TRAILSCAPES PTY LTD

DRAFT - WESTLEIGH PARK MOUNTAIN BIKE TRAILS ASSESSMENT 2018

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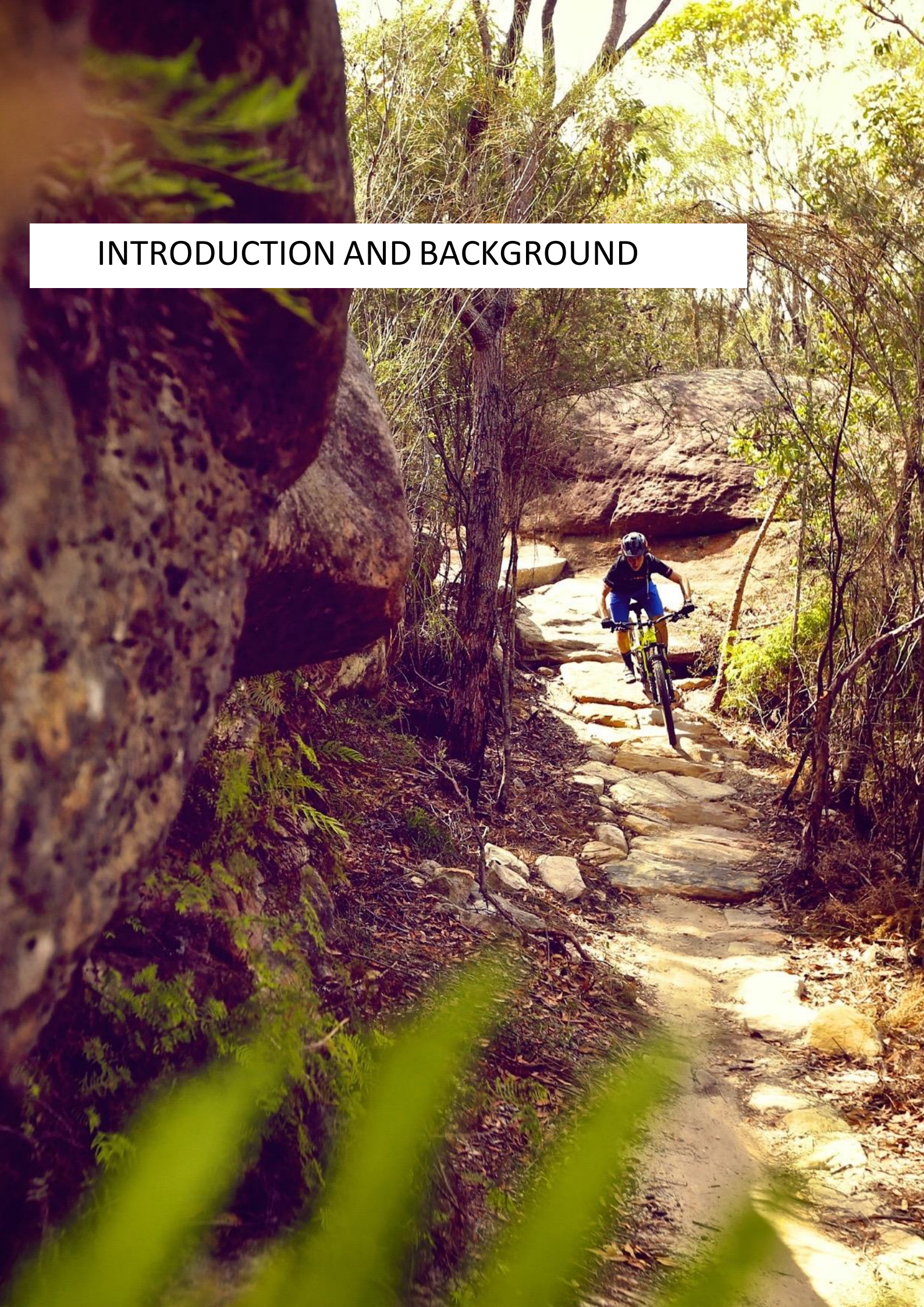
INTRODUCTION AND BACKGROUND



Introduction

TrailScapes conducted a thorough and methodical assessment of the mountain bike trail network in Westleigh Park on the 11th and 12th of July.

The assessment concentrated on the trails within the natural area that would not be directly affected by the adjacent sport fields developments.

The trails were assessed in their current 'promoted' direction of travel and classification as provided by Hornsby Shire Council (HSC). The trails were assessed for compliance against the current International Mountain Bike Association (IMBA) Australia trail classifications and existing, emerging and potential localised trail specific impacts. The trails were also assessed for existing, emerging and potential environmental impacts as defined in the Review of Environmental Factors (REF), Westleigh Natural Areas, December 2017 and other existing and potential impacts observed.

Background Context

An informal mountain bike trail network was historically constructed within the former Sydney Water site at Westleigh. Council purchased the site in 2016 with the main objectives of providing future recreational opportunities and for conservation purposes. The site comprises a mix of large open space areas and bushland with the trail constructed through both the bushland and open space areas. Access to the site is via Warrigal Drive Westleigh.

Council has undertaken various studies of the Westleigh site to identify site opportunities and constraints that will direct future development of facilities on the site. The reports produced include vegetation mapping, existing trail network (including some feature and condition data), hydrology, contamination and a remedial action plan. In brief, the vegetation mapping has identified the presence of certain biodiversity values that have associated legislative requirements; the trail mapping has identified soil degradation issues; and the contamination and remedial action plan has identified the presence of asbestos on the site and proposed certain remedial actions. Only a portion of the informal mountain bike trail network is affected by asbestos, while exposed asbestos is currently managed by monitoring and removal when required, the remediation methodology of underlying asbestos has yet to be confirmed

Hornsby Council is assessing the feasibility of the mountain bike trail network on the site. The feasibility of a preferred trail network will be determined by its long-term sustainability, the extent of environmental impacts and ongoing maintenance issues and requirements. The design and construction standards used to develop the trail will be crucial in its long-term sustainability and the implementation of IMBA design and construction standards should be used as a minimum and are generally supported by Council.

TrailScapes has developed this report to assist Hornsby Shire Council in assessing the feasibility of the trail network.

Consultant Credentials

TrailScapes Pty Ltd is an international trail building and consultancy company based in Adelaide, South Australia. Through our experienced team of professional builders and consultants we provide a comprehensive range of trail related services including:

- Trail feasibility studies
- Trail master planning
- Trail and environmental impact and value assessments
- Trail design
- Trail management and maintenance planning and services
- Trail and environmental training services
- Trail construction and upgrade services.

Kain Gardner and Garry Patterson from TrailScapes worked with Hornsby Shire Council to develop an assessment methodology that would ensure an objective and independent assessment of the trail network.

Lead consultant Kain Gardner (Dip Conservation & Land Mgt.) has over 18 years experience in the trail industry including 12 years with the South Australian Department for Environment and Water (DEW) as State-wide Trails Officer and then Senior Project Manager for Trails and Infrastructure.

Garry Patterson has 26 years experience in the trail industry including 13 years as a professional Trail Designer and Builder. Garry has received worldwide acclaim amongst the trail building community through his innovation in sub-surface drainage technologies, the development of naturalised, low-impact machine built trail construction techniques and the invention of modern trail building tools. A respected trail builder, Garry was a head speaker at the 2014 Mt Buller Australian MTB Summit and also chaired the inaugural meeting of the Master Trail Building Association.

TRAIL ASSESSMENT METHODOLOGY

Trail assessment methodology

- Walk the entire trail network within the Natural Area zone.
- Assess the entire network assuming the current 'promoted' direction of travel
- Assess the entire network against:
    - IMBA Australia trail classifications and core elements
    - Existing and potential environmental impacts as defined in REF and others observed
    - Existing, emerging and potential localised trail impacts
- Waypoint, record and note:
    - Non-compliant sections of trail as per IMBA Au classifications and core elements
    - Existing, emerging and potential environmental impacts as defined in REF and others observed
    - Existing, emerging and potential localised trail impacts
- Provide industry 'best-practice' treatment and management options to address:
    - Non-compliant sections of trail as per IMBA Au classifications and core elements
    - Existing, emerging and potential environmental impacts as defined in REF and others observed
    - Existing, emerging and potential localised trail impacts
    - Contamination issues in line with the Remedial Action Plan (RAP), 62 Quarter Sessions Road, Westleigh, April 2017
- Provide itemised and costed management and treatment options at standard industry rates.
- Provide spatial mapping of findings and a shapefile to enable HSC to use the data as a tool to inform future trail rationalisation and upgrade decisions.
- Provide observations of current use.
- Provide advice and suggestions for value add opportunities and to utilise/recycle some onsite materials
- Provide advice to manage potential future impacts of new visitors associated with sports fields and 'e' bikes.
- Provide an opinion of one of the seven presented selected routes.
- Provide advice on what TrailScapes considers to be a safe, sustainable and enjoyable future trail network (if different from one of seven provided options)

TRAIL ASSESSMENT

General commentary

The Westleigh Park Trails network is in reasonably good condition given the unplanned nature of the trail network, the informal trail construction techniques and the number/type of riders using the network.

The trail network is generally compliant with the HSC provided IMBA trail classifications and general safety requirements.

In its current form the trail network is unsustainable and not 'maintainable'. The appropriate management of water is key to a sustainable trail network. A network that continues to erode and pool water not only contributes to erosion but also edge effects such as trail creep (widening) as riders trample vegetation by riding around erosion gullies, pooling water and deteriorating trail features.

TrailScapes identified 350 individual sites within the Natural Area trail network that are either non-compliant with IMBA classifications, are not sustainable, are dangerous, or are contributing to environmental impacts.

The full list and recommended treatment/management options can be viewed as appendix 3. The costs provided in this table are at individual 'day rates' and do not account for efficiencies gained by carrying out multiple treatments as part of larger trail upgrade project.

The costings provided in the proposal analysis further into the document does apply an efficiency % of combined treatment costs.

Compliance with IMBA Australia Trail Classifications

TrailScapes used the Australian Mountain Bike Trail Difficulty Rating System (TDRS) as a tool to assess the Westleigh Park Trail network. The TDRS was developed by IMBA Australia in 2012 to address of a number of identified needs including:

- 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.

As noted previously, the trail network is generally compliant with the HSC provided IMBA trail classifications and general safety requirements. See the IMBA non-compliance map in appendix 2 for details.

The most important non-compliant feature of the trail network is the absence of a robust and authorised sign and trail marker system that clearly and consistently promotes the TDRS throughout the network.

In this context, a clear and easy to understand and follow, TDRS is critical to:

- Help trail users make informed decisions
- Encourage visitors to use trails that match their skill level

- Manage risk and minimise injuries
- Improve the outdoor experience for a wide variety of visitors
- Aid in the planning of trails and trail systems

As it stands there is no authorised or reliable information available on site for trail users. This absence of important information is contributing to some environmental impacts and putting users at risk. HSC has implemented a good example of communicating a considered TDRS through a sign package at the Hornsby Mountain Bike Trail.

Signage is an important tool for managing risks, although it is not a complete solution by itself. Trails still need to be regularly audited and maintained to ensure they still meet the respective assigned and promoted trail classifications.

Compliance with IMBA Trail Core Elements

IMBA identifies core elements for a sustainable trail which are successfully applied to a range of trail types. The core elements need to be balanced equally in the development a trail and if any one element is over or under emphasised at the expense of the other there could be significant damage to the environment, provide an unsafe or negative experience, or impact financially or practically on trail maintenance. Sustainable trails should have very little impact on the environment; resist erosion through proper design, construction and maintenance and blend with the surrounding area. *Trail Solutions IMBA's Guide to Building Sweet Singletrack* (2004).

Core elements of sustainable trails - An ideal trail will simultaneously incorporate the five sustainable trail principles:

- Maximum Sustainable Grade
- The 10-Percent Average Guideline
- The Half Rule
- Grade Reversals
- Outslope

The publication *Trail Solutions IMBA's Guide to Building Sweet Singletrack* provides more detail into the technical aspects of 'best-practice' trail design, development and construction. https://www.imba.com/resources/trail-building/designing-and-building-sustainable-trails

The Westleigh Park Trail network does not incorporate a balance of the five sustainable trail principles most notably a low number of grade reversals, adequate outslope and conflicts with the half rule. The imbalance of these core elements is contributing to the current and emerging issues identified in the assessment and REF as predicted in the opening statement on IMBA Trail Core Elements. The main contributors to the identified issues is the flatter nature of much of the terrain and that the trail builders have not modified their trail construction techniques to address this challenge.

Planning and building a sustainable trail network on relatively flat terrain is quite challenging especially on erodible sandy soils. The volunteer trail builders have sought to maximise the amount of ridable trail in the available area.

The volunteer trail builders appear to use a quick and relatively easy process to build many of the trails simply by scraping away the organic layers to expose the top soil and start riding! Unfortunately the simple act of organic removal is then compounded by the action of riders using the trails compacting the trail tread and causing a 'cupped' concave lineal trail. As the trail tread is now depressed and cupped, there is no outslope and water has no way to shed off the trail which leads to lineal water erosion as the water gathers speed during rain events. Ideally a trail constructed in flat areas is built using a combination of a raised tread and 'lift and tilt' methods to enable water to shed off the trail tread regularly.

The builders have also sought to maintain speed and flow on the plethora of flat corners by constructing low bermed turns. These have been created by excavating the trail tread and using the mineral earth to build up a berm, often using old fallen timber or standing trees for support. This method has created a series of low points that pool water and create further problems for trail sustainability and edge effects of the trail as rider seek to avoid puddles. This approach of piling soil against tree trunks increases the risk of soil borne infection through the cambium layer of the tree through the soil.

Environmental Impact of the network

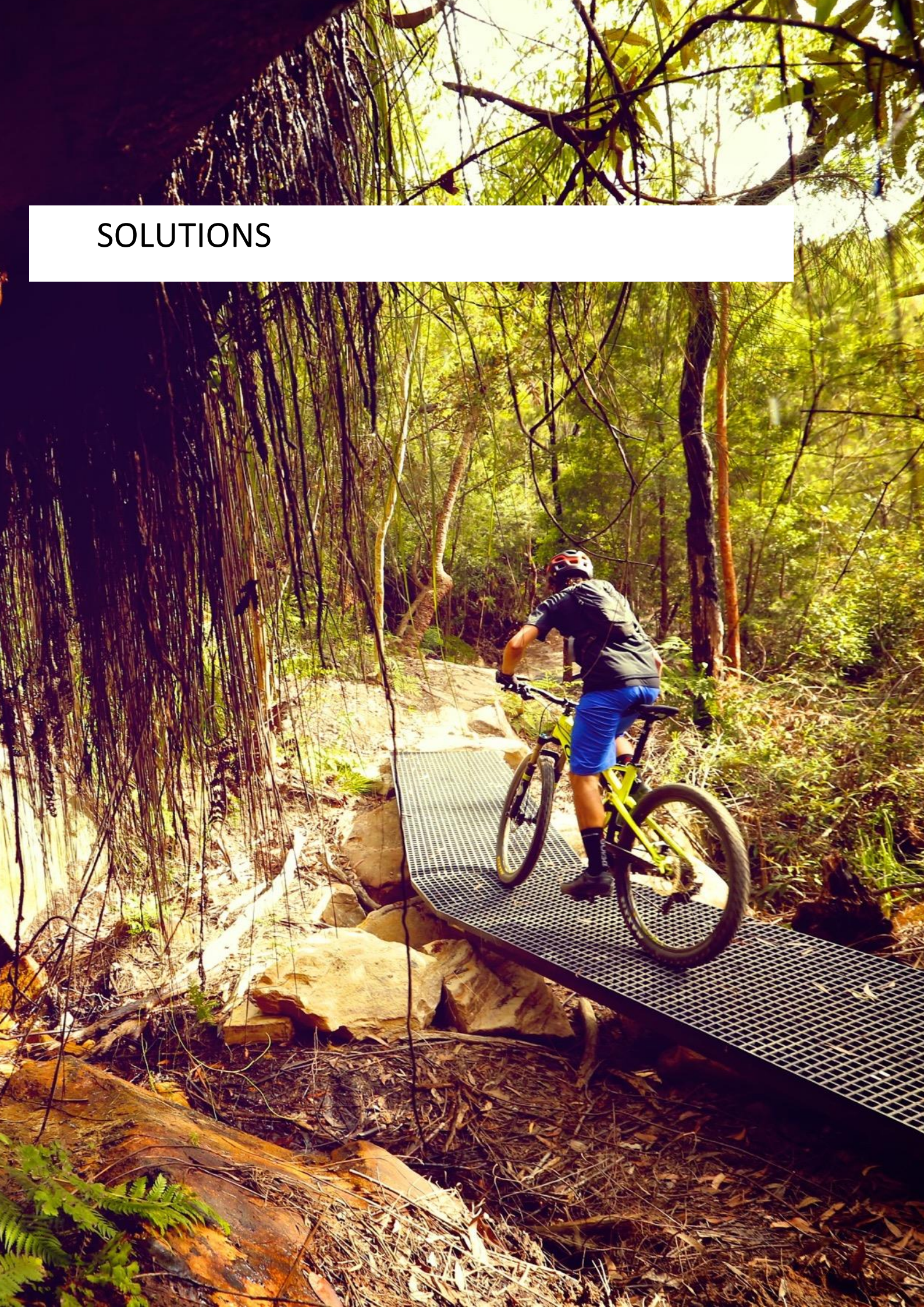
The REF raises several potential environmental concerns and mitigation measures. The most notable being:

- The presence of EPBC and BC listed communities and species
- Topsoil and organic matter removal and displacement
- Soil compaction and increased surface flows
- Fragmentation of vegetation
- Edge effects
- The movement of small and immobile fauna
- Presence of weeds and feral animals
- Land/soil contamination
- Soil borne pathogens

The recommended mitigation measures in the REF are generally supported and have been considered when both assessing the trail network issues and providing associated recommended treatment or management options.

The main impacts in the Westleigh Park Trail network area have already occurred through the clearing of vegetation for trails. If the network was left unmanaged and allowed to evolve through continued unmanaged use, unplanned trail construction and trail creep (as a result of trail deterioration/erosion), it is likely that most of the identified environmental concerns would worsen.

SOLUTIONS



Recommended treatment or management options.

TrailScapes has recommended a series of treatment options to address a range of identified issues (see appendix 3). Whilst an identified trail issue may look or sound similar to others, the actual recommended treatment is trail and site specific. The variety of recommendations aims to build in the required 'balance' of the IMBA core elements for a sustainable trail and have been made in consideration of the following:

- The trail classification and anticipated user experience
- The recommended mitigation measures in the REF and RAP
- The workability of particular products (eg. stone, FRP, clean fill) in a certain area to resolve an identified issue.
- The nature of the surrounding terrain eg. flat, rocky or marshy areas.
- The expectation that user numbers will significantly increase following formalisation and promotion of the network.

Common issues and treatments

Managing erosion

The effective management of water on the trail tread in the southern end of the park is arguably more challenging to manage than in the north due to the flatter terrain. Aside from the instances of 'fall line' (non-compliant with the half-rule) trail alignments throughout the southern end, even the trail constructed along more desirable contours are sitting below the natural lay of the land. Because the trails are not benched into a side slope the usual treatment for managing water drainage by installing nicks does not work. TrailScapes recommends the installation of grade reversals throughout the southern end to enable water to move off the trail tread more regularly. Two types of constructed grade reversals are recommended depending on the trail classification and location on a particular trail. See Appendix 4 for details.

Exposed tree roots on the trail tread is a common issue identified throughout the network. The tree roots are exposed by the action of erosion and can be subject to infection as the bark and cambium layer is worn away by bike tyres and hiking boots.

Trail armouring with Fibreglass Reinforced Plastic (FRP) decking/sheets - There are hundreds of meters of FRP decking treatments recommended throughout the trail network to manage current and emerging erosion forces. The FRP acts as a raised 'boardwalk' and is used maintain a trail height across larger depressions on a route or to traverse exposed roots that are too thick and dense to realistically stone armour around them. See Appendix 4 for details.

Trail armouring with Stone - There are also hundreds of meters of stone trail armouring treatments recommended throughout the trail network to manage current and emerging erosion forces. It is critical that the stone armouring is boxed into the trail tread, well anchored with raised stone and laid as flat as possible to ensure that riders feel comfortable traversing the new sections of stone (particularly on Easy and Intermediate trails). If stone armouring is laid roughly riders tend to try and ride around the treatment, causing trail creep, in search of a smoother ride. See Appendix 4 for details.

Contaminated fill

The RAP confirms that some of the mountain bike features (Jumps and berms) in the network have been built using contaminated materials.

Trail features are an important part of a MTB trail network and offer riders the thrills they seek. Generally, trail planners and builders will look for naturally occurring features to enhance a trail, as they have in the northern area, however in flatter southern area where there are minimal opportunities, they are constructed by any locally available materials. Local volunteers go to great efforts to construct these features adding weight to their importance in a trail network. TrailScapes has recommended the rebuilding of trail features with clean fill or removing the visual contaminants and rebuilding with the original fill if suitable.

The land manager will decide what treatment to initiate and if the complete removal of a contaminated feature is preferred, the contaminated soil would be removed from the trail network and deposited in an agreed area for stockpiling and disposal at the end of the works. The RAP identifies several soil remediation options for consideration by the land manager. Ultimately the contribution of contaminated soil from the trail network is very small in comparison to the larger adjacent fill area. Any stockpiled contaminated soil from the trail network could be added to the scope of work for the 'sports complex' bulk earth works and approved remediation option.

Weeds

The weed problem is spreading from the main central fill site and along the network of drains into the natural area. The trail network does not seem to be contributing to or enabling the spread of weeds. A weed management strategy is required to manage the weed problem in a staged format. This should include regular follow up treatments. In some cases the weeds are acting as natural anchors preventing trail creep. It will be important to ensure the retained network is maintained and contained as the weed eradication program progresses.

Future environmental and trail issues

Stormwater – Stormwater discharge from the future playing fields will need to be managed appropriately. With the increase in hardened areas and sub-surface drainage it is possible that the natural area will experience an increase in stormwater run-off. If some or all stormwater from the playing fields is directed into the natural area rather than the existing stormwater system, the trails that cross over drainage line could be impacted. The proposed TrailScapes treatments on the existing drainage lines are robust enough to manage the current flows and may need to be revised should runoff into the natural area be increased.

Nutrients - If stormwater from the playing fields was to be discharged into the natural areas its likely this would carry a nutrient load from the turf fertilisation regime. This would add to the weed issues and have a negative impact on native vegetation.

Vegetation trampling – Much of the natural area in close proximity to the future playing fields is open woodland with minimal intact middle story vegetation. Whilst the bike riders stay on the trails to maximise the riding experience, some walkers tend to cut straight through and across the vegetative ground covers. It is likely that more children and families will explore the natural areas when the playing fields are completed. The building of bush cubbies and exploration will inevitable increase the extent of ground cover trampling.

TrailScapes recommends the HSC considers installing fencing along the natural area boundary and promoting the trailhead sites and link trails with open 'gates' to better manage the access. It will also be important to install large logs (retained from the clearing of the playing field site) as natural barriers inside 'switchback' turns near these entry/gathering points. These will deter walkers from cutting corners and help protect vegetation.

E-Bikes – TrailScapes observed e-bikes in use during the two day assessment. E-bikes are a good and healthy way for more people to enjoy riding and experience natural areas. The popularity of e-bikes is growing and needs to be acknowledged and catered for by land managers. E-bikes can impact trails that are not designed to, or constructed to accommodate them. The main issues is with uphill corners. An e-bike can approach a corner at more speed (if the rider chooses) than a typical bike. This can put more pressure on a corner than a slower and lighter bike. The recommendations that TrailScapes has proposed on rebuilding corners caters for an increase in e-bike use.

Key considerations and requirements for carrying out the trail upgrade work

- Stone paving/armouring should be sourced from a local landscape supplier with uniform depth to ensure a smoother trail tread.
- HSC should consider the use of helicopter transport to import stone and fill materials in harder to access locations.
- Some central trails marked for closure can be used as the main materials transport corridor between individual work sites. This will cause a noticeable impact during works however be confined to those selected corridors. A thorough closure and rehabilitation program should be initiated as a final stage of works.
- Trail closures of any kind are always controversial. HSC should consider and consult the local MTB trail community to explain the reasons to ensure these are understood and supported.

Trail closure techniques and considerations

There is no 'standard' technique for successful trail closures, rather a range of factors that must be considered:

- Education – The success of most trail closures relies on the education of current or potential users of the trail to be closed. It is important to justify why the trail is being closed and what the alternatives are as part of the closure process. This should be in the form of onsite signs at trail entry points and potentially complimented through local media and stakeholder group information distribution.
- Physical barriers – Robust but non-threatening (no barbed wire) fencing should be considered to reinforce the educational signs. Its worth investing time and resource in quality fencing that does not detract from the surrounds but gives the past/potential user a sense that 'we are serious' and have not just installed some rusty old iron droppers. Fences should start and finish at an existing anchor point or feature. They should be of such a length that it is inconvenient for past/potential users to access the closed trail.
- Water management – Water is often the cause of erosion on trails. Closed trails will continue to erode and cause off trail sedimentation if not adequately managed. It is important that appropriate drains, water bars or silt traps are constructed on closed trails to stop the erosion process. Check for any water that could be funnelling on to the closed trail and ensure this water is permanently diverted from the closed trail.

- Camouflage closed trail – A closed trail will regenerate if traffic and running water can be kept off the alignment. By laying logs, branches and random stones on the trail corridor, the desire from potential users to traverse the closed trail is reduced. They also aid in the retention of leaf litter, seed and other organic materials. The level of effort to spend on covering the trail will vary depending on historical use but as a general rule the effort should exceed what a couple of determined users are capable of removing in a few hours.
- Revegetation – Planting out native species can help accelerate the regeneration of vegetation. Using tree guards to protect seedlings also acts a visual reinforcement that an area is closed to traffic and 'we are actively managing this closure'.

Shared-use trails and signs

Most on-trail conflict develops when information provision and education is inadequate. Sometimes conflict can occur between legitimate users, while on other occasions it may be between the legitimate user group or groups and 'illegal' users. In both cases, information and education are the key tools for trail managers. Enforcement should only be necessary as a last resource.

TrailScapes considers the Easy and Intermediate trail network to be suitable for Shared-use (walking and cycling) as there are adequate sight lines along the trail corridor for users to see each other when approaching and take action as defined in the promoted 'give way rules'. The Advanced trails should remain as cycling only due to the steeper challenging terrain, and less opportunities for users to see and avoid each other safely.

One way trails can help manage conflict however it is impossible to reinforce one way traffic, so it is still important to provide adequate sight lines. It is very important that trail markers are clearly visible from the point of view of the trail user. The dimensions and colours of directional arrows as well as the installation height and frequency of markers should be designed to ensure that trail users are easily able to find their way.

Single-use trails should be clearly signposted as such at all access points. Brochures, maps and media material should also reinforce the message that this is a single-use trail. It is extremely helpful to explain why this is the case eg. user safety etc.

Costed management and treatment options

<u>Recommended treatments</u>
The Issues and Treatments list (appendix 3) is a comprehensive and costed list of trail specific issues and treatments. HSC can use this as a tool to both inform the trails they seek to retain and prepare a scope of work document for trail upgrades.

The costs provided in this table are at individual 'day rates' and do not account for efficiencies gained by carrying out multiple treatments as part of larger trail upgrade project.
The costings provided in the proposal analysis further into the document does apply an efficiency % of combined treatment costs.

<u>Signs and Trail Markers</u>
In addition to the trail treatments a robust and authorised sign and trail marker system is required throughout the network. HSC should develop and deliver a basic sign plan.

Trailhead information should be available at intersections where multiple trails join and at all network entry points. 'You are here' points on the maps reassure people (in particularly new users and tourists) and help them get their bearings and navigate the network safely.

The trailhead signs should include at a minimum:

- Name of network
- Map of network showing coloured trail classifications
- Consider offering and naming a few 'promoted' loops (stacked loops). People can opt for varying length rides depending on available time, fitness or technical ability.
- A combined legend
    - with names of trails or suggested/promoted loops
    - showing the classification of trails and promoted loops
    - clearly showing single or shared-use.
- A clear code of conduct
    - Showing give way rules on shared-use trails
    - A code of practice
    - Any additional warnings
    - Contact info for HSC and the local volunteer group.

A general cost per trailhead sign that includes design, printing, structural materials and installation is @ $1000.

Trail markers should be at every intersection on a network. The trail marker system throughout the network needs to include the designated trail classification and directional information for the trail and/or 'promoted loop'.

100x100mm posts offer the best opportunity to tailor the arrow placements to suit a particular intersection design.

A general cost per trail marker is $100 installed

<u>Fencing</u>

TrailScapes recommends fencing be installed to manage the access to the natural area and to assist with some of the higher profile trail closures. Cost will be subject to the style and length of fencing.

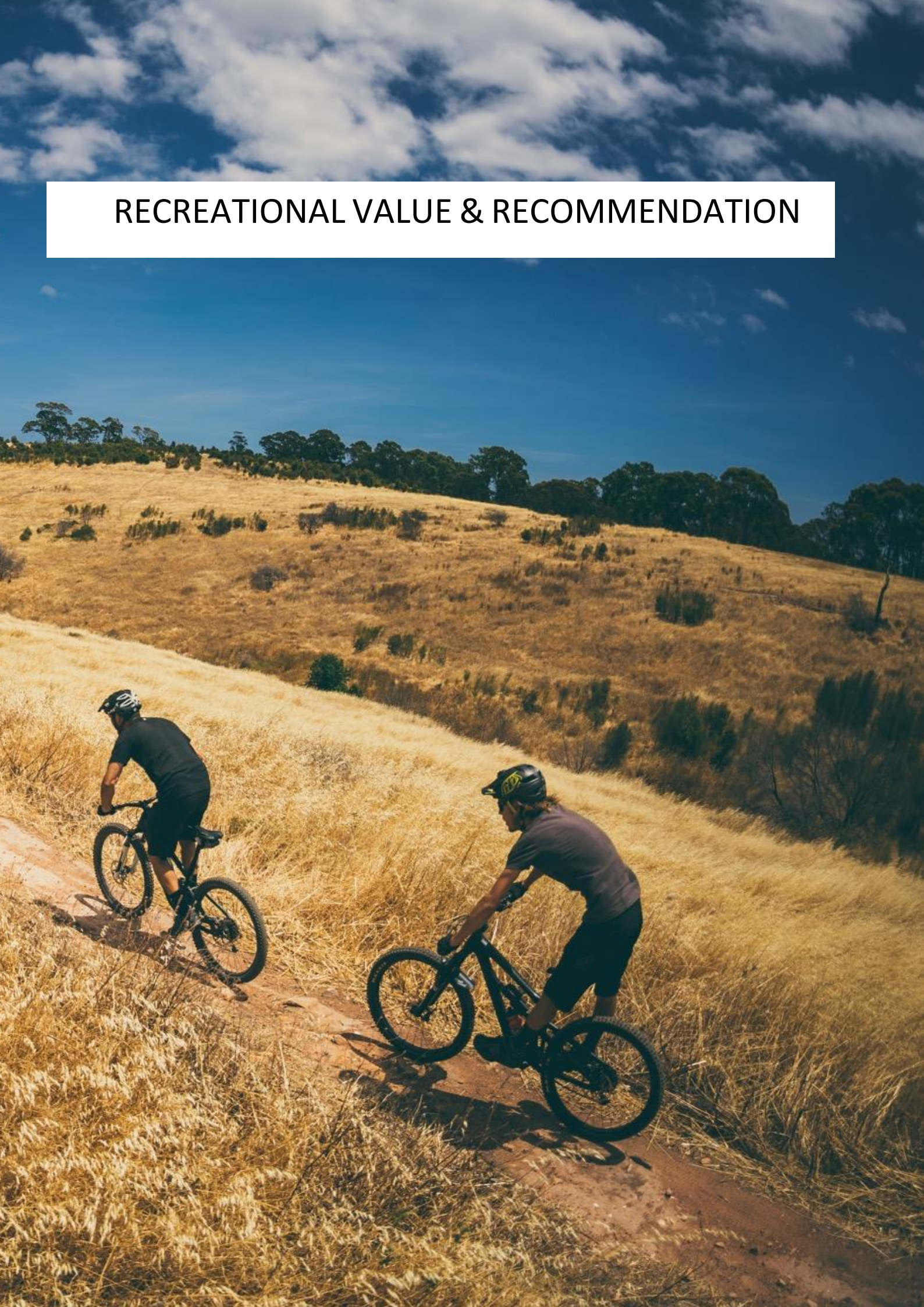
<u>Construction transport corridor rehabilitation</u>

This includes lightly 'ripping' compacted surfaces and installing a series of sediment traps along the length of the old trail corridor. TrailScapes would do this as part of the general upgrade work to rehabilitate the transport corridors. Additional planting of native flora is also recommended.

<u>Final network design and linkages</u>

The approved layout of the sporting complex will inform the exact locations of trailheads and linkages with the complex and other external formalised entry points.

RECREATIONAL VALUE & RECOMMENDATION



Recreational Value

Establishing the scope and scale of a trail network is essential to the new development and ongoing management of trail systems. It ensures that trail systems of the right type and size and are established in the right locations.

The trail significance hierarchy, which was developed by Over the Edge - Destination Development, gives a quantitative justification for identifying the size of a trail network. It states:
'Trail development should, where possible, take place in a strategic way where developments are within the context of trail development and provision as a whole. In order to be strategic, trail development and provision should be within a hierarchy of provision as follows':

National level trail resources

National level trail resources refer to trail networks or products which are of national significance in terms of their scope and scale, economic impacts, importance as recreational and tourism assets and their significance in relation to overall trail provision within the state.

They are trail developments which are of the highest profile and aimed at the largest possible market and intended to be at the peak of trails-based tourism and recreational activity. They can be a primary driver for attracting out of state or overseas visitors and must be of the highest possible value and quality. They must appeal to domestic and overseas trail users and should be stand-alone attractions or destinations in their own rights. With this in mind they must be of sufficient scope and scale to allow for use over a week-long stay as a minimum and be the primary reason for a visitor's visit to the state/country.

Trail resources of national level aimed at off road cyclists should broadly meet the following criteria:

- Trailheads should be not more than 50km from a population centre of regional significance
- They should consist of not less than a total of 100km of trail marked trails
- They should be located not less than 100km from another national level resource aimed at the same user cohort
- Trailheads should be not more than 100km from an airport
- Trailheads should be not more than 20km from a major highway or important transportation node
- Trailheads should be not more than 1km from a surfaced road
- Trailheads should include key visitor services such as orientation, interpretation and trail information, parking, toilets, showers, bike hire and refreshments

Regional level trail resources

Regional level trail resources refers to trail networks or products which are of regional significance and value in terms of their scope and scale, economic impacts, importance as recreational and tourism assets and their significance in relation to overall trail provision within the state.

As stand-alone resources they can be important regional recreational and tourism assets and when combined with other regional scale trail resources they can be seen as national recreation or tourism assets or resources. Primarily though they can be seen as key recreational resources which have significant regional impacts on participation in particular activities and they can be very important in managing the impacts of particular trail activities on land use, landscape and habitats.

Whilst primarily resources for domestic markets and users, regional trail assets can be very important in attracting overseas visitors, particularly when they are combined to form a product of national significance. A good example of this is the Seven Stanes in South Scotland where seven virtually stand-alone day visit or regional mountain bike trail systems have been developed and marketed to create one national level destination of great value and significance.

Regional trails aimed at off road cyclists should broadly meet the following criteria:

- Trailheads should be not more than 30km from a population centre of regional significance
- They should consist of not less than a total of 50km of trail marked trails
- They should be located not less than 50km from another regional level resource aimed at the same user cohort
- Trailheads should be not more than 10km from a major highway or important transportation node
- Trailheads should be not more than 5km from a surfaced road
- Trailheads should include key visitor services such as orientation, interpretation and trail information parking, toilets, bike hire and refreshments in some circumstances

Local trail resources

Local level trails are trail resources which have greatest relevance and impacts in local areas. They are by their very nature closely associated with communities, often in urban or urban fringe settings and can often be very accessible from adjacent communities. Their scope and scale and nature are such that their immediate impacts are as local recreation resources rather than tourism assets. However they can sometimes be considered of regional importance when looked at collectively with other nearby local or regional trail resources.

Local level trails are incredibly important in terms of recreation provision within the state in that they primarily provide trail opportunities that are close to local populations and are often very accessible both in physical terms and in terms of user accessibility. They can be of huge value in terms of fostering and encouraging participation in particular recreational activities and they can also be very important tools in managing the impacts of recreation on land use, landscape, habitats and heritage.

Local trails aimed at off road cyclists should broadly meet the following criteria:

- Trailheads should be not more than 10km from local population centres
- They should consist of not more than a total of 30km of trail marked trails
- They should be located not less than 30km from another local level resource aimed at the same user cohort
- Trailheads should be not more than 5km from a main highway road
- Trailheads should be not more than 1km from a surfaced road
- Trailheads should include basic visitor services such as orientation, interpretation and trail information and parking

Community trail resources

Community trails are resources that are of most significance to local communities as recreational assets. They are trails that are immediately adjacent to communities and which can be very

intensively and regularly used by a wide range of users and which can be of very great value to those communities. They can be of particular value in terms of contributing to health and wellbeing, encouraging physical activity and in allowing people to connect with their local surroundings in positive ways.

As a result of their proximity to where people live, community trails can be subject to very intensive user pressure and the areas where they are located can often be quite sensitive in terms of landscape and habitat value. Community trails can be the most intensively used trail resources and as such need to be sustainable in every sense of the word.

Examples of community trails can be found wherever there are social trail networks available adjacent to communities and where there are prescribed trails in urban and suburban parks. In addition, some user and in particular mountain bikers are very likely to develop unsanctioned trails which can over time become important community recreation resources.

Community trails aimed at off road cyclists should broadly meet the following criteria:

- Trailheads should be accessible by bike from local communities
- They should consist of not more than a total of 20km of trail marked trails
- Trailheads should be not more than 5km from a main road
- Trailheads should be not more than 1km from a surfaced road
- Trailheads can include where appropriate basic visitor services such as orientation, interpretation and trail information and parking.

The Westleigh trail resource

The following table rates the individual attributes of the Westleigh trail resource using the preceding trail significance hierarchy and criteria.

Attribute	Actual metric	Comments	Significance rating
Trailheads accessible by bike from local communities?	300m	Trail network is part of and well used by the local community.	Community
Total distance of marked trails	9km	A minimum of 5km of quality MTB trail is recommended.	Community/Local
Distance from other network for same or similar user group	8km	8km to Old Mans Valley	Community/Local
Trailhead distance from a main/highway road	2.5km		Community/Local
Trailhead distance from a surfaced road	300m		Community/Local
Trailhead visitor services and infrastructure	basic	Trail information, parking etc will be formalised as part of the sporting fields development.	Community/Local

How does Westleigh stack up?

The Westleigh trail resource is ideally located to serve as a genuine community/local trail asset. The trail resource hierarchy only provides maximum amounts of trail for both the community and local networks as 20km and 30km respectively. The Westleigh network in its current form is below these amounts and further trail rationalisation is required to accommodate the sporting field developments and address a range of trail sustainability and environmental issues.

Recommendations

TrailScapes has worked with land managers, MTB clubs and MTB riders all over Australia and South East Asia. TrailScapes recommends that a variety of at least 5km of quality, MTB specific trail is required for the Westleigh Trails to classify as a community/local trail resource. We believe that providing any less than 5km trail will not cater for current or anticipated demand and would lead to illegal riding and trail construction.

Of the Eight trail proposal assessed TrailScapes recommends either Proposal 1B or Proposal 2.

Proposal 1B offers a greater variety and volume of trail compared with Proposal 2 however TrailScapes understands the importance of reducing the potential trail associated impacts in both STIF and Duffy's Forest ecological communities.

Proposal 2 does ultimately minimise the quantity of trail in STIF and Duffy's Forest ecological communities while maintaining a functional and sustainable trail network and still offers a good quality user experience.

ANALYSIS OF ALL PROPOSALS

HSC developed a matrix to provide a quantitative score that is used to compare the seven HSC trail proposals. These scores are considered in association with the qualitative assessment of the following 'Factors for consideration'.

No.	Factor for Consideration	Definition
1	Conservation value	This is an acknowledgement of the legal status of threatened species, populations and ecological communities that occur on the site. The land manager has a legal responsibility to ensure the long-term conservation of protected matters and as such management actions should avoid adverse impacts.
2	Resilience	This is related to the types of vegetation, species and soils that are impacted by the proposals and their ability to repair and recover from these impacts. Can the vegetation communities, flora and fauna species tolerate impacts and recover from the impacts. Look at impacts associated with both construction and during use. In areas where soil erosion occurs the level of resilience has previously been noted as quite low. A general rule indicates vegetation growth form resilience is grassland > heaths > forest understorey > herbaceous understorey. STIF, Duffy's Forest, Peppermint-Angophora Forest and Scribbly Gum Woodland and are likely to be less resilient than Bloodwood Scribbly Gum Woodland.
3	Trail issues	Trail issues have been mapped along the trail network identifying areas of erosion, exposed tree roots, cupping, steep grades and drainage issues and other matters that are likely to require ongoing monitoring and remedial management actions (Appendix E). The presence of these issues is an indicator that the trail may not have been built to an appropriate standard and is considered unsustainable in its current form. Indicators of these issues may include surface, gully and rill erosion and the exposure of tree roots, loose rocks and dust generation. The lack of construction standards also poses risks to users with several trail features using inappropriate materials.
4	Indirect impacts	This will include the dispersal of weeds and pathogens in particular along watercourses and trail edges. An increase in trails adjacent to residences may result in changes to noise levels and amenity for adjoining residents.
5	Recreational Value - Trail length	There are several interrelated factors that contribute to the overall rider experience with trail length being one such factor. There is currently a lack of data on most factors that help define rider experience. It is assumed that there is a likely link between trail length and recreational value and as we have data for trail length it has been used as one of the surrogates for recreational value.
6	Recreational Value - Trail difficulty	One other contributing factor in defining recreational value is the rider skill levels that the trail network caters for. It is considered that providing a variety of trails that cater for a diversity of rider skill levels provides greater recreational value for the trail network.
7	Total area affected	In consideration of the potential for a trail network to fragment and isolate vegetation and habitat we need to review the total length of trail in relation to the footprint of the site. This is a broad consideration of the density of trails with a dense trail network having more adverse environmental impacts than a less dense network.
8	Cumulative impacts	This includes consideration of the future use of the site and how each proposal fits into the overall strategy for its development and use. There is consideration of the varying combination of social, environmental and economic impacts of the proposals.

HSC applied scores to all of the six trail network proposals. TrailScapes has reviewed and revised these scores by applying more rigour to the recreational value factors as per the Hierarchy of Trail Development guidelines. TrailScapes has also revised the scores for other factors assuming that all the recommended trail sustainability treatments and trail closures that apply to the particular proposal are implemented.

Summary of proposals

The following table offers a general summary of all 7 HSC provided proposals as well as the additional TrailScapes proposal 1B (See appendix 6 for copies of all trail network maps). The costings assume all recommended treatments are installed on the trail networks adopted for each proposal. The costings also assume that all other required trail related infrastructure such as signs, link trails, fencing etc. pertaining to that specific proposal are provided and installed. Proposals 1, 1B, 2 non-asbestos and 2 are the only options with any considered merit as potential trail networks. Proposals 3, 4 and 6 are completely inadequate to function as community trail networks, they will not cater for current or anticipated demand and any attempt to offer trail networks to these specifications would lead to illegal riding and trail construction. Proposal 5 is not feasible as it does not address threats to STIF and Duffys Forest nor does it rationalise trails that do not contribute to sound trail network planning.

Proposal	Trail lengths	Summary of proposal	Original score	Revised score	Total Cost estimate GST inc
1	Provides 6.85km Closes 2.51km	• Closes several sections of trail in STIF and Blackwood Scribbly Gum Woodland. • Closes the least amount of trail in Scribbly Gum Open Woodland than all other proposals. • Retains a minimum amount and diversity of trail for a successful 'community' trail network. • Recommends a new south eastern boundary trail. There is already a cleared corridor presumably for fire protection. The purpose of constructing a trail in this corridor is not clear and not supported. • Does not reroute a section of advanced trail in the north away from a prescribed boundary as per proposals 1B, 2 and 3.	230	170	$369 838
1B	Provides 6.92km Closes 2.82km	• Closes several sections of trail in STIF and Blackwood Scribbly Gum Woodland. • Closes more trail in Scribbly Gum Open Woodland than proposal 1 and 5. • Retains the minimum amount and diversity of trail for a successful 'community' trail network. • Reroutes a section of advanced trail in the north away from a prescribed boundary. • Is flexible to suit the future adjacent sporting complex development in regard to providing links and trailheads. • Acknowledges and caters for impacts as a result of new visitors exploring the STIF areas from the sporting complex by providing fencing and gateways to the formalised trail network.	230	170	$351 332

Proposal	Trail lengths	Summary of proposal	Original score	Revised score	Total Cost estimate GST inc
2	Provides 5.67km Closes 3.96km	• Closes more sections of trail in STIF, Duffys Forest and Blackwood Scribbly Gum Woodland than proposals 1, 1B, 2B, 3 and 5. • Provides the minimum amount and diversity of trail for a successful 'community' trail network. • Makes the southern Advanced trail a loop off the intermediate trail and does not link the advanced trail to beginner trail like option 2 non-asbestos. • Reroutes a section of advanced trail in the north away from a prescribed boundary.	210	175	$336 000
2B	Provides 5.3km Closes 4.28km	• Closes more sections of trail in STIF, Duffys Forest and Blackwood Scribbly Gum Woodland than proposals 1, 1B, 3 and 5. • Provides the minimum amount and diversity of trail for a successful 'community' trail network. • Directly links advanced trail to beginner trail which is not recommended and has the potential to contribute to user conflicts between riders of different abilities. • Reroutes a section of advanced trail in the north away from a prescribed boundary.	210	175	$306 064
3	Provides 3.93km Closes 5.67km	• Closes more sections of trail in STIF, Duffys Forest and Blackwood Scribbly Gum Woodland than proposals 1, 1B and 5. • Does not provide the minimum amount and diversity of trail for a successful 'community' trail network. • Removes an entire section of popular advanced trail in the north.	210	190	$262 792
4	Provides 3.80km Closes 8.76km	• Closes more sections of trail in STIF, Duffys Forest and Blackwood Scribbly Gum Woodland than proposals 1, 1B, 2, 3 and 5. • Eliminates nearly all MTB specific trail from the site. • Inadequate to function as community trail networks, it will not cater for current or anticipated demand and any attempt to offer trail networks to these specifications would lead to illegal riding and trail construction. • Recommends a new south eastern boundary trail which in this instance is required to enable a loop of the trail to be completed. • Eliminates the entire advanced trail in the north and south which are popular with riders.	150	190	$200 000

Proposal	Trail lengths	Summary of proposal	Original score	Revised score	Total Cost estimate GST inc
5	Provides 9.36km Closes nil	• This is the entire current network as it exists. • Retains all sections of trail in STIF, Duffys Forest and Blackwood Scribbly Gum Woodland than all proposals. • Fails to rationalise trails that do not contribute to sound trail network planning. • It conflicts with the proposed playing field developments.	230	205	$420 800
6	Provides 4.2km Closes 9.41km	• Closes more sections of trail in STIF, Duffys Forest and Blackwood Scribbly Gum Woodland than proposals 1, 1B, 2, 3 and 5. • Eliminates all MTB specific trail from the site. • Inadequate to function as community trail networks, it will not cater for current or anticipated demand and any attempt to offer trail networks to these specifications would lead to illegal riding and trail construction. • It conflicts with the proposed playing field developments. • Recommends a new south eastern boundary trail which in this instance is required to enable a loop of the trail to be completed.	165	160	$160 000

TrailScapes has provided some more detailed commentary on the revised scores in the tables below.

Proposal 1 – 6.86 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Conservation value	The trail network passes through significant patches of STIF and Duffys Forest which are listed as threatened ecological communities under the NSW BC Act 2016. The trail network also passes through vegetation containing populations of *Darwinia biflora* and *Melaleuca deanei* (listed under Cth EPBC Act, NSW BC Act), *Tetratheca glandulosa* (NSW BC Act) and habitat that supports the Square-tailed Kite (NSW BC Act).	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging impacts to flora and fauna will be reduced. Recommendations that close trails in STIF and Duffys Forest, reduce the trail footprint, manage trail creep, inhibit erosion processes and manage weeds will contribute to the protection of the listed flora and fauna.
Resilience	Impacts are greatest within STIF and Duffy's Forest which have low resilience. Trail sections exhibit signs of soil compaction and erosion which indicates reduced resilience limiting ability to regenerate. The high density of trails will have an influence on the presence and dispersal of fauna species across the site. Many bird species are often intolerant of high levels of disturbance and are noted to be absent when the trail is in use.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging impacts to flora and fauna will be reduced. Recommendations that close trails in STIF and Duffys Forest, reduce the trail footprint, manage trail creep, inhibit erosion processes and manage weeds will contribute to the protection of the listed flora and fauna. By protecting trail edges with strategically installed stone anchors, the soil and vegetation on trail edges will be protected from soil compaction and vegetation will be protected and able to regenerate. The closure and rehabilitation of highly unsustainable sections of trail and some trails in STIF and Duffys Forest will enable regeneration of flora and enable more dispersal of fauna across the site. The act of cycling on a trail is relatively silent exercise. Signs could include messages for riders and walkers to refrain from yelling etc.
Trail issues	The proposal passes along trails that exhibit numerous trail issues.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging impacts to the trail network will be reduced. Recommendations that incorporate IMBA trail core elements to manage erosion, exposed tree roots, cupping, steep grades, drainage etc. will contribute to a safe and sustainable trail network.

Proposal 1 – 6.86 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Indirect impacts	The proposed trail network crosses several drainage lines and areas of waterlogged soils which are common weed dispersal pathways. The presence of waterlogged soils also poses high potential for the dispersal of soil pathogens. While most trails are located within remnant bushland a potential trail on the eastern boundary may increase noise levels for adjacent residents.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging indirect impacts will be reduced. Recommendations that include stone armouring and low FRP decking to traverse drainage lines and waterlogged soils will protect these areas from current trail user impacts and reduce the potential spread of soil borne pathogens. The act of cycling on a trail is relatively silent exercise. Signs could include messages for riders and walkers to refrain from yelling etc. *The new sports complex will provide far greater noise levels to local residents than the trail users.
Recreational Value - Trail length	This proposal provides almost 7km of trail.	The Recreational Value section of the report provides some informed commentary that helps define the link between rider experience and trail length. The proposed trail length is considered a bare minimum for a lower grade 'community' type trail network. The number and type of people using the trails demonstrates that there is a demand for the network and this will grow as the network is formalised, managed and promoted.
Recreational Value - Trail difficulty	The trail network provides specialty trails for a variety of rider skill levels.	The flatter nature of the terrain with predominantly Easy and Intermediate trails is what appeals to the current users groups (including walkers). This network is very different in terrain, style and user groups to the Hornsby MTB Park network. We recommend retaining the current ratio of trail difficulty to satisfy current and future users. The formalised and upgraded network should be promoted as a more 'passive' type trail network. The Advanced trails offer reasonable opportunities for riders to progress their skills and confidence riding a bike.

Proposal 1 – 6.86 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Total area affected	The trail network is considered to have a high ratio of track to area with 6.9km of trail within an area of 0.2km2. While this is a similar density to the Hornsby trail network it is significantly denser than other popular and purpose built trails.	Whilst TrailScapes recommends retaining a higher linear meterage of trail, the upgrade work will reduce the current width of trails and impacts on the trail edge therefore reducing the current actual square meter 'footprint' and reducing the potential for future expansion of that footprint.
Cumulative impacts	Future development of the site is likely to include playing fields and associated car parking and landscaping. The site will also be required to undergo remediation due to the presence of asbestos throughout the site. This trail proposal is unlikely to significantly influence the cumulative impacts across the site; longer trail length will slightly increase total impacts.	Whilst TrailScapes recommends retaining a higher linear meterage of trail, the upgrade work will reduce the current width of trails and impacts on the trail edge therefore reducing the current actual square meter 'footprint' and reducing the potential for future expansion of that footprint. It is important that a trail network and associated trail related infrastructure is provided to help manage the influx of new visitors to the site that are keen to explore the adjacent natural area.
Quantitative score	Original HSC Score - 230	Revised Score - 170
Cost to Implement Proposal	Total cost including preliminaries $369 838	
Proposal summary	• Closes several sections of trail in STIF and Blackwood Scribbly Gum Woodland. • Closes the least amount of trail in Scribbly Gum Open Woodland than all other proposals. • Retains a minimum amount and diversity of trail for a successful 'community' trail network. • Does not reroute a section of advanced trail in the north away from a prescribed boundary as per proposals 1B, 2's and 3.	

TrailScapes Proposal 1B – 6.92 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Conservation value	The trail network passes through significant patches of STIF and Duffys Forest which are listed as threatened ecological communities under the NSW BC Act 2016. The trail network also passes through vegetation containing populations of *Darwinia biflora* and *Melaleuca deanei* (listed under Cth EPBC Act, NSW BC Act), *Tetratheca glandulosa* (NSW BC Act) and habitat that supports the Square-tailed Kite (NSW BC Act).	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging impacts to flora and fauna will be reduced. Recommendations that close trails in STIF and Duffys Forest, reduce the trail footprint, manage trail creep, inhibit erosion processes and manage weeds will contribute to the protection of the listed flora and fauna.
Resilience	Impacts are greatest within STIF and Duffy's Forest which have low resilience. Trail sections exhibit signs of soil compaction and erosion which indicates reduced resilience limiting ability to regenerate. The high density of trails will have an influence on the presence and dispersal of fauna species across the site. Many bird species are often intolerant of high levels of disturbance and are noted to be absent when the trail is in use.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging impacts to flora and fauna will be reduced. Recommendations that close trails in STIF and Duffys Forest, reduce the trail footprint, manage trail creep, inhibit erosion processes and manage weeds will contribute to the protection of the listed flora and fauna. By protecting trail edges with strategically installed stone anchors, the soil and vegetation on trail edges will be protected from soil compaction and vegetation will be protected and able to regenerate. The closure and rehabilitation of highly unsustainable sections of trail and some trails in STIF and Duffys Forest will enable regeneration of flora and enable more dispersal of fauna across the site. The act of cycling on a trail is relatively silent exercise. Signs could include messages for riders and walkers to refrain from yelling etc.
Trail issues	The proposal passes along trails that exhibit numerous trail issues.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging impacts to the trail network will be reduced. Recommendations that incorporate IMBA trail core elements to manage erosion, exposed tree roots, cupping, steep grades, drainage etc. will contribute to a safe and sustainable trail network.

TrailScapes Proposal 1B – 6.92 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Indirect impacts	The proposed trail network crosses several drainage lines and areas of waterlogged soils which are common weed dispersal pathways. The presence of waterlogged soils also poses high potential for the dispersal of soil pathogens. While most trails are located within remnant bushland a potential trail on the eastern boundary may increase noise levels for adjacent residents.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging indirect impacts will be reduced. Recommendations that include stone armouring and low FRP decking to traverse drainage lines and waterlogged soils will protect these areas from current trail user impacts and reduce the potential spread of soil borne pathogens. The act of cycling on a trail is relatively silent exercise. Signs could include messages for riders and walkers to refrain from yelling etc. *The new sports complex will provide far greater noise levels to local residents than the trail users.
Recreational Value - Trail length	This proposal provides almost 7km of trail.	The Recreational Value section of the report provides some informed commentary that helps define the link between rider experience and trail length. The proposed trail length is considered a bare minimum for a lower grade 'community' type trail network. The number and type of people using the trails demonstrates that there is a demand for the network and this will grow as the network is formalised, managed and promoted.
Recreational Value - Trail difficulty	The trail network provides specialty trails for a variety of rider skill levels.	The flatter nature of the terrain with predominantly Easy and Intermediate trails is what appeals to the current users groups (including walkers). This network is very different in terrain, style and user groups to the Hornsby MTB Park network. We recommend retaining the current ratio of trail difficulty to satisfy current and future users. The formalised and upgraded network should be promoted as a more 'passive' type trail network. The Advanced trails offer reasonable opportunities for riders to progress their skills and confidence riding a bike. TrailScapes has reclassified some sections of trail to better suit the network.

TrailScapes Proposal 1B – 6.92 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Total area affected	The trail network is considered to have a high ratio of track to area with 6.3km of trail within an area of 0.2km2. While this is a similar density to the Hornsby trail network it is significantly denser than other popular and purpose built trails.	Whilst TrailScapes recommends retaining a higher linear meterage of trail, the upgrade work will reduce the current width of trails and impacts on the trail edge therefore reducing the current actual square meter 'footprint' and reducing the potential for future expansion of that footprint.
Cumulative impacts	Future development of the site is likely to include playing fields and associated car parking and landscaping. The site will also be required to undergo remediation due to the presence of asbestos throughout the site. This trail proposal is unlikely to significantly influence the cumulative impacts across the site; longer trail length will slightly increase total impacts.	Whilst TrailScapes recommends retaining a higher linear meterage of trail, the upgrade work will reduce the current width of trails and impacts on the trail edge therefore reducing the current actual square meter 'footprint' and reducing the potential for future expansion of that footprint. It is important that a trail network and associated trail related infrastructure is provided to help manage the influx of new visitors to the site that are keen to explore the adjacent natural area.
Quantitative score	Original HSC Score - 230	Revised Score - 170
Cost to Implement Proposal	Total cost including preliminaries $351 332	
Proposal summary	• Closes several sections of trail in STIF and Blackwood Scribbly Gum Woodland. • Closes more trail in Scribbly Gum Open Woodland than proposal 1 and 5. • Retains the minimum amount and diversity of trail for a successful 'community' trail network. • Reroutes a section of advanced trail in the north away from a prescribed boundary. • Is flexible to suit the future adjacent sporting complex development in regard to providing links and trailheads. • Acknowledges and caters for impacts as a result of new visitors exploring the STIF areas from the sporting complex by providing fencing and gateways to the formalised trail network.	

Proposal 2 – 5.67 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Conservation value	The trail network passes through significant patches of STIF and Duffys Forest which are listed as threatened ecological communities under the NSW BC Act 2016. The trail network also passes through vegetation containing populations of *Darwinia biflora* and *Melaleuca deanei* (listed under Cth EPBC Act, NSW BC Act), *Tetratheca glandulosa* (NSW BC Act) and habitat that supports the Square-tailed Kite (NSW BC Act).	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging impacts to flora and fauna will be reduced. Recommendations that close trails, reduce the trail footprint, manage trail creep, inhibit erosion processes and manage weeds will contribute to the protection of the listed flora and fauna.
Resilience	Impacts are greatest within STIF and Duffy's Forest which have low resilience. Trail sections exhibit signs of soil compaction and erosion which indicates reduced resilience limiting ability to regenerate. The high density of trails will have an influence on the presence and dispersal of fauna species across the site. Many bird species are often intolerant of high levels of disturbance and are noted to be absent when the trail is in use.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging impacts to flora and fauna will be reduced. Recommendations that close trails, reduce the trail footprint, manage trail creep, inhibit erosion processes and manage weeds will contribute to the protection of the listed flora and fauna. By protecting trail edges with strategically installed stone anchors, the soil and vegetation on trail edges will be protected from soil compaction and vegetation will be protected and able to regenerate. The closure and rehabilitation of highly unsustainable sections of trail and some trails in STIF and Duffys Forest will enable regeneration of flora and enable more dispersal of fauna across the site. The act of cycling on a trail is relatively silent exercise. Signs could include messages for riders and walkers to refrain from yelling etc.
Trail issues	The proposal passes along trails that exhibit numerous trail issues. The shorter trail length when compared to proposals 1 & 5 will have slightly reduced amount of trail issues.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging impacts to the trail network will be reduced. Recommendations that incorporate IMBA trail core elements to manage erosion, exposed tree roots, cupping, steep grades, drainage etc. will contribute to a safe and sustainable trail network.

Proposal 2 – 5.67 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Indirect impacts	The proposed trail network crosses several drainage lines and areas of waterlogged soils which are common weed dispersal pathways. The presence of waterlogged soils also poses high potential for the dispersal of soil pathogens. While most trails are located within remnant bushland a potential trail on the eastern boundary may increase noise levels for adjacent residents.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging indirect impacts will be reduced. Recommendations that include stone armouring and low FRP decking to traverse drainage lines and waterlogged soils will protect these areas from current trail user impacts and reduce the potential spread of soil borne pathogens. The act of cycling on a trail is relatively silent exercise. Signs could include messages for riders and walkers to refrain from yelling etc. *The new sports complex will provide far greater noise levels to local residents than the trail users.
Recreational Value - Trail length	This proposal provides almost 6km of trail.	The Recreational Value section of the report provides some informed commentary that helps define the link between rider experience and trail length. The proposed trail length is just below the minimum for a lower grade 'community' type trail network. The number and type of people using the trails demonstrates that there is a demand for the network and this will grow as the network is formalised, managed and promoted.
Recreational Value - Trail difficulty	The trail network provides specialty trails for a variety of rider skill levels.	The flatter nature of the terrain with predominantly Easy and Intermediate trails is what appeals to the current users groups (including walkers). This network is very different in terrain, style and user groups to the Hornsby MTB Park network. The proposed ratio of trail difficulty should satisfy most current and future users. The formalised and upgraded network should be promoted as a more 'passive' type trail network. The Advanced trails offer reasonable opportunities for riders to progress their skills and confidence riding a bike.

Proposal 2 – 5.67 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Total area affected	The trail network is considered to have a high ratio of track to area with 6km of trail within an area of 0.2km2. While this is a similar density to the Hornsby trail network it is significantly denser than other popular and purpose built trails.	Whilst TrailScapes recommends retaining a higher linear meterage of trail, the upgrade work will reduce the current width of trails and impacts on the trail edge therefore reducing the current actual square meter 'footprint' and reducing the potential for future expansion of that footprint.
Cumulative impacts	Future development of the site is likely to include playing fields and associated car parking and landscaping. The site will also be required to undergo remediation due to the presence of asbestos throughout the site. This trail proposal is unlikely to significantly influence the cumulative impacts across the site; longer trail length will slightly increase total impacts.	Whilst TrailScapes recommends retaining a higher linear meterage of trail, the upgrade work will reduce the current width of trails and impacts on the trail edge therefore reducing the current actual square meter 'footprint' and reducing the potential for future expansion of that footprint. It is important that a trail network and associated trail related infrastructure is provided to help manage the influx of new visitors to the site that are keen to explore the adjacent natural area.
Quantitative score	Original HSC Score - 210	Revised Score - 175
Cost to Implement Proposal	Total cost including preliminaries $336 000	
Proposal summary	• Closes more sections of trail in STIF, Duffys Forest and Blackwood Scribbly Gum Woodland than proposals 1, 1B, 3 and 5. • Provides the minimum amount and diversity of trail for a successful 'community' trail network. • Makes the southern Advanced trail a loop off the intermediate trail and does not link the advanced trail to beginner trail like option 2 non-asbestos. This will eliminate the chance of trail conflict between the two groups. • Reroutes a section of advanced trail in the north away from a prescribed boundary.	

Proposal 2B – 5.3 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Conservation value	The trail network passes through significant patches of STIF and Duffys Forest which are listed as threatened ecological communities under the NSW BC Act 2016. The trail network also passes through vegetation containing populations of *Darwinia biflora* and *Melaleuca deanei* (listed under Cth EPBC Act, NSW BC Act), *Tetratheca glandulosa* (NSW BC Act) and habitat that supports the Square-tailed Kite (NSW BC Act).	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging impacts to flora and fauna will be reduced. Recommendations that close trails, reduce the trail footprint, manage trail creep, inhibit erosion processes and manage weeds will contribute to the protection of the listed flora and fauna.
Resilience	Impacts are greatest within STIF and Duffy's Forest which have low resilience. Trail sections exhibit signs of soil compaction and erosion which indicates reduced resilience limiting ability to regenerate. The high density of trails will have an influence on the presence and dispersal of fauna species across the site. Many bird species are often intolerant of high levels of disturbance and are noted to be absent when the trail is in use.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging impacts to flora and fauna will be reduced. Recommendations that close trails, reduce the trail footprint, manage trail creep, inhibit erosion processes and manage weeds will contribute to the protection of the listed flora and fauna. By protecting trail edges with strategically installed stone anchors, the soil and vegetation on trail edges will be protected from soil compaction and vegetation will be protected and able to regenerate. The closure and rehabilitation of highly unsustainable sections of trail and some trails in STIF and Duffys Forest will enable regeneration of flora and enable more dispersal of fauna across the site. The act of cycling on a trail is relatively silent exercise. Signs could include messages for riders and walkers to refrain from yelling etc.
Trail issues	The proposal passes along trails that exhibit numerous trail issues. The shorter trail length when compared to proposals 1 & 5 will have slightly reduced amount of trail issues.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging impacts to the trail network will be reduced. Recommendations that incorporate IMBA trail core elements to manage erosion, exposed tree roots, cupping, steep grades, drainage etc. will contribute to a safe and sustainable trail network.

Proposal 2B – 5.3 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Indirect impacts	The proposed trail network crosses several drainage lines and areas of waterlogged soils which are common weed dispersal pathways. The presence of waterlogged soils also poses high potential for the dispersal of soil pathogens. While most trails are located within remnant bushland a potential trail on the eastern boundary may increase noise levels for adjacent residents.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging indirect impacts will be reduced. Recommendations that include stone armouring and low FRP decking to traverse drainage lines and waterlogged soils will protect these areas from current trail user impacts and reduce the potential spread of soil borne pathogens. The act of cycling on a trail is relatively silent exercise. Signs could include messages for riders and walkers to refrain from yelling etc. *The new sports complex will provide far greater noise levels to local residents than the trail users.
Recreational Value - Trail length	This proposal provides almost 6km of trail.	The Recreational Value section of the report provides some informed commentary that helps define the link between rider experience and trail length. The proposed trail length is just below the minimum for a lower grade 'community' type trail network. The number and type of people using the trails demonstrates that there is a demand for the network and this will grow as the network is formalised, managed and promoted.
Recreational Value - Trail difficulty	The trail network provides specialty trails for a variety of rider skill levels.	The flatter nature of the terrain with predominantly Easy and Intermediate trails is what appeals to the current users groups (including walkers). This network is very different in terrain, style and user groups to the Hornsby MTB Park network. The proposed ratio of trail difficulty should satisfy most current and future users. The formalised and upgraded network should be promoted as a more 'passive' type trail network. The Advanced trails offer reasonable opportunities for riders to progress their skills and confidence riding a bike.

Proposal 2B – 5.3 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Total area affected	The trail network is considered to have a high ratio of track to area with 6km of trail within an area of 0.2km2. While this is a similar density to the Hornsby trail network it is significantly denser than other popular and purpose built trails.	Whilst TrailScapes recommends retaining a higher linear meterage of trail, the upgrade work will reduce the current width of trails and impacts on the trail edge therefore reducing the current actual square meter 'footprint' and reducing the potential for future expansion of that footprint.
Cumulative impacts	Future development of the site is likely to include playing fields and associated car parking and landscaping. The site will also be required to undergo remediation due to the presence of asbestos throughout the site. This trail proposal is unlikely to significantly influence the cumulative impacts across the site; longer trail length will slightly increase total impacts.	Whilst TrailScapes recommends retaining a higher linear meterage of trail, the upgrade work will reduce the current width of trails and impacts on the trail edge therefore reducing the current actual square meter 'footprint' and reducing the potential for future expansion of that footprint. It is important that a trail network and associated trail related infrastructure is provided to help manage the influx of new visitors to the site that are keen to explore the adjacent natural area.
Quantitative score	Original HSC Score - 210	Revised Score - 175
Cost to Implement Proposal	Total cost including preliminaries $306 064	
Proposal summary	• Closes more sections of trail in STIF, Duffys Forest and Blackwood Scribbly Gum Woodland than proposals 1, 1B, 3 and 5. • Provides the minimum amount and diversity of trail for a successful 'community' trail network. • Directly links advanced trail to beginner trail which is not recommended and has the potential to contribute to user conflicts between riders of different abilities. • Recommends a new south eastern boundary trail. There is already a cleared corridor presumably for fire protection. The purpose of constructing a trail in this corridor is not clear and not supported. • Reroutes a section of advanced trail in the north away from a prescribed boundary.	

Proposal 3 – 3.93 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Conservation value	The trail network passes through significant patches of STIF and Duffys Forest which are listed as threatened ecological communities under the NSW BC Act 2016. The trail network also passes through vegetation containing populations of *Darwinia biflora* and *Melaleuca deanei* (listed under Cth EPBC Act, NSW BC Act), *Tetratheca glandulosa* (NSW BC Act) and habitat that supports the Square-tailed Kite (NSW BC Act).	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging impacts to flora and fauna will be reduced. Recommendations that close trails, reduce the trail footprint, manage trail creep, inhibit erosion processes and manage weeds will contribute to the protection of the listed flora and fauna.
Resilience	Impacts are greatest within STIF and Duffy's Forest which have low resilience. Trail sections exhibit signs of soil compaction and erosion which indicates reduced resilience limiting ability to regenerate. The high density of trails will have an influence on the presence and dispersal of fauna species across the site. Many bird species are often intolerant of high levels of disturbance and are noted to be absent when the trail is in use.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging impacts to flora and fauna will be reduced. Recommendations that close trails, reduce the trail footprint, manage trail creep, inhibit erosion processes and manage weeds will contribute to the protection of the listed flora and fauna. By protecting trail edges with strategically installed stone anchors, the soil and vegetation on trail edges will be protected from soil compaction and vegetation will be protected and able to regenerate. The closure and rehabilitation of highly unsustainable sections of trail and some trails in STIF and Duffys Forest will enable regeneration of flora and enable more dispersal of fauna across the site. The act of cycling on a trail is relatively silent exercise. Signs could include messages for riders and walkers to refrain from yelling etc.
Trail issues	The proposal passes along trails that exhibit numerous trail issues. The shorter trail length when compared to proposals 1, 2 & 5 will have slightly reduced amount of trail issues.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging impacts to the trail network will be reduced. Recommendations that incorporate IMBA trail core elements to manage erosion, exposed tree roots, cupping, steep grades, drainage etc. will contribute to a safe and sustainable trail network.

Proposal 3 – 3.93 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Indirect impacts	The proposed trail network crosses several drainage lines and areas of waterlogged soils which are common weed dispersal pathways. The presence of waterlogged soils also poses high potential for the dispersal of soil pathogens. While most trails are located within remnant bushland a potential trail on the eastern boundary may increase noise levels for adjacent residents.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging indirect impacts will be reduced. Recommendations that include stone armouring and low FRP decking to traverse drainage lines and waterlogged soils will protect these areas from current trail user impacts and reduce the potential spread of soil borne pathogens. The act of cycling on a trail is relatively silent exercise. Signs could include messages for riders and walkers to refrain from yelling etc. *The new sports complex will provide far greater noise levels to local residents than the trail users.
Recreational Value - Trail length	This proposal has reduced the number of trails through the bushland areas. The proposal still provides over 4km of trail.	The Recreational Value section of the report provides some informed commentary that helps define the link between rider experience and trail length. The proposed trail length below the minimum for a lower grade 'community' type trail network. The number and type of people using the trails demonstrates that there is a demand for the network and this will grow as the network is formalised, managed and promoted.
Recreational Value - Trail difficulty	The trail network provides specialty trails for a variety of rider skill levels.	The flatter nature of the terrain with predominantly Easy and Intermediate trails is what appeals to the current users groups (including walkers). This network is very different in terrain, style and user groups to the Hornsby MTB Park network. The proposed ratio of trail difficulty will not satisfy most current and future users. The formalised and upgraded network should be promoted as a more 'passive' type trail network. The Advanced trails do not offer reasonable opportunities for riders to progress their skills and confidence riding a bike.

Proposal 3 – 3.93 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Total area affected	The trail network is considered to have a high ratio of track to area with 4.4km of trail within an area of 0.2km2. While this is a similar density to the Hornsby trail network it is significantly denser than other popular and purpose built trails.	Whilst TrailScapes recommends retaining a higher linear meterage of trail, the upgrade work will reduce the current width of trails and impacts on the trail edge therefore reducing the current actual square meter 'footprint' and reducing the potential for future expansion of that footprint.
Cumulative impacts	Future development of the site is likely to include playing fields and associated car parking and landscaping. The site will also be required to undergo remediation due to the presence of asbestos throughout the site. This trail proposal is unlikely to significantly influence the cumulative impacts across the site; longer trail length will slightly increase total impacts.	Whilst TrailScapes recommends retaining a higher linear meterage of trail, the upgrade work will reduce the current width of trails and impacts on the trail edge therefore reducing the current actual square meter 'footprint' and reducing the potential for future expansion of that footprint. It is important that a trail network and associated trail related infrastructure is provided to help manage the influx of new visitors to the site that are keen to explore the adjacent natural area.
Quantitative score	Original HSC Score - 210	Revised Score - 190
Cost to Implement Proposal	Total cost including preliminaries $262 792	
Proposal summary	• Closes more sections of trail in STIF, Duffys Forest and Blackwood Scribbly Gum Woodland than proposals 1, 1B and 5. • Does not provide the minimum amount and diversity of trail for a successful 'community' trail network. • Removes an entire section of popular advanced trail in the north.	

Proposal 4 – 3.80 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Conservation value	The trail network passes adjacent to significant patches of STIF and Duffys Forest which are listed as threatened ecological communities under the NSW BC Act 2016. The trail network passes through a population of *Darwinia biflora* (listed under Cth EPBC Act, NSW BC Act), *Epacris purpurascens* (BC Act) and habitat that supports the Square-tailed Kite (NSW BC Act). This proposal has a significantly reduced impact on threatened species and ecological communities compared to the first three proposals.	Agreed, this proposal has a significantly reduced impact on threatened species and ecological communities compared to the first three proposals however this has only been achieved by closing 90+% of the trails.
Resilience	Impacts are limited to the edges of STIF and Duffy's Forest which have low resilience. The greatest impact will be through Bloodwood Scribbly Gum Woodland which is considered as the most resilient vegetation community on the site. There is a reduction in trail sections that exhibit signs of soil compaction and erosion which indicates improved overall resilience and ability to regenerate. There has been a reduction in density of trails and as such impacts on local fauna have been reduced.	Agreed, there is a reduction in trail sections that exhibit signs of soil compaction and erosion which indicates improved overall resilience and ability to regenerate however this has only been achieved by closing 90+% of the trails.
Trail issues	The proposal has a limited length of trail that pass through remnant vegetation. The trail still contains sections that exhibit numerous trail issues primarily associated with erosion. The shorter trail length will require some remediation but associated works and costs will be less than proposals 1, 2 & 5.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging impacts to the trail network will be reduced. Recommendations that incorporate IMBA trail core elements to manage erosion, exposed tree roots, cupping, steep grades, drainage etc. will contribute to a safe and sustainable trail network.

Proposal 4 – 3.80 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Indirect impacts	The proposed trail network crosses several drainage lines and areas of waterlogged soils which are common weed dispersal pathways. The presence of waterlogged soils also poses high potential for the dispersal of soil pathogens. While most trails are located within remnant bushland a potential trail on the eastern boundary may increase noise levels for adjacent residents.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging indirect impacts will be reduced. Recommendations that include stone armouring and low FRP decking to traverse drainage lines and waterlogged soils will protect these areas from current trail user impacts and reduce the potential spread of soil borne pathogens. The act of cycling on a trail is relatively silent exercise. Signs could include messages for riders and walkers to refrain from yelling etc. *The new sports complex will provide far greater noise levels to local residents than the trail users.
Recreational Value - Trail length	This proposal has reduced the number of trails through the bushland areas and focussed on trails on the extremities of the forest. The proposal provides approximately 4km of trail, similar to proposal 3.	The Recreational Value section of the report provides some informed commentary that helps define the link between rider experience and trail length. The proposed trail length is inadequate for a lower grade 'community' type trail network. The number and type of people using the trails demonstrates that there is a demand for the network and this will grow as the network is formalised, managed and promoted. It is imperative the demand is acknowledged and appropriately managed to reduce the likelihood of illegal riding and trail construction if this proposal was adopted.
Recreational Value - Trail difficulty	The trail network provides limited specialty trails however the trail network still caters for a variety of rider skill levels.	The flatter nature of the terrain with predominantly Easy and Intermediate trails is what appeals to the current users groups (including walkers). This network is very different in terrain, style and user groups to the Hornsby MTB Park network. The proposed ratio of trail difficulty will not satisfy current and future users.

Proposal 4 – 3.80 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Total area affected	The trail network is more spread out across the entire site than other proposals with approximately 4km of trail within an area of 0.34km2. While this is a similar density to the Hornsby trail network it is significantly denser than other popular and purpose built trails.	Agreed however this proposal is not a Mountain bike network and therefore will not satisfy most current and future users.
Cumulative impacts	Future development of the site is likely to include playing fields and associated car parking and landscaping. The site will also be required to undergo remediation due to the presence of asbestos throughout the site. This trail proposal is unlikely to significantly influence the cumulative impacts across the site.	Whilst TrailScapes recommends retaining a higher linear meterage of trail, the upgrade work will reduce the current width of trails and impacts on the trail edge therefore reducing the current actual square meter 'footprint' and reducing the potential for future expansion of that footprint. It is important that a trail network and associated trail related infrastructure is provided to help manage the influx of new visitors to the site that are keen to explore the adjacent natural area.
Quantitative score	Original HSC Score - 150	Revised Score - 190
Cost to Implement Proposal	Total cost including preliminaries $200 000	
Proposal summary	• Closes more sections of trail in STIF, Duffys Forest and Blackwood Scribbly Gum Woodland than proposals 1, 1B, 2's, 3 and 5. • Eliminates nearly all MTB specific trail from the site. • Inadequate to function as community trail networks, it will not cater for current or anticipated demand and any attempt to offer trail networks to these specifications would lead to illegal riding and trail construction. • Recommends a new south eastern boundary trail which in this instance is required to enable a loop of the trail to be completed. • Eliminates the entire advanced trail in the north and south which are popular with riders.	

Proposal 5 – 9.36 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Conservation value	The trail network passes through significant patches of STIF and Duffys Forest which are listed as threatened ecological communities under the NSW BC Act 2016. The trail network also passes through vegetation containing populations of *Darwinia biflora* and *Melaleuca deanei* (listed under Cth EPBC Act, NSW BC Act), *Tetratheca glandulosa* and *Epacris purpurascens* (NSW BC Act) and habitat that supports the Square-tailed Kite (NSW BC Act).	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging impacts to flora and fauna will be reduced. Recommendations that close trails, reduce the trail footprint, manage trail creep, inhibit erosion processes and manage weeds will contribute to the protection of the listed flora and fauna.
Resilience	Impacts are limited to the edges of STIF and Duffy's Forest which have low resilience. The greatest impact will be through Bloodwood Scribbly Gum Woodland which is considered as the most resilient vegetation community on the site. There is a reduction in trail sections that exhibit signs of soil compaction and erosion which indicates improved overall resilience and ability to regenerate. There has been a reduction in density of trails and as such impacts on local fauna have been reduced.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging impacts to flora and fauna will be reduced. Recommendations that close trails, reduce the trail footprint, manage trail creep, inhibit erosion processes and manage weeds will contribute to the protection of the listed flora and fauna. By protecting trail edges with strategically installed stone anchors, the soil and vegetation on trail edges will be protected from soil compaction and vegetation will be protected and able to regenerate. The closure and rehabilitation of highly unsustainable sections of trail and some trails in STIF and Duffys Forest will enable regeneration of flora and enable more dispersal of fauna across the site. The act of cycling on a trail is relatively silent exercise. Signs could include messages for riders and walkers to refrain from yelling etc.
Trail issues	The proposal passes along trails that exhibit numerous trail issues, most associated with erosion. Remedial works will be the highest of all proposals.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging impacts to the trail network will be reduced. Recommendations that incorporate IMBA trail core elements to manage erosion, exposed tree roots, cupping, steep grades, drainage etc. will contribute to a safe and sustainable trail network. This proposal does not attempt to rationalise any unsustainable or unnecessary trail.

Proposal 5 – 9.36 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Indirect impacts	The proposed trail network crosses several drainage lines and areas of waterlogged soils which are common weed dispersal pathways. The presence of waterlogged soils also poses high potential for the dispersal of soil pathogens. While most trails are located within remnant bushland a potential trail on the eastern boundary may increase noise levels for adjacent residents.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging indirect impacts will be reduced. Recommendations that include stone armouring and low FRP decking to traverse drainage lines and waterlogged soils will protect these areas from current trail user impacts and reduce the potential spread of soil borne pathogens. The act of cycling on a trail is relatively silent exercise. Signs could include messages for riders and walkers to refrain from yelling etc. *The new sports complex will provide far greater noise levels to local residents than the trail users. This proposal does not attempt to rationalise any unsustainable or unnecessary trail.
Recreational Value - Trail length	This proposal provides over 8km of trail.	The Recreational Value section of the report provides some informed commentary that helps define the link between rider experience and trail length. The proposed trail length is considered a bare minimum for a lower grade 'community' type trail network. The number and type of people using the trails demonstrates that there is a demand for the network and this will grow as the network is formalised, managed and promoted.
Recreational Value - Trail difficulty	The trail network provides the highest amount of specialty trails for a variety of rider skill levels.	The Recreational Value section of the report provides some informed commentary that helps define the link between rider experience and trail length. The proposed trail length is adequate for a lower grade 'community' type trail network. The number and type of people using the trails demonstrates that there is a demand for the network and this will grow as the network is formalised, managed and promoted.

Proposal 5 – 9.36 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Total area affected	The trail network is considered to have a high ratio of track to area with approximately 8.3km of trail within an area of 0.34km2. While this is a similar density to the Hornsby trail network it is significantly denser than other popular and purpose built trails.	The flatter nature of the terrain with predominantly Easy and Intermediate trails is what appeals to the current users groups (including walkers). This network is very different in terrain, style and user groups to the Hornsby MTB Park network. We recommend retaining the current ratio of trail difficulty to satisfy current and future users. The formalised and upgraded network should be promoted as a more 'passive' type trail network. The Advanced trails offer reasonable opportunities for riders to progress their skills and confidence riding a bike. This proposal has several sections of trail that are unnecessary and do not positively contribute to the network.
Cumulative impacts	Future development of the site is likely to include playing fields and associated car parking and landscaping. The site will also be required to undergo remediation due to the presence of asbestos throughout the site. This trail proposal is unlikely to significantly influence the cumulative impacts across the site; longer trail length will slightly increase total impacts.	Whilst TrailScapes recommends retaining a higher linear meterage of trail, the upgrade work will reduce the current width of trails and impacts on the trail edge therefore reducing the current actual square meter 'footprint' and reducing the potential for future expansion of that footprint. It is important that a trail network and associated trail related infrastructure is provided to help manage the influx of new visitors to the site that are keen to explore the adjacent natural area. This proposal directly conflicts with the proposed sporting complex.
Quantitative score	Original HSC Score - 230	Revised Score - 205
Cost to Implement Proposal	Total cost including preliminaries $420 800	
Proposal summary	• This is the entire current network as it exists. • Retains more sections of trail in STIF, Duffys Forest and Blackwood Scribbly Gum Woodland than all proposals. • Fails to rationalise trails that do not contribute to sound trail network planning. • <u>It conflicts with the proposed playing field developments.</u>	

Proposal 6 – 4.2 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Conservation value	The trail network passes adjacent to significant patches of STIF and Duffys Forest which are listed as threatened ecological communities under the NSW BC Act 2016. The trail network passes through a population of *Darwinia biflora* (listed under Cth EPBC Act, NSW BC Act) and habitat that supports the Square-tailed Kite (NSW BC Act). This proposal has a significantly reduced impact on threatened species and ecological communities compared to the previous proposals.	Agreed, this proposal has a significantly reduced impact on threatened species and ecological communities compared to the first three proposals however this has only been achieved by closing all of the trails and replacing them with paths.
Resilience	The greatest impacts are limited to the edges of STIF and Duffy's Forest which have low resilience and edges of Bloodwood Scribbly Gum Woodland which is considered as the most resilient vegetation community on the site. This proposal has the least amount of trail sections that exhibit signs of soil compaction and erosion on the central road which indicates reduced resilience limiting ability to regenerate. There has been a significant reduction in density of trails and as such impacts on local fauna has been minimised.	Agreed, there is a reduction in trail sections that exhibit signs of soil compaction and erosion which indicates improved overall resilience and ability to regenerate however this has only been achieved by closing all of the trails.
Trail issues	The proposal has a limited length of trail utilising existing cleared access roads and easements. The central trail still contains sections that exhibit trail issues primarily associated with erosion. The shorter trail length will require some remediation but associated works and costs will be the least of all proposals.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging impacts to the trail network will be reduced. Recommendations that incorporate IMBA trail core elements to manage erosion, exposed tree roots, cupping, steep grades, drainage etc. will contribute to a safe and sustainable trail network.

Proposal 6 – 4.2 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Indirect impacts	The proposed trail network crosses a drainage line which is a common weed dispersal pathways. The presence of waterlogged soils also poses high potential for the dispersal of soil pathogens. The removal of trails from within remnant bushland focuses activity on the edges of the forest which may increase noise levels for adjacent residents.	By managing, improving and maintaining the trail network as recommended in appendix 2 and discussed in this report, current and emerging indirect impacts will be reduced. Recommendations that include stone armouring and low FRP decking to traverse drainage lines and waterlogged soils will protect these areas from current trail user impacts and reduce the potential spread of soil borne pathogens. The act of cycling on a trail is relatively silent exercise. Signs could include messages for riders and walkers to refrain from yelling etc. *The new sports complex will provide far greater noise levels to local residents than the trail users.
Recreational Value - Trail length	This proposal has reduced the number of trails through the bushland areas and focussed on trails on the extremities of the forest. The proposal provides approximately 2km of trail.	The Recreational Value section of the report provides some informed commentary that helps define the link between rider experience and trail length. The proposed trail length is inadequate for a lower grade 'community' type trail network. The number and type of people using the trails demonstrates that there is a demand for the network and this will grow as the network is formalised, managed and promoted. It is imperative the demand is acknowledged and appropriately managed to reduce the likelihood of illegal riding and trail construction if this proposal was adopted.
Recreational Value - Trail difficulty	The trail network provides the least amount of specialty trails however the trail network still caters for a variety of rider skill levels.	The flatter nature of the terrain with predominantly Easy and Intermediate trails is what appeals to the current users groups (including walkers). This network is very different in terrain, style and user groups to the Hornsby MTB Park network. The proposed ratio of trail difficulty will not satisfy current and future users.

Proposal 6 – 4.2 km of trails		
Specific Factor	**HSC assessment**	**TrailScapes response**
Total area affected	The trail network is more spread out across the entire site than other proposals with approximately 2km of trail within an area of 0.34km2. While this has a slightly less density than the Hornsby trail network it is significantly denser than other popular and purpose built trails.	Agreed however this proposal is not a Mountain bike network and therefore will not satisfy current and future users.
Cumulative impacts	Future development of the site is likely to include playing fields and associated car parking and landscaping. The site will also be required to undergo remediation due to the presence of asbestos throughout the site. While the trail does utilise some of the open spaces it could be incorporated into future designs. This trail proposal is unlikely to significantly influence the cumulative impacts across the site.	Whilst TrailScapes recommends retaining a higher linear meterage of trail, the upgrade work will reduce the current width of trails and impacts on the trail edge therefore reducing the current actual square meter 'footprint' and reducing the potential for future expansion of that footprint. It is important that a trail network and associated trail related infrastructure is provided to help manage the influx of new visitors to the site that are keen to explore the adjacent natural area.
Quantitative score	Original HSC Score - 165	Revised Score - 160
Cost to Implement Proposal	Total cost including preliminaries $160 000	
Proposal summary	• Closes more sections of trail in STIF, Duffys Forest and Blackwood Scribbly Gum Woodland than proposals 1, 1B, 2's, 3 and 5. • Eliminates all MTB specific trail from the site. • Inadequate to function as community trail networks, it will not cater for current or anticipated demand and any attempt to offer trail networks to these specifications would lead to illegal riding and trail construction. • It conflicts with the proposed playing field developments. • Recommends a new south eastern boundary trail which in this instance is required to enable a loop of the trail to be completed.	

Appendix 1

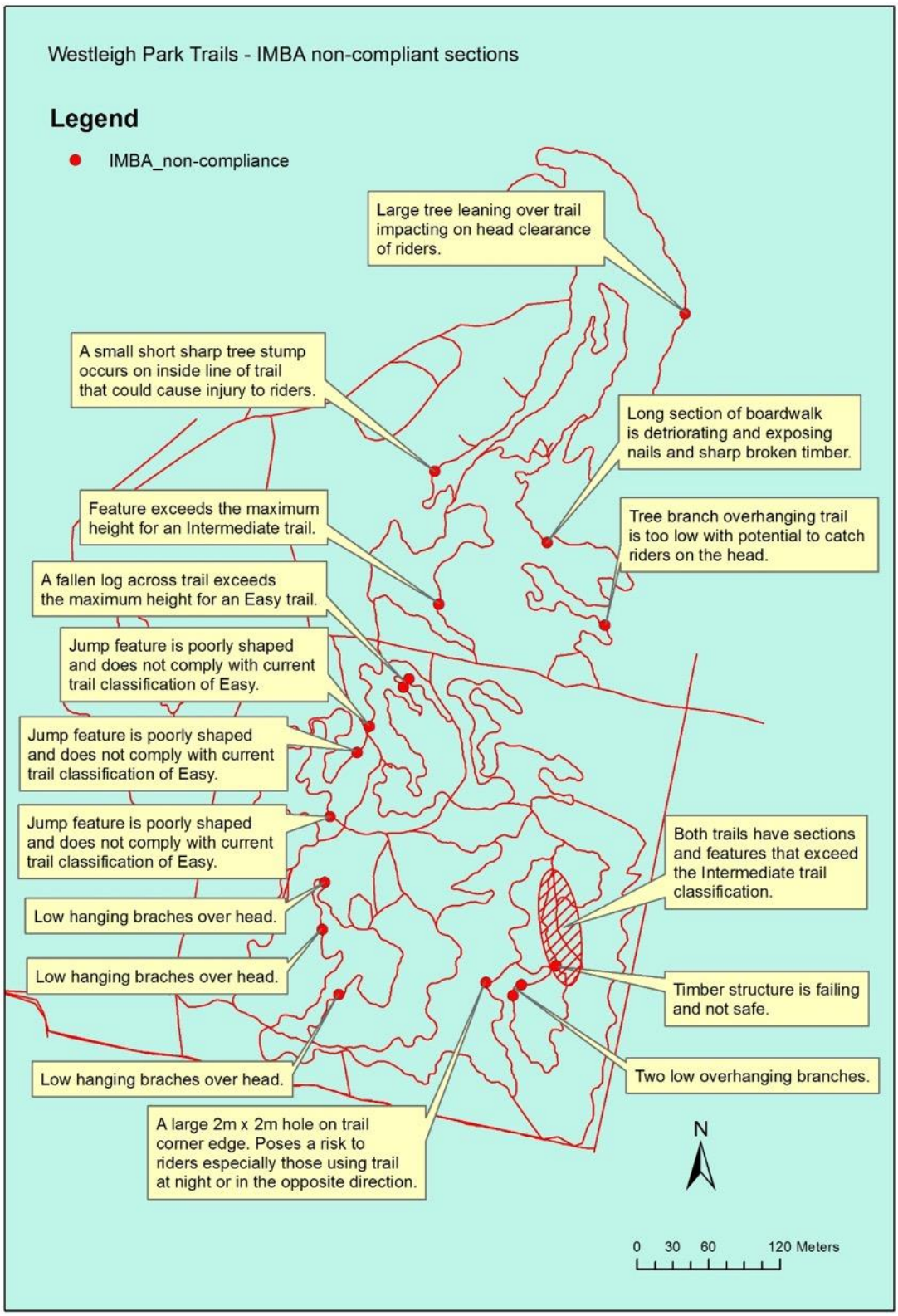
HSC Project deliverables

1. Provide a description of the track assessment methodology
2. Provide a map of the trail network with a summary document of the track audit that identifies sections of trail that:
    a. Currently comply with IMBA standards
    b. Do not comply with IMBA standards and
3. Provide an assessment of selected route option/s as to whether improved trail design (including re-routing) can meet any or all of these objectives:
    a. comply with IMBA standards and be an adequate rider experience
    b. reduce environmental impacts as defined in the REF
    c. ensure consistency with the requirements of the RAP.
4. Provide a summary document outlining the on-going maintenance requirements (eg, asset management plan framework) to ensure the trail network continues to:
    a. comply with IMBA standards
    b. reduce environmental impacts as defined in the REF
    c. ensure consistency with the requirements of the RAP.
5. Provide draft final recommendations.

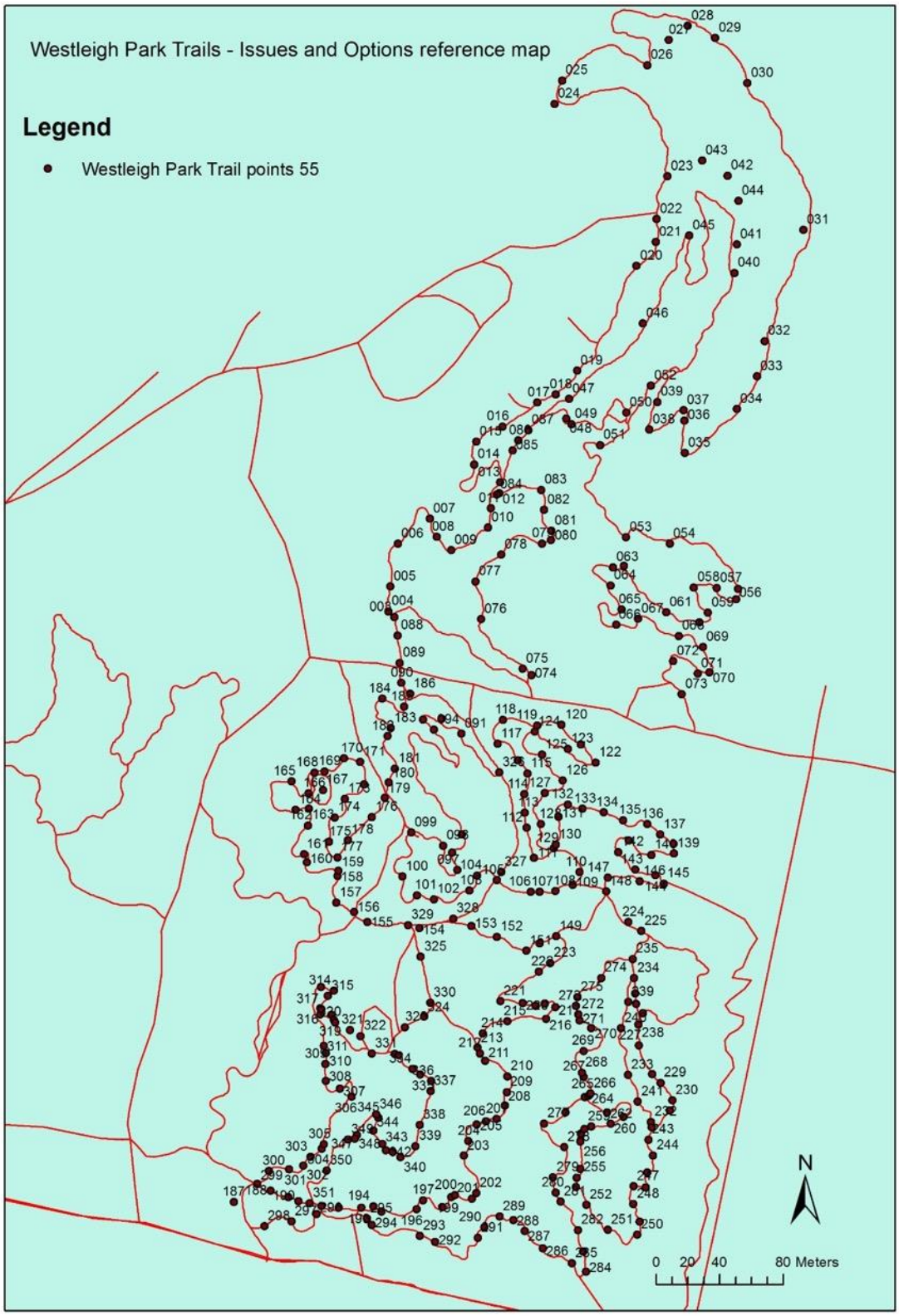
Provisional Items:

6. Provide estimate costs for trail remediation to comply with items 3a, b and c above.
7. Provide estimate costs for annual trail maintenance to comply with items 4a, b and c above.

Appendix 2
IMBA non-compliance locations



Appendix 3 Map of Issues with Treatment option reference points (refer table below)



Appendix 3 – Issues and Treatment Options

The costs provided in this table are at individual 'day rates' and do not account for efficiencies gained by carrying out multiple treatments as part of larger trail upgrade project.

The costings provided in the proposal analysis have applied an efficiency % of combined treatment costs.

Westleigh Park Trail Network - issues and options				
Point ID	ISSUE	Treatment Option	Cost Estimate	Alt. Treatment Option
3	Intersection requires improved definition of trail classifications.	Install trail filter to 'Advanced' route and install anchors to better direct flow of traffic.	1760	
4	Water ponding on trail. Jump and landing is eroding. Trail creep occurring.	Install nick to manage water. Reshape jump and landing. Install trail anchors to restrict trail creep.	880	
5	Eroding trail tread due to heavy braking on entrance to berm. Roots are being exposed as a result.	Install stone armouring to protect tree roots and trail tread. Rebuild second half of berm with 5m in sloped crib wall.	1960	
6	Existing stone armouring is deteriorating.	Extend the armouring by 500mm and secure existing stone.	1760	
7	Eroding trail tread due to heavy braking on entrance to berm.	Reshape exit of berm to enable a steady speed through corner.	880	
8	Cupping of trail tread through minor drainage line holding water.	Install 4m trail armouring to protect trail tread in wet conditions.	2560	
9	Minor drainage issues on approach to corner. Large forked tree trunk acting as berm support is sound but the top ride line is eroding.	Install drainage nicks to direct water to central depression. Install stone edging to top ride line to improve sustainability and rider safety.	1760	
10	Cupping of trail tread through minor drainage line holding water.	Install 2m trail armouring to protect trail tread in wet conditions. Remove small stump.	2160	
11	A section of trail is eroding exposing tree roots.	Install 6m trail armouring to protect tree roots.	2960	
12	A section of trail is eroding exposing tree roots.	Install trail anchors to direct riders around tree roots.	1760	
13	Intersection requires improved definition of trail classifications.	Install trail filter to 'Advanced' route and install anchors to better direct flow of traffic. Will require removal of one sapling.	1760	
14	Climb is eroding.	Install 4m trail armouring to protect trail tread.	2560	
15	A small short sharp tree stump occurs on inside line of trail that could cause injury to riders.	Remove stump with mattock.	440	

16	Trail tread is wearing due to spinning of rear wheels where it meets stone slab armouring.	Install 3 x additional stone slabs on approach to climb. Remove sapling on left of trail.	880	
17	A section of trail is eroding exposing a mat of tree roots that are sitting over a rock shelf.	Install a 4m section of 600mm FRP to protect tree roots.	2360	
18	Trail tread is wearing on exit of rock slab due to tyre and water pressure.	Install 2m of additional stone slab armouring.	1280	
19	Momentum of climb is impeded by location of single trunk dead tree. This is causing some trail creep.	Remove tree and relocate nearby for habitat. Install anchors to define improve trail route.	880	
20	Trail creep issues because descent is not anchored or defined.	Create three small 'drops' in keeping with the trail classification and anchor route.	1760	
21	Alignment of trail directs riders toward a gap in rocks on trail edge causing late braking and trail erosion.	Install a stone trail anchor on low side of trail to direct riders to left of trail earlier.	880	
22	Some trail creep occurring due to poor definition.	Install stone anchors to keep riders on existing stone slab as part of defined trail.	880	
23	Cupped section of trail not allowing water to shed off trail edge will lead to increase in erosion.	Install a single 250mm high rolling grade reversal to shed water from trail. Anchor entrance and exit.	880	
24	Alignment of corner is impeding fluent travel and causing braking related erosion issues.	Rebuild entire corner approx. 20m. Rehabilitate old alignment.	1760	
25	Some trail creep occurring due to poor definition and 'holes' in stone.	Repair and fill gaps in stone armoured alignment to enable a more desirable route and restrict trail creep. Install a stone 'booter' jump for quicker riders.	1760	
26	Minor trail creep.	Install stone anchors to restrict trail creep.	880	
27	Trail reroute required due to boundary issue.	There are multiple options available through a large section of stone terracing. A significant elevation loss is required to match level of trail.	3520	
28	Some trail creep occurring due to poor definition and 'holes' in stone.	Repair and fill gaps in stone armoured alignment to enable a more desirable route and restrict trail creep.	1760	
29	Some trail creep occurring due to poor definition and 'holes' in stone.	Repair and fill gaps in stone armoured alignment to enable a more desirable route and restrict trail creep.	1760	

30	The entrance alignment to the ascent is impeding travel flow. The exposed natural stone slab on alignment is causing issue.	Conduct some stone cutting/chipping to make existing stone slab in corridor more desirable for riders.	880	
31	Large tree leaning over trail impacting on head clearance of riders.	Trim two lowest branches to improve clearance heights.	440	
32	Large exposed tree root on tread.	Install a stone ramp up to and over root to stop bike tyres impacting root further.	880	
33	Large exposed tree root on tread.	Install a stone ramp up to and over root to stop bike tyres impacting root further.	880	
34	Large exposed tree root on tread.	Install a stone ramp up to and over root to stop bike tyres impacting root further.	880	
35	Ride line into corner is impeded by hole in trail tread and tree encroaching trail corridor.	Install a stone slab into hole to enable a better line into corner and avoid rubbing shoulder on tree.	440	
36	Cupping of trail tread on ascent is causing increasing water erosion issues.	Install 4 nicks on section of trail to improve drainage.	880	
37	Climbing turn corner is eroding and exposing tree roots.	Install 10m of stone armoured tread to prevent erosion, protect tree roots and improve traction of tyres.	3760	
38	Corner is poorly aligned causing rider and water related erosion issues.	Install 10m of stone armoured tread to prevent erosion, and improve traction of tyres.	3760	OR - Remove two saplings and realign entire corner to better manage drainage and improve rider flow.
39	Cupping of trail tread is causing increasing water erosion issues.	Install 4 nicks on section of trail to improve drainage.	880	
40	Trail armouring is loose and subject to failure.	Improve existing trail armouring.	880	
41	There is a straight line shortcut of approx. 30m joining two sections of trail. The trail is relatively new and unnecessary.	Close and rehabilitate shortcut using robust site won materials.	880	
42	Large exposed tree root on tread.	Install a stone ramp up to and over root to stop bike tyres impacting root further.	880	
43	Corner berm is supported by rotten timber log.	Remove standing dead sapling to improve the alignment of the corner and eliminate need for berm. Remove rotten timber and flatten berm.	440	

44	Corner is poorly aligned causing rider and water related erosion issues.	Install 6m of stone armoured tread to prevent erosion, and improve traction of tyres.	1960	
45	Corner is cupping causing water related erosion issues.	Install nicks on section of trail to improve drainage.	440	
46	Edge of trail is dropping away caused by tyres eroding off camber section.	Install a stone slab to protect exposed side slope section.	880	
47	Cupping of trail tread preventing effective drainage and causing trail tread to erode.	Install 3m trail armouring to protect trail tread and improve sustainability.	2360	
48	Corner is poorly aligned causing rider and water related erosion issues.	Install 10m of stone armoured tread to prevent erosion, and improve traction of tyres.	3760	
49	Large open section of excessive trail creep. Multiple ride lines to avoid the main ride line rock roll over obstacle.	Install a large stone slab at base of main ride line rock roll over obstacle to enable all riders to safely navigate feature. Install new trail anchors. Close and rehabilitate other areas.	1760	
50	Trail is eroding from water and rider forces following roll over trail feature.	Install 5m of stone armouring to protect trail tread.	2760	
51	Large 50m section of cupped trail. Trail is poorly located and not necessary.	Close and rehabilitate trail.	1760	Install 35m of stone armouring if trail is to be retained in network.
52	Emerging link trail between sections of trail.	Retain for event route options?	880	Close and rehabilitate link.
53	Approximately 70m of timber boardwalk installed by locals to traverse boggy drainage line is in various states of disrepair. Poor condition of boardwalk is causing riders to ride off the boardwalk, creating trail creep and increasing the area of impact.	Replace boardwalk with a low 600mm wide FRP structure. Anchor trail edges and rehabilitate impacted areas.	41300	
54	Exposed sections of tree roots through minor drainage lines.	Install a mix of low FRP and stone armouring over 9m section.	3540	
55	Three small patches of trail cupping due to rider pressure.	Install three short section of stone armouring.	1760	
56	Corner berm is failing and not robust enough to tolerate rider pressures.	Install 5m of stone armouring and anchor trail.	2760	
57	Corner berm is failing and not robust enough to tolerate rider pressures.	Install 6m of stone armouring and anchor trail.	2960	

58	Two sections of trail approaching corner are eroding caused by rider impacts due to restricted flow of trail alignment on corner.	Install two sections of stone trail armouring and move three existing rocks to open flow of trail/corner.	1760	
59	Corner berm is failing and not robust enough to tolerate rider pressures.	Install 8m of stone armouring and anchor trail.	3360	
60	Signs of shortcut emerging between sections of trail.	Close and rehabilitate shortcut using robust site won materials.	880	
61	Large exposed tree root on tread.	Install a stone ramp up to and over root to stop bike tyres impacting root further.	880	
62	Trail cupping and holding water.	Install a nick to assist with drainage.	440	
63	Tree roots are exposed by trail tread erosion.	Install 2m stone armouring to protect exposed tree roots from tyres.	1280	
64	Tree roots are exposed by trail tread erosion.	Install 3m stone armouring to protect exposed tree roots from tyres.	1920	
65	Tree roots are exposed by trail tread erosion.	Install 4m stone armouring to protect exposed tree roots from tyres.	2560	
66	Tree roots are exposed by trail tread erosion.	Install 4m stone armouring to protect exposed tree roots from tyres on step down feature and landing area.	2560	
67	The flow of corner is being impeded by small sapling on trail edge.	Remove sapling and anchor trail edges to improve trail flow.	440	
68	Tree roots are exposed by trail tread erosion and trail creep is occurring on trail edge.	Install 2m stone armouring and anchors to protect exposed tree roots and edge vegetation from tyres.	1280	
69	Tree branch overhanging trail is too low with potential to catch riders on the head.	Cut overhanging branch.	440	
70	Tree roots are exposed by trail tread erosion.	Install 10m stone armouring to protect exposed tree roots from tyres.	3760	
71	An abrupt step is causing erosion due to spinning tyres an trail creep.	Install a stone ramp up the face of the step feature.	440	
72	Tree roots are exposed by trail tread erosion.	Install 10m stone armouring to protect exposed tree roots from tyres.	3760	
73	Existing armouring has three holes from displaced rocks.	Patch up the armouring in three locations.	880	

74	Trail tread is cupping and will continue to catch water and expand.	Install 5m stone armouring to protect trail tread.	2760	
75	Large exposed tree root on tread.	Install a stone ramp up to and over root to stop bike tyres impacting root further.	880	
76	Section exceeds 'Blue - Intermediate' classification due to heights of technical trail features.	Formalise a new ride line to avoid rock drop or...	1760	…or install stone ramp
77	Trail tread is cupping and will continue to catch water and expand.	Install 2m stone armouring to protect trail tread.	1280	
78	Trail tread is cupping and will continue to catch water and expand.	Install 2m stone armouring to protect trail tread.	1280	
79	Old timber not necessary	Remove timber.	440	
80	Tree roots are exposed by trail tread erosion.	Install 3m stone armouring to protect exposed tree roots from tyres.	1920	
81	Timber is being used to support berm and berm is built in depression. Timber will rot and depression will continue to catch and hold water.	Pull soil back into depression and install a 8m berm of FRP.	6520	
82	Trail tread is cupping and will continue to catch water and expand.	Install 8m x 600mm section of low FRP.	6520	
83	Trail tread is cupping and will continue to catch water and expand.	Install 20m stone armouring to protect trail tread.	5760	
84	Tree roots are exposed by trail tread erosion.	Install 3m stone armouring to protect exposed tree roots from tyres.	1920	
85	Trail tread is cupping and will continue to catch water and expand.	Install 10m x 600mm section of low FRP.	7660	
86	Tree roots are exposed by trail tread erosion.	Install 3m x 600mm section of low FRP.	3530	
87	A challenging stone ledge in the trail corridor is causing erosion due to spinning tyres and cascading water. Will continue to get worse and exceed 'Blue - Intermediate' classification.	Install a stone ramp up the face of the step feature.	1760	Install a FRP ramp up the face of the step feature.

88	An old fridge is being used as a support to a jump feature which will degrade over time.	Rebuild jump.	1760	
89	Intersection requires improved definition of trail classifications.	Install trail filter to define classifications and install anchors to better direct flow of traffic.	1760	
90	This straight 20m section of trail linking the 'Green - Easy' loops with the 'Blue - Intermediate' is too wide and encouraging less capable riders to a more difficult trail.	Choke up the corridor by installing a series of stone anchors. See comment 186 too.	1760	
91	Berm is sitting too low and holding water causing trail creep and erosion.	Raise and rebuild berm with stone crib wall.	1760	
92	A fallen log across trail exceeds TDRS for a Green - Easy trail.	Remove log and relocate to block short cuts and for habitat.	880	
93	The footprint of the trail intersection is increasing unnecessary.	Choke up and anchor corner to restrict trail creep.	880	
94	A fallen log across trail exceeds TDRS for a Green - Easy trail.	Remove log and relocate to block short cuts and for habitat.	880	
95	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
96	A minor short-cut is emerging between two sections of trail.	Relocate local logs to block emerging short-cut.	880	
97	A minor short-cut is emerging between two sections of trail.	Relocate local logs to block emerging short-cut.	880	
98	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
99	The footprint of the trail intersection is increasing unnecessary.	Choke up and anchor corner to restrict trail creep.	880	
100	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
101	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	

102	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
103	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
104	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
105	The footprint of the trail intersection is increasing unnecessary.	Redesign and anchor intersection to restrict trail creep and encourage promoted direction of travel.	880	
106	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
107	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
108	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
109	A minor short-cut is emerging between two sections of trail.	Relocate local logs to block emerging short-cut.	880	
110	Entire corner/berm is acting as a catchment dam trapping water as it sheets across area. Higher impact cornering traffic is eroding wet soils and contributing to trail creep.	Raise and rebuild 20m berm with stone crib wall and imported clean quarry rubble	1760	
111	Berm is unsustainable and unnecessary.	Remove berm and reinstate flat corner.	880	
112	Jump feature is poorly shaped.	Rebuild jump to trail classification or…	880	…or remove jump entirely.
113	Jump feature is poorly shaped.	Rebuild jump to trail classification or…	880	…or remove jump entirely.
114	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
115	Jump feature is poorly shaped.	Rebuild jump to trail classification or…	880	…or remove jump entirely.

116	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
117	The shape of corner is restricting good rider flow.	Realign and relocate corner to behind dirt mound.	880	
118	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
119	A minor short-cut is emerging between two sections of trail.	Relocate local logs to block emerging short-cut.	880	
120	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
121	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
122	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
123	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
124	Entire corner/berm is acting as a catchment dam trapping water as it sheets across area. Higher impact cornering traffic is eroding wet soils and contributing to trail creep.	Raise and rebuild 10m berm with stone crib wall and imported clean quarry rubble	1760	
125	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
126	Entire corner/berm is acting as a catchment dam trapping water as it sheets across area. Higher impact cornering traffic is eroding wet soils and contributing to trail creep. Signs of E-Bike type impact.	Raise and rebuild 20m berm with stone crib wall and imported clean quarry rubble	1760	

127	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
128	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
129	A minor short-cut is emerging between two sections of trail.	Relocate local logs to block emerging short-cut.	880	
130	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
131	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
132	Soil built up against tree trunk. Potential for infection through bark.	Rebuild last 3m of berm with stone crib wall to protect tree.	880	
133	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
134	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
135	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
136	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
137	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
138	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	

139	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
140	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
141	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
142	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
143	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread. A minor short-cut is emerging between two sections of trail.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble. Relocate local logs to block emerging short-cut.	1180	
144	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
145	Entire corner/berm is acting as a catchment dam trapping water as it sheets across area. Higher impact cornering traffic is eroding wet soils and contributing to trail creep.	Raise and rebuild 10m berm with stone crib wall and imported clean quarry rubble	1760	
146	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
147	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
148	Intersection requires improved definition of trail classifications.	Install trail filter to define classifications and install anchors to better direct flow of traffic.	1760	
149	Intersection requires improved definition of trail classifications.	Install trail filter to define classifications and install anchors to better direct flow of traffic.	1760	

150	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
151	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
152	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
153	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
154	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
155	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
156	An open impacted gathering spot for riders.	Good location for a trailhead. Install logs for seating and to restrict further spread of impacted area. Install filters to Intermediate/advanced trails. Create a smaller Green - Easy loop by utilising existing corridors.	3520	
157	Jump feature is poorly shaped and does not comply with current trail classification of Green - Easy.	Rebuild jump to trail classification.	880	
158	Jump feature is poorly shaped and does not comply with current trail classification of Green - Easy.	Rebuild jump to trail classification.	880	
159	A minor short-cut is emerging between two sections of trail.	Relocate local logs to block emerging short-cut.	440	
160	Entire corner/berm is acting as a catchment dam trapping water as it sheets across area. Higher impact cornering traffic is eroding wet soils and contributing to trail creep. A minor short-cut is emerging between two sections of trail.	Raise and rebuild 10m berm with stone crib wall and imported clean quarry rubble. Relocate local logs to block emerging short-cut.	1760	

161	Entire corner/berm is acting as a catchment dam trapping water as it sheets across area. Higher impact cornering traffic is eroding wet soils and contributing to trail creep. A minor short-cut is emerging between two sections of trail.	Raise and rebuild 10m berm with stone crib wall and imported clean quarry rubble. Relocate local logs to block emerging short-cut.	1760	
162	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
163	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread. A minor short-cut is emerging between two sections of trail.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble. Relocate local logs to block emerging short-cut.	1180	
164	Roots exposed on trail tread due to erosion.	Install a low 4m section of FRP protect roots from damage.	3240	
165	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
166	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
167	Remnants of an old pump track can be seen of trail. The pump track is no longer being used but could be revived by local users.	Demolish remnant pump track to eliminate temptation to reinstate. Rake back organic matter then fill holes with berm soils. Rake organic matter back over closed track.	1760	
168	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
169	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
170	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	

171	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
172	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
173	A 30m section of trail is unnecessarily wide and impacting trail edge vegetation.	Install stone anchors along trail edge to restrict trail creep.	880	
174	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
175	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
176	Jump feature is poorly shaped and does not comply with current trail classification of Green - Easy.	Rebuild jump to trail classification.	880	
177	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
178	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
179	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread. A minor short-cut is emerging between two sections of trail.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble. Relocate local logs to block emerging short-cut.	1180	
180	Jump feature is poorly shaped and does not comply with current trail classification of Green - Easy. A minor short-cut is emerging between two sections of trail.	Rebuild jump to trail classification. Relocate local logs to block emerging short-cut.	880	
181	Unnecessary bermed corner is contributing to erosion.	Improve alignment by straightening section of trail and removing berm.	880	

182	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
183	Unnecessary bermed corner is contributing to erosion.	Improve alignment by straightening section of trail and removing berm.	880	
184	Unnecessary bermed corner is contributing to erosion.	Improve alignment by straightening section of trail and removing berm.	880	
185	Entire corner/berm is acting as a catchment dam trapping water as it sheets across area. Higher impact cornering traffic is eroding wet soils and contributing to trail creep.	Raise and rebuild 10m berm with stone crib wall and imported clean quarry rubble.	1760	
186	Intersection of trail linking the 'Green - Easy' loops with the 'Blue - Intermediate' requires a redesign as it is directing less capable riders to a more difficult trail.	Install trail filter to define classifications and install anchors to better direct flow of traffic.	1760	
187	An open impacted gathering spot for riders.	Good location for a trailhead. Install logs for seating and to restrict further spread of impacted area. Install filters to Intermediate/advanced trails.	5320	
188	Jump feature is poorly shaped and constructed.	Rebuild jump as a table top type jump with extended landing. Provide clear 'B' line around jump.	880	
189	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
190	Jump feature is poorly shaped and constructed.	Rebuild jump as a table top type jump with extended landing. Provide clear 'B' line around jump.	880	
191	Jump feature is poorly shaped and constructed.	Rebuild jump as a table top type jump with extended landing. Provide clear 'B' line around jump.	880	
192	A wide impacted section of trail has developed along old vehicle access track.	Anchor up section of trail to retain the high line as main trail. Rehabilitate low lying area.	880	
193	Jump feature is poorly shaped and constructed.	Rebuild jump as a table top type jump with extended landing. Provide clear 'B' line around jump.	880	
194	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	

195	Jump at intersection causes confusion for new riders. And right hand corner is on a poor alignment causing skidding and trail creep.	Remove jump to make 'jump return line' more obvious. Remove two dead upright trees on the inside of corner to improve the corner alignment.	880	
196	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
197	Entire corner/berm is acting as a catchment dam trapping water as it sheets across area. Higher impact cornering traffic is eroding wet soils and contributing to trail creep. Soil is built up against tree.	Raise and rebuild 10m berm with stone crib wall and imported clean quarry rubble. Protect tree with stone.	1760	
198	Entire corner/berm is acting as a catchment dam trapping water as it sheets across area. Higher impact cornering traffic is eroding wet soils and contributing to trail creep.	Raise and rebuild 10m berm with stone crib wall and imported clean quarry rubble.	1760	
199	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
200	Entire corner/berm is acting as a catchment dam trapping water as it sheets across area. Higher impact cornering traffic is eroding wet soils and contributing to trail creep.	Raise and rebuild 10m berm with stone crib wall and imported clean quarry rubble.	1760	
201	A minor short-cut is emerging between two sections of trail.	Relocate local logs to block emerging short-cut.	440	
202	Trail tread is cupping and will continue to catch water and expand.	Install 5m stone armouring to protect trail tread.	2760	
203	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
204	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
205	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	

206	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
207	Trail tread is cupping and will continue to catch water and expand.	Install 10m x 600mm section of low FRP.	7660	
208	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
209	Trail tread is cupping and will continue to catch water and expand.	Install 10m x 600mm section of FRP shaped as a bermed corner.	7660	
210	Trail tread is cupping and will continue to catch water and expand.	Install 10m x 600mm section of low FRP.	7660	
211	Trail tread is cupping, exposing tree roots and will continue to catch water and expand.	Install 10m x 600mm section of low FRP.	7660	
212	Two low lying drainage lines are eroding and will continue to degrade.	Install two 3m sections of armouring or…	2960	…or two 3m sections of low FRP decking.
213	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
214	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
215	Existing section of armouring is loose and requires a tidy up.	Tidy up section of stone armouring.	880	
216	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
217	Entire corner/berm is acting as a catchment dam trapping water as it sheets across area. Higher impact cornering traffic is eroding wet soils and contributing to trail creep.	Raise and rebuild 10m berm with stone crib wall and imported clean quarry rubble.	1760	
218	Existing ramp is loose and unsustainable.	Install a more robust stone ramp.	880	
219	Section of trail is depressed and exposing tree roots.	Rebuild crib wall with stone and raise tread to protect roots.	1180	

220	Trail tread is expanding creeping as riders avoid exposed tree roots.	Key in stone armouring around roots and anchor up section to a single line. 6m.	1760	
221	Entrance to corner is too tight for good rider flow and some are cutting corner.	Rebuild entrance to corner 1m out to improve exit flow. Relocate local logs to block emerging short-cut.	1760	
222	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
223	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
224	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
225	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread. Northern Intersection of trail to be closed.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble. Block entrance to trail with site won material.	1180	
226	Southern Intersection of trail to be closed.	Block entrance to trail with site won material. Close and rehabilitate 120m section of trail.	880	
227	Six tree stumps are protruding above trail tread. Trail is creeping as riders navigate around stumps.	Remove six tree stumps. Armour and anchor one ride line with stone. Replace drop roll over with a 1.5m anchored piece of FRP.	2350	
228	Existing deposits of soil are abrupt and eroding.	Reshape lumps of soil to create classification appropriate jump feature.	1760	
229	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
230	Trail tread is cupping and will continue to catch water and expand.	Install 10m x 900mm section of FRP shaped as a bermed corner.	1180	
231	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
232	Old berm made of rubbish.	Remove berm and rubbish.	880	

233	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
234	Fork in trail to two parallel Black - Advanced sections of trail. The multiple options and disrepair of both are causing expanding impacts on the surrounding environment.	Management to decide which line is to be closed and rehabilitated. TrailScapes recommends retaining the eastern line and closing the western line. Issue identification and treatment options are still provided to assist in decision.	3520	
235	Intersection requires improved definition of trail classifications.	Install trail filter to define classifications and install anchors to better direct flow of traffic.	1760	
236	Section of trail is eroding due to dragging of rear wheel.	Install stone armouring to protect trail.	1760	
237	Rock drop matches Black - advanced classification but is daunting due to slope of land causing riders to baulk and ride around a rollable feature.	Install an anchored 1.5m FRP ramp on low side of rock and close/rehabilitate alternative lines around the feature.	2350	
238	Section of trail is eroding due to dragging of rear wheel.	Install 10m of anchored stone armouring to protect trail.	3760	
239	Trail creep is occurring as riders avoid roots exposed by erosion.	Choke up whole section with stone anchors and make one single ride line.	1760	
240	Several holes are developing in the 'rock garden' making riding very difficult.	Repair stone armouring by filling holes for 15m section.	980	
241	A timber bridge has been installed to traverse a large ditch. Timber structure is failing.	Replace timber structure with n FRP bridge 6m or…	5300	…or divert trail around the ditch.
242	Southern Intersection of two parallel trails.	Management to decide which line is to be closed and rehabilitated. TrailScapes recommends retaining the eastern line and closing the western line. Issue identification and treatment options are still provided to assist in decision.	1760	
243	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
244	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	

245	Entire corner/berm is acting as a catchment dam trapping water as it sheets across area. Higher impact cornering traffic is eroding wet soils and contributing to trail creep.	Raise and rebuild 10m berm with stone crib wall and imported clean quarry rubble.	1760	
246	Entire corner/berm is acting as a catchment dam trapping water as it sheets across area. Higher impact cornering traffic is eroding wet soils and contributing to trail creep.	Raise and rebuild 10m berm with stone crib wall and imported clean quarry rubble.	1180	
247	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
248	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
249	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
250	Alignment of corner is impeding fluent travel and causing braking related erosion issues.	Move trail and corner behind the tree to improve flow and manage impacts. Rehabilitate old alignment.	880	
251	Unnecessary climbing turn/corner is contributing to erosion.	Close and rehabilitate corner. Install straight line trail on contour. 5m.	880	
252	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
253	Drainage line crossing has been filled in attempt to make a better crossing. Causing damming effect.	Remove blockages from drainage line and install low 3m FRP deck. Close emerging short cut.	3530	
254	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
255	Low lying drainage line holding water.	Stone armour drainage crossing 2m.	1960	
256	Low overhead branch.	Remove tree branch.	440	
257	Low lying drainage line holding water.	Stone armour drainage crossing 4m.	2160	

258	Entire corner/berm is acting as a catchment dam trapping water as it sheets across area. Higher impact cornering traffic is eroding wet soils and contributing to trail creep.	Raise and rebuild 10m berm with stone crib wall and imported clean quarry rubble.		
259	Low overhead branch.	Remove tree branch.	1760	
260	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install 12m of stone armouring to protect trail tread or…	4160	…or install low 600mm x 12m FRP deck.
261	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
262	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
263	Intersection requires improved definition of trail classifications.	Install trail filter to define classifications and install anchors to better direct flow of traffic.	1760	
264	Low lying drainage line holding water.	Stone armour drainage crossing 1.5m.	2060	
265	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
266	Low lying drainage line holding water.	Stone armour drainage crossing 1.5m.	2060	
267	Low lying drainage line holding water.	Stone armour drainage crossing 2m.	2160	
268	Existing drain pipe is clogged with sediment and organic matter.	Clean pipe.	440	
269	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
270	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
271	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	

272	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
273	Section of trail is cupping and eroding.	Install 10m of anchored stone armouring to protect trail.	3760	
274	Trail is widening and straight.	Install stone anchors to choke up the trail and give it some wiggle.	1180	
275	Tree is encroaching on trail corridor inhibiting fluent travel.	Remove tree and use for habitat.	440	
276	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
277	A large 2m x 2m hole on trail corner edge. Poses a risk to riders especially those using trail at night or in the opposite direction.	Move trail 2m away from edge, fence off hole and install natural barriers around hole or…	2760	…or cover hole with FRP sheeting.
278	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
279	Whole section of trail is catching water and eroding due to location and shape.	Eliminate issues by closing and rehabilitating trail and building a new 35m section of trail along contour from point 277.	1760	
280	Drainage line crossing has been filled in attempt to make a better crossing. Causing damming effect.	Remove blockages from drainage line and install low 4m FRP deck.	4120	
281	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
282	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
283	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
284	Whole corner is built on inefficient alignment.	Rebuild corner within the existing clearing then anchor up trail and rehabilitate impacted area.	1760	

285	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
286	Depression holding water.	Install 1m piece of FRP.	678	
287	Corner is depressed, eroding and holding water.	Install a 10m section of FRP as a raised berm or…	7660	… or Close and rehabilitate the corner and construct new 5m straight section of trail.
288	Some stones have been displaced through the natural stone armoured section causing trail creep.	Reinstall and repair stone armouring.	1760	
289	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread. A shortcut is emerging.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble. Close emerging shortcut.	1180	
290	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
291	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
292	Roots are exposed due to erosion of trail tread.	Stone armour around roots to protect roots..	1760	
293	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
294	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
295	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
296	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
297	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	

298	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
299	Intersection requires improved definition of trail classifications.	Install trail filter to define classifications and install anchors to better direct flow of traffic.	1760	
300	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
301	Entire corner/berm is acting as a catchment dam trapping water as it sheets across area. Higher impact cornering traffic is eroding wet soils and contributing to trail creep.	Raise and rebuild 10m berm with stone crib wall and imported clean quarry rubble.	1760	
302	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
303	Jump feature is poorly shaped and constructed.	Rebuild jump as a table top type jump with extended landing.	880	
304	Exposed rubbish in berm tread.	Remove rubbish from berm and recompact tread.	880	
305	Roots are exposed in the tread on corner.	Close line with exposed roots and build new low line.	880	
306	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
307	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
308	Exposed rubbish in berm tread.	Remove rubbish from berm and recompact tread.	880	
309	Stone and brick armouring is failing.	Repair section with stone.	1760	
310	Low hanging braches over head.	Remove branches.	440	
311	Water pooling on trail tread.	Build a low lying drain around dirt mound to manage drainage.	440	
312	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	

313	Exposed rubbish in berm tread.	Remove rubbish from berm and recompact tread.	440	
314	Low hanging braches over head.	Remove branches.	440	
315	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread. Emerging short cut.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble. Close and rehabilitate emerging short cut.	1180	
316	Exposed rubbish in berm tread.	Remove rubbish from berm and recompact tread.	440	
317	Jump feature is poorly shaped and constructed.	Rebuild jump as a table top type jump with extended landing.	880	
318	Entire corner/berm is acting as a catchment dam trapping water as it sheets across area. Higher impact cornering traffic is eroding wet soils and contributing to trail creep.	Raise and rebuild 5m berm with stone crib wall and imported clean quarry rubble.	1760	
319	Riders are cutting across bottom of bermed corner causing trail creep.	Install stone anchors on inside bottom line of corner.	880	
320	Riders are cutting across bottom of bermed corner causing trail creep.	Install stone anchors on inside bottom line of corner.	880	
321	Riders are cutting across bottom of bermed corner causing trail creep.	Install stone anchors on inside bottom line of corner. Rebuild Berm to work as a fork in the trail.	880	
322	Jump feature is poorly shaped and constructed.	Rebuild jump as a table top type jump with extended landing.	880	Close whole section of trail from 322 to 325.
323	Trail is wide and straight leading to trail creep.	Install stone anchors to choke and wiggle the trail. 30m.	880	Close whole section of trail from 322 to 325.
324	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	Close whole section of trail from 322 to 325.
325	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble. Install three of these in a row over 40m. Install stone anchors to choke and wiggle the trail	1180	Close whole section of trail from 322 to 325.
326	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install stone anchors to choke and wiggle the trail.	440	Close whole section of trail from 326 to 328.
327	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install stone anchors to choke and wiggle the trail.	440	Close whole section of trail from 326 to 328.

328	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install stone anchors to choke and wiggle the trail.	440	Close whole section of trail from 326 to 328.
329	Intersection requires improved definition of trail classifications.	Install trail filter to define classifications and install anchors to better direct flow of traffic.	1760	
330	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install stone anchors to choke and wiggle the trail.	440	Close whole section of trail.
331	Jump feature is poorly shaped and constructed.	Rebuild jump as a table top type jump with extended landing.	880	
332	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
333	Entire corner/berm is acting as a catchment dam trapping water as it sheets across area. Higher impact cornering traffic is eroding wet soils and contributing to trail creep.	Raise and rebuild 10m berm with stone crib wall and imported clean quarry rubble.	1760	
334	Entire corner/berm is acting as a catchment dam trapping water as it sheets across area. Higher impact cornering traffic is eroding wet soils and contributing to trail creep.	Raise and rebuild 10m berm with stone crib wall and imported clean quarry rubble.	1760	
335	Jump feature is poorly shaped and constructed.	Rebuild jump as a table top type jump with extended landing.	880	
336	Entire corner/berm is acting as a catchment dam trapping water as it sheets across area. Higher impact cornering traffic is eroding wet soils and contributing to trail creep.	Push old berm into depression to allow water drainage. Raise and rebuild 10m berm with stone crib wall and imported clean quarry rubble.	1760	
337	Opportunity to improve rider experience inline with classification.	Rebuild with a 'step up' style jump.	880	
338	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install 7m section of low FRP.	5890	
339	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	

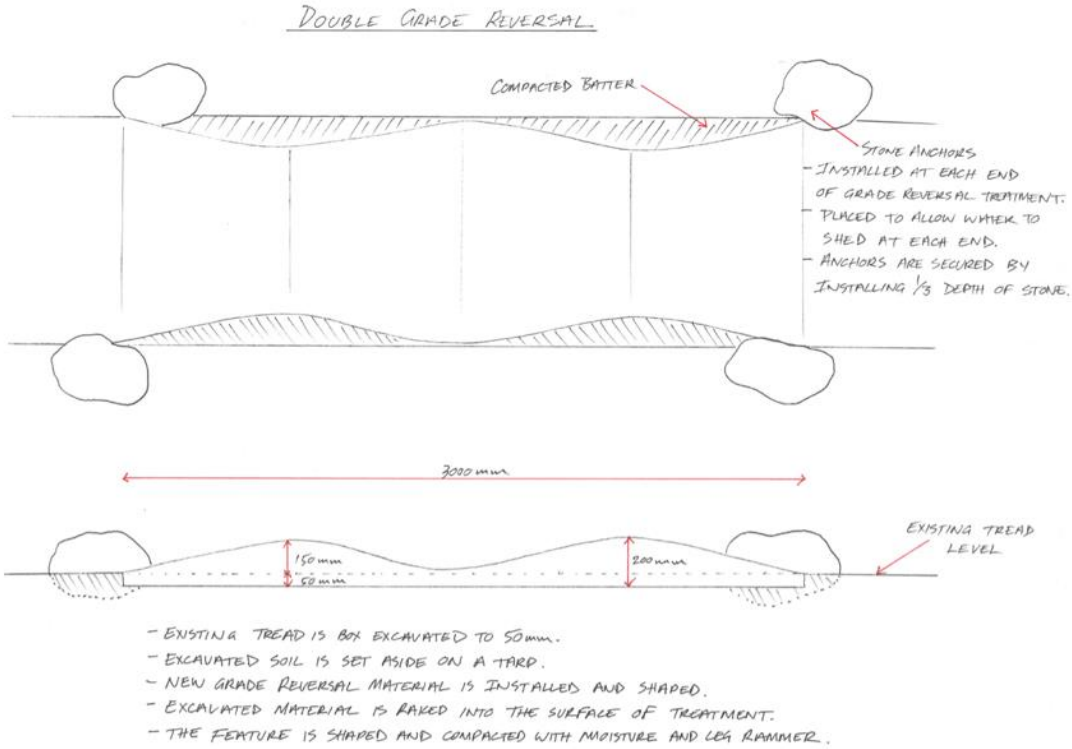
340	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
341	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 3m x 150mm double grade reversal with imported clean quarry rubble.	1180	
342	Old car and engine on trail edge.	Remove and dispose of.	2500	
343	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
344	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
345	Entire corner/berm is acting as a catchment dam trapping water as it sheets across area. Higher impact cornering traffic is eroding wet soils and contributing to trail creep.	Raise and rebuild 10m berm with stone crib wall and imported clean quarry rubble.	1760	
346	Trail creep occurring on bend.	Install stone anchors to keep riders to one line.	880	
347	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
348	Depression holding water.	Install 2m piece of FRP.	2060	
349	Low hanging braches over head.	Remove branches.	440	
350	Continuous section of cupped trail tread holding and channelling water. Causing erosion of trail tread.	Install a 2m x 250mm reinforced mounded grade reversal with stone and imported clean quarry rubble.	1180	
351	Intersection requires improved definition of trail classifications.	Install trail filter to define classifications and install anchors to better direct flow of traffic.	1760	

Appendix 4

Typical treatment details.

a) Double Grade reversal with entry and exit anchors
b) Single Grade reversal with entry and exit anchors
c) Trail armouring example
d) FRP deck example

DOUBLE GRADE REVERSAL



SINGLE GRADE REVERSAL

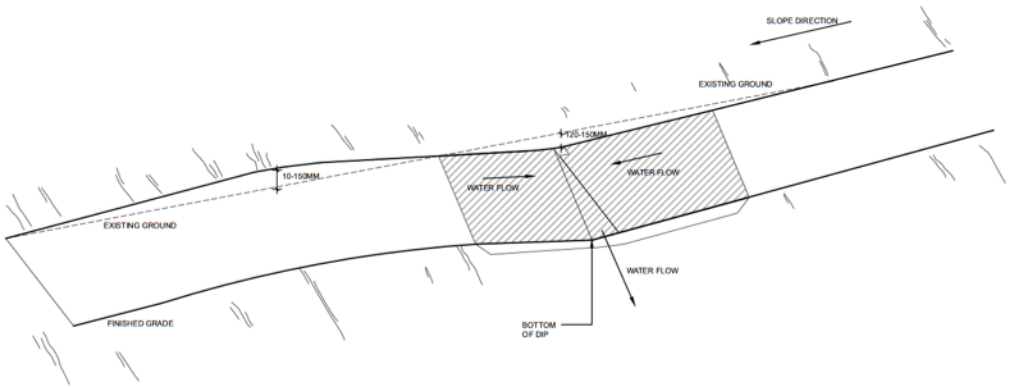
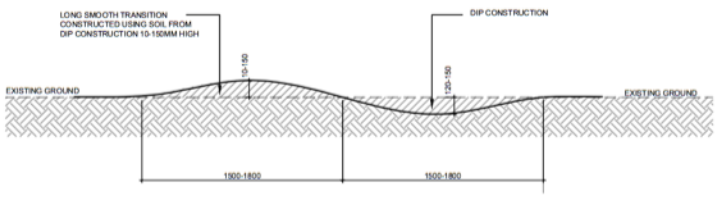


FIGURE 4

GRADE REVERSAL
PERSPECTIVE
SCALE 1:40



TRAIL ARMOURING

FRP DECK EXAMPLE

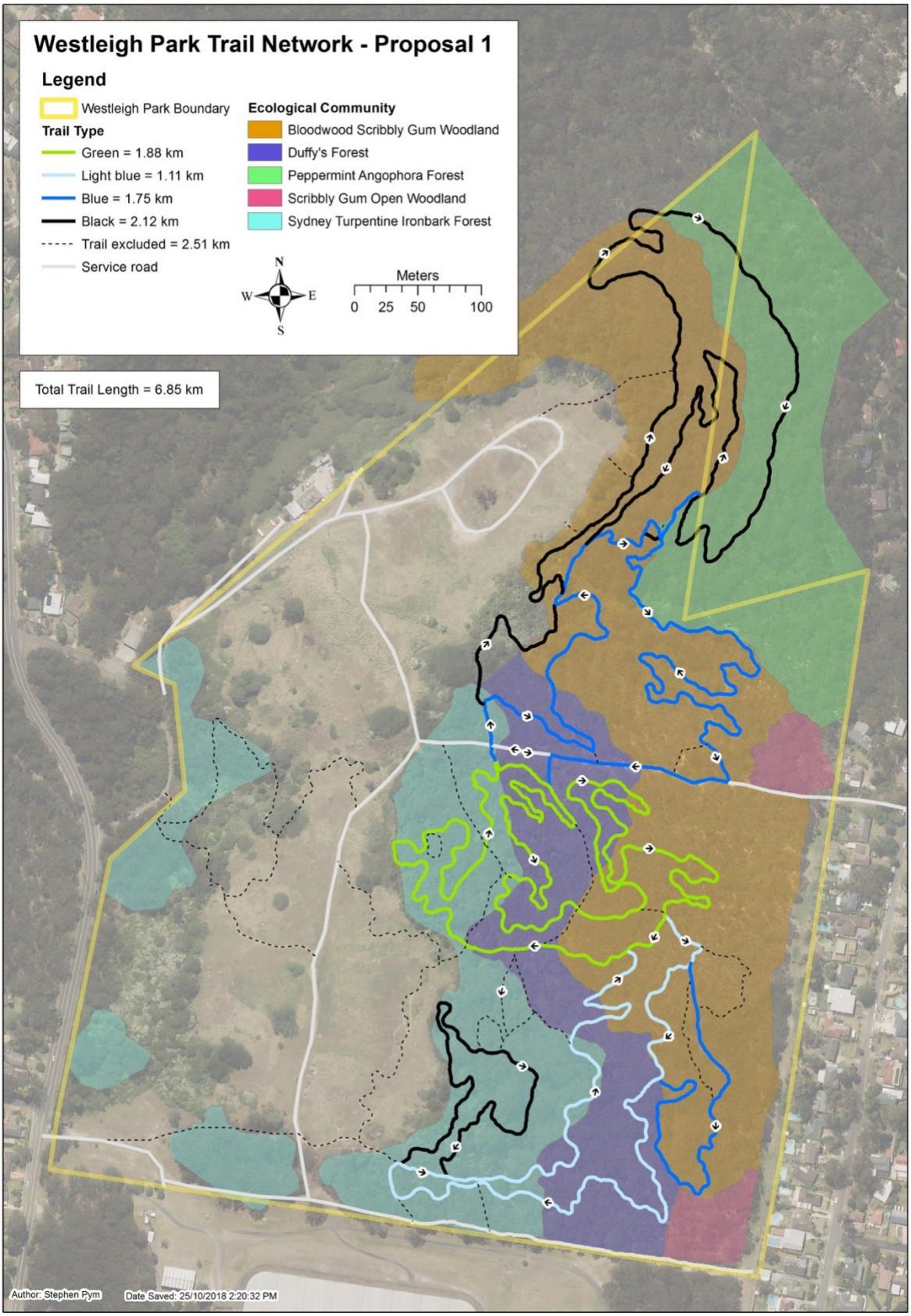
Appendix 5 – Trail Maintenance
Westleigh Park Trail network Maintenance Schedule

This maintenance schedule is a guide and will need to be tailored to suit the final trail network. An annual maintenance budget of up to $10 000 should be set aside to manage auditing and minor upgrades as well as annual programmed maintenance.

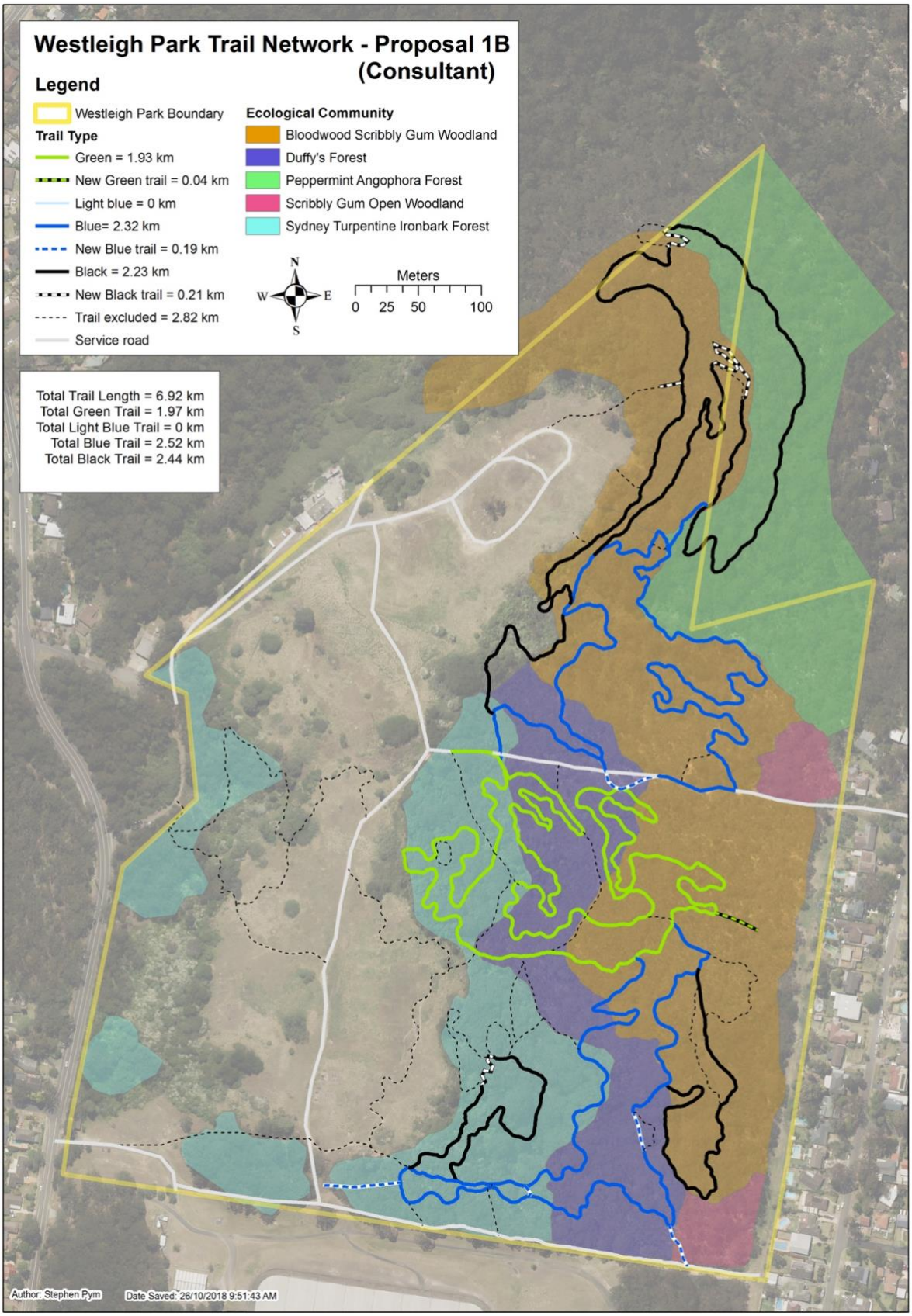
Maintenance Tasks		Details	Frequency	Cost estimate
1	Tread Maintenance Tasks			
	Clean nicks and grade reversals.	Using a long handle shovel and/or fire rake scrape away any debris and sediments trapped in nicks or at base of grade reversals.	Twice a year in early winter and late winter.	24 hours in total.
	Ensure armoured sections are intact and stable.	Reinstate and/or secure any missing/loose rocks in armoured sections of tread.	Once a year.	8 hours in total.
	Reinstate missing/moved anchors	Reinstate and/or secure any missing/moved stone anchors.	Once a year.	8 hours in total.
	Clear drainage and creek crossings.	Using a long handle shovel and/or fire rake scrape away any debris and sediment accumulated in drainage/creek crossings.	Twice a year in early winter and late winter.	8 hours in total.
2	Vegetation Maintenance			
	Weed management.	Continue treating weeds in accordance with the agreed weed management strategy. It is assumed that the volume and extent of work would decrease over time.	Twice a year in early spring and late spring.	TBC (separate contract?)
	Trim/remove encroaching vegetation.	Trim/remove encroaching shrubs that are affecting sight lines of riders or forcing riders off trail.	Once a year in late spring.	8 hours in total.
3	Sign Maintenance			
	Check trailheads	Check trailhead signs for damage, accuracy and vandalism. Remove any graffiti etc.	Work to be programed at same time as other programed work.	1 Hour.
	Check trail markers	Check trailhead signs for damage, accuracy and vandalism. Remove any graffiti etc.	Work to be programed at same time as other programed work.	3 hours.
4	Infrastructure Maintenance			
	Check gates/fencing/stiles	Check that gates, fencing and stiles are functioning as required.	Work to be programed at same time as other programed work.	3 hours.

Maintenance Tasks		Details	Frequency	Cost estimate
	FRP Boardwalks	Check that FRP boardwalks are intact, stable and secure.	Work to be programed at same time as other programed work.	8 hours.
5	Audit and Assessment			
	Audit against Classification	Check that trails comply with the current promoted trail classification.	Twice a year.	4 Hours.
	Trail feature compliance	Check that features still comply with current trail classification. Repair any damages.	Twice a year.	

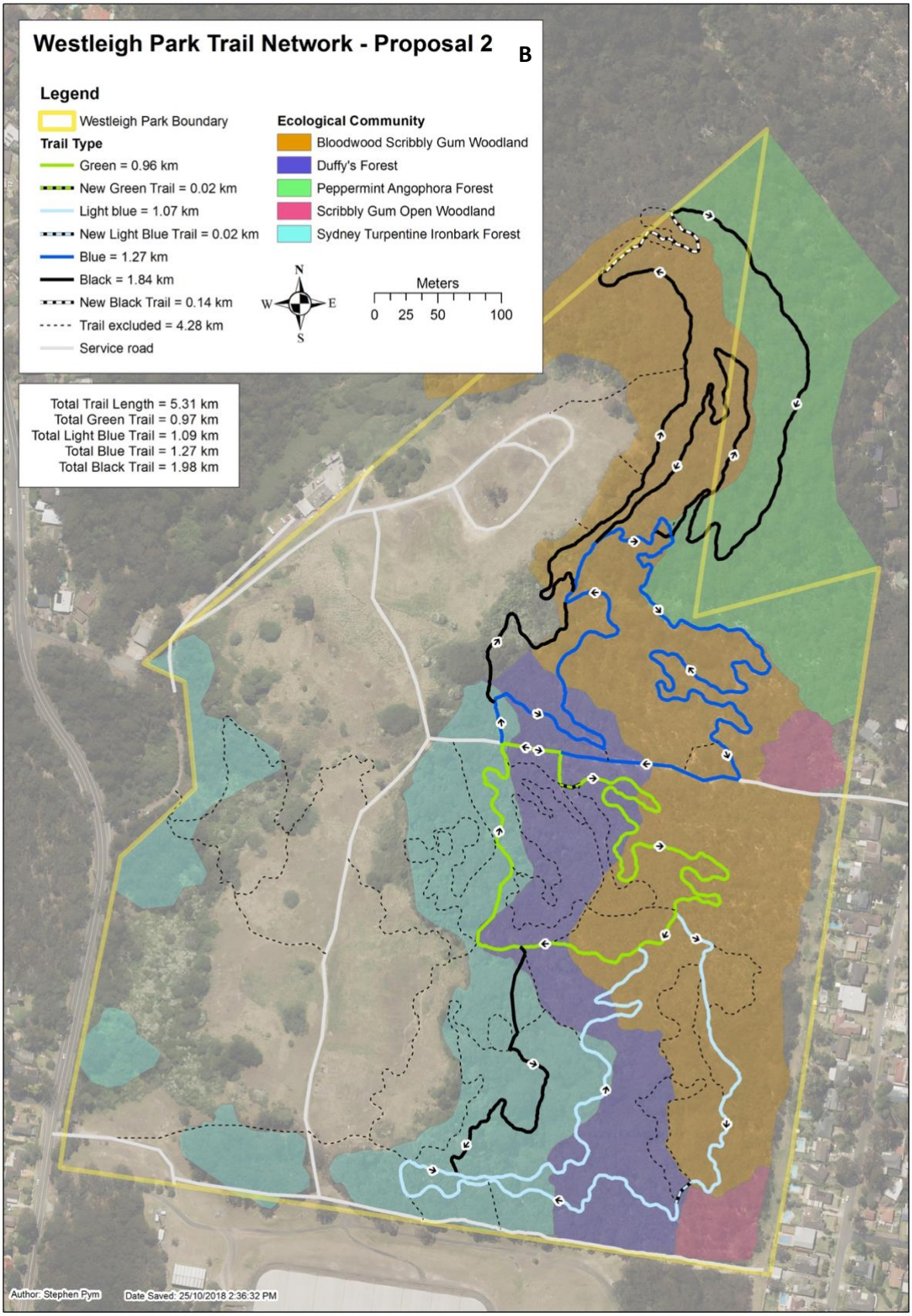
Appendix 6 - Proposal Maps
PROPOSAL 1



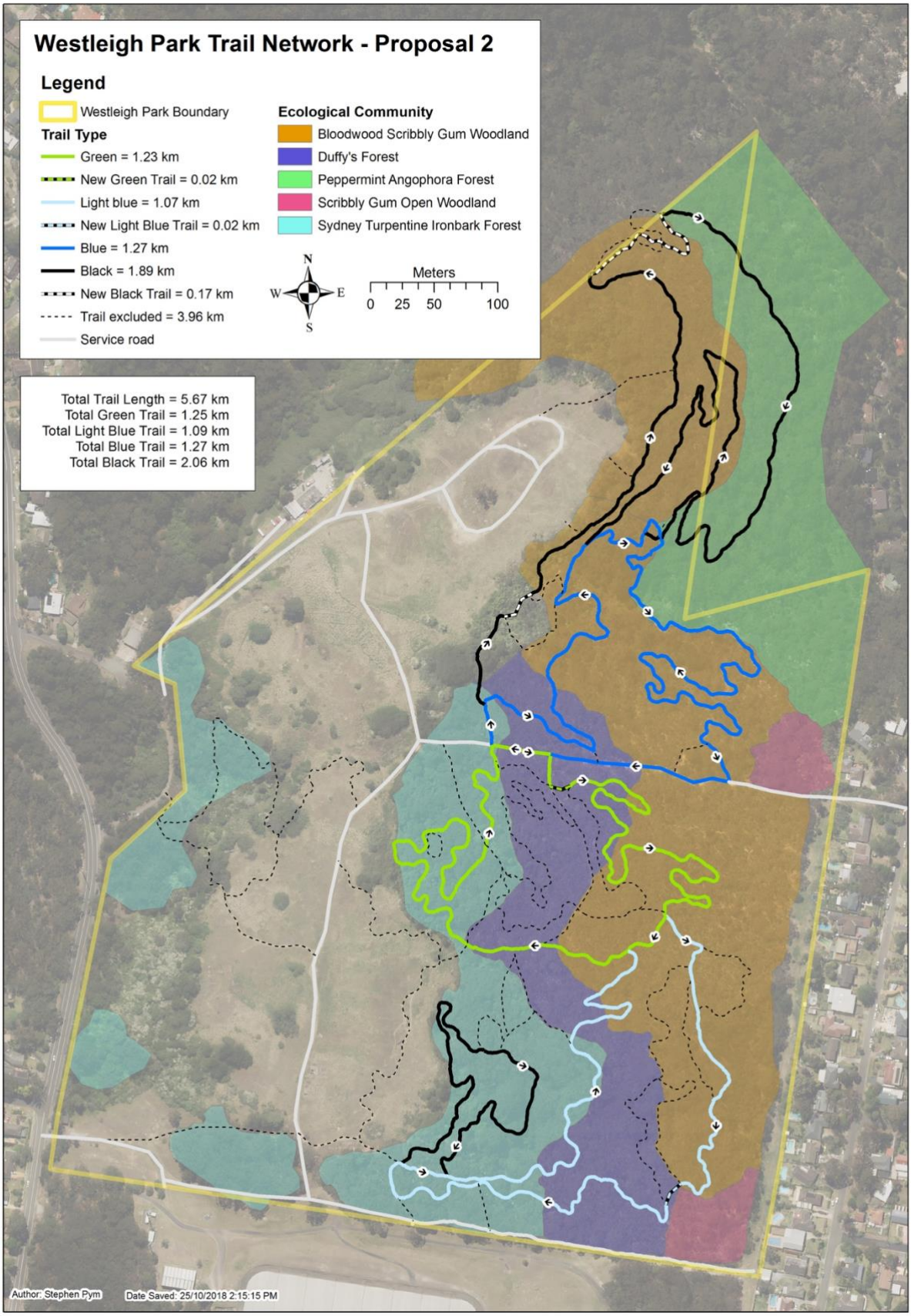
PROPOSAL 1B


Westleigh Park Trail Network - Proposal 1B (Consultant)
Legend
Westleigh Park Boundary
Trail Type
Green = 1.93 km
New Green trail = 0.04 km
Light blue = 0 km
Blue= 2.32 km
New Blue trail = 0.19 km
Black = 2.23 km
New Black trail = 0.21 km
Trail excluded = 2.82 km
Service road
Ecological Community
Bloodwood Scribbly Gum Woodland
Duffy's Forest
Peppermint Angophora Forest
Scribbly Gum Open Woodland
Sydney Turpentine Ironbark Forest
N
W
E
S
Meters
0 25 50 100
Total Trail Length = 6.92 km
Total Green Trail = 1.97 km
Total Light Blue Trail = 0 km
Total Blue Trail = 2.52 km
Total Black Trail = 2.44 km
Author: Stephen Pym
Date Saved: 26/10/2018 9:51:43 AM

PROPOSAL 2 (non-asbestos)



PROPOSAL 2


Westleigh Park Trail Network - Proposal 2
Legend
Westleigh Park Boundary
Trail Type
Green = 1.23 km
New Green Trail = 0.02 km
Light blue = 1.07 km
New Light Blue Trail = 0.02 km
Blue = 1.27 km
Black = 1.89 km
New Black Trail = 0.17 km
Trail excluded = 3.96 km
Service road
Ecological Community
Bloodwood Scribbly Gum Woodland
Duffy's Forest
Peppermint Angophora Forest
Scribbly Gum Open Woodland
Sydney Turpentine Ironbark Forest
N
W
E
S
Meters
0 25 50 100
Total Trail Length = 5.67 km
Total Green Trail = 1.25 km
Total Light Blue Trail = 1.09 km
Total Blue Trail = 1.27 km
Total Black Trail = 2.06 km
Author: Stephen Pym
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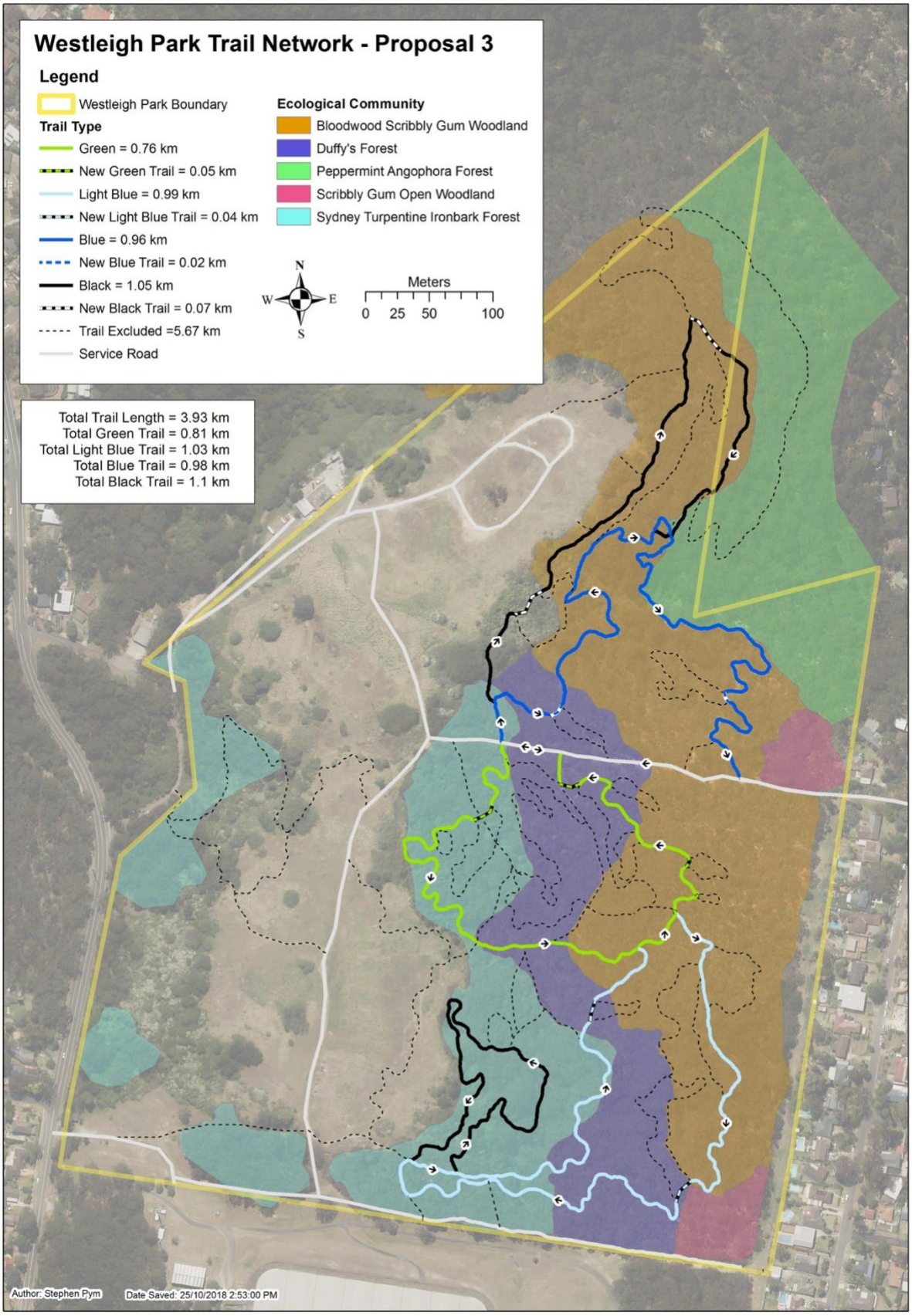
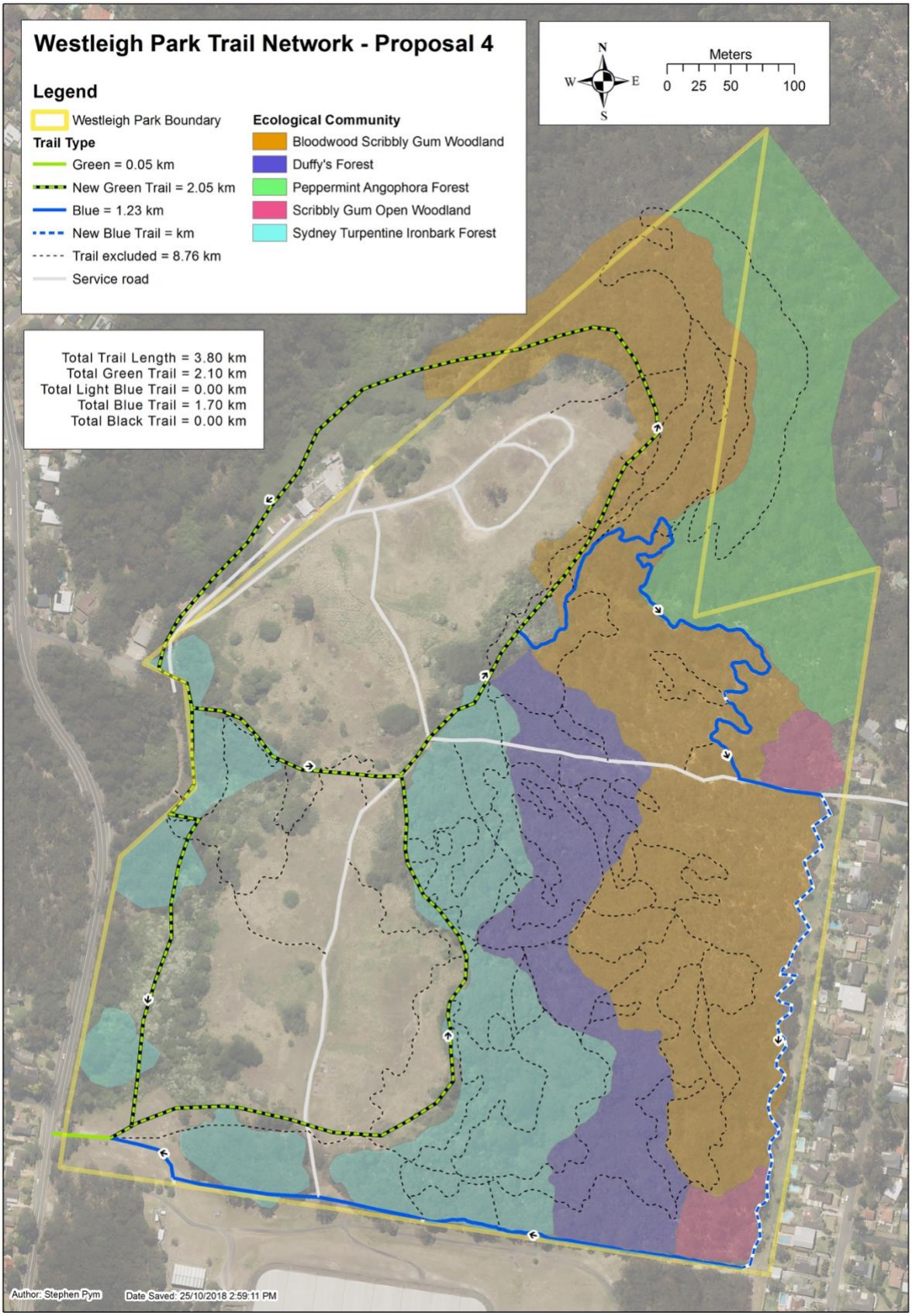
PROPOSAL 3


Westleigh Park Trail Network - Proposal 3
Legend
Westleigh Park Boundary
Trail Type
Green = 0.76 km
New Green Trail = 0.05 km
Light Blue = 0.99 km
New Light Blue Trail = 0.04 km
Blue = 0.96 km
New Blue Trail = 0.02 km
Black = 1.05 km
New Black Trail = 0.07 km
Trail Excluded =5.67 km
Service Road
Ecological Community
Bloodwood Scribbly Gum Woodland
Duffy's Forest
Peppermint Angophora Forest
Scribbly Gum Open Woodland
Sydney Turpentine Ironbark Forest
N
W
E
S
Meters
0 25 50 100
Total Trail Length = 3.93 km
Total Green Trail = 0.81 km
Total Light Blue Trail = 1.03 km
Total Blue Trail = 0.98 km
Total Black Trail = 1.1 km
Author: Stephen Pym
Date Saved: 25/10/2018 2:53:00 PM

PROPOSAL 4


Westleigh Park Trail Network - Proposal 4
Legend
Westleigh Park Boundary
Trail Type
Green = 0.05 km
New Green Trail = 2.05 km
Blue = 1.23 km
New Blue Trail = km
Trail excluded = 8.76 km
Service road
Ecological Community
Bloodwood Scribbly Gum Woodland
Duffy's Forest
Peppermint Angophora Forest
Scribbly Gum Open Woodland
Sydney Turpentine Ironbark Forest
N
W
E
S
Meters
0 25 50 100
Total Trail Length = 3.80 km
Total Green Trail = 2.10 km
Total Light Blue Trail = 0.00 km
Total Blue Trail = 1.70 km
Total Black Trail = 0.00 km
Author: Stephen Pym
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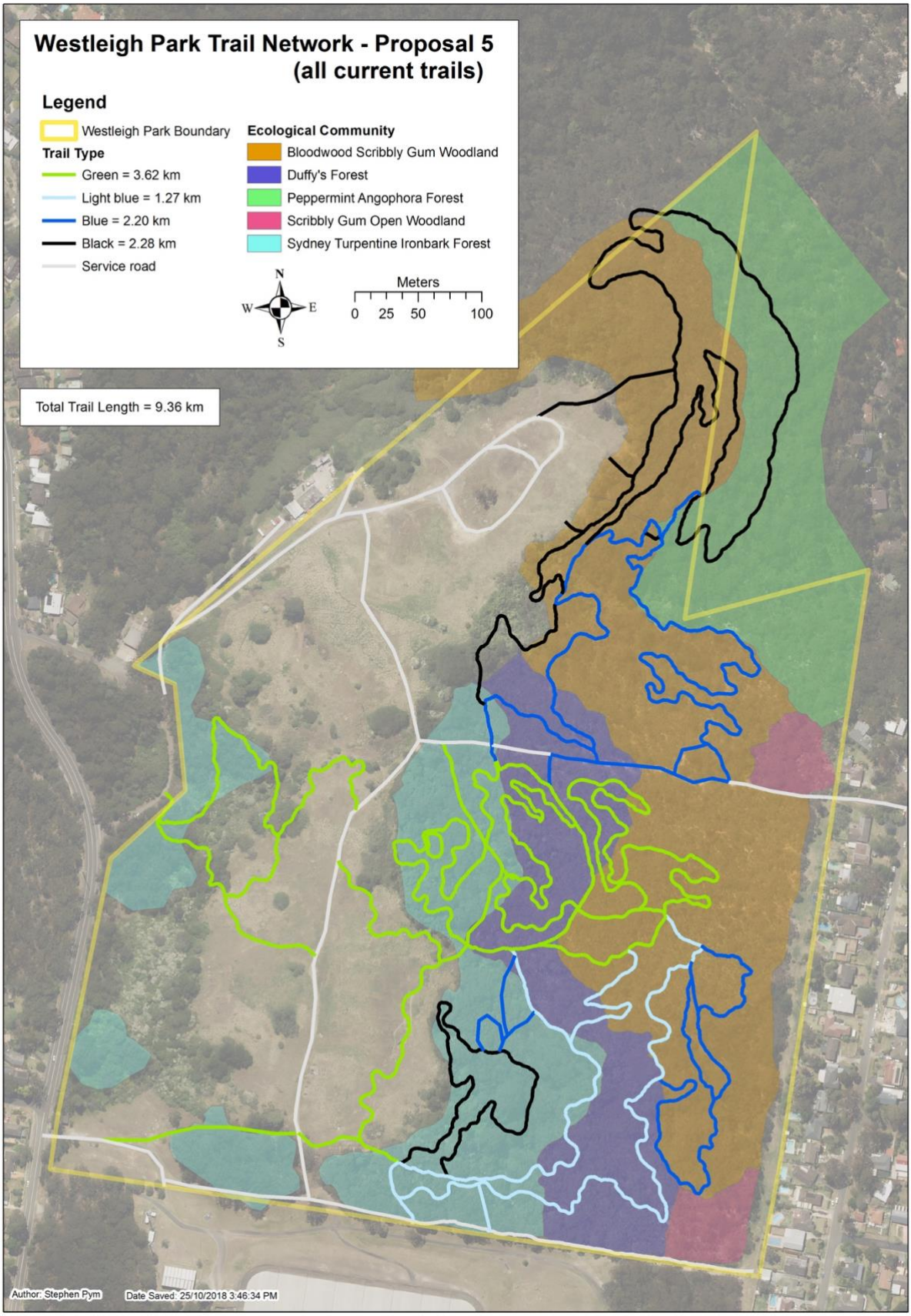
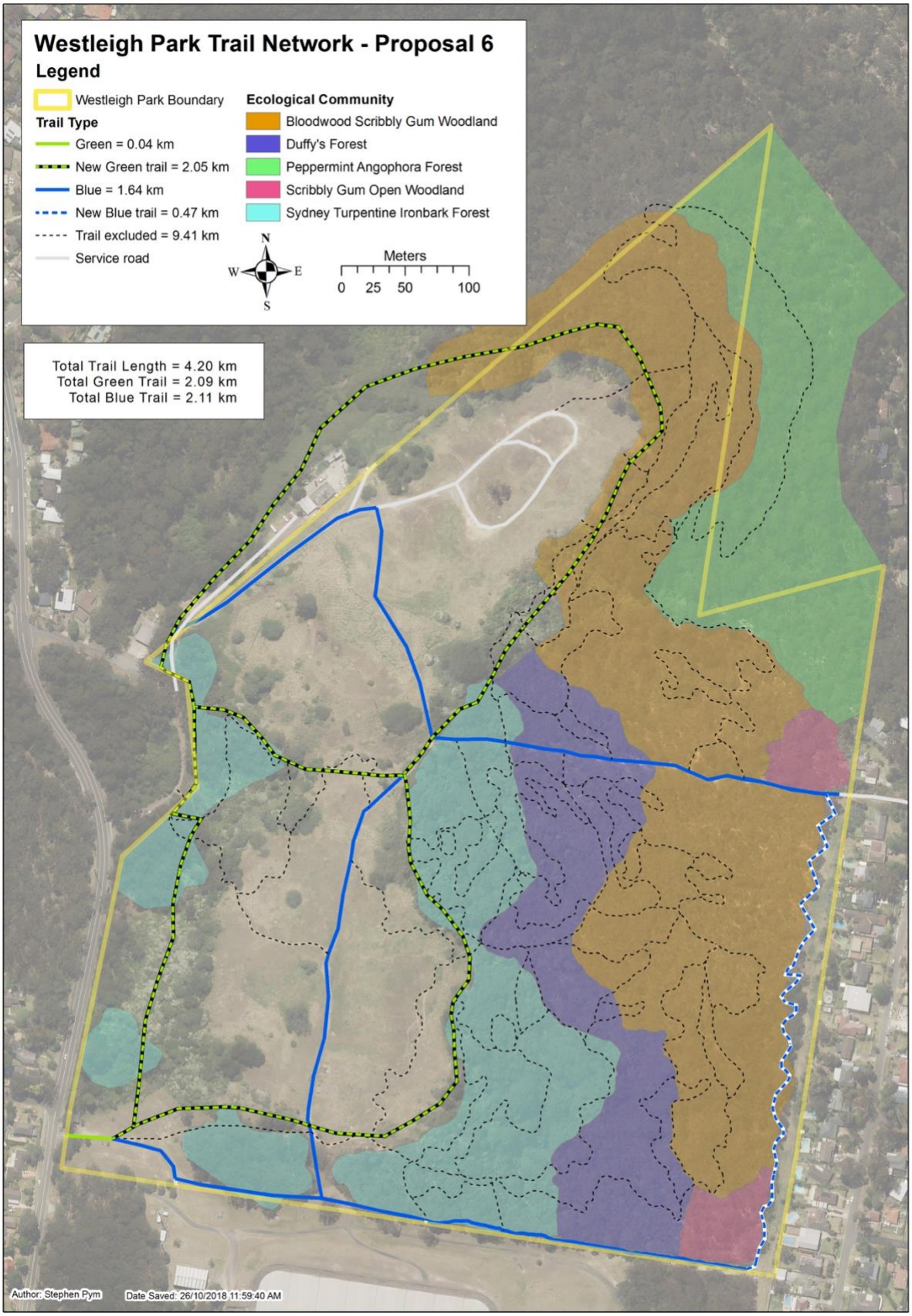
PROPOSAL 5


Westleigh Park Trail Network - Proposal 5
(all current trails)
Legend
Westleigh Park Boundary
Trail Type
Green = 3.62 km
Light blue = 1.27 km
Blue = 2.20 km
Black = 2.28 km
Service road
Ecological Community
Bloodwood Scribbly Gum Woodland
Duffy's Forest
Peppermint Angophora Forest
Scribbly Gum Open Woodland
Sydney Turpentine Ironbark Forest
N
W
E
S
Meters
0 25 50 100
Total Trail Length = 9.36 km
Author: Stephen Pym
Date Saved: 25/10/2018 3:46:34 PM

PROPOSAL 6


Westleigh Park Trail Network - Proposal 6
Legend
Westleigh Park Boundary
Trail Type
Green = 0.04 km
New Green trail = 2.05 km
Blue = 1.64 km
New Blue trail = 0.47 km
Trail excluded = 9.41 km
Service road
Ecological Community
Bloodwood Scribbly Gum Woodland
Duffy's Forest
Peppermint Angophora Forest
Scribbly Gum Open Woodland
Sydney Turpentine Ironbark Forest
N
W
E
S
Meters
0 25 50 100
Total Trail Length = 4.20 km
Total Green Trail = 2.09 km
Total Blue Trail = 2.11 km
Author: Stephen Pym
Date Saved: 26/10/2018 11:59:40 AM