. Drawn by: PMA. Last edited by: pangas
Location: P:\16500s\16539\Mapping\16539_Figure4 fauna

Figure 5: Location of Leadbeater's Possum Reserves within the local area (map supplied by DEPI, Arthur Rylah Institute).



4. Biodiversity Legislation and Government Policy

This section provides an assessment of the project in relation to key biodiversity legislation and government policy.

Where available, links to further information are provided. This section does not describe the legislation and policy in detail and guidance provided here does not constitute legal advice.

4.1 Commonwealth

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act applies to developments and associated activities that have the potential to significantly impact on Matters of National Environmental Significance (MNES) protected under the Act.

Link for further information including a guide to the referral process is available at:

<http://www.environment.gov.au/epbc/index.html>

Matters of National Environmental Significance relevant to the project are summarised in Table 3. It includes an assessment against the EPBC Act policy statements published by the Australian Government which provide guidance on the practical application of EPBC Act.

Table 3: Assessment of project in relation to the EPBC Act

Matter of NES	Project specifics	Assessment against Guidelines
Threatened species and ecological communities	17 listed species and one listed community have been predicted to occur in the project search area. The likelihood of threatened species occurring in the study area is assessed in Appendix 1 (flora) and Appendix 2 (fauna).	A number of these species are likely to occur within the study area. A more detailed field assessment is required to determine whether the project will constitute a significant impact.
Migratory species	A total of 16 migratory species have been recorded or predicted to occur in the project search area (Appendix 2).	While some of these species would be expected to use the study area on occasions, and some of them may do so regularly or may be resident, it does not provide important habitat for an ecologically significant proportion of any of these species.
Wetlands of international importance (Ramsar sites).	The study area is identified as being within the catchment of two Ramsar sites: Gippsland Lakes and Westernport.	The study area does not drain into either Ramsar site and the development is not likely to result in a significant impact.

Database searches identify that a number of MNES are likely to be present within the study area. A field survey could confirm the presence and location of these species and the impact of the proposed mountain bike trail on MNES could be assessed following completion of detailed designs.

4.2 State

4.2.1 Flora and Fauna Guarantee Act 1988 (FFG Act)

The FFG Act is the key piece of Victorian legislation for the conservation of threatened species and communities and for the management of potentially threatening processes. Under the FFG Act a permit is required from DEPI to 'take' protected flora species from public land or private land owned by a public entity (e.g. local government). A permit is generally not required for removal of protected flora from private land. Authorisation under the FFG Act is required to collect, kill, injure or disturb listed fish.

Link for further information: <http://www.dse.vic.gov.au/plants-and-animals/native-plants-and-animals/threatened-species-and-communities/flora-and-fauna-guarantee-act>

The study area is likely to contain a listed community (cool temperate rainforest), and protected flora species such as Acacias and members of the Asteraceae family. The presence of these species could be confirmed during a site assessment. The study area is on public land and if protected species are present a permit from DEPI would be required if any of these species will be affected by the proposal.

4.2.2 Catchment and Land Protection Act 1994 (CaLP Act)

The CaLP Act identifies and classifies certain species as noxious weeds or pest animals, and provides a system of controls on noxious species.

The proponent must take all reasonable steps to eradicate regionally prohibited weeds, prevent the growth and spread of regionally controlled weeds, and prevent the spread of and as far as possible eradicate established pest animals. The State is responsible for eradicating State prohibited weeds from all land in Victoria.

Link for further information: <http://www.dpi.vic.gov.au/agriculture/pests-diseases-and-weeds/protecting-victoria-pest-animals-weeds/legislation,-policy-and-permits/legislation>

4.2.3 Planning and Environment Act 1987 (incl. Planning Schemes)

The *Planning and Environment Act 1987* controls the planning and development of land in Victoria, and provides for the development of planning schemes for all municipalities. As part of the planning process regard needs to be given to Action Statements that have been produced under the FFG Act.

Reforms to the native vegetation permitted clearing regulations are underway and will include amendments to clauses in the Victorian Planning Provisions in all planning schemes in Victoria. For more information on these reforms refer to www.depi.vic.gov.au/nativevegetation.

Of particular relevance to the proposed development are controls over the removal of native vegetation contained within the Yarra Ranges Planning Scheme, including permit requirements. The Planning Scheme defines 'native vegetation' as 'Plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses' (Clause 72). Clause 12.01-2 of the State Planning Policy Framework Clause (Native Vegetation Management) requires that a net gain in the extent and quality of native vegetation is achieved and planning must consider as relevant Victoria's Native Vegetation Management – a Framework for Action.

Clause 52.17 (Native Vegetation) requires a planning permit to remove, destroy or lop native vegetation including dead native vegetation. Decision guidelines are contained in Clause 52.17-5.

The need for a permit to remove native vegetation may also be triggered by overlays within the Yarra Ranges Planning Scheme. The location of the overlays in relation to the study area can be determined via the following link: <http://planningschemes.dpcd.vic.gov.au/index.html>. The provisions of the following overlays apply to the study area:

Environmental Significance Overlay (ESO1 – Z19#) covers part of the study area. Protects the Zoological significance of the Black Sands Creek area and Yarra State Forest. A permit is required to 'construct bicycle pathways and trails' under this overlay.

Environmental Significance Overlay (ESO1 – B55#) covers part of the study area. Protects the botanical significance of the Britannia Creek area. A permit is required to 'construct bicycle pathways and trails' under this overlay.

Bushfire Management Overlay covers the entire study area and requires a permit for works on projects relating to 'leisure and recreation'.

4.2.4 Native Vegetation Management Framework

The Framework provides State Government policy (referred to as the Net Gain policy) for the protection, enhancement and revegetation of native vegetation in Victoria (DNRE 2002) and is an incorporated document in all planning schemes. The Framework is due to be replaced with the *Permitted clearing of native vegetation – Biodiversity assessment guidelines* (DEPI 2013b) as part of reforms to the Victoria Planning Provisions. The reforms are currently scheduled for introduction in September 2013.

Link for further information: <http://www.dse.vic.gov.au/land-management/victorias-native-vegetation-management-a-framework-for-action>

If the proposed mountain bike trails require the removal of vegetation an application will need to be made under clause 52.17 of the Yarra Ranges Planning Scheme to remove, destroy or lop native vegetation. Within the application World Trail must explain (Clause 52.17-3) its response to the three step approach to Net Gain that has been taken to:

- avoid adverse impacts, particularly through the removal of native vegetation clearance, where possible.
- minimise impacts from removal of native vegetation through appropriate consideration during planning processes and expert input to project design and/or management. if impacts cannot be avoided
- Identify appropriate offset option for the loss of native vegetation if required.

Detailed quantification of the vegetation losses associated with this project can be provided following a field assessment and the provision of detailed design drawings for the trails.

4.2.5 Water Act 1989

The primary purpose of the *Water Act 1989* is to provide a framework for the allocation and management of surface water and groundwater throughout Victoria. It provides a principal mechanism for maintenance of ecosystem functions including those of aquatic ecosystems. Under By-Laws created by the relevant Authority under the Act, the authorities regulate the works within and in the vicinity of waterways. In Melbourne Water's management area this applies to all waterways with a catchment area of 60ha or more. These waterways are deemed to be Melbourne Water assets, while all smaller watercourses are deemed the responsibility of the local government.

The construction of mountain bike trails may involve construction or maintenance activities that affect beds and banks of waterways, riparian vegetation or quality or quantity of water in creeks and waterways.

Construction of trails within the study area may require a permit from Melbourne Water. The need for a permit could be further assessed following field assessment and the development of detailed design drawings. Guidelines and application forms are available from Melbourne Water and can be obtained from Melbourne Water's Asset Service team – 9235 1414.

4.2.6 Environment Protection Act 1970: State Environmental Protection Policy (Waters of Victoria) 2003

The Environment Protection Act underpins the State Environmental Protection Policy (SEPP) - Waters of Victoria which provides a legal framework for the protection and rehabilitation of Victoria's surface water environments.

Depending on the final trail designs the project may directly and/or indirectly impact upon waterways and their aquatic ecosystems. The SEPP requires that aquatic ecosystem values be protected. Environmental quality objectives and indicators are defined to protect beneficial uses (i.e. the uses and values of the water environment) and an attainment program provides guidance on protection of the beneficial uses.

Impacts to surface water quality must not result in changes that exceed background levels and/or the water quality objectives specified for the Forest-A segment to protect surface water uses and values. World Trail needs to ensure that direct and indirect (e.g. runoff) impacts to surface water quality do not exceed the background levels and/or water quality objectives.

Link to further information: <http://www.epa.vic.gov.au/water/epa/wov.asp>.

4.2.7 Regional Catchment Strategy and River Health Strategy

State Planning Policy Framework Clause 14.02-1 (Catchment planning and management) states that planning must consider as relevant, Regional Catchment Strategies (RCS) and any associated implementation plan or strategy including any regional river health and wetland strategies.

Strategies of relevance to the study area are the:

- Port Phillip and Westernport Regional Catchment Strategy (PPWCMA 2004)
- West Gippsland Catchment Management Strategy (WGCMA 2012)
- Port Phillip and Westernport Regional River Health Strategy (Melbourne Water 2007)
- West Gippsland River Health Strategy (WGCMA 2005)

These documents provide recommendations on the protection of existing high-value rivers and creeks that are in good condition and strategic improvement of other rivers and creeks.

5. Key Ecological Values and Recommendations

This section identifies the key ecological features of the study area, provides an outline of potential implications of the proposed construction of mountain bike trails on those values and includes recommendations to assist World Trail to design trails that minimise impacts on biodiversity.

This report provides a broad overview of the range of flora and fauna values that may occur within the study area based on available data and expert knowledge. It provides mapping that describes the predicted extent of vegetation communities within the study area and describes the importance of these vegetation communities for threatened flora and fauna species.

The study area is part of a large area of contiguous intact native forest and any works within the area are likely to involve the removal of native vegetation. DEPI vegetation mapping predicts that seven EVCs are likely to be present within the study area and any removal of native vegetation would require compliance with the Yarra Ranges Planning Scheme under the Planning and Environment Act and Victoria's Native Vegetation Management Framework as set out in section 4. A detailed assessment would therefore be required to assess the quality and extent of native vegetation to be impacted.

The FFG Act listed Cool Temperate Rainforest community is likely to be present in some moist gullies within the study area and there are a significant number of threatened species that occur within 5 km. Given the relatively undisturbed nature of the study area there are 29 significant flora species and 21 threatened fauna species that have a medium or higher likelihood of occurrence. The threatened species that have been identified in database searches are typically found in a range of environments that occur across the study area. This includes areas ranging from wet gullies to open forest and aquatic environments. The implication of these findings is that the majority of the study area could be considered potential habitat for threatened species.

The information presented in this report should be incorporated into the next phase of design for the project in order to minimise impacts on biodiversity values. The primary measure to reduce impacts to biodiversity values within the study area is to minimise removal of native vegetation and terrestrial and aquatic habitat. The following steps could be incorporated into the design phase to minimise the impact of the trails on flora and fauna:

- Utilise previously disturbed areas and existing trails wherever possible. These areas will typically contain lower value native vegetation and have a lower likelihood of threatened species being present.
- Where possible the trail alignment should avoid the removal of trees, particularly large old trees containing a diversity of hollows.
- Ensure that canopy connectivity is not impacted by the construction of the trail, which is of particular importance for the Leadbeater's Possum. This includes midstorey canopy connectivity (e.g. dense thicket along waterways and areas containing a midstorey dominated by *Acacia* spp.)
- Avoid impact to the Leadbeater's Possum reserve system. Obtaining the GIS layer for these reserves will be required for future planning.
- Use sensitive construction techniques that minimise disturbance such as elevated platforms over areas of sensitivity and the use of equipment that minimises construction impacts beyond the trail footprint.

- Designs should seek to avoid waterways, low lying damp areas and wet gullies. These habitats are sensitive to disturbance and sedimentation associated with construction can impact on aquatic habitats and species.
- Avoid gullies that may contain the FFG Act listed Cool Temperate Rainforest community.
- Undertake a micro-siting survey to refine the location of the final trail alignment, in order to avoid areas of ecological sensitivity.

As the impacts of the proposed mountain bike trail are likely to be relatively low and localised in comparison to the overall size of the study area a detailed survey of the entire area would not be feasible. Rather, a field assessment of areas outlined in future trail designs that integrate the findings of this desktop assessment could be undertaken to accurately assess the impact of the proposed trail alignment on threatened species, determine the presence of threatened vegetation communities and quantify any associated vegetation losses according to relevant policy. For some rare and cryptic threatened species and communities targeted survey may be required to determine potential impacts.

Our previous experience with the assessment of similar trails has been that early field assessment of proposed trail alignments can be valuable in identifying and avoiding areas of sensitivity.

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Appendices

Appendix 1: Flora

Notes to tables:

EPBC Act: CR - Critically Endangered EN - Endangered VU - Vulnerable	DSE 2005: e - endangered v - vulnerable r - rare
PMST – Protected Matters Search Tool	FFG Act: L - listed as threatened under FFG Act P - protected under the FFG Act (public land only)

A1.1 Significant flora species

The following table includes a list of the significant flora species that have potential to occur within the study area. The list of species is sourced from the Victorian Flora Information System and the Protected Matters Search Tool (DSEWPaC; accessed on 14.08.2013).

Table A1.1. Significant flora species recorded / predicted to occur within 5 km of the study area.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
National Significance									
<i>Astelia australiana</i>	Tall Astelia	VU	v	L	2007	PMST	Cool temperate rainforest in gullies on undulating, upland plateaus; typically in association with <i>Nothofagus cunninghami</i> .	Medium	Restricted to Cool Temperate Rainforest
<i>Dianella amoena</i>	Matted Flax-lily	EN	e	L	#	PMST	Lowland grassland and grassy woodland, on well-drained to seasonally waterlogged fertile sandy loam soils to heavy cracking clays.	Negligible	No suitable habitat
State Significant									
<i>Austrostipa rudis</i> subsp. <i>australis</i>	Veined Spear-grass		r		2005		Cooler areas of moderate altitude, in open-forest on sandy or sandstone derived soils.	Medium	Lower elevation grassy/shrubby forests
<i>Bossiaea cordigera</i>	Wiry Bossiaea		r		2007		Moist well drained soils in heathy open forests	Medium	Suitable habitat present
<i>Bossiaea riparia</i>	River Leafless Bossiaea		r		1900		Moist wet positions along watercourses	Medium	Suitable habitat present
<i>Calochilus</i>	Naked Beard-		r		1980		Drier forests and woodlands	Medium	Lower elevation

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
<i>imberbis</i>	orchid								grassy/shrubby forests
<i>Cardamine papillata</i>	Forest Bitter-cress		r		n.d.		Moist soils in wet mountain forests	Medium	Suitable habitat present
<i>Carex alsophila</i>	Forest Sedge		r		1994		Moist to wet soils in forests of mountain gullies and swamps	Medium	Suitable habitat present
<i>Cephalomanes caudatum</i>	Jungle Bristle-fern		v		1980		Humid rainforests, growing on tree ferns especially the Rough Treefern	Medium	Suitable habitat present
<i>Correa reflexa</i> var. <i>lobata</i>	Powelltown Correa		r		1985		Moist well drained soils in foothill forests	High	Suitable habitat present
<i>Eucalyptus</i> aff. <i>camphora</i> (Upper Yarra)	Upper Yarra Swamp-gum		e		2007		Poorly-drained clay-loam soils near rivers usually at high altitudes	Medium	Suitable habitat present
<i>Eucalyptus fulgens</i>	Green Scentbark		r		2008		Forests and woodlands of the Gippsland Plain and adjacent foothills.	High	Suitable habitat present
<i>Grammitis magellanica</i> subsp. <i>nothofageti</i>	Beech Finger-fern		v		1999		On tree branches and trunks, especially soft tree-ferns, on logs and rocks in sheltered gullies of wet forest in the Central Highlands	Medium	Restricted to Cool Temperate Rainforest
<i>Hovea asperifolia</i> subsp. <i>spinosissima</i>	Rough Hovea		r		1983		Dry well drained slopes in forests	Medium	Suitable habitat present
<i>Lastreopsis hispida</i>	Bristly Shield-fern		r		1977		Moist soils in wet forest and rainforest gullies	High	Suitable habitat present

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
<i>Leionema bilobum</i> subsp. <i>serrulatum</i>	Toothed Leionema		r		1994		Moist well drained soil in moist to wet forests	High	Suitable habitat present
<i>Lindsaea microphylla</i>	Lacy Wedge-fern		r		1993		Moist soils in open forests and heaths	High	Suitable habitat present
<i>Persoonia arborea</i>	Tree Geebung		v		2006		Moist to wet mountain gullies and forests	High	Wet Forest and Margins of Cool Temperate Rainforest
<i>Phebalium squamulosum</i> subsp. <i>squamulosum</i>	Forest Phebalium		r		1989		Moist to dry well drained soils in moist forests	High	Suitable habitat present
<i>Pomaderris pilifera</i> subsp. <i>pilifera</i>	Striped Pomaderris		r		2003		Moist well drained soils in drier open forests and woodland east of Warburton	High	Suitable habitat present
<i>Prasophyllum pyriforme</i> s.s.	Silurian Leek-orchid		e		n.d.		Dry foothill forest with shrubby understorey.	Medium	Suitable habitat present
<i>Pultenaea juniperina</i> s.s.	Prickly Beauty		r		1904		Wet and dry forests, heaths and woodlands	Medium	Suitable habitat present
<i>Pultenaea weindorferi</i>	Swamp Bush-pea		r		1903		Moist depressions in moist forest.	Medium	Suitable habitat present
<i>Sticherus tener</i> s.s.	Tasman Fan-fern		r		1976		Moist clay soils along watercourses in wet and riparian forests and in disturbed sites	High	Suitable habitat present

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
<i>Tetratheca stenocarpa</i>	Long Pink-bells		r		1990		Moist to well drained soils in tall mountain forests.	High	Suitable habitat present
<i>Thismea rodwayi</i>	Fairy Lanterns		e		-		Deep organic loamy soil in damp forests	High	Poorly surveyed species known in the area to Biosis Botanists
<i>Tmesipteris parva</i>	Small Fork-fern		r		1979		Grows on trunks of tree-ferns, especially Rough Tree-fern, in gullies of moist to wet forests	Medium	Rainforest and rainforest margins
<i>Utricularia gibba</i>	Floating Bladderwort#		v		2007		Aquatic environments	Low	Requires open water, slow flowing or stagnant
<i>Westringia senifolia</i>	Alpine Westringia		r		1980		Subalpine woodlands.	Negligible	No suitable habitat
<i>Wittsteinia vacciniacea</i>	Baw Baw Berry		r		1996		Moist soils in rainforest and alpine ash forest in sheltered positions	Negligible	Out of natural range

Appendix 2: Fauna

Notes to tables:

EPBC Act: EX - Extinct CR - Critically Endangered EN - Endangered VU - Vulnerable CD - Conservation dependent PMST – Protected Matters Search Tool	DEPI 2013: ex - extinct cr - critically endangered en - endangered vu - vulnerable nt - near threatened dd - data deficient rx - regionally extinct
## - Species not recorded within relevant databases but predicted to occur by Biosis based on expert knowledge.	FFG Act: L - listed as threatened under FFG Act N - nominated for listing as threatened I - determined ineligible for listing

Fauna species in these tables are listed in alphabetical order within their taxonomic group.

A2.1 Significant fauna species

The following table includes a list of the significant fauna species that have potential to occur within the study area. The list of species is sourced from the Victorian Biodiversity Atlas and the Protected Matters Search Tool (DSEWPaC; accessed on 14.08.2013).

Table A2.1. Significant fauna species recorded, or predicted to occur, within 5 km of the study area.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
Mammals									
<i>Cercartetus nanus</i>	Eastern Pygmy-possum		nt	I	1998		Occurs throughout south-eastern Australia in a variety of vegetation communities including subalpine woodland, wet forest, Box Ironbark Forest, coast scrub, heathy woodland and subalpine heath. Floristic diversity thought to be an important determinant of habitat quality.	Recorded	Previously recorded within study area, suitable habitat present.
<i>Dasyurus maculatus maculatus</i>	Spot-tailed Quoll	EN	en	L	-	PMST	The Spot-tailed Quoll is a large carnivorous marsupial that occupies a broad range of forest and woodland habitats. Den sites include rock crevices, caves and hollow logs and trees.	Low	No records within local area.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
<i>Gymnobelideus leadbeateri</i>	Leadbeater's Possum	EN	en	L	2008	PMST	Until the early 1990s, extant populations of Leadbeater's Possum were believed to be confined to ash-dominated forests in Victoria's Central Highlands, with an outlying population in lowland swamp forest at Yellingbo. However, the species has been discovered using Sub-alpine Woodland at a number of locations including Lake Mountain, Mt Bullfight and Mt Baw Baw. The species is associated with areas regenerating from fire with a diversity of hollows for nesting and the presence of <i>Acacia</i> spp.	Recorded	Known to occur in the area, suitable habitat present.
<i>Isodon obesulus obesulus</i>	Southern Brown Bandicoot	EN	nt	L	1999	PMST	Typically occurs in heathland, shrubland, heathy forest and woodland habitat across southern Victoria. Previously recorded on the outskirts of Stawell and also known from within the Grampians National Park.	Medium	Species has previously been recorded to the west (around Yarra Junction), however suitable habitat elements (e.g. heathy understorey) may not be present within the study area.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
<i>Mastacomys fuscus mordicus</i>	Broad-toothed Rat		en	N	1992		Occupies structurally dense vegetation communities in high rainfall areas in south-eastern Australia. Typically inhabits closed vegetation communities such as heathland, grassland and sedgeland and is a specialist feeder on the stems of plants from the families Poaceae and Cyperaceae.	Recorded	Previously recorded within the broader area, suitable habitat likely to occur, particularly in close proximity to drainage lines.
<i>Miniopterus schreibersii oceanensis</i>	Eastern Bent-wing Bat		vu	L	2000		A range of open forests in relatively high rainfall areas. The species has a requirement for caves (or similar human-built structures such as mineshafts) for roosting, mating and raising young. Some caves may hold many thousands of animals from a wide catchment area.	Recorded	Previously recorded within study area, likely to regularly forage over the study area.
<i>Myotis macropus</i>	Large-footed Myotis		nt		1991		Generally roosts in caves, tunnels and tree hollows and feeds over water bodies, with most Victorian records associated with wetlands or waterways.	Recorded	Likely to forage over watercourses and wetlands within the study area.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
<i>Petauroides volans</i>	Greater Glider		vu		2011		This hollow-dependent, gliding possum feeds largely on eucalypt leaves. It occurs throughout eastern Australia, where it is most common within damp and wet forest with a high density of hollow-bearing trees, especially at higher altitudes.	Recorded	Known to occur in local area, suitable habitat present.
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	VU	cr	L	-	PMST	Currently known only from the tributaries of the Snowy River in East Gippsland and the Grampians in the west. Found in a variety of habitat types, including rainforest gullies, wet and dry sclerophyll forest, and open woodlands, preferring rock faces with large tumbled boulders, ledges and caves and areas that are relatively open and receiving direct sunlight for much of the day.	Negligible	No habitat present.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
<i>Pseudomys fumeus</i>	Smoky Mouse	EN	en	L	-	PMST	Disjunct Victorian distribution with populations in the Snowfields, Eastern Highlands, East Gippsland, Otway Range and the Grampians. Recorded from a variety of vegetation communities ranging from coastal heath and heathy woodland in East Gippsland to subalpine heath and dry forest. The understorey vegetation is typically dominated by heathy shrubs, with seeds and berries providing an important food resource.	Low	Lack of suitable habitat elements, no records within local area.
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	VU	vu	L	1982	PMST	Utilises a wide range of habitats from lowland rainforest in East Gippsland and coastal Stringybark forests to agricultural land and suburban gardens, with permanently established colonies in Melbourne, Geelong and Mallacoota.	Medium	Wide-ranging and highly mobile species likely to utilise habitat within the study area on occasion.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
<i>Rhinolophus megaphyllus megaphyllus</i>	Eastern Horseshoe Bat		vu	L	1998		Occurs in tropical and temperate rainforest, deciduous vine forest, dry and wet sclerophyll forest, open woodland, coastal scrub and grassland areas. More active in mature forests than regrowth and commonly forages along tracks and waterways. Lives in caves as well as abandoned mines, rock piles, buildings, tree hollows, old railway tunnels, tree roots in undercut creek banks, stormwater drains and culverts.	Recorded	Suitable habitat present, likely to forage over the study area.
<i>Sminthopsis leucopus</i>	White-footed Dunnart		nt	L	1978		Occurs in coastal areas and adjacent plains and foothills, also extending inland along some major river valleys. Preferred habitats include coastal tussock grassland and sedgeland, wet heath, and forest or woodland with a dense heathy understorey or mid-storey vegetation.	Medium	Historically recorded from the local area, may occur in drier vegetation communities located along ridgelines.
Birds									
<i>Accipiter novaehollandiae</i>	Grey Goshawk		vu	L	2001		Favours tall, wet forests in gullies but can occur in woodlands, dry forests, wooded farmlands and suburban parks. Relies on mature forests for breeding.	Recorded	Previously recorded within the local area, suitable habitat present.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
<i>Anthochaera phrygia</i>	Regent Honeyeater	EN	cr	L	1985	PMST	Inhabits dry woodlands and forests dominated by Box Ironbark eucalypts. Distribution currently restricted to the Chiltern - Mt Pilot National Park in north-eastern Victoria following severe range contraction and population decline.	Low	Mostly confined to box-ironbark communities.
<i>Ardea modesta</i>	Eastern Great Egret		vu	L	2002	PMST	Usually found in terrestrial wetland, estuarine and wet grassland habitats particularly permanent well-vegetated water bodies but also use freshwater meadows, channels and larger dams. Forages by wading in shallow open water. Uses estuarine mudflats as summer-autumn or drought refuges.	Low	While known from the local area, habitat unlikely to be present within the study area.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
<i>Aythya australis</i>	Hardhead		vu		2001		A mainly aquatic species preferring large, deep freshwater environments with abundant aquatic vegetation, including slow moving areas of rivers. Also occurs in brackish wetlands and can be found in deep dams and water storage ponds. Occasionally in estuarine and littoral habitats such as salt pans, coastal lagoons and sheltered inshore waters. Avoids main streams or rivers, except in calm reaches where aquatic flora is developed.	Low	While known from the local area, habitat unlikely to be present within the study area.
<i>Botaurus poeciloptilus</i>	Australasian Bittern	EN	en	L	1972	PMST	Occurs in wetlands with tall, dense vegetation where it forages in shallow water at the edges of pools or waterways. Prefers permanent freshwater habitats, particularly when dominated by sedges, rushes and reeds.	Negligible	Habitat not likely to be present within the study area.
<i>Ceyx azureus</i>	Azure Kingfisher		nt		2000		Azure Kingfishers are associated with well vegetated freshwater wetlands and slow-flowing creeks and rivers, including artificial wetlands and drains, open riverine or swamp forest or woodland environments and occasionally among mangroves in sheltered coastal areas.	Medium	Suitable habitat present, previously recorded locally.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
<i>Chthonicola sagittata</i>	Speckled Warbler		vu	L	1896		Occurs in open forest and Box Ironbark Woodlands, usually with scattered shrubs and a cover of acacias. Seldom seen far from dense patches of shrubs.	Low	Lack of suitable habitat.
<i>Cinclosoma punctatum</i>	Spotted Quail-thrush		nt		1981		Occurs in drier forests, woodlands and scrub of south eastern Australia. Prefers areas with leaf litter, branches, rocks and tussocks. Often found on the sunny side of dry ridges.	Medium	Historically recorded from the local area, may occur in drier vegetation communities located along ridgelines.
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (south-eastern ssp.)		nt		1973		Often observed feeding on insects as it spirals up trees or when hopping along the ground or on fallen litter. Generally inhabits open eucalypt forests, woodlands and mallee, often where there are stands of dead trees.	Medium	Unlikely to occur in wet/damp forest communities.
<i>Excalfactoria chinensis</i>	King Quail		en	L	1927		This species has a preference for wet heath environments where they feed and nest on the ground, but have also been recorded in coastal heath. The current range of this species in Victoria is not known but it is likely to be severely restricted.	Negligible	No habitat present.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
<i>Gallinago hardwickii</i>	Latham's Snipe		nt		1988	PMST	A migrant to Australia from July to April occurring in a wide variety of permanent and ephemeral wetlands. Prefers open freshwater wetlands with nearby cover, but also recorded on the edges of creeks and rivers, river-pools and floodplains. Forages in soft mud at edge of wetlands and roosts in a variety of vegetation around wetlands including tussock grasslands, reeds and rushes, tea-tree scrub, woodlands and forests.	Low	Habitat within the study area unlikely to be suitable.
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle		vu	L	2001	PMST	Occurs in marine habitats and terrestrial wetlands along or near coastal areas in eastern Victoria, particularly around large open wetlands such as deep freshwater swamps, lakes, reservoirs and billabongs. Uses tall trees in or near water for breeding.	Low	No suitable habitat.
<i>Hirundapus caudacutus</i>	White-throated Needletail		vu		2001	PMST	An almost exclusively aerial species within Australia, occurring over most types of habitat, particularly wooded areas. Less often seen over open farm paddocks.	Recorded	A largely aerial species likely to forage over study area on occasion.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
<i>Lathamus discolor</i>	Swift Parrot	EN	en	L	-	PMST	Migrates to south-east mainland Australia during the winter months where it prefers dry, open eucalypt forests and woodlands, especially Box Ironbark Forest in north-central Victoria. Has also been recorded in urban parks, gardens, street trees and golf courses with flowering ornamental trees and shrubs.	Low	No suitable habitat.
<i>Lewinia pectoralis</i>	Lewin's Rail		vu	L	1988		Inhabits densely vegetated wetlands, including swamps, farm dams, saltmarshes, lakes and small pools that can range from fresh to saline water. May also use riparian forest.	Recorded	May occur along densely vegetated drainage lines and wetlands within the study area.
<i>Melanodryas cucullata</i>	Hooded Robin		nt	L	1976		Occupies a range of open woodlands including those dominated by Eucalypts, Acacias and Callitris with an understorey of smaller trees, shrubs and grasses.	Low	More commonly associated with drier woodland communities, not likely to occur within wet/damp forests.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
<i>Ninox connivens</i>	Barking Owl		en	L	2000		Prefers dry, open sclerophyll forests and woodlands across Australia including dense riparian galleries containing large hollow-bearing trees suitable for nesting. Often located at the interface between forests and cleared land containing abundant prey.	Low	Lack of preferred habitat, unlikely to be present.
<i>Ninox strenua</i>	Powerful Owl		vu	L	2003		Prefers tall open sclerophyll forest and woodlands and requires large, hollow-bearing eucalypts for breeding. While the species has been recorded from a wide range of woodland habitats, preferred habitat typically contains a dense understorey and suitable roost trees with a dense canopy cover. The species is more commonly associated with large tracts of continuous forest, but will also occur in more fragmented landscapes including suburban parklands.	Recorded	Known to occur within the local area; suitable habitat present.
<i>Nycticorax caledonicus hillii</i>	Nankeen Night Heron		nt		1971		Occurs in a variety of estuarine and terrestrial wetlands where it forages in shallow slow-moving water or exposed banks, mudflats and swamp vegetation. Also uses wet meadows and pastures, urban wetlands and ponds,	Low	While known from the local area, habitat unlikely to be present within the study area.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
							preferring wetland areas with swampy fringing vegetation and nearby trees for roosting.		
<i>Phalacrocorax varius</i>	Pied Cormorant		nt		1969		Mainly inhabits marine environments and coastal waters including beaches, coastal lagoons, estuaries and rock platforms. Also found in terrestrial wetlands with open expanses of permanent water including rivers, inland lakes and billabongs. Breeds and roosts in trees or bushes along the edges of wetlands, as well as on artificial structures such as pylons.	Low	While known from the local area, habitat unlikely to be present within the study area.
<i>Platalea regia</i>	Royal Spoonbill		nt		1969		Prefers terrestrial wetlands and wet grassland areas, particularly large expanses of water such as lakes, swamps or lagoons. Also utilises rivers for foraging activities and has regularly been recorded in coastal habitats such as estuaries, inlets and intertidal mudflats.	Low	While known from the local area, habitat unlikely to be present within the study area.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
<i>Rostratula australis</i>	Australian Painted Snipe	EN	cr	L	-	PMST	Generally found in shallow, terrestrial freshwater wetlands with rank, emergent tussocks of grass, sedges and rushes. Australian Painted Snipe can occur in well vegetated lakes, swamps, inundated pasture, saltmarsh and dams.	Negligible	No habitat present.
<i>Tyto tenebricosa</i>	Sooty Owl		vu	L	2008		Prefers tall old-growth montane forests, including rainforest in temperate and sub-tropical regions with sheltered gullies and slopes. Sometimes recorded in riparian habitat and younger forest if there is old-growth forest nearby or a high density of stags. Roosts in trees with dense foliage and requires large tree hollows for breeding.	Recorded	Known to occur within the local area; suitable habitat present.
Reptiles									
<i>Lissolepis coventryi</i>	Swamp Skink		vu	L	1995		Occupies swamp scrub habitat in cool, temperate, low-lying wetlands and swamp margins with a dense shrub layer, particularly in near-coastal areas ranging from the Mt Gambier region in the west, across southern Victoria to just beyond the NSW border to the east.	Low	Habitat unlikely to be present.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
<i>Varanus varius</i>	Lace Goanna		en		1925		Occurs in variety of wooded habitats. Shelters in hollow trunks, limbs and logs.	Recorded	Previously recorded within study area, suitable habitat present.
Frogs									
<i>Litoria raniformis</i>	Growling Grass Frog	VU	en	L	unknown	PMST	Occupies a variety of permanent and semi-permanent water bodies generally containing abundant submerged and emergent vegetation, within lowland grasslands, woodlands and open forests.	Low	Species not likely to occur in forested habitats.
<i>Pseudophryne bibronii</i>	Brown Toadlet		en	L	1962		Occurs in a variety of damp and occasionally inundated habitats at lower elevations, including watercourses and gullies in forest and woodland habitat, roadside ditches and table drains, wetlands, permanent ponds, and heaths and grasslands with abundant damp leaf litter required for shelter.	Medium	Species from this genus are more likely to be found on the flats of the Yarra River than within the study area
Fishes									

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
<i>Galaxiella pusilla</i>	Dwarf Galaxias	VU	en	L	-	PMST	Occurs in relatively shallow still or slow flowing water bodies including streams, wetlands, drains, that in many instances are ephemeral and partially dry up over summer. Typically requires abundant marginal and aquatic vegetation.	Negligible	No suitable habitat within the study area
<i>Macquaria australasica</i>	Macquarie Perch	EN	en	L	1993		A riverine fish preferring deep holes, its natural distribution extends north of the Great Dividing Range in tributaries of the Murray River. Early this century it was introduced to many waters south of the Great Dividing Range but has only been recorded in the Yarra with any regularity since.	Medium	Populations have been successfully established in the Yarra River Catchment and may occur within the study area.
<i>Melanotaenia fluviatilis</i>	Crimson-spotted Rainbowfish		vu	L	1905		Schooling, surface dwelling species that prefers wetlands, billabongs and slow flowing rivers. It is limited to the larger waterways such as the Murray, the Goulburn and Broken rivers in Victoria, due to cold winter temperatures in smaller systems.	Negligible	No suitable habitat within the study area.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
<i>Prototroctes maraena</i>	Australian Grayling	VU	vu	L	2000	PMST	A diadromous species which spends most of its life in freshwater within rivers and large creeks. Juveniles inhabit estuaries and coastal seas. Adults occur in freshwater habitats, typically rivers and streams with cool, clear waters and gravel substrates, but occasionally also in turbid waters.	Low	Species is unlikely to occur within the study area, although limited suitable habitat may be present.
Invertebrates									
<i>Riekoperla darlingtoni</i>	Mt Donna Buang Wingless Stonefly		cr	L	1999		<i>Riekoperla darlingtoni</i> is a wingless stone fly restricted to the southern slopes of Mount Donna Buang. <i>R. darlingtoni</i> larval stages have been collected in trickles of water within its range, with adults being found in adjacent habitats of curled up strips of bark from Alpine Ash <i>Eucalyptus delegatensis</i> .	Low	Study area is outside of the very restricted range of the species.
<i>Thaumatoperla alpina</i>	Alpine Stonefly	EN	vu	L	1962		Found at altitudes >760m in streams above the treeline. Typically found in steep, stony, cool streams, often below a cascade of water underneath cobblestones or detritus. The Alpine Stonefly inhabits high altitude areas at least 760 m above sea level, including areas above the tree line.	Negligible	No suitable habitat within the study area above 760 m ASL. Study area outside of known distribution.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
<i>Thaumatoperla robusta</i>	Stonefly		dd		1972		No habitat information available. Only two available records of this species occur.	High	One of the two available records of this species occurs within the study area.
Crustaceans									
<i>Boeckella nyoraensis</i>	Calanoid copepod		dd		1910		Limited information available of the habitat requirements of the species, although the species is known to occur in vegetated still water bodies with low turbidity.	Medium	Limited suitable habitat likely to occur in the study area.
<i>Engaeus curvisuturus</i>	Curve-tail Burrowing Crayfish		en	L	1983		Occurs on grey clay and silty soils on flood-plains in a restricted area between the Mount Baw Baw region and Warbuton.	Medium	Multiple species of <i>Engaeus</i> are likely to occur within the study area.
<i>Engaeus hemicirratulus</i>	Gippsland Burrowing Crayfish		en		1963		This species typically occupies burrows in yellow orange clay dominated soils on hill slopes adjacent to watercourses or floodplains, usually above an altitude of 100m. The species is widespread in Victoria but has mostly been recorded from the Western and Eastern Strzelecki Ranges.	Medium	Multiple species of <i>Engaeus</i> are likely to occur within the study area.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
<i>Engaeus tuberculatus</i>	Tubercle Burrowing Crayfish		en		1963		Eastern populations of this species occur in the flood-beds and clay-dominated hill-slopes of Eucalyptus regnans forest where there is an abundance of ferns at ground level. In western populations, where it occurs in sympatry with Engaeus urostrictus, the species tends to only inhabit burrows on the slopes above creek beds (independent of the water table).	Medium	Multiple species of <i>Engaeus</i> are likely to occur within the study area.
<i>Engaeus urostrictus</i>	Dandenong Burrowing Crayfish		cr	L	##		Most records occur within the Dandenong Ranges close to streams with abundant fern coverage in wet sclerophyll forest dominated by <i>Eucalyptus regnans</i> . The species is not thought to occur west of the Dandenong Ranges, however, records from Bunyip and Mt Donna Buang suggest that the eastern range may be extensive.	Medium	Multiple species of <i>Engaeus</i> are likely to occur within the study area.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEPI	FFG					
<i>Engaeus victoriensis</i>	Foothill Burrowing Crayfish		e		##		Occurs in north-west, west and southern foothills of the Dandenong Ranges, with a disjunct population occurring on the Mornington Peninsula between Panton Hill and Flinders. The species has been recorded in grey, clay dominated soils of wet sclerophyll foothill forests and the low-lying parts of creek systems.	Medium	Multiple species of <i>Engaeus</i> are likely to occur within the study area.

A2.2 Migratory species (EPBC Act listed)

Table A2.2. Migratory fauna species recorded or predicted to occur within 5 km of the study area.

Scientific name	Common name	Most recent record
<i>Acrocephalus stentoreus</i>	Clamorous Reed Warbler	2001
<i>Anthochaera phrygia</i>	Regent Honeyeater	1985
<i>Apus pacificus</i>	Fork-tailed Swift	2001
<i>Ardea modesta</i>	Eastern Great Egret	2002
<i>Bubulcus ibis</i>	Cattle Egret	-
<i>Chalcophaps indica</i>	Emerald Dove	1800
<i>Gallinago hardwickii</i>	Latham's Snipe	1988
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	2001
<i>Hirundapus caudacutus</i>	White-throated Needletail	2001
<i>Lewinia pectoralis</i>	Lewin's Rail	1988
<i>Merops ornatus</i>	Rainbow Bee-eater	-
<i>Monarcha melanopsis</i>	Black-faced Monarch	1998
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	2000
<i>Pandion cristatus</i>	Eastern Osprey	-
<i>Rhipidura rufifrons</i>	Rufous Fantail	2001
<i>Rostratula australis</i>	Australian Painted Snipe	-