Hassans Wall Reserve

Mountain Bike Trail Development Concept Plan

Hassans Walls Lookout: Wallpapers Vista

Prepared by

Rocky Trail Destination

A division of Rocky Trail Entertainment Pty Ltd.

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In consultation with

For: Lithgow City Council

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1 Project Brief

1. To produce a Mountain Biking Trails Strategy that details the infrastructure requirements, and costs, to develop three purpose-built mountain biking trails at Hassans Walls Reserve that are suited to broader scale mountain biking Superflow type events, which are geared to a wide range of riders – from elite to amateur racers to families, couples and groups of friends riding together.

2. Stimulate widespread usage of trails outside of those difficult and technical downhill trails that are generally only accessible to more advanced riders.

3. The Pony Express track will be one of the three trails to be developed, with the expectation that modifications will be made to the more extreme parts of the trail that inhibit usage by mainstream (beginner to intermediate) riders.

The underlying driver for the Mountain Biking Trails Strategy is to enable the Lithgow community to reap the benefits of the booming popularity of mountain biking.

1.1 Project Management

About Rocky Trail Destination

We propose Rocky Trail Destination as the continued driver of this project. As a nature based tourism consultant we are designed to support destination and government agencies grow tourism, economic development and encourage active recreation. We develop business models and master plans to support destinations throughout the implementation and execution processes of those plans.

Our mission is to enable local, regional, state and federal authorities as well as tourism organisations and key players in the outdoor industry and to see trail and tourism destination development or evolution project through from start to finish – developing a right-fit strategy that delivers whole-of-community benefits into the future.

Our objective is to help councils, clubs, tourism organisations and state governments embrace the nature based tourism opportunity at all stages of the destination maturity curve.

Who we are

Rocky Trail Destination is created by a team of passionate entrepreneurs and travellers, bicycle enthusiasts and experienced event managers who are dedicated to making trail-based and bicycle holidays accessible for people of all abilities with all kinds of trail activities as well as recreational cycling, mountain biking or following historic rail trails on two wheels in mind.

With over 12 years' experience working primarily with regional and rural locations to build presence, assets and awareness the Rocky Trail Destination team bring a diverse approach to trail development, management and destination promotion experience together with underlying social physics methodology to provide a more integrated solution than the visitor economy alone.

What we do

We see ourselves as advocates to develop and foster cycle destinations. We will collaborate with all stakeholders and connect them as the missing link in the cycle tourism industry. We want to achieve the best possible outcome for this project by utilising all our connections to the local MTB community, trailbuilders, local council as well as our contacts within other destinations who have successfully worked on similar projects.

Section 7 is an overview of trail building costs and we also included a project delivery service component, which would see Rocky Trail Destination manage the trail building and network launch process for Council. We can assist with community engagement, signage design and installation, marketing, promotional and public relations initiatives and can guarantee a launch event and advertising campaign burst.

Section 8 outlines how Rocky Trail Destination envisages working with Lithgow City Council to help design and implement a strategy to maximise the use of the trail network as proposed in this "Hassans Walls Mountain Bike Trail Development" project document.

Key personnel and assets

Joe Mullan | Development Consultant - NBT and Socio-Economic

Joe combines his passion for the Bike Economy with his experience in Regional Development. Joe been engaged across Australia to design and implement local benefit and social dividend programs for Multibillion dollar megaprojects through to 100k sporting club projects ensuring funds are secured and spent in the most sustainable way. Joe understands the funding process like no other.

As a Director of Rocky Trail Destinations, Joe helps destinations across Australia to understand, embrace and sustain visitation from a wide variety of active and eco-tourism seekers.

Juliane Wisata | Marketing & Strategy Consultant

Juliane has a degree from the Austrian IMC University of Applied Sciences Krems in Export-Oriented Management with focus on international law, logistics and marketing. As a proud alumni, since 2012 she has been teaching the course Entrepreneurship at the university to Bachelor students in the Tourism and Leisure Management Study Course at campuses in Krems/Austria, Baku/Azerbaijan and Sanya/China.

Juliane has a strong skill set in the development and execution of strategic marketing and branding campaigns. She runs a communications consulting business for key clients in the cycling events industry, supporting them with PR services as well as securing and managing major local and state event funding streams.

As a Director of Rocky Trail Destination, Juliane is passionate about regional destination and sustainable tourism development in Australia and keen to activate her global business and social network to develop exciting concepts for clients to not only increase visitation with a wide variety of active and eco-tourism seekers, but also to support regions to nurture existing and attract new residents to build stronger and thriving communities.

Martin Wisata | Operations Consultant

Martin has a degree from the Austrian IMC University of Applied Sciences in Krems in Tourism and Leisure Management with focus on the economics of all tourism sectors, marketing and business management. As the university's Alumni Ambassador for the Asia-Pacific Region he holds a lecturer position, teaching Entrepreneurship to Bachelor students in the Tourism and Leisure Management Study Course at campuses in Krems/Austria, Baku/Azerbaijan and Sanya/China.

As a Director of Rocky Trail Destination Martin Wisata combines his tourism and leisure management background with his passion for cycling. He is a very strong project manager with thorough financial and operational skills. His passion is destination management and has become a very active opinion leader for cycling event and trail-based activities, land management and destination development in Australia.

Sister company: Rocky Trail Entertainment Pty Ltd

Juliane and Martin Wisata founded Rocky Trail Entertainment Pty Ltd in 2008. It is now the major private cycling events company in Australia and with over 30 races planned for 2020 the only mountain bike events promoter in Australia who runs events across the entire annual calendar across NSW, the ACT, QLD and VIC.

Our business vision is to entertain, engage and excite cyclists and mountain bikers around Australia and be the leading mountain bike outdoor adventure specialist of choice.

We provide a powerful promotional platform to sponsors and a huge variety of events covering cross-country, marathon, multi-day and enduro events – in fact, Rocky Trail Entertainment coined the term "Superflow" for their types of enduro events. With its focus on the quickly-expanding amateur and all abilities and age-inclusive format, the Superflow race concept has become the fastest-growing gravity format in Australia. Superflow races are now held across NSW, the ACT and in Queensland.

Rocky Trail Entertainment attracts a wide range of cyclists and have established a broad network of suppliers, contractors, opinion leaders and venue managers in the Australian Cycling Industry.

Rocky Trail Events

The business manages over 30 mountain bike races annually across NSW and the ACT and as of 2020 also in QLD in three major event categories - Cross-country (47%), Marathon, multi-day stage race (8%), Superflow (45%). In 2020 we forecast to attract more than 4,500-5,000 riders and an estimated 2,000 spectators and other event participants annually into over 20 regions across the East Coast of Australia.

Rocky Trail Communications

PR and media projects for key clients in the cycling industry – athletes and cycling initiatives. We have experience Australia-wide and have also been working on client projects overseas, including the Crocodile Trophy, Alpentour Trophy and Mongolia MTB Challenge stage races.

Rocky Trail Racing Team

Rocky Trail summons cyclists to attend national and international stage races, managed by Martin Wisata.

Rocky Trail Academy

The Rocky Trail academy schools events not only engage youth in healthy social and active recreation but brings a heightened appreciation of nature, the environment, self-reliance , self-learning and independence, all as part of riding a bike in the outdoors. By extension, this program also engages and educates teachers and parents.

Rocky Trail Events in Lithgow

Rocky Trail has held Downhill races at the Pony Express endorsed by the local MTB club for about 10 years until 2016/2017. It has been difficult for the club to maintain the trails as the downhill market is in decline – this is why we propose the Superflow-style of trails in this project as they will attract a broad range of mountain bikers not just to events, but also for ongoing visitation.

Jetblack 24 Hour Endurance Event

Rocky Trail's ultra-endurance event, the Jetblack 24 Hour has had its home in Lidsdale State Forest in Rydal since 2017. Attracting Australia's top endurance and marathon racers, it has become a hugely popular event with the casual mountain bike riders and racers thanks to the uniquely comfortable set up of the event village, which we have been able to achieve in Rydal.

The 2019 edition of the JetBlack 24 Hour with its JetBlack 6+6 Hour offspring took place at Rydal Showgrounds near Lithgow on 23+24 March 2019. More than **300 race competitors** from all over NSW and the ACT raced in teams of up to 6 in the 24 Hour competition and up to 4 in the 6+6 Hour event, clocking in almost 2,900 laps and recording more than 27,500 racing kilometers over the weekend.

The Jetblack 24 Hour once again transformed the Rydal Showgrounds in Lithgow into a vivid mountain bike event centre and tent village over the weekend with 435 racers and overnight event visitors plus an est. 50 local spectators**, injecting more than $250,000 into the local economy**.

Entering its second decade the 11th edition proved that the 24-hour racing concept is more and more becoming a social affair: **more than a third of all racers competed in the teams of six-classification** – and whilst everyone from solo to team participant races hard and gives into this unique endurance challenge, **it's all about that fun weekend away with fellow mountain bikers, family and friends - and this aspect is what we will put a strong emphasis on for the future promotion and growth of this event.**

1.2 Project consultant

The project consultant and mountain bike trail construction expert as part of this submission is **Next Level Mountain Bike**. This trail building business has a strong expertise in industrial design and an extensive background of MTB coaching, which enables the team to design top quality trails suitable for all skill levels.

Next Level MTB brings 15 years of experience in trail building to the construction of IMBA-standard hand-built and machine-built trails. This company constructs sustainable, long-lasting trails using techniques to optimise safety for riders and minimise risk to land-owners. The team around business owner Marcelo Cardona is highly experienced in working to local Council and Parks and Wildlife safety standards and environmental protection standards.

Project milestones 2020

June-July	Desktop research and virtual cooperative project planning process and definition of deliverables between Rocky Trail Destination and Next Level MTB teams.
August	A core team of trail consultants conducted a three-day on-site visit at Hassans Walls and in the Lithgow region to audit existing and assess the potential for new trail development. • Project Manager & Operations: Martin Wisata (Director, Rocky Trail Destination) • Trail consultant: James Hall (Contractor Next Level MTB)
September	Collaborative design of project outcome report
October	Submission of outcome report to Lithgow City Council

In the following we present the project outcomes outlining trail construction costings in detail including the construction as well as project management processes.

2 Lithgow as a Mountain Bike Destination

Lithgow is 140km west of the Sydney CBD, and the 'Gateway to the Central West'. It is connected to the Sydney electric rail system, with about 15 train services per day. Hassans Wall Reserve is located immediately south of the Lithgow CBD. A short ride of about 3km will take visitors from the railway station to the northern end of Hassans Wall Reserve.

> "Hassans Wall Reserve is a regionally important bushland open space area managed to protect its significant natural, heritage and scenic values while also providing environmentally sustainable nature-based or natural-setting recreation opportunities to the local and regional community."
>
> Hassans Wall Reserve Plan of Management, 2017.

The Blue Mountains environment and terrain present exceptional mountain bike development opportunities. Currently, mountain biking infrastructure is in its infancy across much of Australia when compared to other countries around the world. The Blue Mountains region has the potential to offer a truly world class riding destination and the Hassans Walls presents an opportunity to get the ball rolling. The Hassans Walls Reserve is home to the highest point in the Blue Mountains. The expansive views on offer from the various lookouts rival anything in the region for hundreds of kilometres.

The objective of the project is to develop a modern, sustainable, high quality trail network in the Hassans Wall Reserve that caters to riders of all skill levels and facilitates skill progression in the safest possible manner. An essential part of any trail network is an easy climb trail that enables riders of all skill levels to reach the summit trail head. Incorporation of an easy dual use climb trail into the Hassans Wall trail network would provide access to the spectacular summit lookout to both riders and walkers. Modern mountain bikers demand purpose-built single track; use of fire trails is no longer acceptable. It is highly recommended that the Hassans Wall trail network design includes not only three descending trails of varying difficulties, but also an easy climb trail.

2.1 The Market

There is currently a dearth of riding opportunities available to mountain bikers in Sydney, especially those seeking an extended gravity format. Lithgow's proximity the most populous centre in Australia puts it in a strong position to capitalise on the demand for quality riding destinations.

One big advantage of the Hassans Walls Reserve is the publicly accessible Hassans Walls Road to the summit and proposed trailhead. This creates the opportunity for riders to self-shuttle, or for local entrepreneurs to start shuttle businesses. Gravity descents are the most popular format of mountain biking and are also the most easy to monetise (Pröbstl-Haider et al. 2018). Shuttle businesses have proven successful throughout Australia. In areas with good vertical elevation and gravity trails, riders will happily pay for comfortable and reliable transport back to the top of the hill ("Omeo Mountain Bike Destination. 2019"). Derby, Tasmania, for example has at least three commercial shuttle

operators. An opportunity would be created for the Lithgow City Council to generate revenue through commercial shuttle licensing. This revenue could then be used towards the upkeep of Hassans Wall Road and the mountain bike trail network.

The economic impact of a high-quality mountain bike trail network will benefit the local community and city of Lithgow. Local expenditure on accommodation, food and transport reliably increases after the opening of a high-quality mountain bike trail network (Pröbstl-Haider et al. 2018). A trail network design that enables competitive events (superflow, enduro and downhill) will draw hundreds of participants, along with event managers, workers, friends and families. Both non-competitive and competitive events will add value to the region's economy.

Derby, in Tasmania, is an example of how mountain biking can kick-start an economy.

"A ghost town of just 173 people just three years ago, Derby is now a renowned MTB hotspot that generates $23 million a year."

https://www.mtba.org.au/wp-content/uploads/CCJ17427-Blue-Derby-Case-Study.pdf

There are currently about 90 km of trails in the Blue Derby network. It is not necessary to build such a large network of trails to gain significant economic benefit. Small mountain bike projects can attract similar visitor numbers to large-scale projects.

Smithfield Mountain Bike Park in Queensland is only 16 km from Cairns. It has approximately 25km of trail and sees 33,600 users per annum.

Forrest in Victoria, a 1.5-hour drive from Melbourne has 65km of trail and sees usage volumes of between 22,000 – 25,000 per annum

The Wild Mersey project in Tasmania is a great example. Due to its proximity to population centres, the 16km section of stacked loops in the Warrawee Reserve has seen usage volumes similar to that of Blue Derby, with 25,000-30,000 users annually.

Economic benefits of mountain biking are further detailed in

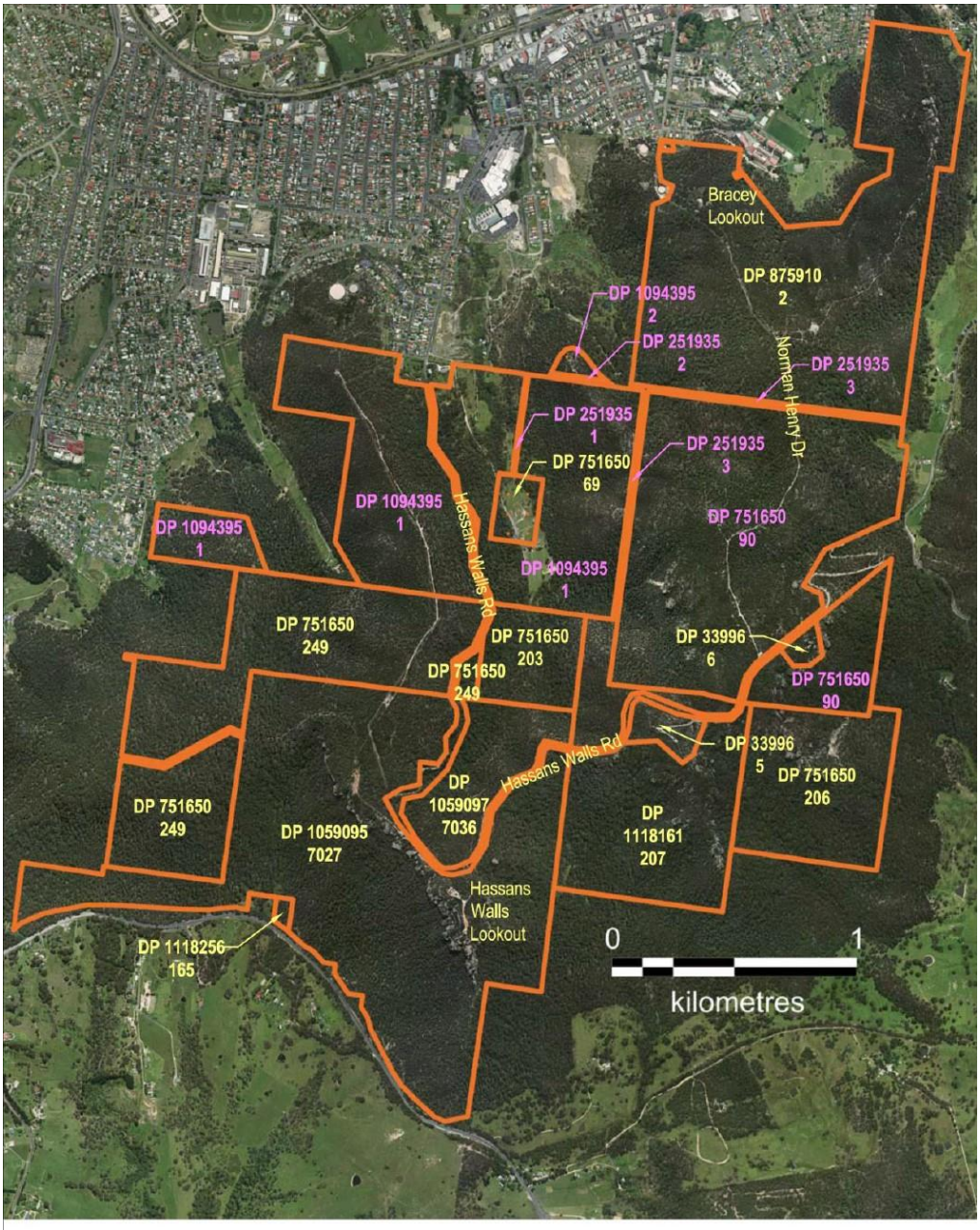
https://adventure.com/mtb-mountain-biking-saving-tiny-towns/

Building trails of 'Quality over Quantity' is recommended as a successful strategy for Lithgow to reap the benefits of mountain bike tourism. To incentivise travel from Sydney to Lithgow, the trail network will need to rival or surpass the quality found at current popular mountain bike destinations around NSW and further afield in Australia.

3 Pre-design Stage

3.1 Land Managers

Hassans Wall Reserve is a 780-hectare area split into 17 parcels of both Community Land and Crown Land managed by Lithgow City Council (fig.1). Lithgow City Council is responsible for the Reserve's care, control and management. The great majority of the Reserve is zoned as Environmental Management under the Lithgow Local Environment Plan 2014.



Map 1.

3.2 Aboriginal heritage

All Aboriginal heritage is protected under the NSW Heritage Act 1977.
Known sites of cultural significance will be identified, and trails routed at an appropriate distance away. If any evidence of Aboriginal heritage is encountered during construction, all excavation and ground-disturbing works will cease and the Office of Environment and Heritage (OEH) will be contacted immediately ((02) 9995 5000 or info@environment.nsw.gov.au).

The Hassans Wall Plan of Management (HWPoM) outlines that;

> "The Reserve lies close to the boundary of the traditional lands of the Darug and Wiradjuri Aboriginal People who would have occupied the area prior to European settlement."

> "The Aboriginal Heritage Information Management System (AHIMS) records do not include any publically available information on Aboriginal sites or Places in Hassans Wall Reserve. Interpretive material at Hassans Wall Lookout notes that middens and rock art are present in the Hassans Wall Reserve however the Wiradjuri traditional owners desire that the location of such sites is not publicly disclosed."

Wiradjuri traditional owners will need to be notified of this construction plan and proposed trail alignments within the Hassans Wall Reserve. To ensure these undisclosed sites will not be disturbed during construction, necessary amendments to the design will be made with advice from traditional owners.

Formal permissions form the Wiradjuri traditional owners must be obtained before any ground disturbing works can commence.

3.3 European Heritage

Three walking tracks constructed around the time of WWI are noted in the 1998 Blue Mountains Walking Track Heritage Study by the NSW National Parks and Wildlife Service. One track leading from Hassans Walls Road in Lithgow Township to the Hassans Walls Lookout was built in 1910. In 1930 the track was upgraded to a dirt road as part of an Unemployment Relief programme, chiefly using manpower and some explosives. The HWPoM states

> "Although some sections of the Browns Gap Track, and the first section of the 1915-16 Heffernans Pass, remain intact other parts of these routes have been substantially altered, and none of the three original walking tracks are regarded as having heritage significance."

The construction of mountain bike trails along the proposed alignments will not have an effect on any three of these tracks. If parking capacity at the Hassans Walls lookout were to eventually be increased, some of the remaining intact sections of Browns Gap Track and Heffernans Pass may be affected.

3.4 Water Management

The annual rainfall for Lithgow is 908mm. It can be expected that rainfall may be slightly higher atop of the Hassans Wall. This level of rainfall presents no particular problem for trail construction or ongoing maintenance outside of usual scheduled maintenance.

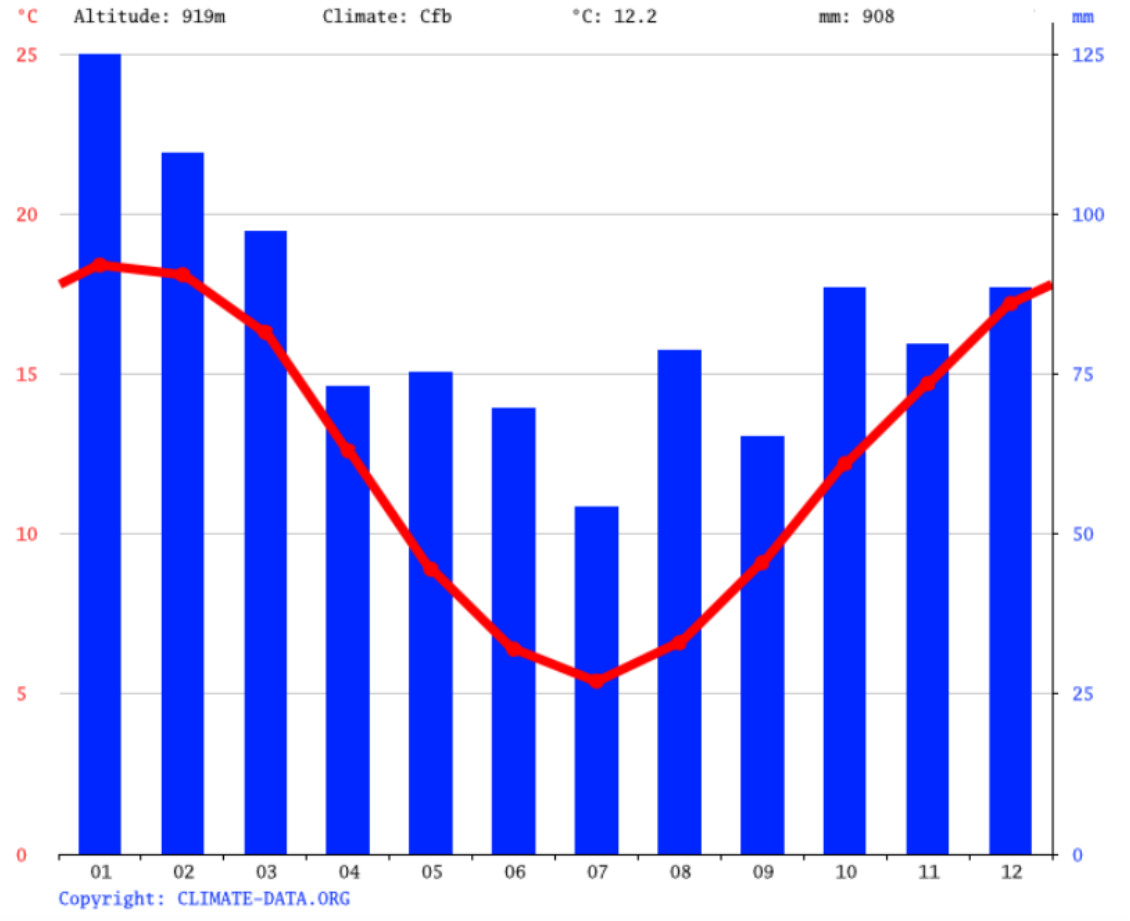


Table 1. Lithgow weather- Climate-Date.Org

The proposed trail alignments avoid wet areas identified during desktop surveys and ground truthing to reduce construction cost and environmental impact. Despite best judgement, it is still possible that unforseen springs can be found on the trail contour during the construction stage. These can be dealt with by either rock armouring the trail tread or digging a turnpike (diversion drain) above the trail to redirect the water onto rock armours or culverts under the trail.

After high rainfall or flooding events, trails should be closed until a comprehensive inspection of the network can be conducted and any issues remedied.

Hassans Walls Lookout: Wallpapers Vista

3.5 Fire Risk

The HWPoM found that "The Hassans Wall Reserve has been identified as a high risk for bushfires under the Lithgow Bush Fire Risk Management Plan 2015 (NSW Rural Fire Service, 2015). The whole of the Reserve is managed as a Strategic Fire Advantage Zone (SFAZ) which recognises that hazard reduction burning around specific assets is necessary as well as back burning during bushfire events. Currently there is no Reserve specific fire management plan that informs the Lithgow Bush Fire Risk Management Plan 2015."

During times of high fire danger, it is recommended to close the mountain bike trails in line with current procedures for reserve access in NSW. A boom gate at the entry to the reserve on Hassans Wall Road should be constructed, allowing land managers to restrict access. Temporary trail closure signage should be installed at the entry and exit of each trail during these times.

After a fire has occurred in the area trails should remain closed until a comprehensive inspection of the network can be conducted by an appropriately body and any damage repaired.

3.6 Geotechnical and Historic Mining Activity

There is no record of Geotechnical Assessment undertaken in the proposed mountain bike trail construction area. The HWPoM states:

> "The Reserve is underlain by extensive mining activity (from 120 to 180m beneath the surface) associated with both the Lithgow Valley and Hassans Wall Colliery Workings. Mining beneath the Reserve appears to have not occurred since the early 1970's. There have been a number of escarpment rock falls and there are innumerable cracks in the sandstone surface rock that are obvious at Hassans Wall Lookout and the escarpment to the west."

Historic mining activity appears to have taken place away from the proposed trail alignments. In 1998 Council approached the NSW Mine Subsidence Board regarding mine subsidence and rock formation cracking and potential impacts of ongoing recreational use of the Reserve. The process appears to have been inconclusive in determining the extent of the cracks and the potential for ongoing rock falls and the associated risk to visitors to the Reserve.

Best judgment was used when designing new trail alignments, however given the geological instability of the sandstone in the area it is recommended that a geotechnical assessment be undertaken. The assessment should include areas immediate to and surrounding the new trail alignments, identifying potentially unstable areas that need to be avoided. The HWPoM estimated the cost of a geotechnical assessment to be $40000 for the entire Hassans Wall Reserve. NLMB estimate that a geotechnical assessment for the proposed construction area to be around $10,000.

3.7 Other regional projects

The Lithgow Regional Economic Development Strategy (REDS) for 2018-2022 identified one of Lithgow's key endowments is that the region has an abundance of natural and recreational amenities. One of the REDS key strategic directions is the prioritisation of liveability/lifestyle infrastructure and local place-making.

Currently there are no other developments planned for the Hassans Wall Reserve that will impact on the development of mountain bike trails. Minor projects focused on upgrading existing infrastructure in the reserve were recommended in the HWPoM and will only compliment the development of the Hassans Walls as a mountain bike destination.

3.8 Local and regional MTB Clubs

The Central Tablelands Mountain Bike Club (CTMBC) are the current informal custodians and managers of mountain bike trails in the Reserve. The Club was contacted for comment on the project and preliminary plans. The following has been modified to read more succinctly, however the overarching messages remain the same*;

> *"The CTMBC formed in 1984 making it one of the first standalone MTB clubs in Australia and local riders have been utilising trails on Hassan Walls since bikes had rubber tyres.*
>
> *The club has long known the potential for mountain bike development in the Hasssans Walls reserve. The first official trail off the reserve was the Gun Club track which was built in the 90s and hosted several State and National races as well as the Oceania DH championships.*
>
> *Other trails in the area have a rough and less kept feel which is in keeping with the feel and character that Hassans Walls has developed over the last 40 years.*
>
> *Upon hearing of potential modification to existing trails (Pony Xpress rebuild), I was a little reluctant. This trail has a distinct character I'd hate to lose. The addition of new trails however would be greatly supported.*
>
> *There are some sensitivities around the area with the local pony club, they have the lease and generously allow us in. We need to make sure we stay on their good side. Pony days are generally only once a month but they do have additional days. Riding through the main grounds while there is a horse event on is highly discouraged.*
>
> *If the trails could be devised so they keep riders up in the bush land to bypass the arena area outside of MTB event days this would be preferable.*
>
> *There are some rare plants and rare butterfly habitat the trails needs to avoid as well.*

The CTMBC is looking forward to seeing this project get up"

These comments were taken on board and the preliminary design presented in this plan, aligns closely with the values of the CTMBC. Before the detailed design stage the CTMBC will be contacted. All members of the club will be invited to a meeting and given an opportunity to comment on the plans.

*Original transcript available on request pending permission from club member Craig Flynn.

Website: www.ctmbc.netwww.ctmbc.net

Email: ctmbc2@gmail.com

Facebook: www.facebook.com/CentraltablelandsMTB/

3.9 Other Users and Potential Conflict

The Hassans Wall Reserve is used for recreation by a number of different users with varying needs and priorities;

3.9.1 Horse riders and the Lithgow Pony Club

The Pony Express mountain bike trail terminates several hundred metres upslope from the area used by the Lithgow Pony Club and bike riders and walkers regularly walk through the area en-route back to Hassans Wall Road.

The Central Tablelands Mountain Bike Club and the Lithgow Pony Club have agreed that mountain bike riders will dismount and walk through the Pony Club area when horses are present. The new proposed trail will pass outside of the Pony Club area.

3.9.2 Walkers and Trail Runners

The proposed climb trail for the new Hassans Wall mountain bike trail network can potentially be used as a dual use trail. By constructing the easy (green circle) climb to dual use IMBA standards, a wider trail with a shallow gradient could be utilized by walkers and trail runners to access Hassans Wall Lookout. This would improve user experience, reduce pedestrian traffic on Hassans Wall Road and reduce the likelihood of collisions between traffic and recreational users. Mountain bikes would only be permitted to use the trail in the ascending direction where excessive speed are not possible. Walkers and trail runners would be permitted in both directions.

Offering a dual use trail as part of the design may expand funding opportunities for the project.

3.10 Sightseers (local and tourists)

Hassans Walls Lookout is the most popular destination on Hassans Walls Road, receiving just under 70% of all vehicle-based visits. The reserve received an estimated 2,245 people* visiting by vehicle in a two week period (including a long weekend) in June 2016.

Traffic up the Hassans Wall Road would be expected to increase due to mountain bikers self-shuttling with private vehicles and the potential for commercial shuttle service operation. Low levels of congestion along the road and at the Hassans Wall lookout should also be expected during peak operating hours (weekends ~10am-3pm).

This will see an increase in dust and noise pollution adjacent to Hassans Wall Road. Maintenance of the road may be required more frequently to deal with the increase in traffic flow.

*(based on the industry standard 2.5 persons per vehicle)

3.10.1 School groups

Currently the only sanctioned trail in the reserve is unsuitable for school use, requiring advanced skills to navigate. The development of an easy (Green) and an intermediate (Blue) would facilitate safe outdoor teaching and recreation at local schools.

3.10.2 Cliff Based Recreation and Activities

Rock climbing and abseiling are currently occurring on an infrequent basis.

The State Emergency Service and other organisations such as the Mine Rescue Station occasionally use the site for training.

The proposed trail alignments will have no adverse effect on these activities.

Overall the development of the Hassans Wall Mountain Bike Trail Network will have minimal ill effects on the current user base and natural values of the reserve. By following correct community consultation procedures, concerns about the development can be addressed and, if required, amendments made to the design.

3.11 Town Services

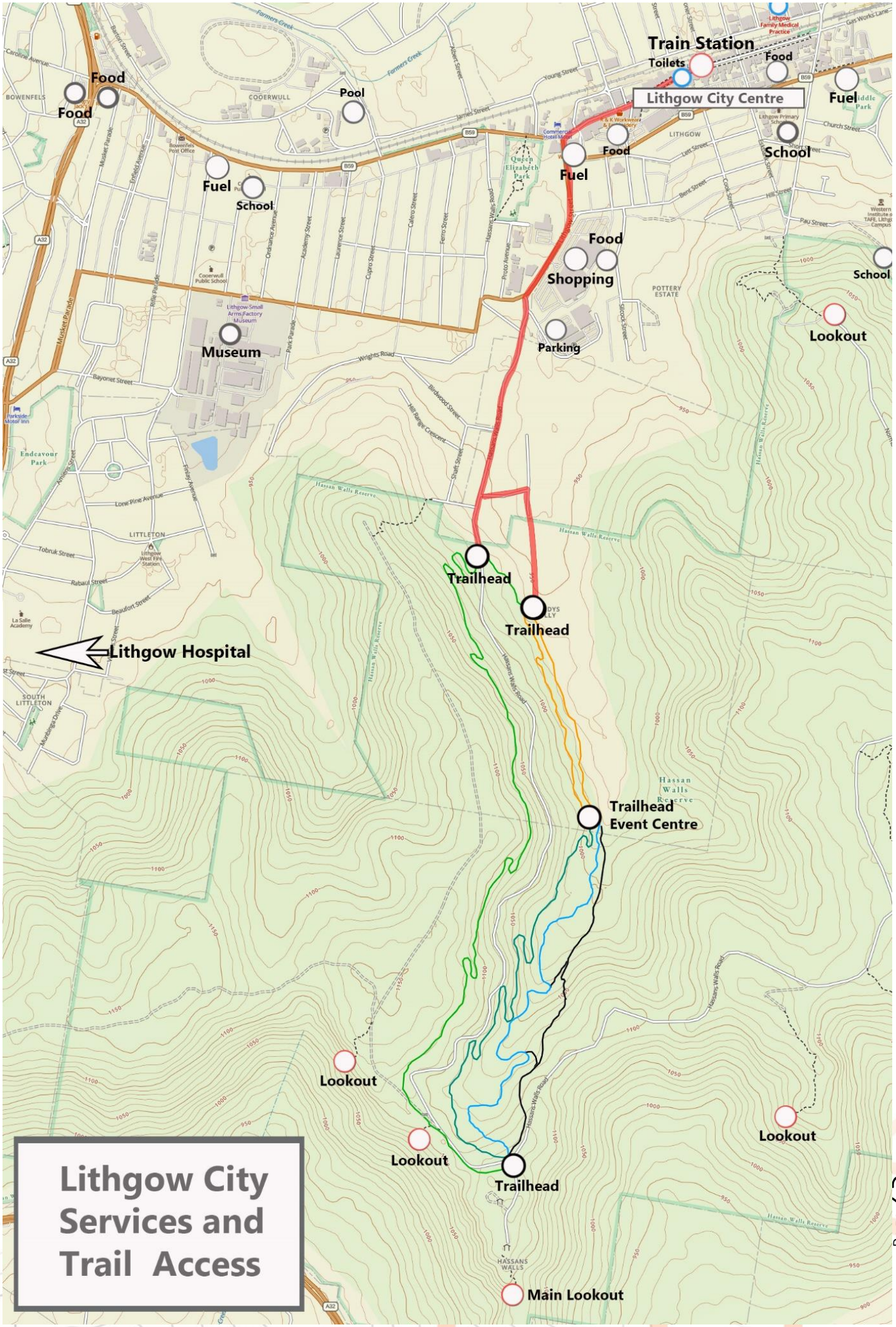
Mountain bikers require essential services. Lithgow is in a strong position in this regard. It has:

- Supermarkets
- Lithgow Hospital
- Fast food outlets and restaurants
- Cafés
- Public Toilets
- Hotels, accommodation, caravan parks and camp sites
- Train station
- Service stations

Lithgow Hospital is a short seven-minute drive from the City Access Trailhead and a twelve-minute drive from the Summit Trailhead.

One important service missing from Lithgow is a well-stocked, accessible bicycle sales, parts and repairs shop. With a commercially constructed trail network, it can be expected that a bicycle shop would soon open in Lithgow. The current lack of a bike shop would certainly deter some non-local riders from visiting.

The council can create business confidence in the community by running public consultation sessions regarding the proposed Hassans Wall Mountain Bike Trail Network. By outlining a design and construction timeline, interested parties can begin planning new businesses to be ready for the opening of the trail network.


Train Station
Toilets
Food
Fuel
Lithgow City Centre
Food
Fuel
School
Pool
Food
Fuel
School
Food
Shopping
Parking
School
Lookout
Museum
Trailhead
Trailhead
Lithgow Hospital
Trailhead
Event Centre
Lookout
Lookout
Lookout
Trailhead
Main Lookout
Lithgow City Services and Trail Access

3.12 Local Businesses and stakeholders

It is important to educate and prepare current local businesses and prospective business owners on the wants and needs of mountain bikers.
Additional requirements of Mountain bike tourists include;

Accommodation

Bike friendly accommodation ranging from budget to boutique.
Secure bike storage for overnight stays (preferably independent to each room).
Work area with a bike repair stand and basic bike tools supplied.
Bike wash station.
Wet area/porch to remove dirty clothes and gear.

Transport

Easy access to Lithgow with a means of bringing a bike.
Bike friendly roads to move about the city.

Food

A range of tasty and nutritious meals, snacks and drinks aimed at varying budgets.
Craft beers, ciders and spirits.

Hire services

Good range of Mountain bike and E-bike hire for a range of budgets and skill levels.
Protective gear.
Parts sales and repairs.

Shuttle, tours and guides

Reliable, frequent shuttle services from the lower trail head to the summit.
Guided tours of the trail network, including skills coaching.
Holding community consultation meetings and information sessions during the design stage will allow the Lithgow community to build or modify their businesses to meet the needs of mountain bikers and be ready for operation when the trails open.

3.13 Existing complementary activities for non-riders

The City of Lithgow and surrounding area has a diverse range of attractions. This elevates the potential of Lithgow as a mountain bike destination because it provides non-riding family members alternative entertainment options. Attractions Include;

- Hassans Wall Lookout
- Bracey Lookout
- ZigZag Brewery
- Fireball Paintball
- Endeavour Park
- Emora Park
- Lithgow Visitor Information Centre
- Lithgow Small Arms Factory Museum
- Lithgow Dog Park and Recreation Area
- Lithgow Blast Furnace
- Lithgow State Mine Heritage Park and Railway
- Lithgow Golf Club

The current range of attractions for non-riders will provide ample entertainment for short term stays (1-2 days). This matches the expected stay durations of non-local riders for the project, making Lithgow quite attractive as a weekend getaway destination for couples and families.

3.14 Environmental Sustainability

Trail construction is constrained by the Hassans Wall Zoning Scheme. All new proposed mountain bike trails should be within The Managed Use Bushland Zone, avoiding the Conservation Zones (green) in the Hassans Wall Reserve (fig. 1).

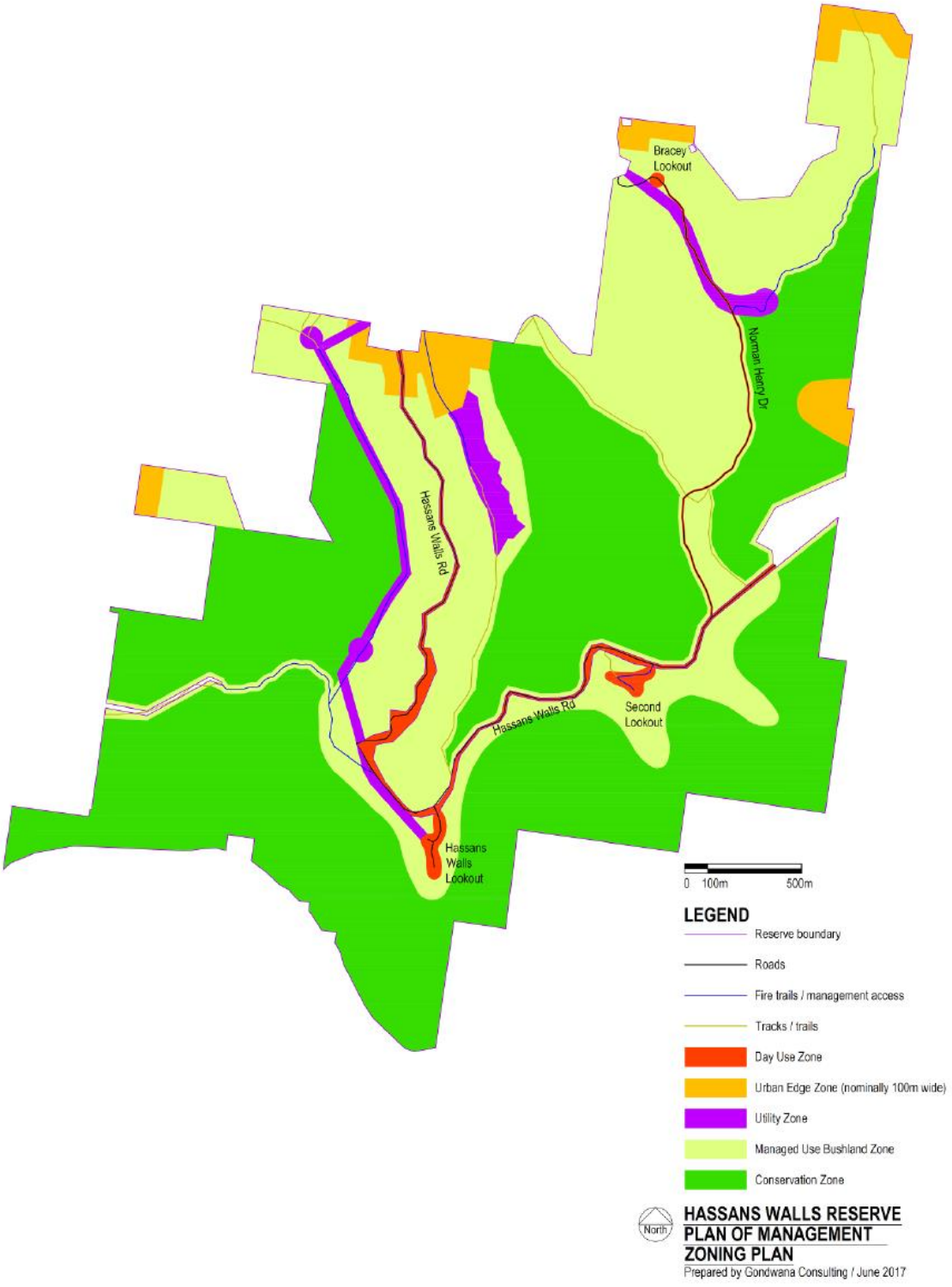


Figure 1

Habitat of the endangered Purple Copper Butterfly *Paralucia spinifera* will need to be identified with assistance from an appropriate environmental consultant. Trail alignments will avoid sensitive habitat, which can be isolated during trail construction to prevent trampling.

Image 1. Purple Copper Butterfly, Picture: SIMON NALLY/ OEH - Lithgow Mercury

Trail design will utilise best practice methodologies as outlined by the International Mountain Bike Association (IMBA) to minimise the environmental impact of constructing new trails, prevent erosion and improve longevity.

All workers and contractors must be trained in the risks of spreading pathogens and weeds and risk mitigation strategies. If available, provide maps to participants with the Location of any infested and clean areas, along with wash-down locations should be mapped.

All plant, machinery, equipment and personnel should undertake a comprehensive wash-down prior to arriving on site, as per the Arrive Clean, Leave Clean guidelines 2015.

Wastes generated by personnel, plant/equipment maintenance and cleaning will be securely stored and removed from site.

International Mountain Bike Association standards (IMBA) for trail design and construction should be adhered to.

IMBA guidelines on water management and erosion prevention are especially important in gravelly soils with low plasticity, such as those found around Lithgow.

Half Rule: a trail's gradient should not exceed half the gradient of the hillside or slope it is traversing.

Ten Percent Average Guideline: an average trail gradient of less than 10% is recommended for most trails. Some short sections of trail can exceed this percentage on hardened, rocky soils.

Maximum Sustainable Grade: Each TDRS (Trail Difficulty Rating System) category has a pre-determined maximum gradient. Trails must be built to comply.

New In-slope-Out-slope guideline: It is essential to allow water to sheet across the trail and not down the trail. A 5% outslope is recommended, but it is essential to have sections of in-slope or level tread to allow for traction. Good traction encourages riders to stay within the trail contour, not expanding it or creating brake bumps which disperse soil and degrade the trail.

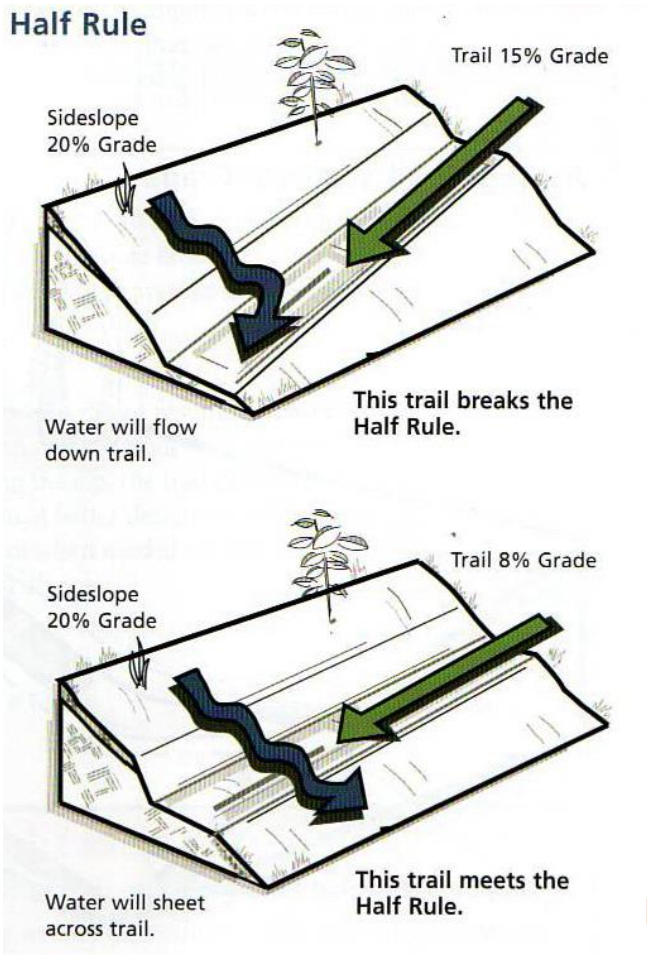


Figure 2 Half Rule

Grade Reversals: These encourage water to exit the trail tread and, when combined with in-slope/level tread/ out-slope in a regular rhythmic combination will produce fun, sustainable trails.

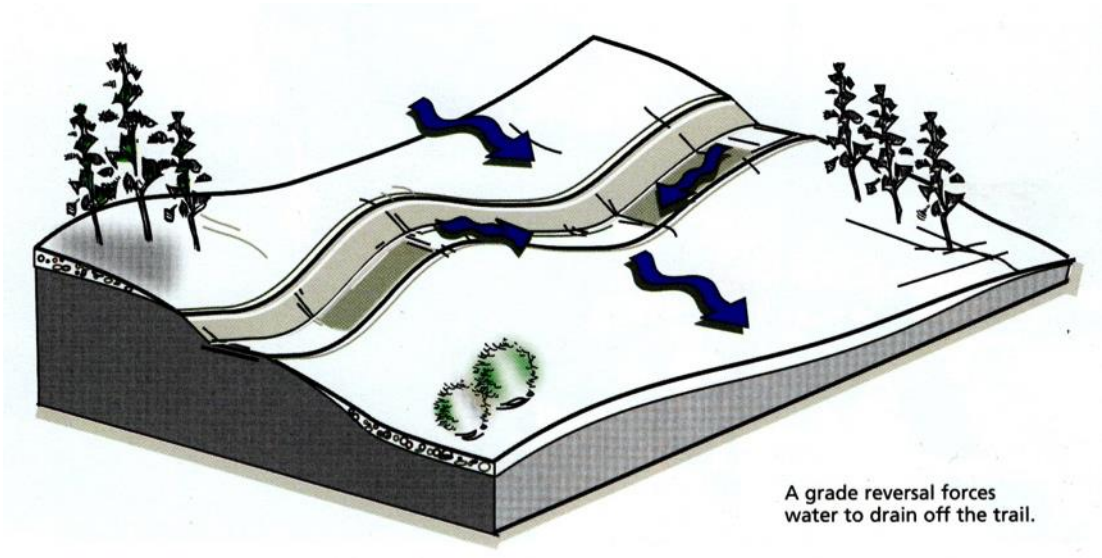


Figure 3. Grade reversals

Full Bench Trails: These provide a long-lasting sustainable solution for erosion control because trails are constructed by carving into solid ground rather than using soft in-fill material that erodes over time.

The most recent IMBA trail design guidelines (IMBA: Turning Trails Inside Out, 2020)

IMBA Australia Guidelines on trail difficulty are outlined in the tables below

IMBA Australia Trail Difficulty Rating System

Difficulty Symbol	*Short Description*
	**Very easy** Wide trail with a gentle gradient smooth surface and no obstacles Suitable for beginner cyclists with basic bike skills, and most bikes
	**Easy** Wide trail with a gentle gradient smooth surface Some obstacles such as roots, logs and rocks Suitable for beginner cyclists with basic mountain bike skills, and off-road bikes
	**Easy with Intermediate Sections** Likely to be single track with a moderate gradient, variable surface and some obstacles Some obstacles such as roots, logs and rocks Suitable for mountain bikers with mountain bikes
	**Intermediate** Single trail with moderate gradients, variable surface and obstacles May include steep sections Suitable for skilled mountain bikers with mountain bikes
	**Intermediate with Difficult Sections** Suitable for competent mountain bikers, used to physically demanding routes Expect large and unavoidable obstacles and features Challenging and variable with some steep climbs or descents and loose surfaces
	**Difficult** Suitable for experienced mountain bikers, used to physically demanding routes Navigation and personal survival skills are highly desirable Expect large, dangerous and unavoidable obstacles and features Challenging and variable with long steep climbs or descents and loose surfaces Some sections will be easier to walk
	**Extreme** Suitable for highly experienced mountain bikers, used to physically demanding routes Navigation and personal survival skills are highly desirable Severe constructed trails and/ or natural features, all sections are challenging Includes extreme levels of exposure and / or risk Expect large and unavoidable obstacles and features Some sections will be easier to walk

Very easy mountain bike trail / Fire trail

		Technical Description (for land Manager use)
	Grade of trail	Very easy
	Description	Likely to be a fire road or wide single track with a gentle gradient, smooth surface and free of obstacles
Guiding Criteria	**Trail Width**	2100 mm plus or minus 900 mm
Guiding Criteria	**Trail Surface**	Hardened or smooth
Guiding Criteria	**Trail Gradient**	Climbs and descents are mostly shallow Ave. trail grade – less than 5% Max. trail grade – 10%
Guiding Criteria	**Quality of Markings**	Trailhead signs and route markers at intersections
Mandatory Criteria	**Level of Trail Exposure**	Firm and level fall zone on either side of the trail corridor
Mandatory Criteria	**Natural Obstacles and Technical Trail Features (TTFs)**	No obstacles
	Experience Required	Suitable for beginner / novice cyclists with basic bike riding skills Suitable for most bikes

Easy mountain bike trail

		Technical Description (for land Manager use)
	Grade of trail	Easy
	Description	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
Guiding Criteria	**Trail Width**	900 mm plus or minus 300 mm
Guiding Criteria	**Trail Surface**	Mostly firm and stable
Guiding Criteria	**Trail Gradient**	Climbs and descents are mostly shallow, but trail may include some moderately steep sections Ave. trail grade – 7% or less Max. trail grade – 15%
Guiding Criteria	**Quality of Markings**	Trailhead signs and route markers at intersections
Mandatory Criteria	**Level of Trail Exposure**	Exposure to either side of the trail corridor includes downward slopes of up to 10%
Mandatory Criteria	**Natural Obstacles and Technical Trail Features (TTFs)**	Unavoidable obstacles to 50mm high, such as logs, roots and rocks Avoidable, rollable obstacles may be present Unavoidable bridges 900mm wide Short sections may exceed these criteria
	Experience Required	Suitable for beginner / novice mountain bikers with basic mountain bike skills Suitable for off-road bikes

Easy / Intermediate mountain bike trail

		Technical Description (for land Manager use)
	Grade of trail	Easy with Intermediate Sections
	Description	Likely to be single track with a moderate gradient, variable surface and some obstacles Short sections may exceed these criteria
Guiding Criteria	**Trail Width**	750 mm plus or minus 200 mm
Guiding Criteria	**Trail Surface**	Mostly firm and stable
Guiding Criteria	**Trail Gradient**	Climbs and descents are mostly shallow, but trail may include some moderately steep sections Ave. trail grade – 7% or less Max. trail grade – 20%
Guiding Criteria	**Quality of Markings**	Trailhead signs and route markers at intersections
Mandatory Criteria	**Level of Trail Exposure**	Exposure to either side of the trail corridor includes downward slopes of up to 20%
Mandatory Criteria	**Natural Obstacles and Technical Trail Features (TTFs)**	Unavoidable obstacles to 100mm high, such as logs, roots and rocks Avoidable, rollable obstacles may be present Unavoidable bridges 900mm wide Short sections may exceed these criteria
	Experience Required	Suitable for beginner / novice mountain bikers with basic mountain bike skills Suitable for off-road bikes

Intermediate mountain bike trail

		Technical Description (for land Manager use)
	Grade of trail	Intermediate
	Description	Single trail with moderate gradients, variable surface and obstacles Dual use or preferred use
Guiding Criteria	**Trail Width**	600 mm plus or minus 300 mm
Guiding Criteria	**Trail Surface**	Possible sections of rocky or loose tread
Guiding Criteria	**Trail Gradient**	Mostly moderate gradients but may include steep sections Ave. trail grade – 10% or less Max. trail grade – 20%
Guiding Criteria	**Quality of Markings**	Trailhead signs and route markers at intersections
Mandatory Criteria	**Level of Trail Exposure**	Exposure to either side of the trail corridor includes downward slopes of up to 20%
Mandatory Criteria	**Natural Obstacles and Technical Trail Features (TTFs)**	Unavoidable obstacles to 200 mm high, such as logs, roots and rocks Avoidable, obstacles to 600 mm may be present Unavoidable bridges 600mm wide Short sections may exceed these criteria
	Experience Required	Suitable for skilled mountain bikers with basic mountain bike skills Suitable for mountain bikes

Intermediate / Difficult mountain bike trail

		Technical Description *(for land Manager use)*
	Grade of trail	Intermediate with Difficult Sections
	Description	Likely to be a challenging single trail with moderate gradients, variable surface and obstacles Dual use or preferred use
Guiding Criteria	**Trail Width**	600 mm plus or minus 300 mm
	Trail Surface	Possible sections of rocky or loose tread
	Trail Gradient	Mostly moderate gradients but may include steep sections Ave. trail grade – 15% or less Max. trail grade – 20%
	Quality of Markings	Trailhead signs and route markers at intersections
Mandatory Criteria	**Level of Trail Exposure**	Exposure to either side of the trail corridor includes downward slopes of up to 25%
	Natural Obstacles and Technical Trail Features (TTFs)	Unavoidable obstacles to 300 mm high, such as logs, roots and rocks Avoidable, obstacles to 1000 mm may be present Unavoidable bridges 600mm wide Short sections may exceed these criteria
	Experience Required	Suitable for competent mountain bikers with good mountain bike skills Suitable for mountain bikes

Difficult mountain bike trail

		Technical Description *(for land Manager use)*
	Grade of trail	Difficult
	Description	Likely to be a challenging single trail with steep gradients, variable surface and many obstacles Single use and direction Optional lines Suitable for cross country, downhill or trials
Guiding Criteria	**Trail Width**	300 mm plus or minus 150 mm for tread and bridges
	Trail Surface	Variable and challenging
	Trail Gradient	Contains steep descents and climbs Max. trail grade – 25%
	Quality of Markings	Trailhead signs and route markers may be limited
Mandatory Criteria	**Level of Trail Exposure**	Exposure to either side of the trail corridor includes steep downward slopes or freefall
	Natural Obstacles and Technical Trail Features (TTFs)	Unavoidable obstacles 380 mm high, such as logs, roots, drop off's or constructed obstacles Avoidable, obstacles to 1200 mm may be present Unavoidable bridges 600mm wide Short sections may exceed these criteria
	Experience Required	Suitable for experienced mountain bikers with good skills, used to physically demanding routes Navigation and personal survival skills are highly desirable Suitable for better quality mountain bikes

Extreme mountain bike trail

		Technical Description (for land Manager use)
	Grade of trail	Extreme
	Description	Extremely difficult trails incorporating very steep gradients, highly variable surface and unavoidable, severe obstacles Single use and direction Optional lines Cross country, downhill or trials
Guiding Criteria	**Trail Width**	150 mm plus or minus 100 mm for tread and bridges Structures can vary
Guiding Criteria	**Trail Surface**	Widely variable and challenging
Guiding Criteria	**Trail Gradient**	Expect prolonged steep, loose and rocky descents or climbs Max. trail grade – 40%
Guiding Criteria	**Quality of Markings**	Trailhead signs and route markers may be limited
Mandatory Criteria	**Level of Trail Exposure**	Exposure to either side of the trail corridor includes steep downward slopes or freefall
Mandatory Criteria	**Natural Obstacles and Technical Trail Features (TTFs)**	Large committing and unavoidable obstacles to 380 mm Avoidable, obstacles to 1200 mm may be present Unavoidable bridges 600mm or narrower Width of bridges is unpredictable Short sections may exceed these criteria
	Experience Required	Suitable for highly experienced mountain bikers with excellent skills, used to physically demanding routes Navigation and personal survival skills are highly desirable Suitable for quality mountain bikes

Table 2. TDRS

No rating system can be totally objective or valid for every situation. This system is a tool to be combined with common sense.

3.15 Risk reduction strategy

Effective risk management relies upon recognising risk, where possible removing the risk or, where removal is not possible, managing the risk effectively. By constructing trails to meet or exceed IMBA Guidelines, the risk to recreational users of mountain bike trails can be greatly reduced. Some example of measure implemented during the design and construction stage include, but are not limited to;

A geotechnical assessment of the proposed construction zone to **recognise hazardous areas** along the proposed alignments.

Good trail grading ensures that users can be confident when riding a trail for the first time, that the designated difficulty of the trail will be consistent with past experiences.

Clear trail signage that is highly visible and intuitive ensures users don't unknowingly attempt a trail beyond their abilities and improve user experience.

Construct trail features to have a **clear line of sight** from beginning to end, extending landing areas of jumps to allow variety of speeds and styles of riding.

Multiple trails with a variety of difficulties ranging from easy (Green Circle), moderate (Blue Square) to difficult (Black Diamond) will cater to a wide portion of the mountain bike market and allow for **safe skill progression**.

Good **medical evacuation access** to the highest risk features (preferably close to town and services). Liaison with the Lithgow Hospitals Emergency Department and Ambulance service regarding an emergency response plan and trail access including keys to locked gates.

Adequate feature separation to allow the rider to recover control of the bike if needed and adjust speed accordingly before the next trail feature.

No gap policy, in line with most international Bike Parks, where only pro-lines will have gap jumps. Instead of gaps, table-top design should be used. This minimises risk of injury and allows for skill progression. It opens trails to riders with a range of skill levels, allowing riders of lesser skill to try out more challenging features without risk of major consequences.

Run-out Zones of jumps and features are cleared of any potentially dangerous debris where possible. This includes removing stumps, logs or medium sized rocks in locations where crashes are most likely to occur.

Trails should automatically **manage speed for the rider**. This is achieved by undulating the trail to lose and gain altitude as necessary. A well designed gravity trail should require minimal breaking and preferably no pedalling. This reduces wear and erosion due to trail use and improves rider experience.

Trail features should be predictable in that a rider traveling at the speed generated and sustained by the trail, will comfortably be able to negotiate blind and unfamiliar sections of a trail within the designated skill level required for that trail.

Mountain biking is a dangerous sport with inherent risks that riders assume every time they get on a bike. Through the implementation of these controls, the risk to riders using the Hassans Walls trail network can be managed to an acceptable level.

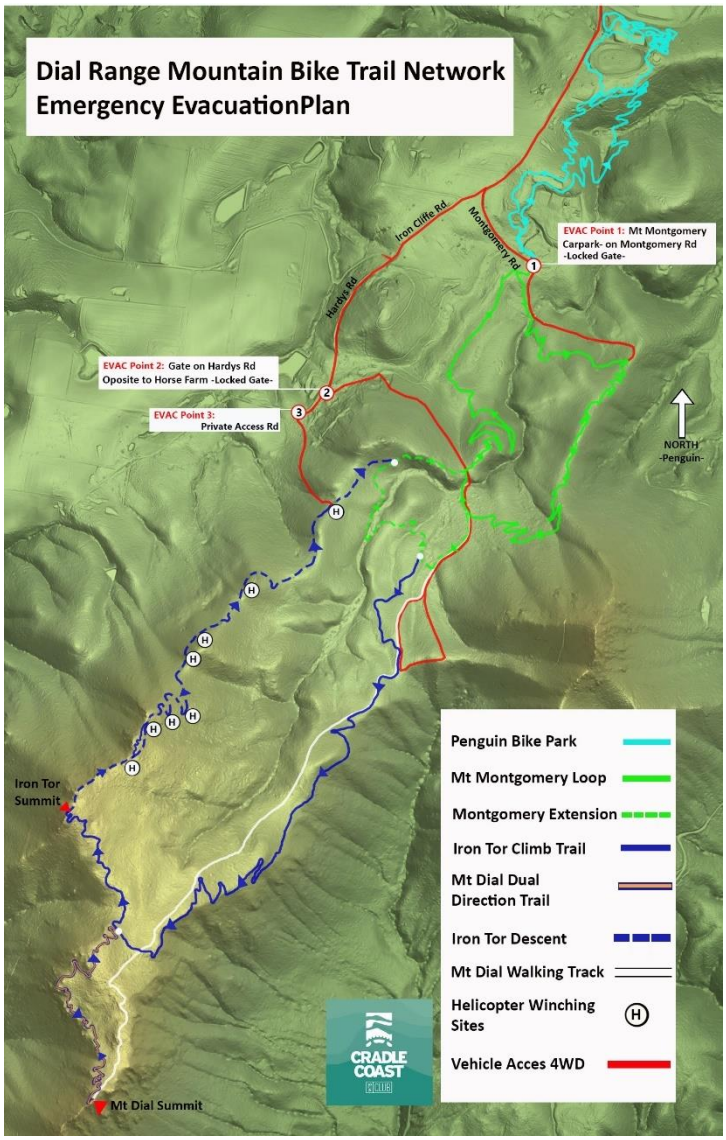
3.16 Emergency Evacuation Plan

The Hassans Walls trail network is designed to be in close proximity to vehicle access roads (within one kilometre at any point) to promote accessibility to emergency vehicles.

Close to the middle access hub the Green Flow trail passes very close to Hassans Walls Rd, allowing easy access to the hub on foot or via small 4WD vehicles (eg quad bike).

A detailed evacuation plan and map should be drafted in conjunction with the NSW Ambulance service and local emergency services. It should include suitable retrieval points, locations of gates and trailheads, winch points, contact numbers, roads, etc.

This plan should be distributed to the local authorities prior to the trail opening to the public.



Map 3. Sample Evacuation Plan

3.17 Legal Risk Assessment

At the core of the Legal Risk Assessment is our advice to contract the trail building activity to an experienced Trail Builder as Next Level MTB. With this project plan and outline a lot of work has gone into analysing the Trail Difficulty Ratings as outlined in Section 4.

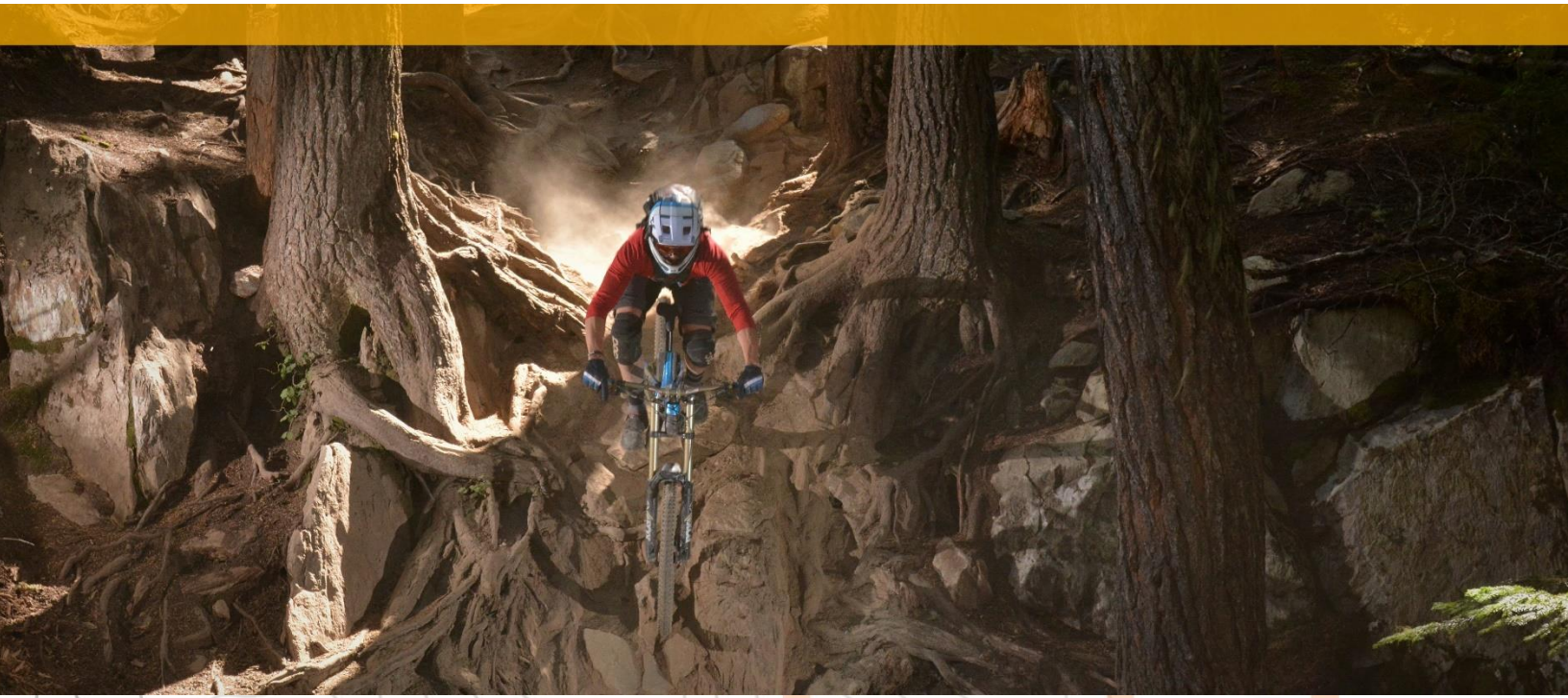
The main risk mitigation strategy and approach is proper signage that communicates the Trail Rating Difficulty and informs trail users of the risks of mountain biking in general. Best practice examples for signage and wordings are shown in the Attachment section.

Rocky Trail Destination proposes to work together with the Lithgow City Council management during the planning, tender and construction stages on the Legal Risk Assessment and Mitigation Strategy Implementations, as part of the next stage of this project as a contracting consulting business who manages the process.

3.18 Existing Sanctioned Trails

Currently there is only one sanctioned designated mountain bike trail. The Pony Xpress is an advanced technical/jump gravity trail, often used by the CTMBC to host race events.

Pony Xpress
Distance: 1,561m
Altitude: 150m
Direction: Descent
TDS: Black Diamond
ATG: 9.6%



3.19 Existing unsanctioned trails

Despite only one trail being approved, the Central Tablelands Mountain Bike Club's website (now-defunct) listed 8 trails of varying standards within the Reserve, ranging in length from 490m to 3 kilometres. The Club notes most of the trails are regarded as upper intermediate to advanced standard. The Hassans Wall Plan of Management (HWPoM) identifies several informal/unapproved "single" tracks having been established and maintained through mountain bike use. There is mixed information from the CTMBC and HWPoM as to whether Gun Club DH is a sanctioned trail.

The Pottery Track
Distance: 1,633m
Altitude: 210m
Direction: Descent
TDS: Black Diamond
ATG: 9.6%

Ewok Forest
Distance: 1,561m
Altitude: 150m
Direction: Descent
ATG: 12.8%
TDS: Black Diamond

Townhouse Trail
Distance: 1,847m
Altitude: 158m
Direction: Descent
TDS: Blue Square
ATG: 8.5%

Gun Club DH
Distance: 1,620m
Altitude: 200m
Direction: Descent
TDS: Blue Square
ATG: 12.3%

Channel 6
Distance: 2,643m
Altitude: 206m
Direction: Descent
TDS: Blue Square
ATG: 7.7

4 Design Stage

4.1 Trailheads

Four trail heads should be constructed for the project;

The city access trailhead will service the majority of riders coming to the reserve and will provide their first interaction with the network. A good first impression is essential, with adequate parking, good signage and some landscaping including a gateway to the network. A car parking and turning area will need to be constructed at this trail head. Generally, mountain bikers will park at the bottom of a gravity zone and begin their ride with a climb to the summit, saving the best part for last. This carpark will need to be built in line with the expected usage of the trail, with the potential to extend parking at a later date if demand increases. The turning area should facilitate buses with trailers for potential shuttle services and private shuttles. Natural rock bollards should be arranged around the signage and rider congregation area. The trailhead is positioned as close to Lithgow city centre as possible to encourage riders to start and finish their experience in town, minimising the use of vehicles and encouraging spending in town.

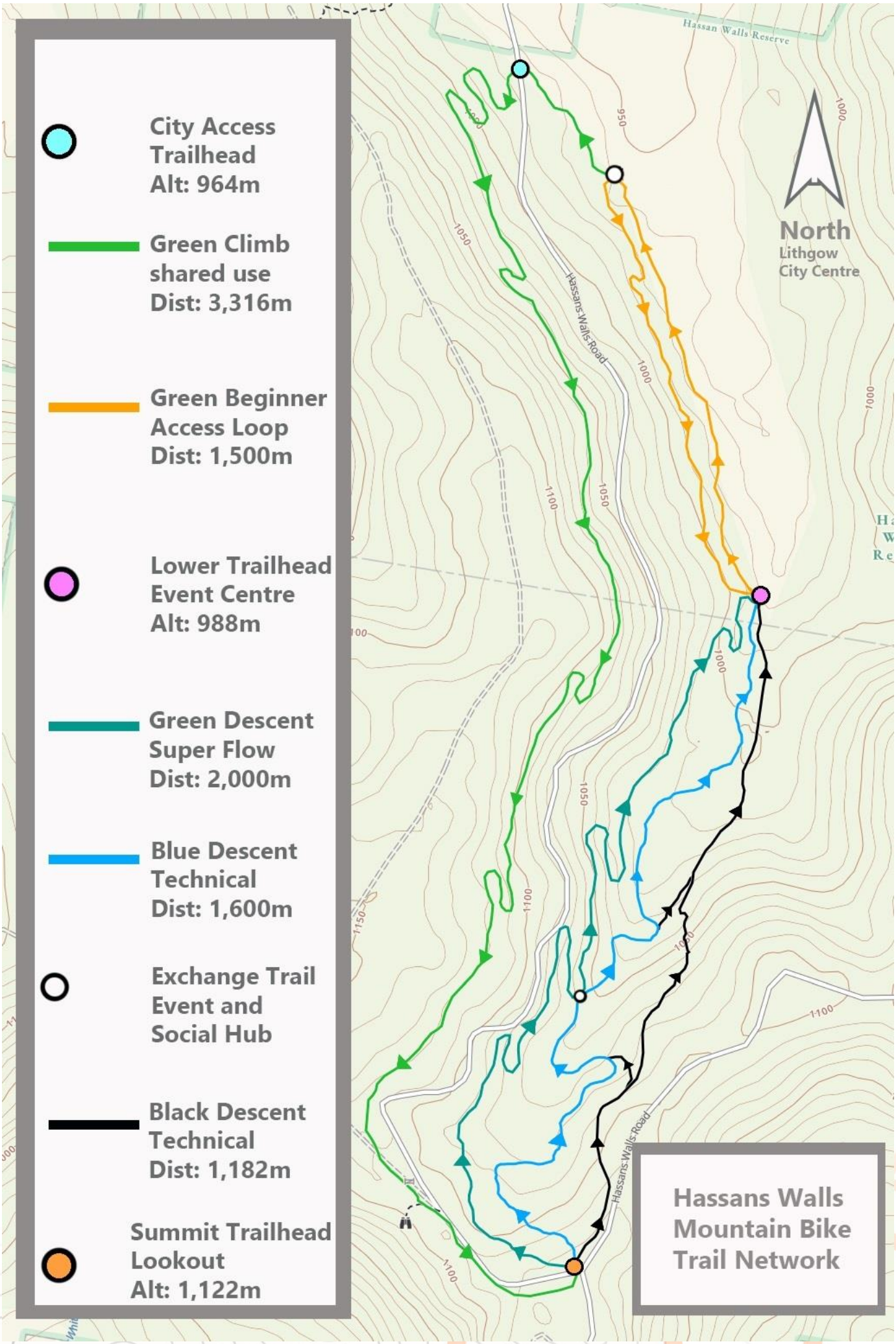
The lower trail head will need to accommodate in excess of 20 people on bikes. This capacity will be critical during events, when there are large numbers of competitors, officials and spectators. A trail map with descriptions and a disclaimer will be erected along with totems to guide users to the descent section of the beginner loop and back to the City Access Trailhead.

The upper trail head and start of the gravity area is the highest point in the network and shoulders onto Hassans Walls Road. Parking at this trailhead should be targeted at short term use as the majority of users in this area will be dropping off riders. A large turning area should be constructed that will facilitate buses with trailers and private shuttle vehicles. A trail network map with descriptions and a disclaimer will be erected, along with some basic landscaping of the area. Natural rock bollards should be arranged around the signage and rider congregation area.

The Middle Social Hub will allow riders to re-join with their friend or riding group and present an opportunity to exchange to a different trail or continue on the same track.

This feature will not only be of great advantage for rider skills progression but also will provide a large combination of options during events.

Here will also create a direct access for easy evacuation in case of emergency


City Access
Trailhead
Alt: 964m
Green Climb
shared use
Dist: 3,316m
Green Beginner
Access Loop
Dist: 1,500m
Lower Trailhead
Event Centre
Alt: 988m
Green Descent
Super Flow
Dist: 2,000m
Blue Descent
Technical
Dist: 1,600m
Exchange Trail
Event and
Social Hub
Black Descent
Technical
Dist: 1,182m
Summit Trailhead
Lookout
Alt: 1,122m
Hassan Walls Reserve
North
Lithgow
City Centre
Hassans Walls Road
Hassans Walls Road
Hassans Walls
Mountain Bike
Trail Network

4.2 Coherent Loop Network

Considering worldwide trends and future rider expectations in mountain biking, the Hassans Walls mountain bike network can be future-proofed in the design and construction stage to ensure longevity of investment.

New mountain bike designs: In the past, riders bought different bikes for different styles of riding. Now they tend to buy one bike to ride all styles: cross country, downhill, enduro, jump, pump, tricks, etc. (MTB trends survey, 2019)) See international market trends https://www.vitalmedianet.com/index.php/mtb-trends-2019/

E-bikes are becoming an important consideration in trail design. E-bike riders travel at higher speeds on climb trails and have more momentum. They are looking for technical features to enjoy when climbing. They cover longer distances and have less need for shuttles. To cater for e-bikes, climb trails should have technical challenges and wider turns and berms, and traverse trails should include fun features. In Europe, trail networks have **'up – flow'** trails which are hugely popular for e-bike riders. Climb-rest-climb sections and gentle average trail gradient help to maintain a high average speed.

Wheel size: there is a strong trend away from 27-inch wheeled mountain bikes in favour of 29-inch wheels. Bikes with 29-inch wheels travel with greater momentum and pass over obstacles more easily. Trails need to be suitable for riding at higher speeds.

The latest IMBA recommendation (Turning trails Inside Out, 2016, https://www.imba.com/blog/turning-trails-inside-out) is to use steep slopes for climb trails and reserve more gently angled slopes for descending gravity, flow and downhill trails.

Riders expect **immediate satisfaction** on all trails: no boring sections.

Climb sections tend to be the **space for social interaction** between riders. Riders expect easy/moderate gradients with rest sections, rather than leg-burning king-of-the-mountain style.

Provide return for effort: If riders are to invest energy on a long climb or pay money to sit in a shuttle vehicle, they demand a long, thrilling continuous descent in return.

All year-round access: The Blue Mountains can be wet, so good trail design and meticulous attention to water management will minimise the need for closures. Trails should be kept high on the ridgelines, out of valleys, and gully crossings should be minimised. Existing rock features and pre-engineered structures could be required.

Following these guiding principles, the Hassans Walls mountain bike trail network should:

Provide easy access from the town centre to the trail network, making Lithgow ready at hand for accommodation, food, supplies and other activities boosting the **local economy**.

Provide shared dual direction **access for walkers** to the summit lookouts at Hassans Walls on the climb trail. Thoughtful design and construction will maintain riders at appropriate speeds to make it safe for a shared basis. A wider than standard trail can be constructed to allow easy passing, rest sections at points of interest, and shortcuts to take walkers and trail runners on a more direct route to the summit.

Be for **mountain bikers only on descending trails** as riders will travel at high speeds on often loose and technical terrain, making sharing with other users dangerous.

Provide access to the complete experience for **riders of all levels**. Beginner, Intermediate and Advanced riders should be able to access the lookout areas and return back to town.

Maintain **social groups**, while allowing individual riders to choose different skill level trails. This can be achieved by creating a number of A-line/B-Line options and creating mini hubs between trails throughout the descents allowing riders to re-join their groups.

Give A-line/B-line options on trails of all difficulties facilitates **progression**. Easy trails with optional side features ensures riders take the easy path by default, while giving more experienced riders the opportunity to ‘play’ with the trail. More difficult trails can be constructed to give advanced riders a time advantage and increase trail flow, while offering slower B-lines to riders who may want to try the trail a less consequential means of doing so.

Bring **return visitations** with high quality trail network design and construction, the two most important factors in creating a good user experiences and creating a successful trail network. Quick easy access, good return on rider effort, ease of navigation and quality gravity riding experiences are all essential qualities of a popular trail network.

Promote Lithgow as a riding **destination** by showcasing the aesthetic qualities of the Hassans Walls and the associated elevation through social media and targeted advertising campaigns.

Facilitate smooth and easy running of **events** with easy access for race officials, volunteers, spectators and medical professionals.

4.3 Climbing Trails

4.3.1 Green Climb Trail (shared)

TDRS:	**IMBA Green**
Estimated Distance:	3,316m
Direction:	Climb (Mountain Bikers), Dual Direction (Walkers, Runners)
Estimated Altitude change:	163m
ATG:	4.9%
Style:	Up Flow with Technical B-lines

Description: This trail will offer an easy climb option to all trail users heading to the Hassans Walls lookout. It is positioned largely on the western side of Hassan Wall Road to keep clear of the descent tracks. Trail features and trail grade will maintain riders at appropriate speeds and clear lines of sight should be maintained to further improve safety.

Departing Hassans Wall Road and heading west, a series of close switchbacks will see riders quickly gain elevation away from the road. The trail then turns south and gradually works its way up along the eastern aspect of the communications tower ridgeline. Upon approaching the Hassans Walls ridgeline, views will open up to reveal the vast fields and mountains. The trail will briefly descend along the Hassans Walls cliff line at a safe distance from the exposed edge, before the final climb section to the Hassans Walls lookout and upper trailhead.

Close switchbacks along the trail will facilitate the construction of optional short cuts for E-mountain bikers, walkers and trail runners. Side **features and shortcuts will challenge** climbing abilities and allow overtaking of slower riders. Fitter riders aboard conventional bikes will be able to make use of these features to challenge themselves and reduce the time spent climbing if desired.

Notes: A social, seamless flowing climb (**keeping the needs of e-bikers in mind**) will be the focus of this trail.

Switch-back turns will require larger turn radii and greater support to handle **higher speeds** that can be reached by e-bikes on a climbing trail.

Traverse sections with undulating features will keep riders entertained and give them a chance to take a breather for a few moments.

Interesting lookout spots will be enhanced to take advantage of the views.

This trail is expected to have a large volume of riders as it serves all descent trails in the gravity area. It will see a diverse range of users with a variety of skills and will need to be constructed slightly wider with a variety of options and side features.

The trail will need to be constructed with a wider than standard surface tread (IMBA Green 900mm) to allow safe and easy passing of any slower riders and walkers. (Recommended 1,200mm wide).

Employ Climb-Rest-Climb (CRC) methodology to the design.

Expected construction difficulty: 4.5

A 2-tonne mini excavator is recommended for this style of trail. The terrain is expected to have exposed rocky sections in combination with deeper gravely soils. Switchbacks should be constructed in deeper soil zones where possible. Medium sized rocks could be taken advantage of to construct retaining walls for trail tread or back sides of berms and switchbacks. Some clean soil may need to be moved from other sections of the construction area for fill.

The trail alignment has been designed away from low gullies and water crossings. Keeping the trail on the ridgeline helps avoid water management problems.

Elevation Profile:

4.4 Descent trails

4.4.1 Green Descent

TDRS:	IMBA **Green**
Estimated Distance:	2,000m
Direction:	Descent
Estimated Altitude Change:	134m
ATG:	6.6%
Style:	Superflow

Description: A descent trail starting from the upper trailhead, this green Super Flow trail promises to be popular with riders of all skill levels. Easy Green level trails can be **super fun** for riders of all skill levels.

Straight out of the gate gravity will take control, meandering down the contour with large rollers. Riders will descend the rolling contours of the eastern aspect of the ridge below Hassans Wall Road. Large supportive berms will create a rollercoaster experience for riders as they switch back and forth across the hillside.

Close to the halfway point riders will encounter a wide space and social hub, this decision point will allow visitors re-join with their group and continue on their current trail or have the option to transfer to a different trail to finish their run.

Gradually rollers will get **deeper and faster**, building rider confidence in the trail. The final section will be wide open and create a safe space for beginner riders to feel fast flow as they float down the trail before slowing again to finish at the lower trailhead at the base of the gravity area.

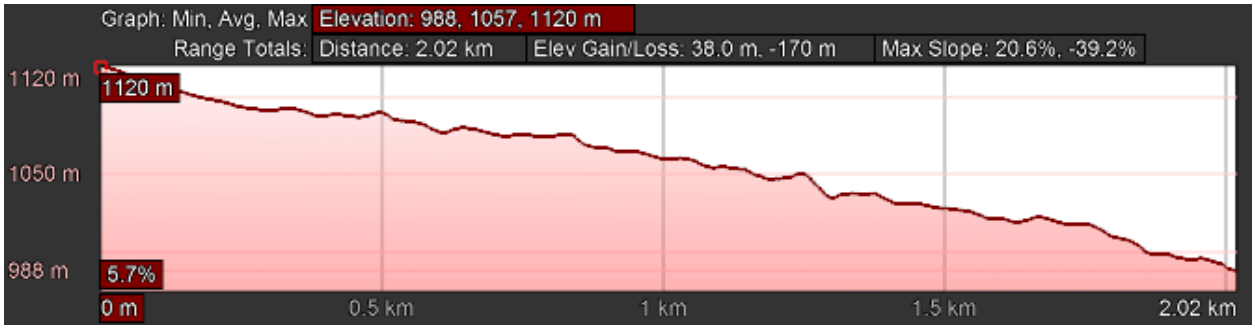
Speed control features will slow riders to suit the upcoming turns, then speed will be regained on straighter sections. Focus on gliding over a rolling contour rather than jumping, inspires beginner riders to gain speed and confidence. Trailside non-compulsory features will allow creative options for more experienced riders.

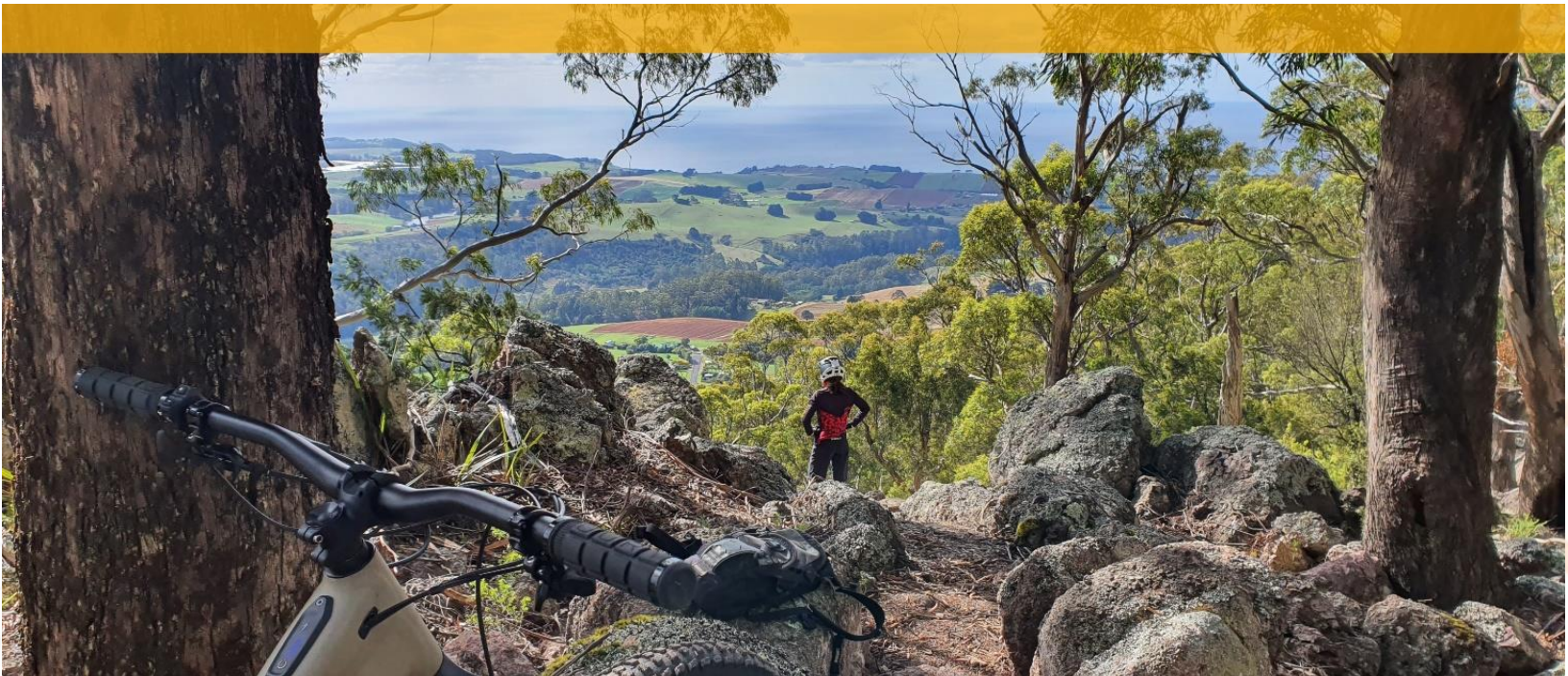
Notes: Applying a “no braking required” approach will be the overall design focus. This is an extremely difficult task to achieve, but is the gold standard in trail flow and essential for novice riders.

Expected construction difficulty:

Difficulty Rating (0-5): 4
A 2-tonne excavator is most suited to the width and earthmoving volumes required to construct this trail. Machines of this size are appropriately powerful to remove large rocks and create a tread appropriately wide for the trail speed.
Buried slab rock will present issues during deeper excavations and may require trail realignments.
Extensive water control measures may be required where water runoff from the road gets concentrated at single points along the trail.
One or two wet areas may require extra attention to drainage.
Large volumes or soil will need to be handled to construct a flow style trail.

Elevation Profile:





4.4.2 Blue Decent

TDRS:	IMBA **Blue**
Estimated Distance:	1,600m
Direction:	Descent
Estimated Altitude change:	134m
ATG:	8.3%
Style:	Technical/Flow (Multiple A & B Lines)

Description: This intermediate Blue descent trail will mix aspects of old school technical with a twist of modern machine-built features. This style of trail is relatively new, but has already proven extremely popular at renowned destinations like Derby, Tasmania, where a tech flow trail was last year awarded best trail of the race season by world level athletes.

Starting from the upper trail head at the summit of Hassans Walls, this trail will make use of the vacant space between the green trail above it and the seasonally flowing gully below it. Almost immediately as the trail begins, a moderately difficult qualifying feature will deter riders of an inappropriate skill level. Much like the green, this trail will take riders along the eastern aspect of the ridgeline. Prominent natural features within the trail corridor will be enhanced to provide riders with an exciting blue trail experience, with obviously optional Black A-lines diverging and merging with the main trail. Rock slabs will allow the construction of steeper sections of trail without compromising sustainability or increasing erosion. Jumps will take advantage of rocky outcrops to act as fill material between take-offs and landings. Areas conducive to deeper excavations will facilitate the construction of bulked park style trail features. Optional merging lines with the Green and Black descent trails will slow riders and allow social groups to reconnect part way down, or allow mixing and matching during a descent. The trail will finish by slowing riders to an appropriate speed before rolling them into the lower gravity trail head.

An important focus of this trail will be to provide **multiple options for riders**. For example, they will be able to choose to ride one side of a tree or the other, take a high line over rocks or the low line on the ground, choose a steep rock slab or the easier, faster straight line. All these alternative lines will allow riders of different skill levels to enjoy the same trail. More skilled riders can ride the trail a different way every time, promoting skill progression and social interaction. Springs and wet areas will require a variety of approaches to manage water.

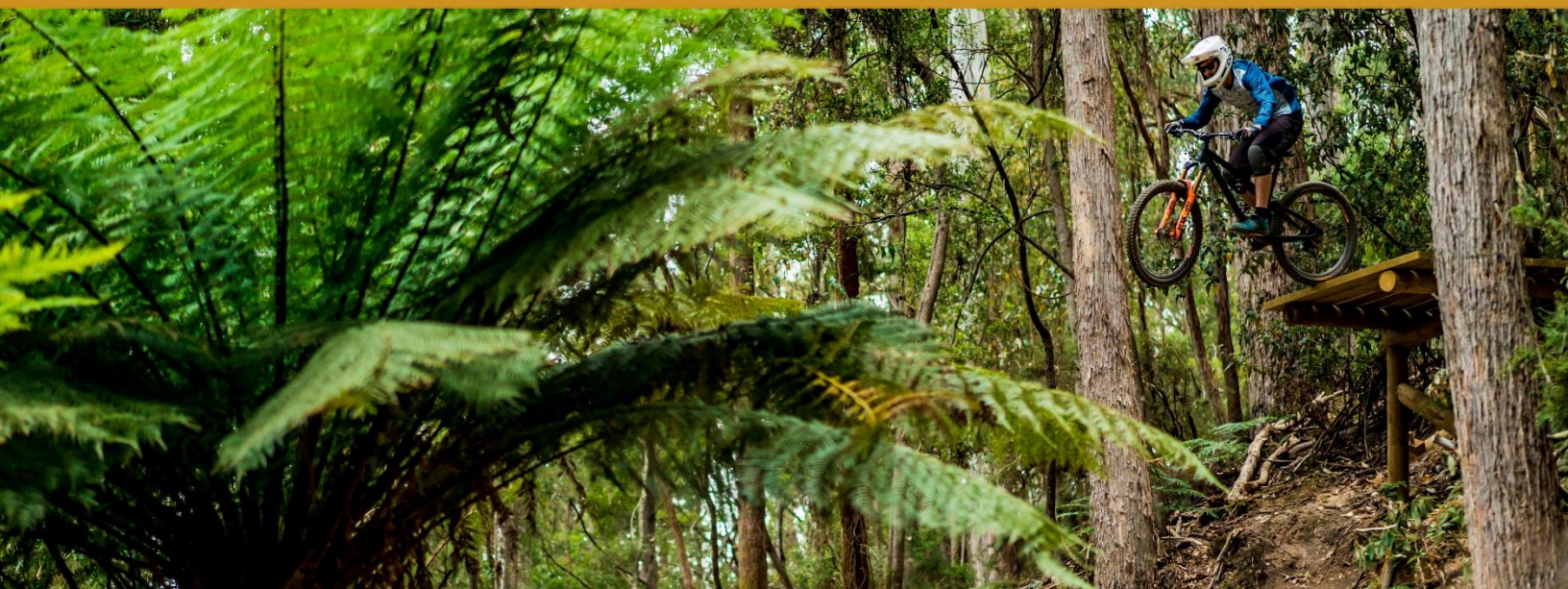
Notes: This trail has a TDRS intermediate Blue rating. Beginner Green-trail riders don't stay beginner riders for long, and are keen to progress their skills. It is important to construct A and B lines with a broad spectrum of skill in mind. This will greatly increase the popularity, accessibility and safety of the trail.

Expected construction difficulty:

Difficulty Rating (0-5): 4

A 1-2 tonne excavator is suitable to create this trail, with a tread width varying between 600mm and 1800mm
A number of water crossings and springs are expected and appropriate solutions will be designed (bridges).
Extensive water control measures may be required where
Concentrated water runoff from the road and green trail may require water control measures at few points.
Daily construction productivity is expected to be slower than usual, given the desired aim to construct creative A and B lines throughout.
Bulk earthmoving volumes to construct park style features takes time and slows daily progress.
Buried slab rock may present issues during deeper excavations and force adaptation of features.

Elevation Profile:



4.4.3 Black Descent (Pony Express)

TDRS:	IMBA **Black**
Estimated Distance:	1,182m
Direction:	Descent
Estimated Altitude change:	134m
ATG:	11.3%
Style:	Technical/Jump

Description:

This trail is currently open to the public, however extensive use over the last 8 years has resulted in the degradation of built features, such as berms, catches, jumps and landings. Upgrades to the trail will see it returned to its former glory. Timber retaining walls that were used to support soil have rotted and become hazardous. Features will be re-built to a commercial standard to ensure longevity. The current alignment will overwhelmingly be utilized during the overhaul. Current popular features along the trail should not be altered unless they pose a serious safety issue. The CTMBC wishes for the nature of the trail to remain the same and careful consideration is important when modifying the trail.

Like the Green and Blue descent trails, this Black descent trail departs from the upper trailhead at the summit of Hassans Walls. The trail will begin with a very clear and unavoidable qualifying feature that riders will have to negotiate in order to progress down the trail. Riders will travel down the western aspect of the opposing eastern ridgeline to the other trails. Large, supportive berms will allow riders to carry greater speeds and improve safety. Rutted entries to rock gardens that currently funnel riders to a single line will be rock armoured to allow multiple line choices. **Steep, technical rock sections** will largely remain unchanged. Sections with extensive breaking bumps before switchback may be realigned to reduce rider reliance on braking before entering a corner. Persistent wet areas will be realigned to drier areas, or modified to deal with water. Safety will further be improved by clearing hazards from possible crash zones along the trail corridor. The trail will merge into the lower gravity trailhead after a speed check zone washes speed from the riders.

Expected construction difficulty:

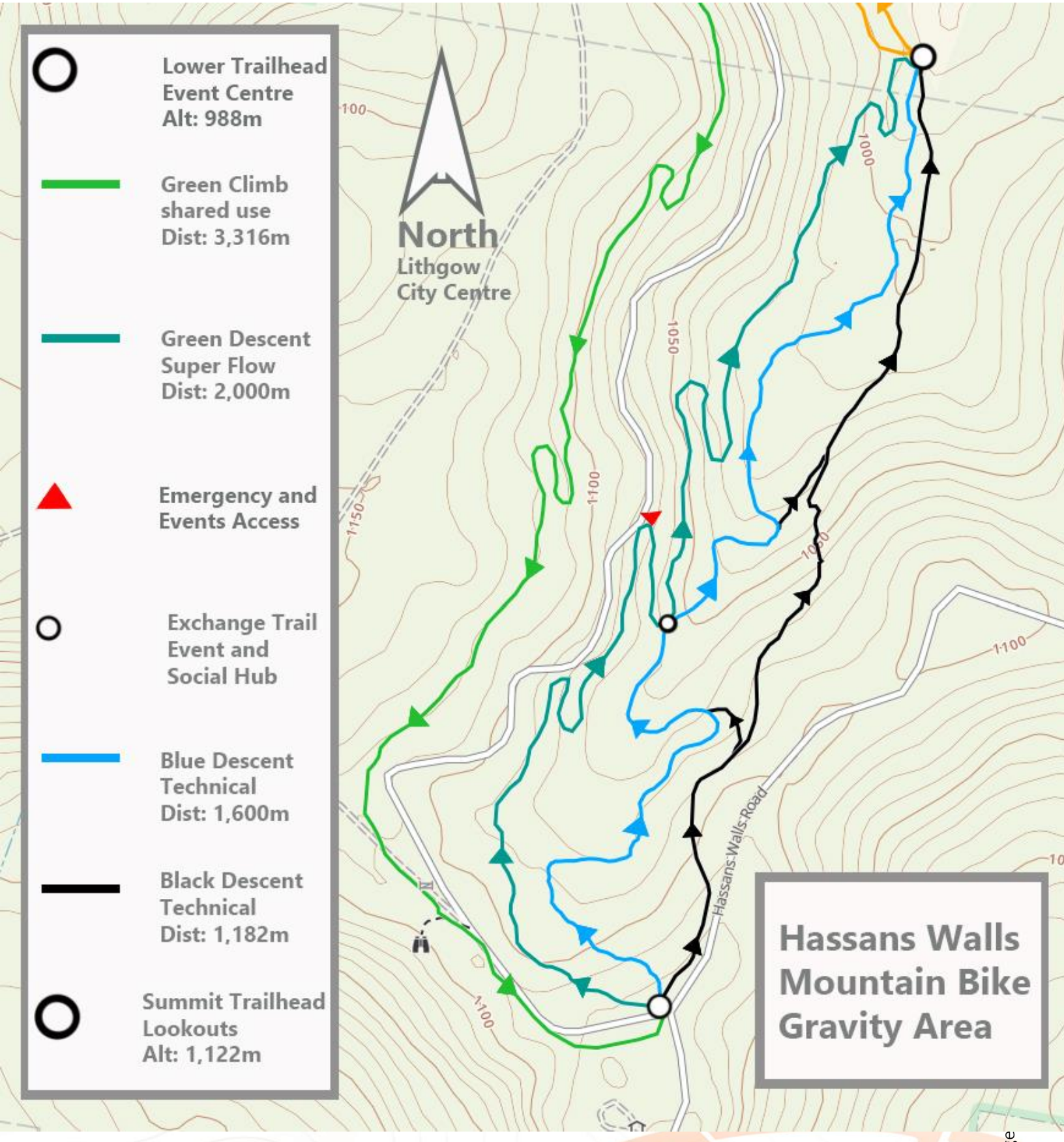
Difficulty Rating (0-5): 3.5

A 1 tonne excavator is recommended for the upper half of this trail rebuild. Navigating a mini excavator down an existing technical trail requires an extremely experienced operator. Some features may need to be demolished and re-constructed in order to move the machine down the trail.

The lower reaches of this trail can be safely and easily accessed through the Pony Club. A 2-3 tonne excavator is recommended to rebuild the lower section, where large volumes of earth will need to be moved in order to construct safe tabletop jumps.

The trail will be modified where deemed necessary, to allow a wider range of users (intermediate - expert) to enjoy the trail. Safe technical features are a priority. A natural look can be achieved using micro-excavators to assist the hand-build crew.

Elevation Profile:


Lower Trailhead
Event Centre
Alt: 988m
Green Climb
shared use
Dist: 3,316m
Green Descent
Super Flow
Dist: 2,000m
Emergency and
Events Access
Exchange Trail
Event and
Social Hub
Blue Descent
Technical
Dist: 1,600m
Black Descent
Technical
Dist: 1,182m
Summit Trailhead
Lookouts
Alt: 1,122m
North
Lithgow
City Centre
Hassans Walls Road
Hassans Walls
Mountain Bike
Gravity Area

4.4.4 Beginner Loop

TDRS:	IMBA **Green**
Estimated Distance:	1,500m
Direction:	Loop (Counter clockwise)
Estimated Altitude change:	27m
ATG:	3.6%
Style:	Flow

Description: Starting from the lower roadside trailhead at the edge of the reserve, this loop trail is the most accessible in the network and will cater mainly to families.

The descending portion of this loop doubles as the exit point for the gravity area. It is important to keep a lasting good impression as it may be the deciding factor in going for another lap or leaving the Reserve.

Riders will negotiate a gentle gradient that will slowly meander its way up the hill from the carpark. Focus will be on gentle meandering with subtle grade reversals to cater to the most beginner of riders. A hard pack surface material with no on-trail obstacles will be essential. Riders will eventually reach the highest point on the trail, the base of the gravity area. From here, a constant flow descent of around 863m, with a subtle **fun pump-track-style** feel will build skills and confidence. Numerous optional features will keep intermediate and advanced riders entertained as they go for another lap or finish their ride.

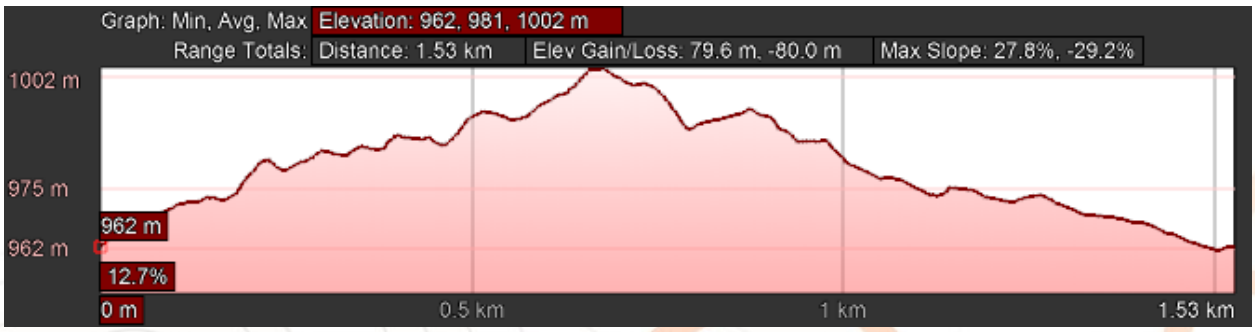
Notes: This trail can expect a high number of users because of its proximity to the main trail head and carpark. It should offer features that appeal to many types of riders. Non-compulsory side features will provide entertainment and opportunity for skills progression.

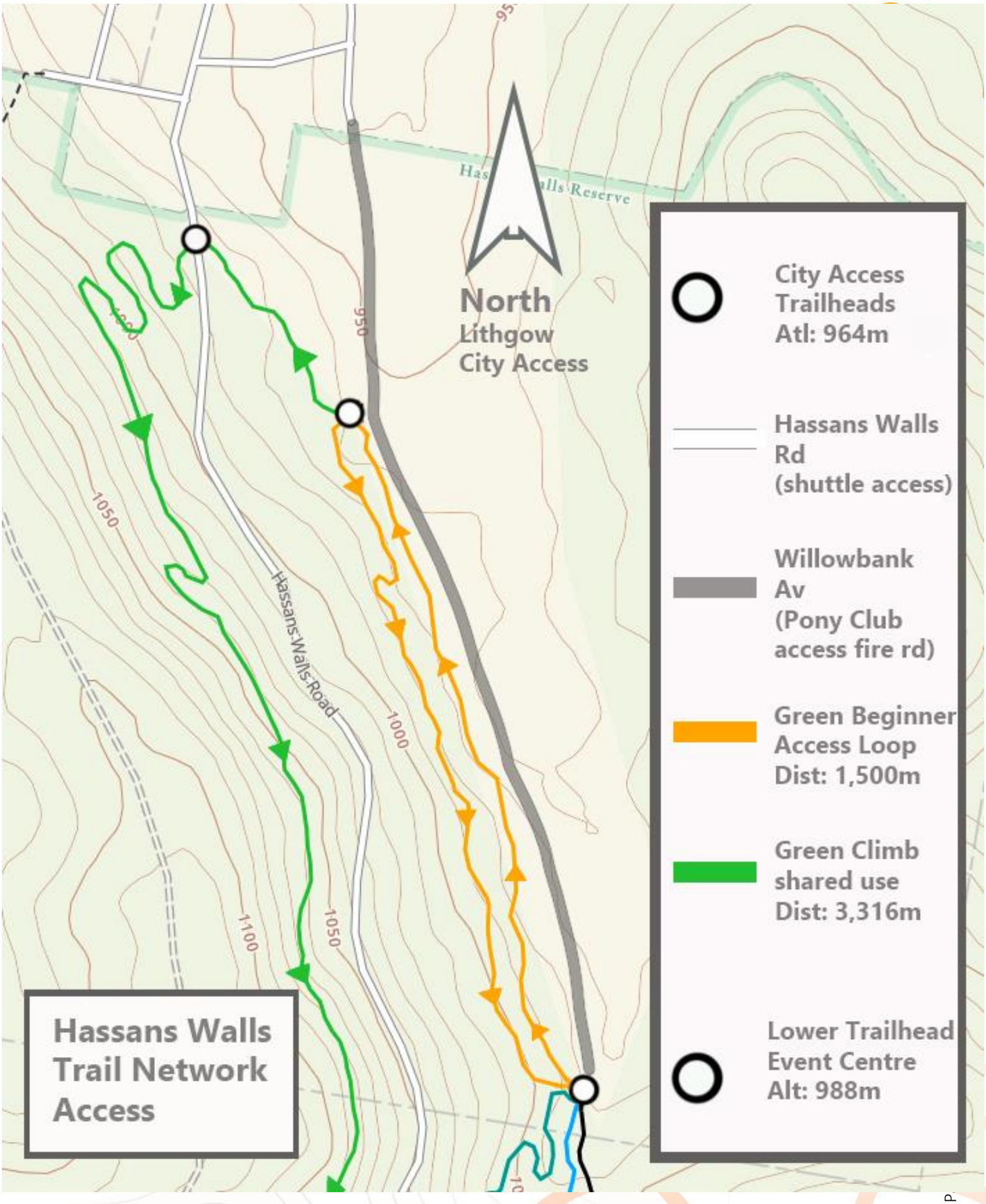
Expected construction difficulty:

Difficulty Rating (0-5): 3.5

The proposed alignment goes through a low-lying area where water may accumulate; effective drainage solutions will be of highest importance. The trail is also the compulsory exit point for the gravity area and a good final impression of the network is critical. Possible solutions include importation of fill material, elevated trail tread, turn piking and bridges.

Elevation Profile:




North
Lithgow
City Access
Hassans Walls Reserve
Hassans-Walls-Road
950
1000
1050
1100
Hassans Walls Trail Network Access
City Access Trailheads Atl: 964m
Hassans Walls Rd (shuttle access)
Willowbank Av (Pony Club access fire rd)
Green Beginner Access Loop Dist: 1,500m
Green Climb shared use Dist: 3,316m
Lower Trailhead Event Centre Alt: 988m

Total New Trail Network Distance: 9,598 metres

4.5 Proposed Network: Trail Difficulty Rating Split

The Hassans Walls network will have a long, compulsory easy climb trail and a family loop trail.
The family loop trail connects the lower trailhead of the gravity area to Hassans Wall Road and future parking area. The descending half of the family loop is an essential piece of trail infrastructure that bypasses the Pony Club grounds and will be utilised by all gravity riders.
In regard to the gravity area of the trail network, the following table demonstrates the amount of trail in each TDRS category.

Network	Total trails (metres)	TDRS	Distance (metres)	Percentage
Hassans Walls Gravity Area	4,787m	Green	2,004m	41.9%
		Blue	1,601m	33.4%
		Black	1182m	24.7%

4.6 Special Features

The Hassans Wall Reserve is an extremely aesthetic natural landscape with several existing lookouts. The trail network should take full advantage of the natural assets in the reserve by taking riders to the most scenic locations possible. This helps to create a connection between riders and place, as well as providing passive marketing for the network. Photo opportunities add value by encouraging people to stop, appreciate the view and capture an image to share. The Hassans Walls Trail Network will provide several **'postcard'** photo opportunities to riders along their way to the summit, before their focus shifts to focusing on the gravity descent ahead.

Image 2. Hassans Walls Lookout. Lithgow Tourism

Extra special rideable features can become famous in the mountain bike community and lead to visitations from riders wishing to ‘conquer’ them. Derby is Tasmania has a trail with a famous rock gap that is just wide enough for handlebars to pass through. Outstanding rock formations within the trail corridor can be utilised by trail builders to create unique and challenging features and should be identified during the detailed design stage.

4.7 Wet Area Management

When wet terrain cannot be avoided, or unexpected springs appear on the trail contour, a number of techniques can be applied.

Elevating the trail tread. This usually requires relocation of gravel material from a different section of the construction area, normally using power carriers.
Turnpiking. Digging a drain next to the trail to divert water away.
Culverts. A tunnel under the trail using existing rock or artificial pipe
Rock armouring the section with rocks from other sections of the trail contour, using power carriers.
FRP Bridges or **elevated tracks** (Fiber Reenforced Plastic) constructed to Parks and Wildlife Service standard) are easy to prefabricate and assemble on site. They require minimal maintenance.

Importing **surfacing material** is a time consuming but long-lasting solution for large areas. It can be transported to the site using power carriers, skid steers or by helicopter (for more remote areas).

Extremely wet terrain may require the use of geotextiles to isolate clay layers from rock/gravel free-draining layers. Other options for extreme circumstances are to construct above-trail turnpikes to divert high volumes of water to a suitable drainage area or create culverts under the trail. (In this case large culverts over 225mm are recommended as they require less maintenance than smaller ones.)

Rocky terrain can be a time-consuming challenge but can also enhance the quality of the trail and give it unique features. Creative trail building is required.

Micro excavators can manoeuvre between rocks and move rocks using slings to create a flow contour or gravity trail feature. Using skeleton buckets, the excavators can sieve material for use along the trail contour. The material can be transported with power carrier and final shaping is done with hand tools.

Some especially rocky areas can be impossible to safely access with excavators so the trail must be hand built using pry bars, slings, winches, jack hammers and other equipment. Construction in areas like this is slow and costly but can result in an iconic, unforgettable trail.

Shallow soil depths or unsuitable terrain

Occasionally the terrain doesn't suit the intended trail design or is not suitable for excavating deep shapes in the ground.

In these cases, large amounts of soil can be imported to enable construction of the desired features. This happens most commonly in jump areas or skills parks where drainage can be a challenge and most of the trail needs to be constructed above ground.

4.8 Site Specific Mitigation

The Super Flow style of the green trail will require dramatic construction methods to create flow in the existing natural terrain.

- The biggest challenge will be the **shallow soil depths**, especially in the highest parts where rock is almost at the surface. Trail design will make use of existing natural features, however it is expected that **importation of suitable soil** could be required. This will be achievable using the existing Hassans Wall Rd, along with a skid steer and power carriers.

- **Sieve (skeleton) buckets** will be essential to sieve the rocky soil and provide a suitable riding surface. Most park-style trails require a smooth surface. When working on rocky terrains it is important to screen the soil to a deeper level, otherwise buried rocks will surface over time and become noticeable as the trail erodes during the first 6 months of use.
- The standard trail building corridor is 10 metres either side of the marked trail, but having a **wider construction corridor** will allow the crew the flexibility to avoid unexpected obstacles (sometimes only found after excavating), make use of interesting features not previously identified, or change alignments to improve overall flow. A construction corridor of 20 metres either side is recommended.
- The rocky subsurface terrain undoubtedly channels water into unexpected locations, creating sudden springs and wet areas. This can be a problem for longevity of features like giant berms and large jumps. In such terrain, **Bike Park style water management** involves significant drainage works to redirect water before it enters the trail, or to channel the water under the trail.

4.9 Ground Truthing

It should be noted that the alignments in this plan are preliminary and, while it provides a reasonably detailed picture of what the Hassans Walls Trail Network might look like, there is still a large body of work to be completed to identify the exact alignment of the trails. Detailed ground-truthing will be undertaken prior to finalising the trail network design.

The detailed design stage will produce;

- The exact alignment of the trail (including GPS track files)
- Seasonal creeks, trail crossing locations and appropriate bridge solutions
- Locations and extensiveness of wet areas and most suitable means of management
- Locations and quantities of any required built structures, such as bridges
- Detailed signage plan

4.10 General Construction Notes

4.10.1 Equipment access points

There is relatively good access to the proposed trail alignments throughout the network. Vehicle access is currently possible to the City Access Trailhead, Lower Trailhead and Summit Trailhead. Excavators, other machinery and equipment can be dropped at these points. Construction of the three gravity descents will begin at the Summit Trailhead, in the same direction as the trails are going to be ridden. Somewhere between halfway and three quarters construction for each trail it will become more economical to access the construction site from the Lower Trailhead.

Construction vehicle and personnel access to the work site will be dependent on permission from the Lithgow Pony Club. As most pony club days take place on a weekend, no problem is foreseen with use of the site for construction access on weekdays.

Construction of the Shared Use Climb will begin at the City Access Trailhead, where machinery and equipment can be unloaded. Access to the trail as construction moves up the ridgeline may be possible from either Hassans Wall Road below or the communication tower track above. E-bikes would speed access, reduce worker fatigue and aid fuel and equipment transport to and from the construction site.

The Beginner Loop will have excellent access throughout from the Lithgow Pony Club. Again, construction vehicle and personnel access to the work site will be dependent on permission from the Lithgow Pony Club.

4.10.2 Estimated average productivity

Between the altitudes of 964 and 1070m within the proposed construction zone vegetation is mostly comprised of Board Leaf Peppermint, Ribbon Gum and Snow Gum in an open forest. This combination results in sparse tree cover with a medium density understory.

The predominance of small to moderate sized rock between altitudes of 964m and 1080m will make clearing and excavating relatively straightforward. Occasional rock slabs should be easy to avoid during benching.

In the higher reaches between 1081m and 1122m, rock slab lies just below the topsoil in most areas within the proposed network, making wide, deep benching more difficult. Retaining walls (built from existing on-site rock) may be needed to elevate tread over bedrock on the green climb and green descent.

4.10.3 Estimated productivity based on the Construction Difficulty Rating (CDR)

Note: IMBA standard does not denote ease or difficulty of construction.

Green Climb

The majority of the climb sits in sparsely populated open woodlands with medium to large trees and contains a medium density understory that should allow easy clearing of a trail corridor. Shallower soil conditions higher up the ridgeline may require the construction of retaining walls to support the tread. Optional A-lines between switchbacks will slow daily construction progress.

Estimated average productivity: 50m/day.

Green Beginner Loop

The area surrounding the proposed green beginner loop has slightly denser vegetation. Bedrock and rocky outcrops should present no issue. Turnpiking of sections of this trail may be needed to raise the tread and divert water through culverts or onto rock armoured sections.

Estimates average productivity: 45m/day.

Green Super Flow Descent

The upper reaches of this trail will present a challenge to build flow trail in rocky terrain with shallow bedrock. Creative solutions like retained berms and rollers will be needed to achieve a flow trail in this terrain. Forced realignments can be expected. The lower reaches will prove much more conducive to flow trail construction, so productivity can expect to increase towards the Lower Trailhead. Concentrated water runoff fed by drains and culverts from Hassans Wall Road may require comprehensive drainage solutions.

Estimates average productivity: 50m/day.

Blue Technical/Flow Descent

A combined techncial flow trail is perfectly suited to the terrain found along the proposed alignment. Builders will be able to enhance natural rock features and create features when soils deepen. Productivity is expected to be slowed in the construction of multiple A and B-lines. Concentrated water runoff fed by drains and culverts from Hassans Wall Road and the Green Trail may require drainage solutions.

Estimated average productivity: 50m/day.

Black Technical Descent

Refurbishing a trail is generally quicker than building a new one from scratch. However, highly technical rock slab sections will require a highly skilled operator to move the machine down the trail. Steep sections will require the construction of new rock retaining walls. The final section of this trail may require a bigger excavator to aid in the construction of large tabletop jumps. Daily progress is highly dependent on how much original trail remains unmodified.

Estimates average productivity: 60m/day.

4.10.4 Weather conditions and fire restrictions

In the event of heavy winds, excessive rain or extreme fire risk, work may need to be suspended until the threat passes. In such instances the Site Manager would determine the plan of action and suspend work or evacuate as appropriate. Work would only resume when the Site Manager has determined it is safe to do so. Decision-making would be guided by (but not limited to) advice obtainable from the Bureau of Meteorology, NSW Fire Service, NSW Police and Parks and Wildlife Service. Hand tools only can be used on days designated Total Fire Ban by the NSW Fire Service.

4.10.5 Construction safety plan

Identification of safety risks and implementation of appropriate risk-management procedures and Job Safety Assessments by the contracted company (example);

- Trail Work JSA
- Excavator JSA
- Chainsaw JSA
- Power Carrier JSA
- Site Access-Mountain Bike JSA
- Trail Test- Mountain Bike Rider JSA
- Covid-19 Safety Plan

Standard safety equipment for use by the crew:

- First aid kit (including snake bite bandages)
- Personal Locator Beacon
- Fully charged mobile phone
- 2-way radio in locations with poor mobile phone coverage
- Gloves
- Wet weather clothes
- Cold weather clothes
- Sun Protection
- Sunscreen
- Glasses/Goggles
- Hi visibility vest/clothes
- Hearing protection
- Safety boots
- Fire extinguisher
- Sufficient water/food

No person is to work alone at any time.

5 Post-Design Stage

5.1 Signage Plan

At this stage of design only an estimate of signage can be made. A comprehensive signage plan can be made during the detailed design stage.

City Access Trailhead

- 1x Large map (1m x 3m), information and disclaimer
- 2x Trail totems (Small 100mm x120mm tiles on posts)

Lower Trailhead

- 1x Medium map (1m x 1m)

Summit Trailhead

- 1x Large map, information and disclaimer

Green Climb

- 2x Trail totems

Green Beginner Loop

- 2x Trail totems

Green Super Flow Descent

- 3x Trail totems

Blue Tech/Flow Descent

- 5x Trail totems

Black Technical Descent

- 4x Trail totems

Signage directing mountain bikers from the train station and motorists from the Lithgow CBD to the Hassans Walls Reserve will also be required.

Total

- **3 Network Maps**
- **18 Directional Totems**

5.2 Communications Plan

The proposed design area should have good mobile coverage throughout. The Climb trail positioned higher on the ridgeline below the communications tower track should present no issue. Alignments of the gravity area are in a gully facing the Lithgow CBD and should have good mobile coverage throughout.

5.3 Work Health and Safety Plan (sample)

5.3.1 Project information

- Management and review
- Principal contractor details
- Details of persons at workplace with WHS responsibilities
- Other contact details
- Scope of work

5.3.2 Roles and responsibilities

- Contracted Company
- Workers

5.3.3 General WHS information

- Legislation
- Codes of Practice and other guidance
- WHS policy
- Obligations
- Responsibilities
- Insurances

5.3.4 Risk management

- Identifying hazards and managing risks
- Hierarchy of control

5.3.5 Emergency and incident response

- Emergency preparedness
- Incident procedure
- Notifiable incidents
- First aid
- Evacuation

5.3.6 Induction and training

- Worker induction
- Worker training

5.3.7 Consultation and communication

- Consultation
- Communication
- Disciplinary procedures

5.3.8 Site safety procedures

- Site rules
- Site amenities
- Site security
- Site signage
- Personal protective equipment
- Managing construction hazards specified in the Regulations
- Managing other construction hazard

5.4 Parking

Mountain bikes are bulky and cumbersome to transport and fragile if loaded or packed incorrectly. For most riders transporting their bike, a private vehicle with a bike rack is the easiest and most convenient means of moving between home and the trailhead. This creates the need for large parking areas at popular riding destinations.

Parking requirements of a mountain bike network change over time. As the sport increases in popularity, visitations of any mountain bike network can expect to increase, especially destinations targeting beginner-intermediate riders. Parking solutions should be dynamic, with the potential to increase parking space volumes as demand increases. This can be achieved by extending existing parking areas, or creating new overflow parking areas further from the trailhead to lessen environmental impacts on the reserve.

A parking area at or nearby the City Access Trail Head will be essential to the project's success. Potential locations of future overflow parking areas should also be identified. If a parking area cannot be constructed at the City Access trailhead, a good turning area and loading bays for shuttle services and private shuttles should be deemed a minimum requirement.

Parking areas at the Summit Trailhead and Hassans Walls lookout area will not require extensive upgrading or development. Parking capacity at the Hassans Wall lookout may need to be increased slightly, however this may be achieved through better parking management and design rather than clearing more area. Usage of the Hassans Wall Road should be monitored following the opening of the mountain bike trails. This will determine change in road usage and whether any action needs to be taken to improve user experience and safety.

5.5 Supporting Infrastructure

Investment in supporting mountain bike infrastructure is a value adding exercise that will increase the willingness for riders to travel to Lithgow.

Common supporting infrastructure includes:

Toilets

Are essential in ensuring gender equality at riding destinations. While it is preferable to have toilets at the main trailhead, the construction cost would be significant. An alternate solution is to advise riders of nearby public toilets in the city. This is by no means a perfect solution and may deter some riders from traveling to the network.

Showers

A non-essential luxury for riders. A trail network of this size would not be expected to include showers.

Change Rooms

Change rooms are a luxury that would not be expected at a network of this size. The development of a toilet, shower and change room block can be considered after the first year of usage, based on visitation data and rider feedback.

Bike Wash

Important in environmentally sensitive areas to remove weeds and pathogens. The Hassans Walls Reserve currently contains 92 pest plant species (Lollback et al, 2014), most of which are concentrated around developed areas within the reserve and sections that adjoin urban areas of Lithgow.
A bike wash is recommended at the main trailhead, along with educational signage to encourage riders to use it.

Camping Areas

Camping areas that can accommodate caravans and motor homes (not just tents) appeal to a wider range of visitors, including families.
Access to camping facilities near the trailhead would encourage riders to stay longer and spend more in town.
Currently there two main campgrounds in the Lithgow area, with fees ranging from $15-25 per site. Both are commercial caravan parks, with one positioned just north of the CBD and the other a 15-minute drive south west.

E-bike Charging Stations

At this stage e-bike charge stations within the reserve are not recommended. Modern e-bikes have a range of 25-35km when fully charged, providing e-bikers sufficient range for a full day of riding. Few riders do more than 35km of mountain biking in a single day. Those wishing to do more will need to bring a second battery or hire a battery from a

local bike shop. For those with e-bikes staying overnight, powered camp sites are available at both existing campgrounds at extra cost.

Bike Repair Stations

Permanent vandal-resistant bike work areas can be constructed to supply riders with the basic tools to perform simple fixes at the carpark.

5.6 Bike Hire

Mountain bike hire is currently not available anywhere in Lithgow. An opportunity would be available to create a new local business. Bike hire is important for couples and families wishing to try the sport for the first time as well as riders who have travelled to Lithgow to ride and experience a major failure of their equipment. Initially, there would be moderate demand for a fleet of entry level mountain bikes and small demand for a fleet of mid-range bikes.

Existing businesses like caravan parks may wish invest in a fleet of hire bikes for use on the trail network.

5.7 Shuttle service

A commercially operated shuttle service would complement the proposed Hassans Walls trail network beautifully. It should be a priority to encourage existing tour businesses or prospective new operators to offer shuttles using minibuses with bike trailers. Trailheads should be constructed with features that cater to the needs of shuttle operators (for example, they should have wide turning circles).

5.8 Media Management

Mountain biking in Australia is still maturing as a sport, gradually drifting into the mainstream. Historically, the marketing of mountain bike trails has been aimed as enthusiasts already participating in the sport. However, recent marketing campaigns for new mountain bike destinations has thrust the sport into the mainstream across Australia. This has led to the realisation that the existing mountain bike enthusiasts are only a portion of the potential market. There is a large untapped market of people who are keen and interested to try mountain biking, but don't identify as mountain bike riders. Recent developments in bike technology, namely e-bikes, have opened up mountain biking to a brand new range of people, previously uninterested in the sport.

5.8.1 Digital Media

Website

Is an essential resource where riders can get information about the destination, such as location, access points, trail maps, trail descriptions, distances, town services and accommodation. The website should include videos of the trails to give riders a flavour of what to expect. The website doubles as a marketing tool.

Social Media Accounts

Often used to promote an area to new potential followers and provide updates, images, videos and information on upcoming events. These accounts can be managed by Council or a designated group of volunteers in the local mountain bike club.

Influencers

Can be used to passively promote destinations to their followers. By employing high profile account holders with values that closely align with the destination, organic content can be created that can reach vast audiences. This form of promotion should minimise scripting and curation to produce natural content that is relatable, fun to consume and promotes the destination.

5.8.2 Print Media

Mountain bike magazines still have a large audience among mountain bikers in Australia. Destination showcases are an effective form of promotion to build a presence of the destination before and after opening.

Trail destinations with a strong beginner-intermediate focus like Lithgow can benefit from print media opportunities (such as newspapers).

5.8.3 Special Events

Supporting and sponsoring special events at a state or national level will help to promote the trail network directly to the target users. Mountain bike athletes and amateur riders are always looking for new and existing destinations, bringing with them a wider support group of visitors to the city.

When developing a new trail network, a first-year marketing budget of between 2.5% to 5% of capital spend is recommended. Lower percentages are generally used on project with budgets upward of $1m and higher percentages where budgets are less than $1m. Existing businesses set to gain from the development could potentially contribute to marketing costs.

It is recommended that a comprehensive marketing plan be developed prior to commencing construction work on the project.

5.9 Asset Management

Modern mountain bikers expect that trails will be kept in good repair at all times. They expect constant upgrades and frequent release of new and better trails.

Commercial bike parks normally keep a permanent maintenance crew at hand all year round. They know that large park-style features require much more maintenance than traditional enduro style trails. They focus their efforts on continuous quality control and long-term improvements. Bike parks that drive innovation in trail design can become hugely popular and successful.

- **Monitoring of trails:** A monthly scheduled inspection of all trails and features is recommended. Good record keeping of level and pattern of usage, and any maintenance issues will help with planning future upgrades.
- **Large dirt features** take some time to settle and it is very common that berms or jumps will considerably shrink over time, changing the original angles and shape. It is recommended that large built features are re-shaped and fine-tuned every couple of years. This is an opportunity to make modifications to keep trail design in line with worldwide trends.
- **Work Health and Safety Standards** require a minimum crew size of 2 people when performing trail maintenance. The work requires use of chainsaws and other tools, often in remote locations.
- **Social media** is a great tool to allow users to report fallen trees, branches or sections of trail in need of repair.
- **Rider feedback** should be sought to help guide future trail improvements.

5.10 Trail Maintenance

Trail maintenance is a critical part of any trail project. Trails that are constructed to the best design and standard will reduce, but not eliminate, the need for maintenance.

Natural processes and rider use will impact the trails over time. Examples include:

- Accumulating organic matter such as leaves and branches
- Encroachment of the trail corridor by growing vegetation
- Water damage, especially by extreme weather conditions
- Creation of depressions that collect water.

Occasionally, events arise that may cause danger to riders and/or necessitate closure of trails (eg fallen trees, landslips, storms, flood, fire, vandalism, unauthorised modifications).

After the first year, the trail network will continue to require regular maintenance, much like any other asset.

Ongoing maintenance is crucial to:

- Keep the trails open
- Keep riders safe
- Maintain brand reputation
- Extend trail longevity
- Apply duty of care
- Reduce legal liability
- Protect the Council and community asset

5.10.1 Seasonal Maintenance Recommendations:

The usual climate pattern in Lithgow sees more rainfall in summer than in winter.

- **Summer** is a good time for larger earthworks because increased ground moisture allows compaction of soil.

- **Autumn.** Leaf litter accumulates on the trails and large dead branches often fall from overhead trees. This is the best time review usage, wear, erosion and drainage.

- **Winter** is a time to keep the trail corridor clear and uncover grade reversals and drainage points ready for spring rains. Extensive earthworks should be avoided because soils will be too dry to achieve compaction. All necessary water management precautions should be completed before spring (e.g. extending rock armoring or upgrading drainage works).

- **Spring** brings new plant growth and the trail corridor can be encroached by vegetation that will need to be pruned. Strong winds are common at this time of year, meaning trees and branches need to be cleared from the trails.

5.10.2 Maintenance costs

The maintenance of a mountain bike network is as important as the construction itself. Trails that are not maintained to a high standard incur greater maintenance costs in the long term and see less visitation from riders. A maintenance crew should comprise experienced trail builders with appropriate tools, qualifications and skills. Mountain bike trail maintenance is a specialised task.

Industry standard maintenance cost is usually about 5% of the overall cost of a project per annum. This is for a full service, including intensive care of high-maintenance bike park-style gravity features and continual innovations in the trail network to keep it world-class.

For a trail network of overall construction cost of $550,000, the full-service maintenance cost estimate would be approximately $27,500 per year. This would pay for a part-time crew of 2 experienced trail builders plus all plant equipment.

More basic trail maintenance could be provided at a cost of $900 per kilometre per year. For a 10-kilometre trail network the cost would be $9,000 per year. Maintenance would be provided by a 2-person crew on a casual basis.

5.11 Trail Counters

Knowing usage numbers is a critical tool to support any future grant applications to either expand the network, or maintain and upgrade the existing one.
Each trail in the network should have its own counter to create a data base that tells a story about the network usage. These data can then be used when distributing funding for maintenance and can also inform decisions on new trails to be built based on existing demand. Data from trail counters can be collected monthly to create a more detailed picture of use in the network at an estimated cost of $1,000 per annum, including hardware.

6 Estimated Trail Construction Timeline

It is estimated that construction productivity in the type of terrain encountered in the Hassans Walls Reserve would be approximately 250 metres per week per construction team. This is slower that a typical mountain bike trail construction project due to the rockiness of the landscape.

A variety of influences could affect the construction timeline. Bushfires and extreme weather events could delay progress.

A Team Leader with two experienced trail builders plus a mini excavator form a standard construction crew.

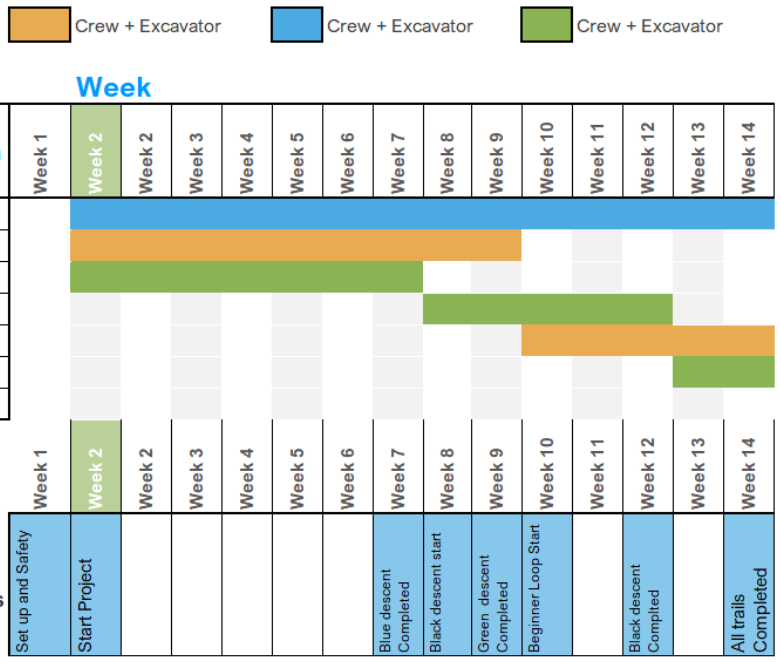
Two of these crews could construct the proposed trail network in approximately 20 weeks.

With three crews working simultaneously on different trails, the trail network could be completed in 14 weeks (given no unexpected delays). See example of construction Gantt Chart below.

Hassans Walls Trail MTB Trail Netwok

CONSTRUCTION PROGRAM- 3 Crew

Trail	Length (metres)	Construction Difficulty 0-5	Average Trail Grade	IMBA	Direction
Green Climb (shared)	3,316m	4.5	4.9%		Climb
Green Descent -Super Flow	2,000m	4	6.6%		Descent
Blue Descent- Technical	1,600m	4	8.3%		Descent
Balck Descent- Ponny Express	1,182m	3.5	11.3%		Descent
Beginner Loop	1,500m	3.5	3.6%		Loop
All Segments groom					
Total	9,598m				



7 Project Construction Cost

7.1 Trail Construction Cost

IMBA standard does not denote ease or difficulty of construction. A green circle trail may be quick and easy to construct if the terrain is conducive. Alternatively, it may be difficult and time-consuming to construct if the terrain is steep, has dense vegetation, requires multiple switchback turns, crosses wet areas or is remote from road access. There is no direct relationship between IMBA standard and construction cost.

Hand-built trails are labour intensive and take longer to complete than machine-built trails.

The difficulty rating is proportional to the steepness of the terrain and the vegetation density.

Construction Difficulty Rating 1 is the easiest (very shallow benching required and no major vegetation clearing).

Construction Difficulty Rating 5 is the most difficult (steepest terrain, hand build, rocky and dense woodland, remote access or extensive earthworks).

Note that in terms of Environmental Sustainability, trail construction is constrained by the Hassans Wall Zoning Scheme. All new proposed mountain bike trails should be within The Managed Use Bushland Zone, avoiding the Conservation Zones (green) in the Hassans Wall Reserve (fig. 1). As part of the follow up conversation and next stages of the project progression, we propose to seek the assistance from an appropriate environmental consultant. Any costs associated with this has not been allowed for in the following costing overview section. However, as mentioned previously, all proposed trail alignments will avoid sensitive habitat, which can be isolated during trail construction to prevent trampling.

7.2 Construction Difficulty and Cost Matrix Guideline

Construction Difficulty Rating	Terrain Difficulty	General Description	Machine or Hand build	Cost per Metre
0.5	Easiest Construction, up to 5% slope	No major excavation required, light vegetation to clear, using existing trail, repairs to drainage and re-establish out slope	Machine	$12
1	Easy Construction 5-10% slope	Sporadic benching, no major vegetation, rocks or obstacles, Trail width <600mm	Machine	$15
1.5	Easy Construction 10-15% slope	Shallow benching (<200mm), some vegetation Trail width <600mm, no rock armouring	Machine	$20
2	Moderate Construction 15-20% slope	Shallow benching (<300mm), some vegetation Trail width <600m, small rocks, no armouring.	Machine	$25
2.5	Moderate Construction 20-25% slope	Moderate benching (<400mm) average vegetation, Trail width <900mm, bigger rocks, no armouring	Machine Some hand build	$30
3	Moderate Construction 25-30% slope	Moderate benching (<500mm), denser vegetation, trees Trail width <900mm, rocky, some rock armouring	Machine and Hand build	$35
3.5	Difficult Construction 30-35% slope	Deep benching (<600mm), denser vegetation, trees. Remote Trail width >900mm or rocky, some rock armouring or double width	Machine and Hand build	$40
4	Difficult Construction 35-40% slope	Deep benching (<700mm), dense vegetation, big trees. Remote Trail width >900mm or rocky, rock armouring or double width	Hand build some Machine	$45
4.5	More Difficult Construction 40-45% slope	Deep benching (<800mm), Thick vegetation, big trees. Remote Trail width >900mm, or heavy rock armouring, or double width	Hand build *	$50
5	Most Difficult Construction above 45% slope	Deepest Benching (>900mm). Remote, heavy thick vegetation Trail width >900mm or heavy rock armouring or double width	Hand build *	$55

*some flow/jump/park style trails in this category (eg trail G6) require significant deep earthworks and will be machine built

7.3 Construction Cost Variances

Individual trails may require optional additional works. Examples include:

- Importation of materials for remote area rock armouring
- elevated structures to pass wet or protected areas
- bridges
- trail surfacing
- barriers
- wood or metal structures such as for jumps or drops
- special trail head features
- retaining structures for unstable terrain.

Cost of such works depends on factors such as trail width, remoteness of the location and availability of construction materials. It is not feasible to accurately price all possible variations prior to commencing a project.

Trail construction over wet areas and creeks will require extensive rock armouring, elevated track, bridges or placing of adequate surface material.

Rock armouring materials can normally be sourced from the trail construction area and be transported with power carriers for short distances. This will reduce the risk of importing pathogens and weeds to the area and greatly reduce the construction cost.

Alternatively, rocks can be imported from a certified pathogen-free quarry and transported with power carriers (or by helicopter in more remote locations).

Similarly, where trail surfacing is required, small amounts of material can be sourced from the trail contour or larger amounts imported to the site.

Bridges and elevated trail sections are typically constructed to Parks and Wildlife Service Tasmania standards using treated pine and a deck of FRP (Fibre Reinforced Plastic). They can be pre-built and then installed on site, reducing debris and pollution. Bridges taller than 1,500 mm will require side railings.

Alternatively, Duragal steel bridges can be constructed.

7.4 Proposed Hassans Walls Trail Network construction cost estimate

(based on the trail construction difficulty table)

	Trail Name	Trail notes	TDRS	Distance (metres)	Construction difficulty 0-5	Cost Per Metre	Total (excl GST)
Access	**Green Climb**	Dual Use Dual Direction (walk)	Green	3,316	4.5	$50	$165,800
Gravity Area	**Green Descent**	Super Flow	Green	2,000	4	$45	$90,000
	Blue Descent	Technical with A-B Lines	Blue	1,600	4	$45	$72,000
	Black Descent	Pony Express with options	Black	1,182	3.5	$40	$47,280
Exit Green Loop	**Beginner Loop**	Family loop and Network exit	Blue	1,500	3.5	$40	$60,000
TOTAL				**9,598**			**$435,080**

Expected Cost variances throughout the network

	Trail notes	Expected Distance Metres	Cost Per Metre	Total (excl GST)
Rock Armouring	It is expected that the rock material will be sourced from the existing site.	500m	$140	$70,000
Drainage Culverts	Turnpike construction and pipes	1,000m	$20	$20,000
FRP Bridges	Fibre Reinforced Plastic (1,200mm wide) constructed to Parks and Wildlife Standards, (see plans in Reference)	25m	$950	$23,750
TOTAL				**$113,750**

Hassans Walls Trail Construction Cost

	Total (excl GST)	Total (incl GST)
TOTAL	**548,830**	**$603,713**

7.5 Other Network Development Cost

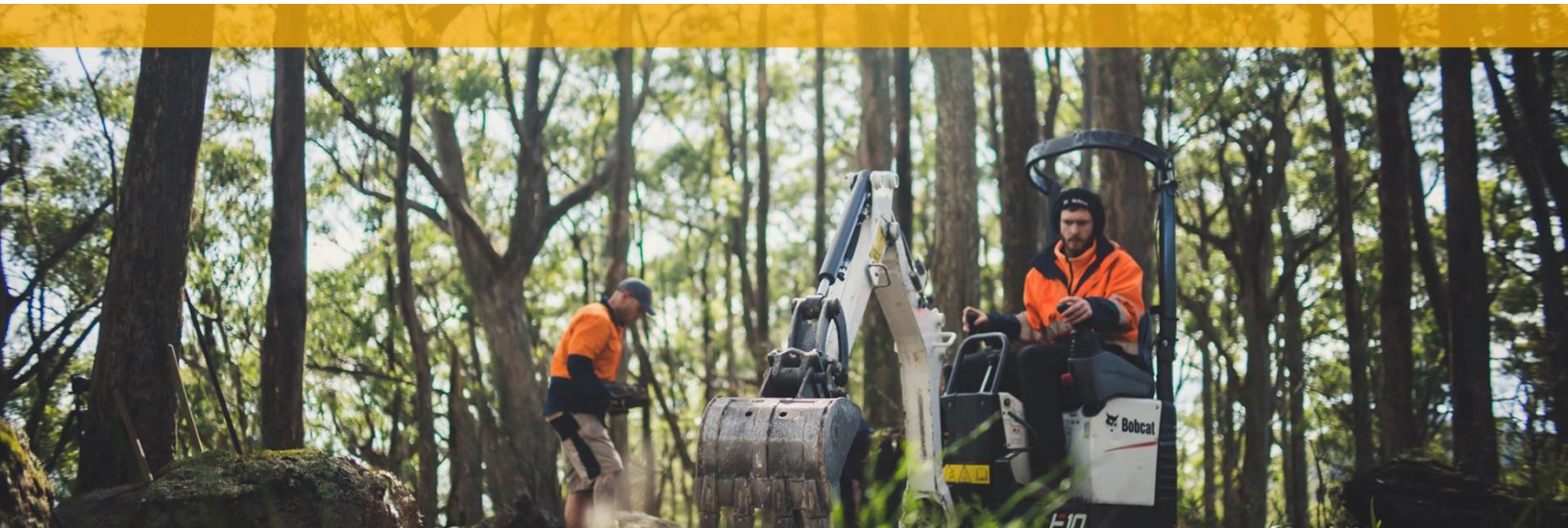
		Total (excl GST)
Trail Signage	(3)Maps. (18)Totems	$5,000
Media Management	Events, Website, Social Media, Films	$20,000
TOTAL		**$25,000**

7.6 Trail Network Estimated Ongoing Cost (est. p.a.)

		Total (excl GST)
Trail Maintenance	Basic trail maintenance -casual crew or local club-	$9,000
Trail Counters	Data management and maintenance	$1,000
TOTAL		**$10,000**

7.8 Trail Building and Launch Project Management Cost

		Total (excl GST)
Trail Building Project Management	Design and implementation of strategy to maximise the use of the trail network	$50,000
Trail Network Project Delivery	Execution of the trail launch incl. (1) community engagement, (2) Signage design and installation, (3) strategic promotional campaign development and execution (incl. $5K media buy for launch)	
Project Launch	Guaranteed: launch event delivered by Rocky Trail Entertainment, proposed Fox Superflow race event support component	$5,000
TOTAL		**$55,000**



8 Outlook and Next Developmental Stage

8.1 Project potential: Phase 2 and beyond

In conclusion we believe that the project deliverables will present a strong case for the expansion of nature based and trail-based activities and the growth potential for tourism opportunities in Lithgow City Council. We are excited about the prospects of this project.

We would like to propose a continued timeline beyond the completion of this project. As the recommended next step, Rocky Trail Destination proposes to provide a Reverse Service Brief outlining the potential and deliverables to produce a "Lithgow Trail Town Masterplan", which would complement and add to existing and ongoing tourism destination strategies.

This proposed reverse brief would be based on this Mountain Bike Trail Development Strategy and present an outline of our approach as well as a quote to implement a strategy how Lithgow City Council can harness the nature-based tourism potential of the region, which will be fueled and strengthened by the new mountain bike trail network.

We envisage presenting a master plan for Lithgow City Council complementary to existing destination development and marketing strategies to appoint Rocky Trail Destination as the principle consultancy to grow economic development and encourage active recreation in the nature based tourism (NBT) sector. The ultimate goal is to establish Lithgow as a 'trail town' – here is an outline of the potential and our team's particular strengths:

Tourism and trail destination trends

With increasing investment in trail infrastructure globally, new NBT destinations need to be competitive to attract visitors, generate socio-economic opportunities and be sustainable.

We know from our experience that the old model of grant funding, engaging a media blast, building a promotional persona and then entering the further funding/promo cycle is now apparent to be unsustainable and ineffective. NBT and Trail Destinations are in a fiercely competitive market and only getting moreso. 'Hard Infrastructure' is not enough. At Rocky Trail Destination, we firmly believe nothing enables a destination's agility more, that an engaged and integrated local community. At Rocky Trail Destination, we call this the 'Soft Infrastructure'.

Our approach

We deliver a sustained economic benefit through Trail infrastructure and NBT experiences. We bring together both the hard and soft infrastructure requirements (soft infrastructure is often overlooked and underestimated) for sustained success of a destination and its economy.

We develop agile business models that support destinations throughout the implementation and execution processes of their master plans. We see trail and tourism destination development projects through from start to finish – from strategy development to professional on the job training for local and regional key players.

Through taking the best in contemporary and proven models from Australia, Europe, New Zealand and North America we bring these together to provide Trail Stewardship integrated with Destination Stewardship.

We can help in all aspects of trails planning including:

- Trail infrastructure feasibility and ROI (Economic benefits assessment)
- Trail and NBT Destination planning
- Integrated shared use trail planning intra-region
- MTB, trekking and ebike specific strategies
- Rail Trail redevelopment
- Cycleway planning

As part of the Soft Infrastructure deliverable we have developed a specific methodology to achieve holistic stakeholder engagement. This model provides a deployable coordination platform for all stakeholders, not only that but provides tracking and score carding can help recalibrate priorities, resources and efforts for a truly cohesive destination.

Rocky Trail Destination exists to integrate the build of a destination with the ongoing local impact of a sustained, robust local economic uplift, through new industry, community pride, integrated stakeholder management and the realisation of a social dividend through natural assets and Nature Based Tourism.

We are excited at the prospect of continuing to deliver our services to the Lithgow community.

9 References

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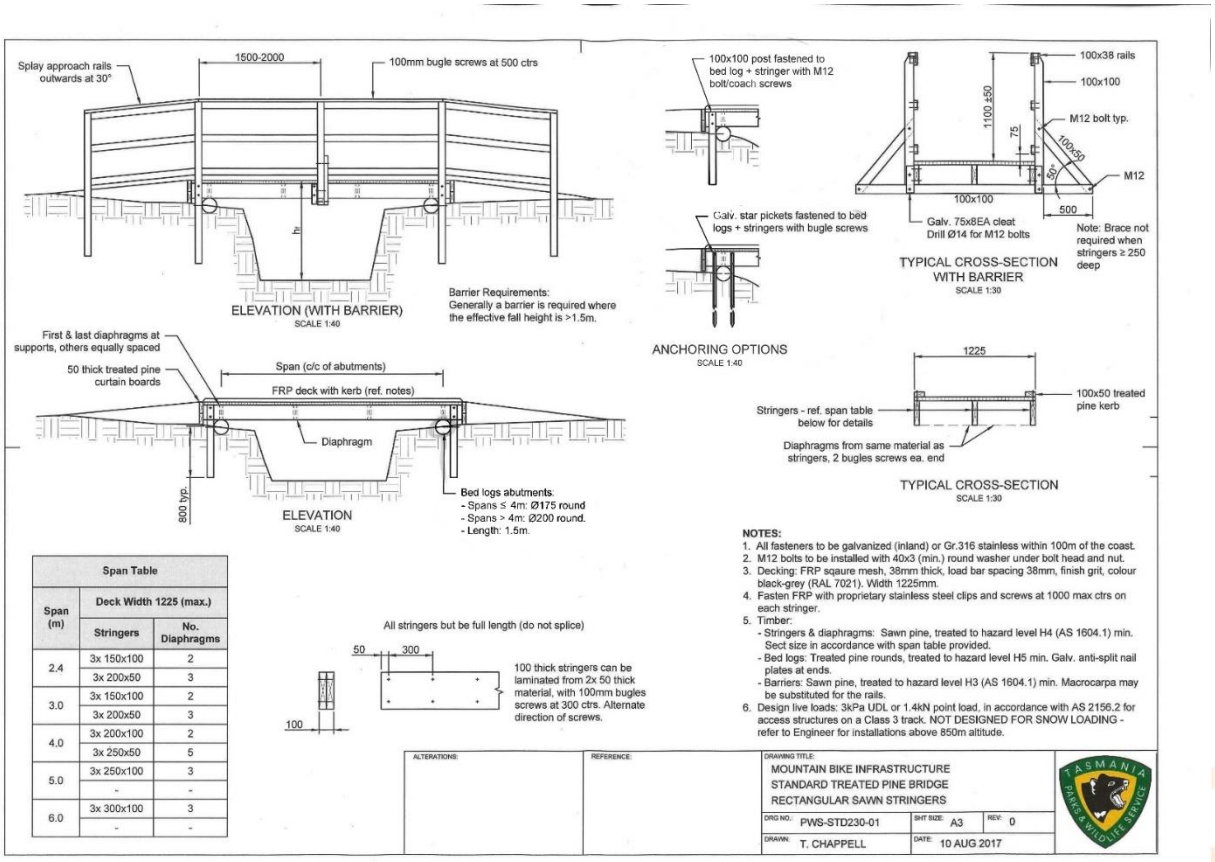


Span Table		
Span (m)	Deck Width 1225 (max.)	
	Stringers	No. Diaphragms
2.4	3x 150x100	2
	3x 200x50	3
3.0	3x 150x100	2
	3x 200x50	3
4.0	3x 200x100	2
	3x 250x50	5
5.0	3x 250x100	3
	-	-
6.0	3x 300x100	3
	-	-

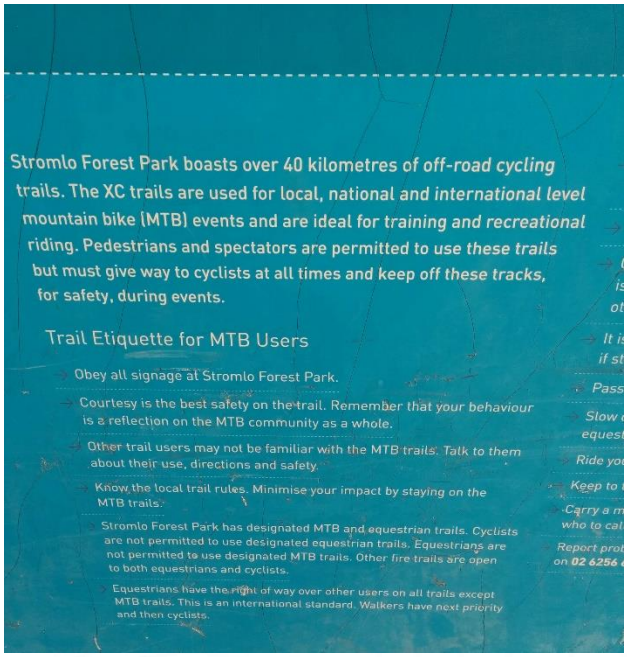
FRP (Fibre Reenforced Plastic), Parks and Wildlife Service Standards

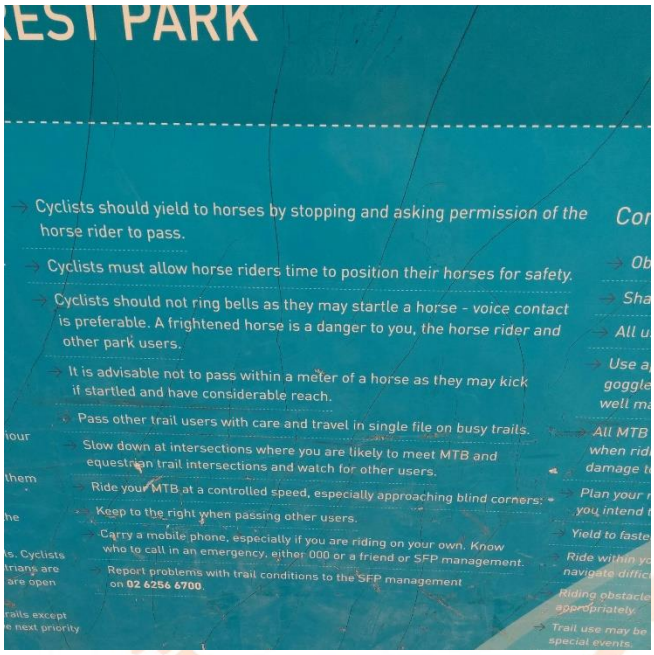
10 Abbreviations

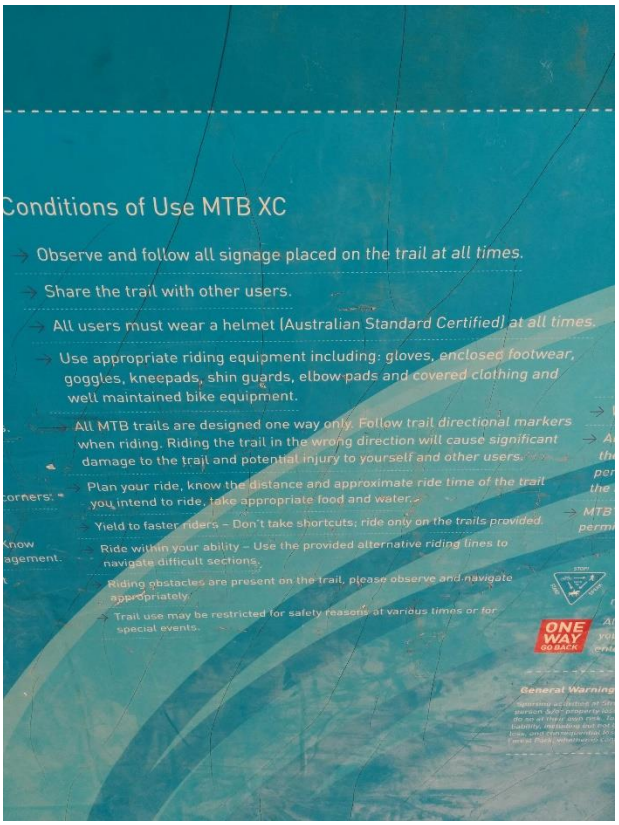
AHIMS	Aboriginal Heritage Information Management System
A-line	Challenging route/trail section
ATG	Average Trail Gradient
B-line	Alternative to challenging route/trail section
CRC	Climb-Rest-Climb
CTMBC	Central Tablelands Mountain Bike Club
HWPoM	Hassans Wall Plan of Management
IMBA	International Mountain Bike Association standards
MTB	Mountain Bike, Mountain Biking, Mountain Biker
REDS	Regional Economic Development Strategy
SFAZ	Strategic Fire Advantage Zone
TDRS	Trail Difficulty Rating System

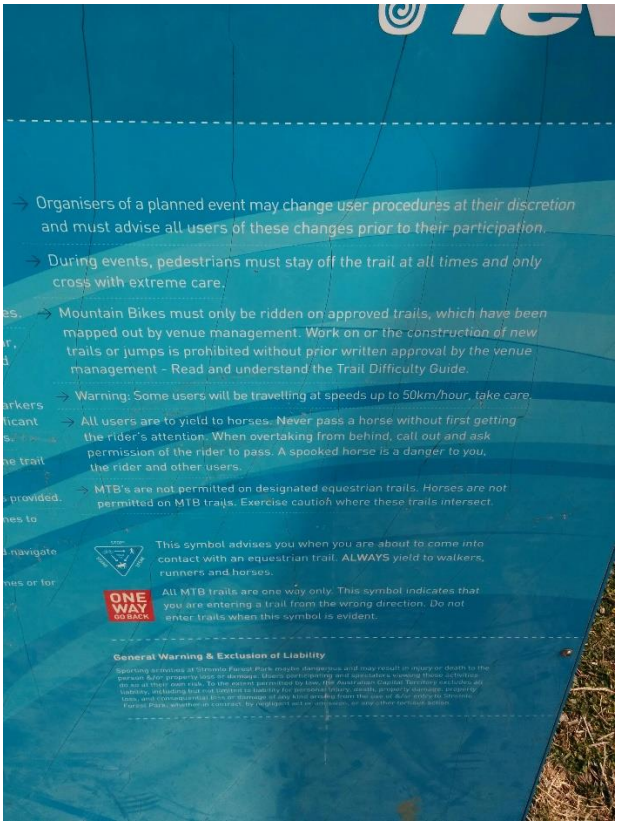
11 Attachments

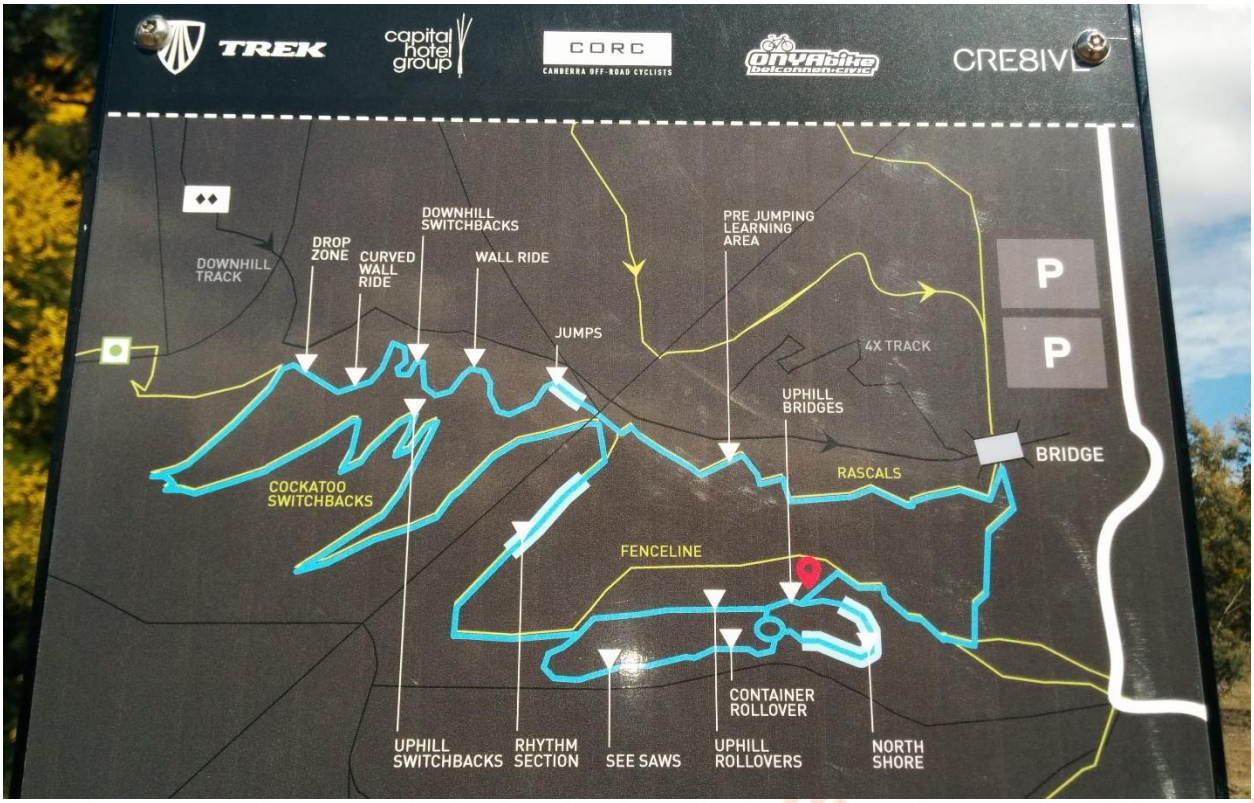
Trail signage examples Stromlo Forest Park, ACT

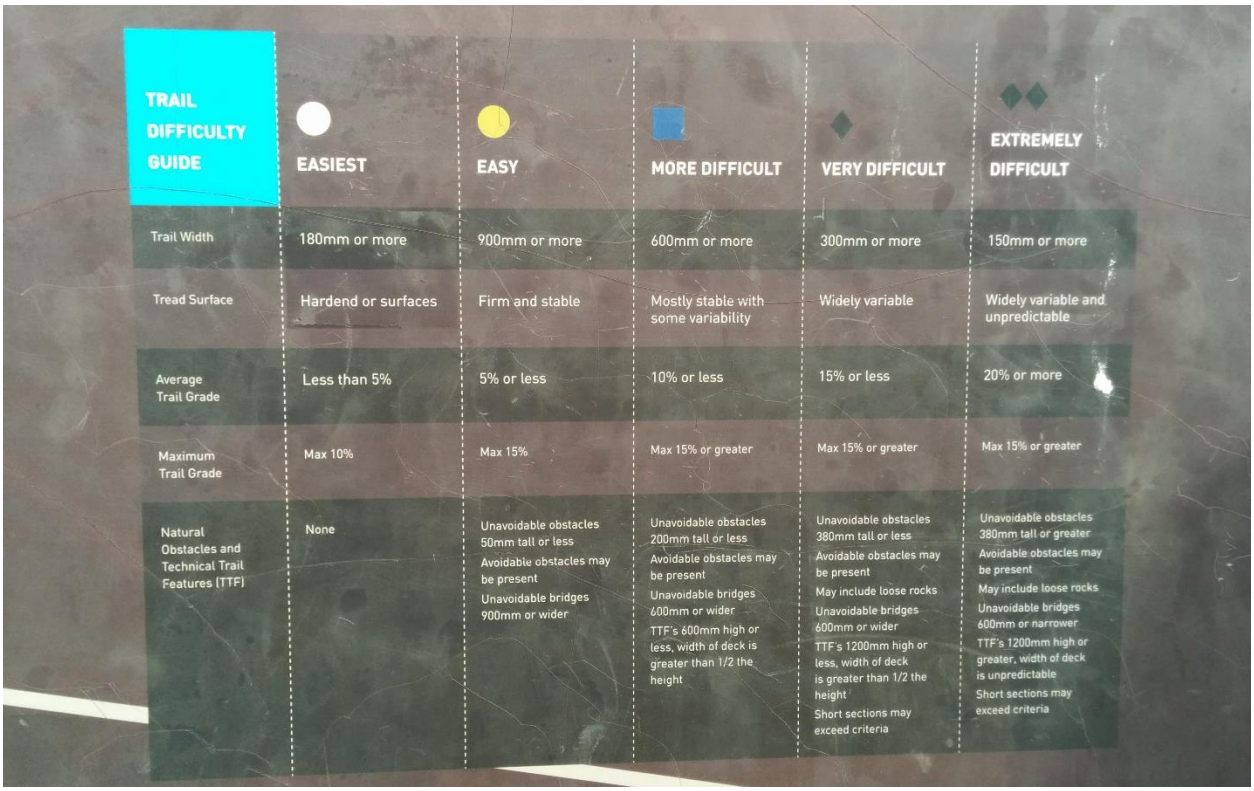





Conditions of Use MTB XC
Observe and follow all signage placed on the trail at all times.
Share the trail with other users.
All users must wear a helmet (Australian Standard Certified) at all times.
Use appropriate riding equipment including: gloves, enclosed footwear, goggles, kneepads, shin guards, elbow pads and covered clothing and well maintained bike equipment.
All MTB trails are designed one way only. Follow trail directional markers when riding. Riding the trail in the wrong direction will cause significant damage to the trail and potential injury to yourself and other users.
Plan your ride, know the distance and approximate ride time of the trail you intend to ride, take appropriate food and water.
Yield to faster riders – Don't take shortcuts; ride only on the trails provided.
Ride within your ability – Use the provided alternative riding lines to navigate difficult sections.
Riding obstacles are present on the trail, please observe and navigate appropriately.
Trail use may be restricted for safety reasons at various times or for special events.
ONE WAY GO BACK
General Warning


Organisers of a planned event may change user procedures at their discretion and must advise all users of these changes prior to their participation.
During events, pedestrians must stay off the trail at all times and only cross with extreme care.
Mountain Bikes must only be ridden on approved trails, which have been mapped out by venue management. Work on or the construction of new trails or jumps is prohibited without prior written approval by the venue management - Read and understand the Trail Difficulty Guide.
Warning: Some users will be travelling at speeds up to 50km/hour, take care.
All users are to yield to horses. Never pass a horse without first getting the rider's attention. When overtaking from behind, call out and ask permission of the rider to pass. A spooked horse is a danger to you, the rider and other users.
MTB's are not permitted on designated equestrian trails. Horses are not permitted on MTB trails. Exercise caution where these trails intersect.
This symbol advises you when you are about to come into contact with an equestrian trail. ALWAYS yield to walkers, runners and horses.
ONE WAY GO BACK
All MTB trails are one way only. This symbol indicates that you are entering a trail from the wrong direction. Do not enter trails when this symbol is evident.
General Warning & Exclusion of Liability


TREK
capital hotel group
CORC
CANBERRA OFF-ROAD CYCLISTS
CRE8IVE
DOWNHILL TRACK
DROP ZONE
CURVED WALL RIDE
DOWNHILL SWITCHBACKS
WALL RIDE
JUMPS
PRE JUMPING LEARNING AREA
4X TRACK
P
P
UPHILL BRIDGES
BRIDGE
RASCALS
COCKATOO SWITCHBACKS
FENCELINE
CONTAINER ROLLOVER
UPHILL SWITCHBACKS
RHYTHM SECTION
SEE SAWS
UPHILL ROLLOVERS
NORTH SHORE



TRAIL DIFFICULTY GUIDE	EASIEST	EASY	MORE DIFFICULT	VERY DIFFICULT	EXTREMELY DIFFICULT
Trail Width	180mm or more	900mm or more	600mm or more	300mm or more	150mm or more
Tread Surface	Hardend or surfaces	Firm and stable	Mostly stable with some variability	Widely variable	Widely variable and unpredictable
Average Trail Grade	Less than 5%	5% or less	10% or less	15% or less	20% or more
Maximum Trail Grade	Max 10%	Max 15%	Max 15% or greater	Max 15% or greater	Max 15% or greater
Natural Obstacles and Technical Trail Features (TTF)	None	Unavoidable obstacles 50mm tall or less Avoidable obstacles may be present Unavoidable bridges 900mm or wider	Unavoidable obstacles 200mm tall or less Avoidable obstacles may be present Unavoidable bridges 600mm or wider TTF's 600mm high or less, width of deck is greater than 1/2 the height	Unavoidable obstacles 380mm tall or less Avoidable obstacles may be present May include loose rocks Unavoidable bridges 600mm or wider TTF's 1200mm high or less, width of deck is greater than 1/2 the height Short sections may exceed criteria	Unavoidable obstacles 380mm tall or greater Avoidable obstacles may be present May include loose rocks Unavoidable bridges 600mm or narrower TTF's 1200mm high or greater, width of deck is unpredictable Short sections may exceed criteria

TRAIL HEAD, LOOP, JUNCTION & TRAIL SIGNS

Stromlo Forest Park employs a signage system to assist with navigation around the trail network and to help riders choose trails that suit their skill level. You are standing at the Stromlo XC **Trail Head** which outlines all trails and rules for park users. The **Trail Loop Signs** feature a map, grading and description of specially selected ride loops for your enjoyment. **Trail Junction signs** are being introduced at various locations throughout the venue and present further information about trail options in the area and help orient riders. **Trail signs** throughout the park indicate the trail name, difficulty rating, loop number(s) and a direction arrow to make navigation easy. Trail maps can be downloaded from **www.stromloforestpark.com.au**

Stromlo Forest Park's trails have been graded in accordance with the IMBA Trail Difficulty Rating System and the trail maps and signs display these ratings. Please ride safely and within your own abilities.The IMBA Trail Difficulty Rating System categorises the relative technical difficulty of recreation trails and is devised to help trail users choose trails that match their skill level, manage risk and minimise injuries and improve the outdoor experience for a wide variety of users.

The following table indicates the difficulty of the trails and the skill level required to ride them.