

**Addendum:
Flora Survey:
Albany Heritage Park Trail Network 2020**



**Report prepared for
City of Albany
November 2022**

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1 SUMMARY

- The City of Albany is proposing to construct mountain bike and walk trails within the Albany Heritage Park. Southern Ecology was engaged in 2017 and 2020 to undertake flora and vegetation assessments of a broad trail corridor (30 m corridor, herein the 'project area') to inform the environmental planning.
- Previous assessments determined that within the project area, critical habitat (1.84 ha) for one Threatened orchid was present (*Caladenia harringtoniae* (VN)) and a further seven flora Priority-listed by the Department of Biodiversity, Conservations and Attractions (DBCA) occur: (*Stylidium falcatum* (P2), *Lasiopetalum* sp. Denmark (B.G. Hammersley 2012) (P3), *Synaphea preissii* (P3), *Adenanthos cunninghamii* (P4), *Corybas ?limpidus* (P4), *Spyridium spadiceum* (P4) and *Thysanotus isantherus* (P4).
- Applications were submitted to Department of Water and Environmental Regulation (DWER) (permit CPS 9182/1) whom have requested additional information relating to flora (items 1 and 7 in letter from DWER 10/12/2021).
 - a) Item 1 - "*Evidence of efforts taken to avoid and/or mitigate significant environmental impacts resulting from the proposed clearing*".
 - b) Item 2 - "*Location of the proposed boardwalk over critical habitat for Caladenia harringtoniae*".
- This addendum addresses the items by providing information relating to implemented and proposed flora impact mitigation measures, a refined flora impact assessment (1-2 m final corridor) and additional biological survey information.

2 INTRODUCTION

2.1 Background

The Albany Heritage Park (AHP) encompasses the summits of Mount Clarence and Mount Adelaide, two prominent granite hills adjacent to the town centre of Albany, Western Australia (Figure 1). The AHP comprises 257 ha of native vegetation interspersed with outcropping granite. The AHP is popular with the local community for its natural, cultural and recreational values and is managed by the City of Albany (CoA) under the ‘*City Mounts Management Plan 2006*’ (City of Albany [CoA] 2006). The CoA is proposing to construct mountain bike and walking trails for the Albany Heritage Park (AHP) Trail Network.

Southern Ecology was engaged in 2017 and 2020 to undertake flora and vegetation assessments to inform the environmental planning. Southern Ecology was further engaged in 2022 to provide advice for reducing impacts to conservation significant flora during the design phase of the project.

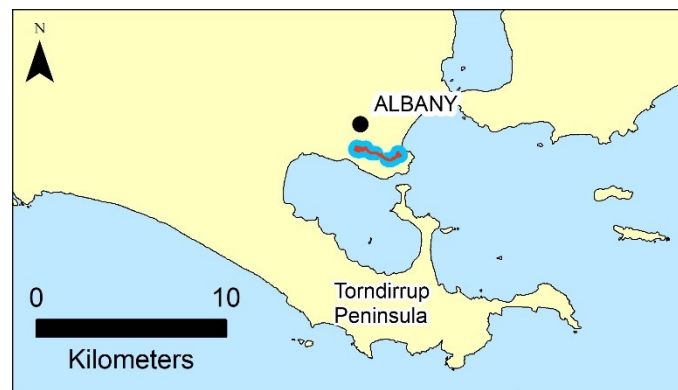


Figure 1. Survey area location in Albany, on the south coast of Western Australia.

3 METHODS

Field Schedule

Assessment of the final trail alignment, sensitive flora avoidance and flora impact assessments were conducted on the 18/10/2022, 19/10/2022 and 4/11/2022.

Assessment for flora and fauna of a proposed realignment (Granite Walk Trail Realignment) outside the 2017-2020 biological survey area was conducted on 18/10/2022.

Flora and Fauna Survey - Granite Walk Trail Realignment

The assessment was conducted by Damien Rathbone, an ecologist with over 15 years of experience in southern Western Australia. All components of the flora and fauna assessment was conducted in accordance with “Technical Guidance for Flora and Vegetation Surveys for Environmental Impact Assessment” (Environmental Protection Agency [EPA] 2016) and “Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment” (EPA 2020). All location information was identified using a handheld GPS (Garmin Oregon 7000).

4 FLORA IMPACT AND MITIGATION

Southern Ecology was engaged by the City of Albany to provide planning guidance and field assistance during the refinement of the proposed AHP trail alignment undertaken by the contractor “Common Ground” during September and August 2022.

A previous biological assessment identified 317 vascular plant species from the project area, including eight conservation significant taxa (Rathbone 2020). Of these, one is considered ‘Threatened’ flora protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and seven are listed by DBCA as ‘Priority’. DWER have indicated that the project initially posed a potentially significant impact to five of the conservation significant taxa:

- a) *Caladenia harringtoniae* (T) (putatively recorded from the project area in 1983)
- b) *Stylidium falcatum* (P2)
- c) *Synaphea preissii* (P3)
- d) *Spyridium spadiceum* (P4)
- e) *Thysanotus isantherus* (P4)

The significance, mitigation measures implemented and refined impact assessment of each of these taxa are discussed and tabulated (Table 1) below. All relevant spatial data is appended to this report in accordance with IBSA standards. The potential impacts to three other conservation significant taxa identified from the project area were considered avoidable or minor:

- f) *Lasiopetalum* sp. Denmark (B.G. Hammersley 2012) (P3)
- g) *Adenanthos cunninghamii* (P4)
- h) *Corybas ?limpidus* (P4)

Table 1. Impact assessment of five conservation significant taxa in the final trail network (as of October 2022), including both existing trails and proposed new trails. The relative impact (i.e., % of total in project area) for *Caladenia harringtoniae* (T) is not explicitly reported due to the different scales of habitat mapping.

Impact Assessment, No. of individual plants or m ² (% of total in project area)				
Taxon	Existing Trails	Proposed New Trails	Total Potential Impact	Project Area Total
<i>Caladenia harringtoniae</i> (T)	^a 317m ²	^b 9.4m ²	^{a+b} 326.4m ²	^a 18,000m ²
<i>Stylidium falcatum</i> (P2)	69 (33.5%)	24 (11.7%)	93 (45.2%)	206
<i>Synaphea preissii</i> (P3)	0 (%)	1 (25%)	1 (25%)	4
<i>Spyridium spadiceum</i> (P4)	5 (1%)	30 (5.8%)	35 (6.8%)	520
<i>Thysanotus isantherus</i> (P4)	140 (32.7%)	3 (0.7%)	143 (33.4%)	428

^aIncludes potential habitat based on broad vegetation unit

^bIncludes critical micro-habitat

***Caladenia harringtoniae* (T)**

Caladenia harringtoniae is a Threatened taxon previously recorded from the project area in 1983. It is an orchid with an underground tuber that may produce leaves and flowers from October to November and is typically more prolific after summer fire (DEWHA 2008). It has a restricted distribution between Albany and Nannup, occurring in swamps, creek lines and granite seepages. It is listed as Vulnerable under the EPBC Act.

Several individuals of *Caladenia harringtoniae* were previously observed (Western Australian Herbarium Accession 00260355) on the 28th September, 1983 at an approximate location within or very close to the project area. The habitat for this taxon was described as sheet granite with species of *Borya*, *Hakea*, *Dodonaea* and *Lepidosperma*, occurring on the Northern face of Mt Clarence. This habitat occurs within the Vegetation Unit “Granite Shrubland and Herbland” (Rathbone 2020).

Mitigation Measures

The nominal alignment and associated 30 m corridor intersected a total 1.84 ha of potential habitat (i.e. the associated Vegetation Unit) for *Caladenia harringtoniae* (T) that occurred in 14 separate locations. Mitigated measures were applied in each of these occurrences as follows: -

- Eight potential habitat areas were completely avoided by shifting the alignment within the 30 m corridor.
- In three potential habitat areas, impacts were minimised by using existing trails (well established tracks) within the 30m corridor (Plate 1). It is recommended that these locations are identified as ‘sensitive flora areas’ and vegetation impacts are avoided, where possible, during any potential track widening or maintenance.
- Three potential habitat areas were re-mapped in fine detail to identify suitable micro-habitat (i.e., “critical micro-habitat”) for *Caladenia harringtoniae*, which could be avoided during trail design. Trails were re-aligned to minimise impacts to critical micro-habitat where possible.

In later areas, the alignment was located to avoid the granite herbfields (Plate 2), which are the specific micro-habitat suitable for *Caladenia harringtoniae*. Where possible, the alignment was confined to either bare granite or shrublands of *Dodonaea* and *Taxandria* (Plate 3). At one location (Granite Walk Trail realignment) a small deviation (60 m) outside the 30 m corridor is additionally recommended (Biological limitations in the additional area are presented in report Section 5). A balustrade is also recommended at this location to reduce the foot traffic downslope of the alignment (see report Section 6).



Plate 1. Existing trail over granite habitat.



Plate 2. Pristine granite herbfields were avoided as they are habitat for *Caladenia harringtoniae* and are highly vulnerable to degradation.



Plate 3. Areas of low shrublands on granite fringe are less suitable for *Caladenia harringtoniae* and significant flora; this was the preferential location for the trail.



Plate 4. *Caladenia harringtoniae*, located in Big Grove, Albany.

***Stylidium falcatum* (P2)**

Stylidium falcatum is a Priority 2 taxon with a narrow geographic range between Mt Melville and Mt Taylor, in the *Stylidium falcatum* vicinity of Albany (Plate 5). It is associated with coastal granite outcrops and surrounding hillslopes. Within the project area it was relatively abundant on the northern slopes of Mt Clarence, particularly in recently burnt areas of *Gastrolobium*/*Hakea* Shrubland.

Mitigation Measures

The nominal alignment and associated 30 m corridor intersected a total 206 individuals of *Stylidium falcatum* (P2). Mitigated measures were applied as follows: -

- Approximately 113 plants were avoided during design of the trails. Twenty-four plants may be impacted by construction of new trails.
- Sixty-nine plants occur on the edge of existing trails that may potentially be impacted by the project. It is recommended that these locations are identified as 'sensitive flora area' and plants are avoided, where possible, during any potential track widening or maintenance.



Plate 5. *Stylidium falcatum* (P2).

***Synaphea preissii* (P3)**

Synaphea preissii is a 'Priority 3' flora from the Proteaceae family. It is known from 28 records across a range of approximately 82 km between Albany and the Stirling Range. A single outlying record is located approximately 200 km north west of Albany.

Mitigation Measures

One individual occurs within the approximate alignment of a proposed new trail. It is recommended that this location is identified as a 'sensitive flora area' and plant(s) are avoided, where possible, during track construction and maintenance.



Plate 6. *Synaphea preissii* (P3).

***Spyridium spadiceum* (P4)**

Spyridium spadiceum is a Priority 4 taxon known from a limited number of populations in coastal reserves in the vicinity of Albany and disjunct occurrences near Augusta and in the Porongurup range. It is associated with granite or limestone outcrops and has been noted to be particularly abundant after fire.

In the survey area the species was relatively abundant in *Gastrolobium/Hakea* Shrubland and Granite Shrublands on the slopes of Mt Clarence, either in canopy openings adjacent to large granite boulders or on the margins of recently burnt granite sheets. Approximately 520 individuals were recorded within the survey area.

Mitigation Measures

The nominal alignment and associated 30 m corridor intersected a total 520 individuals of *Stylidium falcatum* (P2). Mitigated measures were applied as follows: -

- Approximately 485 plants were avoided during design of the trails. Thirty plants may be impacted by construction of new trails.
- Five plants occur on the edge of existing trails that may potentially be impacted by the project. It is recommended that these locations are identified as 'sensitive flora area' and plants are avoided, where possible, during any potential track widening or maintenance.



Plate 7. *Spyridium spadiceum* (P4).

***Thysanotus isantherus* (P4)**

Thysanotus isantherus is a Priority 4 taxon known from several coastal granite outcrops between Betty's Beach and Walpole and a disjunct occurrence near Cape Leeuwin. It is most commonly associated with shallow soil herblands on the margin of granite sheets. It is inconspicuous due to its small size (<15 cm) and few dull pink flowers and its leaves that wither to an underground tuber during dry periods.

In the survey area it was relatively abundant in moss beds amongst Granite Shrubland and Herbland on both Mt Clarence and Mt Adelaide. Approximately 428 individuals were recorded within the survey area.

Mitigation Measures

The nominal alignment and associated 30 m corridor intersected a total 428 individuals of *Thysanotus isantherus* (P4). Mitigated measures were applied as follows: -

- Approximately 285 plants were avoided during design of the trails. Three plants may be impacted by construction of new trails.
- Approximately 140 plants occur on the edge of existing trails that may potentially be impacted by the project. It is recommended that these locations are identified as 'sensitive flora area' and plants are avoided, where possible, during any potential track widening or maintenance.



Plate 8. *Thysanotus isantherus* (P4).

5 ADDITIONAL FLORA AND FAUNA RESULTS – GRANITE WALK TRAIL REALIGNMENT

An additional 0.07 ha of vegetation was surveyed for vegetation, flora and fauna limitations on the 18/10/2022 for a realignment of the Granite Walk Trail. The realignment was a mitigation measure to avoid 0.1 ha of pristine granite herbland, which represents the critical micro-habitat of *Caladenia harringtoniae* (Appendix B – Map 3). The realignment enabled complete avoidance of the habitat patch and results in no change to the final trail length or total impact area.

Vegetation and Flora

The vegetation of the additional survey area was composed of *Eucalyptus/Corymbia* Forest and Granite Shrubland and Herbland in Excellent condition, which represent the regional mapping Unit 17 and 24, respectively (Table 2). These vegetation types are not concordant with any current PEC or TEC and are widely represented throughout the Albany Heritage Park.

Table 2. Extent (hectares) of vegetation in the additional survey area and concordant Albany Regional Vegetation Survey (ARVS) mapping unit (Sandiford and Barrett 2010).

Vegetation Community	ARVS Unit	Area (ha)
<i>Eucalyptus/Corymbia</i> Forest	Marri/Jarraah Coastal Hills Forest (Unit 17)	0.03
Granite Shrubland and Herbland	<i>Taxandria marginata</i> Granite Shrubland (Unit 24)	0.04

Fauna

Areas of *Eucalyptus/Corymbia* Forest may represent habitat for Black Cockatoo (three species) and Western Ringtail Possum that are listed under the EPBC Act 1999. All potential Black cockatoo trees (i.e., Jarraah or Marri < 500mm DBH) where avoided by > 10 m in the realignment. The *Eucalyptus/Corymbia* Forest represents suitable habitat for Western Ringtail Possum. However, this vegetation is contiguous with existing habitats and does not increase the overall impact to this vegetation type or habitat for this species.

Matters of National Environmental Significance

The realignment results in an overall reduction to impacts related to Matters of National Significance and no additional issues occurs in this area. The realignment will significantly reduce local impact to *Caladenia harringtoniae*. A small area of habitat suitable for Black Cockatoo and Western Ringtail Possum is intercepted. However, overall impacts to these species are negligible relative to the initial alignment.

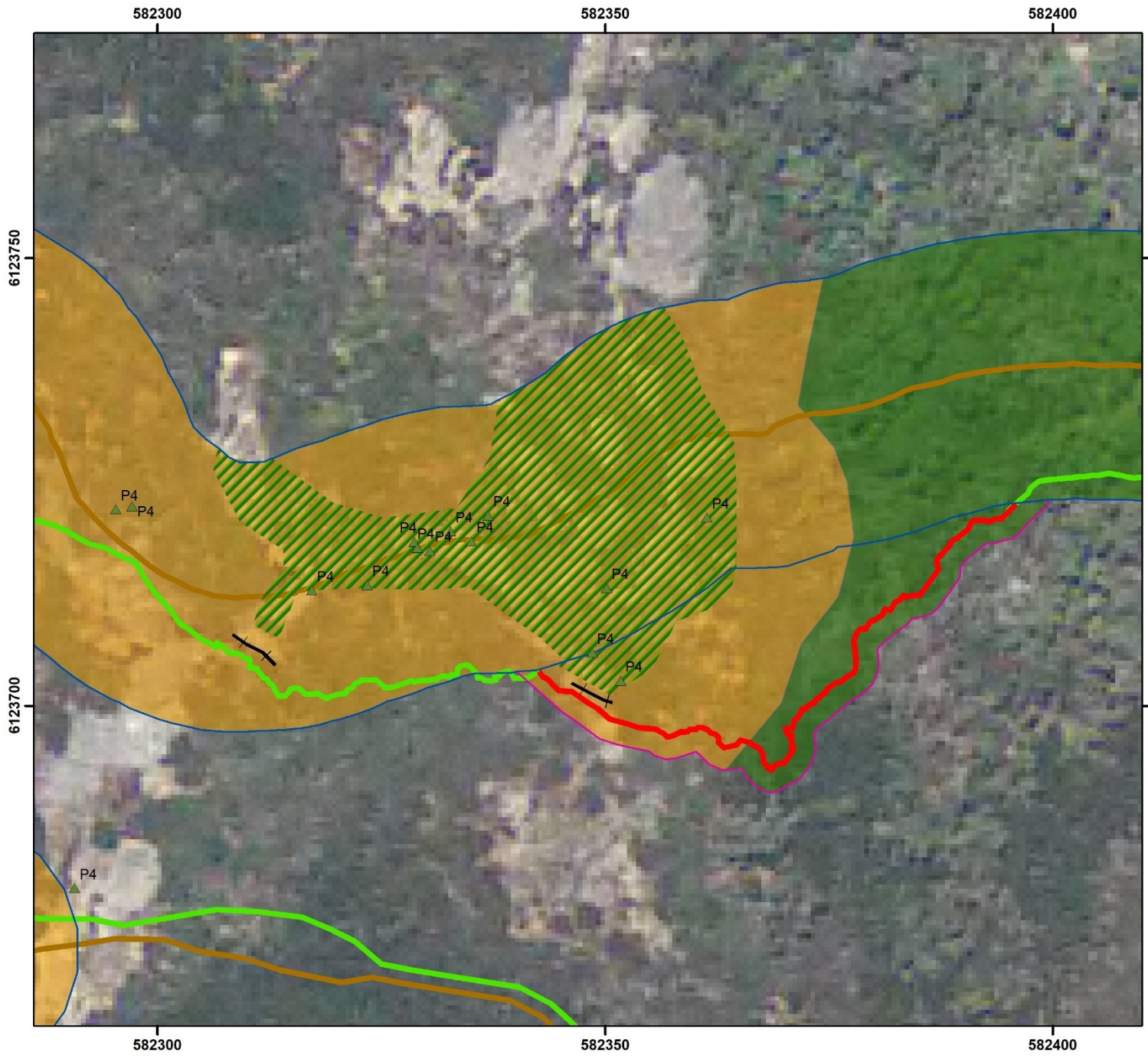
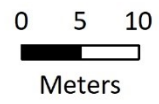


Figure 2: Granite Walk Trail Realignment, Albany Heritage Park 2022

Map Projection: Transverse Mercator Horizontal Datum GDA 1994
 Grid: MGA Zone 50 Map Size: A4

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- ▭ Biological survey area 2017-2020
 - ▭ Biological survey area 2022
 - ▭ Original nominal alignment
 - ▭ Proposed trail alignment (Common Ground 20/10/2022)
 - ▭ Proposed realignment outside 2019 Biological survey area
- Vegetation Type
- ▭ Eucalyptus/Corymbia Forest
 - ▭ Granite Shrubland and Herbland
- Conservation significant flora habitat
- ▨ Micro-habitat of *C. harringtoniae* avoided
 - ▲ Conservation significant flora (Status)
 - ⊥ Flora Protection Balustrade



6 PROPOSED BOARDWALK FOR ORCHID HABITAT

The City of Albany proposed a 'boardwalk' to traverse over the habitat of *Caladenia harringtoniae* that aimed to minimise impacts. Due to the requirement for footings and additional access for construction the value of this impact mitigation strategy is considered less effective than avoidance of the habitat and may also present further opportunity for negative impacts.

The majority of the critical micro-habitat for *Caladenia harringtoniae* has been successfully avoided in the refined alignment for the proposed new trails. In context of the small area of potential habitat intersected and due to the majority of trails utilising the existing network, it is not recommended to construct boardwalks. However, two areas have been indicated that would benefit from a balustrade or barrier to reduce the likelihood of inadvertent foot traffic down slope. This is proposed on the Granite Walk Trail (Figure 2) to minimise potential traffic downslope into the critical habitat of *Caladenia harringtoniae*.

7 RECOMMENDATIONS

1. Areas with conservation significant flora populations have been identified as 'Sensitive Flora Areas'. Where these intersect proposed new trails, significant plants should be demarcated prior to clearing (i.e. by a suitably qualified personnel) and avoided where possible. Where these intersect existing trails, any widening should be avoided and any maintenance should consider the occurrence of protected flora.
2. A proposed realignment of the Granite Walk Trail is recommended. In consideration of both flora and fauna impacts, including Matters of National Significance, this alternative trail location reduces the overall environmental impacts of the project. Necessary biological information for approval has been provided within this report addendum (section 5) and is included in the IBSA dataset.
3. Two balustrades are recommended, in place of boardwalks, that aim to reduce impacts on *Caladenia harringtoniae* habitat.

8 REFERENCES

- Environmental Protection Agency [EPA] (2016) *Technical Guidance Flora and Vegetation Surveys for Environmental Impact Assessment*, EPA, Western Australia.
- Environmental Protection Authority [EPA] (2020), *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment*, EPA, Western Australia.
- Rathbone, DA (2020). Flora Survey: Albany Heritage Park Trail Network. Unpublished report by Southern Ecology for the City of Albany, Western Australia (SE2015).
- Sandiford E. M., Barrett S. (2010) *Albany Regional Vegetation Survey, Extent Type and Status*. Report for the Department of Environment and Conservation, Western Australia.

9 APPENDIX A - Conservation Status Definitions

Table A1. Acts used in environmental impact assessment.

<i>Environment Protection and Biodiversity Conservation [EPBC] Act 1999</i>	https://www.legislation.gov.au/Details/C2016C00777
<i>Wildlife Conservation [WC] Act 1950</i>	https://www.slp.wa.gov.au/legislation/statutes.nsf/law_a908.html
<i>Environmental Protection [EP] Act 1986</i>	https://www.slp.wa.gov.au/legislation/statutes.nsf/law_a252.html
<i>Biodiversity Conservation [BC] Act 2016</i>	https://www.slp.wa.gov.au/legislation/statutes.nsf/law_a147120.html

Table A2. The categories for flora and fauna listed as Threatened or specially protected. Taxa can be recognised as Threatened (T) or Conservation Dependent under Federal (EPBC) and / or State (WC / BC) Acts.

Threat category	Definition
Threatened - Critically Endangered (T-CR)	Considered to be facing an extremely high risk of extinction in the wild
Threatened – Endangered (T-EN)	Considered to be facing a very high risk of extinction in the wild
Threatened – Vulnerable (T-VN)	Considered to be facing a high risk of extinction in the wild
Threatened - Presumed extinct (T-EX)	Species which have been adequately searched for and there is no reasonable doubt that the last individual has died.
Conservation dependant (CD)	Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened
Migratory birds protected under international agreement (IA)	Birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and the Bonn Convention, relating to the protection of migratory birds
Other specially protected fauna (OS)	Fauna otherwise in need of special protection to ensure their conservation

Table A3. Flora or fauna that are potentially threatened but do not meet the survey criteria or are otherwise data deficient are listed under Priority categories.

Category	Description
Priority One (P1)	Known from few locations (generally <5), small populations and/or occurring on land with insecure tenure
Priority Two (P2)	Known from few locations (generally <5), small populations with some occurring on land with secure tenure
Priority Three (P3)	Known from several locations with habitat not under imminent threat
Priority Four (P4)	(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for Vulnerable, but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy

Table A4. Categories for ecological communities listed as Threatened (TEC). Communities can be recognised as Threatened under Federal (EPBC) and / or State (WC / BC) Acts.

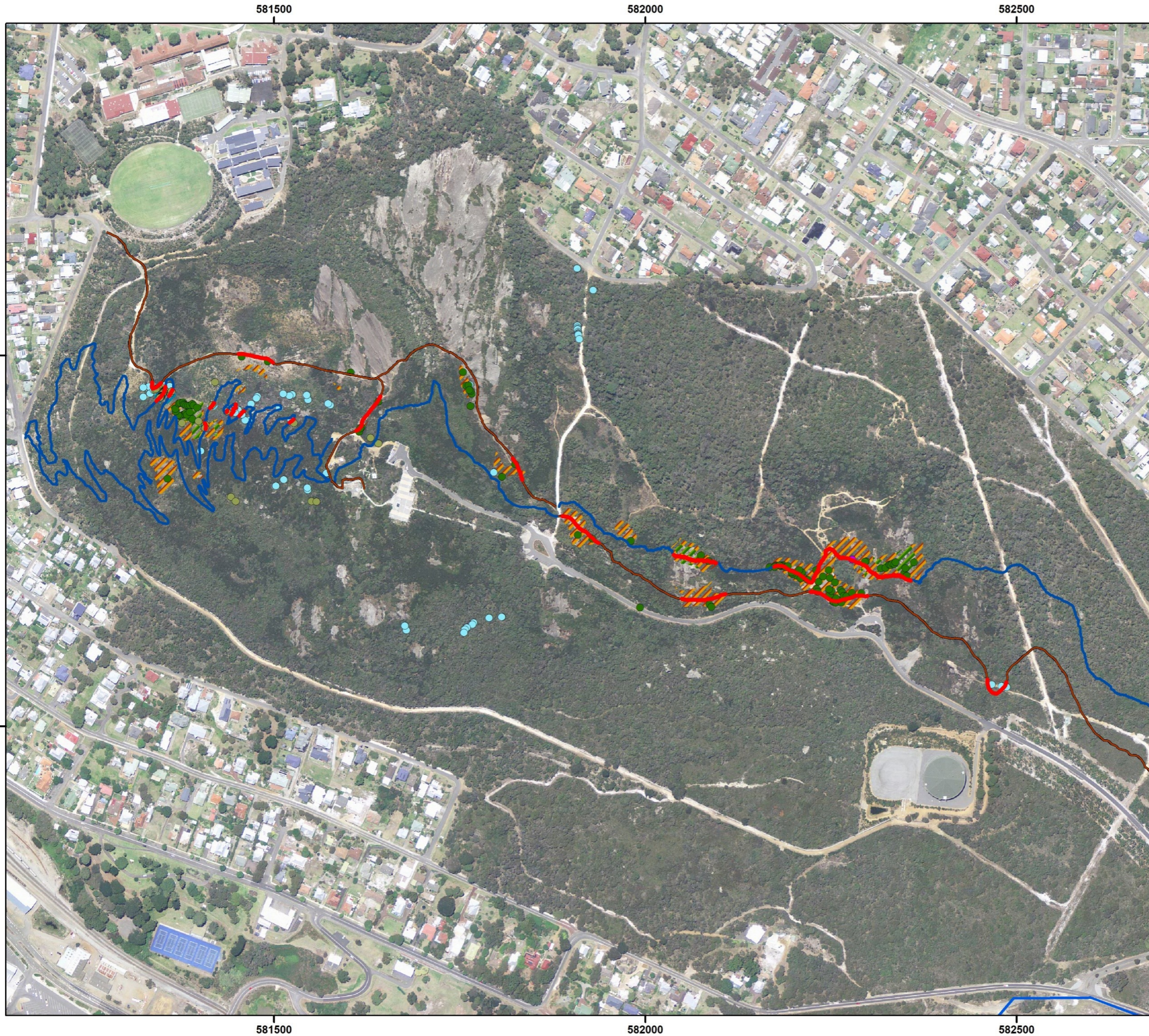
Category	Description
Presumed totally destroyed (PU)	Adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.
Critically Endangered (CR)	Adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future.
Endangered (EN)	Adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future.
Vulnerable (VU)	Adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium (within approximately 50 years) to long-term future.

Table A5. The categories for ecological communities listed as Priority (PEC).

Category	Brief description
Priority One (P1)	Known from very few occurrences with a very restricted distribution (generally ≤ 5 occurrences or a total area of ≤ 100 ha) and are currently under threat
Priority Two (P2)	Known from few occurrences with a restricted distribution (generally ≤ 10 occurrences or a total area of ≤ 200 ha). At least some occurrences are not believed to be under immediate threat (within approximately 10 years)
Priority Three (P3)	Known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: (ii) known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approximately 10 years), or; (iii) made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change etc
Priority Four (P4)	Adequately known, rare but not threatened or meet criteria for Near Threatened or that have been recently removed from the threatened list. These communities require regular monitoring
Priority Five (P5)	Conservation dependant ecological communities. Not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years

10 APPENDIX B - Flora Maps

- Map 1: Conservation Significant Flora and Impact Mitigation Albany Heritage Park, 2022
- Map 2: Conservation Significant Flora and Impact Mitigation Albany Heritage Park, 2022



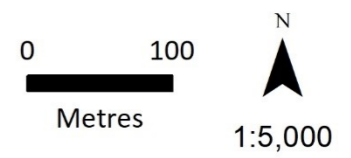
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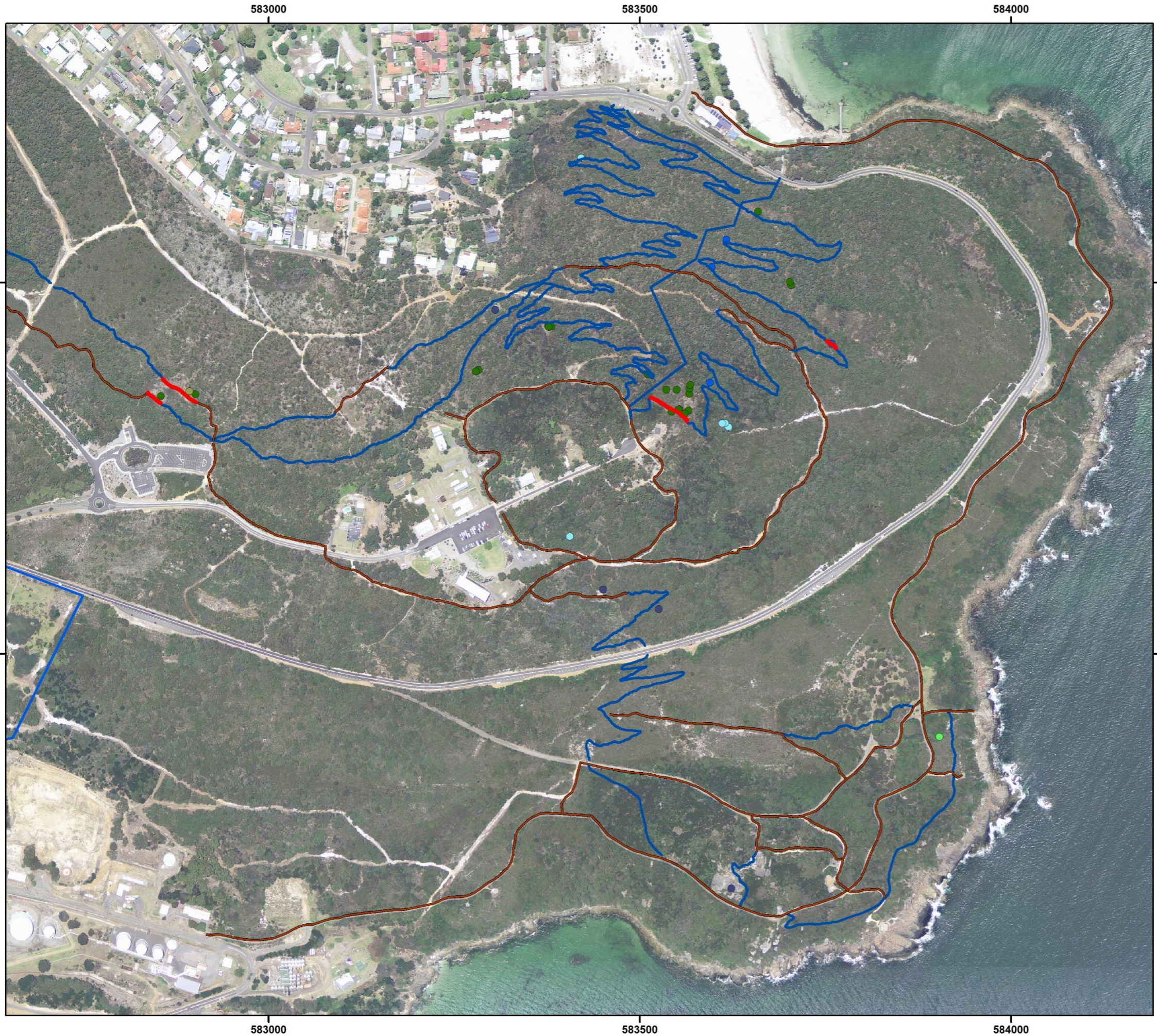
Map produced by Damien Rathbone on 10/11/2022.
 Map Projection: Transverse Mercator Horizontal Datum GDA 1994
 Grid: MGA Zone 50 Map Size: A3

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- Trail Alignments (Common Ground Oct' 22)**
- Existing
 - Proposed
- Flora Impact Mitigation**
- Sensitive Flora Area
- Conservation Significant Flora (points)**
- Stylidium falcatum* (P2)
 - Lasiopetalum* sp. Denmark (P3)
 - Synaphea preissii* (P3)
 - Adenanthos cunninghamii* (P4)
 - Corybas ?limpidus* (P4)
 - Spyridium spadiceum* (P4)
 - Thysanotus isantherus* (P4)
- Conservation Significant Flora (polygons)**
- Caladenia harringtoniae* Critical Micro-Habitat
 - Caladenia harringtoniae* Potential Habitat
 - Spyridium spadiceum*





Map 2: Conservation Significant Flora and Impact Mitigation Albany Heritage Park, 2022

Map produced by Damien Rathbone on 10/11/2022.
 Map Projection: Transverse Mercator Horizontal Datum GDA 1994
 Grid: MGA Zone 50 Map Size: A3



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- Trail Alignments (Common Ground Oct' 22)**
- Existing
 - Proposed
- Flora Impact Mitigation**
- Sensitive Flora Area
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