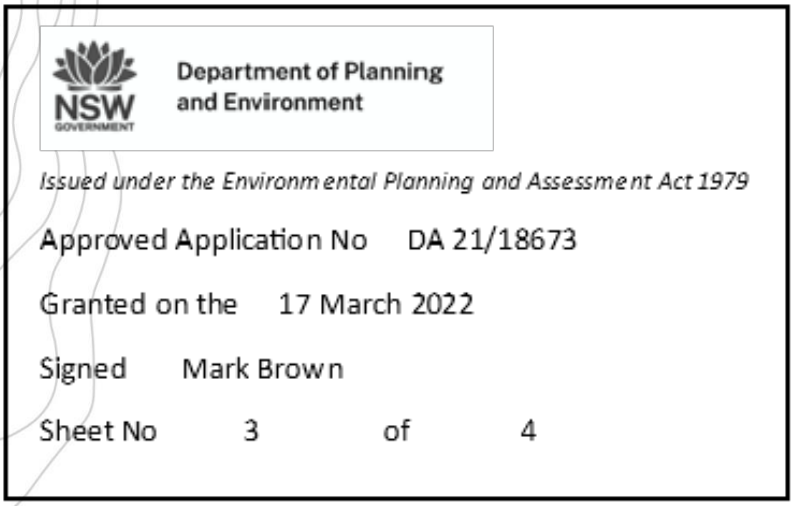
Replacement of Uphill Line, Blaxland and Wentworth T-bars, Perisher Ski Resort
Biodiversity Development Assessment Report

Perisher Blue Pty Ltd



ecological AUSTRALIA
A TETRA TECH COMPANY

1300 646 131
www.ecoaus.com.au

DOCUMENT TRACKING

Project Name	Replacement of Uphill Line, Blaxland and Wentworth T-bars, Perisher Ski Resort
Project Number	18394
Project Manager	Ryan Smithers
Accredited Assessor Certification	
Prepared by	Ryan Smithers
Reviewed by	Frank Lemckert
Approved by	Ryan Smithers
Status	**Final**
Version Number	**4**
Last saved on	**3 March 2022**

This report should be cited as 'Eco Logical Australia 2021. *Replacement of Uphill Line, Blaxland and Wentworth T-bars, Perisher Ski Resort*. Prepared for Perisher Blue Pty Ltd.'

ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd with support from Perisher Blue Pty Ltd

Template 2.8.1

Executive Summary

Eco Logical Australia Pty Ltd was engaged by Perisher Blue Pty Ltd to prepare a BDAR for the proposed replacement of the existing "uphill line" which services the Blaxland and Wentworth T-bars in the Centre Valley area of Perisher Ski Resort.

Some of the native vegetation within the development site is mapped on the Biodiversity Values map. 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).

The development footprint is approximately 0.25 ha in size. The proposed development has been located to take advantage of existing disturbed areas and minimize the required disturbance. As a result, it is anticipated that the proposal will involve the further modification of only 0.16 ha of native vegetation.

The development footprint supports two Plant Community Types (PCT) PCT 637 Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion and PCT 643 Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion. Both are considered to be in moderate condition within the development footprint. PCT 637 is considered to comprise 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 also comprises the *Alpine Sphagnum Bogs and Associated Fens* EEC (hereafter referred to as the Alpine Sphagnum Bogs and Associated Fens) which is listed as an EEC on 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), as occurring within 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) and *Cyclodomorphus praealtus* (Alpine She-oak Skink). Despite targeted surveys, no evidence of *Liopholis guthega* (Guthega Skink) was detected within the development site or immediate surrounds. The development site was found to support an estimated ten individuals of the threatened plant, *Ranunculus anemoneus* (Anemone Buttercup). The endangered *Rytidosperma vickeryae* (Perisher Wallaby Grass) was detected at two locations within the proposed works and the proposal design was subsequently altered to avoid these locations and any impacts on the species.

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 three ecosystem credits and 28 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.

Contents

List of Figures

List of Tables

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
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DPIE	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
NSW	New South Wales
NOW	NSW Office of Water
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 28278. 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 in the Centre Valley area of Perisher Ski 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 the replacement of the existing "uphill line" which services the Blaxland and Wentworth T-bars (the "Duplex T-bar"). The uphill line acts as the safety circuit for the T-bar. The existing uphill line is old and not consistent with contemporary safety standards. The proposed new line will follow the alignment and disturbance corridor associated with the existing uphill line, with deviations in the lower parts to avoid two small patches of *Rytidosperma vickeryae* (Perisher Wallaby Grass), which were detected during the assessment for this report.

The proposed works will be undertaken with a small rubber-tracked 6-tonne excavator to minimise disturbance. The excavator will access the site from the top, off the existing Centre Valley access road, and do a single downhill pass of the project site. Egress will be via the existing Leichhardt access road at the bottom of the T-bars.

The proposed works will result in a disturbance footprint up to 4.5 m wide. The trench will be 300 mm wide by 500 mm deep with three 50 mm conduits and one 150 mm conduit for easy repairs of any future faults without the need for excavation.

The proposed works are expected to be completed over a five-day period and to affect 0.16 ha of native vegetation, much of which is already disturbed. The works will include the progressive reinstatement of excavated material using the sod replacement technique and post construction rehabilitation.

The proposal is further identified in Figure 3 and Photo 1 – Photo 6. The proposal is further described in the Statement of Environmental Effects (SEE) which has been prepared (Perisher Blue 2021).

1.3. Development site footprint

It is anticipated that the proposed development will result in the further disturbance of 0.16 ha of native vegetation, parts of which are already heavily modified. Approximately 0.09 ha of existing roads and exotic grassland will also be disturbed in association with the proposed works.

The development site footprint is identified in Figure 2.

Photo 1: The replacement line will follow the alignment of the existing uphill line, with the exception of a deviation near the bottom to avoid two patches of Perisher Wallaby Grass.

Photo 2: The lateral to the lift operators hut near the top of the development site will traverse exotic grassland.

Photo 3: The proposed works will be largely in already disturbed vegetation. The abundance of Sphagnum moss, as evidenced by the light colouring beneath the T-bar, is a result of the removal of bog shrubs associated with previous excavations, including for the original installation of the uphill line.

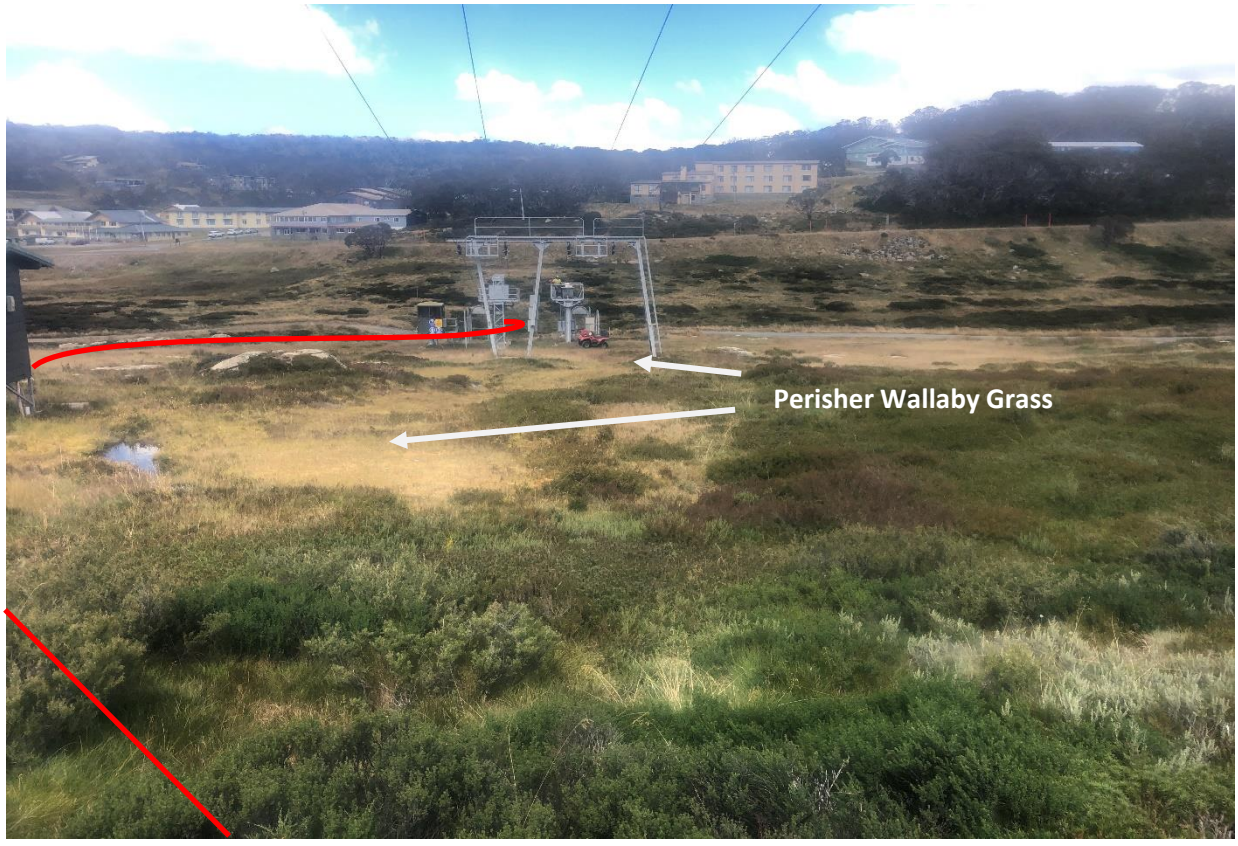


Photo 4: The alignment will be modified to avoid two patches of Perisher Wallaby Grass that are growing in disturbed bog beneath the T-bar.

Photo 5: The lower patch of Perisher Wallaby Grass as indicated by the pink flagging tape. The site is heavily disturbed.

Photo 6: The lowest parts of the development site support exotic grassland.

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		
SEPP Alpine Resorts - Kosciuszko National Park—Alpine Resorts	State Environmental Planning Policy (Kosciuszko National Park—Alpine Resorts) 2007 (SEPP 73) identified the Minister for Planning as the determining authority for development within the NSW Alpine Resorts. SEPP 73 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 Planning, Industry and Environment (DPIE).	-
Snowy River Shire Local Environment Plan 2013	The subject site is zoned E1 National Parks and Nature Reserves under the Snowy River Shire Local Environment Plan 2013.	-

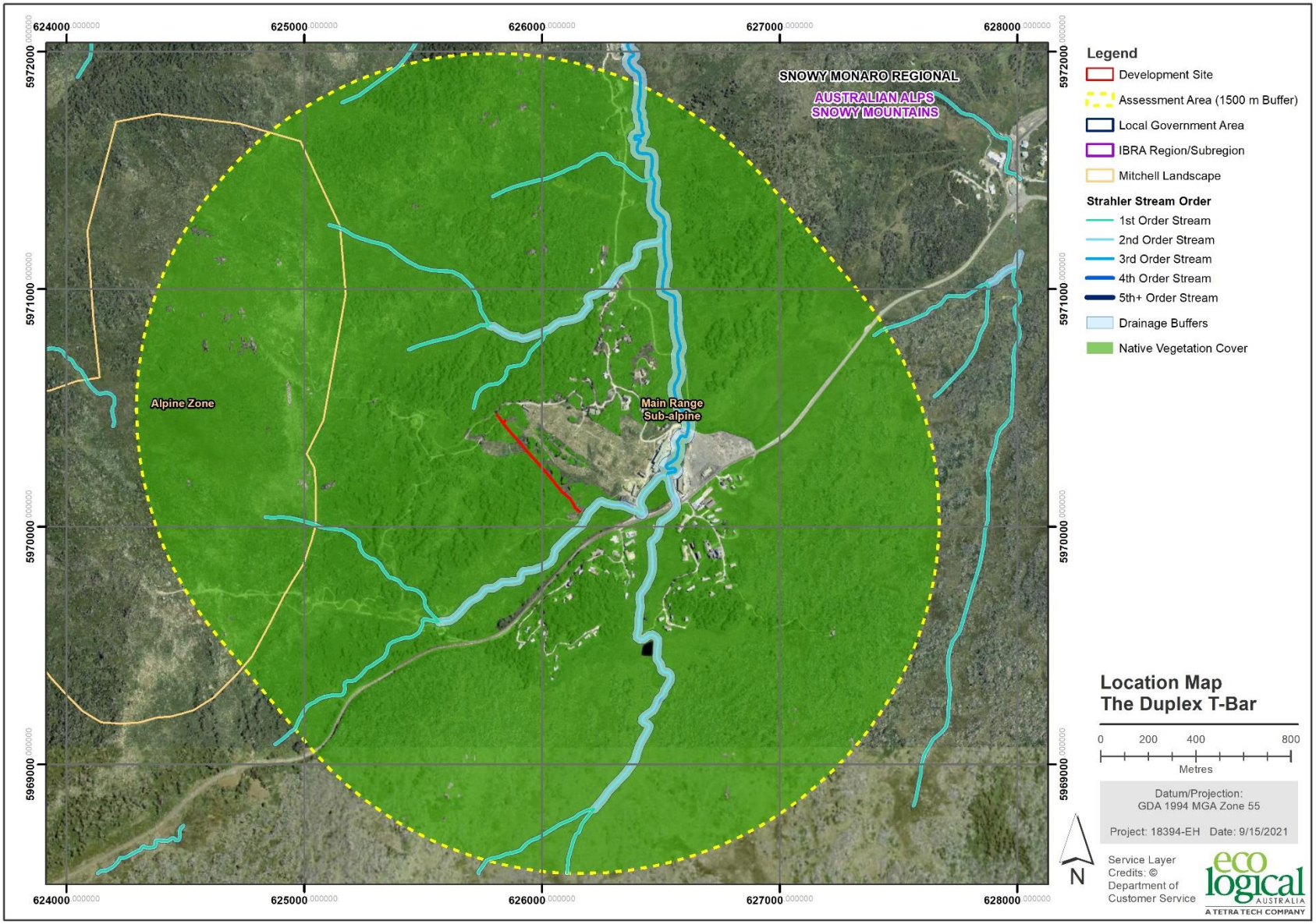


Figure 1: Location map

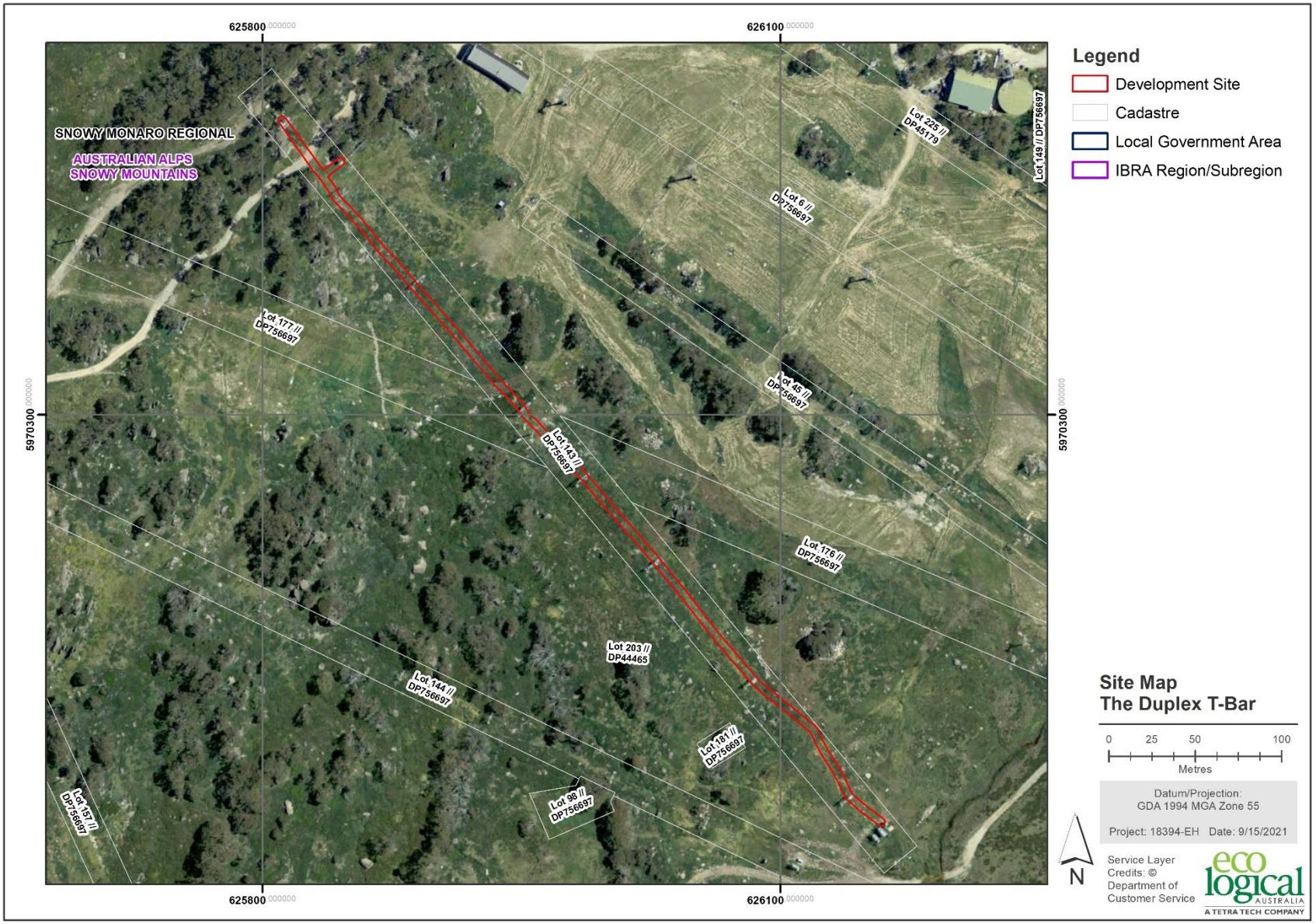


Figure 2: Site map

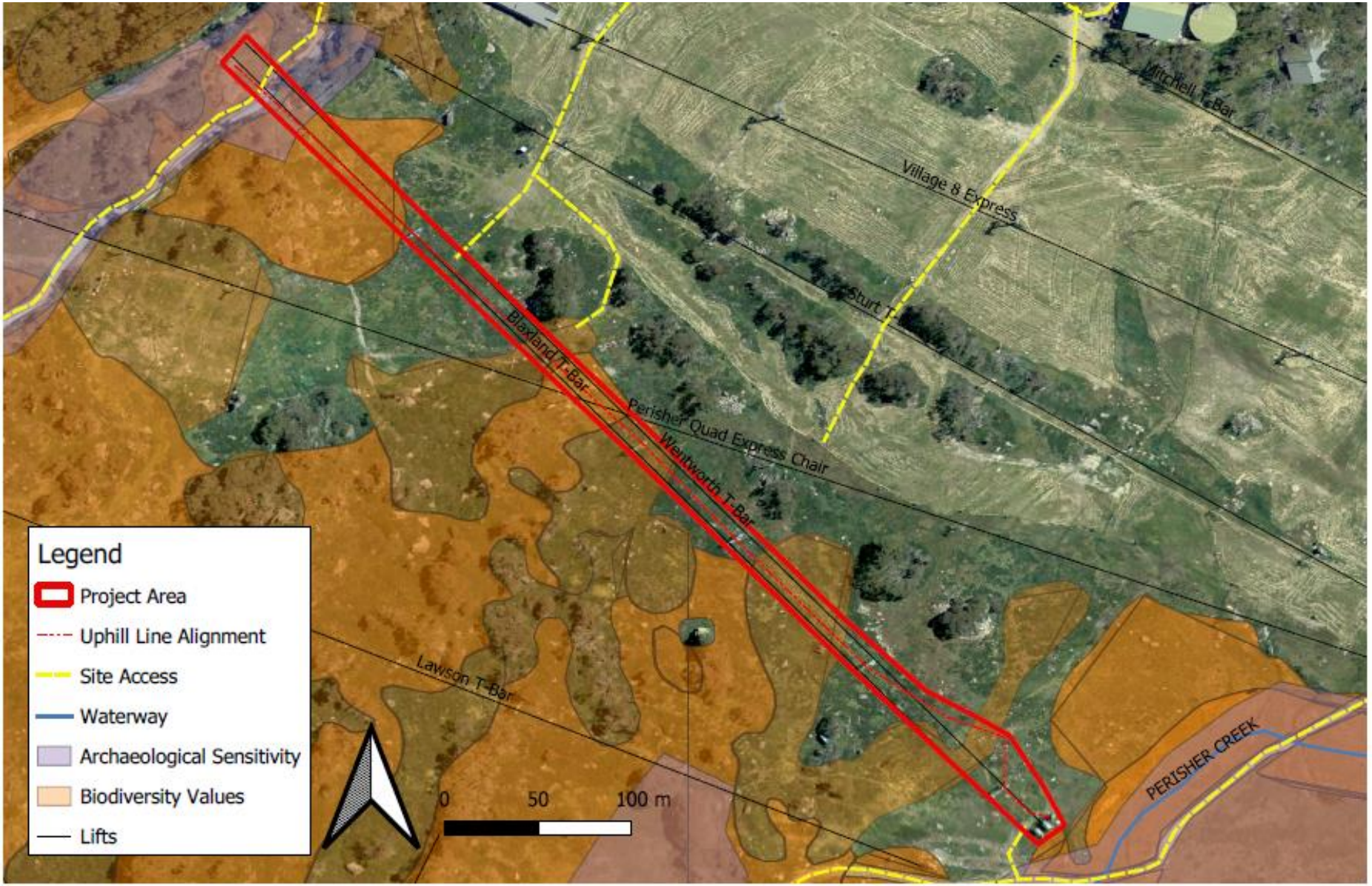


Figure 3: The proposal (as identified in the SEE)

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 Perisher Creek.	Minor unmapped watercourses that are tributaries of Perisher 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	95	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 10 March 2021.

A total of two full-floristic vegetation plots were surveyed to identify Plant Community Types (PCTs) and Threatened Ecological Communities (TECs) on the development site (Table 3). A total of two vegetation integrity survey plots were 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
637	Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion	1
643	Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion	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

Two PCTs were identified within the development site as shown in Table 3. Further detail with respect to the PCTs identified within the development site is presented in Table 4, and their distribution identified in Figure 4.

Table 4: Plant Community Types

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Area within the development site (ha)	Percent cleared
637	Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion	Alpine Bogs and Fens	Alpine Complex	0.09	5
643	Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion	Alpine Heaths	Alpine Complex	0.07	0

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
637	Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion	-
643	Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion	645

3.4. Threatened Ecological Communities

PCT 637 is considered to comprise 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 also comprises 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, as identified in Table 6 and Figure 6.

Table 6: Threatened Ecological Communities

PCT ID	BC Act			EPBC Act		
	Listing status	Name	Area (ha)	Listing status	Name	Area (ha)
637	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	0.09	Endangered	Alpine Sphagnum Bogs and Associated Fens	0.09

3.5. Vegetation integrity assessment

3.5.1. Vegetation zones

Two vegetation zones were identified within the development site based on the broad condition states of PCT 637 and 643, as shown in Figure 5. A total of two vegetation integrity survey plots were collected on the development site, which is consistent with the BAM (Table 7). Descriptions of vegetation zones are provided in Table 8 and Table 9**.**

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 10.

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	637	Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion	Moderate	0.09	101	1	1
2	643	Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion	Moderate	0.07	101	1	1
			Total	0.16	101	2	2

Table 8: Zone 1 PCT 637 Moderate Condition

637 - Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion			
Vegetation formation	Alpine Complex		
Vegetation Class	Alpine Bogs and Fens		
Conservation status	Well conserved. Listed as a TEC on the BC Act or EPBC Act presumably as it is considered vulnerable to the impacts of climate change, the impacts of brumbies of hydroelectric schemes.		
Description	This community is common in the locality. It is poorly described by the current PCTs and associated benchmarks which don't well describe the variety of vegetation communities covered by PCT 637 and the variation in composition and structure values within excellent condition or "benchmark" occurrences of Alpine Bog, Fen and Wet Heath.		
Characteristic canopy trees	It is characteristically treeless although occasional individuals of *Eucalyptus niphophila* may occur around rocks or other micro-habitats that improve drainage.		
Characteristic mid-storey	*Baeckea* spp.		
Characteristic groundcovers	*Empodisma minus, Richea continentis, Sphagnum* sp.*, Stylidium graminifolium, Carex gaudichaudiana, Carpha nivicola, Astelia psychrocharis, Aciphylla simplicifolia, Oreobolus distichus, Carex echinata, Cotula alpina, Ranunculus gunnianus, Ranunculus graniticola, Celmisia spp., Poa costiniana, Trisetum spicatum, Rytidosperma nivicola, Deyeuxia crassiuscula, Luzula modesta, Chionochloa frigida.*		
Mean native richness	26		
Exotic species / HTW cover	*Achillea millefolium*, *Agrostis capillaris*, *Festuca rubra* subsp. *rubra*		
Condition	Moderate		
Variation and disturbance	The zone is impacted by the historic disturbance associated with the existing uphill line and other disturbances.		
No. sites sampled	1		
Threatened flora species	Perisher Wallaby Grass and *Ranunculus anemoneus* (Anemone Buttercup)		
Fauna habitats	Limited. Minor shelter and foraging resources for reptiles, amphibians and mammals such as the Broad-toothed Rat.		
Composition	**Structure**	**Function**	**Vegetation Integrity Score**
80.8	37.6	-	55.1

Table 9: Zone 2 PCT 643 Moderate Condition

643 - Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion			
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. It is poorly described by the current PCTs and associated benchmarks which don't well describe the variety of vegetation communities covered by PCT 643 and the variation in composition and structure values within "benchmark" occurrences.		
Characteristic canopy trees	It is characteristically treeless although occasional individuals of *Eucalyptus niphophila* may occur.		
Characteristic mid-storey	*Grevillea australis, Ozothamnus cupressoides*, *Prostanthera cuneata, Nematolepis ovatifolia, Ozothamnus secundiflorus, Ozothamnus alpinus, Olearia phlogopappa, Orites lancifolius, Oxylobium ellipticum, Podocarpus lawrencei.*		
Characteristic groundcovers	*Acaena novae-zelandiae, Asperula gunnii, Carex breviculmis, Lycopodium fastigiatum, Pimelea alpina, Poa fawcettiae, Polystichum proliferum, Senecio gunnii.*		
Mean native richness	27		
Exotic species / HTW cover	*Acetosella vulgaris, Achillea millefolium, Agrostis capillaris, Festuca rubra subsp. rubra*		
Condition	Moderate condition		
Variation and disturbance	The community is in moderate condition within the development site with varying degrees of weediness as a result of historic disturbances.		
No. sites sampled	1		
Threatened flora species	Anemone Buttercup		
Fauna habitats	Habitat for the Guthega Skink and Broad-toothed Rat.		
Composition	**Structure**	**Function**	**Vegetation Integrity Score**
55.6	48	-	51.7

Table 10: 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	637	Moderate	0.09	80.8	37.6	-	No	55.1
2	643	Moderate	0.07	55.6	48	-	No	51.7

3.6. Use of local data

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

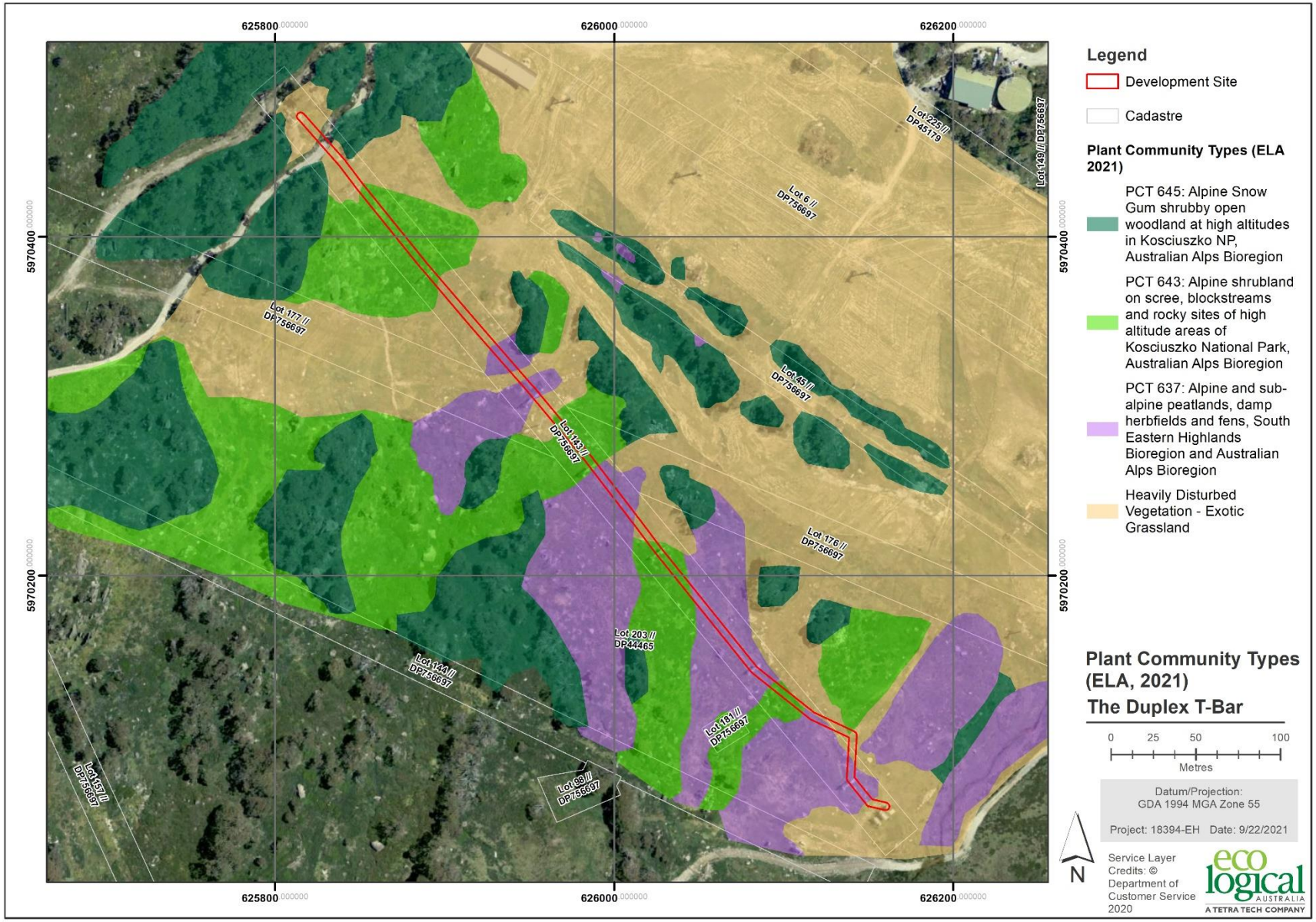


Figure 4: Plant Community Types

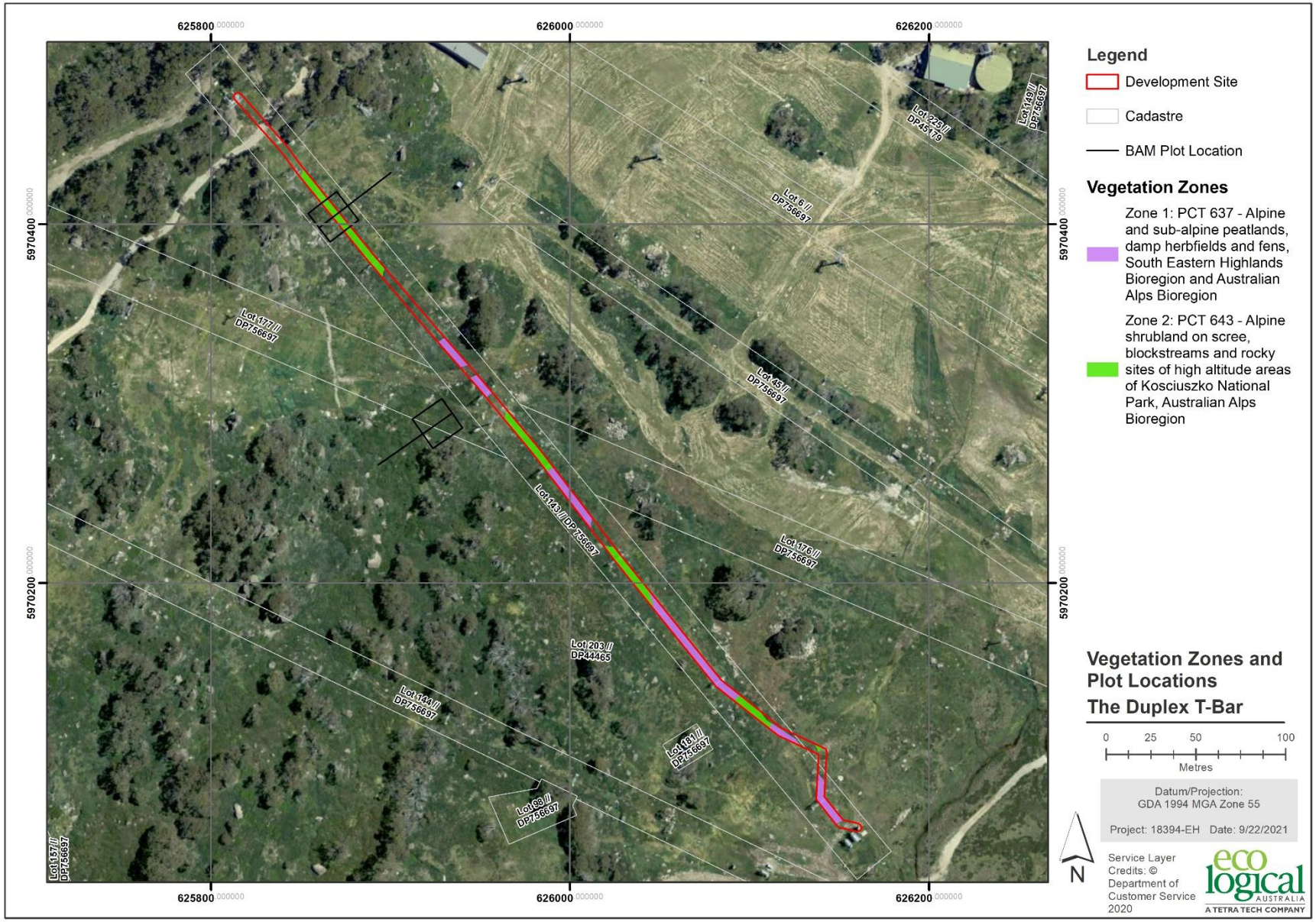


Figure 5: Vegetation Zones and Plots

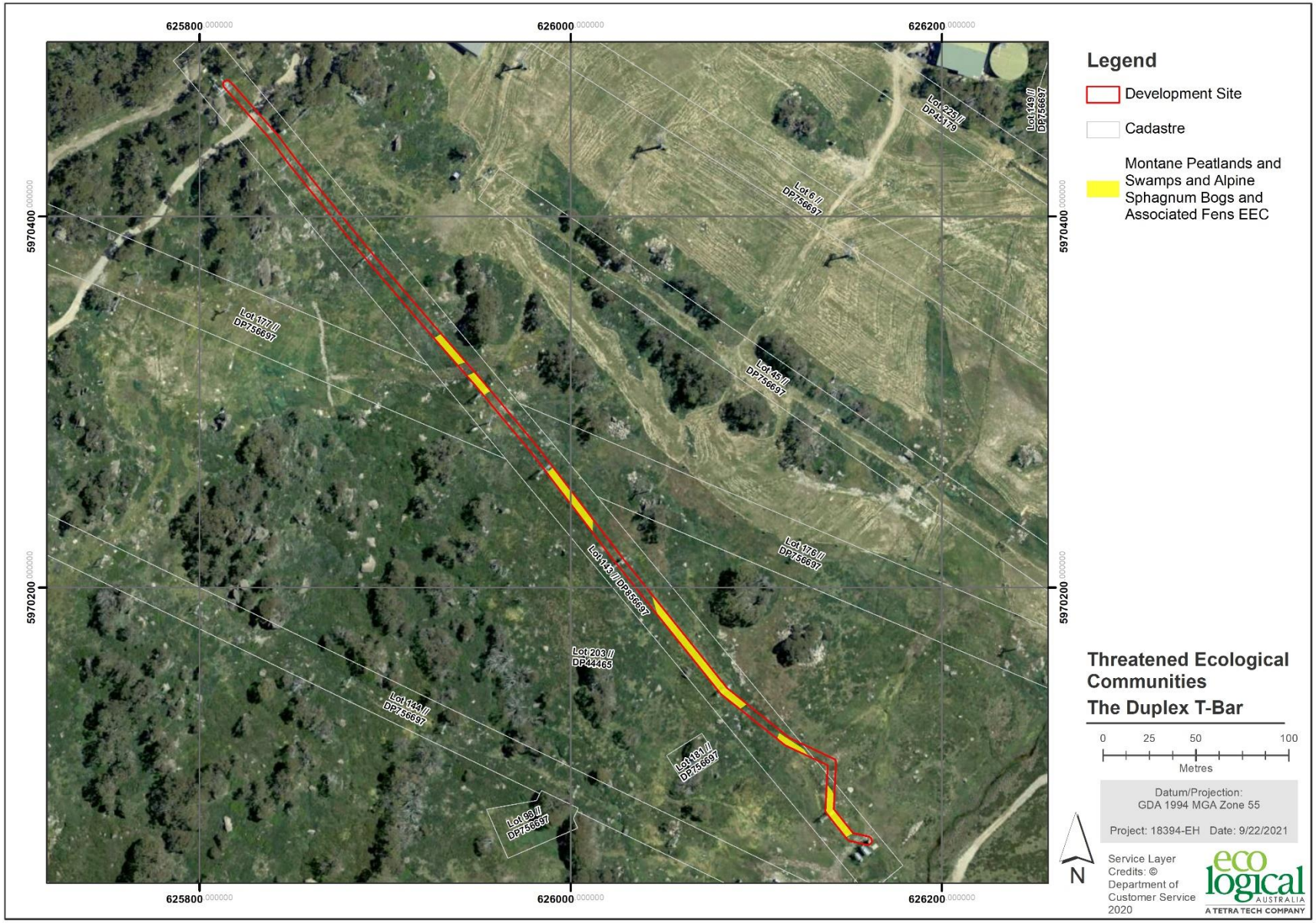


Figure 6: Threatened ecological communities

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 11.

Table 11: 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
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

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 12. Four additional species credit species were added as candidate species, *Liopholis guthega* (Guthega Skink), *Mastacomys fuscus* (Broad-toothed Rat), *Cyclodomorphus praealtus* (Alpine She-oak Skink), and Anemone Buttercup, as they are well known from the Centre Valley area or similar habitats nearby.

4.2.2. Candidate species requiring further assessment

Six species credit species required further assessment following site survey to assess the condition of the development site and the presence of microhabitats; Guthega Skink, Broad-toothed Rat, *Euphrasia scabra* (Rough Eyebright), Perisher Wallaby-grass, Alpine She-oak Skink and Anemone Buttercup.

Table 12: Candidate species credit species

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status
Alpine She-oak Skink	*Cyclodomorphus praealtus*	-	-	High	Endangered	Endangered
Rough Eyebright	*Euphrasia scabra*	-	-	High	Endangered	Not Listed
Guthega Skink	*Liopholis guthega*	Granite substrate and decomposing granite soils Rocky areas including sub-surface boulders	-	High	Endangered	Endangered
Broad-toothed Rat	*Mastacomys fuscus*	-	-	High	Vulnerable	Vulnerable
Smoky Mouse	*Pseudomys fumeus*	-	-	High	Critically Endangered	Endangered
Northern Corroboree Frog	*Pseudophryne pengilleyi*	-	above 700 m asl	Moderate	Critically Endangered	Critically Endangered
Blue-tongued Greenhood	*Pterostylis oreophila*	-	-	High	Critically Endangered	Critically Endangered
Perisher Wallaby-grass	*Rytidosperma vickeryae*	-	-	High	Endangered	Not Listed
Anemone Buttercup	*Ranunculus anemoneus*	Treeless vegetation above 1000 m in altitude	Above 1400 m	High	Vulnerable	Vulnerable

4.2.3. Assessment of habitat constraints and vagrant species

Justification for the exclusion of other candidate species credit species is provided in Table 13.

Table 13: 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
Rough Eyebright	*Euphrasia scabra*	Endangered	Not Listed	High	The species was not detected within the development site or immediate surrounds despite targeted surveys.
Smoky Mouse	*Pseudomys fumeus*	Critically Endangered	Endangered	High	There are no recent records of Smoky Mouse in the locality or evidence of a local population despite considerable survey effort in the locality in recent decades. The species has recently been detected in the northern parts of Kosciuszko National Park in Mountain Gum – Snow Gum forests. It is considered highly unlikely that the species would occur within the development site given its small size, the rarity of the Smoky Mouse and the nature of the habitats there.
Northern Corroboree Frog	*Pseudophryne pengilleyi*	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.
Blue-tongued Greenhood	*Pterostylis oreophila*	Critically Endangered	Critically Endangered	High	In NSW the Blue-tongued Greenhood is known from a few small populations within Kosciuszko National Park and a population of about 40 plants (possibly now extinct) in Bago State Forest and adjoining Crown Leases south of Tumut. It is considered highly unlikely that it would occur in the marginal potential habitat within the development site and has not been recorded in the locality despite extensive flora surveys over many decades.
Perisher Wallaby-grass	*Rytidosperma vickeryae*	Endangered	Not Listed	High	The species was detected within the development site during targeted surveys and the development has been designed to avoid the locations where the species occurs.

4.3. Targeted surveys

The streamlined assessment method only requires targeted surveys for candidate SAII species. The development site does not provide suitable habitat for some of the candidate species credit species that are candidate SAII species; Northern Corroboree Frog, Smoky Mouse and Blue-tongued Greenhood. However, there is potential habitat for Perisher Wallaby Grass and the Rough Eyebright. Surveys were undertaken for these species. Targeted surveys were also undertaken for the Guthega Skink as it is well known from the Centre Valley area and to ensure the proposed development avoids and minimises impacts as far as is possible.

Targeted surveys for relevant threatened species known from locality were undertaken within the development site and immediate surrounds on the dates outlined in Table 14. Weather conditions during the targeted surveys are outlined in Table 15 and survey effort is outlined in Table 16.

Table 14: Targeted surveys

Date	Surveyors	Target species
10 March 2021	Ryan Smithers	Guthega Skink, Broad-toothed Rat, Perisher Wallaby Grass, Rough Eyebright, and Anemone Buttercup
29 March 2021	Ryan Smithers	Guthega Skink, Broad-toothed Rat, Perisher Wallaby Grass, Rough Eyebright, and Anemone Buttercup

Table 15: Weather conditions

Date	Rainfall (mm)	Minimum temperature 0^C	Maximum temperature 0^C
10 March 2021	-	8	15
29 March 2021	-	11	12

Table 16: Survey effort

Method	Habitat (ha)	Stratification units	Total effort	Target species
Target Searches	Approx. 1 ha	Suitable habitats within and immediately surrounding the development site	4.25 person hours	Guthega Skink and Broad-toothed Rat
Targeted threatened flora searches	Approx. 1 ha	Suitable habitats within and immediately surrounding the development site	2 person hours	Perisher Wallaby Grass, Rough Eyebright, and Anemone Buttercup

The targeted surveys resulted in the detection of three species credit species; the Broad-toothed Rat, Perisher Wallaby Grass and 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. The Anemone Buttercup was detected in the central parts of the development site. The number of Anemone Buttercup individuals within the development site was estimated as ten.

Perisher Wallaby Grass was detected in two locations in the lower parts of the development site. A total of 12 plants were estimated to be present in disturbed bog beneath the T-bar. The design of the proposal and the location of the development site was adjusted to ensure that the patches of Perisher Wallaby Grass will not be affected.

The Guthega Skink was not detected within the development site or immediate surrounds despite three sessions (on two separate days) of targeted survey. The Guthega Skink is known from approximately 100 m to the south of the development site however it is considered unlikely that the species would occur within the development site. This is because the species was not detected on the development site, despite targeted surveys for this assessment, and the generally unsuitable or marginal nature of the habitats within the development site, given the dominance of wet habitats and the level of disturbance. However, given the their cryptic nature, on the basis of advice from NPWS, both the Guthega Skink and the Alpine She-oak Skink have been assumed to be present within the drier parts of the development site that support native vegetation.

Following completion of field surveys, the species credit species included in the assessment are outlined in Table 17.

Table 17: Species credit species included in the assessment

Species	Common Name	Species presence	Geographic limitations	Habitat (ha) / count	Biodiversity Risk Weighting
Alpine She-oak Skink	*Cyclodomorphus praealtus*	Assumed	-	0.07	2
Guthega Skink	*Liopholis guthega*	Assumed	-	0.07	2
Broad-toothed Rat	*Mastacomys fuscus*	Yes	-	0.16 ha	2
Anemone Buttercup	*Ranunculus anemoneus*	Yes	Other Treeless vegetation above 1000 m in altitude Above 1400 m	10 individuals	2

4.3.1. Species credit species included in the assessment

Four species credit species, the Alpine She-oak Skink, Guthega Skink, Broad-toothed Rat and Anemone Buttercup, have been included in the assessment as the proposed development will impact on known or potential habitat for these species. A species polygon for the Alpine She-oak Skink, Guthega Skink and Broad-toothed Rat is included as Figure 7. The location of the Perisher Wallaby Grass and Anemone Buttercup within and immediately adjacent to the development site, and historic records of the Guthega Skink, are also shown in Figure 7.

4.4. Identification of prescribed additional biodiversity impact entities

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

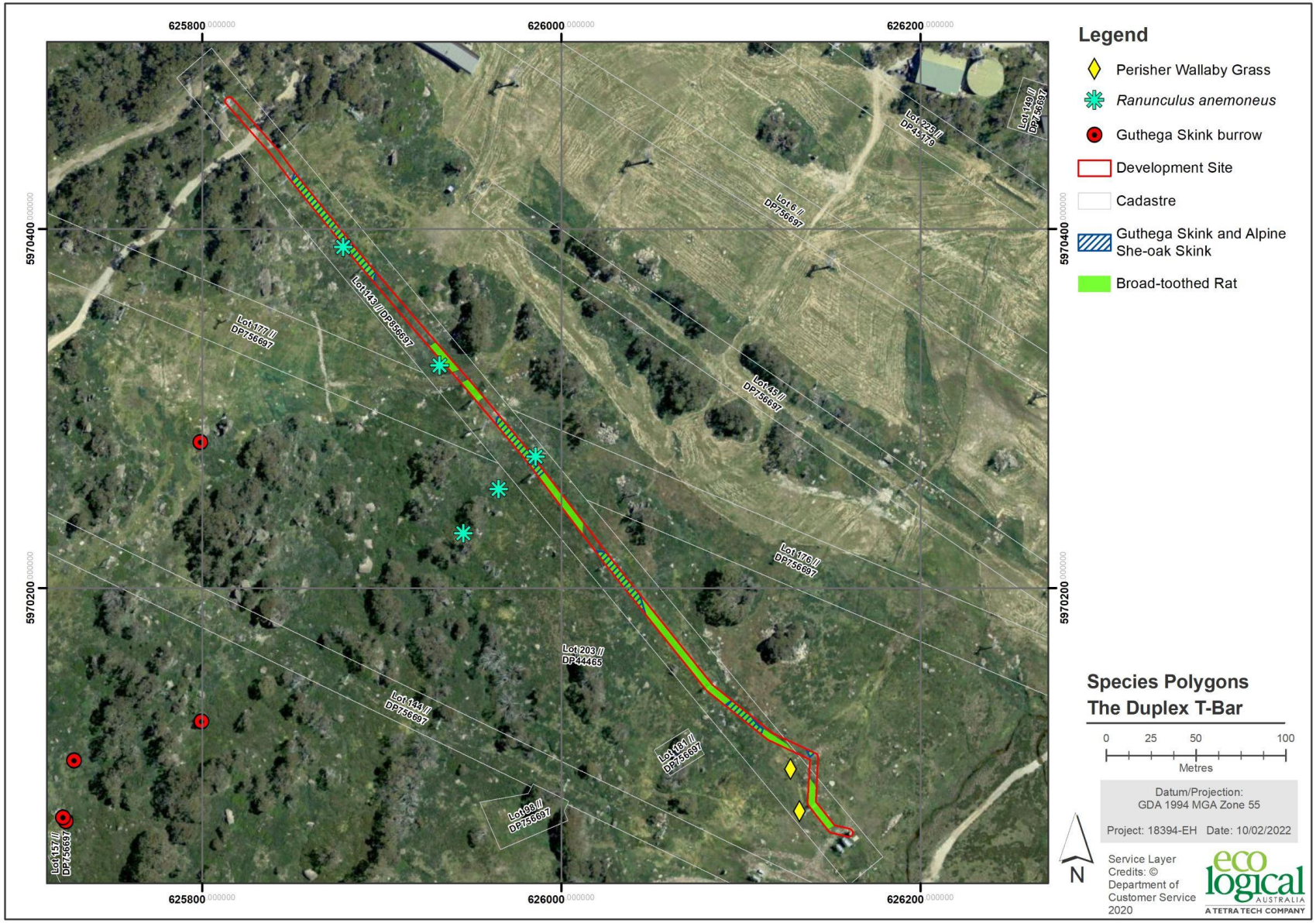


Figure 7: Species polygons

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 works in disturbed areas.
- Minimising the disturbance footprint associated with construction by utilising a small excavator.
- Changing the location of the alignment to avoid known locations of Perisher Wallaby Grass.
- Planning construction access and egress to avoid and minimise impacts on vegetation and fauna habitats.
- Marking the extent of the development site prior to the commencement of works, such that the disturbance footprint will not extend beyond the proposed footprint.
- Marking the locations of Perisher Wallaby Grass prior to the commencement of works and buffering them from the proposed works by a minimum of 5 m to ensure they are not impacted.
- Using low impact construction methods such as sod replacement.
- Undertaking post construction rehabilitation.

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 18.
- Threatened species and threatened species habitat is outlined in Table 19.
- Prescribed biodiversity impacts is outlined in Section 6.4.

Table 18: Direct impacts to native vegetation

PCT ID	PCT Name	BC Act listing	EPBC Act listing	Direct impact (ha)
637	Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion	Endangered	Endangered	0.09
643	Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion	Not listed	Not Listed	0.07

Table 19: 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
Cyclodomorphus praealtus	Alpine She-oak Skink	0.07	Endangered	Endangered
Liopholis guthega	Guthega Skink	0.07	Endangered	Endangered
Mastacomys fuscus	Broad-toothed Rat	0.16 ha	Vulnerable	Vulnerable
Ranunculus anemoneus	Anemone Buttercup	10 individuals	Vulnerable	Vulnerable

6.2. Change in vegetation integrity

The change in vegetation integrity as a result of the development is outlined in Table 20.

Table 20: Change in vegetation integrity

Veg Zone	PCT ID	Condition	Area (ha)	Current vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity
1	637	Moderate	0.09	55.1	0	-55.1
2	643	Moderate	0.07	51.7	0	-51.7

6.3. Indirect impacts

The indirect impacts of the development are outlined in Table 21. Given the nature of the proposed development, and the proposed mitigation measures, indirect impacts are only anticipated to extend a maximum of 2 m into vegetation surrounding the proposed development site. Indirect impact zones are shown on Figure 8.

6.4. Prescribed biodiversity impacts

The proposal does not involve any prescribed biodiversity impact.

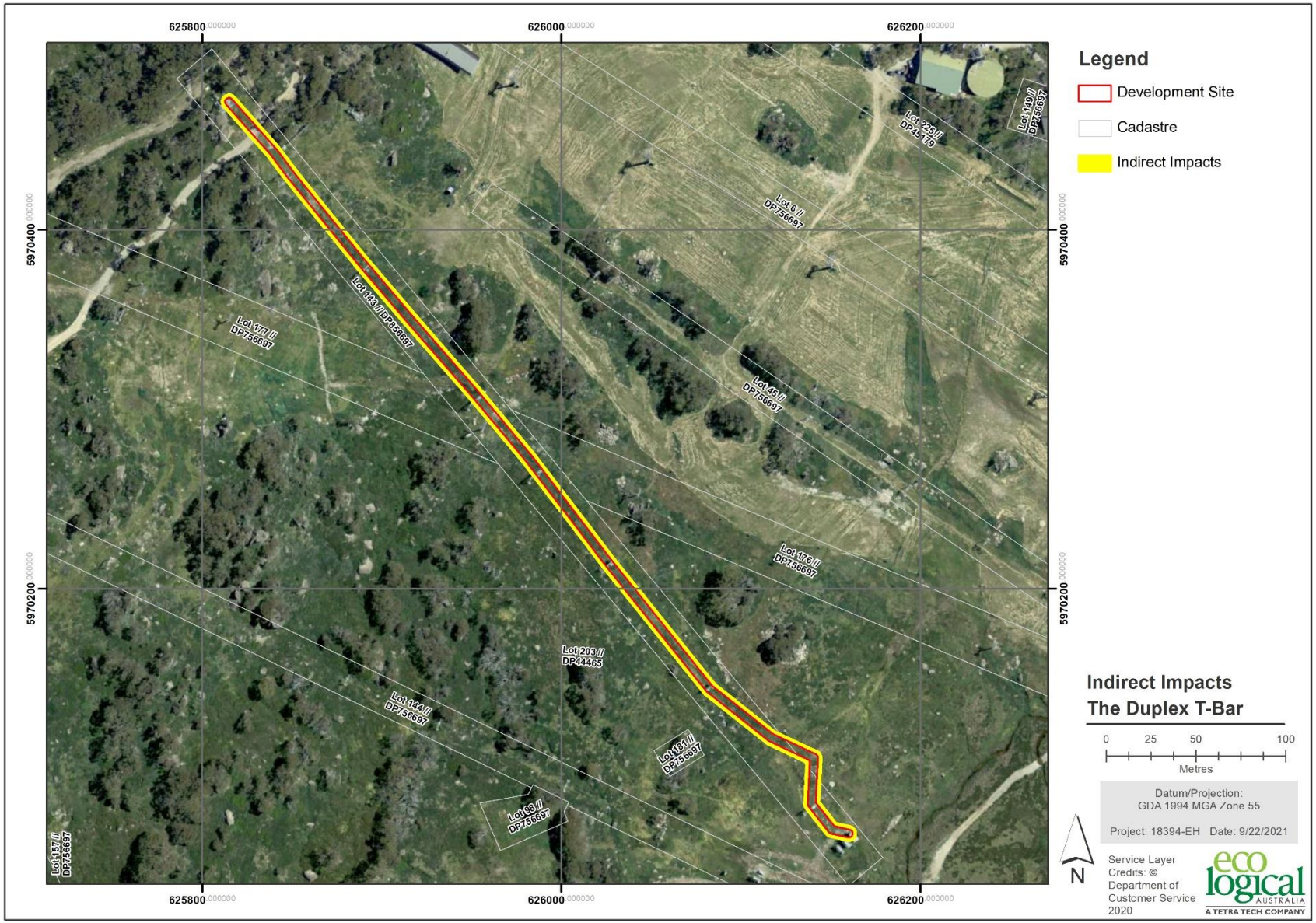


Figure 8: Indirect impact zones

Table 21: 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 Perisher 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 Perisher 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	Minor. It is considered unlikely that any threatened flora species adjacent to the development site will be affected. Measures have been incorporated to avoid and protect known threatened flora occurrences adjacent to the development site.	Minor	Not expected	During construction	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 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 22.

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 22: Measures proposed to mitigate and manage impacts

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Displacement of resident fauna	Low	Low	None proposed.	NA	NA	NA
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	Medium	Low	The location of the Perisher Wallaby Grass patches are to be marked prior to construction. The Perisher Wallaby Grass patches are buffered from the proposed works by a minimum of 5 m. The proposed excavation is to be undertaken using the sod replacement technique. Any plants of Anenome Buttercup that are impacted by the proposed works will be transplanted use the sod replacement technique and watered over the summer period where necessary. Any trenches that are left open overnight are to have plants of wood or the like placed in them to enable fauna to exit the trench. Open trenches are to be inspected in the morning for fauna and any fauna that are trapped are to be released into adjacent areas.	The Perisher Wallaby Grass locations are clearing marked and avoided and buffered from the proposed works. Vegetation impacts mitigated by use of the sod replacement technique. Impacts on the Anenome Buttercup reduced. Impacts on fauna mitigated.	Prior to construction	Perisher
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 paint and/or flagging tape the alignment of the excavation, prior to construction. Tape off native vegetation adjacent to the development site as “no go” areas.	Risk of disturbance beyond proposed disturbance corridor is reduced.	Prior to construction	Perisher

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
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	Perisher
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	Perisher
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	Perisher
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 location of the Perisher Wallaby Grass patches are to be marked prior to construction and identified as “no go” areas. The Perisher Wallaby Grass patches are buffered from the proposed works by a minimum of 5 m.	The Perisher Wallaby Grass locations are clearing marked and avoided and buffered from the proposed works.	Prior to and during construction	Perisher
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 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	Perisher

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
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, particularly the buffer to the Perisher Wallaby Grass patches.	Risk of disturbance beyond proposed disturbance corridor is reduced.	Prior to and during construction as necessary	Perisher
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 Perisher rehabilitation strategies.	Post construction vegetation within the development footprint with high medium-term recovery potential.	Immediately post construction	Perisher
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 23 and shown on Figure 9. The impacts of the development requiring offset for species credit species and their habitats are outlined in Table 24 and on Figure 9.

Table 23: Impacts to native vegetation that require offsets

Vegetation Zone	PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Direct impact (ha)
1	637	Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion	Alpine Bogs and Fens	Alpine Complex	0.09
2	643	Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion	Alpine Heaths	Alpine Complex	0.07

Table 24: 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
Cyclodomorphus praealtus	Alpine She-oak Skink	0.07 ha	Endangered	Endangered
Liopholis guthega	Guthega Skink	0.07 ha	Endangered	Endangered
Mastacomys fuscus	Broad-toothed Rat	0.16 ha	Vulnerable	Vulnerable
Ranunculus anemoneus	Anemone Buttercup	10 individuals	Vulnerable	Vulnerable

7.3. Impacts not requiring offsets

All the impacts of the development on native vegetation and on the Alpine She-oak Skink, Guthega Skink, Broad-toothed Rat and Anemone Buttercup 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 10.

7.4. Areas not requiring assessment

No parts of the proposed development do not require assessment.

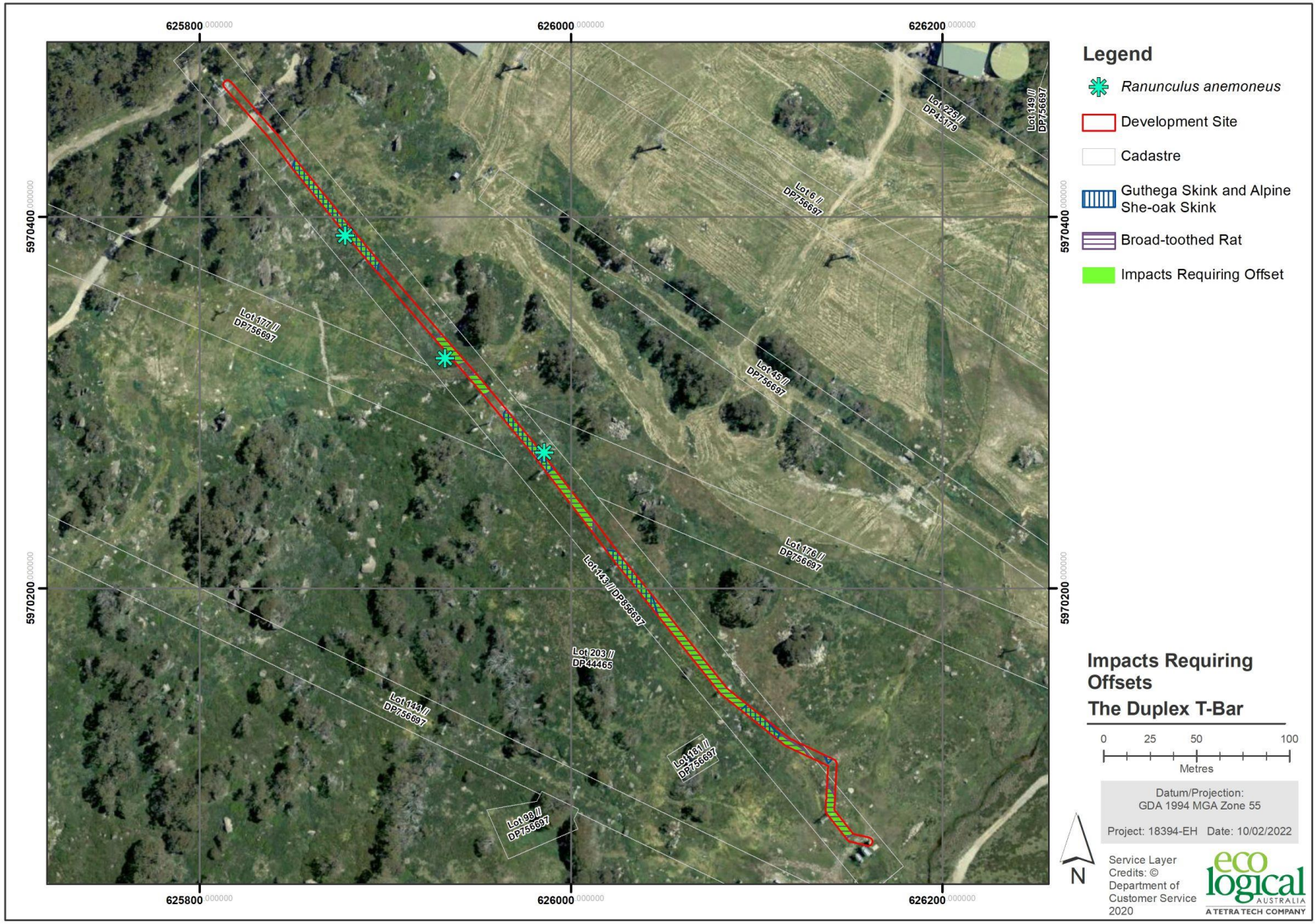


Figure 9: Impacts requiring offset

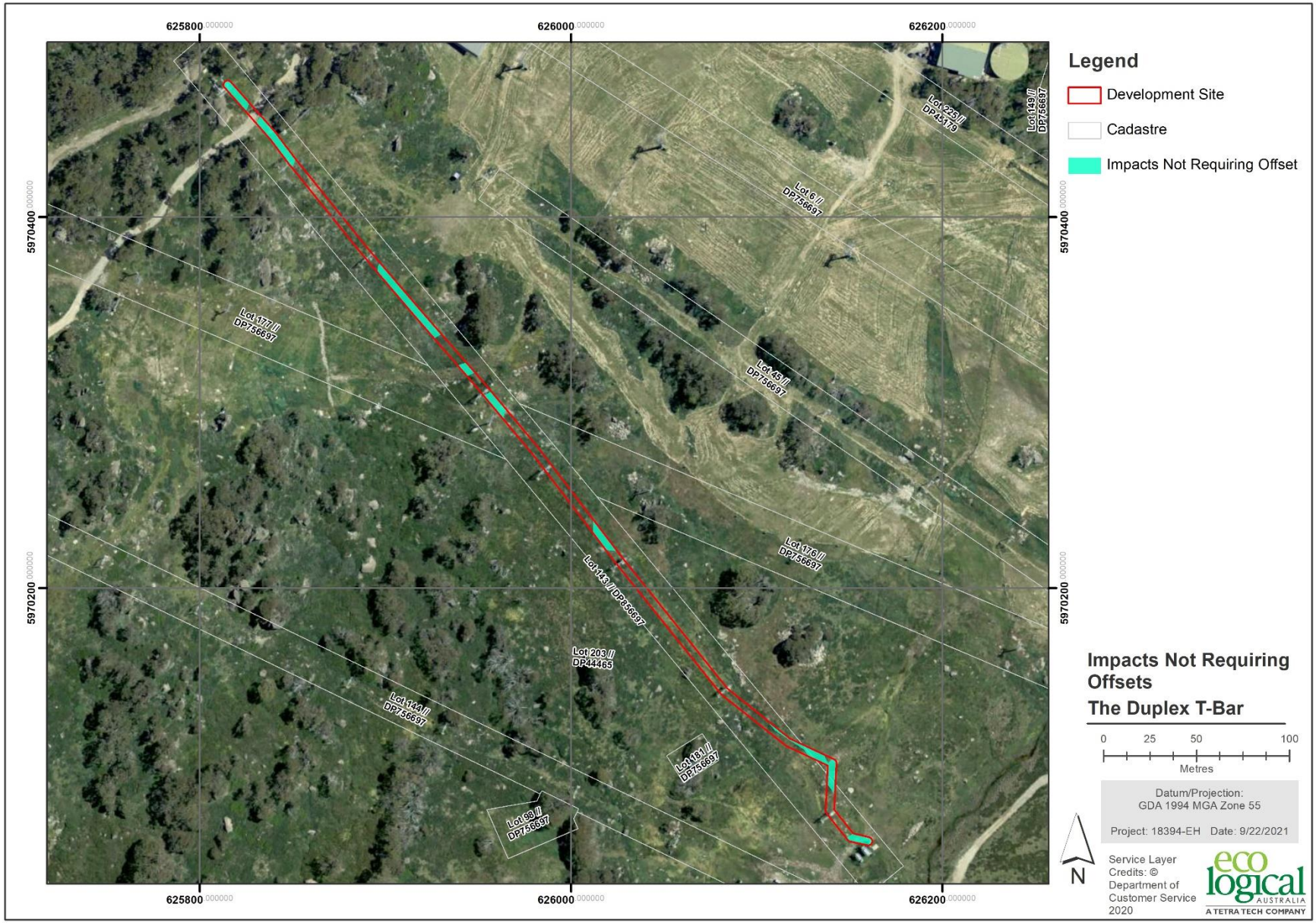


Figure 10: Impacts not requiring offset

7.5. Credit summary

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

The number of species credits required for the development are outlined in Table 26. At the time of writing, a problem with the BAMC did not enable the Anemone Buttercup to be added as a candidate species in the streamlined assessment module.

A biodiversity credit report is included in Appendix F.

Table 25: Ecosystem credits required

Vegetation Zone	PCT ID	PCT Name	Condition	Credit Class	Direct impact (ha)	Credits required
1	637	Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion	Moderate	Alpine Bogs and Fens	0.09	2
2	643	Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion	Moderate	Alpine Heaths	0.07	1

Table 26: Species credit summary

Species	Common Name	Direct impact number of individuals / habitat (ha)	Credits required
Cyclodomorphus praealtus	Alpine She-oak Skink	0.07 ha	2
Liopholis guthega	Guthega Skink	0.07 ha	2
Mastacomys fuscus	Broad-toothed Rat	0.16 ha	4
Ranunculus anemoneus	Anemone Buttercup	10 individuals	20

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:

- Alpine She-oak Skink
- Guthega Skink
- Broad-toothed Rat
- Anemone Buttercup
- Alpine Sphagnum Bogs and Associated Fens.

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 22 should be incorporated into the proposal.

10. Conclusion

Eco Logical Australia Pty Ltd was engaged by Perisher Blue Pty Ltd to prepare a BDAR for the proposed replacement of the existing "uphill line" which services the Blaxland and Wentworth T-bars in the Centre Valley area of Perisher Ski 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 three ecosystem credits and 28 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.

11. Bibliography

Cogger, H.G. 1996. *Reptiles and Amphibians of Australia*. Reed Books, Sydney

Costermans, L. 1994. *Native Trees and Shrubs of South-Eastern Australia*. Lansdowne Publishing, Sydney.

Costins, C., Gray, M., Totterdell, C., and Wimbush, D. 2000. *Kosciuszko Alpine Flora*. CSIO Publishing, Victoria.

Cropper, S.C. 1993. *Management of Endangered Plants*. CSIRO Publishing, Melbourne.

Department of Environment. 2013. *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance*. Australian Government, Canberra.

Department of Environment, Land, Water and Planning. 2016. *National Recovery Plan for the Mountain Pygmy-possum Burramys parvus*. Australian Government, Canberra.

Ecology Australia. 2002. *Kosciuszko Resorts Vegetation Assessment*. A report for Planning NSW.

Gellie, N.J.H. 2006. Native vegetation of the southern forests: South-east Highlands, Australian Alps, South-west Slopes and South-east Corner bioregions. *Cunninghamia 9, 219-254*.

Green, K. 2002. Selective predation on the broad-toothed rat, *Mastacomys fuscus* (Rodentia: Muridae), by the introduced red fox, *Vulpes vulpes* (Carnivora: Canidae), in the Snowy Mountains, Australia. *Austral Ecology 27, 353–359*.

NGH Environmental 2007. *Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park*. A report for Parks and Wildlife Division. Department of Environment and Climate Change NSW.

McDougall, K.L. & Walsh, N.G. 2007. Treeless vegetation of the Australian Alps. *Cunninghamia 10, 1-57*.

NSW Department of Environment and Conservation (DEC). 2006. *Kosciuszko National Park Plan of Management*.

NSW National Parks and Wildlife Service 2001a. *Approved Recovery Plan for the Threatened Alpine Flora Anemone Buttercup (Ranunculus anemoneus), Feldmark Grass (Erythranthera pumila), Raleigh Sedge (Carex raleighii) & Shining Cudweed (Euchiton nitidulus)*. NSW NPWS, Hurstville NSW.

NSW National Parks and Wildlife Service. 2001b. *Approved Recovery Plan for the Southern Corroboree Frog Pseudophryne corroboree*. NSW National Parks and Wildlife Service Hurstville.

NSW National Parks and Wildlife Service. 2002. *Approved Recovery Plan for the Mountain Pygmy Possum Burramys parvus*. NSW National Parks and Wildlife Service Hurstville.

NSW Office of Environment and Heritage (OEH). *2018. Perisher Wallaby Grass (Rytidosperma vickeryae) Kosciuszko National Park 2017*. NSW Office of Environment and Heritage Sydney.

NSW Scientific Committee. 2005. *Final Determination to list Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australia Alps area as an endangered ecological community*.

Perisher Blue. 2021. *Statement of Environmental Effects - Replacement of Uphill Line, Blaxland and Wentworth T-bars, Perisher Valley*.

Sato, C.F., Wood, J.T., Schroder, M., Green, K., Michael, D.R. and Lindenmayer, D. B. 2013. The impacts of ski resorts on reptiles: a natural experiment. *Animal Conservation. Doi: 10.111/acv.12095*.

Sato C.F., Wood J.T., Schroder M., Green, K., Michael, D.R., Osborne, W.S. and Lindenmayer, D.B. 2014. An experiment to test key hypotheses of the drivers of reptile distribution in subalpine ski resorts. *Journal of Applied Ecology 51, 13-22*.

Sato, C.F., Schroder, M., Green, K., Michael, D.R., Osborne, W.S. and Lindenmayer, D.B. 2014. Managing ski resorts to improve biodiversity conservation: Australian reptiles as a case study. *Ecological Management and Restoration 15(2)*.

Strahan, R. 1995. *The Australian Museum Complete Book of Australian Mammals*, Cornstalk Publishing, Sydney.

Threatened Species Scientific Committee. 2009. *Listing Advice for the Alpine Sphagnum Bogs and Associated Fens Endangered Ecological Community*.

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, Critically Endangered Ecological Communities (CEEC) 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 27: 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			Plot 2		
								Stratum & Layer	Cover	Abundance	Stratum & Layer	Cover	Abundance
Rosaceae	*Acaena* sp.	Sheep's Burr	-	-	-	-	Forb (FG)	g	0.5	50	g	0.2	10
Polygonaceae	*Acetosella vulgaris*	Sheep Sorrel	-	-	Yes	Yes		-	-	-	g	0.5	500
Asteraceae	*Achillea millefolium*	Yarrow	-	-	Yes	Yes		g	0.1	1	g	0.1	20
Apiaceae	*Aciphylla simplicifolia*	Mountain Aciphyll	-	-	-	-	Forb (FG)	g	0.1	50	-	-	-
Poaceae	*Agrostis capillaris*	Browntop Bent	-	-	Yes	Yes		g	0.1	20	g	0.3	500
Rubiaceae	*Asperula gunnii*	Mountain Woodruff	-	-	-	-	Forb (FG)	-	-	-	g	0.2	100
Myrtaceae	*Baeckea gunniana*	Alpine Baeckea	-	-	-	-	Shrub (SG)	m	25	100	-	-	-
Orchidaceae	*Caladenia alpina*	-	-	-	-	-	Forb (FG)	g	0.1	5	-	-	-
Cyperaceae	*Carex breviculmis*	-	-	-	-	-	Grass & grasslike (GG)	-	-	-	g	0.2	100
Cyperaceae	*Carex gaudichaudiana*	-	-	-	-	-	Grass & grasslike (GG)	g	1	500	-	-	-
Cyperaceae	*Carex jackiana*	-	-	-	-	-	Grass & grasslike (GG)	g	1	1000	-	-	-
Cyperaceae	*Carpha nivicola*	-	-	-	-	-	Grass & grasslike (GG)	g	0.1	20	-	-	-
Asteraceae	*Celmisia costiniana*	-	-	-	-	-	Forb (FG)	g	0.2	50	-	-	-
Asteraceae	*Coronidium scorpioides*	Button Everlasting	-	-	-	-	Forb (FG)	g	0.1	10	-	-	-
Asteraceae	*Craspedia* sp.	Billy Buttons	-	-	-	-	Forb (FG)	g	0.1	2	g	1	500
Restionaceae	*Empodisma minus*	-	-	-	-	-	Grass & grasslike (GG)	g	50	500	-	-	-
Ericaceae	*Epacris paludosa*	Swamp Heath	-	-	-	-	Shrub (SG)	m	15	100	-	-	-
Onagraceae	*Epilobium* sp.	-	-	-	-	-	Forb (FG)	-	-	-	g	0.1	5
Myrtaceae	*Eucalyptus niphophila*	-	-	-	-	-	Tree (TG)	-	-	-	g	0.1	1

Family	Species	Common Name	Listing Status	ROTAP	Exotic	High Threat Weed	Growth Form Group	Plot 1			Plot 2		
								Stratum & Layer	Cover	Abundance	Stratum & Layer	Cover	Abundance
Orobanchaceae	*Euphrasia collina* subsp. *diversicolor*	-	-	-	-	-	Forb (FG)	-	-	-	g	0.2	20
Poaceae	*Festuca rubra* subsp. *rubra*	Red Fescue	-	-	Yes	-		g	0.1	5	-	-	-
Haloragaceae	*Gonocarpus micranthus* subsp. *micranthus*	-	-	-	-	-	Forb (FG)	g	0.1	10	-	-	-
Proteaceae	*Grevillea australis*	Alpine Grevillea	-	-	-	-	Shrub (SG)	m	0.1	1	m	1	10
Fabaceae (Faboideae)	*Hovea montana*	-	-	-	-	-	Shrub (SG)	-	-	-	g	0.3	10
Asteraceae	*Hypochaeris radicata*	Catsear	-	-	Yes	-		g	0.1	5	g	0.2	100
Juncaceae	*Juncus antarcticus*	Cushion Rush	-	-	-	-	Grass & grasslike (GG)	g	0.1	20	-	-	-
Juncaceae	*Juncus falcatus*	-	-	-	-	-	Grass & grasslike (GG)	g	0.2	100	-	-	-
Lycopodiaceae	*Lycopodium fastigiatum*	Mountain Clubmoss	-	-	-	-	Fern (EG)	-	-	-	g	1	100
Violaceae	*Melicytus dentatus*	Tree Violet	-	-	-	-	Shrub (SG)	-	-	-	g	0.1	5
Rutaceae	*Nematolepis ovatifolia*	-	-	-	-	-	Shrub (SG)	-	-	-	m	1	5
Asteraceae	*Olearia phlogopappa*	-	-	-	-	-	Shrub (SG)	g	0.1	20	g	8	100
Cyperaceae	*Oreobolus distichus*	-	-	-	-	-	Grass & grasslike (GG)	g	0.2	500	-	-	-
Apiaceae	*Oreomyrrhis eriopoda*	Australian Carraway	-	-	-	-	Forb (FG)	g	0.1	50	-	-	-
Proteaceae	*Orites lancifolius*	Alpine Orites	-	-	-	-	Shrub (SG)	-	-	-	m	25	10
Fabaceae (Faboideae)	*Oxylobium ellipticum*	Common Shaggy Pea	-	-	-	-	Shrub (SG)	g	2	100	g	0.5	10
Asteraceae	*Ozothamnus alpinus*	Alpine Everlasting	-	-	-	-	Shrub (SG)	-	-	-	m	0.1	1
Asteraceae	*Ozothamnus cupressoides*	-	-	-	-	-	Shrub (SG)	g	0.1	5	-	-	-
Asteraceae	*Ozothamnus secundiflorus*	Cascade Everlasting	-	-	-	-	Shrub (SG)	-	-	-	m	10	20

Family	Species	Common Name	Listing Status	ROTAP	Exotic	High Threat Weed	Growth Form Group	Plot 1			Plot 2		
								Stratum & Layer	Cover	Abundance	Stratum & Layer	Cover	Abundance
Thymelaeaceae	*Pimelea alpina*	-	-	-	-	-	Shrub (SG)	-	-	-	g	0.1	1
Thymelaeaceae	*Pimelea axiflora* subsp. *alpina*	-	-	-	-	-	Shrub (SG)	-	-	-	m	1	20
Thymelaeaceae	*Pimelea ligustrina* subsp. *ciliata*	-	-	-	-	-	Shrub (SG)	-	-	-	g	0.1	2
Plantaginaceae	*Plantago euryphylla*	-	-	-	-	-	Forb (FG)	-	-	-	g	0.1	20
Poaceae	*Poa costiniana*	Bog Snowgrass	-	-	-	-	Grass & grasslike (GG)	g	0.5	100	-	-	-
Poaceae	*Poa fawcettiae*	Smooth Blue Snowgrass	-	-	-	-	Grass & grasslike (GG)	-	-	-	g	10	1000
Dryopteridaceae	*Polystichum proliferum*	Mother Shield Fern	-	-	-	-	Fern (EG)	-	-	-	g	0.1	2
Lamiaceae	*Prostanthera cuneata*	Alpine Mint-bush	-	-	-	-	Shrub (SG)	-	-	-	m	20	100
Ranunculaceae	*Ranunculus dissectifolius*	-	-	2RCa	-	-	Forb (FG)	g	0.1	1	-	-	-
Ranunculaceae	*Ranunculus graniticola*	Granite Buttercup	-	-	-	-	Forb (FG)	-	-	-	g	0.1	5
Ericaceae	*Richea continentis*	Candle Heath	-	-	-	-	Shrub (SG)	g	3	50	-	-	-
Asteraceae	*Senecio gunnii*	-	-	-	-	-	Forb (FG)	-	-	-	g	0.2	10
Sphagnaceae	*Sphagnum* sp.	-	-	-	-	-		g	65	500	-	-	-
Stylidiaceae	*Stylidium graminifolium*	Grass Triggerplant	-	-	-	-	Forb (FG)	g	0.1	50	-	-	-
Asteraceae	*Taraxacum officinale*	Dandelion	-	-	Yes	-		g	0.1	5	-	-	-
Poaceae	*Trisetum spicatum*	Bristle Grass	-	-	-	-	Grass & grasslike (GG)	g	0.1	20	-	-	-
Violaceae	*Viola betonicifolia*	Native Violet	-	-	-	-	Forb (FG)	-	-	-	g	0.1	20

Appendix C - Vegetation Integrity Plot Data

Table 28: Plot location data

Plot no.	PCT	Condition	Easting	Northing	Bearing
1	637	Moderate	625948	5970311	230
2	643	Moderate	625860	5970397	40

Table 29: Vegetation integrity data (composition)

Composition (number of species)						
Plot	Tree	Shrub	Grass	Forb	Fern	Other
1	0	7	9	10	0	0
2	1	13	2	9	2	0

Table 30: Vegetation integrity data (Structure)

Structure (Total cover)						
Plot	Tree	Shrub	Grass	Forb	Fern	Other
1	0.0	45.3	53.2	1.5	0.0	0.0
2	0.1	67.2	10.2	2.2	1.1	0.0

Table 31: 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	60	0	0	0	0	0	0	0	0.2
2	0	0	62	0	0	0	0	0	0	0	0.9

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 entities which are known or considered to have the potential to occur within the study area are the:

- Alpine She-oak Skink
- Guthega Skink
- Broad-toothed Rat
- Anemone Buttercup
- Alpine Sphagnum Bogs and Associated Fens.

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 development site does provide potential habitat for the following Commonwealth listed endangered entities; Alpine She-oak Skink and Guthega Skink 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, The Guthega Skink has not been detected within the development site or immediate surrounds and the proposed works will be at least 100 m from the nearest known Guthega Skink burrow, which occurs to the south of the development site. The proposed action will only affect a small amount of marginal potential habitat for the species in the context of the extent of potential habitat within the Centre Valley area. The targeted surveys undertaken for this assessment suggest that the species does not utilise the potential habitat within the development site.

Matters to be considered	Impact
	The impacts associated with the proposed action will not result in the removal of any of the dense groundcovers the Alpine She-oak Skink is associated with. As such, the habitats within the study area will continue to available to the species after the completion of the proposed action. It is considered highly unlikely that the proposed works would result in injury or death of any Alpine She-oak Skink individuals as the disturbances associated with the proposed works are likely to temporarily deter any individuals from the locations where works are being undertaken. Under these circumstances, it is considered highly unlikely that the proposed action will lead to a long-term decrease in the size of the Guthega Skink or Alpine She-oak Skink populations. b. reduce the area of occupancy of the species The proposed action will be limited to the disturbance of 0.16 ha of native vegetation which is a small amount of habitat in the context of the extent of similar habitats in the Centre Valley area and in the locality generally. The proposed works will not affect any key habitat resources for the Alpine She-oak Skink or Guthega Skink; nor affect their ability to access habitats within or beyond the development site. Under these circumstances, the proposed action is highly unlikely to reduce the area of occupancy of the local populations of the Alpine She-oak Skink or Guthega Skink. c. fragment an existing population into two or more populations The proposed action will be limited to the disturbance of 0.16 ha of native vegetation which is a small amount of habitat in the context of the extent of similar habitats in the Centre Valley area and in the locality generally. The proposed works will not affect any key habitat resources for the Alpine She-oak Skink or Guthega Skink; nor affect their ability to access habitats within or beyond the development site. Under these circumstances, the proposed action will not fragment an existing population of the Alpine She-oak Skink or Guthega Skink 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 Alpine She-oak Skink or Guthega Skink. There are thousands of hectares of similar habitats in the alpine and subalpine zones of the Australian alps, including elsewhere within the Perisher Resort area. Alpine She-oak Skink an Guthega Skink continue to occur within the Perisher Resort Area despite a long history of similar and more extensive disturbances. e. disrupt the breeding cycle of a population It is possible although unlikely that the Alpine She-oak Skink may breed within the development site. However, any local population of these species is highly unlikely to be limited to the development site, which represents only a very small proportion of the potential habitat available to the species in the locality and so breeding can proceed as normal in the other available areas. It is considered highly unlikely that the Guthega Skink would breed within the development site given the absence of burrows and the generally marginal nature of the potential habitat for the species there. Under these circumstances, it is highly unlikely that the proposed action would disrupt the breeding cycle of a population of the Alpine She-oak Skink or Guthega Skink. f. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

Matters to be considered	Impact
	The proposed action will modify a very small area of marginal potential habitat for the Alpine She-oak Skink and Guthega Skink, 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 Alpine She-oak Skink or Guthega Skink 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 Alpine She-oak Skink or Guthega Skink. 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 Alpine She-oak Skink or Guthega Skink to decline. i. interfere substantially with the recovery of the species. As the proposed action is not considered to decrease or fragment any existing populations the recovery of the Alpine She-oak Skink and Guthega Skink is unlikely to be adversely impacted.
Any impact on Commonwealth Listed Vulnerable Species;	Yes. The study area provides known habitat for two Commonwealth listed vulnerable species: the Broad-toothed Rat and 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. Whilst the proposed action will affect some known Broad-toothed Rat habitat, it will affect only a very small amount (0.16 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. The Anemone 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 in the Centre Valley area and elsewhere throughout the Perisher Resort Area. Under these circumstances the proposed action will not lead to a long-term decrease in the size of an important population of the Broad-toothed Rat or the Anemone Buttercup. b. reduce the area of occupancy of an important population 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 Perisher 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. The proposed action will reduce the area of occupancy of the Anemone Buttercup by a very small amount, approximately 0.5 m^2. c. fragment an existing important population into two or more populations

Matters to be considered	Impact
	The proposed action will not fragment an existing important population of either the Broad-toothed Rat or the Anemone Buttercup into two or more populations. Both species' populations extend beyond the development site and the Perisher 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 Broad-toothed Rat or the Anemone 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 Broad-toothed Rat or the Anemone 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 Broad-toothed Rat or the Anemone Buttercup is likely to decline as the habitat to be affected is very small in the context of the available habitat within the Perisher 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 Broad-toothed Rat or the Anemone Buttercup. Invasive species, including foxes and cats, are already present. 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 or Anemone Buttercup to decline. i. interferes substantially with the recovery of the species. 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. The Anemone 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.
Any impact on a Commonwealth Endangered Ecological Community	Yes: The Alpine Sphagnum Bogs and Associated Fens endangered ecological community occurs within the development site. The significant impact criteria in terms of endangered ecological communities are discussed below: a. reduce the extent of an ecological community The proposal is expected to result in the further modification of approximately 900 m^2 of Alpine of already disturbed Sphagnum Bogs and Associated Fens EEC. The local occurrence of the community is estimated to be at least 100 ha in extent in association with Perisher Creek and Rock Creek.

Matters to be considered	Impact
	b. fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines; The proposal will not fragment the Alpine Sphagnum Bogs and Associated Fens EEC as it will affect a small area on the margins of a very large local occurrence. c. adversely affect habitat critical to the survival of an ecological community The local occurrence of the Alpine Sphagnum Bogs and Associated Fens EEC is estimated to be at least 100 ha in extent in association with Perisher Creek and Rock Creek. In this context, the habitat for the community within the development site is not considered to be critical to its survival. d. modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns The proposal has been designed so as to not modify or destroy the abiotic factors necessary for the survival of the Alpine Sphagnum Bogs and Associated Fens EEC. On the contrary, the proposal has been designed to mitigate against any potential impacts on surface or subsurface hydrology, primarily through the use of the sod replacement technique. The Alpine Sphagnum Bogs and Associated Fens EEC within the development site has been disturbed before by trenching for the existing uphill line and has recovered well. It is expected that a similar recovery will occur post construction of the proposed action although it is acknowledged that the recovery is likely to take several decades. e. cause a substantial change in the species composition of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting. The development site does not support a unique assemblage of characteristic flora species of the Alpine Sphagnum Bogs and Associated Fens EEC that does not occur elsewhere within the local occurrence. Similarly, the fauna assemblage inhabiting the development site is likely to be distributed throughout the local occurrence and contiguous vegetation. Fauna species such as invertebrates, amphibians, reptiles, birds, and mammals utilising foraging substrates within the development site would not be restricted to the areas affected by the action proposed and would be highly likely to continue to utilise habitats in the remainder of the local occurrence. f. cause a substantial reduction in the quality or integrity of an ecological community, including, but not limited to: -assisting invasive species, that area harmful to the listed ecological community, to become established, or -causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants in the ecological community which kill or inhibit the growth of species in the ecological community The proposed action includes appropriate safeguards to limit the potential for invasive plants or pathogens to encroach upon the Alpine Sphagnum Bogs and Associated Fens EEC. It will also include safeguards which limit the potential for any chemicals or pollutants to enter the Alpine Sphagnum Bogs and Associated Fens EEC in association with the action proposed. g. interfere with the recovery of an ecological community The Alpine Sphagnum Bogs and Associated Fens EEC has recovered well since the cessation of grazing in the NSW alps and is one of the most common vegetation communities in alpine and subalpine habitats, and one of the best conserved vegetation communities in Australia. It has also recovered well since the 2003 wildfires. The proposed action will not reduce the extent of the Alpine Sphagnum Bogs and Associated Fens EEC, will not interfere with any wider recovery of the community, which is only potentially

Matters to be considered	Impact
	threatened by impacts associated with climate change, the re-introduction of grazing, horse and pig impacts or adverse fire regimes.
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 20 years' experience in natural resource management (21 years as a consultant- and 3 years with Sydney Catchment Authority as a Catchment Protection Officer). 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
Merritt's 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
Sponar's 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 (Variations)

Proposal Details

Assessment Id

00028277/BAAS17061/21/00028278

Proposal Name

Blaxland and Wentworth T-bars

BAM data last updated *

24/11/2021

Assessor Name

Ryan Smithers

Assessor Number

BAAS17061

BAM Data version *

50

Proponent Name(s)

Report Created

11/02/2022

BAM Case Status

Finalised

Assessment Revision

4

Assessment Type

Part 4 Developments (Small Area)

Date Finalised

11/02/2022

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
637-Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion	Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions	0.1	0	2	2.00
643-Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion	Not a TEC	0.1	0	1	1.00

637-Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region

	Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions This includes PCT's: 518, 607, 637, 665, 681, 766, 788, 939, 1188, 1200, 1256, 1270, 1287, 1298, 1743, 1744, 1745	-	637_Moderate	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.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Alpine Complex	Tier 3 or higher threat status	637_Moderate	No	2	IBRA Region: Australian Alps, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
643-Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Alpine Heaths This includes PCT's: 643	Alpine Heaths <50%	643_Moderate	No	1	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.

BAM Biodiversity Credit Report (Variations)

643-Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Alpine Complex	Tier 4 or higher threat status	643_Moderate	No	1	IBRA Region: Australian Alps, 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
Cyclodomorphus praealtus / Alpine She-oak Skink	**643_Moderate**	0.1	2.00
Liopholis guthega / Guthega Skink	**643_Moderate**	0.1	2.00
Mastacomys fuscus / Broad-toothed Rat	**637_Moderate, 643_Moderate**	0.2	4.00
Ranunculus anemoneus / Anemone Buttercup	**637_Moderate**	10.0	20.00

Credit Retirement Options

Like-for-like options

Cyclodomorphus praealtus/ Alpine She-oak Skink	Spp	IBRA region
	Cyclodomorphus praealtus/Alpine She-oak Skink	Any in NSW

Variation options		
Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Endangered	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.
Liopholis guthega/ Guthega Skink	Spp	IBRA region	
	Liopholis guthega/Guthega Skink	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Endangered	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.
Mastacomys fuscus/ Broad-toothed Rat	Spp	IBRA region	
	Mastacomys fuscus/Broad-toothed Rat	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing	IBRA region

		under Part 4 of the BC Act shown below	
	Fauna	Vulnerable	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.
Ranunculus anemoneus/ Anemone Buttercup	Spp	IBRA region	
	Ranunculus anemoneus/Anemone Buttercup	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Flora	Vulnerable	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.

ecological AUSTRALIA
A TETRA TECH COMPANY

1300 646 131
www.ecoaus.com.au