



Tarraleah Redevelopment Project

Natural Values Report - Terrestrial Ecology Baseline

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Executive summary

Hydro Tasmania is proposing to redevelop the Tarraleah hydropower scheme which will include a new power station and associated infrastructure to convey water from Lake King William to the power station including a new pipeline, a tunnel and tunnel portals, surge tower and penstocks. Entura was engaged by Hydro Tasmania to undertake an assessment of the terrestrial ecology for the Tarraleah Redevelopment Project (the Project). The survey area for the terrestrial assessment included the pipeline alignment, tunnel portals, spoil dumps, surge tower, downstream riverine reaches and 12 km of transmission line upgrade. The aim of assessment was to provide a description of the baseline terrestrial ecology for the Tarraleah Redevelopment Project.

Vegetation

The flora surveys identified thirteen native vegetation communities within the Project survey area including dry and wet sclerophyll forest, buttongrass moorlands and non-eucalypt forest communities. Two of these vegetation communities, subalpine *Diplarrena latifolia* rushland and *Sphagnum* peatland community are listed as threatened under the *Nature Conservation Act 2002* (NC Act) (Tas). While the *Sphagnum* peatland is not within the area directly affected by the redevelopment project, it may potentially be affected by hydrological changes because of future changes in the operation of Tarraleah hydropower scheme. *Sphagnum* peatland is also a component of the Alpine Sphagnum Bogs and Associated Fens ecological community which is listed as endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Cth).

Flora

One flora species listed as endangered under the EPBC Act and the *Threatened Species Protection Act 1995* (TSP Act) (Tas) was recorded with the survey area. There are records of *Barbarea australis* within the Derwent and Nive rivers. The distribution of *Barbarea australis* is detailed in Entura (2023). No other flora species listed under the EPBC Act were considered likely to occur within the survey area.

One flora species listed as rare under the TSP Act was also recorded within the survey area. Two populations of *Westringia angustifolia* were recorded along the proposed transmission line alignment.

Weeds and diseases

Four declared weed species have been recorded within the survey area; four, *Cirsium arvense* var. *arvense*, *Ulex europaeus*, *Genista monspessulana* and *Cytisus scoparius*. The survey area is located within the Central Highlands municipality which is a Zone B municipality for all of these species. The objective of weed management in Zone B municipalities is 'Containment within municipal boundaries, protection of specified areas within municipal boundaries, prevention of spread to Zone A municipalities'. There was no evidence of *Phytophthora cinnamomi* infection in the susceptible vegetation communities such as buttongrass moorland within the survey area.

Fauna

The threatened mammal species the Tasmanian devil, spotted-tailed quoll and eastern quoll may use the wet and dry forest habitats within the survey area. Potentially suitable denning habitat features such as rocky outcrops were recorded within survey area may be utilised by the Tasmanian devil or spotted-tailed quoll. No den sites were recorded during the field surveys between 2018 and 2022.

There are two known wedge-tailed eagle nests within 1 km of the survey area, both are south of the transmission line alignment.

Another six species of birds listed as threatened under the EPBC Act were identified as potentially occurring within the survey area including two swift species *Hirundapus caudacutus* and *Apus pacificus* which are aerial species that do not use terrestrial habitats. There are records of the swift parrot adjacent to the survey area. However, the survey area is not located within the swift parrot breeding range, which is mostly within 10 km of the coast in eastern and south eastern Tasmania.

There were large habitat trees (>100 cm diameter-at-breast height) present within the survey area which may be suitable nesting or roosting habitat for the Tasmanian masked owl. Although there are no known nests within 5 km of the survey area, there is potential for this species to occur in the survey area. Latham's snipe (*Gallinago hardwickii*) may occur on occasions on the buttongrass plains that are along the proposed pipeline alignment, however, there are no records within 5 km.

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1. Introduction

1.1 Project background

Entura was engaged by Hydro Tasmania to undertake an assessment of the terrestrial ecology for the Tarraleah Redevelopment Project (the Project). The survey area for the terrestrial assessment included the pipeline alignment, tunnel portals, spoil dumps, surge tower, downstream riverine reaches and 12 km of transmission line upgrade. The survey area also included associated waterbodies of the Tarraleah Redevelopment Project including riparian habitats along the River Derwent downstream Clark Dam to Lake Catagunya and Nive River downstream Lake Liapootah to Wayatinah Lagoon.

The terrestrial ecology assessment included desktop and field studies to identify vegetation communities, flora and fauna species and habitat values associated with the Project. The aim of the report is to provide a description of the baseline terrestrial ecology for the Tarraleah Redevelopment Project.

1.2 Scope of works

The natural values assessment included:

- A review of terrestrial and riparian flora and fauna data held on the Natural Values Atlas (NVA) and the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) Protected Matters Search Tool (PMST) to identify the potential for the occurrence of threatened flora and fauna species listed under the *Threatened Species Protection Act 1995* (Tas) (TSP Act) and the EPBC Act.
- Identification of the TASVEG (Tasmanian Vegetation Map) vegetation communities occurring in the vicinity of the survey area.
- Field surveys to investigate and verify the possible presence of natural values identified in the desktop assessment including:
 - ground-truthing and mapping of vegetation communities present, with focus on the above-ground disturbance areas.
 - identification of vegetation communities listed as threatened under the *Tasmanian Nature Conservation Act 2002* (NC Act).
 - survey of terrestrial and riparian, annual and perennial, flowering plants.
 - identification of declared weeds listed on the schedules of the *Weed Management Act 1999* (Tas).
 - identification and assessment of potential habitat for threatened terrestrial fauna species.
 - incidental observations of fauna species (e.g. sightings, scats, diggings, dens, shelters).

1.3 Criteria for determining flora and fauna species of significance

The significance of the flora and fauna within the survey area was assessed according to whether they were a:

- Matter of National Environmental Significance (MNES) under the EPBC Act, namely whether they were a listed threatened species, ecological community or migratory species
- terrestrial and riparian flora and fauna species listed under the TSP Act
- threatened TASVEG vegetation community listed under the NC Act.
- declared weed listed on the schedules of the *Weed Management Act 1999* (Tas).

The requirements of each of the Acts that relate to the flora, fauna and vegetation potentially affected by the Tarraleah Redevelopment Project are outlined below.

1.4 Relevant legislation

Environment Protection and Biodiversity Conservation Act 1999 (Cth)

MNES are protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Cth). The EPBC Act provides for Commonwealth involvement in development assessment and approval in circumstances where MNES could potentially be affected. MNES include:

- World Heritage properties
- National Heritage places
- Ramsar Wetlands
- Nationally threatened species and ecological communities
- Migratory species
- Commonwealth marine areas
- Nuclear actions (including uranium mining)
- a water resource, in relation to coal seam gas development and large coal mining development.

A proponent who proposes to take an action that will have or is likely to have a significant impact on MNES must refer that action to the Federal Environment Minister for assessment.

Threatened Species Protection Act 1995 (Tas)

Under the Tasmanian *Threatened Species Protection Act 1995* (TSP Act) a person must not knowingly kill, injure or collect a listed species without a permit. Similarly, a person must not disturb a listed species on land subject to an interim protection order or subject to a land management agreement without a permit. There are threatened flora species listed under the TSP Act that are likely to be impacted by the proposed works.

Nature Conservation Act 2002 (Tas)

The *Nature Conservation Act 2002* (NC Act) provides for the conservation and protection of the fauna, flora and geological diversity in Tasmania and for the declaration of national parks and other reserved land. Schedule 3A of the NC Act lists the native vegetation communities in Tasmania that are threatened. These communities are protected from clearance and conversion under the *Forest Practices Act 1985* and are also afforded higher levels of protection under the Biodiversity Code of local government planning schemes.

Weed Management Act 1999 (Tas)

The *Weed Management Act 1999* is concerned with the management of declared weeds in Tasmania. It includes provisions:

- that prohibit the introduction of declared weeds into Tasmania
- to undertake the eradication of declared weed species
- to take action aimed at preventing the spread of declared weeds within Tasmania
- that require that action be taken against declared weed species where this is necessary to alleviate or prevent a particular problem.

2. Method

The terrestrial ecology assessment was undertaken using methods that are consistent with the *Guidelines for Natural Values Surveys – Terrestrial Development Proposals* (Natural and Cultural Heritage Division 2015). This involved a desktop review of available online databases and field surveys for flora and fauna over a period from late 2018 to December 2022.

2.1 Desktop review

A review of the available online databases was undertaken to identify vegetation communities and flora and fauna species that could potentially occur within the Project survey area. The survey area includes the disturbance footprint and associated waterbodies of the Tarraleah Redevelopment Project. The desktop review included a search of the following online datasets:

- Tasmanian Vegetation Map (TASVEG 4)
- The Tasmanian Natural Values Atlas (NVA)
- Listing statements and recovery plans for respective species, where appropriate
- The EPBC Act Protected Matters Search Tool (PMST).

The search area for the NVA and PMST searches used a buffer of 5 km around the disturbance footprint to generate a list of threatened flora and fauna species and ecological communities that could occur associated with the Tarraleah Redevelopment Project. The database searches were undertaken in November 2022.

2.2 Field surveys

Flora and fauna surveys covering the survey area were carried out over a period between late 2018 and December 2022. Field surveys were undertaken to investigate and verify the potential fauna and flora issues identified in the desktop assessment which included:

- Ground-truthing and mapping of the TASVEG vegetation communities within the survey area
- Survey of terrestrial and riparian flora
- Identification of declared weeds listed on the schedules of the *Weed Management Act 1999 (Tas)*

- Identification of habitats and habitat components (e.g. habitat trees, dens) that may potentially support threatened fauna
- The surveys targeted potential habitats and locations of flora, fauna and ecological communities that are listed under the EPBC Act and TSP Act.

2.2.1 Flora surveys

A meandering survey method was used to undertake the flora surveys. This involved walking over the survey area in a random manner and recording all flora species encountered. The flora surveys focused on vegetation communities and habitats that could potentially support threatened species. All flora species encountered during the survey were recorded on a computer tablet with GPS capability using Entura's EFOS (Environmental Field Observation System) which records data using fields that are consistent with the NVA. Nomenclature for flora follows the current Census of Tasmanian Vascular Plants (de Salas and Baker 2022).

Dominant and co-dominant flora species and their cover abundance were recorded in all vegetation communities that were encountered so that the community could be attributed to the appropriate TASVEG Mapping Units (Kitchener and Harris 2013) as well as recording the presence of any vegetation communities listed under the NC Act or the EPBC Act. The boundaries and extent of the TASVEG communities were mapped on GIS.

A list of the flora surveys and vegetation verification surveys undertaken for the Tarraleah Redevelopment Project area is provided in Table 2.1. Details of the *Barbarea australis* surveys are described in Entura (2023).

Table 2.1: Terrestrial flora, vegetation and fauna habitat surveys undertaken within the Tarraleah Redevelopment Project area

Survey	Date
Flora, vegetation surveys and habitat surveys	5 October 2018
Flora, vegetation surveys and habitat surveys	20 November 2018
<i>Barbarea australis</i> survey	11 December 2018
<i>Barbarea australis</i> survey	18 December 2018
<i>Barbarea australis</i> survey	23 January 2019
<i>Barbarea australis</i> survey	29-31 January 2019
Flora, vegetation surveys and habitat surveys	13 February 2019
Flora, vegetation surveys and habitat surveys	26 August 2019
<i>Barbarea australis</i> survey	29 March 2021
Flora, vegetation surveys and habitat surveys	22 September 2021
Flora, vegetation surveys and habitat surveys	15-16 November 2021
<i>Barbarea australis</i> survey	15 November 2021
Flora, vegetation surveys and habitat surveys	8 December 2021
<i>Barbarea australis</i> survey	4 March 2022.

Survey	Date
Flora, vegetation surveys and habitat surveys	11-12 April 2022
Flora, vegetation surveys and habitat surveys	16 June 2022
Flora, vegetation surveys and habitat surveys	17 July 2022
Flora, vegetation surveys and habitat surveys	15 September 2022
Flora, vegetation surveys and habitat surveys	4 October 2022
Flora, vegetation surveys and habitat surveys	19 October 2022

2.2.2 Limitations

It is possible that not all flora species that occur at the site were identified in the flora surveys because of varying flowering times and seasonality of occurrence. In particular, short-lived annuals, orchids and lilies that may be present at the site may have been missed because they were not able to be identified (i.e. they were not flowering at the time of the survey), or they were not evident at the time of year when the survey occurred (they were annual plants that had died back) or they did not emerge and flower over the period of the survey. However, it is considered that given the number of surveys at different times of the year including the peak flowering time of spring that the flora list is comprehensive.

2.3 Fauna surveys

The fauna surveys included the recording of important fauna habitat components during the flora surveys when they were encountered, including large trees with hollows (habitat trees). In addition, all fauna species encountered during the survey were recorded using EFOS including indirect evidence of fauna presence (e.g. scats, diggings, dens, shelters). Threatened fauna species locations or habitats, if observed, were also recorded using EFOS.

2.4 Possibility of occurrence

The assessment of the possibility of occurrence of threatened flora and fauna species within the surveys was based on the following criteria:

- Likely to occur: records within 5 km and suitable habitat
- Potential to occur: no records within 5 km but suitable habitat
- Unlikely to occur: no records within 5 km and no suitable habitat.

3. Results

3.1 Vegetation communities

The vegetation communities within the survey area have been largely influenced by geology as well as past disturbance particularly from hydropower development, timber harvesting and plantation

development for production forestry. There were 17 vegetation communities identified within the survey area including the proposed transmission line alignment (Figure 3.1 and Figure 3.2). Noting that within the survey area, the proposed above-ground disturbance associated with the Project will affect 13 native vegetation communities (combined disturbance area 176.8 ha) and four modified communities (combined disturbance area 103.8 ha), (Table 3.2). The thirteen affected native vegetation communities are:

- *Eucalyptus amygdalina* forest and woodland on dolerite (DAD)
- *Eucalyptus delegatensis* dry forest and woodland (DDE)
- *Eucalyptus delegatensis* forest with broad-leaf shrubs (WDB)
- *Eucalyptus delegatensis* forest over rainforest (WDR)
- *Eucalyptus dalrympleana* forest (WDA)
- *Eucalyptus dalrympleana*–*Eucalyptus pauciflora* forest and woodland (DDP)
- *Eucalyptus rodwayi* forest and woodland (DRO)
- Pure buttongrass moorland (MBP)
- Buttongrass moorland with emergent shrubs (MBS)
- Subalpine *Diplarrena latifolia* rushland (MDS)
- *Acacia dealbata* forest (NAD)
- *Leptospermum* forest (NLE)
- *Sphagnum* peatland (ASP).

There were two additional native vegetation communities intersected by the tunnel alignment, *Eucalyptus delegatensis* wet forest (undifferentiated) (WDU) and *Leptospermum* with rainforest scrub (SRF). However, there is no proposed above-ground disturbance associated with the tunnel alignment. The tunnel alignment also passes under two modified communities, Urban areas (FUR) and Weed infestation (FWU).

- The subalpine *Diplarrena latifolia* rushland and the *Sphagnum* peatland communities are listed as threatened under the NC Act. The *Diplarrena latifolia* rushland community occurs on the pipeline alignment and there is a 3.9 ha patch of *Sphagnum* peatland adjacent to Mossy Marsh Pond, approximately 1 km south of the tunnel alignment. While this community is not within the Project footprint, it may potentially be affected by hydrological changes as a result of changes in the operation of the redeveloped Tarraleah hydropower scheme.
- The remaining TASVEG vegetation communities are not listed as threatened under the NC Act. Descriptions of the TASVEG vegetation communities are provided below (Table 3.1).
- There were three ecological communities listed under the EPBC Act identified as potentially occurring within 5 km of the survey area on the PMST search:
 - Alpine *Sphagnum* Bogs and Associated Fens (Endangered)
 - Tasmanian Forests and Woodlands dominated by black gum or Brookers gum (*Eucalyptus ovata* / *E. brookeriana*) (Critically Endangered)
 - Tasmanian white gum (*Eucalyptus viminalis*) wet forest (Critically Endangered).

Neither Tasmanian Forests and Woodlands dominated by black gum or Brookers gum (*Eucalyptus ovata* / *E. brookeriana*) or Tasmanian white gum (*Eucalyptus viminalis*) wet forest communities were recorded within the Project survey area. These communities do not occur on the Central Plateau and the survey area is outside the known range of these communities. However, the *Sphagnum* peatland that was found within the survey area is a component of the Alpine Sphagnum Bogs and Associated Fens ecological community.

Table 3.1: Area of native vegetation communities within the Tarraleah redevelopment disturbance footprint

Vegetation community	TASVEG Code	Redevelopment (ha)	Transmission line alignment (ha)	Total
<i>Eucalyptus amygdalina</i> forest and woodland on dolerite	DAD	0	3.3	3.3
<i>Eucalyptus delegatensis</i> dry forest and woodland	DDE	32.4	21	53.4
<i>Eucalyptus delegatensis</i> forest with broad-leaf shrubs	WDB	11.5	39.9	51.4
<i>Eucalyptus delegatensis</i> forest over rainforest	WDR	10.7	0	10.7
<i>Eucalyptus dalrympleana</i> forest	WDA	0.3	0	0.3
<i>Eucalyptus dalrympleana</i> – <i>Eucalyptus pauciflora</i> forest and woodland	DDP	28.9	0	28.9
<i>Eucalyptus rodwayi</i> forest and woodland	DRO	5.1	7.5	12.6
Pure buttongrass moorland	MBP	8.6	0	8.6
Buttongrass moorland with emergent shrubs	MBS	1.1	0	1.1
Subalpine <i>Diplarrena latifolia</i> rushland	MDS	0.4	0	0.4
<i>Acacia dealbata</i> forest	NAD	0.1	5.1	5.2
<i>Leptospermum</i> forest	NLE	0.9	0	0.9
<i>Sphagnum</i> peatland	ASP			
TOTAL		100	76.8	176.8

Table 3.2: Area of non-native vegetation communities within the Tarraleah redevelopment disturbance footprint

Vegetation community	TASVEG Code	Redevelopment (ha)	Transmission line alignment (ha)	Project total
Regenerating cleared land	FRG	0	0.6	0.6
Hardwood plantations for silviculture	FPH	0	2.3	2.3
Permanent easement	FPE	2.4	80.5	82.9
Extra-urban miscellaneous	FUM	11.4	6.6	18.0
TOTAL		13.8	90	103.8

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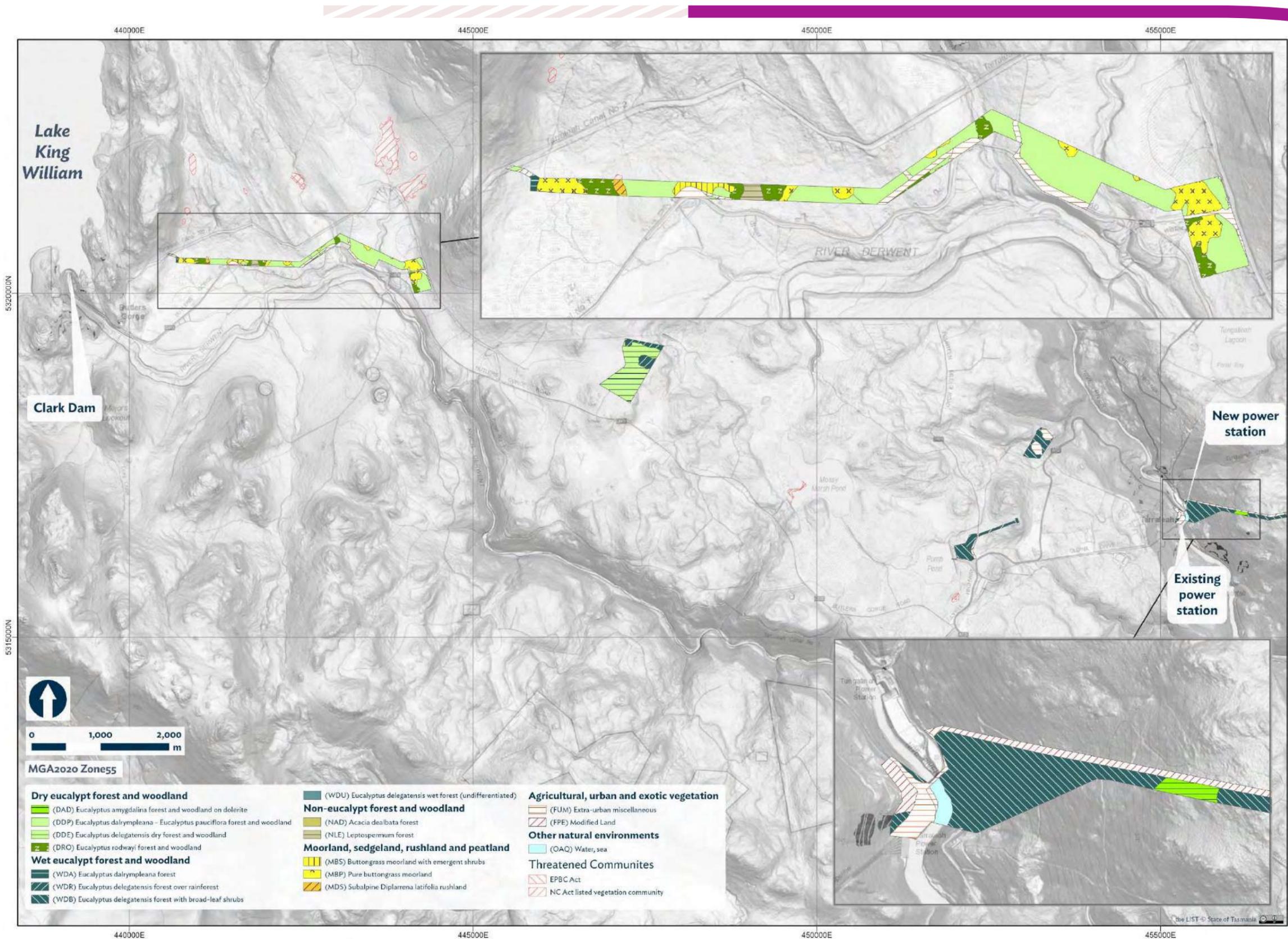


Figure 3.1: Vegetation communities within the Tarraleah Redevelopment Project survey area

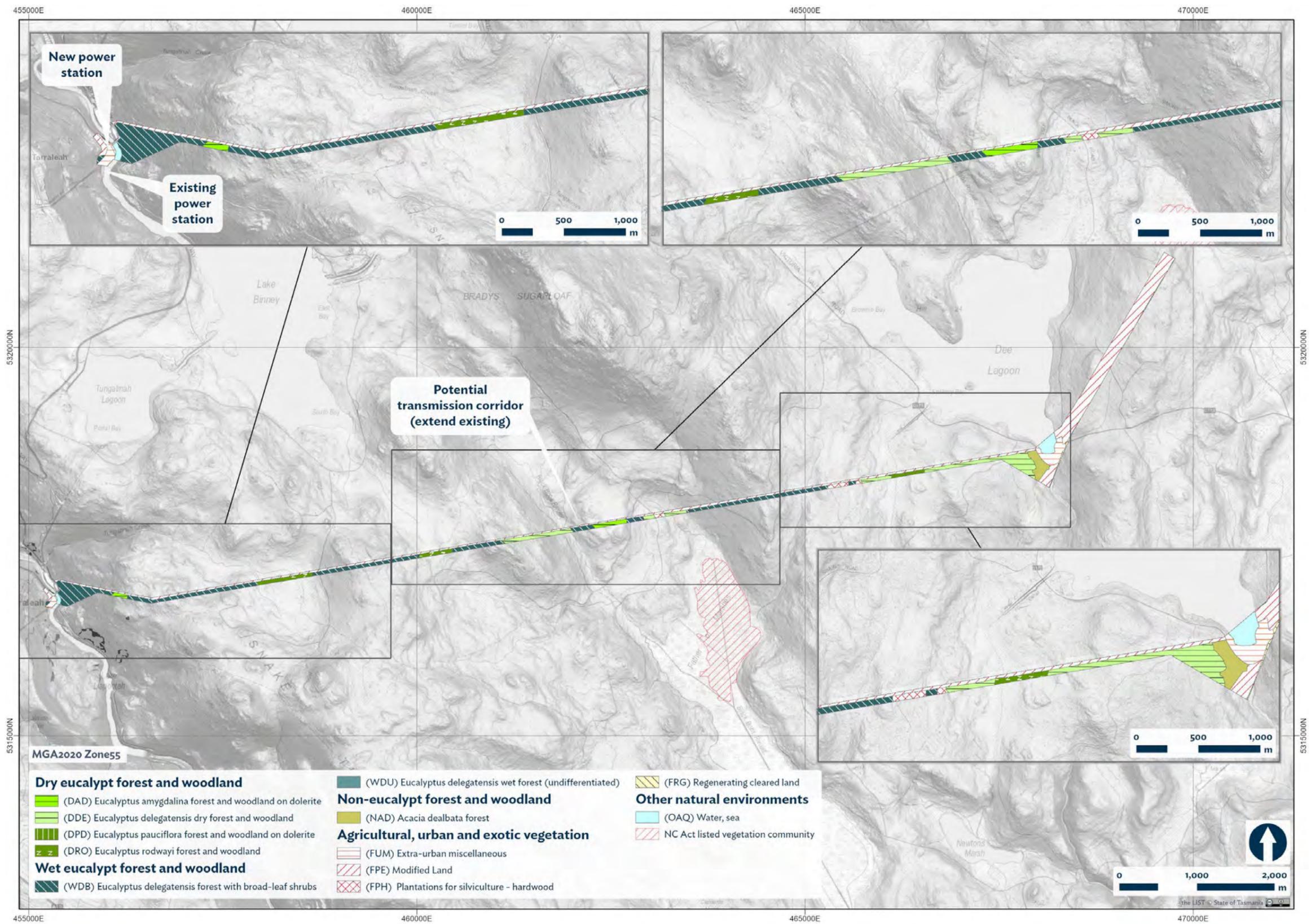


Figure 3.2: Vegetation communities within the Tarraleah Redevelopment Project transmission line survey area

***Eucalyptus amygdalina* forest and woodland on dolerite (DAD)**

There is 3.3 ha of this dry forest community within the transmission line alignment (Figure 3.1, Figure 3.2). This community was dominated by *Eucalyptus amygdalina* (black peppermint) to a height of 25 m (Figure 3.3). *Eucalyptus delegatensis* and *E. dalrympleana* (mountain gum) were occasionally present as components of the canopy layer. The understorey was open with the shrub *Pultenaea juniperina* (prickly beauty) being occasionally present. The threatened shrub *Westringia angustifolia* (narrowleaf westringia) was also recorded in the *Eucalyptus amygdalina* forest and woodland on dolerite community. This species is listed as rare under the TSP Act.



Figure 3.3: *Eucalyptus amygdalina* forest and woodland on dolerite

***Eucalyptus delegatensis* dry forest and woodland (DDE)**

Eucalyptus delegatensis dry forest community was recorded at the mid tunnel; portal and stockpile sites and within the transmission line alignment (Figure 3.1, Figure 3.2, Figure 3.4). Much of this forest is regenerating from previous logging (Figure 3.5). This community is dominated by regrowth *Eucalyptus delegatensis* subsp. *tasmaniensis* (gum-topped stringybark) trees up to 12 m with some taller retained trees to 20 m (Figure 3.5). *Eucalyptus dalrympleana* subsp. *dalrympleana* (mountain white gum) also occurred as a dominant canopy tree in localised areas and *Acacia dealbata* (silver wattle) was commonly present as a small tree.

The shrub layer was dominated by *Pultenaea juniperina* and *Leptecophylla parvifolia* (common pinkberry). The ground layer was sparse with few native herbs present including *Galium australe* (tangled bedstraw), *Hydrocotyle hirta* (hairy pennywort), and *Viola hederacea* (ivy leaf violet). The ground fern *Pteridium esculentum* subsp. *esculentum* (bracken) was commonly present.

There is approximately 53.4 ha of *Eucalyptus delegatensis* dry forest and woodland within the potential disturbance footprint (Figure 3.1, Figure 3.2).



Figure 3.4: *Eucalyptus delegatensis* dry forest and woodland

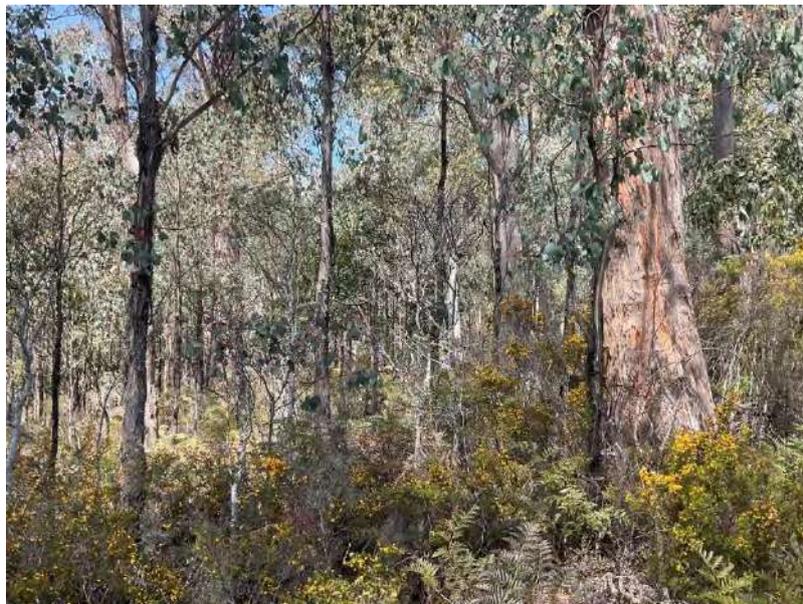


Figure 3.5: Regenerating *Eucalyptus delegatensis* dry forest and woodland

***Eucalyptus delegatensis* forest with broad-leaf shrubs (WDB)**

This vegetation community occurs at the surge shaft site, and within the transmission line alignment (Figure 3.1, Figure 3.2). At the surge tower site, *Eucalyptus delegatensis* formed the canopy to a height of 40 to 45 m (Figure 3.6). *Pomaderris apetala* (common dogwood) formed a dense small tree layer to 8 m. The ground layer was sparse with few herbs present including *Geranium potentilloides* (mountain cranesbill), *Drymophila cyanocarpa* (turquoise berry), *Viola hederacea* and *Hydrocotyle hirta*. There is approximately 2 ha of *Eucalyptus delegatensis* forest with broad-leaf shrubs within the survey area at the surge tower site (Table 3.1).

The largest areas of *Eucalyptus delegatensis* forest with broad-leaf shrubs within the survey area was along the transmission line alignment. These areas were regenerating forest with a shrub layer dominated by the tall shrub *Bedfordia salicina* (blanket leaf), (Figure 3.7). Overall, approximately 74 51 ha of this wet forest community was identified within the disturbance footprint.



Figure 3.6: *Eucalyptus delegatensis* forest over broad-leaf shrubs



Figure 3.7: Regenerating *Eucalyptus delegatensis* forest over broad-leaf shrubs

***Eucalyptus delegatensis* forest over rainforest (WDR)**

This vegetation community occurred adjacent to the existing access track to the no. 3 tunnel downstream portal and at the mid tunnel portal site and along the access to the surge shaft (Figure 3.1, Figure 3.8). *Eucalyptus delegatensis* formed the canopy to a height of 35 to 50 m, with tree species *Acacia dealbata* subsp. *dealbata*, *Phyllocladus aspleniifolius* (celerytop pine) and *Nothofagus cunninghamii* (myrtle) forming the sub-canopy (Figure 3.8). The understorey was comprised of the shrubs *Tasmannia lanceolata* (Tasmanian pepper), *Pimelea drupacea* (cherry riceflower) and *Telopea truncata* (Tasmanian waratah), with herbs such as *Hydrocotyle hirta*, *Galium australe*, *Libertia pulchella* (grassflag) and *Clematis aristata* (mountain clematis) present in the groundcover. Ferns including *Dicksonia antarctica* (soft treefern), *Polystichum proliferum* (mothershield fern), *Histiopteris incisa* (batswing fern), *Blechnum nudum* (fishbone fern) and *B. watsii* (hard waterfern) were common.

Approximately 10.1 ha of *Eucalyptus delegatensis* forest over rainforest is present within the disturbance footprint.



Figure 3.8: *Eucalyptus delegatensis* forest over rainforest

***Eucalyptus dalrympleana* forest (WDA)**

This community was recorded in one small area within the pipeline alignment (Figure 3.1, Figure 3.2). *Eucalyptus dalrympleana* subsp. *dalrympleana* formed the canopy, with the sub-canopy comprised of a sparse coverage of *Leptospermum lanigerum* (woolly tea tree) (Figure 3.9). The understory primarily comprised the shrubs *Leptecophylla parvifolia*, *Hakea epiglottis*, *Richea sprengelioides* (rigid candleheath), *Tasmannia lanceolata*, *Coprosma nitida* (mountain currant), *Lomatia tinctoria* (guitarplant), and *Pultenaea juniperina*, with other shrubs *Olearia phlogopappa* (dusty daisybush), *Olearia viscosa*, *Pimelea nivea* (bushmans bootlace), and *Epacris lanuginosa* (swamp heath) less common. *Pultenaea juniperina* and *Richea sprengelioides* are typical of the drier form of *Eucalyptus dalrympleana* forest. Groundcover included herbs such as *Drymophila cyanocarpa*, *Brachyscome spathulata* (spoonleaf daisy), *Geranium potentilloides*, and *Hydrocotyle hirta*, with *Deyeuxia* (bentgrass), *Poa* grass species (tussockgrass) and the graminoid *Diplarrena latifolia* (western flag-iris) also present.

There is approximately 0.3 ha of *Eucalyptus dalrympleana* forest within the disturbance footprint.



Figure 3.9: *Eucalyptus dalrympleana* forest

***Eucalyptus dalrympleana*–*Eucalyptus pauciflora* forest and woodland (DDP)**

This subalpine vegetation community where *Eucalyptus dalrympleana* subsp. *dalrympleana* and *E. pauciflora* subsp. *pauciflora* (cabbage gum) co-occur was recorded along the proposed pipeline alignment (Figure 3.1, Figure 3.2)). *Eucalyptus dalrympleana* subsp. *dalrympleana* comprised the canopy to 20-30 m, with *E. pauciflora* the subdominant canopy species to a similar height (Figure 3.10). Other occasional canopy species included *Acacia dealbata* (silver wattle), and *E. rodwayi* (swamp peppermint).

The sub-canopy consisted of small trees including *Melaleuca virens* (prickly bottlebrush), *Notelaea ligustrina* (native olive), *Pittosporum bicolor*, *Pomaderris apetala*, *Banksia marginata* (silver banksia) and *Monotoca glauca* (goldy wood). The understory was generally comprised of sparse shrubs including *Richea sprengeioides*, *Lomatia tinctoria*, *L. polymorpha* (mountain guitarplant), *Hakea lissosperma* (mountain needlebush), *Oxylobium ellipticum* (golden shaggypea), and *Tasmannia lanceolata* in the tallest layer, with shorter shrubs including *Pultenaea juniperina* and *Leptecophylla parviflora* (mountain pinkberry) also common. The understory also comprised graminoids such as *Dianella tasmanica* (forest flaxlily), *Diplarrena latifolia*, *Gahnia grandis* (cutting grass) and *Baloskion australe* (southern cordrush). The groundcover included ferns, namely *Pteridium esculentum* and *Gleichenia alpina* (alpine coralfern), and a sparse cover herb such as *Lagenophora stipitata* (blue bottledaisy), *Drymophila cyanocarpa* and *Viola hederacea*. Grasses including *Microlaena tasmanica* (Tasmanian ricegrass) and *Poa tenera* (scrambling tussockgrass) were less common in the groundcover.

Approximately 28.9 ha of *Eucalyptus dalrympleana* - *Eucalyptus pauciflora* forest and woodland is within the disturbance footprint.



Figure 3.10: *Eucalyptus dalrympleana* - *Eucalyptus pauciflora* forest and woodland

***Eucalyptus rodwayi* forest and woodland (DRO)**

This vegetation community was dominated by *Eucalyptus rodwayi* to a height of 25 m and was recorded along the pipeline and transmission line alignment's low lying poorly drained flats (Figure 3.1, Figure 3.2). *Eucalyptus pauciflora* subsp. *pauciflora* was also occasionally present in the canopy in areas of better drainage. There was a range of facies of this community observed within the survey area including grassy *E. rodwayi* forest with a dominant groundcover of *Poa* species, sedgy facies (Figure 3.11) with *Lepidosperma filiforme* (common rapiersedge), *Gahnia grandis* and *Diplarrena latifolia* dominating the understorey, and shrubby facies with *Leptospermum lanigerum* and *Melaleuca virens* dominating the understorey. Other common shrubs recorded within this community included *Pultenaea juniperina*, *Oxylobium ellipticum*, *Leptecophylla parviflora* and *Richea sprengelioides*. Herbs recorded in the groundcover commonly included *Hydrocotyle hirta*, *Gonocarpus tetragynus* (common raspwort) and *Galium australe*. Ferns including *Blechnum pennamarina* subsp. *alpina* (alpine waterfern), *B. nudum*, *Dicksonia antarctica*, *Polystichum proliferum* and *Pteridium esculentum* subsp. *esculentum* were occasional in damper areas.

There was approximately 12.6 ha of *Eucalyptus rodwayi* forest and woodland within the disturbance footprint.



Figure 3.11: *Eucalyptus rodwayi* forest and woodland

Pure buttongrass moorland (MBP)

This vegetation community was commonly recorded in the pipeline survey area (Figure 3.1, Figure 3.2) and is distinguished by the dominance of the sedge *Gymnoschoenus sphaerocephalus* (buttongrass) where it comprises more than 75% cover, and characteristically has a very low species diversity (Figure 3.12). Other sedges present in the community commonly included *Baloskion australe*, *Empodisma minus* (spreading roperus), *Lepidosperma filiforme*, with species like *Diplarrena moraea* (white flag-iris) and *Carpha alpina* (alpine strawsedge) less common. Ferns including *Blechnum pennamarina* subsp. *alpina* and *Gleichenia alpina* were sparse, as were the herbs *Hydrocotyle muscosa* (mossy pennywort), *H. hirta*, *Hypericum japonicum* (matted St Johns-wort), *Gonocarpus micranthus* subsp. *micranthus* (creeping raspwort), and *Geranium potentilloides*. Grasses were occasionally present including *Poa labillardierei* (silver tussockgrass) and *Hierochloa redolens* (sweet holygrass). Shrubs were typically scattered through the buttongrass moorland such as *Ozothamnus rosmarinifolius* (swamp everlastingbush), *Olearia algida* (alpine daisybush), *Almaleea subumbellata* (wiry bushpea) and *Baeckea gunniana* (alpine heathmyrtle).

Pure buttongrass moorland in this area is also listed as a Western Tasmania Blanket Bogs geoconservation site (ID 2527), the statement of significance being ‘the most extensive organosol terrain in Australia and the Southern Hemisphere’ (Figure 3.1, Figure 3.2). There is approximately 8.6 ha of pure buttongrass moorland within the disturbance footprint.



Figure 3.12: Pure buttongrass moorland

Buttongrass moorland with emergent shrubs (MBS)

This vegetation community was recorded in one location within the pipeline alignment (Figure 3.1, Figure 3.2) and was a late successional stage within buttongrass moorland with a higher coverage of shrubs that were sparsely observed in pure buttongrass moorland in the area (Figure 3.13). This community had scattered occurrences of *Eucalyptus rodwayi*, with small trees such as *Leptospermum lanigerum*, *Melaleuca virens* and *Monotoca empetrifolia* (mat broomheath) forming the tall overstorey layer. Other shrubs such as *Sprengelia incarnata* (pink swampheath), *Ozothamnus rosmarinifolius*, *Olearia algida*, *O. phlogopappa*, *Hakea microcarpa* (small fruit needlebush), *Acrothamnus hookeri* (mountain beardheath), *Baeckea gunniana* and *Almaleea subumbellata* were common.

There is approximately 1.1 ha of buttongrass moorland with emergent shrubs within the disturbance footprint.



Figure 3.13: Buttongrass moorland with emergent shrubs

Subalpine *Diplarrena latifolia* rushland (MDS)

This community was recorded in one location within the pipeline alignment between *Eucalyptus rodwayi* forest and *Eucalyptus dalrympleana* - *Eucalyptus pauciflora* forest and woodland, which grades into buttongrass moorland with emergent shrubs to the south as drainage becomes impeded (Figure 3.1, Figure 3.2). It is a graminoid rushland dominated by the graminoid *Diplarrena latifolia* with a sparse cover of shrubs (Figure 3.14). The patch had a sparse cover of *E. rodwayi* and *E. pauciflora*, which is typical of this community on well-drained sites (Kitchener and Harris 2013). Small trees and shrubs recorded in this patch included *Melaleuca virens*, *Leptospermum lanigerum*, *Almaleea subumbellata*, *Epacris gunnii*, *E. lanuginosa*, *Olearia erubescens* (moth daisybush), *Oxylobium ellipticum*, *Hakea microcarpa* and *Leptecophylla parvifolia*. Other graminoid species including *Gymnoschoenus sphaelata*, *Lepidosperma filiforme* and Restionaceae species formed incursions from the lower, poorly drained areas to the south of the patch.

Grasses were occasional, including *Microlaena tasmanica*, *Australopyrum pectinatum* (prickly wheatgrass), and *Poa* species, as were the ground fern species *Asplenium flabellifolium* (necklace fern) and *Blechnum pennamarina* subsp. *alpina*. Herb species were present in the groundcover including *Hydrocotyle muscosa*, *H. hirta*, *H. sibthorpioides* (lawn marshpennywort), *Acaena novae-zelandiae* (common buzzy), *Rubus gunnianus* (alpine raspberry), *Gonocarpus tetragynus*, and *Galium australe*.

This vegetation community is listed as threatened under the NC Act. There was a 0.5 ha area of subalpine *Diplarrena latifolia* rushland recorded during the surveys, of which 0.4 ha falls within the disturbance footprint.

A vegetation condition assessment was undertaken for this patch on 12 July 2022 which assessed the patch as being in excellent condition (VCA score 89). The dominant life form cover of *Diplarrena latifolia* scored highly against the benchmark, as did the species diversity being more than 50% of the benchmark species present for all life forms and more than 50% of life forms present. There were no weed species recorded in the patch, and organic litter was dominated by native species and was more than 50% of the benchmark cover. The landscape surrounding the patch is contiguous native vegetation that is considered significantly disturbed due to the canals, roads and easements and forestry activities within 5 km of the area. The vegetation condition assessments were completed in accordance with *A Manual for Assessing Vegetation Condition in Tasmania* (Michaels 2006).



Figure 3.14: Subalpine *Diplarrena latifolia* rushland and adjacent eucalypt communities

***Acacia dealbata* forest (NAD)**

There was a patch of *Acacia dealbata* forest within the proposed substation site at the Dee Lagoon end of the transmission line alignment (Figure 3.1, Figure 3.2, Figure 3.15). *Acacia dealbata* was the dominant canopy tree to 12 m with the occasional *Eucalyptus dalrympleana* tree. The understorey was similar to the adjacent *Eucalyptus delegatensis* dry forest with a sparse shrub layer comprised of *Pultenaea juniperina*, *Leptecophylla parvifolia* and *Lomatia tinctoria*. The ground fern *Pteridium esculentum* was also commonly present. There is approximately 5.1 ha of *Acacia dealbata* forest within the disturbance footprint.



Figure 3.15: *Acacia dealbata* forest

***Leptospermum* forest (NLE)**

Leptospermum forest was verified from one location of the pipeline alignment on a poorly drained site on the northern side of an existing easement north of Butlers Gorge Road (Figure 3.1). *Leptospermum lanigerum* formed a dense closed canopy to about 3 m tall (Figure 3.16), with sparse mid and ground layers and a deep litter layer. The small trees *Melaleuca virens*, *Pomaderris apetala* subsp. *apetala* and the graminoid *Gahnia grandis* were occasionally present. There is approximately 3 ha of *Leptospermum* forest within the disturbance footprint.



Figure 3.16: *Leptospermum* forest

***Sphagnum* peatland (ASP)**

An area of *Sphagnum* peatland (ASP) is mapped on TASVEG 4 on the western bank of the unconfined channel which conveys water from the No. 2 Canal to Mossy Marsh Pond which is located approximately 400 m downstream of the peatland (Figure 3.1, Figure 3.18). The *Sphagnum* peatland is potentially indirectly affected by the project because currently water is released from No. 2 Canal and flows past the *Sphagnum* peatland into Mossy Marsh Pond. The flow of water past the *Sphagnum* peatland will decline with the Tarraleah redevelopment project which may change the hydrology of the peatland and potentially have an impact. A field survey and a drone survey were undertaken on 27 September and 5 November 2018 to verify the presence of *Sphagnum* peatland (ASP) and to map its current extent. The patch was found to be 3.9 ha in size and in excellent condition (Figure 3.17).

The *Sphagnum* peatland has an almost complete cover of *Sphagnum* moss interspersed with the sedge *Gahnia grandis* and the shrubs *Baeckea gunniana* and *Melaleuca squarrosa* (scented paperbark). *Eucalyptus rodwayi* is present as a scattered tree with a canopy cover of 10%. The level of cover of *Eucalyptus rodwayi* is at the upper end of that which is typically present in a *Sphagnum* peatland at around 10% canopy cover but it still has the defining characteristic of a *Sphagnum* peatland with the presence of a dense cover of (90% or more) of *Sphagnum*.

There was another small patch of *Sphagnum* peatland of 0.3 ha mapped on TASVEG 4 located approximately 700 m to the north east adjacent to Wentworth Canal. The drone survey verified that this patch is *Melaleuca squarrosa* scrub (SMR) and does not include any *Sphagnum* peatland.

Sphagnum peatland is listed as an endangered ecological community under the EPBC Act where it is one of the components of the Alpine *Sphagnum* Bogs and Associated Fens community which occurs in south eastern Australia and Tasmania. *Sphagnum* peatland is also listed as a threatened native vegetation community under the NC Act (Tas).



Figure 3.17: *Sphagnum* peatland

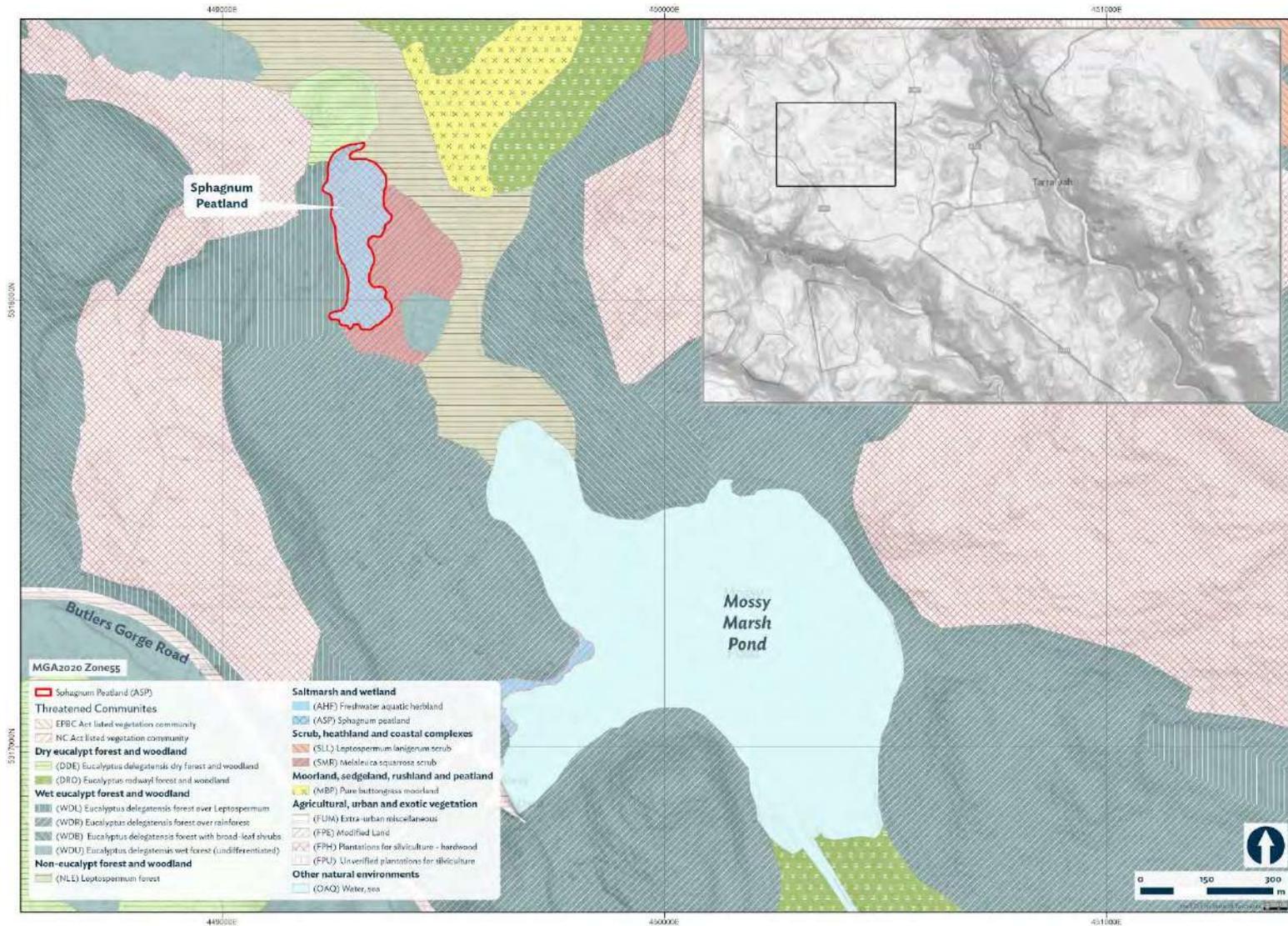


Figure 3.18: Location of *Sphagnum* peatland

3.2 Flora

The field surveys recorded 135 flora species within the Project survey area, of which 119 were native species and 16 were introduced species. A full list of flora species recorded during the survey is provided in Appendix A. Thirteen threatened flora species listed under the TSP Act have previously been recorded within 5 km of the survey area, in addition to two species listed under the EPBC Act (Table 3.3). A further seven species listed under the EPBC Act were identified as potentially occurring by the PMST search (Table 3.3).

The two flora species listed under the EPBC Act that have been previously recorded within 5 km of the Project survey area include *Barbarea australis* (native wintercress) and *Xerochrysum palustre* (swamp everlasting). Surveys for and records of *Barbarea australis* are discussed further in Entura (2023).

There are 12 records of *Xerochrysum palustre* within 5 km of the survey area. The records are from Father of Marshes, 1.7 km south of the transmission line alignment and the most recent records are in May 2021. However, it was not recorded during field surveys within the survey area and is considered unlikely to occur because of the absence of suitable wetland habitat.

Three threatened species listed under the TSP Act were recorded within the survey area during flora surveys: *Westringia angustifolia* (narrowleaf westringia), *Muehlenbeckia axillaris* (matted lignum) and *Ptherosphaera hookeriana* (Mount Mawson Pine). *Westringia angustifolia* is listed as rare under the TSP Act and was recorded at two locations along the transmission line alignment. It was also recorded at three locations along the River Derwent between Clark Dam and Wayatinah Lagoon. At the first location on the transmission line alignment, the population extended over an area of 150 m by 80 m and extended from the current transmission line alignment into the adjacent *Eucalyptus amygdalina* forest on dolerite community (Figure 3.19). At the second location, the population extended over an area of 40 m by 20 m which included the current transmission line alignment and the adjacent *E. delegatensis* dry forest. The three occurrences of *Westringia angustifolia* along the River Derwent comprised one plant at each location.



Figure 3.19: *Westringia angustifolia* (narrowleaf westringia) in the transmission line alignment

Muehlenbeckia axillaris was recorded at one location along the River Derwent between Clark Dam and Wayatinah Lagoon. *Muehlenbeckia axillaris* is listed as rare under the TSP Act. A small population of 11 plants of *Pherosphaera hookeriana* (Mount Mawson pine) was also recorded along this section of the River Derwent. *Pherosphaera hookeriana* is listed as vulnerable under the TSP Act.

Pomaderris elachophylla, which is listed as vulnerable under the TSP Act, was recorded just outside the survey area in the vicinity of the headrace tunnel portal. Ten plants were recorded adjacent to No. 2 Canal over an area 10 m by 3 m.

The remaining eight species listed under the TSP Act identified in the NVA search were considered unlikely to occur within the survey area (Table 3.3), because they were not recorded during field surveys and/or there was no suitable habitat within the survey area.

None of the seven species listed under the EPBC Act identified in the PMST search were considered likely to occur within the survey area (Table 3.3), because:

- none were recorded during field surveys
- the survey area is outside the known ranges of the species
- and/or there was no suitable habitat within the survey area.

Table 3.3: Threatened flora species recorded or may occur within 5 km of the Project survey area.

Species	Common Name	Conservation Category		Source	Habitat	Potential for occurrence
		TSP Act	EPBC Act			
<i>Asperula scoparia</i> subsp. <i>scoparia</i>	Prickly woodruff	Rare	Not listed	NVA	A small perennial rhizomatous herb with white flowers that forms mats (Threatened Species Section 2011a). Known from grassy woodland and tall eucalypt forest often in hilly and rocky sites.	There are seven NVA records within 5 km of redevelopment works last recorded from May 2021 on Butlers Gorge Road to the west of the survey area east of Lake King William. Suitable tall eucalypt forest habitat has been verified within the survey area; however, this species was not recorded during the flora surveys between 2018 and 2022 therefore is unlikely to occur .
<i>Acacia axillaris</i>	Midlands wattle	Vulnerable	Vulnerable	PMST	A shrub to 4 m with narrow pointed leaves mostly occurring along watercourses or around soaks but can extend further into surrounding areas. Occurs in the lowland pastoral and agricultural region of the Midlands, in north and east-central Tasmania, and Mt Barrow in the subalpine/montane zone of northeast Tasmania (Department of the Environment 2014).	No NVA records within 5 km of survey area. Outside of known range; not recorded during 2018 to 2022 flora surveys. Species unlikely to occur .

Species	Common Name	Conservation Category		Source	Habitat	Potential for occurrence
		TSP Act	EPBC Act			
<i>Barbarea australis</i>	Native wintercress	Endangered	Endangered	NVA	An annual or short-lived perennial herb occurring along flood-prone rocky river systems. Endemic to Tasmania, known from about 11 river systems extending from northern Tasmania to rivers flowing south from the Central Highlands (Threatened Species Section 2010a).	There are 25 NVA records within 5 km of survey area and suitable riverine habitat within the River Derwent and Nive River. Species likely to occur .
<i>Carex capillacea</i>	Yellowleaf sedge	Rare	Not listed	NVA	Slender perennial sedge that occurs in marshy habitat and short alpine herbfields associated with snow patches around the Central Highlands at altitudes of 600-1400 m. It has also been recorded from the north-west at Arm River Flats. Tarraleah is listed in the Notesheet as one of the key sites for the species (Threatened Species Unit 2003a).	There is one historic record within 5 km of the survey area last recorded in December 1986 with poor location accuracy of 2.5 km. Species was not recorded during the flora surveys between 2018 and 2022 therefore is unlikely to occur .
<i>Carex gunniana</i>	Mountain sedge	Rare	Not listed	NVA	Perennial sedge that occurs in wet eucalypt forest and sandy heathlands, margins of streams, damp grasslands within dry forest and rough pasture (Threatened Species Section 2016a).	There are two records within 5 km of the Project survey area last recorded in January 2022 on the western shore of Tungatinah Lagoon north of the survey area. Limited suitable habitat within the survey area and species not recorded during 2018 to 2022 flora surveys therefore species unlikely to occur .

Species	Common Name	Conservation Category		Source	Habitat	Potential for occurrence
		TSP Act	EPBC Act			
<i>Colobanthus curtisiae</i>	Curtis' colobanth	Rare	Vulnerable	PMST	Small perennial herb growing to 40 mm high. Requires bare ground for recruitment from seed and responds well to some disturbance such as grazing. Endemic to Tasmania, extending from the Central Plateau to Ben Lomond in the north, to Fingal Tier in the east and Kempton in the south. Grows in grassland to grassy woodland areas and occurs on gentle slopes with elevations between 160 m in lowland areas and 1300 m in alpine areas (Threatened Species Unit 2001).	No NVA records within 5 km of survey areas. No suitable habitat within survey areas, and species not recorded during flora surveys therefore species unlikely to occur .
<i>Eucalyptus gunnii</i> subsp. <i>divaricata</i>	Miena cider gum	Endangered	Endangered	PMST	Small to medium sized tree which is endemic to the Central Plateau in Tasmania with dull green foliage. Juvenile foliage is glaucous and bluish green. Occurs as grassy open woodland at the exposed edges of treeless flats or hollows (frost hollows) around yingina / Great Lake between 865–1150 m AHD (Threatened Species Section 2010b).	No NVA records within 5 km of survey area. Outside of altitudinal and known range, not recorded during flora surveys. Species unlikely to occur .

Species	Common Name	Conservation Category		Source	Habitat	Potential for occurrence
		TSP Act	EPBC Act			
<i>Euphrasia scabra</i>	Yellow eyebright	Endangered	Not listed	NVA	Annual herb with creamy yellow flowers 9 to 12 mm long and 8 mm wide. In Tasmania, this species is known to occur in the Eastern Tiers near Fingal, near Lake Sorell and near Hobart. Populations in the north from St Marys to Rocky Cape are now believed to be extinct. This species occurs in moist herb/sedge communities in grassy leads in marshes or in drier open grassy areas on hills at the headwaters of creeks (Threatened Species Unit 2002).	There are 18 NVA records within 5 km of the Project survey area with a plant count of over 1,000, recorded in January 2022 on the northeast and northern shores of Tungatinah Lagoon north of the survey area. No suitable habitat in survey area. Species not recorded during 2018 to 2022 flora surveys therefore species unlikely to occur .
<i>Glycine latrobeana</i>	Clover glycine	Vulnerable	Vulnerable	PMST	A small prostrate perennial herb up to 10 cm tall which resembles clover. It grows in dry forest and woodland and native grasslands (Carter and Sutter 2010). It occurs on the East Coast, in the north, north-west and the Midlands.	No NVA records within 5 km of survey areas. The Project survey area was outside the known range of the species, and it was not recorded during 2018 to 2022 flora surveys therefore species unlikely to occur .
<i>Hovea tasmanica</i>	Rockfield purplepea	Rare	Not listed	NVA	Spindly erect shrub found on dry, rocky ridges or slopes in forest and riverine scrub (Threatened Species Section 2016b).	There are 17 NVA records within 5 km of the Project survey area, last recorded in October 2014 on the Nive River downstream of Lake Liapootah spillway south of the survey area. No suitable habitat encountered during surveys. Species not recorded during 2018 to 2022 flora surveys therefore species unlikely to occur .

Species	Common Name	Conservation Category		Source	Habitat	Potential for occurrence
		TSP Act	EPBC Act			
<i>Lepidium hyssopifolium</i>	Basalt peppercress	Vulnerable	Vulnerable	PMST	An erect, weedy looking, much-branched herb to 50 cm in the Brassicaceae family. It grows in dry, warm and fertile areas in Tasmania, on flat ground, from an altitude of 40 to 500 m (Threatened Species Unit 2003b). Occurs from the East Coast, through the northern Midlands, southern Midlands and Derwent Valley.	No NVA records within 5 km of survey area. Outside of altitudinal and known range, not recorded during flora surveys. Species unlikely to occur .
<i>Leucochrysum albicans</i> subsp. <i>tricolor</i>	Hoary sunray	Endangered	Endangered	PMST	Perennial herb with greenish-yellow flowers that occurs in the west and on the Central Plateau and the Midlands, mostly on basalt soils in open grassland. Would have originally occupied <i>Eucalyptus pauciflora</i> woodland and tussock grassland, though most of its habitat is now converted to pasture or cropland (Threatened Species Section 2017a).	No NVA records within 5 km of survey areas. The Project survey areas are outside the known range of the species, and it was not recorded during flora surveys therefore species unlikely to occur .
<i>Muehlenbeckia axillaris</i>	Matted lignum	Rare	Not listed	NVA	A small prostrate, straggling or trailing shrub forming patches to 80 cm in diameter. Occurs in moist gravelly places along rivers or rocky places on the Central Plateau, extending out to the north-east, north-west and west of the State (Threatened Species Unit 2003c).	There are four NVA records within 5 km of the Project survey area, last recorded in March 2021 on the River Derwent south of the survey area between Clark Dam and Wayatinah Lagoon. Species recorded at one location along the River Derwent during flora surveys.

Species	Common Name	Conservation Category		Source	Habitat	Potential for occurrence
		TSP Act	EPBC Act			
<i>Pherosphaera hookeriana</i>	Mount Mawson pine	Vulnerable	Not listed	NVA	A small conifer that grows up to 5 m in height and occurs in montane areas (Threatened Species Section 2016c). It grows in a range of habitats, including alpine and coniferous heath, eucalypt woodland, rainforest dominated by <i>Athrotaxis cupressoides</i> (pencil pine), the margins of streams and highland lakes, and <i>Sphagnum</i> bogs.	There are 23 NVA records within 5 km along the River Derwent south and south-east of the survey area, the most recent record from March 2022. Species was recorded at one location along the River Derwent between Clark Dam and Wayatinah Lagoon. Species is present within the survey area.
<i>Pilularia novae-hollandiae</i>	Australian pillwort	Rare	Not listed	NVA	Aquatic or semi-aquatic fern that grows in mud or silt of shallow rivers and on seasonally inundated margins of creeks and rivers. The species is known from the Central Plateau and Midlands (Threatened Species Section 2011b).	There is one NVA record within 5 km of the survey area from February 1991 on the Nive River approx. 240 m downstream of Tungatinah Power Station. There is no suitable habitat within the Project survey area. The flows downstream of the power station can be quite strong and would not allow the establishment of continued persistence of this species. The species was not recorded during 2018 to 2022 flora surveys therefore species is considered unlikely to occur within the survey area.

Species	Common Name	Conservation Category		Source	Habitat	Potential for occurrence
		TSP Act	EPBC Act			
<i>Pimelea curviflora</i> <i>var. gracilis</i>	Slender curved rice flower	Rare	Not listed	NVA	A much branched slender shrub with wiry erect branches to 100 cm tall (Threatened Species Unit 2005). Occurs in wet sclerophyll forest.	There are nine NVA records within 5 km of survey area, the most recent record from October 2016 downstream of the Pump Pond east of Mossy Marsh. Potential suitable wet sclerophyll forest habitat present within the survey area, however species was not recorded within the survey area during the 2018 to 2022 surveys. Species unlikely to occur .
<i>Pomaderris elachophylla</i>	Small-leaf dogwood	Vulnerable	Not listed	NVA	A slender, woody shrub to 3 m with small leaves and branches with a dense covering of hairs (Threatened Species Unit 2003d). It occurs in wet sclerophyll forests to wet shrubby woodlands.	There are 68 records of <i>Pomaderris elachophylla</i> totalling a count of more than 97 plants within 5 km of the survey area. This species was recorded in multiple locations on Butlers Gorge Road and was last recorded in May 2021 west of the Project survey area, however the species was not recorded within the survey area. Species unlikely to occur .
<i>Pterostylis pratensis</i>	Liawenee greenhood	Vulnerable	Vulnerable	PMST	Small terrestrial greenhood orchid to 15 cm tall that is known only from the Central Highlands at an altitude of 850 to 1,100 m. It occurs in subalpine <i>Poa labillardierei</i> tussock grassland with patches of often stunted <i>Olearia algida</i> and <i>Hakea microcarpa</i> (Threatened Species Section 2008).	No NVA records within 5 km of survey area. Outside of known range on the Central Plateau, nearest records are over 34 km to the north east. No suitable <i>Poa</i> tussock grassland and not recorded during flora surveys. Species unlikely to occur .

Species	Common Name	Conservation Category		Source	Habitat	Potential for occurrence
		TSP Act	EPBC Act			
<i>Pseudocephalozia paludicola</i>	Alpine leafy liverwort	Not listed	Vulnerable		An erect or nearly erect light green liverwort that arises from a system of leafless, pale stolons. A subalpine species that occurs around the west and on the central highlands and eastern mountains where it has been found in wet ground in subalpine grassland, moorland and sphagnum areas (Threatened Species Unit 2003e).	No NVA records within 5 km of survey area. Outside of altitudinal and known range, not recorded during flora surveys. Species unlikely to occur .
<i>Uncinia elegans</i>	Handsome hooksedge	Rare	Not listed	NVA	A tufted perennial plant that occurs in a wide range of forest types including wet sclerophyll forest, dry sclerophyll forest and open grassy woodlands. It is most often associated with damp grassy habitats and can occur on disturbed sites (Threatened Species Section 2017b).	There are 44 NVA records within 5 km of the survey area totalling a count of more than 143 plants, last recorded from December 2018. Species recorded from along the Lyell Highway, Fourteen Mile Road, between the Lyell Highway and Nive River upstream of Tungatinah Power Station, and along Victoria Valley Road east of Dee Lagoon. The species was not recorded during 2018 to 2022 flora surveys therefore species unlikely to occur .
<i>Westringia angustifolia</i>	Narrowleaf westringia	Vulnerable	Not listed	NVA	A shrub to 3 m tall with slender spreading branches. With white to pale lilac flowers (Threatened Species Unit 2003f). Grows in dry, shrubby understorey, often on dolerite and often on riverbanks.	There are 31 records of <i>Westringia angustifolia</i> within 5 km of the survey area along Butlers Gorge Road, River Derwent, and Nive River. The most recent NVA records are from along the Nive River downstream of Liapootah Dam from October 2014, south of the

Species	Common Name	Conservation Category		Source	Habitat	Potential for occurrence
		TSP Act	EPBC Act			
						Project survey area. Species recorded in flora surveys in December 2022 at two locations on the transmission alignment and at three locations on the River Derwent in March 2022.
<i>Xerochrysum palustre</i>	Swamp everlasting	Vulnerable	Vulnerable	NVA	Perennial yellow paper daisy 30 to 120 cm high, that occurs in wet habitats including sedgeland and rushland dominated wetlands, grassy to sedgy wet heathlands and heathy open <i>Eucalyptus ovata</i> woodlands (Threatened Species Section 2016b). In Tasmania, the species has a scattered distribution in the northeast, east coast, Central Highlands and midlands at altitudes below 700 m AHD (Threatened Species Section 2016d).	There are six NVA records within 5 km of the survey area. The records are located in areas mapped on TASVEG 4 as lacustrine herbland (AHL) and agricultural land (FAG) approximately 2 km south of the transmission line alignment. No suitable habitat with the survey area. Species was not recorded during flora surveys. Species unlikely to occur.

3.3 Weeds and diseases

3.3.1 Weeds

Fifteen introduced plant species were recorded within the survey area of which four, *Cirsium arvense* var. *arvense* (Californian thistle), *Ulex europaeus* (gorse), *Genista monspessulana* (Montpellier Broom), *Cytisus scoparius* (English broom), are listed as declared under the *Weed Management Act 1999* (Tas). A complete list of introduced species encountered during surveys is provided in the flora species list in Appendix A.

3.3.2 *Phytophthora cinnamomi*

Commonly known as root rot or dieback, *Phytophthora cinnamomi* is a soil-borne fungal pathogen that invades the roots of plants and starves them of nutrients and water. It is generally spread by the transportation of soil on vehicles, construction machinery and walking boots. Soils that are more favourable for the spread of *Phytophthora* are generally the low nutrient types that support healthy communities. The vegetation types most affected in Tasmania are heathland, moorland, dry sclerophyll forest.

Phytophthora cinnamomi requires warm moist soils if it is to reproduce and spread. This limits its distribution in Tasmania to areas that are generally below about 700 m in altitude. There are potentially susceptible vegetation communities within the survey area including dry sclerophyll forest, however, the survey area is towards the upper limit of the altitudinal range of *Phytophthora cinnamomi* therefore the pathogen is unlikely to occur. There are no *Phytophthora cinnamomi* records on the NVA within 5 km of the survey area, and there were no symptoms of infection (i.e. dieback in susceptible species) recorded during field surveys.

3.4 Fauna

The proposed Tarraleah Redevelopment Project area covered three main fauna habitats including dry and wet sclerophyll forest and buttongrass moorland. However, buttongrass moorland generally supports a low diversity of fauna due to its simple structure resulting in a lack of habitat heterogeneity. The two forest habitats would provide habitat for a range of fauna species including the two threatened fauna species that have been recorded on the NVA within 5 km of the survey area (Table 3.4). The threatened fauna includes the two mammal species, the carnivores *Dasyurus viverrinus* (eastern quoll) and *Sarcophilus harrisii* (Tasmanian devil). These species have been recorded within 5 km of the survey area and are considered likely to occur in suitable habitat within the survey area, however, no dens were recorded during the 2018 to 2022 surveys (Table 3.4). Further, *Dasyurus maculatus* subsp. *maculatus* (spotted-tailed quoll) was identified as potentially occurring within the survey area from the PMST, and there was suitable wet forest habitat recorded within the survey area for this species, however, no dens were recorded during field surveys. Tasmanian devils and the quolls are known to be at high risk from roadkill due to their scavenging behaviour attracting them to roads. Note there are four Tasmanian devil roadkill records on the Lyell Highway between the Tarraleah village and the Butlers Gorge Road intersection, and a further six Tasmanian devil records between the Butlers Gorge Road intersection and Wayatinah.

Perameles gunnii (eastern barred bandicoot) is an EPBC Act listed (vulnerable) mammal identified as potentially occurring within the survey area from the PMST search, however, there are no NVA records within 5 km of the survey area. The nearest record was from the Lyell Highway 14 km to the east of the

survey area which was recorded in May 2007. There is no suitable forest agricultural mosaic habitat for the eastern barred bandicoot within the survey area. Therefore, this species is unlikely to occur in the survey area.

There are two wedge-tailed eagle nests within 1 km of the survey area recorded on the NVA listed as present:

- nest #2298 which is located 420 m south of transmission line alignment which was last surveyed in June 2022 and was noted to be in poor condition
- nest #1700 which is located 820 m south of transmission line alignment which was last surveyed in June 2022 and was noted to be in average condition.

There is also nest #484: which is located 660 m south of transmission line alignment and was last surveyed in October 2000 where it was recorded as disintegrated. This nest is recorded on the NVA as being absent.

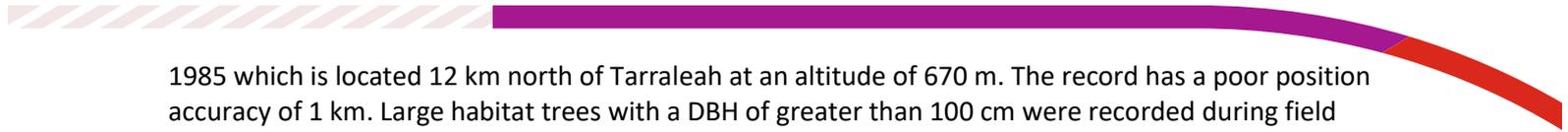
A further 12 bird species were identified as potentially occurring in the survey area on the PMST, of which six species *Myiagra cyanoleuca* (satin flycatcher), *Hirundapus caudacutus* (white-throated needletail), *Apus pacificus* (fork-tailed swift), *Lathamus discolor* (swift parrot), *Gallinago hardwickii* (Latham's snipe) and *Tyto novaehollandiae castanops* (Tasmanian masked owl), may occur within the survey area (Table 3.4).

The satin flycatcher occurs in wet and damp tall eucalypt forests in Tasmania, of which there is approximately 62 ha of wet eucalypt forest within the survey area. Fork-tailed swifts and white-throated needletails are almost exclusively aerial and have the potential to occur over a range of habitats, including those that occur within the survey area.

There is potential for the swift parrot to occur in *Eucalyptus delegatensis* forest within the survey area. However, the site is not within the species breeding range which is mostly within 10 km of the coast in eastern and south eastern Tasmania, although there is breeding in some years on the central north and north western coast of Tasmania (Threatened Species Scientific Committee 2016). Post breeding birds move westwards to the Central Plateau and western Tasmania as their preferred breeding season foraging resource flowering *Eucalyptus globulus* (Tasmania blue gum) declines and other eucalypts begin to flower elsewhere, including *Eucalyptus delegatensis*. The parrots are nomadic during the post breeding period, appearing wherever there is a suitable nectar source in the west and north of the state.

Latham's snipe may be found in a variety of vegetation types or communities including tussock grasslands with rushes, reeds and sedges, coastal and alpine heathlands, button-grass plains, alpine herbfields and open forest. There is potential for the species to occur in the buttongrass moorland with emergent shrubs (1.6 ha) within the survey area.

The Tasmanian masked owl is widely distributed throughout the state in a range of wet and dry forest types, with the highest known densities occurring in low elevation areas (<600 m ASL) dominated by mature dry sclerophyll forests, open woodlands and modified forest–pasture mosaics (Bell and Mooney 2002; Todd et al. 2018). Potential nesting trees for the masked owl includes those with large hollows with an entrance usually larger than 15 cm diameter. Large hollows are found in large trees, and trees over 100 cm diameter-at-breast height (DBH) have been found to have a higher probability of containing hollows suitable for masked owls than smaller diameter trees (Forest Practices Authority 2014). Therefore, forest areas that contain trees with large hollows are considered to be important habitat for the species. There are no NVA record within 5 km of the survey area and the nearest records of masked owl are 6.6 km east of Tarraleah from 2006 at around 600 m ASL. There is one historic nest record from



1985 which is located 12 km north of Tarraleah at an altitude of 670 m. The record has a poor position accuracy of 1 km. Large habitat trees with a DBH of greater than 100 cm were recorded during field surveys, particularly in unlogged forest areas along the pipeline alignment, at the surge tower and at the start of the transmission line alignment.

There were two fauna species that are listed under the TSP Act identified on the NVA within 5 km of the survey area. They are the grey goshawk (*Accipiter novaehollandiae*) and the Lake Fenton trapdoor spider (*Plesiothele fentoni*) which are both listed as endangered under the TSP Act. There is a small area of 7.4 ha of suitable wet forest habitat in the form of *Eucalyptus delegatensis* forest over rainforest for both species within the survey area.

No threatened reptiles or amphibians were identified as potentially occurring in the survey area from the PMST search, nor were there any NVA records within a 5 km of the survey area. In addition, none were sighted or heard during the field surveys.

Table 3.4: Threatened fauna species recorded or may occur within 5 km of Project survey area.

Key – NVA (Natural Values Atlas), PMST (Protected Matters Search Tool), MiT (Migratory Terrestrial species), MiW (Migratory Wetland Species)

Species	Common Name	Conservation Category		Source	Habitat	Potential for occurrence
		TSP Act	EPBC Act			
Mammals						
<i>Dasyurus maculatus</i> subsp. <i>maculatus</i>	Spotted-tailed quoll	Rare	Vulnerable	NVA	A medium-sized carnivorous marsupial found in a variety of habitats, however, forest elements such as rainforest and wet and dry eucalypt forest are important components of their habitat (Threatened Species Section 2022a).	There are eight records within 5 km of the Project survey area. Five of these records are historic (pre-1957) and three are more recent: 1985 and 2014. There is wet sclerophyll forest that is potentially suitable foraging and denning habitat within the survey areas. No dens were recorded during surveys. Species likely to occur .
<i>Dasyurus viverrinus</i>	Eastern quoll	Not listed	Endangered	NVA	A small carnivorous marsupial found in a range of vegetation types including open grassland (including farmland), tussock grassland, grassy woodland, dry eucalypt forest, coastal scrub and alpine heathland, but tends to be absent from large tracts of wet eucalypt forest and rainforest (Threatened Species Scientific Committee 2015).	There are 17 records on the NVA within 5 km of the Project survey area with the most recent record being from March 2009. There is dry sclerophyll forest that is potentially suitable foraging and denning habitat within the survey areas, however, no dens were recorded during the surveys. Species likely to occur .

Species	Common Name	Conservation Category		Source	Habitat	Potential for occurrence
		TSP Act	EPBC Act			
<i>Perameles gunnii</i>	Eastern barred bandicoot	Not listed	Vulnerable	PMST	A small marsupial with long pink nose and large ears and characteristic pale bars across its hindquarters. Occurs in a range of agricultural habitats across Tasmania where improved pasture is interspersed with patches of native bush (Department of the Environment, Water, Heritage and the Arts 2008).	Ten NVA records within 5 km of Project survey area; the most recent being from May 2007. Most of these records are in the vicinity of the proposed transmission line route. Limited suitable habitat present within the redevelopment area. Species likely to occur .
<i>Sarcophilus harrisii</i>	Tasmanian devil	Endangered	Endangered	NVA	A medium-sized carnivorous marsupial that occurs in a wide range of habitats across Tasmania including forest, woodland, agricultural areas and forest plantations (DEWHA 2009).	There are 30 records on the NVA within 5 km of the Project survey area; the most recent record from January 2022. The nearest record to the redevelopment area is along Butlers Gorge Road from 2008. There is suitable foraging and denning forest habitats within the survey areas, however, no dens were recorded during surveys. Species likely to occur .
Birds						
<i>Accipiter novaehollandiae</i>	Grey goshawk	Endangered	Not listed	NVA	A medium sized white goshawk that inhabits wet forest, mixed forest and swamp forest, particularly where blackwood is present (Threatened Species Section 2023). The species nests in mature wet forest, usually in the vicinity of a watercourse.	There are six NVA records within 5 km of the Project survey area, with the last record from October 2018. There are no known nests within 1 km. There is 7.4 ha of <i>Eucalypt delegatensis</i> forest over rainforest within the survey area which may be potential suitable nesting habitat. Species likely to occur .

Species	Common Name	Conservation Category		Source	Habitat	Potential for occurrence
		TSP Act	EPBC Act			
<i>Actitis hypoleucos</i>	Common sandpiper	Not listed	MiW	PMST	A small sandpiper found along all coastlines of Australia and in many areas inland. When in Australia, the population is concentrated in northern and western Australia (Department of the Environment 2022d).	No suitable habitat as primarily a coastal dwelling and marine species. No NVA records within 5 km of survey areas. Species unlikely to occur .
<i>Apus pacificus</i>	Fork-tailed swift	Not listed	MiW	PMST	A medium to large blackish swift with a white band across the rump. It has a slim body, long narrow wings and a deeply forked tail. Migratory species which occurs in Australia between October and mid-April. They are almost exclusively aerial within the species' Australian distribution, where they occur over a range of habitats both inland and on coasts (Department of the Environment 2022a). They sometimes occur above wet sclerophyll forest or open forest.	No NVA records within 5 km of the Project survey areas, however species likely to occur as it occurs over a range of habitat type including wet and dry forests.

Species	Common Name	Conservation Category		Source	Habitat	Potential for occurrence
		TSP Act	EPBC Act			
<i>Aquila audax fleayi</i>	Tasmanian wedge-tailed Eagle	Endangered	Endangered	NVA	<p>A large brown-black eagle that occurs across Tasmania. Important habitat for the species is nesting habitat, which is defined as patches of eucalypt forest of predominantly old growth trees greater than 10 ha in area (Threatened Species Section 2022b).</p>	<p>There are three known wedge-tailed eagle nests within 1 km of the Project survey area including:</p> <ul style="list-style-type: none"> • nest #484: approx. 660 m south of transmission line alignment; last surveyed in October 2000 and was noted as disintegrated and recorded as absent. • nest #2298: approx. 420 m south of transmission line alignment; last surveyed June 2022 and was noted as being in poor condition. • nest #1700: approx. 820 m south of transmission line alignment; last surveyed in June 2022 and was noted as being in average condition. <p>There are an additional four wedge-tailed eagle nests between 1 and 2 km of the transmission line alignment, including nest #1013, #1082, #2831 and #855. Species likely to occur.</p>

Species	Common Name	Conservation Category		Source	Habitat	Potential for occurrence
		TSP Act	EPBC Act			
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	Not listed	MiW	PMST	A small to medium-sized wader that spends its non-breeding season in Australia over summer. Prefers muddy edges of shallow fresh or brackish waters, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. In Tasmania, they mostly occur in coastal areas in the east from George Town to Hobart, with scattered records on the north-west coast, and west coast from Henty River and Port Davey (Department of the Environment 2022c).	No NVA records within 5 km of the Project survey areas. No suitable wetland habitat within survey areas. Species unlikely to occur .
<i>Calidris ferruginea</i>	Curlew sandpiper	Not listed	Critically endangered	PMST	Small, slim sandpiper that mainly occurs on intertidal mudflats in sheltered coastal areas and around non-tidal swamps, lakes and lagoons near the coast. They mostly occur in coastal eastern Tasmania, but also at several sites in the northwest (Department of the Environment 2022d).	No NVA records within 5 km of the Project survey areas. No suitable wetland habitat within survey areas. Species unlikely to occur .
<i>Calidris melanotos</i>	Pectoral sandpiper	Not listed	MiW	PMST	Small to medium-sized sandpiper that occurs in coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The species is a rare visitor to Tasmania, with records existing for Cape Portland, Orielson Lagoon-Sorell, Barilla Bay, Clear Lagoon, Cameron Inlet and	No NVA records within 5 km of the Project survey areas. No suitable wetland habitat at the site and species is very rare in Tasmania. Species unlikely to occur .

Species	Common Name	Conservation Category		Source	Habitat	Potential for occurrence
		TSP Act	EPBC Act			
					Flinders Island (Department of the Environment 2022e).	
<i>Ceyx azureus diemenensis</i>	Tasmanian azure kingfisher	Endangered	Endangered	NVA	A small brightly coloured kingfisher with a long slender black bill and red legs. This species inhabits the forested margin of rivers. The breeding range in Tasmania is considered to be western and north western near-coastal Tasmania (Threatened Species Section 2012).	There is one record within 5 km of the Project survey area from January 2002 at Station Bay in Dee Lagoon. No suitable riverine habitat within survey area. Species unlikely to occur .
<i>Gallinago hardwickii</i>	Latham's snipe	Not listed	MiW	PMST	Medium-sized wader that occurs in permanent and ephemeral wetlands up to 2000 m AHD. May be found in a variety of vegetation types or communities including tussock grasslands with rushes, reeds and sedges, coastal and alpine heathlands, lignum or tea-tree scrub, buttongrass plains, alpine herbfields and open forest. This species is widespread in Tasmania, with the Central Plateau supporting large colonies of Latham's snipe (Department of the Environment 2022f).	No NVA records within 5 km of the Project survey area. Potentially suitable tea-tree scrub, buttongrass plains and open forest habitat within survey areas. Potential to occur .
<i>Haliaeetus leucogaster</i>	White-bellied sea-eagle	Vulnerable	Marine	NVA	A large eagle with white breast and grey wings which occurs along the coastline (including offshore islands) of mainland Australia and Tasmania. In Tasmania, nesting habitat is forest with old-growth eucalypts within 5 km of the coast (nearest coast including shores, bays, inlets and peninsulas), rivers, lakes or	There 14 observation records on the NVA but no known nests within 1 km of the Project survey area. Species unlikely to occur .

Species	Common Name	Conservation Category		Source	Habitat	Potential for occurrence
		TSP Act	EPBC Act			
					farm dams (Threatened Species Section 2006).	
<i>Hirundapus caudacutus</i>	White-throated needletail	Not listed	Vulnerable	NVA	A large swift with a thickset, cigar-shaped body, stubby tail and long pointed wings. Migratory species, almost exclusively aerial within its Australian distribution. Although they occur over most types of habitats, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings (Department of the Environment 2022g).	Two historic NVA records within 5 km of Project survey area, from 1976 and 1981, with poor location accuracy of 18.5 km. Potential to occur as it is almost exclusively aerial and occurs over most habitat types.
<i>Lathamus discolor</i>	Swift parrot	Endangered	Critically Endangered	NVA	A small bright green parrot with red under the wings and a red face. Breeding range (foraging and nesting habitat) is mostly within 10 km of the coast (including shores, bays, inlets or peninsulas) predominantly in eastern and south eastern Tasmania, although there is breeding in some years on the central north and north western coasts of Tasmania (Threatened Species Scientific Committee 2016). Foraging habitat is <i>Eucalyptus globulus</i> dry and wet forest and <i>E. ovata</i> forest during breeding season. Nesting habitat is forest with large eucalyptus trees with hollows in close proximity to foraging habitat (Threatened Species Scientific Committee 2016). Following breeding,	There are 13 NVA records within 5 km of the Project survey area, with the most recent recorded during surveys in February 2022 located 4 km north of the survey area. Species likely to occur as it may forage in <i>Eucalyptus delegatensis</i> forest within the survey area.

Species	Common Name	Conservation Category		Source	Habitat	Potential for occurrence
		TSP Act	EPBC Act			
					birds move westwards to the Central Plateau and western Tasmania as blue gum flowering declines and other eucalypts begin to flower elsewhere, including <i>Eucalyptus delegatensis</i> . The parrots are nomadic during the post-breeding period, appearing wherever there is a suitable nectar source in the west and north of the state.	
<i>Myiagra cyanoleuca</i>	Satin flycatcher	Not listed	MiT	NVA	Glossy blue-black and white flycatcher which is a summer migrant to Tasmania. The species inhabit wet and damp tall eucalypt forests in Tasmania (Department of the Environment 2022h).	There are 16 records on the NVA within 5 km of the Project survey area recorded between 1977 and 2019, with two recent records from the Mossy Marsh Lagoon area. Potentially suitable wet eucalypt forest habitat within Project area. Likely to occur in suitable wet eucalypt forest within survey area.
<i>Numenius madagascariensis</i>	Eastern curlew	Endangered	Critically endangered / MiT	PMST	The largest migratory shorebird with a characteristic long down-curved bill. During the non-breeding season in Australia, the eastern curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats. Eastern curlews are rarely recorded inland (Department of the Environment 2015).	No suitable habitat as coastal dwelling species in Tasmania. No records on NVA within 5 km of the Tarraleah redevelopment. Outside known Tasmanian range Species unlikely to occur .

Species	Common Name	Conservation Category		Source	Habitat	Potential for occurrence
		TSP Act	EPBC Act			
<i>Pterodroma leucoptera</i> subsp. <i>leucoptera</i>	Gould's petrel	Not listed	Endangered	PMST	Small, slightly built petrel about 70 cm in length. It is a pelagic marine species spending much of its time foraging at sea and coming ashore only to breed. Breeds on Cabbage Tree Island off the coast of mid north NSW (Department of the Environment 2022i).	No NVA records within 5 km of the Project survey areas. Outside of species range and no suitable habitat. Species unlikely to occur .
<i>Tyto novaehollandiae</i> subsp. <i>castanops</i>	Tasmanian masked owl	Endangered	Vulnerable	NVA	Large barn owl with buff to chestnut coloured facial disk. Inhabits a range of forest and woodland habitats including agricultural and forest mosaics. The highest densities are in the east and north and the lowest densities occur in the west of Tasmania (DEWHA 2010).	No NVA records or known masked owl nests within 5 km of the Project survey area. However, there were large habitat trees recorded within the Project survey area that may comprise suitable nesting or roosting habitat for the species. Potential for species to occur within the survey area.
Frogs						
<i>Litoria raniformis</i>	Green and gold frog	Vulnerable	Vulnerable	PMST	Large green tree frog to 80 cm long that breeds in permanent freshwater lagoons with a dense cover of aquatic vegetation in Lowland areas in Tasmania (Clemann and Gillespie 2012).	There are no records within 5 km of the of the Project survey area. Outside of species range and no suitable wetland habitat with emergent vegetation. Species unlikely to occur .
Invertebrates						
<i>Oreixena ptunarra</i>	Ptunarra brown butterfly	Vulnerable	Endangered	PMST	A small brown and orange butterfly endemic to Tasmania and restricted to five areas of the state: the Midlands, Steppes, Northwest Plains, Eastern Highlands and the Central	There are no records within 5 km of the of the Project survey area. Nearest known records are over 20 km to the north of the Project survey area. No suitable <i>Poa</i> tussock grassland habitat

Species	Common Name	Conservation Category		Source	Habitat	Potential for occurrence
		TSP Act	EPBC Act			
					Plateau. The species is found in areas where there is a significant cover of Poa tussock. The preferred habitat includes <i>Poa</i> tussock grassland Poa tussock grassland with scattered <i>Hakea microcarpa</i> shrubs and <i>Eucalyptus</i> grassy open woodland over Poa tussock (Threatened Species Section 1998).	within the Project survey area. Species unlikely to occur .
<i>Plesiothele fentoni</i>	Lake Fenton trapdoor spider	Endangered	Not listed	NVA	Small burrow inhabiting spider to 1.5 cm in length, with a yellow brown strongly patterned abdomen (Threatened Species Section 2017c). The species was until recently only known from Lake Fenton in the Mount Field National Park, where it occurs in subalpine woodland. It has since been recorded from the Wentworth Hills area near Tarraleah and south-west Tasmania in the Hartz National Park. At Wentworth Hills, the species was excavated from its holes in moss beds in tall wet forest. The potential habitat for the spider is described as 'mossy patches within rainforest, mixed forest and mature wet forest (particularly those with rainforest species in the understorey (Threatened Species Section 2017c).	There are 3 records on the NVA within 5 km of the Project survey area. Potential for species to occur in suitable wet eucalypt forest particularly with rainforest understorey (e.g. <i>Eucalyptus delegatensis</i> forest over rainforest).

4. Summary

4.1 Vegetation communities

The flora surveys identified thirteen native vegetation communities within the Project survey area including dry and wet sclerophyll forest, buttongrass moorlands and non-eucalypt forest communities. Two of these vegetation communities, subalpine *Diplarrena latifolia* rushland and *Sphagnum* peatland community, are listed as threatened under the NC Act. While the *Sphagnum* peatland is not within the area directly affected by the Project, it may potentially be affected by hydrological changes because of future changes in the operation of the Tarraleah hydropowerscheme. *Sphagnum* peatland is also a component of the Alpine Sphagnum Bogs and Associated Fens ecological community which is listed as endangered under the EPBC Act.

4.2 Flora

One flora species listed as endangered under the EPBC Act and the TSP Act was recorded with the survey area. There are records of *Barbarea australis* within the Derwent and Nive rivers and these may be potentially affected by hydrological changes due to the redevelopment project. The distribution of *Barbarea australis* is detailed in Attachment 4 - Tarraleah Redevelopment Freshwater Natural Values Report (Entura 2023). No other flora species listed under the EPBC Act were considered likely to occur within the survey area.

One flora species listed as rare under the TSP Act was also recorded within the survey area. Two populations of *Westringia angustifolia* were recorded along the proposed transmission line alignment.

4.3 Weeds and diseases

Four declared weed species have been recorded within the Project survey area; *Cirsium arvense* var. *arvense*, *Ulex europaeus*, *Genista monspessulana* and *Cytisus scoparius*. The survey area is located within the Central Highlands municipality which is a Zone B municipality for all of these species. The objective of weed management in Zone B municipalities is 'Containment within municipal boundaries, protection of specified areas within municipal boundaries, prevention of spread to Zone A municipalities'. There was no evidence of *Phytophthora cinnamomi* infection in the susceptible vegetation communities such as buttongrass moorland within the survey area.

4.4 Fauna

The threatened mammal species such as the Tasmanian devil, spotted-tailed quoll and eastern quoll may use the wet and dry forest habitats within the survey area. Potentially suitable denning habitat features such as rocky outcrops were recorded within survey area may be utilised by the Tasmanian devil or spotted-tailed quoll. No den sites were recorded during the field surveys between 2018 and 2022.

There are two known wedge-tailed eagle nests within 1 km of the survey area, both are south of the transmission line alignment.

Another six species of bird species listed as threatened under the EPBC Act were identified as potentially occurring within the survey area including two swift species *Hirundapus caudacutus* and *Apus pacificus* which are aerial species that do not use terrestrial habitats. There are records of the swift parrot adjacent to the survey area. However, the survey area is not located within the swift parrot breeding range, which is mostly within 10 km of the coast in eastern and south eastern Tasmania.

There were large habitat trees (>100 cm DBH) present within the survey area which may be suitable nesting or roosting habitat for the Tasmanian masked owl. Although there are no known nests within 5 km of the survey area, there is potential for this species to occur in the survey area. Latham's snipe (*Gallinago hardwickii*) may occur on occasions on the buttongrass plains that are along the proposed pipeline alignment, however, there are no records within 5 km.

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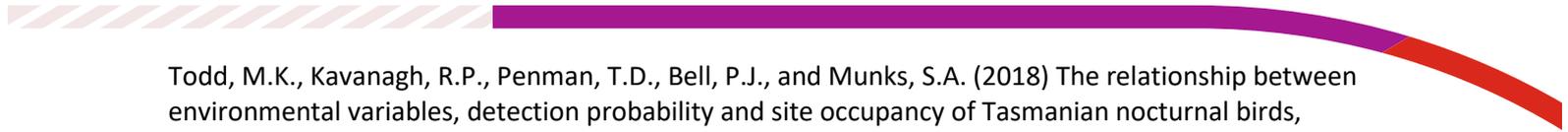
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Appendices

A Flora list from the Tarraleah Redevelopment Project area

Key: i – introduced, D – declared under the *Weed Management Act 1999*, e – endemic, En - Endangered EPBC Act, en - endangered TSP Act, r – rare TSP Act

Species name	Common name	Status
DICOTYLEDON		
Apiaceae		
<i>Hydrocotyle hirta</i>	hairy pennywort	
<i>Hydrocotyle sibthorpioides</i>	lawn marshpennywort	
<i>Hydrocotyle muscosa</i>	mossy pennywort	
<i>Oreomyrrhis eriopoda</i>	Australian caraway	
Asteraceae		
<i>Bedfordia linearis</i>	blanketleaf	en
<i>Brachyscome spathulata</i>	spoonleaf daisy	
<i>Cassinia aculeata</i>	dolly bush	
<i>Cirsium arvense</i> var. <i>arvense</i>	Californian thistle	I, D
<i>Coronidium monticola</i>	mountain everlasting	
<i>Euchiton</i> sp.	cottonleaf	
<i>Hypochaeris radicata</i>	cats' ear	i
<i>Lagenophora stipitata</i>	blue bottledaisy	
<i>Leontodon saxatilis</i>	hairy hawkbit	i
<i>Olearia algida</i>	alpine daisybush	
<i>Olearia erubescens</i>	moth daisybush	
<i>Olearia phlogopappa</i>	dusty daisybush	
<i>Olearia pinifolia</i>	prickly daisybush	en
<i>Olearia viscosa</i>	viscid daisybush	
<i>Ozothamnus rosmarinifolius</i>	swamp everlastingbush	
<i>Ozothamnus thyrsoideus</i>	arching everlastingbush	
<i>Senecio</i> sp.	groundsel	
<i>Sonchus oleraceus</i>	common sowthistle	i
<i>Taraxacum officinale</i>	dandelion	i
Brassicaceae		
<i>Barbarea australis</i>	Native wintercress	E, e, en

Species name	Common name	Status
<i>Cardamine hirsuta</i>	hairy bittercress	i
Cunoniaceae		
<i>Bauera rubioides</i>	wiry bauera	
Ericaceae		
<i>Epacris gunnii</i>	coral heath	
<i>Epacris impressa</i>	common heath	
<i>Epacris lanuginosa</i>	swamp heath	
<i>Gaultheria hispida</i>	copperleaf snowberry	e
<i>Leptecophylla parvifolia</i>	mountain pinkberry	e
<i>Monotoca glauca</i>	goldy wood	
<i>Richea sprengeioides</i>	rigid candleheath	
<i>Sprengelia incarnata</i>	pink swampheath	
<i>Styphelia nesophila</i>	prickly beardheath	
Euphorbiaceae		
<i>Poranthera microphylla</i>	small poranthera	
Fabaceae		
<i>Almaleea subumbellata</i>	wiry bushpea	
<i>Pultenaea juniperina</i>	prickly beauty	
<i>Pultenaea dentata</i>	swamp bushpea	
<i>Ulex europaeus</i>	gorse	i, D
<i>Genista monspessulana</i>	Montpellier Broom	i, D
<i>Cytisus scoparius</i>	English broom	i, D
Fagaceae		
<i>Nothofagus cunninghamii</i>	myrtle beech	
Geraniaceae		
<i>Geranium brevicaule</i>	alpine cranesbill	
<i>Geranium potentilloides</i>	mountain cranesbill	
Gunneraceae		
<i>Gunnera cordifolia</i>	Tasmanian mudleaf	
Haloragaceae		
<i>Gonocarpus montanus</i>	mountain raspwort	
<i>Gonocarpus sp.</i>	raspwort	
<i>Gonocarpus teucrioides</i>	forest raspwort	
Lamiaceae		
<i>Prunella vulgaris</i>	selfheal	i

Species name	Common name	Status
<i>Westringia angustifolia</i>	narrowleaf westringia	r
Linaceae		
<i>Linum catharticum</i>	white flax	i
Mimosaceae		
<i>Acacia dealbata</i> subsp. <i>dealbata</i>	silver wattle	
<i>Acacia melanoxylon</i>	blackwood	
Myrtaceae		
<i>Baeckea gunniana</i>	alpine heathmyrtle	
<i>Eucalyptus dalrympleana</i> subsp. <i>dalrympleana</i>	mountain white gum	
<i>Eucalyptus delegatensis</i> subsp. <i>tasmaniensis</i>	gumtopped stringybark	en
<i>Eucalyptus pauciflora</i> subsp. <i>pauciflora</i>	cabbage gum	
<i>Eucalyptus rodwayi</i>	swamp peppermint	en
<i>Leptospermum lanigerum</i>	woolly tea tree	
<i>Melaleuca pallida</i>	yellow bottlebrush	
<i>Melaleuca squamea</i>	swamp honeymyrtle	
<i>Melaleuca virens</i>	prickly bottlebrush	en
Oleaceae		
<i>Notelaea ligustrina</i>	native olive	
Onagraceae		
<i>Epilobium</i> sp.	willowherb	
Oxalidaceae		
<i>Oxalis</i> sp.	woodsorrel	
Pittosporaceae		
<i>Billardiera longiflora</i>	purple appleberry	en
<i>Pittosporum bicolor</i>	cheesewood	
Proteaceae		
<i>Banksia marginata</i>	silver banksia	
<i>Cenarrhenes nitida</i>	native plum	en
<i>Hakea epiglottis</i>	beaked needlebush	en
<i>Hakea lissosperma</i>	mountain needlebush	
<i>Hakea microcarpa</i>	smallfruit needlebush	
<i>Lomatia polymorpha</i>	mountain guitarplant	en
<i>Lomatia tinctoria</i>	guitarplant	en
<i>Orites diversifolius</i>	variable orites	en
<i>Persoonia gunnii</i>	mountain geebung	en

Species name	Common name	Status
<i>Telopea truncata</i>	Tasmanian waratah	en
Ranunculaceae		
<i>Clematis aristata</i>	mountain clematis	
<i>Ranunculus amphitrichus</i>	river buttercup	
<i>Ranunculus lappaceus</i>	woodland buttercup	
<i>Ranunculus repens</i>	creeping buttercup	i
<i>Ranunculus triplodontus</i>	threetooth buttercup	
Rhamnaceae		
<i>Pomaderris apetala</i> subsp. <i>apetala</i>	common dogwood	
Rosaceae		
<i>Acaena novae-zelandiae</i>	common buzzy	
<i>Rosa rubiginosa</i>	sweet briar	i
<i>Rubus gunnianus</i>	alpine raspberry	en
Rubiaceae		
<i>Coprosma hirtella</i>	coffeeberry	
<i>Coprosma nitida</i>	mountain currant	
<i>Coprosma quadrifida</i>	native currant	
<i>Galium australe</i>	tangled bedstraw	
Santalaceae		
<i>Exocarpos humifusus</i>	mountain native-cherry	en
<i>Leptomeria drupacea</i>	erect currantbush	
Scrophulariaceae		
<i>Euphrasia collina</i>	eyebright	
<i>Verbascum virgatum</i>	twiggy mullein	i
Stylidiaceae		
<i>Stylidium graminifolium</i>	narrowleaf triggerplant	
Thymelaeaceae		
<i>Pimelea drupacea</i>	cherry riceflower	
<i>Pimelea nivea</i>	bushmans bootlace	en
Tremandraceae		
<i>Tetratheca procumbens</i>	spreading pinkbells	
Violaceae		
<i>Viola hederacea</i> subsp. <i>hederacea</i>	ivyleaf violet	
Winteraceae		
<i>Tasmania lanceolata</i>	mountain pepper	

Species name	Common name	Status
GYMNOSPERMAE		
Podocarpaceae		
<i>Phyllocladus aspleniifolius</i>	celerytop pine	en
MONOCOTYLEDON		
Cyperaceae		
<i>Carex breviculmis</i>	shortstem sedge	
<i>Eleocharis acuta</i>	common spikesedge	
<i>Gahnia grandis</i>	cutting grass	
<i>Gymnoschoenus sphaerocephalus</i>	buttongrass	
<i>Isolepis fluitans</i>	floating clubsedge	
<i>Lepidosperma longitudinale</i>	spreading swordedge	
<i>Schoenus</i> sp.	bogsedge	
Iridaceae		
<i>Diplarrena latifolia</i>	western flag-iris	en
<i>Diplarrena moraea</i>	white flag-iris	
Juncaceae		
<i>Juncus articulatus</i>	jointed rush	i
<i>Juncus astreptus</i>	rigid rush	en
<i>Juncus bassianus</i>	forest rush	
<i>Luzula</i> sp.	woodrush	
Liliaceae		
<i>Dianella tasmanica</i>	forest flaxlily	
<i>Drymophila cyanocarpa</i>	turquoise berry	
Orchidaceae		
<i>Corybas</i> sp.	helmet orchid	
<i>Pterostylis melagramma</i>	black-stripe leafy greenhood	
<i>Thelymitra</i> sp.	sun-orchid	
Poaceae		
<i>Australopyrum pectinatum</i>	prickly wheatgrass	
<i>Deyeuxia</i> sp.	bentgrass	
<i>Dichelachne</i> sp.	plumegrass	
<i>Microlaena stipoides</i> var. <i>stipoides</i>	weeping grass	
<i>Poa sieberiana</i> var. <i>sieberiana</i>	grey tussockgrass	
<i>Poa</i> sp.	tussockgrass	
<i>Rytidosperma</i> sp.	wallabygrass	

Species name	Common name	Status
Restionaceae		
<i>Baloskion australe</i>	southern cordrush	
<i>Empodisma minus</i>	spreading roperush	
Xyridaceae		
<i>Xyris muelleri</i>	roundhead yelloweye	en
PTERIDOPHYTA		
Aspleniaceae		
<i>Asplenium flabellifolium</i>	necklace fern	
Blechnaceae		
<i>Blechnum nudum</i>	fishbone waterfern	
<i>Blechnum wattsii</i>	hard waterfern	
Dennstaedtiaceae		
<i>Hypolepis rugosula</i>	ruddy groundfern	
<i>Pteridium esculentum</i> subsp. <i>esculentum</i>	bracken	
Dicksoniaceae		
<i>Dicksonia antarctica</i>	soft treefern	
Dryopteridaceae		
<i>Polystichum proliferum</i>	mother shieldfern	
Gleicheniaceae		
<i>Gleichenia alpina</i>	alpine coralfern	
<i>Gleichenia microphylla</i>	scrambling coralfern	
Ophioglossaceae		
<i>Ophioglossum lusitanicum</i> subsp. <i>coriaceum</i>	adders-tongue	

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