Statement of Environmental Effects

Ricochet Mountain Bike Trail Realignment

Thredbo Alpine Resort
Kosciuszko National Park, NSW

Project: 23004MO

June 2024

Kosciuszko Thredbo Pty Ltd
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Document Control

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3	24.06.2024	Updated Section 6.4.2 to include concluding comment.	J.Best	C.Chalk

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1 Introduction

This Statement of Environmental Effects (SEE) has been prepared to support the Development Application (DA) for the realignment of the Ricochet Mountain Bike Trail (hereinafter referred to as the Development).

1.1 Application Details

Application Details	
Applicant	Kosciuszko Thredbo Pty Ltd (KT)
ABN	95 000 139 015
Applicant Address	1 Friday Drive, Thredbo NSW 2625
Development Address	Thredbo Alpine Resort, Kosciuszko National Park, 2 Friday Drive, Thredbo NSW 2625
Lot/Plan	876/DP1243112
Local Government Area	Snowy Monaro Regional Council
Zoning	Zone C1 – National Parks and Nature Reserves
Planning Instrument	*State Environmental Planning Policy (Precincts – Regional)* 2021 (Precincts – Regional SEPP)
Integrated Development	Not applicable
Consent Authority	Department of Planning, Housing and Infrastructure
Type of Development	Vegetation clearing Construction of mountain bike trail, including earthworks Rehabilitation works
Summary of works	Realignment of existing Ricochet mountain bike trail.

1.2 Supporting Documentation

Document	Title	Author	Document Reference
BDAR	Proposed Ricochet Realignment, Thredbo Alpine Resort: Biodiversity Development Assessment Report	Eco Logical Australia Pty Ltd	V5
SEMP	Ricochet Mountain Bike Trail Realignment: Site Environmental Management Plan	Kosciuszko Thredbo Pty Ltd	Rev 2
Cost of Works	Ricochet Mountain Bike Trail Realignment: Estimated Cost of Works	Kosciuszko Thredbo Pty Ltd	19/12/2023

2 Site Context and Analysis

2.1 Site Location

Regionally, the site is located in Thredbo, within the southern part of KNP, approximately 35 km south-west of Jindabyne in the Snowy Monaro Regional Local Government Area (LGA) (**Figure 1**).

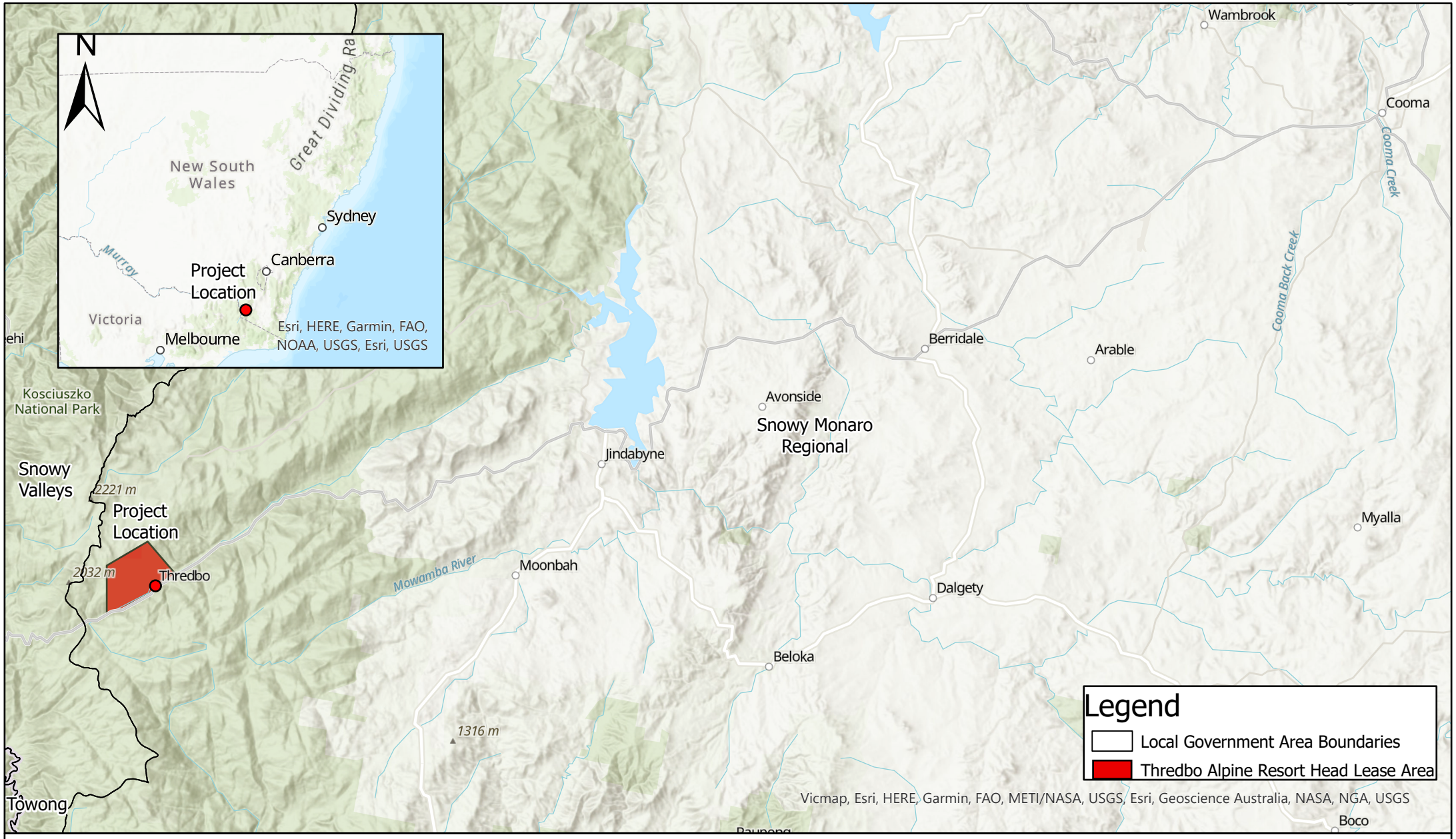
Within the context of the resort, the site is located southwest of Gunbarrel Chairlift top station, on Lenny's Leap ski run, High Noon ski run and the Glades ski area (**Figure 2**).

The site and immediate surrounds comprise native vegetation, ski runs, mountain bike trails, access tracks and snowmaking infrastructure.

2.2 Site Suitability

The following matters have been considered to demonstrate the site is suitable for the Development.

Site Suitability Considerations	**Consideration**
Site constraints such as flooding, slope, geotechnical hazards, bushfire and any other risks	The site ranges from approximately 1,705 to 1,785 m Australian Height Datum (AHD). This elevation makes the site ideal for an intermediate gravity trail. The Development is not located within the "G" line area of the geotechnical maps supporting the *Geotechnical Policy Kosciuszko Alpine Resorts* (DIPNR 2003). No measures are required to mitigate geotechnical, flooding or bushfire risks.
Effects on the local environment, landscape, streetscape, appearance or scenic quality of the locality	The Development will result in acceptable impacts to the local environment, landscape, appearance and scenic quality of the locality. A detailed assessment is provided in **Section 6**.
Biological and ecological impacts including the impacts on fauna and flora	A Biodiversity Development Assessment Report (BDAR) has been prepared by Eco Logical Australia Pty Ltd (ELA 2024) for the Development, refer **Appendix E**. Offsets are proposed for residual unavoidable impacts.
Impacts on existing and future amenity of the locality	No significant adverse impacts on the existing and future amenity of the locality are expected. The new trail is consistent with adjoining land uses (i.e. existing Centre Link and All-Mountain trails).



Scale: 1:305,832

3 1.5 0 3 6 9 12

Kilometers

Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 2020
Grid: GDA 2020 MGA Zone 55

N

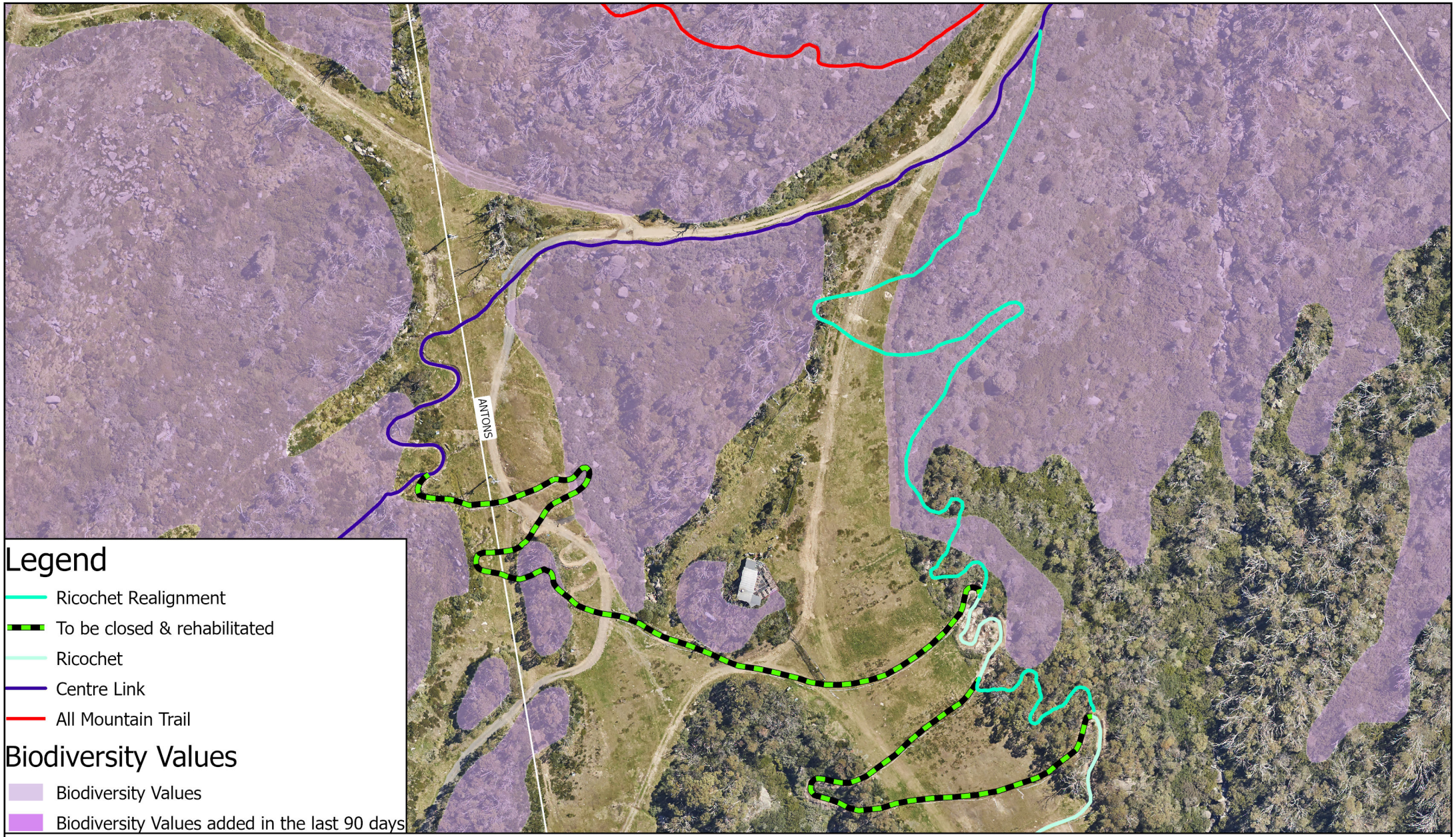
THREDBO

FIGURE 1: REGIONAL SITE CONTEXT

Revision: A

Date: 7/06/2022

Produced By: KO



Scale: 1:1,750

0 10 20 40 60 80

Meters

Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 2020
Grid: GDA 2020 MGA Zone 55

N

THREDBO

SITE PLAN

Project: Ricochet Realignment

Revision: 3

Date: 15/01/2024

Produced By: BB

3 Project Description

3.1 Background

The exiting Ricochet trail was constructed in summer 2019/20 under DA 9823 (referred to as N6 in the DA). The trail comprised several berms that crossed the groomed ski run and vehicle access track on the skiers left of Anton' t-bar track.

A modification to the trail was approved under MOD 10083 (30/10/2019). The modification was to the top section of the approved alignment to avoid the underground services/up-hill safety line cable of Anton's T-bar and wetter ski slope associated with the Antons Tbar track. The original alignment was moved to the east, skiers left on the disturbed Lenny's Leap ski run.

Upgrades to the upper section of the trail on Lenny's Leap ski run (adjacent to Antons T-bar) took place in November 2020 under DA 10214 (approved 28/08/2020). This involved the realignment of six corners that were located on the ski run and across the summer access road. The berms were removed from the ski slope to achieve a more sustainable trail that would meet the IMBA trail guidelines.

3.2 Justification for Development

The purpose of the Development is to close and rehabilitate the upper section of Ricochet trail on the open ski slopes and access road (across Antons t-bar lift line, section below Frostbite and switch backs on High Noon) and provide a sustainable route that meets the IMBA guidelines by incorporating regular grade changes.

The trail realignment in 2020 failed to achieve IMBA guidelines for regular grade changes/reversals as the narrow (vertical) area of the Lenny's Leap ski run does not enable regular grade changes with each trail section on the ski run falling only one way to each corner exacerbating trail water flow/erosion.

This area is also one of the main vehicle access routes for machinery and vehicles which results in ongoing soil disturbance in these locations, resulting in rock and soil displacement leading to erosion during intense rainfall events. This is apparent in **Plate 1** to **Plate 3**.

During low snowfall winter seasons, exposed rocks from trail and berm construction on Lenny's Leap has created hazards for skiers and snowboarders. This was particularly evident during winter 2023 as documented by Thredbo's Ski Patrollers. The trail remains impacted by multiple road crossings which also creates rider safety concerns when riding at speed. There are several reported incidents in KT's DoneSafe incident reporting database along this section of trail to be closed.

The closure of this section of trail will improve the trail sustainability, guest safety and mountain operations issues currently experienced in this location.

Plate 1: Trail erosion and rock displacement from existing trail on Lenny's Leap ski run

Plate 2: Trail erosion on Lenny's Leap ski run facing towards Anton's tbar corridor

Plate 3: Evidence of rock displacement associated with existing trail (post-winter 2023)

The section of trail below Frost Bite to be closed is steep and prone to erosion and trail braiding as shown in **Plate 4** and **Plate 5**.

Plate 4: Ricochet trail erosion and braiding (post-winter 2023)

Plate 5: Ricochet trail channel erosion on the Frostbite crossing (post-winter 2023)

Sections of the trail on Lenny's Leap and High Noon ski runs contain wet areas (potential springs) which make trail maintenance in these areas difficult (**Plate 6**). Removing the trail from these wet areas will avoid/minimise further environmental degradation in these locations.

The trail realignment will reduce the need for knock down / rebuild each season on these highly trafficked ski runs, reducing the impacts on winter operations and provide a better riding experience for guests.

The levelling and rehabilitation of the section being removed off Anton's T-Bar track and Lenny's Leap ski run will also provide an improved winter operation outcome for grooming operators and skiers/snowboarders.

Plate 6: Ricochet trail wet areas on High Noon ski run (post-winter 2023)

3.3 Trail Options Analysis

Based on the failure of the trail on the Lenny's Leap ski run and Frost bite crossing and the resultant on-going erosion impacts as outlines above, KT sought to find a more sustainable route.

Retaining the current alignment was not considered acceptable from a long term environmental perspective as well as from rider safety and mountain operations perspectives.

A preliminary site assessment was undertaken by key Project personnel (i.e. Project Manager, MTB trail designers, Environmental Officer) to identify potential constraints (e.g. ecological and construction) of the proposed trail alignment and to allow for appropriate controls to be incorporated into the design. During this assessment stage, several walkthroughs of the proposed trail alignment were undertaken to ensure the trail objectives are met whilst minimising the impacts on the natural environment as much as practicable.

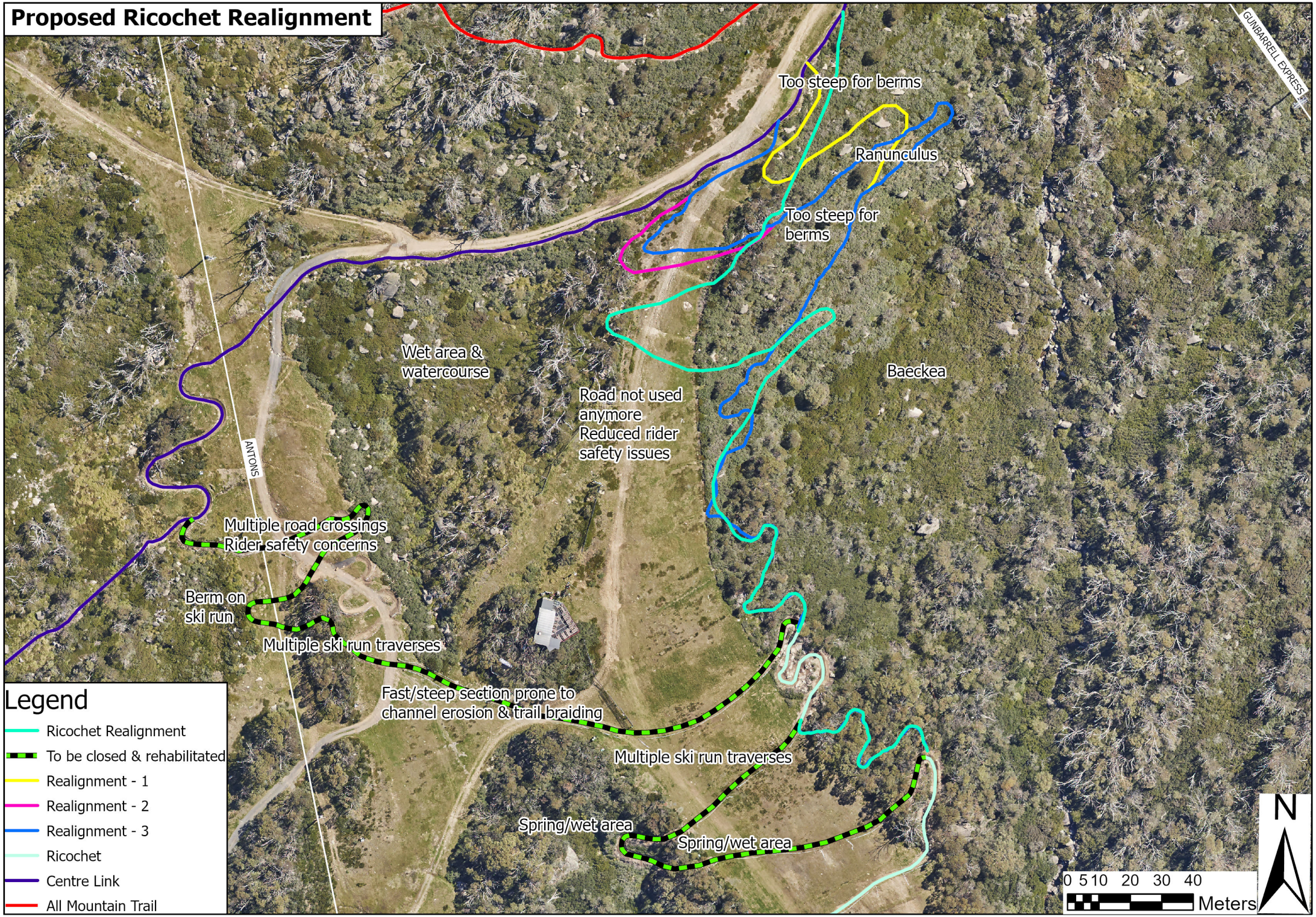
Since the original proposal was lodged in July 2023, ongoing consultation has occurred with DPE and NPWS to determine an alternative that that would achieve an appropriate environmental, safety and operational balance.

On Monday 18 December 2023, representatives from DPE and NPWS walked the final alignment with KT's key Project personnel. A site plan showing the trail options considered is provided in **Figure 3**.

As demonstrated in the trail options analysis, the locality is constrained by several factors including biodiversity values (significant wet areas, watercourse crossings, large tracks of wet heath, patches of Anemone Buttercup), topographical limitations (slope, rocky outcrops), operational constraints (snowmaking infrastructure, access roads, lifting infrastructure and underground services). Hence, realignment options 1-3 depicted in **Figure 3** were discounted.

The preferred alignment has been located on the edge of the BV mapped vegetation to first avoid impacts to conservation significant species as much as practicable, and then minimise impacts to biodiversity values whilst trying to achieve the intended safety and operational outcomes.

Importantly, the preferred alignment runs at some distance along a falling contour to enable regular grade reversals so as to achieve the IMBA guidelines. KT is confident that this new alignment, as with other new trails that go into native vegetation off ski runs and that run for some distance along falling contour (as opposed to being narrowly constrained within a ski run), will provide a longer term sustainable trail.


Proposed Ricochet Realignment
GUNBARRELL EXPRESS
ANTONS
Too steep for berms
Ranunculus
Too steep for berms
Wet area & watercourse
Road not used anymore Reduced rider safety issues
Baeckea
Multiple road crossings Rider safety concerns
Berm on ski run
Multiple ski run traverses
Fast/steep section prone to channel erosion & trail braiding
Multiple ski run traverses
Spring/wet area
Spring/wet area
Legend
Ricochet Realignment
To be closed & rehabilitated
Realignment - 1
Realignment - 2
Realignment - 3
Ricochet
Centre Link
All Mountain Trail
N
0 5 10 20 30 40
Meters

3.4 Project Timing

Construction is planned for March 2024, with opening of the trail expected in October 2024.

3.5 Overview of Trail

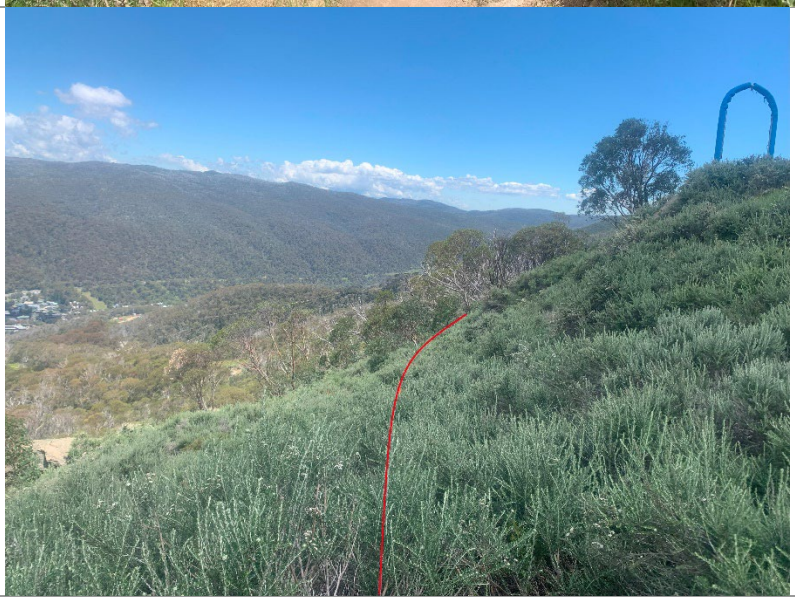
The trail realignment is approximately 367 m in length (first section = 286 m, second section = 81 m). The trail commences approximately 95 m southwest of the Gunbarrel Chairlift top station, traversing the edge of the Glades ski area and High Noon ski run, and terminates when it reconnects onto the existing Ricochet trail. The trail will remain an intermediate (blue) trail.

The trail will incorporate rolling contours, grade reversals, berms and natural obstacles to create an interesting trail for users. The length of the existing Ricochet trail that will be closed and rehabilitated is 523 m.

Site photos are provided in **Table 1** with site photo reference points shown on **Figure 4**.

Figure 4: Site Photo Points

Table 1: Trail Overview & Site Photos

Photo Point ID / Description	Photo
PH1: The start of the trail commences off the existing Centre Link trail southwest of the Gunbarrel chairlift top station towards High Noon ski run.	
PH2: The trail follows the contours of the slope toward High Noon ski run.	

PH3: The trail continues across the slope towards High Noon ski run.	
PH4: The trail continues towards High Noon ski run between the gaps in the trees.	
PH5: The trail continues along the edge of High Noon ski run.	

PH6: The trail leaves the native vegetation and cross the High Noon ski run towards the tree island above Frost Bite.	
PH7: The trail heads into a berm on the edge of the tree island before heading back across the High Noon ski run.	
PH8: The trail leaves the ski run and heads back into the native vegetation known as “The Glades” ski area.	

PH9: The trail traverses the slope into a berm.	
PH10: The trail leaves the berm, following the contours of the slope downhill towards High Noon ski run.	
PH11: The trail passes through the gaps in the trees, following the contours of the slope.	

PH12: The trail heads downslope on the edge of High Noon ski run.	
PH13: The trail heads through the gaps in the trees on the edge of High Noon ski run.	
PH14: The trail heads into a berm.	

PH15: The trail heads into a berm on the edge of High Noon ski run.	
PH16: The trail heads east between the trees into a berm.	
PH17: The trail heads rejoins an existing berm on the Ricochet trail.	

PH18: The trail traverses along the existing Ricochet trail.	
PH19: The trail leaves the edge of High Noon ski run and heads east into a berm.	
PH20: The trail heads southwest into a berm on the edge of High Noon ski run.	

PH21: The trail heads east into a berm.	
PH22: The trail rejoins the existing Ricochet trail on the edge of the berm.	

3.6 Trail Design and Construction Techniques

3.6.1 MTB Trail Design and Construction Techniques

The MTB trail design and construction techniques have been developed with consideration of the following:

- Criteria outlined in Chapter 4 of the *Guidelines for a Quality Trail Experience: Mountain Bike Trail Guidelines* (IMBA 2018) (IMBA MTB Guidelines)
- Sections 6 and 7 of the *Trail Difficult Rating System – Build* (IMBA 2012)
- *Guidelines for trail planning, design and management: a toolkit for state and local government agencies, community groups and investors on how to plan, manage and market exceptional trail experiences* (TRC Tourism 2015)
- Australian Mountain Bike Trail Guidelines (AusCycling 2019)

- Design principles applied to the construction of existing trails within the resort, including: trails for everyone, recreation versus competition, one-way trails, trail difficulty ratings, trail names and minimise environmental impacts.

3.6.1.1 MTB Trail Design

A summary of the trail design is provided in **Table 2**. Examples of trail design elements are provided in **Appendix B**.

Table 2: Trail Design

Element	Details
Trail length	Approx. 528 m
Trail difficulty rating	In accordance with the IMBA Trail Difficulty Rating System (IMBA 2012), the trail difficulty rating is Intermediate.
Trail tread width	The tread refers to the actual surface of the trail upon which users travel. The average trail tread width will be 600 mm which is in accordance with the Trail Difficulty Rating System Land Managers Guide (IMBA 2012) (**Appendix A**).
Trail corridor width	The trail corridor refers to the full dimensions of the trail, including the area on either side of the tread and the space overhead that needs to be cleared of vegetation and obstacles. The trail corridor is generally double the width of the tread, dependent upon the slope. The greater the slope, the wider the corridor due to the extent of the upper and lower batters. *Flexible trail corridor* A 20 m wide corridor is required to provide flexibility for the trail builders to respond to any unforeseen construction constraints (e.g. during excavation the uncovering of a large amount of rock just beneath the surface).
Trail type	One-way (descending) – This design component is a key risk management technique to minimise the likelihood of head-on collisions between riders.
Tread surface	The trail surface will be predominately natural soil, with local crushed granodiorite used where required. The surface will comprise possible sections of rocky tread.
Natural Obstacles and Technical Trail Features (TTFs)	The trail will likely include unavoidable, rollable obstacles to 200 mm high. Avoidable, rollable obstacles up to 600 mm may also be present on the trail. Note, short sections may exceed the criteria.
Average trail grade	The climbs and descents will be mostly moderate gradients but may include steep sections. The average trail grade will be 10 % or less (IMBA 2012) (**Appendix A**).
Maximum trail grade	The trail grade will be a maximum of 20 % or greater (IMBA 2012) (**Appendix A**).
Trail Signage	Trail signage is installed to clearly mark the trail, inform users of their responsibilities, aid in navigation and provide key information. *Decision Point Signs* Decision point signs generally comprise posts with information in relation to important departure and destination locations along the trail. The signs generally include the following information: • name of the new trail departing from that point; • difficulty symbol (e.g. green circle, blue square, black diamond – the number on this symbol correlates to the trail descriptions on the Thredbo Mountain Bike Park Map; • trail type (e.g. flow, technical, shared, permitted/prohibited use); • arrow indicating the direction of the new trail; and • trail network logo.

	The signs are 400 mm wide x 200 mm high and attached to a 50 mm round post which is 1,800 mm high. Standard signage plans are provided in **Appendix C**.

3.6.1.2 MTB Trail Construction Techniques

A summary of the construction techniques to be used for the Project is provided in **Table 3**. Examples of construction techniques are provided in **Appendix B**.

Table 3: Summary of Construction Techniques

Construction Technique	Details
Follow the contours	The trail should be built on a side slope, aligned along the contours of the hillside (as demonstrated in **Appendix B**). The most sustainable trails are those that have a low overall grade (<10 % or a one in 10 change in elevation) and frequent undulations, which will ensure water flows across and not along the trail.
Partial or full bench-cut construction	Trails built on sloping ground require excavation to achieve a partial or full bench construction. Partial bench tread involves using some of the excavated soil to construct the downhill side of the tread. This technique is prone to slipping and is not recommended, except in specific circumstances in which it must be supported by a retaining wall. Full bench tread involves excavating down and into the hillside and puts the entire tread width on mineral soil, thereby maximising stability and minimising ongoing maintenance.
Outslope	A method of tread construction that leaves the outside edge of a hillside trail lower than the inside, in order to shed water in sheet flow (refer **Appendix B**). The trail should slope gently (no greater than 5 %) down towards the lower, outside edge. It is noted that completely outsloping trails will not provide enjoyable and safe trails.
Rock armouring	Rock / tread armouring is used to harden the trail to create an elevated trail tread above wet or soft terrain and to harden the trail tread against potential erosion from trail users. Although armouring hardens the trail tread, all the principles of sustainable trail design still apply as it is essential that water is prevented from following down or under that section of trail (refer **Appendix B** for example).
Drainage crossings	Drainage crossings are a critical element of trail design and construction in areas which may have the greatest impact on water quality and the site where water has the greatest potential to damage the trail. Where minor drainage crossings are required, low level platforms will be constructed, similar to the structures used on the All-Mountain Trail as well as the TVT, which have been constructed from steel frames with fibre-glass mesh on top, as shown in **Appendix B**. Drainage crossings will be low profile and located close to the ground, and therefore handrails are unlikely required. However, if handrails are required, the steel posts will be pile driven (to refusal) for each section of the fibreglass mesh tread and bearers be installed with the fibreglass mesh on top.
Half rule	A trail's grade shouldn't exceed half the grade of the sideslope (e.g. if the gradient of the side slope is 20 %, the maximum allowable trail gradient would be 10 %). This will assist the sheeting of water across the trail. If the trail grade is steeper than half the grade of the side-slope, it is considered a fall-line trail (IMBA 2012).
10 % rule – average trail grade guideline	Generally, an average trail grade of 10 % or less is the most sustainable (IMBA 2012). The 10 percent rule is based on experience an industry best practise which has shown a grade of less than 10 percent is most sustainable; It applies to most soil types,

	minimises user caused erosion, allows for design flexibility, accommodates undulations, and allows for realignments above or below features (AusCycling 2019).
Grade dips and reversals	A reverse in the trail grade, usually a short dip followed by a rise, creating a small watershed and forcing the water off the trail. Grade reversals make trails more enjoyable and provide excellent drainage solutions. A grade reversal is the change in trail tread grade from up to down as the trail moves across the side slope. Grade reversals allow water to leave the trail at the low point of the grade reversal before it can gain enough speed and volume to cause erosion. Grade reversals divide the trail into continuous small watersheds. This means the drainage feature of one part of the trail won't affect another section, which reduces erosion (AusCycling 2019) (refer **Appendix B**).
Rolling grade and knicks	A knick is a shaved down section of trail, semicircular in shape and about 3 m in diameter, with the centre of the knick outsloped at about 15 % to draw the water off the trail. Rolling grade dips build on the knick feature. The knick is built and followed by a long gentle soil ramp. Rolling grade dips require little maintenance and create effective drainage (AusCycling 2019).
Trail demarcation and anchors	Marking trail boundaries with rocks or vegetation to discourage users from cutting corners or from the desired path. Trail users will often cut corners through turns or around technical trail features. This can negatively affect the sustainability of a trail. Demarcation or anchors are a subtle way of keeping riders on the intended line. This is achieved by placing natural elements such as existing vegetation, rocks, logs or other natural landform or onsite materials. Strategically selected and placed demarcations or anchors prevent trail widening and can offer a more advanced features for more experienced riders (AusCycling 2019). This technique is only possible in vegetated areas and not on disturbed ski runs as no natural anchors or demarcation is available.
Trail Flow	Correct trail flow manages the riders speed and momentum through trail design and construction. Consistent flow can minimise soil disturbance and displacement by reducing the need for users to exert more downwards or sideways force to stay on the trail. The goal of this element of trail design is to avoid abrupt changes and corners that are likely to make riders brake excessively or skid, which can result in braking bumps and trail widening.
Berms or insloped turns	A bermed corner has a banked outer edge that runs the entire length of the corner, allowing the rider to maintain a faster speed. Berms improve trail flow and reduce soil movement on corners. Berms help riders maintain speed without sliding out of the turn. Berms in conjunction with effective grade reversals provide effective drainage outlets.

3.7 Construction Corridor & Disturbance Area

3.7.1 Flexible Construction Corridor

The construction corridor for the Development comprises 10 m either side of the ground-truthed alignment.

3.7.2 Disturbance Footprint

The width of the MTB trail corridor must not exceed 3 m at any location, with an average disturbance width not exceeding 2.5 m. The disturbance will affect approximately 0.113 ha, including 0.1 ha of native vegetation, and approximately 0.013 ha of exotic grassland and non-vegetation areas on the existing ski runs (ELA 2024).

3.8 Construction Activities

Pre-construction activities will comprise:

- establishment of site boundary;
- marking significant vegetation to be retained and no-go zones;
- erection of site signage and traffic controls;
- flagging exact trail alignment using pin flags to mark the edges of the trail for construction; and
- mobilisation of machinery, equipment and construction materials to site.

Construction activities will comprise:

- vegetation clearing (50 m increments) within the trail corridor to expose bare earth
    - excess cut vegetation to be spread into the surrounding heath and used for rehabilitation of exposed soil on the trail edges
    - topsoil and vegetation sods are to be stockpiled close to the trail tread;
- cut into the slope using a mini excavator and excavate the soil to achieve the appropriate depth of bench;
- remove loose rocks, roots and compact the trail;
- back slope the batter, ensuring outslope and appropriate drainage;
- define the trail line using rocks, logs and other obstacles; and
- re-instate the verge areas, topsoil and preserved vegetation sods.

Post-construction activities will comprise:

- rehabilitation in accordance with the Rehabilitation Guidelines and Detailed Rehabilitation and Monitoring Plan;
- demobilisation of plant and machinery; and
- site clean-up.

3.9 Construction management details

Construction management details, including site access, construction materials, machinery, plant and equipment, stockpile sites and site facilities are detailed in the SEMP (**Appendix F**).

3.10 Operational Activities

The trail will operate during the mountain biking season (generally end of November to end of April each year).

During operation, ongoing monitoring and maintenance of the trail is critical to ensure effective and sustainable trail management. The trail will form part of the ongoing maintenance and monitoring program under the *Thredbo Mountain Bike Trail Management Plan*. The plan sets out the management requirements and guides the maintenance works required to sustainably manage the Thredbo MTB Trail Network, as well as the monitoring and reporting requirements to effectively monitor the environmental condition of trails and their impact on the surrounding environment.

A summary of the trail maintenance and monitoring programs are provided below.

3.10.1.1 MTB Trail Maintenance

The trail maintenance program includes (but 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.

The MTB trail maintenance program is outlined in Section 3.5.1 of the Thredbo Mountain Bike Trail Management Plan.

3.10.1.2 MTB Trail Monitoring

The trail monitoring program comprises four (4) main components:

1) operational safety monitoring;
2) environmental monitoring;
3) pre and post seasonal monitoring; and
4) annual monitoring.

Daily operational monitoring is primarily focused on rider safety and recording of any major environmental concerns.

Monthly environmental monitoring is used to direct maintenance works required to ensure minimal environmental impact is sustained from ongoing trail use.

Annual monitoring is carried in spring each year using the baseline data as reference points which is reported to NPWS.

The trail monitoring program is detailed in Section 4 of the of the Thredbo Mountain Bike Trail Management Plan. The plan will be updated to incorporate the proposed trail.

4 Legislation, Policies, Plans and Guidelines

4.1 Legislative Review

A review of key legislation and planning instruments applicable to the Project is provided in **Table 4**.

Table 4: Legislative Review

Acts & Planning Instruments	Summary
Commonwealth	
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	The EPBC Act provides a legal framework to protect and manage nationally and internationally important aspects of the Australian environment. The EPBC Act is administered by the Department of Climate Change, Energy, the Environment and Water (DCCEEW). Under Part 3 of the EPBC Act, a person must not undertake an action (e.g. a development) that will have, or is likely to have, a significant impact on a protected matter listed under the EPBC Act (referred to as Matters of National Environmental Significance (MNES)) without approval from the Australian Government Minister for the Environment. Refer to **Section 6.4** for details.
State	
Environmental Planning and Assessment Act 1979 (EP&A Act) Environmental Planning and Assessment Regulation 2021 (EP&A Regulation)	The EP&A Act is the primary piece of legislation governing development within NSW. DPE assesses development proposals within NSW alpine resort areas where the Minister for Planning is the consent authority under Part 4 of the EP&A Act. Refer **Section 4.2.1** for matters to be considered. This SEE has been prepared in accordance with the requirements of the EP&A Regulation. Throughout the planning and design phases of the Development, KT has considered the principles of ESD.
National Parks and Wildlife Act 1974 (NPW Act) *National Parks and Wildlife Regulation 2019*	The objects of the NPW Act include: • the conservation of nature; • the conservation of objects, places or features (including biological diversity) of cultural value within the landscape; • fostering public appreciation, understanding and enjoyment of nature and cultural heritage and their conservation; and • providing for the management of land reserved under the Act in accordance with the management principles applicable for each type of reservation. As detailed in this report, appropriate environmental mitigation and management measures are proposed to ensure the Project results in acceptable environmental impacts. The NPW Act provides that a person who exercises due diligence in determining that their actions will not harm Aboriginal objects has a defence against prosecution if they later unknowingly harm an object without an Aboriginal heritage impact permit. A due diligence assessment has been undertaken in **Section 6.4.2.**

Biodiversity Conservation Act 2016 (BC Act) Biodiversity Conservation Regulation 2017 (BC Regulation)	The purpose of the BC Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ESD. The Development is consistent with principles of ESD, as demonstrated in the subsequent sections of this report. The BC Regulation sets out threshold levels for when the Biodiversity Offsets Scheme (BOS) will be triggered. The threshold has two elements: • whether the amount of native vegetation being cleared exceeds the area threshold; and • whether the impacts occur on an area mapped on the Biodiversity Values Map (BVM). If clearing and other impacts, including biodiversity impacts prescribed by Clause 6.1 of the BC Regulation, exceed either trigger, the BOS applies. The BOS also applies when: • the 'test of significance' in section 7.3 of the BC Act identifies that the development or activity is likely to significantly effect threatened species or ecological communities, or their habitats; or • the works are carried out on a declared area of outstanding biodiversity value. The Development will trigger the BOS. A Biodiversity Development Assessment Report (BDAR) is provided in **Appendix E**.
Environmental Planning Instruments	
State Environmental Planning Policy (Precincts – Regional) 2021 (Precincts – Regional SEPP)	The aim and objectives of the Policy for Kosciuszko National Park and alpine resorts (Chapter 4) are: • to encourage the carrying out of a range of development in the alpine resorts that do not result in adverse environmental, social or economic impacts on the natural or cultural environment; • provide planning controls to encourage ESD; and • minimise the risk of community exposure to environmental hazards within the alpine resort areas. Development in NSW alpine resort areas are governed by the Precincts – Regional SEPP. Key requirements are addressed in **Section 4.2.2**.

4.2 Planning Framework

An assessment against the relevant matters of the EP&A Act and relevant environment planning instruments, policies and plans is provided in this section.

4.2.1 Environmental Planning and Assessment Act 1979

Pursuant to Section 4.15 of the EP&A Act, the consent authority is to consider the matters outlined below.

(1) Matters for consideration – General	**Consideration**
the provisions of—	
(i) any environmental planning instrument	The Precincts – Regional SEPP is the only environmental planning instrument which applies to the site for this proposal. An assessment against the relevant sections of the Precincts – Regional SEPP have been addressed in **Section 4.2.2**.

(ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Planning Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved)	Not applicable to the Development.
(iii) any development control plan	Not applicable to the Development.
(iiia) any planning agreement that has been entered into under section 7.4, or any draft planning agreement that a developer has offered to enter into under section 7.4	Not applicable to the Development.
(iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph)	The DA and supporting information has been prepared in accordance with the requirements of the EP&A Regulation.
(a) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality	The likely impacts of the Development on the natural and built environment, and social and economic impacts in the locality have been assessed in **Section 6**.
(b) the suitability of the site for the development	The site suitability is assessed in **Section 2.2**.
(c) any submissions made in accordance with this Act or the regulations	KT will consider submissions made through the DA process.
(d) the public interest.	The Development is considered to be within the public interest for the following reasons: • The Development is consistent with the aim and objectives of the Precincts – Regional SEPP. • The Development is compatible with the site. • The Development will not have any significant adverse environmental impacts. • The Development is consistent with the principles of ESD. • The Development will contribute to tourism and recreation opportunities in Thredbo resort.

4.2.2 Precincts – Regional SEPP

The relevant sections of Chapter 4 (Kosciuszko National Park and alpine resorts) of the Precincts – Regional SEPP are addressed in this section.

4.2.2.1 Section 4.7 – Land Use Table (Thredbo Alpine Resort)

Pursuant to the Land Use Table in Section 4.7 of the Precincts – Regional SEPP, 'recreation infrastructure' is permissible with consent within the Thredbo Alpine Resort.

Recreation infrastructure is defined in Schedule 4A Dictionary – Chapter 4 as: '*infrastructure provided for the purposes of active or passive recreation for tourists and visitors, including walking*

trails, mountain bike trails, directional signage, cross-country ski trails and oversnow routes, but does not include ski slopes'.

The Development is for the purpose of 'mountain bike trails' which falls under this definition, therefore the Development is permissible with consent.

4.2.2.2 Section 4.25 Earthworks

Section 4.25 Earthworks	**Consideration**
(1) The objective of this section is to ensure that earthworks for which development consent is required will not have a detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items or features of the surrounding land.	The Development is consistent with the objectives of this section.
(2) Development consent is required for earthworks in the Alpine Region unless— (a) the earthworks are exempt development under this Chapter or another environmental planning instrument, or (b) the earthworks are ancillary to— (i) development permitted without consent under this Chapter, or (ii) development for which development consent has been given.	Earthworks form part of this application seeking Development Consent.
(3) In deciding whether to grant development consent for earthworks, or for development involving ancillary earthworks, the consent authority must consider the following matters— (a) the likely disruption of, or adverse impact on, drainage patterns and soil stability in the locality of the development, (b) the effect of the development on the likely future use or redevelopment of the land, (c) the quality of the fill or the soil to be excavated, or both, (d) the effect of the development on the existing and likely amenity of adjoining properties, (e) the source of any fill material and the destination of any excavated material, (f) the likelihood of disturbing relics, (g) the proximity to, and potential for adverse impacts on, a waterway, drinking water catchment or environmentally sensitive area, (h) appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.	a) Unlikely, refer to **Sections 6.1** and **6.2**. b) The Development is not anticipated to adversely impact upon the redevelopment of the site. c) The excavated material will be reused onsite. The quality of the material is not expected to change. d) The majority of adjoining land comprises of ski slopes, lifting infrastructure and mountain bike trails, therefore the Development is not expected to have any significant impacts on the amenity of adjoining land, refer to **Section 6.5.** e) No fill material is proposed. In the event fill material is required, it will be sourced in accordance with the requirements outlined in the SEMP (**Appendix F**). f) Unlikely, refer **Section 6.4.2.** g) Impacts unlikely, refer **Section 6.2.** h) Refer **Section 7** for proposed mitigation measures.

4.2.2.3 Section 4.28 – Consideration of master plans and other documents

Matters for consideration	Consideration
(1) In deciding whether to grant development consent to development in the Alpine Region, the consent authority must consider the following—	
(a) the aim and objectives of this Chapter set out in section 4.1,	The Development is consistent with the objectives of Chapter 4, as demonstrated in this report.
(b) a draft development control plan that is intended to apply to the land and has been published on the NSW planning portal,	Not applicable.
(c) a conservation agreement under the Environment Protection and Biodiversity Conservation Act 1999 of the Commonwealth that applies to the land,	Not applicable.
(d) the Geotechnical Policy —Kosciuszko Alpine Resorts published by the Department in November 2003,	The Development is not located within the "G" line area of the geotechnical maps supporting the Geotechnical Policy. No further assessment is required.
(e) for development in the Perisher Range Alpine Resort— (i) the Perisher Range Resorts Master Plan, published by the National Parks and Wildlife Service in November 2001, and (ii) the Perisher Blue Ski Resort Ski Slope Master Plan adopted by the National Parks and Wildlife Service in May 2002.	Not applicable to the Development.
(2) In deciding whether to grant development consent to development in the Alpine Region, the consent authority must consider—	
(a) a master plan approved by the Minister under section 4.26 that applies to the land, or	Refer to **Section 4.4.2**.
(b) if a master plan has not been approved—a draft master plan prepared under section 4.26 that is intended to apply to the land and has been published on the NSW planning portal.	Master Plan has been approved, see above.

4.2.2.4 Section 4.29 – Consideration of environmental, geotechnical and other matters

Matters for consideration	Consideration
(1) In deciding whether to grant development consent to development in the Alpine Region, the consent authority must consider the following— (a) measures proposed to address geotechnical issues relating to the development, (b) the extent to which the development will achieve an appropriate balance between— (i) the conservation of the natural environment, and (ii) taking measures to mitigate environmental hazards, including geotechnical hazards, bush fires and flooding, (c) the visual impact of the proposed development, particularly when viewed from the land identified as the Main Range Management Unit in the Kosciuszko National Park Plan of Management,	(a) Not applicable. (b) The Development does not require environmental controls to mitigate environmental hazards (including geotechnical hazards, bush fires and flooding) that would impact upon the conservation of the natural environment. c) The Development is not anticipated to result in any significant visual impacts. The trail is not visible from the Main Range Management Unit.

(d) the cumulative impacts of development and resource use on the environment of the Alpine Subregion in which the development is carried out,	There is no framework to assess cumulative impacts within the Alpine Subregion. The impacts of the Development are addressed in **Section 6**. With the implementation of appropriate environmental controls during construction and operation, the Development is not anticipated to result in any significant adverse impacts on identified environmental values of the site and surrounds.
(e) the capacity of existing infrastructure and services for transport to and within the Alpine Region to deal with additional usage generated by the development, including in peak periods,	The Development will not impact upon the capacity of existing infrastructure and services for transport to deal with additional usage generated by the Development.
(f) the capacity of existing waste or resource management facilities to deal with additional waste generated by the development, including in peak periods.	The Development will not adversely impact upon the capacity of existing waste or resource management facilities. Waste generation from the Development is expected to be minimal.
(2) For development involving earthworks or stormwater draining works, the consent authority must also consider measures to mitigate adverse impacts associated with the works.	Earthworks are proposed. Temporary drainage, erosion and sediment control measures will be implemented during construction to mitigate potential adverse impacts associated with earthworks (refer to the SEMP, **Appendix F**).
(3) For development the consent authority considers will significantly alter the character of an Alpine Subregion, the consent authority must also consider— (a) the existing character of the site and immediate surroundings, and (b) how the development will relate to the Alpine Subregion.	a) The Development will not alter the alpine resort character. The trail will form part of the existing mountain bike trail network. b) The realignment has been designed to improve the rider experience, and therefore positively contribute to tourism in the Alpine Subregion.

4.3 Integrated Development

The Development is not integrated development.

4.4 Plans, Policies and Guidelines

4.4.1 South East and Tablelands Regional Plan 2036

The Development is consistent with the *South East and Tablelands Regional Plan 2036* (Regional Plan) as it will address rider safety, operational and environmental issues, and enhance Thredbo's MTB trail network, whilst minimising impacts on the natural environment.

4.4.2 Snowy Mountains Special Activation Precinct Master Plan

The Development is consistent with the Master Plan as it will contribute to the social values of KNP by ensuring the continual operation of the Ricochet trail.

4.4.3 Kosciuszko National Park Plan of Management

The Development is a purpose-built mountain bike trail which has undergone a comprehensive environmental impact assessment to fist avoid and then minimise and mitigate adverse impacts on existing environmental values. The Development is considered consistent with the management objectives of the KNP PoM.

4.4.4 Kosciuszko National Park Cycling Strategy 2017

The Development will enhance the recreational and social values of KNP, whilst minimising potential impacts to the natural environment, therefore is considered consistent with the KNP Cycling Strategy.

4.4.5 Guidelines

The following guidelines have been considered during the preparation of this SEE:

- Application requirements (DPE 2022);
- Development referrals guide (DPE 2022); and
- What to include with your development application (DA) (DPE 2017).

5 Assessment Method

The assessment for the Development consisted of a desktop review of publicly available data sources and information. The desktop review was followed by a preliminary site assessment and subsequent field surveys carried out within the project area to describe the environmental values present on the site and to aid the evaluation of potential impacts of the project to those values. A summary of the assessment methods is provided in the following sections.

5.1 Desktop Assessment

A desktop assessment was carried out to identify relevant environmental values, that potentially occur within the Project area. Database and information sources that were utilised in the assessment include:

- NSW Planning Portal Spatial Viewer (NSW Government 2023a);
- Biodiversity Values Map and Threshold Tool (NSW Government 2023b);
- NSW BioNet (NSW Government 2023c);
- Water Management (General) Regulation 2018 hydroline spatial data 1.0 (NSW Government 2023d);
- Protected Matters Search Tool (DCCEEW 2023); and
- Aboriginal Heritage Information Management System Web Services (Heritage NSW 2023).

5.2 Technical Assessments

5.2.1 Flora and Fauna Assessment

The flora and fauna assessment was undertaken by Ryan Smithers (Senior Ecologist and Accredited Person) from Eco Logical Australia Pty Ltd (ELA). The assessment comprised an ecological survey and the preparation of a BDAR A copy of the report is provided in **Appendix E**.

6 Impact Assessment

6.1 Land

6.1.1 Soils and Disturbance

To create the trail form, earthworks comprising cut and fill are required using a mini excavator. The disturbance corridor will range from 2-3 m in width, containing the upper and lower batters and the trail surface when the trail is traversing across moderate to steep slopes. On gentler slopes the disturbance corridor will be closer to 1.5 m. The average disturbance width is expected to be 2.5 m.

Due to the nature of the works, the final trail alignment will not be rehabilitated. However, the Development will be constructed to effectively manage erosion and run-off in accordance with best practice environmentally sustainable trail design outlined in the IMBA Guidelines.

The construction of the trail will incorporate key sustainable trail design concepts and construction techniques such as rolling contours, outslope, the half rule and 10% average guideline and use of frequent grade reversals to minimise erosion and soil stability risks.

Where areas of disturbance do not form part of the final trail alignment, they will be stabilised and/or revegetated in accordance with the *Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park* (NGH 2007) (Rehabilitation Guidelines) and Detailed Rehabilitation and Monitoring Plan (provided in the SEMP, **Appendix F**) which will assist in achieving an erosion resistant state.

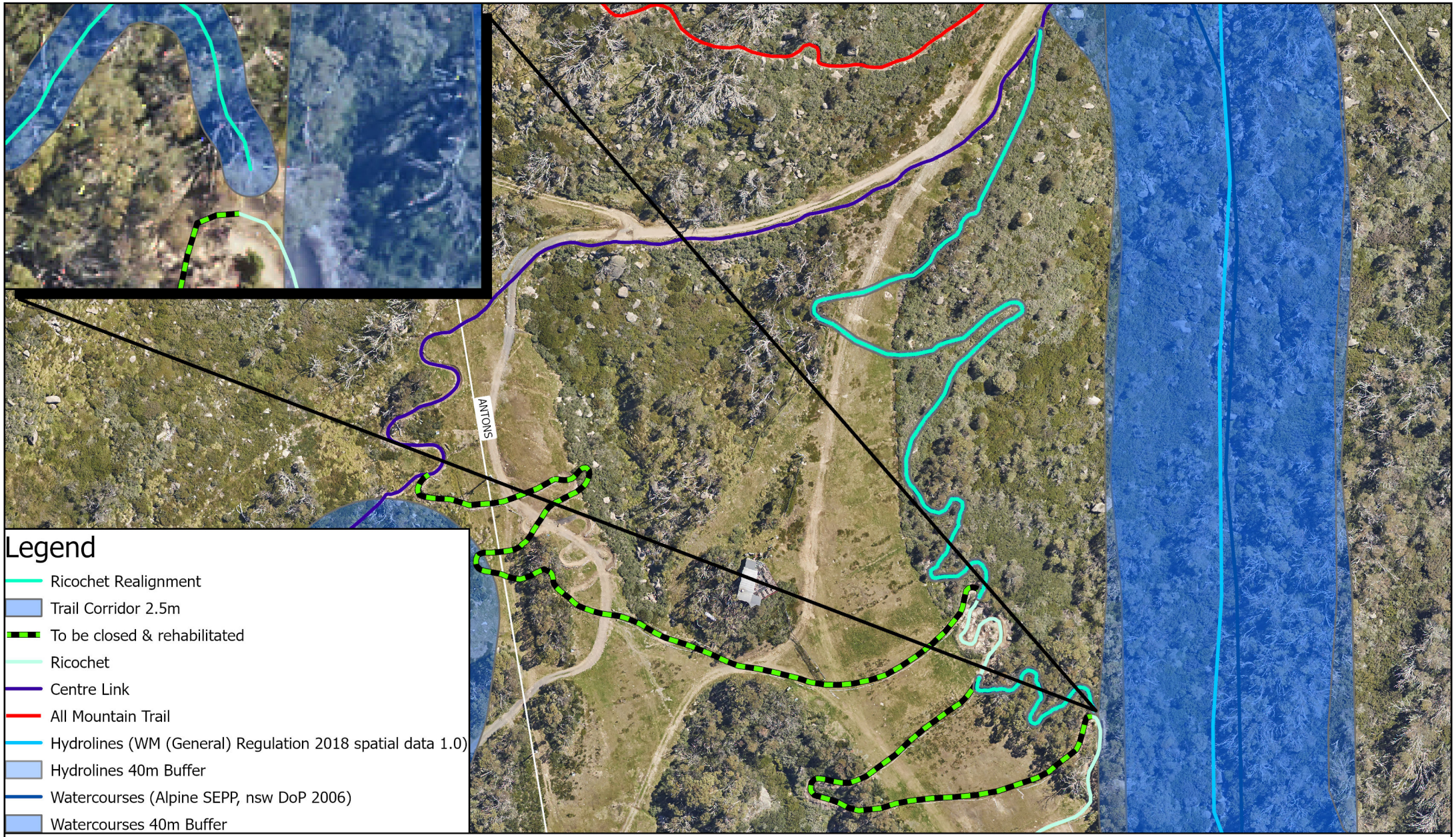
6.1.2 Land Use

The Development area comprises ski runs, lifting infrastructure, snowmaking infrastructure, walking tracks and mountain bike trails. The site comprises native vegetation. The mountain bike trail is a permitted land use under the head lease and Precincts – Regional SEPP.

6.2 Water

A review of the *Water Management (General) Regulation 2018 Hydro Line spatial data* (NSW Government 2018) and the *State Environmental Planning Policy (Kosciuszko National Park – Alpine Resort) 2007 Thredbo Alpine Resort, Sheet 1 of 5* (DoP 2006) confirms the Development is not located within 40 m of a watercourse. It is noted the previous alignment (depicted in SEE, Rev 0) was located with 40 m of the watercourse, however since the trail alignment has been modified no works will be carried out in waterfront land, refer **Figure 5**.

Surface water diversion is an important component of trail construction. If not managed appropriately, water run-off has the potential to result in erosion of the trail surface and pooling of water resulting in soft boggy conditions for riders. During construction appropriate drainage controls will be implemented to divert and/or manage stormwater run-off entering and leaving the trail corridor. The incorporation of rolling contours, grade reversals, outsloping and sediment retention pits on the low side of the trail (where required) will minimise the potential impacts associated with surface water run-off during operation of the trail.



Scale: 1:1,750

0 10 20 40 60 80

Meters

Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 2020
Grid: GDA 2020 MGA Zone 55

N

THREDBO

MAPPED WATERCOURSES

Project: Ricochet Realignment

Revision: 3

Date: 15/01/2024

Produced By: BB

6.3 Flora and Fauna

A summary of the BDAR (ELA 2024) is provided below:

- The Development will result in the clearing or further modification to 0.1 ha of native vegetation (PCT 3879: Kosciuszko High Plateua Grass Open Heath) and about 0.013 ha of exotic grassland and non-vegetated areas on existing ski runs. The proposal will require the clearing of understorey and groundcovers only, and will not result in the removal of any mature trees, or any associated fauna habitats such as hollows.
- The Development will impact on habitat for *Mastacomys fuscus* (Broad-toothed Rat) (listed as Vulnerable under the BC Act and Endangered under the EPBC Act).
- The Development does not involve any prescribed biodiversity impact.
- The Development does not have any Serious and Irreversible Impacts (SAII).
- The Development requires offsets, comprising two (2) ecosystem credits for Alpine Heaths and three (3) species credits for Broad-toothed Rat.

A copy of the BDAR is provided in **Appendix E**.

6.4 Heritage

6.4.1 Historic Heritage

A review of the Precincts – Regional SEPP, NSW historic inventory and the Thredbo Alpine Village Conservation Plan, Vol.2 Inventory (Clive Lucas, Stapleton and Partners 1997) concluded no heritage items are located within the site. No further assessment is required.

The site is located in KNP, forming part of the Australian Alps National Parks and Reserves (AANP). An assessment is provided below.

6.4.1.1 National Heritage Place (MNES)

The Development site is located within KNP, forming part of the Australian Alps National Parks and Reserves (AANP) which were included on the National Heritage List on 7 November 2008 for their –

1) course or pattern of Australia's natural or cultural history;
2) possession of uncommon, rare or endangered aspects of Australia's natural or cultural history;
3) importance in demonstrating the principal characteristics of: (i) a class of Australia's natural or cultural places, or (ii) a class of Australia's natural or cultural environment
4) importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
5) strong or special association with a particular community or cultural group for social, cultural or spiritual reasons; and
6) special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history.

In total, three reserves, seven national parks and one wilderness area comprise the National Heritage Place.

To determine whether a referral and formal assessment is required for the Development, an assessment against the significant impact criteria in the *Matters of National Environmental*

Significance: Significant Impact Guidelines 1.1 (DoE 2013) (MNES Significant Impact Guidelines) has been undertaken in **Table 5**.

Table 5: Significant Impact Assessment – Australian Alps National Parks and Reserves (AANP)

National Heritage Values of the AANP		Significant Impact Assessment
Criteria: An action is likely to have a significant impact on the National Heritage values of a National Heritage place if there is a real chance or possibility that it will cause: • one or more of the National Heritage values to be lost, • one or more of the National Heritage values to be degraded or damaged, or • one or more of the National Heritage values to be notably altered, modified, obscured or diminished.		
1)	The AANP are of outstanding landscape value and are important in the pattern of Australia's natural history, containing glacial and periglacial features, fossils, karst, biological heritage, moth feasting, transhumant grazing, scientific research, water harvesting and recreation. The AANP have outstanding heritage value for the longevity and diversity of its recreational use (Commonwealth of Australia 2008).	The Development will not result in significant any adverse impacts on these values. The Development will contribute to the year-round recreational offerings within KNP.
2)	The high altitude peaks and plateaus, glacial lakes and alpine and sub-alpine ecosystems of the alps are rare in Australia's mostly flat, dry and hot continent. The AANP contain a vast range of mountain environments and plant communities adapted to cold climates including tall, wet, fern-filled forests to snowgum woodlands and open expanses of alpine meadows. The alps also contains landforms created by glaciers, remarkable fish fossils and unique fauna including Mountain Pygmy Possum (*Burramys parvus*) and Bogong moth (*Agrotis infusa*) (Commonwealth of Australia 2008; DAWE 2021).	The Development will not result in any significant adverse impacts on these values.
3)	The AANP are listed for the north-east Kosciuszko pastoral landscape values which demonstrate the use of mountain resources, namely he summer grasses and herbfields. The landscape demonstrates the past grazing leases which convey the principal characteristics of transhumance and permanent pastoralism in a remote environment (Commonwealth of Australia 2008). The area contains stockman's huts, homestead complexes, stock yards and stock routes which reflect 150 years of summer grazing on the alpine high plains (DAWE 2021).	The Development is not located within the north-eastern area of KNP, therefore it will not impact on these landscape values.
4)	The AANP is a powerful, spectacular and distinctive landscape and natural beauty. The mountain vistas, alpine streams and rivers, lakes, snow-covered eucalypts, high plain grasslands, summer alpine wildflowers, forests and natural sounds are highly valued by community groups (Commonwealth of Australia 2008; DAWE 2021).	The Development will not result in any significant adverse impacts on these values.
5)	The AANP have a strong association with Australia's pioneering history, while the snowfields and national parks have long been popular recreation areas. Many community groups have a strong association with the alps for social and cultural reasons. The pioneering history of the high country is valued as an important part of the construction of the Australian identity featuring in myths, legends and literature. The mountain huts constructed for grazing, mining and recreation are valued by communities as physical expression of the cultural history of the region (Commonwealth of Australia 2008; DAWE 2021).	The Development will not result in any significant adverse impacts on these values. The trail will positively contribute to the recreational value of the resort and rider experience.
6)	There is a long history of scientific research and endeavour in the AANP and its associated with the life or works of highly recognised persons such as Baron Ferdinand von Mueller (botanist), Eugen Von Guerard (artist), and writers/poets, Andrew Barton 'Banjo' Paterson, Elyne	The Development will not have any impact on the life or works of a person, or group of persons, of

	Mitchell and David Campbell (Commonwealth of Australia 2008; DAWE 2021).	importance in Australia's natural or cultural history.

The Development will not cause any of the heritage values of the AANP to be lost, degraded, damaged or to be notably altered, modified, obscured or diminished.

6.4.2 Aboriginal Cultural Heritage

To establish due diligence for the Development, an assessment against the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010) has been undertaken.

Due Diligence Process	Comment
1. Will the activity disturb the ground surface or any culturally modified trees?	The Development will result in ground disturbance. No cultural modified trees were identified within the site during the site survey.
2. Are there any: a) relevant confirmed site records or other associated landscape feature information on AHIMS? And/or	A search of the Aboriginal Heritage Information Management System (AHIMS) was undertaken on 07 July 2023. The search results (**Appendix D**) identified no Aboriginal sites or places are recorded in or near the site.
b) Any other sources of information of which a person is already aware? And/or	Several historical independent assessments have been undertaken within the resort by Past Traces Heritage Consultants (2017), NGH Environmental (2017), Iron Bark (2013), and URS Australia Pty Ltd (2004; 2005). The *Ricochet MTB Trail Re-alignment Upgrades, Thredbo Alpine Resort, Kosciusko National Park: Statement of Environmental Effects* (Dabyne 2020) also assessed the surrounding area which is of relevance to this Development. All assessments concluded there are no previously recorded Aboriginal sites located on or within the vicinity of the Development Site. The assessments conclude that the ski slope areas have low archaeological potential. The studies also concluded that given the steepness and exposed aspect/lack of sheltering tors, the ski slopes are unlikely to have been favourable campsite locations.
c) landscape features that are likely to indicate presence of Aboriginal objects?	No landscape features that are likely to indicate presence of Aboriginal objects were identified within the site. It is considered the Development has low potential to impact on unrecorded Aboriginal objects or sites. There is no requirement to move onto Steps 3 and 4.
3. Can harm to Aboriginal objects listed on AHIMS or identified by other sources of information and/or can the carrying out of the activity at the relevant landscape features be avoided?	Not applicable.
4. Does a desktop assessment and visual inspection confirm that there are Aboriginal objects or that they are likely?	Not applicable.

All reasonable steps have been undertaken to ensure the Development fulfils the requirements of the Aboriginal Cultural Heritage Due Diligence Process. Potential impacts from the Development on objects or sites of Aboriginal Cultural Heritage significance are considered unlikely. In the unlikely event that Aboriginal objects are discovered, controls outlined in the SEMP (**Appendix F**) will be implemented.

6.5 Landscape Character and Visual Amenity

The existing site and surrounds comprise a mix of native vegetation and disturbed land, comprising ski runs and associated infrastructure, MTB trails, access tracks and lifting facilities. The Development is not expected to significantly alter the character of the resort as it will form part of the existing Thredbo MTB Trail Network. The tread of the trail is shaped using natural materials (rocks and soil) to provide features that blend within the existing landscape.

6.6 Traffic and Access

During construction, the Development site will be accessible via the summer mountain access road.

During operation, chairlift access is via the Kosciuszko Express, Gunbarrel and Cruiser chairlifts. Riders are able to access the trail from the Kosciuszko Express chairlift, via the Upper All-Mountain trail and onto the Centre Link. From the Gunbarrel chairlift, riders are able to access the trail from the Centre Link. From the Cruiser chairlift riders are able to access the trail from Easy Rider trail, and onto the Centre Link, refer **Figure 6**.

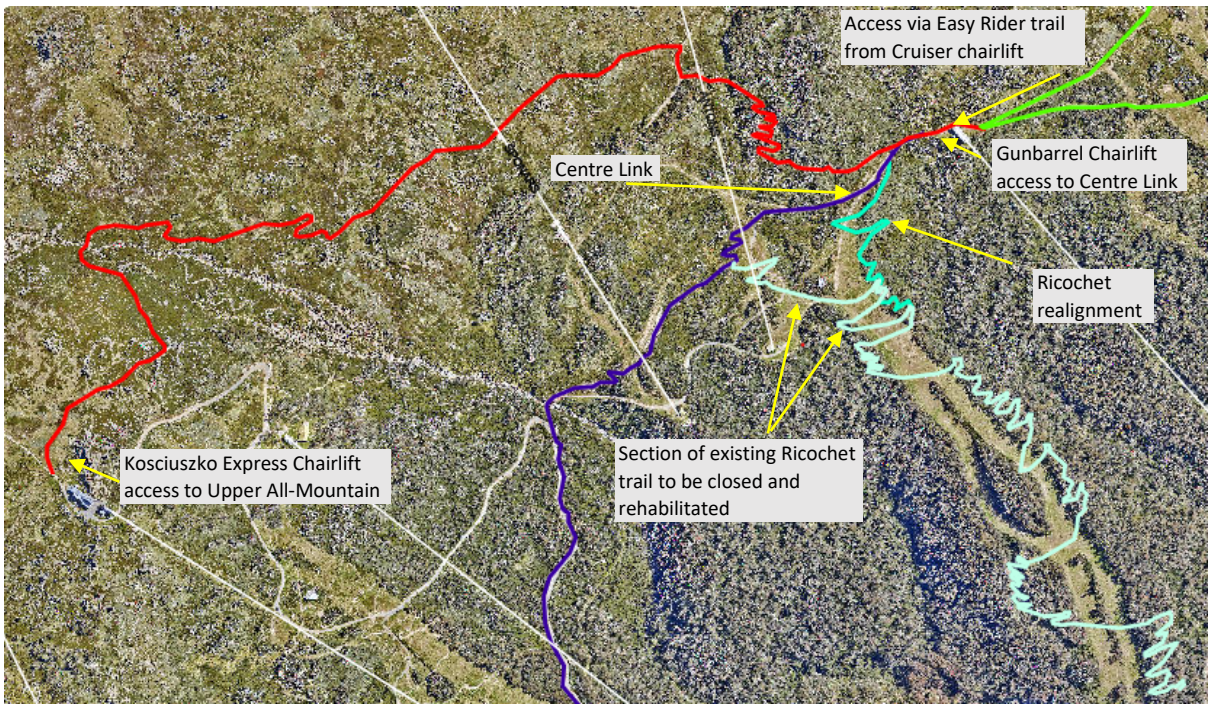


Figure 6: Integration with Existing Trail Network

6.7 Air Quality

Dust can be a nuisance and decrease the amenity value of an area. Dust impacts are likely to be generated during construction from activities including: vegetation clearing and earthworks; and vehicle movements.

There are no sensitive receptors located within close proximity of the site. With the implementation of appropriate controls, adverse impacts are not expected.

6.8 Noise

It is proposed construction hours of works will be undertaken during standard working hours. This includes 7:00am – 6:00pm Monday to Friday, 8:00am – 1:00pm Saturdays, and no work on Sundays or public holidays. Out-of-hours works are not anticipated. There are no sensitive land uses within close proximity of the site, as such no adverse noise impacts are anticipated.

6.9 Socio-Economic

KT have been developing mountain bike trails within the resort since the 1990s. Consequently, the level of understanding of the existing landscape and industry will ensure that the trail is designed and constructed to comply with best-practice environmentally trail design principles; and provides targeted mountain biking objectives and difficulty with consideration of the natural, social and operational setting.

The section of trail being closed will reduce the need for knock down / rebuild each season, reducing the impacts on winter operations and provide a better riding experience.

Whilst the Development will result in ongoing trail maintenance costs, the economic impacts will be largely positive as the trail will contribute to improved economic stability for the resort through the provision of an enhanced trail network which will cater to a broader range of mountain bikers and boost summer visitation. The Development will also provide construction and ongoing operational jobs.

6.10 Matters of National Environmental Significance

A search of the EPBC Act Protected Matters Search Tool (PMST) (DCCEEW 2023) (records within a 5 km buffer of the site was undertaken to determine whether any MNES are likely to occur within the Development area (refer **Appendix D)**. The Protected Matters Report (PMR) identified the five (5) categories (as listed under the EPBC Act) of MNES (**Table 6**) that may be relevant to the Development area and surrounds.

Table 6: Summary of MNES

MNES Categories	Comment
National Heritage Places	The Development is located within KNP, part of the Australian Alps National Parks and Reserves (AANP). An assessment is provided in **Section 6.4.1.1**. The Snowy Mountains Scheme is not considered relevant to the site. No further assessment is required.
Wetlands of International Importance	Blue Lake is not considered relevant to the site. No further assessment is required.
Listed Threatened Ecological Communities (TECs)	There are no Listed TECs were identified within the site. The Commonwealth listed species which are known or considered to have the potential to occur within the study area include Broad-toothed Rat and Anenome Buttercup. An assessment against the Significant Impact Criteria has been undertaken in Appendix D of the BDAR (**Appendix E**). The assessment concluded the Development is unlikely to result in any significant impacts to these species.
Listed Threatened Species	
Listed Migratory Species	

While based on some species records, the PMST relies on predictive modelling of suitable habitats and does not necessarily reflect an actual record of the species/community for a particular location.

Following consideration of the MNES Significant Impact Guidelines, it is concluded that the Development is unlikely to have a significant impact on any MNES or Commonwealth land, and a referral to the Commonwealth Environment Minister is therefore not recommended.

6.11 Waste

Waste generation from the Development is expected to be minor. Waste may include: general solid waste (putrescible) e.g. waste from litter bins; and general solid waste (non-putrescible) e.g. plastic, paper, cardboard, construction waste. General litter bins, recyclable bins and the Waste Transfer Facility will be utilised for the storage and disposal of waste.

7 Mitigation and Management Measures

Recommended mitigation and management measures to reduce potential impacts on the key values of the natural, built and human environment within the site and surrounds are provided below.

	Mitigation and Management Measures	Timing
General		
1	Prepare and implement Site Environmental Management Plan (SEMP).	Prior to and during construction
2	Prepare and implement Thredbo Mountain Bike Trail Management Plan, including trail maintenance and monitoring programs.	Prior to operation
3	All Project staff and contractors should undergo a site-specific induction which will cover environmental awareness training, environmental obligations and compliance requirements (e.g. limit of disturbance footprint and other environmental safeguards), emergency and incident response, reporting, and relevant procedures.	Prior to construction
4	The Development site will be temporarily fenced, roped or flagged to clearly delineate the construction area and no-go zones.	Prior to and during construction
Land and Water		
1	Appropriate drainage, erosion and sediment controls will be implemented at the site to minimise impacts to the water quality of run-off and the potential for sediment to leave the site and impact on the surrounding environment during construction and operational use. Erosion and sediment controls to be inspected and maintained in accordance with the SEMP.	During and post-construction, operation
2	All stockpiles will be managed in accordance with the Soil Stockpile Guidelines.	During construction
3	All storage of petroleum products, oils or chemicals to be in accordance with Australian Standards.	During construction
4	Refuelling procedures to be implemented to minimise spills of fuel products.	During construction
5	Progressive rehabilitation of disturbed areas to reduce erosion risks in accordance with the *Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park* (NGH 2007) (Rehabilitation Guidelines) and Detailed Rehabilitation and Monitoring Plan.	During and post construction
6	New signs to be located in existing disturbed areas or areas disturbed for construction of the trail.	During construction
7	The incorporation of sustainable design principles, such as following the contours of the hillside, outsloping, the half rule, the 10 % average guideline and use of frequent grade reversals will minimise erosion during operation of the trail.	During construction, operation
8	The incorporation of sustainable design principles, such as frequent grade reversals, avoidance of wet/boggy areas and installation of drainage crossings will assist in surface water diversion and minimise impacts on water quality.	During construction, operation
Flora and Fauna		
1	The trail should be aligned during construction as necessary to avoid any wombat burrows in close proximity to the trail, including those identified in Figure 8 of the BDAR. If any wombat burrows need to be impacted by the proposal a wombat management plan should be developed for the proposal in consultation with NPWS (ELA 2024).	During construction
2	Identify with flagging tape the trail alignment where it encroaches upon relatively undisturbed native vegetation (ELA 2024)	Prior to construction

3	Restrict work to daylight hours (ELA 2024)	Prior to construction
4	Any machinery or vehicles involved with the proposed works that are not owned by Thredbo will be washed down to remove all soil and vegetative matter before entering the site to limit spread of weeds and disease such as *Phytophthora cinnamomic* (ELA 2024)	During construction
5	Brief all workers as to limit of disturbance footprint and other environmental safeguards (ELA 2024)	During construction
Transport		
1	Traffic and construction vehicle access will be managed as per regular daily operation in the resort.	During construction
2	All vehicle and plant operators will be licensed and trained.	During construction
3	Appropriate signage will be installed to ensure the safety of road users, cyclists and pedestrians during construction and operation.	Prior to and during construction, operation
Air Quality		
1	Reasonable and practicable measures (e.g. water sprays, vehicles carrying rubble must be covered) will be implemented to prevent dirt and dust from affecting the amenity or the surrounding environment during construction. Measures will be detailed in the SEMP.	During construction
2	In the event a complaint is received in relation to air quality/dust nuisance, the source of the complaint will be investigated, and if required corrective actions will be implemented to minimise or avoid impacts.	During construction
Noise and Vibration		
1	Project staff will take reasonable and practicable management measures to avoid and mitigate environmental nuisance from noise associated with the works e.g. turn off plant that is not being used.	During construction
2	Construction works and operation of plant will comply with Australian Standard *AS 2436-2010 Guide to noise and vibration control on construction, demolition and maintenance sites* and the *Interim Construction Noise Guideline* (DECC 2009) e.g. ensure plant is regularly maintained, and repair or replace equipment that becomes noisy, keep drivers informed of designated vehicle routes and parking locations.	During construction
3	Construction works will be conducted during standard hours stipulated in the conditions of approval.	During construction
4	In the event a noise complaint is received, the source of the complaint will be investigated, and if required corrective actions will be implemented to minimise or avoid noise impacts.	During construction
Cultural Heritage		
1	Where unexpected items of potential archaeological, built or Aboriginal cultural heritage significance are discovered, works will cease, relevant authorities (i.e. NPWS) will be notified and the site will be secured by erecting a no-go zone. If human remains are found, works will cease, the site will be secured and NSW Police will be notified immediately.	During construction
Waste		
1	Waste to be managed in accordance with the waste hierarchy – avoid and reduce → reuse waste→ recycle waste → recover energy→ treat waste→ dispose of waste.	During construction
2	All construction waste and litter to be minimised and contained within appropriate receptacles. All receptacles will be in good condition.	During construction
3	All waste to be managed and disposed of in accordance with legislative requirements and relevant standards.	During construction

4	All waste transportation vehicles should be covered appropriately to ensure waste cannot spill, leak or escape onto the road or wash into stormwater drains.	During construction

8 Conclusion

The purpose of the Development is to close and rehabilitate the upper section of Ricochet trail on the open ski slopes and access road (across Antons t-bar lift line, section below Frostbite and switch backs on High Noon) and provide a sustainable route that meets the IMBA guidelines by incorporating regular grade changes. The closure of this section of trail will improve the trail sustainability, guest safety and mountain operations issues currently experienced in this location.

In accordance with the requirements of the EP&A Act, EP&A Regulations and Precincts – Regional SEPP, this SEE has assessed the potential impacts of the Development on the human, built and natural environment of the Project site and surrounds.

The Development will involve the clearing or further modification of 0.1 ha of native vegetation and 0.013 ha of exotic grassland and non-vegetation areas on existing ski runs (ELA 2024). The proposal will require the clearing of understorey and groundcovers only, and will not result in the removal of any mature trees, or any associated fauna habitats such as hollows. The Development does not have any Serious and Irreversible Impacts (SAII).

To meet offset obligations under the BOS, a payment of two (2) ecosystem credits for Alpine Heaths and three (3) species credits is required to offset the unavoidable impacts to PCT 3879 and Broad-toothed Rat.

Following consideration of the MNES Significant Impact Guidelines, it is concluded that the Development is unlikely to have a significant impact on any MNES or Commonwealth land, and a referral to the Commonwealth Environment Minister is therefore not recommended.

The impacts of the Development are considered to be largely positive. The Development is consistent with the principles of ESD and it will not result in any significant adverse impacts on the human, built or natural environment. With the implementation of appropriate mitigation and management measures during construction and operation, the impacts of the Development are considered acceptable. The Development is therefore considered suitable for the site and within the public interest.

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10 Appendices

Appendix A IMBA Trail Difficulty Rating System

8.0 Trail Difficulty Rating System Land Managers Guide

	Very easy White Circle	Easy Green Circle	Intermediate Blue Square	Difficult Single Black Diamond	Extreme Double Black Diamond
Description	Likely to be a fire road or wide single track with a gentle gradient, smooth surface and free of obstacles. Frequent encounters are likely with other cyclists, walkers, runners and horse riders.	Likely to be a combination of fire road or wide single track with a gentle gradient, smooth surface and relatively free of obstacles. Short sections may exceed these criteria. Frequent encounters are likely with other cyclists, walkers, runners and horse riders.	Likely to be a single trail with moderate gradients, variable surface and obstacles. Dual use or preferred use Optional lines desirable	Likely to be a challenging single trail with steep gradients, variable surface and many obstacles. Single use and direction Optional lines XC, DH or trials	Extremely difficult trails will incorporate very steep gradients, highly variable surface and unavoidable, severe obstacles. Single use and direction Optional lines XC, DH or trials
Trail Width	2100mm plus or minus 900mm	900mm plus or minus 300mm for tread or bridges.	600mm plus or minus 300mm for tread or bridges.	300mm plus or minus 150mm for tread and bridges. Structures can vary.	150mm plus or minus 100mm for tread or bridges. Structures can vary.
Trail Surface	Hardened or smooth.	Mostly firm and stable.	Possible sections of rocky or loose tread.	Variable and challenging.	Widely variable and unpredictable.
Average Trail Grade	Climbs and descents are mostly shallow. Less than 5% average.	Climbs and descents are mostly shallow, but may include some moderately steep sections. 7% or less average.	Mostly moderate gradients but may include steep sections. 10% or less average.	Contains steeper descents or climbs. 20% or less average.	Expect prolonged steep, loose and rocky descents or climbs. 20% or greater average
Maximum Trail Grade	Max 10%	Max 15%	Max 20% or greater	Max 20% or greater	Max 40% or greater
Level of Trail Exposure	Firm and level fall zone to either side of trail corridor	Exposure to either side of trail corridor includes downward slopes of up to 10%	Exposure to either side of trail corridor includes downward slopes of up to 20%	Exposure to either side of trail corridor includes steep downward slopes or freefall	Exposure to either side of trail corridor includes steep downward slopes or freefall

Natural Obstacles and Technical Trail Features (TTFs)	No obstacles.	Unavoidable obstacles to 50mm (2") high, such as logs, roots and rocks. Avoidable, rollable obstacles may be present. Unavoidable bridges 900mm wide. Short sections may exceed criteria.	Unavoidable, rollable obstacles to 200mm (8") high, such as logs, roots and rocks. Avoidable obstacles to 600mm may be present. Unavoidable bridges 600mm wide. Width of deck is half the height. Short sections may exceed criteria.	Unavoidable obstacles to 380mm (15") high, such as logs, roots, rocks, drop-offs or constructed obstacles. Avoidable obstacles to 1200mm may be present. Unavoidable bridges 600mm wide. Width of deck is half the height. Short sections may exceed criteria.	Large, committing and unavoidable obstacles to 380mm (15") high. Avoidable obstacles to1200mm may be present. Unavoidable bridges 600mm or narrower. Width of bridges is unpredictable. Short sections may exceed criteria.

Source: Section 8.0 Trail Difficulty Rating System Land Managers Guide of (IMBA 2012, p.10).

Appendix B Trail Design and Construction Techniques

Trail Design Elements and Construction Techniques	
Berm	
Decision point sign	
Partial and full bench	 **Hillside before trail:** Vegetation keeps water sheeting slowly downhill **Incomplete Full Bench:** Left with unfinished vertical cut, soil will slough off, making tread narrower. Obtrusive back cut also forces rider to outside of tread. **Full Bench Cut:** Entire tread width is cut into firm mineral soil. Tread compacts uniformly and is sustainable. 5% outslope ensures water sheets across tread. Back cut is blended into back slope. Proper back slope, out slope and full bench cut minimize maintenance.

	Source: IMBA 2001
Outslope	
Rock armour	
Natural feature	

Half rule		
Grade reversals		
Drainage		

Appendix C Standard Signage Plans

Decision Point Sign

200 mm

400 mm

Date: 14/06/2022 Revision: 0 Kosicuszko Thredbo Pty Ltd **Not to scale**	**Standard Signage Plans** **Project: Lower All Mountain MTB Trail Diversion**	

Appendix D Desktop Search Results

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : Ricochet

Client Service ID : 798490

Kosciuszko Thredbo Pty Ltd

Date: 07 July 2023

Po Box 92
Thredbo New South Wales 2625

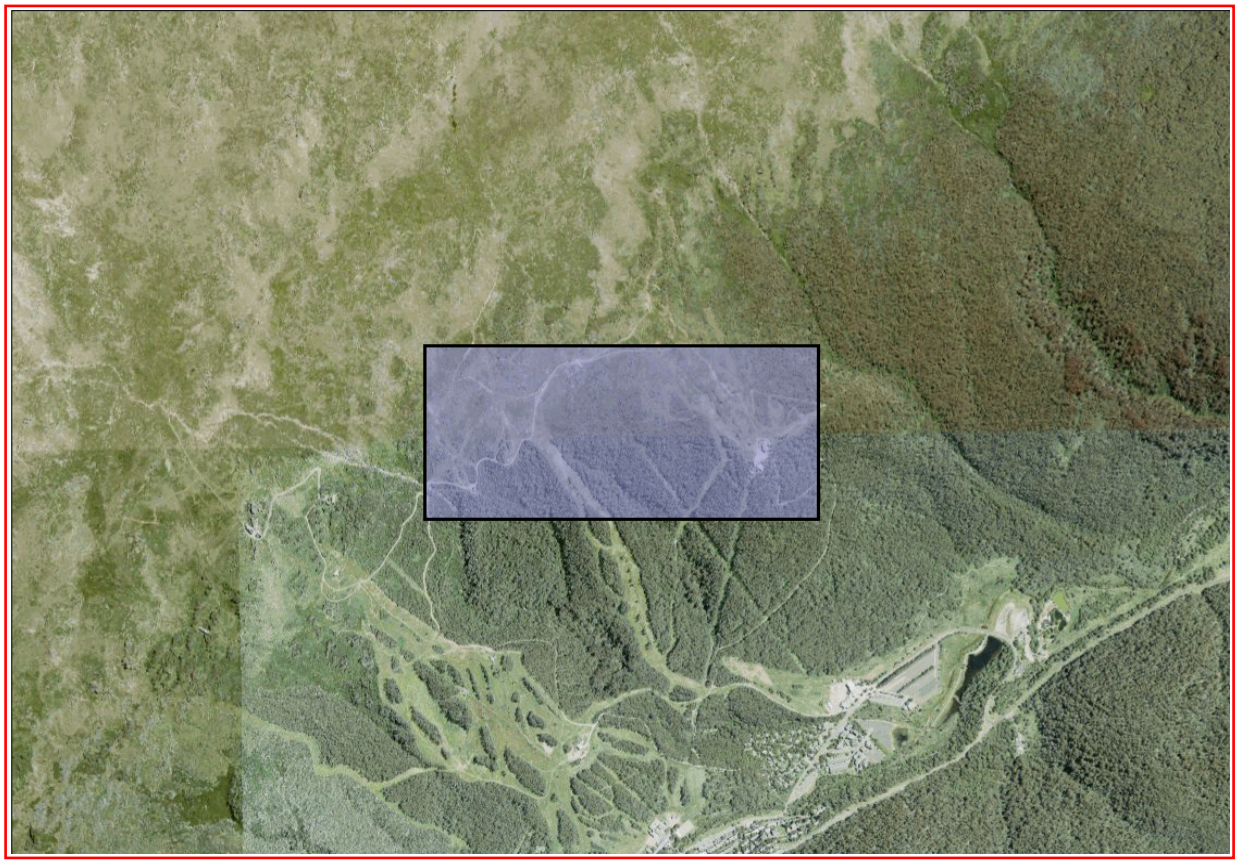
Attention: Chloe Chalk

Email: chloe_chalk@evt.com

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -36.4934, 148.2944 - Lat, Long To : -36.4878, 148.3099, conducted by Chloe Chalk on 07 July 2023.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Level 6, 10 Valentine Ave, Parramatta 2150
Locked Bag 5020 Parramatta NSW 2124
Tel: (02) 9585 6345

ABN 34 945 244 274
Email: ahims@environment.nsw.gov.au
Web: www.heritage.nsw.gov.au

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 12-Jul-2023

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	2
Wetlands of International Importance (Ramsar	8
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	42
Listed Migratory Species:	11

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	16
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	1
Regional Forest Agreements:	1
Nationally Important Wetlands:	None
EPBC Act Referrals:	4
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

National Heritage Places			[Resource Information]
Name	State	Legal Status	Buffer Status
Historic			
Snowy Mountains Scheme	NSW	Listed place	In feature area
Natural			
Australian Alps National Parks and Reserves	ACT	Listed place	In feature area

Wetlands of International Importance (Ramsar Wetlands)		[Resource Information]
Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	700 - 800km upstream from Ramsar site	In buffer area only
Barmah forest	200 - 300km upstream from Ramsar site	In buffer area only
Blue lake	Within 10km of Ramsar site	In feature area
Gunbower forest	300 - 400km upstream from Ramsar site	In buffer area only
Hattah-kulkyne lakes	500 - 600km upstream from Ramsar site	In buffer area only
Nsw central murray state forests	200 - 300km upstream from Ramsar site	In buffer area only
Riverland	700 - 800km upstream from Ramsar site	In buffer area only
The coorong, and lakes alexandrina and albert wetland	700 - 800km upstream from Ramsar site	In buffer area only

Listed Threatened Ecological Communities			[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status

Community Name	Threatened Category	Presence Text	Buffer Status
Alpine Sphagnum Bogs and Associated Fens	Endangered	Community known to occur within area	In feature area
Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	Community may occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Stagonopleura guttata](#) Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In feature area
FISH			
[Galaxias supremus](#) Kosciuszko Galaxias [87878]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Galaxias terenasus](#) Roundsnout Galaxias [87175]	Endangered	Species or species habitat likely to occur within area	In feature area
[Maccullochella peelii](#) Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Macquaria australasica](#) Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area	In buffer area only
[Prototroctes maraena](#) Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area	In feature area
FROG			
[Litoria spenceri](#) Spotted Tree Frog [25959]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
[Litoria verreauxii alpina](#) Alpine Tree Frog, Verreaux's Alpine Tree Frog [66669]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
MAMMAL			
[Burramys parvus](#) Mountain Pygmy-possum [267]	Endangered	Species or species habitat known to occur within area	In feature area
[Dasyurus maculatus maculatus (SE mainland population)](#) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In feature area
[Mastacomys fuscus mordicus](#) Broad-toothed Rat (mainland), Tooarrana [87617]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Petaurus australis australis](#)			
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)](#)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area	In feature area
[Pseudomys fumeus](#)			
Smoky Mouse, Konoom [88]	Endangered	Species or species habitat known to occur within area	In feature area
[Pteropus poliocephalus](#)			
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In buffer area only
PLANT			
[Argyrotegium nitidulum](#)			
Shining Cudweed [82043]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Calotis glandulosa](#)			
Mauve Burr-daisy [7842]	Vulnerable	Species or species habitat may occur within area	In feature area
[Colobanthus curtisiae](#)			
Curtis' Colobanth [23961]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Glycine latrobeana](#)			
Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat may occur within area	In feature area
[Haloragis exalata subsp. exalata](#)			
Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Leucochrysum albicans subsp. tricolor](#)			
Hoary Sunray, Grassland Paper-daisy [89104]	Endangered	Species or species habitat may occur within area	In feature area
[Pimelea bracteata](#)			
[8125]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Prasophyllum bagoense Bago Leek-orchid [84276]	Critically Endangered	Species or species habitat may occur within area	In feature area
Prasophyllum petilum Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area	In feature area
Pterostylis oreophila Blue-tongued Orchid, Kiandra Greenhood [22903]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Ranunculus anemoneus Anemone Buttercup [14889]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rytidosperma pumilum Feldmark Grass [66716]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat may occur within area	In feature area
REPTILE			
Cyclodomorphus praealtus Alpine She-oak Skink [64721]	Endangered	Species or species habitat known to occur within area	In feature area
Liopholis guthega Guthega Skink [83079]	Endangered	Species or species habitat known to occur within area	In feature area
Liopholis montana Mountain Skink [87162]	Endangered	Species or species habitat likely to occur within area	In feature area
Pseudemoia cryodroma Alpine Bog Skink, Alpine Bog-skink [84408]	Endangered	Species or species habitat known to occur within area	In feature area
Listed Migratory Species			[Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Kosciuszko	National Park	NSW	In feature area

Regional Forest Agreements	[Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status
Southern RFA	New South Wales	In feature area

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
Aerial baiting for wild dog control	2006/2713	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Appendix E Biodiversity Development Assessment Report

Proposed Ricochet Realignment, Thredbo Alpine Resort
Biodiversity Development Assessment Report

Kosciuszko Thredbo Pty Ltd

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DOCUMENT TRACKING

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This document has been prepared by Eco Logical Australia Pty Ltd with support from Kosciuszko Thredbo Pty Ltd

Template 2.8.1

Executive Summary

Eco Logical Australia Pty Ltd was engaged by Kosciuszko Thredbo Pty Ltd to prepare a Biodiversity Development Assessment Report (BDAR) for the proposed construction of a new mountain bike trail and associated works, within Thredbo Alpine Resort.

This report has been prepared to meet the requirements of the Biodiversity Assessment Method 2020 established under Section 6.7 of the NSW *Biodiversity Conservation Act 2016* (BC Act). A portion of the native vegetation within the development site is mapped on the Biodiversity Values map.

The proposed development has been located to take advantage of existing disturbed areas and minimize the required clearing. As a result, it is anticipated that the proposal will involve the clearing or further modification of only 0.1 ha of native vegetation. The proposal will require the clearing of understorey and groundcovers only, and will not result in the removal of any mature trees, or any associated fauna habitats such as hollows.

The development footprint supports one Plant Community Type (PCT) PCT 3879 Kosciuszko High Plateau Grassy Open Heath in one condition state; Good. PCT 3879 does not conform to any Endangered Ecological Communities (EEC) listed under the NSW BC Act or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Targeted surveys within the development site and immediate surrounds identified one threatened fauna species, *Mastacomys fuscus* (Broad-toothed Rat), and one threatened flora *species Ranunculus anemoneus* (Anemone Buttercup), as occurring within or close to the development site. A number of other threatened fauna species are known to occur in adjoining habitats and/or have the potential to occur within the development site, such as *Petroica phoenicea* (Flame Robin).

This BDAR outlines the measures taken to avoid, minimise and mitigate impacts to the vegetation and habitats present within the development footprint during the design, construction and operation of the development. The residual unavoidable impacts of the proposed development were calculated in accordance with the BAM by utilising the Biodiversity Assessment Method Credit Calculator. A total of two ecosystem credits and three species credits are required to offset the unavoidable impacts to the vegetation and habitats present within the development footprint.

Serious and Irreversible Impact (SAII) values have been considered as part of this assessment. The proposal will not result in any SAII.

Following consideration of the administrative guidelines for determining significance under the EPBC Act, it is concluded that the proposal is unlikely to have a significant impact on matters of National Environmental Significance (MNES) or Commonwealth land, and a referral to the Commonwealth Environment Minister is therefore not recommended.

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Abbreviations

Abbreviation	Description
BAM	Biodiversity Assessment Method
BAMC	Biodiversity Assessment Method Credit Calculator
BC Act	NSW *Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
CEEC	Critically Endangered Ecological Community
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DCCEEW (NSW)	NSW Department of Climate Change, Energy, the Environment and Water
DPE	NSW Department of Planning, Industry and Environment
EEC	Endangered Ecological Community
ELA	Eco Logical Australia Pty Ltd
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
FM Act	NSW *Fisheries Management Act 1994*
GIS	Geographic Information System
GPS	Global Positioning System
IBRA	Interim Biogeographic Regionalisation for Australia
LGA	Local Government Area
NPWS	New South Wales National Parks and Wildlife Service
NSW	New South Wales
NRAR	NSW Department of Natural Resources Access Regulator
PCT	Plant Community Type
SEPP	State Environmental Planning Policy
TEC	Threatened Ecological Community
VIS	Vegetation Information System

1. Introduction

This Biodiversity Development Assessment Report (BDAR) has been prepared by Ryan Smithers, an Accredited Person (BAAS17061) to apply the Biodiversity Assessment Method (BAM) under the NSW *Biodiversity Conservation Act 2016* (BC Act). All credit calculations have been undertaken using the BAM Calculator (BAMC) version 2020 in case number 41644. Consistent with the BAM, the streamlined (small area) assessment module has been used for this assessment.

Definitions of terminology used throughout this report are presented in Appendix A.

1.1. General description of the development site

The development site comprises existing ski slopes and remnant native vegetation on the edges of the High Noon ski run, within Thredbo Alpine Resort. Parts of the development site are already heavily modified in association with existing ski slopes and associated infrastructure.

This report includes two base maps, the Location Map (Figure 1) and the Site Map (Figure 2).

1.2. Brief description of the proposal

The proposed development comprises a realignment of the existing Ricochet mountain bike trail. The purpose of the trail realignment is to remove the section of the existing Ricochet trail that traverses the Antons T-bar track, below Frostbite and High Noon ski run. This will reduce need for knock down / rebuild each season, reducing the impacts on winter operations and provide a better riding experience. The levelling and rehabilitation of this section being removed off the ski slope will provide an improved winter operation outcome for grooming machinery and subsequently guest experience.

The proposed trail will result in an expected average disturbance footprint width of 2.5 m. The proposed works are expected to affect 0.1 ha of native vegetation, and about 0.013 ha of exotic grassland and non-vegetated areas on the existing ski runs. The proposed trail has gone through a number of design iterations in consultation with NSW NPWS Resorts Environmental Services Team (REST) to minimise impacts associated with the proposed trail. These iterations have avoided patches of the threatened *Ranunculus anemoneus* (Anemone Buttercup), threatened ecological communities and minimised impacts generally.

The impacts of the proposed trail can be summarized as follows:

- The clearing of shrubs and groundcovers in a 2-3 m wide corridor where the trail traverses native vegetation. The disturbance corridor is required to contain the upper and lower batters and the trail surface when the trail is traversing across moderate to steep slopes. On gentler slopes the disturbance corridor will be closer to 1.5 m. The average disturbance width is expected to be 2.5 m. The clearing will be undertaken with a mix of hand tools i.e. chainsaws and brush-cutters, and machinery i.e. mini-excavator.
- In general, it is possible to align the trail to avoid tree removal, however there will be some areas where the removal of some saplings is likely to be unavoidable.
- Earthworks (cut and fill) to create the trail form. This will be undertaken with a mini-excavator.
- Importation of some decomposed granite for the track surface

The proposal is further identified in Figure 3 and Photo 1 – Photo 6. Figure 4 shows earlier versions of the proposed realignment (version 1-3).

Photo 1: The proposed trail diverts from the existing Centre Link trail and heads west along contour towards the High Noon ski run.

Photo 2: The trail traverses heath as it heads towards High Noon ski run.

Photo 3: The trail traverses High Noon ski run before turning back and traversing High Noon again.

Photo 4: The trail alignment has been selected to avoid the wet heath that occurs further downslope and to avoid the Anemone Buttercup patches which occur to the east of the proposed alignment.

Photo 5: The trail alignment heads back towards High Noon ski run before heading downslope through a series of bends in the woodland on the edge of the ski run.

Photo 6: The trail traverses the woodland on the edge of the High Noon ski run before re-joining the existing Ricochet trail.

1.3. Development site footprint

It is anticipated that the proposed development will result in the removal or modification of 0.1 ha of native vegetation. Approximately 0.013 ha of exotic grassland, on High Noon ski run, will also be disturbed in association with the proposed trail.

The development site footprint is identified in Figure 2. The proposal is identified in Figure 3.

1.4. Sources of information used

The following data sources were reviewed as part of this report:

- BioNet Vegetation Classification
- BioNet Atlas Database
- Threatened Biodiversity Data Collection
- Additional GIS datasets including cadastre, contours, imagery and drainage.

1.5. Legislative context

Legislation relevant to the development site is outlined in Table 1.

Table 1: Legislative context

Name	Relevance to the project	Report Section
Commonwealth		
Environment Protection and Biodiversity Conservation Act 1999	Matters of national Environmental Significance (MNES) have been identified on or near the development site. This report assesses impacts to MNES and concludes that the development is unlikely to have a significant impact on MNES.	Appendix D
State		
Environmental Planning and Assessment Act 1979	The proposed development requires consent and is to be assessed under Part 4 of the EP&A Act. The EP&A Act places a duty on the determining authority to adequately address a range of environmental matters including the maintenance of biodiversity and the likely impact to threatened species, populations and communities.	-
Biodiversity Conservation Act 2016	The proposed development involves clearing of vegetation identified as high conservation value on the Biodiversity Values Land Map and thus requires submission of a Biodiversity Development Assessment Report.	-
Environmental Planning Instruments		
Precincts - Regional SEPP 2021	State Environmental Planning Policy (Precincts—Regional) 2021 (Precincts-Regional SEPP) facilitates a planning framework for Special Activation Precincts (Precinct/s) in regional NSW, streamlining planning processes and guiding the delivery of the precincts. The Precincts-Regional SEPP identifies the Minister for Planning as the determining authority for development within the NSW Alpine Resorts. Precincts-Regional SEPP requires the Minister for Planning to refer for comment any development application in the Alpine Resorts to the Director General of the NSW Department of Environment and Climate Change (DECC).	-
Snowy River Shire Local Environment Plan 2013	The subject site is zoned C1 National Parks and Nature Reserves under the Snowy River Shire Local Environment Plan 2013.	-

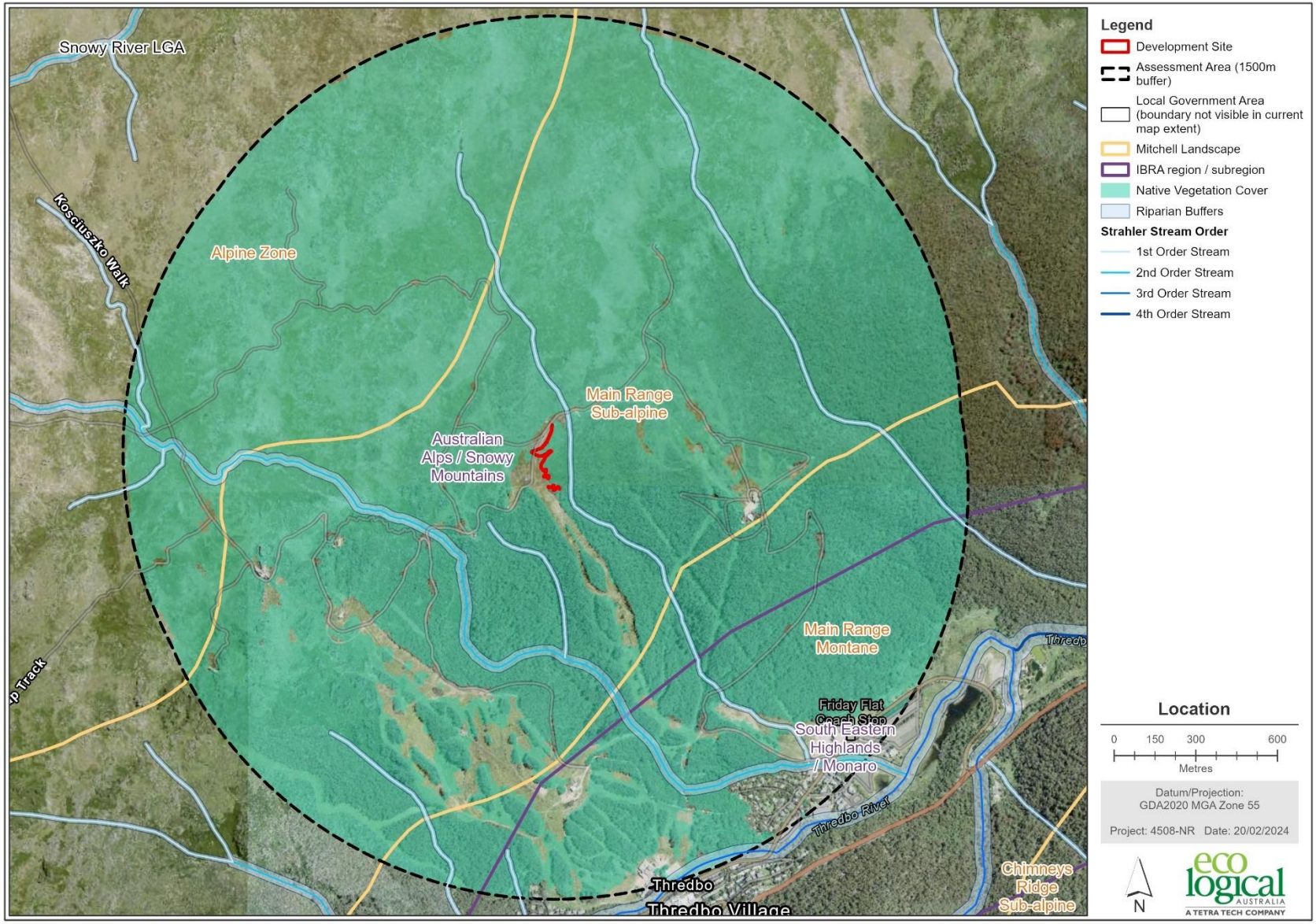

Figure 1: Location Map

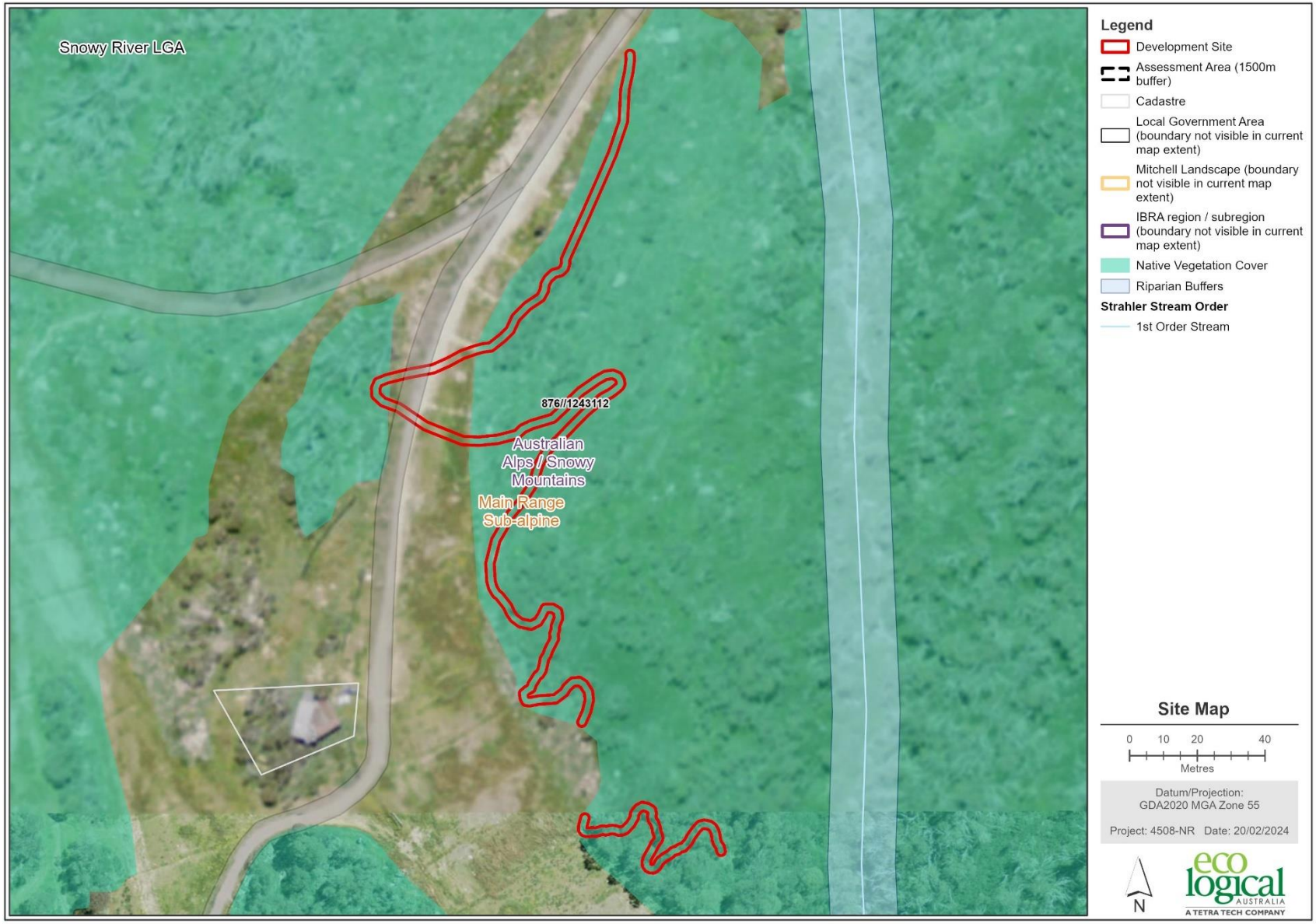

Figure 2: Site Map

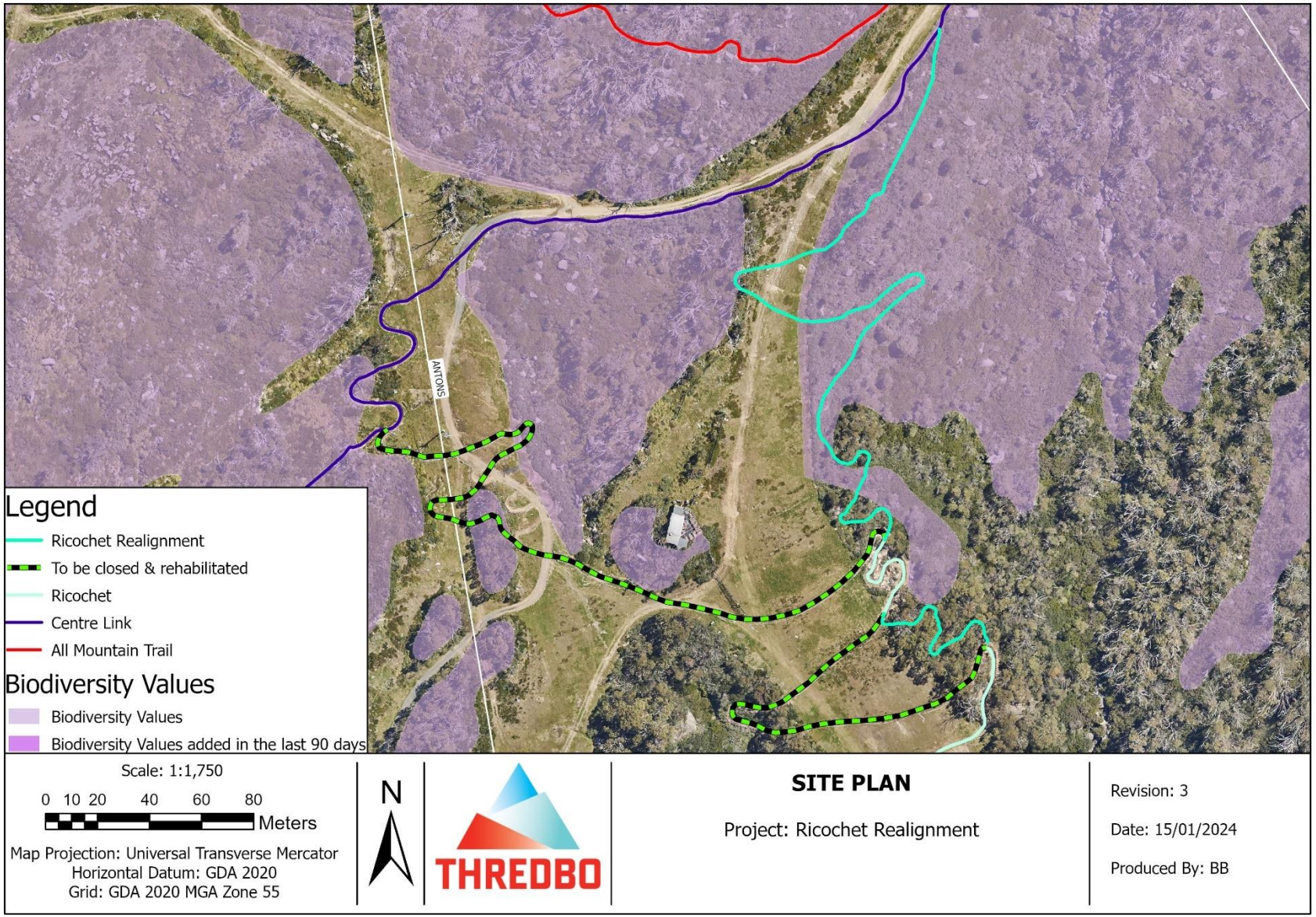

Figure 3: The proposal

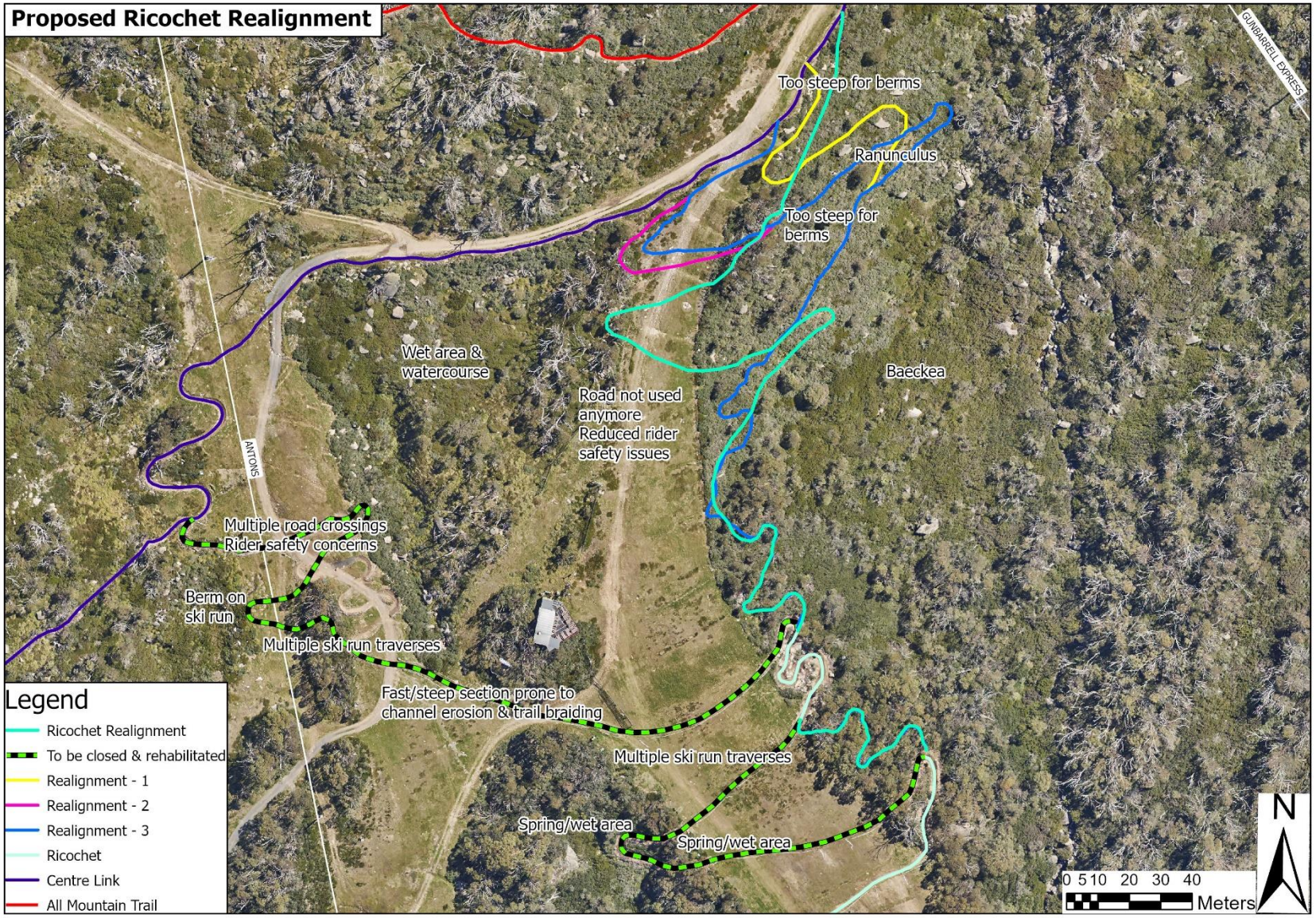

Figure 4: The existing trail, proposed realignment, and earlier design iterations of the proposed realignment.

2. Landscape features

The site-based method was applied for this assessment. As such, the assessment area is the 1,500 m buffer surrounding the outside edge of the development footprint.

The landscape features considered for this assessment are presented in Table 2, Figure 1 and Figure 2.

Table 2: Landscape features

Landscape feature	Development Site	Assessment Area	Data source
IBRA Region(s)	Australian Alps	Australian Alps	Interim Biogeographic Regionalisation for Australia, Version 7
IBRA subregion(s)	Snowy Mountains	Snowy Mountains	Interim Biogeographic Regionalisation for Australia, Version 7
Rivers and streams	Minor unmapped watercourses that are tributaries of Merritts Creek.	Minor unmapped watercourses that are tributaries of Merritts Creek	NSW LPI Waterway mapping
Estuaries and wetlands	No	No	NSW directory of important wetlands
Connectivity of different areas of habitat	The development site is connected to vast areas of native vegetation.	No	Aerial imagery
Geological features of significance and soil hazard features	The rock outcropping in the development site is very typical of the locality and not of any particular geological significance.	No	Site observation
Areas of Outstanding Biodiversity Value	No	No	Register of Declared Areas of Outstanding Biodiversity Value (DPIE 2020)
NSW (Mitchell) Landscapes	Main Range Subalpine	-	NSW (Mitchell) Landscapes - version 3.1 (DPIE 2016)
Percent (%) native vegetation extent	94	There are no substantial differences between the mapped vegetation extent and the aerial imagery	Calculated using aerial imagery and ArcGIS software

3. Native Vegetation

3.1. Survey Effort

Vegetation survey was undertaken within the development site by Ryan Smithers on 31 March 2023 (Figure 5).

One full-floristic vegetation plot was surveyed to identify Plant Community Types (PCTs) and Threatened Ecological Communities (TECs) on the development site (Table 3). One vegetation integrity survey plot was undertaken on the development site to assess the composition, structure and function components of each vegetation zone in accordance with the BAM.

All field data collected at full-floristic and vegetation integrity plots is included in Appendix B and Appendix C.

Table 3: Full-floristic PCT identification plots

PCT ID	PCT Name	Number of plots surveyed
3879	Kosciuszko High Plateau Grassy Open Heath	1

3.2. Native vegetation extent within the development site

There are no substantial differences between the extent of native vegetation within the development site as identified in recent aerial imagery and that identified during the vegetation survey.

3.3. Plant Community Types present

One PCT was identified within the development site as shown in Table 3. Further detail with respect to the PCT identified within the development site is presented in Table 4, and its distribution identified in Figure 5.

Table 4: Plant Community Types

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Area within the development site (ha)	Percent cleared
3879	Kosciuszko High Plateau Grassy Open Heath	Alpine Heaths	Alpine Complex	0.1	0.64

3.3.1. Plant Community Type selection justification

In determining the PCTs for the development site, various attributes were considered in combination to assign vegetation to the best fit PCT. Attributes included dominant species in each stratum and relative abundance, community composition, soils and landscape position. Reference was made to the PCT descriptions in the BioNet Vegetation Classification. There are only a small number of PCTs in the alpine and sub-alpine so there are very few PCT options, as shown in Table 5.

Table 5: Potential PCTs

Selected PCT ID	PCT Name	Other PCT options
3879	Kosciuszko High Plateau Grassy Open Heath	3381

3.4. Threatened Ecological Communities

PCT 3879 does not comprise any TEC which is listed on the BC Act or EPBC Act, as identified in Table 6. PCT 3890, which occurs just beyond the development site, as shown in Figure 7, comprises the *Montane Peatland and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions* endangered ecological community (EEC) (hereafter referred to as the Montane Peatland and Swamps), which is listed on the BC Act. It may also comprise the *Alpine Sphagnum Bogs and Associated Fens* EEC (hereafter referred to as the Alpine Sphagnum Bogs and Associated Fens) which is listed on the EPBC Act. The proposed development has been designed to avoid impacts on this community.

Table 6: Threatened Ecological Communities

PCT ID	BC Act			EPBC Act		
	Listing status	Name	Area (ha)	Listing status	Name	Area (ha)
3879	Not listed	-	-	Not listed	-	-
3890	Endangered	Endangered Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions	-	Endangered	Alpine Sphagnum Bogs and Associated Fens	-

3.5. Vegetation integrity assessment

3.5.1. Vegetation zones

One vegetation zone was identified within the development site or immediate surrounds based on the broad condition states of PCT 3879, as shown in Figure 6. One vegetation integrity survey plot was collected within the development site, which is consistent with the BAM (Table 7). A description of the vegetation zone within the development site is provided in Table 8.

3.5.2. Patch size

Patch size was calculated using available vegetation mapping for all patches of intact native vegetation on and adjoining the development site. Patch size was assigned to one of four classes (<5 ha, 5-24 ha, 25-100 ha or ≥100 ha). A patch size ≥100 ha was determined for the development site.

3.5.3. Assessing vegetation integrity

A vegetation integrity assessment using the BAM Calculator (BAMC) was undertaken and the results are outlined in Table 9.

Table 7: Vegetation zones and vegetation integrity survey plots collected on the development site

Vegetation Zone	PCT ID	PCT Name	Condition	Area (ha)	Patch Size	Vegetation Integrity Survey Plots required	Vegetation Integrity Survey Plots collected
1	3879	Kosciuszko High Plateau Grassy Open Heath	Good	0.1	101	1	1
			Total	0.1	101	1	1

Table 8: Zone 1 PCT 3381 Good Condition

3879 - Kosciuszko High Plateau Grassy Open Heath			
Vegetation formation	Alpine Complex		
Vegetation Class	Alpine Heaths		
Conservation status	Widespread and well conserved. Not listed as a TEC on the BC Act or EPBC Act		
Description	This community is common in the locality but highly variable structurally, comprising a heathland or open woodland in places.		
Characteristic canopy trees	*Eucalyptus niphophila*.		
Characteristic mid-storey	*Grevillea australis, Ozothamnus cupressoides*, *Prostanthera cuneata, Nematolepis ovatifolia, Ozothamnus secundiflorus, Ozothamnus alpinus, Olearia phlogopappa, Orites lancifolius, Oxylobium ellipticum.*		
Characteristic groundcovers	*Acaena novae-zelandiae, Asperula gunnii , Carex breviculmis, Lycopodium fastigiatum, Pimelea alpina, Poa fawcettiae, Poa hiemata, Polystichum proliferum, Senecio gunnii.*		
Mean native richness	25		
Exotic species / HTW cover	*Acetosella vulgaris, Agrostis capillaris*		
Condition	Good		
Variation and disturbance	PCT 645 is in good condition within the zone with minor variations in shrub cover.		
No. sites sampled	1		
Threatened flora species	*Ranunculus anemoneus*		
Fauna habitats	Broad-toothed Rat and Flame Robin.		
Composition	**Structure**	**Function**	**Vegetation Integrity Score**
64.6	63.2	-	63.9

Figure 5: Plant Community Types

Figure 6: Vegetation Zones and Plots

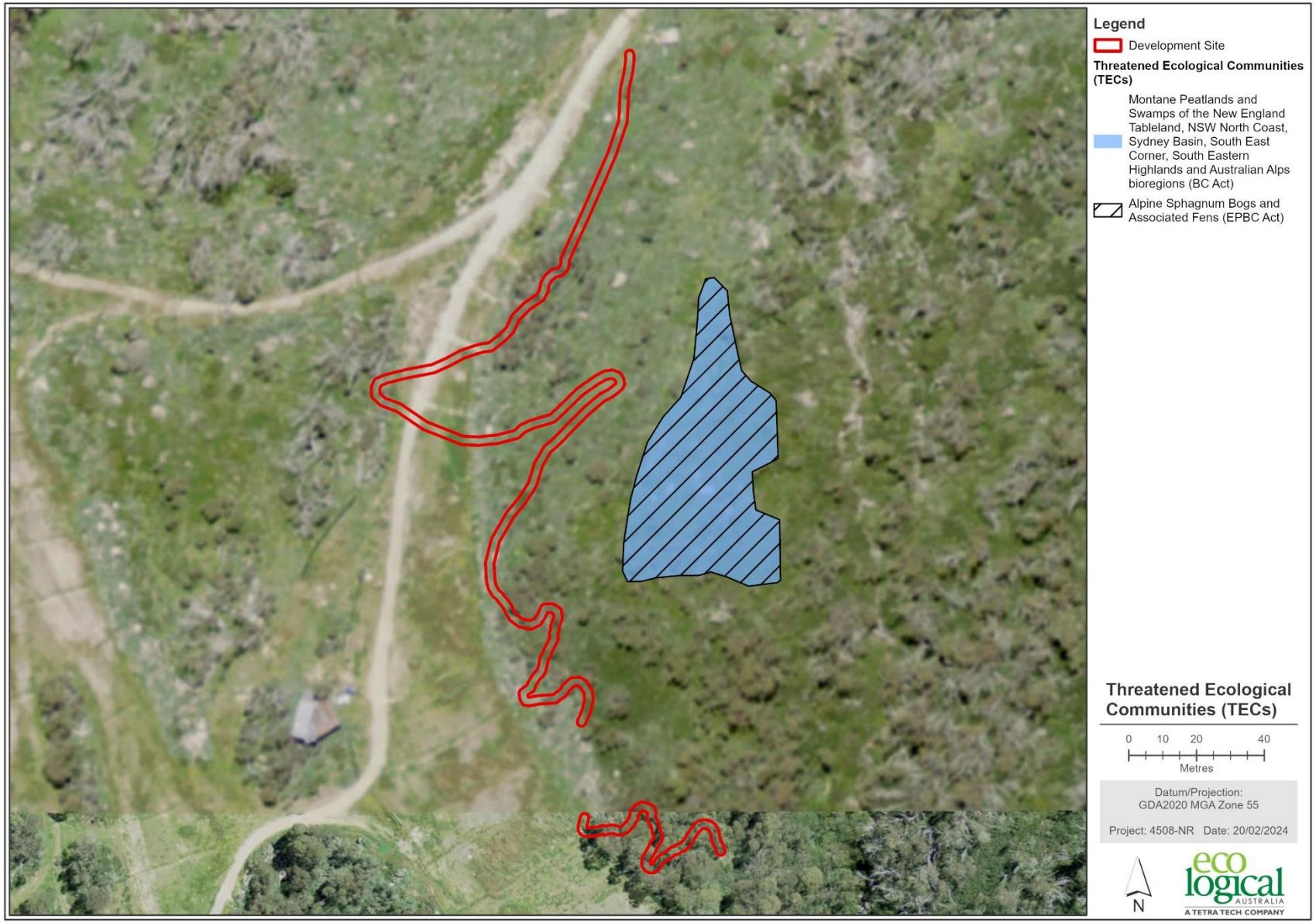

Figure 7: Threatened ecological communities

Table 9: Vegetation integrity scores

Veg Zone	PCT ID	Condition	Area (ha)	Composition Condition Score	Structure Condition Score	Function Condition Score	Presence of Hollow bearing trees	Current vegetation integrity score
1	3789	Good	0.1	64.6	63.2	-	No	63.9

3.6. Use of local data

Use of local data instead of benchmark integrity scores is not proposed.

4. Threatened species

4.1. Ecosystem credit species

Ecosystem credit species predicted to occur within the development site are generated by the BAMC following the input of VI data and the PCTs identified within Chapter 3. Ecosystem credit species predicted to occur at the development site, their associated habitat constraints, geographic limitations and sensitivity to gain class are included in Table 10.

Table 10: Predicted ecosystem credit species

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status
Artamus cyanopterus cyanopterus	Dusky Woodswallow	-	-	Moderate	Vulnerable	Not Listed
Callocephalon fimbriatum (foraging)	Gang-gang Cockatoo	-	-	Moderate	Vulnerable	Endangered
Dasyurus maculatus	Spotted-tailed Quoll	-	-	High	Vulnerable	Endangered
Hieraaetus morphnoides (Foraging)	Little Eagle	-	-	Moderate	Vulnerable	Not Listed
Hirundapus caudacutus	White-throated Needletail	-	-	High	Not Listed	Vulnerable
Pachycephala olivacea	Olive Whistler	-	-	Moderate	Vulnerable	Not Listed
Petroica boodang	Scarlet Robin	-	-	Moderate	Vulnerable	Not Listed
Petroica phoenicea	Flame Robin	-	-	Moderate	Vulnerable	Not Listed

4.2. Species credit species

4.2.1. Identification of species credit species

Species credit species that require further assessment within the development site (i.e. candidate species), their associated habitat constraints, geographic limitations and sensitivity to gain class are included in Table 11.

Table 11: Candidate species credit species

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status
Litoria spenceri	Spotted Tree Frog	Waterbodies River environments with rocky habitat or with 500m of rocky river	-	Very High	Critically Endangered	Endangered
Mastacomys fuscus	Broad-toothed Rat	-	-	High	Vulnerable	Endangered
Pseudomys fumeus	Smoky Mouse	-	-	High	Critically Endangered	Endangered
Pseudophryne corroboree	Southern Corroboree Frog	NA/Swamps Within 200 m of high montane and sub-alpine bog or ephemeral pool environments	above 1000 m asl	Very High	Critically Endangered	Critically Endangered
Pseudophryne pengilleyi	Northern Corroboree Frog	-	above 700 m asl	Moderate	Critically Endangered	Critically Endangered
Ranunculus anemoneus	Anemone Buttercup	Treeless vegetation above 1000 m in altitude	Above 1400 m	High	Vulnerable	Vulnerable

4.2.2. Assessment of habitat constraints and vagrant species

Justification for the exclusion of other candidate species credit species is provided in Table 12.

Table 12: Justification for exclusion of candidate species credit species

Species	Common Name	NSW listing status	EPBC Listing status	Sensitivity to gain class	Justification for exclusion of species
Litoria spenceri	Spotted Tree Frog	Critically Endangered	Endangered	Very High	The Spotted Tree Frog is extremely rare and in NSW is known only from two rocky streams that occur on the north-western side of the Great Dividing range, along way from the development site. It is considered highly unlikely that it would occur within the development site and it was not detected there opportunistically.
Pseudomys fumeus	Smoky Mouse	Critically Endangered	Endangered	High	The nearest records of the Smoky Mouse are old records that are more than 15 km to the south of the development site at lower elevations. It is considered highly unlikely that it would occur within the development site and it was not detected there opportunistically.
Pseudophryne corroboree	Southern Corroboree Frog	Critically Endangered	Critically Endangered	Very High	The Southern Corroboree Frog is limited to sphagnum bogs of the northern Snowy Mountains, in a strip from the Maragle Range in the northwest, through Mt Jagungal to Smiggin Holes in the south. Its range is entirely within Kosciuszko National Park. This species is all but extinct in the wild. It is no longer present at its former southern limit at Smiggin Holes. It is considered highly unlikely that it would occur within the development site and it was not detected there opportunistically.
Pseudophryne pengilleyi	Northern Corroboree Frog	Critically Endangered	Critically Endangered	Moderate	The Northern Corroboree Frog does not occur within the locality, being limited to the northern parts of the Snowy Mountains and Brindabella Range. It is considered highly unlikely that it would occur within the development site and it was not detected there opportunistically.
Ranunculus anemoneus	Anemone Buttercup	Vulnerable	Vulnerable	High	Whilst the species was detected near the development site, the proposed trail has been designed to avoid any direct impacts on the species through realignment. As such, no direct impacts on the species are expected.

4.2.3. Candidate species requiring further assessment

Two species credit species required further assessment following site survey to assess the condition of the development site and the presence of microhabitats; *Mastacomys fuscus* (Broad-toothed Rat) and *Ranunculus anemoneus* (Anemone Buttercup).

4.3. Targeted surveys

The streamlined assessment method only requires targeted surveys for candidate SAII species. The development site does not meet the habitat constraints of any of the candidate species credit species that are candidate SAII species. Two species credit species, the Broad-toothed Rat and the Anemone Buttercup, were incidentally recorded within the development site or immediate surrounds and were added as candidate species.

Targeted surveys for relevant threatened species known from locality were undertaken within the development site and immediate surrounds on the dates outlined in Table 13. Weather conditions during the targeted surveys are outlined in Table 14 and survey effort is outlined in Table 15.

Table 13: Targeted surveys

Date	Surveyors	Target species
31 March 2023	Ryan Smithers	Broad-toothed Rat and Anemone Buttercup

Table 14: Weather conditions

Date	Rainfall (mm)	Minimum temperature 0^{C}	Maximum temperature 0^{C}
31 March 2023	-	10	12

Table 15: Survey effort

Method	Habitat (ha)	Stratification units	Total effort	Target species
Targeted searches	Approx. 0.2 ha	Suitable habitats within and immediately surrounding the development site	1 person hour	Broad-toothed Rat
Targeted threatened flora searches	Approx. 0.2 ha	Suitable habitats within and immediately surrounding the development site	1 person hour	Anemone Buttercup

The characteristic scats of the Broad-toothed Rat were scattered in low densities throughout the development site and surrounds, as they are in suitable habitats throughout much of the locality.

Several patches of the Anemone Buttercup were detected within the original realignment footprint and immediate surrounds, as shown in Figure 8. The patches are estimated to comprise at least 150 individuals. The proposal has been realigned to avoid impacts on these individuals.

Targeted surveys were not undertaken for the Southern Corroboree Frog, Northern Corroboree Frog, or the Spotted Tree Frog given the absence of suitable habitats for the species, including suitable bog breeding habitat. The extant populations of this species are currently well known and heavily monitored. The habitats within the development site are considered unsuitable for the Smoky Mouse. None of these species were detected opportunistically.

Following completion of field surveys, the species credit species included in the assessment are outlined in Table 16.

Table 16: Species credit species included in the assessment

Species	Common Name	Species presence	Geographic limitations	Habitat (ha) / count	Biodiversity Risk Weighting
Mastacomys fuscus	Broad-toothed Rat	Yes	-	0.1	2

4.3.1. Species credit species included in the assessment

One species credit species, the Broad-toothed Rat, has been included in the assessment as the proposed development will impact on habitat for the species. A species polygon for the Broad-toothed Rat is included as Figure 8.

The Anemone Buttercup has not been included in the assessment as the proposal has been designed to avoid impacts on this species by realigning the trail to avoid the species.

4.4. Identification of prescribed additional biodiversity impact entities

The proposed development does not include any prescribed additional biodiversity impact entities.

Figure 8: Species polygons

5. Avoiding and Minimising Impacts on Biodiversity Values

5.1. Locating a project to avoid and minimise impacts on biodiversity values

5.1.1. Direct and indirect impacts

The proposal has been designed to avoid and minimise direct and indirect impacts. In particular, this has involved:

- Locating the proposed trail in part in disturbed areas.
- Minimising the disturbance footprint associated with construction.
- Designing the trail to avoid adverse impacts on threatened flora.
- Aligning the trail to avoid wombat burrows.
- Aligning the trail to avoid wet areas.
- Designing and constructing the trail to avoid the need for mature tree removal.
- Using low impact construction methods.
- Undertaking post construction rehabilitation.

The proposed trail realignment has been the result of multiple design iterations and extensive consultation with NPWS REST team to minimise impacts associated with the proposed trail. These iterations have avoided patches of the threatened Anemone Buttercup, threatened ecological communities and minimised impacts generally. The design has also avoided areas that are too steep for trail berms, and avoided other hazards such as access roads, multiple ski run traverses, and areas that are prone to channel erosion and trail braiding.

5.1.2. Prescribed biodiversity impacts

The proposal does not involve any prescribed biodiversity impacts.

5.2. Designing a project to avoid and minimise impacts on biodiversity values

5.2.1. Direct and indirect impacts

The proposal has been designed to avoid and minimise direct and indirect impacts on biodiversity values as described in Section 5.1.1.

5.2.2. Prescribed biodiversity impacts

Prescribed biodiversity impacts have been avoided and minimised by incorporating the design features identified in Section 5.1.1.

6. Assessment of Impacts

6.1. Direct impacts

The direct impacts of the development on:

- Native vegetation are outlined in Table 17.
- Threatened species and threatened species habitat is outlined in Table 18.
- Prescribed biodiversity impacts is outlined in Section 6.4.

Table 17: Direct impacts to native vegetation

PCT ID	PCT Name	BC Act listing	EPBC Act listing	Direct impact (ha)
3879	Kosciuszko High Plateau Grassy Open Heath	Not listed	Not Listed	0.1

Table 18: Direct impacts on threatened species and threatened species habitat

Species	Common Name	Direct impact number of individuals / habitat (ha)	BC Act listing status	EPBC Act Listing status
Mastacomys fuscus	Broad-toothed Rat	0.1	Vulnerable	Vulnerable

6.2. Change in vegetation integrity

The change in vegetation integrity as a result of the development is outlined in Table 19.

Table 19: Change in vegetation integrity

Veg Zone	PCT ID	Condition	Area (ha)	Current vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity
1	3879	Good	0.1	63.9	0	-63.9

6.3. Indirect impacts

The indirect impacts of the development are outlined in Table 20. Given the nature of the proposed development, and the proposed mitigation measures, indirect impacts (in the form of increased light and wind penetration) are only anticipated to extend a maximum of 10 m into vegetation surrounding the proposed development site. Indirect impact zones are shown on Figure 9.

6.4. Prescribed biodiversity impacts

The proposal does not involve any prescribed biodiversity impact.

Figure 9: Indirect impact zones

Table 20: Indirect impacts

Indirect impact	Project phase	Nature	Extent	Frequency	Duration	Timing
Sedimentation and contaminated and/or nutrient rich run-off	Construction and post construction	Minor potential for sedimentation during and immediately post-construction. However, the proposed sediment control measures have been effective during the many other similar developments that have been undertaken within the alpine resorts in recent years.	Minor	During and after any heavy rainfall	12 month maximum	Intermittently during and post construction phase
Noise, dust or light spill	Construction	Minor during construction.	Minor	Intermittently during construction phase	During construction	Intermittently during construction phase
Inadvertent impacts on adjacent habitat or vegetation	Construction	Minor. The construction methods used at Thredbo have been effective at preventing impacts on adjacent vegetation during the many other similar developments that have been undertaken in recent years.	Minor	Not expected, but possible	During construction	Not expected
Transport of weeds and pathogens from the site to adjacent vegetation	Construction	Not expected. The development site includes and abuts areas that are already heavily modified and which support weeds which are common within the Thredbo Resort area and elsewhere within the NSW Alps. The proposal will include post construction rehabilitation and weed control.	Not expected	Not expected, but possible	Not expected	Not expected
Vehicle strike	Construction	Minor. It is considered unlikely that the proposal will include vehicle strike impacts. Vehicles will be travelling at very slow speeds within the development site and the noise and vibration associated with vehicle movements is expected to deter any fauna within or adjoining the development site from the path of any vehicles.	Not expected	Not expected, but possible	During construction	Not expected
Trampling of threatened flora species	Construction	Not expected. The proposal has been designed to avoid locations where Anemone Buttercup individuals are present.	Not expected	Not expected	Not expected	Not expected
Rubbish dumping	Construction	Not expected. Construction materials will be removed from the site regularly and no rubbish will be dumped or otherwise left to pollute the surrounding environment.	Not expected	Not expected	Not expected	Not expected
Wood collection	Construction	Not expected.	Not expected	Not expected	Not expected	Not expected

Indirect impact	Project phase	Nature	Extent	Frequency	Duration	Timing
Bush rock removal and disturbance	Construction	Minor. A relatively small amount of rock will be removed as part of the development. No additional indirect impacts are expected.	Minor	Intermittently during construction phase	During construction	Intermittently during construction phase
Increase in predatory species populations	Construction and post construction	Not expected. The proposed development occurs on the edge of an already disturbed area and will not increase the populations of predatory species such as foxes and cats.	Not expected	Not expected	Not expected	Not expected
Increase in pest animal populations	Construction and post construction	Not expected.	Not expected	Not expected	Not expected	Not expected
Increased risk of fire	Construction	Minor potential for increased risk of fire during construction.	Minor	Intermittently during construction phase	During construction	Intermittently during construction phase
Disturbance to specialist breeding and foraging habitat, e.g. beach nesting for shorebirds	Construction and post construction	Not expected as none as none are known to be present.	Not expected	Not expected	Not expected	Not expected

6.5. Mitigating and managing direct and indirect impacts

Measures proposed to mitigate and manage impacts at the development site before, during and after construction are outlined in Table 21.

6.6. Mitigating prescribed impacts

The development does not have any prescribed biodiversity impacts.

6.7. Adaptive management strategy

This section is required for those impacts that are infrequent, cumulative or difficult to predict. Impacts associated with the proposed development have been considered extensively and addressed in Section 5 and Section 6. Further consideration of infrequent, cumulative or difficult to predict impacts is not considered to be necessary.

Table 21: Measures proposed to mitigate and manage impacts

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Displacement of resident fauna	Medium	Low	The trail should be aligned during construction as necessary to avoid any wombat burrows in close proximity to the trail, including those identified during this assessment as shown in Figure 8. If any wombat burrows need to be impacted by the proposal a wombat management plan should be developed for the proposal in consultation with NPWS.	Fauna within the disturbance footprint should move and thus any injury to fauna species during construction should be avoided. Impacts no wombats are mitigated.	During construction	Thredbo
Timing works to avoid critical life cycle events such as breeding or nursing	Low	Low	None proposed.	NA	NA	NA
Instigating clearing protocols including pre-clearing surveys, daily surveys and staged clearing, the presence of a trained ecologist or licensed wildlife handler during clearing events	Low	Low	Identify with flagging tape the trail alignment where it encroaches upon relatively undisturbed native vegetation, prior to construction	Risk of disturbance beyond proposed disturbance corridor is reduced	Prior to construction	Thredbo
Clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance; for example, removal of native vegetation by chainsaw, rather than heavy machinery, is preferable in situations where partial clearing is proposed	Medium	Low	Identify with flagging tape the trail alignment where it encroaches upon relatively undisturbed native vegetation, prior to construction	Risk of disturbance beyond proposed disturbance corridor is reduced	Prior to construction	Thredbo
Sediment barriers or sedimentation ponds to control the quality of water released from the site into the receiving environment	Medium	Low	Sediment control measures as necessary such as fencing and hay bales	Risk of sedimentation of water quality impacts substantially reduced	During and post-construction	Thredbo
Noise barriers or daily/seasonal timing of construction and operational activities to reduce impacts of noise	Low	Low	Restrict work to daylight hours	Noise impacts mitigated	During construction	Thredbo
Light shields or daily/seasonal timing of construction and operational activities to reduce impacts of light spill	Low	Low	Restrict work to daylight hours	Light impacts mitigated	During construction	Thredbo

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Adaptive dust monitoring programs to control air quality	Low	Low	None proposed	NA	NA	NA
Programming construction activities to avoid impacts; for example, timing construction activities for when migratory species are absent from the site, or when particular species known to or likely to use the habitat on the site are not breeding or nesting	Low	Low	None proposed	NA	NA	NA
Temporary fencing to protect significant environmental features such as riparian zones	Low	Low	The trail alignment will be delineated with flagging tape where it encroaches upon relatively undisturbed native vegetation	Protection of vegetation and habitats beyond the disturbance footprint	Prior to and during construction	Thredbo
Hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas	Medium	Low	Any machinery or vehicles involved with the proposed works that are not owned by Thredbo will be washed down to remove all soil and vegetative matter before entering the site to limit spread of weeds and disease such as *Phytophthora cinnamomi*	Risk of weed or pathogen spread substantially reduced	Prior to and during construction	Thredbo
Staff training and site briefing to communicate environmental features to be protected and measures to be implemented	Medium	Low	Brief all workers as to limit of disturbance footprint and other environmental safeguards	Risk of disturbance beyond proposed disturbance corridor is reduced	Prior to and during construction as necessary	Thredbo
Making provision for the ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on or adjacent to the development footprint	Medium	Low	Post construction rehabilitation consistent with standard Thredbo rehabilitation strategies	Post construction vegetation within the development footprint with high medium-term recovery potential	Immediately post construction	Thredbo
Monitoring	Low	Low	None proposed	NA	NA	NA

7. Impact summary

Following implementation of the BAM and the BAMC, the following impacts have been determined.

7.1. Serious and Irreversible Impacts (SAII)

The development does not have any Serious and Irreversible Impacts (SAII).

7.2. Impacts requiring offsets

The impacts of the development requiring offset for native vegetation are outlined in Table 22 and shown on Figure 10. The impacts of the development requiring offset for species credit species and their habitats are outlined in Table 23 and on Figure 10.

Table 22: Impacts to native vegetation that require offsets

Vegetation Zone	PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Direct impact (ha)
1	3879	Kosciuszko High Plateau Grassy Open Heath	Alpine Heaths	Alpine Complex	0.1

Table 23: Impacts on threatened species and threatened species habitat that require offsets

Species	Common Name	Direct impact number of individuals / habitat (ha)	BC Act listing status	EPBC Act Listing status
Mastacomys fuscus	Broad-toothed Rat	0.1	Vulnerable	Endangered

7.3. Impacts not requiring offsets

All the impacts of the development on native vegetation and on the Broad-toothed Rat require offsets. The impacts of the proposed development on non-native vegetation do not require offsets. Those impacts that do not require offsets area shown in Figure 11.

7.4. Areas not requiring assessment

No parts of the proposed development do not require assessment.

Figure 10: Impacts requiring offset

Figure 11: Impacts not requiring offset

7.5. Credit summary

The number of ecosystem credits required for the development are outlined in Table 24.

The number of species credits required for the development are outlined in Table 25.

A biodiversity credit report is included in Appendix F.

Table 24: Ecosystem credits required

Vegetation Zone	PCT ID	PCT Name	Condition	Credit Class	Direct impact (ha)	Credits required
1	3879	Kosciuszko High Plateau Grassy Open Heath	Good	Alpine Heaths	0.1	2

Table 25: Species credit summary

Species	Common Name	Direct impact number of individuals / habitat (ha)	Credits required
Mastacomys fuscus	Broad-toothed Rat	0.1	3

8. Consistency with legislation and policy

8.1. Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

An impact assessment under the EPBC Act was undertaken on MNES known to occur within the development footprint or immediate surrounds or with potential to occur there. These MNES were:

- Broad-toothed Rat
- Anemone Buttercup.

The outcome of this assessment was that it is highly unlikely that the development would significantly impact on those MNES assessed (Appendix D).

A referral to the Commonwealth under the EPBC Act is not recommended.

9. Recommendations

To further ameliorate the potential impacts of the proposed development and to improve environmental outcomes, the following recommendations for impact mitigation and amelioration are suggested as modifications to the proposal and/or as conditions of consent.

- The mitigation measures identified in Table 21 should be incorporated into the proposal.

10. Conclusion

Eco Logical Australia Pty Ltd was engaged by Kosciuszko Thredbo Pty Ltd to prepare a BDAR for the proposed construction of a new mountain bike trail, within Thredbo Alpine Resort.

This report has been prepared to meet the requirements of the BAM 2020 established under Section 6.7 of the BC Act.

This BDAR outlines the measures taken to avoid, minimise and mitigate impacts to the vegetation and habitats present within the development footprint during the design, construction and operation of the development. The residual unavoidable impacts of the proposed development were calculated in accordance with the BAM by utilising the BAMC. The BAMC calculated that a total of two ecosystem credits and three species credits are required to offset the unavoidable impacts to the vegetation and fauna habitats present within the development footprint.

SAII values have been considered as part of this assessment. The proposal will not result in any SAII.

Following consideration of the administrative guidelines for determining significance under the EPBC Act, it is concluded that the proposal is unlikely to have a significant impact on MNES or Commonwealth land, and a referral to the Commonwealth Environment Minister is therefore not recommended.

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Appendix A - Definitions

The following terminology has been used throughout this report for the purposes of describing the impacts of the proposal in the context of a biodiversity assessment in accordance with the NSW Biodiversity Assessment Method 2020. This terminology may or may not align with other technical documents associated with the proposed development.

Terminology	Definition
Biodiversity credit report	The report produced by the Credit Calculator that sets out the number and class of biodiversity credits required to offset the remaining adverse impacts on biodiversity values at a development site, or on land to be biodiversity certified, or that sets out the number and class of biodiversity credits that are created at a biodiversity stewardship site.
BioNet Atlas	The BioNet Atlas (formerly known as the NSW Wildlife Atlas) is the OEH database of flora and fauna records. The Atlas contains records of plants, mammals, birds, reptiles, amphibians, some fungi, some invertebrates (such as insects and snails) and some fish.
Broad condition state	Areas of the same PCT that are in relatively homogenous condition. Broad condition is used for stratifying areas of the same PCT into a vegetation zone for the purpose of determining the vegetation integrity score.
Connectivity	The measure of the degree to which an area(s) of native vegetation is linked with other areas of vegetation.
Credit Calculator	The computer program that provides decision support to assessors and proponents by applying the BAM, and which calculates the number and class of biodiversity credits required to offset the impacts of a development or created at a biodiversity stewardship site.
Development	Has the same meaning as development at section 4 of the EP&A Act, or an activity in Part 5 of the EP&A Act. It also includes development as defined in section 115T of the EP&A Act.
Development footprint	The area of land that is directly impacted on by a proposed development, including access roads, and areas used to store construction materials.
Development site	An area of land that is subject to a proposed development that is under the EP&A Act.
Ecosystem credits	A measurement of the value of EECs, CEECs and threatened species habitat for species that can be reliably predicted to occur with a PCT. Ecosystem credits measure the loss in biodiversity values at a development site and the gain in biodiversity values at a biodiversity stewardship site.
Extent of occurrence (EOO)	Measures the spatial spread of a taxon to determine the degree to which risks from threatening factors could impact an entire population, and is not intended to be an estimate of the amount of occupied or potential habitat.
High threat exotic plant cover	Plant cover composed of vascular plants not native to Australia that if not controlled will invade and outcompete native plant species.
Hollow bearing tree	A living or dead tree that has at least one hollow. A tree is considered to contain a hollow if: (a) the entrance can be seen; (b) the minimum entrance width is at least 5 cm; (c) the hollow appears to have depth (i.e. you cannot see solid wood beyond the entrance); (d) the hollow is at least 1 m above the ground. Trees must be examined from all angles.
Important wetland	A wetland that is listed in the Directory of Important Wetlands of Australia (DIWA) and SEPP 14 Coastal Wetlands.
Linear shaped development	Development that is generally narrow in width and extends across the landscape for a distance greater than 3.5 kilometres in length.
Local population	The population that occurs in the study area. In cases where multiple populations occur in the study area or a population occupies part of the study area, impacts on each subpopulation must be assessed separately.
Local wetland	Any wetland that is not identified as an important wetland (refer to definition of Important wetland).

Terminology	Definition
NSW (Mitchell) landscape	Landscapes with relatively homogeneous geomorphology, soils and broad vegetation types, mapped at a scale of 1:250,000.
Multiple fragmentation impact development	Developments such as wind farms and coal seam gas extraction that require multiple extraction points (wells) or turbines and a network of associated development including roads, tracks, gathering systems/flow lines, transmission lines.
Operational Manual	The Operational Manual published from time to time by DPIE, which is a guide to assist assessors when using the BAM.
Patch size	An area of intact native vegetation that: a) occurs on the development site or biodiversity stewardship site, and b) includes native vegetation that has a gap of less than 100 m from the next area of native vegetation (or ≤30 m for non-woody ecosystems). Patch size may extend onto adjoining land that is not part of the development site or stewardship site.
Proponent	A person who intends to apply for consent to carry out development or for approval for an activity.
Reference sites	The relatively unmodified sites that are assessed to obtain local benchmark information when benchmarks in the Vegetation Benchmarks Database are too broad or otherwise incorrect for the PCT and/or local situation. Benchmarks can also be obtained from published sources.
Regeneration	The proportion of over-storey species characteristic of the PCT that are naturally regenerating and have a diameter at breast height <5 cm within a vegetation zone.
Residual impact	An impact on biodiversity values after all reasonable measures have been taken to avoid, minimise or mitigate the impacts of development. Under the BAM, an offset requirement is determined for the remaining impacts on biodiversity values.
Retirement of credits	The purchase and retirement of biodiversity credits from an already-established biobank site or a biodiversity stewardship site secured by a biodiversity stewardship agreement.
Riparian buffer	Riparian buffers applied to water bodies in accordance with the BAM.
Sensitive biodiversity values land map	Development within an area identified on the map requires assessment using the BAM.
Site attributes	The matters assessed to determine vegetation integrity. They include: native plant species richness, native over-storey cover, native mid-storey cover, native ground cover (grasses), native ground cover (shrubs), native ground cover (other), exotic plant cover (as a percentage of total ground and mid-storey cover), number of trees with hollows, proportion of over-storey species occurring as regeneration, and total length of fallen logs.
Site-based development	A development other than a linear shaped development, or a multiple fragmentation impact development.
Species credits	The class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates. Species that require species credits are listed in the Threatened Biodiversity Data Collection.
Subject land	Is land to which the BAM is applied in Stage 1 to assess the biodiversity values of the land. It includes land that may be a development site, clearing site, proposed for biodiversity certification or land that is proposed for a biodiversity stewardship agreement.
Threatened Biodiversity Data Collection	Part of the BioNet database, published by DPIE and accessible from the BioNet website.
Threatened species	Critically Endangered, Endangered or Vulnerable threatened species as defined by Schedule 1 of the BC Act, or any additional threatened species listed under Part 13 of the EPBC Act as Critically Endangered, Endangered or Vulnerable.

Terminology	Definition
Vegetation Benchmarks Database	A database of benchmarks for vegetation classes and some PCTs. The Vegetation Benchmarks Database is published by OEH and is part of the BioNet Vegetation Classification.
Vegetation zone	A relatively homogenous area of native vegetation on a development site, land to be biodiversity certified or a biodiversity stewardship site that is the same PCT and broad condition state.
Wetland	An area of land that is wet by surface water or ground water, or both, for long enough periods that the plants and animals in it are adapted to, and depend on, moist conditions for at least part of their life cycle. Wetlands may exhibit wet and dry phases and may be wet permanently, cyclically or intermittently with fresh, brackish or saline water.
Woody native vegetation	Native vegetation that contains an over-storey and/or mid-storey that predominantly consists of trees and/or shrubs.

Appendix B - Vegetation Floristic Plot Data

Table 26: Species recorded in the plots and incidentally elsewhere within the development site or immediate surrounds.

Family	Species	Common Name	Listing Status	ROTAP	Exotic	High Threat Weed	Growth Form Group	Plot 1		
								Stratum & Laver	Cover	Abundance
Rosaceae	*Acaena* sp. Thredbo River Gorge (L.A.S.Johnson & E.F.Constable s.n., 19 Jan 1951)	-	-	-	-	-	Forb (FG)	g	2	20
Polygonaceae	*Acetosella vulgaris*	Sheep Sorrel	-	-	Yes	Yes	-	g	0.3	500
Poaceae	*Agrostis capillaris*	Browntop Bent	-	-	Yes	Yes	-	g	0.1	20
Rubiaceae	*Asperula gunnii*	Mountain Woodruff	-	-	-	-	Forb (FG)	g	2	100
Myrtaceae	*Baeckea brevifolia*	-	-	-	-	-	Shrub (SG)	g	0.1	1
Asteraceae	*Celmisia costiniana*	-	-	-	-	-	Forb (FG)	g	0.1	1
Poaceae	*Chionochloa frigida*	Robust Wallaby Grass	-	2RCa	-	-	Grass & grasslike (GG)	g	0.1	1
Asteraceae	*Coronidium scorpioides*	Button Everlasting	-	-	-	-	Forb (FG)	g	1	100
Asteraceae	*Craspedia* sp.	Billy Buttons	-	-	-	-	Forb (FG)	g	0.3	50
Asteraceae	*Erigeron nitidus*	-	-	-	-	-	Forb (FG)	g	0.2	100
Asteraceae	*Euchiton* sp.	A Cudweed	-	-	-	-	Forb (FG)	g	0.1	10
Proteaceae	*Grevillea australis*	Alpine Grevillea	-	-	-	-	Shrub (SG)	m	15	50
Ericaceae	*Acrothamnus hookeri*	-	-	-	-	-	Shrub (SG)	m	0.3	5
Juncaceae	*Luzula novae-cambriae*	-	-	-	-	-	Grass & grasslike (GG)	g	0.1	20
Lycopodiaceae	*Lycopodium fastigiatum*	Mountain Clubmoss	-	-	-	-	Fern (EG)	g	0.5	100
Asteraceae	*Olearia phlogopappa.*	-	-	-	-	-	Shrub (SG)	m	2	50
Fabaceae (Faboideae)	*Oxylobium ellipticum*	Common Shaggy Pea	-	-	-	-	Shrub (SG)	g	5	50

Family	Species	Common Name	Listing Status	ROTAP	Exotic	High Threat Weed	Growth Form Group	Plot 1		
								Stratum & Laver	Cover	Abundance
Asteraceae	*Ozothamnus cupressoides*	-	-	-	-	-	Shrub (SG)	m	2	10
Asteraceae	*Ozothamnus secundiflorus*	Cascade Everlasting	-	-	-	-	Shrub (SG)	m	45	100
Thymelaeaceae	*Pimelea alpina*	-	-	-	-	-	Shrub (SG)	g	0.5	50
Thymelaeaceae	*Pimelea axiflora* subsp. *alpina*	-	-	-	-	-	Shrub (SG)	m	1	10
Poaceae	*Poa fawcettiae*	Smooth Blue Snowgrass	-	-	-	-	Grass & grasslike (GG)	g	35	1000
Podocarpaceae	*Podocarpus lawrencei*	Mountain Plum Pine	-	-	-	-	Shrub (SG)	m	0.2	2
Dryopteridaceae	*Polystichum proliferum*	Mother Shield Fern	-	-	-	-	Fern (EG)	g	0.3	10
Ranunculaceae	*Ranunculus anemoneus*	Anemone Buttercup	BC V, EPBC V	-	-	-	Forb (FG)	g	0.1	5
Asteraceae	*Senecio pinnatifolius* var. *alpinus*	-	-	-	-	-	Forb (FG)	g	0.1	10
Violaceae	*Viola betonicifolia*	Native Violet	-	-	-	-	Forb (FG)	g	0.1	5

Appendix C - Vegetation Integrity Plot Data

Table 27: Plot location data

Plot no.	PCT	Condition	Easting	Northing	Bearing
1	3879	Good	616413	5961004	210

Table 28: Vegetation integrity data (composition)

Composition (number of species)						
Plot	Tree	Shrub	Grass	Forb	Fern	Other
1	0	10	3	10	2	0

Table 29: Vegetation integrity data (Structure)

Structure (Total cover)						
Plot	Tree	Shrub	Grass	Forb	Fern	Other
1	0.0	71.1	35.2	6.0	0.8	0.0

Table 30: Vegetation integrity data (Function)

Function											
Plot	Large Trees	Hollow trees	Litter Cover	Length Fallen Logs	Tree Stem 5-9	Tree Stem 10-1 9	Tree Stem 20-29	Tree Stem 30-49	Tree Stem 50-79	Tree Regen	High Threat Weed Cover
1	0	0	23	0	0	0	0	0	0	0	0.4

Appendix D - EPBC Act Significant Impact Criteria

The EPBC Act Administrative Guidelines on Significance (DoE 2013) set out 'Significant Impact Criteria' that are to be used to assist in determining whether a proposed action is likely to have a significant impact on matters of national environmental significance. Matters listed under the EPBC Act as being of national environmental significance include:

- Listed threatened species and ecological communities
- Listed migratory species
- Wetlands of International Importance
- The Commonwealth marine environment
- World Heritage properties
- National Heritage places
- Nuclear actions
- Great Barrier Reef.

Specific 'Significant Impact Criteria' are provided for each matter of national environmental significance except for threatened species and ecological communities in which case separate criteria are provided for species listed as endangered and vulnerable under the EPBC Act.

The Commonwealth listed species which are known or considered to have the potential to occur within the study area are the:

- Broad-toothed Rat
- Anenome Buttercup.

The relevant Significant Impact Criteria have been applied to determine the significance of impacts associated with the proposal.

Matters to be considered	Impact
Any environmental impact on a World Heritage Property or National Heritage Places	No. The proposed action does not impact on a World Heritage Property or a National Heritage Place - (listed natural: Australian Alpine National Parks and Reserves; nominated historic: Snowy Mountains Scheme NSW).
Any environmental impact on Wetlands of International Importance	No. The proposal will not affect any part of a wetland of international importance.
Any impact on Commonwealth Listed Critically Endangered or Endangered Species;	Yes. The study area provides potential habitat for one Commonwealth listed endangered species: the Broad-toothed Rat. The significant impact criteria for endangered species are discussed below: a. lead to a long-term decrease in the size a population of a species, Whilst the proposed action will affect some known Broad-toothed Rat habitat, it will affect only a very small amount (0.1 ha) of the potential habitat for the species in the immediate area. As such, the proposed works are unlikely to adversely affect a significant proportion of the home range of one or more Broad-toothed Rat individuals and will not result in habitat fragmentation which could isolate individuals or a population of the Broad-toothed Rat. The noise and vibration associated with the proposed works is likely to temporarily deter any Broad-toothed Rat individuals that may be near the affected areas. As such, it is unlikely that any individuals would be killed during the implementation of the proposed action.

Matters to be considered	Impact
	Under these circumstances, it is considered highly unlikely that the proposed action will lead to a long-term decrease in the size of the Broad-toothed Rat population. b. reduce the area of occupancy of the species It is highly likely that the Broad-toothed Rat will continue to occur within the development site after the implementation of the proposed action. The species continues to be locally common in the Thredbo Resort Area where there have been many similar and larger developments over many decades. As such, the proposed action is highly unlikely to reduce the area of occupancy of the Broad-toothed Rat. c. fragment an existing population into two or more populations The proposed action will be limited to the loss or further modification of 0.1 ha of native vegetation which is a small amount of habitat in the context of the extent of similar habitats in the locality generally. The proposed works will not affect any key habitat resources for the Broad-toothed Rat; nor affect the species ability to access habitats within or beyond the study area. Under these circumstances, the proposed action will not fragment an existing population of the Broad-toothed Rat into two or more populations. d. adversely affect habitat critical to the survival of a species No habitat within the development site is considered likely to be critical to the survival of the Broad-toothed Rat. There are thousands of hectares of similar habitats in the alpine and subalpine zones of the Australian alps, including elsewhere within the Thredbo Resort area. The Broad-toothed Rat continues to occur within the Thredbo Resort Area despite a long history of similar and more extensive disturbances. e. disrupt the breeding cycle of a population The proposed action and affected area is too small to disrupt the breeding cycle of a population of the Broad-toothed Rat. Under these circumstances, the proposed action will not disrupt the breeding cycle of a population of the Broad-toothed Rat. f. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline The proposed action will modify a very small area of habitat for the Broad-toothed Rat, but this area is unlikely to be important to the species in the context of the extent of potential habitat in the locality. Under these circumstances it is highly unlikely that the proposed action would modify- destroy- remove or isolate or decrease the availability or quality of habitat to the extent that the Broad-toothed Rat is likely to decline. g. result in invasive species that are harmful to an endangered species becoming established in the endangered or critically endangered species' habitat The proposed action is unlikely to result in invasive species that are harmful becoming established in potential habitat of the Broad-toothed Rat. Species such as cats or foxes are already present in the landscape and are subject to control programs within the resort. h. introduce disease that may cause the species to decline The proposed action is unlikely to introduce disease that may cause the Broad-toothed Rat to decline. i. interfere substantially with the recovery of the species.

Matters to be considered	Impact
	Whilst there have been documented declines in some Broad-toothed Rat populations within the Snowy Mountains, these declines have been attributed to factors such as major bushfire events and early snow thaws, and not impacts of the nature of those proposed. The local population of the Broad-toothed Rat appears to continue to be relatively large on the basis of the abundance of the species scat throughout the Thredbo Resort Area including within the village, and in areas that have been subject to the sorts of activities proposed. As such, it is considered highly unlikely that proposed action will substantially interfere with the recovery of the Broad-toothed Rat.
Any impact on Commonwealth Listed Vulnerable Species;	Yes. The study area provides known habitat for one Commonwealth listed vulnerable species: the Anemone Buttercup. The significant impact criteria in terms of the vulnerable species are discussed below: a. lead to a long-term decrease in the size of an important population of a species. The Anenome Buttercup has recovered well from the brink of extinction since the cessation of grazing in the NSW alpine areas, and is now locally common throughout the main range. The local population of the species is likely to comprise many thousands of plants. The species is common throughout the higher parts of the Thredbo Resort Area. The action proposed has been designed to avoid any direct or otherwise adverse impacts on any of the Anenome Buttercup individuals which occur within the development site or immediate surrounds. Under these circumstances the proposed action will not lead to a long-term decrease in the size of an important population of the Anenome Buttercup. b. reduce the area of occupancy of an important population The proposed action will not reduce the area of occupancy of the Anenome Buttercup. c. fragment an existing important population into two or more populations The proposed action will not fragment an existing important population of the Anenome Buttercup into two or more populations. The species population extend beyond the development site and the Thredbo Resort Area. d. adversely affect habitat critical to the survival of a species No habitat within the development site is considered to be critical to the survival of the Anenome Buttercup. e. disrupt the breeding cycle of an important population The proposed action and affected area is too small to disrupt the breeding cycle of a population of the Anenome Buttercup. f. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline The proposed action will not modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the Anenome Buttercup is likely to decline as the habitat to be affected is very small in the context of the available habitat within the Thredbo Resort Area and the proposal will not cause any additional fragmentation of habitat or barriers to movement. g. result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat The proposed action will not result in invasive species that are harmful becoming established in habitat for the Anemone Buttercup. h. introduce disease that may cause the species to decline The proposed action is unlikely to introduce disease that may cause the Anemone Buttercup to decline. i. interferes substantially with the recovery of the species. The Anenome Buttercup has recovered well from the brink of extinction since the cessation of grazing in the NSW alpine areas, and is now locally common throughout the main range. The local population of the species is likely to comprise many thousands of plants.

Matters to be considered	Impact
Any impact on a Commonwealth Endangered Ecological Community	No endangered ecological communities occur within the development site.
Any environmental impact on Commonwealth Listed Migratory Species;	No. The proposed action will not have any adverse impacts on any listed migratory species.
Does any part of the Proposal involve a Nuclear Action;	No. The project does not include a Nuclear Action.
Any environmental impact on a Commonwealth Marine Area;	No. There are no Commonwealth Marine Areas within the study area.
In addition- any direct or indirect impact on Commonwealth lands	No. The project does not directly or indirectly affect Commonwealth land.

Appendix E - Staff CVs

CURRICULUM VITAE

Ryan Smithers

SENIOR ECOLOGIST

QUALIFICATIONS

BEnvSc (Land Resources Management)- University of Wollongong with 1st Class Honours 1995.
Accredited BBAM- FBA- and BAM Assessor
Alpine Ecology Course Australian Alpine Institute and La Trobe University
Senior First Aid- St. Johns Ambulance.

Ryan brings to ELA more than 25 years' experience in natural resource management. He has extensive practical experience in flora and fauna surveying- fire-fighting- planning and land management throughout southern NSW and has undertaken numerous flora and fauna surveys- biodiversity plans- environmental impact assessments- vegetation management plans- fire management plans and weed management plans.

Ryan has extensive experience in general and targeted fauna surveys using a diverse range of survey techniques. Ryan has undertaken many flora and fauna surveys on the NSW south coast- southern tablelands and in the Australian Alps- and in other parts of Australia including in the Northern Territory.

Ryan is an accredited Biobanking (BBAM)- Framework for Biodiversity Assessment (FBA) and Biodiversity Assessment Method (BAM) assessor and has undertaken may surveys using BBAM-BAM and DPIE Vegetation Survey Standard or very similar methodologies. Ryan project managed ELAs contributions to the Full-floristic Vegetation Survey and Condition Assessment for the South-east Highlands and Australian Alps of the Upper Murrumbidgee Catchment and South-east Corner Biometric Benchmark projects which involved the collection of more than 250 plots.

Ryan has particular ecological expertise in the NSW southern tablelands and Alps- gained from 15 years of survey and assessment across the Alps- including many assessments within the Charlotte Pass- Thredbo and Perisher Ski Resorts- and assessments on the Monaro including around Jindabyne.

Ryan has undertaken assessments in the region for a broad range of clients including NSW NPWS, Local Land Services, Biodiversity Conservation Trust, Kosciuszko Thredbo, Vail Resorts and Charlotte Pass Ski Resort.

RELEVANT PROJECT EXPERIENCE

Monaro and Werriwa Snow Gum Woodland and Grasslands Conservation Tender
Monaro Grasslands Conservation Tender
Kosi Walk Realignment Review of Environmental Factors
Diggings Campground Upgrade Review of Environmental Factors
Mount Perisher Chairlift Biodiversity Development Assessment Report
Merritts Gondola Biodiversity Development Assessment Report
Corin Forest Ski Slope Assessment
Montane Peatlands Strategic Action Plan
Perisher Guthega Skink Targeted Surveys
Numerous Mountain Bike Ecological Assessments at Thredbo
Leichardt Chairlift Ecological Assessment
Thredbo Masterplan Ecological Assessment
Guthega Quad Chair Flora and Fauna Assessment
Thredbo Chairlift Constraints Analysis
Friday Flat Ecological Assessment
Sponars Traverse Flora and Fauna Assessment
Lobs Hole Review of Environmental Factors
Lake Wallace Flora and Fauna Assessment for Cooma Monaro Shire at Nimmitabel
Numerous Impact Assessments in alpine and sub-alpine environments for OEH- Vail- Kosciuszko-Thredbo and Charlotte Pass Ski Resorts
Boco Rock Wind Farm Ecological Assessment and Offsets Analysis
South-east Highlands and Australian Alps of the Upper Murrumbidgee Catchment Full Floristic Survey and Condition Assessment
South-east Corner Biometric Benchmark Project
Queanbeyan Biodiversity Study
Mount Jerrabomberra Ecological Assessment
Eurobodalla Bio-certification Project
Jervis Bay Biodiversity Assessment
Broulee and South Moruya Biocertification Project
North Moruya Biodiversity Study
Eurobodalla Vegetation Mapping Validation
Eurobodalla Biodiversity Study for future Urban Expansion Lands
Merimbula STP Upgrade Terrestrial Ecological Assessment
Cobowra LALC Lands Biobanking Assessment
Upper Lachlan Shire Biodiversity Planning Framework
Parkes- Cabonne- Bland- Upper Lachlan and Temora Shires Biodiversity Assessment and NRM Projects
Old Comma Road deviation Species Impact Statement
Flora and Fauna Assessment Edwin Lane Parkway Extension
Ecological Studies – Proposed Googong township
Tarrawonga Biobanking Assessment – Boggabri
Katherine to Gove Pipeline – Mitchell Ranges fauna surveys
Darwin regional flora and fauna survey RAAF Darwin- defence establishment Berrimah and Shoal Bay receiving station.

Appendix F - Biodiversity credit report

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00041643/BAAS17061/23/00041644

Proposal Name
Ricochet Realignment

BAM data last updated *
22/06/2023

Assessor Name
Ryan Smithers

Assessor Number
BAAS17061

BAM Data version *
61

Proponent Names

Report Created
26/02/2024

BAM Case Status
Finalised

Assessment Revision
2

Assessment Type
Part 4 Developments (Small Area)

Date Finalised
26/02/2024

BOS entry trigger
BOS Threshold: Biodiversity Values Map

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
3879-Kosciuszko High Plateau Grassy Open Heath	Not a TEC	0.1	0	2	2

BAM Biodiversity Credit Report (Like for like)

3879-Kosciuszko High Plateau Grassy Open Heath

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Alpine Heaths This includes PCT's: 3878, 3879, 3880, 4135	Alpine Heaths <50%	3879_Good	No	2	Snowy Mountains, Bondo, Monaro, Murrumbateman, Snowy Mountains and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Mastacomys fuscus / Broad-toothed Rat	**3879_Good**	0.1	3.00

Credit Retirement Options

Like-for-like credit retirement options

	Spp	IBRA subregion
Mastacomys fuscus / Broad-toothed Rat	**Mastacomys fuscus /** Broad-toothed Rat	Any in NSW

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Appendix F Site Environmental Management Plan

Site Environmental Management Plan (SEMP)

Ricochet Mountain Bike Trail Realignment

Thredbo Alpine Resort
Kosciuszko National Park, NSW

Project: 23004MO

April 2024

Kosciuszko Thredbo Pty Ltd
1 Friday Drive, Thredbo, New South Wales 2625
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Document Control

Revision	Date	Revision Type	Author	Approved by
A	12.07.2023	Draft	C.Chalk	K.Delpit
0	26.07.2023	Final	C.Chalk	K.Delpit
1	04.03.2024	Updates based on revised alignment	C.Chalk	K.Delpit
2	04.04.2024	Updated Section 4.5 to reflect disturbance area in amended BDAR.	-	C.Chalk

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1 Introduction

This Site Environmental Management Plan (SEMP) has been prepared for implementation by Kosciuszko Thredbo Pty Ltd (KT) (and its contractors) for the realignment of Ricochet Mountain Bike Trail (the Project).

1.1 Purpose

This SEMP has been developed to outline how construction processes for the Project are to be managed in order to maintain and protect the environmental values of the Project site and surrounds.

1.2 Objective

The objectives of this SEMP are to:

- provide mitigation measures to minimise the potential for environmental harm and/or environmental nuisance;
- provide guidance for the development of detailed construction environmental management plans;
- ensure all project personnel understand individual roles and responsibilities;
- provide corrective actions to be implemented in the event of environmental harm and/or environmental nuisance; and
- ensure project personnel understand incident and emergency response procedures.

2 Reference Documentation

2.1 Applicable Legislation

The Project will be carried out in accordance with the applicable legislative requirements outlined in the following Acts and subordinate legislation:

- *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)*;
- *Biodiversity Conservation Act 2016*;
- *Environmental Planning and Assessment Act 1979*;
- *Environmentally Hazardous Chemicals Act 1985*;
- *Heritage Act 1977*;
- *National Parks and Wildlife Act 1974*;
- *Protection of the Environment Operations Act 1997*;
- *Waste Avoidance and Resource Recovery Act 2001;*
- *Water Management Act 2000;* and
- *Work Health and Safety Act 2011.*

2.2 Approvals

The Project will be carried out in accordance with the Development Consent.

2.3 Supporting Documentation

Document	Title	Author / Prepare by	Document Reference
BDAR	Proposed Ricochet Realignment, Thredbo Alpine Resort: Biodiversity Development Assessment Report	Eco Logical Australia Pty Ltd	V4
Procedure	Construction Site Incident and Emergency Procedures Thredbo Village	Kosciuszko Thredbo Pty Ltd	2021/22
Procedure	Emergency Response Spill Procedure	Kosciuszko Thredbo Pty Ltd	1
Procedure	Standard Operating Procedure: Use and Maintenance of Wash Down Bay (KT055)	Kosciuszko Thredbo Pty Ltd	March 2019

2.4 Guidelines

- Guideline for the Preparation of Environmental Management Plans (DIPNR 2004).
- Managing Urban Stormwater: Soils and Construction, Volume 1, 4th Edition (Landcom 2004).
- Managing Urban Stormwater: Soils and Construction, Volume 2A, Installation of services (NSW DECC 2008).

3 Project Description

3.1 Project Location

The Project site is located within Thredbo Alpine Resort (Thredbo), Kosciuszko National Park (KNP), approximately 35 kilometres (km) south-west of Jindabyne, New South Wales (NSW). Within the context of the resort, the trail is located southwest of the Gunbarrel Chairlift top station, and traverses the edge of the Glades ski area and High Noon ski run.

3.2 Scope of Works

The Project will comprise:

- vegetation clearing;
- construction of mountain bike trail, including earthworks; and
- rehabilitation works.

4 Construction Management Details

4.1 Construction Site Access

During construction, site access will be via the Mountain access road.

4.2 Construction Activities

Pre-construction activities will comprise:

- establishment of site boundary;

- marking significant vegetation to be retained and no-go zones;
- erection of site signage and traffic controls;
- flagging exact trail alignment using pin flags to mark the edges of the trail for construction; and
- mobilisation of machinery, equipment and construction materials to site.

Construction activities will comprise:

- vegetation clearing (50 m increments) within the trail corridor to expose bare earth
    - excess cut vegetation to be spread into the surrounding heath and used for rehabilitation of exposed soil on the trail edges
    - topsoil and vegetation sods are to be stockpiled close to the trail tread;
- cut into the slope using a mini excavator and excavate the soil to achieve the appropriate depth of bench;
- remove loose rocks, roots and compact the trail;
- back slope the batter, ensuring outslope and appropriate drainage;
- define the trail line using rocks, logs and other obstacles; and
- re-instate the verge areas, topsoil and preserved vegetation sods.

Post-construction activities will comprise:

- rehabilitation in accordance with the *Detailed Rehabilitation and Monitoring Plan* provide in **Appendix D**;
- demobilisation of plant and machinery; and
- site clean-up.

4.3 Machinery, Plant and Equipment

Machinery, plant and equipment will likely include (but not limited to):

- mini excavator;
- motorised wheelbarrows;
- quad bikes;
- dump trucks (to and from stockpile sites);
- 4 WD vehicles;
- side-by-side vehicles; and
- handtools (i.e. chainsaws and brush-cutters).

The tread width of on-ground machinery used in trail construction must not exceed 1,500 millimetres (mm).

4.4 Construction Materials

Construction materials will likely include:

- trail signs e.g. decision point signs; and
- gravel / decomposed granite for the trail surface.

4.5 Construction Corridor

The construction corridor for the Development comprises 10 m either side of the ground-truthed alignment.

The width of the MTB trail corridor must not exceed 3 m at any location, with an average disturbance width not exceeding 2.5 m. The disturbance will affect approximately 0.113 ha, including 0.1 ha of native vegetation, and approximately 0.013 ha of exotic grassland and non-vegetation areas on the existing ski runs (ELA 2024).

4.6 Site Compound

No site compound is required for the Development.

4.7 Material Storage Areas

No material storage areas are required.

4.8 Stockpile Sites

Temporary stockpiles will be required along the trail alignment for the effective management of gravel, soil and vegetation. These stockpiles will be located within pre-disturbed areas, on relatively flat land, away from watercourses and avoid native vegetation.

Excess materials from construction will be located within the main stockpile area within the resort (refer **Appendix B** for locations). Access to these locations will be restricted to KT staff and contractors.

Soil stockpiles will be managed in accordance with the *Soil Stockpile Guidelines for the Resort Areas of Kosciuszko National Park, version 1.0* (OEH 2017) (Soil Stockpile Guidelines).

4.9 Work Hours

Works will be carried out in accordance with the hours specified in the Development Consent.

4.10 Adverse Weather Contingencies

Adverse weather events (e.g. high winds, thunderstorms, heavy rain, hail, snow, bushfire and high temperatures) have the potential to negatively impact upon construction activities. To ensure appropriate consideration of such events, the Construction Manager / Site Project Manager will monitor weather conditions throughout the construction period. The Bureau of Meteorology (BoM) Thredbo AWS station provides daily weather observation data for the resort. The NSW Rural Fire Service website 'Fires Near Me' includes information on current bush fires and other incidents, as well as warnings for fires which may affect your location.

If adverse weather events are anticipated and/or occur during construction, contingencies will be implemented and arrangements will be made to postpone construction activities.

The Construction Manager / Site Project Manager will be responsible for notifying construction staff of any impending adverse weather, and to implement appropriate controls onsite, such as:

- erecting wind breaks or covering stockpiles to prevent materials being blown away;
- evaluate temporary sediment and erosion controls to ensure they are adequately installed to withstand adverse weather events;
- discontinue use of plant and machinery;
- secure materials and equipment; and
- protect open excavations.

4.11 Imported materials and stabilising agents

- NPWS requests that its authorisation is sought where the proponent intends to utilise either of the following in construction or maintenance of the trail:
    - Imported gravel or fill material; or
    - soil stabilising or adhesive agents.
- The proponent may obtain imported gravel or fill material from sources already assessed by NPWS as appropriate for use in KNP, being gravel or fill material from:
    - the McMahons Earthmoving quarry, located on Alpine Way, Crackenback NSW; or
    - the Kraft Earthmoving / Snowy Mountains Sand and Gravel quarry located on Kosciuszko Road, Jindabyne NSW.

5 Environmental Management

5.1 Environmental Management Structure and Responsibility

5.1.1 Project Team Structure

The Project team structure is provided in **Figure 1**.

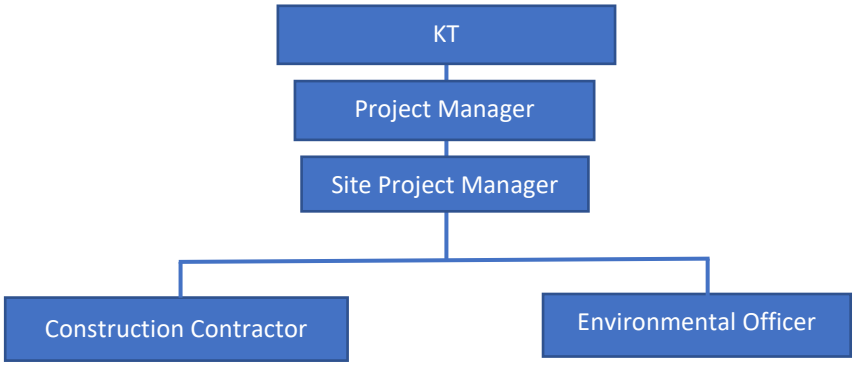


Figure 1: Project Team Structure

5.1.2 Roles and Responsibilities

The roles and responsibilities are outlined below.

Role	Responsibilities
Project Manager	• Ensure the SEMP is made available, communicated, maintained and understood by all Project staff. • Responsible for the overall management of the construction and operation of the Project. • Ensure the SEMP is updated with applicable conditions of approval following the provision of Development Consent from Department of Planning and Environment (DPE). • Ensure that the requirements of the SEMP and sub-plans have been addressed in all contractor environmental management documentation. • Review of incidents, non-conformances and non-compliance. • Ensuring Project personnel and contractors are adequately trained and qualified to fulfil their roles.

Site Project Manager	• Implement and maintain the SEMP. • Ensure all Project personnel comply with the requirements of the SEMP. • Report any incidents, non-conformances to the Project Manager.
Environmental Officer	• Oversee all works which are part of the Project on behalf of KT. • Ensure compliance with all environmental protection measures detailed in the SEMP, supporting management plans and conditions of approval. • Ensure all environmental controls are in place and adequately functioning during construction. and • Conduct construction inspections and complete reporting requirements e.g. progress reports, environmental incidents, non-compliance, corrective action and auditing.
All Personnel	• Comply with requirements of this SEMP. • Report any actual or potential environmental incidents to the Construction Manager immediately. • Identify and report non-conforming or potentially hazardous work practices, equipment, machinery or products. • Only perform tasks for which they are trained and competent. • Assist with environmental incident investigations and applying corrective actions. • Ensure all machinery, plant and equipment are in good working order and condition prior to use.
Construction Contractor	• Comply with SEMP and legislative requirements. • Construction contractor to develop and implement management plans in accordance with this SEMP, conditions of approval and contractual obligations.

5.2 Key Contacts

Key contacts for the Project are provided in **Table 1**. Prior to commencement of works, contact details (name and contact number) will be provided for Project personnel.

Table 1: Key Project Personnel Contact Details

Party to Notify	What to Notify	When to Notify	Responsibility to Notify Regulatory Agency
DPE	Commencement of construction	DPE will be notified in writing at least 48 hours prior to the commencement of construction.	Site Project Manager
NPWS	Details of any material suspected of being a European or Aboriginal culturally significant site, relic or artefact.	Immediately upon discovery of any archaeological/culturally significant site or relic that are encountered. NSW Police to also be notified immediately upon discovery of human remains.	Site Project Manager
NSW Environmental Protection Agency	Details of pollution incident – who, what, when, where, how, any other supporting information and evidence (e.g. photos)	Immediately upon identification of pollution incident causing or threatening material harm to the environment, in accordance with KT's *Construction site Incident and Emergency Procedures Thredbo Village 2021/2022*.	KT Environmental Manager

5.3 Communication

KT is committed to ensuring effective communication and consultation is undertaken to inform the development of this SEMP and ensure it is implemented on-site as per the Project roles and responsibilities in **Section 3.1.** Where required, communication with key external stakeholders such as DPE and NPWS will be undertaken. A summary of the key consultation activities is provided in **Table 2**.

Table 2: Summary of Consultation Activities

Consultation Activity	Communication Method	Frequency
Internal	Site inductions	Prior to commencement of works
	Pre-start meetings and toolbox talks	Daily
	Reports to Project Manager identifying project progress, any environmental incidents, and review of any complaints or enquiries	Weekly
External	Face-to-face meetings, phone and email correspondence with relevant Government Departments / Agencies	As required
	In-writing notifications to Government Departments / Agencies and relevant parties	As required

5.3.1 Notification Protocols

A summary of the key notification protocols is provided in **Table 3.** Notification requirements will be updated as required.

Table 3: Regulatory Agency Notification Protocols

Party to Notify	What to Notify	When to Notify	Responsibility to Notify Regulatory Agency
DPE	Commencement of construction	DPE will be notified in writing at least 48 hours prior to the commencement of construction.	Project Manager
NPWS	Details of any material suspected of being a European or Aboriginal culturally significant site, relic or artefact.	Immediately upon discovery of any archaeological/culturally significant site or relic that are encountered. NSW Police to also be notified immediately upon discovery of human remains.	Project Manager
NSW Environmental Protection Agency	Details of pollution incident – who, what, when, where, how, any other supporting information and evidence (e.g. photos)	Immediately upon identification of pollution incident causing or threatening material harm to the environment, in accordance with ***KT's Construction site Incident and Emergency Procedures Thredbo Village 2021/2022***.	KT Environmental Manager

5.4 Competence and Training

All Project staff will be made aware of the site-specific environmental controls through a site induction, and pre-start meetings / toolbox talks prior to the commencement of construction.

The site induction will cover the following key aspects:

- roles and responsibilities;
- overview of environmental risks and specific locations of environmental and/or cultural heritage significance;
- the scope of legislative requirements and other licences and approvals;
- communication and notification requirements e.g. procedures for notifying and reporting incidents and complaints;
- environmental management and controls stipulated in this SEMP;
- workplace health and safety issues;
- emergency preparedness and response; and
- procedures for notifying and reporting incidents and complaints.

5.5 Environmental Incident and Emergency Response

All Project personnel are required to follow KT's ***Construction site Incident and Emergency Procedures Thredbo Village 2021/2022***. The procedure will be available on-site and all Project staff will be trained on their implementation through the site induction. The procedure classifies examples of emergencies and incidents and provides specific procedures for response to such events, such as:

- serious injuries requirement urgent medical help;
- there are threats to property or life;
- criminal activity e.g. you have witnessed a serious crime or accident;
- sewer or water service breaks;
- bushfire, building fire, spot fire on-site;
- electricity service faults;
- leaking gas;
- fires and explosions; and
- release of pollution e.g. release of sediment into watercourse, chemical spill.

The procedure also outlines general site management principles, incident reporting and notification requirements and provides an emergency contacts list.

In the event of an environmental incident, emergency or near-miss, the following steps should be taken:

1) **STOP** works in the area and if safe to do so ensure the safety of personnel within the vicinity;
2) **NOTIFY** relevant persons e.g. emergency services or Construction Manager;
3) **ISOLATE** the risk or hazard e.g. turn off machinery/plant, implement immediate site controls, set up exclusion zone; and
4) **REPORT** and notify relevant persons (e.g. Project Manager, regulatory agencies).

Environmental incident and near-miss reporting requirements are detailed in **Section 7.1**. Contact details for key Project personnel and emergency services are provided in **Table 3**.

External contractors are required to prepare and implement an emergency and incident response procedure. The contractor will be responsible for responding to any environmental emergency caused by any action (or inaction) of the contractor's staff, including notification requirements to external parties such as EPA and Fire, Fire and Rescue NSW.

6 Environmental Controls

6.1 General

- Ensure works are conducted by suitably qualified and trained personnel.
- Ensure all site environmental management controls relevant to that stage of work are implemented in accordance with the approved plans and conditions of consent.
- Provide approved plans and relevant documentation in the site office or other suitable location so that they are easily assessible by all construction staff.
- Brief all workers as to limit of disturbance footprint and other environmental safeguards (ELA 2024).

6.1.1 Site Establishment

- Establishment of site boundary with temporary fencing, rope or flagging to clearly delineate the construction corridor and "no-go" areas.
- Erection of site signage and pedestrian/traffic controls.
- Installation of erosion and sediment controls.

6.1.2 Machinery and Storage

- All equipment, machinery and vehicles used during construction of the Project must be cleaned prior to entry into the Park and prior to site mobilisation to ensure they are free of mud and vegetative propagules (ELA 2024).
- Equipment, machinery, and vehicles must be regularly maintained and manoeuvred to prevent the spread of exotic vegetation.
- Storage of equipment, machinery, vehicles and material is to be restricted to existing disturbed areas (i.e. at the stockpile, formed roads and within the construction corridors) and avoid undisturbed areas.
- All vehicles and machinery entering Thredbo must adhere to the *Standard Operating Procedure: Use and Maintenance of Wash Down Bay, March 2019 (KT055).*

6.1.3 Material Sourcing

Authorisation from NPWS is to be sought where imported gravel or fill material is required, unless the material is sourced from the following NPWS approved locations:

- McMahons Earthmoving quarry, located on Alpine Way, Crackenback NSW; or
- Kraft Earthmoving / Snowy Mountains Sand and Gravel quarry located on Kosciuszko Road, Jindabyne NSW.

6.2 Soil and Water Quality

Soil and Water Quality		
Objective	Minimise potential impacts to receiving water sources; and Reduce the potential for erosion and sediment moving offsite.	
Mitigation Measures		**Timing**
	Where required, implement erosion and sediment controls outlined in **Section 6.2.1**.	Construction
	Erosion and sediment controls to be inspected and maintained regularly, particularly immediately following rain events.	Construction
	All straw bales used for sediment and erosion control or rehabilitation must be weed free.	Construction

	Construction works should not be undertaken in periods of significant rainfall.	Construction
	Progressive rehabilitation of disturbed areas should be undertaken in accordance with the *Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park* (NGH 2007) (Rehabilitation Guidelines);	Construction
	Stockpiles managed in accordance with the Soil Stockpile Guidelines.	Construction
	On-ground machinery used in vegetation removal and trail construction must adhere to the following: • the tread width of on-ground machinery used in trail construction must not exceed 1500 mm • disturbance/works must be entirely contained within the 3 m disturbance corridor.	Construction
Performance Criteria	No significant sediment deposition observed leaving the site.	
Corrective Actions	If sediment is observed leaving the site, identify the source and amend the ESCs on-site to ensure appropriate controls are in place. If required, additional ESCs to be installed.	

6.2.1 Erosion and Sediment Controls

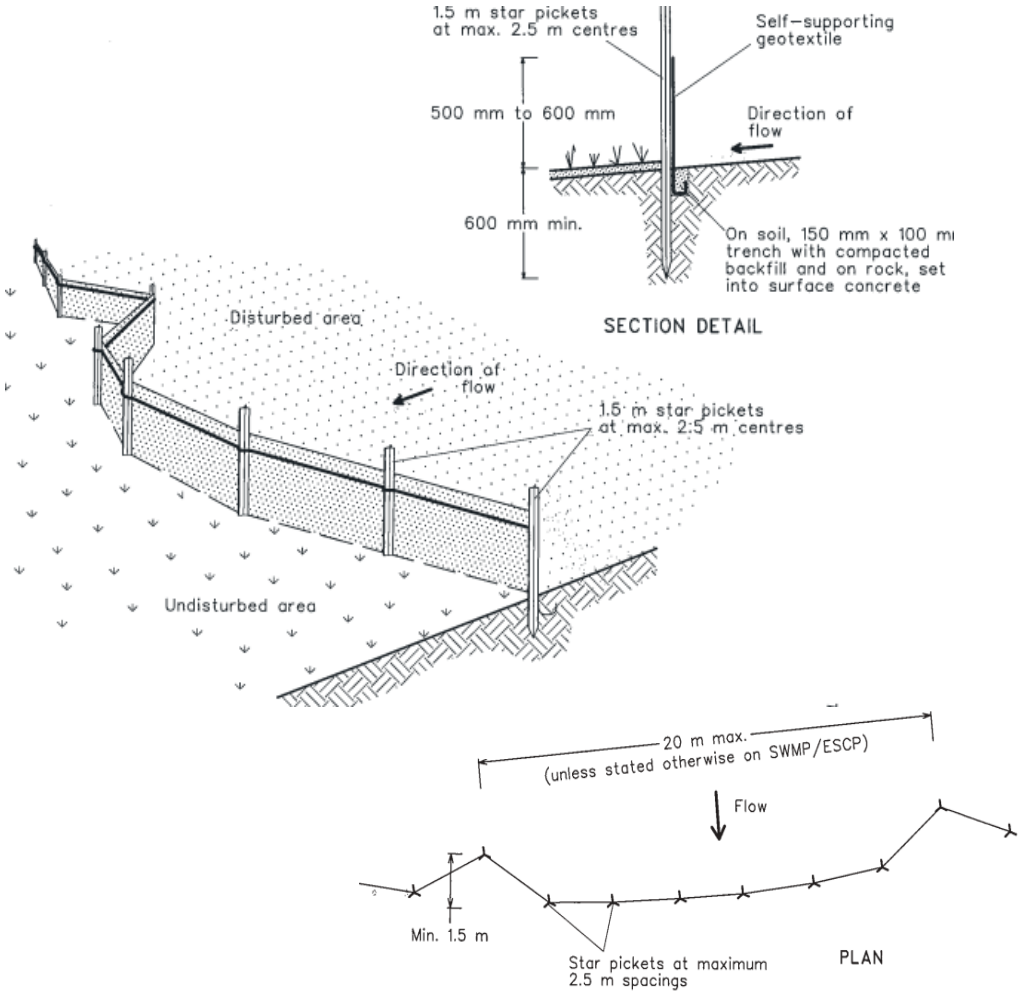
Sediment fencing and straw bale filter fencing is to be utilised during construction of the trail and stockpiling, as required. Controls are to be installed prior to works and retained in place until exposed areas of soil are stabilised.

6.2.1.1 Sediment Fence

The purpose of sediment fencing is to prevent sediment run-off and divert water around and away from disturbed areas. Sediment fencing should be used on the downslope side of works area, wetter areas and surrounding stockpiles.

Construction notes:

1) Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns to limit the catchment area of any one section. **The catchment area should be small enough to limit water flow if concentrated at one point to 50 L/s in the design storm event, usually the 10-year event.*
2) Dig a 150 mm deep trench along upslope line of fence for the bottom of the fabric to be entrenched.
3) Install 1.5 m long star pickets into ground at 2.5 m intervals (max) on the downslope edge of the trench. **Fit star pickets with safety caps.*
4) Fix geotextile to the upslope side of the posts ensuring it goes to the base of the trench.



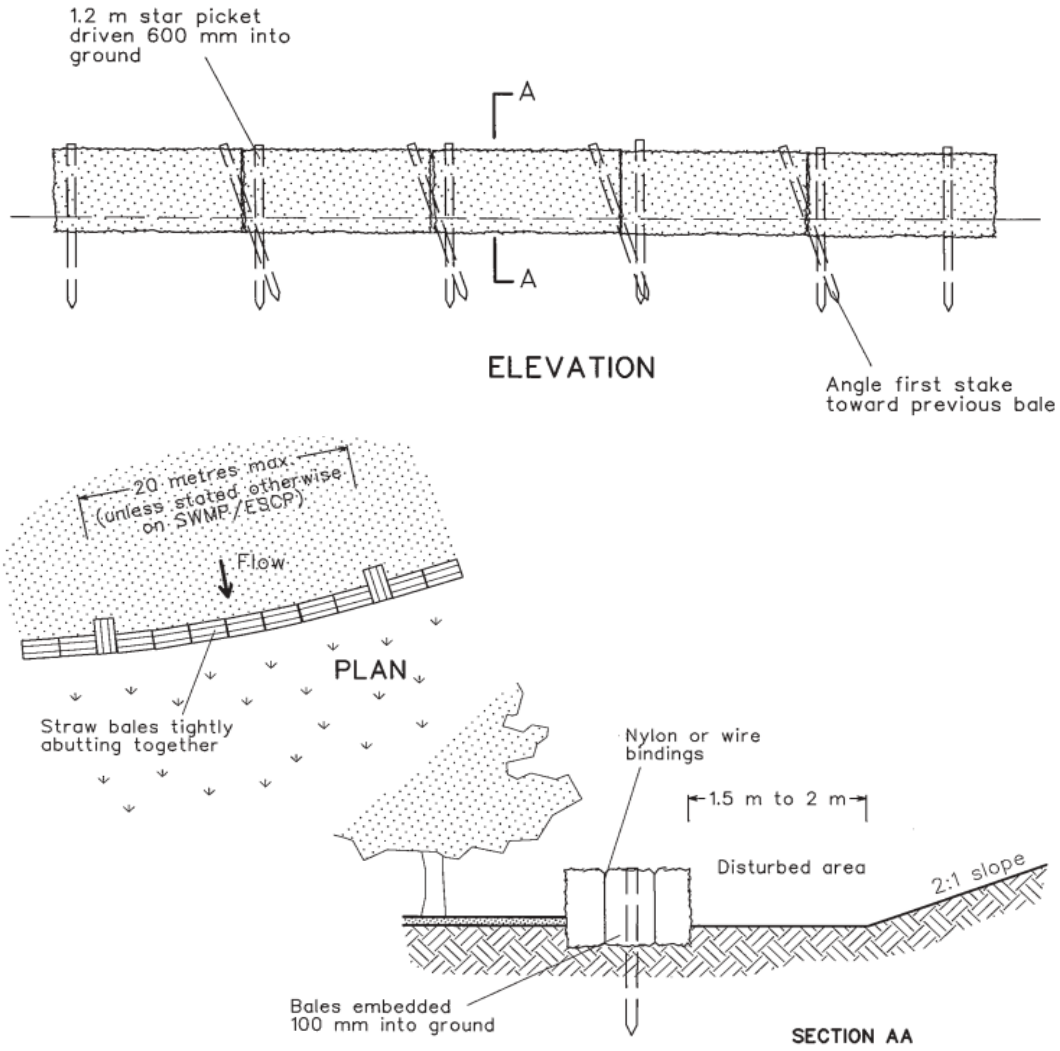
Standard Sediment Fence Installation (Source: Landcom 2004)

6.2.1.2 Straw Bale Filter Fence

Straw bales may be used to divert water around and away from disturbance areas during down-slope and cross-slope excavations. Straw bales are to be used on the uphill side of works area running cross-slope.

Construction notes:

1) Construct the straw bale filter as close as possible to being parallel to the contours of the site.
2) Place bales lengthwise in a row with ends tightly abutting (1 bale = max height of filter). Fill gaps between bales with straw and wrap with geofabric where necessary.
3) Embed each bale in the ground 75-100 mm and anchor with two 1.2 m stakes/star picket. Angle the first stake in each bale towards the previously laid bale. Stakes should be driven 600 mm into ground, sitting flush with top of bale (if possible). **If using star pickets which protrude above bales, fit with safety caps.*
4) Where a straw bale filter is constructed downslope from a disturbed batter, ensure the bales are placed 1-2 m downslope from the toe.



Standard Straw Bale Filter Installation (Source: Landcom 2004)

6.2.1.3 Cross Drainage and Sediment Barriers

The recommended spacing for cross drainage and sediment barriers is provided below:

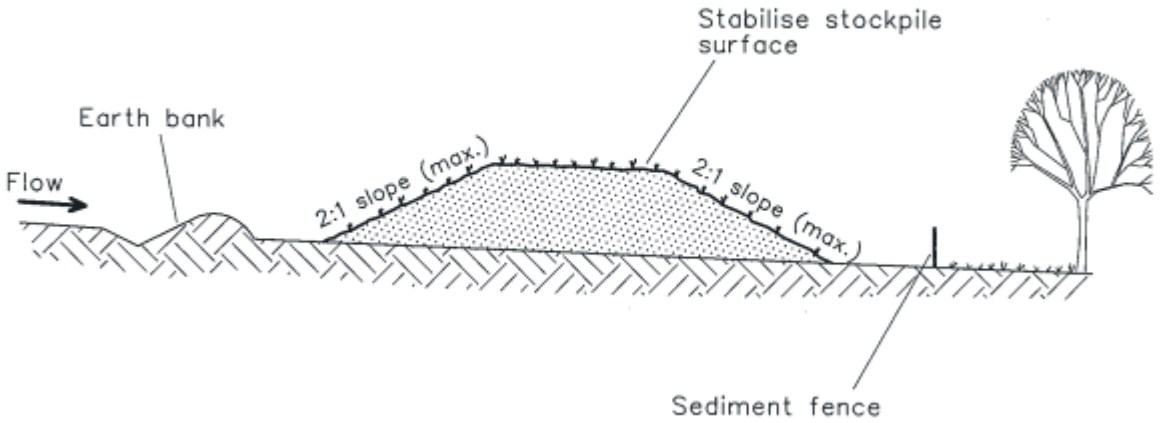
Slope Grade (%)	Cross Drain / Sediment Barrier (m)
5-10	15-20
10-15	10-15
15-25	8-10
>25	5-8

Source: NPWS 2007; Parr-Smith and Polley (1998)
Note: To calculate the grade of a slope: (rise/run) x 100 = slope grade

6.2.2 Soil and Stockpile Management

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

- Temporary stockpile sites within the construction corridor should adhere to the following criteria (Landcom 2004; OEH 2007):
  - not exceed 2 m in height, have a slope <50% (26°)
  - be at least 2 m from vegetation, concentrated water flows, roads, publicly accessible areas or hazardous areas
  - avoid impacts to native vegetation and be located on disturbed areas
  - located directly adjacent to the works
  - located on relatively flat ground, where possible
  - in areas with sufficient room to accommodate the volume of material being stockpiled
  - be contained by appropriate erosion and sediment controls.
- Any excess excavated material will be removed from site and transported to the designated soil stockpiles sites.



Stockpile Management (Source: Landcom 2004)

6.3 Flora and Fauna

During the field surveys, two wombat burrows were identified within proximity of the trail alignment (refer **Figure 2**).

Figure 2: Wombat burrows identified in the field survey (ELA 2024)

6.3.1 Vegetation and Habitat Management

Vegetation and Habitat Management		
Objective	To ensure compliance with legislative requirements and protect existing native vegetation. Minimise impacts to native vegetation.	
Mitigation Measures		**Timing**
	Brief all workers as to limit of disturbance footprint and other environmental safeguards (ELA 2024).	During construction
	Identify with flagging tape the trail alignment where it encroaches upon relatively undisturbed native vegetation (ELA 2024).	Prior to construction
	To the extent reasonably practicable, trail alignment must be adjusted to avoid the removal of mature trees, large boulders and rock outcrops.	During construction
	The construction works will be confined to the approved construction corridor.	During construction
	To the extent reasonably practicable, live tree roots are to be protected (and not removed) within the timbered areas of the trail corridor. This could occur through rock armouring, grade reversals or other construction methods.	During construction

	Rehabilitation of all disturbed areas (excluding the trail tread) is to be undertaken in accordance with the *Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park* (DECC 2007).	During construction, post-construction
Performance Criteria	No damage to site fencing. No damage to native vegetation (including vehicle tracks) associated with unauthorised access.	
Corrective Actions	Fencing to be repaired / reinstated by appointed contractor. Entry points for unauthorised access to be identified and access restricted through fencing or other appropriate barriers.	

6.3.2 Native Fauna

Native Fauna Management		
Objective	To minimise potential impacts to native fauna, their breeding places and habitat.	
Mitigation Measures		**Timing**
	Restrict work to daylight hours (ELA 2024).	During construction
	The trail should be aligned during construction as necessary to avoid any wombat burrows in close proximity to the trail, including those identified in **Figure 2**. If any wombat burrows need to be impacted by the proposal a wombat management plan should be developed for the proposal in consultation with NPWS (ELA 2024).	During construction
	Maintain a clean and tidy work area to ensure animals are not attracted to the site, including provision of covered bins during proposed works.	During construction
Performance Criteria	No death or injury to fauna as a result of on-site activities. No disturbance outside the approval disturbance area.	
Corrective Actions	Review and implement suitable strategies to dissuade fauna from coming to site. Contact NPWS / LAOKO if injured fauna is identified as a result of site activities.	

6.3.3 Exotic Species

Exotic Species Management		
Objective	To reduce the risk of introducing invasive/pest species.	
Mitigation Measures		**Timing**
	All relevant weed species that occur within the construction corridor and associated staging and stockpile sites must be treated prior to works commencing to ensure these weeds are not spread further at the site or within KNP.	Prior to vegetation clearing, prior to construction
	All machinery and equipment used during construction must be cleaned prior to entry into KNP and prior to site mobilisation to ensure the machinery is free of mud, vegetative propagules, and pathogens. This includes machinery that may have been working in an area of the resort that contains weeds and is preparing to be redeployed in the construction corridor and associated stockpile and staging areas.	During construction
	All vehicles and machinery entering Thredbo must adhere to the *Standard Operating Procedure: Use and Maintenance of Wash Down Bay, March 2019 (KT055).* The wash down bay is located at the Thredbo Waste Transfer Station for use by KT staff and contractors.	During construction
	All machinery and equipment must be stored on existing disturbed areas (i.e. at the stockpile and staging areas proposed on the ski slopes) and should not be stored on native vegetation.	During construction
	All machinery to be regularly maintained and manoeuvred to prevent the spread of weeds and pathogens.	During construction

Performance Criteria	No introduction of invasive species as a result of construction activities.
Corrective Actions	Review existing biosecurity procedures (e.g. clean down procedure) and implement additional controls if required.

6.4 Air Quality

Air Quality Management		
Objective	To minimise potential impacts on sensitive receivers from dust and other air pollution from construction activities.	
Mitigation Measures		**Timing**
	Minimise the number and extent of disturbed areas at any given time. When there is a risk of works creating dust nuisance, dust suppression measures are to be implemented i.e. the site is to be watered.	Vegetation clearing; during construction
	Plant and equipment to be maintained and operated in an efficient manner to reduce air pollution.	During construction
	Vehicles are to adhere to speed limits to minimise dust general and potential spill of hauled materials.	During construction
	All vehicles carrying spoil or rubble to/from site should be covered to prevent the escape of dust or other material. Covers are to be adequately secured.	During construction
Performance Criteria	No complaints received in relation to air pollution.	
Corrective Actions	If complaints are received, the following steps should be taken: • Investigate specific cause of complaint. • Review site activities/processes and identify the source of air emissions. • Implement immediate corrective actions on-site e.g. water site, replace equipment deemed to be poorly maintained. • If required, implement administrative controls e.g. additional staff training, alter construction methods or timing for undertaking dust generating activities.	

6.5 Noise and Vibration

Noise and Vibration Management		
Objective	To ensure that noise and vibration from construction activities does not cause environmental nuisance in the locality.	
Mitigation Measures		**Timing**
	Selection of the most appropriate plant and equipment to minimise noise generation.	Prior to construction
	Construction works will be undertaken during standard work hours.	During construction
	Appropriate noise management strategies will be implemented for construction works and operation of plant and equipment in accordance with the Australian Standard AS 2436-2010 *Guide to noise and vibration control on construction, demolition and maintenance sites.*	During construction
	Regular checks are to be undertaken to ensure all equipment and vehicles are in good working order and are operated correctly.	During construction
	All machinery and equipment will be maintained in accordance with the manufacturer's requirements.	During construction
Performance Criteria	No construction related noise and vibration complaints received. No unreasonable noise or vibration.	

Corrective Actions	If complaints are received, the following steps should be taken: • Investigate specific cause of complaint. • Review site activities/processes and identify the source of the noise emissions. • Implement immediate corrective actions e.g. swap out noisy equipment. • If required, implement administrative controls e.g. additional staff training or change work hours to minimise noise.

6.6 Fuels and Chemicals

Fuels and Chemicals Management		
Objective	Eliminate the potential for release of fuels, chemicals and hazardous substances to the environment.	
Mitigation Measures		**Timing**
	Spill kits will be available onsite and all site personnel will be made aware of their locations in the site induction.	During construction
	In the event on an on-site spill, construction staff will follow KT's **Construction Site Incident and Emergency Procedures Thredbo Village, 2021/2022**.	During construction
	Hazardous substances, toxic materials or dangerous goods must not be stored or processed on-site at any time without prior approval from the DPE Secretary or nominee.	During construction
	Fuel and chemicals will be appropriately stored and handled in accordance with relevant Australian Standards.	During construction
	Appropriate controls will be implemented when refuelling Project vehicles and machinery.	During construction
Performance Criteria	No fuel, chemical or hazardous substance spills.	
Corrective Actions	Corrective actions will be taken in accordance with the **Construction Site Incident and Emergency Procedures Thredbo Village, 2021/2022**, including: immediate spill response, implementation of any necessary control measures as directed by authorities. Where required, an investigation will be undertaken to determine the root cause.	

6.7 Traffic and Access

Traffic and Access Management		
Objective	Minimise potential impacts on existing road network	
Mitigation Measures		**Timing**
	Traffic and construction vehicle access will be managed as per regular daily operation in the resort.	During construction
	All Project vehicles and machinery to adhere to speed limits and signage and stay within construction corridor.	During construction
	Pedestrian and bikers within proximity of the site will be managed though the use of signage and fencing/flagging as required.	During construction
Performance Criteria	No significant impacts to existing road network or users. No complaints in relation to traffic or vehicle operators.	
Corrective Actions	If complaints are received, traffic management procedures will be reviewed and amended (if necessary).	

6.8 Waste

Waste Management		
Objective	Minimise construction waste as much as practicable. and Reduce the impact of waste on-site and beyond the site boundary.	
Mitigation Measures		**Timing**
	All waste will be managed and disposed of in accordance with the KT's waste management procedures.	During construction
	Where possible, construction materials will be salvaged for reuse to divert waste from landfill.	During construction
	All waste will be separated into waste streams and contained within appropriate receptacles and/or disposed of in accordance with the EPA guidelines. All receptacles will be in good condition.	During construction
	All waste transportation vehicles will be covered appropriately to ensure waste cannot spill, leak or escape onto the road or wash into stormwater drains.	During construction
Performance Criteria	No litter or waste material to be released from site in an uncontrolled manner.	
Corrective Actions	• Investigate cause of inappropriate waste disposal/management. • Review on-site waste handling facilities and implement corrective actions e.g. change in receptacle size and/or waste management signage. • If required, implement administrative controls e.g. additional waste management training for staff.	

6.9 Cultural Heritage

6.9.1 Unexpected Finds Procedure

Where unexpected items of potential archaeological, built or Aboriginal cultural heritage significance are discovered, Project personnel will follow the below procedure:

- **STOP:** Stop work and leave the site or item where it is.
- **NOTIFY:** Notify the Project Manager and NPWS to arrange for representatives to inspect the site. If human remains are found, the NSW Police must also be notified.
- **MANAGE:** Management may involve securing the find by erecting a no-go zone.
- **REPORT:** The Project Manager will complete any reporting requirements, as directed by NPWS.

7 Monitoring and Reporting

7.1 Environmental Monitoring

The Environmental Officer will conduct monitoring during all project phases (pre-construction, during construction and post-construction) to ensure compliance with this SEMP, associated management plans and conditions of approval.

The Environmental Officer will undertake weekly inspections utilising the ***Site Environmental Management Measures Report***. The report includes a checklist on the following matters:

- Administration (weekly site inspections, sub-contractor environmental management, environmental monitoring, environment incidents, complaints handling, reporting and record keeping)
- Biosecurity management

- Chemical spills / emergency response
- Vegetation management and rehabilitation
- Waste management
- Native fauna management
- Material storage and sourcing
- Water quality
- Erosion and sediment controls
- Stockpile management
- Air quality and noise and vibration
- Cultural heritage
- Safety.

7.2 Weekly Environmental Reporting

The Environmental Officer will provide copies of the ***Site Environmental Management Measures Report*** to the Project Manager on a weekly basis. All records will be stored within KT's files and distributed to relevant persons / regulatory authorities as required.

7.3 Environmental Incident Reporting

All incidents and near misses will be managed in accordance with KT's ***Construction site Incident and Emergency Procedures Thredbo Village 2021/2022***. The document provides procedures for responding to incidents and emergences, reporting and notification requirements and emergency contacts.

The following information should be recorded:

- Time and date of the incident / near miss
- A description of the incident / near miss
- A sequence of events that led to the incident / near miss occurring
- Person/s involved in the incident / near miss (including witnesses)
- Written statements from person/s involved (as applicable)
- Details of corrective actions.

The ***Environmental Incident Report Form*** should be completed for all environmental incidents. All parts of the form must be completed in accordance with KT's incident procedure and following the instructions within the form. The form must be signed by the person making the report and the Project Manager/person in charge of the site/activity.

7.4 Non-conformance

A non-conformance is the failure to comply with the requirements of this SEMP and supporting management plans. Non-conformances identified via site inspection or during day to day activities will be documented on the ***Site Environmental Management Measures Report*** (or similar contractor's form) and closed out in subsequent inspections. The Environmental Officer is responsible for investigation and managing corrective and preventative actions in the event of non-conformance or a situation likely to cause environmental harm.

7.5 Corrective Actions

Corrective actions should be prioritised on the following hierarchy of controls:

1. **Elimination** – can activities and processes be eliminated to reduce the risk of reoccurrence?
2. **Substitution** – can activities be substituted with another activity of lesser risk?
3. **Isolation** – can you isolate the hazard from any person exposed to it?
4. **Engineering controls** – can you reduce the risk of reoccurrence through engineering changes?
5. **Administrative controls** – can a change in work practices, additional training or additional checks reduce the risk?
6. **Personal Protective Equipment (PPE)** – can PPE be worn to protect personnel from harm?

The Construction Manager will be responsible for managing the implementation of corrective actions on-site.

7.6 Complaints Management

Should complaints be received from the public in relation to the Project they will be recorded using the ***Complaints Form*** (or similar contractor's form). The Project Manager will be responsible for investigating, recording and closing out any complaints received. All records will be stored within KT's files and distributed to relevant persons / regulatory authorities as required.

8 Record Keeping and Review

8.1 Document Control

All Project related documentation will be maintained within KT's Project file. Documents stored within the file include (but not limited to) the following:

- Copies of relevant planning approvals and documents, licences and permits.
- All completed induction forms and visitor sign-on register.
- Records of routine environmental inspections.
- Records of any environmental incidents, complaints, non-conformances and no-compliances.

8.2 SEMP Review

This SEMP is a live document and will undergo reviews and amendments as necessary. Reviews will generally be undertaken –

- If there is a change in the scope of the Project.
- Prior to commencement of construction to ensure any relevant conditions of consent and/or other approval, licence or permit requirements are incorporated.
- If there is a need to improve environmental controls to protect environmental values.
- If there is an increase or introduction of a new environmental risk or impacts.
- At the end of a Project to allow for improvements in subsequent Projects.

9 References

Department of Environment and Climate Change (DECC) 2007, Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park, NSW Government.

Department of Environment and Climate Change (DECC) 2009, Interim Construction Noise Guideline, July 2009, https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/noise/09265cng.pdf?la=en&hash=EF4576FD79DBB25D5AC22DFA1A883A2BADA1F77B

Department of Infrastructure, Planning and Natural Resources (DIPNR) 2004*, Guideline for the Preparation of Environmental Management Plans*, https://www.planning.nsw.gov.au/~/media/Files/DPE/Guidelines/guideline-for-the-preparation-of-environmental-management-plans-2004.ashx?la=en

Department of Planning & Environment (DPE) (2017) *What to include with your development application*, version January 2017, https://www.planning.nsw.gov.au/Policy-and-Legislation/~/media/65E2BA89886F426991525FF25707A9A9.ashx

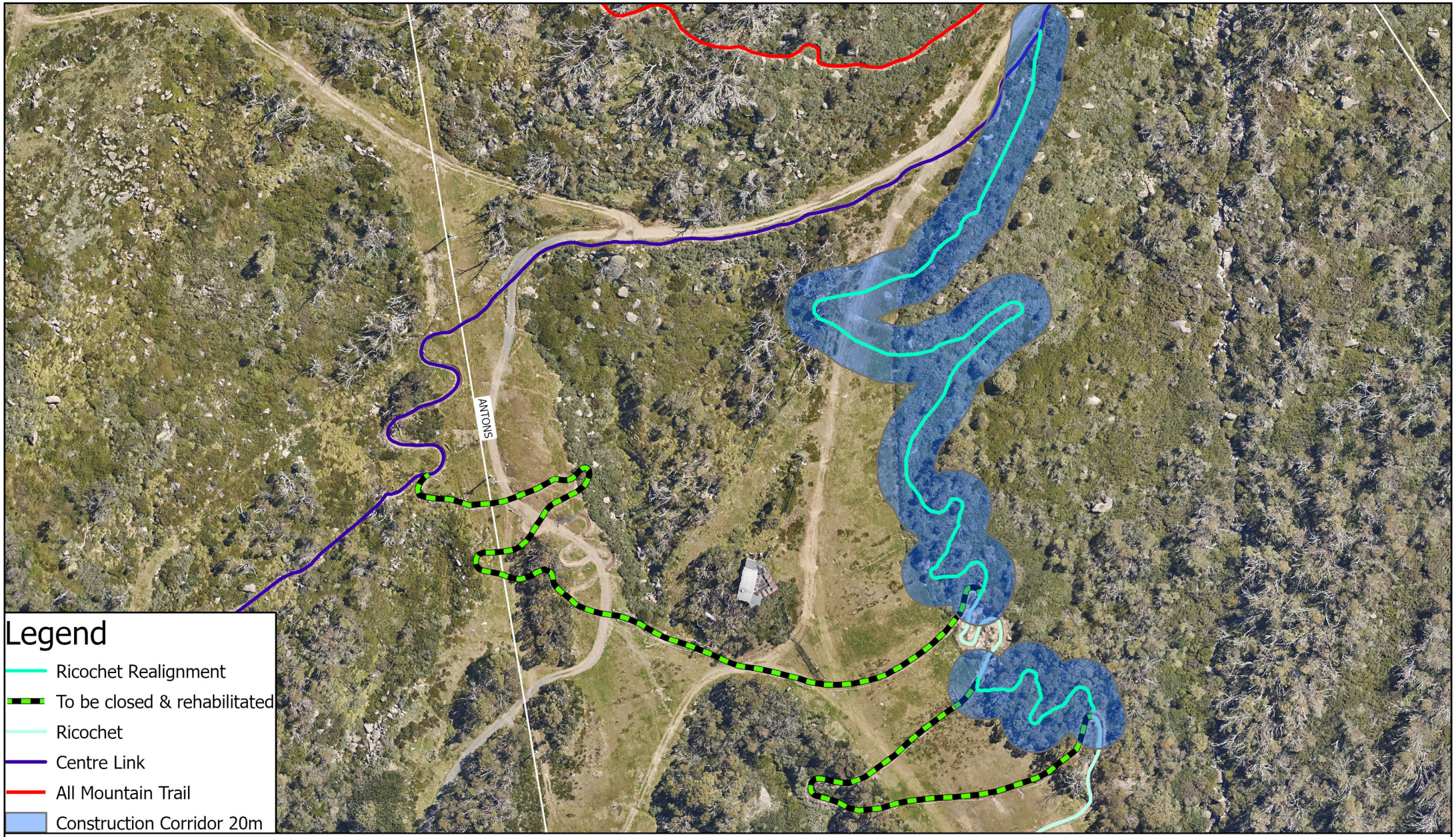
Eco Logical Australia Pty Ltd (ELA) 2024, Proposed Ricochet Realignment – Biodiversity Development Assessment Report, Thredbo Alpine Resort. Prepared for Kosciuszko Thredbo Pty Ltd.

Kosciuszko Thredbo Pty Ltd (KT) 2022, Statement of Environmental Effects for Cruiser Beginner Mountain Bike Trail and Parks.

Office of Environment and Heritage (OEH) 2017, *Soil Stockpile Guidelines for the Resort Areas of Kosciuszko National Park, version 1.0, October 2017*, NSW National Parks and Wildlife Service.

10 Appendices

Appendix A Plans



Scale: 1:1,750

0 10 20 40 60 80

Meters

Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 2020
Grid: GDA 2020 MGA Zone 55

N

THREDBO

CONSTRUCTION CORRIDOR

Project: Ricochet Realignment

Revision: 3

Date: 15/01/2024

Produced By: BB

Appendix B Stockpile and Material Storage Areas

0 4.5 9 18 27 36 Meters

Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 2020
Grid: GDA 2020 MGA Zone 55

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THREDBO

STOCKPILE AND MATERIAL STORAGE LOCATION WASTE TRASFER FACILITY

Revision: A

Date: 14/09/2023

Produced By: KOS

Appendix C Environmental Schedules

THREDBO ENVIRONMENTAL SERVICES

Record of complaint

Sheet _____of_____

Project: _____ Date / Time: _____

Received by: _____ Reference Number: _____

Complainant details:	Witness details:

Nature of complaint:

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..... Complainant sign:

Action taken:

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Kosciuszko Thredbo Pty Ltd

Environmental Incident Reporting Form

Confidential document after first entry

The purpose of this form is to report any incident that may have resulted in Environmental harm on Kosciuszko Thredbo Pty Ltd premises. Remember to be succinct, stick to the facts and do not make assumptions. Only record information you know to be correct.

The only persons authorised to contact external agencies eg EPA in relation to environmental incidents are the Kosciuszko Thredbo General Manager and Environmental Services Manager or their approved delegates.

Return completed form to the Environmental Services Manager as soon as practicle, on completion of the Environmental incident.

Date of Incident:	**Time of incident:**
Reported by:	**Department:**

Location of Incident

EXACT location of the incident (include landmarks and features, nearest cross street etc to make it easier to identify later)		
Site:	Building:	Room:

Description of incident

Provide description and extent of incident: …… …… …… …… ……
Have relevant photos been taken and attached? Yes ☐ No ☐
If 'No', provide sketch and attach to the rear of this document.
What was the estimated duration of the incident?

Type of incident

☐ Spill (including fuel,oil,waste material or other polluting substance)	☐ Erosion and sedimentation incident	☐ Contaminated water discharge
☐ Noise emission/complaint	☐ Unauthorised/accidental damage to heritage item	☐ Unauthorised/accidental vegetation removal or harm
☐ Air Emission	☐ Wildlife habitat/nesting area disturbed	☐ Other (specify)

Environmental Incident Reporting Form

Level of incident

Level	Example
☐ Minor	eg. No material has escaped the site or caused material harm to the environment – it is easy to clean up without additional assistance.
☐ Major	eg. Material has escaped the site causing pollution downhill/downstream areas, which will require clean up involving other agencies and/or additional resources not available to local site management. Damage has occurred or is likely to occur to the environment.

Hazardous Material Spilt

☐ Petroleum based products/ Hydrocarbons	☐ Chemicals domestic or industrial grade
☐ Biological waste / Clinical and related waste	☐ PCB insulating liquids
☐ CFC containing equipment	☐ Paints or paint products
☐ Radioactive waste	☐ Other (specify)
Detail type/ingredient spilt: (UN, MSDS details)	
Detail concentration of material spilt:	
Detail quantity of material spilt:	

Type of Spill

☐ Spilt onto ground	☐ Spilt into stormwater drain
☐ Spilt into waterway	☐ Poured down sink
☐ Poured down sewer	☐ Released into atmosphere
☐ Caused odour	☐ Caused fire/explosion
☐ Caused infectious contamination	☐ Other (specify)

Immediate Actions

Was spill contained? Yes ☐ No ☐
Detail immediate actions/controls measures taken to rectify or contain the incident …… …… …… …… …… …… …… ……

Environmental Incident Reporting Form

Corrective Actions

Detail corrective clean up action taken

……

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Disposal

Detail disposal method/plans and location

……

……

……

Recommended follow up and preventative actions

Detail recommendations

……

……

……

Persons present at Incident

Were there any witnesses to the accident? Yes ☐ No ☐ If 'Yes', please provide names

……

……

Declaration

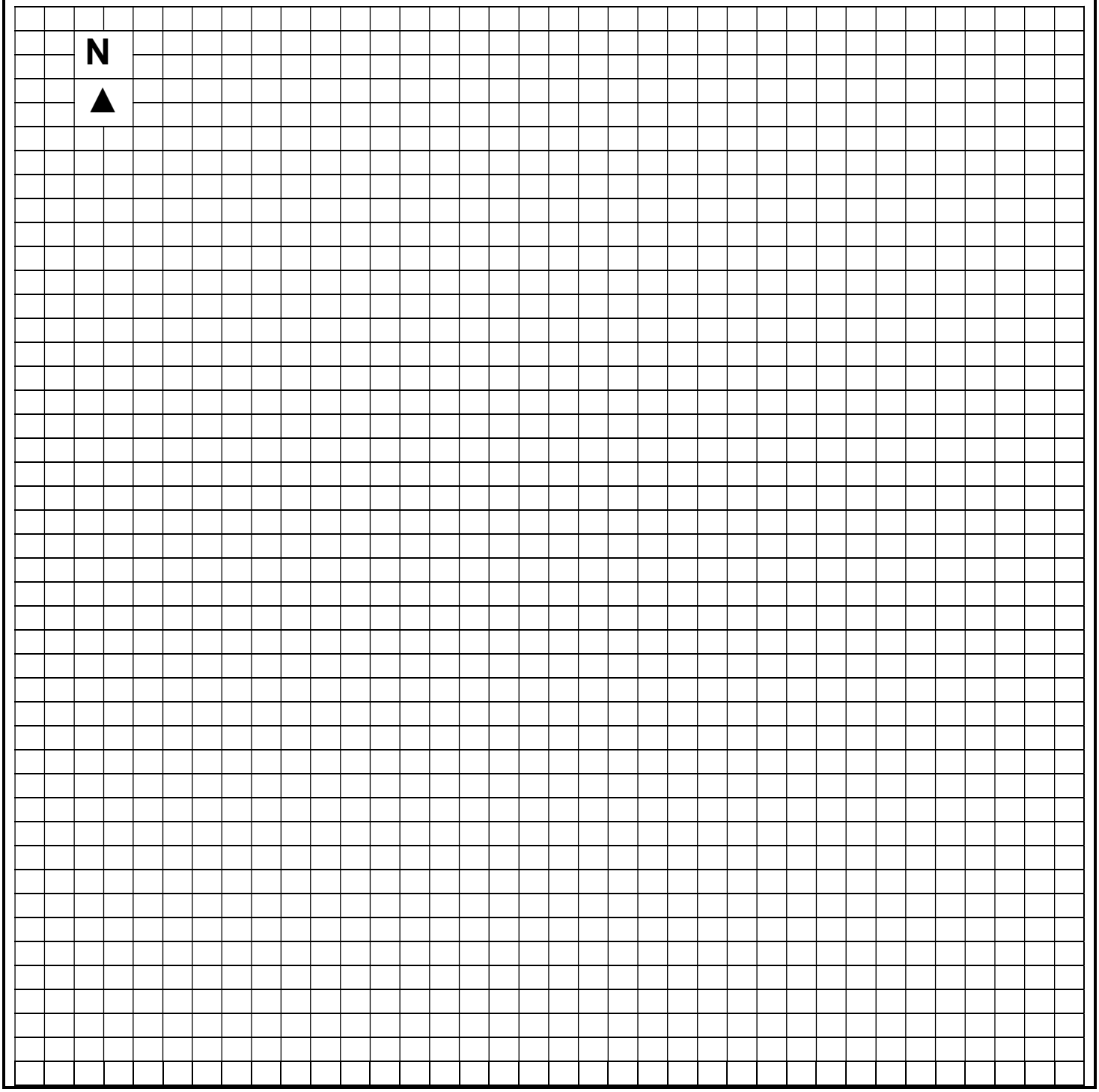
The information and answers given above are true in every detail and no information has been withheld.

Departmental Supervisors Name	
Departmental Supervisors signature	*Date*

Departmental Managers Name	
Departmental Managers signature	*Date*

Environmental Incident Reporting Form

Diagram: (do not scale)



Created By: Paul Corcoran
Created Date: 24 Mar 2009
Review Date: 24 Mar 2017
Reviewed Date: 7th January 2020, by E Diver

Appendix D Rehabilitation and Monitoring Plan

Construction of Mountain Bike Trails

Ricochet Realignment

Detailed Rehabilitation and Monitoring Plan

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1 Introduction

This rehabilitation and monitoring plan has been prepared to detail the rehabilitation required for all areas disturbed by the construction works associated with the development. The rehabilitation activities consist of trail verge stabilisation and revegetation works.

1.1 Aims and Objectives

The aim of this plan is to achieve successful rehabilitation of all areas disturbed by the works with full vegetation coverage to achieve an erosion resistant state. The objectives of this rehabilitation plan are:

- Detail the rehabilitation works required by the proposal for all disturbed areas;
- Set out the schedule for the rehabilitation activities;
- Provide information on plant species and planting ratios; and
- Dictate the maintenance and monitoring of the disturbed and rehabilitation areas.

2 Rehabilitation Program

2.1 Rehabilitation Areas

The areas to be rehabilitated consist of all areas disturbed as a component of the works. These areas include the verges of the completed trail, existing trail alignment that is to be closed and any disturbed areas adjacent to the works. The development areas are shown in Appendix 1.

2.2 Rehabilitation and Stabilisation

The rehabilitation and stabilisation works will be consistent with the Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park (NPWS). The works are to be carried out by Kosciuszko Thredbo Pty Ltd (KT) staff or suitable contractor on KT's behalf. Methods will consist of:

Timing	Procedure	Methods
Pre-construction	Establish construction corridor & trail alignment	• Flag trail alignment using pin flags and flagging tape • Mark out construction corridor to prevent damage to adjacent areas
	Treatment of weeds	• Treat weeds within disturbance area to ensure they are not spread further using methods relevant to the weed species being treated
	Identify trees to be removed	• Clearly identify any trees to be removed with flagging tape and inspect for nests / fauna • Alignment of trail is to avoid clearance of mature canopy vegetation
	Implement Site Environmental Management Measures	• Erosion & sediment controls to be put in place prior to construction where possible and during construction
	Cleaning of machinery	• Ensure all machinery to be used on construction site is cleaned at wash down bay to prevent spread of weed species in resort

	Identify "No Go" areas	• Identify & mark "No Go" areas to clearly delineate sensitive areas to be avoided
	Identify *Podocarpus lawrencei* (Mountain Plum Pine)	• Identify and mark out *Podocarpus lawrencei* • Alignment of trail is to avoid *Podocarpus lawrencei* • Ensure KT staff/contractors are able to accurately identify
	Identify *Ranunculus anemoneus* (Anemone Buttercup)	• Identify and mark out *Ranunculus anemoneus* in order to minimise and mitigate impacts during construction works • Alignment of trail is to avoid *Ranunculus anemoneus* • Ensure KT staff/contractors are able to accurately identify • Environmental Officer to GPS record location of *Ranunculus anemoneus* for on-going monitoring
	Identify set down and stockpile areas	• Identify and mark out appropriate plant & equipment set down areas for short term placement of machinery & materials avoiding areas of native vegetation • Set down areas are to be located within trail construction zone, identified stockpile site or site compound only and strictly adhered to
	Identify wombat burrows	• Identify and mark out wombat burrows within the construction corridor • Trail alignment is to avoid wombat burrows
During Construction	Minimise disturbance & stay within trail corridor	• Minimise disturbance to adjacent native vegetation • Limit movement of construction equipment to construction area and nominated set down areas
	Identify *Ranunculus anemoneus* (Anemone Buttercup)	• If *Ranunculus anemoneus* is discovered on the trail alignment during the course of construction that has not been previously identified, Environmental Officer is to be contacted immediately and works are to cease in that area • Environmental Officer and trails supervisor to determine if trail alignment can be moved within the flexible construction corridor of 20m (10m either side of the ground-truthed alignment) to avoid • If trail alignment is unable to be altered, KT is to consult NPWS regarding most appropriate action
	Regularly maintain site environmental management measures	• Conduct regular inspections and maintenance of sediment and erosion controls
	Sod cutting, collection & storage (as per Rehabilitation Guidelines for the Resort Areas of KNP)	• Native forbs and grasses are the most appropriate for sodding • Where sod collection is possible, cut sods to a depth of 10-20cm (leaving a layer of intact topsoil underneath) and to a size of 30cm^2 • Store sods collected on geofabric adjacent to the construction area

		• Sod storage time to be kept to a minimum and sods to be utilised as soon as possible after cutting and storage • Monitor sods and environmental conditions and water if necessary
	Soil removal	• Place topsoil & subsoil separately • Adhere to Soil Stockpile Guidelines for Resort Areas of KNP
	Soil replacement	• All excess soil gained from trail construction works is to be spread over the disturbed areas prior to rehabilitation • Ensure subsoil and topsoil are replaced in correct order
	Spread excess vegetation	• All excess native vegetation to be dispersed on exposed soil along the trail edge, placed on batters & embankments for erosion control or carefully spread further into bushland to avoid smothering of understory vegetation communities • Any excess thatch unable to be used for the above is to be stockpiled off-site for use on other rehabilitation projects with the resort
	Management of ephemeral springs crossing marked trail alignment	• Manage water from ephemeral springs with the installation of rock armouring and/or construction of rock stormwater pits and piping of water underneath trail • Drainage pipe to discharge into rock dispersion pits to reduce water velocity and erosion
Post Construction	Direct seeding	• Areas of open ski slope adjacent to the trail tread, or trail to be closed, and dominated by EXOTIC grasses, seed using a 1:1 mix of Chewings fescue & *Poa fawcettiae* • Areas of open ski slope adjacent to the trail tread, or trail to be closed, and dominated by NATIVE species, use only 100% native *Poa* endemic to the area • Seeding rate: Slope grade <40% use 15-20g/m^2 Slope grade >40% use 20-30g/m^2 • Broadcast Dynamic Lifter @ 100g/m^2 • Weed free rice straw mulch and jute mesh to be applied over seed to protect soil and provide a favourable environment for establishment
	Sod replacement	• Utilise sod replacement in disturbed areas where possible particularly in areas of native vegetation in accordance with “Rehabilitation Guidelines for the Resort Areas of KNP” – Section C.1.4
	Stabilise disturbed areas (batters/embankments and trail to be closed)	• Spread weed free rice straw on slope grades <40% @ 1 bale per 25m^2 and weigh down using native thatch / litter gained from works. Jute mesh may be used if thatch amount insufficient • Install Jute mesh (or similar) over straw on batters & embankments >500mm height & with a slope >40% (Grade% = Rise/Run x 100)

		• Direct seed at rates listed above to stabilise disturbed areas including batters & embankments
	Planting native tube stock	• Plant tube stock on batters & embankments in areas of native vegetation • Plant shrubs at 3/m^2 • Plant grasses and forbs at 5/m^2 • Refer to Appendix 2 for suitable rehabilitation species • Water crystals & organic fertiliser may be used at label rates • *Water crystals:* 5gm pre-hydrated crystals, crystals must be hydrated for at least 2hrs prior to planting • *Fertiliser:* 1 x Typhoon Native fertiliser tablet per plant (*Poa* & shrubs) placed next to or below roots
	Watering	• If required, water rehabilitation areas to assist in seed germination, tubestock establishment and straw retention
	Weed control	• Monitor all areas disturbed by the works (including areas adjacent to the works) for signs of weed infestation • Treat weeds with methods appropriate to weed species being treated including low pressure spot spraying and hand removal techniques • Limit off-target damage by only spraying in the appropriate conditions • Weed monitoring & control is to be conducted on an on-going basis and included in annual resort weed control activities

2.3 Trail Hardening

Trail hardening during and post construction will assist in reducing surface loss from the trail tread which in turn will reduce issues such as breaking bumps, exposed roots and sub-surface rock, water channelling and undercutting and sedimentation of drains, sumps and vegetation.

Trail hardening methods will include:

- Trail grading and compaction using excavator, manual hand tools and vibrating plate;
- Watering of trail tread to aid in compaction;
- Use of rock armouring and aggregate where required;
- Trail not to be used by the general public for a minimum of 30 days following completion;
- Approved KT staff to "ride-in" trail in a steady and controlled manner to aid compaction in the preferred ride line (ride-in staff to be approved at the Mountain Managers discretion).

2.4 Rehabilitation of closed trail alignment

At the completion of the trail hardening period and once the new alignment is open, sections of trail to be closed are to be rehabilitated. Rehabilitation method is to consist of:

- "Scratch up" existing alignment with mini excavator to reduce compaction of trail tread, allow increased water infiltration and aid in plant and root establishment;
- Import topsoil from Thredbo stockpile site and place in areas of trail requiring topsoil;

- Lightly rake disturbed alignment cross-slope to form shallow furrows for seed. As fescue & *poa* seed is small, furrows should only be 1-2cm deep. Grass seed will not germinate if sown too deep;
- Apply dynamic lifter;
- Spread weed free rice straw on all exposed soil;
- Water in to prevent straw from blowing away and aid in seed germination;
- Seed, fertiliser and straw to be applied at rates listed in the Rehabilitation & Stabilisation table;
- Chewings fescue to only be used on areas of open ski slope dominated by exotic grasses;
- In areas of native vegetation, use only 100% native *Poa* endemic to the area and native shrubs as per Appendix 2 – Rehabilitation Species.

2.5 Monitoring

Weekly inspections of the construction area will be carried out by the Environmental Officer during the construction phase as per the Site Environmental Management Plan (SEMP). These inspections are to ensure that all site environmental management measures are in place and in good working order. On-going monitoring will occur as per the Rehabilitation & Monitoring schedule.

2.6 Schedule

The initial rehabilitation and stabilisation works are to be carried out as a component of the construction works during the trail finishing and closed trail rehabilitation phase. The maintenance works associated with the rehabilitation areas are to be undertaken on an on-going, as required basis throughout each summer season. The schedule for the rehabilitation works is provided in the table below. The appointed Environmental Officer for the project is responsible for ensuring that all preparation, works, monitoring and reporting are carried out to the required standard. The works will be carried out by KT staff or an appointed contractor.

Rehabilitation and monitoring schedule

AREA	PROCEDURE	TIMING
Trail verge Berms Batters Embankments Closed Trail section	Site Preparation	During construction
	Seeding and planting tube stock	During construction and ongoing annually until adequate groundcover has been achieved
	Mulching	During construction and ongoing annually until adequate groundcover has been achieved
	Maintenance (incl. weed control & replacement planting)	Ongoing annually as required (between November and May)
	Monitoring	**Weekly** during construction as per SEMP **Monthly** post construction for the first 12 months to monitor for erosion, sediment control and plant establishment **Annually** once stabilisation has been achieved, between November & May each year up until the date 5 years after the issue of a final occupation certificate.

		At the completion of the 5 years general monitoring & maintenance will continue. **Monitoring** will be conducted by way of site inspection with triggers for action detailed in Section 2.6 - Maintenance & Mitigation

2.7 Maintenance & Mitigation

In the event that monitoring indicates initial rehabilitation efforts are not effective (minimal grass / shrub establishment, establishment of weed species or declining coverage), additional management actions may be required. Management actions will be determined following 3 consecutive months of poor establishment or declining survival rates of native species planted. If deemed necessary, this period will be brought forward to implement the additional actions required. The management actions are to consist of one or more of the following:

Area	Maintenance trigger	Action
All areas disturbed by construction works	Poor grass & shrub establishment <75% native species coverage	• Additional direct seeding in areas of open non-native vegetation • In-fill planting of native tube stock • Grazing control by use of tree guards where appropriate
	Presence of weeds	• Weeds to be controlled annually include, but not limited to, Milfoil, St John's Wort, thistle & Juncus • Spot spray using low pressure sprayer • Use of hand removal techniques where appropriate
	Identification of erosion & unstable areas	• Installation of Jute mesh, brush matting & mulching • Installation of hay bale and sediment fencing control measures • Maintenance of sediment retention pits, water bars and drains • Carry out additional planting & re-vegetation works as per Rehabilitation table
	Presence of sediment & debris	• Remove build-up of sediment from sediment retention pits and pipe inlets & outlets as required • Removal of any excess sediment from vegetation adjacent to the trail
Drains Water bars Sediment retention pits	Presence of sediment & debris Identification of damage	• Inspection of drains, water bars & sediment retention pits particularly after heavy rainfall • Removal of sediment and debris to prevent blockages / overflow and limit sedimentation of vegetation • Regular inspection to identify damage to system and maintenance

Additional planting & re-vegetation works are to be carried out as per the Rehabilitation table. If it is found that after 12 months of monitoring the rehabilitation efforts are not effective, KT will liaise with NPWS to determine the most appropriate action. The 12-month period will allow time for the rehabilitation area to establish prior to any further intervention.

3 Exotic Species

All areas disturbed by the works are to be monitored on an ongoing basis for the occurrence of any exotic flora and evidence of exotic fauna (scats and tracks). In the event of the detection of exotic species, appropriate control works are to be scheduled as required as set out below.

Exotic flora

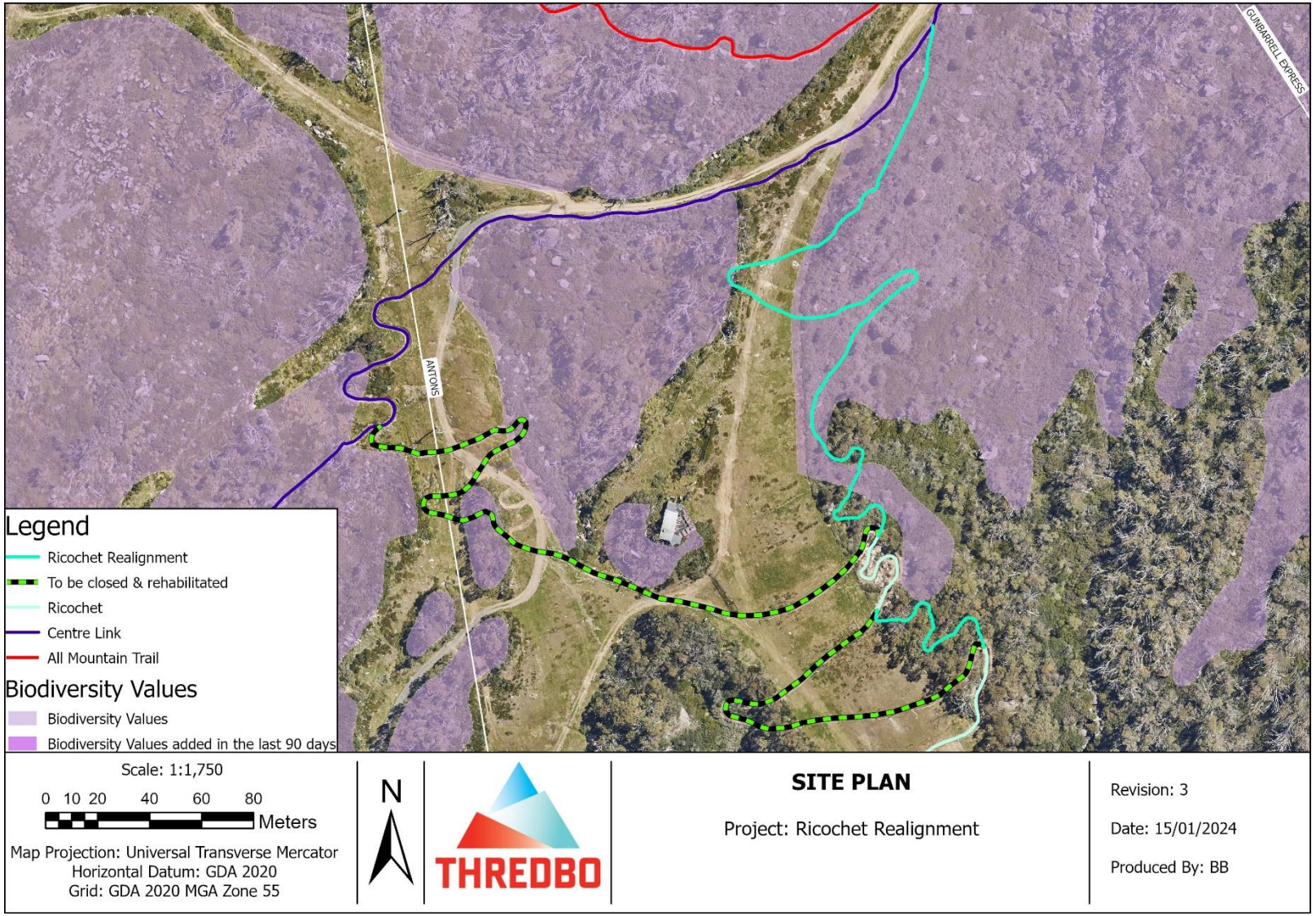
The control of exotic flora is to be undertaken using either spot spraying or hand removal techniques. The spraying activities are to be undertaken using appropriate herbicide for the species being treated and techniques for the conditions on the day. All control activities are to be undertaken prior to plant seed set.

Exotic fauna

The control of exotic fauna is to be undertaken in cooperation with NPWS as a resort wide program targeting the control of cats, foxes and rabbits. The cat and fox trapping program is undertaken by KT during the winter months in the village and on the lower slopes of the resort. Rabbit control programs are conducted in autumn and spring by KT staff also targeting these areas. Feral deer, cat, fox and dog control is undertaken by NPWS outside of the KT lease area.

4 Appendices

4.1 Appendix 1 – Development Area Map



4.2 Appendix 2 – Rehabilitation Species

The following species have been selected from the publication "Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park (NPWS 2007)" and also known to be present in the development area as per the Flora and Flora Assessment conducted by Ryan Smithers, Senior Ecologist, Eco Logical Australia. The table represents some of the recommended species for revegetation activities within Thredbo Resort at the development site altitude.

Rehabilitation Species – The Glades Area (1705m – 1790m)

Form	Species	Common Name
Forbs		
	Acaena novae-zelandia	Bidgee-widgee
	Asperula gunnii	Mountain Woodruff
	Celmisia pugionformis	Dagger-leaf Celmisia
	Leptorhynchos squamatus	Scaly Buttons
	Microseris lanceolata	Native Dandelion
	Senecio gunnii	Gunn's Groundsel
	Stellaria pungens	Starwort
Grasses		
	Poa ensiformis	Puple-sheathed Tussock-grass
	Poa fawcettiae	Smooth-blue Snow-grass
Shrubs		
	Baeckea gunniana	Alpine Baeckea
	Bossiaea foliosa	Small Leaved Bossiaea
	Grevillea australis	Alpine Grevillea
	Hovea montana	Alpine Hovea
	Olearia phlogopappa	Dusty Daisy-bush
	Ozothamnus secundifloris	Cascade Everlasting
	Ozothamnus hookeri	Kerosene Bush
	Podocarpus lawrencei	Mountain Plum-pine
	Prostanthera cuneata	Alpine Mint-bush
	Tasmannia xerophila	Alpine Pepper
Trees		
	Eucalyptus pauciflora	Snow Gum