

THREDBO

ALPINE VILLAGE

Thredbo MTB

[DRAFT]

**Mountain Bike Trail
Management Plan**



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1 Introduction

Mountain biking at Thredbo is a large component of the summer activities offered within the resort. The increasing mountain bike visitation to the resort has triggered the need for expansion of the trail network. Increased mountain bike traffic and an increased footprint from the development of additional trails results in additional environmental impact from the trail network and its use. The requirement for a mountain bike trail management plan has been identified as a component of the development application process for additional trails within Thredbo resort. The management plan is aimed to set out the management requirements and guide the maintenance works required to sustainably manage the trail network. As an additional component, the management plan sets out the monitoring and reporting requirements to monitor the environmental condition of the trails and their impact on the surrounding environment.

1.1 Background

Thredbo resort is located in the southern ranges region of New South Wales, occupying an area of 960 ha within the southern portion of the Kosciuszko National Park, approximately 35 km from Jindabyne (figure 1). Thredbo resort is a year round tourist destination, with snow related activities on offer during the winter months and activities such as hiking and mountain biking during the summer months.

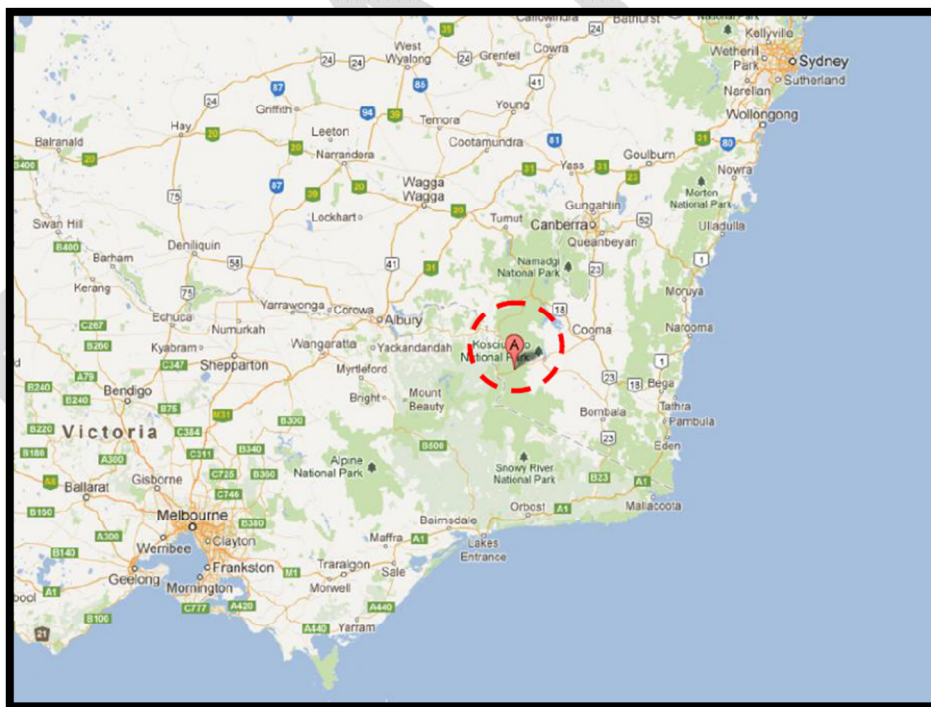


Figure 1 - Location of Thredbo Village (Source: Google Maps)

Thredbo offers a largely gravity focussed mountain biking experience, with a total of 28.5 km of mountain bike trails and summer long chairlift access. The gravity focus of Thredbo's trail network compliments the Snowy Mountains region's mountain bike offerings, with the Thredbo Valley Track, Lake Crackenback Resort, Lake Jindabyne and Cooma trails providing a predominantly cross country riding experience.

Thredbo's mountain bike trails originally utilised the existing mountain access road network until purpose built trails were constructed. The initial construction works involved the establishment of the Thredbo Downhill trail, an advanced level trail. In 2012 an intermediate level trail, the Kosciuszko Flow trail, was constructed to cater to less advanced riders. In 2015 Thredbo's All Mountain Trail was proposed to be a new intermediate level trail in Thredbo's network. The All Mountain Trail is designed to provide the longest trail in both length and elevation descent within the resort. The trail has a focus on flow with technical trail sections while providing scenic views of the Thredbo Valley and surrounding area. Links to Thredbo's cross country trail network, and the Thredbo Valley Track, are incorporated into the trail. The construction of the All Mountain Trail and the integrated cross country trails was undertaken in several stages, with the final completed trail opened in 2017.

1.2 Objectives

The objective of the trail management plan is to set out the management, maintenance and monitoring requirements in order to effectively manage Thredbo's mountain bike trail network. The objectives of the plan are as follows:

- Identify key staff in the daily management of the trail network;
- Set out trail maintenance requirements and priorities;
- Provide guidance for the trail maintenance activities;
- Dictate trail opening and closing parameters;
- Set out the trail monitoring and reporting requirements;
- Ensure conformance to the principles of the trail management and maintenance guidelines set out by the International Mountain Bicycling Association (IMBA).

This management plan is intended to provide an overall management framework for the Thredbo mountain bike trail network. This plan specifically addresses the requirements set out in condition G.5 of the development consent for the construction of Thredbo's mountain bike trails stage 1B (DA 6571), while maintaining consistency with the Sustainable Mountain Biking Strategy (NPWS). This plan has been created with reference to the Kosciuszko National Park Plan of Management (2006) and the International Mountain Biking Association guidelines (Trail Solutions and Managing Mountain Biking).

2 Trail Network

2.1 Existing Trail Network

Thredbo's existing trail network consists of nine trails, with a total length of 28.5 km. The network is comprised of three gravity focused trails and six cross country trails. The network is comprised of a mix of single track and shared use trails, with three of the cross country trails also being utilised as walking trails within the village. The three gravity focussed trails and three of the cross country trails are dedicated single track. A map illustrating the trails is provided as appendix 1.

2.1.1 Gravity Trails

Thredbo Downhill

The Thredbo downhill is Thredbo's premier gravity focussed trail. Graded as a double black diamond, the trail has advanced technical sections and a dedicated jump park incorporated into the 3km of trail. The Thredbo Downhill is the main trail to host events including the Cannonball Downhill. The downhill trail is a legacy trail first constructed in the early 1990's with no formal DA approval, as construction pre-dated the Alpine State Environmental Planning Policy (SEPP) and IMBA guidelines. The trail was formalised in its current alignment in the 1995/6 summer period.

Kosciuszko Flow

The Kosciuszko Flow trail is Thredbo's intermediate trail, with an increased focus on flow in comparison to the Thredbo Downhill trail. The trail is 4 km in length and primarily gravity focussed, with some intermediate level technical sections. The Kosciuszko Flow trail was first established in 2005 to cater to riders with less technical skill than required for the Thredbo Downhill trail. The trail is not subject to an approved development application.

All Mountain

Thredbo's All Mountain trail is an 8.5 km trail traversing from the alpine zone (above 1800m elevation) to the valley floor. The trail began construction in the 2014/15 summer period, with section 1A (DA 6114) beginning at the top of the Gunbarrel chairlift and returning to the base of the Kosciuszko Express chairlift. The trail also has a return to link to Friday Flat via the Friday Flat loop trail and the Kosciuszko Flow trail via the Flow Link Trail. The second stage of the All Mountain Trail (DA 6571) begins at the top of the Kosciuszko express chairlift and connects to stage 1A at the top of the Gunbarrel chairlift. Stage 1B was constructed over the 2015/16 and 2016/17 summer periods.

2.1.2 Cross-Country Trails

Village Loop

The village loop trail is a 2.8 km single track cross country trail which forms a loop of the Valley Terminal end of Thredbo Village. The trail was constructed as a component of Thredbo Mountain Bike Trails – Stage 1A (DA 6114).

Friday Flat Loop

The Friday Flat Loop trail is a 2.5 km single track cross country trail situated in the Friday Flat area of the village. The trail was originally constructed as a component of Thredbo Mountain Bike Trails – Stage 1A (DA 6114).

Pipeline Path

The pipeline path is a legacy trail originally being constructed as part of Thredbo's walking trail network. The trail is a 2.3km shared use trail, forming a loop following the Thredbo River and Thredbo's snowmaking reservoirs and back along Friday Drive. As a component of DA6114 the pipeline path was extended to follow the edge of the Friday flat day carparks. The trail also provides a link from the Pipeline path to the Friday Flat loop trail and the Thredbo Valley Track trailhead.

Bridle Trail Loop

The Bridle Trail Loop is a 2.3 km legacy shared use trail which utilises the first 1km section of the Thredbo Valley Track with a loop at the end of this section and returning to Friday Flat along the same section of the Thredbo Valley Track. The Bridle Loop trail was originally constructed as a component of Thredbo's walking trail network with no formal DA approval.

Golf Course Loop

The Golf Course Loop trail is a 2.4km shared use legacy trail originally constructed as a part of Thredbo's walking trail network with no formal DA approval. The trail forms a loop of the Thredbo golf course, utilising the first 1 km of the Riverside walk and returning to the start of the trail via Crackenback drive.

Golf Course Connector

The Golf Course connector is a 0.6 km link trail which connects the Golf Course loop trail to an intersection with the Kosciuszko Flow, All Mountain and Village loop trails. The trail was initially established as a component of the Golf Course Loop trail for use in cross country biking events.

2.1.3 Bike Parks

Pump Track

The pump track is designed to be a beginner level track for skills development, consisting of rollovers and banked corners. The pump track is located on the village green, with development consent as a component of the Village Green Enhancement Project (DA 6877).

Skills Park

As a component of the trail network a skills park is located at the Valley terminal base area. The skills park is aimed to induct first time riders prior to using the wider trail network, consisting of a small trail loop with rock and berm features, similar to those found on the wider trail network.

Bunnywalk Station, Middle Slopes and Kosci Jump Parks

Seasonal jump parks are incorporated into the trail network to provide an enhanced and progressive rider experience. The Bunnywalk Station jump line is located adjacent to Bunnywalk station on Snowgums chairlift, above the Rossignol racecourse. The middle slopes jump park is located above the cat shed between the Kosciuszko Express and Snowgums chairlift lines. The Kosci jump park is located on the Village trail above the Valley Terminal base area, intended to form the finish area of the Thredbo Downhill, Kosciuszko Flow and All Mountain trails.

The jump parks are constructed prior to opening and de-constructed after the close of each mountain biking season. The construction of the jump parks will utilise the existing site soil to construct the jump features and appropriate building materials to construct wall ride and bridge features. All features constructed within these parks will not exceed 2.4 meters in height, and will have batters/embankments appropriately stabilised/revegetated. The de-construction of the parks will involve re-spreading the soil material onto the site and applying appropriate stabilisation/ re-vegetation measures. The construction of the jump parks are to be undertaken in accordance with the SEMP (attachment 2) and the NSW Soil Conservation service – Conservation Earthworks practices.

2.2 Planned Trail Network

Thredbo has engaged DirtArt, Australia's leading mountain bike and recreational trail design, consultancy and construction company to produce a Trail Master Plan for the resort. This plan is aimed to set out the future direction of mountain biking within Thredbo and provide concept designs for future trail development within the resort. This Mountain Bike Master Plan is currently under development.

2.3 Hygiene Stations

Bike and boot hygiene stations provide areas to wash down bikes before and after using the trail network to minimise the transport of foreign soil and plant material to and from Thredbo. Wet and dry hygiene stations are installed at the beginning and end of the mountain bike trails. The wet stations are located at Valley Terminal and Friday Flat base areas, while dry stations are located at the Valley Terminal cross country trailhead and the Thredbo Valley Track trailhead at Friday Flat. The installation of additional, or upgrade of existing, bike and boot hygiene facilities will be considered if user numbers continue to increase or the current facilities are no longer adequate.

3 Trail Management and Maintenance

The mountain bike trail management prescriptions, maintenance actions and schedule are detailed below, with the organisational management structure associated with the day to day operations and management of the trail network identified. The trail management and maintenance section of this plan guides the management and maintenance works required for the trail network.

3.1 Management Structure

3.1.1 Key Management Staff

The key management personnel associated with the day to day operations and management of the trails are identified as follows with an outline of the responsibilities of each position relevant to the management of the trail network.

Resort Operations Manager

- Oversee all aspects of resort operations, including mountain biking
- Engagement of contractors
- Compliance monitoring
- Community and Stakeholder engagement

Mountain Manager

- Oversee day to day mountain operations, including mountain bike trail management
- Trail monitoring inspections and works scheduling
- Compliance monitoring and reporting
- Stakeholder engagement

Trail Maintenance Supervisor

- Trail construction and maintenance
- Coordination and direction of works crews
- Works scheduling
- Trail monitoring inspections
- Compliance monitoring

Environmental Coordinator

- Environmental monitoring and reporting
- Trail monitoring inspections
- Compliance Monitoring and reporting
- Stakeholder engagement

Slopes Manager

- Liaise with Trail Maintenance Supervisor
- Manage trail crew staffing levels
- Goods procurement
- Compliance Monitoring

3.1.2 Operational Staff

The operational departments associated with the day to day maintenance and management of the trail network are identified below, with a brief outline of the responsibilities of each department relating to trail maintenance and management.

Trail Maintenance Crews

- Undertake trail maintenance and construction works, including rehabilitation and stabilisation works
- Trail condition inspections and issue reporting

Mountain Bike Trail Guides

- Day to day public trail use management
- Daily trail condition monitoring inspections
- Environmental and safety issue reporting

Bike Patrol

- Emergency first response and management
- Trail safety monitoring inspections
- Trail signage inspection and maintenance
- Undertake trail maintenance works as required

3.2 Staff Training and Induction

A formalised staff induction and training regime is conducted on an annual basis, prior to any construction or preparation works associated with the trail network commencing each season. The training and induction program is provided through a combination of an internal mountain bike trail specific induction/training course and external trail building workshops and training courses.

The internal induction and training course is a requirement for all new staff associated with the mountain bike trail network, with the requirement for an annual refresher course to be undertaken by permanent and returning staff. The opportunity for external training for select staff is sought periodically, with priority given to permanent and returning staff members. The staff members selected for external training courses is at the discretion of the Mountain Manager. The details of the mountain bike trail induction are set out in a separate document, with an outline of the induction contents set out below.

3.2.1 New Staff Training/Induction

The training program for all new staff associated with the maintenance and management of the mountain bike trail network is based around a mountain bike trail specific induction. This induction and training is an in house 2 day course conducted prior to the commencement of each mountain biking season by KT management staff, with assistance from guest instructors engaged to conduct the course. The modules included in the induction and training course include the following:

1) Hazard Identification and Safety Procedures

- Safe operating procedures and safe work method statements
- Hazard identification and reporting
- Incident reporting and management
- Mountain and trail access, including 4wd vehicle operation
- Communication procedures and protocols

2) Environmental Awareness

- Mountain ecology overview, including alpine area sensitivity
- Environmental impact minimisation
- Pest and weed identification and management
- Erosion and Sediment control
- Environmental issue identification and reporting
- Revegetation and rehabilitation
- Bike hygiene station location, operation, and maintenance
- Guest information and education

3) Trail Construction and Maintenance

- Introduction to International Mountain Biking Association guidelines
- Trail construction and maintenance procedures and techniques
- Trail drainage and water management
- Site stabilisation and revegetation

4) Trail monitoring

- Introduction to trail monitoring program
- Safety monitoring and issue reporting
- Environmental monitoring and issue reporting
- Trail opening and closing parameters

3.2.2 Permanent/Returning Staff Training and Induction

The refresher course for permanent and returning staff associated with the maintenance and management of the mountain bike trail network is based around a mountain bike trail specific induction. The induction and training course is a 1 day course conducted prior to the commencement of each mountain biking season by KT management staff, with assistance from guest instructors engaged for training purposes. The modules included in the induction and refresher course include the following:

1) Hazard Identification and Safety Procedures

- Safe operating procedures and safe work method statements
- Hazard identification and reporting
- Incident reporting and management

2) Environmental Awareness

- Environmental impact minimisation
- Pest and weed identification and management
- Erosion and Sediment control
- Environmental issue identification and reporting
- Revegetation and rehabilitation
- Bike hygiene station operation and maintenance
- Guest information and education

3) Trail Construction and Maintenance

- International Mountain Biking Association guidelines
- Trail construction and maintenance procedures and techniques
- Trail drainage and runoff management
- Site stabilisation

4) Trail monitoring

- Safety monitoring and issue reporting
- Environmental monitoring and issue reporting
- Trail opening and closing parameters

3.3 Trail Opening and Closing

The opening and closing of the trail network is considered on both a seasonal and daily operational basis, dictated by factors such as trail condition, post-winter snow drift persistence, rider safety, adverse weather conditions and mountain bike event schedules. The overall length of the mountain bike season will vary each year, largely influenced by post-winter snow persistence and early season snowfall.

During the mountain biking season the trail network periodically requires either partial or full closure. The primary factors influencing the periodic opening and closing of trails is rider safety and the potential for the trail and surrounding environment to sustain damage due to trail use. The potential for damage to the trails and surrounding environment arising from trail use is largely dictated by the nature and severity of weather events. The secondary factor in periodic trail closure is operational requirements for trail maintenance activities. Mountain bike events are planned in advance with measures for trail closure in place prior to the event date. In the event of one of the following trail opening and closing parameters being triggered, the trails will not be opened for daily operations in the first instance with issues detected during operations triggering the closure of the trail.

3.3.1 Seasonal Opening and Closing Parameters

The mountain bike season will vary each year, with the season opening no earlier than the first weekend of November and season closing no later than the first weekend of May. The seasonal opening and closing of the trail network is to be undertaken with regard to the required trail preparation works and parameters.

3.3.1.1 Seasonal Opening

The opening of the trail network (or part thereof) is to be considered on an individual trail basis, with each of the trails requiring the following to be completed prior to season opening.

- The trail is to be completely free of snow cover;
- Berms are to be re-established post-winter;
- Jump lines are to be established post-winter, where required;
- All appropriate revegetation and stabilisation works have been completed;
- All appropriate environmental controls are in place and functioning correctly.

3.3.1.2 Seasonal Closing

The seasonal closing of the trail network (or part thereof) will occur no later than the first weekend in May. Earlier closures may be necessitated by weather events such as persistent rain or snow in line with Daily Opening and Closing Parameters. The following works are to be completed prior to the 1st June each year.

- All berms located on open ski-slopes are to be deconstructed, with all material placed on the existing trail tread and appropriately stabilised/revegetated;
- Jump lines are to be deconstructed, with all material being spread on site and appropriately stabilised/revegetated;
- All environmental controls are to remain in place until site stabilisation/revegetation has been achieved;
- Rice straw bales are to be installed in areas of potential under-snow erosion, where appropriate.

3.3.2 Daily Trail Opening and Closing Parameters

3.3.2.1 Trail User Safety

The daily trail monitoring events (detailed in section 4 of this plan) are aimed to ensure the trails are safe for public use, with all trails signed off by the MTB trail guides prior to the commencement of daily operations. As rider safety issues are largely influenced by the overall trail condition, environmental factors play a large role in the safety of riders using the trail network. The issues triggering trail closure include, but are not limited to the following:

- Integrity of the trail surface, including trail features (jumps, berms, bridges, etc.)
- Damage to structures (platforms, bridges, jumps, etc.)
- Trail drainage and water management
- Obstructions within the trail corridor (tree branches, rocks, etc.)
- Daily weather (outlined in section 3.3.2)
- Snow covering the trail surface

Shared use trail user safety will be managed through the provision of guest education and signage. Thredbo's shared use trail policy is that walkers give way to riders in order to minimise user conflict and potential for injury to any party.

3.3.2.2 Weather

The potential of the trails and surrounding environment to sustain damage due to trail use is impacted to a large degree by the severity of weather events. Major rain and snow events cause the trail surface to become unsuitable for traffic, due to the increased potential for sediment movement. The daily weather conditions are constantly monitored by the Mountain Manager and Lifts Manager, with advice forwarded to the MTB trail guides prompting trail inspections to assess the trail condition. If the intensity of any rainfall event causes substantial runoff or pooling on the trails, the trails are closed until conditions have improved enough to allow trail opening. In the event of snow lying on the trails, the trail network is closed until the snow has thawed and the trail surface has sufficiently drained to allow trail use. The guidelines for weather events triggering additional trail inspections and closure are set out below.

- Additional trail inspections by trail guides – > 10mm rainfall over a 4 hour period (within 1 calendar day)
- Trail closure - >30mm of rain within a 12 hour period (within 1 calendar day)

3.3.2.3 Maintenance Works

The operational requirements for trail maintenance activities may necessitate either partial or full closure of the trail on which the maintenance works are being carried out. The scale and extent of the trail maintenance works dictates the length of trail to be closed for each maintenance event. In the event of a partial trail closure, a bypass of the trail section undergoing maintenance works is to be put in place to exclude riders from the work site. Trail maintenance works may also be conducted outside of operational hours to avoid the closure of trails. All trail closures are to be implemented as outlined in section 3.3.5 of this plan.

3.3.2.4 Mountain Bike Events

Mountain Bike events are pre-scheduled with all trail closures set in place prior to the beginning of the event. Information on all trail closures and times is provided to the public through notification on Thredbo's website, information available at the ticket office and MTB retail and rental store and Thredbo's information centre. All mountain bike events are run with regard to all of the trail opening and closing parameters.

3.3.2.5 Hygiene Stations

Mountain bike and boot hygiene stations have been installed at Valley Terminal and Friday Flat base areas in order to minimise the amount of foreign soil and weed propagules transported from outside of the National Park.. In the event of the bike and boot hygiene stations being not operational the trails will not be opened for daily operations. If the stations become inoperable at any stage during the day any new riders will not be allowed to access Thredbo's trail network until the hygiene stations have been returned to appropriate operating condition.

3.3.3 Trail Closure Procedure

All trail closures (full and partial) require the notification of guests and riders on the trail status. This information is to be provided to guests indirectly via Thredbo's website and social media pages and directly through Thredbo's guest services, Thredbo's ticket office and Thredbo's MTB rental and retail store. Trail closure notification is also required on each closed trail. The on-trail notification is to consist of the installation of appropriate signage at the base of the access chairlift and the start of each closed trail. In the event of a partial trail closure, appropriate signage is to be installed prior to the bypass with the trail section taped off to exclude riders from the work site.

3.4 Emergency Response

Emergency and incident response is undertaken by Thredbo Bike Patrol personnel, with the assistance of NSW Emergency Services where required. Thredbo Bike Patrol liaises with the NSW Emergency Services in the event of a major incident and where additional assistance is required.

3.4.1 Emergency Contact

Emergency contact numbers, including contact numbers for Thredbo bike patrol are displayed at all trail head locations and at the base stations of lifts. The emergency contact numbers are as follows:

Thredbo Bike Patrol	NSW Emergency Services	Thredbo Medical Centre
Phone: (02) 64594147	000	(02)64576254

3.4.2 Emergency Access

Bike patrol and emergency services vehicle access to all sections of the trail network is facilitated by Thredbo's mountain road network. The mountain road network allows on-ground evacuation from the trail network. The vehicles used to access all areas of the mountain consist of the following:

- 4WD Vehicle (Ski Patrol Toyota Landcruiser)
- Kubota ATV
- Quad Bikes
- Mountain Bikes

The village green precinct in Thredbo serves as the emergency helicopter access point for patient transfer from ground to air transport.

3.4.3 Trail Position and Maps

The trail network is equipped with markers clearly displaying the trail distance traversed (since start of trail) at 200m intervals. These markers allow riders to assist Bike Patrol and Emergency services in locating injured riders. Thredbo Bike Patrol and the NSW Emergency services (Thredbo Fire Brigade) have been supplied with a trail zone map clearly displaying the trail and mountain road network. The trails on the map are divided into operational zones to assist in emergency response and trail access planning. The trail zone map is provided in this plan as appendix 2.

3.5 Trail Maintenance

3.5.1 Management Prescriptions

The trail network is to be subject to a comprehensive monitoring program (detailed in section 4 of this plan). The monitoring events are undertaken to identify environmental and safety issues associated with the trails and determine the nature and extent of the maintenance works required to rectify any issues. The general maintenance works required for the trail network are outlined below; however the maintenance works are not limited to the following.

- Drainage and erosion issues are to be addressed to achieve effective water management and minimise soil movement from the trail;
- Exposure of tree roots/bases and sub surface rocks is to be addressed to ensure the protection of vegetation;
- Braking ruts are to be addressed to ensure trail surface integrity;
- Berms and embankments are to be re-instated/re-constructed where required to minimise soil movement and ensure trail surface integrity;
- Stabilisation and revegetation of disturbed areas to minimise soil movement and inhibit weed colonisation;
- Weed management within trail verges and adjacent to trail corridor;
- Maintenance of revegetated areas to ensure effective establishment;
- Delineation of trails to ensure riders stay on track;
- Built structures are to be maintained to ensure protection of sensitive areas and rider safety.

All trail maintenance works are to be carried out manually with the use of rakes, picks, shovels, handheld brush cutters, chainsaws and mini-excavators for larger scale trail maintenance and construction works. The works are to be undertaken with regard to minimising direct and indirect adverse environmental impacts including damage to the surrounding environment. The trail design and associated maintenance works are to be carried out to ensure soil retention and erosion prevention in the first instance, ensuring an environmentally sustainable trail.

3.5.2 Maintenance Works Triggers

The requirement for maintenance works is triggered by the observation of environmental issues, identified through the trail monitoring (detailed in section 4 of this plan). The maintenance works triggers take into account issues on the trail tread, trail verges and areas adjacent to the trails. The observations which trigger the maintenance works are outlined as follows:

1. Erosion and Water Management:

- Water pooling on trail
- Water channelling
- Sediment runoff from trail
- Sediment collection in sumps
- Tree root/base exposure
- Sub-surface rock exposure
- Stutter bumps/braking ruts

2. Batters, Berms and Embankments

- Loose soil on embankments/batters
- Sediment movement from embankments
- Undercutting of berms/batters/embankments

3. Vegetation

- Damage to native vegetation
- Weed occurrence in trail verges and adjacent to trails
- Re-vegetation area maintenance

4. Unauthorised Trail Formation

- Trail widening/rock avoidance
- Corner cutting
- Stop off areas
- Intentional unauthorised trail construction

5. Built Structures

- Damage to structures
- Damage to entrance/exit from structures
- Season opening and closing bridge decking refitting/removal
- Damage to hygiene stations and general maintenance

3.5.3 Maintenance Schedule

The maintenance schedule (tabled below) is aimed to guide the trail management actions and timing of the works required to maintain the trail network to the required standard. The maintenance schedule is also aimed to assist with the planning of pre and post mountain biking season trail works.

Category	Maintenance Trigger	Management Prescription	Method	Timing
Erosion and Water Management	Water pooling	<ul style="list-style-type: none"> • Ensure effective trail drainage and water management • Minimise sediment movement • Minimise potential for frost heave 	<ul style="list-style-type: none"> • Manual shaping of trail surface • Installation of additional drainage measures • Manual re-construction of trail section 	<ul style="list-style-type: none"> • Prior to season opening • After rain and snow events • Ongoing as required
	Water channelling	<ul style="list-style-type: none"> • Minimise sediment movement • Ensure effective trail drainage and water management • Minimise sedimentation of surrounding environment • Ensure integrity of trail surface 	<ul style="list-style-type: none"> • Manual shaping of trail surface • Installation of additional drainage measures • Installation of additional trail protection measures 	<ul style="list-style-type: none"> • Prior to season opening • After rain and snow events • Ongoing as required
	Sediment runoff	<ul style="list-style-type: none"> • Minimise sediment movement • Minimise sedimentation of surrounding environment 	<ul style="list-style-type: none"> • Installation of additional drainage measures • Installation of sediment controls • Manual re-construction of trail section 	<ul style="list-style-type: none"> • Prior to season opening • After rain and snow events • Ongoing as required
	Sedimentation of sumps	<ul style="list-style-type: none"> • Minimise sediment movement • Ensure effective trail drainage and water management • Minimise sedimentation of surrounding environment 	<ul style="list-style-type: none"> • Manual shaping of trail surface • Installation of additional drainage measures • Installation of additional sediment controls 	<ul style="list-style-type: none"> • Prior to season opening • After rain and snow events • Ongoing as required
	Tree root/base exposure	<ul style="list-style-type: none"> • Minimise sediment movement • Protect native vegetation • Ensure rider safety 	<ul style="list-style-type: none"> • Manual shaping of trail surface • Installation of additional tree protection • Re-surfacing of trail • Re-construction of trail section 	<ul style="list-style-type: none"> • Prior to season opening • Ongoing as required
	Sub-surface rock exposure	<ul style="list-style-type: none"> • Minimise sediment movement • Ensure integrity of trail surface • Ensure rider safety 	<ul style="list-style-type: none"> • Manual shaping of trail surface • Re-surfacing of trail • Manual re-construction of trail section 	<ul style="list-style-type: none"> • Prior to season opening • Ongoing as required
	Stutter bumps/braking ruts	<ul style="list-style-type: none"> • Minimise sediment movement • Ensure integrity of trail surface • Ensure rider safety 	<ul style="list-style-type: none"> • Manual shaping of trail surface • Re-surfacing of trail • Installation of additional trail protection measures 	<ul style="list-style-type: none"> • Ongoing as required • After MTB events and busy periods

Category	Maintenance Trigger	Management Prescription	Method	Timing
Batters, Berms and Embankments	Exposed Soil	<ul style="list-style-type: none"> • Minimise soil movement • Minimise the potential for frost heave • Minimise sedimentation of surrounding environment 	<ul style="list-style-type: none"> • Installation of stabilisation measures • Undertake re-vegetation works • Installation of additional sediment control measures 	<ul style="list-style-type: none"> • Prior to season opening • Ongoing as required
	Sediment runoff	<ul style="list-style-type: none"> • Minimise soil movement • Minimise sedimentation of surrounding environment 	<ul style="list-style-type: none"> • Installation of additional sediment control measures • Installation of stabilisation measures • Undertake re-vegetation works 	<ul style="list-style-type: none"> • Prior to season opening • After rain and snow events • Ongoing as required
	Undercutting	<ul style="list-style-type: none"> • Minimise soil movement • Minimise the impact of sedimentation on surrounding environment • Ensure integrity of trail surface • Ensure rider safety 	<ul style="list-style-type: none"> • Manual shaping of trail surface • Re-surfacing of trail • Manual re-construction of trail section 	<ul style="list-style-type: none"> • Prior to season opening • After rain and snow events • After MTB events and busy periods • Ongoing as required
Vegetation	Damage to Native Vegetation	<ul style="list-style-type: none"> • Protect native vegetation 	<ul style="list-style-type: none"> • Installation of additional protection measures • Additional delineation of trail 	<ul style="list-style-type: none"> • Prior to season opening • After MTB events and busy periods • Ongoing as required
	Weed colonisation	<ul style="list-style-type: none"> • Protect native vegetation • Control weeds 	<ul style="list-style-type: none"> • Manual weed removal • Weed spraying • Re-vegetation activities to minimise weed colonisation 	<ul style="list-style-type: none"> • Prior to season opening • Ongoing as required
	Revegetation area maintenance	<ul style="list-style-type: none"> • Minimise soil movement • Protect native vegetation • Ensure revegetation areas are establishing effectively 	<ul style="list-style-type: none"> • Installation of additional stabilisation measures • Watering of revegetation areas • Replacement of dead plants • Manual weed removal 	<ul style="list-style-type: none"> • Prior to season opening • Ongoing as required

Category	Maintenance Trigger	Management Prescription	Method	Timing
Unauthorised Trails	Trail widening/rock avoidance	<ul style="list-style-type: none"> • Protect native vegetation • Ensure integrity of trail surface • Minimise sediment movement • Effectively manage trail use 	<ul style="list-style-type: none"> • Installation of additional protection measures • Additional delineation of trail • Installation of additional stabilisation measures 	<ul style="list-style-type: none"> • Prior to season opening • After MTB events and busy periods • Ongoing as required
	Corner cutting	<ul style="list-style-type: none"> • Protect native vegetation • Ensure integrity of trail surface • Minimise sediment movement • Effectively manage trail use 	<ul style="list-style-type: none"> • Installation of additional protection measures • Additional delineation of trail • Installation of additional stabilisation measures • Undertake Re-vegetation works 	<ul style="list-style-type: none"> • After MTB events and busy periods • Ongoing as required
	Stop off areas	<ul style="list-style-type: none"> • Protect native vegetation • Minimise sediment movement • Effectively manage trail use 	<ul style="list-style-type: none"> • Installation of additional protection measures • Installation of stabilisation measures • Additional delineation of trail • Formalisation of stop off areas 	<ul style="list-style-type: none"> • After MTB events and busy periods • Ongoing as required
	Unauthorised trail construction	<ul style="list-style-type: none"> • Protect native vegetation • Effectively manage trail use 	<ul style="list-style-type: none"> • Installation of additional protection measures • Additional delineation of trail • Undertake Re-vegetation works 	<ul style="list-style-type: none"> • Ongoing as required
	Built Structures	Damage to structures	<ul style="list-style-type: none"> • Ensure integrity of trail surface • Ensure rider safety 	<ul style="list-style-type: none"> • Maintenance and repair of built structures • Re-surfacing of trail at entrance/exits to structures
	Damage to entrance/exit from structures	<ul style="list-style-type: none"> • Minimise sediment movement • Ensure integrity of trail surface • Ensure rider safety 	<ul style="list-style-type: none"> • Manual re-shaping of trail surface • Manual re-construction of trail section • Installation of additional protection measures 	<ul style="list-style-type: none"> • Prior to season opening • After season closing • Before and after MTB events and busy periods • Ongoing as required

Category	Maintenance Trigger	Management Prescription	Method	Timing
	Season opening/closing bridge decking removal/refitting	<ul style="list-style-type: none"> • Ensure integrity of trail surface • Minimise potential for damage to built structures 	<ul style="list-style-type: none"> • Manual removal/refitting of bridge decking 	<ul style="list-style-type: none"> • Prior to season opening • After season closing • Ongoing as required

3.6 Sensitive Ecological Areas

The sensitive areas adjacent to the trail consist of areas of upland wetland, short alpine herbfield, snowpatch communities and riparian zones. These areas are shown on the vegetation maps produced and provided by Ecological Australia, included as appendix 3 of this report. The ongoing protection of sensitive ecological areas adjacent to the trail is to be carried out as a component of the trail maintenance and management regime.

The sensitive areas are to be a subject of the monthly environmental monitoring events (detailed in section 4 of this plan). The monitoring activities observe the impacts of the trail and trail use within these areas, with management controls and protection measures installed as necessary. The controls and protection measures are to include, but are not limited to the following:

- Delineation of the trail
- Fencing off the area
- Installation of additional protection measures (e.g. Rock work/edging, sediment controls)
- Installation of signage
- Undertaking rehabilitation/remediation works
- Closure of the trail adjacent to the sensitive area until rehabilitation/remediation works are complete (to the satisfaction of the Environmental Coordinator)

In the event of the sensitive ecological areas having sustained any impact as a result of the trails or trail use, advice will be sought from the Office of Environment and Heritage prior to rehabilitation/remediation works being undertaken.

4 Monitoring, Reporting and Review

Daily resort operations and the long term environmental sustainability of the mountain bike trail network necessitates an integrated approach to trail condition monitoring and management. This intensive monitoring regime is comprised of three main components, operational safety and environmental monitoring, pre and post seasonal monitoring and annual monitoring. The monitoring regime involves monitoring the trail network from four different aspects, one of which is focussed on the alpine sections of trail. The details of the trail monitoring regime and reporting requirements are provided below.

4.1 Trail Monitoring Regime

The monitoring activities carried out by KT staff consist of trail inspections aimed at assessing both rider safety and environmental issues. The trail monitoring inspections are carried out daily, monthly and pre and post season.

4.1.1 Daily Operational Monitoring

As a requirement of the daily trail opening and closing procedures the MTB trail guides inspect the entire trail network on bikes at the start and end of each day of operation. These daily inspections are primarily rider safety focussed, however an additional component of the inspections includes the recording of any major environmental concerns. In the event of environmental issues being noted the details are forwarded to the slopes manager for follow up inspection and appropriate works scheduling. The trail guides are required to complete a post inspection checklist after each morning inspection (provided as attachment 1); this checklist takes into account safety and environmental considerations. The trails are not opened for daily operations until inspections of all trails have been completed, with completed checklists provided to the Slopes Manager.

4.1.2 Monthly Environmental Monitoring

The monthly environmental monitoring inspections are to be carried out by the Trail Maintenance Supervisor and Environmental Coordinator, with the opportunity to attend the inspection events provided to the Mountain Manager and Slopes Manager. These trail inspections are carried out in order to direct the maintenance works required to ensure minimal environmental impact is sustained from ongoing trail use. A monthly report is to be produced by the Environmental Coordinator from the inspections detailing the overall condition of the trails and surrounding environment, with particular attention paid to sensitive ecological areas adjacent to the trails. This report is to include maintenance and trail management recommendations and is to be provided to the Mountain Manager and Trail Maintenance Supervisor for appropriate works scheduling.

4.1.3 Trail Condition Assessment

A comprehensive trail condition assessment is carried out before and after each mountain biking season by a representative from NPWS and the Environmental Coordinator. The trail condition assessment follows the model set up and initiated by the NPWS, involving the mapping of the Thredbo Downhill and Kosciuszko Flow trails and logging all environmental issues along the trail length with coordinate references and pictures as required. The trail condition assessment enables a report of the overall trail condition of the two trails to be produced, with the report, recommendations and associated spatial data provided to KT. The reports are to be used for the purposes of directing the maintenance, stabilisation and rectification works required along the two trails.

4.1.4 Alpine Trail Monitoring

Additional monitoring requirements for the section of the All Mountain trail constructed in the alpine zone (above 1800m elev.) were identified in the development application procedure for Thredbo Mountain Bike Trails – Stage 1B (DA 6571). The requirement set out in condition E.10 of the development consent consists of the capturing of a baseline dataset as a starting point for the comparison of environmental condition with on-going annual monitoring data. The requirement for ongoing annual monitoring is set out in the Baseline Monitoring Data Report (Ref: BW16:30), and is to be incorporated into the Environmental Offsets Monitoring Plan. A map displaying the monitoring points for the alpine section of the All Mountain trail is provided as appendix 4.

4.2 Reporting

As an additional requirement of the monitoring activities, a reporting regime is to be implemented. The reporting is to be based on the trail monitoring events, with the reports provided to the Office of Environment and Heritage as set out below.

4.2.1 Trail Condition Assessment Report

The trail condition assessment, as detailed in section 4.1.3 of this report, is to be undertaken prior to season opening and after season closing. The trail condition assessment report is to be completed by a representative from NPWS in consultation with Thredbo's Mountain Manager and Environmental Coordinator. The pre-season report will be finalised, with a copy provided to KT, before the 30th of November each year. The post-season report is to be finalised, with a copy provided to KT, prior to the 1st of June each year.

4.2.2 Alpine Trail Monitoring Report

The alpine trail monitoring report, as detailed in section 4.1.4 of this report is to be carried out as a component of the environmental offset monitoring report for Thredbo Mountain Bike Trails – Stage 1B (DA 6571). The environmental offsets monitoring report is to be provided to the Office of Environment and Heritage before the 31st of December each year.

4.3 Management Plan Review

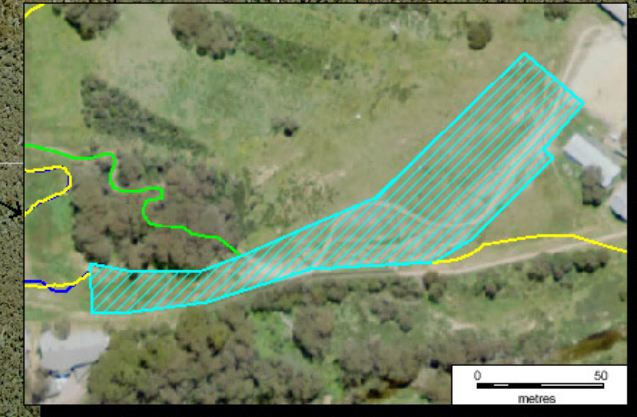
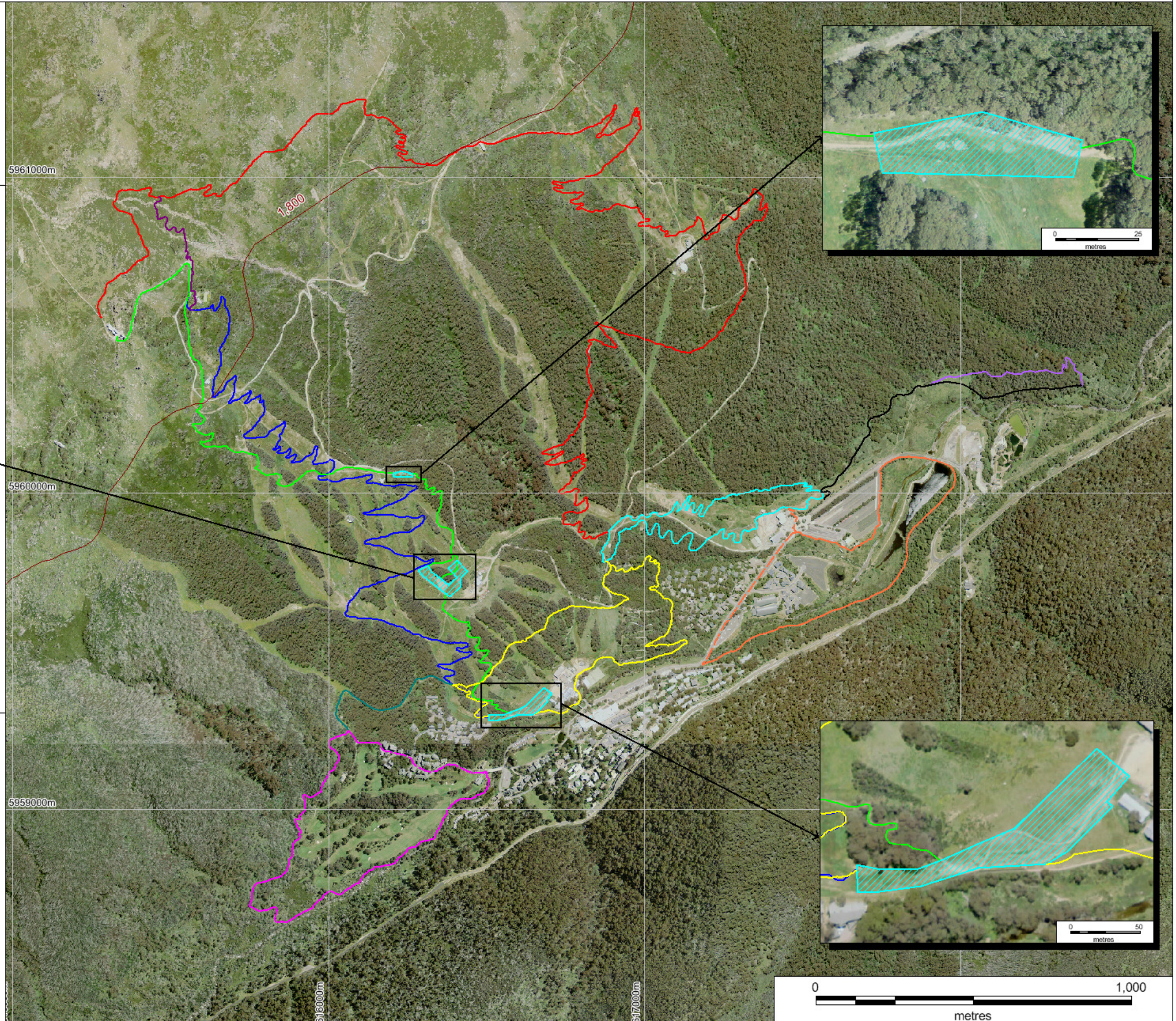
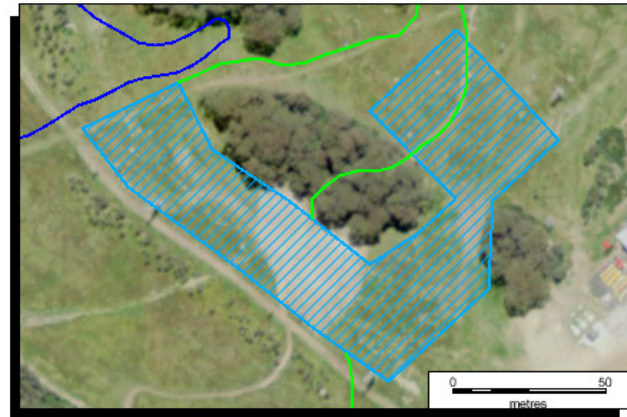
This management plan is intended to be a working document, to be updated as necessary. As such, this plan is to be subject to biennial internal review.

5 Appendices

5.1 Appendix 1 – Thredbo Mountain Bike Trail Map

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Thredbo Mountain Bike Trails



Map Legend

- Thredbo Downhill
- Kosciuszko Flow Trail
- All Mountain Trail
- Flow Link Trail
- Village Loop
- Friday Flat Loop
- Pipeline Path
- Golf Course Loop
- Golf Course Connector
- Bridle Loop
- Thredbo Valley Track
- 1800m contour
- Seasonal Jump Park Construction Area



Datum/projection: GDA 1994 MGA Zone 55
 Prepared by: BW Date: 26/09/17

5.2 Appendix 2 – Trail Zone Map

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DOWNHILL & FLOW

DOWNHILL ZONES

Start: Fire Road

1. Top of Snowgums
2. Kareela
3. Snakes and ladders
4. True blue
5. Snow gun heights
6. Bunnywalk Station
7. Magnetic, bottom of Rossi
8. River Rapids
9. IMBA'S
10. Finish area

FLOW ZONES

1. Start Eagles Nest
2. Flow/ All Mountain intercept
3. Black Sallees START
4. Kareela
5. Supertrail Summer Road Kareela
6. T18
7. Scaffold
8. Tower 12 Snowgums Chair
9. Tower 9 Kosciuszko Express
10. Tower 11 Ramshead Chair
11. Milk run Tower 7 Ramshead
12. Flow and All Mountain intercept
13. Ski in ski out

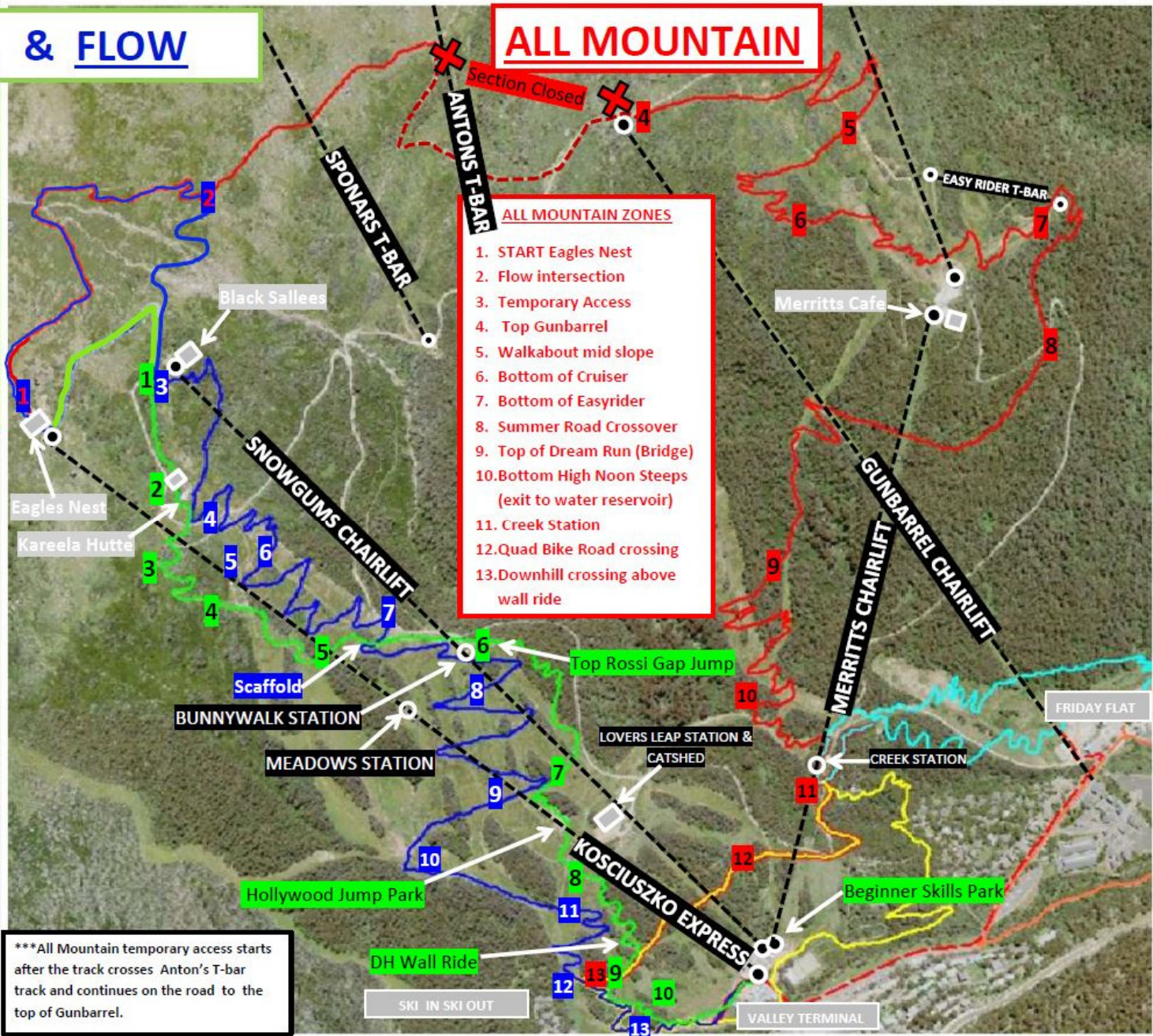
Mountain Bike Trails Legend

- Pipeline Path
- Bridle Trail
- Valley Terminal Loop
- Thredbo Valley Track
- Flow Trail
- Friday Flat Loop
- All Mountain Trail
- Thredbo Downhill Trail
- ***ALL Mountain Temporary Access

ALL MOUNTAIN

ALL MOUNTAIN ZONES

1. START Eagles Nest
2. Flow intersection
3. Temporary Access
4. Top Gunbarrel
5. Walkabout mid slope
6. Bottom of Cruiser
7. Bottom of Easyrider
8. Summer Road Crossover
9. Top of Dream Run (Bridge)
10. Bottom High Noon Steeps (exit to water reservoir)
11. Creek Station
12. Quad Bike Road crossing
13. Downhill crossing above wall ride

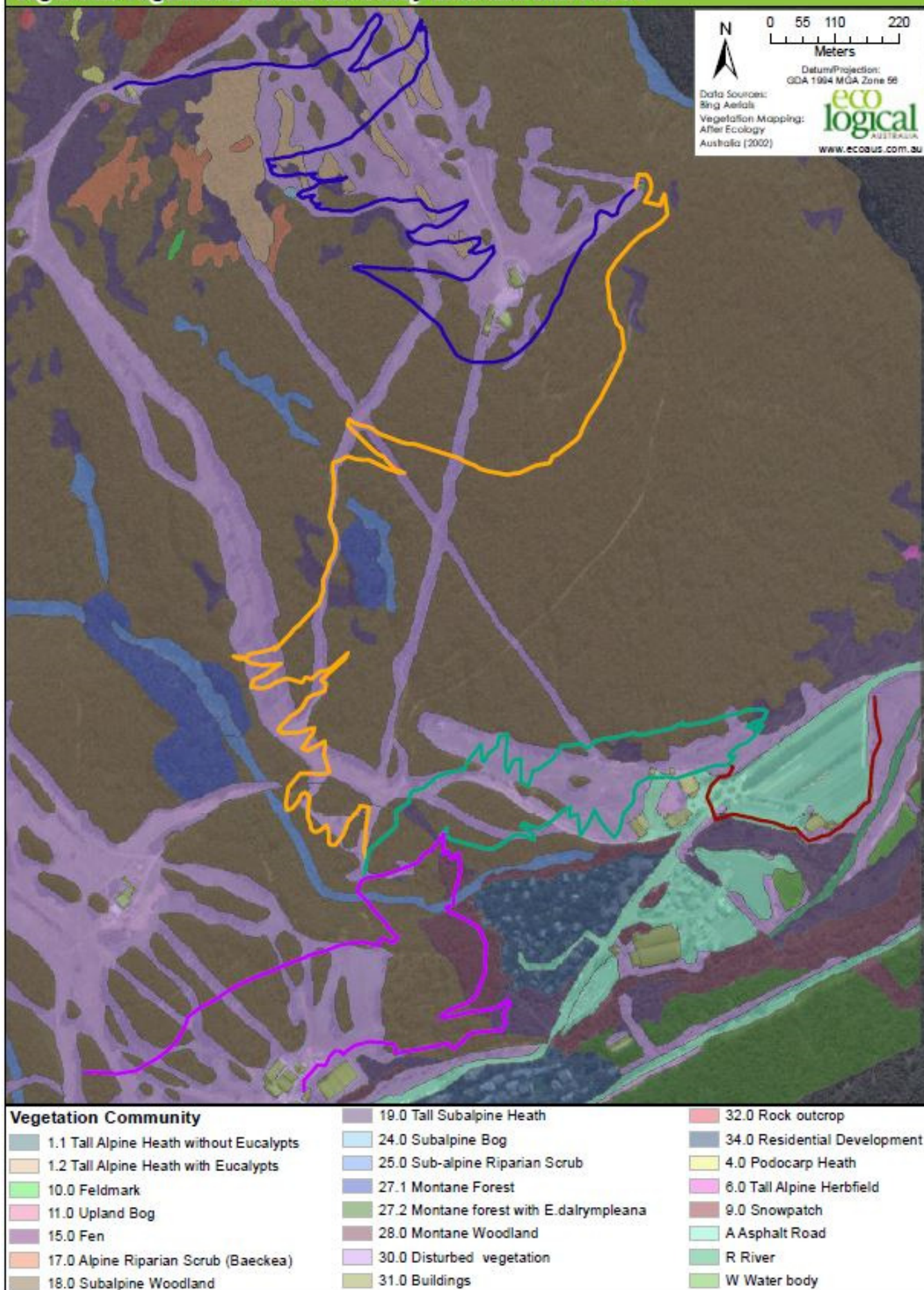


***All Mountain temporary access starts after the track crosses Anton's T-bar track and continues on the road to the top of Gunbarrel.

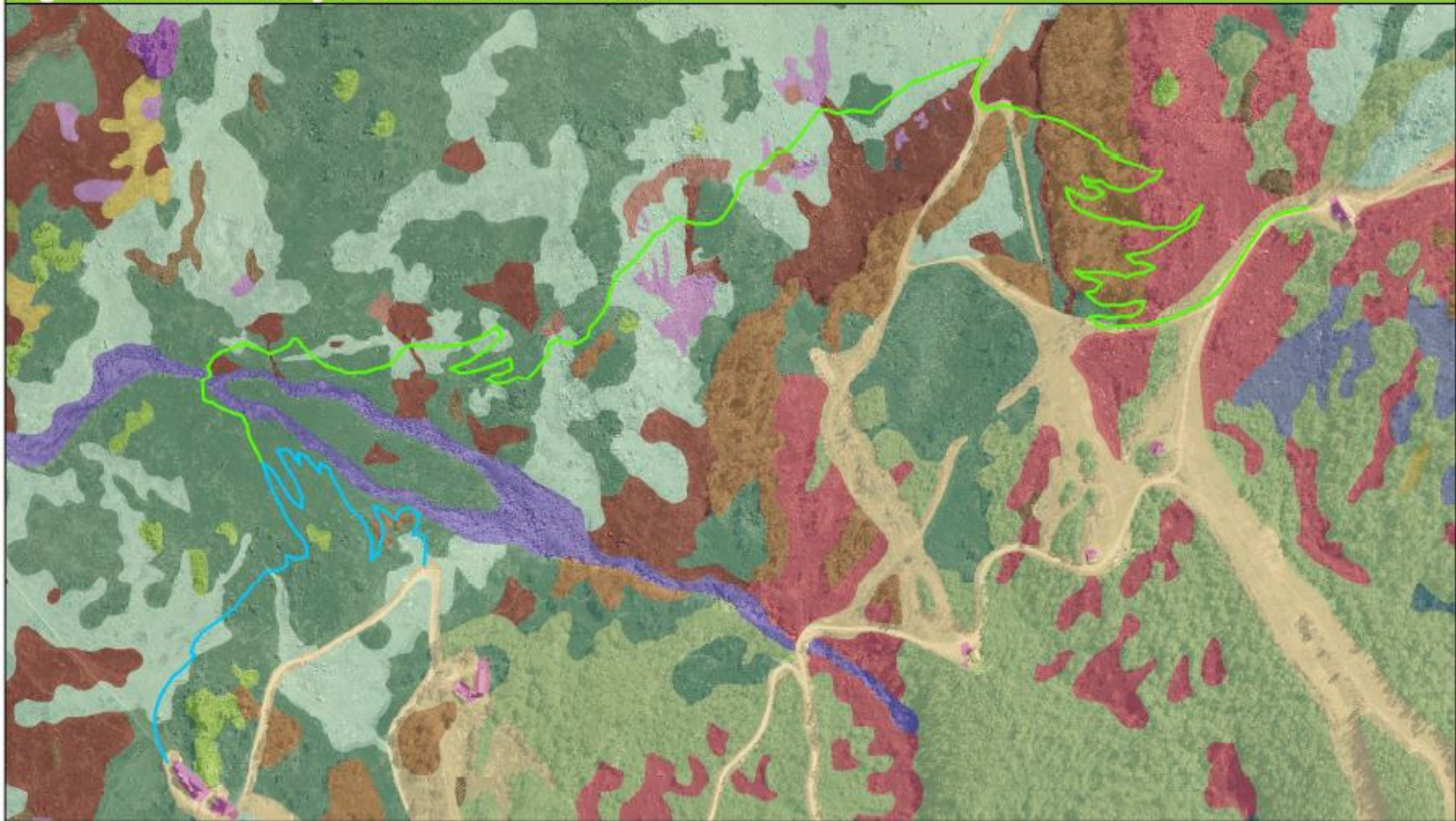
5.3 Appendix 3 – Vegetation Maps

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Figure 2: Vegetation within the study area and surrounds



Vegetation within the study area and immediate surrounds



Legend

Trail 12

Trail 13 Section 1

1.1 Tall Alpine Heath without Eucalypts

1.2 Tall Alpine Heath with Eucalypts

10.0 Feldmark

11.0 Upland Bog

13.0 Sod Tussock Grassland

15.0 Fen

16.0 Alpine Stream Complex

17.0 Alpine Riparian Scrub (Baeckea)

18.0 Subalpine Woodland

19.0 Tall Subalpine Heath

2.0 Short Alpine Heath

25.0 Sub-alpine Riparian Scrub

30.0 Disturbed vegetation

31.0 Buildings

32.0 Rock outcrop

4.0 Podocarp Heath

8.0 Short Alpine Herbfield

9.0 Snowpatch

Ribbon Grass - Shield Fern

0 45 90 180
Metres

Datum/Projection:
GDA 1994 MGA Zone 58



eco
logical
AUSTRALIA

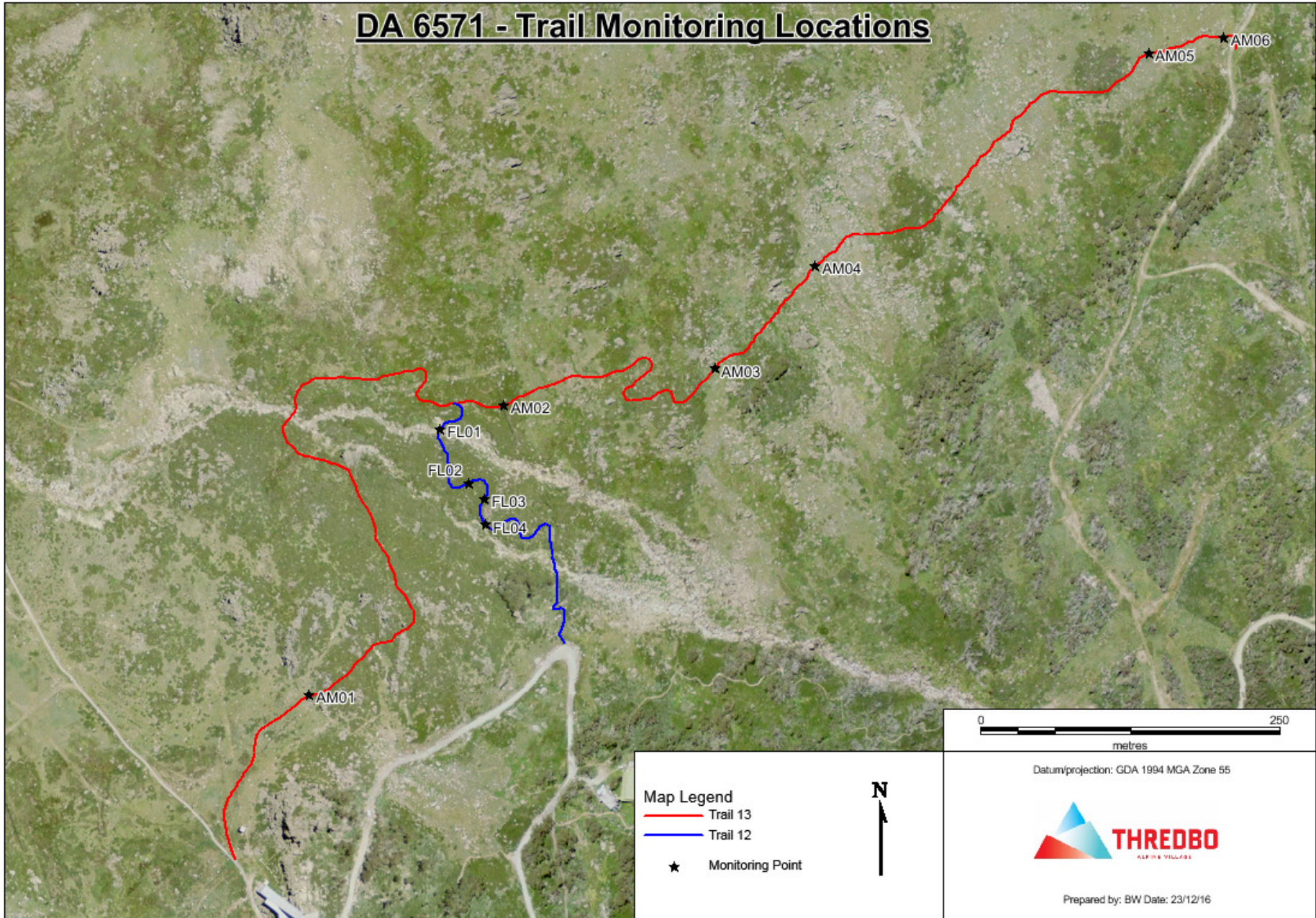
www.ecoaus.com.au

Prepared by: DE Date: 22/05/2014

5.4 Appendix 4 – Alpine Trail Monitoring Points

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DA 6571 - Trail Monitoring Locations



6 Attachments

6.1 Attachment 1 - Daily Operational Monitoring Checklist

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MTB Course Inspections

Event Location: Thredbo MTB Trails

Date: _____

All Mountain Trail

	YES	Signed
❖ Check fences and signage in place	<input type="checkbox"/>	_____
❖ Take offs and landings inspected	<input type="checkbox"/>	_____
❖ Trail surface inspected	<input type="checkbox"/>	_____
❖ Full course inspection completed before opening to public	<input type="checkbox"/>	_____

Cannonball DH Trail/Flow Trail

❖ Check fences and signage in place	<input type="checkbox"/>	_____
❖ Take offs and landings inspected	<input type="checkbox"/>	_____
❖ Trail surface inspected	<input type="checkbox"/>	_____
❖ Full course inspection completed before opening to public.	<input type="checkbox"/>	_____

Comments/Issues noted:

.....

.....

.....

.....

I certify that I have inspected the course on behalf of Thredbo MTB Bike Patrol. I deem that the course has been constructed appropriately, inspected by myself and certify that it is fit for purpose.

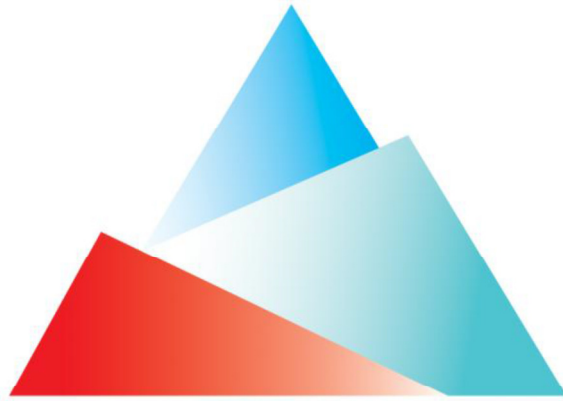
Name.....

Signature.....

Date.....

6.2 Attachment 2 – Jump Park Site Environmental Management Plan

DRAFT



THREDBO

ALPINE VILLAGE

Site Environmental Management Plan

**Thredbo MTB
Jump Park Construction**

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1. Introduction

As a component of Thredbo's mountain bike trail network, a total of three seasonal jump parks are constructed along the alignment of the Thredbo Downhill and the Kosciuszko Flow trail to provide an enhanced and progressive rider experience. The Bunnywalk station jump line is incorporated into the Thredbo downhill trail, located adjacent to Bunnywalk station on Snowgums chairlift, above the Rossignol racecourse. The middle slopes jump park is located above the cat shed between the Kosciuszko Express and Snowgums chairlift lines. The Kosci jump park is located on the Village trail above the Valley Terminal base area, intended to form the finish area of the mountain bike trails. The jump parks are constructed prior to opening and de-constructed after the close of each mountain biking season. The construction activities will utilise the existing site soil to construct the jump features and appropriate building materials to construct wall ride and bridge features.

1.1 Objective

This Site Environmental Management Plan (SEMP) has been prepared for use by all personnel involved in the project, and is intended to ensure that all environmental safeguards for such works are implemented and monitored. The SEMP details the appropriate environmental management measures and sets out environmental criteria against which environmental controls and work measures can be assessed. The SEMP is a working document to be updated as necessary.

1.1.1 SEMP objectives

- To determine timing and responsibilities for implementing environmental undertakings;
- To enable self-assessment to ensure that mitigation measures are implemented; and
- To identify responsibilities for carrying out monitoring.
- To identify environmental objectives

Environmental Objectives

Soils and Geology

- Minimise soil erosion and sediment movement from the site, ensuring minimal risk of impact on the surrounding environment and landscape features.
- Minimise the potential for the spill of environmentally harmful substances.
- Ensure prompt and effective hazardous material spill response.

Water Quality

- Minimise the potential for pollution of waterways during and following works, including the impact of sediment movement from the site.
- Minimise the potential for the spill of environmentally harmful substances.
- Ensure prompt and effective hazardous material spill response.

Flora and Fauna

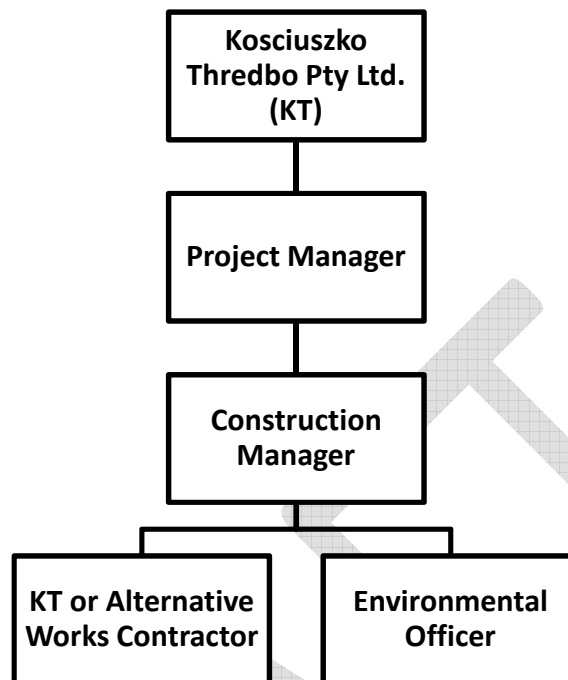
- Ensure minimal impact on native flora and fauna throughout the works.
- Minimise the impacts sustained by habitat features used by native fauna.
- Ensure rehabilitation of works site is undertaken with appropriate locally indigenous species, restoring ecological and associated habitat values as soon as practical following the works.

Social and Economic Impacts

- Minimise the impacts on aesthetic values of the area during and following construction
- Minimise the impacts of noise and dust for the duration of the works.
- Minimise the potential impacts on artefacts and areas of aboriginal cultural significance.

2. Environmental Management Structure

2.1 Project Team Structure



2.2 Roles and Responsibilities

2.2.1 Project Manager

- Ensure compliance with the SEMP;
- Seek advice from the relevant Kosciuszko Thredbo Pty Ltd. Staff if conditions of the SEMP cannot be met;
- Responsible for ensuring the implementation and maintenance of the SEMP;
- Advise on unexpected environmental issues arising during implementation of the plan as well as investigating solutions; and
- Undertake environmental audits to monitor compliance with SEMP.

The Project Manager is to receive a copy of the SEMP and will be made aware of the environmental responsibilities of the position.

2.2.2 Construction Manager

- Is familiar with contents of this SEMP,
- Ensuring that all personnel including contractors/sub-contractors comply with the SEMP requirements relevant to their scope of work.

The Construction Manager is to receive a copy of the SEMP and will be made aware of the environmental responsibilities of the position.

2.2.3 KT Works Staff or Contractors

- Implement and maintain compliance with the SEMP;
- Report to the project or construction manager on compliance if required.

2.2.4 Environmental Officer

- Is familiar with the contents of this SEMP;
- Monitor compliance on a daily basis, either personally or through delegation to a suitably qualified KT employee;
- Participate in construction audits

2.2.5 SEMP Contacts

Relevant government departments will be consulted by Kosciuszko Thredbo Pty Ltd, where necessary.

ENVIRONMENTAL MANAGEMENT PLAN CONTACTS		
Organisation	Responsibility	Contact
National Parks and Wildlife Service	Flora, fauna, archaeology	6450 5555
Environment Protection Authority (EPA)	Water/noise/air pollution control and regulation	62297002
Soil Conservation Service – The Department of Primary Industries	Soil erosion and sediment control	6452 1455

2.3 Environmental Training

Environmental training for the project is to be provided through site induction, involving all KT staff and contractors working specifically on the project. The site induction is to be conducted by relevant KT staff, with the induction of additional contractors staff the responsibility of the contractor.

The site induction is to consist of training in environmental awareness, including relevant KT policies and procedures, and environmental issues including (but not limited to):

- This SEMP,
- Legislation, licencing and approvals,
- Emergency response/procedures,
- Site environmental procedures, including soil and water management (plan provided as appendix 1)
- Incident reporting procedures.

2.4 Communication

The communication requirements will be carried out as per the project roles and responsibilities, outlined in section 2.2 (above). Communication with key stakeholders will occur with the Department of Planning and Environment and the NSW National Parks and Wildlife Service as required.

2.5 Construction Procedures

2.5.1 Construction Program

The construction program is provided to document the sequence of the works to be undertaken for the project.

1. Site induction for all contractors/staff involved in the works.
2. Locating and marking of below ground services within the construction zones.
3. Installation of site environmental management measures, including all sediment protection.
4. Reclamation of site soil and construction of features.
5. Finalise all stabilisation and revegetation works ensuring the site is erosion resistant.

2.5.2 Construction Zone

A diagrammatic plan identifying all jump park construction zones for the project is provided with this SEMP as Appendix 2.

2.5.3 Stockpile Sites

Temporary stockpile sites may be required to effectively manage the material associated with the jump park construction works. These sites will be strategically located within the construction zones (appendix 2), adhering to the following criteria;

- Located directly adjacent to the works
- Situated on relatively flat ground
- Not within 40m of any watercourse
- In areas with sufficient room to accommodate the volume of material being stockpiled

All stockpiles will be managed in accordance with the Soil Stockpile Guidelines for the Resort Areas of Kosciuszko National Park (OEH 2017)

2.5.4 Waste Management

All waste and rubbish on the site is to be minimised in the first instance, with all remaining waste and rubbish on site to be contained within covered receptacles. All waste is to be disposed of in accordance with the Thredbo Village Waste Management Strategy. Under no circumstances is any material to be swept or hosed into any waterways.

2.5.5 Noise and Vibration

Given the nature of the construction and proximity to village lodges, minimal noise and vibration disturbance is expected from the works; reasonable efforts will be made to minimise obtrusive impacts on residents and visitors. Construction will be limited to between the hours of 7:00 am and 5:00 pm, outside of peak visitation periods.

Where complaints are received, work may need to be postponed or cease. Alternatively, noise pollution controls may be implemented.

2.5.6 Dust management

All works are to be carried out with regard to dust minimisation to ensure there are no adverse effects on the air quality of the surrounding area and the waterway in which the works will be undertaken. Dust management measures are to consist of dampening the area of work through light watering.

2.5.7 Traffic Management

Traffic and vehicle access will be managed as per regular daily operation with regard to village and mountain access.

All construction vehicles will enter and exit the sites via the Thredbo mountain access road network. Once on-site all construction vehicles will be confined, including loading and unloading, to the construction zones identified in Appendix 2.

Construction vehicles to be used;

- 4WD vehicles/utilities
- Truck/Tipper Truck
- Excavator

2.5.8 Pedestrian and Bike Rider Management

Kosciuszko Thredbo Pty Ltd. is the head lessee and manager of all cycling and pedestrian activities within the lease area. As such; bike rider and pedestrian access within the construction zones will be managed by KT, through the use of signage and exclusion from the construction zones.

Minimal impacts on bike rider and pedestrian use are predicted, as the construction works are scheduled outside of peak visitation periods.

3. Environmental Impacts

3.1 Soil Erosion and Water Quality

The soil disturbance will be limited to the area of the works and the immediate surrounds. Soils adjacent to the project site are identified as susceptible to erosion once disturbed, as such; temporary erosion and sediment control measures will be used as required, set out in Appendix 1.

3.2 Flora and Fauna

The works to be undertaken will involve minimal disturbance or modification of any existing native vegetation. The construction works will be strictly confined to pre-existing disturbed ski slopes.

3.3 Cultural Heritage

Due to the existing highly modified nature of the site, the occurrence of cultural heritage items and values within the construction area is likely to be very low, with no aboriginal scarred trees identified within the construction zone or surrounding area.

In the event of discovery of potential archaeological or aboriginal culturally significant items, all works within the site will cease immediately. The designated Environmental officer is to be informed and a formal site inspection carried out with a representative from the OEH (Office of Environment and Heritage).

3.4 Air Quality and Dust

The works are anticipated to generate moderate amounts of dust, potentially impacting upon the air quality of the area. Environmental controls are to be implemented to mitigate the impacts on air and water quality within the construction site and surrounding areas. The required environmental controls are detailed in appendix 1.

4. Environmental Incident Management

Environmental Incident management is to focus on prevention in the first instance, through appropriate machinery maintenance, and storage of fuel, paints, and oils. In the event of an incident occurring, Thredbo Environmental Services department is to be notified. Additional incident management is to be carried out with reference to, and in accordance with, the following:

- The safety of all personnel is the first priority in the event of any incident.
- All emergency/incident response is to be carried out in accordance with Thredbo's Construction Site Incident and Emergency Procedures Thredbo Village (2014/2015) document. This document includes reference to spill procedures and emergency and incident responses. The Thredbo brigade has HAZMAT response capabilities, and the village and engineering department has spill kits at every village facility (i.e. cat shed, VT workshop, pump stations, golf course sheds etc.) and 240-litre bin spill kits available for response.
- It is a requirement that any contractor involved with the works has an emergency/incident procedure plan. The contractors will be responsible for responding to any environmental emergency caused by any action (or inaction) of the contractor or contractor's staff, this includes contacting appropriate authorities (KT, NPWS etc.).

5. Monitoring and Review

5.1 Assessment and Monitoring

The implementation of, and conformance with the SEMP is to be assessed by the Project Manager in the first instance. Monitoring is to be undertaken during all stages of works, including prior to commencement and after works have been completed.

A Kosciuszko Thredbo Pty Ltd. representative is required to sign off each task specified in the SEMP, after ensuring compliance. The representative is also responsible for taking corrective action in the event of non-conformance or a situation likely to lead to adverse environmental impact.

5.2 Legislative/Statutory Requirements

5.2.1 General Requirements

Activities carried out on the site must comply with the relevant provisions of all legislation relating to the construction and operation of the project. This includes but is not limited to the following:

- Environmental Planning and Biodiversity Conservation Act 1999
- Environmental Planning and Assessment Act 1979
- Protection of the Environment and Operations Act 1997
- Threatened Species Conservation Act 1995
- National Parks and Wildlife Act 1974
- Native Vegetation Act 2003
- Soil Conservation Act 1938
- Noxious Weeds Act 1993
- Water Act 1912
- Heritage Act 1977
- Environmentally Hazardous Chemicals Act 1985

5.2.2 Additional Requirements

In addition to the general requirements, all activities on the site must comply with the provisions set out in the following:

- Kosciuszko National Park Plan of Management 2006
- Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park 2007
- Soil Stockpile Guidelines for the Resort Areas of Kosciuszko National Park 2017

6. Appendices

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6.1 Appendix 1 – Erosion and Sediment Control Plan

6.1.1 Erosion and Sediment Control

Due to the nature and extent of the works, appropriate environmental controls will be used to manage surface water and sediment movement as required. The environmental controls are to consist of either a straw bale filter (Figure 1); or a sediment fence (Figure 2). Additional or alternative controls can be used, subject to approval by the appointed project Environmental Officer.

Figure 2 - Standard Straw Bale Filter Installation

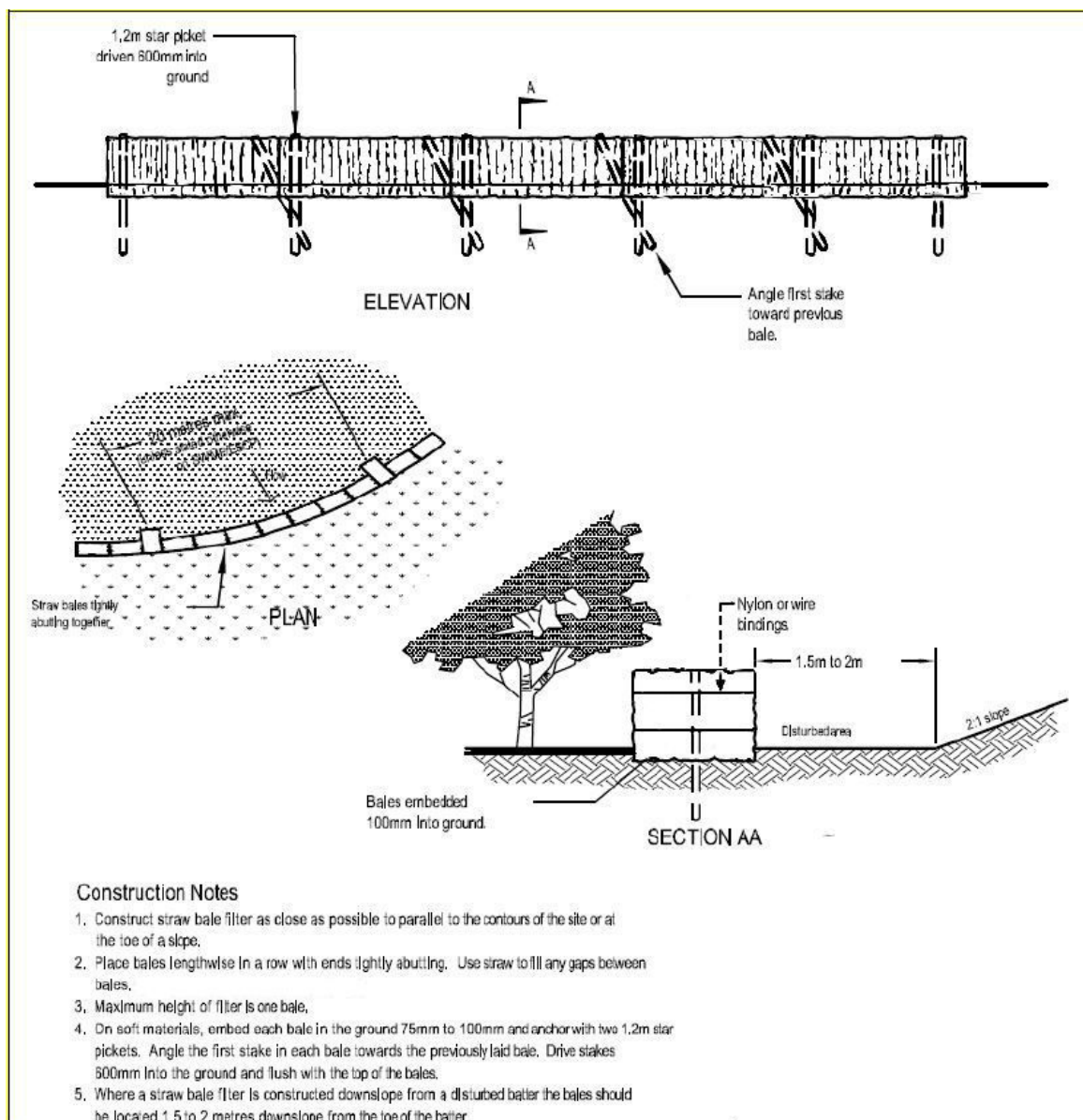
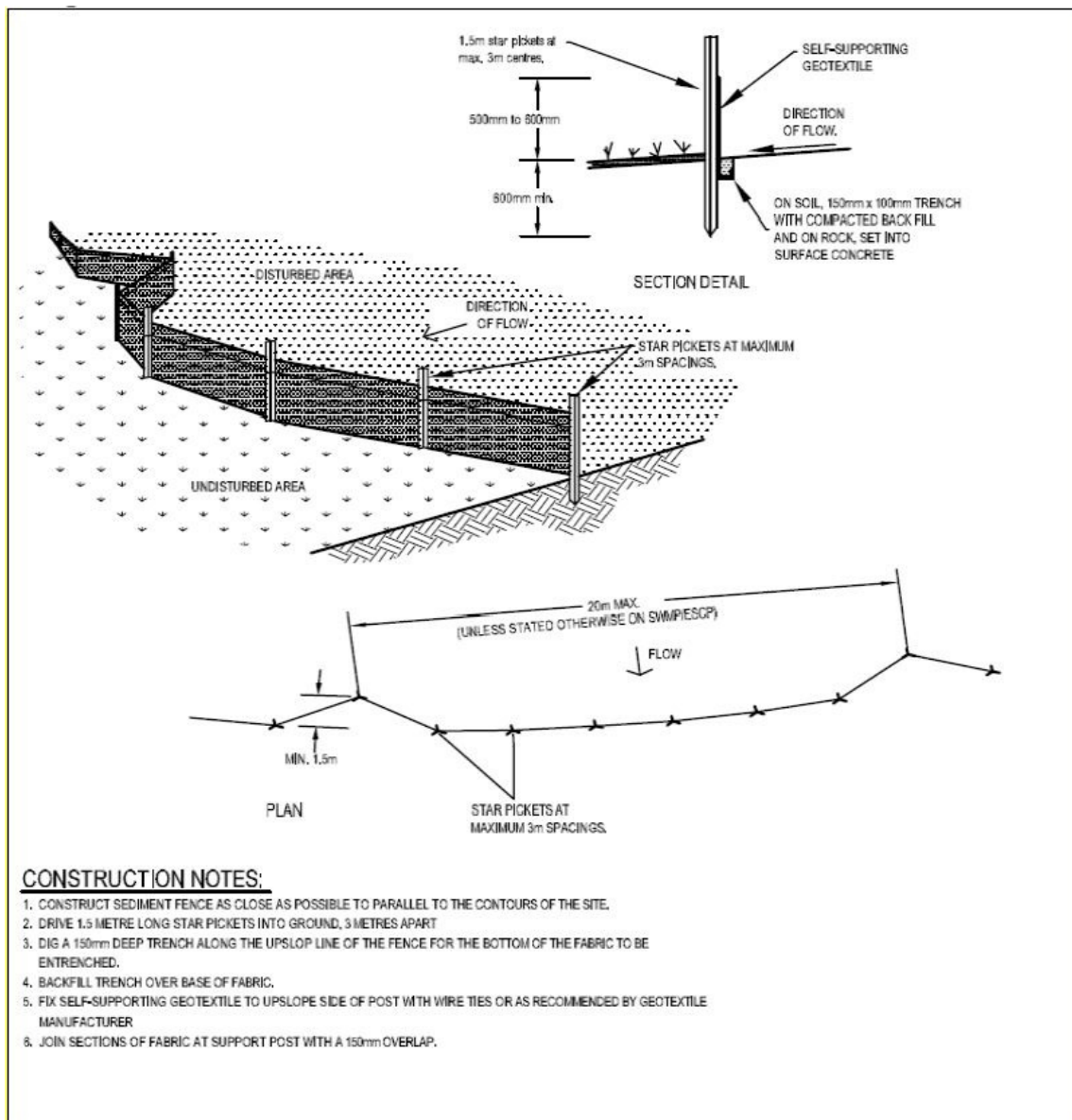


Figure 3 - Standard Sediment Fence Installation



The construction area and activities are situated on a pre-disturbed and highly modified site. As such, erosion, sediment, and dust controls are necessary to protect the surrounding natural areas from environmental harm.

In the event of sediment control being utilised, the following suite of criteria is to be applied:

- Soil stockpiles are to be surrounded by sediment control fencing.
- Works will cease during rainfall events.
- To prevent sediment entering any watercourse, a sediment fence is to be located on downslope side of the excavations, where required, in accordance with Figure 2; above.
- Sediment control measures are to be implemented prior to any construction work and retained in place until exposed areas of soil or vegetation are stabilised and/or revegetated.
- Drainage management and sediment control measures are to have particular regard to the prevention of any sedimentation of watercourses.
- Only weed-free straw or natural thatch/litter should be used in sediment control activities.

6.1.1.1 Drainage

Temporary surface water runoff controls are required to be installed around any and all drains immediately down-slope of the construction/excavation works. The temporary controls are to consist primarily of silt fencing or straw bales /coir logs*, placed surrounding the inlet of the drains.

6.1.1.2 Down-slope Excavations

The temporary surface water runoff controls to be installed on excavations on declines are to consist primarily of straw bales*, to be placed at each end of the open trenches. The placement of the bales is designed to divert water around and away from the open excavation works.

6.1.1.3 Cross-Slope Excavations

The temporary surface water runoff controls to be installed in excavations on flat areas running cross-slope is to consist of straw bales/coir logs* to be placed on the uphill side, along the length of the excavation where required. The placement of the water runoff controls is designed to divert water around and away from the open excavation works.

*Alternative surface water runoff and sediment controls may be used, subject to approval by the nominated project Environmental Officer.

6.1.2 Water in Excavations

If water enters any excavations, it may be required to be pumped out prior to the recommencement of works. In the event of pumping operations, the following measures are to be complied with.

- A geo-fabric dam filter is to be installed within the construction zone, capturing sediment and pollutants;
- All pumping operations and equipment is to be confined to the construction zone.

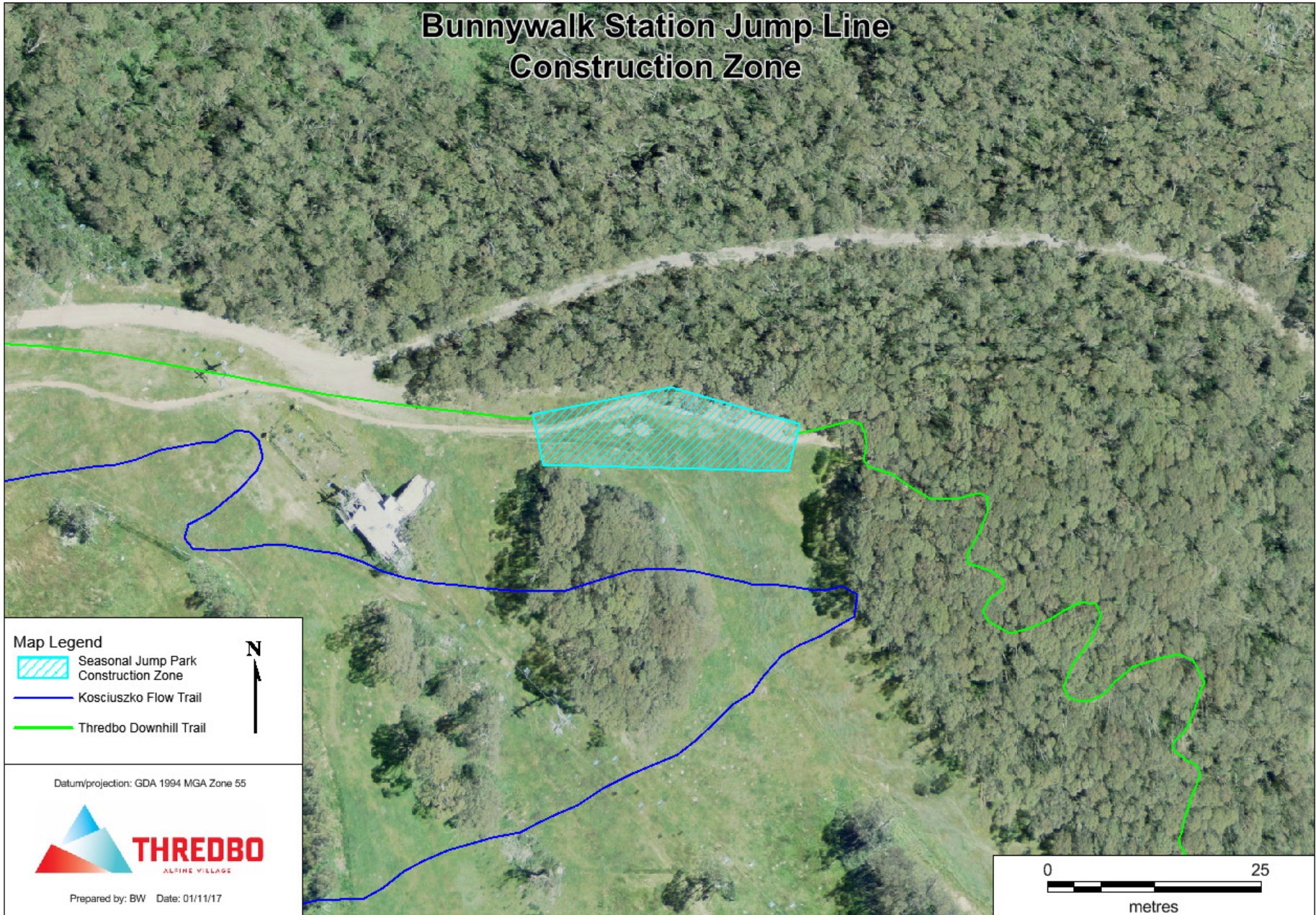
6.1.3 Monitoring


The regular monitoring and maintenance of the sediment and erosion controls is the responsibility of all parties involved with the project. The nominated environmental officer is to undertake weekly audits of any environmental controls used for the duration of the construction works.

6.2 Appendix 2 – Diagrammatic Plans

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Bunnywalk Station Jump Line Construction Zone



- Map Legend
-  Seasonal Jump Park Construction Zone
 -  Kosciuszko Flow Trail
 -  Thredbo Downhill Trail



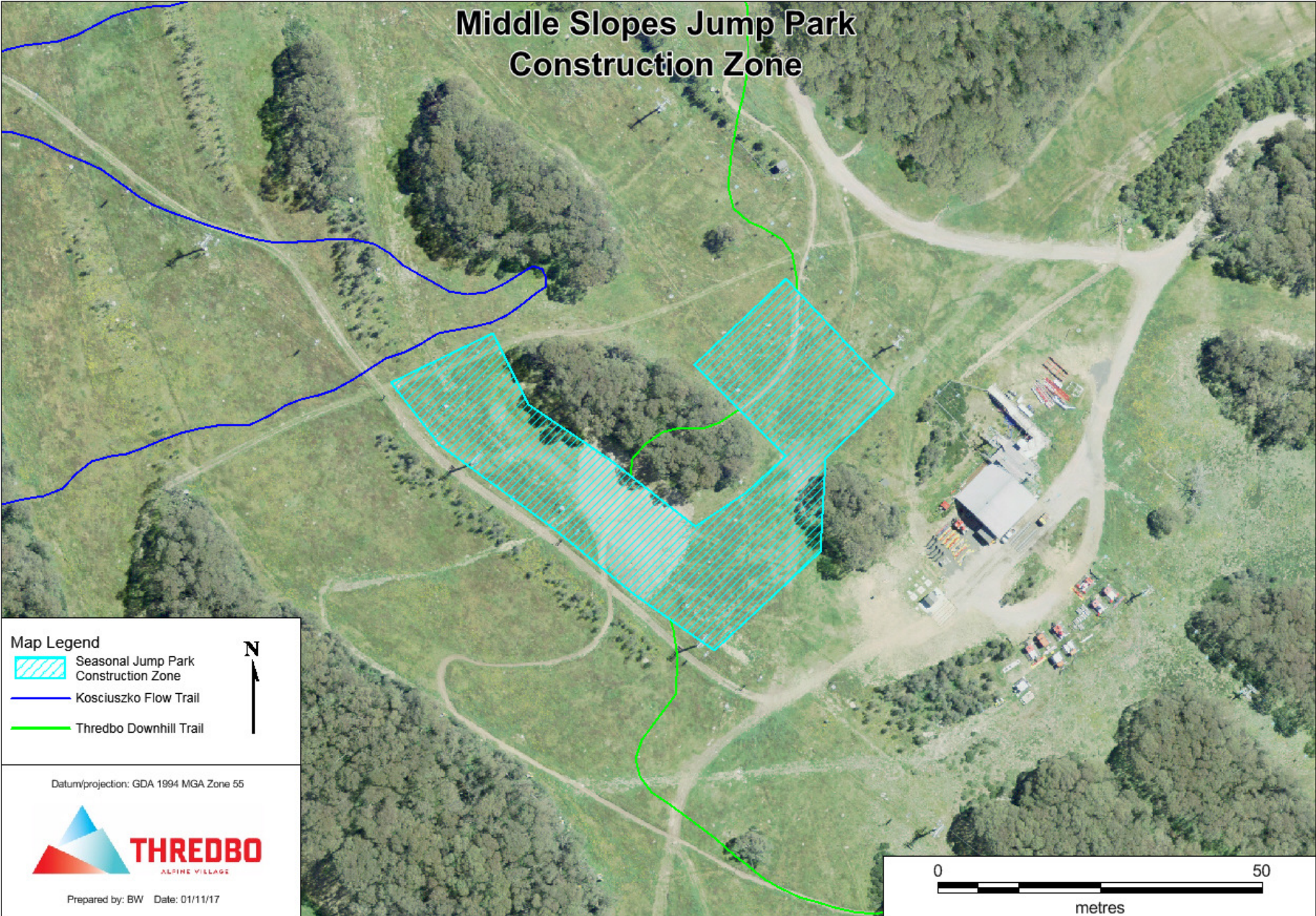
Datum/projection: GDA 1994 MGA Zone 55






Prepared by: BW Date: 01/11/17

0 25
metres

Middle Slopes Jump Park Construction Zone



Map Legend

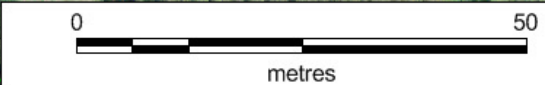
-  Seasonal Jump Park Construction Zone
-  Kosciuszko Flow Trail
-  Thredbo Downhill Trail

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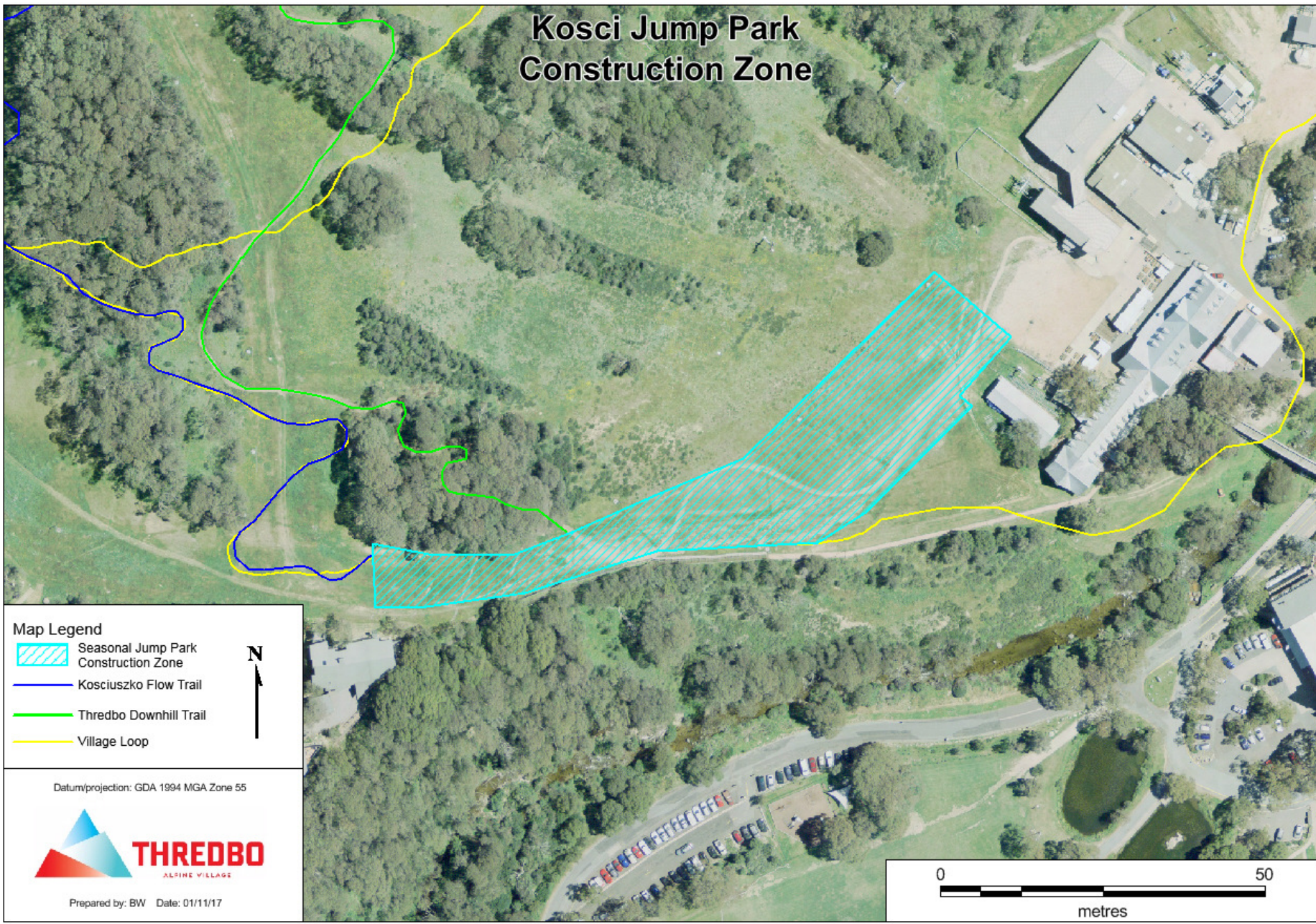
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Prepared by: BW Date: 01/11/17



Kosci Jump Park Construction Zone



Map Legend

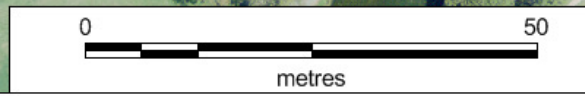
-  Seasonal Jump Park Construction Zone
-  Kosciuszko Flow Trail
-  Thredbo Downhill Trail
-  Village Loop

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Datum/projection: GDA 1994 MGA Zone 55



Prepared by: BW Date: 01/11/17



6.3 Appendix 3 - Recommended Revegetation Species

The following is an extract from the publication; Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park (NPWS 2007). The table represents some of the recommended species for revegetation activities within Thredbo.

Rehabilitation Species List: Thredbo & Bullocks Flat

This appendix provides a list of species known to be successful in rehabilitation, and which would be suited to the Kosciuszko resorts. It does not provide a definitive list of species found in each resort.

Form	Species	Common Name	Community	Propagation and Seed Collection Notes	Direct Seeding
<i>Forbs</i>					
	<i>Craspedia jamesii</i>	James's Billy-button	TAHa, STG	Seed or division	Y
	<i>Craspedia lamicola</i>	Shiny-leaf Billy-button	TAHa, STG	Seed or division	Y
	<i>Craspedia leucantha</i>	Pale Billy-button	SAH, TAHa	Seed or division	Y
	<i>Craspedia maxgrayi</i>	Woolly Billy-button	TAHa, STG	Seed or division	Y
	<i>Helichrysum scorpioides</i>	Button Everlasting	TAHa, W	Seed	Y
	<i>Podolepis robusta</i>	Alpine Podolepis	TAHa, STG	Seed	Y
	<i>Senecio linearifolius</i>	Fireweed Groundsel	SAH, W, SR	Seed	Y
	<i>Stylidium graminifolium</i>	Alpine Trigger-plant	TAHa, STG, H, B, W, SAH, SG	Seed	Y
<i>Grasses, rushes</i>					
	<i>Carex hebes</i>	Dryland Sedge	TAHa, STG	Seed or division	Y
	<i>Poa costiniana</i>	Prickly Snow-grass	STG, F, B, TAHa, H, SAH	Seed or division	Y
	<i>Poa ensiformis</i>	Sword Tussock-grass	W, SAH, SR	Seed or division	Y
	<i>Poa fawcettiae</i>	Smooth-blue Snow-grass	TAHa, STG	Seed or division	Y
	<i>Poa hiemata</i>	Soft Snow-grass	TAHa, SG	Seed or division	Y
<i>Shrubs</i>					
	<i>Acacia obliquinervia</i>	Mountain Hickory Wattle	SAH	Seed (collect in March)	Y
	<i>Cassinia monticola</i>	Cassinia	W, SG		
	<i>Grevillea australis</i>	Royal Grevillea	H, SAH	Tip cutting	
	<i>Hakea microcarpa</i>	Small-fruit Hakea	SAH, W		Y
	<i>Ozothamnus ellipticum</i>	Kerosene Bush	B, H	Soft cutting	
	<i>Ozothamnus secundiflorus</i>	Cascade Everlasting	H, SAH	Soft cutting	
	<i>Podolobium alpestre</i>	Alpine Shaggy-pea	H	Seed (collected in March)	
		<i>Prostanthera cuneata</i>	Alpine Mint-bush	H	Cuttings
<i>Trees</i>					
	<i>Eucalyptus dalrympleana</i>	Mountain Gum	W	Seed	Y
	<i>Eucalyptus delegatensis</i>	Alpine Ash	W	Seed	Y
	<i>Eucalyptus pauciflora</i>	Snow Gum	W	Seed (available all year). 3 weeks cold treatment at 4°C recommended.	Y
	<i>Eucalyptus stellulata</i>	Black Sally	W	Seed (available all year). 3 weeks cold treatment at 4°C recommended.	Y

Key to Communities:

TAHa	Tall Alpine Herbfield <i>Celmisia</i> – <i>Poa</i> alliance	H	Heath (alpine)
		F	Fen
TAHb	Tall Alpine Herbfield <i>Brachyscome</i> – <i>Austrodanthonia</i> alliance	B	Bog
		STG	Sod Tussock Grassland
SAH	Short Alpine Herbfield	W	Woodland
FMa	Feldmark <i>Epacris-Chionohebe</i> alliance	SAH	Sub-alpine heath
		SR	Subalpine Riparian and wet areas
FMb	Feldmark <i>Coprosma</i> – <i>Colobanthus</i> alliance	SG	Subalpine Grassland and dry, treeless areas

7. Attachments

7.1 Attachment 1 – SEMP Checklist

The following table is to be completed prior to, during and after completion of construction. The table sets out the specific requirements for the mitigation of environmental impacts, and designates responsibility for ensuring that the requirements are met.

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Issue	REF	Action	Responsibility	Timing	Sign off and Date
Licences, Permits and Approvals		Acquire and complete all relevant licences, permits, and approvals for the proposed construction works.	Project Manager	Prior to construction	
Community Consultation		Ensure all relevant and/or affected surrounding residences and landholders are made aware of the proposed works.	Project Manager	Prior to and during construction	
		Provide all affected residents with an appropriate contact name and telephone number.	Project Manager	Prior to construction	
		Maintain a register to monitor community complaints and actions taken.	Project Manager	During construction	
Emergency Contacts		Provide the TAH & VT Reception with the names of two contacts who can be contacted on a 24 hour basis in the event of an emergency.	Project Manager	Prior to construction	
Work Compound Site		Establish the works compound site on the site.	Construction Manager	During construction	
		Liquid fuel and chemicals should be stored in a lockable floored structure which is surrounded by an earth bund able to contain at least 110% of the volume of the largest container stored in the structure.	Construction Manager	During construction	
		Equipment maintenance to be undertaken at the Valley Terminal maintenance shed.	Construction Manager	During construction	
		Install appropriate drainage and soil erosion controls around the compound.	Construction Manager	During construction	
		The works compound site is to be rehabilitated to a clean and tidy state on completion.	Construction Manager	Post construction	
Erosion and Sedimentation Control		Prepare a temporary erosion and sedimentation control plan.	Project Manager	Prior to construction	
		Install temporary erosion and sedimentation controls at drainage lines adjacent to the site.	Construction Manager	Prior to construction	
		Where necessary, construct diversion banks to prevent runoff entering the site.	Construction Manager	Prior to and during construction	
		Confine the area of disturbance to the minimum area required for construction purposes.	Construction Manager	During construction	

Issue	REF	Action	Responsibility	Timing	Sign off and Date
Erosion and Sedimentation Control (cont.)		Define construction boundaries with temporary fencing or appropriate barrier tape and avoid disturbance outside this area.	Construction Manager	During construction	
		Stockpile stripped topsoil and scalped grass sods for respreading on disturbed areas on completion.	Construction Manager	During construction	
		Stabilise stockpiles to prevent weed infestation and erosion.	Construction Manager	During construction	
		Soil erosion and sedimentation controls to be placed around all stockpile sites.	Construction Manager	During construction	
		Monitor effectiveness of erosion control measures and undertake necessary maintenance on a regular basis especially after rain, i.e. remove trapped sediments.	Construction Manager	During construction	
		Maintain records of soil erosion control inspections - refer to checklist attached (Attachment 2).	Construction Manager	During construction	
		Undertake progressive revegetation of disturbed areas in consultation with the Environmental Officer.	Construction Manager	During and post construction	
Air Quality		Dust from construction to be controlled by strategic watering of disturbed areas.	Construction Manager	During construction	
		Restrict the size of areas exposed.	Construction Manager	During construction	
		Water stockpile sites to reduce dust if necessary.	Construction Manager	During construction	
		Exposed areas to be progressively revegetated.	Construction Manager	During construction	
		No burning of waste vegetation and other material.	Construction Manager	During construction	
		Cover all truckloads to reduce dust.	Construction Manager	During construction	
		Maintain construction vehicles and equipment in an efficient condition as per manufacturer's specifications.	Construction Manager	During construction	

Issue	REF	Action	Responsibility	Timing	Sign off and Date
Visual		Retain existing vegetation.	Construction Manager	During construction	
		Minimise impacts on vegetation not directly affected by the work.	Construction Manager	During construction	
		Revegetate the area progressively and as soon as possible.	Construction Manager	During construction - Progressively	
Flora and Fauna		Clearly mark all vegetation to be removed.	Construction Manager	Prior to construction	
		Check trees and shrubs for resident animals prior to felling and vegetation clearance. Contact NPWS for advice on relocating any animals found.	Construction Manager	During construction	
		Retain regeneration areas where possible.	Construction Manager	During construction	
		Minimise area to be cleared and retain mature trees whenever possible.	Construction Manager	During construction	
		Ensure that all equipment and materials are stored on previously cleared areas to avoid impacts on vegetation not directly affected by construction.	Construction Manager	During Construction	
		Undertake a revegetation program with suitable local native species, in accordance with the Plan.	Construction Manager	Progressively and on completion of construction	
		If trees are to be removed as specified in the Plan, do not push fell trees into windrows.	Construction Manager	During construction	
Noise and Vibration		Restrict work to between 7:00 am – 5:00 pm.	Construction Manager	During construction	
		Maintain and service machinery in accordance to the specifications of the manufacturers.	Construction Manager	Prior to working outside normal working hours	
		Ensure that all vehicles and construction equipment are fitted with appropriate noise control devices.	Construction Manager	During construction	

Issue	REF	Action	Responsibility	Timing	Sign off and Date
Heritage		Ensure that all workers on site are aware of the location of any Aboriginal or other heritage sites and the need to maintain a buffer of 10 metres between these sites and the work.	Construction Manager	During construction	
		If any Aboriginal sites or relics are discovered, work shall cease immediately at that location and the Environmental Engineer for Kosciuszko Thredbo Pty Ltd informed immediately.	Construction Manager	During construction	
Waste Disposal		Chip and mulch small branches from cleared vegetation and stockpile for later use during revegetation.	Construction Manager	During construction	
		Timber disposal to be undertaken in accordance with the Kosciuszko National Park Plan of Management (2006); <ul style="list-style-type: none"> • Large trees and logs to be utilised in landscaping and regeneration projects; or • To be cut into firewood and made available for public use within Thredbo • Alternatively; cleared timber to be disposed of at a legally operating landfill site, as a last resort. 	Construction Manager	During Construction	
		No burning or burying of waste on site.	Construction Manager	During construction	
		All other waste to be disposed at a legally operating landfill site or recovered and reused if possible.	Construction Manager	During construction and on completion	
		Asbestos removal is to be conducted in accordance with relevant legislation and codes of practice	Qualified asbestos removalist	During construction and on completion	
		Asbestos to be disposed at an appropriately Licensed landfill and proof of legal disposal provided to KT Pty Ltd.	Qualified asbestos removalist	During construction and on completion	

7.2 Attachment 2 – Erosion and Sediment Control Inspection Report



THREDBO ENVIRONMENTAL SERVICES INSPECTION REPORT FOR TEMPORARY EROSION/SEDIMENTATION CONTROLS

Sheet ____ of ____

Project: _____ Inspection Date: _____

Inspected by: _____ Inspect the site weekly or immediately after rain.

<p>1. Are temporary drains effective in diverting all runoff from exposed areas to silt traps or other sediment structures before leaving site? If No, state location and action required:</p>	<p>Yes/No</p>
<p>2. Have new areas been disturbed which need temporary controls? If Yes, state where:</p>	<p>Yes/No</p>
<p>3. Are there any disturbed areas where work is sufficiently advanced for revegetation to be undertaken? If Yes, state where:</p>	<p>Yes/No</p>
<p>4. Is any dirty runoff water bypassing or overflowing existing silt traps/sediment control structures? Do existing traps need to be increased in capacity? Are any additional traps needed? If Yes, state location, action needed and priority:</p>	<p>Yes/No Yes/No Yes/No</p>
<p>5. Do any silt traps/sediment control structures need maintenance or repair to operate effectively? If Yes, state location, action needed and priority</p>	<p>Yes/No</p>
<p>6. Are any silt/sediment control structures more than 60% full or otherwise in need of cleaning out? If Yes, state location</p>	<p>Yes/No</p>
<p>7. Are actions taken after last inspection adequate and effective? If NO, list outstanding actions:</p>	<p>Yes/No</p>

Signature: _____ Date: _____

7.3 Attachment 3 – SEMP Weekly Inspection Report



THREDBO ENVIRONMENTAL SERVICES SEMP WEEKLY INSPECTION REPORT

Sheet ____ of ____

Project: _____ Inspection Date: _____

Inspected by: _____

Weather:	Morning		Afternoon	
	Clear/Overcast	Fine/Rain/Snow	Clear/Overcast	Fine/Rain/Snow
Operation	Condition	Plant/Labour	Comments	
Silt Fence				
Hay Bale retention ponds				
Hay Bale sediment protection				
Stormwater Pit protection				
Cyclone Fence (including gates)				
Para-web Fence				
Site Signage				
Paint Washout facility				
Vehicle Wash-down				
Waste Skips				
Tree Protection				
Verbal Discussion with Contractor:		Verbal discussion with others:		
Materials Received / Required:		Site Instructions Issued:		
Inspectors Report / Summary:		Action required:		
Signature: _____		Date: _____		

