Belmont Regional Park Trail Audit

Belmont Area Mountain Bike Association
in Partnership with Greater Wellington Regional Council

BAMBA
BELMONT AREA MOUNTAIN BIKE ASSOCIATION

Greater Wellington
Te Pane Matua Taiao

TrailPRO TRAIL CONSTRUCTION
WE DIG, YOU RIDE

The Vision for the Belmont Regional Park Mountain Bike Trails
"Strategic solutions for long term mountain bike trail development
and quality riding experiences with strong links to cultural and ecological education"

Report Summary

Belmont Regional Park is situated on the North Island of New Zealand in the Wellington Region near New Zealand's Capital City, Wellington. More specifically the 3500ha (approx.) block of land is sandwiched between Porirua to the North, Tawa to the West and the Hutt Valley to the South and East. Open farmland, native bush and native forest regrowth typifies the landscape of the park. The park has a long-standing history that is important to both Māori and early European settlers of the lower north Island as well as important ecological assets that contribute to the regional significance of Belmont Regional Park.

The assessment of trails for the purposes of the trail audit has been conducted in a number of ways. Firstly, by on-site collection of data and in order to see the trail network firsthand to allow for subjective evaluation against the assessors' extensive experience in the mountain bike industry. Secondly, the collection of secondary data and finally the analysis of primary and secondary data and information was undertaken in order to generate the audit report.

Main Findings
The trail network has good access from all corners of the park, future proofing a variety of recreation-based developments across the entire park. This will allow park managers to cater to the growing population bases in surrounding areas.

The climate and geology of the region lends itself well to year-round mountain biking. The core fundamental soil type of the BRP is classified as Brown. These soil types are relatively stable topsoils and are most common across New Zealand. Orthic Brown and Firm Brown soils are the two main subcategories of soil classification found in the park. The geological conditions of the park create favourable conditions for the construction of cost effective, sustainable, and high-quality trails. Generally, the terrain and landscape lends itself well to hosting a high quality network of mountain bike trails.

There are 31 trails in the Belmont Regional Park totalling approximately 70km. There are a range of trails across various trail use types and styles however, the main concentration of mountain bike trails within the park is in the grade 3 bracket with 38km of trail. The primary area of focus for this trail audit is the area of Belmont Regional Park located between the Stratton Street and Hill Road entrances. There are several valuable pieces of infrastructure that allow for an enhanced user experience at these sites such as the provision of parking vehicles at both entrances. This area contains the core concentration of mountain bike specific single tracks at approximately 14km of trail. Within this network there is a total of 5.9km of grade 2 trails, 6.1km of grade 3 trails, one 970m grade 4 trail, and one 760m grade 5 trail. The trail network itself is well designed with good network flow. However, certain key trails in the network lack continuity in their style and others could do with some additional maintenance and care in their upkeep. By attending to these issues, the user experience of the current trail network will be greatly enhanced.

Trail use analysis was completed based on data uploaded by users directly to Trailforks or synced from their Strava accounts. Analysis of this information found that current users are mostly males between 30 – 50 years of age and mostly locals and visitors from the Wellington area. Popular loop rides consist mainly of Bull Run - Bull A Varde connector, Bull Run, 4 degrees and Borderline while top individual trail rankings by check-ins are 1. 4 degrees, 2. Electric Avenue, 3. Weta, 4. Bull Run and 5. Borderline.

External Opportunities for Belmont Regional Park Mountain Bike Development

1. Park Specific Management and Policies; Belmont Regional Park
2. Continued growth and changes in the sport of mountain biking

Recommendations

Core Development Principles

The following core development principles have been recommended as a basis for enhancing the user experience of the Belmont Regional Park for mountain bikers and are;

1. Safe skill progression achieved through maintaining the principal ideas of allowing for rider progression and providing a range of trail styles in the network,
2. Destination trails with a focus on the ride experience that take riders on an educational and experiential journey of culture and ecology during mountain bike rides in the Belmont Regional Park communicated with a persona specific to the trail network,
3. Controls imposed on the planning and development of the mountain bike trail network through Wellington Regional Council policies and park development strategy; and
4. Quality over Quantity as the root of core development principles driving high-quality cost-effective trail construction as the bottom line.

Trail Redevelopment

Trail upgrades to Weta, Electric Avenue, Bull Run and the intersection of Bull Run, Bull A Varde and Bull Run – Bull A Varde Connector, the Stratton Street family loop, and the Steam trail are recommended to enhance the current trail offerings. These upgrades will achieve an increase in trail style continuity, trail ride quality and sustainability, substantially lifting the appeal of Belmont Regional Park as a local and regional trail destination relative to other trail network offerings.

New Trail Development

New trail development proposed for the park includes the following additions to the network; grade 2 progression trail, grade 3 / 4 hybrid trail, grade 3 big flow trail, grade 3 / 4 jump trail, extended adventure loop 1, and extended adventure loop 2. Similarly, to the proposed trail redevelopments the rationale for adding these concepts to the trail network stems from objectives specific to each trail born from the core development principles.

Strategic Development Process

By employing the following strategic process for development. Park management objectives can be achieved in an inclusive manner and in reasonable time frame with great success.

1. **Structured Approach** - a plan to develop mountain biking as a recreation sport in Belmont Regional Park with the support of stakeholders.
2. **Discussion and Engagement** - achieve strategic alignment across policy makers and stakeholders to ensure clear development pathway.
3. **Maintain/Upgrade** - display the potential and capabilities of Belmont Regional Park management groups to deliver on providing a quality trail network.
4. **Engage** - broaden and Increase the commitment of the wider stakeholder and community groups to the development plan.
5. **Fundraising** - accumulate funds in order to assist with the implementation and execution of the concept plan.
6. **Development Planning** - develop detailed plan for the construction of new mountain bike trails in Belmont Regional Park.
7. **New Development** - implement park development plan.
8. **Gather Data** - encourage riders to sign up to use Trailforks and/or Strava to collect data.
9. **Test** - to understand the impact specific developments in the park have on use and engagement of the assets in Belmont Regional Park.
10. **Re-evaluate** - establish an iterative process for improving the impact of park management groups policy making, planning and development.

If implemented in the right manner policies and developments will attract further interest and use of park assets further contributing to the positive momentum of mountain biking in the Wellington region.

Trailpro Company Ethos

Trailpro has completed a wide range of trail construction projects across New Zealand for mountain bike clubs, councils, schools and private individuals. The company is built on the following key business principles:

LEADERSHIP

The company is headed by Byron Scott, a high energy individual who has always had a passion for trail building, something that has coexisted with developing himself as a highly accomplished competitive racer. Byron set up Trailpro in 2014 off the back of constructing 440 Mountain Bike Park, a private commercial bike park with 25 kms of trail 1 hour from Auckland CBD. In 2018 Cam Cole, world champion downhill racer and ex professional mountain biker partnered in business with Byron and Trailpro to expand the capabilities and geographic areas the company services. Both Byron and Cam are keen trail builders with a passion for improving the quality of cycling in New Zealand.

UNDERSTANDING

Trailpro is a professional trail building company built on a reputation for building trails that enhance the intended users experience of the trail and the surrounding environment. It is the diverse and experienced people in the Trailpro team that sets us apart from other professional trail builders. Our team members collaborate closely with each other on every project to ensure the expectations of the end user are met or exceeded.

PRIDE

Our team takes pride in constructing quality trail that that is built to last, with consideration of the natural environment and with the most efficient techniques. We get in and get the job done so you can get on your bike.

FORESIGHT

Recent and continuing developments in the sport of mountain biking influence Trailpro's construction style and continue to push the company as a specialist mountain bike trail building company into new territory as a trail solutions provider across trail planning process, trail design, and construction.

Prepared by Trailpro Construction Central Ltd
January 2021

Cam Cole
Professional Profile

Director, Trailpro Construction Central Ltd
Bachelor of Commerce (Marketing and International Business)

Value Adding Skill Set

- Junior Mountain Bike World Champion, World Cup podiums and former professional downhill mountain biker
- 15 years of mountain bike industry experience with extensive mountain bike industry relationships
- Business development, market research, product development, branding, project management and 4 + years of trail design and construction experience

"I competed successfully across the globe at the highest level in mountain biking for 10 years. This developed a results focused approach in me that I take to all facets of my life. Through my in depth understanding of consumer behaviour I am able to identify business opportunities and tailor future proofed solutions to the motivations and behaviours of the market."

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1. Background and Methodology

1.1 Background

Sandwiched between East Porirua and the Hutt Valley Belmont Regional Park (BRP) covers approximately 3,500 ha of land. Titles are held over the following approximates of land within the park; Wellington Regional Council (WRC) 1300 hectares (ha), Hutt City Council 1078 ha, Department of Conservation 822ha, Wellington City Council 105 ha, Porirua City Council 44 ha.

Much of the park consists of open ridge tops that are visible across the Wellington region. More specifically the majority of the land consists of farmland, of which 1000 ha are currently in operation as managed by WRC. Native forest and forest regrowth occupy the Korokoro Valleys to the south/south west of the park and the Dry Creek valleys to the east of the park.

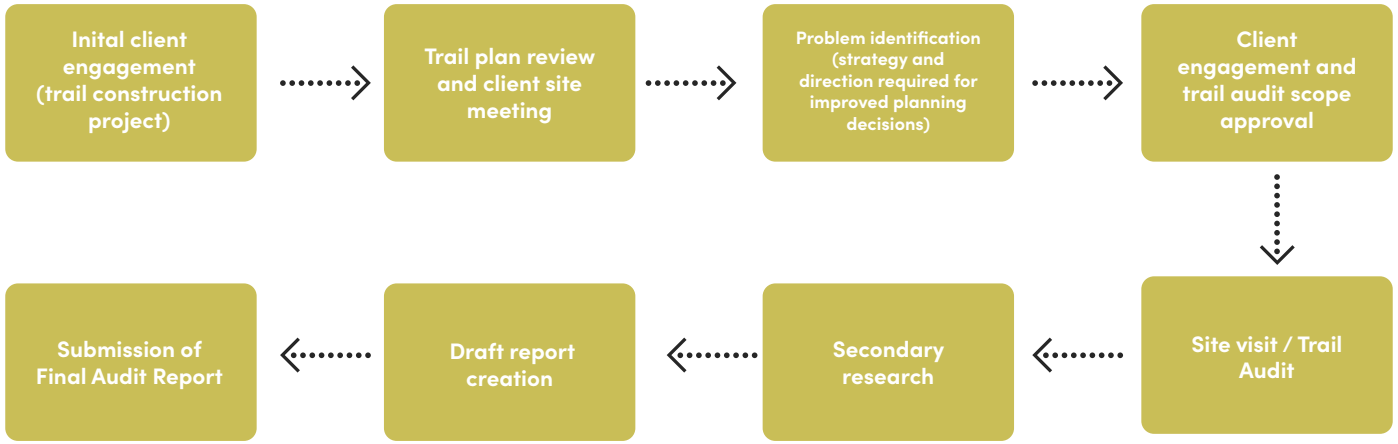
The parks heritage dates back to pre 1900 as routes were used by lower North Island Māori iwi to access the Wellington harbour. Korokoro stream was also an important food source. Post 1900 saw the construction of the original main coach road from Wellington and the Korokoro dam in 1903. Remnants of different types of WWII infrastructure are also present namely the munitions bunkers at the most central point of the park.

There are several key ecological areas to the park that are vital to the ecology of the local area. These areas of high value within the park consist of Duck Creek, Korokoro stream, Cannons Creek, Belmont and Speedy's streams as important water ways; and Cannons Creek Reserve and Korokoro bush as important forest vegetation zones.

BRP contains approximately 60km of trails most of which can be accessed by mountain bike. Approximately 30km of these trails are classified as single track, the remainder are classified as double track, gravel or dirt road and gravel path.

1.2 Methodology

The opportunity to conduct this audit arose when representative's for BAMBA approached Trailpro, a Wellington based trail construction company to consult, plan, mark out and construct a grade 2 downhill flow trail. The proposed line for the trail started at the top of Connect 4 and to finished towards the beginning of the 4 degrees climbing trail. After a site visit with BAMBA representatives to review the trail plan for the proposed Grade 2 trail construction project it was identified that the plan for the trail had several key issues. It was then proposed that a trail audit that would assist with the formation of a core strategic approach for the group with the assistance of professional trail builders as a sure way to plan for future projects.



For the purposes of this report GPS data was collected using a Garmin etrex32 from a mixture of riding approximately 15km of trail and on foot reconnaissance in the area with the core concentration of mountain bike specific trails in BRP. More specifically the area of focus is bordered by Stratton Street and Korokoro stream to the South West / West and Hill road to the East as shown in the Regional Map (page 3). This data was processed and analysed using the Gamin Basecamp software.

The dynamics and ride quality of the trails have been assessed subjectively against the assessors' extensive experience in the mountain bike industry and in particular the design and construction of trails across New Zealand. There are numerous trail difficulty rating systems used across New Zealand and globally. The New Zealand Mountain Bike Association (MTBNZ), Mountain Bikers Code and Trail Grades have been employed in the assessment of the BRP trail network for this audit. The Trail Grade system is used as a guideline to assess trail difficulties due to its nationally endorsed status and its simple and easy to understand nature (refer appendix A). Although, it should be used as just that, a guideline. These standards provide the strongest reference point and context in order to understand this document. However, supporting documents to the NZMBA Mountain Bikers Code and Trail grade are available to provide more in-depth information about the trail grading system. Readers understanding of other grading systems may be used to further enhance the readers understanding of trail design and grading such as the International Mountain Bike Association (IMBA) Trail Difficulty Rating System.

Supplementary data was accumulated using a combination of online resources from Trailforks, local GIS mapping resources and government resources. This broadened the picture for analysis allowing a more holistic evaluation of the park. This data was also used to cross-reference the data gathered by GPS on foot and by bike.

2. Location

2.1 National and Regional Maps

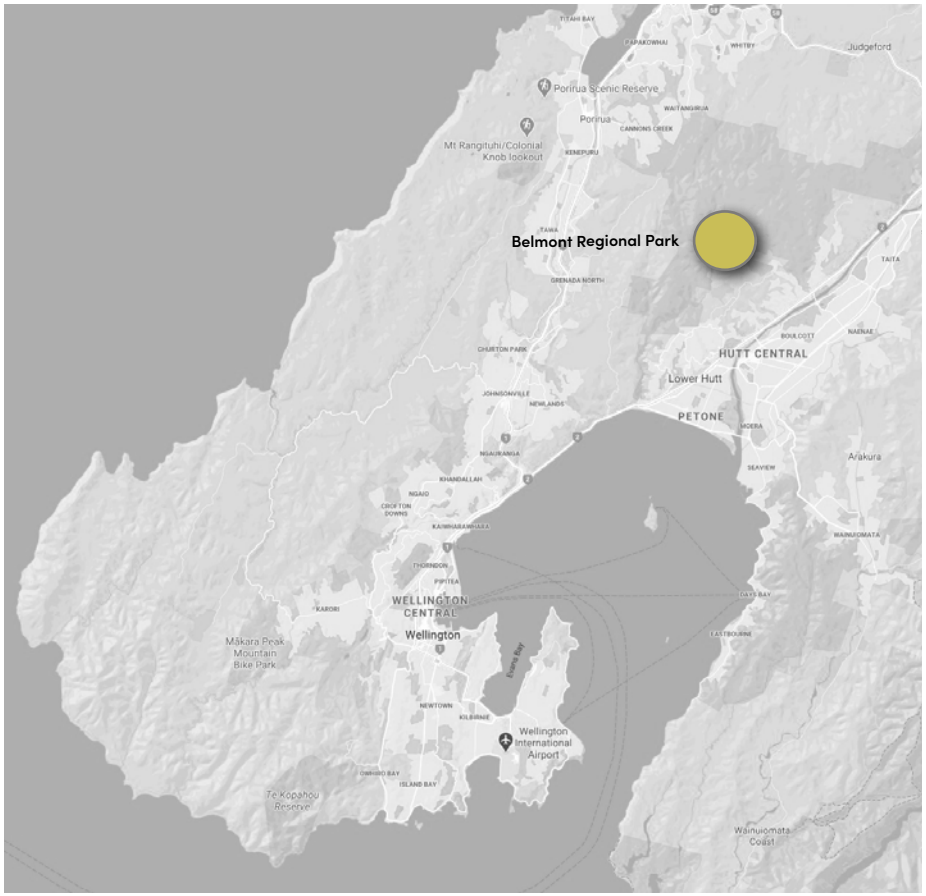


Figure 1 (Left) - National Map
Figure 2 (Right) - Regional Map

3. Key Definitions of Mountain Bike Trail Related Terms

Table 1. Key Definitions of Mountain Bike Related Terms

TERM	DEFINITION
Access Track	Tracks where riders and walkers/runners can travel alongside one another along the trail. They maybe also be used for vehicle access to locations on the land that the trail network occupies.
All-mountain	A term describing rugged or adventurous cross-country riding, often with a descending focus.
Bench	The cut made into a side slope of a hill side to provide the trail surface width otherwise known as the trail tread/surface.
Berm	A banked corner designed to make for faster and easier cornering.
Big Flow	Increased and enhanced scale of the trail features compared to Flow Trails (see below). Usually built with a 2.5-ton or larger excavator and approximately 1.5 – 2.1 m wide. Trail difficulty can range from grades 2 – 4.
Camber	Trail surface side slope angle. Positive camber refers to an in-sloping trail, negative camber refers to an out-sloping trail
Double Jump	A jump with a defined gap between take-off and landing.
Dual Direction	Trails that can be used in either direction by riders. Dual Use and Dual Direction trails although common are not recommended for inclusion in trail networks.
Fall Line	A term used to describe a trail that is aligned directly down/up the contours of a hill, or on a sustained descent/ascent across the contour of a hill.
Flow	A term used loosely to describe the free-flowing nature of a trail. Typically flowing trails feature minimal braking and little need for intense pedalling.
Flow Trail	A trail with a smooth riding surface and a three-dimensional shape, including bermed corners, rollers and jumps. This style of trail is typically designed to reduce or exclude braking by careful placement of trail features and trail gradient. This style of trail is usually constructed with a 1.7-ton – 2.5-ton excavator and approximately 1.5 – 1.8m wide. Trail difficulty can range from grades 2 – 4.
Grade Reversal	A reversing of trail gradient or slope of a trail. Grade reversals are used to assist in the management of rider's speed and the management of trail surface water.
Hip Jump	A jump where the angle of the take-off is different to the landing (or vice-versa) and may also be slightly different to the direction of travel the rider is heading in.

TERM	DEFINITION
Hybrid Trail	A trail construction style that aims to achieve a hand-built trail feel by using a range of construction styles and techniques from pure hand build, to digger assisted hand building and pure digger building. The use of machinery can greatly increase the efficiency in the construction of the tail (faster and cheaper) while maintaining hand-built trail characteristics.
IMBA	The International Mountain Bicycling Association. The global body responsible for trail advocacy and providing internationally recognised trail standards.
Jump Trail	A trail construction style that includes a variety of jumps as well as flow trail style features. Jumps are shaped in many different ways depending on the target trail difficulty including tabletops, step downs, step ups, doubles, hip jumps (see other terms for definitions).
MTBNZ	Mountain Bike New Zealand. The New Zealand association and governing body for mountain biking in New Zealand
Progression	The intention to design trails and trail networks that allow riders to progress their skills and fitness on the bike in a safe and controlled manner.
Ride Line	The main line that riders most frequently take on a trail. Due to this it is more susceptible to wear and tear.
Roller	A single hump in the trail designed and shaped to add flow to the trail by allowing riders to generate speed. May also be used as a surface water management tool to get water off the trail. There are several variations of a roller that can be built into the trail on any angle – they are called curved rollers.
Single Track	Relatively narrow trail designed for use by one rider to pass through the trail at a time (e.g., you cannot ride side by side). The trail riding surface is typically 1m wide but can vary from 500mm – 2m wide depending on the trail style.
Shared Use	Trails that are sanctioned for multiple user groups such as walkers, runners, hikers, bikers and sometimes horses or vehicles depending on the trail style and the decisions of the bodies responsible for managing the trail.
Stacked Loop	Loops within the trail network that are designed in such a way to allow riders to have the option to adjust the difficulty of their ride by opting into different trails along their route. Riders can either shorten or extend the distance of their ride or chose more or less technical trails along their route at junction points within the network.
Step Down	A jump where the landing ramp is lower than the take off ramp.
Step Up	A jump where the landing ramp is higher than the take off ramp.
Tabletop	A jump with a flat/in-filled space between the take-off and landing.
Tech Flow	A trail that features distinct contrasting sections of trail. On one hand rougher, more natural trail surfaces that are sometimes narrow linked with smooth and wider sections of trail on the other hand. This allows riders to achieve maximum flow through the trail even over the more technical sections.
Technical Trail	A trail that typically features a rougher, more natural trail surface. Technical trails often have a narrow tread and may feature a number of raw features such as rocks, roots and drop-offs.

4. Current Situation

4.1 Macro Factors

4.1.1 Climate and Weather

The onsite trail audit was conducted on Saturday 21 November 2020. This period is considered late spring. The region is categorised generally as an oceanic climate due to New Zealand's location between 35 and 60 degrees south of the equator. This results in relatively mild summers and winters and abundant annual rainfall. Table 2 below shows the weather conditions prior to and during the trail audit site visit, while table 3 shows annual weather averages for the Wellington Region.

Table 2. Weather conditions prior to and during site audit

Date (November 2020)	High (deg Celsius)	Low (deg Celsius)	Rain Fall (mm)	Wind Direction	Peak Wind (km/h)
Tuesday 17	18	12.5	0	NW	106
Wednesday 18	11	11	21.2	NW	78
Thursday 19	14	10	0.2	S	65
Friday 20	18	8	0.8	NW	39
Saturday 21 (Site visit and data collection)	18	14	0.2	NW	102

**Weather recoding's taken from Kelburn, Wellington approximately 14km directly South West of site audit location https://www.metservice.com/towns-cities/locations/wellington/past-weather*

Table 3. Monthly weather averages for Wellington

Season	Summer			Autumn			Winter			Spring		
Month	December	January	February	March	April	May	June	July	August	September	October	November
Average Temp (deg Celsius)	15.4	16.9	17.2	15.8	13.7	11.7	9.7	8.9	9.4	10.8	12	13.4
Average Rain Fall (mm)	82	66	54	80	97	110	119	126	114	87	86	77
Average Wind Speed (km/h)	20.2	19.4	17.6	19.1	16.9	18.4	18.7	19.1	18.7	20.2	21.6	20.2

https://www.weatherbase.com/weather/weather.php3?s=43439&cityname=Wellington%2C+Wellington%2C+New+Zealand&units= (30 years on record)

4.1.2 Population Centres

The population bases that have fair and direct access to BRP are Lower Hutt and Porirua, an approximate total of 162,000 people. Although the potential to increase user numbers of the park's facilities expands to the entire Wellington region and beyond. Population estimates as at 2018 for the Wellington region are listed and tallied in table 4 below.

Table 4. Population estimates as at 2018 Census

AREA	POPULATION
Wellington City	212,000
Lower Hutt City	105,000
Upper Hutt City	44,000
Porirua City	57,000
Others (Kapiti, Carterton, Masterton, South Wairarapa, Tararua)	87,000
Total for the Wellington Region	505,000

https://www.stats.govt.nz/tools/2018-census-place-summaries/

4.2 Overview of Existing Trail Network

The following sections in this report firstly provide an overview of existing trails in the wider BRP which is the secondary area of focus before secondly digging into the trails in the area specific to the primary audit zone for this trail audit report. It is important to understand what the wider park offers trial users and mountain bikers before focusing in on the primary audit zone. The primary area of focus for this trail audit document has been identified as area of land between Stratton Street and Hill Road and has the core concentration of mountain bike specific single tracks in BRP.

4.2.1 Belmont Regional Park General Trail Information

This section contains general information relating to both the primary audit zone and secondary zone of focus in the trail audit report. Table 5 below and Belmont Regional Park - Regional Map - (Page 10) help paint a broader picture of BRP as a whole. Due to the size of the park and the various points of interest this information is important to note in the wider context of the mountain bike trail audit.

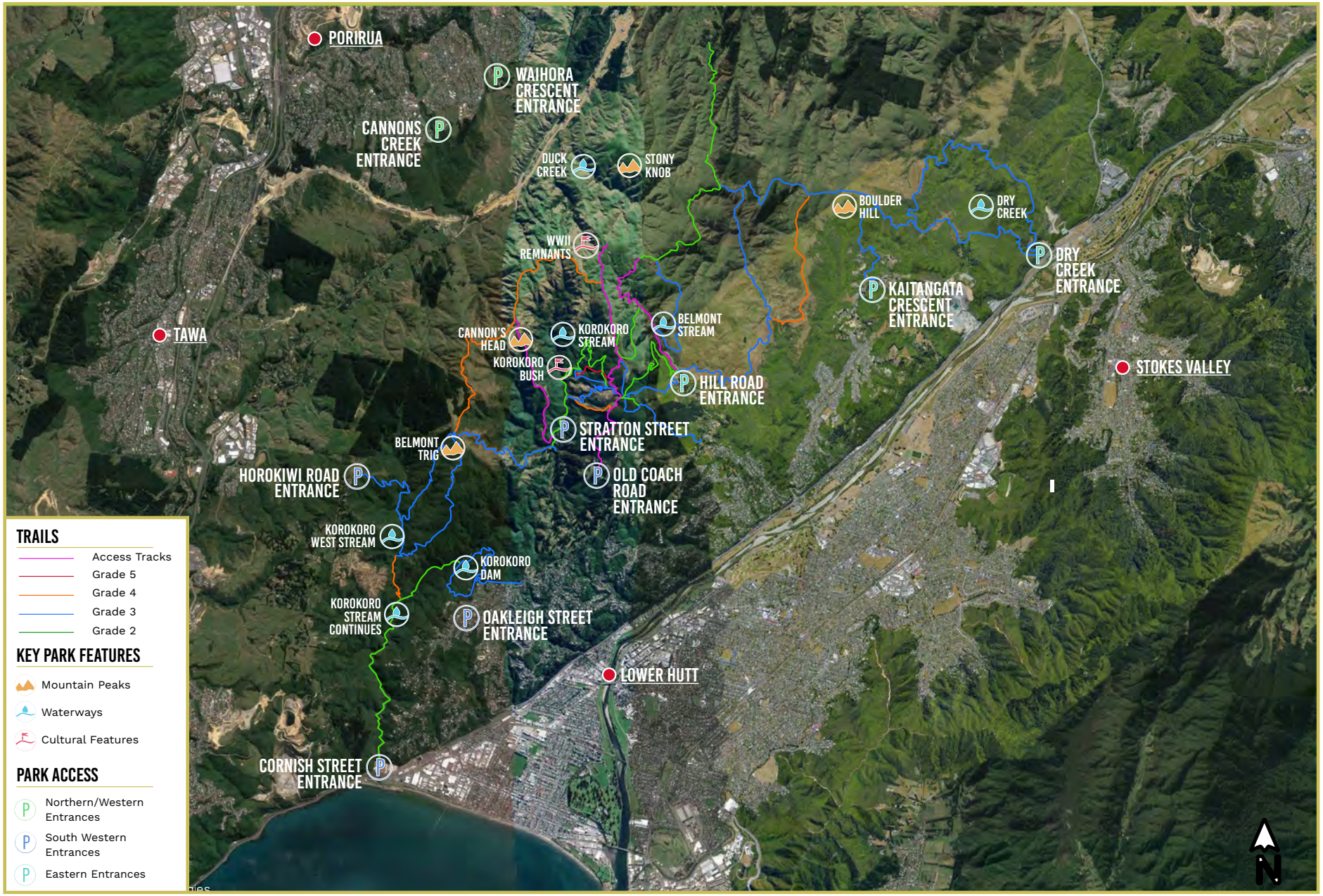
Table 5. Belmont Regional Park General Trail Information (Primary audit zone and secondary zone of interest included)

Belmont Regional Park General Trail Information			
Trail	**Primary Trail Orientation**	**Distance**	**Trail Grading**
Trails – North and East (secondary focus area)			
Trail	Dual direction, shared use, double track	5.3km	Grade 3 (Grade 4 climb)
Kaitangata Crescent to Boulder Hill	Dual direction, shared use, single track	1.9km	Grade 3
Buchannan's Road	Climbing, shared use, double track	4.3km	Grade 3
Boulder Hill Tramping Track	Dual direction, shared use, double track	2.4km	Grade 3
Speedy's	Downhill, shared use, single track	2.4km	Grade 4
Belmont Road	Dual direction, shared use, double track	4.7km	Grade 2 / 3
Kilmister	Dual direction, shared use, double track	5km	Grade 3
Waitangirua Ridge	Dual direction, shared use, single track	2.2km	Grade 3
Hill Road to Old Coach Road Connector	Climbing, shared use, double track	650m	Access Trail (Grade 3)
Old Coach Road	Dual direction, shared use, double track	4km	Access Trail (Grade 2)
Dress Circle	Dual direction, double track	5.3km	Access Trail (Grade 4 / 5)
Trails – South and West (secondary focus area)			
Middle Ridge	Downhill, shared use, double track	2.1km	Access Trail
Belmont Trig	Dual direction, shared use, double track	2.8km	Grade 3
Baked Beans Bend (complete trail)	Dual direction, shared use, single track	3.4km	Grade 3
Baked Beans Bend (complete trail)	Dual direction, shared use, double track	2.4km	Grade 3
Korokoro Dam	Dual direction, shared use, single track	4km	Grade 2
Oakleigh Street	Downhill, shared use, single track	800m	Grade 3
Otonga Track Up	Climbing, shared use, single track	1.4km	Grade 3
Otonga High Line	Dual direction, shared use, single track	900m	Grade 3
Trails in the Primary Audit Zone			
Bull Run – Bull A Varde Connector	Climbing Trail	2.4km	Grade 2
Hill Road Views	Dual Direction double Track	1.2km	Grade 2 / 3
Bull Run	Downhill	1.3km	Grade 3

Sweet Acres	Downhill	1.9km	Grade 3
Pylon Connector	Dual Direction Double Track	330m	Grade 3
Naked Flame	Downhill	240m	Grade 3
Borderline	Downhill	975m	Grade 4
Electric Avenue	Downhill	914m	Grade 3
Weta	Downhill	766m	Grade 3
Connect 4	Link Trail	694m	Grade 3
OCD	Downhill	766m	Grade 5
4 degrees	Climbing Trail	3.2km	Grade 2 / 3
Stream Trail	Link Trail	850m	Grade 2
Totals			
Grade 2 Trails		16.7km	7
Grade 3 Trails		38km	19
Grade 4 Trails			3
Grade 5 Trails		0.76km	1
Access Trails		6.75km	3
Accumulative Totals		70.6km	31

There are approximately 70km of trail in BRP varying in trail styles and difficulties. The core concentration of trails in the park are in the grade 3 bracket with 38km of trails followed by grade 2 trails with almost 17km of trail. Belmont Regional Park – Regional Map – Map 3 on page 10 places BRP visually in the Wellington region with labels showing nearby city centres, park entrances as well as natural and cultural features of the park in relation to the trails included in table 5 above.

4.2.2 Belmont Regional Park - Regional Map - Map 3



BELMONT REGIONAL PARK - REGIONAL MAP - MAP 3

4.2.3 Belmont Regional Park Mountain Bike Trail Information – Primary Audit Zone

This section of the report deals with the trails specific to the trail audit. Table 6 presents the data that was collected during the site visit in the primary audit zone being the core of the mountain bike trail network within the park.

Table 6. Belmont Regional Park Trail Information – primary audit zone

Trail Information from Data Collected								
Trail Code	**Trail**	**Primary Trail Orientation**	**Distance**	**Ascent/Descent**	**Max Elevation**	**Minimum Elevation**	**Average Grade**	**Trail Grading**
East Facing Trails								
1	Bull Run / Bull A Varde Connector	Climbing Trail	2.4km	182m Ascent (45m Descent)	369m	224m	5.5%	Grade 2
2	Bull Run	Downhill	1.3km	151m Descent	362m	213m	-10.4%	Grade 3
3	Bull A Varde	Link Trail	400m	17m Ascent (9m Descent)	2.2%	363m	5.5%	Grade 2
4	Sweet Acres	Downhill	1.9km	269m Descent (44m Ascent)	400m	148m	-11.8%	Grade 3
5	Pylon Connector	Link Trail	330m	40m Ascent	408m	368m	12%	Grade 3
6	Naked Flame	Downhill	240m	57m Descent	411m	354m	-23%	Grade 3
West Facing Trails								
7	Borderline	Downhill	975m	173m Descent	337m	166m	-17.2%	Grade 4
8	Electric Avenue	Downhill	914m	130m Descent (37m Ascent)	356m	263m	-10.1%	Grade 3
9	Weta	Downhill	693m	92m Descent	262m	171m	-13.1%	Grade 3
10	Connect 4	Link Trail	694m	74m Ascent (6m Descent)	262m	191m	9.7%	Grade 3
11	OCD	Downhill	766m	127m Descent	308m	182m	-16.3%	Grade 5
12	4 Degrees	Climbing Trail	3.2km	296m Ascent (114m Descent)	355m	172m	5.8%	Grade 2 / 3
13	Stream Trail	Link Trail	850m	25m Descent (3m Climb)	155m	128m	2.7%	Grade 2 / 3
14	Skills Track	Family loop	200m					Grade 2
Totals				**Distance**				**Quantity**
Grade 2 Trails				5.9km				6
Grade 3 Trails				6.1km				7
Grade 4 Trails				975m				1
Grade 5 Trails				766m				1
Accumulative Totals				**13.7km**				**14**

In terms of the proportion of the trails within the network there is a strong tendency towards easier trails that are either grade 2 or easier grade 3 trails. Within these categories the bulk of the volume of trails in terms of distance comes from two of the key climbing trails within the network namely Bull Run – Bull A Varde connector and 4 degrees adding up to 5.6km. On the flip side there is less than 2km of grade 4 and above trails.

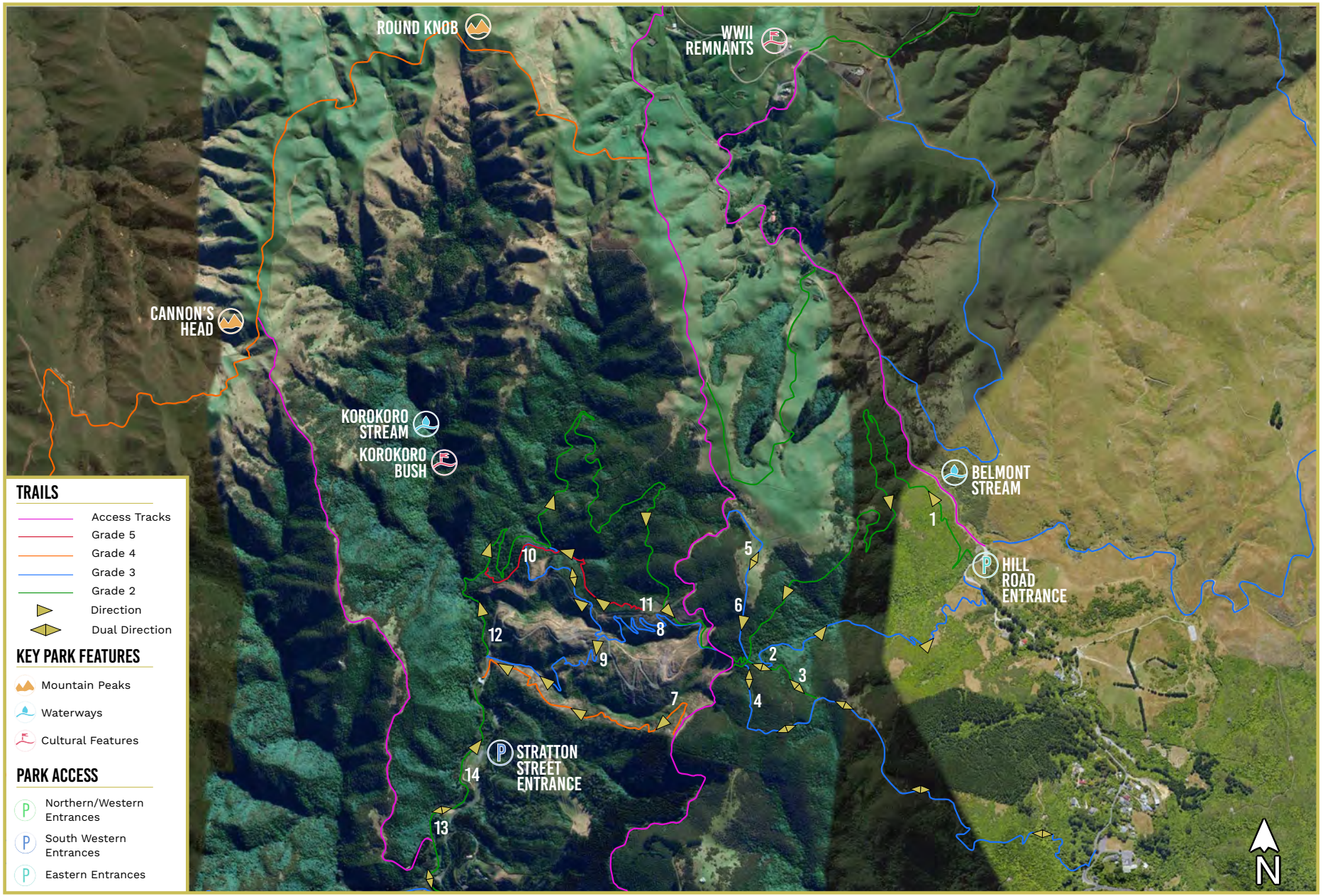
4.2.4 Belmont Regional Park Infrastructure

There are two entrances to the park that are proximal to the primary trail audit zone with infrastructure that is available specifically for mountain bikers.

At the Hill Road park entrance there are currently car parking spaces available for approximately 18 vehicles across two main parking bays near the trail head. There are no other amenities at the Hill Road entrance to BRP.

At the Stratton Street park entrance there are currently spaces available for approximately 30 vehicles. The main car park immediately at the main entrance point to BRP from Stratton Street holds the majority of parking spaces. Further parking spaces are available for additional vehicles further away from the main park entrance off Stratton Street at various parking bays. Other amenities at the Stratton Street entrance include toilets that are open for public use on a daily basis.

4.2.5 Belmont Regional Park - Audit Zone - Current Trails - Map 4



BELMONT REGIONAL PARK - AUDIT ZONE - CURRENT TRAILS - MAP 4

4.3 Trail Evaluation Detail

4.3.1 Trail Rating System and Trail Evaluation

In the evaluation of the trail network a rating system has been adopted for ease of reference and understanding in the evaluation of aspects of the trails. Table 7 below explains the rating system that is used in table 8 page 17. Other aspects of the trail evaluation are then presented as observations in a conversational manner in table 9 page 18 – 20 adding more detail to the evaluation of the individual trails.

Table 7. Trail Rating Evaluation System Explained

Rating Measure	Rating Evaluation Outline
Holistic Value	Trails have been assigned a rating 1 to 5 to assess the trails value to the Belmont Regional Park trail network. 1. Extremely limited value: Closure recommended. 2. Limited value: Closure could be justified. 3. Moderate value: Trail has some value to the current network; improving the trail could be of benefit to the network. 4. High value: The trail is of significant value to the current network and should be retained or rebuilt. 5. Extremely high value: This trail is of high importance to the current trail network, it either provides a high-quality ride experience or is strategically important network connection.
Ride Quality	Trails have been assigned a rating out of five to assess the experience and ride quality of the trail and general trail experience. 1. Extremely poor: The ride quality and riding experience of this trail is very poor. 2. Poor: Overall this trail has a low-quality riding experience. 3. Average: The experience (trail flow and dynamics) of this trail has aspects of it that are good, but improvements could be made. 4. Good: Trail flow/dynamics are mostly good. Generally, this is quality riding experience. Some sections of the trail could be improved. 5. Very good: This trail offers a very high-quality riding experience for its entire length.
Sustainability Rating	Trails have been assigned a rating out of five to assess overall trail sustainability. These ratings are assessing the trails as they were found at the time of assessment and may not reflect current trail conditions. 1. Extremely poor: This trail offers very poor sustainability even in the short term. Trail alignments and trail construction technique is poor. 2. Poor: This trail offers poor sustainability in the short to mid-term. The trail could be improved with major changes in alignment and/or construction techniques. 3. Average: This trail has average levels of sustainability. Medium to long-term sustainability is unable to be determined. 4. Good: This trail has a good level of long-term sustainability. Some maintenance will be required in the mid to long-term. 5. Very good: The trail is aligned and constructed to a best practice standard. The trail will offer best-case levels of sustainability in the long term.

Table 8 below presents each trail included as part of the primary area of focus for the trail audit. In addition to the aforementioned trail rating system observations and comments have been made about each of the trails to provide more information in regard to the holistic evaluation of the trails in table 9 that follows page 16 – 18.

Table 8. Trail Evaluation based on Trail Rating System

Trail Rating System Evaluation				
Trail Code	**Trail**	**Holistic Value**	**Ride Quality**	**Sustainability Rating**
1	Bull Run / Bull A Varde Connector	5	5	4
2	Bull Run	5	4	3
3	Bull A Varde	3	2	3
4	Sweet Acres	3	3	3
5	Pylon Connector	4	2	2
6	Naked Flame	2	2	2
5	Borderline	4	4	4
6	Electric Avenue	5	3	3
7	Weta	5	3	3
8	Connect 4	3	3	3
9	OCD	4	4	3
10	4 Degrees	5	4	4
11	Stream Trail	3	2	2
12	Skills Track / Family Loop	5	2	3

Table 9 below presents subjective detail in the form of observations and comments in a conversational matter supplementary to the above trail rating system.

Table 9. Detailed Trail Evaluation and Discussion

Trail Code	Trail	Trail Grading / Orientation	Observations	Comments	Trail Status
1	Bull Run / Bull A Varde Connector	Grade 2 Climbing trail	Trail surface is in great condition – some trail surfacing with imported material was noted. Trail gradient and flow all work well together.	1 / 2. All in all, this climbing track is well placed in the trail network currently servicing two downhill trails that descend out to the Hill Road side of the trail network. The design of the trail is decent with consistent and fair gradients that most riders will enjoy. Reverse gradings are present which both allow the riders a break from the gradient and allow surface water to exit the trail.	Monitor the trail for future maintenance.
2	Bull Run	Grade 3 / 4 Tech Flow Downhill	Trail style lacks continuity. Trail surface was slightly unpredictable (slippery in some sections) but appears to drain well.	1. Trail gradient gets quite steep in a couple of sections and very flat in other sections i.e. most of the trail is a grade 3 but there were a couple of sections that rode like a grade 4 and a couple that were very flat which affected the trail flow.	Trail continuity needs addressing in order to assist with trail flow and ensuring trail gradient matches the difficulty of the trail. This will greatly increase the riding experience.
3	Bull A Varde	Link Trail (Grade 2)	1. Link Track that serves a purpose.	1. Trail is short but adds to the network flow by linking Naked Flame, Bull Run - Bull A Varde Connector, and Bull Run to the Old Coach Road. 2. Trail intersections and flow could be improved.	Monitor the trail for future maintenance. Possible to improve this trail network intersection (see section 7.2.1 Belmont Regional Park Trial Upgrades page 29).
4	Sweet Acres	Grade 3 Bench Cut / Dual Direction	1. Trail surface is mostly grass, some mud was present towards the middle to end of the trail – this was one of the wetest trails ridden on the day of data gathering. 2. Trail lacks features for a pure mountain bike trail	1. Grass made the trail quite unpredictable in terms of grip. Bottom section in the trees had a few muddy sections. 2. The lack of trail features is understandable as it is a dual direction shared use trail.	For a shared access track into the park this trail serves a purpose. It could do with some modifications and improvements to ensure its long-term sustainability and use as an all-weather trail. If the downhill direction is most popular this trail could be a safety hazard for all users due to the speed that the trail can be ridden by bike. Possibly look at closing the trail to downhill bike traffic.
5	Pylon Connector	Link Trail (Grade 3)	1. Trail allows for rider access to the highest point of the primary trail audit zone at approx. 410m. 2. Trail design does not enhance the impact of arriving at the high point.	1. The trial has some value in the current trail network layout however this could be maximised further.	This trail requires further review (see section 7.2.1 Belmont Regional Park Trial Upgrades page 29).

Trail Code	Trail	Trail Grading / Orientation	Observations	Comments	Trail Status
6	Naked Flame	Grade 3 Downhill	1. Trail surface is mostly grass. 2. Trail drops from a high point (approx. 410m). 3. Trail route is fall line creating long term sustainability issues. 4. Trail lacks the presence and feature a trail from such a high point could deliver.	1. This trial does not fully utilise the fact it drops from a high point in the park of 410m, the highest elevation of any trail in the trail audit zone.	This trail requires further review (see section 7.2.1 Belmont Regional Park Trial Upgrades page 29).
7	Borderline	Grade 4 Technical Flow Downhill	1. Trail has good continuity in its style and trail difficulty grading. 2. Trail is quite exposed to direct weather elements 3. Trail surface was packed with evidence of moisture locked into it.	1. Trail continuity is something that is lacking in the park however this trail delivers a consistent run down the hill. The trail grading matches the difficulty well and the trail is well placed on the hill side. In terms of the wider park trail network flow this trail also fits well in that – starting and ending in locations that could be easily rationalised. 2 / 3. The trail surface adds to and matches the trail grading. On grade 4 and above trails the upkeep of the surface is less critical as riders who look for these trails to ride are interested in the changing character of the trail.	Maintenance is due on some of the catch berms while other corners could be rebuilt.
8	Electric Avenue	Grade 3 Flow Trail	1. Trail is quite exposed to direct weather elements. 2. Main riding surface was broken and worn in places 3. Limited use of true reverse gradings. 4. Trail surface was very dry.	1 / 2. Trail surface would benefit from shelter and cover from taller vegetation growth either side of the trail. This will protect the trail surface and stop the surface breaking up and wearing due to direct weather exposure. Plantings were noted. 3. Reverse gradings that assist in the control of rider speed and trail surface water management could be improved.	This trail requires further review (see section 7.2 Trail Development page 29).
9	Weta	Grade 3 Bench Cut	1. Trail style lacks continuity. 2. Minimal use of reverse gradings. 3. Trail surface is broken and was scattered with some loose rock. 4. Trail surface had some moisture in it.	1 / 2. The difficulty of the trail varies considerably mainly due to the gradient of the trail switching between mellow and steep gradients without gradient breaks to help manage rider speed and surface water. 3. The other key factor contributing to the inconsistency of the trail grading is the loose trail surface.	This trail requires further review (see section 7.2 Trail Development page 29).
10	Connect 4	Grade 3 Bench Cut/ Dual Direction Trail	1. Trail gradient felt quite steep to ride. 2. Lack of reverse gradings.	1 / 2. Although the average trail grade is 5.8% this trail felt quite steep. This could be due to the lack of reverse gradings to allow for riders to catch a break towards the end of the climb where the gradient pitches up more than the bottom section. Additionally, the lack of reverse gradings could mean additional maintenance in the long term compared to more advanced trail design.	Trail requires some maintenance to ensure that riders continue to use the trail. The value of this trail will increase if new trail developments occur.

Trail Code	Trail	Trail Grading / Orientation	Observations	Comments	Trail Status
11	OCD	Grade 5 Technical Downhill	1. Trail was lined with tall grass and vegetation.	1. Grass and vegetation caused the ride line and line choice on the trail to become narrow and difficult to see which is important on a grade 5 trail.	Trail requires some maintenance to ensure that riders continue to use the trail.
12	4 Degrees	Grade 2/3 Climbing trail	1. Some wet areas were evident in the dense native bush. 2. Some use of reverse gradings.	1. Wet areas were as expected on a mountain bike trail especially given the dense native bush and the weather noted in table 1. Prior to site visit for the trail audit.	Trail could use some attention to fill narrow drains and cut additional out slope on the trail surface. This will help with trail flow.
13	Stream Trail	Grade 2	1. Trail surface is mostly grass. 2. Trail crosses the stream, and a few wet patches were present. 3. No trail signage noted.	1 / 2. Stream crossings, drainage and trail surface could be improved. 3. Average trail alignment.	Trail could use upgrade and realignment but currently the trail is really only a link track from middle ridge to the car park. The volume of riders that use the trail is likely to be quite minimal. Currently the road is more attractive.
14	Skills Track / Family Loop	Grade 2	1. Trail surface is weathered. 2. Trail shape and features are lacking for a trail of this type.	1 / 2. Trail could do with some maintenance to keep the trail features and surface in better condition.	This trail requires further review (see section 7.2.1 Belmont Regional Park Trial Upgrades page 29).

The design of the trail network in its current state is good when considering trail placement and trail network flow in relation to the terrain and geography of BRP. One observation that can be made with this design perspective in mind is that trail development is concentrated on the west facing hill. This hillside contains the bulk of the trails in the primary audit zone between Stratton Street and Hill Road. The trails in this zone consist of a range of trail styles and difficulty gradings including Borderline, Electric Avenue, Weta, OCD and 4 degrees. These trails all filter to/from the Stratton Street entrance. The relatively steep and rugged terrain on offer in this section of the park is more conducive to the design and construction of at a very minimum grade 3 trails. The east facing hill has a lesser number of trails developed across it and filters out to the Hill Road entrance. The type of terrain on this east facing section of the primary audit zone is more mellow and forgiving compared to the west face. Therefore, more favourable for the construction of grade 2 – 4 trails for making best use of the terrain on offer.

5. Findings

The following section of this document provides a synthesis of the analyses relevant to the holistic evaluation of BRP as internal and external factors that have influenced the development of the park to date. Subsequent to the presentation of the findings a greater understanding of the park can be used to identify opportunities and inform park management and development decisions moving forward. Internal factors that have been considered are cultural, ecological and geological aspects of the land BRP occupies have been considered in the evaluation of the trail network. External factors such as trail use has also been analysed in order to evaluate trail users' behaviours and preferences. These factors combined allow for a strategic analysis to be completed to assess the strategic position of BRP in the mountain bike sport and recreation industry and marketplace.

5.1 Cultural and Ecological Aspects

BRP has a long history that is central to the heritage of the Wellington region. Pre 1900 the park was valuable to lower north island Maori as it was host to important routes and passageways, while the natural features provided key food sources. Post 1900 the construction of the both the main coach road and Korokoro dams built on its existing history. To this day much of these cultural assets are visible within the park including different types of WWII infrastructure.

Key ecological assets within the park that are nearest to the core of the mountain bike trail network include sections of Korokoro stream, Belmont stream and sections of Korokoro bush.

This information is important in the context of the trail audit due to its social, cultural and environmental significance as well as the requirement for BRP and mountain bike trail management groups to be aware of in any development planning and plan execution.

5.2 Geology

The core fundamental soil type of the BRP is classified as Brown. These soil types are relatively stable topsoils and are most common across New Zealand. Orthic Brown and Firm Brown soils are the two main subcategories of soil classification found in the park. Orthic Brown soil is commonly found on slopes or younger land surfaces which is consistent with the type of terrain found in much of the park. It is weaker or less stable than its Firm Brown counterpart. Firm Brown soils are found on stable sites and are considered as a strong soil type.

Generally, the aforementioned soil types can be found down to a range of depths including shallow, moderate and deep i.e., 300mm – greater than 1m before gravel or bed rock is encountered. They do not become waterlogged during winter and range from moderately well drained to well drained. Consistency of the soil's ranges from silt, silt over loam, and loam in minimal amounts. Depths from the surface to hard soil, rock or gravel range from shallow, moderately deep and deep across the park i.e. 300mm plus.

By eye the soil types throughout the audit zone were variable. The material that was most commonly found on the trail surfaces across the site audit zone had evidence of fair stability and compaction qualities for use as mountain bike trail surfaces. Most trails generally appeared to handle rider's braking and water erosion well despite a lack of controls in place when compared with best practice standards. On trails with steeper gradients some evidence of accelerated erosion in the formation of ruts along the trail ride line were evident.

Some sections of the audit zone were found to consist of a mixture of the brown material (commonly described as a clayey material in trail building circles) with rock mixed in. Trails in these areas had good resistance to wear as trail surfaces if there was sufficient protection from the weather elements due to the surrounding vegetation.

In other sections, where trail surfaces were weathered, or large excavations were required some harder material was visible. This was suspected to be some form of greywacke commonly found across the Wellington region usually more common on exposed ridgelines and highly weathered landscapes.

This information is important in the context of the trail audit as it has an impact on trail design and construction techniques as well as influence over the potential to construct sustainable, high quality trails in a cost-effective manner.

5.3 Trail Use Analysis

Trail use analysis was completed using the Trailforks website application. Trail information and trail use data on Trailforks is co-created by trail users. It is sustainable due to the contribution by trail network managers, organisations and trail users who create and update the trail information on the application. For example, trail use statistics are based on ride log GPS data which is uploaded by users directly to Trailforks or synced from their Strava accounts. Trailforks then matches their ride against trails in the Trailforks database. When a match is found a trail "check-in" is generated. A single ride log can contain multiple trail check-ins along the recorded route.

Trail information and trail use data has been collected on Trailforks since 2014 and is presented as monthly or annual statistics depending on the type of stat that is being viewed on the Trailforks website.

This information is important in the context of the trail audit as it suggests who is currently using the trail network and how these users are engaging in the use of the network as a whole and on an individual trail level.

The key statistics from this data suggest that users of the trails in the primary audit zone are mostly males between 40 – 50 (152) and 30 – 40 (126). They are made up of 70% locals and 30% visitors mostly from the Wellington area. Most rides occur in the park between 4pm – 8pm while 10am is also a popular time to ride.

The busiest months of the year for logged rides in the park are as follows; November (620), January (580) followed by December and March (570) and February and April (510). Rides per year have been steadily increasing with a large jump seen from 2018 (730) to 2020 (2,300). Average ride time for 2020 was approximately 1 hour 10 minutes for a distance of 16km trending down slightly since 2017.

Popular loop rides consist mainly of Bull Run - Bull A Varde connector, Bull Run, 4 degrees and Borderline while one-time trail check-ins are led by 4 degrees (2,800), Electric Avenue (2080), Weta (1960), Bull Run (1900) and Borderline (1000).

Trail Rankings by individual trail check ins.

1. 4 degrees
2. Electric Avenue
3. Weta
4. Bull Run
5. Borderline
6. Bull Run – Bull A Varde Connector
7. Korokoro Dam
8. Oakleigh Street
9. Connect 4
10. Baked Beans Bend

5.4 Strategic Analysis

A strategic analysis (refer Appendix B) has been used to examine the position of BRP with specific focus on the trail network in the context of the mountain bike recreation industry. This analysis has been undertaken after the preceding trail audit to assist in the identification of opportunities and recommendations subsequent to the trail audit analysis.

The findings of the strategic analysis establish that the key strength of BRP is its accessibility and general trail network layout.

Current weaknesses are the lack of maintenance and a lack in the range of trail styles within the park as well as a lack of trail style continuity.

Opportunities uncovered the potential ability to leverage current policies governing the park to maintain and develop the trail network, the proximity of the park to growing population bases who already have access to the park and the continued growth and changes in the sport of mountain biking.

Potential threats to the development and existence of mountain bike trails in the area are changes to the management priorities of the park (policy and management focus) and the need to protect or enhance the cultural and ecological assets of the park.

This strategic analysis links strongly to critical success factors (refer appendix C) that determine the success of mountain bike trail destinations in the mountain bike recreation industry and competitive marketplace based on previous industry research. There are 5 CSF's that must be met in order for trail development to become successful. The most important are;

- stakeholder/political will,
- quality mountain bike trails and
- complimentary services.

6. Opportunities

1. Park Specific Management and Policies; Belmont Regional Park

In order for groups such as BAMBA to proceed with park and trail development in a productive manner it will be important for them to tie their strategy for plans for development in BRP to the Greater Wellington Regional Council (GWRC) strategy for land development and management in the area. Several key relevant pieces of information that should direct this are noted in the "Park-Specific Management and Policies; Belmont Regional Park" document. These are that BRP

- is an important area for intermediate to advanced mountain biking,
- it provides recreation links between Porirua, Lower Hutt and Wellington Cities, and
- there are significant sites for community restoration projects.

While the key management focus to come out of the Park-Specific Management and Polices document highlights several aspects that should also be taken onward from this trail audit and should guide the planning phase of mountain bike trail development in the park. These management principles were:

1. Protect the geological landscape of the boulder block fields
2. Provide extensive open space for outdoor recreation by retaining farming of the open tops
3. Conserve and enhance native forest in the valleys
4. Maintain examples of the historic munition's bunkers

2. Continued growth and changes in the sport of mountain biking

Mountain biking is a sport which utilises specialist equipment to navigate off road trails and tracks. It requires technical skills and is physically demanding on the participants. In New Zealand the sport is practiced in varying types of mountainous terrain. Dual use and an increasing number of specifically constructed mountain bike trails can be found nationwide. The evolution of mountain biking from a fringe or rebellious sport where the only participants were those who raced regional and national level races in the 80's and 90's to one nearing mass mainstream participation has been driven by those immersed in the industry. The strength of the industry in New Zealand today has been shaped by all those who have gone before. From local club committee members, bike store owners, volunteer trail builders, and bike shuttle operators to government funding of national bike related projects, professional racers representing New Zealand internationally and professional trail construction companies, an army has been required to obtain the level of recognition that the sport of mountain biking now boasts.

Serious Leisure – the complexity of mountain bikers' decisions to participate
Kiwis are increasingly coming around to value activities from which they can obtain authentic experiences such as those mountain biking offers. Leisure, the pursuit of freely chosen interests, is often described as the opposite of work without consideration of it involving obligations, commitment and responsibilities.

The concept of serious leisure was developed by Robert Stebbins in the 1970s to develop an understanding of complex forms of leisure that are central to participants' identities and lifestyles. This framework includes the perseverance of participation; progression through a long-term career; turning points and achievements; accumulation of skills and knowledge; lasting benefits for the participants such as self-esteem, self-actualisation and social interactions; a unique ethos or a subculture in the activity; and social identification with the activity. As the sport of mountain biking matures expect to see a percentage of those who have not yet or just entered participation in the sport, those "less serious" about their leisure as Stebbins would say become more serious as they begin to accept, adapt to and align with these aspects of his framework.

As the mountain bike industry and market in New Zealand matures so too will the consumers of the sport which will influence their choices in the bikes and trails, they choose to ride. The sustainability of the mountain bike industry both in New Zealand and globally will involve tapping into the desires and ambitions of serious leisure participants. Mountain bike trail networks are a key element of the potential for sustained growth as they are the key ingredient that can facilitate the pursuit of serious leisure. The value of a trail network in the mountain bike community is measured by its capacity to strengthen the commitment of serious leisure participants.

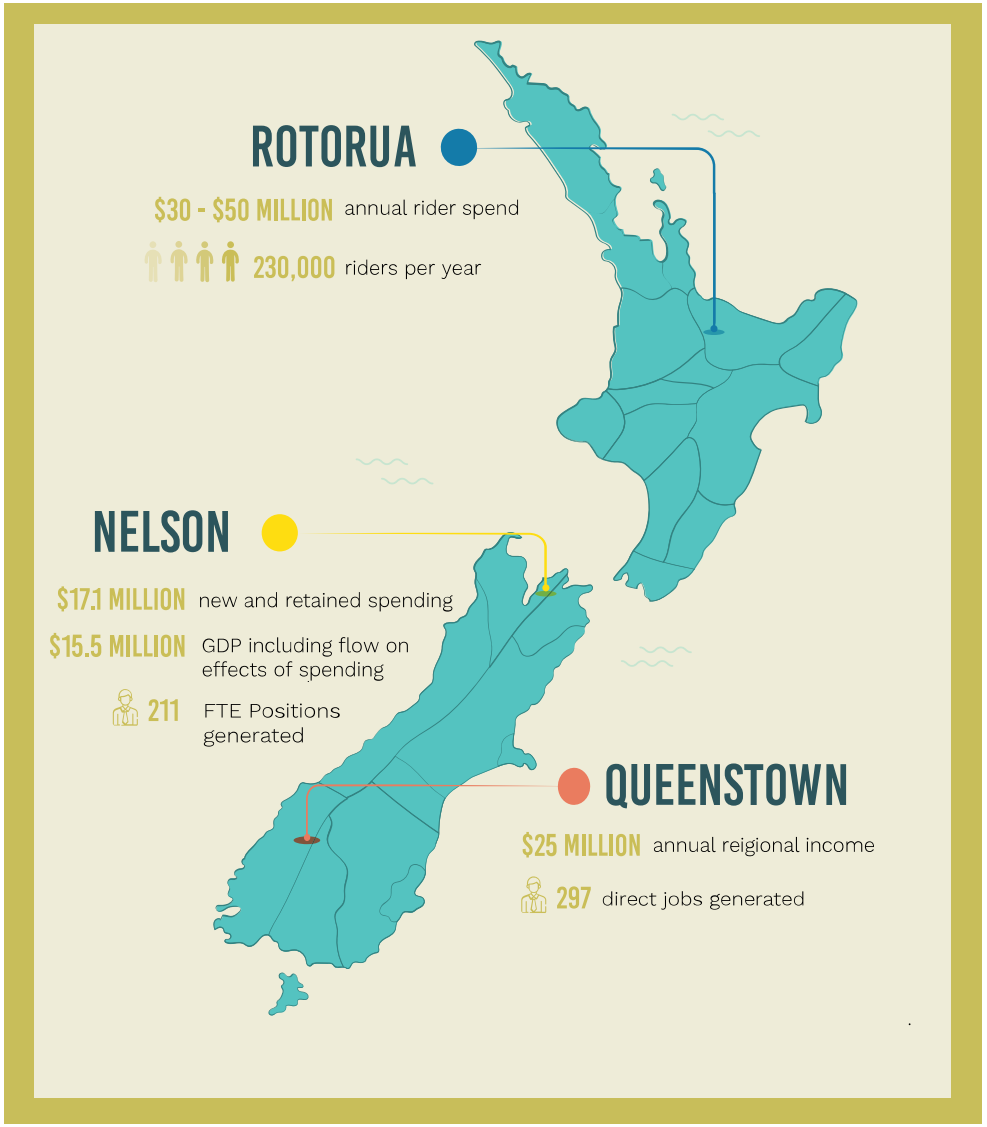
Economic Benefits
The growth and diversification of many sports including mountain biking serves as a path to social and economic development for New Zealand. Mountain biking although relatively young compared with other comparable sport and recreation activities has seen substantial growth across New Zealand since the late 90's. The habits of those who participate in these sports reflects trends in global consumer culture that can be applied in many regional contexts across New Zealand. This is evident in the following economic markers for selected New Zealand destinations.

Rotorua
- $30 - $50 million annual spend
- 200 – 350 FTE jobs (equivalent $10 - $20 million dollars in income)
- Approximately 230,000 rides in the forest per year

Nelson
- $17.1 Million new and retained spending
- $15.5 Million GDP including flow on effects of spending
- 211 FTE Positions generated

Queenstown
- $25 Million annual regional income
- 297 direct jobs generated

The significant growth in all disciplines of cycling has caused a corresponding increase in attention from planners and policymakers in their recognition of its social and economic potential. The response has been to develop or continue to develop supporting infrastructure at many national and regional cycling hubs. In addition to this growth and the changes in mountain biking; the growing population bases in the Wellington region and the spread of residential areas to the fringes of Belmont Regional Park will increase the need to accommodate an increase in park use. All of these factors will require increasing attention on the management of mountain biking in BRP in a manner that has a positive impact on the sport and complements park management policies. If implemented in the right manner policies and developments will maximise their uses and attract further interest and use of BRP assets.



7. Recommendations

7.1 Core Development Principles

Based on the above strategic analysis and opportunity's evaluation the following core development principles have been established for recommendation. Subsequently these have informed proposed trail development recommendations.

Core Development Principles

1. Safe skill progression

This is achieved through the design of trails around a core principle of progression and having something for everyone in the network. This allows riders to 'warm up' on easy trails, with the option to ride more difficult trails as they feel comfortable in a progressive manner. The style and continuity of each trail is important to focus on in regard to this aspect of trail networks to ensure trails are consistent and predictable. Further elements that contribute to this progression within the network are the provision for stacked loops that give riders the opportunity to create different routes with multiple loop options suitable for a range of skill and fitness levels.

2. Destination Trails

Destination trail networks focus on the holistic rider experience from the moment the rider's step into their vehicle or jump on the bike from their residence or accommodation. On a specific level destination trails are trails that really stand out as icons to mountain bikers for the enhanced experience compared to other trails and trail networks.

Trails and trail networks that are considered successful as destinations strive to enhance the experience for riders beyond the experience on the trail itself and often include a mix or all of the following elements:

- Cultural and Ecological - Create a character or persona that can be used to create a humanistic experience of the cultural and ecological features of BRP. The humanistic experience will help to facilitate information dissemination from way finding and health and safety messaging, to cultural, ecological and park management education for the public.
- Safe skills progression - Progression within the network for different skill and fitness levels. Further elements that contribute to this progression within the network are the provision for stacked loops that give riders the opportunity to create different routes with multiple loop options suitable for all skill levels, fitness levels and may also increase appeal for electric power assisted mountain bike riders.
- Flow – the trail networks ability to enhance and strengthen the commitment of participants to the activity. Or better still to take the participant from leisure to serious leisure.

These elements should be incorporated into as many aspects of the BRP mountain bike trail network development plan as possible.

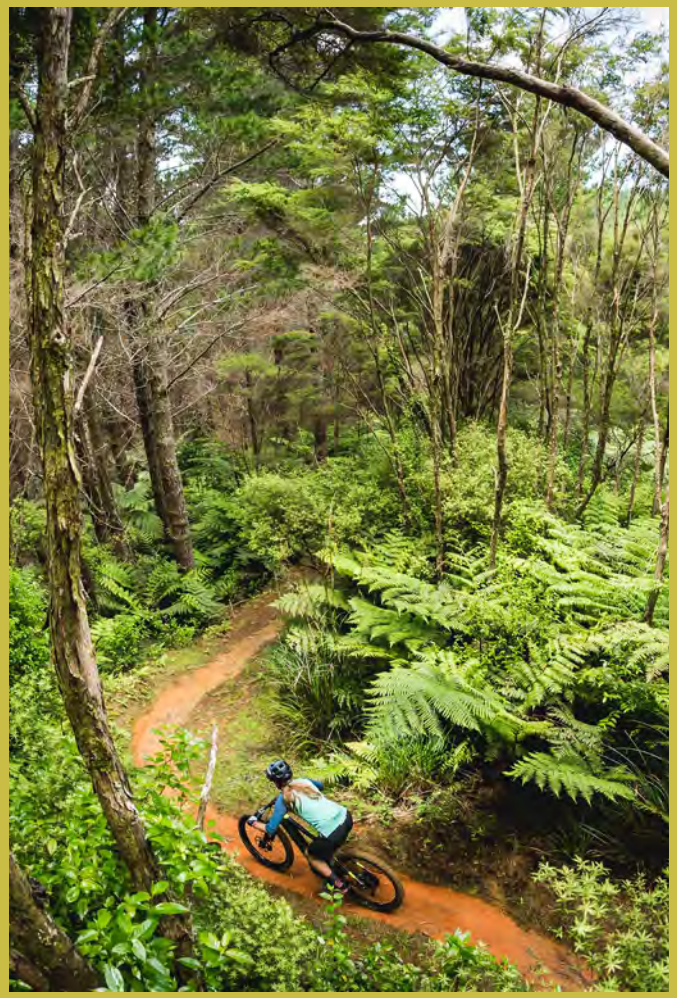
3. Controls

Although there are a multitude of opportunities to develop BRP there are still restrictions that will be imposed on the development of the trail network. WRC policies should be adhered to during this process. Some consideration of this has been applied to the following conceptual mapping however it is impossible to attend to the required detail in conceptual planning until more specific trail development planning takes place. For example, controls will need to be applied in sensitive ecological areas where human activity should be limited and areas presenting uneconomic or unsustainable trail construction conditions will need to be considered during specific trail planning.

4. Quality over Quantity

When it comes to crux of core development principles high quality, cost effective trail construction should be the bottom line.

- High Quality - less is more mindset that allows for a focus on sustainability and the ability for governing bodies to maintain the trails to a high standard with available resources.
- Cost effective - with a long-term focus, take a considerate and strategic approach in choosing which trails to upgrade, remove or tweak with regard to existing trails. For new trails consider the placement of them within the network and the landscape relative to water ways, steep sidings, intensively protected ecological or cultural sites that may increase the construction costs of new developments unnecessarily.



7.2 Trail Development

The proposed trail developments that follow are based on the findings and evaluation of the trail audit itself and with the preceding core development principles in mind. The proposed trail upgrades and new trails for construction are based on the reasoning that;

1. There are gaps or missing links in the trail network as it stands that need fulfilling to enhance the user experience,
2. The riding experience requires diversification and the ability to deliver quality trails to a wider user group, and
3. There are areas in the park that can offer outstanding opportunities for high impact trail development including the opportunity to maximise the cultural and ecological features of the park.

Central to the following trail upgrades and new trail development proposal is the ability to maintain the split trail network hubs of Stratton Street and Hill Road. By focusing the development of easier grade 2 and 3 progression trails in the east facing split of the primary audit zone. This is the zone where current trails filter to/from the Hill Road entrance. This will ensure that the best use of the terrain in the east is made in developing trails that match the terrain. In doing this the Hill Road car park would naturally become the network hub for true grade 2 riders. It will also create opportunities to develop a wider range of technical trails for grade 3 and above on the west facing hill filtering to/from the Stratton Street entrance. Though this part of the trail network will maintain and increase the number of grade 3 trails allowing for riders to progress their riding skill and fitness across the trail network.

7.2.1 Belmont Regional Park Trial Upgrades

The following (table 10) shows in order of most priority (refer table 10) the trails that are recommended to be upgraded. The degree of upgrade varies between each trail. Upgrade priority was given to the trails with consideration of the scores in Table 8. Trail Evaluation Based on Trail Rating System, page 17 and the comments made in Table 9. Detailed Trail Evaluation and Discussion, pages 18 – 20. Approximate pricing estimates have been included.

Table 10. Belmont Regional Park Trail Upgrade Detail

Trail Code	Trail	Trail Style	Trail Difficulty	Approximate distance	Upgrade Objectives	Construction Notes	Cost Estimate	Upgrade Priority
7	Weta	Progression /Flow Trail	Grade 3	700m	• Increase the trail style continuity. • Increase the sustainability of the trail. • Increase the flow of the trail. • Improve trail start and end intersections.	• Redesign Sections, Full Trail Rebuild and Reshape • Mellow out steeper gradients by realigning these sections of trail. • Increase the number of reverse grades on the trail. • Reshape all berms and trail features • Reshape berms and catchers to be more effective.	$15,000 – $25,000	1
6	Electric Avenue	Progression / Flow Trail	Grade 3	1km	• Improve the trail experience. • Improve the sustainability of the trail. • Improve trail start and end intersections.	• Full trail rebuild and reshape • Utilise the current trail line without majorly realigning the trail corridor. • Increase the number of trail features. • Reshape all berms and trail features. • Increase number of trail features while maintaining the current trail difficulty grading.	$12,000 – $22,000	2

Trail Code	Trail	Trail Style	Trail Difficulty	Approximate distance	Upgrade Objectives	Construction Notes	Cost Estimate	Upgrade Priority
12	Skills Park	Skills Progression / Flow Trail	Grade 2	300m	• Improve the trail experience. • Increase the ability of the trail to allow for skills progression.	• Full trail redesign and rebuild • Increase the number of trail features (include rollers, berms, paved rock garden and timber skills bridges etc). • Import quality material to enhance the shape of the trail by increasing the number and scale of trail features.	$8,000 - $15,000	3
2	Bull Run (plus Bull Run, Bull A Varde, Bull Run – Bull A Varde Connector Intersection)	Tech Flow	Grade 3	1.3km	• Increase the trail style continuity. • Increase the flow of the trail. • Improve trail start intersection.	• Alignment adjustments and reshaping. • Mellow out steeper gradients by realigning these sections of trail. • Steepen or add flow to sections of trail with mellow gradient by realigning/reshaping these sections of the trail. • Re shape berms and catch benches to be more effective. • Mixture of digger and hand build work.	$8,000 - $15,000	4
11	Stream Trail	Link Track	Grade 2	900m	• Provide link track return to Stratton Street car park when CT 5 is constructed (refer section 7.2.2 page 31) • Increase use of the trail.	• Increase the level of development of the trail. • Realign trail to minimise stream crossings where possible.	$10,000 - $13,000	5
Total Distance				**4.2km**	**Total Cost Estimate** *** Cost estimate does not include trail surfacing, or the construction of major bridges required along the route – quotations will be required in order to price projects more accurately.**		**$53,000 - $90,000**	

7.2.2 New Trail Development

New trails proposed for BRP are included in table 11 that follows. Approximate pricing estimates have been included along with a construction priority number from 1 – 4 with 1 being assed as adding the most value to the network and should be prioritised in any further development plans.

The trail routes for each of the recommended concept trails as listed in table 11 and marked on Map 5, page 36 - (Belmont Regional Park – Audit Zone – Map 5) are indicative and require final review as part of confirming the specific plan for each new trail in the Development Planning stage (refer Table 12 page 40 - 41). Major re-routes or changes to the location of any of the following concept trails set out in the following development plan may be required to ensure high-quality, cost-effective trail development. If on further investigation major changes are required, it is crucial that the following tables for each individual trail containing the construction objectives and descriptions for each trail concept is referred to. This will ensure the core development principles and strategic objectives set out in this document are maintained regardless of any changes to the concept. Belmont Regional Park new trail concept details follow in the tables specific to each individual trail.

Concept Trail 1 / 4

Trail Code (as shown on Map 5)	CT1 / CT4 (CT1 or CT4 can be built on/near either proposed trail line depending on the terrain available to better suit the intended trail grading)
Construction Priority	1
Trail Style	Progression Trail
Proposed Trail Difficulty	Grade 2
Approximate distance	2.6km
Trail Construction Objectives	• True grade 2 descent to cater to beginner riders who enter BRP and want an introduction to feeling of flow. • Enhance the impact of the high point as a key feature of the trail network. • Trail to utilise the area of BRP running out to Hill Road as this terrain is more conducive to constructing grade 2 trails.
Proposed Trail Description	Classic reverse graded flow trail with the addition of some roller and berm features as required to maintain flow. There may be the potential to add alternate line trail features to allow for the progression of grade 2 riders.
Construction Notes	1.7-ton machine build (1.3m bench minimum)
Cost Estimate*	$48,000 – $70,000

Concept Trail 2

Trail Code (as shown on Map 5)	CT2
Construction Priority	2
Trail Style	Adventure Loop/Tech descent
Proposed Trail Difficulty	Grade 2
Approximate distance	3.5km
Trail Construction Objectives	• Provide additional grade 4 trails in the park. • Provide additional extended / stacked loop option for riders. • Opportunity to include destination features such as educational aspects on the trail – e.g., trail name and signage when passing though valuable sections Korokoro bush and / or near streams and mountain peaks. • Capitalise on differing terrain in another aspect of the park to increase trail impact.
Proposed Trail Description	The core of this trail can be grade 3+ / grade 4 however the traverse to get to the descent must be G3 in order to be able to provide access for CT5 which is proposed as a grade 3. There is the potential after the trails split to utilise the ridgeline to construct more natural features by the use of the machine with a light touch and the look and feel of hand-built trail. Alternate line options for grade 4 and above riders may also be possible as the terrain allows. As the trail drops into the valley the trail style would become more of a classic benched trail due to the traversing and switch backing nature of the route however the build crew should aim to maintain some grade 4 style with the use of more aggressive shape and alternate lines in the trail as the conditions for building safely allow.
Construction Notes	0.8-ton - 1.7-ton machine build (approx. 1m trail width)
Cost Estimate*	$65,000 - $105,000

Concept Trail 3

Trail Code (as shown on Map 5)	CT3
Construction Priority	1
Trail Style	Jump Trail
Proposed Trail Difficulty	Grade 3 / 4
Approximate distance	1km
Trail Construction Objectives	• Provide additional trail styles and variety to the trail network thus increasing network ride quality. • To allow for safe on trail jump progression for grade 3 and 4 riders. • Provide alternate descent trail from Old Coach Road down towards the Stratton Street car park.
Proposed Trail Description	Main trail formation is grade 3 jump and flow trail features. Jump features are progressive allowing grade 3 riders to hone their jumping skills in a progressive manner while also allowing grade 4 and above riders to have a lot fun on the trail. Main trail line (grade 3) features are rollable so the trail can be ridden safely by all. This will become a guaranteed feature trail of the network loved by a range of rider abilities.
Construction Notes	2.5-ton machine build (approximately 1.3m – 1.5m trail width)
Cost Estimate*	$30,000 - $48,000

Concept Trail 4

Trail Code (as shown on Map 5)	CT4 / CT1 (CT4 or CT1 can be built on / near either proposed trail line depending on the terrain available to better suit the intended trail grading)
Construction Priority	3
Trail Style	Big Flow Trail
Proposed Trail Difficulty	Grade 3
Approximate distance	1.8km
Trail Construction Objectives	• Progression of flow trail from introductory flow trails with increased scale of features and trail speed. • Provide additional trail styles and variety to the trail network thus increasing network ride quality.
Proposed Trail Description	Propper grade 3 flow trail with wide reverse graded bench. Includes large scale classic flow trail features such as berms rollers and curved rollers. The potential to use the 2.5-ton machine here would allow for larger flow trail features to be constructed in an efficient time frame. Aiming for overall increased ride speeds compared to other flow trails in the network.
Construction Notes	1.7-ton ton or 2.5-ton machine build (1.3m bench minimum)
Cost Estimate*	$39,000 - $54,000

Concept Trail 5

Trail Code (as shown on Map 5)	CT5
Construction Priority	3
Trail Style	Adventure Loop/Bench cut/Mellow flow trail
Proposed Trail Difficulty	Grade 3
Approximate distance	5.4km
Trail Construction Objectives	• Provide additional extended / stacked loop option for riders. • Opportunity to include destination features such as educational aspects on the trail – e.g., trail name and signage when passing though or near cultural sites and mountain peaks. • Great loop extension for electric mountain bike riders. • Capitalise on differing terrain in another aspect of the park to increase trail impact.
Proposed Trail Description	This is a true all mountain back country style trail with undulating trail gradients in the beginning to get across to the Belmont trig. The bulk of the trail should be classic bench cut by machine with frequent reverse grading and addition of some mellow shape to enhance the trail while balancing the efficiency of the trail build due to its longer length.
Construction Notes	1.7-ton machine build (1m bench minimum)
Cost Estimate*	$90,000 - $140,000

Concept Trail 6

Trail Code (as shown on Map 5)	CT6
Construction Priority	2
Trail Style	Hybrid Tech Trail
Proposed Trail Difficulty	Grade 3 / 4
Approximate distance	1km
Trail Construction Objectives	• Any machinery used to be used with a light touch mentality in order to give the look and feel of hand-built trail.
Proposed Trail Description	This is a grade 3 descent with grade 4 option features. The core of the trail should be excavator hybrid style build (i.e., digger assisted with a hand-built feel). There are possibilities to work in natural terrain features to create alternate line grade 4 sections using the more technical elements of the terrain. These alternate lines incorporated into the trail can be machine assisted or pure hand build. Due to its unique style this would become a feature trail of the network.
Construction Notes	• Bulk of the tail to be constructed with 1.7-ton machine (approx. 900mm - 1m trail width). • Grade 4 spec features 400mm or wider.
Cost Estimate*	$28,000 – $38,000

Concept Trail 7

Trail Code (as shown on Map 5)	CT7
Construction Priority	4
Trail Style	Progression Jump Lines
Proposed Trail Difficulty	Grade 2 - 4
Approximate distance	200m
Trail Construction Objectives	• Provide area for grade 2 – 4 riders to hone their jumping skills in a safe and progressive manner on a designated jump line. • Attract a wider user group to the trail network.
Proposed Trail Description	Three separate jump lines should be provided for from grade 2 – 4. They should be built in a way that is also appealing to grade 4+ jumpers who can create alternate lines by transferring between the jump lines. The importation of clean clay type materials may be required depending on final site identification in order to construct quality jump features of a good size.
Construction Notes	Combination of large Posi-track / Bobcat and 2.5-ton plus machinery to construct jump lines.
Cost Estimate*	$15,000 - $24,000

***Total Cost estimate for the addition of the new trail concept trails to the network is $315,000 - $479,000.**
This cost estimate does not include trail surfacing, or the construction of major bridges required along the route – quotations will be required in order to price projects more accurately.

Total distance that the proposed new trail developments would add to the trail network Is 15.5km.

7.2.3 Trail Closures

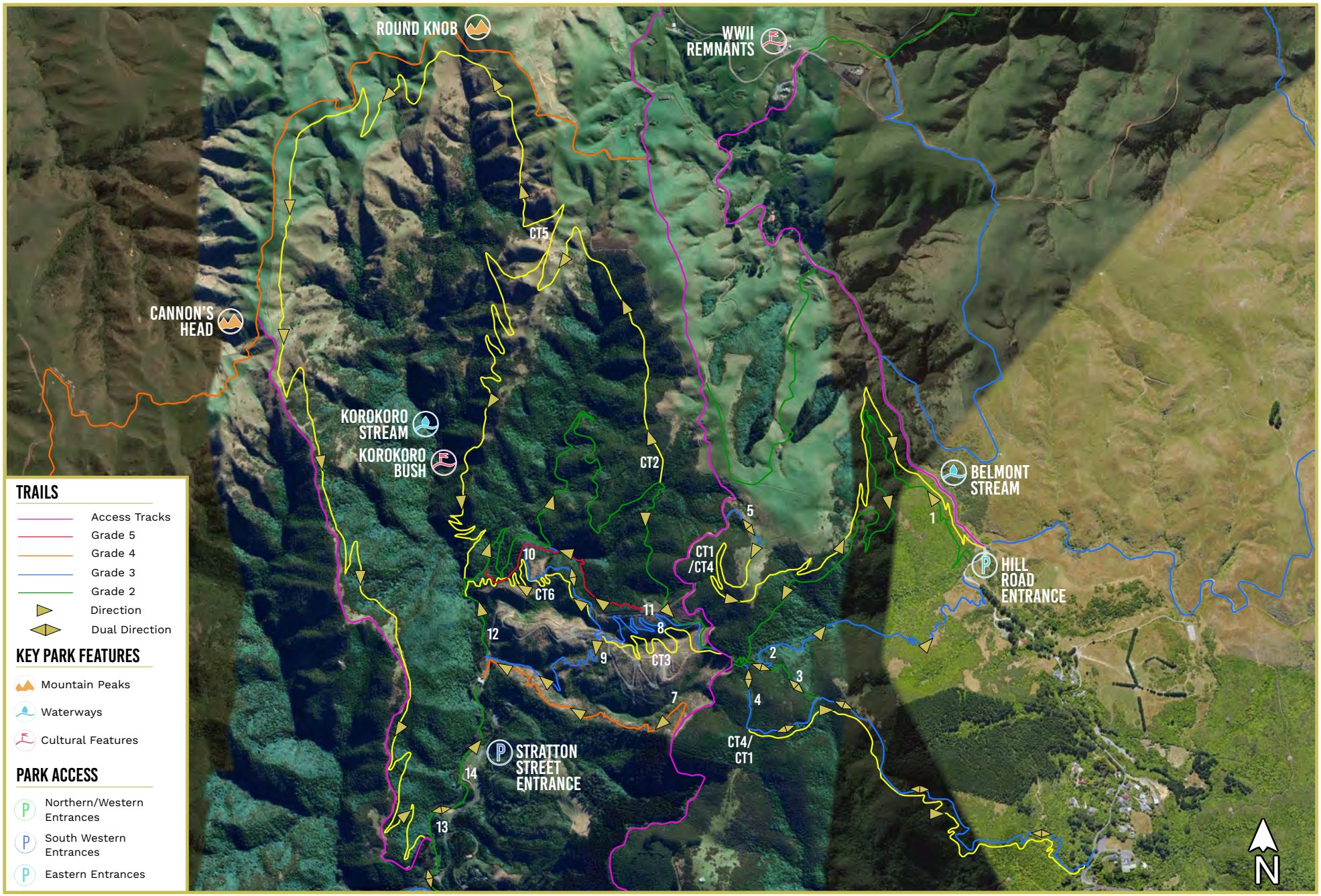
It is recommended to close the Naked Flame trail (trail 6 marked on Map 4) to allow for the construction and use of the east facing hill side where concept trail CT 1 / 4 is proposed to be routed.

7.2.4 Infrastructure Development

It is recommended that the demand on vehicle parking is monitored in future as BRP trail development takes place. Intensive trail construction projects have been known to cause a considerable uptake in trail use and corresponding increases in the demand for parking putting pressure on the infrastructure available prior to trail developments taking place. Plans to increase the volume of parking spaces should be considered in the development planning stage of the strategic process for park development (page 37 - 38).

Due to the proposed increase in the number of grade 2 trails in the eastern bloc of the core mountain bike trail network a corresponding increase in the number of users using the Hill Road entrance would be expected. It would be anticipated that this entrance would become more popular with certain user groups, thus proportionally increasing the demand on infrastructure relative to the Stratton Street entrance.

Toilets at the Hill Road entrance and bike washing stations at both the Stratton Street and Hill Road entrances would drastically enhance the user experience of BRP particularly for newcomers to the sport of mountain biking. It is anticipated that this group expect similar levels of infrastructure to other popular and developed recreation activities. Including the addition of such facilities in any BRP development plans should be undertaken with guidance from experts in park and recreation planning and civil construction.



BELMONT REGIONAL PARK - AUDIT ZONE - CONCEPT TRAILS - MAP 5

7.3 Strategic Process for Park Development

The following strategic recommendations can be used as a foundation to move forward with a structured plan for the care and development of mountain bike trails in BRP. With all parties aligned with one strategy in a cohesive manner this will ensure successful movement through the planning implementation and execution stages of the process.

Table 12. Strategic Process for Belmont Regional Park Development

Step in the Process	Objective	Action	Outcome
1. Structured Approach	Come up with a plan to develop mountain biking as a recreation sport in BRP with the support of stakeholders.	Follow below processes and ensure checks and balances are referred to along the way e.g., Objective above and the BAMBA brand vision as the guiding lights for all involved so that everyone has an understanding of the strategic direction of the plan.	Inclusive and sustainable development of mountain biking in the BRP i.e., Engage, Plan, Engage, Implement, Execute, Results.
2. Discussion and Engagement	Achieve strategic alignment across policy makers and stakeholders to ensure clear pathway to move forward with.	Use this document to start a detailed discussion around its contents and the recommendations provided in a practical and inclusive manner.	Ensures strategic alignment across bodies and groups who have an interest in the use of land in the BRP. Progress together through the following recommended steps.
3. Maintain/ Upgrade	Display the potential and capabilities of BRP management groups to deliver on providing a quality trail network for public use.	Provide leadership within the community to deploy resources to increase the quality of the trail network in alignment with the core development principles. This can be executed through either one or both of the volunteer organisation stand up or engagement of professional trail builders to carry out work on the existing trail network without over capitalising e.g., keep in mind concept and development planning and future park development plans.	Display of executing objectives of the strategy and plan developed from this audit. Greater interest in the park overall, a perception in the community of commitment to the trail network and an increase in the quality of trail and riding experience in the network.
4. Engage	Broaden and Increase the commitment of the wider stakeholder and community groups to the BRP cause.	Educate - community and stakeholders about policy, the adopted BRP strategy and planning process, culture, ecology, and the influence of strength in numbers e.g., membership to BAMBA. This can be achieved through marketing tactics such as web and social media use, Public relations, BRP signage, ambassadors and champions for BRP. Participate – Create and support events (i.e., community restoration projects, BAMBA and Wellington MTBC) that align with, and support the park development strategy (spanning all development objectives including cultural and ecological). *Community and Stakeholders = wide meaning stretching from local residents e.g., groups, individuals, schools; council e.g., interested council members, groups and / or subgroups; other BRP user groups; mountain bike industry players e.g., bike shops, trail construction companies, volunteer groups, potential funding sources.*	Increased commitment and efforts of stakeholders and the community by increasing buy-in and support. Level political hierarchy (collective efforts). Attract more funding opportunities for park development.
5. Fundraising	Accumulate funds in order to assist with the implementation and execution of the development plan.	Research potential funding resources and create a list of potential funders. Enrol club/ community members to develop funding strategy to target potential funders for BRP mountain bike development.	Organised and structured approach to the accumulation of funding for the development of mountain biking in BRP or specific projects as outlined in the plan.

Step in the Process	Objective	Action	Outcome
6. Development Planning	Develop a detailed plan for trail upgrades and construction of new mountain bike trails in BRP.	Engage professional mountain bike industry expert and trail builders to map and plan the trail upgrades and new trail construction in accordance with strategic principles and core development principles.	Sanctioned and stakeholder endorsed plan for trail and BRP development (trail maintenance, new trail construction, and facilities).
7. New Development Execution	Implement park development plan.	Decide on tactical approach for new park developments e.g., engage professional construction firm for construction of infrastructure, engage trail construction crews for new trail builds, enrol volunteer crew for new trail build, or decide of what aspects volunteers and professionals can work together on a joint venture project.	New park development plans executed.
8. Gather Data	Encourage riders to sign up to Trailforks and/or Strava to log rides (collect data).	Encourage the use of and engagement with Trailforks and Strava to record and save activity.	More data that can be used to build a wider picture of trail popularity and use in the park that can be used to inform future planning. This can also double down as a strategic leveraging point in the community and stakeholder group to expand.
9. Test	To understand the impact certain developments in the park have on use and how the users engage in them.	Process data and information provided by 7. Gather Data above and analyse in order to improve the decision making and planning process.	To continue to deliver strategic and future proofed developments in the BRP.
10. Re-evaluate	Establish an iterative process for improving the capabilities of park management groups in political, planning, development and decision-making dimensions.	Analyse, evaluate and reflect on the successes and short comings of the core principles and strategies of the past. This can be done through the engagement of industry professionals to reassess the trail network.	The evolution and enhancement of strategic drivers of the BRP for future and continued park developments.

8. Additional Considerations

The contents of this report provides concepts and recommendations for future BRP trail and infrastructure developments subsequent to the trail audit. The proposed developments contained in this report are purely conceptual and require additional consultation with council, government and other relevant bodies prior to proceeding further with any projects.

9. Summary

In summary Belmont Regional Park is situated centrally in the Wellington region allowing easy access for users to access the park. The wider BRP trail network provides good access from all corners of the park. In the coming years this will create opportunities for the expanding population to access the trail network from all park entrance points. The core mountain bike trail network of the main focus for this trail audit is located closest to the Stratton street and Hill Road entrances. There are several valuable pieces of infrastructure that allow for an enhanced user experience at these sites such as the provision of parking vehicles at both entrances.

The current trail network provides a core offering of grade 3 intermediate trails for mountain bike trail users. The network itself is well designed with good network flow. Individually trails are well placed to increase sustainability. However, as the trail network stands in its current state it could do with some additional maintenance and care in the upkeep in order to enhance the riding experience.

Both primary and secondary data was collected specific to the trail audit zone and has been presented in the text of the audit report supplemented by a combination of tables and maps. Subsequent evaluation, discussion and analysis of the current trail offerings has been conducted leading to the identification of opportunities for the development of mountain bike trails and infrastructure in BRP. These findings specific to the context of BRP coupled with insights from leading mountain bike industry expertise reveal several recommendations park management bodies can implement to enhance the mountain bike experience.

By adopting the recommended core development principles, trail designs can be improved to further enhance the user experience of the trails in the park.

Trail upgrades are recommended to Electric Avenue, Weta, Bull Run and intersection, Family Loop and Stream Trail to varying extents. The primary drivers of these proposed trail upgrades are to improve the trail style continuity and increase the sustainability of the trails.

New trail development proposed for the park includes additions to the network with the core objectives to provide additional options for trail users by increasing the variety of trails in the park, build destination attractions into the trail experience and to allow for safe skill progression for all rider skill levels. Trail styles included in the new trail concept detail include the following: grade 2 progression trail, grade 3 / 4 hybrid trail, grade 3 big flow trail, grade 3 / 4 jump trail, extended adventure loop 1, and extended adventure loop 2.

By employing the strategic process for development of the park the development objectives can be achieved in a reasonable time frame and with great success.

If implemented in the right manner policies and developments will attract further interest and use of park assets further contributing to the positive momentum of mountain biking in the Wellington region and beyond.

All in all, the BRP has a solid mountain bike trail network that as it stands has substantial opportunities for an increase in the quality of all grade 2 - 5 mountain bike trails in the park. If plans are conceptualised, developed and executed with the core principles highlighted in this document at the heart of the management team the park will become a significant asset to the Wellington region and the sport of mountain biking in the coming years.

Appendix

Appendix A

Trail Difficulty Guidelines

Reference: https://www.mtbnz.org.nz/mtb-trail-grading

Appendix B

Strategic Assessment Table

Strengths	Weaknesses
• Network Accessibility – multiple entrances, split car parking • Trail styles currently on offer in the park - flow trail, hand build tech flow, hand build tech, bench cut • Network Design – for the most part current trails are well placed to add value to network flow and remain sustainable	• Trail maintenance • Trail style continuity • Trail styles not on offer in the park - jump trail, big flow trail, digger assisted tech flow trail, true back country extended loop and options, grade 2/3 progression trail w/ g4 alternate features.
Opportunities	**Threats**
• Current policy support for mountain biking and trail development within the park • Trail network proximity to growing population • Excellent • Changing mountain bike industry • Other regional trail network development	• Potential for policy to change around park management and development focus • Cultural and ecological • Potential for land use to change

Appendix C

Mountain Bike Recreation and Tourism Critical Success Factors	
1. Stakeholders/Political will	Drive, support, education, planning, management, partnerships, flattening of political hierarchy (collective efforts), and funds
2. Trails (core product)	Physical geography, and terrain such as mountains, forest, and scenery
3. Complimentary Services	Supplementary tourism, accommodation, food, beverage, entertainment, and partnerships
4. Marketing	Target market identification, promotion, media, packaging, and web presence.
5. Legislation/Regulation	Recognition, liability, and risk mitigation.