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14 November 2025

Our ref: 25PER10317VAR2

DevelopmentWA
Mia Yellagonga Tower 2
Level 7/5 Spring St
Perth WA 6000

Attention: Chee Lai

Dear Chee

Spring Ecological Surveys at Lot 2001 and 1001 Pederick Road, Neerabup

This report details the outcomes of the variation to project 25PER10317 to perform additional tasks related to the proposed subdivisional works within Lots 2001 and 1001 Pederick Road (north).

During an out-of-season Reconnaissance flora and vegetation survey, two patches of regrowth of over 20 years (the survey area) were identified to represent potential habitat for *Caladenia huegelii, Thelymitra variegata* and *Poranthera moorokatta,* and to have the potential to represent the Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community due to the presence of key tree species including, *Banksia attenuata* and *Banksia menziesii*.

As such, the additional tasks of this variation were to undertake targeted searches for *Caladenia huegelii, Thelymitra variegata* and *Poranthera moorokatta* and to assess regrowth within the survey area against the diagnostic criteria for Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community.

To summarise, no individuals of *C. huegelii, T. variegata* or *P. moorokatta* were recorded within the survey area and the species can be considered unlikely to occur within the survey area. Although one floristic community type was identified within the survey area (FCT21c, a subcomponent of the Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community), vegetation within the survey area does not represent the Threatened Ecological Community when assessed against the key diagnostic characteristics due to a misalignment with the structure and composition criteria.

Please see below for further details.

Regards,

Jeff Cargill
Principal Ecologist

1. Introduction

1.1. Project Background

Eco Logical Australia Pty Ltd (ELA) was engaged by DevelopmentWA to undertake the following ecological surveys within the remnant bushland at Lot 1001 and 2001, Pederick Road, Neerabup:

- A targeted survey for three conservation significant flora species:
    - *Caladenia huegelii* (listed as Endangered [EN] under the *Environment Protection and Biodiversity Conservation Act 1999* [EPBC Act], and Critically Endangered [CR] under the *Biodiversity Conservation Act 2016* [BC Act])
    - *Thelymitra variegata* (listed as CR under the BC Act)
    - *Poranthera moorokatta* (listed as Priority 2 [P2] by Department of Biodiversity, Conservation and Attractions [DBCA]).
- A TEC clarification survey to assess to patches of regrowth of over 20 years against the diagnostic criteria for Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community (Banksia Woodland TEC; listed as EN under the EPBC Act and as P3 by DBCA), and to subsequently determine the presence of the Banksia Woodlands TEC.

Lot 2001 Pederick Road is comprised of two blocks, one previously cleared 9.98 ha block north of Pederick Road and a 12.26 ha block of remnant vegetation south of Pederick Road. This survey was undertaken within two patches of regrowth of over 20 years: the road verge directly north of Lot 2001 (south) (herein referred to as Patch 1) and a small northern portion of Lot 1001 (herein referred to as Patch 2). Patch 1 and Patch 2 will be referred to together as 'the survey area' (Figure 1). The survey area, located in Neerabup, approximately 38 km north of Perth, Western Australia (WA), forms part of Meridian Park within the Neerabup Industrial Area (NIA).

This survey follows on from the Reconnaissance flora and vegetation survey undertaken in June 2025 (ELA 2025). The survey area was identified as potential suitable habitat for *C. huegelii, T. variegata* and *P. moorokatta* and the species were assessed as having the 'Potential' to occur. In addition, the survey area was also identified as having the 'Potential' to represent floristic aspects of the Banksia Woodlands TEC. The timing and level of the previous survey was suboptimal for identification of these conservation significant flora species and clarification of vegetation structure, composition and condition within the survey area against the diagnostic criteria for Banksia Woodlands TEC.

1.2. Species Profile

1.2.1. Caladenia huegelii

The Grand Spider-orchid (*Caladenia huegelii*) is a terrestrial orchid that grows between 25-70 cm tall and is listed as Endangered under the EPBC Act and Critically Endangered under the BC Act. It is distinguished from similar species by its large flowers and distinctively long fringing labellum where each segment can extend up to 15 mm and may bifurcate near the tip. The flowering period of this species is between late September and early November, with the plants lying dormant between late November and late April (DEC 2009). It should be noted that the species does not flower every year.

Suitable habitat requirements as described in the Recovery Plan (DEC 2009) comprise mixed woodland of *Eucalyptus marginata* (Jarrah), *Banksia attenuata* (Candlestick Banksia), *B. ilicifolia* (Holly Banksia) and *B. menziesii* (Firewood Banksia) with scattered *Allocasuarina fraseriana* (Sheoak) and *Corymbia*

calophylla (Marri) over dense shrubs. Throughout its range the species tends to favour areas of dense undergrowth.

It is known from 33 populations on the Swan Coastal Plain with more than 85% of known plants recorded from two of these populations (DEC 2009). It has been found to associate with grey sandy soils of the Bassendean and rarely in the Spearwood dune system between Wanneroo and Busselton, where it also relies on a specific fungus for germination and survival and the thynnid wasp for pollination.

The orchid is known to remain dormant in the soil profile as a vegetative tuber for up to two years without producing a vegetative leaf and longer without producing flowering parts essential to identification (DEC 2009).

1.2.2. Thelymitra variegata

The Queen of Sheba orchid grows 40-100 mm long and is listed as Critically Endangered under the BC Act and is currently undergoing threatened listing assessment under the EPBC Act. It is endemic to the south-west of Western Australia and is characterised by its variegated reddish, purplish or violet flowers with darker spots and blotches and yellowish margins (ALA 2025). This species flowers between August and early October (Jeanes 2009).

This species is known to grow in low shrubs and grasses in woodland, forest and heath and is found between Perth and Albany within the Geraldton Sandplains, Jarrah Forest, Mallee, Swan Coastal Plain and Warren bioregions (ALA 2025). Flowers open wide on hot, sunny days and rely on insects for pollination (ALA 2025).

1.2.3. Poranthera moorokatta

Poranthera moorokatta is a rare new species discovered in Perth, Western Australia, and is currently listed as P2 by DBCA. The species grows between 16-47 mm tall and is distinguished from similar species by the petiolate opposite leaves, deeply dissected stipules, seed characters and habitat preferences (Barrett 2012). The species flowers and fruits from late September to early November.

The species is currently known from two populations in Perth. At the Kings Park location, it is known to grow in open *B. menziesii – B. attenuata* woodland on white silica sand in open spaces between shrubs, and avoids shaded areas or in areas of high litter cover (Barrett 2012). At the Ellenbrook location, the species has been recorded growing in shallow dampland on mixed grey and white sand with scattered leaf litter (Barrett 2012). Uncertainty continues to surround the species' range and whether it has simply been overlooked due to its small stature or if it is truly rare and locally restricted in distribution (Barrett 2012).

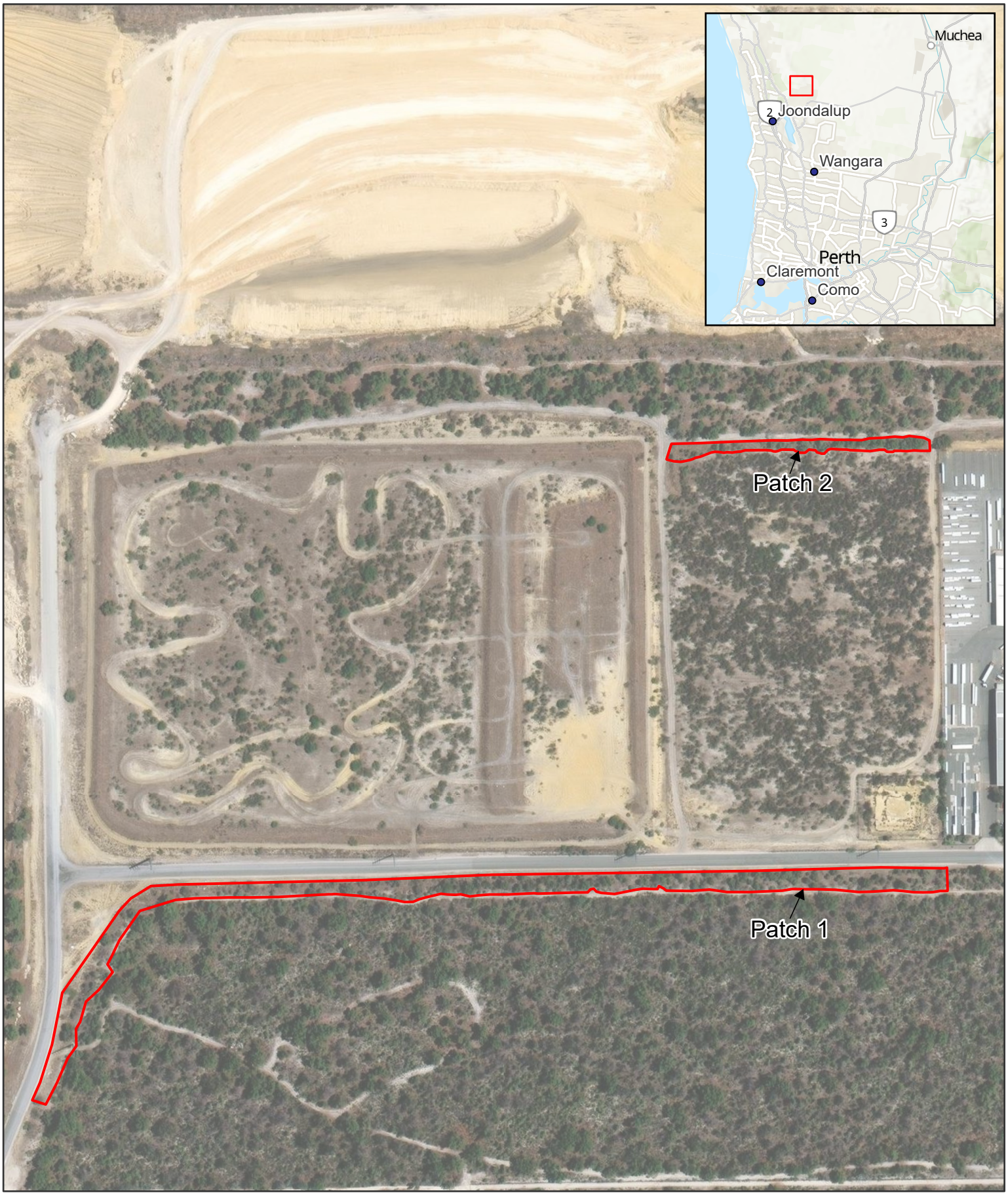

Figure 1: Survey Area

Survey Area

0 25 50 100
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

Project: 25PER10317-DH Date: 11/13/2025

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2. Environmental Setting

2.1. Climate

The survey area is located in the Swan Coastal Plain bioregion (Swan Coastal Plain; SWA) as defined by the Interim Biogeographic Regionalisation for Australia (IBRA) (DCCEEW 2024). This subregion is described as having a Mediterranean type climate, with total annual rainfall ranging between 600 mm and 1,000 mm (Mitchell et al. 2002). The nearby weather station at Wanneroo (Station No. 009105, open since 1905) receives an annual mean rainfall of 784.4 mm with most rainfall occurring during winter months of June, July and August (BoM 2025). In the three months preceding the field survey (July, August, September) a total of 515.1 mm rainfall was received, which is significantly greater than the average 368.2 mm for the same period.

2.2. Regional Context

Environmental values for the region relevant to the survey area are presented in Table 1.

Table 1: Environmental values of the region

Existing environmental attributes	Survey area
IBRA Bioregion	Swan Coastal Plain (SWA).
IBRA Subregion	Perth (SWA02) – commonly characterised by Tuart and heath on limestone soils and Banksia-Jarrah woodland on sandy soils. The subregional area is 1,333,901 ha (Mitchell et al. 2002).
Geology, landform and soils	Situated on the Spearwood Dune System (Spearwood 6) with soils derived from Tamala Limestone, characterised as yellow sands of quartz, coated with iron oxide (DPIRD 2022). The Spearwood Sand Phase occurs within the survey area, characterised by undulating dunes with rocky crests on Aeolian sand over limestone.

2.3. Broad-scale Vegetation Mapping

Vegetation type and extent have been mapped at a regional scale by Beard (1990) who categorised vegetation into broad vegetation associations. Based on this mapping at a scale of 1:1,000,000, the Department of Primary Industries and Regional Development (DPIRD) has compiled a list of vegetation extent and types across WA (Shepherd et al. 2002).

One vegetation association occurs within the survey area: Spearwood 6 – Medium woodland, tuart and jarrah (Table 2). This vegetation association has less than 30% of its total pre-European extent remaining within the SWA02 subregion (Government of Western Australia 2019).

Table 2: Beard (1990) vegetation associations of the survey area

Vegetation association	Description	Pre-European extent (ha) within the SWA02 subregion	Current extent (ha) within the SWA02 subregion	Remaining (%)
Spearwood 6	Medium woodland; tuart and jarrah	56,343.01	13,362.25	23.72

3. Methodology

3.1. Desktop Review

An assessment of ecological values of the survey area have been covered in the preceding *Neerabup North Subdivision Ecological Surveys* report (ELA 2025). Details of database searches such as EPBC Act Protected Matters Search, DBCA and Birdlife, including a likelihood of occurrence assessment for significant flora can also be found in the previous ELA (2025) report.

The previous survey (ELA 2025) recorded five vegetation types, the following of which were considered to provide potential habitat for *C. huegelii, T. variegata* and *P. moorokatta* and be potentially representative of floristic aspects of the Banksia Woodlands TEC:

- Vegetation Type 3 (VT3, Patch 1): *Eucalyptus marginata, Allocasuarina fraseriana* low open woodland over *Banksia attenuata, B. menziesii* tall open shrubland over mixed natives
- Vegetation Type 5 (VT5, Patch 2): *E. marginata* mid open woodland and *B. attenuata* and *B. menziesii* low woodland over mixed natives.

There have been an additional three previous relevant flora surveys conducted immediately adjacent to Patch 1 (ELA 2022; 2021a; 2021b). The results of these surveys as it relates to *C. huegelii, T. variegata, P. moorokatta* and Banksia Woodlands TEC are summarised in Table 3.

Table 3: Results from previous surveys conducted adjacent to Patch 1

Survey	Survey area and time undertaken	Occurrences of *C. huegelii, T. variegata* and *P. moorokatta*	Occurrence of Banksia Woodlands TEC
Lot 2001 Pederick Road TEC Clarification Survey (ELA 2022)	Lot 2001 (south) 10th September 2021	No individuals of *C. huegelii* or *P. moorokatta* were recorded. *Thelymitra* sp. was recorded at 0.1% cover within two quadrats, ELA03 and ELA04.	A total of 11.84 ha was recorded as representative of the Banksia Woodlands TEC. Of this, floristic community type (FCT) 20a covered 2.77 ha and FCT 28 covered 9.06 ha.
Neerabup Lot 2001 Pederick Rd Flora, Vegetation and Black Cockatoo Survey (ELA 2021a)	Lot 2001 (south) 21st November 2019	No individuals of *C. huegelii, T. variegata* or *P. moorokatta* were recorded. *C. huegelii* was assessed as possibly occurring within the survey area due to the presence of suitable habitat. *P. moorokatta* was assessed as unlikely to occur due to lack of suitable habitat within the survey area.	A total of 11.84 ha of vegetation within the survey area was assessed as representing the Banksia Woodlands TEC.
Targeted Survey for *Caladenia huegelii* at Lot 2001 Pederick Rd, Neerabup (ELA 2021b)	Lot 2001 (south) 14th October 2020	No individuals of *C. huegelii* were recorded. The species was considered highly unlikely to occur within the survey area.	N/A

3.2. Field Survey

3.2.1. Survey Team and Timing

The field survey was conducted on 9th October 2025 by ELA Botanist Daniel Brassignton. The survey was undertaken under scientific collection licence FB2000196 and permit to take DRF collection licence TFL 15-1920. October falls within the spring season (September to November) and is recommended for

detailed level surveys in the Environment Protection Authority (EPA) *Technical Guidance: Flora and Vegetation Surveys for environmental Impact Assessment* (EPA 2016).

The *Draft Survey Guidelines for Australia's Threatened Orchids* (Commonwealth of Australia 2013) recommend that survey timing be selected to coincide with flowering periods to maximise the likelihood of detection and identification. The *Grand Spider Orchid (*Caladenia huegelii*) Recovery Plan* (DEC 2009) states the flowering times to be late September to early November, and flowering periods can be confirmed by checking known locations with similar habitat and climate influences, which are key drivers for emergence and flowering. The survey timing also coincided with the flowering period of both *T. variegata* and *P. moorokatta*.

3.2.2. Targeted Flora Survey

The survey area was systematically traversed by foot at 10 m interval parallel transects. Track logs were represented on aerial photography and are shown below in Figure 2. Any flora potentially representing *C. huegelii, T. variegata*, *P. moorokatta*, Threatened or Priority species, or unfamiliar species located during the field survey, were collected as voucher specimens for later identification. All collections were assigned a unique collecting number. The following data was also collected:

- GPS coordinate of location (points of each individual plant)
- Number of individuals in the population (recording a range of co-ordinates if necessary)
- Reproductive phase (basal leaf, flowering, etc.)
- Description of the vegetation community and associated species at each location
- Details on landform, soil type and site conditions
- Photographs of the plant in situ and broader habitat
- Time and date observed
- Observer details
- Relevant notes such as potential threats to individuals and/or populations (e.g. weeds, clearing, herbivory)
- A voucher specimen suitable for use as a reference specimen (if appropriate to do so for conservation significant flora).

3.2.3. TEC Clarification Survey

The survey was conducted in accordance with the EPA *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016). A total of seven quadrats were established across the survey area (four within Patch 1 and three within Patch 2; Figure 2) to meet the requirement of three quadrats established per vegetation unit, as outlined in the EPA guidance statement (EPA 2016), and to provide sufficient information to undertake an assessment of diagnostics as detailed in Section 3.3.2.

Dominant vegetation communities were described, with respect to dominant species, structure and overall condition. The survey involved the use of 10 x 10 m quadrats as recommended for the Swan

Coastal Plain bioregion (EPA 2016)[1]. Opportunistic sampling of species not recorded within the quadrats was undertaken to supplement the existing list of species recorded from within the survey area.

Photos were taken from the north-west corner of each quadrat. The following data was recorded within each quadrat:

- Site details (site name, number, observers, date and location)
- Environmental information including landform, soil type and colour bare ground and leaf litter cover, rock outcropping and time since last fire event
- Biological information including vegetation structure, vegetation condition in accordance with Keighery (1994), degree of disturbance, species present and species percentage cover.

3.3. Data Analysis

3.3.1. Floristic Community Type (FCT) Analysis

Floristic Community Type (FCT) refers to the vegetation types derived by Gibson et al. (1994) through the floristic survey of the Swan Coastal Plain (SCP). Species within the Gibson et al. (1994) data set were updated to align with current names as specified by FloraBase (DBCA and WAH 2025). Using current records, a number of species in the Gibson et al. (1994) data set were shown to be significant range extensions from the SCP, where appropriate such cases were removed. In addition, excluded and misspelled names were removed from the data set and infra-specific names were reduced. The merged datasets were analysed using a combination of pre-treatments such as the inclusion and/or removal of introduced species and singletons. The removal of both singletons and introduced species from the merged dataset, an accepted pre-treatment for such analysis, produced the best results (e.g. stronger correlations; (Clarke and Gorley 2006). Inclusion of such data (i.e. weeds and singletons) merely served to confound the dataset by introducing stochastic and 'site' artefact data. Transformed data were analysed using a combination of multivariate analysis routines including Bray-Curtis Similarity Matrices, Cluster Analysis (Flexible Beta single site insertion) and Multi-Dimensional Scaling (MDS).

To identify potential TECs and Priority ecological Communities (PECs) in the survey area, ELA quadrats and vegetation communities were compared to FCTs defined by Gibson et al (1994). To identify the presence of FCTs, appropriate multivariate analyses comparing current data to that of Gibson et al (1994) species by quadrat data, and inferences based on dominant species and geomorphology were used. Given the nature of the data (e.g. spatial and temporal differences), results and subsequent extrapolations, assigned FCTs within the survey area were inferred and not absolute, i.e. a vegetation code assigned to an FCT was inferred to comprise, to varying degrees, floristic aspects of that FCT as defined by Gibson et al (1994).

3.3.2. Assessment of Diagnostics to Confirm Presence of Threatened Ecological Communities

The Banksia Woodlands TEC is listed as EN under the EPBC Act (TSSC 2016). For information to assist in referral, environmental assessment and compliance issues, it has been recommended to refer to the Listing Advice and/or Conservation Advice and Recovery Plan on the Department of Climate Change, Energy, the Environment and Water (DCCEEW) Species Profile and Threats Database (DCCEEW 2025).

[1] In the event where a 10 x 10 m quadrat was not suitable to fit the width of the vegetation unit, the dimensions were adjusted so that a 100 m^2 area within the vegetation unit was sampled.

The Listing Advice and/or Conservation Advice defines that national ecological community and includes key diagnostic characteristics, condition threshold and additional considerations (TSSC 2016).

In order the determine whether the Banksia Woodlands TEC is present in the survey area, key diagnostic characteristics must be met under Section 2 of the Conservation Advice (TSSC 2016). The four-stage assessment identified by DCCEEW to ascertain the presence of the Banksia Woodlands TEC within the survey area was undertaken by ELA following the field survey.

3.4. Flora Identification and Nomenclature

Flora specimen identification was undertaken by ELA Botanist Daniel Brassington, with additional specimens confirmed by the Western Australian Herbarium (WAH). Species identification utilised taxonomic literature and keys and where required specimens were confirmed using the WAH collection. Suitable material that meets WAH specimen lodgement requirements, such as new incidences of Threatened or Priority flora, range extensions and good floristic material where current collections lack, are submitted along with Threatened and Priority Report forms to DBCA, as required by conditions of collection licences issued under the BC Act. Nomenclature used for the flora species within this report follows the WA Plant Census as available on FloraBase (DBCA and WAH 2025).

3.5. Limitations

The EPA *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016) recommends including discussion of the constraints and limitations of the survey method used. Constraints and limitations for the ecological surveys undertaken for the survey area are summarised in Table 4 below. No constraints were identified.

Table 4: Survey limitations

Constraint	Limitations
Sources of information	**Not a constraint:** The Swan Coastal Plain has been very well surveyed, with increasing survey work occurring due to the ongoing urban development of the Perth metropolitan area. Several flora and fauna surveys have been undertaken within and adjacent to the survey area which have been utilised for the purposes of this survey. Gibson et al. (1994) was a primary source of determination of methods, analysis and results for assessing FCT's. Broad-scale vegetation mapping at a scale of 1:1,000,000 was available. Land system mapping at a scale of 1:2,000,000 and soil and landform mapping was also available. The information which was available was sufficient and as such sources of information were not considered a major limitation.
Scope of work	**Not a constraint:** The TEC clarification survey meets the requirements for a Detailed and Targeted flora and vegetation survey in accordance with the EPA *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016) was adequately met. Survey requirements for the Targeted Flora Survey in accordance with the *Draft Survey Guidelines for Australia's Threatened Orchids* (Commonwealth of Australia 2013) was also adequately met.
Completeness of survey	**Not a constraint:** The survey area was surveyed to the satisfaction of the scope as per relevant guidelines.
Intensity of survey	**Not a constraint:** Survey effort was considered adequate to meet objectives of the scope. The number of quadrats established was sufficient to gather sufficient information to identify any vegetation of conservation significance (Banksia Woodlands TEC). Traverses across the survey area were also sufficient to identify any occurrences of *C. huegelii, T. variegata* and/or *P. moorokatta.*
Timing, weather, season, cycle	**Not a constraint:** The survey area is located in the Swan Coastal Plain bioregion of Western Australia. Recommended survey timing for this region is in spring (September – November) (EPA 2016). The field survey was undertaken in early October. Many flora species were

Constraint	Limitations
	flowering at the time of the field survey or had sufficient material (fruit) available to identify the dominant and target species. The field survey was also undertaken within the flowering period of *C. huegelii, T. variegata* and *P. moorokatta*. The timing was therefore appropriate for conducting this level of survey.
Disturbances	**Not a constraint:** Disturbances within the survey area included the presence of weeds, tracks, clearing, grazing, rubbish dumping and edge effects. These disturbances did not negatively impact the ability to meet objectives outlined in the scope of works.
Resources	**Not a constraint:** Danel Brassington is suitably qualified to identify specimens, having previously undertaken flora and vegetation assessment on the Swan Coastal Plain and within Lot 2001.
Accessibility	**Not a constraint:** All relevant areas of the survey area were easily accessed and able to be surveyed.

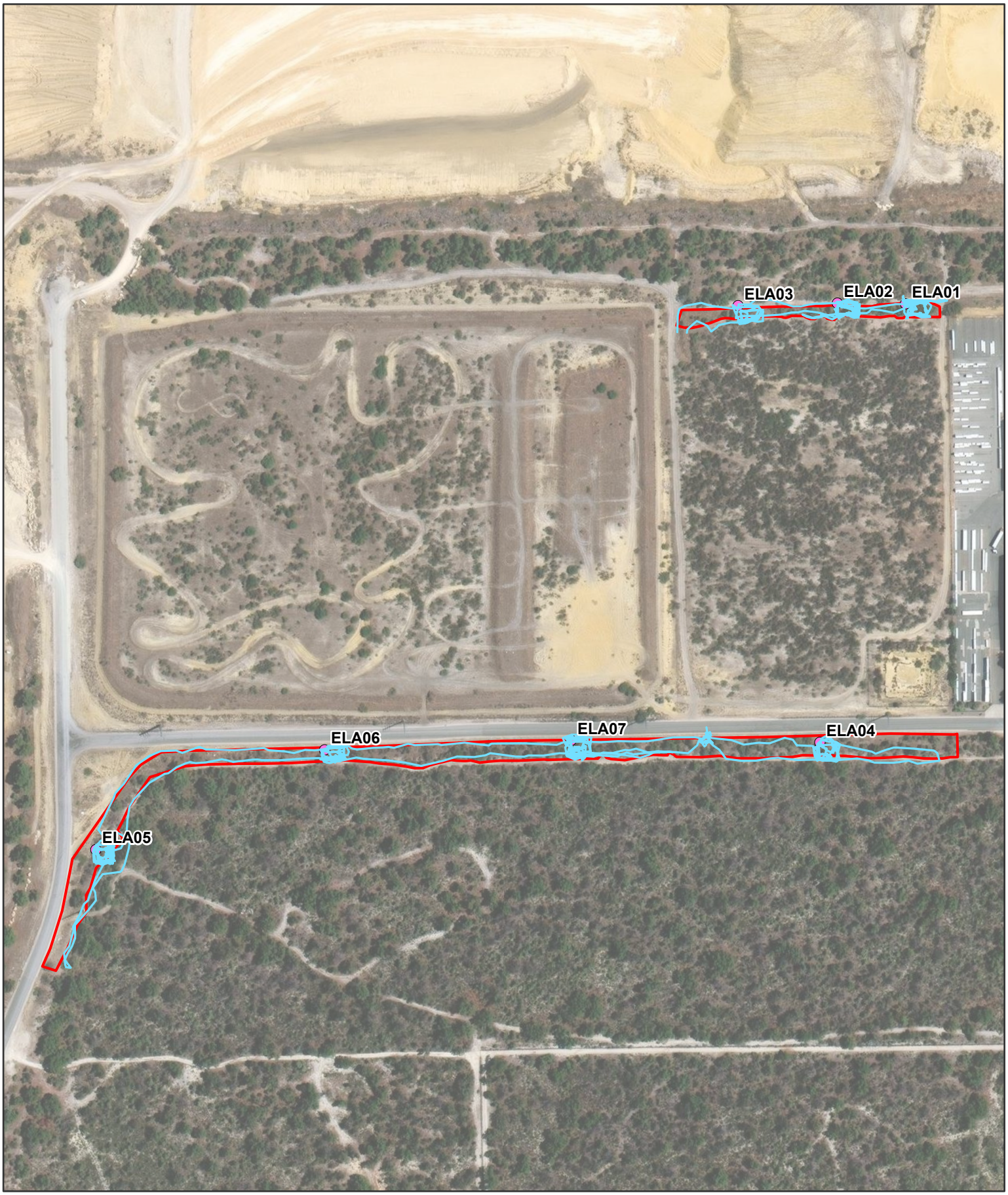

Figure 2: Survey Effort

- Quadrat Location
- Survey Area
- GPS Track Log

0 25 50 100
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

Project: 25PER10317-DH Date: 11/13/2025

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4. Results

4.1. Flora and Vegetation Overview

A total of 60 taxa (29 native and 31 introduced taxa) from 55 genera and 26 families were recorded across the survey area. Families with the highest number of species included Poaceae and Fabaceae with 10 species. The majority of the taxa recorded within the survey area (over 50%) comprises introduced (weed) species. A flora species list is provided in Appendix A.

No individuals of *C. huegelii, T. variegata* or *P. moorokatta* were observed within the survey area.

Seven quadrats were established in representative locations across the survey area (Figure 2). Individual quadrat data is presented in Appendix B and a summary of each is presented below in Table 5.

Table 5: Quadrat vegetation summaries

Quadrat	Vegetation Description
ELA01	*Banksia attenuata, B. menziesii* and *Eucalyptus marginata* low woodlands over *Kunzea glabrescens* tall sparse shrubland over *Jacksonia furcellata* and *J. sternbergiana* mid sparse shrubland over **Ehrharta calycina* sparse grassland over **Ursinia anthemoides* and **Carpobrotus edulis* sparse herbland.
ELA02	*Banksia attenuata, B. menziesii* and *Eucalyptus marginata* low open woodland over *Jacksonia sternbergiana* tall sparse shrubland, over **Ehrharta calycina, *Briza maxima* and *Microlaena stipoides* open grassland with **Ursinia anthemoides* and **Arctotheca calendula* low sparse herbland.
ELA03	*Eucalyptus marginata* low open woodland over *Jacksonia furcellata* and *J. sternbergiana* tall sparse shrubland over *Hibbertia hypericoides* and **Pelargonium capitatum* low sparse shrubland with **Briza maxima, *Ehrharta calycina* and **Ursinia anthemoides* open grassland.
ELA04	*Allocasuarina fraseriana, Banksia attenuata* and *B. menziesii low* open woodland over *Jacksonia furcellata* and *J. sternbergiana* tall sparse shrubland over *Hibbertia hypericoides* low sparse shrubland with **Briza maxima* and **Ehrharta calycina* sparse grassland over **Ursinia anthemoides* and **Leontodon rhagadioloides* sparse herbland.
ELA05	*Banksia menziesii* and *Eucalyptus marginata* low open woodland with *Jacksonia furcellata* and *J. sternbergiana* tall sparse shrubland over *Acacia pulchella* var. *glaberrima* and *Stirlingia latifolia* mid sparse shrubland over **Pelargonium capitatum* and *Gompholobium tomentosum* low sparse shrubland with **Briza maxima*, **Ehrharta calycina* and **Ursinia anthemoides* sparse grass/herbland
ELA06	*Allocasuarina fraseriana, Banksia attenuata* and *B. menziesii* low open woodland over *Jacksonia sternbergiana* and *J. furcellata* sparse shrubland over **Ehrharta calycina, *Eragrostis curvula* and **Briza maxima* open grassland with **Ursinia anthemoides* sparse herbland.
ELA07	*Allocasuarina fraseriana, Banksia attenuata* and *Eucalyptus marginata* low woodland over *Jacksonia sternbergiana* tall sparse shrubland over *Gastrolobium capitatum* and **Pelargonium capitatum* low sparse shrubland with **Ehrharta calycina, *E. longifolia* and **Briza maxima* sparse grassland over **Ursinia anthemoides, *Leontodon rhagadioloides* and **Hypochaeris glabra* sparse herbland.

4.2. Vegetation Condition

Vegetation condition within the survey area was classed based on the condition scale adapted from Keighery (1994) described in the EPA *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016). Majority of the survey area was considered to be in Good condition (0.93 ha; 97.63% of the survey area). Vegetation within the survey area comprises regrowth of over 20 years with disturbances including the presence of weeds (over 50% of the flora species recorded), cleared tracks, grazing and rubbish dumping. Vegetation condition within the survey area is presented in Table 6 and Figure 3 below.

Table 6: Vegetation Condition within the survey area

Vegetation Condition	Area (ha)	Portion of survey area (%)
Very Good	0.02	2.37
Good	0.93	97.63
Total	0.96	**100**

4.3. Floristic Community Types

To identify each quadrat's relationship to Banksia Woodlands TEC in the survey area, ELA quadrat data was compared to FCT's defined by Gibson et al. (1994) (see Section 3.3.1). Quadrat data is presented in Appendix C.

One FCT as originally described by Gibson et al. (1994) was identified within the survey area, within Patch 2 (FCT21c) covering a total area of 0.02 ha (2.37% of the survey area; Figure 4). FCT21c, described as 'Low lying *Banksia attenuata* woodlands or shrublands', is listed as P3 by DBCA and is recognised as a subcomponent of the Banksia Woodlands TEC.

Results of the multivariate analysis infer that quadrat EL01 within Patch 2 is moderately affiliated with FCT21c. Analysis of the seven quadrats also shows an affiliation with FCT6. However, this is common when comparing areas with a high proportion/composition of introduced species relative to native species. This result is therefore a false positive. No other FCTs were identified within the survey area.

4.4. Banksia Woodlands TEC Diagnostic

Vegetation was assessed against the key diagnostic characteristics outlined in the *Approved Conservation Advice (incorporating listing advice) for the Banksia Woodlands of the Swan Coastal Plain Ecological Community* (TSSC 2016) to determine the presence of the Banksia Woodlands TEC within the survey area. Assessment of vegetation within Patch 1 and Patch 2 are detailed in Table 7 below.

Table 7: Assessment of vegetation within the survey area against the Banksia Woodlands TEC diagnostic

Key Diagnostic Criteria	Patch 1	Patch 2
Location/landform	Patch 1 is located on the Swan Coastal Plain and occurs on the Spearwood System, and as such, meets this diagnostic criterion.	Patch 2 is located on the Swan Coastal Plain and occurs on the Spearwood System, and as such, meets this diagnostic criterion.
Structure and composition	Vegetation within Patch 1 contains diagnostic species including *Banksia attenuata* and *B. menziesii*, however, lacks an intact, distinctive structure comprised of native indicator species. The understorey is dominated by introduced species, lacking a high cover of native shrub and herb species. As such, Patch 1 does not meet this diagnostic criterion. Vegetation within Patch 1 had no FCT affiliations.	Structurally, vegetation within Patch 2 largely represents a woodland with a canopy dominated by key diagnostic species, including *B. attenuata* and *B. menziesii*. However, vegetation within Patch 2 lacks a distinctive, species-rich understorey consisting of native shrubs of various heights and an herbaceous ground layer of native species. The understorey is also largely composed of weed species. As such, Patch 2 does not meet this diagnostic criterion. Of the three quadrats established within Patch 2, one (ELA01) had a moderate affiliation with FCT21c (listed as P3), which is recognised as a subcomponent of the Banksia Woodlands TEC. FCT21c occupies 0.02 ha within Patch 2. The two remaining quadrats within Patch 1 (ELA02 and ELA03) had no FCT affiliations likely due to the greater weed species composition and lack of

Key Diagnostic Criteria	Patch 1	Patch 2
		intact native woodland structure when compared to ELA01.
Condition thresholds	Patch 1 was assessed and sampled in the highest condition representation available and was completed in the most appropriate season for the Swan Coastal Plain. Patch 1 was assessed as being in Good condition.	Patch 2 was assessed and sampled in the highest condition representation available and was completed in the most appropriate season for the Swan Coastal Plain. The majority of Patch 2 was assessed as being in Good condition with a small area (0.02 ha) in Very Good condition.
Minimum patch size	Regrowth within Patch 1 occupies an area of 0.83 ha and as such, does not meet the minimum patch size criteria of 2 ha.	Regrowth within Patch 2 occupies an area of 0.13 ha and as such, does not meet the minimum patch requirements.

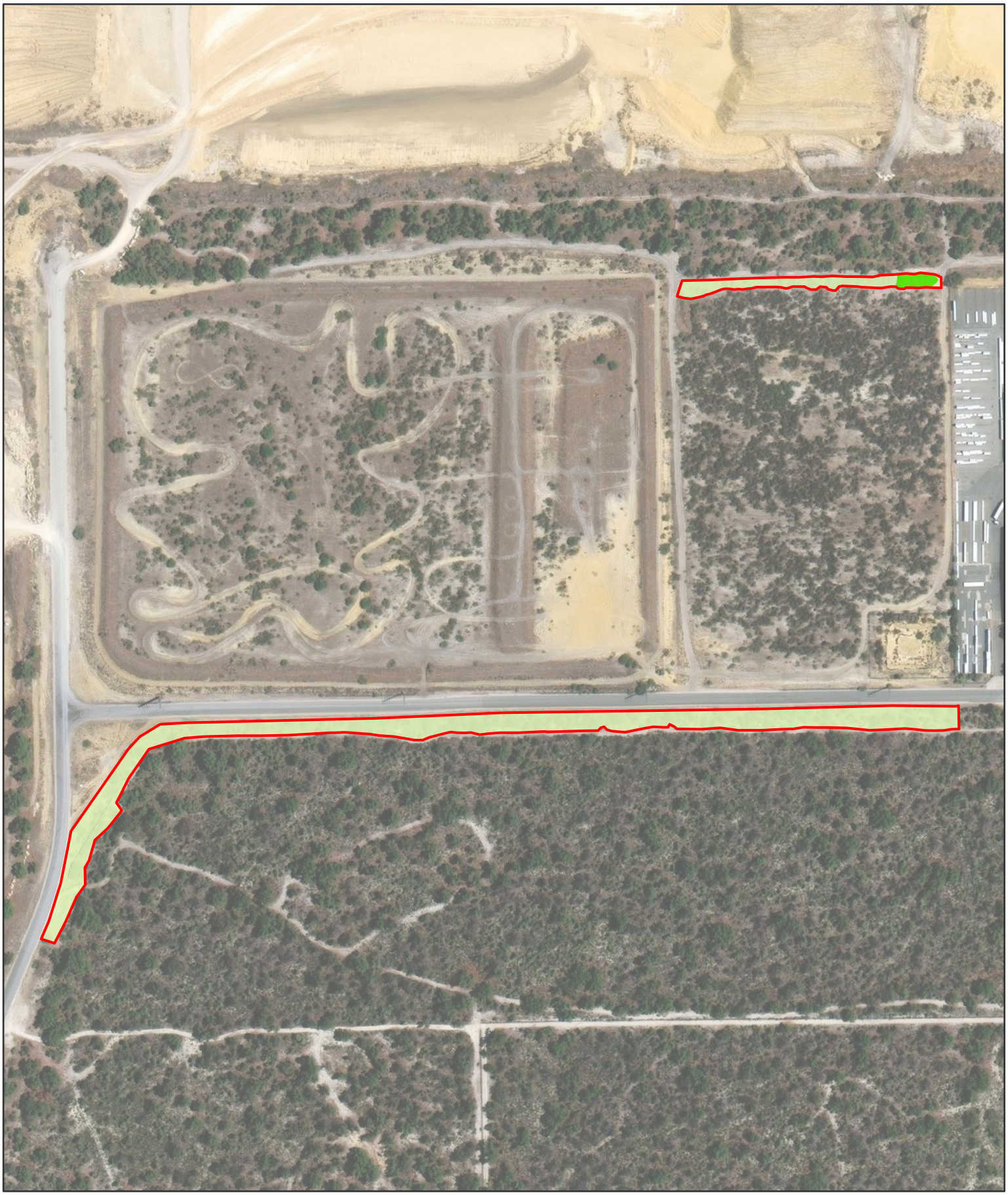

Figure 3: Vegetation condition within the survey area

Survey Area

Vegetation condition

Good

Very good

0 25 50 100

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

Project: 25PER10317-DH Date: 11/13/2025

N

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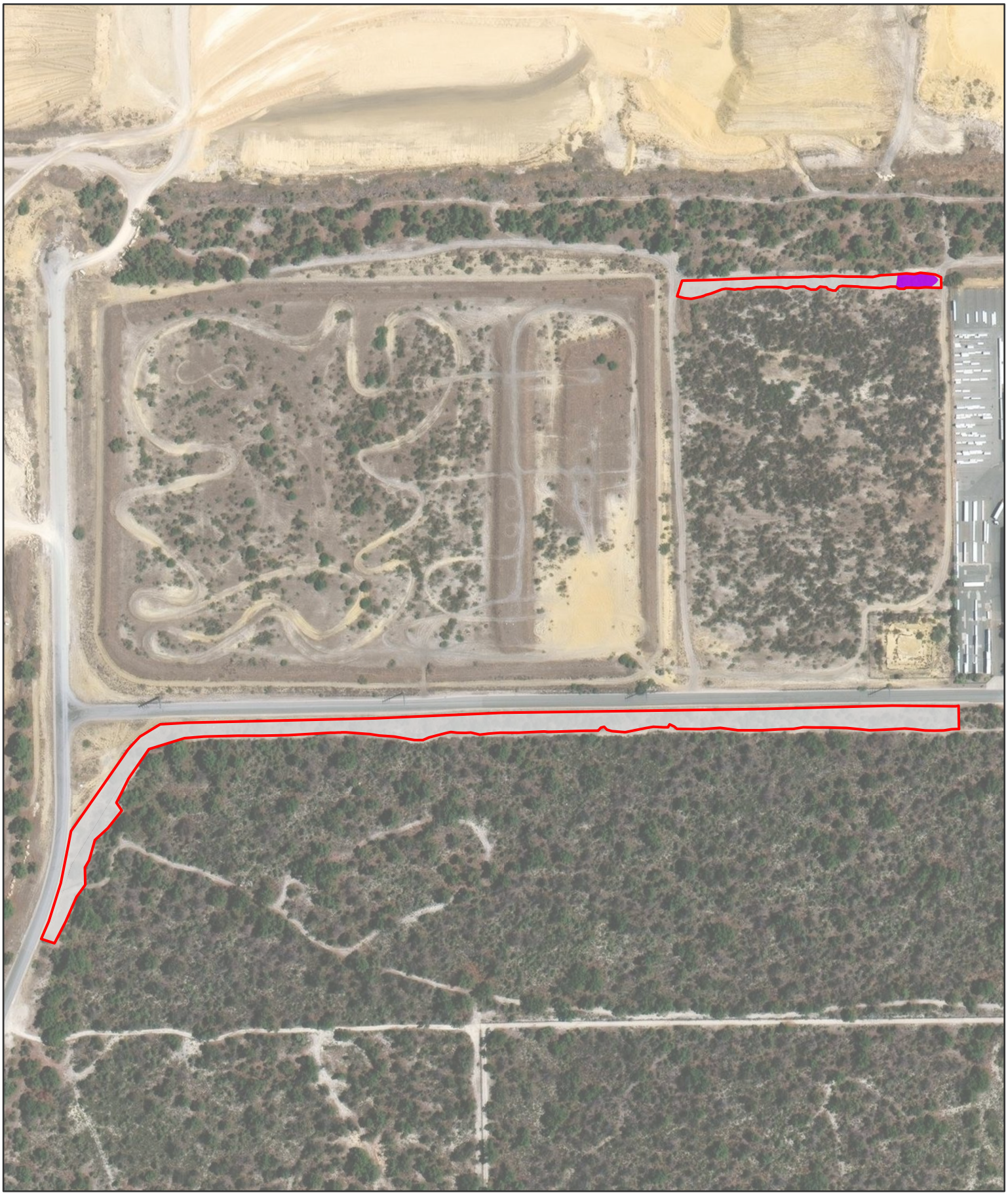

Figure 4: Inferred Floristic Community Types within the Survey Area

Survey Area

Floristic community types

FCT21C

No affiliated FCTs

0 25 50 100

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

Project: 25PER10317-DH Date: 11/13/2025

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5. Discussion

5.1. Flora

A total of 60 taxa (29 native and 31 introduced) from 55 genera and 26 families were recorded across seven quadrats established within two patches of regrowth across the survey area. Flora species recorded in the survey area were typical of the Swan Coastal Plain IBRA bioregion (DBCA and WAH 2025), with over 50% of the taxa recorded comprising introduced species.

No individuals of *C. huegelii, T. variegata* or *P. moorokatta* were recorded within the survey area, despite survey timing aligning with known flowering times (DEC 2009; Jeanes 2009; Barrett 2012). No other Threatened or Priority flora listed under the EPBC Act, the BC Act or by DBCA were recorded within the survey area. A total of three other orchid species were recorded, namely, *Caladenia flava* (Cowslip Orchid), *Disa bracteata* (South African Weed Orchid) and *Microtis media* (Common Mignonette Orchid). The presence of numerous orchids flowering in the survey area, indicate that conditions supporting flowering were appropriate. As such, it may be inferred that if *C. huegelii, T. variegata* or *P. moorokatta* were present, the species would also be in a flowering stage and therefore visible. As such, these species are considered Unlikely to occur within the survey area.

No individuals of *T. variegata* or *P. moorokatta* have previously been recorded within vegetation adjacent to the survey area. Although *P. moorokatta* can be easily overlooked due to its small stature (Barrett 2012), a post-field likelihood of assessment undertaken within vegetation adjacent to the southern portion of the survey area, within Lot 2001 (south), determined that *P. moorokatta* was Unlikely to occur due to lack of suitable habitat (ELA 2021a). *T. variegata* requires sunlight to flower and can be distinguished by its unique reddish, purple or violet flowers in addition to a number of unique features that distinguish *T. variegata* from closely related species (Jeanes 2009).

Additionally, a targeted *C. huegelii* survey was previously undertaken within Lot 2001 (south), adjacent to southern portion of the survey area, on 14th October 2020. Parallel transects were walked throughout the survey area at a spacing of 10 m. No records of *C. huegelii* were observed during this survey, and the species was considered 'Unlikely' to occur (ELA 2021b).

It should be noted that given the cryptic nature of *C. huegelii*, definitive statements regarding its presence/absence within the survey area are unable to be provided. Due to the intermittent flowering seasons, it is common practice to conduct surveys over several years when targeting *C. huegelii,* in order to give the surveys a temporal component to increase certainty (Commonwealth of Australia 2013).

5.2. Vegetation

A TEC clarification survey was undertaken within two patches of regrowth of over 20 years within the survey area (Patch 1 and Patch 2), to determine if this vegetation meets the minimum thresholds of the key diagnostic characteristics of the Banksia Woodlands TEC as outlined in TSSC (2016).

Vegetation condition within the survey area ranged from Good to Very Good condition, based on the Keighery (1994) vegetation scale provided in the EPA (2016) *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment*. Majority of the survey area was observed to be in Good condition (0.84 ha; 97.39% of the survey area). These results largely align with vegetation condition mapped within the survey area during the Reconnaissance flora and vegetation survey undertaken in June 2025 (ELA 2025), which identified the survey area to be in Good condition. Areas mapped as being in Very Good condition (0.02 ha; 2.37% of the survey area) can be attributed a more detailed level of

survey undertaken. Disturbances within the survey area included the presence of weeds (over 50% of the total flora species recorded), tracks and cleared areas, grazing and rubbish dumping.

To identify potential TECs and PECs in the survey area, ELA quadrats were compared to FCTs defined by Gibson et al. (1994). Results of the multivariate analysis showed that one quadrat, namely ELA01, had a moderate affiliation with FCT21c. FCT21c (listed as P3 by DBCA) is described as 'Low lying *Banksia attenuata* woodlands or shrublands' and is recognised as a subcomponent of the Banksia Woodlands TEC (listed as EN under the EPBC Act and as P3 by DBCA).

Analysis of the seven quadrats also showed an affiliation with FCT6; however, this result is common when comparing areas with a high proportion/composition of weed species relative to native species, and is therefore a false positive result. No other FCTs were identified within the survey area.

Vegetation within the survey area were assessed against the key diagnostic characteristics outlined in the *Approved Conservation Advice (incorporating listing advice) for the Banksia Woodlands of the Swan Coastal Plain ecological community* (TSSC 2016). Following the step process within the conservation advice, Patch 1 and Patch 2 were assessed to not represent the Banksia Woodlands TEC against the diagnostic characteristics, due to a misalignment with the structure and composition criteria.

Vegetation within Patch 1, occupying an area of 0.83 ha, was assessed as being in Good condition and consists of regrowth that is approximately 20 years old within road batter. Although key diagnostic Banksia tree species, including *Banksia attenuata* and *B. menziesii*, were present, vegetation within Patch 1 lacks a distinctive intact midstorey and understorey, with weeds occurring to the exclusion of native flora species. Additionally, no FCT affiliations were identified within Patch 1 as the regrowth lacks high native species cover, and has an understorey dominated by weed species. A TEC clarification survey previously undertaken within Lot 2001 (south) – adjacent to the southern portion of Patch 1, separated by a firebreak – determined that remnant vegetation within Lot 2001 (south) is representative of FCT20a (listed as EN under the BC Act) and FCT28 (not listed on a State level), both of which are recognised as a component of the Banksia Woodlands TEC (ELA 2022). Despite this and considering the lack of any FCT affiliations and the firebreak separation, vegetation within Patch 1 is not considered to form a significant functional component of this patch of Banksia Woodlands TEC.

Vegetation within Patch 2 comprises an area of 0.13 ha of regrowth that is approximately 20 years old. One quadrat, ELA01, within Patch 2 was shown to have a moderate affiliation with FCT21c (0.02 ha; listed as P3 by DBCA), which is a recognised subcomponent of the Banksia Woodlands TEC. The remaining two quadrats within Patch 2, ELA02 and ELA03, were not affiliated with any FCTs likely due to the greater weed species composition and lack of intact native woodland structure when compared to ELA01; vegetation within ELA01 was also assessed as being in Very Good condition, while vegetation within ELA02 and ELA03 were assessed as being in Good condition. When assessed against the key diagnostic characteristics of the Banksia Woodlands TEC, vegetation within Patch 2 broadly comprises a woodland structure with a canopy consisting of *B. attenuata* and *B. menziesii*, however, the understorey is largely comprised of weed species and lacks high native species cover. Vegetation within Patch 2 was mapped as VT5 during the out-of-season Reconnaissance flora and vegetation survey (ELA 2025). An additional 0.77 ha of VT5 comprising of remnant bushland occurs to the north, outside of Patch 2, and is considered to potentially represent floristic aspects of the Banksia Woodlands TEC (ELA 2025); Patch 2 is separated from this additional area of VT5 by a firebreak. Considering the high weed species cover in the understorey of the regrowth within Patch 2 in addition to the lack of direct connectivity with remnant vegetation within VT5 to the north, vegetation within Patch 2 is therefore unlikely to form an integral functional component of the remainder of VT5 regardless of its status as Banksia Woodlands TEC.

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Appendix A Flora Species List

Family	Species
Aizoaceae	**Carpobrotus edulis*
Amaranthaceae	*Ptilotus polystachyus*
Araliaceae	*Trachymene pilosa*
Asteraceae	**Arctotheca calendula*
Asteraceae	**Hypochaeris glabra*
Asteraceae	**Leontodon rhagadioloides*
Asteraceae	*Podotheca gnaphalioides*
Asteraceae	*Senecio pinnatifolius*
Asteraceae	**Sonchus oleraceus*
Asteraceae	**Ursinia anthemoides*
Brassicaceae	**Raphanus raphanistrum*
Campanulaceae	**Wahlenbergia capensis*
Caryophyllaceae	**Petrorhagia dubia*
Caryophyllaceae	**Polycarpon tetraphyllum*
Caryophyllaceae	**Silene gallica*
Casuarinaceae	*Allocasuarina fraseriana*
Crassulaceae	*Crassula colorata*
Cyperaceae	*Centrolepis drummondiana*
Dilleniaceae	*Hibbertia hypericoides*
Droseraceae	*Drosera* sp.
Ericaceae	*Styphelia propinqua*
Euphorbiaceae	**Euphorbia terracina*
Fabaceae	*Acacia pulchella* var. *glaberrima*
Fabaceae	*Bossiaea eriocarpa*
Fabaceae	*Gastrolobium tomentosum*
Fabaceae	*Hardenbergia comptoniana*
Fabaceae	*Jacksonia furcellata*
Fabaceae	*Jacksonia sternbergiana*
Fabaceae	**Ornithopus compressus*
Fabaceae	**Trifolium arvense*
Fabaceae	**Trifolium campestre*
Geraniaceae	*Erodium cygnorum*
Geraniaceae	**Pelargonium capitatum*
Haemodoraceae	*Conostylis aculeata* subsp. *aculeata*
Iridaceae	**Gladiolus caryophyllaceus*
Iridaceae	**Romulea rosea*
Myrtaceae	*Eucalyptus marginata*
Myrtaceae	*Gaudium laevigatum* (ex. *Leptospermum laevigatum)**
Myrtaceae	*Kunzea glabrescens*
Orchidaceae	*Caladenia flava*
Orchidaceae	**Disa bracteata*
Orchidaceae	*Microtis media*
Papaveraceae	**Fumaria capreolata*

Family	Species
Poaceae	**Avena barbata*
Poaceae	**Briza maxima*
Poaceae	**Bromus diandrus*
Poaceae	**Bromus rubens*
Poaceae	**Erharta calycina*
Poaceae	**Erharta longifolia*
Poaceae	**Eragrostic curvula*
Poaceae	*Microlaena stipoides*
Poaceae	**Pentameris pallida*
Poaceae	**Vulpia myuros*
Primulaceae	**Lysimachia arvensis*
Proteaceae	*Banksia attenuata*
Proteaceae	*Banksia menziesii*
Proteaceae	*Bossiaea eriocarpa*
Proteaceae	*Stirlingia latifolia*
Restionaceae	*Desmocladus flexuosus*
Xanthorrhoeaceae	*Xanthorrhoea preissii*

Appendix B Quadrat Data

Quadrat	Date	Site type	Observer
ELA01	9 October 2025	8 m x 12.5 m	DB
Condition	**Disturbances**	**Fire history (years)**	**Vegetation description**
Very Good	Weeds, tracks, clearing	Old (>20 years)	*Banksia attenuata, B. menziesii* and *Eucalyptus marginata* low woodlands over *Kunzea glabrescens* tall sparse shrubland over *Jacksonia furcellata* and *J. sternbergiana* mid sparse shrubland over **Ehrharta calycina* sparse grassland over **Ursinia anthemoides* and **Carpobrotus edulis* sparse herbland.
Soil type	**Soil colour**	**Landform unit**	**Aspect/slope**
Sandy loam	Grey	Slope (batter)	South
Rock type	**Outcropping %**	**Easting**	**Northing**
Limestone	0	385848	6495050

Species	Cover (%)	Height (m)	Stratum (U=Upper, M=Middle, G=Ground)	Growth Form
Banksia attenuata	5	5	U	Tree
Banksia menziesii	15	5	U	Tree
Eucalyptus marginata	12	6	U	Tree
Kunzea glabrescens	15	3	U	Shrub

Species	Cover (%)	Height (m)	Stratum (U=Upper, M=Middle, G=Ground)	Growth Form
Jacksonia furcellata	1.5	1.8	M	Shrub
Jacksonia sternbergiana	1	1.5	M	Shrub
**Ehrharta calycina*	4	0.6	L	Grass
**Gladiolus caryophyllaceus*	0.01	0.5	L	Herb
Gompholobium tomentosum	0.01	0.3	L	Shrub
Hardenbergia comptoniana	0.01	0.3	L	Herb
**Arctotheca calendula*	0.01	0.1	G	Herb
**Briza maxima*	0.1	0.1	G	Grass
Caladenia flava	0.01	0.1	G	Herb
**Carpobrotus edulis*	5	0.1	G	Herb
**Disa bracteata*	0.1	0.1	G	Herb
Drosera sp.	0.2	0.01	G	Herb
**Hypochaeris glabra*	0.2	0.1	G	Herb
Microlaena stipoides	0.01	0.1	G	Grass
Microtis media	0.01	0.3	G	Herb
**Ornithopus compressus*	0.1	0.1	G	Herb
Trachymene pilosa	0.1	0.1	G	Herb
**Ursinia anthemoides*	1	0.3	G	Herb

Quadrat	Date	Site type	Observer
ELA02	9 October 2025	8 m x 12.5 m	DB
Condition	**Disturbances**	**Fire history (years)**	**Vegetation description**
Good	Weeds, tracks, clearing, grazing	Old (>20 years)	*Banksia attenuata, B. menziesii* and *Eucalyptus marginata* low open woodland over *Jacksonia sternbergiana* tall sparse shrubland, over **Ehrharta calycina, *Briza maxima* and *Microlaena stipoides* open grassland with *Ursinia anthemoides* and *Arctotheca calendula* low sparse herbland.
Soil type	**Soil colour**	**Landform unit**	**Aspect/slope**
Sandy loam	Yellow-grey	Slope (batter)	South
Rock type	**Outcropping %**	**Easting**	**Northing**
Limestone	0	385804	6495051

Species	Cover (%)	Height (m)	Stratum (U=Upper, M=Middle, G=Ground)	Growth Form
Banksia attenuata	10	6	U	Tree
Banksia menziesii	1	4.5	U	Tree
Eucalyptus marginata	10	6	U	Tree
Hardenbergia comptoniana	1	5	U	Herb
Jacksonia sternbergiana	4	4.5	U	Shrub
**Avena barbata*	0.1	0.8	L	Grass
**Ehrharta calycina*	20	0.8	L	Grass

Species	Cover (%)	Height (m)	Stratum (U=Upper, M=Middle, G=Ground)	Growth Form
Gastrolobium capitatum	0.01	0.3	L	Shrub
**Gladiolus caryophyllaceus*	0.1	0.6	L	Herb
**Pelargonium capitatum*	1	0.5	L	Herb
Ptilotus polystachyus	1	0.9	L	Herb
Styphelia propinqua	0.5	0.4	L	Shrub
**Arctotheca calendula*	3	0.1	G	Herb
**Briza maxima*	5	0.2	G	Grass
**Disa bracteata*	0.1	0.2	G	Herb
Drosera sp.	2	0.01	G	Herb
Erodium cygnorum	0.01	0.2	G	Herb
Hibbertia hypericoides	0.01	0.1	H	Shrub
**Hypochaeris glabra*	2	0.1	G	Herb
**Leontodon rhagadioloides*	0.01	0.1	G	Herb
Microlaena stipoides	2	0.1	G	Grass
Microtis media	0.01	0.3	G	Herb
**Ornithopus compressus*	1	0.1	G	Herb
**Romulea rosea*	0.01	0.2	G	Herb
**Trifolium arvense*	0.01	0.1	G	Herb
**Trifolium campestre*	0.01	0.1	G	Herb
**Ursinia anthemoides*	5	0.3	G	Herb
**Vulpia myuros*	0.5	0.3	G	Grass

Quadrat	Date	Site type	Observer
ELA03	9 October 2025	8 m x 12.5 m	DB
Condition	**Disturbances**	**Fire history (years)**	**Vegetation description**
Good	Weeds, tracks, clearing, dumped garden soil	Old (>20 years)	*Eucalyptus marginata* low open woodland over *Jacksonia furcellata* and *J. sternbergiana* tall sparse shrubland over *Hibbertia hypericoides* and **Pelargonium capitatum* low sparse shrubland with **Briza maxima, *Ehrharta calycina* and **Ursinia anthemoides* open grassland.
Soil type	**Soil colour**	**Landform unit**	**Aspect/slope**
Sandy loam	Grey	Slope (batter)	South
Rock type	**Outcropping %**	**Easting**	**Northing**
Limestone	0	385739	6495049

Species	Cover (%)	Height (m)	Stratum (U=Upper, M=Middle, G=Ground)	Growth Form
Eucalyptus marginata	8	5	U	Tree
Jacksonia furcellata	5	4	U	Shrub
Jacksonia sternbergiana	10	3	U	Shrub
Banksia menziesii	0.1	1	M	Tree
Hardenbergia comptoniana	0.5	2	M	Herb
**Avena barbata*	0.4	0.1	L	Grass
**Ehrharta calycina*	20	0.9	L	Grass

Species	Cover (%)	Height (m)	Stratum (U=Upper, M=Middle, G=Ground)	Growth Form
Gastrolobium capitatum	0.05	0.4	L	Shrub
**Gladiolus caryophyllaceus*	0.01	0.4	L	Herb
Hibbertia hypericoides	3	0.5	L	Shrub
**Pelargonium capitatum*	1	0.4	L	Herb
**Arctotheca calendula*	0.5	0.1	G	Herb
**Briza maxima*	5	0.2	G	Grass
**Bromus rubens*	0.01	0.3	G	Grass
**Disa bracteata*	0.1	0.2	G	Herb
Erodium cygnorum	0.01	0.1	G	Herb
Gompholobium tomentosum	0.01	0.2	G	Herb
Microlaena stipoides	1	0.2	G	Grass
**Ornithopus compressus*	0.2	0.1	G	Herb
**Ursinia anthemoides*	15	0.3	G	Herb
**Vulpia myuros*	0.1	0.2	G	Grass,
**Wahlenbergia capensis*	0.01	0.3	G	Herb

Quadrat	Date	Site type	Observer
ELA04	9 October 2025	10 m x 10 m	DB
Condition	**Disturbances**	**Fire history (years)**	**Vegetation description**
Good	Weeds, tracks, clearing, rubbish	Old (>20 years)	*Allocasuarina fraseriana, Banksia attenuata* and *B. menziesii low* open woodland over *Jacksonia furcellata* and *J. sternbergiana* tall sparse shrubland over *Hibbertia hypericoides* low sparse shrubland with **Briza maxima* and **Ehrharta calycina* sparse grassland over **Ursinia anthemoides* and **Leontodon rhagadioloides* sparse herbland.
Soil type	**Soil colour**	**Landform unit**	**Aspect/slope**
Sandy loam	Grey-brown	Slope (batter)	North
Rock type	**Outcropping %**	**Easting**	**Northing**
Limestone	0	385793	6494767

Species	Cover (%)	Height (m)	Stratum (U=Upper, M=Middle, G=Ground)	Growth Form
Allocasuarina fraseriana	5	6	U	Tree
Banksia attenuata	3	5	U	Tree
Banksia menziesii	8	5	U	Tree
Eucalyptus marginata	4	5	U	Tree
Jacksonia furcellata	1	3	U	Shrub
Jacksonia sternbergiana	5	2	M	Shrub

Species	Cover (%)	Height (m)	Stratum (U=Upper, M=Middle, G=Ground)	Growth Form
**Avena barbata*	0.1	0.6	L	Grass
**Bromus diandrus*	0.1	0.4	L	Grass
**Ehrharta calycina*	10	0.8	L	Grass
**Eragrostis curvula*	0.01	1.1	L	Grass
**Gladiolus caryophyllaceus*	0.01	0.5	L	Herb
Hardenbergia comptoniana	0.1	0.3	L	Herb
Hibbertia hypericoides	2	0.5	L	Shrub
**Pelargonium capitatum*	0.01	0.3	L	Herb
**Briza maxima*	5	0.3	G	Grass
Centrolepis drummondiana	0.01	0.05	G	Herb
Crassula colorata	0.01	0.03	G	Herb
Erodium cygnorum	0.1	0.1	G	Herb
**Euphorbia terracina*	0.01	0.3	G	Herb
**Hypochaeris glabra*	0.1	0.2	G	Herb
**Leontodon rhagadioloides*	4	0.2	G	Herb
Microlaena stipoides	0.01	0.1	G	Grass
Microtis media	0.01	0.3	G	Herb
**Pentameris pallida*	0.01	0.1	G	Grass
Podotheca gnaphalioides	0.1	0.1	G	Herb
**Romulea rosea*	0.01	0.2	G	Herb
**Sonchus oleraceus*	0.01	0.2	G	Herb
**Trifolium campestre*	0.01	0.1	G	Herb
**Ursinia anthemoides*	15	0.3	G	Herb
**Wahlenbergia capensis*	0.01	0.2	G	Herb

Quadrat	Date	Site type	Observer
ELA05	9 October 2025	10 m x 10 m	DB
Condition	**Disturbances**	**Fire history (years)**	**Vegetation description**
Good	Weeds, tracks, clearing, rubbish, overhead powerlines	Old (>20 years)	*Banksia menziesii* and *Eucalyptus marginata* low open woodland with *Jacksonia furcellata* and *J. sternbergiana* tall sparse shrubland over *Acacia pulchella* var. *glaberrima* and *Stirlingia latifolia* mid sparse shrubland over **Pelargonium capitatum* and *Gompholobium tomentosum* low sparse shrubland with **Briza maxima*, **Ehrharta calycina* and **Ursinia anthemoides* sparse grass/herbland
Soil type	**Soil colour**	**Landform unit**	**Aspect/slope**
Sandy loam	Grey-brown	Slope (batter)	North-west
Rock type	**Outcropping %**	**Easting**	**Northing**
Limestone	0	385325	6494698

Species	Cover (%)	Height (m)	Stratum (U=Upper, M=Middle, G=Ground)	Growth Form
Banksia menziesii	8	3.5	U	Tree
Eucalyptus marginata	2	3.5	U	Tree
Jacksonia furcellata	3	3.5	U	Shrub
Jacksonia sternbergiana	1	3	U	Shrub
Acacia pulchella var. *glaberrima*	8	1	M	Shrub
Stirlingia latifolia	1	1	M	Shrub

Species	Cover (%)	Height (m)	Stratum (U=Upper, M=Middle, G=Ground)	Growth Form
Xanthorrhoea preissii	0.1	1	M	Shrub
**Avena barbata*	1	1	L	Grass
**Ehrharta calycina*	4	1	L	Grass
Gastrolobium capitatum	0.1	0.3	L	Shrub
**Gladiolus caryophyllaceus*	0.1	0.6	L	Herb
Gompholobium tomentosum	1	0.3	L	Shrub
Hardenbergia comptoniana	0.1	0.3	L	Herb
Hibbertia hypericoides	0.2	0.4	L	Shrub
**Pelargonium capitatum*	3	0.5	L	Herb
Petrorhagia dubia	0.01	0.4	L	Herb
Banksia attenuata	0.01	0.2	G	Tree
**Briza maxima*	2	0.3	G	Grass
Conostylis aculeata subsp. *aculeata*	0.2	0.2	G	Herb
Desmocladus flexuosus	0.5	0.3	G	Sedge
**Eragrostis curvula*	0.01	0.2	G	Grass
Erodium cygnorum	3	0.1	G	Herb
**Euphorbia terracina*	0.01	0.2	G	Herb
**Fumaria capreolata*	0.01	0.1	G	Herb
**Hypochaeris glabra*	0.5	0.1	G	Herb
**Leontodon rhagadioloides*	2	0.2	G	Herb
**Lysimachia arvensis*	0.01	0.1	G	Herb
Microlaena stipoides	0.01	0.1	G	Grass
Podotheca gnaphalioides	0.5	0.1	G	Herb
**Romulea rosea*	0.01	0.2	G	Herb
Senecio pinnatifolius	0.01	0.3	G	Herb
**Silene gallica*	0.01	0.2	G	Herb
**Sonchus oleraceus*	0.01	0.2	G	Herb
Trachymene pilosa	0.01	0.1	G	Herb
**Ursinia anthemoides*	8	0.3	G	Herb
**Wahlenbergia capensis*	0.01	0.2	G	Herb

Quadrat	Date	Site type	Observer
ELA06	9 October 2025	8 m x 12.5 m	DB
Condition	**Disturbances**	**Fire history (years)**	**Vegetation description**
Good	Weeds, tracks, clearing, rubbish	Old (>20 years)	*Allocasuarina fraseriana, Banksia attenuata* and *B. menziesii* low open woodland over *Jacksonia sternbergiana* and *J. furcellata* sparse shrubland over **Ehrharta calycina, *Eragrostis curvula* and **Briza maxima* open grassland with **Ursinia anthemoides* sparse herbland.
Soil type	**Soil colour**	**Landform unit**	**Aspect/slope**
Sandy loam	Grey	Slope (batter)	North
Rock type	**Outcropping %**	**Easting**	**Northing**
Limestone	0	385473	6494763

Species	Cover (%)	Height (m)	Stratum (U=Upper, M=Middle, G=Ground)	Growth Form
Allocasuarina fraseriana	11	5	U	Tree
Banksia attenuata	3	5	U	Tree
Banksia menziesii	4	4	U	Tree
Jacksonia furcellata	1	3	U	Shrub
Jacksonia sternbergiana	4	1.8	M	Shrub
**Avena barbata*	1	1	L	Grass
**Bromus diandrus*	1	0.6	L	Grass

Species	Cover (%)	Height (m)	Stratum (U=Upper, M=Middle, G=Ground)	Growth Form
**Ehrharta calycina*	30	0.8	L	Grass
**Eragrostis curvula*	2	1.2	L	Grass
**Gladiolus caryophyllaceus*	0.01	0.6	L	Herb
**Pelargonium capitatum*	1	0.4	L	Herb
**Raphanus raphanistrum*	0.01	0.4	L	Herb
**Sonchus oleraceus*	1	0.6	L	Herb
**Arctotheca calendula*	0.1	0.1	G	Herb
**Briza maxima*	2	0.3	G	Grass
Erodium cygnorum	1	0.1	G	Herb
**Euphorbia terracina*	0.5	0.3	G	Herb
**Hypochaeris glabra*	1	0.1	G	Herb
**Lysimachia arvensis*	0.01	0.1	G	Herb
Microlaena stipoides	0.1	0.2	G	Grass
**Pentameris pallida*	0.01	0.1	G	Grass
**Polycarpon tetraphyllum*	0.01	0.1	G	Herb
**Romulea rosea*	0.01	0.2	G	Herb
**Ursinia anthemoides*	5	0.3	G	Herb

Quadrat	Date	Site type	Observer
ELA07	9 October 2025	10 m x 10 m	DB
Condition	**Disturbances**	**Fire history (years)**	**Vegetation description**
Good	Weeds, tracks, clearing, rubbish	Old (>20 years)	*Allocasuarina fraseriana, Banksia attenuata* and *Eucalyptus marginata* low woodland over *Jacksonia sternbergiana* tall sparse shrubland over *Gastrolobium capitatum* and **Pelargonium capitatum* low sparse shrubland with **Ehrharta calycina, *E. longifolia* and **Briza maxima* sparse grassland over **Ursinia anthemoides, *Leontodon rhagadioloides* and **Hypochaeris glabra* sparse herbland.
Soil type	**Soil colour**	**Landform unit**	**Aspect/slope**
Sandy loam	Grey	Slope (batter)	North
Rock type	**Outcropping %**	**Easting**	**Northing**
Limestone	0	385632	6494769

Species	Cover (%)	Height (m)	Stratum (U=Upper, M=Middle, G=Ground)	Growth Form
Allocasuarina fraseriana	25	5	U	Tree
Banksia attenuata	5	5	U	Tree
Banksia menziesii	1	4	U	Tree
Eucalyptus marginata	4	6	U	Tree
Hardenbergia comptoniana	1	3	U	Herb
Jacksonia sternbergiana	6	3	U	Shrub

Species	Cover (%)	Height (m)	Stratum (U=Upper, M=Middle, G=Ground)	Growth Form
Jacksonia furcellata	0.3	1.3	M	Shrub
**Avena barbata*	0.1	1	L	Grass
Bossiaea eriocarpa	0.1	0.3	L	Shrub
**Bromus diandrus*	0.01	0.4	L	Grass
Conostylis aculeata subsp. *aculeata*	0.01	0.4	L	Herb
**Ehrharta calycina*	3	0.8	L	Grass
**Ehrharta longifolia*	1	0.6	L	Grass
Gastrolobium capitatum	1	0.4	L	Shrub
**Gaudium laevigatum* (ex. *Leptospermum laevigatum*)	0.2	0.4	L	Shrub
**Gladiolus caryophyllaceus*	0.1	0.6	L	Herb
Microtis media	0.01	0.4	L	Herb
**Pelargonium capitatum*	1	0.4	L	Herb
**Raphanus raphanistrum*	0.01	0.4	L	Herb
**Briza maxima*	2	0.3	G	Grass
**Carpobrotus edulis*	0.01	0.1	G	Herb
Centrolepis drummondiana	0.01	0.05	G	Herb
Crassula colorata	0.1	0.03	G	Herb
**Disa bracteata*	0.1	0.2	G	Herb
**Euphorbia terracina*	0.1	0.3	G	Herb
Gompholobium tomentosum	0.2	0.2	G	Shrub
**Hypochaeris glabra*	2	0.2	G	Herb
**Leontodon rhagadioloides*	0.01	0.1	G	Herb
Microlaena stipoides	0.1	0.2	G	Grass
**Pentameris pallida*	0.01	0.1	G	Grass
**Petrorhagia dubia*	0.1	0.2	G	Herb
Podotheca gnaphalioides	0.01	0.1	G	Herb
**Romulea rosea*	0.01	0.1	G	Herb
**Sonchus oleraceus*	0.01	0.3	G	Herb
Trachymene pilosa	0.01	0.1	G	Herb
**Ursinia anthemoides*	15	0.3	G	Herb

Appendix C Species by Quadrat Matrix

Taxon	ELA01	ELA02	ELA03	ELA04	ELA05	ELA06	ELA07
Acacia pulchella var. *glaberrima*					8		
Allocasuarina fraseriana				5		11	25
**Artotheca calendula*	0.01	3	0.5			0.1	
**Avena barbata*		0.1	0.1	0.1	1	1	0.1
Banksia attenuata	5	10		3	0.01	3	5
Banksia menziesii	15	1	0.1	8	8	4	1
Bossiaea eriocarpa							1
**Briza maxima*	0.1	5	5	5	2	2	2
**Bromus diandrus*				0.1		1	0.01
**Bromus rubens*			0.01				
Caladenia flava	0.01						
**Carpobrotus edulis*	5						0.01
Centrolepis dummondiana				0.01			0.01
Conostylis aculeata subsp. *aculeata*					0.2		0.01
Crassula colorata				0.01			0.1
Desmocladus flexuosus					0.5		
**Disa bracteata*	0.1	0.1	0.1				0.1
Drosera sp.	0.2	2					
**Erharta calycina*	4	20	20	10	4	30	3
**Erharta longifolia*							1
**Eragrostis curvula*				0.01	0.01	2	
Erodium cygnorum		0.01	0.01	0.1	3	1	
Eucalyptus marginata	12	10	8	4	2		4
**Euphorbia terracina*				0.01	0.01	0.5	0.1
**Fumaria capreolata*					0.01		
Gastrolobium capitatum		0.01	0.5		0.1		1
**Gaudium laevigatum* (ex. *Lepotospermum laevigatum*)							0.2
**Gladiolus caryophyllaceus*	0.01	0.1	0.01	0.01	0.1	0.01	0.1
Gompholobium tomentosum	0.01		0.01		1		0.2
Hadenbergia comptoniana	0.01	1	0.5	0.1	0.1		1
Hibbertia hypericoides		0.01	3	2	0.2		
**Hypochaeris glabra*	0.2	2		0.1	0.5	1	2
Jacksonia furcellata	1.5		5	1	3	1	0.3
Jacksonia sternbergiana	1	4	10	5	1	4	6
Kunzea glabrescens	15						
**Leontodom rhagadioloides*		0.01		4	2		2
**Lysimachia arvensis*					0.01	0.01	
Microlaena stipoides	0.01	2	1	0.01	0.01	0.1	0.01
Microtis media	0.01	0.01		0.01			0.01
**Ornithopus compressus*	0.1	1	0.2				
**Pelargonium capitatum*		1	1	0.01	3	1	1
**Pentameris pallida*				0.01		0.01	0.01

Taxon	ELA01	ELA02	ELA03	ELA04	ELA05	ELA06	ELA07
**Petrohagia dubia*					0.01		0.1
Podotheca gnaphalioides				0.1	0.5		0.01
**Polycarpon tetraphyllum*						0.01	
Ptilotus polystachyus		1					
**Raphanus raphanistrum*						0.01	0.01
**Romulea rosea*		0.01		0.01	0.01	0.01	0.01
Senecio pinnatifolius					0.01		
**Silene gallica*					0.01		
**Sonchus oleraceus*				0.01	0.01	1	0.01
Stirlingia latifolia					1		
Styphelia propinqua		0.5					
Trachymene pilosa	0.1				0.01		0.01
**Trifolium arvense*		0.01					
**Trifolium campestre*		0.01		0.01			
**Ursinia anthemoides*	1	5	15	15	8	5	15
**Vulpia myuros*		0.5	0.1				
**Wahlenbergia capensis*			0.01	0.01	0.01		
Xanthorrhoea preissii					0.1		