Forrest Mountain Bike (MTB) Detailed Design Plan Project

Colac Otway Shire

February 2020

DIRTART
WORLD LEADERS IN TRAILS

Table of Contents

1 Section 1- Report Overview 10

1.1 Executive Summary 10

1.2 Introduction 12

1.2.1 Project Overview 12
1.2.2 Key Objectives 12

1.3 Methodology 13

1.3.1 Literature Review 13
1.3.2 Consultation 13
1.3.3 Field investigation 13
1.3.4 Concept trail development 13
1.3.5 Detailed trail design 14

1.4 Report Structure 15

2 Section 2- Consultation 17

2.1 Overview 17

2.2 Consultation summary 17

2.2.1 Colac Otway Shire Council 17
2.2.2 DELWP 18
2.2.3 Parks Victoria 18
2.2.4 Forrest MTB Club 18
2.2.5 Barwon Water 18
2.2.6 VIC Roads 18
2.2.7 Local businesses 19
2.2.8 Traditional Owner Groups 19
2.2.9 Broader community 19

3 Section 3- Current Situation 22

3.1 Overview 22

3.2 History 22

3.3 Site Analysis 22

3.3.1 Location 22

3.4 Current Visitation 25

3.5 Other Trail Users 25

3.6 Attribute Analysis 26

3.6.1 Audience 26
3.6.2 Elevation Opportunity 26
3.6.3 Topography 26
3.6.4 Geology 27
3.6.5 Climate 27

3.7 Attribute Summary 27

3.8 Market Positioning 28

3.8.1 Overview 28
3.8.2 Regional Competitor Analysis 28
3.8.3 Key Victorian Destinations 29

3.8.4 Mount Buller 29
3.8.5 Falls Creek 29
3.8.6 Bright 30
3.8.7 Warburton 30
3.8.8 Forrest's position as a mountain bike destination 30
3.8.9 Suggested Development Strategy 31

3.9 Road Crossings Analysis and Design 32
3.9.1 Overview 32
3.9.2 Forrest Crossing 32

3.10 Boundary Road Crossing 33
3.10.1 Overview 33
3.10.2 Potential Treatment Options 33

3.11 Existing Trails Overview 35
3.11.1 Overview 35
3.11.2 Auditing Process 35
3.11.3 Aims and Objectives 35
3.11.4 Ranking Criteria 36
3.11.5 Overview of Ranking Criteria 36
3.11.6 General Comments – Trail Condition 37
3.11.7 General Comments- Trail Network Layout 37
3.11.8 Trail Maps – Existing 38
3.11.9 Trails Assessed 41
3.11.10 Third Time Lucky 42
3.11.11 Follow the Dog 43
3.11.12 Marriners Run 44
3.11.13 Grass Trees 45
3.11.14 Foxtail 46
3.11.15 J2 47
3.11.16 Yo-Yo 48
3.11.17 Casper Black 49
3.11.18 Vista 50
3.11.19 Barre Warre 51
3.11.20 Yaugher Super Loop 52
3.11.21 Red Carpet 53
3.11.22 Forrest Loop 54
3.11.23 Balidjaru 55

3.12 Trail Heads 56
3.12.1 Forrest Trail Head 56
3.12.2 Review of Existing Infrastructure 56
3.12.3 Car Park 57
3.12.4 Shelter 57
3.12.5 Toilets 57
3.12.6 Kids Pump Track 57
3.12.7 Pump track 57
3.12.8 Skills Park 58
3.12.9 Trail Head Signage 58
3.12.10 Green Space 59
3.12.11 General Amenity and Landscaping 59
3.12.12 Yaugher Trail Head 59
3.12.13 Review of Existing Infrastructure 59

3.13 Signage Audit 61
3.13.1 Overview 61

3.13.2 Current Signage Overview 61

3.14 Gap and Opportunities Analysis 64
3.14.1 Overview 64
3.14.2 Gap Analysis 64
3.14.3 Opportunities Analysis 64

4 Proposed New Developments 67

4.1 Overview 67

4.2 Proposed Loop Trail Re-Formatting 67

4.3 Road Crossing Treatments 67

4.4 Forrest Trail Head Trail Network Proposed Works 70
4.4.1 Overview 70
4.4.2 Key recommendations 70
4.4.3 Forrest Trail Head Master Plan 70

4.5 DELWP Ex Depot Master Plan 79
4.5.1 Overview 79
4.5.2 Potential Uses 79

4.6 Yaugher Trail Head Master Plan 81
4.6.1 Overview 81
4.6.2 Key Recommendations 81
4.6.3 Review of new proposed infrastructure 81

4.7 Trail Upgrades and Realignments 84
4.7.1 General trail audit recommendations 84
4.7.2 General upgrade process 85
4.7.3 Existing Trail Works Summaries- Forrest Trail Head Trails 88
4.7.4 Existing Trail Works Summaries- Yaugher Trail Head Trails 101

4.8 New Proposed Trails 123
4.8.1 Forrest Trail Head Trails 123
4.8.2 N1 - Barwon Flow Descent One 125
4.8.3 N2 - Barwon Flow Descent Two 126
4.8.4 N3 - Barwon Flow Ascent 127
4.8.5 N9 - Roller Coaster Loop 2 129
4.8.6 N10 - Red Carpet Duplication 130
4.8.7 Proposed New Trails- Yaugher Trail Head Area 131
4.8.8 N7 - Boundary Road Ascent 133
4.8.9 N8 - Boundary Road Descent 134
4.8.10 N12A - Eastern Loop Trail Part A 135
4.8.11 N12B Southern Loop Trail Part B 136

4.9 Hiking and Equestrian Trails 137

4.10 Suggested Signage Strategy 139
4.10.1 Overview 139
4.10.2 Look-and-feel and branding 139
4.10.3 Signage types 139
4.10.4 Secondary Map Boards 143
4.10.5 Trail Head Signage 143
4.10.6 Wayfinding Signage 143
4.10.7 Signature Rides 143
4.10.8 Emergency Management 144

4.11 Potential Future Concepts 145
4.11.1 Overview 145
4.11.2 Forrest Eastern Loop Trail 145
4.11.3 Forrest to Coast Trail 145

4.12 Implementation Plan 147
4.12.1 Approvals 147
4.12.2 Construction Approach 147
4.12.3 Signage 147
4.12.4 Suggested Development Budget 148
4.12.5 Development Staging 148

4.13 Design and Construction Methodology 149
4.13.1 Environmental management 149
4.13.2 Detailed Design 149
4.13.3 Trail types 149

5 Section 5- Operational Considerations 155

5.1 Management Models 155

5.2 Trail Maintenance 155

5.3 Risk and Incident Management 156

5.4 Marketing and Branding 157
5.4.1 Overview 157
5.4.2 Key Strengths 157
5.4.3 Marketing Plan 157
5.4.4 Marketing Formats and Channels 158
5.4.5 Influencers 159
5.4.6 Digital Media 159
5.4.7 Print Media 159
5.4.8 Website 160
5.4.9 Marketing Budget 160

6 Section 6- Conclusion 162

7 Appendix 1- Mountain Bike Market Overview 164

7.1 The Mountain Bike Market - National and Local 164
7.1.1 Overview 164
7.1.2 History 164
7.1.3 Current Market 164
7.1.4 Current Participation and Economic Data- Australia 165
7.1.5 Current Participation and Economic Data - Southern Hemisphere 166
7.1.6 Current Participation and Economic Data - Northern Hemisphere 166
7.1.7 The Future 167

7.2 Mountain bike tourism 168
7.2.1 Mountain Bike Tourism Markets 168
7.2.2 Complementary Mountain Bike Tourism Markets 168
7.2.3 Enthusiast Tourist Market 169

8 Appendix 2- Policy 170

8.1 Overview 170

8.2 Relevant Standards and Guidelines 170
8.2.1 Overview 170

8.2.2 IMBA Guidelines 170

8.3 Guiding Principals 171

8.4 Universal Access 171

8.4.1 Overview 171
8.4.2 Trail Guidelines 172
8.4.3 Suitable Trails 172
8.4.4 General Amenities 172

9 Appendix 3 - Literature Review 173

9.1 Forrest Mountain Bike Strategic Plan 173

9.1.1 Summary 173
9.1.2 General Summary 173
9.1.3 Key Themes 173

9.2 Barwon Flow Trail Report 176

9.2.1 Summary 176
9.2.2 General Summary 176
9.2.3 Dirt Art Response 176

9.3 Distinctive Trail Developments Trail Audit Report 177

9.3.1 General Summary 177
9.3.2 Dirt Art Response 177

9.4 Forrest Mountain Bike Trails Economic Cost Benefit Analysis 177

9.4.1 General Analysis 177
9.4.2 Dirt Art Response 178
9.4.3 Additional Information 178

9.5 Birregurra and Forrest Community Infrastructure Plan 179

9.5.1 General summary 179
9.5.2 Dirt Art feedback 179

10 Appendix 4- Project Budgets 180

11 Appendix 5- One Mile Grid Traffic Reports 182

12 Appendix 6- IMBA TDRS 184

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- Colac Otway Shire
- Department of Environment, Land, Water and Planning
- Parks Victoria
- Forrest Mountain Bike Club
- Barwon Water
- Forrest and District Community Group

Section 1- Report Overview

1 Section 1- Report Overview

1.1 Executive Summary

The Forrest MTB Trails ('Forrest') were first opened in 2005, with a combination of formalised informal trails, and new professionally-built trails. The network spreads across two primary trail heads, Forrest and Yaugher, encompassing over 60km of trails. At the time of its launch, Forrest was arguably Australia's first mountain bike town. The project was the first time in Australia that mountain biking had been used as a driver for tourism and economic development, following the slow-down of the forestry industry in the region.

Since Forrest's opening, the mountain bike destination industry in Australia has grown exponentially, with large-scale destination trail projects being established right across the country. At the time of developing this report, the benchmark for trail destinations in Australia is high; with several destinations with over 100km of purpose-built trails in operation, utilising a wide range of wilderness and mountainous areas. While Forrest was initially a benchmark development as a trail destination in Australia, the town and its trail network have since been relegated to a trail destination of minor national significance.

The project scope includes auditing and detailed design for all existing and proposed trails, a signage audit, design of traffic treatments, master planning of the Forrest and Yaugher Trail Heads in addition to Cultural Heritage and Native Vegetation studies.

An additional ~38km of new trail volume has been proposed to take the overall trail volume to approximately 100+km, which when constructed will re-establish Forrest as a nationally significant mountain bike destination.

Dirt Art has worked to establish and recognise Forrest's key strengths, while targeting areas that are most suitable for economical, high-quality trail development. A broad range of experiences has been targeted, which will meet current and future rider demands, while retaining elements of the character and riding experience for which Forrest is renowned. The proposed trail network rationalisation and reformatting will create a highly-functional, revitalised riding experience that will appeal to both local and visiting riders. The proposed trail head works create vibrant, functional and appealing public recreational opportunities, which will appeal to visiting riders of their own volition. The proposed Forrest Trail Head works will create one of Victoria's premier gateway riding experience, that is expected to hold extremely strong appeal for riders of all abilities. The asphalt pump track proposed for this area is the only asphalt track within a 200km radius and is expected to attract significant attention from mountain bikes, BMX riders, scooter riders and skaters.

The complete detailed design plan has worked to provide a cost-effective, environmentally and socially sensitive pathway towards re-establishing Forrest as one of

Australia's great mountain biking destinations. The revised network designs have focused on providing year-round riding for a broader market of riders, and the provision of a network of trails that are simpler and more cost-effective to manage for land managers. Once completed, the Forrest trails will provide significant appeal to existing customers, while broadening opportunities to embrace a number of new rider markets.

1.2 Introduction

1.2.1 Project Overview

Dirt Art has been engaged by the Colac Otway Shire Council (COSC) to undertake a Detailed Design Plan (DDP) for the Forrest Mountain Bike (MTB) Trails. This project received grant funding from the Australian Government via Round 2 of the Building Better Regions Fund 'Community Investment Stream' and has be co-funded by COSC.

The project document assesses existing trails and infrastructure and analyses the current mountain bike market, before developing plans and recommendations for the following key infrastructure projects;

- Forrest Trail Head Master Plan
- Barwon Flow Trail Detailed Design Project
- Existing trails capital renewal and trail network re-formatting
- New trails designs
- Signage audit and plan
- Construction methodology

The project has a significant consultation component, involving liaison with a number of agencies, groups and individuals. The final project will propose a number of capital improvements and works, new trails and infrastructure, which have been targeted at generating a significant increase in visitation as well as increasing rider safety and enjoyment.

1.2.2 Key Objectives

The key objectives of this project are to develop a mountain bike plan that;

- Improve the existing trail experience for a broad market of riders
- Re-establish Forrest as a nationally-significant mountain bike destination
- Improve trail network functionality through trail head upgrade, trail realignments and network restructuring
- Develop Trail Head Master Plans that creates an appealing destination for a broad market of riders and other active and passive users
- Develop new trail concepts that target demand markets
- Establish Forrest's key market strengths and work to capitalise on these strengths

1.3 Methodology

The project has engaged the following methodology;

1.3.1 Literature Review

The following reports and plans have been reviewed;

- Forrest Mountain Bike Trails Strategic Plan
- Barwon Flow Trail Detailed Design Plan
- Birregurra and Forrest Community Infrastructure Plan
- Forrest Mountain Bike Trails Economic and Cost Benefit Analysis

A complete literature can be found at **Appendix 3 (page 175).**

1.3.2 Consultation

Dirt Art has undertaken significant consultation through the project. A list of groups, organisations and individuals consulted with can be found below. A detailed consultation summary can be found in **Section 2 (page 18).**

1.3.3 Field investigation

Multiple field investigations have been undertaken between May and September, which have focused on assessing existing trails, planning for trail realignments and improvements, and developing new trail designs.

The field assessment process has included a trails audit of all formal mountain bike trails. This audit can be found in **Section 3.11 (page 36).**

This field investigation involved the assessment of existing trails, including, formal mountain bike trails, informal mountain bike trails, and walking/horse trails.

1.3.4 Concept trail development

Using a comprehensive opportunities and gap analysis, a number of concept trail alignment shave been prepared. These alignments aim to address key network gaps, as well as opportunities for establishment of high-quality trail experiences. Concept trail alignments have been developed in areas that provide the lowest possible conflicts with environmental, historical and cultural values.

Dirt Art has utilised a combination of desktop GIS analysis and field investigations to develop trail concepts.

1.3.5 Detailed trail design

Following presentation and consultation of the concept trail designs, these trail concepts have been revised as required. Upon acceptance of the concept trail alignments, a process of detailed trail design has been undertaken.

The detailed design process involved the field assessment, ground truthing and GIS data logging of all trails. Trails 1, 2 and 3 were also flagged in the field utilising survey tape hung at ~5m intervals.

1.4 Report Structure

The report has been formatted into seven sections;

- Section 1- Report Overview
- Section 2: Consultation
- Section 3: Current Situation
- Section 4: New Proposed Developments
- Section 5: Operational Considerations
- Section 6: Conclusion
- Section 7: Appendices

Section 2- Consultation

2 Section 2- Consultation

2.1 Overview

During the development of this project, a number of groups, organisations, individuals and the broader community have been consulted with. Broader community consultation was led by the Colac Otway Shire, due to their history in the project and greater understanding of community wants and needs.

Consultation included the below key groups;

- Colac Otway Shire Council
- DELWP
- Parks Victoria
- Project Control Group
- Forrest MTB Club
- Barwon Water
- Local businesses
- Local community
- Tour and transport businesses
- Traditional Owner Groups

The Colac Otway Shires Economic Development team is managing the Forrest MTB Detailed Design Project for the Forrest MTB Trails. The Project Control Group involves representatives from the community (Forrest MTB Club and the community), COS Economic Development, DELWP and Barwon Water.

Consultation has been undertaken in face-to-face meetings, via phone and email, and via online survey. A summary of consultation can be found below.

2.2 Consultation summary

2.2.1 Colac Otway Shire Council

Throughout the project, *Dirt Art* has continued to liaise with the Colac Otway Shire Council (COSC). COSC are strong supporters of the project and seek to support the renewal of the Forrest MTB Trails. Key consultation outcomes are as below;

- Strong project supporters
- Intending to seek grant funding to support the project going forward
- Desire to see the project completed comprehensively, with a view to providing a thorough, easily-implementable strategy and design

2.2.2 DELWP

DELWP are the principal land manager for the land utilised by the majority of the current trail network. DELWP are long-time supporters of the Forrest MTB Trails, though notably have funding and resource constraints that limit their capacity to maintain, renew and expand the trail network. Key consultation outcomes are below;

- Strong project supporters
- Acknowledged constraints to maintain, renew and expand the trails
- Raised potential processes required for new trails
- Raised potential processes for realigning existing trails

2.2.3 Parks Victoria

Parks Victoria were liaised with around certain elements of the project, including existing and proposed new trails under their land tenure. Parks Victoria encouraged the use of the Public Land Mountain Bike Guidelines and have provided in-principle support for proposed works on the existing Red Carpet and Barlidjaru trails.

2.2.4 Forrest MTB Club

The Forrest Mountain Bike Club are the local not-for-profit group representing the local mountain bike fraternity. The group have been consulted with primarily through the Project Control Group. Key consultation outcomes are below;

- Strong supporters of the project
- Desire to see the existing network expanded
- Desire to see the existing trails improved
- Desire to see the network diversified (more beginner and more advanced trails)
- Desire for ongoing involvement
- Consultation around master planning of the former DELWP depot site

2.2.5 Barwon Water

Barwon Water manage the land where a number of proposed and existing trails are located. Barwon Water attended an agency walk through the Barwon Flow Trails alignments (N1, N2 and N3) and have provided in principle support for the implementation of these trails.

2.2.6 VIC Roads

VIC Roads have in principally approved the traffic treatment plans developed for the project by *One Mile Grid.*

2.2.7 Local businesses

Local businesses have been liaised with during the development of this report, through a range of avenues.

2.2.8 Traditional Owner Groups

COSC has liaised with traditional owner groups throughout the project. Further consultation will occur as the project progresses.

2.2.9 Broader community

Prior to project commencement, COSC staff met with 20 community members to discuss the purpose of the detail design project. These meetings mainly took place with residents interested in learning more about the project process as well as others querying the rationale behind further MTB industry investment and those with existing issues relating to mountain bikers.

Residents and riders were also invited to submit project ideas and questions via an online portal and via a social media survey. 340 supportive comments were made via the portal and social media platforms assisted with contacting and working with local community members either in support or opposed to the project.

Council conducted four open house sessions with the community in May (two sessions), July and October 2019. In total, 102 different community members attended these sessions which occurred in conjunction with *Dirt Art* assisting a walk through by five community members and 10 staff from local agencies to investigate the Barwon Flow Trails product.

Acquiring contact details from community members and other interested parties via the above forums has enabled COSC to send out three separate project communication updates to a database of 180 members. All forums further provided COSC and the project consultants a valuable insight on the work required to meet the needs of the community and create a nationally significant mountain bike facility in Forrest.

Key broader community consultation outcomes can be found below;

- General support for the project
- Vocal component of the horse community seeking shared trail access and development
- Residential concerns regarding trails being developed close to local houses
- Concern around environmental impacts
- Concern around access

- Desire for as horse-riding loops at the Yaugher Trail Head

Consultation sessions also allowed *Dirt Art* and Council to discuss the value of mountain biking to Forrest with a broad community audience.

Section 3- Current Situation

3 Section 3- Current Situation

3.1 Overview

Forrest MTB Trails have been open since 2005, with the trail network undergoing limited expansion and/or renewal since this time. While the trail network generally remains functional and provides a good quality trail experience, the trails lack many of the elements desired by the modern mountain bike rider.

3.2 History

At its opening, Forrest was arguably Australia's first 'mountain bike town', with the project underpinned by a desire to generate tourism and economic development.

Forrest went on to host a number of mountain bike events, including but not limited to; The Otway Odyssey, and the Forrest Festival (no longer operating).

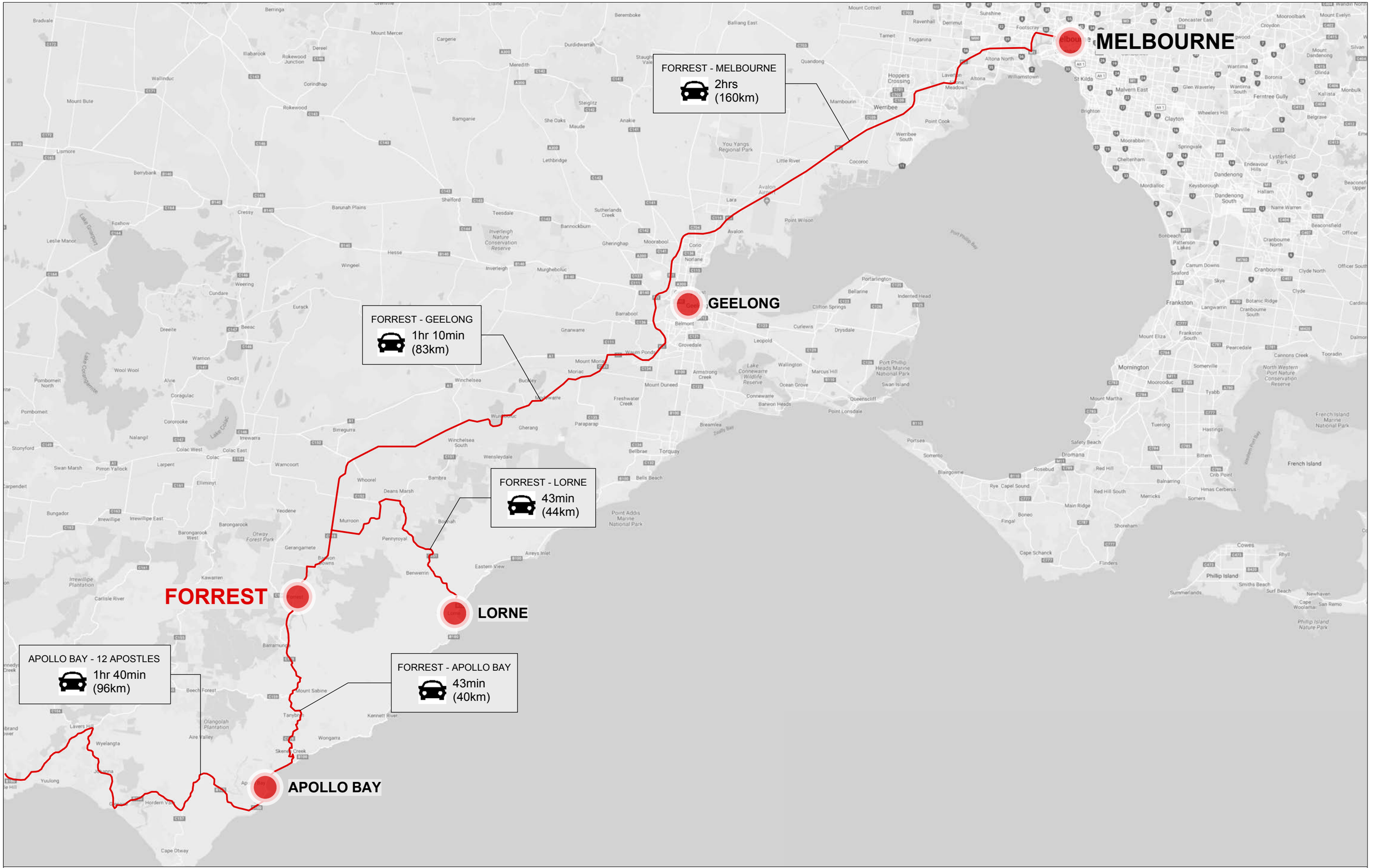
3.3 Site Analysis

3.3.1 Location

Forrest is located approximately 2hr drive from the City of Melbourne. The site features minimal elevation and generally gentle side slopes. Darker shaded areas of the site generally feature more appealing forest types, including pockets of rainforest, while sunnier aspects feature dry mixed forest, including some dry, sandy areas.

The trail essentially departs from the town, though the Yaugher Trail Head is accessed via vehicle by many users.

Location maps can be found over the page.



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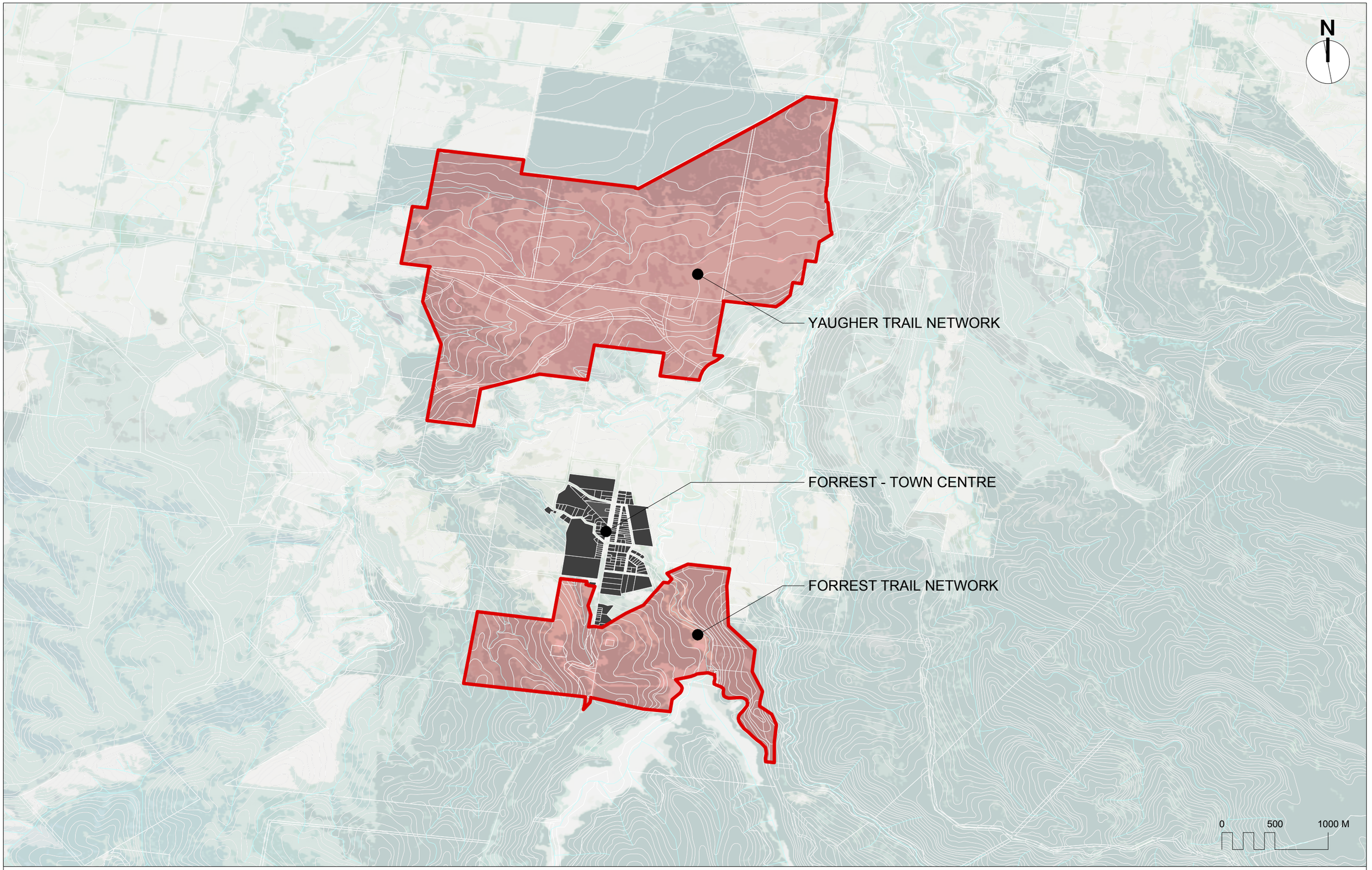
PROJECT	Forrest Mountain Bike (MTB) Detailed Design Plan
LOCATION	Forrest VIC
CLIENT	Colac Otway Shire

DWG
[LOCATION MAP]

DRAWN JL | SCALE @ A3 AS SHOWN | DATE # 21/11/19 | REVISION B

DWG # LM



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PROJECT	Forrest Mountain Bike (MTB) Detailed Design Plan
LOCATION	Forrest VIC
CLIENT	Colac Otway Shire

DWG
[SITEPLAN]

DRAWN	SCALE @ A3	DATE #	REVISION
JL	AS SHOWN	01/10/19	A

DWG #
01

3.4 Current Visitation

Visitation levels through the past several years appear relatively static, though no accurate visitation data was available at the time of preparing this report. Current trail visitation counts are likely to be in the vicinity of 25,000 annual rider entries into the trail network. Given the public nature of the trail network, and multiple entry points, an accurate visitor count is difficult to achieve.

With increasing high-quality trail development occurring across the state of Victoria, and a lack of any major new trail or capital improvement works, Forrest is struggling to compete with other mountain bike destinations. The trail-based riding, with lack of sustained ascending/descending, along with a general trail deterioration is compounding this issue.

There is a significant opportunity for the area to achieve visitation growth, with attractions like the nearby Great Ocean Road seeing continual growth. The COSC has seen 29.6% visitor growth since March 2015, with visitor numbers at 1.04m. Visitor nights in the municipality have increase 21.9% through the same period[1].

Dirt Art believe that there is significant opportunity to drive visitation growth at Forrest, led by high-quality trail upgrades and new trail development.

3.5 Other Trail Users

The Forrest trail network is popular with both equestrian and walking users.

Equestrian users were strongly represented in the community consultation sessions and have voiced a strong desire for the formalisation of a loop of trails at the Yaugher Trail Head that does not include roads. A route has been suggested for these trail users and can be found at **Section 4.9 (page 139).**

Dirt Art suggests that walking is a compatible shared-use on all ascending and contouring mountain bike trails if desirable.

[1] Data-insights GORRT Tracking Report YE March 2019

3.6 Attribute Analysis

3.6.1 Audience

Local population	~150
200km radius population	~5m

Located an approximately 2hr drive from Melbourne, Forrest has a significant potential audience. While the local town features just ~150 residents, the 200km radius area encompasses a potential population of over ~5m.

With a significant urban market opportunity, Forrest is well positioned to capitalise on a beginner-intermediate rider market.

3.6.2 Elevation Opportunity

Current	~70m
Potential	~120

The current elevation opportunity at Forrest is approximately 70m, though notably, this opportunity has not been fully utilised by any existing trails. The potential elevation opportunity is approximately 120m with the new proposed trails. Notably, a greater elevation opportunity would be available further from Forrest, with 600m+ elevation available within a 30km radius from the town.

This opportunity does not suit downhill trails and is best suited to trail and enduro-focused riding.

3.6.3 Topography

Average slope	10-20%
Maximum slope	~45%

Slopes on site are generally in the region of 10-20%, though notably many areas of the Yaugher Trail Network feature extremely flat slopes, which are causing sustainability and functionality issues.

Where possible, *Dirt Art* has sought to establish new trails in areas with a slope of 20-40%. Notably, this has not always been possible with the extensive areas of shallow slopes, particularly around the Yaugher Trail Head.

3.6.4 Geology

Predominant soil type	Sandy clay

The predominant soil type at Forrest is a sandy clay. It would appear that generally deeper sub surface soils are highly clay-based, and do not promote a year-round riding experience. *Dirt Art* suggest that sub surface soils are not used for future trails, and that key trails are surfaced where required to provide high-quality year-round riding.

The geology of Forrest is generally devoid of rock, providing limited opportunity to develop sustainable and functional technical trails.

3.6.5 Climate

Average annual rainfall	1,038mm (mean)

Forrest generally features mild, warm summers, and cool, wet winters. With over 1m of annual rainfall, and areas of dense soils, the trails are prone to wet weather issues. As noted above, *Dirt Art* suggest consideration of surfacing key trails.

3.7 Attribute Summary

The Forrest MTB Trails are located in an area with limited elevation, moderate slopes and generally high environmental and scenic value. The soil types are conducive to development of non-technical flow trails due to the lack of on-site rock.

Key site attributes result in the following recommended development focuses;

- Enduro-focused trails that maximise climbing and descending opportunities
- Flow trail development that caters for the broadest market of riders, including the development of some jump-focused trails
- A beginner to intermediate rider focus due to the limited slopes, elevation and rock available on site, and the opportunity to cater for schools, corporate groups
- Key trails should be weather-proofed (surfaced) to enable year-round riding

3.8 Market Positioning

3.8.1 Overview

When developing a mountain bike destination, it is important to consider the positioning of the destination in an increasingly competitive marketplace. For the purpose of this project, *Dirt Art* has focused on the Victorian mountain bike market, and the positioning of Forrest within that market.

3.8.2 Regional Competitor Analysis

Destination	Distance	Trail Volume
You Yangs	95km	65km
Lysterfield	145km	45km
Anglesea	45km	20km
La Larr Ba Guawa MTB Park	170km	35km
Creswick (proposed)	150km	100km (proposed)

You Yangs- Forrest's largest current regional competitor is the You Yangs MTB Park, located approximately 45min from the Melbourne CBD. The You Yangs is renowned for its rocky, challenging trails and generic dry forests. Forrest's key strengths over this destination are; appealing forest types, capacity for flow trails, beginner/intermediate trail opportunities, and the Great Ocean Road and Otways and their nature and food and beverage-based tourism offerings

Lysterfield- Lysterfield is the second largest Greater- Melbourne trail destination, though notably is located on the eastern side of the city. Lysterfield features fairly generic trails, with a modest elevation opportunity. Forrest's main competitive strengths over this destination are; appealing forest types, beginner/intermediate trail opportunities, and the Great Ocean Road and Otways and their nature and food and beverage-based tourism offerings.

Anglesea- Anglesea has a small network of partially formalised trails, located between the Great Ocean Road and the coastline. The compact trail network is largely volunteer-driven and is not renowned as a riding destination in its own right, however Anglesea offers a great variety of food and beverage and some seaside adventure tourism experiences. Forrest's main competitive strengths over this destination are; appealing forest types, and beginner/intermediate trail opportunities.

La Larr Ba Gauwa MTB Park- Located in Harcourt, some distance from Forrest, these trails are renowned for their challenging rocky nature. Forrest's main competitive strengths over this destination are; appealing forest types, proximity to the Great Ocean Road, beginner/intermediate trail opportunities and servicing (restaurant, café etc.).

Creswick- A large (100km network of trails is proposed in Creswick. The project has been under planning for the past several years, and while funded, there are currently no approvals in place to proceed with construction. *Dirt Art* understands that the council intends to begin construction in early 2020.

3.8.3 Key Victorian Destinations

Victoria has a number of successful mountain bike destinations, many of which have bene in operation for a number of years. Victoria's destinations are generally located away from major population areas, with a concentration of destinations in the North East of the state.

3.8.4 Mount Buller

Trail volume	~65km
Elevation range	1,000m+
Riding styles	Trail, enduro, downhill
Uplift opportunity	Shuttle bus

Mount Buller was Victoria's first alpine mountain bike destination, launching with a significant offering of cross-country trails and a small network of downhill trails. The resort completed their current trail development plan with the Epic, a 42km back country ride. Mount Buller's key strengths are its volume of trail and alpine location, which affords a range of viewpoints and appealing forest types. The popularity of the trail network has waned in recent years as more endure focused riding destinations have grown in popularity.

Mount Buller has a small offering of providers open through summer to service their riders. As an alpine area, the resort is open only seasonally.

3.8.5 Falls Creek

Trail volume	~45km
Elevation range	700m+
Riding styles	Trail, enduro, downhill
Uplift opportunity	Shuttle bus

Falls Creek is a relative newcomer on the Victorian destination scene, though has been steadily growing their trail network over a number of years, with a further ~40km of trails planned to be added in coming years. The resort has a strong reputation in the enduro riding scene, with many trails accessible via vehicle uplift. Falls Creek's key strengths are its long format descents, and alpine location.

The resort has a growing number of operators opening through the summer season to service its riders. As an alpine area, the resort is open only seasonally.

3.8.6 Bright

Trail volume	~60km
Elevation range	400+m
Riding styles	Trail, enduro, downhill
Uplift opportunity	Shuttle bus

Bright is a highly popular mountain bike destination, where riders will often base themselves to rider other nearby destinations including; Mount Beauty, Yackandandah, Beechworth, and Falls Creek.

Bright is renowned for its small-town atmosphere and technical pine forest trails through a good (~400m) elevation range.

3.8.7 Warburton

Trail volume	~100km
Elevation range	1,000m+
Riding styles	Trail, enduro, downhill
Uplift opportunity	Shuttle bus

Warburton is a proposed mountain bike destination, located approximately one hour from Melbourne. Currently progressing through planning, the destination is proposed to include a wide range of trails, with an opening volume of approximately 100km of trails.

3.8.8 Forrest's position as a mountain bike destination

3.8.8.1 Competitor Analysis

Forrest has a strong opportunity for re-establishment as a significant mountain bike destination, though this success will only be achieved through the capitalisation on Forrest's key strengths, and an understanding of how to best position the facility amongst other Victorian mountain bike destinations.

Forrest cannot compete with other destinations in an elevation sense, with less than 100m elevation available. With this in mind, Forrest is best served targeting trail-focused riding, and maximising what elevation opportunity it has through the provision of sustained climbs and descents where possible.

Forrest does not have the rocky and technical terrain offered at many other key riding destinations, nor does the area have the gradient to facilitate steeper and more challenging trails.

3.8.9 Suggested Development Strategy

Forrest is best positioned as a family-friendly trail riding destination, with a focus on flow trails, intermediate jump trails and relatively non-technical riding. This is not to suggest that Forrest cannot facilitate more technical, advanced riding, but this should not be the development focus.

3.9 Road Crossings Analysis and Design

3.9.1 Overview

Dirt Art has been tasked with reviewing road crossings at Forrest-Birregurra road and Boundary Road, with the view to establishing formal treatments that will improve trail user safety. An analysis of this process and the resulting recommendations can be found below.

Dirt Art has engaged traffic consultants, *One Mile Grid* to assist with analysing and designing traffic treatments. Reports provided by *One Mile Grid* can be found at **Appendix 5 (page 184)**.

3.9.2 Forrest Crossing

3.9.2.1 Overview

Riders are currently crossing this road section to access the Forrest Loop. Vehicle speed limits and sight lines are good for both riders and vehicles. The Forrest crossing does not appear to be causing any major issues for trail or road users.

3.9.2.2 Opportunities Analysed

For this crossing, only a road treatment was analysed. It was not deemed feasible nor necessary to install an overpass or underpass.

3.9.2.3 Proposed Treatment

The proposed treatment for this section is a simple road treatment. A design for this treatment can be found at **Appendix 5 (page 184)**.

3.9.2.4 Consultation

VIC Roads has in principally approved the treatment proposed by *One Mile Grid*.

3.10 Boundary Road Crossing

3.10.1 Overview

At this crossing, riders are crossing Boundary Road to access the Yaugher Trail Head and trail network. This section of road features 100km/h speeds and poor-average sightlines. *Dirt Art* and *One Mile Grid* have analysed a number of treatment options for this crossing. These can be found below.

Ultimately, a simple traffic treatment and speed reduction has been proposed. *Dirt Art* do not believe the cost and complexity of an overpass or underpass is justified, when it's primary purpose would only be to service events.

3.10.2 Potential Treatment Options

3.10.2.1 Overpass

An overpass was explored for this crossing, though the viability of this installation is significantly reduced due to the following factors;

- Significant cost
- Lack of viable space to install ramps and footings
- Poor riding experience due to sharp climb and descent

3.10.2.2 Underpass

An underpass was explored for this crossing, though the viability of this installation is significantly reduced due to the following factors;

- Significant cost
- Lack of viable space to install ramps and footings
- Poor riding experience due to sharp climb and descent

3.10.2.3 Bridge crossing

Dirt Art investigated a potential crossing under the existing bridge ~2km prior to the current road crossing, with a new trail to be installed to connect this crossing to the Yaugher Trails. This option remains a potentially viable opportunity, though *Dirt Art* does not recommend it be pursued due to the following constraints;

- Cost
- Complexity of 2km trail construction
- Removal of a number of large trees along required trail corridor
- Potential installation of hand rails/barricades on some trail sections

3.10.2.4 Road Treatments and Speed Reduction

Dirt Art engaged *One Mile Grid* to investigate traffic treatments to manage this road crossing. Once confirmed as the preferred approach, a set of concept and detailed designs have been undertaken. These can be found **Appendix 5 (page 184)**.

3.10.2.5 Consultation

VicRoads has in principally approved the treatment proposed by *One Mile Grid*. *VicRoads* has noted that vegetation pruning, and management will be required as a component of this traffic treatment.

Local residents, the Forrest MTB Club and the Forrest Horse Riding clubs were also engaged during this project. All parties supported the 'One Mile Grid' traffic treatment option.

3.11 Existing Trails Overview

3.11.1 Overview

Dirt Art has undertaken a comprehensive assessment of all existing trails. A number of consistent issues were identified with these trails, which will be reviewed below.

Detailed works summaries for all trails can be found in the Section 4.7 (page 86).

3.11.2 Auditing Process

Dirt Art has employed the below methodology to assess all trails. The step-by-step process provides a board analysis of the trails key characteristics and includes both a desktop and infield assessment.

1. Desktop analysis- This stage involves a desktop analysis of the trail, with the view to establishing environmental values, gradients, and fit within the broader trail network (if relevant). Desktop analysis will generally establish larger, more fundamental flaws in the trail.
2. In field analysis- All trails are reviewed in detail during a field assessment. The assessment may be completed on foot or on bicycle. The infield analysis aims to establish trail issues such as; alignment, drainage issues and safety concerns.
3. Network analysis- Using desktop and in field analysis, *Dirt Art* will assess the trails value to the broader trail network.
4. Signage analysis- *Dirt Art* will assess the adequacy and appropriateness of trail signage during in field analysis.
5. Budget scope of works- The trail audit will conclude with an overview of key works and a suggested market rate budget for these works

3.11.3 Aims and Objectives

In undertaking any trail audit, *Dirt Art* are working to the following key objectives;

1. Improve user safety
2. Improve the trail experience
3. Improve environmental performance of the trail
4. Provide objective advice around trail closure/s and network rationalisation
5. Provide advice that allows land managers to effectively invest in priority trail projects

3.11.4 Ranking Criteria

3.11.4.1 Overview

To provide objectivity and clarity to the trail audit process, *Dirt Art* has developed an attribute ranking system for trail auditing. Each trail audited is ranked against 10 key criteria, which assess its performance against a wide range of qualitative and quantitative metrics. These 10 criteria are provided a score of 1-5, which results in a total score from 50 for each trail. *Dirt Art* recommend that trails scoring less than 25 should not be included in a formalised trail network.

3.11.5 Overview of Ranking Criteria

Sustainability: This criterion refers to the sustainability of the trail in the short, mid and long term. The trail is assessed for its capacity to manage water and rider traffic, with a focus on gradient versus soil type and rider behavior. The capacity of the site to manage the trail use in the local climate is also considered. A low sustainability score does not necessarily mean that a trail should be closed, rather the sustainability issues in some cases may be easily and cost effectively addressed.

Ride Experience: This criterion refers to the trails capacity to provide a high-quality riding experience. This qualitative criterion assesses the ride quality across a wide range of trail types- no one trail style is considered to provide a higher quality experience than any other trail style.

Broad market appeal: This criterion refers to the capacity for the trail to cater for a broad market of riders. A low score for this criterion does not necessarily mean a trail is low quality, rather that the trail will cater only for a smaller market segment (notably small market segments may translate to strong visitation if that market segment is poorly catered for tin the market)

Environmental Experience: This criterion refers to the environmental experience that the trail provides for the user. A strong environmental experience may include unique and appealing vegetation, views points and vistas, rivers and creeks and related attributes. A weaker environmental experience may include heavily disturbed areas, generic vegetation types and logged areas.

Value to Network: This criterion ranks the trail on the value it adds to the broader trail network. Trails that provide key connectivity and/or provide diversity in the network will score higher, whereas trails that are duplicated in alignment and style will generally score lower.

Environmental compatibility: This criterion refers to the compatibility of the trail with the environmental values of the site. Trails that have a significant detrimental impact on

natural values will score low, whereas trails that do not impact on natural values will score higher. This criterion also analyses a broad spectrum of natural values, including rare and endangered flora and fauna on site.

Social Compatibility: This criterion assesses the trails impact on the social values of the site. Trails that negatively impact on other trails and user groups, and/or trails that impact negatively on local residences will score low. Trails that do not negatively affect any other users or residents will score highly.

Heritage Compatibility: This criterion assesses the impact the trail may have on any known Indigenous or European cultural heritage values of the site. Importantly, this criterion only assesses against known rather than potential values.

Lifecycle Cost Rating: This criterion assesses the lifecycle costs of the trail. Trails will score low where lifecycle costs are higher, which may be due to a number of factors such as poor soil types, poor maintenance access and climatic factors.

Emergency Access: This criterion assesses the complexity of emergency access to the site, should it be required. A range of access methodologies are considered, including on trail, road and via air.

3.11.6 General Comments – Trail Condition

The trail network is generally in poor-good condition. The entire trail network requires significant works to establish a high-quality, sustainable experience, and as such, *Dirt Art* suggests that all trails receive the following blanket works across their entire length;

- Trail surface re-profiling and establishment of rolling contour alignments (including potential realignments of 5m +/-)
- Installation of drainage treatments as required
- Vegetation pruning
- Removal of degraded timber trail features

A detailed summary of the above works is provided in **Section 4.7 (page 86).**

3.11.7 General Comments- Trail Network Layout

The general layout of the Forrest mountain bike trail network is highly problematic. There is little to no obvious network continuity, and a distinct lack of consistency in trail experiences. As a visiting rider, it is extremely difficult to navigate the trail network, or to seek out a particular desired trail experience.

A number of re-structuring developments are proposed to allow for the development of a stacked loop trail system. Details of these proposed works can be found at Section 4.7 (page 86).

3.11.8 Trail Maps – Existing

Maps of existing trails at both Forrest and Yaugher trail zones can be found over the page.

SEVEN BRIDGES ROAD

BIRREGURRA FORREST ROAD

N

Tiger Loop

Yo-Yo

Yaugher Super Loop

Foxtail

Marriners Run

Grass Trees

J2

Vista

Casper Black

Barre Warre

BOUNDARY ROAD

PARKING + TOILET

TOMS TRACK

YAUGHER ROAD

TO FORREST

LEGEND

- Major Trail Head
- Existing Infrastructure
- Existing Trail
- Major Sealed Road
- Minor Sealed Road
- Unsealed Road
- Watercourse
- 10m Contour
- Project Area

0 500 1000 M

DIRTART
t. 1300 872 457 e. info@dirtart.com.au w. www.dirtart.com.au

PROJECT	Forrest Mountain Bike (MTB) Detailed Design Plan
LOCATION	Forrest VIC
CLIENT	Colac Otway Shire

DWG
[EXISTING TRAILS PLAN - YAUGHER NETWORK]

DRAWN JL SCALE @ A3 AS SHOWN DATE # 09/10/19 REVISION A

DWG # E1

TO YAUGHER TRAIL HEAD

N

COLAC- FORREST ROAD

TURNER DRIVE

YAUGHER ROAD

FORREST

Shelter

Roller Coaster

Forrest Loop

Forrest Loop

Red Carpet

KAANGLANG ROAD

Red Carpet

Third Time Lucky

Roller Coaster

Follow The Dog

Follow The Dog

Third Time Lucky

Barlidjaru

Barlidjaru

Barlidjaru

KAANGLANG ROAD

FORREST-APOLLO BAY ROAD

TO BARRAMUNGA

LEGEND

- Major Trail Head
- Existing Infrastructure
- Existing Trail
- Major Sealed Road
- Minor Sealed Road
- Unsealed Road
- Watercourse
- 10m Contour
- Project Area

0 500 1000 M

DIRTART
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PROJECT	Forrest Mountain Bike (MTB) Detailed Design Plan
LOCATION	Forrest VIC
CLIENT	Colac Otway Shire

DWG
[EXISTING TRAILS PLAN - FORREST NETWORK]

DRAWN JL SCALE @ A3 AS DRAWN DATE # 09/10/19 REVISION A

DWG # E2

3.11.9 Trails Assessed

3.11.9.1 Rollercoaster

Criteria	Rating				
Sustainability					
Ride Experience					
Broad Market Appeal					
Environmental Experience					
Value to Network					
Environmental Compatibility					
Social Compatibility					
Heritage Compatibility					
Life Cycle Cost Rating					
Emergency Access					

Total Score	36/50

Key Stats	
Length	2.1km
TDRS	Blue Square
Style	Flow
Formalisation status	Formalised
Recommendation	Retain and upgrade
Weather notes	Dry winter conditions

Trail Overview

The Rollercoaster Trail is the trail that begins the Forrest mountain bike experience for most riders. The trail features many reasonably aligned and constructed sections, though a number of trail sections are far too steep to meet the Green Circle criteria. These steeper sections are also unsustainable and are subsequently suffering damage. The trail is generally a flow style of trail, with a number of berms and roller type trail features.

Recommendations for trail upgrades and/or realignments can be found at **Section 4.7 (page 86).**

3.11.10 Third Time Lucky

Criteria	Rating				
Sustainability					
Ride Experience					
Broad Market Appeal					
Environmental Experience					
Value to Network					
Environmental Compatibility					
Social Compatibility					
Heritage Compatibility					
Life Cycle Cost Rating					
Emergency Access					

Total Score	32/50

Key Stats	
Length	1.8km
TDRS	Blue Square
Style	Flow
Formalisation status	Formalised
Recommendation	Upgrade and retain
Weather notes	Dry winter conditions

Trail Overview

Third Time Lucky follows on from Rollercoaster, providing a more challenging trail experience. The trail follows a generally sound alignment, providing short, climbs, descents and contouring sections. The trail features some flow style sections, though is a relatively generic style of trail with limited trail features.

A number of minor drainage and alignment issues are evident on the trail, though these will be captured within the proposed surface-re-profiling works.

Recommendations for trail upgrades and/or realignments can be found at **Section 4.7 (page 86).**

3.11.11 Follow the Dog

Criteria	Rating				
Sustainability					
Ride Experience					
Broad Market Appeal					
Environmental Experience					
Value to Network					
Environmental Compatibility					
Social Compatibility					
Heritage Compatibility					
Life Cycle Cost Rating					
Emergency Access					

Total Score	31/50

Key Stats	
Length	4.2km
TDRS	Black Diamond
Style	Technical
Formalisation status	Formalised
Recommendation	Retain and reformat into stacked loop
Weather notes	Dry winter conditions

Trail Overview

Follow the Dog follows on from Third Time Lucky. The trail has some quality sections, though features numerous poor alignments that will require realignment. A number of sustainability and drainage issues are occurring as a result of these poor trail alignments. The trail features a number of berm features, and some small log/timber features, though is generally characterised by steep, poorly aligned sections.

The final section of the trail features a very complex network of winding trails that arguably adds minimal value to the riding experience.

Recommendations for trail upgrades and/or realignments can be found at **Section 4.7 (page 86).**

3.11.12 Marriners Run

Criteria	Rating				
Sustainability					
Ride Experience					
Broad Market Appeal					
Environmental Experience					
Value to Network					
Environmental Compatibility					
Social Compatibility					
Heritage Compatibility					
Life Cycle Cost Rating					
Emergency Access					

Total Score	30/50

Key Stats	
Length	4.7km
TDRS	Black Diamond
Style	Technical
Formalisation status	Formalised
Recommendation	Reformat and extend to provide access from main trail head
Weather notes	Dry winter conditions

Trail Overview

Marriners Run Trail is a classic Forrest trail, often referred to as one of the networks signature trails. The trail features a meandering alignment that traverses through multiple riparian areas, these riparian areas feature a number of low/wet areas.

The trail features a number of open flowing trail sections providing a great trail experience, though there is a distinct inconsistency in the trail style. The trail also fails to capitalise on the sustained climbing/descending opportunities afforded by the site. Trail features consist of berms, some jumps and a number of timber features.

Recommendations for trail upgrades and/or realignments can be found at **Section 4.7 (page 86).**

3.11.13 Grass Trees

Criteria	Rating				
Sustainability					
Ride Experience					
Broad Market Appeal					
Environmental Experience					
Value to Network					
Environmental Compatibility					
Social Compatibility					
Heritage Compatibility					
Life Cycle Cost Rating					
Emergency Access					

Total Score	28/50

Key Stats	
Length	1.8km
TDRS	Black Diamond
Style	Technical
Formalisation status	Formalised
Recommendation	Retain- reformat loop
Weather notes	Dry winter conditions

Trail Overview

Grass Trees is a short, relatively flat trail that forms an essentially closed loop from the Super Loop. The trail features a number of tight, technical trail features, which are often constructed utilising decomposing logs.

The trail is constructed in relatively flat slopes, with sandy, friable soils, through some wet areas. Generally, the trail has not been constructed in an area conducive to a high-quality trail.

Recommendations for trail upgrades and/or realignments can be found at **Section 4.7 (page 86).**

3.11.14 Foxtail

Criteria	Rating				
Sustainability					
Ride Experience					
Broad Market Appeal					
Environmental Experience					
Value to Network					
Environmental Compatibility					
Social Compatibility					
Heritage Compatibility					
Life Cycle Cost Rating					
Emergency Access					

Total Score	33/50

Key Stats	
Length	3.8km
TDRS	Blue Square
Style	Technical
Formalisation status	Formalised
Recommendation	Retain- reformat into closed loops
Weather notes	Dry winter conditions

Trail Overview

Foxtail is a predominantly descending trail that departs from the Yaugher Trail Head. The trail features a generally good quality riding experience, though some sections towards the end of the trail are poorly aligned through wet areas. The trail features a relatively generic construction style, with limited notable trail features.

Only minor works are required on the descending section of the trail, though some larger scale works will be required through the latter sections of the trail.

Recommendations for trail upgrades and/or realignments can be found at **Section 4.7 (page 86).**

3.11.15 J2

Criteria	Rating				
Sustainability					
Ride Experience					
Broad Market Appeal					
Environmental Experience					
Value to Network					
Environmental Compatibility					
Social Compatibility					
Heritage Compatibility					
Life Cycle Cost Rating					
Emergency Access					

Total Score	32/50

Key Stats	
Length	3.9km
TDRS	Blue Square
Style	Technical
Formalisation status	Formalised
Recommendation	Retain and reformat into closed loop
Weather notes	Dry winter conditions

Trail Overview

J2 is a predominantly descending trail, which departs from the Yaugher Trail Head. The trail provides a generally good riding experience, though some sections are poorly aligned, reducing sustainability and the quality of the riding experience. The trail features a relatively generic construction style, with limited notable trail features.

A number of sections of J2 rise and fall dramatically through fall line sections. *Dirt Art* suggests removing these sections, effectively rationalising the trail to be slightly shorter. This change would increase sustainability and the quality of the riding experience.

Recommendations for trail upgrades and/or realignments can be found at **Section 4.7 (page 86).**

3.11.16 Yo-Yo

Criteria	Rating				
Sustainability					
Ride Experience					
Broad Market Appeal					
Environmental Experience					
Value to Network					
Environmental Compatibility					
Social Compatibility					
Heritage Compatibility					
Life Cycle Cost Rating					
Emergency Access					

Total Score	19/50

Key Stats	
Length	2.5km
TDRS	Black Diamond
Style	Technical
Formalisation status	Formalised
Recommendation	Exclude from formal trail network
Weather notes	Dry winter conditions

Trail Overview

Yo-Yo is a short, non-closed loop trail at the outer extremity of the Forrest trail network. The trail features poor alignments up and down the fall line for sustained sections.

Dirt Art suggests that the trail could be closed and rehabilitated.

3.11.17 *Casper Black*

Criteria	Rating				
Sustainability					
Ride Experience					
Broad Market Appeal					
Environmental Experience					
Value to Network					
Environmental Compatibility					
Social Compatibility					
Heritage Compatibility					
Life Cycle Cost Rating					
Emergency Access					

Total Score	26/50

Key Stats	
Length	4.7km
TDRS	Black Diamond
Style	Technical
Formalisation status	Formalised
Recommendation	Reformat into closed loop, rationalising some trail sections
Weather notes	Dry winter conditions

Trail Overview

Casper Black is a complex trail, that provides a mixed riding experience quality, with a generally very poor network structure. The trail includes many sections through extremely poor alignments. These poor alignments are compounded by friable, sandy soils. Many of these sections follow straight up then down the fall line, and in these cases, *Dirt Art* suggests these sections be removed and rehabilitated. Trail features are generally focused on steep trail sections, with limited berms and timber features.

Recommendations for trail upgrades and/or realignments can be found at **Section 4.7 (page 86).**

3.11.18 Vista

Criteria	Rating				
Sustainability					
Ride Experience					
Broad Market Appeal					
Environmental Experience					
Value to Network					
Environmental Compatibility					
Social Compatibility					
Heritage Compatibility					
Life Cycle Cost Rating					
Emergency Access					

Total Score	33/50

Key Stats	
Length	6.7km
TDRS	Black Diamond
Style	Technical
Formalisation status	Formal
Recommendation	Reformat loop structure
Weather notes	Dry winter conditions

Trail Overview

Vista provides a highly-variable riding experience, which changes consistently in both quality and trail difficulty. Notably, the trail takes riders to one of the few view points in the entire Forrest trail network. Trail features vary greatly with some newer sections featuring larger berms and rollers, and original trail sections featuring relatively generic trail features.

Recommendations for trail upgrades and/or realignments can be found at **Section 4.7 (page 86).**

3.11.19 Barre Warre

Criteria	Rating				
Sustainability					
Ride Experience					
Broad Market Appeal					
Environmental Experience					
Value to Network					
Environmental Compatibility					
Social Compatibility					
Heritage Compatibility					
Life Cycle Cost Rating					
Emergency Access					

Total Score	35/50

Key Stats	
Length	2.4km
TDRS	Green Circle
Style	Flow
Formalisation status	Formal
Recommendation	Reformat into closed loop
Weather notes	Dry winter conditions

Trail Overview

Barre Warre is a relatively flat, generally beginner friendly trail departing the Yaugher Trail Head. The trail is a balloon and string format, with a flat entry trail entering a closed loop. The eastern section of the trail has appealing views across neighbouring farmland. The trail features a generic construction style, with no notable trail features.

Recommendations for trail upgrades and/or realignments can be found at **Section 4.7 (page 86).**

3.11.20 Yaugher Super Loop

Criteria	Rating				
Sustainability					
Ride Experience					
Broad Market Appeal					
Environmental Experience					
Value to Network					
Environmental Compatibility					
Social Compatibility					
Heritage Compatibility					
Life Cycle Cost Rating					
Emergency Access					

Total Score	26/50

Key Stats	
Length	9.9km
TDRS	Blue Square
Style	Flow
Formalisation status	Formal
Recommendation	Only include and upgrade higher quality sections
Weather notes	Dry winter conditions

Trail Overview

The Yaugher Super Loop departs from the Yaugher Trail Head and provides a highly-variable riding experience in both trail difficulty and trail quality. The trail is mostly fire trails/service roads, with some singletrack sections. The trail features a generic construction style, with no notable trail features.

Recommendations for trail upgrades and/or realignments can be found at **Section 4.7 (page 86).**

3.11.21 Red Carpet

Criteria	Rating				
Sustainability					
Ride Experience					
Broad Market Appeal					
Environmental Experience					
Value to Network					
Environmental Compatibility					
Social Compatibility					
Heritage Compatibility					
Life Cycle Cost Rating					
Emergency Access					

Total Score	36/50

Key Stats	
Length	1.5km
TDRS	Blue Square
Style	Flow
Formalisation status	Formal
Recommendation	Retain and upgrade
Weather notes	Dry winter conditions

Trail Overview

Red Carpet is generally considered to be one of the hero trails of the Forrest trail network. The trail is one of the few trails in the network that predominantly descends, providing a sought-after riding experience. The trail features a number or larger berms and tabletop jumps, which have recently been upgraded.

Recommendations for trail upgrades and/or realignments can be found at **Section 4.7 (page 86).**

3.11.22 Forrest Loop

Criteria	Rating				
Sustainability					
Ride Experience					
Broad Market Appeal					
Environmental Experience					
Value to Network					
Environmental Compatibility					
Social Compatibility					
Heritage Compatibility					
Life Cycle Cost Rating					
Emergency Access					

Total Score	34/50

Key Stats	
Length	1.7km
TDRS	Green Circle
Style	Flow
Formalisation status	Formal
Recommendation	Retain, minimal works
Weather notes	Dry winter conditions

Trail Overview

The Forrest loop is a shared-use trail used primarily to connect riders from the Forrest Trail Head through to Red Carpet. The trail is a simple style of construction, with no notable trail features. The trail features some sections requiring minor realignment, otherwise only limited works are required.

Recommendations for trail upgrades and/or realignments can be found at **Section 4.7 (page 86)**.

3.11.23 Balidjaru

Criteria	Rating				
Sustainability					
Ride Experience					
Broad Market Appeal					
Environmental Experience					
Value to Network					
Environmental Compatibility					
Social Compatibility					
Heritage Compatibility					
Life Cycle Cost Rating					
Emergency Access					

Total Score	36/50

Key Stats	
Length	5.6km
TDRS	Blue Square
Style	Flow
Formalisation status	Undergoing formalisation
Recommendation	Consider formalisation
Weather notes	Dry winter conditions

Trail Overview

The trail provides valuable arterial climbing access for the Red Carpet trail, though the remaining section of trail appears to receive relatively low levels of use. The trail features some sections requiring minor realignment, otherwise only limited works are required.

Recommendations for trail upgrades and/or realignments can be found at **Section 4.7 (page 86).**

3.12 Trail Heads

3.12.1 Forrest Trail Head

A primary component of this project involves the development of a master plan for the Forrest Trail Head area.

The Forrest Trail Head is the primary access node to the trails for most riders and is also a valuable area of public open space for the local community. The current trail head features a reasonable standard of infrastructure, but generally falls short of providing a high-quality experience for local and visiting riders. A key issue is the highly-disorganised trail entry points, which make it very difficult for visiting riders to embark on their ride.

Development of the trail head master plan has involved the following key tasks;

- Review of existing infrastructure
- Consultation
- Review of existing infrastructure
- Development of opportunities analysis
- Development of master plan

Dirt Art has developed a master plan that will provide a vast increased in functionality, amenity and visual appeal, which will transform the area into a highly-appealing public space.

3.12.2 Review of Existing Infrastructure

3.12.2.1 Overview

The current Forrest Trail Head includes a number of trail and non-trail infrastructure. This infrastructure includes;

- Sealed car park (~30 spaces)
- Shelter (90m2) (including seating and bike tool stand)
- Toilets (composting)
- Kids pump track
- Pump track
- Skills park
- Trail head signage

Key elements of the above infrastructure will be reviewed below;

3.12.3 Car Park

The current car park houses approximately 30 parking spaces. While this is adequate on quieter weekdays, capacity of the car park is exceeded during peak periods. The car park is sealed and in generally good condition.

Dirt Art suggests that overflow parking is investigated in the ex-DELWP compound if required, which is detailed in the master plan for the area.

3.12.4 Shelter

The current shelter is in good condition and includes limited seating.

Dirt Art suggests that the shelter provides adequate size and amenity to cater for riders in the short to mid-term only. Seating is potentially inadequate as trail usage grows in line with investment into new and improved trails and facilities.

3.12.5 Toilets

The current toilet provides two cubicles in a pit-style (non-flush), without water.

Dirt Art suggests that the toilet is currently adequate for the site, though connection to water (running or tank) would be beneficial for hand washing. While the current toilets will not be adequate for larger events, it is not unreasonable for event hosts to bring in additional temporary toilets as required.

3.12.6 Kids Pump Track

The current kids pump track provides a good riding experience for children on strider and small pedal type bikes. The track is surfaced in a coarse gravel, which significantly reduces the quality of the riding experience. The track is well-located near the main trail head.

Dirt Art suggests retaining this track and resurfacing the facility in a finer gravel or asphalt material.

3.12.7 Pump track

The current pump track provides a poor-average riding experience, which is further reduced in its quality by poor track surface, limited track size and lack of line choice or direction change opportunities.

Dirt Art suggests completely rebuilding the existing pump track on a larger footprint, with greater line choice. The new pump track should be asphalt surfaced, to provide a high-

quality, all weather riding experience. An image of the current pump track surface can be found below;

3.12.8 Skills Park

The current skills park provides an unstructured skills development area, that provides a relatively poor skills development experience. The current track suffers from a lack of drainage and tread elevation, resulting in number of low-lying wet areas. The features installed provide a good starting point for skills development, but no avenues for skills progression. Many of the features have been constructed against manufacturers specifications and building guidelines, including the lack of appropriate fasteners for FRP trail features.

The current skills track location confuses an already confusing entry point to the trail network and does not feature any slope/fall to allow for riders to generate speed. The flat nature of the park makes it difficult for many riders to gain the baseline speed required to complete trail features successfully and safely.

Dirt Art suggests decommissioning and moving the skills park to allow for a larger and more progressive facility to be constructed. The new facility should be gravel surfaced to allow for all weather operation. A number of the features in the existing skills park can be moved and recycled in the new facility.

3.12.9 Trail Head Signage

The current trail head signage is very outdated and faded and does not provide riders with a quality information set to assist them in getting the most from their riding experience. The signage also fails to lead riders onto a clear and well-organised journey through the trails, due to a confused entry trail. Current trail head signage can be seen below;

3.12.10 Green Space

Green space suitable for picnic rugs and play is an important component of any facility targeting families and children. The current trail head features limited green space.

3.12.11 General Amenity and Landscaping

The general amenity of the trail head is reasonable, though landscaping and plantings are limited. There is also quite significant trampling through neighbouring bushland due to the confusing trail entry and skills park.

3.12.12 Yaugher Trail Head

3.12.13 Review of Existing Infrastructure

3.12.13.1 Car Park

The existing car parking is spread around the trail head in a relatively haphazard fashion. It is clear that at capacity, many vehicles are parking informally, damaging vegetation in the process. The ~20 parking spaces appear adequate for weekdays, though it is clear that during weekends and school holidays, capacity is exceeded.

Capacity may be somewhat mitigated through the focus of development at the Forrest Trail Head, through growth in the volume of users.

3.12.13.2 Toilet

A basic, pit-style toilet provides adequately for the area and usage volume. There is also an AED (defibrillator) attached to the toilet structure.

3.13 Signage Audit

3.13.1 Overview

Signage throughout the Forrest trail network is generally outdated and in places dysfunctional. The issues with signage are compounded by the trail networks general lack of functionality and structure.

Dirt Art recommends development and implementation of a new signage system as a key component of the new trails development.

3.13.2 Current Signage Overview

3.13.2.1 Trail map

The current trail map provides limited detail to assist riders with trail choice and navigation through the trail network. A lack of contour data and/or trail profiles makes it difficult for riders to understand the elevation gained/lost in trails. The broad area captured by the three trail zones also results in limited data for each zone when utilising an overview-only trail map.

3.13.2.2 Trail network structure

The current trail network structure lacks cohesiveness and stacked loops and is extremely difficult to navigate for most visiting riders.

These network structural issues result in challenges in delivering a functional signage system.

3.13.2.3 Trail intersections

Many of the current trail intersections feature multiple braided sections of trail, and confusing connectivity between trails. These trail design and construction issues result in challenges implementing effective signage at intersections.

3.13.2.4 Main trail head signage

Currently, main trail head signage is installed at both the Forrest and Yaugher Trail Heads. An example of this signage can be found below:

Current trail signage has a number of issues;

- Lacks clear emergency information
- Lacks relevant trail details
- Lacks information regarding the use of trails as functional rides (i.e. 'Signature Rides')
- Lacks clear and functional trail maps
- Signage and maps are too small to facilitate multiple riders viewing the sign simultaneously
- Lack of zoom in area maps results in limited map detail
- Outdated photography

3.13.2.5 Secondary trail map signage

The current network lacks secondary trail map signage. This signage is typically placed at major intersections throughout the trail network, allowing rider to gain understanding of their location within the trail network. Secondary trail map signage is a critical component of trail functionality and rider safety.

3.13.2.6 Trail head signage

Trail head signage throughout the network is generally composed of timber signage with small information panels. While the signage is generally adequate from a visibility and information stand point, the general location of many of these trail head signs is confusing for riders. The issues with this signage are compounded by the general lack of trail design and construction structure at main intersections, and the current lack of stacked loop structure within the network.

An example of trail head signage can be found below;

3.14 Gap and Opportunities Analysis

3.14.1 Overview

The Forrest trail network is essentially uniformly meandering trail that in many cases fails to take advantage of sustained climbing and descending opportunities. In an area where vertical elevation is extremely limited, *Dirt Art* suggests that new trail developments should focus on achieving maximum ascent and descent, focusing on developing trails in areas with the best elevation opportunities.

Significant opportunities exist to install new trail sections to reformat and improve the current trail network. These new trail sections will significantly improve the riding experience, improving trail quality and consistency, along with improving trail network functionality and navigability. *Dirt Art* has placed a primary focus on new trail development which improves upon the existing trail network.

Fundamental to any new development opportunity within the Forrest area is a major capital renewal program for the existing trails. *Dirt Art* has highlighted the key trails in the network and proposed a major renewal and reformatting program for these trails. Notably, these works will significantly reduce current maintenance demands, while making major improvements to the riding experience.

When seeking green field trail opportunities, *Dirt Art* suggests a primary focus on developing further trail at the Forrest Trail Head. This focus has a number of key advantages, which will be explored below.

3.14.2 Gap Analysis

A number of significant gaps are evident in the Forrest trail network. Primary gaps are listed below;

1. Lack of sustained ascending/descending trails
2. Undersupply of Green Circle trails
3. Additional trail volume at the Forrest Trail Head
4. Significant network gaps throughout the Yaugher Trail Network
5. Connection between Boundary Rd and Yaugher Trail Head

3.14.3 Opportunities Analysis

A comprehensive opportunities analysis has sought to determine potential trail development areas where conditions are conducive to cost-effective, high quality trail development, and feature a low constraints profile. Many areas within the Forrest trail network feature vegetation and soil types that clearly indicate issues with water, these

areas have been avoided, with a focus on developing trails on sustained slopes wherever possible.

Dirt Art has placed proposed new trail where possible in areas with good side slopes (20-40%) and dry soil types. Riparian areas have been avoided, as have areas with low quality visual amenity.

Section 4- Proposed New Developments

4 Proposed New Developments

4.1 Overview

Dirt Art have proposed approximately 38km of new trails at Forrest. In general, the suggested trail corridors address network gaps and areas that have low development constraints. In the long term this factor will assist land managers to minimise ongoing trail lifecycle costs.

Expanding on the design works, a Cultural Heritage Management Plans (CHMPs) and the Native Vegetation Studies will be completed in the next phase of the project.

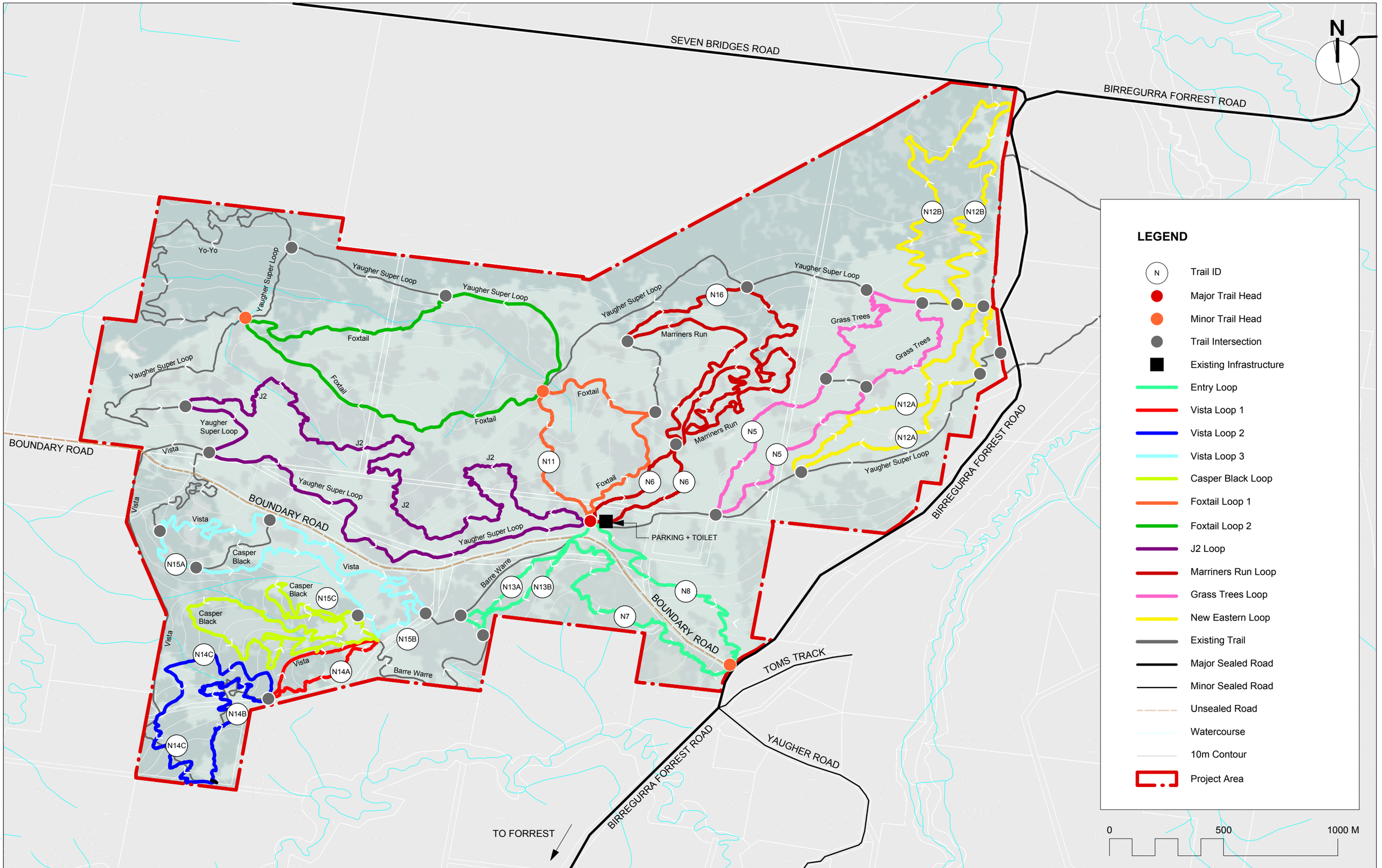
4.2 Proposed Loop Trail Re-Formatting

Where possible, *Dirt Art* have proposed a stacked loop trail system for both the Forrest Trail Head and Yaugher Trail Head trail networks. This trail network structure provides the most optimal network functionality and navigability, while providing the best usage of terrain and elevation opportunities.

Maps representing how the loop concept structure works can be found **over the page.**

4.3 Road Crossing Treatments

Road crossing treatments are proposed for both Forrest and yaugher Trail Heads. Details of proposed treatments can be found at **Appendix 5 (page 184).**



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PROJECT	Forrest Mountain Bike (MTB) Detailed Design Plan
LOCATION	Forrest VIC
CLIENT	Colac Otway Shire

DWG
[TRAIL LOOPS PLAN - YAUGHER]

DRAWN JL SCALE @ A3 AS SHOWN DATE # 21/11/19 REVISION B

DWG # L1

TO YAUGHER TRAIL HEAD

COLAC- FORREST ROAD

TURNER DRIVE

YAUGHER ROAD

FORREST

Shelter

N10

N3

Forrest Loop

Roller Coaster

Forrest Loop

Red Carpet

KAANGLANG ROAD

N4

Third Time Lucky

N2

N1

Red Carpet

Barlidjaru

Barlidjaru

Follow The Dog

Follow The Dog

N9

Barlidjaru

KAANGLANG ROAD

FORREST-APOLLO BAY ROAD

TO BARRAMUNGA

N

LEGEND

- Trail ID
- Major Trail Head
- Minor Trail Head
- Trail Intersection
- Existing Infrastructure
- Rollercoaster Loop
- Third Time Lucky Loop
- Follow The Dog Loop
- Follow The Dog Internal Loop
- Roller Coaster Extension (N9)
- Red Carpet Loop
- Barwon Flow Descent (N1)
- Barwon Flow Descent (N2)
- Existing Trail
- Major Sealed Road
- Minor Sealed Road
- Unsealed Road
- Watercourse
- 10m Contour
- Project Area

0 500 1000 M

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DWG # L2

4.4 Forrest Trail Head Trail Network Proposed Works

4.4.1 Overview

Forrest's southern trail network is situated in a mix of stunning cool temperate rainforest and wet sclerophyll (eucalypt) forest; the forest surrounds the township and the trails offer a ride-in ride-out experience. The area already offers some of Forrest's best trails, however, due to clay surfaces and poor drainage, key trails in the networks are seldom open.

4.4.2 Key recommendations

- Upgrade of all existing trails at the southern network so that they contain Forrest's signature and hero offerings.
- Build a network that is open year-round and proximal to the township will positively impact local businesses.
- Install a revamped trail head which boasts; a world class skills progression facility, a landscaped visitor precinct and safer connections to the townships and trails
- Utilise elevation opportunities to provide greater diversity across the trails,
- Create Victoria's first adaptive MTB experience and Australia's most comprehensive adaptive rider facility
- A new flow trail precinct which will create Victoria's best progressive jump trail facility (Barwon Flow Trails)
- Build trails that are more sustainable, have less impact on the environment, and are easier to access and maintain

4.4.3 Forrest Trail Head Master Plan

4.4.3.1 Overview

Dirt Art proposes a number of new developments for the trail head which aim to establish the area as a high-quality destination in its own right. The trail head site (which is adjacent to the road from Forrest to the Great Ocean Road) will be a visually appealing stopping point and serve to on-sell mountain biking and Forrest to the hundreds of thousands of cars that pass by annually.

The site will become a gateway to the southern trails system and riders will be able to experience a world-class skills development course. The trail head will be made into a dual-purpose visitor precinct; facilities will be upgraded to increase the sites public realm which will create an engaging natural environment for visitors and community members.

A summary of proposed developments can be found below. A detailed budget and prioritisation breakdown can be found at **Appendix 4 (page 182).**

4.4.3.2 New Pump Track

A larger, more dynamic pump track is proposed, with multiple line and directional changes. The pump track is proposed to have an asphalt surface and a minimum rideable area of 500m^2. This surfacing will make the pump track ideal for scooter and skateboard riders as well as mountain bike riders.

A design for the proposed pump track can be found in the Forrest Trail Head Master Plan **page 78.**

A sample mage of an asphalt pump track can be found below.

4.4.3.3 Skills Park

Dirt Art has proposed a new skills park that significantly expands upon and relocates the current skills park. The new skills park is designed to provide a broad range of structured skills development experiences, including but not limited to;

- Timber/FRP drop features
- Timber/FRP A frame roll over features (in place of unsafe and unpredictable see-saw features)
- Timber balance beams/log rides
- Roller and berm features

The skills park base trails (including the return trail) are proposed at minimum width of 1,200mm, and should be surfaced with a compacted depth of 60mm of imported gravel. Give the flat nature of parts of the site, the track surfaces should all be elevated.

A design for the proposed skills park can be found in the Forrest Trail Head Master Plan **page 78.**

4.4.3.4 Jumps Park

Dirt Art has proposed a jumps park as an extension of the skills park. The proposed jump park will cater for a beginner-intermediate rider audience, providing avenues for learning to jump for the first time and for safe skills progression. All jumps would be table tops, with no double jumps to be installed.

A minimum of two jump lines are proposed; one beginner and one intermediate.

The jump park base trails (including the return trail) are proposed at minimum width of 1,500mm, and should be surfaced with a compacted depth of 60mm of imported gravel. Give the flat nature of parts of the site, the track surfaces should all be elevated.

A design for the proposed jump park can be found in the Forrest Trail Head Master Plan **page 78.**

4.4.3.5 New Entry Trail

A new entry trail is proposed, providing two-way access into the trail network, including access to Roller Coaster and the Forrest Loop Trail. The trail is proposed at 2,500mm width and with an imported gravel surface at 60mm depth.

The trail should be landscaped with native plants and mulch and should have gentle cambered corners and some rock landscape edging.

The trail is designed to provide a clear and attractive entry and exit to and from the trail network for riders of all abilities.

4.4.3.6 New Entry Signage

New entry signage is proposed, which will feature new trail maps, revised branding and styling, and updated trail use information. The sign board should feature map components greater than 1,500mm x 1,1000mm to ensure signage is easily interpreted.

4.4.3.7 New Entry Archway

A new large timber archway is proposed at the main entry point to the trails. Rustic aged timber beams would be the preferred materials type, with refreshed branding attached to the archways top beam. The archway clearly defines the entry point, but also acts as a branding exercise and social media content opportunity for riders. A high-quality, visually

appealing installation with bold branding will ensure images of the archway with riders will appear across social media from most visiting riders.

A sample archway image can be found below.

Image- Flow Mountain Bike

4.4.3.8 Picnic Area

A new picnic and family space have been proposed, where visitors can spread out a rug and play/eat/sit with young children. The area includes sub surface drainage works to create a larger space, which can be re-turfed and landscaped with native plantings.

The picnic area is also proposed to include a minimum of six outdoor seating picnic tables.

This picnic area is expected to be a popular area for both rider and non-rider visitors.

4.4.3.9 Bike Wash

A bike wash area is important for weed and pathogen management, as well as for visiting riders wishing to wash down immediately post-ride. The bike wash area should include a minimum of two wash bays, with silt traps, bike stands and hoses. The wash area may also include wash brushed on wire ropes. *Dirt Art* suggest walling/screening between

wash bays to prevent riders being affected from overspray from the neighbouring wash bay.

A sample bike wash can be found below;

Image- Muc-Off

4.4.3.10 Barbeques

Coin operated barbeques will be a valuable addition to the space, particularly for visiting families who may come to the town purely for the trail head facilities such as the pump and skills tracks.

4.4.3.11 New Toilet and Shower Block

A new toilet and shower block are proposed on the location of the existing toilet block. *Dirt Art* suggest a pre-fabricated installation with a minimum of 4 toilet pans, and 4 shower cubicles. Coin-operated showers would be optional to provide a cost offset for the development and operation of the asset.

4.4.3.12 Water Point

A filtered water point is proposed at the location of the new toilet and shower block. *Dirt Art* suggest the use of a purpose-built public drink bottle filling station.

4.4.3.13 Other Considered and Potential Developments

4.4.3.13.1 Café/Commercial Area

A café space and commercial area was rejected from the proposal due to space constraints, and the potential conflict with existing businesses in the town. There may be an opportunity for this development type in the future, though it is not part of the priority current development.

Dirt Art do not recommend a café or commercial area forms part of the current master plan.

4.4.3.13.2 Accommodation

There is limited scope to develop accommodation in the trail head area due to space constraints, such a development would also require zoning changes. Such a development would also conflict with existing accommodation suppliers.

Dirt Art do not recommend accommodation forms part of the current master plan.

4.4.3.13.3 Camping

The potential for camping on site was explored, though was rejected due to space constraints and conflicts with paid camping providers in the town and broader region.

Dirt Art do not recommend camping forms part of the current master plan.

RIVENDELL LANE

TO FORREST
TOWN CENTRE

FORREST LOOP TRAIL

N

existing building

adaptive rider
car parking

existing
carpark

existing toilet

existing
shelter

BBQ
area

existing
sign

existing
entry

DJ1

DJ2

ST2

ST1

FORREST LOOP TRAIL

FORREST-APOLLO BAY ROAD

FORREST LOOP TRAIL

TO ROLLER
COASTER TRAIL

existing Forrest Loop
Trail road crossing

LEGEND

- Trail ID
- Major Trail Head
- Minor Trail Head
- Trail Intersection
- Existing Infrastructure
- Proposed Skills Track
- Proposed Dirt Jump Track
- Climbing / Link Trail
- Shared-Use Trail
- Low Bollard / Fencing
- Major Sealed Road
- Minor Unsealed Road
- Bicycle Rack
- Picnic Table
- Park Bench
- Planter Box Seating
- Proposed Landscaping
- Existing Landscaping
- Potable Water Source
- Bicycle Wash Station
- Entry Archway
- Trail Signage
- Shower Facility
- Asphalt Pump Track
- Existing Pump Track
- Start Mound
- Bermed Corner
- Tabletop Jump

0 5 15 25 M

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PROJECT Forrest Mountain Bike (MTB) Detailed Design Plan

LOCATION Forrest VIC

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DWG
[MASTERPLAN - FORREST TRAIL HEAD]

DRAWN JL SCALE @ A3 1:500 DATE # 21/11/19 REVISION B

DWG # 04

CONCEPT IMAGERY

BICYCLE WASH STATION

PLANTER BOX SEATING

PICNIC TABLES

SHOWER / AMENITIES BLOCK

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PROJECT	Forrest Mountain Bike (MTB) Detailed Design Plan
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DWG
[SCHEMATIC - FORREST TRAILHEAD]

DRAWN	SCALE @ A3	DATE #	REVISION
JL	AS SHOWN	10/10/19	A

DWG #
SM1

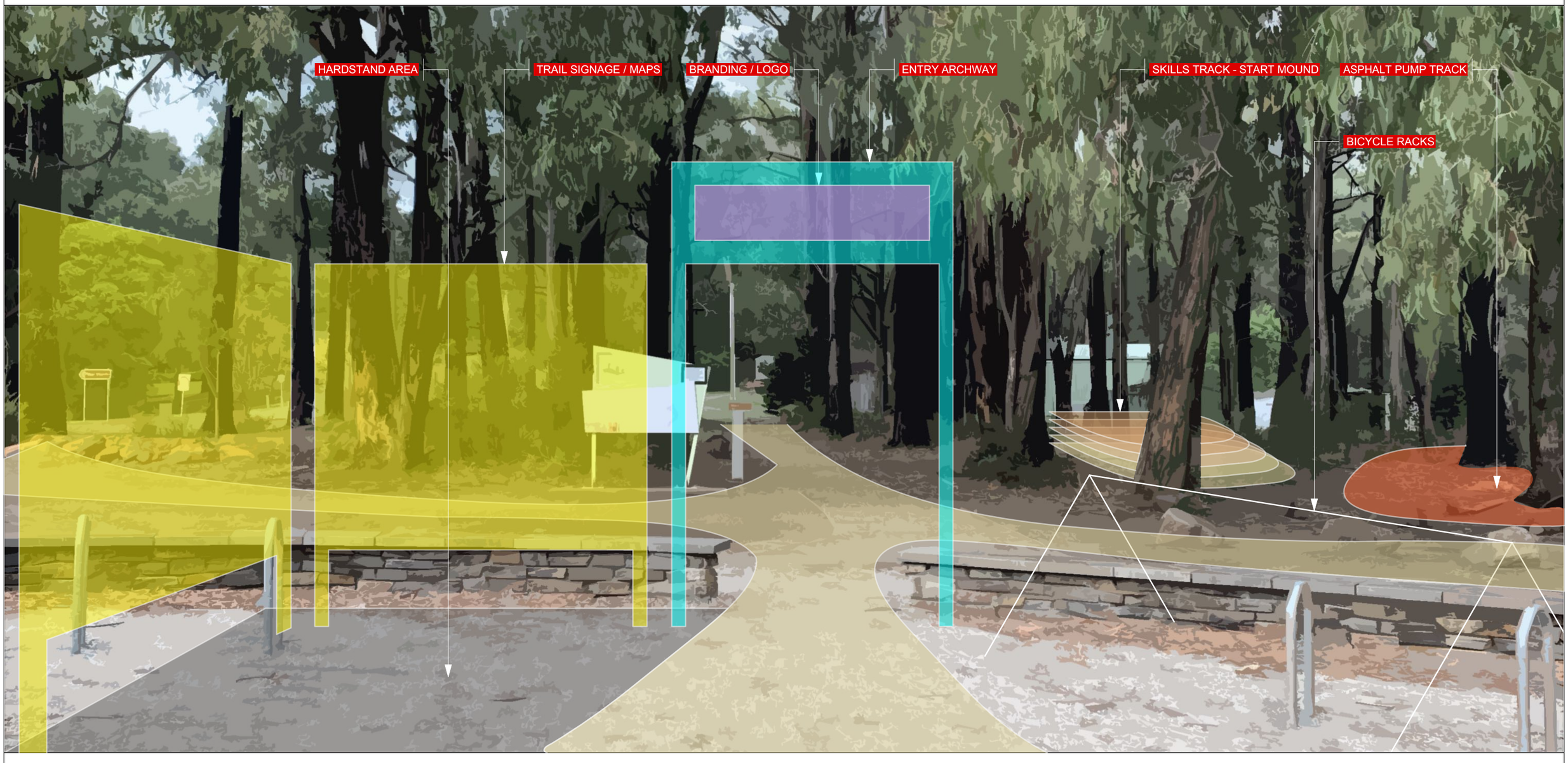
CONCEPT IMAGERY

BICYCLE RACK

TRAILHEAD SIGNAGE / MAP

ASPHALT PUMP TRACK

ENTRY ARCHWAY



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PROJECT	Forrest Mountain Bike (MTB) Detailed Design Plan
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DWG
[SCHEMATIC - FORREST TRAIL ENTRY]

DRAWN	JL	SCALE @ A3	AS SHOWN	DATE #	10/10/19	REVISION	A

DWG #
SM2

4.5 DELWP Ex Depot Master Plan

4.5.1 Overview

The DELWP depot compound adjacent to the Forrest Trail Head is no longer used by the agency and is now being managed by the Forrest MTB Club. The site features a number of buildings in various conditions, and a gravel parking/hard stand area.

4.5.2 Potential Uses

A number of uses may be possible for the site. In the short term, *Dirt Art* suggest that the site be used for overflow parking. The ex DELWP site adjacent to the Forrest Trail Head has been proposed for future overflow parking and as a potential club rooms, gym and multi-purpose building. If rezoned, this site could be redeveloped for a range of purposes, though the development of a multi-purpose gym-type building could provide a wide range of purposes including but not limited to; gym, yoga studio, and meeting room.

Rollercoast Trail

TO FORREST
TRAILHEAD

OLD ROLLERCOASTER TRAIL ALIGNMENT

existing Forrest Loop
Trail road crossing

N

N4

Carpark

42 41 40 39

38 37 36 35

24 25 26 27

28 29 30 31

32 33 34

22 21 20 19 18 17 16 15 14 13 12 11 10 9

8 7 6 5 4 3 2 1

Entry

Materials
Stockpile

Trail Building
Depot

Refurbished
Admin
Building

Forrest MTB
Club Room

Entry
(Depot)

OLD ROLLERCOASTER ALIGNMENT

FORREST-APOLLO BAY ROAD

LEGEND

- N — Trail ID
- Existing Infrastructure
- Low Bollard / Fencing
- Major Sealed Road
- Minor Unsealed Road
- Picnic Table
- Proposed Landscaping
- Existing Landscaping
- Community Centre / Gym
- Depot - Storage Shed

0 5 15 25 M

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PROJECT Forrest Mountain Bike (MTB) Detailed Design Plan

LOCATION Forrest VIC

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DWG [MASTERPLAN - FORREST DEPOT]

DRAWN JL SCALE @ A3 1:500 DATE # 24/02/20 REVISION

DWG # 06

4.6 Yaugher Trail Head Master Plan

4.6.1 Overview

The Yaugher Trail Head is the access node for the largest volume of trails in the Forrest trail network. While the site is not proposed for a major upgrade, enhancements to the sites visual appeal, amenities, safety and functionality will transform the current trail head experience.

Forrest's northern network, called the Yaugher network is mainly situated in dry eucalypt forest. The current network contains varying experiences, difficult navigation, shared access issues and an exceptionally dangerous road crossing.

4.6.2 Key Recommendations

Dirt Art's key recommendations for this area are to:

- Install a safe traffic treatment so mountain bikers, families, walkers and equestrian users can safely access the Yaugher network,
- Fashion two new link trails to the Yaugher network to take all users off the road,
- Utilise the elevation of the area to create exciting and diverse trail alignments and links,
- Build a system of stacked and closed loops to enhance safety and rider experience,
- Reformat all the trails so that they are deemed more appropriate for the advertised skill level,

  Create three new designated horse and walking trails which serve to broaden Forrest's recreational trails offering.

4.6.3 Review of new proposed infrastructure

4.6.3.1 Parking expansion

Dirt Art suggest formalising existing informal car parking to expand the current formal parking by approximately 20 spaces. With a focus on expanding the trail network at the Forrest Trail Head it is also expected that parking focus may shift over coming years, away from the Yaugher Trail Head.

4.6.3.2 Trail Head landscaping and trail realignment

The key to upgrading the Yaugher Trail Head is the creation of new access trails to key trails in the Yaugher trails network (such as Grass Trees and Marriners Run); this will make navigating the network easier and much safer. Additionally, the trail head will be

landscaped so as to enhance the areas existing natural assets in addition to clearly defining trail pathways.

4.6.3.3 New trail head signage

New trail head signage with revised branding and maps should be installed at the trail head. A new staging space will house the signage, away from parking (the current signage is directly behind existing car parks). The new signage will be consistent with signage at the Forrest Trail Head.

4.6.3.4 New entry archway

Similar to the Forrest Trail Head, a new timber entry archway is proposed for the entry to the trails. The preferred installation would be constructed from rustic timber beams. Updated branding would be installed to the arch cross beam.

N

N11

Foxtail

N6

N6

N8

J2

to N5 & N12A

Yaugher Super Loop

adaptive rider car parking

existing carpark

existing carpark

existing toilet

proposed additional parking

existing entry

to N7, N13A, & N13B

Barre Warre

BOUNDARY ROAD

BIRREGURRA FORREST ROAD

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

LEGEND

- N — Trail ID
- Major Trail Head
- Minor Trail Head
- Trail Intersection
- Existing Infrastructure
- New Trail Links
- Existing Trail
- Low Bollard / Fencing
- Major Sealed Road
- Minor Unsealed Road
- Bicycle Rack
- Picnic Table
- Park Bench
- Planter Box Seating
- Proposed Landscaping
- Existing Landscaping
- Pedestrian Crossing
- Entry Archway
- Trail Signage

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PROJECT Forrest Mountain Bike (MTB) Detailed Design Plan

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DWG [MASTERPLAN - YAUGHER TRAIL HEAD]

DRAWN JL SCALE @ A3 1:500 DATE # 20/11/19 REVISION B

DWG # 05

4.7 Trail Upgrades and Realignments

4.7.1 General trail audit recommendations

Dirt Art makes the following key recommendations regarding the existing trail network;

1. **Determine key trails**: A number of trails and trail sections in the Forrest MTB trails network add little to no value to the riding experience. *Dirt Art* recommends focus is placed on high-quality existing trails only, with some trails to be rationalised or removed from the formal trail network.
2. **Re-profile entirety of existing trails:** All key existing trails require significant capital renewal. This process would include surface re-profiling and minor realignments (+/- 5m).
3. **Surface key trails:** Install imported gravel surface to key trails as required to allow for year-round riding.
4. **Remove informal timber trail features:** These features are generally degraded and add little to the trail experience. Where required they may be replaced with rock and/or soil features.
5. **Restructure trails into closed loops where possible:** Much of the trails in the Forrest trail network are not closed loops. This style of network results in navigational difficulties for visitors, and a lack of structure in the riding opportunities. All trails should be reformatted into loops where possible.
6. **Improve trail consistency:** The current trails in the Forrest trail network feature significant inconsistencies in trail style and difficulty. Recent trail works have often compounded these issues. The capital renewal program should focus on creating consistency in style and difficulty through individual trails.
7. **Focus on removing poor quality trail features and opening up trail flow, recognising the key strength of Forrest as a generally non-technical riding venue:** Many existing 'technical' trail features are simply poorly aligned trails, constrained by awkward corners and fall-line sections. *Dirt Art* suggests working with, rather than against the landscape and local conditions for all future trails.
8. **Remove trails from wet and riparian areas where possible:** Many trails repetitively cross wet, riparian areas resulting in sustainability and functionality issues. Where possible trails should be removed from these areas.
9. **Rationalise cluttered and dysfunctional intersections into a clear and organised trail heads:** Many intersections in the Forrest trail network are disorganised and cluttered with duplicated trails. A major goal of this audit and upgrade process will be to improve these intersections.
10. **Replace all trail signage with a better organised, consistent signage system:** The current trail signage is not functional and requires complete replacement.
11. **Create easy points of access for maintenance, management and emergency management**
12. **Separate recreational user groups:** Where possible, recreational user groups (particularly bikes and horses) should be separated

4.7.2 General upgrade process

4.7.2.1 Overview

All trails in the Forrest Trail Network require upgrade and improvement. The below methodology is provided for the upgrade of all formal trails in the network. *Dirt Art* do not suggest YoYo and Super Loop are included in the upgrade process (excluding sections of Super Loop detailed in loop detailed below.

4.7.2.2 Re-Profiling

Dirt Art has suggested that all key existing trails undergo complete re-profiling, which will include realignment within +/- 5m. The fundamental principal of re-profiling will first be that all alignments must be correct or should realigned as required. Re-profiling should then follow the below key principles;

1. Realign as required before upgrade
2. Maintain trail gradients inside 15% unless rock armouring is installed
3. Remove organic matter as required
4. Establish in-slope where required to maintain rider confidence and flow
5. Establish out slope for drainage as required in low spots- culverts should not be installed unless strictly required
6. Utilise a rolling contour construction approach, which features frequent (~20m interval) gradient changes to shed water
7. Realign trails from wet areas before treating the wet area- only treat the wet area if realignment not possible
8. Re-bench trails to a suitable depth
9. Utilise the excavator tracks and bucket to compact the trail surface and all batters and spoil
10. Utilise a full bench construction approach where possible
11. Avoid using burrow pits below 1,000mm depth unless strictly required
12. All burrow pits should minimise peripheral disturbance, and to be completely rehabilitated, including packing in organic material to fill the pit, and brushing over with organic material once filled

4.7.2.3 Minor realignment of trails

Trails should be realigned where required and possible. These minor realignments are intended to reside within 10 metres either side of the existing trail. Major realignments will be addressed in Section **4.7.3 (Page 90).** Realignment should be utilised for managing a range of issues, including but not limited to; steep gradients, wet areas, limited cross slope, network functionality and ride experience.

When realigning trails, the following methodology should be employed;

- All realignments should adhere to relevant approvals and conditions
- Wet areas should be avoided
- Riparian areas should be avoided
- Trails should be placed in areas with 20-40% cross slope where possible
- Closed trail sections should be aerated (breaking up of the trail tread), before being brushed in organic material

4.7.2.4 Drainage

Drainage should be managed wherever possible through the use of passive drainage measures, such as grade reversals to remove water from the trail. The use of culvert pipes should be avoided unless strictly necessary.

4.7.2.4.1 Installing Rolling Contour Drainage Measures

A genuine rolling contour trail type should be established, where gradient is reversed based on the following specifications;

- Gradient change should be installed every <20m
- Waterbars and knicks should be avoided
- A rolling contour high point should be a minimum of 500mm (target minimum is 1,000mm) above the low point
- The total length of the high point should be a minimum of 5m
- Low points should be out sloped with a minimum gradient of 5%
- Low points should allow water to be completely removed from the trail (avoiding construction off trail sumps/pits)

4.7.2.4.2 Culvert Pipe Installation

Wherever possible, culvert pipes should be avoided. Where strictly required, the following methodology should be employed;

- Minimum 150mm pipe size should be utilised
- Pipe intakes should be a minimum of 500mm from the trail edge
- A minimum sump hole size of 500mm x 500mm should be utilised, with a minimum depth of 250mm
- Pipe intakes should be raised a minimum of 100mm from the base of the sump
- Soil around the sump should be compacted extensively to minimise the risk of pipe blockage

4.7.2.4.3 Managing Wet/Sodden Areas

There are a number of wet and sodden areas in the Forrest trail network. In most cases these areas are the result of poor trail alignment, so should be managed through realignment wherever possible. Where realignment is not possible, one of two treatment options should be employed;

Gravel hardening- All organic material should be excavated and removed from the area. Extremely wet areas will require the laying of geofabric. Following geofabric (if required), a base of 60-100mm coarse rock should be installed. The base course should sit 'proud' from the ground by a minimum of 60mm. The base course should be surfaced with a 20mm gravel for a minimum depth of 60mm.

Rock armouring- Little to no on-site rock is available in the Forrest trail network, so all rock will likely have to be imported. Rock of 200-400mm size is preferable, and where possible the rock colour should match the local geology. All rock armouring should be carefully interlocked so there is zero rock movement. Armouring should cover the full functional width of the trail and should have corrals installed where required to ensure riders utilise the armoured surface.

4.7.3 Existing Trail Works Summaries- Forrest Trail Head Trails

4.7.3.1 Rollercoaster

4.7.3.1.1 General recommendations

Dirt Art makes the following recommendation for this trail;

1. **Change trail direction:** The trail is currently ridden in a clockwise direction, with riders beginning their ride on a gravel path, and finishing their ride with a steep climb out of the creek. *Dirt Art* recommend reversing the trail to a counterclockwise direction, providing a descending finish to the trail and a vastly improved rider experience.
2. **Remove and replace gravel path section:** *Dirt Art* suggests developing purpose built singletrack in place of the existing gravel path (to the low side of the existing path). This has been proposed **N4 Trail.** This change would result in a significant improvement to the trail experience, with riders also finishing with a sustained descending section (with trail direction reversed).
3. **Realign trail sections:** One section of trail is steep and unsustainable, also exceeding criteria for a Green Circle trail. This section has been proposed for realignment. This realignment has been proposed as **N19 Trail.** This realigned section provides a gentle climb for riders as they begin the trail.
4. **Development as a hero trail:** *Dirt Art* suggest developing the trail as one of the hero trail products of the network, which will include establishing the trail as a large-scale flow trail.
5. **Gravel surfacing:** The trail should be surfaced with gravel to allow for sustainable and functional year-round riding.
6. **New entry trail:** A new entry to the trail is proposed through the Forrest Trail Head. This new entry trail creates an improved access, which essentially makes Rollercoaster an extension of the proposed Skills Park.

A plan showing the proposed restructure of this loop can be found on **page 93.**

4.7.3.1.2 Summary of works

General upgrade and re-profile (m)	1,000
Surfacing (m)	1,000
Realignments (m)	1,311
Others	NA

4.7.3.1.3 Existing trail works

General trail upgrade as per **Section 4.7.2 (page 87).**

Surface trail in compacted aggregate for entire trail length.

4.7.3.1.4 Realignments

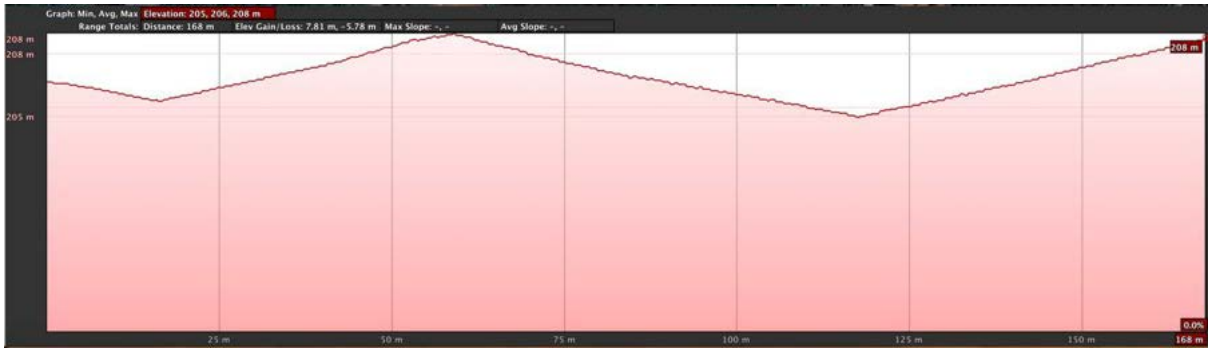
Rollercoaster Realignment 1 (N4)	
Length	0.972km
Trail Type	2B
Surface	60mm depth imported gravel (<20mm screen)
TDRS	Green Circle
Construction	<2.5 tonne excavator
Adaptive Capable	Yes
Trail features	General rolling contour trail features

Overview

Rollercoaster currently begins on a section of footpath/rail trail, which is a very basic gravel pathway, and concludes with a short, steep climb. *Dirt Art* recommend reversing the trail direction, and replacing the initial gravel path with a new, purpose built descending trail section below the existing trail. This development will allow riders to finish their ride with a high-quality descent, right back into the main trail head. This new section of trail closes Rollercoaster into a loop, which improves the rider experience and simplifies navigation.

Notably, this trail is proposed as an adaptive bike-friendly trail.

Rollercoaster Realignment 2 (N19)	
Length	0.339km
Trail Type	2B
Surface	60mm depth imported gravel (<20mm screen)
TDRS	Green Circle
Construction	<2.5 tonne excavator
Adaptive Capable	Yes
Trail features	Nil specific



Overview

Rollercoaster Trail currently features a steep section of trail into/out of a creek area. This proposed realignment creates a sustainable, functional improvement to the trail, while ensuring the trail meets gradient criteria for IMBA Green Circle Trails.

This section of trail is proposed as a simple climbing flow trail with no features required other than in-sloping turns.

Notably, this trail is proposed as an adaptive bike-friendly trail.

A map showing proposed realignments can be found over the page.

RIVENDELL LANE

FRIZON STREET

FORREST-APOLLO BAY ROAD

FORREST LOOP

Rollercoaster

Rollercoaster

Third Time Lucky

N19

N19

N4

The upper portion of N19 creates a more sustainable climb on the east

The lower portion of N18 creates a more sustainable descent to the west

The N4 proposed descent replaces the existing shared-use climbing trail

N

LEGEND

- Proposed Trail / Realignment
- Proposed Trail / Realignment
- Existing Trail
- Major Sealed Road
- Minor Sealed Road
- Unsealed Road
- Watercourse
- 10m Contour
- Project Area

0 50 100 150 200 250 300 M

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DWG [REALIGNMENT PLAN - ROLLERCOASTER]

DRAWN JL SCALE @ A3 AS DRAWN DATE # 05/12/19 REVISION B

DWG # R3

4.7.3.2 Third Time Lucky

4.7.3.2.1 Recommendations

Dirt Art makes the following recommendation for this trail;

1. **Extend trail to form a loop:** *Dirt Art* suggest a new trail section to form a closed loop for the trail. This has been achieved with **N18 Trail.**
2. **Create a natural progression from Rollercoaster Trail:** The upgraded trail should provide a high-quality intermediate trail experience that acts as a natural progression from Rollercoaster Trail. The trail should feature engaging berms, rollers and jumps to create a fast, fun and free-flowing intermediate ride experience.

A plan showing the proposed restructure of this loop can be found over the page.

4.7.3.2.2 Summary

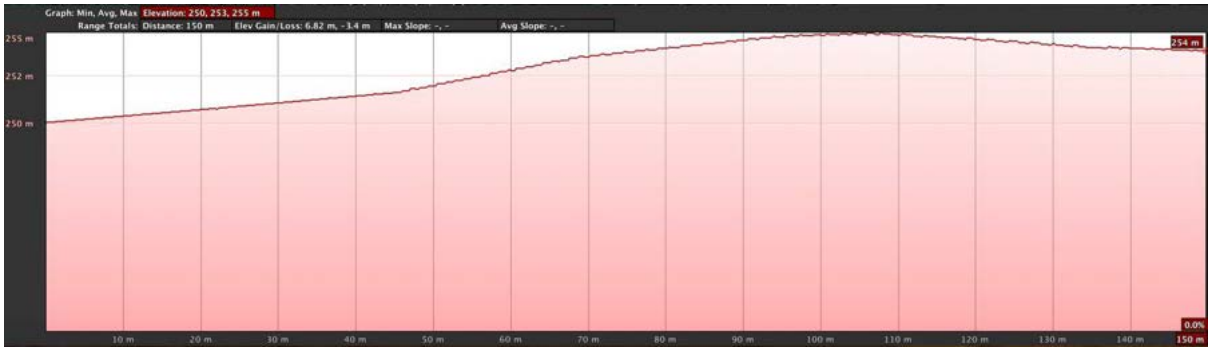
General re-profile (m)	1,833
Surfacing (m)	0
Realignments (m)	163
Others (m)	NA

4.7.3.2.3 Existing trail works

General trail upgrade as per **Section 4.7.2 (page 87).**

4.7.3.2.4 Realignments

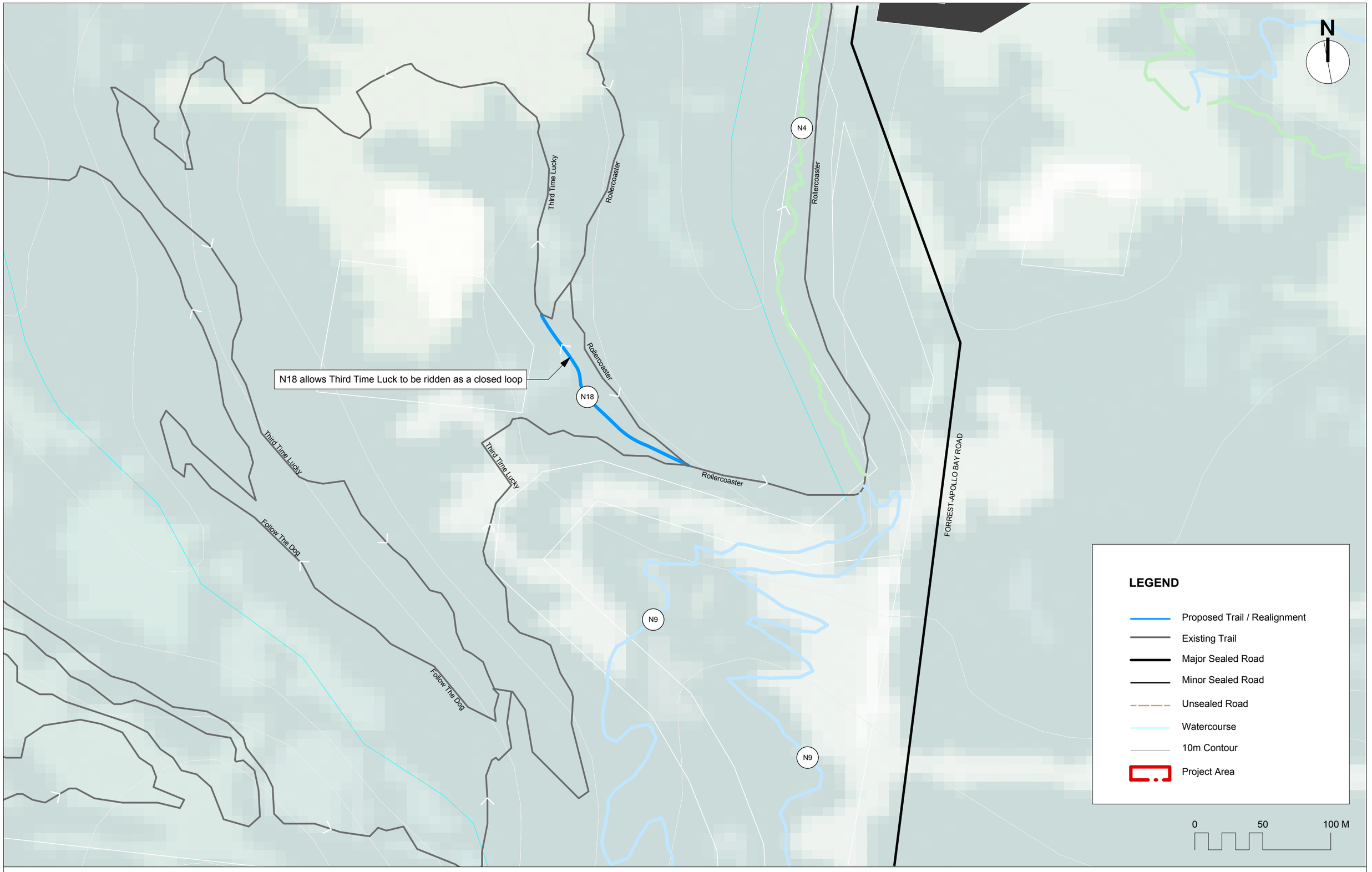
Third Time Lucky Realignment 1 (N18)	
Length	0.163km
Trail Type	2B
Surface	Natural
TDRS	Green Circle
Construction	<2.5 tonne excavator
Adaptive Capable	Yes
Trail features	Nil specific



Overview

This short section of beginner-friendly trail is designed to re-format the trail into a closed loop. The trail is proposed as an intermediate flow trail, with banked corners and rollers.

A map showing proposed realignments can be found over the page.



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DWG
[REALIGNMENT PLAN - THIRD TIME LUCKY]

DRAWN	JL	SCALE @ A3	AS DRAWN	DATE #	28/11/19	REVISION	B

DWG # R2

4.7.3.3 Follow the Dog

4.7.3.3.1 Recommendations

Dirt Art makes the following recommendation for this trail;

1. **Form two loops:** *Dirt Art* proposes forming two loops from the trail, improving the riding experience, and providing greater options for riders. This proposed trail change is capture by new trails, **Trail N17B, N17C and N17D.** The dual loop change will improve trail consistency, and allow for the creation of a higher quality advanced trail experience featuring short, steep sections, and steep bermed corners.
2. **Realign steep sections:** *Dirt Art* suggest realigning steep sections of trail to improve sustainability and ride experience. These realignments have been captured in new **Trail N17A.**

A plan showing the proposed restructure of this loop can be found on **page 100.**

4.7.3.3.2 Summary

General re-profile (m)	4,225
Surfacing (m)	0
Realignments (m)	953
Others	NA

4.7.3.3.3 Existing trail works

General trail upgrade as per **Section 4.7.2 (page 87).**

4.7.3.3.4 Realignments

Follow the Dog Realignment 1 (N17A)	
Length	0.224km
Trail Type	2B
Surface	Natural surface
TDRS	Black Diamond
Construction	<1.7 tonne excavator
Adaptive Capable	Yes
Features	General rolling contour trail features

Overview

This realignment removes a steep and unsustainable trail section while retaining the difficulty and character of the existing trail.

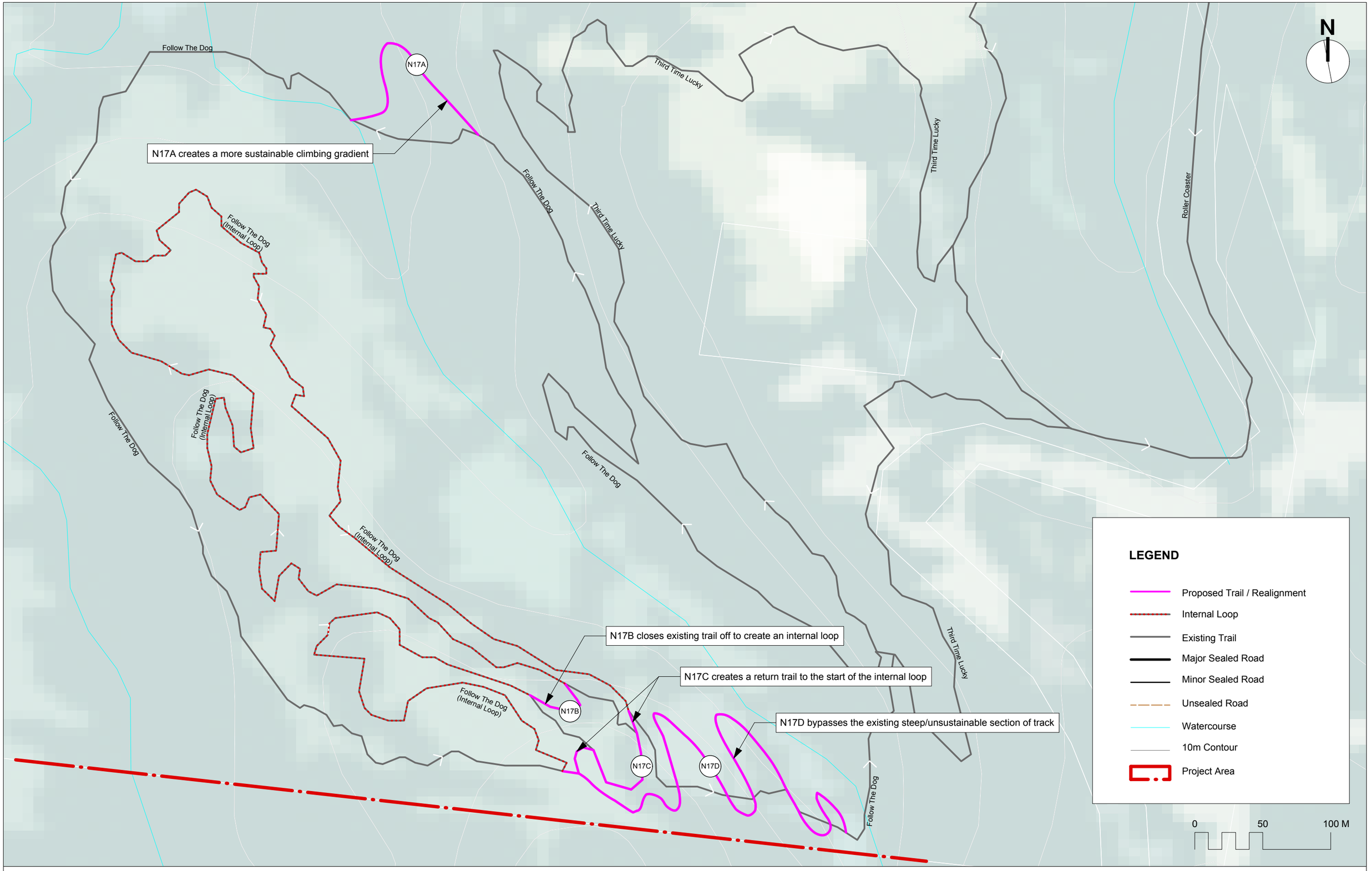
The trail will be built to a black diamond difficulty level with a narrow alignment with steep pinches, broken up by grade reversals.

Follow the Dog Realignment 2 (N17B, N17C, N17D)	
Length	0.729km
Trail Type	2B
Surface	60mm depth imported gravel (<20mm screen)
TDRS	Black Diamond
Construction	<2.5 tonne excavator
Adaptive Capable	Yes
Trail features	Berms 5

Overview

This realignment is designed to facilitate the reformatting of the existing trail into two distinct loop trails, while also addressing steep, unsustainable trail sections. The realignment consists of three separate short sections of trail. The trail will be built to a black diamond difficulty level with steep pinches, broken up by grade reversals, and large falling banked corners.

A map showing proposed realignments can be found over the page.



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[REALIGNMENT PLAN - FOLLOW THE DOG]

DRAWN	SCALE @ A3	DATE #	REVISION
JL	AS DRAWN	28/11/19	B

DWG #

R1

4.7.3.4 Forrest Loop

4.7.3.4.1 Recommendations

Nil major works required, beyond recommended general trail upgrade. This trail is recommended for shared use (mountain biking and walking).

4.7.3.4.2 Summary

General re-profile	1,691
Surfacing	0
Realignments	0
Others	NA

4.7.3.4.3 Existing trail works

General trail upgrade as per **Section 4.7.2 (page 87).**

4.7.3.4.4 Realignments

Nil major realignments are required.

4.7.3.5 Balidjaru

4.7.3.5.1 Recommendations

Nil major works required, beyond recommended general trail upgrade. This trail is recommended for shared use (mountain biking and walking).

4.7.3.5.2 Summary

General re-profile	5,600
Surfacing	0
Realignments	0
Others	NA

4.7.3.5.3 Existing trail works

General trail upgrade as per **Section 4.7.2 (page 87).**

4.7.3.5.4 Realignments

Nil major realignments required.

4.7.3.6 Red Carpet

4.7.3.6.1 Recommendations

Dirt Art makes the following recommendation for this trail;

1. **Create a hero intermediate trail product:** Trail re-profiling works should create a genuine hero trail product with progressive jumps, berms and rollers, providing an en gaging experienced for intermediate to advanced riders.
2. **Gravel surfacing:** Recent works on the trail have involved significant burrow pitting, which has resulted in a dense clay trail surface, further reducing the trails wet weather performance. Given the popularity of the trail, and its importance to the network, *Dirt Art* suggest the trail be surfaced in an imported gravel to allow for year-round riding.

4.7.3.6.2 Summary

General re-profile (m)	1,533
Surfacing (m)	1,533
Realignments (m)	0
Others	NA

4.7.3.6.3 Existing trail works

General trail upgrade as per **Section 4.7.2 (page 87).**

Surface trail in compacted aggregate for entire trail length.

4.7.3.6.4 Realignments

Nil major realignments required.

4.7.4 Existing Trail Works Summaries- Yaugher Trail Head Trails

4.7.4.1 Yaugher Super Loop

4.7.4.1.1 Recommendations

Dirt Art makes the following recommendation for this trail;

1. **Remove from formal trail maps**: Given the highly varied nature of the trail and low-quality trail sections, *Dirt Art* suggests that the trail no longer be marketed as part of the formal trail network. Instead, key sections of the trail will be built into structured loops with other existing trails- details of these proposed changes can be found at Section. The full loop will remain available for those riders wishing to complete it, though it should not be marketed due to its detraction from the level of quality in experience being targeted with this project.
2. **Retain section to form loop with J2**: The exception to the above change is the inclusion of a section of the Super Loop into the proposed loop with J2. This section should be upgraded and formed into a closed loop.
3. **Shared use**: The remainder of the trail should be retained and provided for shared-use (mountain bike, walking and equestrian).

4.7.4.1.2 Summary

General re-profile (m)	1,200
Surfacing (m)	0
Realignments (m)	0
Others	NA

4.7.4.1.3 Existing trail works

General trail upgrade as per **Section 4.7.2 (page 87)** (only to section utilised by forming a loop with J2).

4.7.4.1.4 Realignments

Nil major realignments required.

4.7.4.2 Grass Trees

4.7.4.2.1 Recommendations

Dirt Art makes the following recommendation for this trail;

1. **Bring trail to main Yaugher Trail Head:** *Dirt Art* proposes to develop a new trail section to bring the trail to a start and finish point close to the main trail head. This proposed trail change is capture by new trail, **N5.**
2. **Link into Marriners Run:** The proposed realignments should provide direct connectivity into Marriners Run, providing an iconic black diamond loop ride of over 10km.

A plan showing the proposed restructure of this loop can be found on **page 106.**

4.7.4.2.2 Summary

General re-profile (m)	1,809
Surfacing (m)	0
Realignments	0
Others	NA

4.7.4.2.3 Existing trail works

General trail upgrade as per **Section 4.7.2 (page 87).**

4.7.4.2.4 Realignments

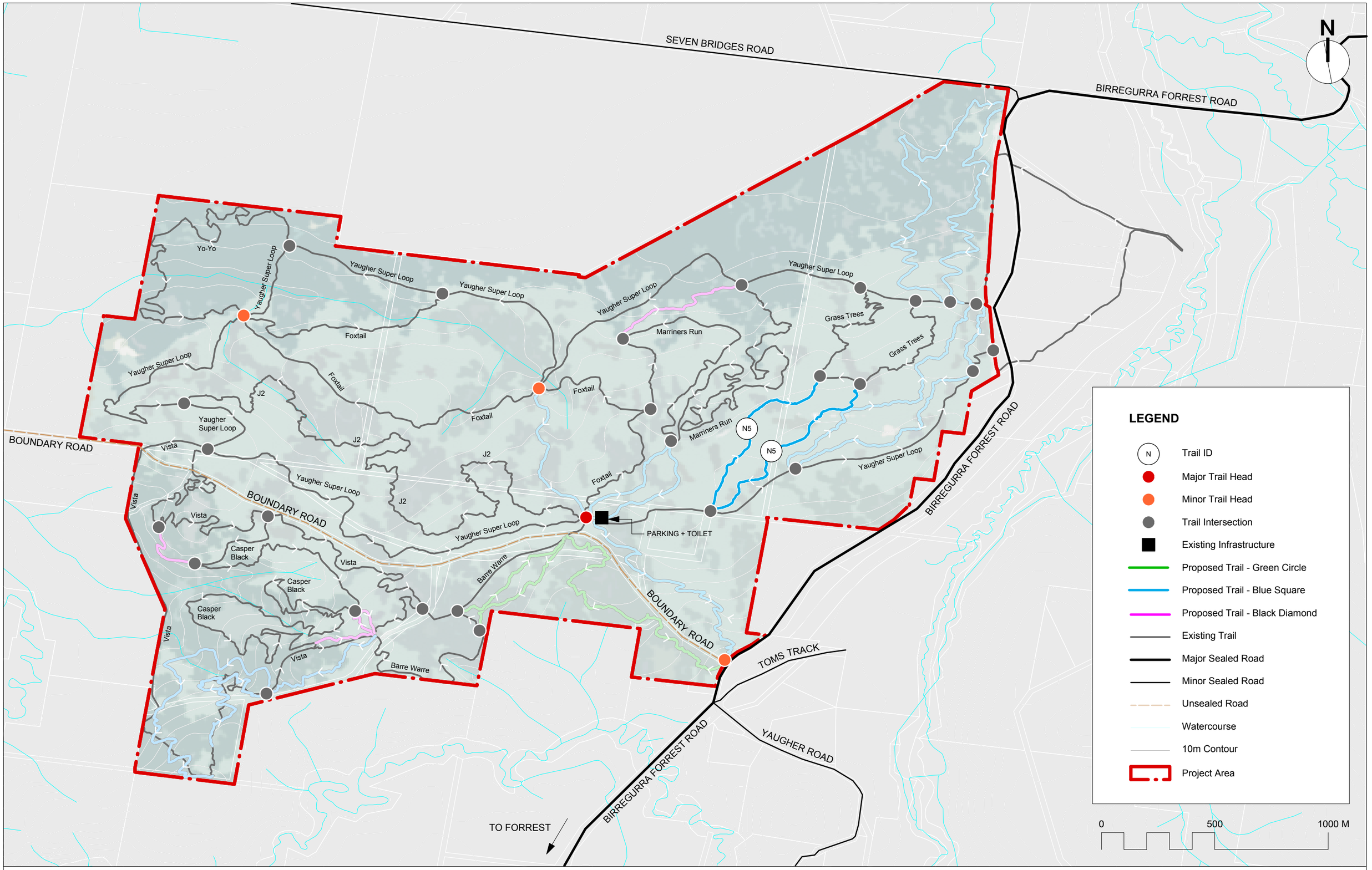
Grass Trees Realignment 1 (N5)	
Length	2.131km
Trail Type	1B
Surface	Natural surface
TDRS	Black Diamond
Construction	<1.8 tonne excavator
Adaptive Capable	No
Trail features	Berms 12, Tabletop jumps 3

Overview

Grasstrees is currently a relatively poor-quality trail, though the trail does utilise some good trail building areas. The current trail loop is also complicated to access from the main trail head, making navigation hard for visiting riders. *Dirt Art* propose to extend the current loop back towards the trail head, providing access essentially straight from the trail head. This extension will capitalise on a good-quality elevation opportunity, while also vastly improving network functionality. The trail is proposed a black diamond flow trail, with some steep sections, banked turns and jumps.

The new extension also provides a direct link between Marriners Run and Grasstrees, improving network functionality and flow.

A map showing realignments can be found over the page.



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DWG
[REALIGNMENT PLAN - GRASS TREES]

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DWG # R4

4.7.4.3 Marriners Run

4.7.4.3.1 Recommendations

Dirt Art makes the following recommendation for this trail;

1. **Form a closed loop:** *Dirt Art* proposes developing a new trail section to close Marriners Trail into a loop format. This proposed trail change is capture by new trail, **N16.**
2. **Bring trail to main Yaugher Trail Head:** *Dirt Art* proposes to develop a new trail section to bring the trail to a start and finish point close to the main trail head. This proposed trail change is capture by new trail, **N6.**
3. **Link into Grass Trees:** The proposed realignments should provide direct connectivity into Grass Trees Trail, providing an iconic black diamond loop ride of over 10km.

A plan showing the proposed restructure of this loop can be found on **page 109.**

4.7.4.3.2 Summary

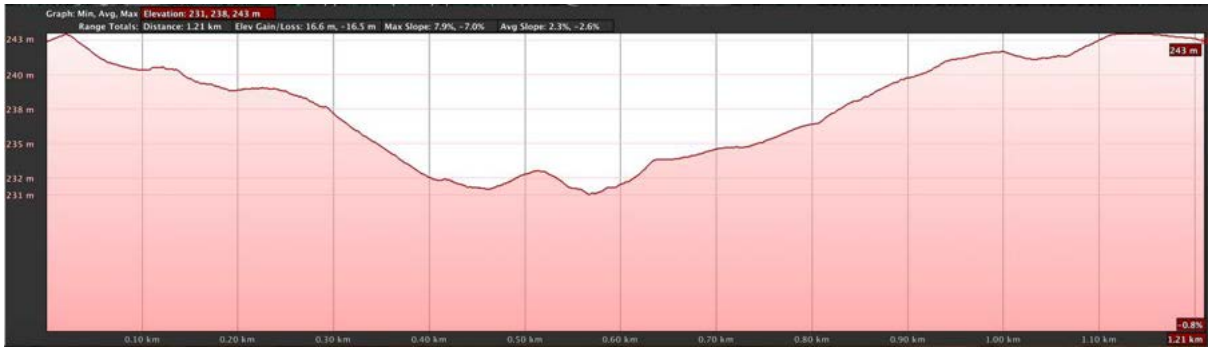
General re-profile	4,733
Surfacing	0
Realignments	0
Others	NA

4.7.4.3.3 Existing trail works

General trail upgrade as per **Section 4.7.2 (page 87).**

4.7.4.3.4 Realignments

Marriners Run Realignment 1 (N6)	
Length	1.341km
Trail Type	2B
Surface	Natural surface
TDRS	Black Diamond
Construction	<1.8 tonne excavator
Adaptive Capable	No
Trail features	15 berms, 4 tabletop jumps



Overview

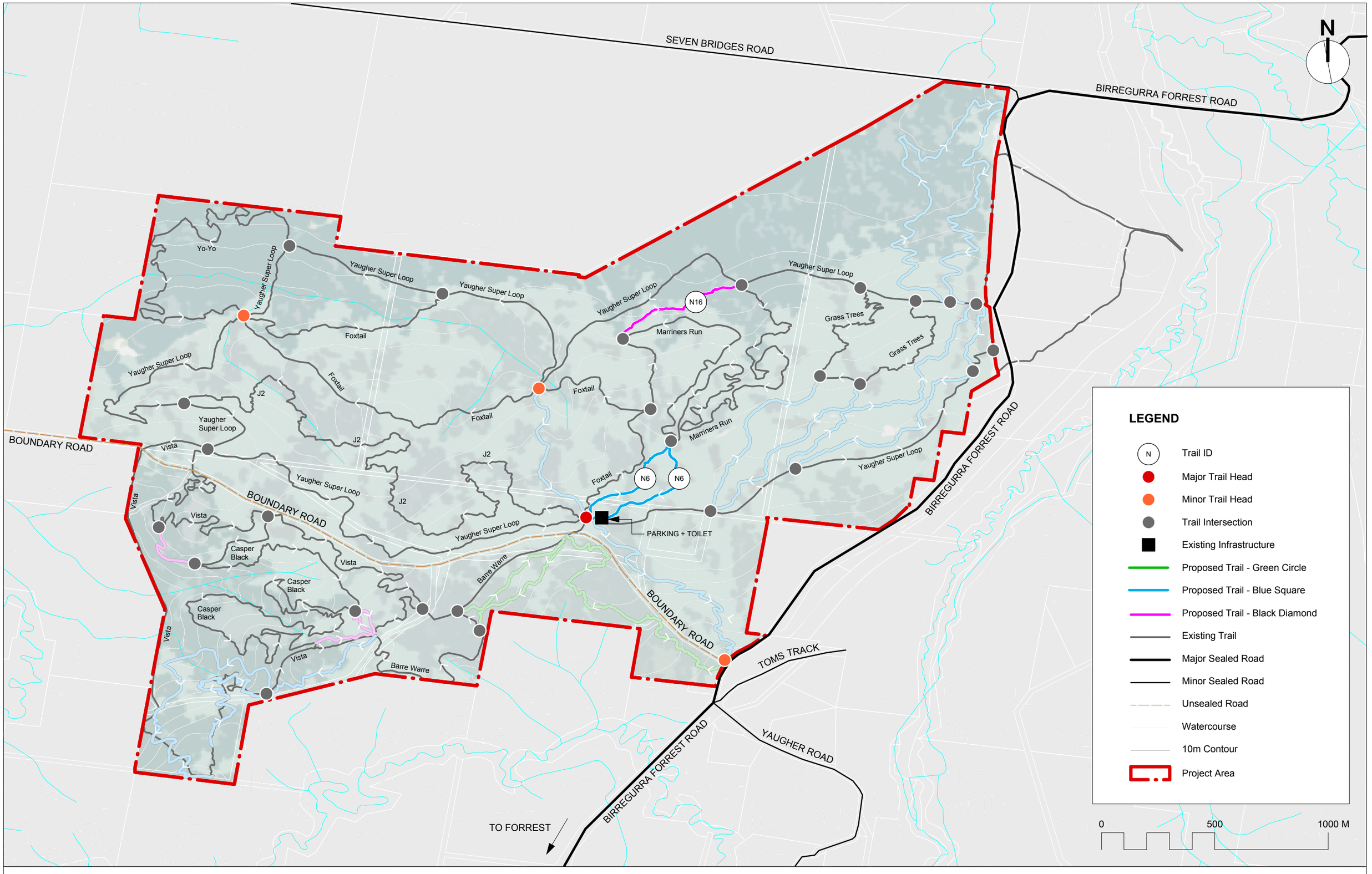
Marriners is currently one of the more popular trails in the Forrest Trail network, though the trail has a highly-disorganised network layout, which is hard to access from the main trail head. The proposed extension to this trail, will make better use of elevation opportunities, while creating vastly improved access and network functionality from the Yaugher Trail Head, by allowing riders to access the trail straight from the trail head.

Marriners Run Realignment 2 (N16)	
Length	0.695km
Trail Type	2B
Surface	Natural surface
TDRS	Black Diamond
Construction	<1.8 tonne excavator
Adaptive Capable	No
Trail features	9 berms, 2 tabletop jumps

Overview

This short section of trail re-formats Marriners Run into a closed loop. The trail is designed to mirror the existing style of the trail with a number of upper level intermediate trail features such as tabletop jumps, berms and short steeper trail sections.

A map showing proposed realignments can be found over the page.



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DWG [REALIGNMENT PLAN - MARRINERS RUN]

DRAWN JL SCALE @ A3 AS SHOWN DATE # 01/10/19 REVISION B

DWG # R6

4.7.4.4 J2

4.7.4.4.1 Recommendations

Dirt Art makes the following recommendation for this trail;

1. **Reformat to a closed loop:** *Dirt Art* suggests reformatting J2 into a closed loop with a portion of the Yaugher Super Loop Trail. This change will make the trail more sustainable, the current fall lines will be removed which will make the trail shorter, however, the quality of the riding experience will be enhanced.

A plan showing the proposed restructure of this loop can be found at **page 69.**

4.7.4.4.2 Summary

General re-profile	3,901
Surfacing	0
Realignments	0
Others	NA

4.7.4.4.3 Existing trail works

General trail upgrade as per **Section 4.7.2 (page 87).**

4.7.4.4.4 Realignments

Nil major realignment required.

Proposed formatting into a closed loop with Yaugher Super Loop, see Trail Loops Plan **page 69.**

4.7.4.5 Foxtail

4.7.4.5.1 Recommendations

Dirt Art makes the following recommendation for this trail;

1. Reformat to a closed loop: *Dirt Art* recommends the trail be reformatted into two closed loops, improving trail network structure. The first closed loop will incorporate a new trail (Trail 11) and will provide a beginner standard loop ride from the Yaugher Trail Head. The second loop will combine with a section of the Yaugher Super Loop to create an intermediate loop ride. This proposed trail change is capture by new trail, **N11.**

A plan showing the proposed restructure of this loop can be found on **page 112.**

4.7.4.5.2 Summary

General re-profile (m)	3,782
Surfacing (m)	0
Realignments (m)	0
Others (m)	NA

4.7.4.5.3 Existing trail works

General trail upgrade as per **Section 4.7.2 (page 87).**

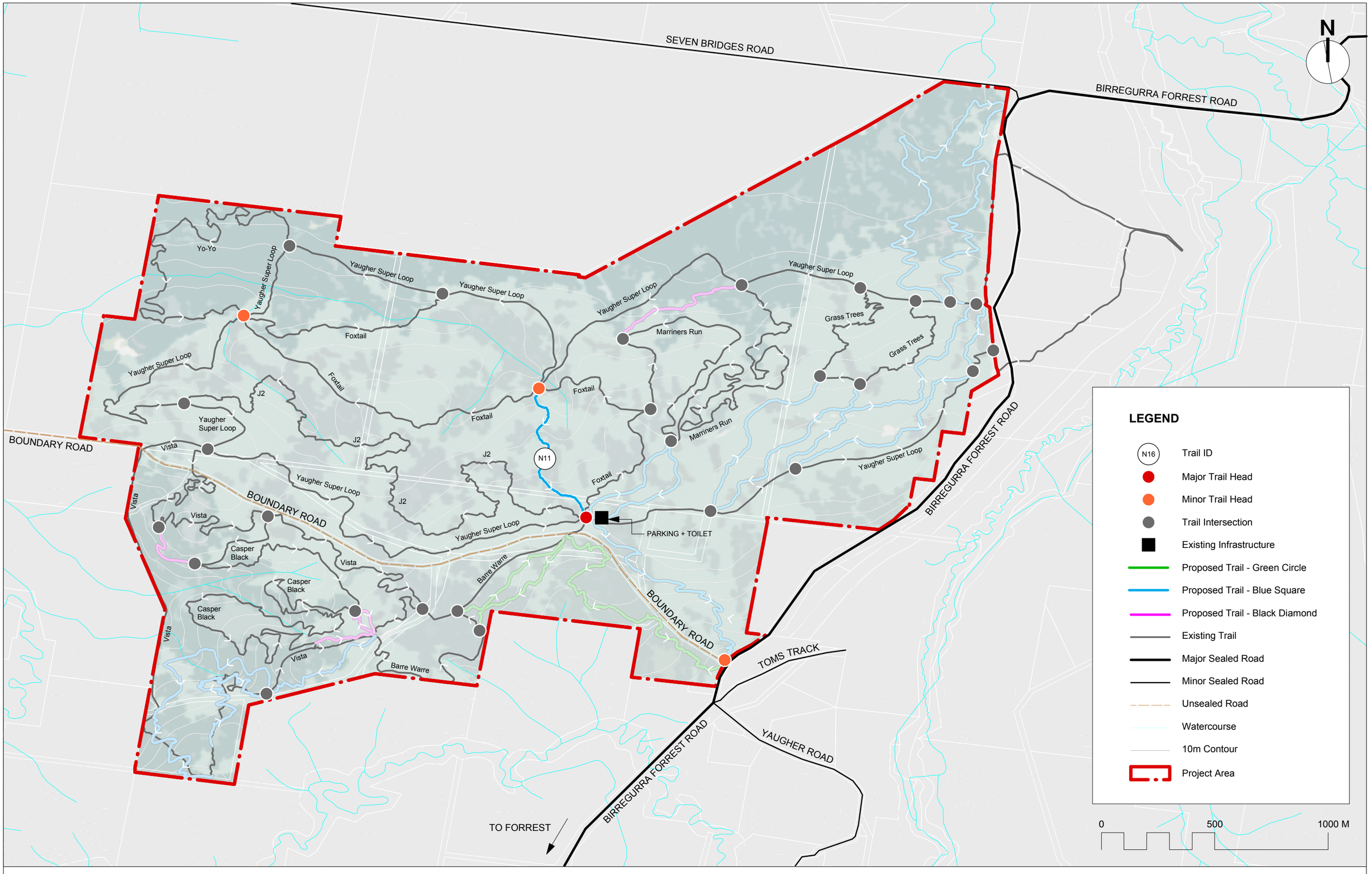
4.7.4.5.4 Realignments

Foxtail Realignment 1 (N11)	
Length	0.849km
Trail Type	1B
Surface	Natural surface
TDRS	Green Circle
Construction	<1.8 tonne excavator
Adaptive Capable	Yes
Trail features	Berms 9

Overview

The Foxtail loop trail provides a closed loop beginner trail from the existing Foxtail Trail. The loop connects back to the Yaugher Trail Head, simplifying the network and diversifying to allow for more beginner-standard riding. The trail is proposed as an IMBA Green Circle flow trail with beginner flow-style trail features.

A map showing proposed realignments can be found over the page.



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[REALIGNMENT PLAN - FOXTAIL]

DRAWN JL | SCALE @ A3 AS SHOWN | DATE # 05/12/19 | REVISION B

DWG # R5

4.7.4.6 Casper Black

4.7.4.6.1 Recommendations

Dirt Art makes the following recommendation for this trail;

1. **Reformat to two closed loops:** *Dirt Art* suggests the trail be reformatted into two closed loops. Loop one would combine with a section of Vista Trail, and loop two would close as a separate loop. These changes would greatly improve network functionality and consistency. This proposed trail change is capture by new trails **N15A, N15B and N15C.**

A plan showing the proposed restructure of this loop can be found on **page 108.**

4.7.4.6.2 Summary

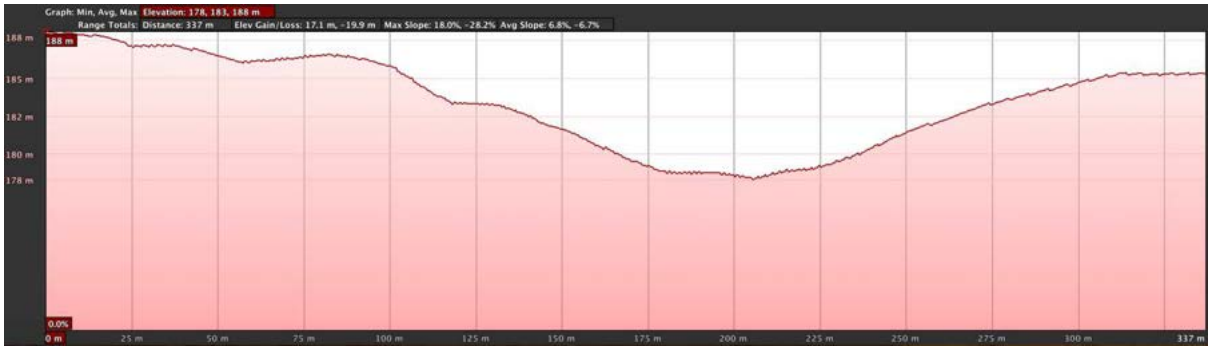
General re-profile (m)	4,681
Surfacing (m)	0
Realignments (m)	992
Others	NA

4.7.4.6.3 Existing trail works

General trail upgrade as per **Section 4.7.2 (page 87).**

4.7.4.6.4 Realignments

Casper Black Realignment 1 (N15A)	
Length	0.364km
Trail Type	1B
Surface	Natural surface
TDRS	Black Diamond
Construction	<1.8 tonne excavator
Adaptive Capable	No
Trail features	Berms 4

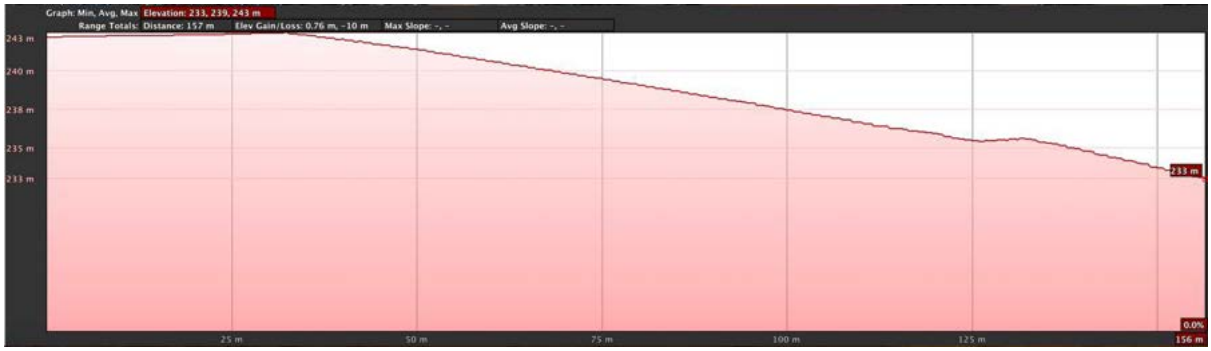


Overview

N15A forms a linkage between Casper Black and Vista Trail sections, allowing the formation of a closed loop system. The trail is proposed as a black diamond flow trail, with steeper turns and trail sections.

A map showing realignments can be found on **page 116.**

Casper Black Realignment 1 (N15B)	
Length	0.169km
Trail Type	1B
Surface	Natural surface
TDRS	Black Diamond
Construction	<1.8 tonne excavator
Adaptive Capable	No
Trail features	Berms 4



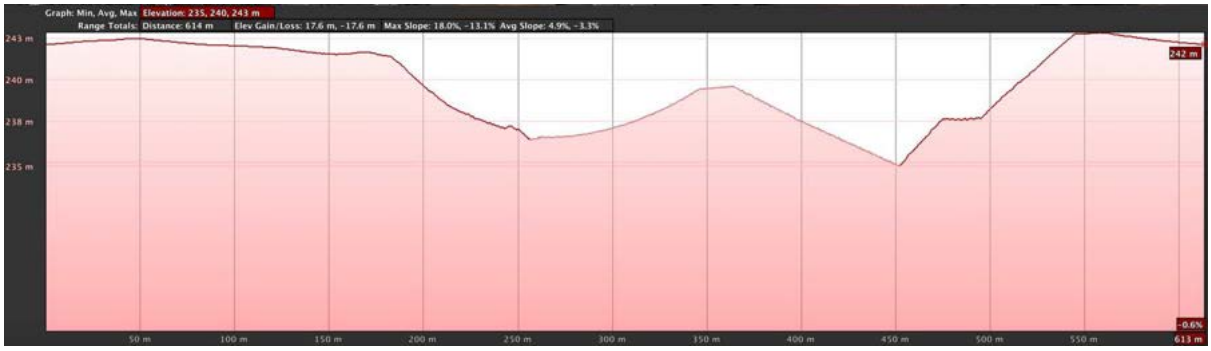
Overview

N15B is a short trail section that separates a loop with Casper Black and Vista Trails, allowing the formation of a closed loop system. The trail creates a new trail hub, providing improved network flow and navigability. The trail is proposed as a black diamond flow trail, with steeper turns and trail sections.

A map showing realignments can be found on **page 116.**

Casper Black Realignment 1 (N15C)	
Length	0.459km

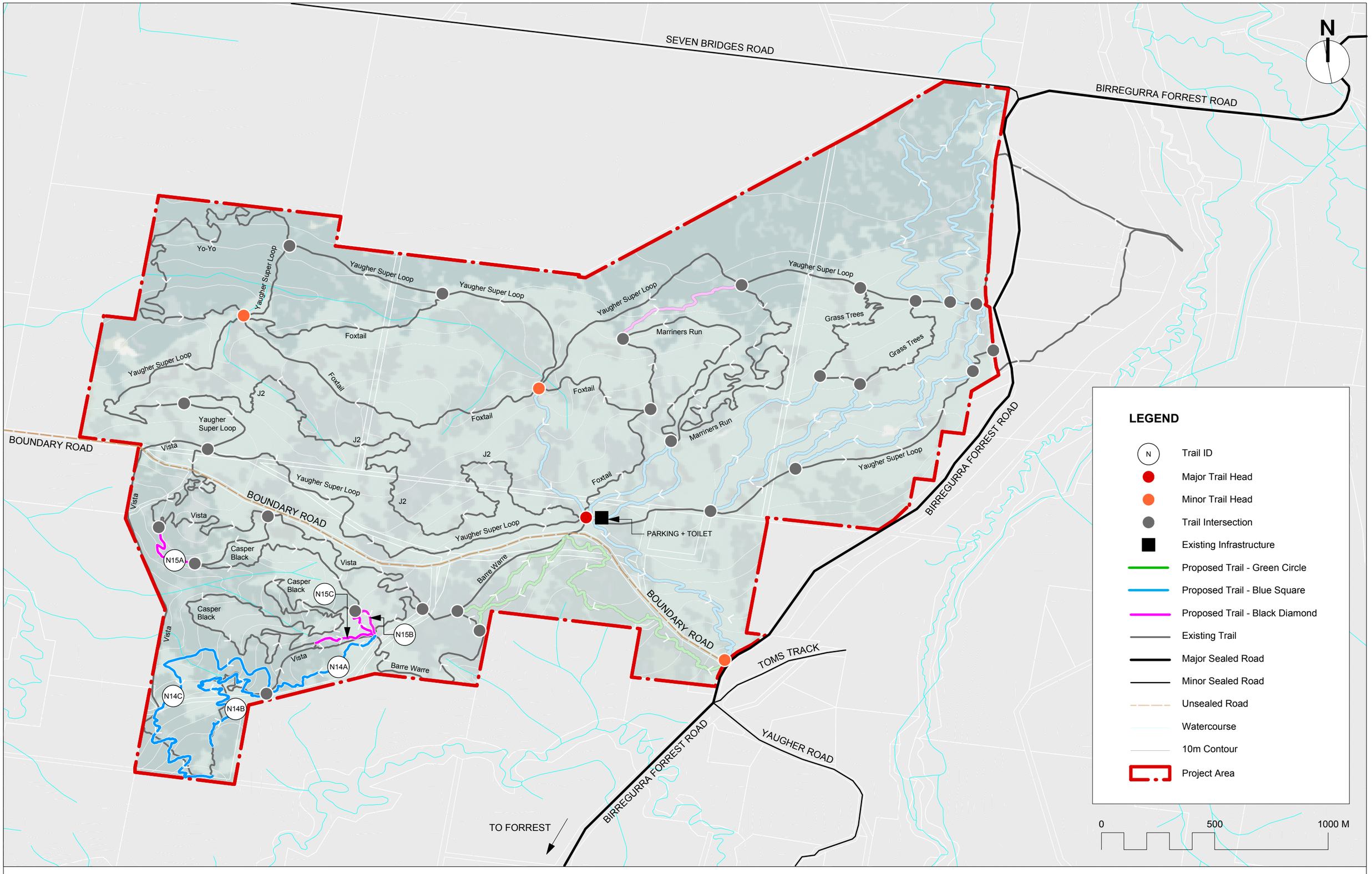
Trail Type	1B
Surface	Natural surface
TDRS	Black Diamond
Construction	<1.8 tonne excavator
Adaptive Capable	No
Trail features	Berms 4



Overview

N15C is a short trail section that allows a section of Casper Black to be ridden as a new, independent closed loop. The trail creates a new trail hub, providing improved network flow and navigability. The trail is proposed as a black diamond flow trail, with steeper turns and trail sections.

A map showing realignments can be found over the page.



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PROJECT	Forrest Mountain Bike (MTB) Detailed Design Plan
LOCATION	Forrest VIC
CLIENT	Colac Otway Shire

DWG
[REALIGNMENT PLAN - VISTA / CASPER BLACK]

DRAWN JL SCALE @ A3 AS SHOWN DATE # 05/12/19 REVISION B

DWG # R7

4.7.4.7 Vista

4.7.4.7.1 Recommendations

Dirt Art makes the following recommendation for this trail;

1. **Reformat to closed loops:** The trail is poorly structured, and as such *Dirt Art* suggests major reformatting of the trail. The trail would be broken into four loops, combining with other trails. This reformatting will also propose changing the difficulty grading of the trail. This proposed trail change is capture by new trail, **N14A, N14B and N14C. These new loops provide a logical progression from trails such as Barre Warre, while creating a new trail hub connecting a number of loops in the area.**

A plan showing the proposed restructure of this loop can be found on **page 120.**

4.7.4.7.2 Summary

General re-profile (m)	5,300
Surfacing (m)	699 (in realignment/new trail section)
Realignments (m)	3,848
Others	NA

4.7.4.7.3 Existing trail works

General trail upgrade as per **Section 4.7.2 (page 87).**

4.7.4.7.4 Realignments

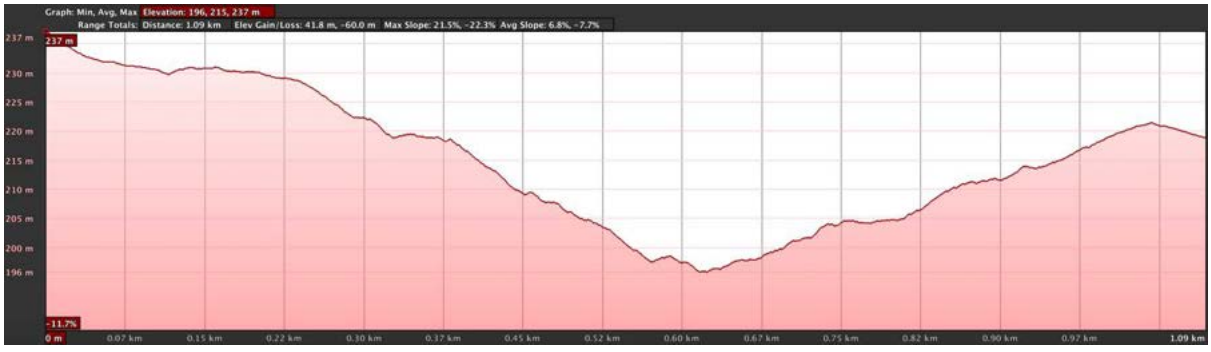
Vista Realignment 1 (N14A)	
Length	0.699km
Trail Type	1B
Surface	60mm depth imported gravel (<20mm screen)
TDRS	Blue Square
Construction	<2.5 tonne excavator
Adaptive Capable	No
Trail features	9 berms, 10 tabletop jumps

Overview

N14A creates the first new loop out of the Vista Trail. The current Vista Trail is extremely variable and inconsistent. The first formed loop suits intermediate riders and provides a logical progression and extension from Barre Warre.

This section of trail provides a fun and engaging intermediate descent, which would focus on a jump style of trail with tabletop jumps providing a progressive trail experience.

Vista Realignment 2 (N14B)	
Length	1.223km
Trail Type	1B
Surface	Natural surface
TDRS	Blue Square
Construction	<1.8 tonne excavator
Adaptive Capable	No
Trail features	Berms 10



Overview

N14B realigns the SW section of Vista Trail, creating a more functional, sustainable trail suitable for intermediate riders. The realignment ensures that the majority of riders can access one of the few view points in the Forrest trail network.

The trail provides scope to develop a more technical trail alignment weaving through trees in the area. Flatter corners and a more technical style of trail are proposed to increase trail diversity for intermediate riders.

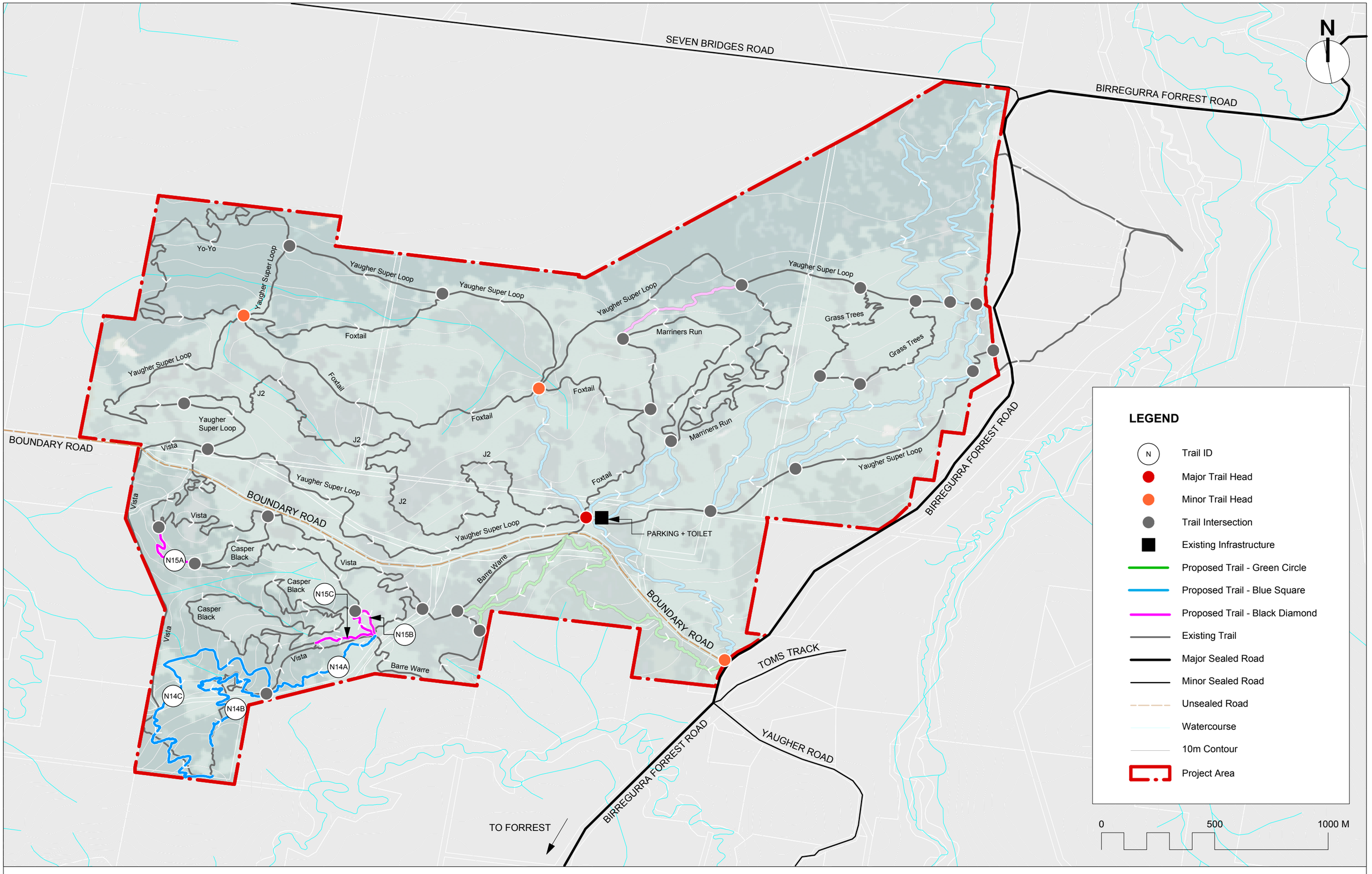
Vista Realignment 3 N14C)	
Length	1.926km
Trail Type	1B
Surface	Natural surface
TDRS	Blue Square
Construction	<1.8 tonne excavator
Adaptive Capable	No
Trail features	Typical intermediate trail features

Overview

The second Vista Trail realignment closes an intermediate standard trail loop, and eliminates the steep, degraded sections of the current trail.

This section of trail is predominantly climbing and provides potential for a more technical climb as it weaves through trees in the area.

A map showing proposed realignments can be found over the page.



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[REALIGNMENT PLAN - VISTA / CASPER BLACK]

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DWG # R7

4.7.4.8 Barre Warre

4.7.4.8.1 Recommendations

Dirt Art makes the following recommendation for this trail;

1. **Replace trail section:** The trail features a long, flat section of ex-fire trail that provides a poor riding experience. *Dirt Art* proposes replacing this section with new trail and turning this into an equestrian trail. This proposed trail change is capture by new trail **N13A.**
2. **Loop restructure:** The trail is poorly structured, and as such *Dirt Art* suggests reformatting of the trail. This proposed trail change is capture by new trail **N13B.** By adding gravel surfaces to the two new link trails, N13B (the descending alignment), N13A (the ascending alignment) and Barre Warre will be durable in all weather conditions. The trail is proposed as a beginner flow trail, featuring gentle in-sloped berms and rolling terrain.

A plan showing the proposed restructure of this loop can be found on **page 124.**

4.7.4.8.2 Summary

General re-profile (m)	1,873
Surfacing (m)	0
Realignments (m)	1,406
Others	NA

4.7.4.8.3 Existing trail works

General trail upgrade as per **Section 4.7.2 (page 87).**

4.7.4.8.4 Realignments

Barre Warre Realignment (N13A)	
Length	0.678km
Trail Type	1B
Surface	60mm depth imported gravel (<20mm screen)
TDRS	Green Circle
Construction	<1.8 tonne excavator
Adaptive Capable	Yes
Trail features	Berms 7

Overview

The current Barre Warre Trail is a balloon on string format and would benefit from being reformatted as a closed loop. The proposed extension will close a loop and move sections of trail into conditions more conducive to high-quality, sustainable trail. The trail is proposed as a beginner flow trail, featuring gently in-sloped berms and rolling terrain. *Dirt Art* has proposed the trail be gravel surfaced as some trail areas are wet and prone to poor riding quality experiences in wet weather.

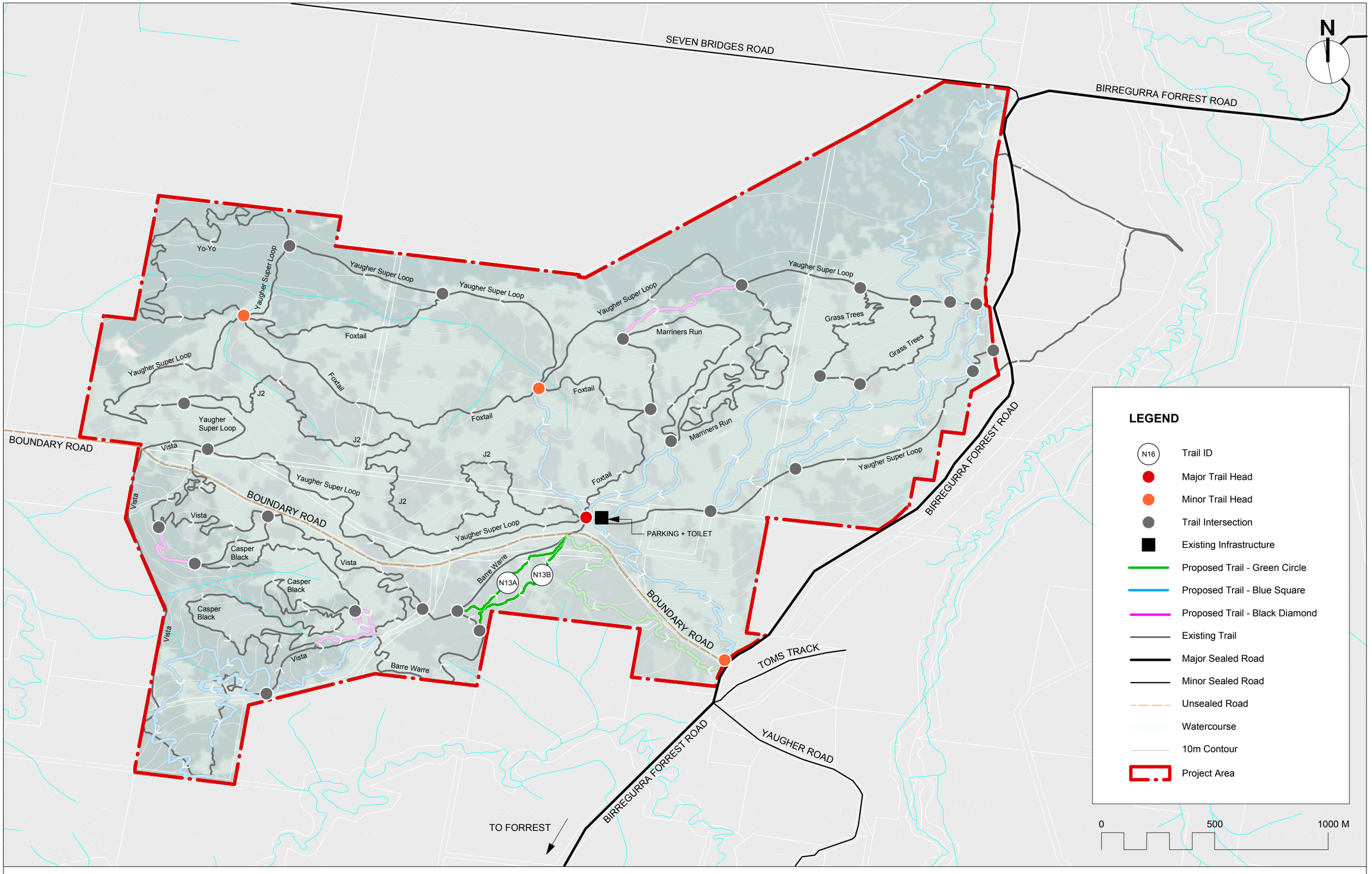
The extension will provide beginner flow-style trail features focusing on bermed terrain.

Barre Warre Realignment 2 (N13B)	
Length	0.728km
Trail Type	1B
Surface	60mm depth imported gravel (<20mm screen)
TDRS	Green Circle
Construction	<1.8 tonne excavator
Adaptive Capable	Yes
Trail features	Berms 4

Overview

N13B realigns Barre Warre away from a flat, wet area, creating a better ride experience and a more sustainable trail. The trail will focus on beginner-level flow-style terrain with berms and rollers creating a fun and engaging trail experience.

A map showing proposed realignments can be found over the page.



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DWG [REALIGNMENT PLAN - BARRE WARRE]

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DWG # R8

4.8 New Proposed Trails

4.8.1 Forrest Trail Head Trails

A number of new trails are proposed around the Forrest Trail Head, with a focus on the new gravity trails area referenced as 'Barwon Flow Trails.' The Barwon Flow Trails provide a sustained descending experience that is currently lacking in Forrest, which operates as a closed loop trail system. Other proposed new trails aim to broaden the current trail offering, while capitalising on areas conducive to quality trail construction. The Barwon Flow Trails network will offer one beginner descent, one intermediate descent, and one ascending trail. The trails all meet halfway down the hill so multiple alignments can be created. As an example, riders can start on the beginners run and then at the halfway point, swap to the intermediate run, or, alternatively continue riding to the top or bottom sections. In essence when combined with the Forrest Loop this closed circuit of three trails offers 12 separate rider alignments.

PLEASE NOTE: The coloured lines show the proposed new trail alignments for the Forrest Network

TO YAUGHER TRAIL HEAD

N

COLAC- FORREST ROAD

TURNER DRIVE

YAUGHER ROAD

FORREST

Shelter

N10

N3

Forrest Loop

Roller Coaster

Forrest Loop

Red Carpet

KAANGLANG ROAD

N2

N1

Red Carpet

Barlidjaru

Barlidjaru

Follow The Dog

Follow The Dog

N9

Barlidjaru

KAANGLANG ROAD

FORREST-APOLLO BAY ROAD

TO BARRAMUNGA

LEGEND

- N — Trail ID
- Major Trail Head
- Minor Trail Head
- Trail Intersection
- Existing Infrastructure
- Proposed Trail - Green Circle
- Proposed Trail - Blue Square
- Proposed Trail - Black Diamond
- Existing Trail
- Major Sealed Road
- Minor Sealed Road
- Unsealed Road
- Watercourse
- 10m Contour
- Project Area

0 500 1000 M

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[DETAILED TRAIL PLAN - FORREST NETWORK]

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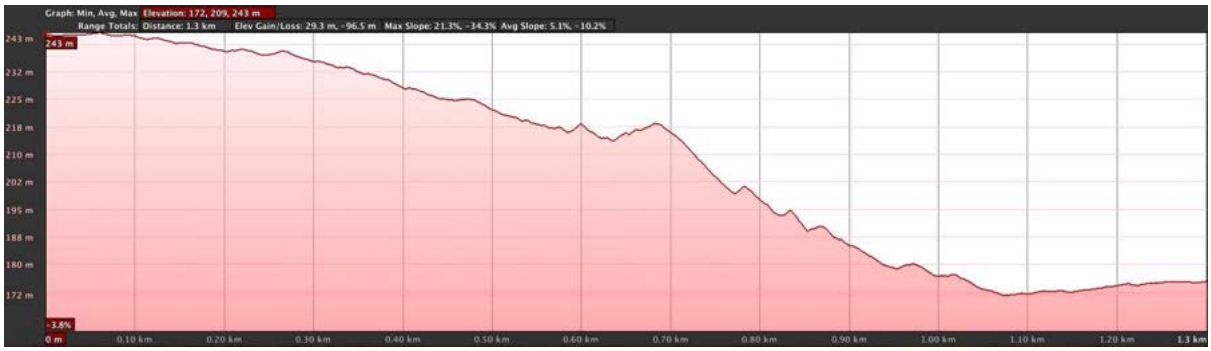
DWG # 03

4.8.2 N1 - Barwon Flow Descent One

Trail Details	
Length	1.451km
Trail Type	2A
Surface	60mm depth imported gravel (<20mm screen)
TDRS	Green Circle
Construction	<3.5 tonne excavator
Adaptive Capable	Yes
Trail features (approx.)	10 berms, 12 table top jumps



Overview

The first Barwon Flow Trail Descent is proposed as a beginner level descending flow trail. The trail will feature gently rolling terrain, large berms and smooth and gentle rollers. The trail will provide small and gentle jumping opportunities for beginner riders, with a maximum jump height of 1200mm.

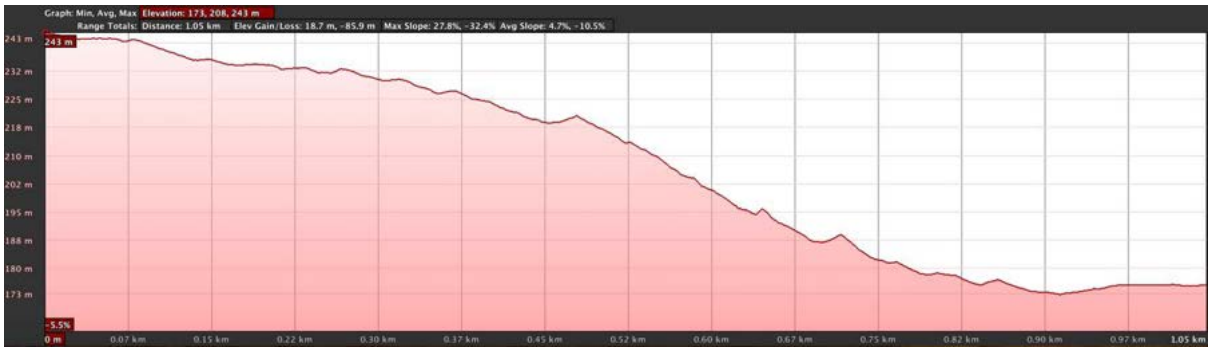
Proposed gravel surfacing has been implemented to provide high-quality riding conditions, year-round.

The trail is designed as a premier beginner descending product, which will appeal strongly to visiting riders.

A schematic design plan for these trails can be found at **page 130.**

4.8.3 N2 - Barwon Flow Descent Two

Trail Details	
Length	1.152km
Trail Type	3A
Surface	60mm depth imported gravel (<20mm screen)
TDRS	Blue Square
Construction	<3.5 tonne excavator
Adaptive Capable	Yes
Trail features	10 berms, 12 table top jumps



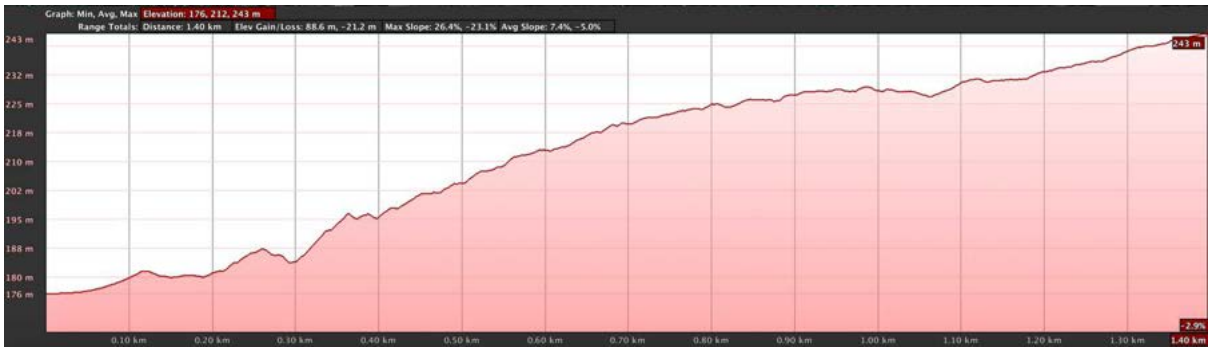
Overview

The second Barwon Flow Trail descent is proposed as a progressive intermediate jump/flow trail, with some optional advanced-level features. The trail includes a range of larger table top jump features, some with split take off lips, to allow for multiple rider skill levels. With jump height up to 2,000mm, the trail will provide one of Victoria's best intermediate jump trail experiences, and arguably the best place in the state to safely progress jumping ability. Proposed gravel surfacing has been implemented to provide high-quality riding conditions, year-round.

A schematic design plan for these trails can be found at **page 130.**

4.8.4 N3 - Barwon Flow Ascent

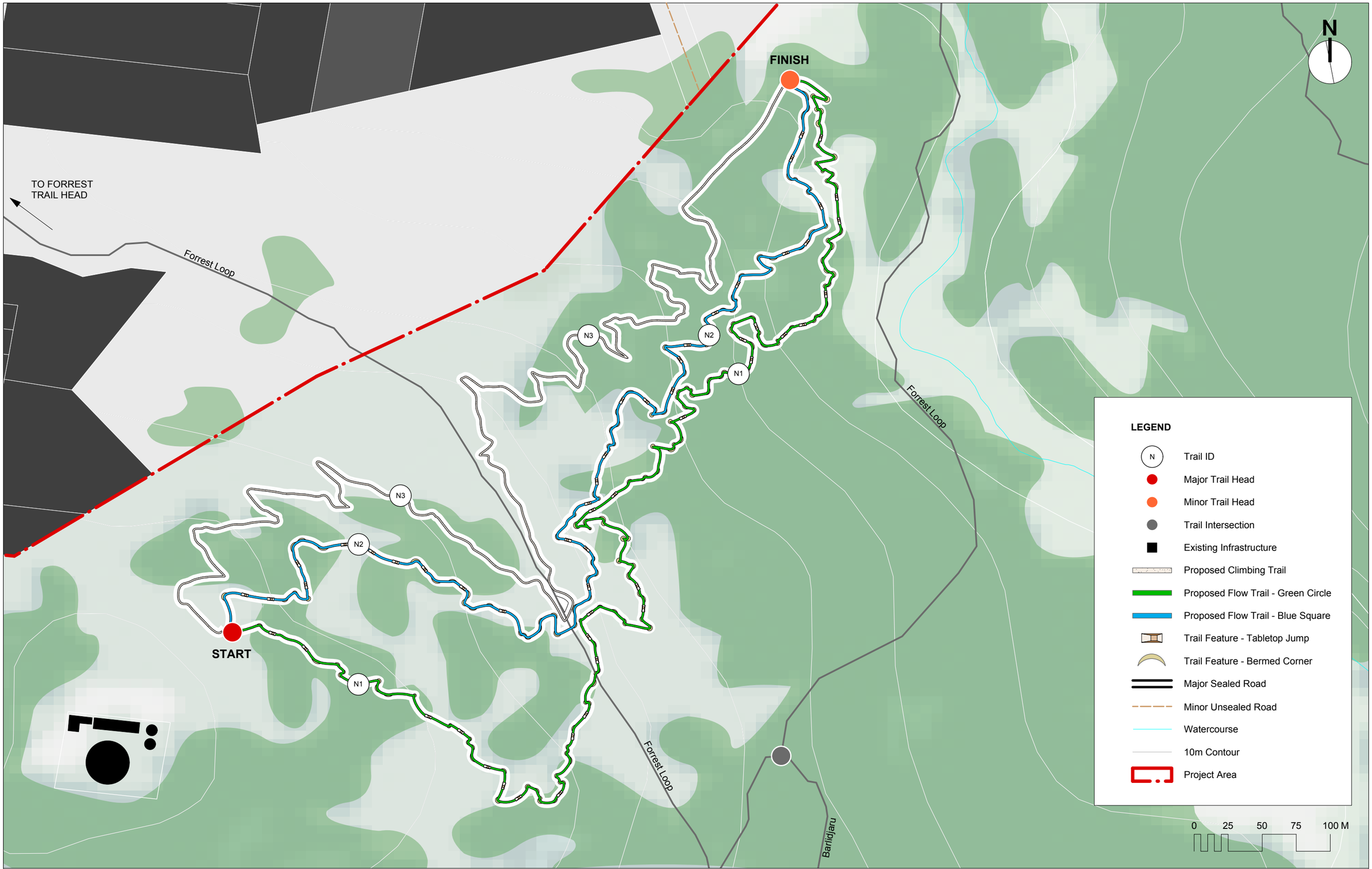
Trail Details	
Length	1.548km
Trail Type	1B
Surface	60mm depth imported gravel (<20mm screen)
TDRS	Green Circle
Construction	<2.5 tonne excavator
Adaptive Capable	Yes
Trail features	Climbing switchback turns (as required)



Overview

The Barwon Ascent Trail provides an arterial connector to take riders from the base of the Barwon Flow Trails, back to the summit point, closing a riding loop. The trail connects to the Forrest Loop Trail, approximately halfway up the hill, providing riders with a shorter loop option if desired. As a beginner-standard trail, a gentle ascent is on offer, suitable for riders of all abilities. Given the climbing direction of the trail, the trail would also be suitable for shared use with walkers. Proposed gravel surfacing has been implemented to provide high-quality riding conditions, year-round.

A schematic design plan for these trails can be found at **page 130.**



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DWG
[DETAILED TRAIL PLAN - BARWON FLOW TRAILS]

DRAWN JL SCALE @ A3 1:2500 DATE # 21/11/19 REVISION B

DWG # 07

4.8.5 N9 - Roller Coaster Loop 2

Trail Details	
Length	1.518km
Trail Type	2B
Surface	60mm depth imported gravel (<20mm screen)
TDRS	Green Circle
Construction	<1.8 tonne excavator
Adaptive Capable	Yes
Features	Berms 8, tabletop jumps/rollers 10

Overview

N9 proposes a new loop to extend the existing trail, which capitalises on an elevation opportunity that allows rider to climb and descent further. The trail is proposed as a new beginner standard flow trail in the same format as the original Rollercoaster trail. Notably, this trail is proposed as an adaptive bike-friendly trail.

The trail builds upon the trails and facilities at the Forrest Trail Head to provide a world-class gateway trails experience, right from the centre of Forrest.

4.8.6 N10 - Red Carpet Duplication

Trail Details	
Length	0.807km
Trail Type	2B
Surface	60mm depth imported gravel (<20mm screen)
TDRS	Blue Square
Construction	<1.8 tonne excavator
Adaptive Capable	No
Trail features	Berms 11, tabletop jumps 7

Overview

The existing Red Carpet Trail capitalises on one of the better elevation opportunities in the Forrest trail network. The duplication of this trail allows for a new, different trail type to be installed, complementing the existing trail and diversifying the trail network. The new trail is proposed as an intermediate jump/flow trail, which provides a new experience alongside the new Barwon Flow Trails.

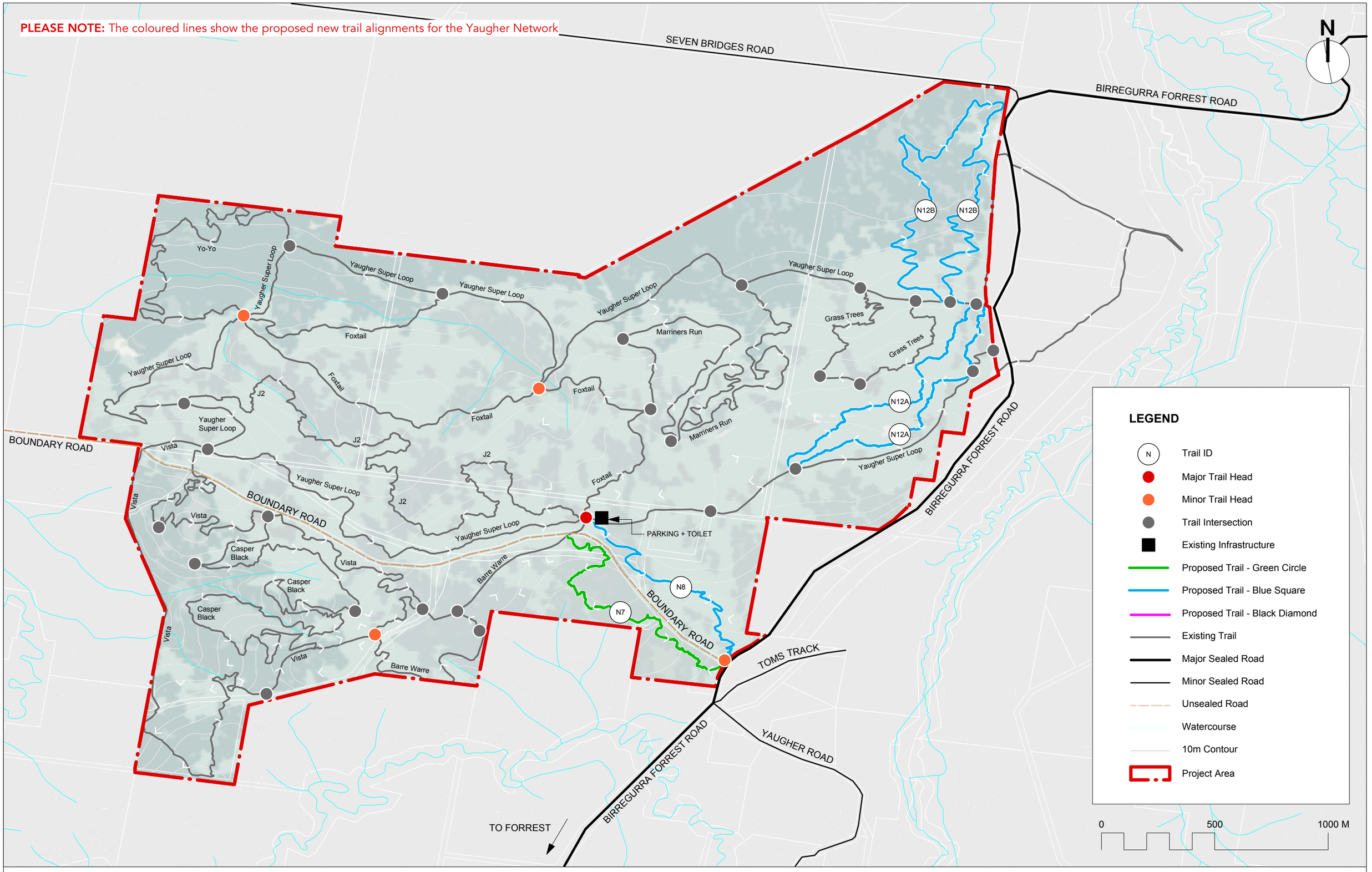
Notably, this trail is proposed as an adaptive bike-friendly trail.

4.8.7 Proposed New Trails- Yaugher Trail Head Area

Proposed new trails at the Yaugher Trail Head focus on improving connectivity to and from Boundary Road, and on a new area of potential development to the east of the current trails. The proposed new trails diversify the riding experience while capitlising on maximum elevation opportunities, providing sustained climbing and descending trails not currently available in Forrest.

A map for the proposed new trails at Yaugher Trail Head can be found over the page.

PLEASE NOTE: The coloured lines show the proposed new trail alignments for the Yaugher Network



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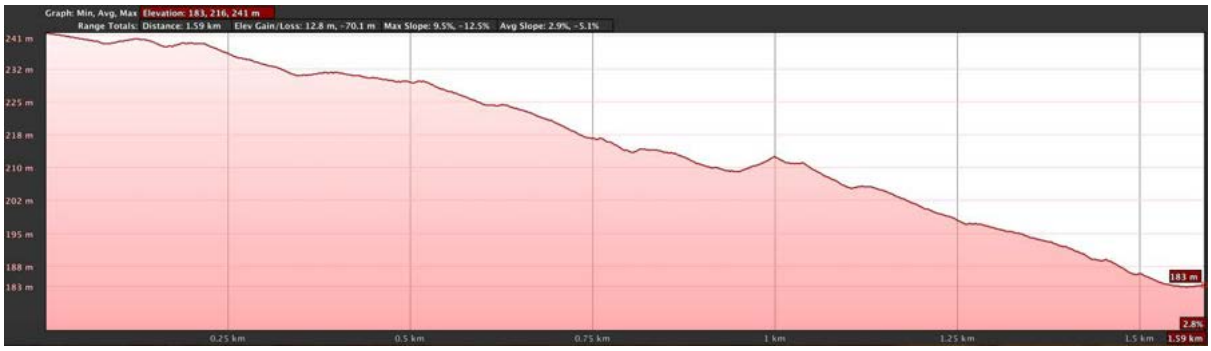
DWG
[DETAILED TRAIL PLAN - YAUGHER NETWORK]

DRAWN JL | SCALE @ A3 AS SHOWN | DATE # 09/12/19 | REVISION B

DWG # 02

4.8.8 N7 - Boundary Road Ascent

Trail Details	
Length	1.852km
Trail Type	2B
Surface	60mm depth imported gravel (<20mm screen)
TDRS	Green Circle
Construction	<1.8 tonne excavator
Adaptive Capable	Yes
Trail features	Berms 14



Overview

The Boundary Road Ascent provides a singletrack climb for beginner level riders, which also functions as a descent for riders of this level (intermediate and above riders have access to an intermediate descent. The trail features a gently ascending gradient, with smooth, flat ascending switchbacks.

The dual direction status of the trail ensures beginner riders have access to singletrack descending from the Yaugher Trail Head.

The trail has also been designed to accommodate equestrian and walking users as required.

4.8.9 N8 - Boundary Road Descent

Trail Details	
Length	1.4km
Trail Type	2B
Surface	Natural surface
TDRS	Blue Square
Construction	<1.8 tonne excavator
Adaptive Capable	No
Trail features	Berms 11, tabletop jumps 9

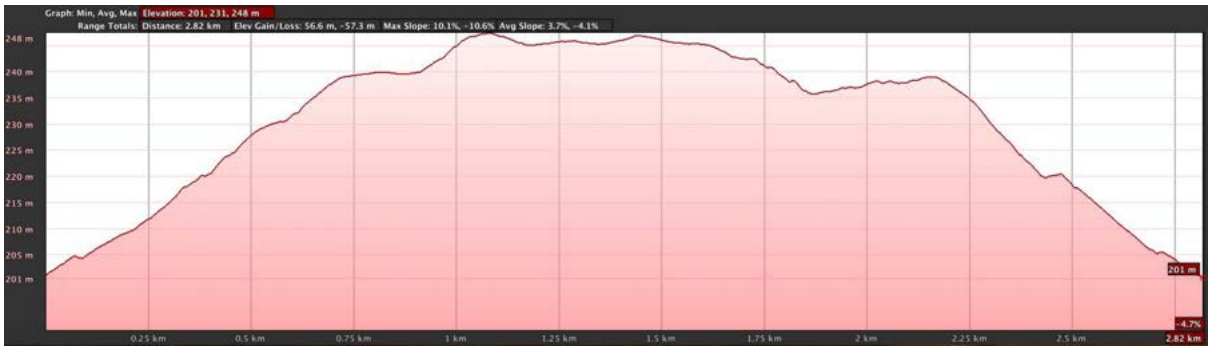
Overview

The Boundary Road Descent capitalises on one of the better elevation opportunities in the Forrest trail network. The trail allows riders to descent from Yaugher Trail Head to boundary road or can be combined with the Boundary Road Ascent into a loop trail.

The trail is proposed as a flow style trail, which capitalises on the local landscape to create a fun and engaging trail experience.

4.8.10 N12A - Eastern Loop Trail Part A

Trail Details	
Length	3.201km
Trail Type	2B
Surface	Natural surface
TDRS	Blue Square
Construction	<1.8 tonne excavator
Adaptive Capable	No
Trail features	Berms 21, tabletop jumps 9



Overview

Adjacent to Grasstrees is one of the better elevation opportunities in the network area. This area is currently completely not utilised. *Dirt Art* proposes a brand-new trail loop in this area, suitable for intermediate riders. N12A is the first half of this loop, with N12B acting as a continuation of this loop.

4.8.11 N12B Southern Loop Trail Part B

Trail Details	
Length	3.909km
Trail Type	2B
Surface	Natural surface
TDRS	Blue Square
Construction	<1.8 tonne excavator
Adaptive Capable	No
Trail features	Berms 14, tabletop jumps 4

Overview

Adjacent to Grasstrees is one of the better elevation opportunities in the network area. This area is currently completely not utilised for trails.

Dirt Art proposes a brand-new trail loop in this area, suitable for intermediate riders. N12A is the first half of this loop, with N12B acting as a continuation of this loop.

4.9 Hiking and Equestrian Trails

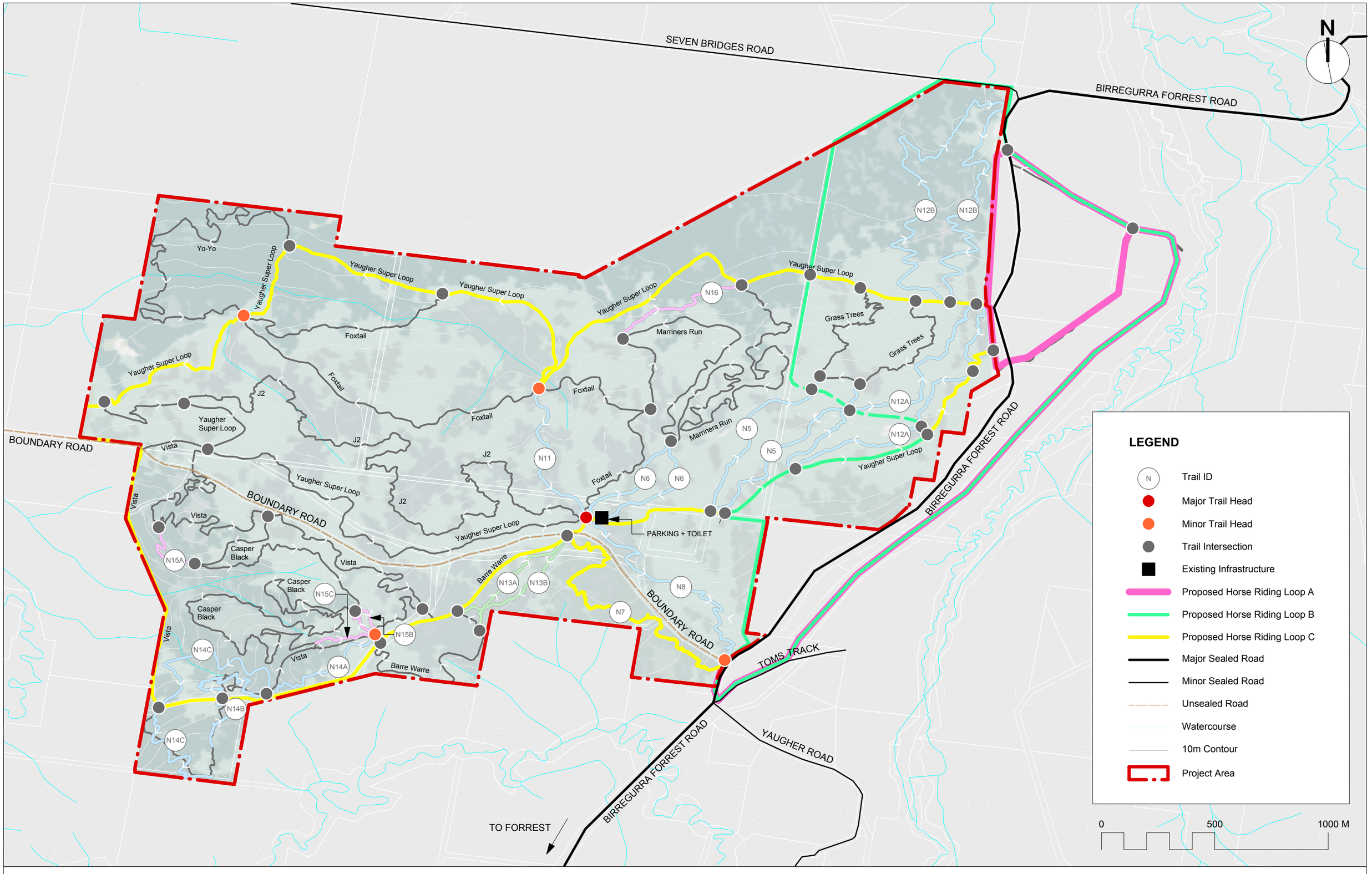
The Forrest Horse Riding Club has 71 members and host events for approximately 5,000 Horse Riding Club Association of Victoria (HRCAV) members annually. Additionally, a high number of non-club members also visit the trails system each year. At the Yaugher network, the current trail system offers a 20km horse trail system that is made up of fire trails and joint-use mountain bike trails. Since initial community consultation it was apparent that mixing horse riders and mountain bike riders was creating considerable safety risks.

Dirt Art's design proposals include decommissioning several mountain bike trails within the current network as they are difficult and costly to manage, and offer limited future mountain bike potential. The loamy soil and steep hills on the trails that are proposed for conversion are well suited for equestrian users and walkers, and not ideal for mountain biking. *Dirt Art* have proposed that three new designated horse riding and walking routes are possible:

- The first route is perfect for kids and has been designed in a loop to prevent the 'run home' factor,
- The second loop is a little longer (1.5hr-2hr) and is suited for children with more experience, families or riders who are just looking to immerse themselves in the native bush,
- The third loop (3hr-3.5hr) is for experienced riders of all ages and takes in a native bush setting plus some challenging sand hill climbs.

While there will still be some short sections of shared-use trail (approximately 1.5km across the network), the installation of appropriate signage for all users (detailed in the signage strategy) will make the network much safer.

The designated horse and riding routes (which have been endorsed in principal by the Forrest Horse Riding Club) can be viewed over the page.



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DWG [DETAILED TRAIL PLAN - HORSE RIDING LOOPS]

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DWG # H

4.10 Suggested Signage Strategy

4.10.1 Overview

Dirt Art suggest that a brand-new signage system be implemented along with the new trail development. This new signage system would include a new branding and style guide for all signage, as well as updating signage content and locations. The functionality of the new signage system will be greatly aided through the restructure of trail intersections and loops.

Given the wet climate in Forrest, *Dirt Art* suggest avoiding timber signage as these signage types will weather and degrade.

4.10.2 Look-and-feel and branding

Current signage look-and-feel is not consistent with a high-quality mountain bike destination. *Dirt Art* strongly suggest a re-brand and redesign of all signage. The revitalised Forrest brand and signage style guide will make signage more visible, more functional and more visually appealing. This style guide should be carried across all signage types in the network.

4.10.3 Signage types

4.10.3.1 Type 1 – Main Sign Boards

Dirt Art suggest that major sign boards are located at the Forrest, Yaugher and Red Carpet (lower) trail heads.

Trail map signage is the main signage board that will greet riders when they arrive at a trail head. The current trail map signage at both trail heads is inadequate in size and detail and does not provide visiting riders with the information to embark on their ride quickly and easily.

Signage should be large enough to allow several riders to view the trail maps and signage at the same time.

Trail maps signage should contain the following at a minimum;

- Vibrant branding
- High quality trail maps
- Trail names, difficulty ratings and lengths
- Shared/single use status of trails
- A summary of the IMBA trail difficulty rating system
- Emergency phone numbers/information

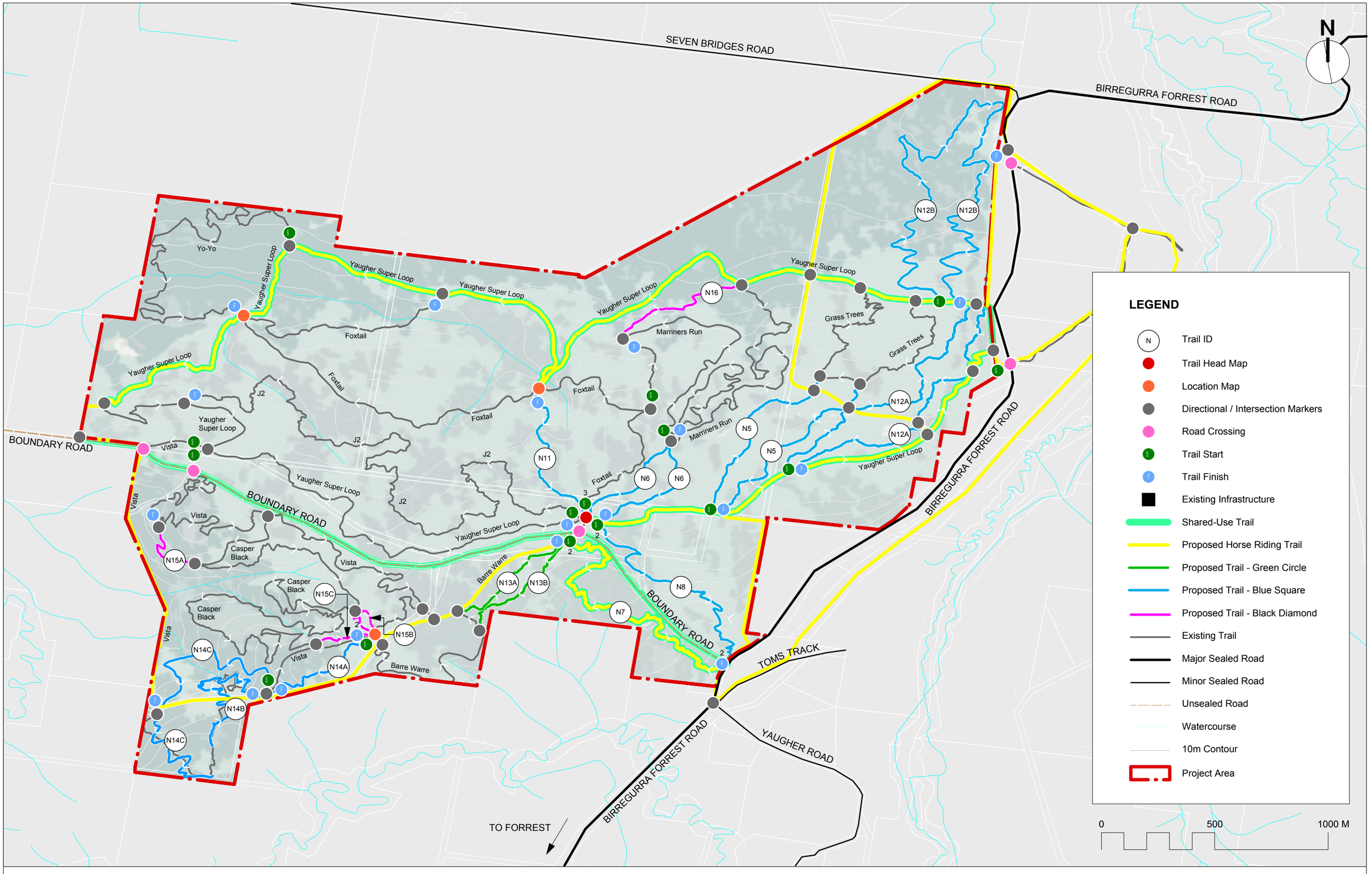
- General trail safety information
- General environmental (flora and fauna) information
- Weed and pathogen management info
- Emergency location point
- Web site
- Social media pages and hashtags

Dirt Art also suggests the following information be considered;

- Link to Trailforks application (noting that all trails should be uploaded to the system before installation of signage)
- Local club/committee of management information
- Information regarding wet weather riding
- Trail/facility support and/or sponsorship information

Dirt Art suggest that a large timber archway is installed at both trail heads, which will provide a point of interest for riders, as well as a clearly delineating the entry point to the trails. Main trail map signage should be installed immediately adjacent to this archway.

Proposed locations for primary trail map signage can be found over the page.



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DWG [SIGNAGE PLAN - YAUGHER NETWORK]

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DWG # S1

TO YAUGHER TRAIL HEAD

COLAC- FORREST ROAD

TURNER DRIVE

YAUGHER ROAD

FORREST

KAANGLANG ROAD

FORREST-APOLLO BAY ROAD

TO BARRAMUNGA

Roller Coaster

Forrest Loop

Third Time Lucky

Follow The Dog

Red Carpet

Barridjaru

N1

N2

N3

N4

N9

N10

LEGEND

- N16 — Trail ID
- Trail Head Map
- Location Map
- Directional / Intersection Markers
- Road Crossing
- Trail Start
- Trail Finish
- Existing Infrastructure
- Proposed Trail - Green Circle
- Proposed Trail - Blue Square
- Proposed Trail - Black Diamond
- Existing Trail
- Major Sealed Road
- Minor Sealed Road
- Unsealed Road
- Watercourse
- 10m Contour
- Project Area

0 500 1000 M

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PROJECT	Forrest Mountain Bike (MTB) Detailed Design Plan
LOCATION	Forrest VIC
CLIENT	Colac Otway Shire

DWG
[SIGNAGE PLAN - FORREST NETWORK]

DRAWN JL SCALE @ A3 AS DRAWN DATE # 21/11/19 REVISION B

DWG # S2

4.10.4 Secondary Map Boards

It is important to install secondary trail map signage at key major intersections, allowing riders to orientate themselves before they proceed through the intersection. These signs are typically smaller than primary trail maps signs, as they do not have the same requirements to be read by several riders at the same time. An important component of these signs is the addition of 'you are here' mark up.

With the restructure of the Forrest trail network and subsequent formation of a number of primary trail heads and intersections, the installation of secondary trail maps signage is an important component of the signage system for the facility.

Proposed locations for secondary trail map signage can be found at on the previous page.

4.10.5 Trail Head Signage

Trail head signage is installed at the start of each trail. The signage is generally smaller and mounted on a single post. The signage should include the following information at a minimum;

- Trail name
- Trail difficulty
- Shared/single use status
- Trail length
- Suitability for recumbent bicycles
- Emergency location point

4.10.6 Wayfinding Signage

Wayfinding signage is required where the trail route is confusing or unclear. In most cases, the need for way finding signage at Forrest can be eliminated through improved trail network functionality. Where required, way finding signage should note the trail name and difficulty.

Wayfinding signage should be used wherever trails cross roads, fire trails or other trails.

4.10.7 Signature Rides

Given the inherent complexity of the Forrest trail network, *Dirt Art* suggest the development of a group of Signature Rides. These Signature Rides would consist of a collection of loop rides that are formatted and presented through signage, assisting visiting riders in their ride planning. Signature Rides should feature a consistent difficulty and trail style, allowing riders to easily determine a collection of loops best suited to their ability and riding preference.

Dirt Art suggest that signature rides are provided on a separate signage panel, so as not to confuse main sign boards. Signature ride panels should be located at the three type 1 signage locations proposed.

It is suggested that Signature Rides be developed with input from local riders, so as to capture the primary loops these riders are riding.

4.10.8 Emergency Management

Signage is an important component of emergency management. An emergency local point should be added to all signage, with the corresponding points and grid references to be shared with local emergency services. Detailed grid reference information can also be added to signage if desired.

4.11 Potential Future Concepts

4.11.1 Overview

The following concepts are proposed as a high-level overview of potential future trail developments. These concepts have not been ground-truthed or explored in detail.

4.11.2 Forrest Eastern Loop Trail

Dirt Art has investigated the concept of a loop trail to the east of the Forrest Township, which maximises available elevation to create a trail that can operate as a lop ride, or uplifted descent. The trail links into the proposed Barwon Flow Trails to create a longer format climb and descent.

The trail has not been ground-truthed as part of this project.

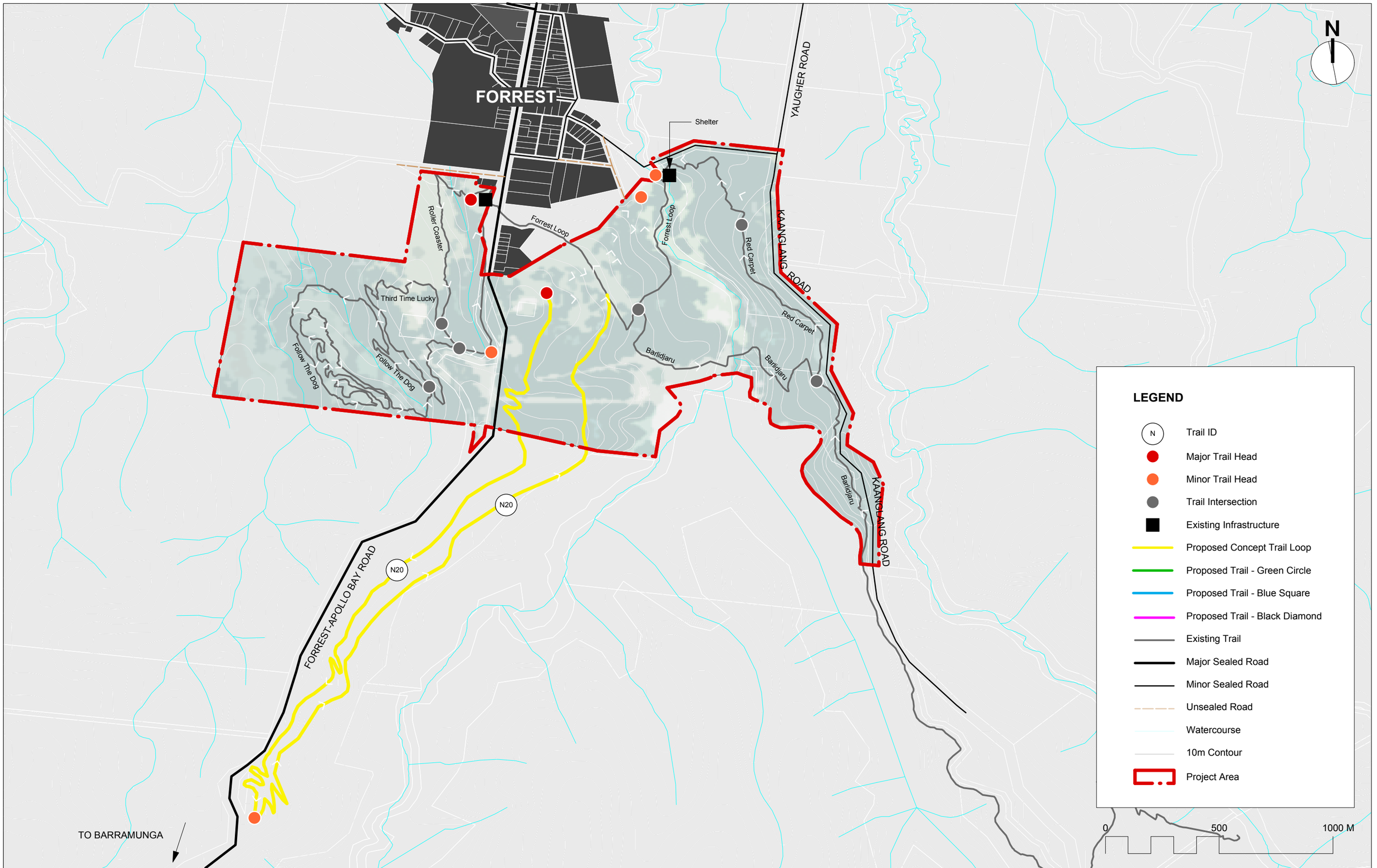
Notably, the trail is located on *Parks Victoria* land tenure, and as such would require relevant approvals from the agency to allow pursuit of the concept.

A concept plan for the trail can be found over the page.

4.11.3 Forrest to Coast Trail

The concept of a multi-day trail connecting Forrest with the coast has been raised a number of times during this report. Such a trail would likely cater for walking and mountain bike riding, with potential to link towns as overnight stops, maximising economic benefit. The Forrest types, elevation opportunities and scenery in this area would make for a stunning trail experience.

Dirt Art suggests that the concept warrants further investigation in due course.



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PROJECT Forrest Mountain Bike (MTB) Detailed Design Plan

LOCATION Forrest VIC

CLIENT Colac Otway Shire

DWG [FUTURE TRAIL CONCEPTS]

DRAWN JL SCALE @ A3 AS DRAWN DATE # 09/12/19 REVISION B

DWG # T-N20

4.12 Implementation Plan

4.12.1 Approvals

The majority of proposed works will require formal development approvals. In most cases this will include an internal DELWP works approval and a council development application. A component of these approvals, a cultural heritage assessment (Cultural Heritage Management Plan) and environmental assessments will be undertaken in the next phase of the project.

The estimated costs of approvals can be found in the project budget, **Appendix 4 (page 181).**

4.12.2 Construction Approach

4.12.2.1 Machine Construction Where Possible

Most modern mountain bike trail construction is undertaken with mini-excavators in the size rage of 0.8 to two tonnes. The use of excavators offers significant improvements in efficiency relative to hand-building in most environments.

It is recommended that where possible machine construction is pursued, where this does not adversely impact the experience provided by a trail and where it does not substantially impact the character of the development. In the case of this project, *Dirt Art* suggest that excavators should be appropriate for all proposed trail upgrades and new trails.

4.12.2.2 Climatic Considerations

Trail construction in Forrest should remain mostly viable year-round, though wetter areas may offer limited construction potential during the winter months.

4.12.3 Signage

4.12.3.1 Overview

Effective signage is critical for the functionality of any destination mountain bike project, while also assisting in risk and incident management. The signage should focus on large map boards, as well as trail head and way marker signage.

An important consideration is also main road signage, ensuring that visitors are aware of the attraction as they approach via vehicle.

4.12.3.2 Budget

Dirt Art suggest a signage budget of 2.5% of capital investment ($25,000/$1m investment).

4.12.4 Suggested Development Budget

See suggested project budget at **Appendix 4 (page 182).**

4.12.5 Development Staging

Where possible, implementation of the full project will provide the most optimal visitation outcomes, while improving the riding experience significantly for local riders.

Should the project be staged, *Dirt Art* suggests that priority works focus on upgrading Forrest's signature trails, including;

- Rollercoaster
- Third Time Lucky
- Follow the Dog
- Marriners Run
- Grass Trees
- J2
- Foxtail
- Vista
- Casper Black
- Red Carpet

Works to these trails should also include the proposed realignments and new trail sections to allow the formation of a stacked loop trail system. The prioritised upgrade of the above trails would deliver the best value for money, while addressing current trail network issues.

Should staging be required for trail head upgrades, the Forrest Trail Head should take priority.

4.13 Design and Construction Methodology

4.13.1 Environmental management

All works should be delivered under a comprehensive construction environmental management plan (CEMP). The CEMP should address all environmental risks and controls associated with the project.

4.13.2 Detailed Design

Detailed trail design involves the in-field determination of routes for trails. The route is recorded with a GPS device, which represents the centre line of the trail. For the purposes of this project, only three trails have been flagged in the field with survey tape; N1, N2, and N3. All other trails have been GPS mapped only.

The construction specifications for each trail are indicated via the trail types summarised below.

4.13.3 Trail types

4.13.3.1 Overview

For the purposes of this project, *Dirt Art* has developed a framework of trail types to assist in implementation.

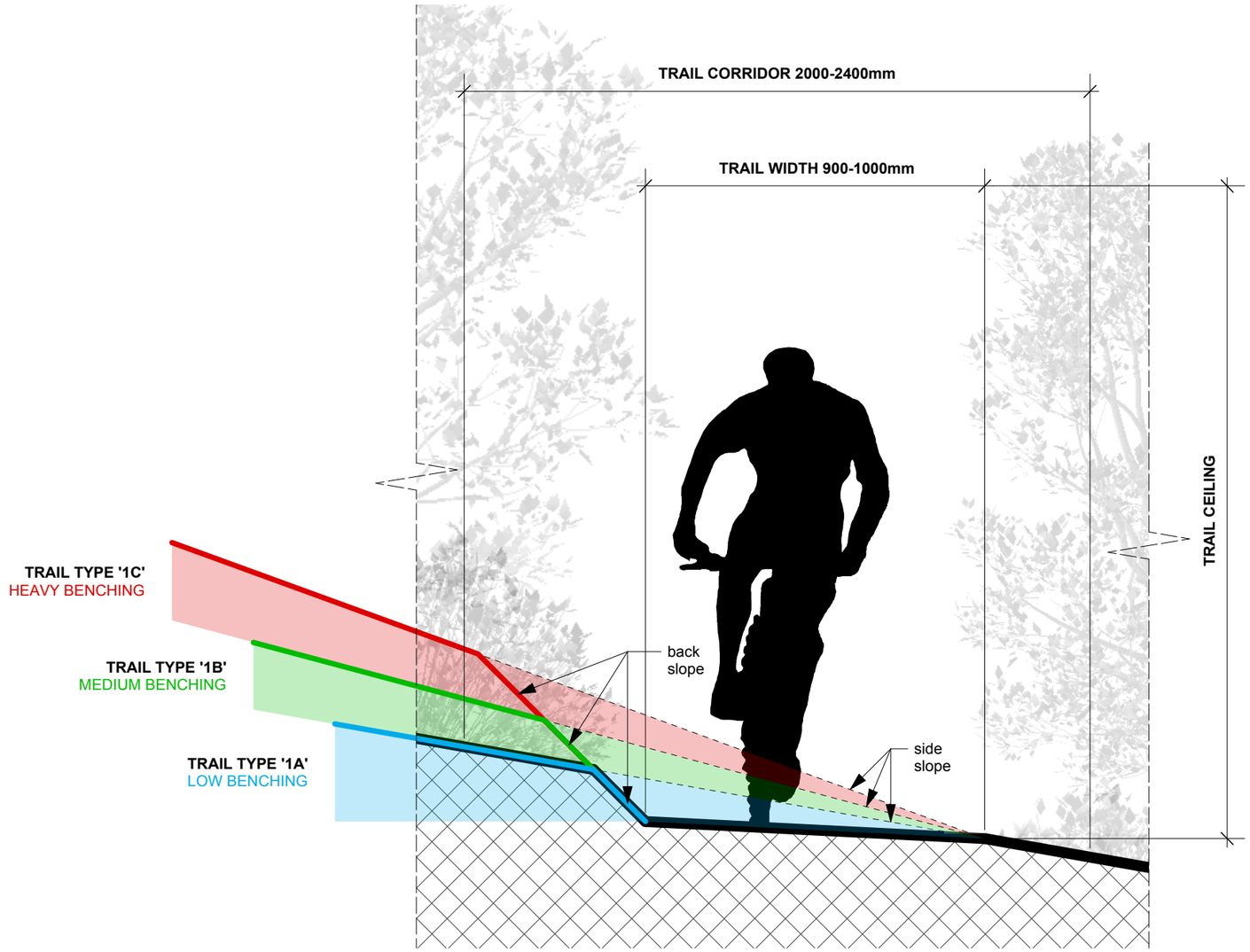
4.13.3.2 Trail types design plan

Design plans for these trail types can be found over the page.

TRAIL TYPE	1A
CONSTRUCTION METHODOLOGY	Excavator
BENCH TYPE	Low
TECHNICAL/FLOW	Flow
WIDTH	900-1000mm
SURFACE	Natural Surface
MAX. JUMP HEIGHT	1000mm
MAX. BERM HEIGHT	1000mm

TRAIL TYPE	1B
CONSTRUCTION METHODOLOGY	Excavator
BENCH TYPE	Medium
TECHNICAL/FLOW	Flow
WIDTH	900-1000mm
SURFACE	Natural Surface
MAX. JUMP HEIGHT	1000mm
MAX. BERM HEIGHT	1000mm

TRAIL TYPE	1C
CONSTRUCTION METHODOLOGY	Excavator
BENCH TYPE	Heavy
TECHNICAL/FLOW	Flow
WIDTH	900-1000mm
SURFACE	Natural Surface
MAX. JUMP HEIGHT	1000mm
MAX. BERM HEIGHT	1000mm



1 DETAILED SECTION: TRAIL TYPE 1
Scale: 1:20

CONCEPT IMAGERY

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PROJECT	Forrest Mountain Bike (MTB) Detailed Design Plan
LOCATION	Forrest VIC
CLIENT	Colac Otway Shire

DWG
[DETAILED SECTION: TRAIL TYPE 1]

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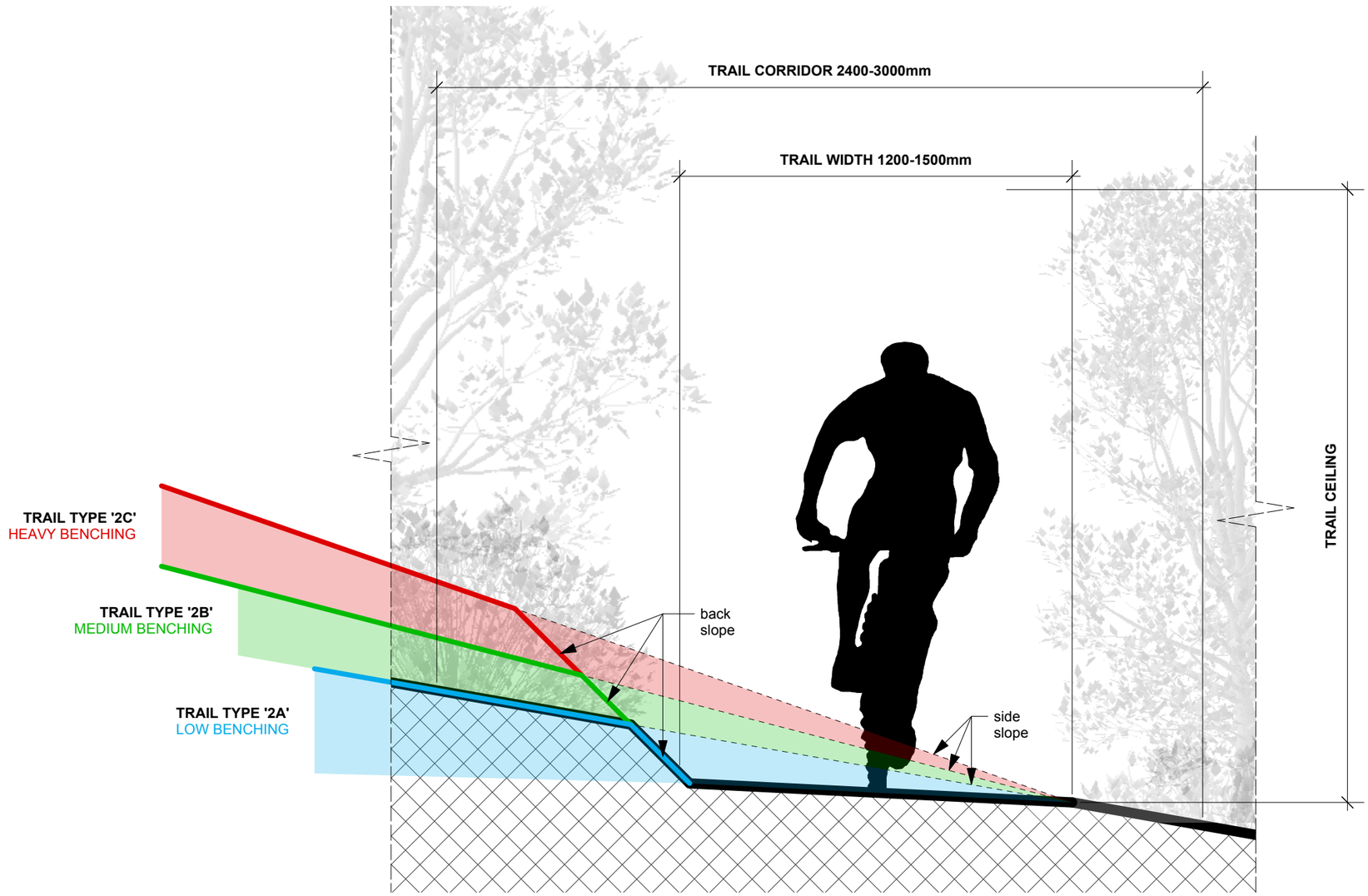
DWG # TT1

TRAIL TYPE	2A
CONSTRUCTION METHODOLOGY	Excavator
BENCH TYPE	Low
TECHNICAL/FLOW	Flow
WIDTH	1200-1500mm
SURFACE	Natural Surface
MAX. JUMP HEIGHT	1500mm
MAX. BERM HEIGHT	1500mm

TRAIL TYPE	2B
CONSTRUCTION METHODOLOGY	Excavator
BENCH TYPE	Medium
TECHNICAL/FLOW	Flow
WIDTH	1200-1500mm
SURFACE	Natural Surface
MAX. JUMP HEIGHT	1500mm
MAX. BERM HEIGHT	1500mm

TRAIL TYPE	2C
CONSTRUCTION METHODOLOGY	Excavator
BENCH TYPE	Heavy
TECHNICAL/FLOW	Flow
WIDTH	1200-1500mm
SURFACE	Natural Surface
MAX. JUMP HEIGHT	1500mm
MAX. BERM HEIGHT	1500mm



1 DETAILED SECTION: TRAIL TYPE 2
Scale: 1:20

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DWG
[DETAILED SECTION: TRAIL TYPE 2]

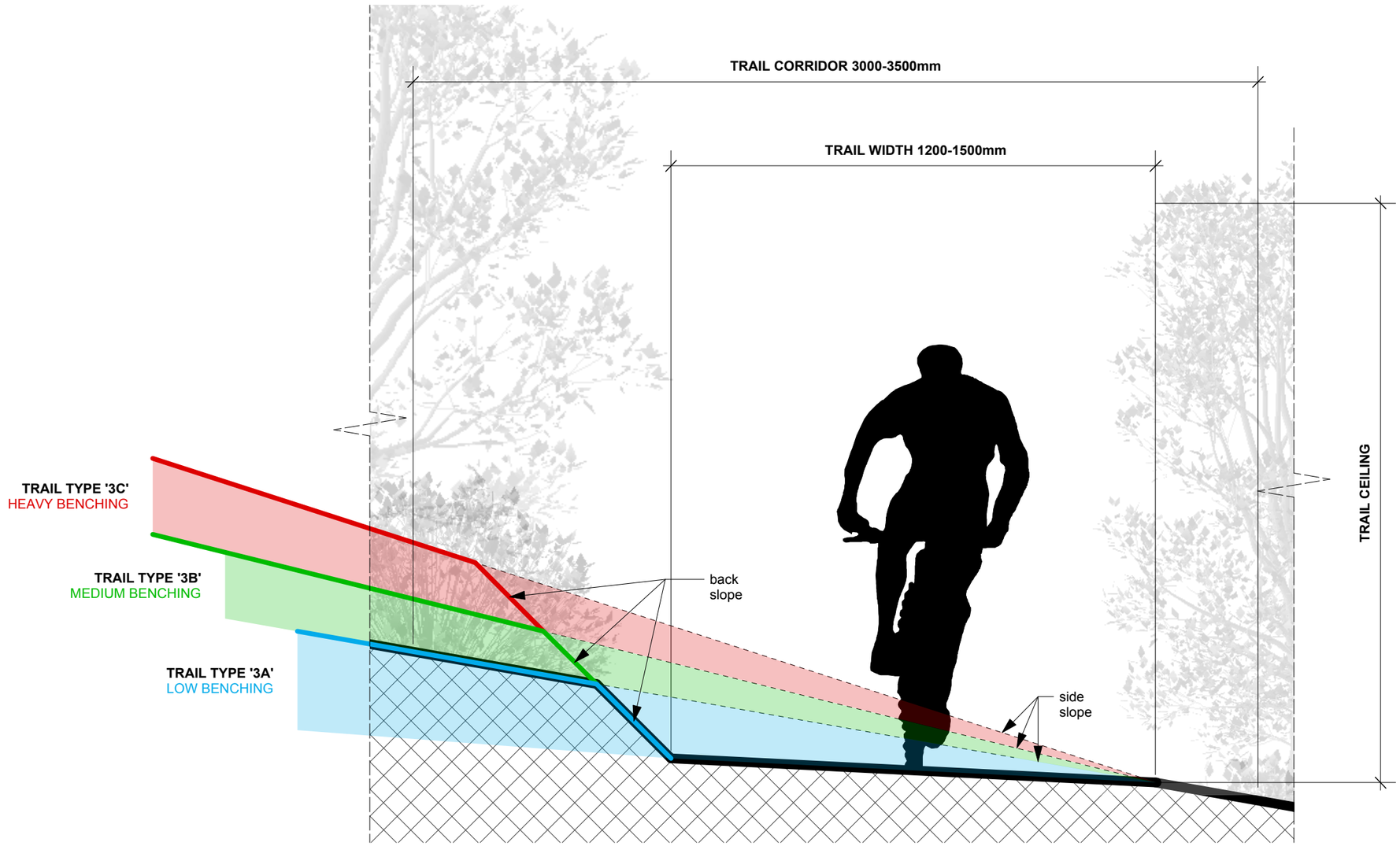
DRAWN JL SCALE @ A3 1:20 DATE # 08/10/19 REVISION A

DWG #
TT2

TRAIL TYPE	3A
CONSTRUCTION METHODOLOGY	Excavator
BENCH TYPE	Low
TECHNICAL/FLOW	Flow
WIDTH	1500-2000mm
SURFACE	Natural Surface
MAX. JUMP HEIGHT	2000mm+
MAX. BERM HEIGHT	2000mm+

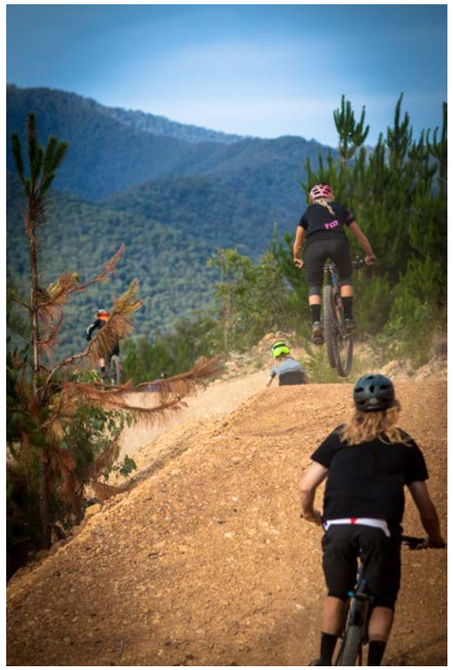
TRAIL TYPE	3B
CONSTRUCTION METHODOLOGY	Excavator
BENCH TYPE	Medium
TECHNICAL/FLOW	Flow
WIDTH	1500-2000mm
SURFACE	Natural Surface
MAX. JUMP HEIGHT	2000mm+
MAX. BERM HEIGHT	2000mm+

TRAIL TYPE	3C
CONSTRUCTION METHODOLOGY	Excavator
BENCH TYPE	Heavy
TECHNICAL/FLOW	Flow
WIDTH	1500-2000mm
SURFACE	Natural Surface
MAX. JUMP HEIGHT	2000mm+
MAX. BERM HEIGHT	2000mm+



1 DETAILED SECTION: TRAIL TYPE 3
Scale: 1:20

CONCEPT IMAGERY



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DWG
[DETAILED SECTION: TRAIL TYPE 3]

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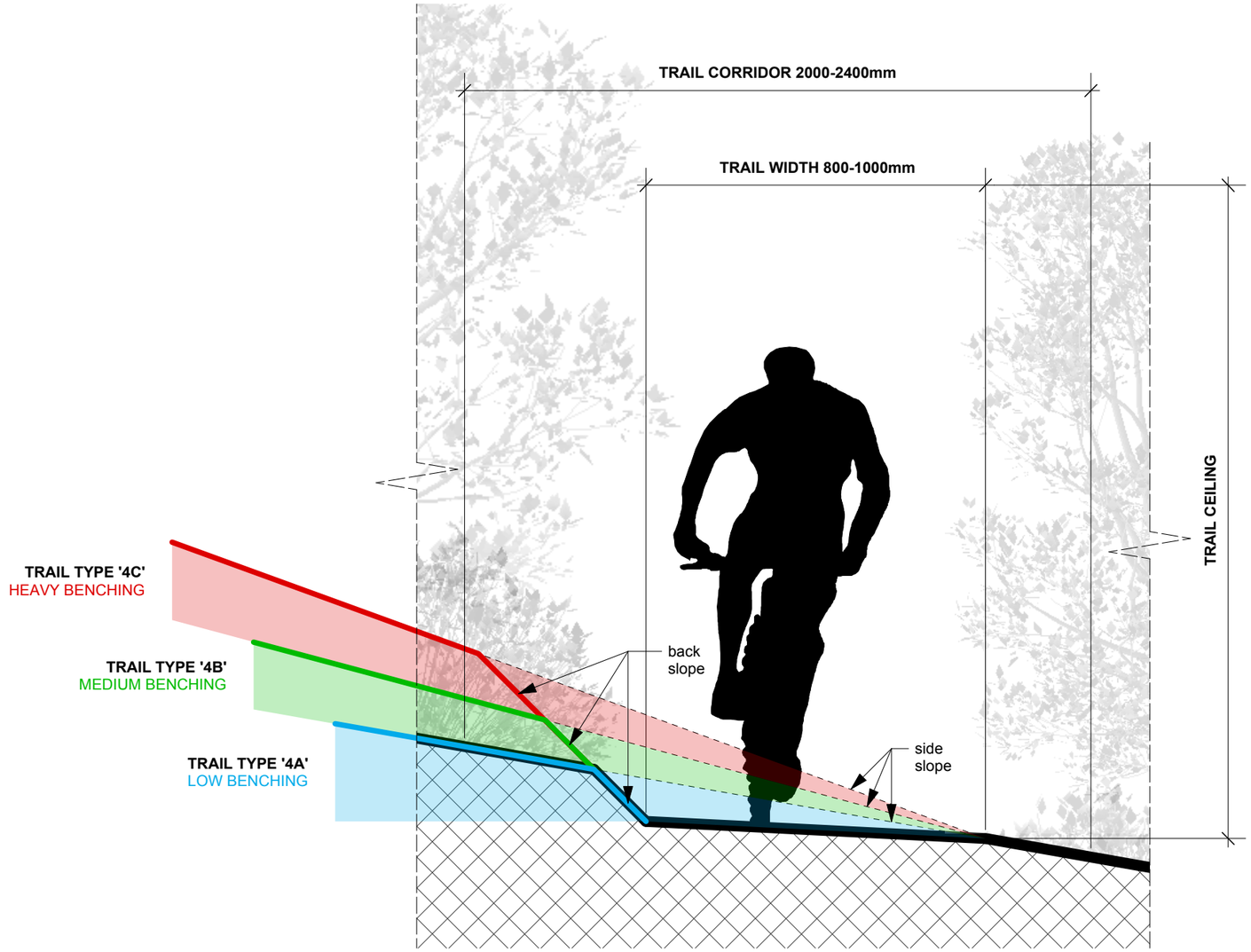
DWG #
TT3

TRAIL TYPE	4A
CONSTRUCTION METHODOLOGY	Hand
BENCH TYPE	Low
TECHNICAL/FLOW	Technical
WIDTH	800-1000mm
SURFACE	Natural Surface
MAX. JUMP HEIGHT	1000mm+
MAX. BERM HEIGHT	1000mm+

TRAIL TYPE	4B
CONSTRUCTION METHODOLOGY	Hand
BENCH TYPE	Medium
TECHNICAL/FLOW	Technical
WIDTH	800-1000mm
SURFACE	Natural Surface
MAX. JUMP HEIGHT	1000mm+
MAX. BERM HEIGHT	1000mm+

TRAIL TYPE	4C
CONSTRUCTION METHODOLOGY	Hand
BENCH TYPE	Heavy
TECHNICAL/FLOW	Technical
WIDTH	800-1000mm
SURFACE	Natural Surface
MAX. JUMP HEIGHT	1000mm+
MAX. BERM HEIGHT	1000mm+



1 DETAILED SECTION: TRAIL TYPE 4
Scale: 1:20

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PROJECT	Forrest Mountain Bike (MTB) Detailed Design Plan
LOCATION	Forrest VIC
CLIENT	Colac Otway Shire

DWG
[DETAILED SECTION: TRAIL TYPE 4]

DRAWN JL SCALE @ A3 1:20 DATE # 08/10/19 REVISION A

DWG #
TT4

Section 5- Operational Considerations

5 Section 5- Operational Considerations

5.1 Management Models

The majority of land utilised for the current trail network is managed by DELWP. It has been acknowledged through a number of forums that DELWP is under-resourced to undertake ongoing management and maintenance of the trails.

The majority of current Australian mountain bike destinations utilise crown land under a parks' agency management, with trail corridors leased and managed by the local council. As the council is generally the major project proponent and beneficiary, they are generally able to better justify allocation of resources to ongoing facility maintenance.

Dirt Art suggests that a model be explored for Forrest, where Colac-Otway Shire investigate a lease of the trail corridors for existing and new trails, and thereby assume the overarching maintenance responsibility for the trails, supported by other agencies as required. This model is consistent with current market-leading trail destinations such as Blue Derby (Tasmania).

While funding constraints for Colac Otway Shire will likely limit the capacity of the council to solely management network, the important factor is that there is a single contact point and authority as a consumer-facing management group. The Forrest trail network will likely to be managed through an inter-agency agreement going forward.

5.2 Trail Maintenance

Trail maintenance is one of the key operational considerations of any trail destination. In general terms, a high -quality mountain bike destination will require regular maintenance, to ensure trails are maintained to a standard expected by the traveling mountain bike rider. Forrest features areas of friable and water-prone soils, which until properly treated, will result in areas of significant management burden.

The proposed upgrades and new trails will address many current maintenance issues but will also in many cases improve maintenance access to trails.

Dirt Art suggest that volunteer trail maintenance is not a viable approach for managing 100% of the Forrest trail networks maintenance demands. Volunteer maintenance may continue with a focus on minor surface works and grooming, though it should be utilised in support of a professional trail maintenance program. Most successful mountain bike destinations, including *Blue Derby* and *Maydena Bike Park* rely on paid, professional maintenance teams. It is recommended that this capacity is developed within Council as the proponent of the trail development.

Dirt Art suggests a maintenance budget of approximately $1,500 per kilometer of trail per annum would be appropriate.

5.3 Risk and Incident Management

Risk and incident management is a critically important consideration for any mountain bike trail development and should be considered continually throughout the development and construction process. Given the remote nature of many of the trails proposed, a well-considered risk and emergency management plan will be essential for this project.

Incidents can be minimised through the following key considerations;

- Predictability in trails
- Low consequence trail features (limited gap jumps, blind drops etc.)
- Appropriate trail difficulty grading
- Appropriate signage
- High-quality trail design and construction

Incidents can be managed through the following key considerations;

- Liaison with emergency services
- Noting of key access routes
- Noting of emergency points on all trails
- Consideration of aerial rescue points

5.4 Marketing and Branding

5.4.1 Overview

In an increasingly competitive mountain bike destination marketplace, marketing and branding are critical components of any successful destination. The Forrest brand is aligned with the current market perception of the trails, which for many riders is not an entirely positive association. The existing brand is also quite dated and does not match with the key strengths and values of the trail network.

Dirt Art suggest a new branding exercise be undertaken following renewal and expansion of the trails, which will assist in re-launching and re-positioning the destination.

Dirt Art suggest retaining the current Forrest Mountain Bike Trails name, but that a new branding package be developed to re-establish the town as a competitive mountain bike trail destination. This package would include a new logo and a broader style guide and package, which is consistent with the values of the revitalized trail destination.

5.4.2 Key Strengths

The key strengths of the Forrest trail network and brand are;

- Strong natural values and quality environments
- Small town charm and community values
- Food, beverage and accommodation opportunities
- High-quality beginner-intermediate flow trails

The above key strengths should form the basis of a new branding package.

5.4.3 Marketing Plan

The updated trail destination should be packed by a comprehensive marketing plan and implementation. The plan should work across a range of formats and platforms to target existing and new audiences in Forrest's key rider markets.

The marketing plan should not be enacted until significant capital works have been undertaken to ensure the strategy aligns with quality new and upgraded existing trails.

5.4.4 Marketing Formats and Channels

5.4.4.1 Content Creation

Quality content is a fundamental component of any marketing strategy. Forrest should develop a large content library of photo and video media, which directly aligns with the core values and strengths of the destination.

A high-quality digital asset library is critical to the marketing strategy as it will provide the content required to drive marketing initiatives through a wide range of channels.

Content creation includes self-produced photo and video content, where the destination may produce their own content for distribution through their and other channels. Self-produced and distributed content can be a cost-effective way of producing content that directly aligns with the values of the destination.

5.4.4.2 Social Media

Social media provides a marketing channel that is generally well-aligned with the mountain bike consumer and provides a simple and cost-effective marketing opportunity.

While a range of platforms existing, *Dirt Art* suggest that Facebook and Instagram are the two key platforms for targeting mountain bike consumers. Facebook will generally target a slightly older audience, and Instagram a slightly younger audience. Twitter is not considered a highly-relevant platform for mountain bike destinations due to its generally older demographic and journalistic and political focus. Snapchat is a challenging platform to manage relevant content through, and generally offers little scope to target key audiences due to its millennial user focus.

If another platform is desired, You Tube is recommended, with scope to create a fantastic video content library. Should You Tube be pursued it must be understood that significant cost and effort will be required to produce regular video updates.

Content should generally be curated specifically to Facebook and Instagram, with the platforms suited to the below approach;

- Facebook: Written content and information (must always be shared with a high-quality image), events, article links
- Instagram: Imagery, video, shorter format written content

- The following key tips are relevant to both platforms;

- Written personality: The writing style portrayed should match the target audience (professional built light hearted), and should be consistent across posts and platforms
- All image and video content should be high-quality, professional
- Content should not be shared identically across platforms unless it is critical news
- Ideal posting regularity is 5 times a week for Facebook and 7 times a week for Instagram (reinforcing the importance of a large content library)
- Video links will generally be downranked by Facebook unless they are directly loaded into the platform
- Web site links will generally be downranked by Facebook

5.4.5 Influencers

Influencers are a potentially valuable marketing methodology. When engaging influencers, care should be taken to ensure that the influencers channel and audience aligns with the values of the destination. For example, gravity-focused athletes and influencers should not be used to market a cross country-focused trail network.

When utilising influencers, *Dirt Art* recommend keeping scripting and curation to a minimum, instead relying on the influencer to control content so it may be as organic as possible. Basic key messaging notes can be provided to the influencer to ensure that their outputs are consistent with the values of the destination.

5.4.6 Digital Media

Digital media provides a range of potentially valuable marketing opportunities, including but not limited to; destination showcases, competitions, and standard news pieces. In Australia, the main digital news outlet specific to mountain bike is Flow Mountain Bike. Australian destinations have also been known to utilise Pink Bike (a North American supplier, and the world's biggest mountain bike media outlet).

Dirt Art recommend the above two outlets as high-quality opportunities for content creation and distribution. Destination showcases are a particularly strong opportunity well when curated and presented so they are entirely consistent with the key strengths and
values of the destination.

5.4.7 Print Media

Print media remains a valuable marketing opportunity, though its reach is diminishing as customers continue to shift to digital media consumption. The main print media outlets specific to mountain biking in Australia are; *Australian Mountain Bike Magazine, Revolution MTB Magazine* and *Mountain Biking Australia* Magazine. These magazines have the following key reader markets;

- Australian Mountain Bike: Broad audience with a trail riding focus
- Revolution MTB: Gravity-focused with a younger audience
- Mountain Biking Australia Magazine: Trail riding focused with an older audience

When engaging print media, content should be high-quality and consistent with the values of the destination. Paid advertising may also be used in conjunction with destination showcases, strengthening the package.

As the profile of mountain biking continues to grow further towards a mass market activity, there are a growing number of more diverse print media opportunities. These include but are not limited to; airline magazines, travel magazines and outdoor magazines. Trail destinations with a strong beginner-intermediate focus will benefit particularly well from general print media opportunities.

5.4.8 Website

A web site is a functional aid for riders but can also act as a valuable marketing tool. Mountain bike destination web sites should include the following information at a minimum;

- Location information
- Trail information and maps
- Accommodation information
- Local business information (food, beverage and services)
- Regional trail information
- Other things to do (focus on family friendly activities, and non-rider activities such as wineries etc.)

In recent years it has also become common for trail destinations to develop their own bespoke phone app. A phone app can be useful for mapping and trail information, though the pubic application Trail Forks has usurped the need for the mapping function in most bespoke destination apps.

5.4.9 Marketing Budget

When developing new trails and infrastructure, *Dirt Art* recommend a year one marketing budget of 2.5% of capital spend ($25,000/$1m spent). This budget provides a high-level guide, though notably if a large impact is sought from a small investment, then the percentage marketing spend may need to be 5+% of capital investment.

When marketing a broader destination showcase it may also be relevant to request some support (financial and/or in-kind) from the local business community.

Section 6- Conclusion

6 Section 6- Conclusion

The Forrest Mountain Bike Trails were once considered some of Australia's best, and arguably led the industry as Australia's first true mountain bike town. A lack of maintenance, capital renewal and new trail development has seen the area progressively relegated lower down the list of competitive mountain bike destinations through the past several years.

Despite the current issues within the trail network, and the loss of market position, there remains a strong opportunity to re-establish Forrest as a leading mountain bike destination. Re-establishment of a competitive suite of trail products and supporting facilities, will require an acceptance of and focus on Forrest's competitive strengths and key site attributes. These strengths and attributes are;

- Potential for world-class beginner-intermediate flow trails
- The mountain bike town concept, where trails depart and return immediately from the town
- Showcasing of high-quality natural environments available throughout the target area
- Focus on a family, schools, weekend warrior and corporate markets
- Short format descents and climbs that capitalise on maximum available elevation

This detailed design plan provides design and implementation plans designed to create a range of improved and new trail experiences and supporting facilities, which will attract significant new visitation. The proposed development pathway leverages Forrest's key competitive strengths to create a trail-based destination that will drive a significant increase in visitation, and economic impact for the town and broader region.

Section 7- Appendices

7 Appendix 1- Mountain Bike Market Overview

7.1 The Mountain Bike Market - National and Local

7.1.1 Overview

The following market profile draws upon research and anecdotal observations from a range of sources. The information draws heavily upon the Australian Mountain Bike Market Profile Survey, undertaken by *Dirt Art* in 2014, 2016 and 2018.

7.1.2 History

Mountain biking has been well-established in Australia since the early 90's, though the sport really began to prosper in the mid-late 90's, which saw a period of some of the first purpose-built mountain bike infrastructure in Australia. In 2004 some of Australia's first large-scale mountain bike parks were developed, namely Glenorchy Mountain Bike Park in Tasmania and Mount Stromlo in Canberra. Prior to these developments, mountain biking was taking place largely on existing walking trails and on informal trails created by the riders themselves.

Between 2005 and present day there have been significant advances in mountain bike technology, which is contributing to defining the type of riding experience achievable for and desired by riders. While some trends in riding have come and gone, the disciplines of downhill and cross–country have remained albeit with some blurring between these styles of riding with the emergence of the all-mountain and endure bicycle.

7.1.3 Current Market

The current mountain bike market is dominated by longer travel, dual suspension mountain bikes, broadly referred to as all– mountain, trail, or enduro bicycles. This style of bike is incredibly capable at both climbing and descending and has effectively increased the capability of the average rider.

Currently riders are seeking a broad range of experiences from local urban and peri-urban trails through to remote wilderness style longer distance riding experiences. Generally speaking, the mountain bike tourist market is seeking these destinations, adventure experiences in more remote natural environments, involving longer distance loops or point-to-point trails. Trails proximate to urban areas are typically most popular with local riders because of their accessibility and convenience, though may be ridden by visitors drawn to an area for other experiences.

Research indicates that the current prevailing demographic of riders is predominately male, with an age of 25-45 years and a high disposable income.[2] This market is a key target for tourism as they are seeking longer, destination-based' stays and typically seek out high quality dining and accommodation options.

7.1.4 Current Participation and Economic Data- Australia

Current participation data for mountain biking in Australia is distinctly lacking due, in the main, to the nature of the activity itself. However, as new commercial venues emerge more data is becoming available. Traditionally the recording of trail usage numbers has been a relatively rare practice, though in a current climate often characterised by particularly frugal government and corporate investment, this practice is increasing being used to justify investment in trails. Sample data from some of Australia's key mountain bike destinations can be found below;

Maydena Bike Park (Tasmania) Maydena Bike Park is Australia's largest gravity-focused bike park, with 80km of trails suiting a predominantly enduro market. The park has hosted 25,000 uplift days and brought an estimate total 25,000 visitors to the town in its first year of operation. With a broadening focus towards trail-based riding and beginner friendly trails, visitation at the park is likely to increase significantly through later years.

Blue Derby (Tasmania) Blue Derby is Australia's highest profile mountain bike trail destination, with a focus on intermediate trail riding with limited up-lift opportunities. Derby has been in operation for close to 5 years, and reportedly hosted over 30,000 riders in 2018. The town is seeing a dramatic transformation, with several new business opening across tour, retail and food and beverage sectors.

Mount Buller (Victoria) have invested over $2m over a four-year period in developing predominantly all–mountain and cross–country mountain bike trails. Data for the resort (as of June 2014) recorded a total rider count of 40,000 – 50,000 visitors over a nine–month period.[3]

You Yangs (Victoria) have recorded rider numbers of approximately 150,000 per annum in 2011, though a higher true count is expected due to the various entry points used for the park.[4]

[2] Koepke, J. (2005) Exploring the Market Potential for Yukon Mountain Bike Tourism, Cycling Association of Yukon, Canada, page 5.
[3] September to May, private communication
[4] Data provided by Parks Victoria staff July 2011.

7.1.5 Current Participation and Economic Data - Southern Hemisphere

Internationally, New Zealand is Australia's closest competitor in the mountain bike tourism market. While New Zealand offers a significant volume of trails, not all trails are necessarily of a world-class standard, often involving poorly constructed volunteer-built trails, fire trails and access roads to add volume to trail distances. Examples of participation in an international context can be seen below;

Rotorua (North Island) is perhaps New Zealand's most recognised and loved mountain bike destination. The 150km+ trail network is regarded around the world for its fast, flowing trails through a working pine forest. Research by APR consulting found that approximately 33% of visitors to the forest in 2007 were Australian.[5] It was recently reported that mountain bike activity in Rotorua is generating $10.2m per annum, as opposed to the $4.6m (one time) in export revenue potentially generated by logging the forest.[6]

Queenstown (South Island) is one of the Southern Hemisphere's leading mountain bike destination. Queenstown has a gravity-based bike park (Skyline Queenstown), along with a number of other regional cross country and all mountain trails. The region is renowned for its iconic long-format descending trails, such as Rude Rock, Corrotown and Skippers Canyon.

A 2017 report by TRC Tourism found that mountain biking contributed over $25m per year to the local economy.

7.1.6 Current Participation and Economic Data - Northern Hemisphere

Whistler Mountain Bike Park (Canada) is arguably the world's most recognised mountain bike park, offering one of the highest volumes of trail in one venue anywhere in the world. The Whistler Bike Park receives approximately 200,000 riders per year (through its green season), but it is estimated that a similar volume of users rides the surrounding valley trail network annually.

A 2016 report commissioned by the Whistler Off Road Cycling Association (WORCA) found that mountain biking contributed over $79m p.a. to the regional economy of British Columbia. The report also found that over 500,000 individual rides were undertaken in the region in 2016.[7]

Park City, Utah (United States of America) offers hundreds of miles of single-track across a number of riding areas. All riding styles are catered for across public trails, and

[5] Recreational Use and Economic Impact of Whakarewarewa Forest (2009 Update), APR Consultants
[6] The New Zealand Herald January 17th 2012, Bikes bring more money than wood from Rotorua forest
[7] CSTA Economic Impact of Mountain Biking 2016

commercial gravity-based bike parks. This IMBA Gold level mountain bike destination received over 1m visits in 2014.

Oregon (United States of America) has a significant cycle tourism industry. Cycle tourism (predominantly mountain biking) was worth over $400m to the state in 2013, with cycle tourist spending on average 20% more than general tourists.[8]

7.1.7 The Future

7.1.7.1 General

The sport of mountain biking has continued to see sustained and exponential growth both in Australia and overseas. With current demand for high-quality riding opportunities still far exceeding supply, there exists significant potential to see excellent return on investment when developing world-class mountain bike trails and facilities.

Dirt Art suggest that the all–mountain category of riding will continue to grow, resulting in an increasing demand for more challenging, descending-focused riding. *Dirt Art* suggests that the next five years will see a huge increase in demand for chairlift or shuttle accessed descending cross–country and all–mountain trail experiences. Many of the major recent and underway mountain biking trail developments focus on these experiences (e.g. Mt Buller Epic, Hollybank Juggernaut, Blue Tier, Derby's Black Stump Shuttle Trails, Thredbo AM Descent and Valley Trail) which are reflective of the increasing demand for this style of descending cross–country / all–mountain trail.

7.1.7.2 E-bikes

While traditional bike technology is likely to continue to stabilise, the rapid emergence of the E-bike is likely to have a significant impact on the sport. In *Dirt Art's* view, E-bikes will never completely replace the traditional mountain bike, but as technology improves the bikes will become a much more common feature on the trails. E-bikes make the sport more accessible to newer and less-capable riders and increase the ride duration and the accessible elevation range for more experienced riders.

The growth in use of E-bikes will have a distinct benefit to areas such as the Forrest, due to the trail riding focus of the current and proposed trails. E-bikes will allow riders to access significant elevation ranges without the need for vehicle shuttles (most E-bikes will provide pedal assistance for up to 2,000 metres of climbing) – making multiple ascents and descents of the new gravity-focused trails possible.

It is important to recognise the distinction in E-bikes between high-powered throttle assisted bikes and lower-powered pedal-assisted bikes. Pedal assisted bikes have no

[8] Information provided by Destination Oregon.

additional impacts on trails, whereas throttle powered bikes are illegal in most public areas and will cause significant additional damage to trails.

7.2 Mountain bike tourism

7.2.1 Mountain Bike Tourism Markets

Tourists engaging in mountain biking can be divided into two distinct categories, the 'complementary market'; those who engage in mountain biking as a complementary activity (not as a primary motivator or sole purpose for travel), and the 'enthusiast market' those who have travelled with mountain biking being the primary or sole reason for their trip.

7.2.2 Complementary Mountain Bike Tourism Markets

Mountain bike riding as a complementary activity has risen dramatically in popularity in recent years, as the sport has moved beyond the 'extreme sport' image of the past, and more towards the accurate perception of the sport as a safe, inclusive and fun 'adventure' activity.

Complementary visitation is a key component of a successful government-backed mountain bike destination as it allows the capture of a much larger target audience, and promotes longer stays, and increased travel party size. Complementary tourists include valuable family markets, who will often stay longer and spend more than solo and small group tourists.

The emergence of mountain biking as a commercially viable complementary activity has been driven largely through the development of safer, more beginner-friendly trails, and by the growing number of commercial operators including the sport in their activity programs. Commercial viability of mountain biking as a complementary activity requires a lower volume of trail than for the enthusiast market, though the required quality and maintenance demand of trails will be higher. As a complementary activity, mountain biking offers genuine avenues for commercial return, while also potentially lengthening the duration of stay for existing guests. In addition to this, targeted marketing may draw in guests that may otherwise have travelled to an alternative location.

Successfully targeting the complementary tourism market involves careful consideration and delivery against the following key areas;

- High-quality beginner-friendly trails
- A structured progression in difficulty through trail types
- A good volume of smoother flow style trails
- Access to high-quality hire bikes
- Comprehensive and easily interpreted trail signage

- Access to a variety of formal and informal non-riding activities
- Access to a good range of accommodation and food and beverage opportunities.

The Forrest Skenes Creek Road sees over 300k passes per annum, which provides a significant opportunity for complementary visitation. The proposed re-development of the major trail head within Forrest provides a significant opportunity to increase visibility of the trail network, and thus encourage complementary visitation.

7.2.3 Enthusiast Tourist Market

The enthusiast market is defined as mountain bike tourists for whom mountain biking is the primary motivator/purpose for their travel. The enthusiast market seeks out new and exciting mountain bike destinations, and typically travel multiple times annually to engage in mountain biking.

The mountain bike enthusiast market is typically populated by 25-45-year-old males with a high disposable income, who are seeking opportunities to travel to destinations with the primary purpose of going mountain bike riding.

While mountain bike riding may be the primary travel motivator, the availability of alternative activities will still influence this traveler as they will often look for destinations where they can viably travel with family, their spouse or non-enthusiast travelling companion/s.

The mountain bike enthusiast is typically travelling for multi-day stays and is seeking unique and high-quality trail experiences. These users will typically seek higher volumes of trail, as they will often ride 30-40km+ per day.

Successfully targeting the enthusiast tourism market involves careful consideration and delivery against the following key areas;

- High quality trails
- Unique and iconic environments
- Iconic signature trail experiences
- High volumes of trails
- A good supply of intermediate to advanced trails

8 Appendix 2- Policy

8.1 Overview

The following report section provides a wide range of recommendations around policy and guiding frameworks for the future management and development of mountain bike riding in the Forrest Area.

8.2 Relevant Standards and Guidelines

8.2.1 Overview

There is no 'standard' for the development of mountain bike trails in Australia, with no Australian Standard or other official standard for construction in place. While walking trail development does have an Australian Standard (AS 2156), this standard relates directly to walking trails, and has little to no relevance to mountain bike trail development.

It is generally accepted within the industry from both a supplier and land manager point of view, that the International Mountain Bike Association (IMBA) guidelines will be utilised for trail difficulty rating, and as a guide for construction methodology. Over the years, a number of projects have attempted to develop alternative difficulty rating systems and construction guidelines, though none of these projects has been able to develop a system that has been universally accepted.

In New Zealand, a numerical grading system is used for trail difficulty. *Dirt Art* do not recommend this system as it is inconsistent with the vast majority of other Australian destinations and has little international relevance beyond New Zealand.

8.2.2 IMBA Guidelines

The IMBA guidelines provide a near-universally accepted high-level framework for trail development and management.

Dirt Art recommend the IMBA trail difficulty rating system be utilised to determine and advertise the difficulty ratings of all trails. The rating system from Green Circle to Double Black Diamond should be utilised. In some commercial bike parks, a higher, pro-line difficulty grading is utilised, though this grading is not generally applicable in a public trail setting.

Dirt Art recommend using core IMBA trail design and construction principles for managing trail development. These core recommend principles are;

- **The half rule:** This principle states that a trail gradient should never exceed 50% of the side slope the trail is developed upon. For example, a 20% side slope should feature have a trail gradient beyond 10%. There are many ways to sustainably contravene this rule (such as by installing rock armouring), though it is a sound principle that should in most cases be adhered to.
- **Maximum 10% average gradient rule:** In most cases, trails beyond an average gradient of 10% are difficult to develop sustainably. There are many ways to sustainably contravene this rule (such as by installing rock armouring), though it is a sound principle that should in most cases be adhered to. Notably, for this project, some of the black and double diamond trails proposed will exceed this rule.
- **Frequent grade reversals:** The installation of frequent grade reversals is the single best, and simplest way to manage trail drainage and rider speeds. Grade reversals should be genuinely installed (not just water bars), and should feature minimum lengths of 4,000mm and minimum depths of 500mm.

There are a number of IMBA principles that are outdated and should not be applied to this project:

- **Out sloping trail:** IMBA guidelines specify that the majority of trail should be out sloped by ~3% to allow for functional drainage. *Dirt Art* suggest that frequent grade reversals are a far more effective way of managing drainage.

8.3 Guiding Principals

When pursuing any large-scale destination project, a set of guiding principles assists in the provision of a consistent, high-quality product. *Dirt Art* has developed the following guiding principles for the project;

1. Recognise and respect natural, social and cultural values
2. Sustainably and sensitively showcase high-quality natural areas
3. Focus on an enduro/trail audience
4. Develop trails in areas conducive to cost effective construction
5. Capitalise on maximum elevation opportunities
6. Develop stacked loop trail concepts where possible

8.4 Universal Access

8.4.1 Overview

Universal access has traditionally not been a major component of mountain bike trail planning, though over recent years new bike technology has provided a range of bike types suitable for disabled riders. Universal access is also important consideration at trail head facilities, where toilets and other amenities may be used by disabled users.

Dirt Art has worked to maximise opportunities for universal access throughout the project. Notably, due to the nature of more demanding and technical trails, and access constraints at the Yaugher Trail Head, not all trails and facilities will be suitable for universal access.

8.4.2 Trail Guidelines

Break the Boundary are a group dedicated to improving access for disabled off road trail users (adaptive mountain bike riders). The group has prepared a set of trail development guidelines, designed to assist in the development of trails suitable for adaptive mountain bike riding.

Parameters for trail design and construction include the below benchmarks;

Minimum width: 1,500mm
Minimum feature radius: 1,500mm
Maximum cross slope tread gradient: 5%
Maximum trail gradient: 20% (targeted maximum 10%)

The guidelines specify that minimum trail width should be targeted at 1,500mm, and also specifies a number of guidelines for turn radii and trail features[9]. *Dirt Art* has utilised the guidelines to aid in proposing a number of trails as suitable for adaptive use.

8.4.3 Suitable Trails

Dirt Art has proposed a number of trails to be developed suitable for varying levels of adaptive mountain bike use. These trails are noted in new trails descriptions where the trail is 100% compatible for adaptive cyclists. Notably, many trails in the network are and will be partially compatible for adaptive cyclists. A relevant audit against the Adaptive Guidelines would be required post construction to establish detail around partially compatible trails.

8.4.4 General Amenities

The Forrest Trail Head includes a range of new facilities and amenities. The toilet and shower block upgrades in particular will require capacity for universal access.

At this stage the township of Forrest has a limited supply of universally design supporting product. When the trails are developed, universally designed facilities for visitors will become a new business development opportunity.

[9] Australian Adaptive Mountain Bike Guidelines 2017, Break the Boundary

9 Appendix 3 - Literature Review

9.1 Forrest Mountain Bike Strategic Plan

9.1.1 Summary

Report title	Forrest MTB Strategic Plan
Author/s	Thompson Berrill Landscape Design
Date	February 2015
Client/s	Colac Otway Shire Council

9.1.2 General Summary

Then report provides a generally sound, high-level strategic plan for the Forrest MTB Trails. While lacking in a detailed understanding of the mountain bike market and detailed strategic direction, the report provides a basic yet sound strategic direction for the destination.

9.1.3 Key Themes

The report features the following key themes, with corresponding responses from *Dirt Art.*;

- Lack of diverse trails in proximity to Forrest.

Dirt Art fundamentally agree with this statement, though note that trails should be fit into their landscape and constraints. Forrest lacks many natural elements that would be required to create some elements of diversity (such as rock).

- Lack of MTB Skills Park.

While a small skills park has now been installed, *Dirt Art* proposes a relocation and major expansion of this facility.

- Minimal facilities/opportunities for MTB beginners and families in close proximity to town.

Dirt Art agrees with this sentiment and has focused on a major expansion and renewal of beginner friendly opportunities, particular peripheral to Forrest.

- Limited DELWP funds for ongoing management and maintenance of MTB trails.

This is acknowledged as likely an ongoing issue/risk.

• Unsafe Colac-Forrest Road crossing (link between Tiger Rail Trail and Boundary Road to Yaugher Trail Head).

This crossing has been addressed.

• Limited food and beverage options in Forrest during off peak seasons.

Dirt Art experienced a reasonable level of F&B servicing during our winter field work period. Ultimately this will be market led and will likely require a significant improvement to trails to attract increased visitation.

• Events held in Forrest can negatively impact on surrounding local residents, e.g. road closures.

While this is acknowledged, the current frequency of events is unlikely to cause a genuine issue.

• Inadequate signage of trails for users.

This is a significant issue, which has been addressed by *Dirt Art* during trail auditing.

• MTB events impact negatively on the MTB trail corridors with limited agency/financial support for DELWP to maintain and manage the trails post events.

This is a risk, though poorly designed and constructed trails are a significant contributing factor. The trails audit addresses these issues.

• Limited capacity of existing public toilets during events.

This remains an issue, though *Dirt Art* do not believe immediate investment in additional toilets is justified. With the infrequency of events, hire toilets should be sufficient.

• No marketing strategy to identify areas for maximum growth and focus limited resources.

Dirt Art acknowledges this is a significant issue, though would add that the current trail product is not at a quality that it should be marketed. This detailed design plan addresses this issue.

Key recommendations include:

• The formation on an Advisory Group with key agency representatives (from Colac Otway Shire, DELWP, Barwon Water, Parks Victoria and potential stakeholder representatives), to meet, discuss and provide direction for ongoing maintenance, management and funding options for the MTB trail network.

This group has now been formed.

• Establish a new 'blue' trail 'Barwon Flow' within the Forrest MTB Trail Network, providing a new loop trail suitable for intermediate rider ability, in close proximity to the Forrest Township.

This development forms a component of this project.

• Undertake MTB trail upgrade/enhancement works to existing trails within the Forrest and Yaugher MTB trail network including; Rollercoaster, Red Carpet and Follow the Dog to provide more trail diversity.

This development forms a component of this project.

• Establish an MTB skills development park adjacent to the Forrest Trail Head site.

This development has occurred.

• Undertake landscape improvement works at the Forrest Trail Head and improve overall trail entry experience, with enhanced planting, key visitor information, signage and future wash down facility.

A master plan for this area forms a component of this project.

• Undertake detailed design for a tunnel underpass (below Colac-Forrest Road) and realignment of the trail link from the Tiger Rail Trail to the Yaugher Trail Head.

A simple road treatment has been designed for these crossings.

• Undertake detailed design for a new off-road trail (west of Boundary Road) 'Boundary Rider' from the new tunnel underpass to the Yaugher Trail Head.

This development forms a component of this project.

• Change the use of Vista Trail to dedicated equestrian use.

Dirt Art do not support this recommendation. Vista is a highly-disorganised trail, though it does provide one of the only view points in the Forrest trail network. A major re-working of the trail has been proposed.

• Upgrade trail signage, including directional, wayfinding and interpretation, across the Forrest and Yaugher MTB trail network.
Dirt Art has proposed a major renewal of signage throughout the trail network.

• Retain and protect existing areas of Native Vegetation and undertake revegetation works in targeted areas.

Dirt Art acknowledge and support this statement.

9.2 Barwon Flow Trail Report

9.2.1 Summary

Report title	Barwon Flow Trail Detailed Design Plan
Author/s	Distinctive Trail Developments
Date	June 2018
Client/s	Colac Otway Shire Council

9.2.2 General Summary

The report provides a design plan for the development of a flow trail and partial climbing trail, with the aim to diversify the Forrest trail network.

9.2.3 Dirt Art Response

The notion of a flow trail is fundamentally a trail that requires little to no pedaling or braking, with the trail gradients generating and maintaining rider speeds.

The proposed trail would result in an average descending gradient of ~2%. An average gradient of 5-7% is required for flow trails to allow riders to generate speed without pedaling. *Dirt Art* has updated the trail to split into two, shorter genuine flow trail descents.

The proposed trail crosses wet riparian areas multiple times, *Dirt Art* has removed all unnecessary crossings. The elimination of these crossing significantly reduces trail development and maintenance costs, while minimising environmental impacts.

The proposed partial climbing trail passes unnecessarily close to local residences and creates a highly-confused trail format. *Dirt Art* has moved the trail away from residences and aligned it from the finish of the descending trails, allowing rider to ride closed loops. This change will improve network functionality and reduce the risk of riders getting lost.

The proposed report aligned the trail directly adjustment to water management infrastructure at the summit. This area is flat and wet and creates unnecessary risk to this infrastructure. *Dirt Art* has moved the trail alignment down to an area of good slope, outside of visual view of the infrastructure.

9.3 Distinctive Trail Developments Trail Audit Report

9.3.1 General Summary

Report title	Forrest Trail Audit Report
Author/s	Distinctive Trail Developments
Date	June 2018
Client/s	DELWP

The report provides a basic trail audit of the majority of key trails in the Forrest Trails Network. While the report does propose some detailed trail works, it does not recognize many of the structural flaws in the trail alignments and network layout that are current the root cause of the majority of issues for the trails.

9.3.2 Dirt Art Response

The audit report provides a basic summary of works, though these works generally provide only temporary fixes, while not addressing many fundamental flaws in the trail network. The current trail network features many alignment and structural flaws, that have been addressed by *Dirt Art* in the trails audit. *Dirt Art* do not recommend undertaking any further expenditure into trail repairs without addressing fundamental trail issues.

9.4 Forrest Mountain Bike Trails Economic Cost Benefit Analysis

9.4.1 General Analysis

Report title	Forrest MTB Trails Economic Cost Benefit Analysis
Author/s	MacroPlan Dimasi
Date	September 2018
Client/s	Colac Otway Shire Council

The report explores the costs and benefits associated with a range of investment and development scenarios at Forrest. The report analyses a range of scenarios from business as usual, through to a $1m+ investment in trail and infrastructure.

9.4.2 Dirt Art Response

Dirt Art agree with the general sentiment of the report. When viewing the targeted investment, *Dirt Art* believe the value of investment will not be enough to deliver visitation and thus economic results.

9.4.3 Additional Information

Given the variance between the predicted project costs and actual detailed design costs supplied by *Dirt Art, MarcroPlan* have reworked the headline numbers from the 2018 Economic Analysis. As at 11/11/19, the reworked Construction and Operational outputs are as follows:

9.4.3.1 Construction Output

· The $4.25M initial capital investment (direct output) may generate another $5.36M indirect economic output during the construction phase, based on the ABS Input-Output multipliers.
· The overall impact on the local and regional economic output totals $9.61M including initial / direct capital investment and indirect impact during the construction phase.

9.4.3.2 Construction Employment

· This initial capital investment may also generate approximately 5.1 direct FTE jobs per annum on site in the construction sector and another 8.1 indirect FTE jobs per annum elsewhere in the economy during the construction phase, based on the employment multipliers.
· The overall employment generated during the construction phase totals 13.2 FTE jobs per annum.

9.4.3.3 Tourism Output

(* tourism impact to the Otway SA2 during stabilised operational phase in 5 years after project completion)
· Direct tourist expenditure contributed by cycling visitors is estimated at $6.11M per annum during the operational phase, assuming total cycling visitation to reach 50,000 trips per annum in 5 years after project completion and average tourist expenditure at $108 per trip as at current level with a 2.5% annual escalation.
· Indirect tourist output contributed by cycling visitors is estimated at $3.97M per annum during the operational phase, based on tourism multiplier of 0.65.
· Total tourism output contributed by cycling visitors is estimated at $10.08M per annum during the operational phase.

*Please note MacroPlan has kept most of the base assumptions unchanged, except updating the initial capital investment and visitation / expenditure data up to date.

9.5 Birregurra and Forrest Community Infrastructure Plan

9.5.1 General summary

Report title	Forrest Trail Audit Report
Author/s	Distinctive Trail Developments
Date	June 2018
Client/s	DELWP

The plan explores the infrastructure status, needs and priorities for the township of Forrest and nearby Birregurra, which included the hosting of community feedback sessions.

9.5.2 Dirt Art feedback

The report features high-level, on-specific infrastructure priorities. While some of these priorities indirectly relate to the mountain bike trails, there remains little direct relationship in the current environment.

Notably, *Dirt Art* has factored in a range of community active and passive spaces at the proposed Forrest Trail Head master plan development.

10 Appendix 4- Project Budgets

Forrest Mountain Bike Trails - Proposed Development Budget

25.02.20

Forrest Trail Head Works				
Trail / Area	**Works / Infrastructure**	**Cost**	**Volume**	**Total**
Entry Archway	N/A	$ 10,000.00	1	$ 10,000.00
Signage	Main sign board	$ 10,000.00	1	$ 10,000.00
	Pump track sign	$ 1,500.00	1	$ 1,500.00
	Skills park sign	$ 1,500.00	1	$ 1,500.00
	Jump park sign	$ 1,500.00	1	$ 1,500.00
Landscaping	General earthworks	$ 10,000.00	1	$ 10,000.00
	Turfing m3	$ 65.00	200	$ 13,000.00
	Planting and mulch m3	$ 75.00	150	$ 11,250.00
Drainage works	General earthworks	$ 5,000.00	1	$ 5,000.00
	Pipes 300mm ribbed plastic Lin. M	$ 95.00	36	$ 3,420.00
	Concrete end walls	$ 450.00	4	$ 1,800.00
Bike wash	Concrete and site prep	$ 10,000.00	1	$ 10,000.00
	Hoses and stands	$ 4,500.00	1	$ 4,500.00
	Plumbing	$ 2,500.00	1	$ 2,500.00
New Seating	Steel and hardwood tables	$ 1,250.00	10	$ 12,500.00
New Entry Trail	2,000 width, 60mm gravel surface trail	$ 150.00	200	$ 30,000.00
Skills Park	2,500 width, 60mm gravel surface trail	$ 125.00	220	$ 27,500.00
	Start mound	$ 5,000.00	1	$ 5,000.00
	Rock features	$ 1,000.00	10	$ 10,000.00
	Timber/FRP Features	$ 2,500.00	6	$ 15,000.00
	Dirt feature line Lin. M	$ 200.00	50	$ 10,000.00
Asphalt Pump Track	Base track form (inc sub base) m3	$ 250.00	400	$ 100,000.00
	Drainage	$ 5,000.00	1	$ 5,000.00
	Asphalt m3	$ 70.00	400	$ 28,000.00
Resurface Kids Pump Track	m3 resurfacing	$ 55.00	95	$ 5,225.00
Shower Block	Building kit	$ 145,000.00	1	$ 145,000.00
	Site prep and concrete	$ 25,000.00	1	$ 25,000.00
	Services connections	$ 25,000.00	1	$ 25,000.00
Dirt Jumps Park	Jumps surface area, 60mm gravel surface	$ 300.00	150	$ 45,000.00
	Start mound	$ 5,000.00	1	$ 5,000.00
			Subtotal =	**$ 579,195.00**

Forrest Trail Head Works	
Item cost	**Total Cost**
Entry Archway	$ 10,000.00
Signage	$ 14,500.00
Landscaping	$ 34,250.00
Drainage Works	$ 10,220.00
Bike Wash	$ 17,000.00
New Seating	$ 12,500.00
New Entry Trail	$ 30,000.00
Skills Park	$ 67,500.00
Asphalt Pump Track	$ 133,000.00
Resurface Kids Pump Track	$ 5,225.00
Shower Block	$ 195,000.00
Dirt Jumps Park	$ 50,000.00
Subtotal =	**$ 579,195.00**

Forrest Trail Works				
Trail / Area	**Works / Infrastructure**	**Cost**	**Volume**	**Total**
Upgrade Rollercoaster	Re-profile and surface 60mm gravel	$ 75.00	1000	$ 75,000.00
N4 - Roller Coaster Realignment	60mm gravel surfaced trail	$ 75.00	972	$ 72,900.00
N19 - Roller Coaster Realignment	60mm gravel surfaced trail	$ 75.00	339	$ 25,425.00
Upgrade 3rd Time Lucky	Re-profile	$ 30.00	1833	$ 54,990.00
N18 - 3rd Time Lucky Realignment	Natural surface trail	$ 35.00	163	$ 5,705.00
Upgrade Follow the Dog	Re-profile	$ 30.00	4225	$ 126,750.00
N17A - Follow the Dog Realignment	Natural surface trail	$ 35.00	224	$ 7,840.00
N17B - Follow the Dog Realignment	Natural surface trail	$ 35.00	68	$ 2,380.00
N17C - Follow the Dog Realignment	Natural surface trail	$ 35.00	138	$ 4,830.00
N17D - Follow the Dog Realignment	Natural surface trail	$ 35.00	524	$ 18,340.00
Upgrade Red Carpet	Re-profile and surface 60mm gravel	$ 75.00	1533	$ 114,975.00
Upgrade Forrest Loop Trail	Re-profile	$ 30.00	1691	$ 50,730.00
Upgrade Balijaru	Re-profile	$ 30.00	5600	$ 168,000.00
Traffic Treatments at Road Crossing		$ 15,000.00	1	$ 15,000.00
Signage	Trail head signs	$ 1,000.00	11	$ 11,000.00
	Way finding signs	$ 250.00	20	$ 5,000.00
			Subtotal =	**$ 758,865.00**

Forrest Trail Works	
Item cost	**Total Cost**
Upgrade Rollercoaster	$ 173,325.00
Upgrade 3rd Time Lucky	$ 60,695.00
Upgrade Follow the Dog	$ 160,140.00
Upgrade Red Carpet	$ 114,975.00
Upgrade Forrest Loop Trail	$ 50,730.00
Upgrade Balijaru	$ 168,000.00
Traffic treatments	$ 15,000.00
Signage	$ 16,000.00
Subtotal =	**$ 758,865.00**

Yaugher Trail Head / Trail Works				
Trail / Area	**Works / Infrastructure**	**Cost**	**Volume**	**Total**
Trail Head Upgrade	Trail realignments 60mm gravel surface	$ 75.00	220	$ 16,500.00
	Entry archway	$ 10,000.00	1	$ 10,000.00
	Additional carparking m3	$ 75.00	400	$ 30,000.00
	Landscaping m3	$ 75.00	50	$ 3,750.00
Upgrade Marriners Run	Re-profile	$ 30.00	4733	$ 141,990.00
Upgrade Grass Trees	Re-profile	$ 30.00	1809	$ 54,270.00
Upgrade Foxtail	Re-profile	$ 30.00	3782	$ 113,460.00
Upgrade J2	Re-profile	$ 30.00	3901	$ 117,030.00
Upgrade Yaugher Super Loop	Priority areas re-profile	$ 30.00	3200	$ 96,000.00
Upgrade Vista	Priority areas re-profile	$ 30.00	5300	$ 159,000.00
Upgrade Barre Warre	Minor upgrade for equestrian use	$ 15.00	1873	$ 28,095.00
Upgrade Casper Black	Re-profile	$ 30.00	4681	$ 140,430.00
N5	Natural surface trail	$ 35.00	2131	$ 74,585.00
N6	Natural surface trail	$ 35.00	1341	$ 46,935.00
N11	Natural surface trail	$ 35.00	849	$ 29,715.00
N13A	Natural surface trail	$ 35.00	678	$ 23,730.00
N13B	Natural surface trail	$ 35.00	728	$ 25,480.00
N14A	Natural surface trail	$ 35.00	699	$ 24,465.00
N14B	Natural surface trail	$ 35.00	1223	$ 42,805.00
N14C	Natural surface trail	$ 35.00	1926	$ 67,410.00
N15A	Natural surface trail	$ 35.00	364	$ 12,740.00
N15B	Natural surface trail	$ 35.00	169	$ 5,915.00
N15C	Natural surface trail	$ 35.00	459	$ 16,065.00
N16	Natural surface trail	$ 35.00	695	$ 24,325.00
Traffic Treatments at Road Crossing		$ 25,000.00	1	$ 25,000.00
Signage	Main sign board	$ 10,000.00	1	$ 10,000.00
	Trail head signs	$ 1,000.00	14	$ 14,000.00
	Way marker signs	$ 250.00	20	$ 5,000.00
			Subtotal =	**$ 1,358,695.00**

Yaugher Trail Head / Trail Works	
Item cost	**Total Cost**
Trail Head Upgrade	$ 60,250.00
Upgrade Marriners Run	$ 141,990.00
Upgrade Grass Trees	$ 54,270.00
Upgrade Foxtail	$ 113,460.00
Upgrade J2	$ 117,030.00
Upgrade Yaugher Super Loop	$ 96,000.00
Upgrade Vista	$ 159,000.00
Upgrade Barre Warre	$ 28,095.00
Upgrade Casper Black	$ 140,430.00
N5	$ 74,585.00
N6	$ 46,935.00
N11	$ 29,715.00
N13A	$ 23,730.00
N13B	$ 25,480.00
N14A	$ 24,465.00
N14B	$ 42,805.00
N14C	$ 67,410.00
N15A	$ 12,740.00
N15B	$ 5,915.00
N15C	$ 16,065.00
N16	$ 24,325.00
Traffic treatments	$ 25,000.00
Signage	$ 29,000.00
Subtotal =	**$ 1,358,695.00**

New Trail Concepts				
Item / Trail	**Works / Infrastructure**	**Cost**	**Volume**	**Total**
N1	60mm gravel surfaced trail, flow/jump	$ 85.00	1600	$ 136,000.00
N2	60mm gravel surfaced trail, flow/jump	$ 85.00	1200	$ 102,000.00
N3	60mm gravel surfaced trail, flow/jump	$ 85.00	1700	$ 144,500.00
N7	Natural surface trail	$ 75.00	1852	$ 138,900.00
N8	Natural surface trail	$ 35.00	1400	$ 49,000.00
N9	Natural surface trail	$ 35.00	1518	$ 53,130.00
N10	Natural surface trail	$ 35.00	807	$ 28,245.00
N12A	Natural surface trail	$ 35.00	3201	$ 112,035.00
N12B	Natural surface trail	$ 35.00	3909	$ 136,815.00
Signage	Trail head signage	$ 1,000.00	4	$ 4,000.00
	Way marker signage	$ 250.00	10	$ 2,500.00
Bridges and platforms	Timber and FRP Lin. M	$ 1,500.00	30	$ 45,000.00
			Subtotal =	**$ 952,125.00**

New Trail Concepts	
Item cost	**Total Cost**
N1	$ 136,000.00
N2	$ 102,000.00
N3	$ 144,500.00
N7	$ 138,900.00
N8	$ 49,000.00
N9	$ 53,130.00
N10	$ 28,245.00
N12A	$ 112,035.00
N12B	$ 136,815.00
Signage	$ 6,500.00
Bridges and platforms	$ 45,000.00
Subtotal =	**$ 952,125.00**

Future Concept				
Item / Trail	**Works / Infrastructure**	**Cost**	**Volume**	**Total**
N20 - Eastern Loop Concept	Natural surface trail	$ 75.00	7435	$ 557,625.00
			Subtotal =	**$ 557,625.00**

Future Concept	
Item cost	**Total Cost**
N20 - Eastern Loop Concept	$ 557,625.00
Subtotal =	**$ 557,625.00**

Ancillaries				
Item		**Cost**	**Volume**	**Total**
Re-branding		$ 15,000.00	1	$ 15,000.00
Website		$ 15,000.00	1	$ 15,000.00
Phone Application		$ 25,000.00	1	$ 25,000.00
Marketing		$ 50,000.00	1	$ 50,000.00
			Subtotal =	**$ 105,000.00**

Ancillaries	
Item cost	**Total Cost**
Branding	$ 15,000.00
Web site	$ 15,000.00
Phone app	$ 25,000.00
Marketing	$ 50,000.00
Subtotal =	**$ 105,000.00**

Planning and Approvals				
Item		**Cost**	**Volume**	**Total**
Cultural Heritage Approvals		$ 75,000.00	1	$ 75,000.00
Environmental Approvals		$ 75,000.00	1	$ 75,000.00
Planning Consultancies		$ 50,000.00	1	$ 50,000.00
			Subtotal =	**$ 200,000.00**

Planning and Approvals	
Item cost	**Total Cost**
Cultural Heritage Approvals	$ 75,000.00
Environmental Approvals	$ 75,000.00
Planning Consultancies	$ 50,000.00
Subtotal =	**$ 200,000.00**

Totals		
Trail Head Works		$ 579,195.00
Forrest Trail Heads Trails		$ 758,865.00
Yaugher Trail Head Trails		$ 1,358,695.00
New Trail Concepts		$ 952,125.00
Future Concept		$ 557,625.00
Ancillaries		$ 105,000.00
Planning and Approvals		$ 200,000.00
	Totals	**$ 4,511,505.00**

Forrest Mountain Bike Trails - Development Staging

25.02.20

Stage 1

Forrest Trail Head

Item	Cost
Entry Archway	$ 10,000.00
Signage	$ 14,500.00
Landscaping	$ 34,250.00
Drainage Works	$ 10,220.00
Bike Wash	$ 17,000.00
New Seating	$ 12,500.00
New Entry Trail	$ 30,000.00
Skills Park	$ 67,500.00
Asphalt Pump Track	$ 133,000.00
Resurface Kids Pump Track	$ 5,225.00
Dirt Jumps Park	$ 50,000.00
Subtotal =	**$ 384,195.00**

Forrest Trail Head Trails

Item	Cost
Upgrade Rollercoaster	$ 173,325.00
Upgrade 3rd Time Lucky	$ 60,695.00
Upgrade Red Carpet	$ 114,975.00
N9	$ 53,130.00
Traffic Treatments at Road Crossing	$ 15,000.00
Signage	$ 16,000.00
Subtotal =	**$ 433,125.00**

Yaugher Trail Head

Item	Cost
Trail Head Upgrade	$ 60,250.00
Upgrade Marriners Run	$ 141,990.00
Upgrade Grass Trees	$ 54,270.00
Upgrade Foxtail	$ 113,460.00
Upgrade J2	$ 117,030.00
Upgrade Yaugher Super Loop	$ 96,000.00
Upgrade Vista	$ 159,000.00
N13A	$ 23,730.00
N13B	$ 25,480.00
N14A	$ 24,465.00
N14B	$ 42,805.00
N14C	$ 67,410.00
N15A	$ 12,740.00
N15B	$ 5,915.00
N15C	$ 16,065.00
Traffic Treatments	$ 25,000.00
Signage	$ 29,000.00
Subtotal =	**$ 1,014,610.00**

Barwon Flow Trails

Item	Cost
N1	$ 136,000.00
N2	$ 102,000.00
N3	$ 144,500.00
Signage	$ 6,500.00
Bridges and Platforms	$ 45,000.00
Subtotal =	**$ 434,000.00**

Ancillaries

Item	Cost
Re branding	$ 15,000.00
Web site	$ 15,000.00
Phone app	$ 25,000.00
Marketing	$ 50,000.00
Subtotal =	**$ 105,000.00**

Planning and Approvals

Item	Cost
Environmental Approvals	$ 75,000.00
Cultural Heritage Approvals	$ 75,000.00
Planning Consultancies	$ 50,000.00
Subtotal =	**$ 200,000.00**

Total Stage 1 Development =	**$ 2,570,930.00**

Stage 2

Forrest Trail Head

Item	Cost
Shower Block	$ 195,000.00
Subtotal =	**$ 195,000.00**

Forrest Trail Head Trails

Item	Cost
Upgrade Follow the Dog	$ 160,140.00
Upgrade Balijaru	$ 168,000.00
N10	$ 28,245.00
Upgrade Forrest Loop Trail	$ 50,730.00
Subtotal =	**$ 407,115.00**

Yaugher Trail Head

Item	Cost
Upgrade Casper Black	$ 140,430.00
Upgrade Barre Warre	$ 28,095.00
N5	$ 74,585.00
N6	$ 46,935.00
N7	$ 138,900.00
N8	$ 49,000.00
N11	$ 29,715.00
N12A	$ 112,035.00
N12B	$ 136,815.00
N16	$ 24,325.00
Subtotal =	**$ 780,835.00**

Future Concept

Item	Cost
N20 - Eastern Loop Concept	$ 557,625.00
Subtotal =	**$ 557,625.00**

Total Stage 2 Development	$ 1,940,575.00

11 Appendix 5- One Mile Grid Traffic Reports

onemilegrid
TRAFFIC ENGINEERING

Birregurra-Forrest Road, Forrest

Road Safety Audit

190223RSA001A.docx

25 April 2019

onemile**grid**

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DOCUMENT INFORMATION

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Prepared by	James Dear	**Reviewed by**	Trevor Waugh
Signature		**Signature**	

CONTENTS

1 INTRODUCTION 4
1.1 Auditor and Audit Process Details 4
1.2 Project and Site Details 4
1.3 Risk Ratings 6
1.4 Responding to the Audit Report 7
2 AUDIT FINDINGS AND RECOMMENDATIONS 8
3 ALTERNATIVE CROSSING LOCATIONS 10
4 CONCLUSIONS 11

TABLES

Table 1 How often is the problem likely to lead to a crash? 6
Table 2 What is the likely severity of the resulting crash type? 6
Table 3 The Resulting Level of Risk 7
Table 4 Treatment Approach 7

FIGURES

Figure 1 Site Location 4
Figure 2 Birregurra-Forrest Road facing north (left) and south (right) 5
Figure 3 Forest Trail Map 5
Figure 4 Alternative crossing options 10
Figure 5 Signage blocking visibility of crossing 13
Figure 6 Birregurra-Forrest Road roadside vegetation and topography 13
Figure 7 Birregurra-Forrest Road sight distance to south at Yaugher Road 14

APPENDICES

APPENDIX A SITE PHOTOS 12
APPENDIX B CONCEPT PLAN 15

1 INTRODUCTION

1.1 Auditor and Audit Process Details

This report results from an Existing Conditions stage Road Safety Audit on the road crossing of Birregurra-Forrest Road in Forrest.

The audit has been carried out for Dirt Art.

The Road Safety Audit was undertaken by the following VicRoads/ARRB accredited auditors:

Trevor Waugh (Team Leader)	***James Dear***
Ass. Dip. C. Eng - Senior Road Safety Auditor	BE (Civil) – Senior Road Safety Auditor

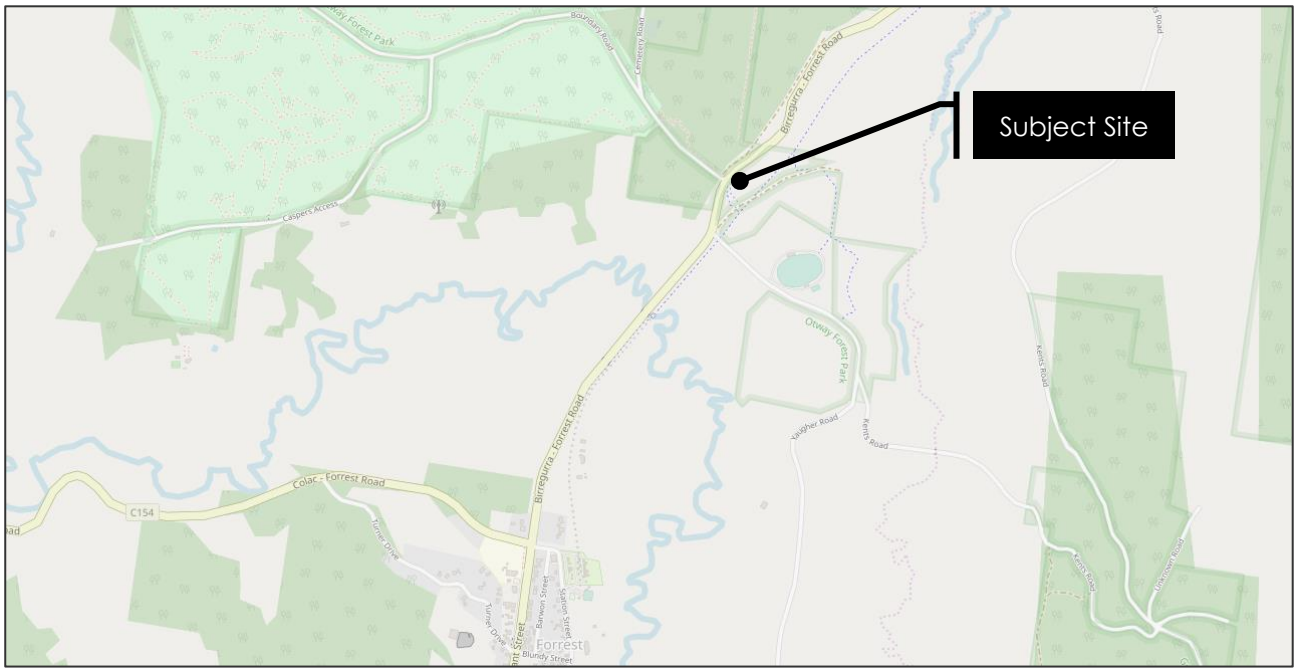
An audit was undertaken on the existing conditions, with an inspection of the site, including all approaches, on 23/04/2019, between the hours of 11:00AM and 1:00PM. The weather during the inspection was clear and sunny.

The audit has been carried out following the procedures set out in Austroads Guide to Road Safety – Part 6: Road Safety Audit. The audit covers physical features of the project which may affect road user safety and it has sought to identify potential safety hazards. However, the auditors point out that no guarantee is made that every deficiency has been identified. Further, if all the recommendations in this report were to be followed, this would not guarantee that the site is 'safe'; rather, adoption of the recommendations should improve the level of safety of the facility.

1.2 Project and Site Details

The site is located at the intersection Boundary road and Birregurra-Forrest Road approximately 1.5km north of the Forrest township as shown in Figure 1.

Figure 1 Site Location



Birregurra-Forrest Road is a VicRoads controlled arterial road, aligned generally north-south between Forrest and bawon Downs tosnhips, extending northwards to Birregurra and southwards ultiamtely to Skenes Creek.

In the vicitiy of the site it operates with a single traffic lane in each direction, with a total sealed width of approximately 6 metres.

A posted speed limit of 100km/h applies at the site, however advisory signage on the northern approach (southbound direction) suggests a 80km/h speed due to pedestrian and cyclist presence. This corresponds to a clear zone of at least 6 metres (see Austroads Guide to Road Design Part 6, VicRoads Supplement page 6).

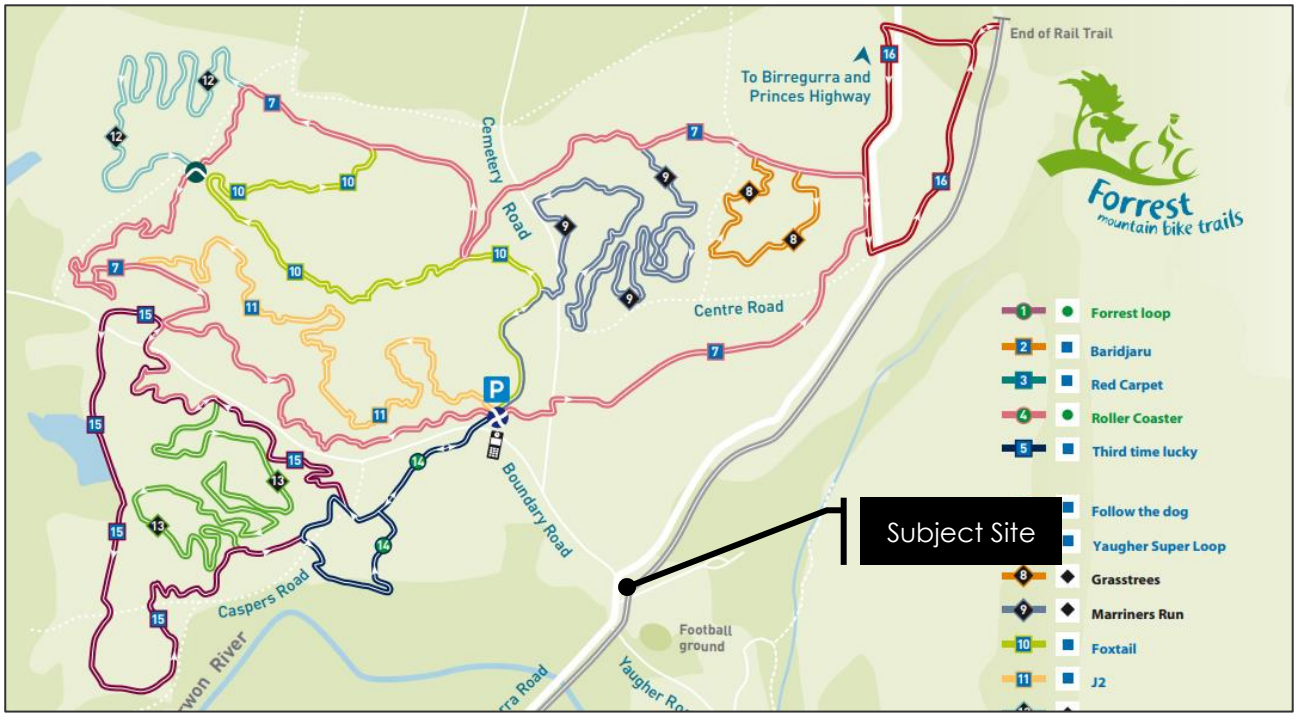
A view of the Birregurra-Forrest Road cross-section is provided in Figure 2 below.

Figure 2 Birregurra-Forrest Road facing north (left) and south (right)

Boundary Road is a Council controlled local road extending north-east from its intersection with Birregurra-Forrest Road.

It is unsealed and provides the primary link from the Forrest Township to the Yaugher Trailhead, located approximately 800 metres up Boundary Road. A view of the trail network in context with the site is provided in Figure 3.

Figure 3 Forest Trail Map



Currently, accessing the trailhead requires cyclists to travel up Birregurra-Forrest Road and access Boundary Road directly, or utilise the Tiger Rail Trail, which runs along the eastern side of Birregurra-Forrest Road, and either:

- Connect to the trail network at a signed crossing approximately 2km north of Boundary Road; or
- Use a trail connection directly opposite Boundary Road.

The project involves a review of the existing road crossing of Birregurra-Forrest Road for cyclists, and identification of alternative options or improvements to the existing crossing arrangement.

1.3 Risk Ratings

As outlined in Austroads Guide to Road Safety Part 6: Road Safety Audits, in order to provide guidance regarding whether or not recommendations need to be resolved, consideration has been given to:

- Likelihood that the identified problem will result in harm;
- Severity of that harm; and
- The resulting level of risk.

Four tables within the Austroads Guide to Road Safety Part 6: Road Safety Audits summarise the frequency, severity, resulting risk and treatment approach. These are reproduced in the following tables.

Table 1 How often is the problem likely to lead to a crash?

Frequency	*Description*
Frequent	Once or more per week
Probable	Once or more per year (but less than once per week)
Occasional	Once every five to ten years
Improbable	Less often than once every ten years

Table 2 What is the likely severity of the resulting crash type?

Severity	*Description*	*Examples*
Catastrophic	Likely multiple deaths	High speed, multi vehicle crash on Freeway
		Car runs into a crowded bus stop
		Bus and petrol tanker collide
		Collapse of a bridge or major tunnel
Serious	Likely death or serious injury	High or medium speed vehicle/vehicle collision
		High or medium speed collision with a fixed roadside object
		Pedestrian or cyclist struck by car
Minor	Likely minor injury	Some low speed vehicle collisions
		Cyclist falls from a bicycle at low speed
		Left turn rear-end crash in a slip lane
Limited	Likely trivial injury or property damage only	Some low speed vehicle collisions
		Pedestrian walks into an object (no head injury)
		Car reverses into a post

Table 3 The Resulting Level of Risk

	Frequent	*Probable*	*Occasional*	*Improbable*
Catastrophic	Intolerable	Intolerable	Intolerable	High
Serious	Intolerable	Intolerable	High	Medium
Minor	Intolerable	High	Medium	Low
Limited	High	Medium	Low	Low

Table 4 Treatment Approach

Risk	*Suggested treatment approach*
Intolerable	Must be corrected
High	Should be corrected or the risk significantly reduced, even if the treatment cost is high
Medium	Should be corrected or the risk significantly reduced, if the treatment cost is moderate, but not high
Low	Should be corrected or the risk reduced, if the treatment cost is low

1.4 Responding to the Audit Report

As set out in the road safety audit guidelines, responsibility for the road design always rests with the designer/project manager and not the auditor. A project manager is under no obligation to accept all the audit recommendations. Also, it is not the role of the auditor to agree to or approve of the project manager's response to the audit. Rather, the audit provides the opportunity to highlight potential problems and have them formally considered by the project manager, in conjunction with all other project considerations.

The road safety audit report should be responded to in writing, giving reasons for each rejection of an audit recommendation. Acceptance of a recommendation may require no further comments, but explanation of how or when the action will be taken may be useful.

2 AUDIT FINDINGS AND RECOMMENDATIONS

	Audit Findings	Recommendations	Level of Risk	Designer/Project Manager Response
1.	The Austroads Guide to Road Design (AGRD) Part 4A outlines the crossing sight distance (CSD) requirements for pedestrians when crossing a road. CSD should be provided at crossings where the pedestrian does not have the priority, to allow sufficient time to cross the road, clear of any approaching traffic. It is considered that these same requirements are applicable to cyclists. For the given arrangement at Boundary Road, assuming a 5 second critical gap, and the posted speed limit of 100km/h, this requires a CSD of 138 metres. Whilst this requirement is satisfied for cyclists crossing from the west side (Boundary Road), it is not achieved on the east side.	Trim tree vegetation along the eastern verge to ensure that the minimum CSD requirements are met for both crossing directions. See Appendix B. Investigate alternative crossing locations (discussed in Section 3 below).	High	
2.	Birregurra-Forrest Road has a posted speed limit of 100km/h. In the event of a collision with a cyclist and motorist at this speed, the probability of a fatality is almost certain. Review of Strava (a social network and training tool for cyclists) heatmap data from the region indicates that Birregurra-Forrest Road is heavy utilised for access to the trailhead, so exposure to vehicle traffic is high.	Consider a reduction in speed limit to 60km/h or 80km/h for the entire approach from Forrest to past Boundary Road. This has an added benefit of reducing stopping distances for vehicles in the event of a potential collision. Reductions in speed will assist in reducing the CSD requirements to 111m, and reduce the associated loss of vegetation	High	
3.	Advisory signage on the northern (southbound approach) of Birregurra-Forrest Road to Boundary Road can partially obscure the presence of a cyclist on the western side of Birregurra-Forrest Road crossing to the east. See Figure 5.	Relocate signage away from crossing location.	Medium	

	Audit Findings	Recommendations	Level of Risk	Designer/Project Manager Response
4.	Signage is in place noting the presence of the Tiger Rail Trail crossing on Yaugher Road however there is no advance warning signage on either approach advising motorists of increased likelihood of cyclist activity adjacent to Boundary Road.	Install advance warning signage on both approaches to Boundary Road noting the likelihood of cyclist activity in this location. See Appendix B.	Medium	

3 ALTERNATIVE CROSSING LOCATIONS

As part of recommendations made in Section 2 above, alternative locations for cyclist road crossings have been investigated. These are discussed below.

1. Establish a connection within the western verge of Birregurra-Forrest Road, crossing underneath Birregurra-Forrest Road at the existing bridge approximately 800 metres south of Boundary Road
2. Establish a short connection within the western verge of Birregurra-Forrest Road, crossing to the Tiger Rail Trail at the intersection of Yaugher Road.

Both options are illustrated in Figure 4 below.

Figure 4 Alternative crossing options

Whilst Option 1 mitigates issues associated with crossing Birregurra-Forrest Road, it would necessitate a path of at least 2.5 metres width within a roadside area of dense vegetation and varying topography. See Figure 6. This would necessitate removal of a significant number of trees and shrubs, and would require considerable earthworks to provide a level surface appropriate for cyclists use. Further, cyclists would still be travelling in close proximity to a high-speed road, which is not preferred.

Option 2 mitigates the issue of crossing at Boundary Road, and minimises impacts to roadside vegetation and earthworks on Birregurra-Forrest Road, but results in a crossing location with even poorer sight distance, particularly for cyclists crossing from the west viewing traffic from the south (northbound). See Figure 7.

In consideration of the above, it is recommended that the existing Boundary Road crossing is retained and upgraded.

4 CONCLUSIONS

This Road Safety Audit report has been conducted in accordance with the audit process specified within Austroads Guide to Road Safety Part 6: Road Safety Audit. The site has been inspected and the audit carried out for the purposes of identifying any design features which could be altered or removed to improve the safety of the proposal. The identified issues have been noted in this report and these findings and recommendations are put forward for consideration by Dirt Art and any authorities for consideration.

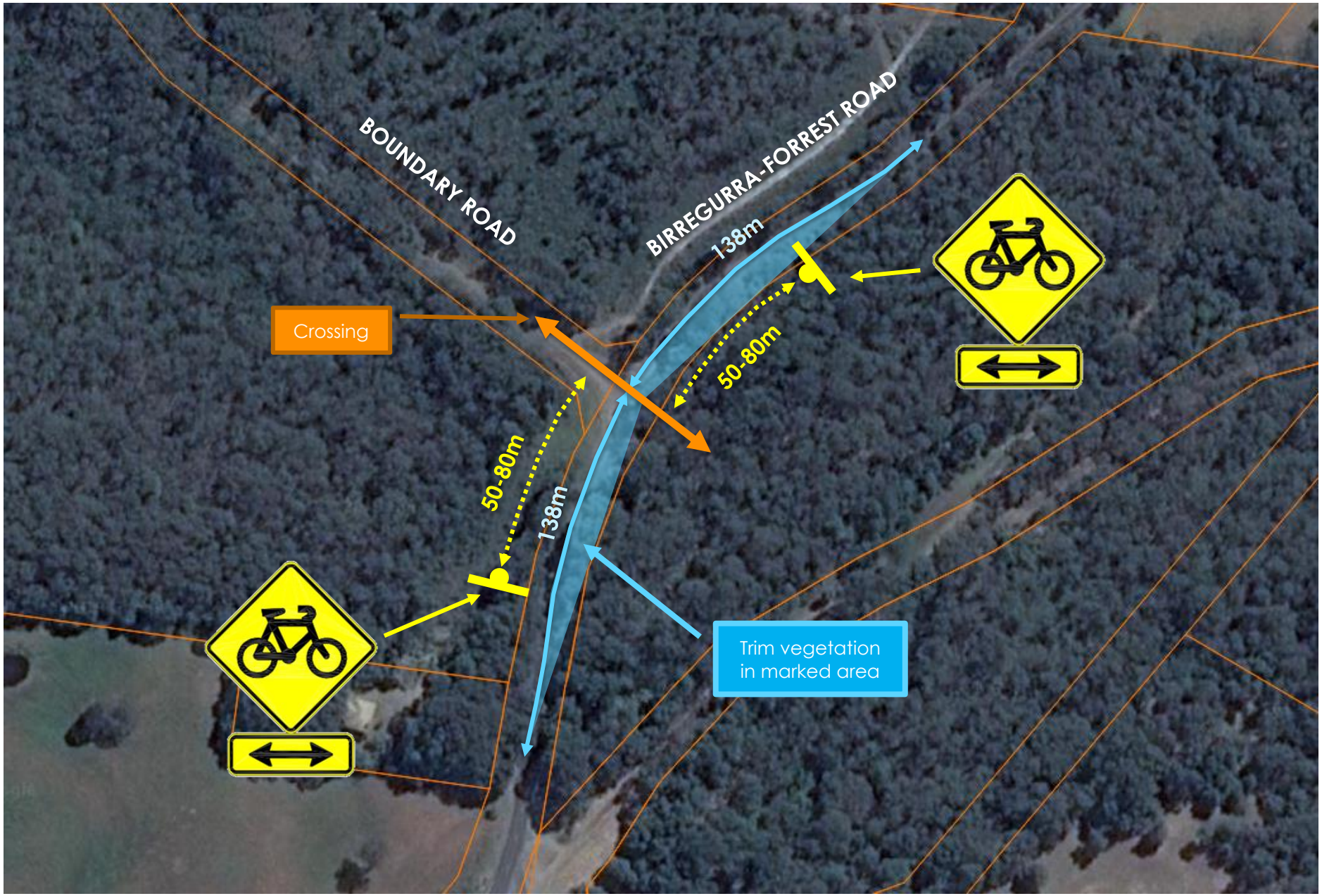
Appendix A Site Photos

Figure 5 Signage blocking visibility of crossing

Figure 6 Birregurra-Forrest Road roadside vegetation and topography

Figure 7 Birregurra-Forrest Road sight distance to south at Yaugher Road

Appendix B Concept Plan


BOUNDARY ROAD
BIRREGURRA-FORREST ROAD
138m
50-80m
Crossing
50-80m
138m
Trim vegetation
in marked area

12 Appendix 6- IMBA TDRS

IMBA Trail Difficulty Rating System

	VERY EASY White Circle	EASY Green Circle	INTERMEDIATE Blue Square	DIFFICULT Single Black Diamond	EXTREME Double Black Diamond
Description	Likely to be a fire road or wide single track with a gentle gradient, smooth surface and free of obstacles. Frequent encounters are likely with other cyclists, walkers, runners and horse riders.	Likely to be a combination of fire road or wide single track with a gentle gradient, smooth surface and relatively free of obstacles. Short sections may exceed these criteria. Frequent encounters are likely with other cyclists, walkers, runners and horse riders.	Likely to be a single trail with moderate gradients, variable surface and obstacles. Dual use or preferred use Optional lines desirable	Likely to be a challenging single trail with steep gradients, variable surface and many obstacles. Single use and direction Optional lines XC, DH or trials	Extremely difficult trails will incorporate very steep gradients, highly variable surface and unavoidable, severe obstacles. Single use and direction Optional lines XC, DH or trials
Trail Width	2100mm plus or minus 900mm	900mm plus or minus 300mm for tread or bridges.	600mm plus or minus 300mm for tread or bridges.	300mm plus or minus 150mm for tread and bridges. Structures can vary.	150mm plus or minus 100mm for tread or bridges. Structures can vary.
Trail Surface	Hardened or smooth.	Mostly firm and stable.	Possible sections of rocky or loose tread.	Variable and challenging.	Widely variable and unpredictable.
Average Trail Grade	Climbs and descents are mostly shallow. Less than 5% average.	Climbs and descents are mostly shallow, but may include some moderately steep sections. 7% or less average.	Mostly moderate gradients but may include steep sections. 10% or less average.	Contains steeper descents or climbs. 20% or less average.	Expect prolonged steep, loose and rocky descents or climbs. 20% or greater average
Maximum Trail Grade	Max 10%	Max 15%	Max 20% or greater	Max 20% or greater	Max 40% or greater
Level of Trail Exposure	Firm and level fall zone to either side of trail corridor	Exposure to either side of trail corridor includes downward slopes of up to 10%	Exposure to either side of trail corridor includes downward slopes of up to 20%	Exposure to either side of trail corridor includes steep downward slopes or freefall	Exposure to either side of trail corridor includes steep downward slopes or freefall
Natural Obstacles and Technical Trail Features (TTFs)	No obstacles.	Unavoidable obstacles to 50mm (2") high, such as logs, roots and rocks. Avoidable, rollable obstacles may be present. Unavoidable bridges 900mm wide. Short sections may exceed criteria.	Unavoidable, rollable obstacles to 200mm (8") high, such as logs, roots and rocks. Avoidable obstacles to 600mm may be present. Unavoidable bridges 600mm wide. Width of deck is half the height. Short sections may exceed criteria.	Unavoidable obstacles to 380mm (15") high, such as logs, roots, rocks, drop-offs or constructed obstacles. Avoidable obstacles to 1200mm may be present. Unavoidable bridges 600mm wide. Width of deck is half the height. Short sections may exceed criteria.	Large, committing and unavoidable obstacles to 380mm (15") high. Avoidable obstacles to1200mm may be present. Unavoidable bridges 600mm or narrower. Width of bridges is unpredictable. Short sections may exceed criteria.