Crater Lakes Trails Plan

CITY OF MOUNT GAMBIER

OPEN TRAILS AUSTRALIA

Status	Changes	Author	Reviewer	Date
Draft V2		K Gardner	H Rowe	August 2023
Draft V4		K Gardner	E Solly	September 2023
Final	Council feedback	K Gardner	E Solly	November 2023

This report was prepared by Open Trails Australia Pty Ltd for the City of Mount Gambier in relation to the Crater Lakes Trails network.

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Acknowledgement

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

Contents

Introduction

In response to the comprehensive Crater Lakes Trails Audit, Open Trails Australia proudly presents the Crater Lakes Trail Plan. The Plan serves as a pivotal response aimed at addressing critical gaps within the trail network, mitigating user conflicts, elevating the visitor experience, and delivers on the opportunities and actions outlined in the Draft Crater Lakes Activation Plan.

The plan encompasses a wide spectrum of trail-related matters, offering a foundation of sound and objective recommendations. These recommendations are designed to empower the City of Mount Gambier and Active user groups as it progresses towards establishing a fully functional, safe, sustainable, and compliant trail network that caters to the needs of the local community and visitors alike.

Notably, the actions and recommendations put forth in both the Draft Crater Lakes Activation Plan and the Trails Plan closely align with the strategic priorities outlined in the recently released Statewide Trails Strategy 2023 – 2033 by the Government of South Australia.

Situated within the unique confines of Crater Lakes Park, the Crater Lakes Trails Plan capitalises on the existing complementary facilities to craft a high-quality, inclusive, and enjoyable trails network.

The Crater Lakes Trails Plan represents the culmination of extensive research, community engagement, and collaboration among local stakeholders, recreational trail experts, and passionate advocates for outdoor recreation. It is a blueprint that envisions a formalised network of trails that will not only serve as a source of enjoyment and relaxation but also as a catalyst for economic development, improved public health, and environmental stewardship.

The plan acknowledges the requirement for additional maintenance resources and recommends recruiting a Full Time Equivalent (FTE). The new FTE position would provide support to the existing 2 FTE staff in handling other general maintenance tasks within Crater Lakes Park. In turn, the existing FTEs would lend their assistance with trail-related maintenance tasks. This collaborative approach should help streamline and optimise overall maintenance efforts for both trails and other new and upgraded facilities.

As the future cultural heritage assessment is undertaken for the Crater Lakes Park the Trail Plan will be updated to reflect any findings from the assessment.

Guiding Vision

City of Mount Gambier guiding vision for the Parks Tails network is to: *Provide a sustainable and high-quality network of trails which enhance and complement the immersive nature of the Park, while improving access and celebrating its unique qualities.*

The overall purpose of the Plan is to:

- Provide a best practice framework and plan for the sustainable provision, management, and maintenance of the Parks trails network
- Ensure the Plan is centred around accessibility, connectivity, cultural and environmental conservation
- Provide advice regarding the governance, safety/compliance and event management considerations across the trails network
- Provide the detail required for Council to submit a development approval application for the trails network across the Park
- Ensure the provision of trails align, wherever possible, to the needs, interests and aspirations of key user groups including, but not limited to, walkers, runners, cyclists, mountain bike enthusiasts and visitors seeking interpretive experiences
- Supply Council with useable maps and resources for the promotion of the Parks Trails.

The planning process has included:

- The mapping and assessment of the existing trails as a quick reference guide
- An extensive community engagement process
- A gap analysis of trail provision and future opportunities
- A study and presentation of potential management models, recommendations and draft agreements
- Provision of a construction/works plan to deliver on the Plan recommendations with preliminary opinions of costs
- Delivery of a sign plan that both represents the status of the crater lakes trails and achieves compliance with sign locations, types and content
- A comprehensive trails management and maintenance plan indicating the type of maintenance required, where, why, how and by whom

The suite of documentation will form the base for the Development Approval Application to formalise the existing trail network and allow for the recommended future upgrades, works and new trail to be constructed.

DRAFT Crater Lakes Activation Plan 2023

At the time of writing the Trails Plan the Crater Lakes Activation Plan 2023 was still being developed however there was some clear guidance from a trail perspective that is worth noting. The following statements and ambitions have been extracted from the Draft.

Key findings

Crater Lakes Park provides a unique opportunity to establish a formal outdoor recreation and open space facility in proximity to Mount Gambier city centre.

Vision

Intrinsically central to our local identity, the Mount Gambier Crater Lakes Complex is a world-class peri-urban park providing unique experiences in a well-managed natural environment on the fringe of our city.

The area plays a critical role in enabling cultural connection, improving liveability in our community and enhancing the visitor experience within our region.

Trails

A key opportunity for the site is the delivery of trail facilities providing the opportunity for informal recreation activities such as walking, running and mountain biking; in particular, the development of an all abilities, family friendly trail.

Key opportunities:

- Formalisation of trails network to ensure development and maintenance is delivered with a focus on the conservation of the park and connect visitors to our story “you are traversing the land of volcanos, sinkholes, caves and crater lakes”.
- Seek resourcing opportunities for the employment of a full-time Peri-Urban Park Manager offering technical experience in the ongoing management and conservation of the Crater Lakes Park as a world-class natural attraction.

Actions

1. Trails and linkages

Action		Priority	Alignment, Dependency and/ or Considerations
1.1.	In consultation with site users, conduct a trails planning process to classify existing trails and internal linkages better define access and our desired product offering.	High	• SROSS • Tourism • RAP • DAIP • Cultural Heritage Assessment
1.2.	Achieve an approved and permanent network of trails which meet user expectation, are environmentally and culturally sensitive and fit-for-purpose for both casual and competitive use.	High	• SROSS • Tourism • RAP • DAIP • Cultural Heritage Assessment
1.3.	Develop an implementation and management plan for sustainable provision of a high-quality trail network throughout the entire precinct, inclusive of service agreements with key user groups to ensure trails remain safe and of high-quality.	High	• SROSS • Tourism • RAP • Volunteer Management Plan
1.4.	Building on pre-existing documentation (such as the Leg of Mutton Landscape Master Plan) undertake a comprehensive interpretive signage and materials study to inform cultural heritage, flora and fauna and geological overlays to trails to further enhance the visitor experience and reiterate the identity of the precinct.	Low	• Tourism • Cultural Heritage Assessment
1.5.	Encourage self-funded pathway and lighting infrastructure which links the Blue Lake Holiday Park and Blue Lake Golf Club.	Medium	
1.6.	Explore potential to integrate starter/family friendly trails within Bay Road pine plantation. Note: OTA assessed the Pine Plantations suitability for family friendly trails. We found several factors as to why this may be unsuitable in its current guise. • The area is a formal 'dogs off lead' area. It is not safe to mix dogs off lead with young families riding and walking. • The area within the trees is out of sight where passive surveillance is challenging. • The area may be suitable to develop if the dog area was fully fenced and the trees were thinned or managed to allow for trail design and construction.	Low	• Actions 1.1,1.2 & 1.3 Crater Lakes Park Trails Plan • Pine Plantation Maintenance • SROSS

Gap analysis

The Crater Lakes Recreation Area has witnessed the evolution of its trail network over several decades to meet the changing needs and demands of the local community and tourism industry. The network comprises a variety of trails, including walking trails, mountain bike (MTB) specific trails, designated shared-use trails, and vehicle management tracks. A recent Crater Lakes Precinct users survey conducted in November 2022 revealed that trails and tracks are a key attraction with 78% of survey respondents saying they use the trails and broader precinct for walking, running or bike riding. Key trail related themes from the surveyed users included:

- Greater definition of the network of tracks and trails could reduce conflict between users, particularly where bike riding and walking intersect co-exists.
- Clear opportunity to review and better define the network of tracks and trails within the precinct to respond to increased demand, improve quality and safety and reduce conflict between users.
- Trail ratings could assist in improving safety and ensuring there are trails for users of different ages and experience.
- A maintenance and management plan for tracks and trails is required to keep these assets in good condition, avoid impromptu development and reduce issues attached to vegetation removal and erosion.

The above-mentioned themes (amongst others) were also identified during the trails audit process and trails planning community engagement process.

The trails in this area have become increasingly popular for various activities such as walking, exercise, dog walking, trail running, and mountain biking. Regular local users have developed a good understanding of the trail network and create custom loops and links to suit their needs. However, tourists, visitors, and irregular users can find it challenging to navigate the network due to the irregular sign system and the complexity of the trail layout.

To address these challenges, it is important to improve the trail network's functionality and efficiency to benefit all users. This will involve enhancing opportunities for safe trail sharing among different user groups. Currently, the Strava Heat Maps indicate that users engage in activities like biking, walking, or running on trails that may not be intended for their specific user group. This highlights the need to evaluate and potentially modify the trail design to accommodate various user activities while minimising conflicts.

The focus should shift towards managing areas of conflict, improving and upgrading specific trail sections, and implementing a coherent and improved signage system. These measures will contribute to creating a high-quality community recreational asset that provides an enjoyable and safe experience for all users.

Through this comprehensive trail planning exercise, stakeholders can identify areas where gaps in the network and conflict exists and find solutions to manage these. This may involve developing separate trail sections for different user groups, constructing new trails, improving trail signage to provide clear directions, and implementing trail upgrades where necessary.

Overall, by addressing areas of conflict, enhancing key trails, and implementing an improved sign system, the trail network in the Crater Lakes Recreation area can function more efficiently, accommodate various user activities, and become a valuable recreational asset for the community.

Crater lakes trails gap analysis

The analysis of existing trails considered trail tenure, quantity, classifications, types and diversity, to help identify gaps in supply when compared to other similar trail destinations. The analysis highlighted the current gaps in participation across the broader community, lack of a coherent sign system, missing easy and critical access trails, and a lack of a consistent framework and coordinated approach to governance and management. Critical gaps identified include:

Gaps in participation in the broader community:

- Underrepresentation of young children, families and mobility impaired people.

Gaps in the range of trails required for the network to function safely and inclusively

- No provision for introductory trail experiences to cater for beginners to build skills and confidence.
- No low gradient trails suitable for prams and people with limited mobility.
- No safe access into and out of the main recreation area suitable for pedestrians and cyclists.
- Limited shared use trails and unnecessary single use trail designations.

Lack of supporting infrastructure required for a safe and informative trail network:

- No publicly accessible all-encompassing information portal on the trail network.
- No sign system to adequately inform and guide users through the trail network.

Lack of adequate trail maintenance

- Current maintenance is restricted to weed spraying areas only accessible by vehicle.
- Volunteers only permitted to spray herbicide on weeds.
- No regular programmed maintenance to manage drainage, trail surfaces, signage and vegetation encroachment (by council or volunteers).

Lack of a consistent framework and coordinated approach to governance and management

- The various layers of relevant legislation and CMG policies and programs contribute to internal confusion and communication issues around trail management.
- A coordinated and strategic approach to managing Crater Lakes Trails is lacking.
- Frustration of stakeholders due to inconsistent application of approvals for trail maintenance and event requirements.
- Lack of funding and resourcing for trail development.
- Lack of funding and resourcing for ongoing trail maintenance.

Lack of robust trails and progressive features

- Advanced DH trails need upgrades to improve long term sustainability.
- Limited trail features with A, B and C lines to enable and encourage skills progression.

Trail network as a whole does not currently meet the targets and expectations of Community Land Management Plan (Draft) in respect to *'9. Objectives for Management of the Land'* and *'11. Management Objectives, Performance Targets and Measures'.*

- If the recommendations of the Crater Lakes Recreational Trails Plan are implemented the trail network will meet the relevant targets and expectations.

Key recommendations

The Crater Lakes Trails Plan aims to address several gaps in the current network, user conflict and various compliance and safety issues. It aims to transfer to an improved governance model and incorporate a resourced programmed maintenance schedule to ensure the trail network is and remains fully operational for all users. The following tables are general recommendations and actions, the detail and specifics are provided in each of the individual trail precinct analysis later in the Plan.

As the future cultural heritage assessment is undertaken for the Crater Lakes Park the Trail Plan will be updated to reflect any findings from the assessment.

Governance and Management

1	Action	Priority
1.1	Trails Plan to be updated to reflect the findings of the Cultural Heritage Assessment.	Compulsory
1.2	Cultural engagement to be undertaken throughout the implementation of the plan eg naming of trails, signage content etc to ensure a cultural lens over all areas of delivery.	Compulsory
1.3	Adopt Trail Plan recommendations and initiate the Development Approval process to enable the Sign Plan design, fabrication and installation process to commence.	Immediate
1.4	Establish a coordinated and strategic approach to managing trails in the Crater Lakes Recreational Precinct.	Short term
1.5	Create a detailed reference flow chart outlining the various legislative and council policy/strategic hierarchies to inform future trail related decision making and authority approvals.	Short term
1.6	Establish a Memorandum of Understanding (MOU) for a partnership with a Crater Lakes Trails Reference Group. Considering the multiple interest groups and future management responsibilities it is recommended that a partnership model be developed. This model would ensure compliance with legislative requirements, policies, and agency guidelines while allowing for engagement and shared responsibility of trail management with a skills-based interest group.	Short term
1.7	Initiate discussions with Dept. for Transport and Infrastructure (DIT) regarding future management and upgrades of the narrow pathway adjacent to Riddoch Highway.	Medium
1.8	Adopt and promote use of the My Local Services mobile application as a method for trail users to report hazards.	Medium

Trail Maintenance

2	Action	Priority
2.1	A change of approach to trail maintenance is required to ensure a safe and sustainable trail network and meet the requirements and expectations of the trail users. Recruit a Full Time Equivalent. The new FTE position would provide support to the existing 2 FTE staff in handling other general maintenance tasks within Crater Lakes Park. In turn, the existing FTEs would lend their assistance with trail-related maintenance tasks. This collaborative approach should help streamline and optimise overall maintenance efforts.	Short term
2.2	Using the trail maintenance guidelines and plan provided, designate tasks and responsibilities to the skilled-based interest group/s in accordance with the agreed MOU.	Short term
2.3	Maintain a file on all trail audits, inspections and maintenance activities. This will help the land manager to: • Develop a long-term record of maintenance activities undertaken that will assist with future budgeting requirements. • provide a record that will assist with risk management, where records will demonstrate trail inspections and maintenance have been undertaken in accordance with recommended practices.	Short term

Supporting infrastructure and resources

3	Action	Priority
3.1	Using the sign plan provided, initiate the design, fabrication and installation of a new Sign System throughout the Crater Lakes Trails. The sign system will: • Provide clear and quality information at trailheads • Clear waymarking for easy navigation of the trail network • Clearly display the permitted use for each trail • Manage previous conflict and lost user issues • Be easily adaptable to incorporate new trails in the future	Short term
3.2	Create a Crater Lakes Trail information page on the CMG website. Include trail information, downloadable Avenza enabled map and the ability to download the GPX file to upload onto their own GPS device.	Medium

Trail upgrades and improvements

4	Action	Priority
4.1	Adopt the recommended redesignation of trails and permitted use. The incorporation of more shared-use trails as opposed to single use trails will enable a more inclusive trail network. Some shared-use trail will be only one direction for bicycles to manage speed and improve pedestrian safety.	Short term
4.2	Commence planning and implementation of individual trail upgrades as per Trail Plan recommendations.	Medium
4.3	Design and construct link trail between Brownes Lake and Sugarloaf area (recommendation of the 2004 Management Plan)	Medium
4.4	Design and construct easy trail loop in Brownes Lake (recommendation of the 2004 Management Plan)	Medium

Trail issues and opportunities overview

The following maps show a before and after scenario of the Crater Lake trails layout.

They also identify and discuss solutions to the key issues and opportunities raised during the Gap analysis and community engagement process.

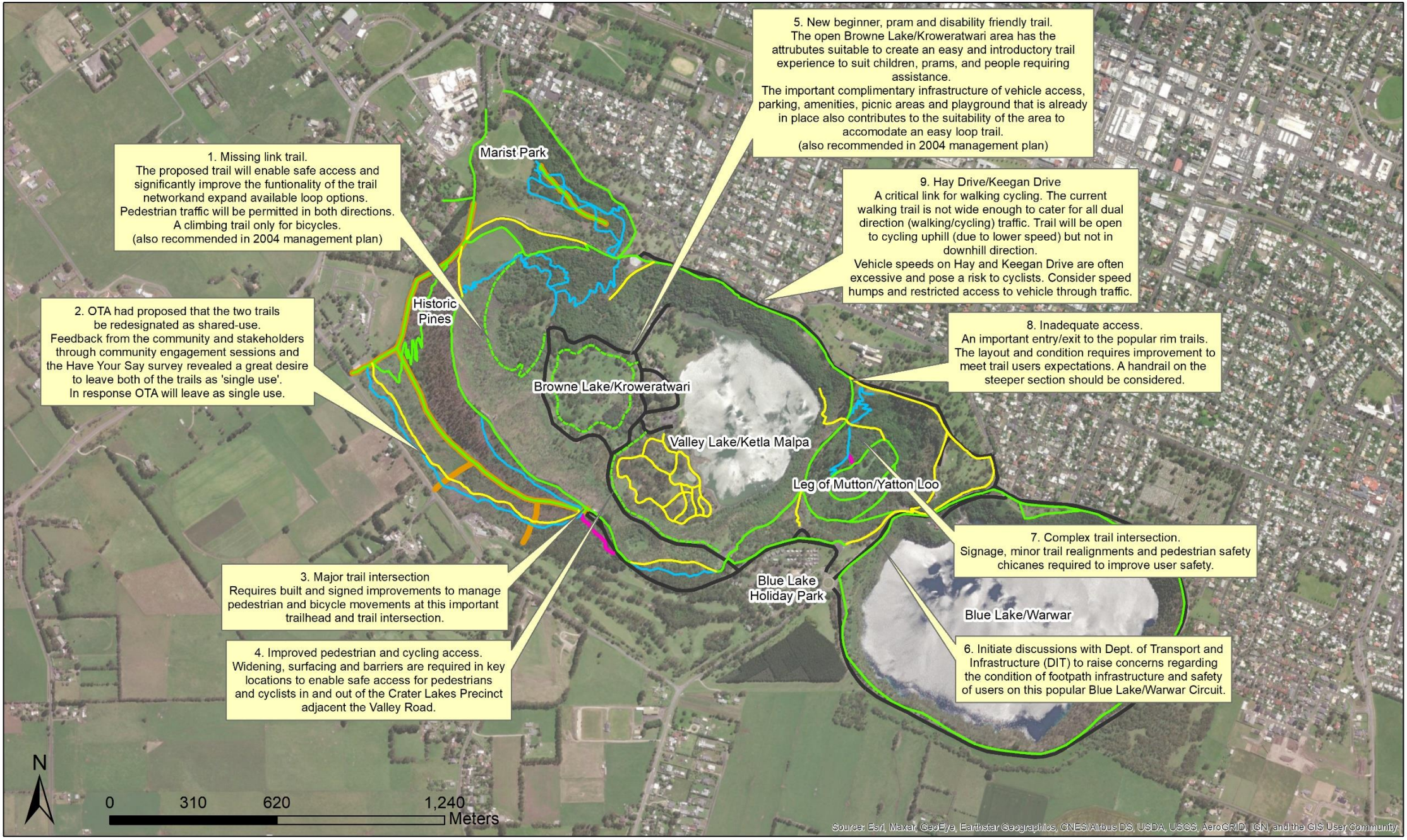
The **Works/Construction Plan** section provides more detail, priorities and cost estimates on specific work.

Legend

- Current_Shared_Trails_Combined
- Current_Walking_Trails_Combined
- Current_Cycling_Trails_Combined
- Management_Vehicle_Access_Track
- Crater_Lakes_Roads

City of Mount Gambier, Crater Lakes Trails
Current trail network as designated - including pre-fire trails
Main issues and gaps in the current network

City of Mount Gambier



Legend

- Future_Walking_Trails_Combined
- Future_Shared_Trails_Combined
- Future_Cycling_Trails_Combined
- Proposed_New_Shared_Trails
- Proposed_Trails_to_Close
- Management_Vehicle_Access_Track
- Crater_Lakes_Roads

City of Mount Gambier, Crater Lakes Trails
Future formalised trail use and key trail improvements

City of Mount Gambier

Stakeholder and Community Consultation

Community Engagement Stage 1 Summary

Introduction and process

As part of the Crater Lakes Trails Planning process the first stage community engagement focus groups were held on Sunday 23 (one session) and Monday 24 (two sessions) July 2023 at the Wulanda Recreation and Convention Centre. A total of 36 participants attended along with Hayley Rowe, Strategic Projects Coordinator for City of Mount Gambier and Kain Gardner and Piers Brissenden for Open Trails Australia. The second stage engagement in mid-August 2023 aims to present a draft plan back to the community groups for any further feedback.

The aim of the stage one engagement was to consider what issues are important to community members in relation to the Crater Lakes Trails to enable the feedback to be taken into account in the planning process.

Themes for discussion were derived from the Have Your Say survey 'What do you consider are important aspects' section. Nine themes were considered during the sessions with open discussion being facilitated by the Open Trails Australia team.

The nine themes discussed were:

1. Improved and more informative signage and online information
2. Improved cultural and heritage interpretive signage and information
3. Designated trailhead locations for people to gather and get information
4. Diversity of trail types and styles suitable for a range of abilities
5. More community participation in using the trails and area
6. A high-quality trails network that attracts visitors and contributes to the regional economy
7. Safe and sustainable trails that are robust and long lasting
8. Clearly defined and delegated trail maintenance responsibilities
9. Effective governance for ongoing trail development and management to help realise the Crater Lakes Trails Vision

Any other themes not mentioned or questions to seek answers to were placed aside for further consideration by the council.

Outcomes

Whilst it is clear that all themes noted are important and will be included in the trails plan, the top three priority themes identified during the sessions were essentially the same across the three groups.

1. Theme 7: Safe and sustainable trails that are robust and long lasting
   - includes environmental sustainability
   - correct trail design to enable longevity
   - walkers/cyclists at intersections – who gives way to who?
   - MTB night riding can be an issue (noting it is not allowed)

2. Theme 1. Improved and more informative signage and online information
   - Informative maps needed at all trailheads
   - Trailheads should include all relevant information
   - QR codes leading to downloadable maps needed
   - On-trail wayfinding at intersections and other decision points

3. Theme 4. Diversity of trail types and styles suitable for a range of abilities
   - Disability friendly trails are required – include some lookouts
   - Beginner/family/pram friendly trails are lacking – consider a loop at Brownes Lake
   - Consider the pine plantation area as an opportunity for novice trails
   - Valley Road exit – road is not appropriate to walk/ride on. A trail behind barrier is required

Additional themes were also discussed and considered important to record
   - An alternative climbing trail out of Brownes Lake is needed – currently no other way out apart from the road
   - The Blue Lake walking path is narrow on western side – consider options to improve

A consistent matter raised was the need to re-open the tracks/trails through the Historic Pine Plantation. There is great frustration from many attendees that CMG have kept the area closed when the amount of trees that fall do not warrant such a risk adverse approach.

<u>For further consideration</u>

Matters raised not directly related but complementary to the trails plan are listed below.
   - Records of user activity and number of users is needed
   - Method of gathering information from users who do not access or use online technology needs to be implemented – eg: in-person surveys
   - Better dog on/off lead signs and rules are required to better communicate intent
   - When trails are available for use needs to be better advised (eg: park closes at 7pm)
   - Consider an 'I share my trail' campaign to better communicate a code of conduct for all trail users
   - Follow up from post-fire impacts needs to be communicated to the community
   - Consider if Park Run signage can be included on park signs
   - Consider safety around Keegan Drive adjacent the old hospital – hazardous for trail users. Suggestion to close that section of road or limit vehicle movement

<u>Governance matter – Friends Group</u>

Discussion was held at two sessions about the potential for a Friends of Crater Lakes Trails Group. This could be a good option for council to consider and formalise an agreement between parties to enable appropriate volunteer management support. Could be part of a broader precinct Friends Group and aligned to Friend of Parks Incorporated (an existing independent state body established to protect and represent the interests of the many individual Friends of Parks groups and affiliated groups in South Australia).

Community Engagement Stage 2 Summary

Introduction and process

As part of the Crater Lakes Trails Planning process the second stage community engagement focus groups were held on Friday 11 (two sessions) August 2023 at the Wulanda Recreation and Convention Centre. A total of 30 participants attended along with Hayley Rowe, Strategic Projects Coordinator and Elisa Solly for City of Mount Gambier and Kain Gardner and Piers Brissenden for Open Trails Australia.

The aim of the stage two engagement was to present a draft plan back to the community groups for any further feedback.

OTA conducted a recap on the process to date, noting:

- A draft plan has been provided and noted by Council members
- Have your Say Survey received 165 submissions
- Results have been distilled into common issues

OTA presented proposed trails plan including

- Display maps showing:
    - current trails with call outs describing issues and
    - proposed trails with call outs describing solutions
- Talk through issues and recommended solutions
- Promoted discussion to enable queries and feedback
- General discussion about principles and techniques of trail construction, maintenance and governance.

The presentation was well received. Minor changes to the plan were discussed and agreed.

Have Your Say

In addition to the 5 community and stakeholder meetings, the council facilitated an online 'Have your say' questionnaire and feedback portal. This was carried in two stages. The first being the introduction of the project and gaining initial thoughts, wants, needs, issues and opportunities. The second being a presentation of the first conceptual draft, gap analysis and trail plan recommendations.

The first stage received 165 submissions, the second 15 submissions. The consensus is that the draft plan was well received with only minor changes in regard to shared-use recommendations required.

Internal council consultation

Two meetings were held on 24 July 2023 between City of Mount Gambier staff and Open Trails Australia. This included representatives from Governance and Property, Development Services, Operations, Parks and Gardens, Events, Tourism and the Crater Lakes Precinct Project. The scope of the trails plan was discussed, and staff had the opportunity to put forward views and ideas.

The DRAFT Trail Plan V2 was circulated among staff in September 2023 for comment. Feedback received focussed on concerns regarding existing resources and the ability to manage and maintain

the trails network. Subsequent drafts addressed these concerns by calculating resources required and making recommendations based on these.

The DRAFT Trail Plan V4 was presented to staff and Councillors for feedback in October 2023. Feedback received addressed minor grammatical inconsistencies.

Recreational Trails

What is a Track and Trail?

The terms Track and Trail are often interchanged but there should be a clear distinction drawn between the two for the purpose of this Plan.

The term 'track' is typically used when the corridor is primarily designed and intended to cater to management vehicles or provide access for purposes such as land management, fire management, or other management activities. While recreational use is a secondary benefit, tracks are integral to land management and often promoted for recreational purposes as well. Common examples of tracks are roads within parks and reserves that are utilised by vehicles for access and management purposes. Track conditions may be altered over time to accommodate fire management and land management priorities.

On the other hand, the term 'trail' is used when the corridor has been primarily designed for recreational use. Trails are specifically intended for recreational purposes, and their physical design is usually narrower than tracks, making it impractical for management vehicles to traverse them. Therefore, trail users do not expect to encounter vehicles while using a trail. The exclusivity of trails often enhances the user experience by providing a stronger connection with nature and minimising urban influences.

To confuse the matter slightly, narrow, natural surface trails are widely referred to as 'singletrack'.

By understanding the distinction between tracks and trails, land managers and trail users can have a clearer understanding of the purpose, design, and expectations associated with each. This differentiation allows for better planning and management of recreational and land management activities, ensuring appropriate infrastructure is in place to cater to the specific needs and experiences of users in different environments.

Factors important to trail users

A sustainable trail facilitates public access and enjoyment of landscapes while minimising impacts on natural and cultural resources. By incorporating responsible design, maintenance practices, and promoting responsible user behaviour, a trail can provide long-term benefits to both users and the environment. Factors important to many trail users include:

- Setting/Nature: The trail's surroundings and natural environment play a significant role in attracting and engaging trail users. Scenic landscapes, diverse ecosystems, and the presence of flora and fauna enhance the overall experience.

- Singletrack Style Trail: Many trail users prefer a trail that is specifically designed for non-motorised use, such as hiking or biking, rather than a vehicle track. Singletrack trails provide a more immersive and intimate experience in nature, away from motorised traffic.

- Exercise Opportunity: Trails offer an opportunity for physical activity and exercise. Whether it's walking, running, cycling, or hiking, users appreciate trails that allow them to engage in their preferred form of exercise, promoting health and well-being.

- Loops and Connectivity: Users often value trails that offer loop options or connect to other trails. Loop trails provide a sense of completion and allow users to explore different areas without retracing their steps. Connectivity to other trails or destinations enhances the trail network and expands recreational opportunities.

- Variety of Trail Type/Style: Diversity in trail type and style caters to the preferences and abilities of various users. Some may enjoy rugged and challenging trails, while others prefer gentle, accessible paths. Providing a mix of trail types ensures inclusivity and attracts a broader range of users.

- Good Information: Users appreciate accurate and up-to-date information about the trail, including maps, trailhead signage, distance markers, and points of interest. Clear communication regarding trail conditions, regulations, and any potential hazards helps users plan their trips effectively and enhances their overall experience.

These factors contribute to creating an enjoyable and fulfilling experience for all trail users, encouraging them to explore, appreciate nature, and engage in physical activity. By considering these factors during trail planning, design, and management, trail managers can create inclusive and appealing environments for diverse user groups.

Singletrack Trail Users

- Hikers - more focused on setting and destination, most mobile users, capable of cross-country travel.
- Trail Runners – most similar in movement to mountain bikers (speed, distance, preferred trail conditions) where the trail itself is an important factor along with exercise.
- Mountain Bike Riders - wide range of desired experiences, but the trail itself is generally the primary factor, rather than destination or setting .
    - Factors more specific to mountain bikes
        - Playfulness
        - Technical challenge
        - Skills progression
        - Trail flow
- E-Bike MTB - similar in desired experiences to human-powered mountain bikers but able to cover more distance for a given fitness level.

Please see the Glossary for meanings of other terminology used in the document.

Single use and shared use trails

Single use trails are designed and developed exclusively for a particular user group, often seen in mountain biking. These trails are specifically tailored to meet the needs and challenges of that user group, which may include technical features and terrain that are not suitable for other users. Single use trails should be clearly identified as such to ensure that users have the best experience possible and to minimise conflicts with incompatible user groups.

Shared use trails are designed to accommodate multiple user groups. These trails are open to various users, such as mountain bikers, trail runners, and walkers. Shared use trails require users to be mindful of others and to practice responsible trail etiquette. Mountain bikers can play a role in building positive relationships with other users by respecting their presence and yielding the right of way when appropriate.

The concept of shared use trails acknowledges that different user groups can coexist and enjoy the trails while respecting each other's needs and safety. Shared use trails are generally Easy to Intermediate in classification with some of the following attributes depending on the situation:

- Clear signage is important to inform users
- Good sight lines where users can see each other approaching
- Room to pass safely (or step off trail) if other users are encountered
- Lower gradient and lower speed trails
- Can be narrow singletrack if:
    - Volume of use is low so likelihood of encountering other groups is low
    - Trail is used as a climbing trail only trail for MTB and both directions for walking

It is important for all users to understand and adhere to the designated trail guidelines and etiquette to ensure a harmonious and enjoyable trail experience for everyone.

By distinguishing between single use and shared use trails, trail managers can appropriately plan and designate trails to cater to specific user groups, while also considering the potential for shared use trails where multiple user groups can safely and responsibly coexist.

Environmental Benefits

Volunteer contributions from trail users, particularly mountain bike riders, play a significant role in trail care and maintenance, benefiting trail networks in South Australia and throughout Australia. In addition to the valuable work volunteers perform in preserving and caring for the environment, the planned development of trails can also provide various environmental benefits. Some of these benefits include:

- Increased Community Ownership and Connection: Trails create opportunities for community members to engage with and appreciate natural areas. By providing access and connection to the environment, trails foster a sense of ownership and stewardship among users. This increased connection can lead to long-term conservation outcomes as individuals develop a vested interest in protecting and preserving the natural surroundings.
- Preservation and Protection of the Environment: Well-designed and properly managed trails that are sensitive to the landscape can help preserve and protect the environment. By identifying suitable trail routes and implementing appropriate trail construction and maintenance techniques, the impact on ecosystems, habitats, and sensitive areas can be minimised. This approach ensures that trails add value to the area while preserving its natural integrity.
- Prevention of Unsustainable Trail Development: Strategic planning for trail development, based on user demand and environmental considerations, helps prevent the creation of unsanctioned trails in unsuitable environments. When trails are carefully planned, designed, and managed, they can direct users to designated areas that are suitable for recreational activities, reducing the potential for unauthorised trail development that may harm sensitive habitats or ecosystems.
- Passive Surveillance and Reduction of Illegal Activities: The presence of trail users provides passive surveillance in natural areas, discouraging antisocial behaviour and illegal activities such as dumping waste. When trails are well-travelled and actively used, it creates a sense of community and shared responsibility for the environment. This can help deter illegal dumping and other undesirable activities, contributing to the overall cleanliness and protection of the natural areas.

By recognising the value of volunteer contributions and implementing well-designed and managed trails, the Crater Lakes Trails network can harness the environmental benefits outlined above. This approach not only enhances the trail experience but also promotes environmental stewardship, community engagement, and the long-term preservation of the natural surroundings.

Social and Health Benefits

Engaging in outdoor activities such as walking, running, and mountain biking within the Crater Lakes Trails network can bring about numerous social and health benefits. Some of these benefits include:

1. Improved Mental and Physical Health: Spending time in nature and being physically active have been linked to improved mental well-being and physical health outcomes. Regular exercise in natural environments can contribute to reduced stress, improved mood, increased energy levels, and better overall physical fitness. These positive effects can lead to potential reductions in healthcare costs and enhanced productivity.
2. Community Connection and Reduced Isolation: The trails provide opportunities for individuals to connect with their community and reduce social isolation. People of all ages and backgrounds can come together to enjoy outdoor activities, fostering a sense of belonging and social interaction. Shared experiences on the trails can help build relationships and strengthen community bonds.
3. Active and Social Family and Friend Gatherings: The Crater Lakes Trails offer a setting where friends and families can engage in physical activity and socialise together. Participating in outdoor activities as a group promotes a healthy lifestyle, strengthens relationships, and creates lasting memories.
4. Outdoor Learning Environment for Children: The trail network can serve as an outdoor classroom for children, providing them with opportunities to learn about nature, culture, and history while being active. Exploring the natural environment and engaging in educational activities along the trails can foster a sense of curiosity, environmental awareness, and a deeper connection to the local area.
5. "Green Exercise": Research suggests that exercising in natural environments, such as the Crater Lakes Trails, can have additional benefits compared to indoor exercise alone. This concept of "green exercise" combines physical activity with the positive impacts of being in nature, leading to improved mental well-being, reduced stress, increased self-esteem, and enhanced overall enjoyment of the activity.

By offering a space for outdoor recreation and promoting physical activity, the Crater Lakes Trails can contribute to the well-being of individuals, families, and the community as a whole. The social and health benefits associated with these activities can have a positive impact on the quality of life and create a sense of pride and ownership within the community.

Trail Sustainability

The development of a sustainable trail requires a balanced approach to the five core elements, as any overemphasis or underemphasis on a particular element can lead to negative consequences. These elements contribute to minimising environmental impact, providing a safe and positive user experience, and ensuring practical and financial feasibility for trail maintenance.

1. Maximum Sustainable Grade: Sustainable trails aim for a low overall grade, typically less than 10%, to minimise water erosion. By keeping the grade gentle, water flow is reduced, minimizing the potential for erosion and sedimentation. The 10% gradient can be increased if additional measures are put in place such as stone armouring or steps.
2. The 10-Percent Average Guideline: Following the 10-percent average guideline helps maintain a balance between trail usability and erosion control. This means avoiding excessively steep sections, especially for extended distances, as they can lead to erosion and user difficulties. Striving for a moderate and manageable grade promotes a more sustainable and enjoyable experience for trail users.
3. The Half Rule: The half rule is applied when unavoidable steeper sections are encountered. It suggests that these sections should be kept as short as possible (not exceeding 20 meters) and have a gradient no more than 50% of the fall line gradient. This rule helps control erosion by limiting the length and steepness of challenging trail segments.
4. Grade Reversals: Grade reversals are changes in the slope direction of the trail. They play a critical role in shedding water away from the trail surface and preventing water from flowing directly along the trail, reducing erosion. Incorporating grade reversals at appropriate intervals helps maintain trail sustainability and prevents concentrated water flow.
5. Outslope or Crossfall: Providing an outslope or crossfall refers to designing the trail tread to slope gently away from the high side. This design feature ensures that water flows across the trail rather than along it, reducing the potential for erosion. The outslope or crossfall is an important component of sustainable trail design and helps protect the trail and surrounding environment.

The current sign system

Trail signage plays a crucial role in managing trails effectively and providing valuable information to trail users. The current sign system for trails was installed in @1988 and only covers approximately 30% of the trail network. Further, most of the critical trail markers used to navigate the trails no longer exist. With the changes in Australian Standards 2156.1 and the evolving needs of users, it is important to update the signage to ensure it meets the current requirements and effectively communicates with a broader range of trail users.

The introduction of shared-use and Mountain Bike only trails brings additional complexities, as signage needs to inform users about specific rules or classifications for each user type. However, if the signage is lacking in the required information or poorly positioned, it can lead to user confusion and instances of conflict. This highlights the need for proper signage design, placement, and content to effectively guide users and minimise risks.

Signage serves as a critical communication tool for trail users, helping them make informed decisions about which trails are suitable for their needs. By accurately grading or classifying trails and promoting these classifications through well-placed, clear, and concise signage, land managers can provide users with essential information while also managing public liability risks.

It's important to note that while signage is a crucial aspect of trail management, it is not a complete solution by itself. Regular trail audits and maintenance are still necessary to ensure that trails meet their assigned classifications and are safe for users. Signage should be seen as part of a comprehensive approach to trail management, working in conjunction with other measures such as trail inspections, maintenance, and user education.

Given the significant changes in standards and user needs over the years, it is necessary to assess and update the trail signage to align with current requirements.

A separate Sign Plan is being developed as part of the Crater Lakes Trails Planning process.

Maintenance feedback & hazard identification tool

Trail users can often be your best source of information on a day to day basis.

CMG have adopted the My Local Services app as a way for the community and visitors to report issues.

The website and signage will provide a CMG contact number to report urgent hazards and the My Local Services app details for non-urgent issues.

See https://www.localcouncils.sa.gov.au/my-local-services-app#features for more information.

Effective Governance and Management

For the Crater Lakes Trails to become a recognised and successful community asset and tourism destination, it is crucial to establish a clear and effective governance model.

Governance is a central factor in the effectiveness of successful trail destinations. A well-designed governance structure ensures that there is clear accountability, effective decision-making processes, and proper management of resources. It helps establish a framework for collaboration among various stakeholders, including land managers, user groups, local government, and community organizations.

Looking at other successful trail destinations, governance plays a central role in their effectiveness and national recognition. Based on the successful management models seen in trail networks across Australia and New Zealand, the following characteristics should be considered:

1. Clear and Simple Governance: The governance structure should be clear, easy to initiate, and administer over the long term. It should provide a transparent framework for decision-making, accountability, and communication among the partners involved.
2. Recognising Partner Strengths: Each partner's strengths and expertise should be acknowledged and considered when allocating responsibilities and authority within the governance model. This ensures that each partner can contribute effectively to the success of the trail network.
3. Enhancing Visitor Experience and Presentation: The governance model should prioritise the improvement and continuous enhancement of the visitor experience and the overall presentation of the trail network. It should enable commercial tourism positioning, product development, and effective marketing strategies to attract visitors.
4. Diverse Funding Sources: A successful governance model should support the trail network through a range of funding sources. It should include mechanisms for revenue generation to enhance cash flow, allowing for self-generated investments in facilities, assets, and services.
5. Effective Risk Management: The governance model should establish an effective control environment to mitigate key risks, ensuring the safety of staff, volunteers, and visitors. It should not adversely affect the operations of each agency involved, maintaining their effectiveness in their respective roles.
6. Community Inclusivity: The benefits of the new governance model should be visible and inclusive of user and community groups. It should actively involve and engage the community, ensuring their input, participation, and support for the trail network.

By considering these characteristics, the Crater Lakes Trails can establish an effective governance model that supports its success as a community asset and tourism destination. Clear governance, accountability, visitor experience enhancement, diversified funding, risk management, and community inclusivity are essential elements to be incorporated into the model.

Coordination function and responsibilities

In a trail governance and management structure involving multiple partners, it is crucial to have a clear coordination function. This ensures that there is a designated organisation, group, or individual responsible for driving an integrated and consistent approach to trail management. The coordination function takes on several important responsibilities, including:

1. Integrated Approach: The coordination function ensures that all trail management activities are aligned and integrated. It facilitates coordination and collaboration among different agencies, stakeholders, and user groups involved in the trail network. This helps avoid duplication of efforts and ensures a cohesive and unified approach to trail management.
2. Task and Priority Management: The coordination function is responsible for overseeing the implementation of actions outlined in trail plans. It tracks progress, monitors timelines, and ensures that tasks are completed according to the agreed-upon priorities. By managing tasks and priorities, the coordination function helps keep the trail management efforts on track and ensures that goals are achieved.
3. Reporting and Accountability: The coordination function serves as the reporting mechanism, providing updates and progress reports to the governance entity. It keeps all relevant stakeholders informed about the status of trail management activities, milestones reached, and any challenges or issues that may arise. Reporting ensures transparency, accountability, and effective communication among all involved parties.
4. Executive Support: The coordination function provides executive support to the governance body, assisting in implementing decisions and strategies. This includes facilitating meetings, preparing documentation, and supporting the decision-making process. The coordination function acts as a liaison between the governance body and other stakeholders, ensuring smooth execution of decisions.
5. Stakeholder Coordination: One of the key roles of the coordination function is to coordinate activities among various agencies and stakeholders. It facilitates collaboration, fosters effective communication, and ensures that all relevant parties are engaged and working together towards common goals. This coordination helps streamline efforts and enhances the overall effectiveness of trail management.

By having dedicated people resources for trail management and coordination, the governance structure can operate efficiently, ensuring effective implementation of decisions, coordination of activities, and progress tracking. This dedicated support is essential for successful trail management, as it provides the necessary expertise, oversight, and coordination to drive the integrated approach and achieve the desired outcomes.

Adequate resources for trail operations

Operating a trail network involves various tasks that are integral to effective land management. These tasks include:

- Infrastructure Maintenance and Repair: This includes regular upkeep and repair of trail surfaces, signage, parking areas, amenities (such as toilets and picnic areas), and waste management infrastructure (such as rubbish and/or recycling bins). Regular maintenance ensures that the trails are safe, accessible, and well-maintained for visitors.
- Trail Classification and Performance: Monitoring and assessing the trails to ensure they meet their intended classification or difficulty levels is essential. This involves evaluating trail conditions, trail features, and user feedback to ensure that the trails provide the desired user experience and align with the designated trail classification system.
- Environmental Management: Trail networks exist within natural environments, and it is crucial to manage their impact on the surrounding ecosystems. Environmental management tasks may include erosion and runoff control measures, vegetation management (including invasive species control), protection of significant species or habitats, and compliance with relevant environmental regulations and legislation. Additionally, fire management strategies should be implemented to mitigate bushfire risks and ensure visitor safety.
- Emergency Management: Planning and preparation for emergency situations are vital for trail networks. This includes providing emergency access routes, issuing emergency notices (such as for fires or floods), and implementing trail closures when necessary to protect visitors and respond to emergency situations effectively.
- Visitor Management: Effective visitor management ensures that trail users adhere to any use requirements or regulations, such as trail etiquette (code of conduct), permitted activities, and safety guidelines. Trail managers may also oversee the organisation and management of trail events, coordinating logistics, safety measures, and participant communication.

Funding issues and opportunities

The development of many trails in Australia has been marked by a lack of funding and a high reliance on government grants. This has resulted in a somewhat inconsistent and "stop-start" pattern of trail development, with progress depending on the success of grant applications. Unfortunately, in some cases, limited provision of funds has been allocated for future management and maintenance of the trails. This lack of adequate funding for ongoing maintenance can lead to challenges in ensuring proper upkeep and may result in trails falling into disrepair or a heavy reliance on volunteer efforts.

The funding landscape for trail development in Australia often requires trail managers and developers to compete for limited government grants. This can create uncertainty and inconsistency in securing funding for projects, as grants may not always be available or accessible on a continuous basis. The stop-start nature of funding can disrupt the seamless development and maintenance of trail networks, hindering their overall effectiveness and sustainability.

Additionally, the lack of dedicated funds for ongoing management and maintenance poses challenges for ensuring the long-term viability of trail networks. Without sufficient financial resources, it becomes difficult to allocate funds for routine maintenance, repairs, signage updates, or other necessary improvements. This can result in trails deteriorating over time, compromising the visitor experience and potentially impacting safety.

Furthermore, heavy reliance on volunteers to carry out maintenance tasks can be unsustainable in the long run. While volunteers play a crucial role in trail management, their availability and capacity may vary, leading to inconsistencies in maintenance efforts. Relying solely on volunteers for trail upkeep may not provide the level of expertise, consistency, or resources required to ensure optimal trail conditions.

To address these challenges, it is essential to explore diverse funding streams and strategies for trail development and ongoing management. This can involve seeking alternative funding sources such as corporate sponsorships, user fees, partnerships with businesses or tourism entities, or exploring potential revenue-generating opportunities within the trail network. By diversifying funding sources and establishing a sustainable financial model, trail managers can better ensure the ongoing maintenance and development of trails, ultimately enhancing the visitor experience and promoting the long-term success of the trail destination.

Trail Plan – Funding opportunities

The City of Mount Gambier and its partners have access to various grant opportunities that can support the development and implementation of the Crater Lakes Trails Plan. These grants can provide funding for infrastructure projects, open space improvement, and regional community development. Some potential grant sources include:

1. SA Office for Recreation, Sport and Racing: ORSR offers grants for infrastructure projects related to recreation and sport.
2. Department for Infrastructure and Transport: The Planning and Development Fund administered by this department provides investment for planning and improvement of open spaces and public realms in South Australia.
3. Federal Government Building Better Regions Fund (BBRF): This fund focuses on supporting projects that create jobs, drive economic growth, and enhance regional communities.
4. Bike SA: Bike SA occasionally offers grants for cycling infrastructure and events. The City of Mount Gambier can keep an eye on potential funding opportunities from Bike SA that align with their trail development plans.

In addition to grants, commercial businesses, property developers, and philanthropic organisations can also contribute to infrastructure funding. The City of Mount Gambier can explore partnerships and donations from these sources to support the development of trails and mountain bike networks.

It's important to note that the cost estimates provided in the Crater Lakes Trails Plan are based on current market rates and previous studies. However, actual implementation costs may vary and additional approvals, detailed design, and documentation stages will be required before the construction of trails and associated infrastructure can begin.

By leveraging grant opportunities, seeking partnerships with commercial entities, and exploring philanthropic support, the City of Mount Gambier can access the necessary funding to implement the Crater Lakes Trails Plan and bring the envisioned trail network to life.

Different models of management

There isn't a single governance model that suits every destination, as each model has its own advantages and disadvantages. These models can be categorised into three broad categories:

Option 1: Sole Agency Management

This model involves a single authority being responsible for utilizing the land they have either ownership of or a license to use for trail development and usage. There is no sharing of accountability, and user groups are neither allowed nor supported to volunteer their services. This model is typically applied to mountain bike trails that are built on a specific land tenure, without direct involvement of the community or businesses (and indirectly in some cases).

In this scenario, marketing is generally carried out by the agency, although there may be instances of external marketing through mountain bike clubs or third-party websites like Trail Forks.

Visitor servicing is also typically handled directly by the management agency; however, in certain cases, local clubs may be permitted to provide visitor services on the land designated for mountain biking purposes.

Option 2: Public/Private Partnership Structure

This model entails a greater involvement of user groups in a partnership with local government. It allows the land manager to concentrate on their core responsibilities, such as parks, reserves, and council operations, while remaining a partner in the trail network's development. Various variations of this model can occur, including the establishment of a Memorandum of Understanding (MOU), expanded roles of trust models, and reducing the number of authorities involved through contracts or other approaches.

If a partnership is deemed appropriate, there are several mechanisms that can be employed. These mechanisms can be broadly described as follows:

Memorandum of Understanding (MOU)

This mechanism is generally used for less formal arrangements where coordination and collaboration are key aspects of the partnership. It works best when there is one dominant land manager. An MOU may be developed to allow one partner to manage the trails with support and input from other partners and/or stakeholders.

Incorporated Association

Incorporated Associations are established and governed by the ACT Associations Incorporation Act 1991. They must have a minimum membership, become a legal entity capable of entering into contracts, and can sue or be sued.

This form of partnership has its own set of advantages and disadvantages. Incorporated Associations are typically used in complex situations where land managers, trail users, governments, and businesses aim to establish a formal partnership. It can also bind members to a set of rules, commonly known as a constitution.

Delegation and Volunteerism

This model applies to land managers who are willing to delegate the running, operations, maintenance, or other aspects of the trail destination to a voluntary group. In some cases, these arrangements are formalized through agreements. The trails must be accessible to the community free of charge, and the club responsible for their management must be affiliated with AusCycling.

Option 3: Private Arrangements

This model involves a single entity assuming management control of the trails, raising the required funding for operation, marketing, and maintenance, and having complete management authority. This arrangement typically occurs on private land.

Criteria for determining the right model for the Crater Lakes Trail Network

When developing governance arrangements for trails, trail managers and developers need to carefully consider various options. The following questions can assist the City of Mount Gambier and its key stakeholders in determining the most appropriate model for their circumstances, taking into account the unique characteristics of mountain bike developments:

1. Does the chosen model provide a clear and straightforward governance structure that aligns with the land tenure and purpose of the trail destination? It should ensure that the governance arrangements are well-suited to the specific characteristics of the land and the intended use of the trails.
2. Are the roles and responsibilities clearly defined and understood for both the land manager and the entity governing the trail users? It is essential to have a clear understanding of the accountabilities and expectations placed on each party involved in the governance structure.
3. Is the proposed model in compliance with the relevant legislation, regulations, and policies in South Australia? It is crucial to ensure that the proposed governance arrangements are legally permissible and align with the existing framework.
4. Does the proposed model facilitate opportunities for partnerships with other organizations that can add value to the project? Exploring partnership opportunities can enhance the effectiveness and success of the trail development, leveraging the strengths and resources of different entities.
5. Will the new model provide optimal visitor servicing for the target markets identified? It is essential to consider how the proposed governance arrangements will support and enhance the visitor experience, ensuring that the needs and expectations of the identified target markets are met.
6. Does the model maximise the commercial viability of the proposed mountain bike hub, considering the ongoing maintenance needs and the potential for generating income for growth? The chosen model should enable sustainable financial management and support the long-term viability of the mountain bike hub.
7. Does the model allow for community input, engagement, and volunteerism? It is important to ensure that the governance arrangements provide opportunities for community involvement,

fostering a sense of ownership and promoting volunteer participation in trail management and development.

8. Does the model minimise duplication and uncertainty? It should streamline processes and minimise redundancies, reducing administrative burdens and ensuring clarity in decision-making and implementation.
9. Does the model provide a suitable mechanism for managing risk, including safety considerations? The governance arrangements should incorporate appropriate risk management practices to ensure the safety of trail users and mitigate potential liabilities.

By answering these questions, trail managers and stakeholders can systematically assess and determine the most suitable governance model for their specific circumstances, taking into account the unique aspects of the trail development project.

The right governance and management model

The recommended governance model for the Crater Lakes trail network acknowledges the significant role of the City of Mount Gambier as the primary land manager within the project area. As the owner and caretaker of most of the land within the network, the City of Mount Gambier plays a crucial role in the development and management of the trails.

There are potential opportunities for private land development and other trail-related experiences, such as camping and accommodation facilities, that can be connected to this plan. These opportunities may involve accessing parcels of land under the management of other landowners or through agreements with the City of Mount Gambier or other incorporated bodies.

It is also possible that the City of Mount Gambier may identify future land that is important for trail development or for creating strategic connections between different trails and networks, thereby enhancing the Crater Lakes trail network as a whole.

While the City of Mount Gambier can take on a leadership role in developing the trail network, it is not expected to be responsible for the ongoing management of the trail network beyond its direct control. Other entities, such as private landowners or incorporated bodies, may take on the management responsibilities for specific sections or facilities within the trail network.

Overall, this governance model recognises the key role of the City of Mount Gambier as the primary land manager while allowing for potential collaboration with private landowners and other stakeholders to enhance the trail network and provide diverse experiences for trail users.

Recommendation- A partnership model

Considering the multiple interest groups and future management responsibilities it is recommended that a partnership model be developed. This model would ensure compliance with legislative requirements, policies, and agency guidelines while allowing for engagement and shared responsibility of trail management with a skills-based interest group. The specific form of this partnership could be established through a Memorandum of Understanding (MOU) or by creating an incorporated body, depending on the agreed level of responsibility sharing.

The partnership group would play a crucial role in providing collaborative leadership for the development of new trail experiences and assisting with the ongoing management and expansion of the existing network. They would actively seek commercial investments, explore grant opportunities, and secure resources from various sources such as the land manager, philanthropic organisations, and potential future revenue streams like events or user fees. Additionally, the partnership model would facilitate the involvement of user groups, allowing them to contribute actively and ensuring the land manager can concentrate on their core responsibilities, such as parks, reserves, and council operations, while remaining a key partner in the trail network's development.

By adopting this partnership model, the Crater Lakes trail network can benefit from the expertise and resources of diverse stakeholders, fostering collaboration, innovation, and sustainable management practices.

Legislative, policy and agency guidelines would continue to apply and the agency has the option to engage and share responsibility for trail management with a skills-based group brought together under an MOU or an incorporated body depending on the agreed level of responsibility sharing.

This group would ensure collaborative leadership in the development of the new trail experiences and assist with the ongoing management and development of the current network. It will also be instrumental in seeking commercial investment, resources from grant opportunities and through land manager, philanthropic and or future revenue from events, user fees or from budget allocations.

This model would see a greater role for user groups and provides for the land manager to focus on core business (parks and reserves, and Council operations) and remain a partner in the development of the trail network.

Sample MOU

The following text is a starting point to formalise an agreement between the Council and a Trails orientated volunteer group.

As part of our commitment to providing the best trail experience, Trail Care Group (TCG) have entered into a Memorandum of Understanding (MoU) with the City of Mount Gambier (CMG).

The MoU outlines the responsibilities for both parties to manage Trails within the Crater Lakes Recreational Precinct. Importantly, it provides the agreement between TCG and the CMG to enable grants and funding for the professional trail development and signage in Crater Lakes. It will also be key to the future progress of the growth and maintenance of the Crater Lakes trail network.

Roles and responsibilities of CMG

CMG has the responsibility to care for, control and manage the relevant parks and reserves.

CMG are responsible for:

1. Communicating with TCG on issues relating to trails within the Crater Lake Precinct.
2. Seeking input from TCG regarding future plans that affect trails within the Crater Lakes Precinct.
3. Supporting the staged implementation of the Crater Lakes Trails Plan recommendations.
4. Where possible, providing support in the form of equipment, materials, human resources and funding to establish, restore or maintain sustainably designed trails.
5. Where possible, providing training for TCG volunteers in occupational health and safety, equipment use, weed control, conservation and other relevant topics.
6. Responding in a timely manner to TCG requests for approval to conduct special events within the Crater Lakes Precinct.
7. Providing constructive feedback to funding applications, plans and project briefs developed by TCG, regarding use of the Crater Lakes Precinct.
8. Working constructively with the TCG to resolve any negative issues relating to trails in the Crater Lakes Precinct.

Roles and responsibilities of TCG

The role of TCG is to assist in the development and management of trails within the Crater Lakes Precinct.

TCG has responsibility for:

1. Promoting understanding of responsible trail use (mountain bike riding, running, walking) and practices among TCG members and the community more generally.
2. Encouraging all members to respect the cultural and natural values of the Crater Lakes Precinct.
3. Encouraging all mountain bikers, runners, walkers to respect each other and other park users.
4. Organising and running social events within the Crater Lakes Precinct.

5. Organising and running competition events (races) within the Crater Lakes Precinct.
6. Increasing the knowledge of TCG members, and other relevant parties, of sustainable trail principles and maintenance techniques.
7. Preparing, for the approval of CMG, strategic master plans for Crater Lakes Precinct.
8. Seek approval from CMG to maintain or construct sustainable trails in the Crater Lakes Precinct.
9. Organising volunteers to maintain and construct trails, as well as undertake approved activities, such as weed control, vegetation trimming, and drain clearing in the Crater Lakes Precinct.
10. Establishing a mechanism so TRG members can report matters that may be of interest to CMG, including unsafe visitor infrastructure, road and track conditions, notable wildlife observations, pests, weeds and feral animal observations, alleged breaches of the relevant legislation i.e. illegal dumping.

Mutual Roles and Responsibilities

In addition, the CMG and TCG will:

1. Recognise and respect each other's roles and responsibilities.
2. Follow the directions and expectations detailed in the Trail Maintenance – General Procedures document.
3. Promote responsible mountain biking, running and walking as legitimate activities within the Crater Lakes Precinct.
4. Support a collaborative and cooperative partnership between CMG, TCG and any other affiliated organisations to develop and maintain trail in the Crater Lakes Precinct.
5. Communicate openly with each other on matters relating to trails within Crater Lakes Precinct, and work constructively to resolving problems identified by either party.
6. Operate within the spirit of strategic master plans, plans of management, or other plans relating to the development or improvement of trails within the Crater Lakes Precinct.
7. Collaborate on the development of publicity materials to promote both organisations and inform the public of the partnership activities. Any such material prepared by either party for publicity will be submitted to the other party for approval prior to its release.
8. Not advertise or promote materials carrying the logo or other official text or emblems that might suggest service endorsement by either association without prior approval.
9. Meet half yearly to discuss progress and plans under this MOU, and on any other dates agreed necessary by both parties.

Volunteer insurance and funding

There are several ways to ensure that volunteers are covered for the activities they are undertaking.

1. If the volunteer group falls under the Friends of Park Incorporated (FoP Inc) banner, they would be insured through that system. FoP Inc affiliated groups can apply for funding as an independent incorporated organisation.

2. The group can pay for their own public liability insurance with an annual cost of around $2000.

3. If the group Is affiliated with AusCycling, they are covered for public liability whilst undertaking trail building and maintenance activities on a voluntary basis. It is understood that the *Mount Gambier Mountain Bike Club* is already affiliated with AusCycling and is currently covered to work on trails under the conditions detailed in Appendix C. AusCycling affiliated groups can apply for funding as an independent incorporated organisation.

Trail Maintenance

Introduction

The following trail maintenance section has been assembled specifically for the City of Mount Gambier in response to the requirements of the Crater Lakes Trail Network. This section provides a comprehensive overview of the "What," "When," "Why," and "How" aspects concerning the management and maintenance of the entire Crater Lakes trail system. While it might initially appear to be a daunting task, in practical terms, it is a straightforward process. The main objectives of the Crater Lakes Trails Maintenance Plan is to conduct inspections periodically and ensure that vegetation is adequately trimmed, drainage is free of obstructions and the trails meet their respective grades.

With the assistance of local volunteers, the CMG can maintain the trails to an appropriate standard without imposing significant strain on the existing operational resources.

Trails are recreational assets

Trails are assets and should be managed in a similar way to any other visitor facility asset such as a footpath, tennis court, bridge or building. They have a capital value, useful life, a level of service and require a funded/resourced preventative maintenance program like other council owned and managed assets.

Trails should be managed based on the following principles of asset management to ensure that they:

- Represent value for money
- Are fit for purpose
- Meet service level requirements
- Are sustainable for their whole of life
- Minimise risk and maximise user opportunity
- Minimise the impact on the environment.

Trails do not maintain themselves. Well-designed trails require less maintenance; however, all trails will require some ongoing maintenance. A maintenance program should be developed to provide a strategic and targeted approach to ensuring trails are maintained in the best condition possible, providing the optimum user experience and minimising maintenance costs in the future. It is important to accept that unscheduled maintenance tasks will be required occasionally as a result of fires and severe storm damage.

All trails require ongoing maintenance if their standard is to be kept high. The quality of trails is often cited as a key attraction for popular trails and trail based tourism destinations and likewise poorly signed, heavily eroded and rutted trails are usually avoided by users.

Causes of trail deterioration typically relate to the amount of use, weather conditions, standard and quality of construction, soil types, availability of suitable materials and the absence of adequate maintenance. Good trail maintenance should include and consider:

- Maintaining trails against their promoted classification
- Good maintenance practices and schedules are there to protect the investment/asset and meet the prescribed standards
- Maintaining the drainage system to protect the trail and surrounds
- Manage and mitigate public liability risks

The resource and time requirements for trail maintenance is heavily influenced by the quality of the initial trail design and construction. Poorly designed and built trails and trail features will require more frequent maintenance, and earlier in their life, than trails that are built sustainably.

Principles of effective trail maintenance

When prioritising and programming trail works, the following key principles should be considered:

1. Expect some Trail Deterioration: It's important to recognise that all trails will undergo some level of deterioration over time, even with proper maintenance. Factors such as usage, weather conditions, construction quality, soil types, and maintenance practices influence trail deterioration. Anticipating and planning for this natural wear and tear helps set realistic expectations.
2. Maintain Trails to their Promoted Classification: Trails should be maintained according to their promoted classification, as defined by relevant standards and guidelines. The classification considers trail elements such as surface, gradient, and corridors. Over-servicing or under-servicing trails based on their actual usage or desired presentation level should be avoided to ensure appropriate allocation of resources.
3. Good Maintenance Practices and Schedules: Implementing regular and proactive maintenance practices is crucial for protecting trail investments/assets and meeting prescribed standards. Preventative maintenance not only reduces the need for costly repairs but also ensures a safe and enjoyable experience for trail users.
4. Early Issue Identification and Intervention: Promptly identifying and addressing trail issues is essential for preventing more extensive and expensive repairs. Regular inspections and monitoring help identify potential problems before they worsen. Investigating off-trail influences that may contribute to rapid degradation is also important for effective intervention.
5. Correct Diagnosis for Effective Treatment: When addressing trail problems, it's crucial to identify the root cause and treat it appropriately. Merely addressing symptoms without tackling the underlying issue leads to inefficient and ongoing maintenance. Consider factors beyond the trail itself, such as off-trail changes that may impact degradation rates.
6. Restoration of Correct Crossfall: Maintaining the correct crossfall of the trail is vital for sustainable trail use. Cleaning nicks and removing built-up edge berms restores the proper surface profile. Proper water management is essential, as water movement on the trail surface is often a major contributor to degradation. Implement effective drainage measures that allow water to sheet across the trail, avoiding concentrated channels that exacerbate erosion.
7. "Go BIG" Approach to Maintenance: Adopting a proactive approach to maintenance tasks can save time and resources in the long run. When trimming vegetation, remove back to the main trunk or consider removing the entire specimens to reduce the need for frequent trimming. For drainage, invest time in making nicks bigger to ensure effective water flow. This approach minimises the need for frequent return visits to address the same issue.

By considering these principles when prioritising and programming trail works, trail managers can optimise resource allocation, enhance sustainability, and provide trail users with safe and enjoyable experiences.

Trail maintenance Program

A trail maintenance program should consist of the following:

- Auditing of the trail
- Hazard identification and reporting
- Frequency of maintenance tasks
- Standards of maintenance tasks
- Visitor statistics
- Trail upgrades and renewal

Auditing and Inspections

The trail audit serves as a valuable tool for trail managers to assess the condition of their trails and allocate resources and funding effectively. When developing a maintenance program for a new trail, it is recommended to capture audit information at the practical completion stage and record it on the land owner/manager's asset register. This ensures that the trail's condition is documented and can guide future maintenance efforts.

Trail inspections are a requirement under the Australian Walking Track Standards 2156.1 and are necessary for any publicly accessible asset, including trails covered by a land manager's asset management strategy/program. Inspections play a crucial role in ensuring public safety, user enjoyment, and asset protection within trail networks. It is important to conduct these inspections periodically by qualified staff or accredited providers.

Inspections assess the trail against its promoted classification and identify any existing or emerging risks and sustainability issues. Trails naturally change over time due to usage, and while trail surface changes are acceptable as long as the original planned trail classification is maintained, certain conditions must be met. These include ensuring that trail infrastructure and signage remain safe and serviceable, technical trail features are in good condition, and no environmental issues like excessive erosion or shortcutting have developed.

The required inspection frequencies for each class of trail are outlined in the Australian Standard 2156.1 Walking Tracks Part 1: Classification and Signage. In the absence of similar standards for cycling trails, Open Trails Australia recommends that land managers adopt best practices and err on the side of caution when determining inspection intervals. This approach ensures the safety of trail users and helps manage public liability risks effectively.

Hazard Identification and Reporting

Trails are susceptible to various challenges, such as wear and tear, unauthorised use, vandalism, and the impact of weather conditions. These factors can potentially pose risks to trail users. Therefore, it is crucial to incorporate a hazard inspection process and schedule, along with reporting criteria, into a comprehensive trail management plan.

The trail management plan should clearly outline the responsibilities for managing hazards, which typically lie with the trail owner. To effectively address hazards, the following steps should be followed:

1. Hazard Identification: Identify potential hazards along the trail.
2. Risk Assessment: Evaluate and assess the level of risk associated with each identified hazard.
3. Risk Management: Take appropriate measures to manage the identified risks. This can involve accepting the risk, modifying the risk, or eliminating the risk altogether.
4. Review, Monitoring, and Documentation: Continuously review and monitor the effectiveness of the risk management actions taken. Keep detailed records of all actions and their outcomes.

Frequency of maintenance tasks

The frequency of trail maintenance will vary based on several factors:

1. Trail System and Classification: The extent and classification of the trail system will play a role in determining the maintenance schedule. Larger trail networks may require more frequent maintenance compared to smaller ones.
2. Usage: The amount and type of trail usage are important considerations. Recreational use, regular events, or larger-scale events can impact the wear and tear on the trail and may require more frequent maintenance.
3. Trail Type: Different types of trails have distinct maintenance requirements. For example, coastal trails exposed to wind erosion or downhill mountain bike trails with steeper terrain may need more frequent maintenance to address erosion, trail degradation, or potential hazards.
4. Soil Type: The soil composition along the trail can affect its durability and susceptibility to damage. Some soils may require more regular maintenance to manage erosion or degradation.
5. Vegetation Type: Trails surrounded by vegetation that rapidly regenerates and encroaches upon the trail may need more frequent maintenance to ensure clear passage for trail users.
6. Location: The geographic location of the trail plays a significant role. Trails located in regions with higher rainfall may require substantial maintenance after each significant rain event. Additionally, trails that are easily accessible may be more prone to vandalism or illegal dumping, necessitating more frequent maintenance and monitoring.
7. Extreme Weather Events: Unforeseen extreme weather events can cause unexpected damage to trails, requiring unscheduled maintenance and hazard checks to address any safety concerns.

A tailored maintenance schedule should be established within the trail management plan to ensure the appropriate frequency of maintenance activities, monitoring, and inspections. Regular assessments and adjustments to the maintenance schedule may be necessary based on the trail's condition and evolving circumstances.

Standards of maintenance

It is crucial to ensure that standards are maintained. The following are some key standards to be upheld:

1. Original Planned Trail Classification: The trail should be maintained according to its intended classification, whether it's a hiking trail, mountain biking trail, or shared-use trail. This ensures that the trail meets the designated purpose and user expectations.
2. Construction Standards: Adherence to construction standards is essential to maintain the integrity of the trail. This includes obtaining prior approval for any alterations or modifications to the trail, maintaining trail surface standards, implementing proper drainage systems, upholding hygiene standards, preserving existing Technical Trail Features (TTFs) as per their original design, using approved machinery and tools, and ensuring final finishing standards are met.
3. Signage Standards: Clear and appropriate signage is crucial for trail users. The trail management plan should include guidelines for signage placement, content, and maintenance to ensure effective communication and wayfinding along the trail.
4. Visitor Risk Management Standards: Implementing visitor risk management standards is vital for the safety of trail users. This may involve establishing protocols for site closures in hazardous conditions, providing signage and notifications to communicate risks or trail closures, and regularly reviewing and updating risk management procedures.

By incorporating these standards into the trail management plan, trail managers can ensure that the trail is constructed, maintained, and managed in a manner that aligns with the intended design, user expectations, and safety considerations. Regular inspections and audits will ensure compliance with these standards and address any deviations or deficiencies that may arise.

Visitor and trail use statistics

Understanding the usage patterns and frequency of trail use is important for trail managers. It provides valuable insights that can assist in various aspects of trail management and planning. Some key benefits of understanding trail usage include:

1. Evaluating Project Success: By assessing how trails are being used, trail managers can evaluate whether the project has achieved its objectives. They can determine if the trails are being utilised as intended, providing feedback on the effectiveness of the trail design and implementation.
2. Planning Future Maintenance: Data on trail usage helps in planning future maintenance works. By understanding which sections of the trail receive more usage, owners can prioritise maintenance efforts accordingly. This ensures that resources are allocated efficiently to address the areas that require the most attention.
3. Prioritising Maintenance and Resources: With information about trail usage, trail managers can prioritise maintenance activities based on the usage patterns. High-traffic areas or sections with specific maintenance needs can be identified and allocated appropriate resources, ensuring the trails remain safe and enjoyable for users.
4. Guiding Future Trail Development: Data on trail usage can guide future trail development plans. It provides insights into popular routes or types of trails that are in demand, helping owners make informed decisions when expanding or developing new trails.
5. Supporting Additional Funding Requests: Accurate information on trail usage can strengthen funding requests. By demonstrating the significant use and impact of the trails, managers can make a compelling case for additional funding to support ongoing maintenance, improvements, or expansion of trail projects.

Collecting data

To collect trail usage data, there are various methods available, and the choice of method depends on the specific purpose. Some common data collection methods include surveys, trail counters, user feedback forms, observational studies, user interviews, and digital tracking tools. Each method has its advantages and limitations, and a combination of approaches may be used to gather information about trail usage.

Popular people counters used in natural areas are those that can easily be hidden and/or are robust and reduce the risk of tampering and vandalism. A common device used in Australia is the TRAFx Infrared Trail Counter.

Manual counts are generally used on higher use trails where the range of users need to be counted separately. The trail manager will engage volunteers or professionals to count the numbers and type of trail users on particular days. This information is then used to form a general average of user numbers and types.

The TRAFx Infrared Trail Counter counts people — walkers, hikers, joggers, inline skaters, horseback riders, cyclists, etc. — on trails, paths and sidewalks. It senses and detects the infrared wavelength

that people emit. Unlike other trail counters, it does not require a receiving unit or reflector to operate. This results in a very compact, unobtrusive design, that reduces risk of vandalism.

It uses three standard 'AA size' alkaline batteries and has very long battery life. This versatile counter has proven itself from Alaska to Australia, from mountains to deserts, and from wilderness areas to urban areas. https://www.trafx.net/products#IR-counter

TRAKER-COUNT - operates by sensing the natural heat energy of walkers. The micro power electronics processes this signal to maximize the sensitivity to a real event of a person walking past, and to minimise stray false counts. The total count is displayed on an LCD display. The count can be reset to zero using the proximity key.

TRAKER-COUNT is specifically designed to provide reliable data for use by land management agencies in areas such as national parks, municipal parks & walkways, and wilderness areas. The data can provide the basis and justification for the allocation of resources to particular areas. https://www.islandresearch.com.au/

The Traker-Count model as used by the City of Mitcham, South Australia. Mounted in a stainless-steel box as protection from the elements and to prevent vandalism. The counter can be mounted to signs or other structures adjacent the trail.

Trail upgrades and renewal

Trail renewal is a process that involves significant changes to an existing trail while utilising, for the most part, the existing trail corridor. There are several reasons why trails may require upgrades, alterations, or realignments, including:

1. Changing User Demands: As the type of users or their methods of using the trail change over time, modifications may be necessary to adapt the trail to meet the evolving needs. This could involve adding or modifying features, adjusting trail difficulty, or improving accessibility to accommodate different user groups.
2. Unsustainability or Problematic Sections: Certain sections of the trail may become unsustainable or pose challenges, such as erosion-prone areas, drainage issues, or safety concerns. Adjustments or realignments may be required to address these problems and ensure the long-term viability of the trail.
3. Introducing New Trail Experiences: Trail renewal provides an opportunity to introduce new features or experiences within the existing trail footprint. This could involve incorporating new elements such as viewpoints, interpretive signage, educational displays, or interactive elements to enhance the trail user's experience.
4. Increasing Visitation or New User Types: If a trail experiences rapid growth in visitation or sees the emergence of new user types (e.g., electric mountain bikes), upgrades may be necessary to accommodate the increased demand or specific needs of these users.
5. Stakeholder or User Requests: Local stakeholders, event managers, or tour operators may request additional features or modifications to enhance the trail for specific purposes or events. These requests can influence trail renewal decisions.
6. Changes in Trail Classification: Changes in trail classification, such as designating a shared-use trail or creating separate sections for different user groups, may require upgrades or alterations to ensure compliance with the new classification and cater to the diverse user needs.
7. Wear and Tear: Over time, natural surface trails and trail features experience general wear and tear due to usage and weather conditions. Upgrading and maintaining these elements is necessary to preserve the trail's quality, safety, and overall user experience.

By conducting regular audits and consulting with stakeholders, trail managers can determine the appropriate trail renewal actions needed to address specific challenges, improve user satisfaction, and ensure the sustainability and relevance of the trail system.

Maintenance resourcing

To help guide the resourcing for trail management and maintenance, the recommended Partnership Model can be established through a Memorandum of Understanding (MOU) or by creating an incorporated body. The agreed level of responsibility sharing will determine the final mix of resources required. These may include:

1. Operational Staff: Dedicated staff, such as CMG operational staff, can be responsible for scheduled trail inspections based on Australian Standards (AS2156.1), MTB guidelines and relevant council policies. They can also undertake maintenance tasks on an ad hoc basis, ensuring regular upkeep and addressing immediate maintenance needs.

2. Trail Contractors: Independent auditing or inspections. For more complex renewal or maintenance tasks that require specific plant and equipment or large-scale trail works, trail contractors can be engaged. These contractors specialise in trail construction and have the expertise to undertake complex projects that may go beyond the capabilities of volunteers and in-house staff.

3. Arborists and Weed Management Contractors: Specialised contractors, such as arborists and weed management professionals, can be engaged to handle larger-scale corridor works, address fallen trees, mitigate tree-related risks, perform large-scale fire suppression clearing around assets, or prepare for prescribed burns. These contractors have the necessary expertise and equipment to manage vegetation-related maintenance tasks safely and effectively.

4. Other Fee-for-Service Works: Various fee-for-service works can be outsourced to external providers to ensure comprehensive maintenance coverage. This can include services such as the provision and installation of new signage, sign-related tasks, engineering inspections of critical infrastructure, or independent auditing of trail conditions. These specialised services can complement the efforts of in-house staff and contractors to maintain and enhance the trail system.

5. Volunteers can be a great asset to a community trail system. Many trail systems around the country are currently maintained by local volunteer organisations. Volunteers are very cost-effective and provide a good avenue for establishing a sense of pride and ownership of the trail system. Volunteers typically need lots of direction; be sure to have appropriate staff to help guide and oversee volunteer activities. In communities with large, successful trail volunteer organisations, the majority of maintenance can be delegated to the volunteer group, as long as there is a solid history of performance and a desire of the volunteer group to shoulder that type of responsibility. In communities with small or no volunteer organisations, capacity and lack of expertise can be an issue until a larger, better-trained organisation is developed.

   Regardless, it is highly recommended to establish a formal, signed contract or agreement between the agency and volunteer group. The agreement should define the roles and responsibilities of all parties mentioned in the agreement, as well as define approved activities and limits of each group in the defined relationship. Most agencies require volunteer groups to carry liability insurance, so this must also be addressed. Between the agreement and the liability insurance, acceptable and unacceptable activities should be defined. For example, it is often forbidden for volunteer groups to operate tools such as

chainsaws or motorized equipment like excavators and skid steers. This is not always the case, but these are the kinds of situations that need to be discussed and decided upon when forming a formal relationship.

Just like with hired staff, a plan to train and retrain volunteers on an ongoing basis should be in place. This is especially important with volunteers since there is typically significantly more turnover with volunteers than with staff members.

Trail inspection intervals

Australian Standard 2156.1 Walking Tracks Part 1: Classification and signage outlines the required inspection frequencies for each class of trail. In the absence of similar standards for cycling trails that set out inspection frequencies, Open Trails Australia recommends that land managers adopt best practice and err on the side of caution regarding inspection intervals to both ensure the safety of users and manage public liability risks.

The following table demonstrates OTAs recommended inspection intervals for the various trail classifications.

Mountain Bike Trail Grades

Service Level	Grade	Symbol	Inspection Interval	Shared-use compatible?
High	Very easy		3 months	Yes
High	Easy		3 months	Yes
Moderate	Easy - Intermediate		6 months	Yes
Moderate	Intermediate		6 months	Yes
Moderate	Intermediate - Difficult		6 months	Yes
Moderate	Difficult		6 months	No
Moderate	Extreme		6 months	No

See Trail Classification section in appendix for more details.

Walking Trail Grades

Service Level	Grade	Symbol	Inspection Interval	Shared-use compatible?
Highest	1		Monthly	Yes
High	2		3 months	Yes
Moderate	3		6 months	Yes
Moderate	4		6 months	Yes
Low	5		12 months	No

Trail inspection record keeping

OTA recommends that audits and maintenance activities are recorded and kept on file. This will help the land manager to:

- develop a long-term record of maintenance activities undertaken that will assist with future budgeting requirements
- provide a record that will assist with risk management, where records will demonstrate trail inspections and maintenance have been undertaken in accordance with recommended practices.

Australian Walking Track Grading System

Trail classification allows land managers to develop, design, build, promote and maintain trails appropriate for the anticipated trail users.

Australian Standard 2156.1 Walking Tracks Part 1: Classification and Signage identifies six classes of walking tracks, describing each in terms of the elements used for classification and the resulting management considerations.

Public land management agencies across Australia have adopted the Australian Walking Track Grading System as a plain English language description to describe walks to the public. Under the system, walking trails are graded on a difficulty scale from grades on to five.

- GRADE ONE is suitable for the disabled with assistance
- GRADE TWO is suitable for families with young children
- GRADE THREE is recommended for people with some bushwalking experience
- GRADE FOUR is recommended for experienced bushwalkers, and
- GRADE FIVE is recommended for very experienced bushwalker

For more detail see Appendix A

2156.2- 2001- Walking Tracks- Infrastructure and design

AS 2156.2 specifies requirements for the structural design of walking track structures, to protect natural and cultural assets and for use as aids to recreation in outdoor areas where the environment is the focus of recreational activities.

The structural design criteria given in this Standard take into account factors such as location, expected use and type of recreational opportunity through reference to the track classifications given in AS 2156.1.

The following structures and parts of structures are covered in this Standard:

(a) Boardwalks

(b) Galleries

(c) Pedestrian bridges, including wire crossings

(d) Platforms (for viewing)

(e) Barriers

(f) Stairways

(g) Ladders

(h) Stiles

This Standard does not cover structures intended to carry livestock (e.g. horses) or vehicles (including bicycles and light maintenance vehicles).

This Standard is intended primarily to be applied to new structures.

MTBA/AusCycling - Trail Difficulty Rating System

In 2012 the Australian Mountain Bike Trail Difficulty Rating System (TDRS) was developed by the International Mountain Bike Association (IMBA) of Australia to address a number of identified needs:

- Requests from land managers for a formal and 'approved' Australian trail classification standard, as a risk mitigation strategy
- The need to further clarify aspects of the existing IMBA International TDRS to account for additional trail characteristics such as exposure, suitability and a range of gradients or widths.

In 2019 Mountain Bike Australia (MTBA) reviewed the IMBA TDRS and added two additional classifications to address gaps on the 2012 system. The new classifications of Easy with some Intermediate sections/features and Intermediate with some Difficult sections/features are designed to give land managers more flexibility when grading trails and provide users with more detail to make informed decisions.

The TDRS provides seven levels of difficulty for mountain bike trails. The TDRS enables visitors to understand the nature of the trail before beginning their ride and allows them to plan their ride for enjoyment, appropriate level of challenge and safety.

Trail ratings can be communicated in several ways. Pre-visit information may include a more detailed description of the ratings, while a shorter description is required for trailhead signage and maps. Rating colours should be use on all trail directional signage.

See appendix B for more detail.

Trail Maintenance Directions

The 3 main trail maintenance tasks are:

- Vegetation Management
- Drainage Management
- Trail Tread Management

Vegetation Management Directions

Vegetation in and around the trail corridor needs to be actively managed to ensure trail users safety and optimal experience is maintained and to assist with trail asset sustainability.

The exact type of vegetation management and frequency will differ as the trail passes through changing vegetation communities and micro climates.

It is expected that the trail managers will monitor the level of vegetation management required and modify the vegetation maintenance regimes accordingly.

Vegetation management tasks include:

- Slashing of annual grasses
- Spraying of weeds or annual grasses
- Trimming of encroaching bushes
- Leaf litter and windfall removal
- Vista maintenance
- Hazardous branch or tree removal

These tasks are critical in ensuring that trail users have appropriate sight lines and stick to the trail tread. Vegetation impinging on the corridor can cause trail widening and increase the risk of conflict through inadequate sight lines. These works can be undertaken year round, however some tasks (slashing and/or spraying of weed species) have optimal times.

Slashing of grasses

Slashing of grasses may be required in some areas to ensure good visibility and safe passage of trail users. Long grass on the trail edge can hide trail features and anchors from the trail user. Slashing is an expensive form of vegetation management however is required in some circumstances for a variety of reasons. Due to the expense it is essential that slashing is carried out correctly and at the right time of year to maximise effectiveness and longevity.

Slashing should occur once grasses have completed the majority of their growth and are starting to brown off slightly. Slashing too early may lead to requiring a second treatment.

Grasses should be slashed 1m each side of the marked trail edge and as low as the machine/operator can reasonably manage. Slashed grass must be removed (Raked, tossed, blown) from the trail tread as part of the work.

Spraying of grass/weeds with herbicide

Grasses, weeds and some plant roots can undermine and damage both natural surfaced and sealed trails. It is important to manage the encroachment and impact these have on the trail edges. Applying herbicide is more cost effective and sustainable preference to slashing, however due to the sensitive nature of some environments it is important to apply herbicide carefully and only where required.

Trails should be sprayed with a herbicide appropriate for the vegetation being treated in accordance with local weed management specifications. For larger annual spray programs, or in sensitive and complex situations, the use of a contractor may be preferable.

It is not possible or practical to assume that trails should be accessible by management vehicles for spraying. It is essential that people responsible for spraying do so on foot with the use of long-lines and backpack pressurised applicators.

Trimming of encroaching vegetation

Cut any limbs or branches flush with the tree trunk. Provide cuts to the underside of branches to ensure that removal will not tear or strip bark from the trees.

For plants growing within the trail tread, remove all woody material for a minimum of 75 mm below the tread surface. Fill holes caused by removal with matching tread material.

If unable to be pulled out by hand, cut brush and small woody plants as near flush to the ground surface as possible. Cut and swab invasive weed species with appropriate chemical.

Consider removing the entire specimen if a bush on the trail edge is causing constant maintenance issues.

Disposal of cut materials

Remove cut vegetation from the trail corridor and scatter, placing cut ends away from the trail to allow for a natural distribution or stockpile and utilise for trail closures/remediation where required.

Do not place cut vegetative materials in creek lines, drainage alignments, ditches, culvert inlets, or other locations where they would prevent the free flow of water away from the trail tread.

Drainage Management Directions

Understanding and maintaining water management features in the trail tread is essential to help prevent erosion and control the spread of any soil borne pathogens.

The number one enemy of simple drains is sediment. If the drain clogs, the water you are trying to move off the trail either continues eroding its way down the tread, or just sits there in a puddle.

The best drains are'self cleaning' but in reality most drains collect debris and sediment; this must be removed before the drain stops working. Since a long time may pass between maintenance visits, the drain needs to handle annual high volume runoff without failing.

Most problem drains are waterbars. If the water is slowed by hitting the waterbar, sediment builds up. This can be compounded by inadequate angle, outsloping or an outlet that is too narrow. Water bars detract from the walking and riding experience and usually wear out from constant traffic and require regular rebuilding.

Drainage features can include:

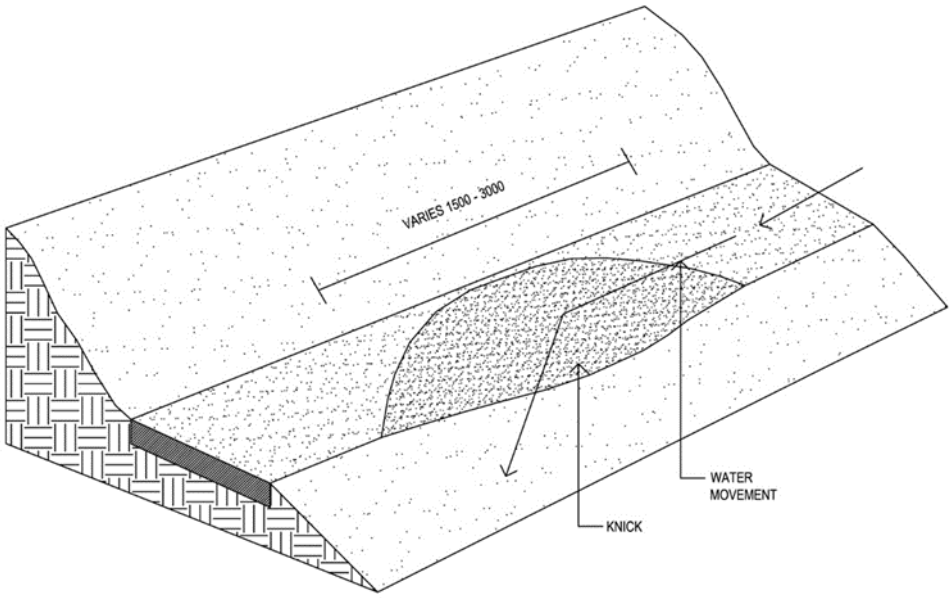
- Nicks
- Grade dips or drainage swales
- Culverts and pipes
- Side drains

Nicks

A nick consists of a subtle, semicircular depression in the trail, generally 1.5 to 3 meters long. The depression exit point angles at about 15 percent grade so that water runs off the edge of the trail.

Newly constructed nicks should be sufficiently compacted to provide a secure trail surface and to allow for the movement of water.

Nicks tend to capture and hold general organic matter (leaves, sticks etc.) which in turn collects silt and weeds and inhibits the free movement of water off the trail. Clean out nicks periodically with a shovel or fire rake to ensure free flow of water off the trail.

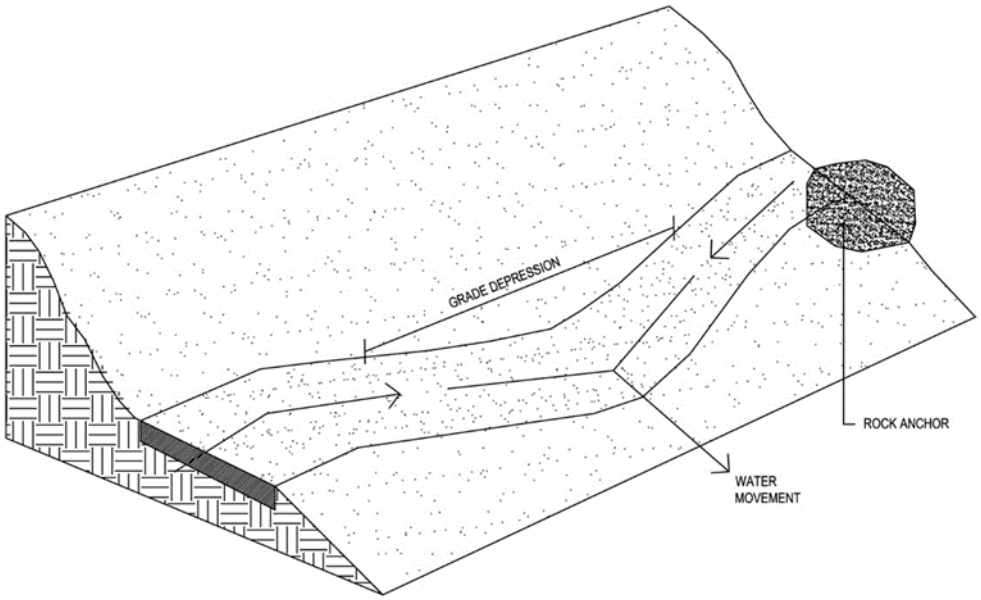


Rolling Grade Dips/Reversals

A rolling grade dip has an out sloped depression (much like a nick) with a ramp (or ramps) built from the removed soil. The ramp is out sloped like normal tread, up to 5 percent. Rolling grade dips are generally 4 to 12m meters long and are effectively used on relatively steep trails.

Use of rock anchors may be needed to direct users towards the centre of the trail tread.

Rolling grade dips, like nicks, can also hold general organic matter (leaves, sticks etc.) which collects silt and weeds and inhibits the movement of water off the trail. Dips should be cleaned out periodically with a shovel or fire rake to ensure free flow of water off the trail. Ramps should be maintained using mineral material cleaned from the drain.



Culverts

A culvert pipe takes water from one side of the track to the other. With the exception of those are required for permanent or intermittent water flows, culverts should meet the following requirements:

- Recommended minimum culvert internal diameter is 225 mm
- Internal walls must have a smooth finish to allow material such as leaves, small stones and twigs to pass through and reduce the likelihood of blockages.

The placement and frequency of installed culverts depends upon the circumstances. Soil type, side slope, local weather and track design all contribute to spacing of culverts.

Culvert headwalls should be lined with rocks particularly around the culvert mouth. Rocks lower excessive flow from pipes and culverts, prevent scour, and dissipate energy. Good outlet protection significantly reduces erosion and sedimentation by reducing flow velocities.

Pipes

A pipe or pipe culvert is a closed drain used to move water underneath the trail or other impediments to having an open drain. The use of pipes should be carefully considered as proper maintenance can be challenging. There may be water flow modelling and engineering advice required.

Side drains

Side drains are constructed along the side of the track on slopes or on low wet ground where drainage is a problem. Side drains intercept water from the side slope and from the track surface watershed. They carry the water down to a discharge point or culvert that directs the water to the downslope side of the track.

Geotextiles fabric lining should be considered for high flow drains or in areas of more erodible soil types. Drain can be lined with stone armouring to improve longevity.

Trail Tread Management Directions

Trail tread tasks are best performed when soils are damp, but not waterlogged. Soil moisture is important for soil compacting following tread modification tasks.

Depending on the soil type, region and annual rainfall, the exact time of year may vary.

Avoid disturbing the tread when soils are dry as it can accelerate erosion.

Trail tread feature requiring maintenance can include:

- Edge berms
- Back cut or back slope
- Trail anchors
- Trail armouring

Edge Berms

Edge berms are the result of soil, rock and debris collecting on the downside of the trail tread and are a natural and predictable consequence of tread surface displacement and redeposition. They can be a symptom of inadequate outslope or compaction of trail treads during construction. The formation of an edge berm reduces the effective trail tread width and often provides a false edge.

Edge berms form a barrier that prevents water from sheeting across the trail. Water hits the berm and runs down the tread itself, gathering volume and soil as it goes. Often this water flow will create a gutter which amplifies the effects of edge berms.

To remove edge berms, loosen compacted berm material with a mattock, shovel, pick or rake, then remove the soil with a shovel. Use excess soil to fill holes in the tread, or to create grade reversals. Reshape the tread to restore its cross fall (outslope) and compact soil thoroughly. Avoid disturbing the back cut unless absolutely necessary. Remove the toe of the berm, and blend the slope back into natural ground levels.

Excess material should be stockpiled alongside the trail for future use rather than discarded.

Back cut/back slope

The back cut or back slope is the gently angled bank on the high side of the trail, which should blend the trail tread with the surrounding surfaces. A well-maintained back cut controls the width of the tread and reduces trail ‘creep’ over time. Back cuts direct water to nicks and grade reversals and reduce erosion through the even spreading of water. Vertical or steep back cuts can lead to a waterfall effect as water moves across the back cut and lead to slumping of back cut soil onto the trail tread.

Following trail construction, vegetation will readily grow in the back cut zone. Back cuts should be kept free of excessive vegetation. (Relocate vegetation disturbed by the back cut in accordance with the vegetation management schedule)

Reinstate the back cut using a mattock or fire rake if it has slumped or is too steep. Any excess material should be stockpiled or can be used for other trail tread maintenance.

Trail Anchors

Trail anchors are natural or manmade objects within or encroaching on the trail corridor. Anchors can define the sides of the trail, helping to direct users into the centre of the trail tread. Anchors on the inside of corners can prevent users from cutting corners.

Anchors can intrude on the designated trail width to varying degrees and give the trail a more natural feel. Trail anchors should allow for the free movement of trail users. Ensure the anchors are free from jagged, sharp or otherwise hazardous surfaces.

If installing replacement rock anchors, place rock/boulders into desired position and set a minimum of 1/3 into natural ground. Provide mortar if required to secure rock in place. Ensure rockwork secure and free from rocking or movement. Take care to ensure that sharp edges are facing away from the trail if possible.

If maintaining existing anchors, check for movement and remove any inward facing sharp edges.

Retain existing vegetation as trail anchors where possible. When utilising revegetation, ensure to choose carefully species selection and location so that future growth will not encroach on the trail corridor.

Retain existing nesting hollows or nests for birds and wildlife.

Trail armouring

Where no alternate route is available, tread armouring should be used: -

- to elevate or harden the trail out of soft or wet areas
- to address / reduce user induced erosion
- in areas of potential heavy wear e.g. braking
- in areas where the trail exceeds a sustainable gradient and steps are not an option

Armouring should generally be constructed using local rock, however other materials such as gravel, flagging stone, paving, plastic soil reinforcement, boardwalks or synthetic materials may be acceptable with approval from Council. Preference is to limit tread armouring by avoidance of areas that require hardening, but where tread armouring is necessary, all principles of sustainable trail design should still apply. Ensure trail armouring is level and free from rocking or movement.

Crater Lakes Trail Maintenance Task Schedules

The Crater Lakes Trail Maintenance - General procedures document outlines the instructions for the management of risks to visitors and staff during trail maintenance. All the procedures and in the document should be followed/applied as standard operating procedure for the Crater Lakes Trail Maintenance Plan.

Vegetation Management

Maintenance guidelines	Vegetation Management
Type of tasks covered	• Slashing of annual grasses • Spraying of weeds or annual grasses • Trimming of encroaching branches/bushes • Leaf litter removal • Vista maintenance • Hazardous branch or tree removal
Issue	Vegetation in and around the trail corridor can contribute to a number of issues that can affect both trail sustainability and user safety and experience.
Effect on trail asset sustainability and user experience	User safety and experience • Vegetation that encroaches into the trail corridor can hinder sight lines contributing to user conflict and has the potential to injure users • Trees and branches assessed as unsafe can fall onto the trail restricting access or injuring users • Rest points and lookouts selected for vistas are less attractive if the views are not maintained by vegetation management • Vegetation encroaching on trail structures can undermine footings, obscure defects and contribute to fire risk Trail sustainability • Encroaching vegetation that restricts sightlines can contribute increased braking and trail tread wear when users cannot see around corners etc. • Encroaching vegetation can contribute to trail widening as users walk and ride around vegetation • Leaf litter and debris building up in drainage features can restrict water flows and contribute to trail tread erosion • Grasses and weeds can emerge from seed stock and runners and undermine and damage (break up) the trail tread contributing to erosion and reducing lifespan of the trail

Maintenance guidelines	Vegetation Management
Maintenance requirement to prevent/resolve issue	Slashing grasses Slashing of grasses may be required in some areas to ensure good visibility and safe passage of trail users. Long grass on the trail edge can hide trail features and anchors from the trail user. Slashing is an expensive form of vegetation management however is required in some circumstances for a variety of reasons (presence of protected species that will be harmed if sprayed with herbicides). Due to the expense it is essential that slashing is carried out correctly and at the right time of year to maximise effectiveness and longevity. Spraying of grasses/weeds with herbicide Treating grasses and encroaching weeds with herbicide is an effective way to manage problematic and unwanted vegetation in and around the trail corridor as an alternative to slashing. Due to the sensitive nature of some environments it is important to apply herbicide only where required. Trimming of encroaching branches/bushes Trimming of encroaching branches and bushes that extend into and encroach on the trail corridor will ensure good visibility and safe passage of trail users Leaf litter removal Removing leaf litter and debris from drains and trail edges to ensure free movement of water Vista maintenance Trimming of branches to maintain intended views and vistas Hazardous branch or tree removal The tree specific auditing process will identify hazardous branches and trees. Removing or managing identified hazardous branches/tree will reduce risk of injury to trail users

Maintenance guidelines	Vegetation Management
Tools/equipment and resources required for task	Slashing Grasses Brush cutters and clearing saws are recommended for slashing a variety of grasses. Spraying of grasses/weeds with herbicide A variety of spraying equipment may be suitable for use on trails from long line vehicle-based units to smaller back pack units. Trimming of encroaching branches/bushes Simple hand tools (secateurs, handsaws) to powered tools (chainsaws and pole saws) are all effective devices. Leaf litter removal Powered leaf blowers are an efficient way to remove leaf/debris. Where leaves have sat for a period and are unable to blown a fire rake will remove these. Vista maintenance As per the trimming of encroaching branches/bushes process. May involve engaging arborists for larger trees. Hazardous branch or tree removal Powered tools (chainsaws and pole saws) are generally utilised. Additional ropes and tree climbing equipment may be used by qualified arborists.

Maintenance guidelines	Vegetation Management
How to carry out task	Slashing Grasses Slashing should occur once grasses have completed the majority of their growth and are starting to brown off slightly. Slashing too early may lead to requiring a second treatment. Grasses should be slashed 1m each side of the marked trail edge and as low as the machine/operator can reasonably manage. Slashed grass must be removed (Raked, tossed, blown) from the trail tread as part of the work. Spraying of grasses/weeds with herbicide Trails should be sprayed with a herbicide appropriate for the vegetation being treated and in accordance with QPWS specifications. For larger annual spray programs, or in sensitive and complex situations, the use of a contractor may be preferable. Trimming of encroaching branches/bushes Cut any limbs or branches flush with the main trunk. Provide cuts to the underside of branches to ensure that removal will not tear or strip bark from the trees. If unable to be pulled out by hand, cut brush and small woody plants as near flush to the ground surface as possible. Cut and swab invasive weed species with appropriate chemical. Consider removing the entire specimen if a bush on the trail edge is causing constant maintenance issues. For plants growing within the trail tread, remove all woody material for a minimum of 75 mm below the tread surface. Fill holes caused by removal with matching tread material. Leaf litter and removal Blow or rake leaf litter and debris from the trail edge and drainage features. Vista maintenance As per the trimming of encroaching branches/bushes process. May involve engaging arborists for larger trees. Hazardous branch or tree removal On advice of qualified arborist.

Maintenance guidelines	Vegetation Management
Frequency of task	Slashing Grasses Program when once grasses have completed the majority of their growth and are starting to brown off slightly. Spraying of grasses/weeds with herbicide The correct timing of herbicide application is critical to ensure effectiveness. Generally, periods of when the plants are younger and in a rapid growth stage is ideal. Trimming of encroaching branches/bushes Timing of this work is not as critical as other tasks that rely on periods of active growth. This can be programmed at the same time as other maintenance tasks. Leaf litter and removal Timing not critical but preferable prior to winter and periods of heavy rain. Vista maintenance As per the trimming of encroaching branches/bushes process. May involve engaging arborists for larger trees. Hazardous branch or tree removal As required on result of a risk assessment by a suitably qualified person.
Disposal of cut material	Remove cut vegetation from the trail corridor and scatter, placing cut ends away from the trail to allow for a natural distribution or stockpile and utilise for trail closures/remediation where required. Do not place cut vegetative materials in creek lines, drainage alignments, ditches, culvert inlets, or other locations where they would prevent the free flow of water away from the trail tread.

Drainage Management

Maintenance guidelines	Drainage Management
Type of tasks covered	Maintenance of the following drainage features: • Nicks • Grade dips or drainage swales • Culverts and pipes • Side drains
Issue	Sediment and debris accumulates in drainage features causing the drain to be less effective or stop working .
Effect on trail asset sustainability and user experience	User safety and experience • Water can pool in blocked drains and create a hazard on the trail for walkers and riders • Water can erode the trail tread creating tripping hazards • Erosion gullies can change the classification of a trail leading to public injury and liability issues • Un managed water can undermine the footings of built trail structures and contribute to visitor safety risks Trail sustainability • Blocked or ineffective drains lead to accelerated trail erosion as water bypasses the drain and continues down the trail tread at speed • Blocked drains can lead to significant trail damage in the event of heavy rain and storm events

Maintenance guidelines	Drainage Management
Maintenance requirement to prevent/resolve issue	Nicks Remove accumulated sediment and debris from the nick and outflow area off the trail. Grade dips or drainage swales Remove accumulated sediment and debris from the grade reversal and outflow area off the trail. Culverts and pipes Remove accumulated sediment and debris from the culvert and pipe. Remove any potential impediments from the entry to prevent these being washed through. Remove impediments from the outflow area of the culvert/pipe to allow a free flow of water. Inspect the culvert/pipe for internal blockages and remove any found. Side drains Remove accumulated sediment and debris from the drain. Remove any potential impediments from the entry to prevent these being washed through. Remove impediments from the outflow area of the drain to allow a free flow of water.
Tools/equipment and resources required for task	Nicks Fire rakes and long handled shovels are best used for removing sediment and debris from nicks. In some cases following a large storm event where excessive sedimentation has occurred and settled in several drains, a small excavator with a skilled operator may be more efficient. Grade dips or drainage swales As per the equipment for maintaining nicks. Culverts and pipes As per the equipment for maintaining nicks. Additional tools may be required to access blocked pipes. Side drains As per the equipment for maintaining nicks.

Maintenance guidelines	Drainage Management
How to carry out task	Nicks Scrape and dig out accumulated sediment and disperse down slope of the trail. Ensure the cleaning process includes the potion of drain on/in the trail tread Grade dips or drainage swales As per procedure for cleaning nicks Culverts and pipes As per procedure for cleaning nicks Side drains As per procedure for cleaning nicks
Frequency of task	Nicks Drains should be cleaned prior to the start of the winter. A follow up cleaning should occur early in winter to capture any debris and sediment that has accumulated after the first heavy rains. A third cleaning should be programmed at the end of winter. Grade dips or drainage swales As per the frequency of nicks Culverts and pipes As per the frequency of nicks Side drains As per the frequency of nicks
Disposal of material	Dispose of removed silt, sediment and debris by dispersing down slope of the trail.

Trail Tread Management

Maintenance guidelines	Trail Tread Management
Type of tasks covered	Trail tread features requiring maintenance can include: • Edge berms • Back cut or back slope • Trail anchors • Trail armouring
Issue	Edge berms are the result of soil, rock and debris collecting on the downside of the trail tread and are a natural and predictable consequence of tread surface displacement and redeposition. Edge berms form a barrier that prevents water from sheeting across the trail. Non-maintained trail back cut, anchors and armouring leads to trail creep and edge impacts on vegetation.
Effect on trail asset sustainability and user experience	User safety and experience • Water can erode the trail tread creating tripping hazards. • Erosion gullies can change the classification of a trail leading to public injury and liability issues. • Slumping back cuts, loose trail anchors and loose armouring can force users off the trail creating a safety issue and contributing to a poor user experience . Trail sustainability • Slumping back cuts, loose trail anchors and loose armouring can force users off the trail and impact on surrounding vegetation. • Excessive edge berms can lead to accelerated trail erosion as water bypasses the drain and continues down the trail tread at speed. • Edge berms can lead to significant trail damage in the event of heavy rain and storm events.

Maintenance guidelines	Trail Tread Management
Maintenance requirement to prevent/resolve issue	Edge berms Remove edge berm and reinstate the original outslope of the trail tread. Back cut or back slope Remove excessive vegetation from the back cut, reinstate the original angle and/or repair following a slumping event. Trail anchors Trail anchors should allow for the free movement of trail users. Ensure the anchors are free from jagged, sharp or otherwise hazardous surfaces. Trail armouring Ensure trail armouring is level and free from rocking or movement.
Tools/equipment and resources required for task	Edge berms Fire rakes, mattock and long handled shovels are good for breaking up and removing edge berms. In some cases where the edge berm has been allowed to accumulate for several kilometres a small excavator with a skilled operator may be more efficient. Back cut or back slope Reinstate the back cut using a mattock or fire rake if it has slumped or is too steep. In some cases where the back cut is large and requires additional shaping, a small excavator with a skilled operator may be more efficient. Trail anchors A range of tools can be useful for resetting and stabilising anchors. A crowbar is very good for compacting the soil around an anchor. Trail armouring A range of tools can be useful for resetting and stabilising trail armouring. A crowbar is very good for compacting the soil around loose stone.

Maintenance guidelines	Trail Tread Management
How to carry out task	Edge berms To remove edge berms, loosen compacted berm material with a mattock, shovel, pick or rake, then remove the soil with a shovel. Use excess soil to fill holes in the tread, or to create grade reversals. Reshape the tread to restore its cross fall (outslope) and compact soil thoroughly. Back cut or back slope Back cuts should be kept free of excessive vegetation. (Relocate vegetation disturbed by the back cut in accordance with the vegetation management schedule) Reinstate the back cut using a mattock or fire rake if it has slumped or is too steep. Trail anchors Check for movement on the trail anchor. Ram rubble material or good mineral earth around the anchor with a crowbar to firm up the anchor. Trail armouring Check for movement on the trail anchor. Ram rubble material or good mineral earth around the anchor with a crowbar to firm up the anchor.

Maintenance guidelines	Trail Tread Management
Frequency of task	Edge berms Edge berms should be removed prior to the start of winter. A follow up treatment should occur early in winter to capture any debris and sediment that has accumulated after the first heavy rains. A third treatment should be programmed at the end of winter. Back cut or back slope The reinstatement of back cuts may be guided by the trail inspection/audit process. It is unlikely that a back cut should require specific treatment on a regular basis. Storm events may contribute to the need to carry out back cut repairs. Trail anchors The reinstatement of anchors may be guided by the trail inspection/audit process. It is unlikely that anchors should require specific treatment on a regular basis. Storm events may contribute to the need to carry out repairs. Trail armouring The reinstatement of trail armouring may be guided by the trail inspection/audit process. It is unlikely that trail armouring should require specific treatment on a regular basis. Storm events may contribute to the need to carry out repairs.
Disposal of material	Excess soil material should be stockpiled alongside the trail for future use rather than discarded.

Urgent/reactive maintenance

Although scheduled trail maintenance days will account for the bulk of all maintenance works carried out, occasionally there may be a need to undertake maintenance works reactively and/or urgently. These maintenance works are generally required where the problem can't wait until the next scheduled trail maintenance day.

Some likely types of works that would be considered urgent are listed in the table below.

Possible Urgent Trail Maintenance Works Problem	Solution	Tools Required
Following extreme rain event, the trail is substantially damaged by water.	Run-off channels need to be filled in, compacted and smoothed over. Puddles need to be drained, allowed to dry, filled in, compacted and smoothed over. Reinstate and drains or nicks that have been impacted or damaged.	Excavator, shovel, Rake, Rake hoe.
After heavy winds or storms, trees often fall across trails.	Trees need to be cut into smaller pieces and removed. Assessments by qualified arborists may be required if trees adjacent to the trail appear to be damaged.	Chainsaw
Trail slip. Trails built along steep side-slopes can be prone to slipping. This usually occurs after heavy rain and can be caused by the top batter slumping onto the trail, or the lower batter slipping down the hill.	Upper batter slips can be easily fixed by removing the fallen soil and rocks and re-shaping the trail tread and batter. If the lower batter slips down the hill, the trail may need to be re-built with rocks or a different alignment.	Excavator, shovel, Rake, Rake hoe.
Tree has fallen and broken a timber bridge or berm.	Cut and remove tree. Replace or repair timber structure if possible.	Chainsaw, Drill, Saw, Other carpentry tools.

Not all urgent works can be carried out immediately and may require the trail to be temporarily closed until the remediation work can be arranged. Temporary trail closures should be reinforced with bunting/fencing, signage and promoted on the land managers website.

Trail Maintenance – general procedures

This procedure document outlines the instructions for the management of risks to visitors during trail maintenance. All staff and volunteers who perform trail work must be provided with these instructions and demonstrate the required competencies and understanding to the relevant person.

A: Prior to commencing trail maintenance activities

Personal Protective Equipment (PPE) – Ensure that appropriate PPE is available and in good working order prior to undertaking tasks and operating equipment. All people are to wear the appropriate PPE for the tasks being undertaken. Ensure that first aid kits are available, well stocked and up to date.

Training and induction - All people who will be undertaking maintenance work must be instructed in the performance of relevant tasks and trained in the operation of plant and equipment (if applicable) prior to work commencing. However, where this work forms part of on-site training, it must be performed under the supervision of a competent person.

A site-specific induction is required for all people who have not previously worked on a site, and induction refreshers should be undertaken at least annually.

Risks to the Public - If machinery such as power carriers or chainsaws are to be operated on trails open to the public, then warning signs are to be placed on the trail to make visitors aware that work is taking place. Where the risk to visitors is assessed as high or above, the trail must be temporarily closed for the duration of that activity.

Note that visitors and staff using tracks or facilities above and particularly below the worksite may also be at risk. The risk to those downhill from spilled loads or runaway equipment may be far greater than the risks at the worksite. Therefore, this risk also needs to be assessed and appropriate controls put in place.

Manual Handling - Trail work often involves the transport of heavy materials and equipment. Where possible, utilise mechanical assistance to deliver materials and equipment to the worksite. Where there are stairways, steep terrain, culverts, drains or creek crossings, detailed planning must be carried out to ensure that they can be traversed with the intended equipment in a safe manner.

B: When performing trail maintenance work

- Perform task briefings and inductions prior to commencing work for the day
- perform daily checks of tools and equipment prior to commencing work for the day
- lay out warning signs and/or close trails and infrastructure before commencing maintenance work
- use appropriate PPE at all times
- carry first aid kits and ensure they are within easy reach of the current work site, given that trail maintenance tends to move site regularly
- use appropriate tools and equipment to perform each task, as per task briefing
- only operate equipment if trained and/or appropriately supervised; and
- work in teams of at least two wherever possible.

C: Other operational considerations

Incident Reporting - Report all incidents and near hits to the site supervisor and ensure that they are entered into the council reporting system within the required timeframe. Significant incidents may require a debriefing session for people working on the site, and the outcome of investigations should inform procedural improvements.

Equipment Maintenance - All equipment must be maintained in good working order. Any damaged or faulty equipment must be reported to the site supervisor and removed from service until repaired. Tag-out procedures are to be implemented to prevent the use of such equipment.

Storage - If equipment is to be stored on site (rather than at a base) for operational convenience, it must be secured to prevent unauthorised persons from operating it or injuring themselves. Any starter keys must be removed, and equipment should preferably only ever be left unattended overnight.

Predictable trail degradation scenario

The following selected images demonstrate the effects of not maintaining drains on a new trail.

Year 1

The image shows a water management feature designed to channel water off the trail. The feature is full of sediment and requires cleaning to enable the feature to continue to function as a device to shed water and protect the integrity of the trail.

Year 2 & 3

With all the water management features full of sediment they are unable to function effectively. Water is no longer shed from the trail and now flows over the water management features.
Degradation of the trail tread continues and increases with every rain event.
At this stage the remediation work to reinstate the trail is considerable.

Years 4 onwards

Water continues to erode the trail surface exposing tree roots or bedrock which contributes to degradation of the environment, increases potential of disease introduction to trees, creates more tripping hazards and impacts on visitor experience and agency reputation.

Years 4 onwards

Erosion gullies can become uncomfortable and dangerous to walk/ride so users create new trail adding to edge effects and impacts of the original trail.

If not addressed

The level of erosion reaches a point where it is almost irreversible and extensive remediation work is required to repair or reroute the trail.

Preventative Maintenance

The entire predictable scenario could be avoided with regular programmed maintenance.

Trail Maintenance Inspection Interval Table

Crater Lakes Trails Inspection Schedule								
	Frequency					Notes	Responsibility *	
	Monthly	Quarterly	Bi-annual	Annually	After Storm		Trail Manager or Trail Contractor	Trail Volunteer
Trailhead (Visitor nodes) Signs								
Inspect Condition			✓		✓	Is the structure sound and in good condition?	✓	✓
Check Notices/Maps/Local Alerts	✓				✓	Are the notices and maps up to date?	✓	✓
Shelters/benches								
Inspect condition				✓	✓	Is the Structure sound. Is painting required?	✓	
Roads (eg shuttle or other public access)								
Road Surface and Drainage			✓		✓	Is the road free from problems, does it require grading?	✓	
Other								
Elevated Structures					✓	**AS per CMG Policy for managing elevated structures**	✓	
Check Pedestrian Counters		✓			✓	Have counters been read and data submitted?	✓	✓
Trail Signage								
Inspect Condition and location			✓		✓	Are the signs in good condition? Are the markers appropriate for the trail classification? Are intersections clearly marked?	✓	✓
Trail Tread								
Surface			✓		✓	Are there signs of erosion? Is water pooling or flowing along the tread? Is there debris build up? Is extra drainage required?	✓	✓
Trail Drainage								
Check condition of drains			✓		✓	Are drains full of leaf litter or silt? Are culverts clogged?	✓	✓
Technical Trail Features								
Inspect condition			✓		✓	Is the feature structurally stable? Is it maintained to original specification? Have alternative lines been created?	✓	✓
Inspect fall zones			✓		✓	Are the fall zones clear of hazards eg sharp rocks and logs?	✓	✓
Vegetation								
Check Sight Lines			✓		✓	Does vegetation need to be pruned to maintain sight lines?	✓	✓
Check Intersections			✓		✓	Are intersection signs visible?	✓	✓
Check Trail Corridor and overhead clearance			✓		✓	Is trail corridor clear of vegetation and cleared appropriately to classification?	✓	✓

- NOTE: Many of the tasks could be carried out by a qualified trail volunteer group.

Trail maintenance costs and resourcing

Funding for ongoing trail management and maintenance is often overlooked or expected to be absorbed into existing operational budgets. It is important to consider how trail management and maintenance will be funded during the early stages of planning.

OTA has provided the details of scheduled maintenance, inspections and suggested times when these tasks should be carried out. We have provided advice on whether a contractor, CMG ground staff and/or Volunteers could carry out this work.

It's a challenge to provide an exact monetary cost estimate for implementing the maintenance plan. Nevertheless, we can allocate anticipated time required to complete the tasks, enabling us to outline the expected staffing and resource needs for CMG.

The respective general tasks are summarised in the following table and assume the bulk of the Trail Plan recommendations are accepted and implemented. OTA has applied a generous amount of time to complete each task to high level.

Item	Task	Regularity	Annual estimate
1	Vegetation Maintenance	3 blocks a year	8 weeks
2	Drainage Maintenance	2 blocks a year	4 weeks
3	Trail Tread Maintenance	2 blocks a year	4 weeks
4	Inspection Schedules	2 blocks a year	1 week
5	Urgent/reactive Maintenance	As required	2 weeks
6	Staff training		2 weeks

If we assume that the tasks are carried out in pairs, the total annual estimate equates to approximately the equivalent of 1 Full-Time Equivalent (FTE) position. We anticipate that this additional FTE position would provide support to the existing 2 FTE staff in handling other general maintenance tasks within Crater Lakes Park. In turn, the existing FTEs would lend their assistance with trail-related maintenance tasks. This collaborative approach should help streamline and optimise overall maintenance efforts.

Works/Construction Plan

The Crater Lakes Trails Works and Construction Plan (Plan) focuses on trail upgrades, areas of risk and potential new trails. It does not cover signage or typical maintenance items such as vegetation and drainage management. These items have been identified in the individual trail audits and appear in the separate document 'Crater Lakes Trails Quick Reference Guide November 2023'.

Some recommendations are straight forward, within existing trail corridors, do not require additional approvals and could be carried out by volunteers and/or staff, whilst others are more complex and will require some form of detailed design, additional approvals and involvement of professional trades/contractors.

The Plan focuses on 3 key precinct areas to simplify the process. These are:

- Valley Lake/Kelta Malpi Precinct
- Leg of Mutton/Yatton Loo Precinct
- Blue Lake/Warwar Precinct

OTA has applied numbers to each task, and in some cases images, to demonstrate the required work. The numbers in the tables and images can also be matched with the proceeding maps. Each table provides a brief description of work, a cost estimate if carried out by a trail contractor and weather the works could be completed by staff or volunteers. OTA has applied a general priority rating to each task that, in our opinion, should be considered when programming or seeking funding for work in the future. User safety, public liability risks, gaps in the current network, work required to enable trail network to function as per plan and user experience are all considered when applying the priorities.

The cost estimates are provided as a guide only and only account for the cost of the works and materials that are recommended. They do not include preliminaries, mobilisation, and other exclusions that may be required (Engineering, geotechnical surveys, permits etc.)

Leg of Mutton/Yatton Loo Precinct Works

1. Informal/formal lookout requires attention.

Lookout requires attention to determine future. The lookout seems informal but a bench is supplied.

Option 1: Remove bench, rehabilitate impacted area and prevent access.

Option 2: Install compliant barrier and hand railing. Promote as lookout.

2. Install section of missing compacted rubble trail.

2. Install missing section of compacted rubble trail across grassed area adjacent carpark to enable continuous link of both Mountain Trail and Pepper Pot Trail. @50m x 1.5m wide.

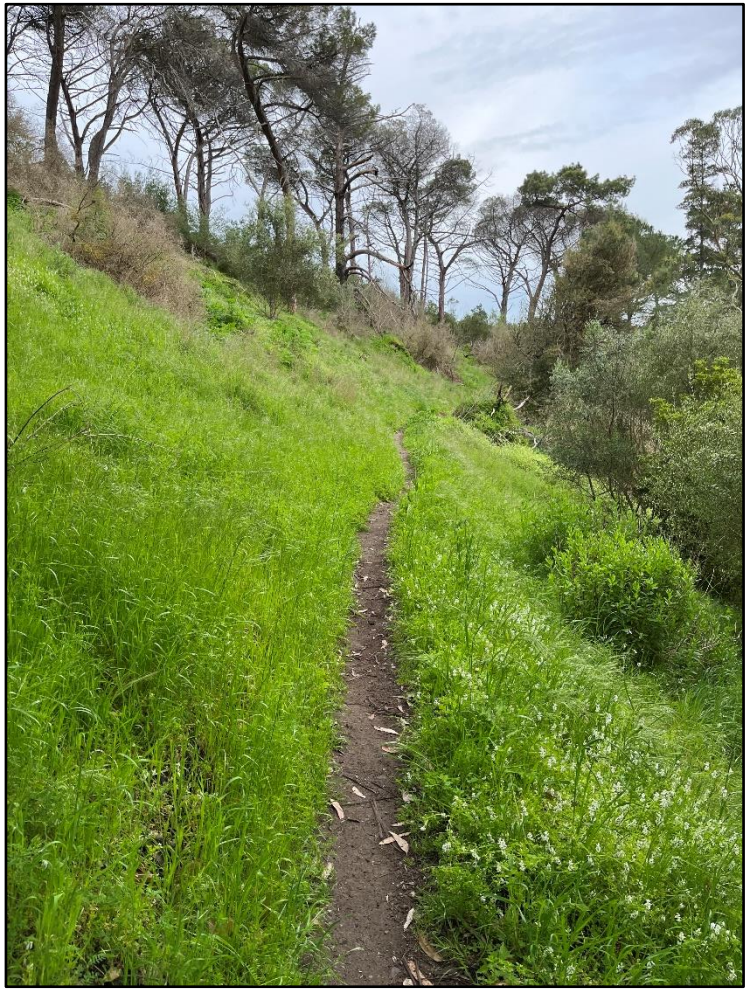
Currently trail stops at road and carpark and users unsure where to go.

3. Add compacted rubble with outslope to stop water pooling.

Approximately 110m x 1m wide requires attention.

4. Paint Yellow Line on edge of asphalt through carpark to act as guide for continuation of Pepper Pot Trail. Currently users unsure where to go from this point.

5. Carry out some minor trail widening at narrow points and vegetation trimming to improve sight lines.



6. Rebuild the intersection. Heavy trim of overhanging pines, remove old signage

7. Trim overhanging bush and block short cut at end of

Nurses Curses to guide and slow exit of cyclists.

8. Trim vegetation at intersection to maintain current alignments but improve sight lines for all users. Note: 3 x trail markers to install.

Leg of Mutton/Yatton Loo Precinct Works Table

Task	Description	Cost estimate	Resource required	Priority
1	Lookout requires attention to determine future. The lookout seems informal but a bench is supplied.		CMG decision	High
	Option 1: Remove bench, rehabilitate impacted area and prevent access.	$500	Contractor or CMG Staff	
	Option 2: Install compliant barrier and hand railing. Promote as lookout.	$5000+	Contractor or CMG Staff	
2	Install missing section of compacted rubble trail across grassed area adjacent carpark to enable continuous link of both Mountain Trail and Pepper Pot Trail. @50m x 1.5m wide. Currently trail stops at road and carpark and users unsure where to go.	$4000	Contractor or CMG Staff	Moderate
3	Add compacted rubble with outslope to stop water pooling. Approximately 110m x 1m wide requires attention.	$6500	Contractor or CMG Staff	Moderate
4	Paint Yellow Line on edge of asphalt through carpark to act as guide for continuation of Pepper Pot Trail. Currently users unsure where to go from this point.	$250	Contractor or CMG Staff	Moderate
5	Carry out some minor trail widening at narrow points and vegetation trimming to improve sight lines.	$2500	Contractor or Volunteers	High
6	Rebuild the intersection. Heavy trim of overhanging pines, remove old signage.	$4000	Contractor or CMG Staff	Moderate
7	Trim overhanging bush and block short cut at end of Nurses Curses to guide and slow exit of cyclists.	$500	Contractor, Volunteers or CMG Staff	High
8	Trim vegetation at intersection to maintain current alignments but improve sight lines for all users.	$250	Contractor, Volunteers or CMG Staff	High
9	Close and rehabilitate old trail. Drag surrounding fallen timber across trail. Install temporary bunting/fencing at top of trail until site has adequately recovered.	$300	Contractor, Volunteers or CMG Staff	High

Task	Description	Cost estimate	Resource required	Priority
10	Install fresh compacted rubble to existing trail alignment. A popular trail with tourists and locals, muddy when wet. Requires upgrade to meet user expectations. @ 750m and 2m wide.	$50,000	Contractor or CMG Staff	Low

Legend

- Trail_Marker
- Trail_Totem
- Trail_Feature_Sign
- Trailhead_Sign
- Walking_Trails_Combined
- Shared_Trails_Combined
- Cycling_Trails_Combined
- Crater_Lakes_Roads

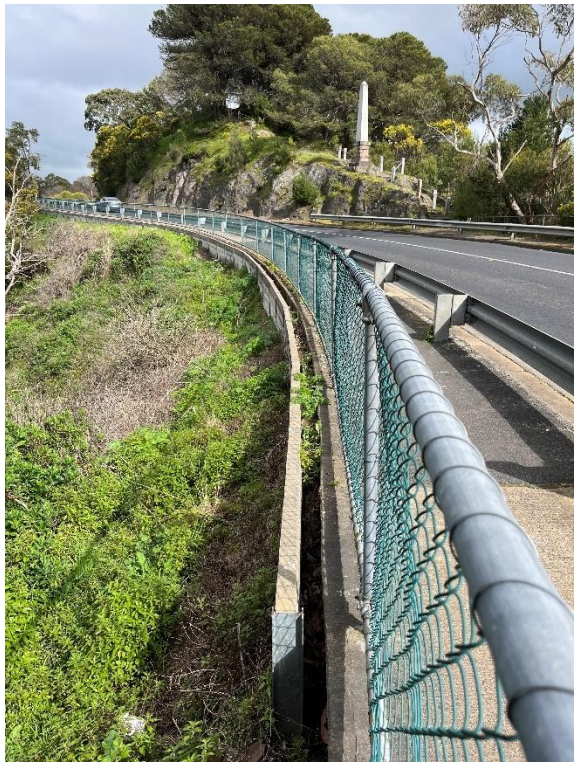
Leg of Mutton/Yatton Loo Precinct Works

0 125 250 500 Meters

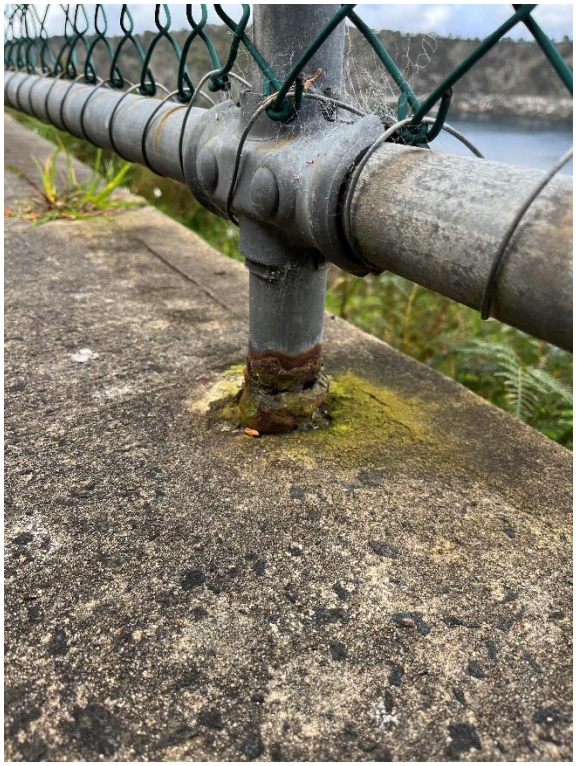
City of Mount Gambier

Blue Lake/Warwar Circuit Precinct Works

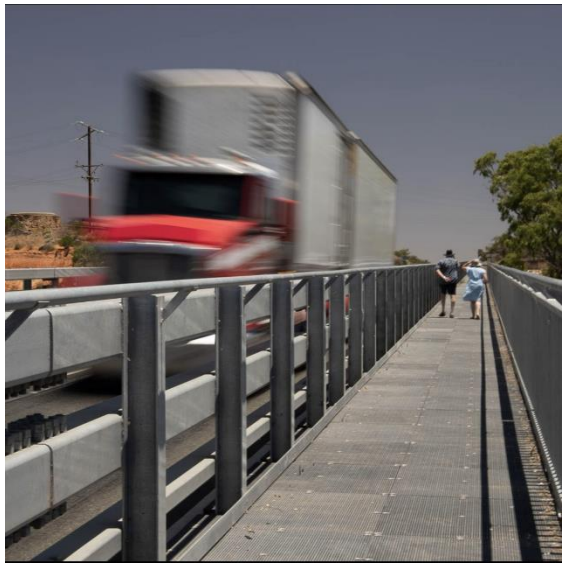
The location of some Armco barrier support uprights encroach into the path and affect the available width for users. An alternative barrier solution could increase the available space for trail users. See next page.



The structural integrity of the concrete sleeper retaining wall behind path is unknown. The gap between path and wall allows water to undermine path. Could a new fence be attached to the retaining wall steel uprights to increase path width?



The structural integrity of the fence should be inspected, and any issues rectified.



Example of vehicle barrier on the Kingston Bridge in the Riverland, SA. This type of barrier takes up less room, provides protection for trail users, provides more space and allows for improved pedestrian and bicycle access.

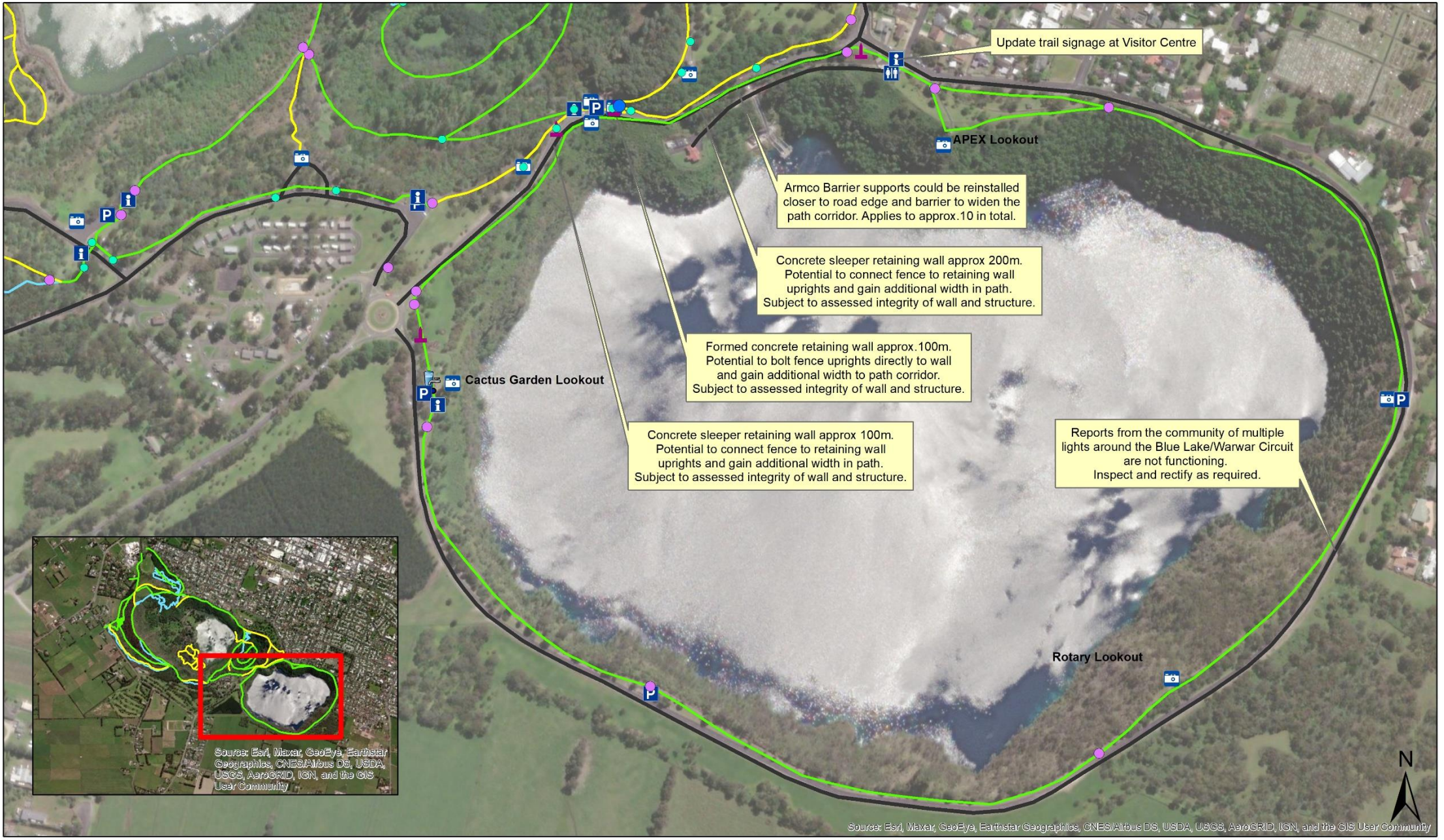
The existing Armco barrier support uprights appear in a range of locations from the actual barrier. As per the image, the orange arrow shows the upright set back with two spacers and the green arrow shows the upright with no spacers.

Is a potential solution to the width issues of the path installing all uprights as per the green arrow example?

Blue Lake/Warwar Circuit Precinct Works Table

Much of the identified work relates to issues and opportunities associated with the narrow path section. This area is under the control and management of the Department for Infrastructure and Transport (DIT). The key recommendation is to engage with both DIT and SA Water and commence solution-based discussions. OTA cannot provide costings or structural integrity advice for this piece of work.

Task	Description	Cost estimate	Resource required	Priority
	Engage with both DIT and SA Water and commence solution-based discussions on the various issues identified.			Moderate
	Inspect and repair non-functional lights around the Blue Lake/Warwar Circuit.	Un known	Contractor or CMG Staff	High



Legend

- Trail_Marker
- Trail_Totem
- Trail_Feature_Sign
- Trailhead_Sign
- Walking_Trails_Combined
- Shared_Trails_Combined
- Cycling_Trails_Combined
- Crater_Lakes_Roads

Blue Lake/Warwar Circuit Precinct Works

0 125 250 500 Meters

City of Mount Gambier

Valley Lake/Ketla Malpi Precinct Works

1. Remove unsightly and damaged boom gate and stile. Not required in this section of the network.

2. The drainage off the recently sealed carpark requires some redirection away from nearby trails.

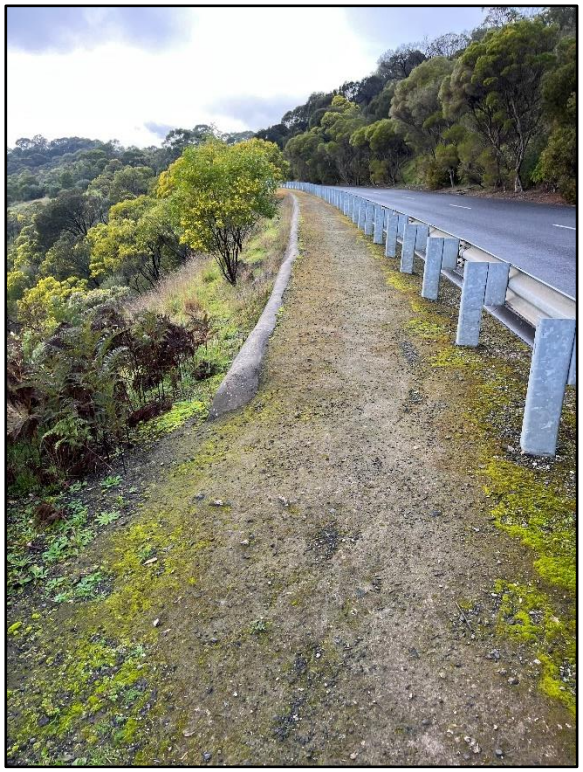
3. Install approximately 80m of retaining wall to enable trail to be built up to a safe and traversable level for prams etc.

A basic post and rail fence would also provide a sense of security for users.

5. Clear the fallen timber from the first 200m of the Blue Gums Ride and reinstate the drainage and trail tread.

6. The main issue with the existing informal path adjacent the road is the narrow width. Prams and bicycles are unable to pass through the narrow point of approx. 100m.

Install retaining wall, widen path and install new fence to enable safe and traversable passage for prams etc.



7. Installing a basic post and rail fence will help define the path and provide a sense of security to users of the trail.

9. Rake off the stones and organic matter to expose and reinstate the rubble path and make safe for pedestrians and prams.

10. Design and construct a new beginner, pram and disability friendly trail. The open Browne Lake/Kroweratwari area has the attributes suitable to create an easy and introductory trail experience to suit children, prams, and people requiring assistance. The important complimentary infrastructure of vehicle access, parking, amenities, picnic areas and playground that is already in place also contributes to the suitability of the area to accommodate an easy loop trail. (also recommended in Draft Crater Lakes Activation Plan and 2004 management plan)

Valley Lake/Ketla Malpi Precinct Works Table

Task	Description	Cost estimate	Resource required	Priority
1	Remove unsightly and damaged boom gate and stile. Not required in this section of the network.	$800	Contractor or CMG Staff	Moderate
2	Drainage off sealed carpark requires a robust solution to permanently redirect water away from the trails. This may mean a long shallow swale is created to bypass the trail entry points.	$2500	Contractor or CMG Staff	High
3	Install approximately 80m of retaining wall to enable trail to be built up to a safe and traversable level for prams etc. A basic post and rail fence would also provide a sense of security for users.	$35,000	Contractor	Moderate
4	Remove old signs and close/rehabilitate trail corridor	$2500	Contractor, Volunteers or CMG Staff	Moderate
5	Clear the fallen timber from the first 200m of the Blue Gums Ride and reinstate the drainage and trail tread.	$4500	Contractor or CMG Staff	High
6	Improve pedestrian and cycling access. Widening, surfacing and barriers are required in key locations to enable safe access for pedestrians and cyclists in and out of the Crater Lakes Precinct adjacent the Valley Road. Install retaining wall, widen path and install new fence to enable safe and traversable passage for prams etc. approx.. 100m	$45,000	Contractor	High
7	Installing a basic post and rail fence will help define the path and provide a sense of security to users of the trail.	$10,000	Contractor	High
8	Installing a basic post and rail fence will help define the path and provide a sense of security to users of the trail.	$2500	Contractor	High
9	Rake off the stones and organic matter to expose and reinstate the rubble path and make safe for pedestrians and prams.	$300	Contractor, Volunteers or CMG Staff	High

Task	Description	Cost estimate	Resource required	Priority
10	Design and construct a new beginner, pram and disability friendly trail. The open Browne Lake/Kroweratwari area has the attributes suitable to create an easy and introductory trail experience to suit children, prams, and people requiring assistance. The important complimentary infrastructure of vehicle access, parking, amenities, picnic areas and playground that is already in place also contributes to the suitability of the area to accommodate an easy loop trail. (also recommended in 2004 management plan and DRAFT Crater Lakes Activation Plan 2023) Compacted rubble path/trail, approximately 1000m x 1.8m	$65,000	Contractor	High
11	Design and construct new link trail. The proposed trail will enable safe access and significantly improve the functionality of the trail network and expand available loop options. Pedestrian traffic will be permitted in both directions. A climbing trail only for bicycles. (also recommended in 2004 management plan) Natural surface single trail, approximately 850m x 1m	$34,000	Contractor	Moderate

Legend

- Trail_Marker
- Trail_Totem
- Trail_Feature_Sign
- Trailhead_Sign
- Walking_Trails_Combined
- Shared_Trails_Combined
- Cycling_Trails_Combined
- Proposed_New_Shared_Trails
- Crater_Lakes_Roads

Valley Lake/Ketla Malpi Precinct Works

0 200 400 800
Meters

City of Mount Gambier

Glossary

Anchor:	Natural or placed barrier to reinforce trail flow and reduce trail straightening. Marking trail boundaries with rocks or vegetation to discourage users from cutting corners or straying from the desired path.
Armouring:	Armouring is a method of using large rocks to pave a trail and prevent erosion.
Back slope:	The back cut or batter of a bench cut trail.
Base Course:	The layer or layers of specified material of designed thickness placed on a trailbed to support surfacing.
Berm corner:	A bermed corner has a banked outer edge that runs the entire length of the corner, allowing the rider to maintain a faster speed.
Berm (edge):	The ridge of material formed on the outer edge of the trail that projects higher than the tread. Berms can be both intentional and unintentional, caused by the transport of tread material through heavy use.
Clearing Limit:	The area over and beside the trail that is cleared of trees, limbs, and other obstructions.
Climbing turn:	A climbing turn should be used on shallow slopes that are free flowing and gentle. Grade reversals before the turn to help divert water away and avoid erosion.
Clinometer:	An instrument used to measure gradients in the field.
Cross-country:	A style of mountain biking that involves a variety of riding experiences, including downhill and uphill trails of varying steepness.
Culvert:	Any structure with a bottom, regardless of the fill depth, the depth of invert, or the presence of a horizontal driving surface, or any bottomless (natural channel) structure with footings that does not have wheel loads in direct contact with the top of the structure.
Cupping:	When a trail surface becomes concave due to wear, displacement, compaction and/or water erosion.
De berm:	Removing an unintentional ridge of material formed on the outer edge of the trail that projects higher than the tread to restore correct drainage.
Desire Line:	Often the shortest route from point A to B. Commonly found off trail where a trail lacks good planning and design principles or where anchors have been insufficiently installed.
Downhill (DH)	A style of mountain biking that involves descending steep downhill trails as quickly as possible.
Drop-off:	A drop off is a feature on the trail where the rider will undertake a step down from a high level to a lower, defined by losing vertical height of the trail edge.

Fall line: Fall line trails follow the shortest route up or down a hill following the slope. Fall line trails are problematic as they become gullies, funnelling water which strips the trail of its tread and creates deep ruts. These alignments are almost impossible to maintain without costly annual remediation.

Fall Zone: The area on either side of or below a technical trail feature that provides a clear landing for a rider who has failed to negotiate the obstacle.

Filter: A trail filter is a high skill level, low consequence obstacle situated at the start of the trail that demonstrates the difficulty of the trail. Its purpose is to inform riders of the characteristics and technical difficulty of the trail before they start to ride.

Flow: A trail that allows riders to carry momentum through turns, minimising braking and skidding to avoid soil disturbance and displacement.

Full Bench: Trailbed constructed entirely on undisturbed mineral soil material.

FRP: Fibreglass Reinforced Plastic Composite product used in lieu of timber.

Gap Jumps: A type of jump on a trail in which there is a break between the take-off and the landing. The priority when building jumps is to create smooth flow through the approach, take-off, air and landing.

Grade reversal: A short out sloped dip in gradient on the trail followed by a rise, forcing water off the trail.

Gradient A measure of the angle of a geographical feature such as the slope of terrain or a trail. Gradient is expressed as a percentage with 100% gradient being vertical.

Gravity Enduro A mountain bike race format with timed downhills and untimed uphills. Racing is over a series of stages, with the winner the rider with the fastest combined time over those stages.

GPS : Geographically/global positioning system.

Half Bench: Trailbed constructed on half undisturbed mineral soil and half the compacted spoil from excavating the bench.

Half Rule: An important consideration for trail design which stipulates that a trail's gradient shouldn't exceed half the gradient of the sideslope except in limited circumstances. If it does it is considered a fall line trail.

Inslope: Where the trail's tread is sloped downward toward the backslope.

Loop: A loop trail starts and finishes at the same point.

Max. Grade: The maximum sustainable trail grade is typically 15 to 20 percent, but is site-specific and varies with track alignment, use of the half rule, soil type, annual rainfall, vegetation, use of grade reversals, type of users, number of users and level of difficulty.

Natural Features: Objects that add challenge by impeding travel. Examples include: rocks, roots, logs, holes, ledges, drop-offs etc.

Nick: A nick is a shaved down section of trail, semicircular in shape and about three metres in diameter, with the centre of the nick out sloped at about 15 percent to draw the

water off the trail. There must be lower ground next to the trail for the nick to be effective.

Outslope: Where the trail tread is sloped downward toward the embankment or daylight side of the trail tread. A method of tread construction that leaves the outside edge of a hillside lower than the inside, in order to shed water in sheet flow.

RGD: Rolling Grade Dip. A long gentle soil ramp and depression.

Rock Armouring: Hardening the trailbed using stone.

Roller: A roller is a trail feature where the trail surface rises then falls smoothly, which should be ridable without pedalling.

Rolling nick: A knick is a semi-circular, shaved down section of the trail, that is canted to the outside (and lower slope) to draw water off the trail.

Sideslope: The natural slope of the ground, usually expressed as a percentage.

Singletrack: A common name widely used to refer to Singletrail. Narrow purpose-built trail for walking, cycling or horse riding.

Singletrail: Narrow purpose-built trail for walking, cycling or horse riding.

Step-up: A type of jump that sends a rider up from a lower section of trail to a higher elevation.

Surfacing: Material placed on top of the trailbed or base course that provides the desired tread.

Switchback: A reverse in direction of trail grade with a level landing used to maintain appropriate gradients change elevation on a steep slope, usually involving special treatment of the approaches, crib wall and drainages.

TDRS Technical Difficulty Rating System. A system used to grade trails with similar levels of technical difficulty. Trails are graded on width, grade (maximum and average), surface, natural obstacles and Technical Trail Features (TTFs). Other factors such as enclosure and exposure can also influence classification.

TTFs Technical Trail Features are objects that have been introduced to a trail to add technical challenge.

Tabletop: A tabletop is a jump feature with a flat top which separates the take-off ramp from the downslope. The advantage with this feature is that the jump can be rolled over at any stage.

Trailbed: The finished surface on which base course or surfacing may be constructed. For trails without surfacing the trailbed is the tread.

Trail corridor: The full dimensions of the trail, including the area on either side of the tread and the space overhead that needs to cleared of bush and obstacles.

Tread: The surface portion of the trail upon which traffic moves.

Water Courses: Any natural or constructed channel where water naturally flows or will collect and flow during spring runoff, rainstorms, etc.

Wiggles: A term used to describe the meandering and twisting shape of a trail.

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Appendices

Appendix A – Australian Walking Track Grading System

Trail grading or classification allows land managers to develop, design, build, promote and maintain trails appropriate for the anticipated trail users.

Australian Standard 2156.1 Walking Tracks Part 1: Classification and Signage identifies six classes of walking tracks, describing each in terms of the elements used for classification and the resulting management considerations.

AS 2156.1-2001 Walking Tracks - Classification and Signage

The Australian Walking Track Grading System benchmarks to AS 2156.1-2001.

Public land management agencies across Australia have adopted the **Australian Walking Track Grading System** as a plain English language description to describe walks to the public. Under the system, walking trails are graded on a difficulty scale from grades one to five.

	**A Grade 1 walk corresponds to AS 2165.1 Class 1 track** • Suitable for the disabled with assistance • Total distance does not exceed 5 km • Well signed, marked and maintained • Well formed track of at least 1.2 m width, surface suitable for wheelchairs • No walking experience required • No steps, or where steps exist a ramp is also provided.
	**A Grade 2 walk corresponds to AS 2165.1 Class 2 track** • Suitable for families with young children • Total distance does not exceed 10 km • Generally hardened surface, width of 900 mm or more, well maintained • Trailhead signs and route markers at intersections • Minimal use of steps
	**A Grade 3 walk corresponds to AS 2165.1 Class 3 track** • Recommended for people with some bushwalking experience • Total distance does not exceed 20 km • Formed earthen track with a few obstacles (natural hazards), width less than 1.2 m • Trailhead signage and markers where track may be indistinct • Steps may be common.
	**A Grade 4 walk corresponds to AS 2165.1 Class 4 track** • Recommended for experienced bushwalkers • Distance may be more than 20 km and require multiple days • Rough track, includes arduous climbs and trail obstacles • Trailhead and some markers as required • Hikers may need to independently navigate.

	**A Grade 5 walk corresponds to AS 2165.1 Class 5 and 6 track.** • Recommended for very experienced bushwalker • Distance may be more than 20 km and require multiple days • Rough track with arduous climbs and trail obstacles • No signage or markers • Hikers will need to independently navigate and be self-sufficient.
	**Grade 6 or Class 6** is recommended for very experienced bushwalkers and consists of hiking where no trail exists – the right to roam experience.

Users guide to the Australian Walking Track Grading System

The Australian Walking Track Grading System has been developed by the Walking Tracks Grading and Improvement Project and funded by 'Go for your life' - a Victorian Government initiative aimed at developing stronger, healthier communities through promoting healthy eating and increased participation in physical activity.

The Australian Walking Track Grading System has been endorsed by Parks Forum as a voluntary industry standard and will be promoted for adoption amongst its members.

Australian Walking Track Grading System

This booklet shows you how to apply the Australian Walking Track Grading System.

The Grading System is essentially designed to assist people who are not regular or confident bushwalkers to experience walking by providing helpful information about walking trails.

Why do we need an Australian Walking Track Grading System?

The Australian Walking Track Grading System answers one question – is this walk suitable for me?

Track grading is a primary means of informing people about the features of walking tracks and assists in the marketing and promotion of walking as a leisure activity. By providing a standardised level of difficulty or track grading users are able to gauge whether a particular track is suitable for them. Currently there is no nationally consistent system to grade the level of difficulty of the track walking experience and then to clearly communicate that information to the public.

The lack of an agreed Australian track grading standard is limiting the accessibility and use of walking tracks for recreation and physical activity.

Does the Australian Walking Track Grading System ask the right questions?

97.3% of respondents felt the Australian Walking Track Grading System enables them to decide if a walk is the right level of difficulty for them.

The Grading System has been developed after a three year program of extensive research into domestic and international walkers' information needs.

Three major studies and nearly 1900 consumer interviews were commissioned to answer one question.

What information do people considering going walking actually want?

The more criteria used to grade a walk, the more complex the system becomes to apply. Consequently the system is designed to be simple – easy to apply and easy to use.

Using the Australian Walking Track Grading System

The application of the Australian Walking Track Gradin g System is a two step process.

The first step is a technical grading of the walk. The land manager determines a walk's grade of difficulty using descriptors taken from the *Australian Standard 2156.1 - 2001 Walking Tracks - Classification and Signage*.

The second step is to communicate to the public why a walk has received its grading – in essence translating the technical grading into 'plain English language'.

Technical and public descriptors: Grade One walk

A Grade 1 walk corresponds to AS 2165.1 Class 1 track

	Technical Description for Land Manager use	Walk Description for Public Information	Generic Description for Public Information
Grade of walk	Grade 1	Grade 1	Grade 1
Symbol			
Distance	Total distance of track must not exceed 5km.	Total distance of track to nearest 100 metre (eg 4.2km).	No bushwalking experience required. Flat even surface with no steps or steep sections. Suitable for wheelchair users who have someone to assist them. Walks no greater than 5km.
Gradient	Grades in accordance with the AS 1428 series. *(AS 2165.1)* A ramp at 1:14 (7.14% slope or 4.1degrees) is the maximum slope/gradient suitable for a person in a wheelchair.	Flat.	
Quality of path	Broad, hard surfaced track suitable for wheelchair use. Width: 1200mm or more. Well maintained with minimal intrusions. *(AS 2165.1)*	Well formed track.	
Quality of markings	Track head signage and route markers at intersections.	Clearly sign posted .	
Experience required	Users need no previous experience and are expected to exercise normal care regarding their personal safety. *(AS 2165.1)*	No experience required.	
Time	30 minute increments (eg 1-1.5hr) or if the predicted time is less than an hour in 15 minute increments (eg 30-45 minutes).	Time needed to complete track to nearest half hour or nearest 15 minute increment (eg 1-1.5hrs or 30-45 minutes).	
Steps	Steps allowed only with alternate ramp access. *(AS 2165.1)*	No steps.	

Technical and public descriptors: Grade Two walk

A Grade 2 walk corresponds to AS 2165.1 Class 2 track

	Technical Description for Land Manager use	Walk Description for Public Information	Generic Description for Public Information
Grade of walk	Grade 2	Grade 2	Grade 2
Symbol			
Distance	Total distance of track must not exceed 10km.	Total distance of track to nearest 100 metre (eg 4.2km).	No bushwalking experience required. The track is a hardened or compacted surface and may have a gentle hill section or sections and occasional steps. Walks no greater than 10km.
Gradient	The gradient is generally no steeper than 1:10 (or 10% or 5.7 degrees). *(AS 2165.1).*	Gentle hills.	
Quality of path	Generally a modified or hardened surface. Width: 900mm or more. Well maintained with minimal intrusions. *(AS 2165.1).*	Formed track.	
Quality of markings	Track head signage & route markers at intersections.	Clearly sign posted.	
Experience required	Users need no previous experience and are expected to exercise normal care regarding their personal safety. *(AS 2165.1).* Suitable for most ages and fitness levels.	No experience required.	
Time	30 minute increments (eg 1.5-2hrs) or if the predicted time is less than an hour in 15 minute increments (eg 30-45 minutes).	Time needed to complete track to nearest half hour or nearest 15 minute increment (eg 1-1.5hrs or 30-45 minutes).	
Steps	Minimal use of steps. *(AS 2165.1).*	Occasional steps .	

Technical and public descriptors: Grade Three walk

A Grade 3 walk corresponds to AS 2165.1 Class 3 track

	Technical Description for Land Manager use	Walk Description for Public Information	Generic Description for Public Information
Grade of walk	Grade 3	Grade 3	Grade 3
Symbol			
Distance	Total distance of track must not exceed 20km.	Total distance of track to nearest 100 metre (eg 4.2km).	Suitable for most ages and fitness levels. Some bushwalking experience recommended. Tracks may have short steep hill sections a rough surface and many steps. Walks up to 20km.
Gradient	May exceed 1:10 (or 10% or 5.7 degrees) for short sections but generally no steeper than 1:10. *(AS 2165.1).*	Short steep hills.	
Quality of path	Formed earthen track, few obstacles. Generally a modified surface, sections may be hardened. Width: variable and less than 1200mm. Kept mostly clear of intrusions and obstacles. *(AS 2165.1).*	Formed track, some obstacles.	
Quality of markings	Track head signage and route markers at intersections and where track is indistinct.	Sign posted.	
Experience required	Users need no bushwalking experience and a minimum level of specialised skills. Users may encounter natural hazards such as steep slopes, unstable surfaces and minor water crossings. They are responsible for their own safety. *(AS 2165.1).*	Some bushwalking experience recommended.	
Time	Hours/days (eg 9hrs) or if the predicted time is less than an hour in 15 minute increments (eg 45 minutes).	Hours/days or if the predicted time is less than an hour 15 minute increments.	
Steps	Steps may be common. *(AS 2165.1).*	Many steps .	

Technical and public descriptors: Grade Four walk

A Grade 4 walk corresponds to AS 2165.1 Class 4 track

	Technical Description for Land Manager use	Walk Description for Public Information	Generic Description for Public Information
Grade of walk	Grade 4	Grade 4	Grade 4
Symbol			
Distance	Total distance of track may be greater than 20km. Distance does not influence grading.	Total distance of track to nearest km.	Bushwalking experience recommended. Tracks may be long, rough and very steep. Directional signage may be limited.
Gradient	May have arduous climbs and steep sections. May include long steep sections exceeding 1:10.	Very steep.	
Quality of path	Generally distinct without major modification to the ground. Encounters with fallen debris and other obstacles are likely. *(AS 2165.1)* Walkers may encounter natural obstacles (eg tides).	Rough track, many obstacles.	
Quality of markings	Track head signage and route markers.	Limited signage .	
Experience required	Users require a moderate level of specialised skills such as navigation skills. Users may require maps and navigation equipment to successfully complete the track. Users need to be self-reliant, particularly in regard to emergency first aid and possible weather hazards. *(AS 2165.1)*.	Experienced bushwalkers.	
Time	Hours/days (eg 9hrs) or if the predicted time is less than an hour in 15 minute increments (eg 45 minutes).	Hours/days or if the predicted time is less than an hour 15 minute increments.	
Steps	N/A (AS 2165.1) Steps do not influence grading.	-	

Technical and public descriptors: Grade Five walk

A Grade 5 walk corresponds to AS 2165.1 Class 5 & 6 track

	Technical Description for Land Manager use	Walk Description for Public Information	Generic Description for Public Information
Grade of walk	Grade 5	Grade 5	Grade 5
Symbol			
Distance	Total distance of track may be greater than 20km. Distance does not influence grading.	Total distance of track to nearest km.	Very experienced bushwalkers with specialised skills, including navigation and emergency first aid. Tracks are likely to be very rough, very steep and unmarked. Walks may be more than 20km.
Gradient	May have very arduous climbs and steep sections. May include long steep sections exceeding 1:10.	Very steep and difficult.	
Quality of path	No modification of the natural environment. *(AS 2165.1)*.	Rough unformed track.	
Quality of markings	Signage is generally not provided. *(AS 2165.1)*.	No directional signage.	
Experience required	Users require previous experience in the outdoors and a high level of specialised skills such as navigation skills. Users will generally require a map and navigation equipment to complete the track. Users need to be self-reliant, particularly in regard to emergency first aid and possible weather hazards. *(AS 2165.1)*.	Very experienced bushwalkers.	
Time	Hours/days .	Hours/days.	
Steps	N/A *(AS 2165.1)*. Steps do not influence grading.	-	

Glossary

AS 2156.1-2001 Walking Tracks - Classification and Signage	The Australian Walking Track Grading System benchmarks to AS 2156.1-2001. A Grade 1 walk corresponds to AS 2165.1 Class 1 track A Grade 2 walk corresponds to AS 2165.1 Class 2 track A Grade 3 walk corresponds to AS 2165.1 Class 3 track A Grade 4 walk corresponds to AS 2165.1 Class 4 track A Grade 5 walk corresponds to AS 2165.1 Class 5 and 6 track				
Descriptions	Walk features are described as they exist. For example the description of a Grade 2 walk gradient is *gentle hills*. However if the walk is flat it should be described as flat.				
Distance	The distance given is the actual distance travelled to complete the walk. *oneway* if the walk is promoted as a walk from one point to another (Point A – Point B); *return* if the walk is to a point and back (Point A – Point B – Point A); or *circuit* or *loop* if the walk is a loop. For Grades 1-3 distance is given to the nearest 100 meters (eg 4.2km) For Grades 4-5 distance is given to the nearest kilometre.				
Grade	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**
Distance	Up to 5km.	Up to 10km.	Up to 20km.	N/A	N/A
Experience required	Experience required refers to the degree of bushwalking experience required to safely complete a specific grade walk. Bushwalking experience required benchmarks to AS 2156.1-2001. A Grade 1 walk corresponds to AS 2165.1 Class 1 track A Grade 2 walk corresponds to AS 2165.1 Class 2 track A Grade 3 walk corresponds to AS 2165.1 Class 3 track A Grade 4 walk corresponds to AS 2165.1 Class 4 track A Grade 5 walk corresponds to AS 2165.1 Class 5 and 6 track				
Gradient (or slope)	The Australian Walking Track Grading System uses text to describe gradient to the public. Technical descriptions (eg. ratios or degrees) are used to technically grade the walk.				
Grade or Level of Difficulty	The grade of the walk is determined by its hardest characteristic. Specific symbols are assigned to each grade.				
	Grade 1	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**
					
Steps	A structure with a series of risers (steps) which provides pedestrian access from one level to another.				

How to grade a walk

The key to grading a walk is to describe it so that a person doing the walk gets a good idea of what to expect. This means:

- Walks should be described as they actually are; and
- A walk gets its grading from its hardest component.

Therefore, a walk will often have components that are easier than the walk's ultimate grade.
The application of the Australian Walking Track Grading System is a two step process.

Step 1 – Technical grading of a walk

The person grading the walk uses technical descriptors, based on *AS 2156.1 Walking Tracks – Classification and Signage*, to determine the walk's level of difficulty.

Step 2 – Translating the technical grading into a plain English grading

Using the 'Walking Track Grading System Decision Matrix for the public' the technical grading information is translated into plain English.

How much information should you provide?

Land managers wanting to get the best out of the grading system should provide the full suite of information.
If it's not practical to provide the full suite of information at the start of the track, and in supporting material, the minimum information you should provide is the grade of walk (difficulty), identifying symbol and the actual distance.

Recommended information

	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Symbol	Symbol	Symbol	Symbol	Symbol	Symbol
Distance	Distance to complete walk. x km.	Distance to complete walk. xx km.	Distance to complete walk. xx km.	Distance to complete walk. xx km.	Distance to complete walk. xx km.
Gradient	Flat.	Gentle hills.	Short steep hills.	Very steep.	Very steep and difficult.
Quality of path	Well formed track.	Formed track.	Formed track, some obstacles.	Rough track, many obstacles.	Rough unformed track.
Quality of markings	Clearly sign posted.	Clearly sign posted.	Sign posted.	Limited signage.	No directional signage.
Experience required	No experience required.	No experience required.	Some bushwalking experience required.	Experienced bushwalkers.	Very experienced bushwalkers.
Time	High and low estimate of time needed to complete track (eg 1.5-2hrs).	High and low estimate of time needed to complete track (eg 1.5-2hrs).	Time needed to complete track (hours/days).	Time needed to complete track (hours/days).	Time needed to complete track (hours/days).
Steps	No steps.	Occasional steps.	Many steps.	N/A	N/A

Example: Wineglass Bay Lookout Walk

Wineglass Bay Lookout Walk

This short walk offers visitors one of Tasmania's most celebrated views over the beautiful white sands of Wineglass Bay. The track is a short, fairly steep climb to the saddle between Mt Amos and Mt Mayson, two of the imposing granite peaks of the Hazards. From the saddle, a side track leads to a lookout with spectacular views over Wineglass Bay.

The track and Wineglass Bay are located within Freycinet National Park in Tasmania.

In this example the technical assessment of the components distance, quality of path, quality of markings and experience required are all Grade 1 or 2. The gradient and steps are Grade 3. Therefore, as the Wineglass Bay Lookout Walk has one or more Grade 3 components the Tasmanian Parks and Wildlife Service have graded the walk at Grade 3.

Grade 1:

Distance	Total distance of track must not exceed 5km. Wineglass Bay Lookout Wlak 2.4km.
Quality of markings	Track signage & route markers at intersections.
Experience required	Users need no previous experience and are expected to exercise normal care regarding their personal safety. (*AS 2165.1*)

Grade 2:

Quality of path	Generally a modified or hardened surface. Width: 900mm or more. Well maintained with minimal intrusions. (AS 2165.1)

Grade 3:

Gradient	May exceed 1:10 (or 10% or 5.7 degrees) for short sections but generally no steeper than 1:10. (AS 2165.1).
Time	Hours/days (eg 9hrs) or if the time predicted is less than an hour to the nearest 15 minute interval (eg 45 minutes). Wineglass Bay Lookout Walk 1.5 hrs.
Steps	Steps may be common. (AS 2165.1)

Example: Wineglass Bay, Tasmania

The technical assessment of the Wineglass Bay Lookout Walk is then translated into plain English. NOTE: Time is the land manager's best estimate of the amount of time a person of average fitness, walking in good conditions, will take to complete the walk. Time does not describe difficulty. Because this is a Grade 3 walk a high/low estimate is not required.

Grade 1:

Distance	Distance to complete walk is 2.4km.
Quality of markings	Clearly sign posted.
Experience requires	No experience required.

Grade 2:

Quality of path	Formed track.

Grade 3:

Gradient	Short steep hills.
Time	Time needed to complete track (hours/days) 1.5hrs.
Steps	Many steps.

Wineglass Bay Lookout walk could be described to the public as:

Wineglass Bay Lookout Walk. Grade 3.

Symbol	**Distance:**	2.4km
	Gradient:	Short steep hills
	Quality of path:	Formed track
	Quality of markings:	Clearly sign posted
	Experience required:	No experience required
	Time:	1.5hrs
	Steps:	Many steps

Gradient (or slope)
The Australian Walking Track Grading System uses text to describe gradient to the public. Technical descriptions (eg. ratios or degrees) are used to technically grade the walk.

Grade or Level of Difficulty
The grade of the walk is determined by its hardest characteristic.
Specific symbols are assigned to each grade.

- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Grade 5

Steps
A structure with a series of risers (steps) which provides pedestrian access from one level to another.

Time
For Grades 1 and 2 time is specified in a range given in 30 minute increments (eg 1-1.5hrs) or, if the predicted time is less than an hour, in 15 minute increments (eg 30-45 minutes).

For Grades 3 – 5 time is given as hours or days or, if the predicted time is less than an hour, in 15 minute increments.

Determining approximately how long an individual walk will take to complete is the responsibility of the agency describing the walk.

Track (or trail)
The choice of the term *track* or *trail* is determined by local usage.

For further information on the Australian Walking Track Grading System please visit http://www.dse.vic.gov.au/walking.

Appendix B – Australian Mountain Bike Trail Classification System

Symbols and Descriptions

The Trail Difficulty Rating System (TDRS) outlined below provides seven levels of difficulty for mountain bike trails. The TDRS enables visitors to understand the nature of the trail before beginning their ride and allows them to plan their ride for enjoyment, appropriate level of challenge and safety.

Trail ratings can be communicated in several ways. Pre-visit information may include a more detailed description of the ratings , while a shorter description is required for trailhead signage and maps. Rating colours should be used on all on trail directional signage.

Mountain bike TDRS short trail descriptors should be used at trail signage, on brochures and maps or similar applications.

The use of the bike in the centre of each symbol is optional and will likely depend if the trail network consists of multi-use & shared use trails or single use.

Table 10: Mountain bike TDRS short descriptors

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

Trail Classification Matrix

The Trail Classification Matrix incorporates the Trail Difficulty Rating System and provides detailed information to use when planning, designing, constructing and maintaining mountain bike trails to ensure a consistent classification standard is applied.

Very easy mountain bike trail / Fire trail

	○	*Technical Description (for land Manager use)*	*Trail Description (for public information)*	*Generic Description (for public Information)*	*Short Classification Key*
	Grade of trail	Very easy			
	Description	Likely to be a fire road, rail trail or wide single track with a gentle gradient, smooth surface and free of obstacles	Likely to be a fire road, rail trail or wide single track with a gentle gradient, smooth surface and free of obstacles	Wide trail with a gentle gradient smooth surface and no obstacles Suitable for beginner cyclists with basic bike skills, and most bikes	Wide trail, gentle gradient smooth surface, no obstacles For beginner cyclists with basic bike skills
Guiding Criteria	**Trail Width**	2100 mm plus or minus 900 mm	Two riders can ride side by side		
Guiding Criteria	**Trail Surface**	Hardened or smooth	Hardened with no challenging features on the trail		
Guiding Criteria	**Trail Gradient**	Climbs and descents are mostly shallow Ave. trail grade – 7% or less Max. trail grade – 15%	Climbs and descents are mostly shallow		
Guiding Criteria	**Quality of Markings**	Trailhead signs and route markers at intersections	Clearly signposted		
Risk Assessable Criteria	**Level of Trail Exposure**	Exposure to either side of the trail corridor includes downward slopes of up to 30%	Minimal exposure on either side of the trail corridor		
Risk Assessable Criteria	**Natural Obstacles and Technical Trail Features (TTFs)**	Unavoidable bridges 2100mm or wider	No obstacles		
	Experience Required	Suitable for beginner / novice cyclists with basic bike riding skills Suitable for most bikes	Suitable for beginner / novice cyclists with basic bike riding skills Suitable for most bikes		

Easy mountain bike trail

	●	*Technical Description (for land Manager use)*	*Trail Description (for public information)*	*Generic Description (for public Information)*	*Short Classification Key*
	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	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	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	Wide trail, gentle gradient, some obstacles For beginner mountain bikers with basic mountain bike skills
Guiding Criteria	**Trail Width**	900 mm plus or minus 300 mm	Handlebar width or greater		
Guiding Criteria	**Trail Surface**	Mostly firm and stable	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%	Climbs and descents are mostly shallow, but trail may include some moderately steep sections		
Guiding Criteria	**Quality of Markings**	Trailhead signs and route markers at intersections	Clearly signposted		
Risk Assessable Criteria	**Level of Trail Exposure**	Exposure to either side of the trail corridor includes downward slopes of up to 30%	Minimal exposure on either side of the trail corridor		
Risk Assessable Criteria	**Natural Obstacles and Technical Trail Features (TTFs)**	Unavoidable obstacles to 100mm high, such as logs, roots and rocks Avoidable, rollable obstacles or jumps may be present Unavoidable bridges 900mm or wider Short sections may exceed these criteria	Trail may have obstacles such as logs, roots, rocks and jumps		
	Experience Required	Suitable for beginner / novice mountain bikers with basic mountain bike skills Suitable for off-road bikes	Suitable mountain bikers with basic mountain bike skills Suitable for most bikes		

Easy / Intermediate mountain bike trail

		Technical Description (for land Manager use)	*Trail Description (for public information)*	*Generic Description (for public Information)*	*Short Classification Key*
	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	Likely to be single track with a moderate gradient, variable surface and some obstacles Short sections may exceed these criteria	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	Single track, moderate gradient and some obstacles For beginner mountain bikers with basic mountain bike skills
Guiding Criteria	**Trail Width**	750 mm plus or minus 200 mm	Handlebar width		
Guiding Criteria	**Trail Surface**	Mostly firm and stable	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%	Climbs and descents are mostly shallow, but trail may include some moderately steep sections		
Guiding Criteria	**Quality of Markings**	Trailhead signs and route markers at intersections	Clearly signposted		
Risk Assessable Criteria	**Level of Trail Exposure**	Exposure to either side of the trail corridor includes downward slopes of up to 30%	Minimal exposure on either side of the trail corridor		
Risk Assessable Criteria	**Natural Obstacles and Technical Trail Features (TTFs)**	Unavoidable obstacles to 200mm high, such as logs, roots and rocks Avoidable, rollable obstacles and jumps may be present Unavoidable bridges 900mm or wider Short sections may exceed these criteria	Trail may have obstacles such as logs, roots, rocks and jumps		
	Experience Required	Suitable for beginner / novice mountain bikers with basic mountain bike skills Suitable for off-road bikes	Suitable mountain bikers with basic mountain bike skills Suitable for most bikes		

Intermediate mountain bike trail

		Technical Description (for land Manager use)	*Trail Description (for public information)*	*Generic Description (for public Information)*	*Short Classification Key*
	Grade of trail	Intermediate	Intermediate	Intermediate	Intermediate
	Description	Single trail with moderate gradients, variable surface and obstacles Dual use or preferred use	Single trail with moderate gradients, variable surface and obstacles	Single trail with moderate gradients, variable surface and obstacles May include steep sections Suitable for skilled mountain bikers with mountain bikes	Single trail, moderate gradients, obstacles and some steep sections For skilled mountain bikers
Guiding Criteria	**Trail Width**	600 mm plus or minus 300 mm	Handlebar width or greater		
Guiding Criteria	**Trail Surface**	Possible sections of rocky or loose tread	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% Short sections may exceed these criteria	Mostly moderate gradients but may include steep sections		
Guiding Criteria	**Quality of Markings**	Trailhead signs and route markers at intersections	Signposted		
Risk Assessable Criteria	**Level of Trail Exposure**	Exposure to either side of the trail corridor includes downward slopes of up to 50%	Sections of trail will include moderate exposure on either side of the trail corridor		
Risk Assessable Criteria	**Natural Obstacles and Technical Trail Features (TTFs)**	Unavoidable obstacles to 350 mm high, such as logs, roots and rocks Avoidable, obstacles to 600 mm may be present, width of deck is greater than half the height of the obstacle Tabletop jumps to 1500mm high, rollable double jumps and avoidable gap jumps Unavoidable bridges 600mm or wider Short sections may exceed these criteria	Trail will have obstacles such as logs, roots, rocks and jumps		
	Experience Required	Suitable for skilled mountain bikers with basic mountain bike skills Suitable for mountain bikes	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)	*Trail Description (for public information)*	*Generic Description (for public Information)*	*Short Classification Key*
	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	Likely to be a challenging single trail with moderate gradients, variable surface and obstacles	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	For competent mountain bikers Large, unavoidable obstacles and features Some steep climbs or descents and loose surfaces
Guiding Criteria	**Trail Width**	600 mm plus or minus 300 mm	Handlebar width or greater		
Guiding Criteria	**Trail Surface**	Possible sections of rocky or loose tread	Possible sections of rocky or loose tread		
Guiding Criteria	**Trail Gradient**	Mostly moderate gradients but may include steep sections Ave. trail grade – 20% or less Max. trail grade – 30% Short sections may exceed these criteria	Mostly moderate gradients but may include steep sections		
Guiding Criteria	**Quality of Markings**	Trailhead signs and route markers at intersections	Signposted		
Risk Assessable Criteria	**Level of Trail Exposure**	Exposure to either side of the trail corridor includes downward slopes of up to 50%	Sections of trail will include moderate exposure on either side of the trail corridor		
Risk Assessable Criteria	**Natural Obstacles and Technical Trail Features (TTFs)**	Unavoidable obstacles to 400 mm high, such as logs, roots and rocks Avoidable, obstacles to 1000 mm may be present, width of deck is greater than half the height of the obstacle Tabletop jumps to 2000mm high, rollable double jumps and avoidable gap jumps Unavoidable bridges 600mm or wider Short sections may exceed these criteria	Trail will have obstacles such as logs, roots, rocks and jumps		
	Experience Required	Suitable for competent mountain bikers with good mountain bike skills Suitable for mountain bikes	Suitable for competent mountain bikers with good mountain bike skills Suitable for mountain bikes		

Difficult mountain bike trail

		Technical Description (for land Manager use)	*Trail Description (for public information)*	*Generic Description (for public Information)*	*Short Classification Key*
	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	Likely to be a challenging single trail with steep gradients, variable surface and many obstacles	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	For experienced mountain bikers Challenging trail Large, unavoidable obstacles and features Long, steep climbs or descents and loose surfaces
Guiding Criteria	**Trail Width**	300 mm plus or minus 150 mm for tread and bridges	Can be less than handlebar width		
Guiding Criteria	**Trail Surface**	Variable and challenging	Variable and challenging		
Guiding Criteria	**Trail Gradient**	Contains steep descents and climbs Ave. trail grade – 20% or less Max. trail grade – 30% Short sections may exceed these criteria	Contains steep descents and climbs		
Guiding Criteria	**Quality of Markings**	Trailhead signs and route markers may be limited	Limited signs		
Risk Assessable Criteria	**Level of Trail Exposure**	Exposure to either side of the trail corridor includes steep downward slopes or freefall	Exposure to either side of the trail corridor includes steep downward slopes or freefall		
Risk Assessable Criteria	**Natural Obstacles and Technical Trail Features (TTFs)**	Unavoidable obstacles to 500 mm high, such as logs, roots, drop off's or constructed obstacles Avoidable, obstacles to 1200 mm may be present, width of deck is greater than half the height of the obstacle Tabletop jumps to 2500mm high, rollable double jumps and avoidable gap jumps Unavoidable bridges 600mm or wider Short sections may exceed these criteria	Unavoidable obstacles such as logs, roots, drop off's, jumps or constructed obstacles		
	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	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)*	*Trail Description* *(for public information)*	*Generic Description* *(for public Information)*	*Short Classification Key*
	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	Likely to be a challenging single trail with steep gradients, variable surface and many obstacles	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 jumps, obstacles and features Some sections will be easier to walk.	For highly experienced mountain bikers All sections extremely challenging Large, unavoidable jumps, obstacles and severe features
Guiding Criteria	**Trail Width**	150 mm plus or minus 100 mm for tread and bridges Structures can vary	Can be less than handlebar width		
Guiding Criteria	**Trail Surface**	Widely variable and challenging	Widely variable and challenging		
Guiding Criteria	**Trail Gradient**	Expect prolonged steep, loose and rocky descents or climbs Average trail grade – 20% Max. trail grade – 40% Short sections may exceed these criteria	Expect prolonged steep, loose and rocky descents or climbs		
Guiding Criteria	**Quality of Markings**	Trailhead signs and route markers may be limited	Limited signs		
Risk Assessable Criteria	**Level of Trail Exposure**	Exposure to either side of the trail corridor includes steep downward slopes or freefall	Exposure to either side of the trail corridor includes steep downward slopes or freefall		
Risk Assessable Criteria	**Natural Obstacles and Technical Trail Features (TTFs)**	Unavoidable obstacles over 1000 mm Avoidable, obstacles may be present Unavoidable gap jumps and doubles Unavoidable bridges 600 mm or narrower Width of bridges is unpredictable Short sections may exceed these criteria	Unavoidable obstacles such as gap jumps, logs, roots, drop off's or constructed obstacles		
	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	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		

Appendix C: AusCycling insurance for trail building and maintenance activities

Insurance For AusCycling Clubs Relating To Trail Building and Maintenance Activities

V Insurance Group are the insurance brokers for Auscycling. Insurance cover is provided to members, clubs, volunteers, officials and other insured persons/entities involved in activities that are sanctioned by Auscycling. Activities include races, organised training including individual training, meetings, fundraising activities, voluntary trail building activities, social rides and travel to and from. The Auscycling insurance pogram provides cover for affiliated clubs,members and volunteers when involved in Cycle Trail Building and Maintenance activities. Please find below some frequently asked questions and answers.

Frequently Asked Questions

1. **Are clubs and trail care organisations affiliated with Auscycling covered for public liability whilst undertaking trail building and maintenance activities on a voluntary basis?**
The liability policy organised by V Insurance covers Auscycling clubs and trail care organisations affiliated with Auscycling whilst undertaking trail building and maintenance on a voluntary basis.

2. **What type of equipment and machinery can clubs, trail care organisations and their volunteers use for trail building activities and be covered for Public Liability and Personal Accident?**
Clubs, trail care organisations and their volunteers are covered for Public Liability and Personal Accident when using equipment and light machinery for trail building activities subject to the following:
   a. *Where a piece of equipment or machinery requires a licence or ticket to operate as dictated by the relevant State or Territory regulatory authority, the volunteer operator must have the required qualification;*
   b. *Where a piece of equipment or light machinery does not require a ticket or licence to operate as dictated by the relevant State or territory authority, the Club or trail care organisation and the volunteer operator must follow Workplace Health and Safety guidelines and safety procedures as dictated by the relevant State or Territory authority;*
   c. *Machinery is limited to a safe working load limit of 2,000kg; and*
   d. *All operators of equipment and light machinery must be volunteers and not receiving any payment.*

3. **Are Auscycling members who volunteer their time covered for public liability and personal accident while participating in official club and trail care organisations trail building and maintenance activities?**
Auscycling members who volunteer their time for trail building and maintenance activities are covered by the Public Liability and Personal Accident policies.

4. **Are non-Auscycling members who volunteer their time covered for public liability and personal accident while participating in official club and trail care organisations trail building and maintenance activities?**
Non-Auscycling members who are volunteering their time to assist with official club trail building and maintenance activities are covered by Public Liability and Personal Accident policies.

5. **Clubs and trail care organisations that build and maintain trails, skills parks and other infrastructure associated with mountain biking are they covered against public liability claims from both Auscycling members and the general public (non members) regardless of whether use is during a club activity or not?**
Clubs that build and maintain trails, skills parks and other infrastructure associated with mountain biking are covered for claims under Public Liability from members and third parties where they are legally liable and negligent for the third party personal injury or property damage.

6. Are clubs and trail care organisations that have some form of tenure agreement with a landowner for access to public or private land for mountain bike facilities covered for public liability claims from anyone (Auscycling member and non member) that uses the facility regardless of whether the activity is an official club activity or not?

Clubs and trail care organisations are covered for Public Liability for injuries that Auscycling and its affiliated clubs are legally liable or negligent for, subject to the terms and conditions of the tenure agreement.

ENQUIRIES

For all enquiries please contact:

V-Insurance Group
www.vinsurancegroup.com
Address: Level 25, Angel Place
123 Pitt Street, Sydney, NSW, 2000
Phone: (02) 8599 8660
Toll free: 1300 945 547
Fax: (02) 8599 8661
Email: sports@vinsurancegroup.com

LEGAL DETAILS

- V-Insurance Group is an Authorised Representative of Willis Australia (AR # 432898). Willis Australia holds an Australian Financial Service Licence (AFSL #238334)
- Insurance Group ABN is 67 160 126 509

Appendix D – Crater Lakes Trails Quick Reference Guide

Provided in separate doc.