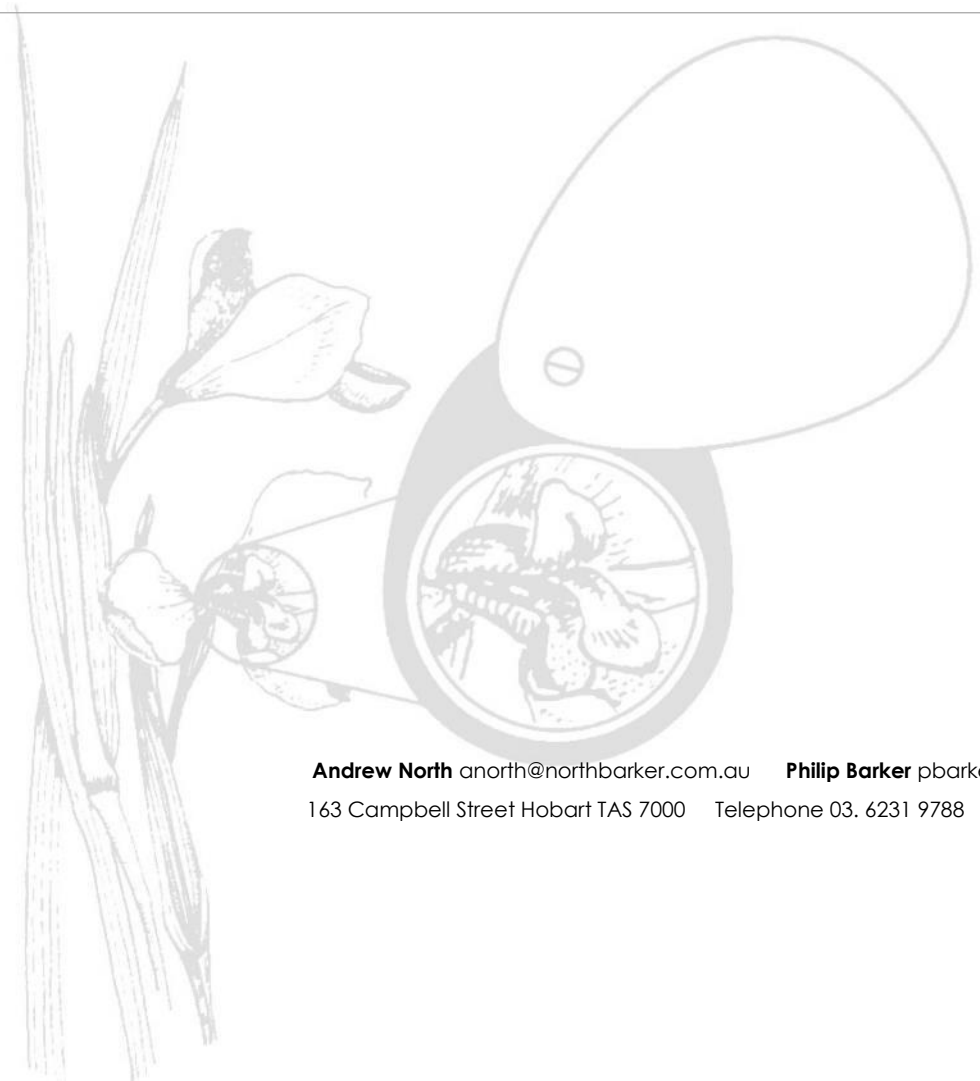
northbarker
ECOSYSTEM SERVICES

52 Richardsons Road
Lauderdale

Natural Values Assessment

28 May 2020

For JULIE RICHARDS AND LADO PROPERTY HOLDINGS PTY LTD
JMG024



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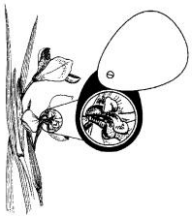
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Summary

Clarence Interim Planning Scheme 2015	
Title Ref:	C.T. 158742/9
Rezoning To:	General Residential. Rural Living and Open Space
Current Zone	Rural Resource Zone Environmental Living
Overlays Considered	Biodiversity Protection Area
	Waterway and Coastal Protection Area
Waterway and Coastal Protection Code E11	Avoids impact to natural values on land adjoining Racecourse Flats saltmarsh within the overlay
Natural Assets Code E27	Conforms to E27.9.1 For a Minor Impact P1 through the minimisation of impact to priority vegetation and the provision of offsets.
Threatened flora	Juniper wattle – *Acacia ulicifolia* – rare TSPA Sea clubsedge – *Bolboschoenus caldwellii* – rare TSPA Fennel pondweed - *Stuckenia pectinata* – rare TSPA
Impacts	None
Threatened fauna and habitat	Possibly eastern barred bandicoot
Impacts	Insignificant
Threatened vegetation	*E. viminalis* coastal forest (DVC) -NCA Wetland communities (ASF AHL) – NCA Saltmarsh (ASS) - EPBCA
Impacts	1.2 ha DVC
Native vegetation	*E. amygdalina* coastal forest (DAC)
Impacts	0.37 ha DAM
Environment Protection and Biodiversity Conservation Act (EPBCA)	No significant impact to MNES
Threatened Species Protection Act (TSPA)	No impact to listed species
Nature Conservation Act (NCA)	Permit to take product of wildlife potentially required should trees supporting nesting hollows be removed
Weed Management Act (WMA)	Declared weeds present in project area

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1 INTRODUCTION

1.1 Background

52 Richardson Road, Lauderdale (Title Ref: C.T. 158742/9) is a large property of 72.8 ha. It extends over two zones under the Clarence Interim Planning Scheme 2015 (CIPS) – Rural Resource D26 and Environmental Living D14. Worbey Developments Pty Ltd are looking to rezone some of the land to release a portion of the property for residential development. Prior to preparing a rezoning application they are placing a request to Clarence City Council to have the Southern Land Use Strategy revised to extend the Urban Growth Boundary into part of the property.

The concept plan for the subdivision includes 147 residential lots, 8 larger rural lots and an extensive area (over 35 ha) of Public Open Space capturing a significant proportion of the natural areas currently captured within the Environmental Living Zone plus important land backing the Racecourse Flats saltmarshes.

This report provides ecological assessment of the property and considers implications for the Natural Assets Code of the CIPS to assist with the application.



Plate 1:View from Richardson Hill toward Mt Wellington over Racecourse Flats saltmarsh and Ralphs Bay

1.2 Study area

The study area is in Lauderdale in south-eastern Tasmania (Figure 1). It is in the Tasmanian South East bioregion[1] in the Clarence City Council and is approximately 72.8 ha in extent. The site is zoned subject to several Codes under the *Clarence Interim Planning Scheme 2015*. This report confines itself to those with implications for biodiversity values, the *Natural Assets Code* (E27) and the *Waterways and Coastal Protection Areas Code* (E11.

[1] IBRA 7 (2012)

The site extends from just above sea level where it adjoins racecourse Flats to 78m at the crest of Richardsons Hill.

It includes forested western slopes of Richardsons Hill, some remnant and regenerating saltmarsh, brackish and freshwater wetlands and extensive areas of old long-established pasture dominating the southern slopes of Richardsons Hill. The site has been modified through sand extraction, materials storage and land fill, of which the latter operation continues to the present time.

The geology is predominantly classified as undifferentiated Quaternary sediments with Richardson Hill crest Permian Upper glaciomarine sequences of pebbly mudstone, sandstone and limestone[2]. The site is captured within the Nine Mile Beach Land System which is extrapolated to other major sand spits including Seven Mile Beach and Lauderdale where it is formed from calcareous wind-blown sands and with localised areas of clay soils typically forming dunes and backflats [3].

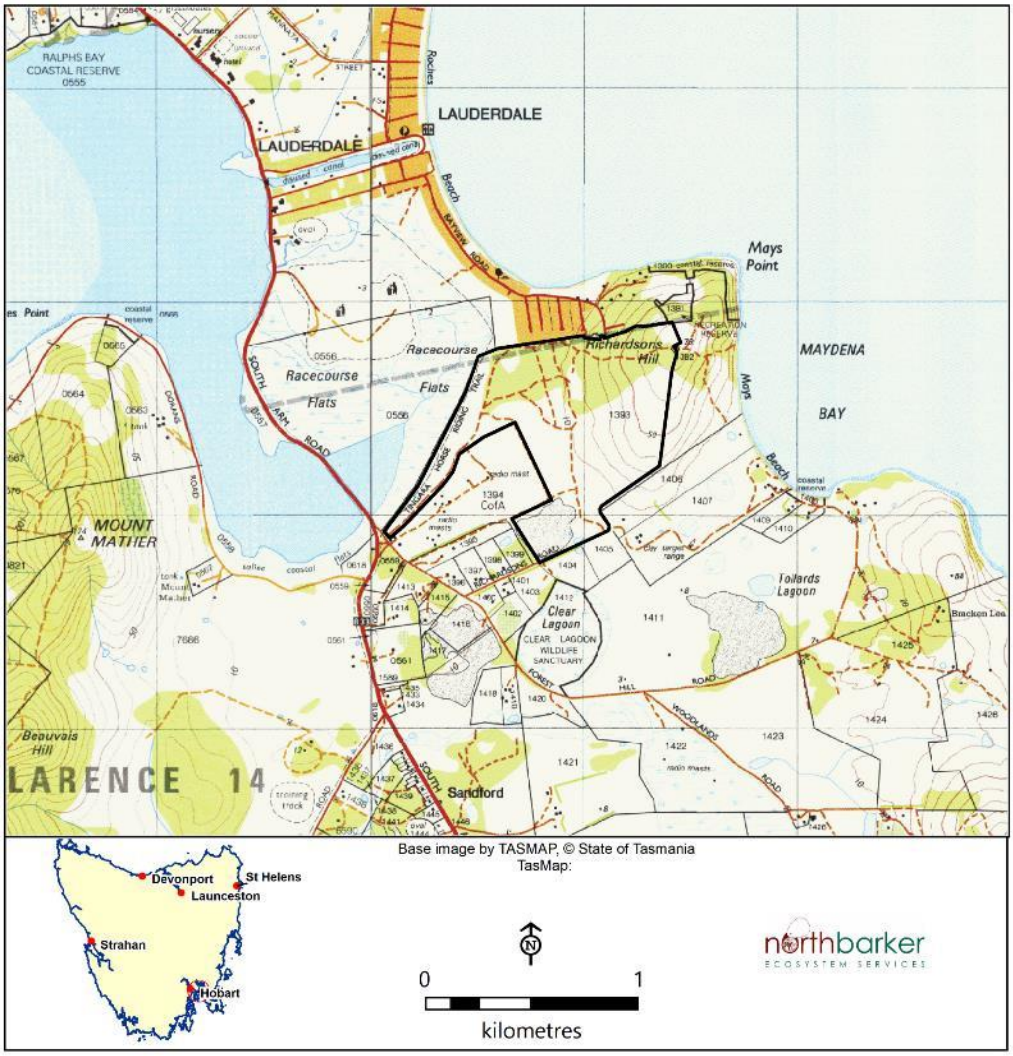


Figure 1: Location of 52 Richardsons Road

[2] 1:250,000 Digital geology from The List
[3] Davies 1988

2 METHODS

The following sources were used for biological records for the region:

- TASVEG version 3.1 digital layer[4],
- Natural Values Atlas (NVA) - all threatened species records within 5 km of the study area and threatened fauna considered possible to occur in suitable habitat[5],

2.1 Botanical Survey

This assessment was undertaken in accordance with the 'Guidelines for Natural Values Surveys – Terrestrial Development Proposals'[6].

Native vegetation was mapped in accordance with units defined in TASVEG 3.1[7]. Vascular plants were recorded in accordance with the current census of Tasmanian plants[8]. The site was mapped using a meandering area search technique[9]. Particular attention was given to habitats suitable for threatened species under the Tasmanian *Threatened Species Protection Act 1995* (TSPA) and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA), and to 'declared' weeds under the Tasmanian *Weed Management Act 1999* (WMA)[10].

2.2 Fauna survey

The survey was carried out in accordance with DPIPWE's 'Guidelines for Natural Values Surveys – Terrestrial Development Proposals'[11].

The study area was searched for the potential presence, habitat, and signs (e.g. scats, tracks, nests) of threatened fauna concurrently with the botanical survey.

2.3 Limitations

Due to various limitations (e.g. variations in species presence and detectability), no biological survey can guarantee that all species will be recorded during a single visit. The field survey was undertaken in late spring, so seasonal and ephemeral species/habitat may have been overlooked or are seasonally absent, including summer flowering species. However, we are confident the surveys sufficiently captured community level diversity. We compensate for survey limitations in part by considering all listed threatened species from data from the Tasmanian *Natural Values Atlas* (NVA). These data include records of all threatened species known to occur, or with the potential to occur, up to 5 km from the study area.

3 RESULTS - BIOLOGICAL VALUES

A full inventory of all vascular plant species recorded on site is included in Appendix A. Separate plots were recorded in each discernible vegetation community (Appendix B), along with 'running' species list from incidental observation recorded elsewhere on the property.

A total of 152 species were recorded including (120 native and 32 introduced).

[4] Kitchener and Harris (2013)
[5] DPIPWE Natural Values Atlas Report (2020) report 26 November 2019
[6] DPIPWE (2015)
[7] Kitchener and Harris (2013)
8 de Salas and Baker (2019)
[9] Goff *et al.* (1982)
[10] Tasmanian State Government 1995; Commonwealth of Australia 1999; Tasmanian State Government 1999
[11] DPIPWE (2015)

3.1 Vegetation communities

TASVEGv3.1 (Figure 2) shows the bushland in the north of the site to be *E. amygdalina* coastal forest and woodland (DAC). Our assessment generally agrees but has separated off two patches as *E. viminalis* coastal forest (DVC). Cleared areas are classified similarly as predominantly Agricultural land (FAG) and variously Urban Areas (FUM) or Extra Urban Miscellaneous areas (FUR). Our mapping (Figure 3) has tightened boundaries. We have also pulled out some small patches of wetland vegetation and classified them as Lacustrine herbland (AHL) or Freshwater aquatic sedgeland and rushland (ASF). The panhandle shaped piece of land that borders Racecourse Flats is mapped correctly on TASVEG being Coastal grassland (GHC) albeit modified, and narrow sliver of Succulent saltmarsh (ASS).

Table 1: Vegetation Communities

Community	EPBC Listing	NCA Listing	Area
Eucalyptus viminalis – E. globulus coastal forest (DVC)		Threatened	7.16
Eucalyptus amygdalina coastal forest (DAC))			19.22
Coastal grassland (GHC)			7.43
Lacustrine herbland (AHL)		Threatened	0.81
Succulent saline herbland (ASS)	Vulnerable		1.78
Freshwater aquatic sedgeland and rushland (ASF)		Threatened	0.25
Regenerating cleared land (FRG)			5.57
Agricultural land (FAG)			22.70
Urban Area (FUR)			0.37
Extra-urban Miscellaneous Areas (FUM)			6.73
Water (OAQ)			0.86
TOTAL			72.88

DVC corresponds to the threatened community, Eucalyptus viminalis-Eucalyptus globulus coastal forest and woodland, listed as 23 Schedule 3A under the Tasmanian *Nature Conservation Act 2002* (NCA).

AHL and ASF are both included in Wetlands, a threatened community, listed as 39 Schedule 3A under the Tasmanian *Nature Conservation Act 2002* (NCA).

ASS is part of the subtropical and temperate coastal saltmarsh ecological community, listed as vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

Vegetation types across the survey area are summarised in text below. Distribution of TASVEG native vegetation communities are presented in Figure 3, with patch floristics in Appendix B.

3.1.1 *Eucalyptus viminalis– E. globulus* coastal forest and woodland (DVC)

This occupies two distinct environments. On the upper slopes of Richardsons Hill (Plate 2) it is characterised by an open woodland character with widely spaced trees over a sagg *Lomandra longifolia* dominated ground layer with a few scattered shrubs, mostly of bull oak *Allocasuarina littoralis.* There is a grassy and herb component that includes sun orchids *Thelymitra* spp. and tiger orchids *Diuris sulphurea.* There are potentially likely to be other species that could be picked up in surveys in different seasons. It is in good condition with few weeds. Some of the trees are mature and hollow bearing.



Plate 2: *Eucalyptus viminalis* coastal woodland Richardsons Hill with few shrubs and prominent sagg

The second area is on the lower slopes of Richardson's Hill. The larger stand includes a dense secondary layer of regrowth *E. viminalis* and a prominent silver wattle *Acacia dealbata* component (Plate 3) . The understorey is dominated by bracken which in places forms a dense layer outcompeting other species, but in other co-exist with saggs and a range of smaller low shrubs. On sandy ridges backing the saltmarsh the vegetation takes on a more heathy character (Plate 4).

Eucalyptus viminalis – E. globulus coastal forest and woodland (DVC) is listed as threatened under the Tasmanian NCA. There are only 3400 ha in Tasmania, 1600 ha in the SE Bioregion and 200 ha in Clarence of which only 40 ha is secured in reserves[12].

[12] TASVEG_3_0_areaBYvegcode_June 2014. (spreadsheet provided by DPIPWE)



Plate 3: *Eucalyptus viminalis* coastal forest lower slopes of Richardsons Hill with silver wattle and bracken



Plate 4: Eucalyptus viminalis coastal forest over heathy understorey adjacent to Racecourse Flats

3.1.2 *Eucalyptus amygdalina* coastal forest (DAC)

This dominates the mid slopes of Richardsons Hill and shows significant structural availability. In some places it is characterised by a tall shrub layer that includes areas dominated by bull oak and others where tea tree *Leptospermum scoparium* forms an almost single species secondary layer (Plate 6). Bracken is locally dense but in other areas is spare allowing for a diverse heathy and in other places sedge dominated ground layer. Floristically this community is very diverse. It is infested with a range of woody weeds and climbers which have the potential to impact on native species. There are occasional large trees bearing hollows, but most are younger specimens.



Plate 5: *Eucalyptus amygdalina* coastal forest (DAC) over heathy undertorey with bracken



Plate 6: Eucalyptus amygdalina coastal forest (DAC) over scrubby undertorey dominated by tea tree

Eucalyptus amygdalina coastal forest and woodland (DVC) is not listed as threatened under the Tasmanian NCA. There are 150,000 ha in Tasmania, 13,800 ha in the SE Bioregion and 600 ha in Clarence of which only 50 ha is secured in reserves[13].

3.1.3 Coastal grassland (GHC)

This occupies a broad band behind the saltmarsh on low sandy rises that frame the Racecourse Flats. Generally, depauperate with a prominence of *Poa poiformis* tussocks with knobby clubsedge *Ficinia* nodosa scattered through. Other native grasses occupying open patches include *Rytidosperma geniculatum* and *Lachnagrostis filiformis.* Introduced grasses such as cocksfoot *Dactylis glomerata* and sea wheatgrass *Thinopyrum junceiforme* are locally prominent. The general absence of native herbs suggests the site has been subject to attempts of agricultural improvement and is likely to have been ploughed and sown to pasture in previous decades.



Plate 7: Coastal grassland (GHC)

Coastal grassland (GHC) is not listed as a threatened community under state or Commonwealth legislation. There are 11500 ha in Tasmania, 500 ha in the SE Bioregion and just 50 ha in Clarence of which only 3 ha is secured in reserves[14].

3.1.4 Lacustrine herbland (AHL)

This is an area of low herbfield which support a flora that is distinguished from saltmarsh due to the (virtual) absence of succulent herb such as *Sarcocornia* spp. This occurs in less saline environments than ASS and is associated with brackish conditions at sites that would be inundated after heavy rain events. It is likely to be occupying an area that has been stripped of sand in the past and so has colonised an induced environment. It includes a diverse range of brackish and saltmarsh marginal species along with more typical freshwater herbs. The component species grade into the adjacent vegetation mapped as Regenerating Cleared Land (FRG) which is notable for the diverse mix of native species albeit heavily weed infested. (Plate 9).

[13] TASVEG_3_0_areaBYvegcode_June 2014. (spreadsheet provided by DPIPWE)
[14] TASVEG_3_0_areaBYvegcode_June 2014. (spreadsheet provided by DPIPWE)



Prominent herbs include *Samolus repens, Selliera radicans*, *Mimulus repens, Carpobrotus rossii and Disphyma crassifolium subsp. Clavellatum*. Fine leaved sedges and rushes include *Isolepis spp.* and *Schoenus nitens*. Tiny short-lived annual herbs such as *Lilaeopsis polyantha* are apparent in spring before dying off. This includes scattered tussocks of common blown grass *Lachnagrostis filiformis.* By summer extensive patches of bare ground characterise some of this mapping unit.

Plate 8: Lacustrine herbland up close (AHL)

Lacustrine herbland (LHA) is listed as a threatened community under the Tasmanian *NCA* as 'wetland'. There are only 1400 ha in Tasmania, 200 ha in the SE Bioregion but none are mapped in Clarence. Wetlands occupy 200 ha of which 80 ha is secured in reserves[15].



Plate 9: The old sand mine being recolonised by various native and non-native flora, classified as regenerating cleared land (FRG)

[15] TASVEG_3_0_areaBYvegcode_June 2014. (spreadsheet provided by DPIPWE)

3.1.5 Succulent saline herbland (ASS)

Classic succulent saltmarsh forms extensive areas around and across Racecourse Flats north west of the site and just extends into the margins of the panhandle shaped arm of the property. This is tidally influenced and includes a distinct succulent saltmarsh community of *Sarcocornia quinqueflora*, *Wilsonia backhousei* and *Disphyma crassifolium subsp. clavellatum*.

Plate 10: Succulent saline herbland - pink flower of *Disphyma crassifolium*

Succulent saline herbland (ASS) is captured wit



hin the EPBC vulnerable ecological community subtropical and temperate coastal saltmarsh but is not listed as a threatened community under the Tasmanian *NCA*. There are only 2400 ha in Tasmania, 1600 ha in the SE Bioregion and 400 ha in Clarence, of which 100 ha is secured in reserves[16].

3.1.6 Freshwater aquatic sedgeland and rushland (ASF)

This occupies two deeper excavations where standing water persist throughout the year other than in drought conditions. The marginal vegetation is dominated by a dense mix of *Bolboschoenus caldwellii, Eleocharis acuta, Typha* sp. and *Schoenoplectus pungens*. Deeper water supports *Myriophyllum salsugineum, Potamogeton ochreatus* and *Stuckenia pectinata*.

Freshwater aquatic sedgeland and rushland (ASF) is listed as a threatened community under the Tasmanian *NCA* as 'wetland'. There are 6900 ha in Tasmania, 1800 ha in the SE Bioregion and 40 ha are mapped in Clarence. Wetlands occupy 200 ha in Clarence of which 80 ha is secured in reserves[17].

[16] TASVEG_3_0_areaBYvegcode_June 2014. (spreadsheet provided by DPIPWE)
[17] TASVEG_3_0_areaBYvegcode_June 2014. (spreadsheet provided by DPIPWE)



Plate 11: Freshwater aquatic sedgeland and rushland ASF

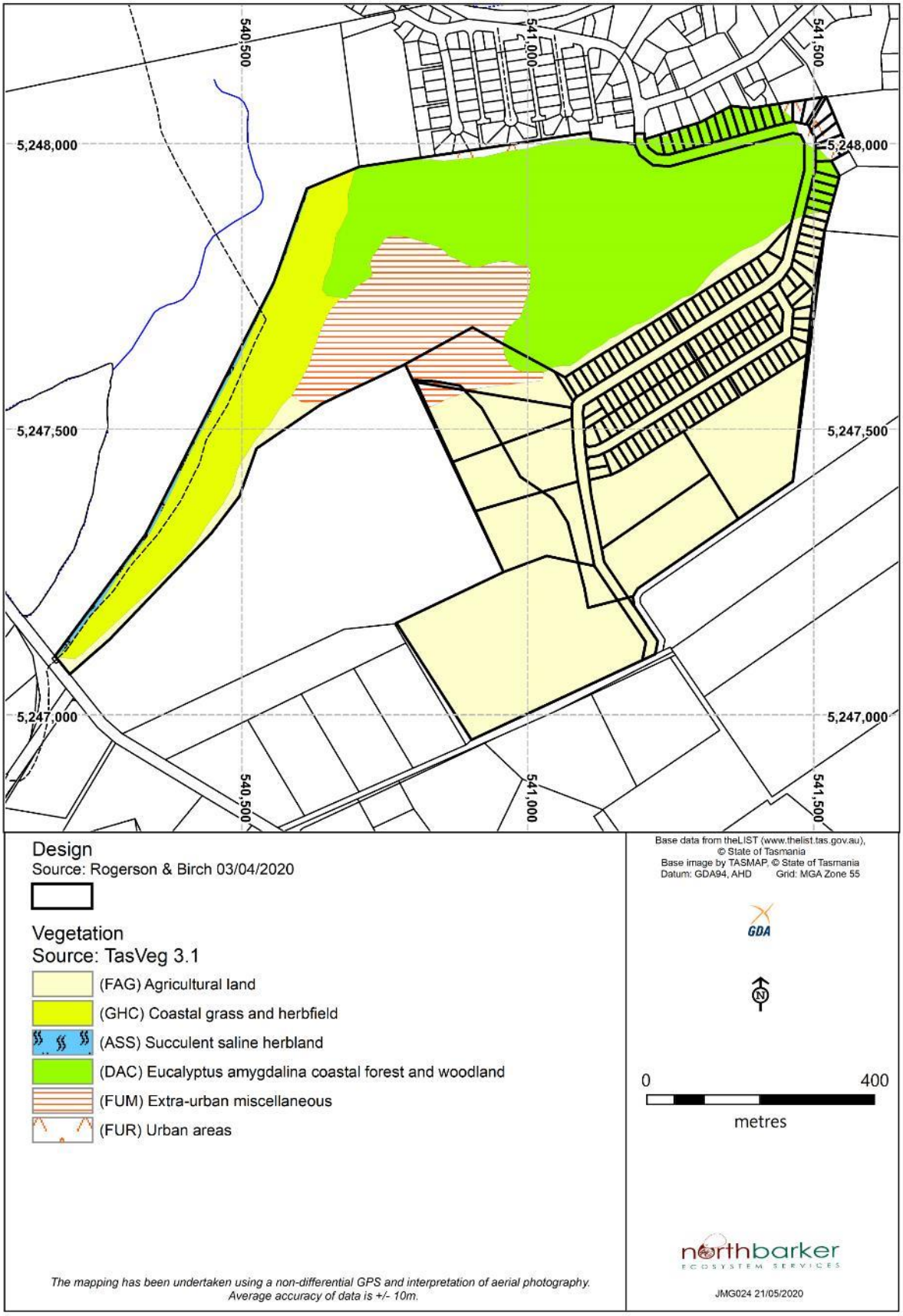


Figure 2: Vegetation communities - TASVEG 3.1

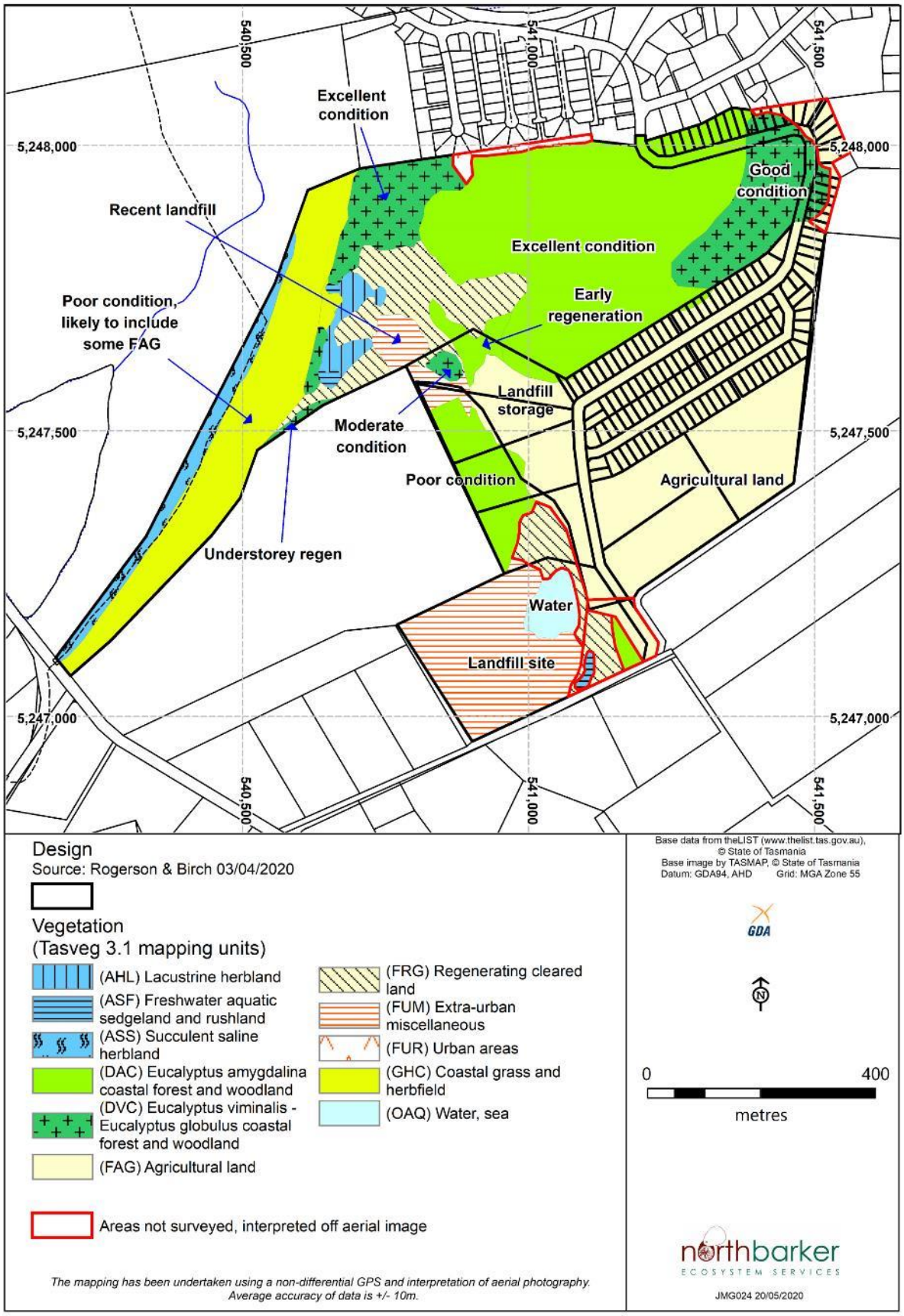


Figure 3: Vegetation communities - this study

3.2 Flora of Conservation Significance

3.2.1 Threatened Flora Recorded in Survey

- *Acacia ulicifolia* juniper wattle



Plate 12: Juniper wattle *Acacia ulicifolia*

This straggly shrub with distinctive prickly foliage is present in low numbers in the forested area. Recorded at just one location the cryptic nature means plants could easily be overlooked, especially outside the early Spring flowering period.

This species is rarely recorded in Clarence and there is only one record on the Natural Values Atlas from Waverly Flora Park, making this occurrence a significant find. Typical habitat is heathland and heathy forest on sandy substrates. It occurs throughout the northern and eastern Tasmania, typically in coastal and subcoastal locations.

Note: The morphology is atypical of *A. ulicifolia* and further taxonomic assessment may indicate it to belong to another taxon. It has affinities to the unlisted *A. genistifolia* and *A. gunnii* but does not match either of those exactly.

- *Bolboschoenus caldwellii* – sea club sedge



Plate 13: Sea clubsedge *Bolboschoenus caldwellii*

This distinctive bright green sedge forms dense patches in shallow water on the margins of two wetlands. Plants in one of the dried-out depressions had been heavily browsed (by wallabies or cattle?). The largest patches extend over 100 sqm each. They are all located in an area identified for Pubic Open Space.

B. caldwellii is not uncommon in Clarence with numerous records from Lauderdale, Cremorne, Seven Mile Beach area, although most occur on private land.

- *Stuckenia pectinata* – fennel pondweed



This was recorded mixed in with other floating and submerged aquatic vegetation on one of the deeper pools. There is potential for it to occur in other low lying aquatic sites on the property although these were all at low levels of inundation due to the drought conditions prevalent at the time of survey.

S. pectinata is known from nearby sites on Ralphs Bay and in Rushy Lagoon near Cremorne.

Plate 14: Fennel pondweed *Stuckenia pectinata* (fine-leaved plant)

3.2.2 Other Significant flora Recorded in Survey

- *Cassytha pedicellosa* – stalked dodderlaurel



Recorded at several location in DAC and on sandy substrates in previously cleared sites. All locations are within the proposed Public Open Space.

This is a Tasmanian endemic parasitic ground hugging creeper that attaches itself to prostrate plants in heathland and heathy woodland. These records build on previous observations of *C. pedicellosa* in Clarence at Cape Deslacs and Calverts Lagoon.

Plate 15: stalked dodder laurel *Cassytha pedicellosa*

3.2.3 Other Threatened Flora Recorded in Vicinity

Below are lists taken from a Natural Values Report for the site

Threatened flora within 500 metres

Verified Records

Species	Common Name	SS	NS	Bio	Observation Count	Last Recorded
Cuscuta tasmanica	golden dodder	r		n	7	04-Apr-2017
Lachnagrostis robusta	tall blowngrass	r		n	16	01-May-2012
Ruppia tuberosa	tuberous seatassel	r		n	56	19-Oct-2017
Triglochin minutissima	tiny arrowgrass	r		n	1	07-Dec-1974

Threatened flora within 5000 metres

Verified Records

Species	Common Name	SS	NS	Bio	Observation Count	Last Recorded
Bolboschoenus caldwellii	sea clubsedge	r		n	4	24-Jan-2013
Caladenia filamentosa	daddy longlegs	r		n	2	12-Oct-1995
Cotula vulgaris var. australasica	slender buttons	r		n	1	15-Nov-1906
Cuscuta tasmanica	golden dodder	r		n	7	04-Apr-2017
Eucalyptus morrisbyi	morrisbys gum	e	EN	e	70	30-Sep-2018
Eucalyptus morrisbyi x viminalis subsp. viminalis		ph	PH	e	13	30-Sep-2018
Eucalyptus risdonii	risdon peppermint	r		e	1	15-Mar-2016
Hyalosperma demissum	moss sunray	e		n	1	10-Oct-2017
Juncus amabilis	gentle rush	r?		n	20	21-Jul-2010
Lachnagrostis punicea subsp. filifolia	narrowleaf blowngrass	r		n	4	21-Dec-2016
Lachnagrostis robusta	tall blowngrass	r		n	39	29-Feb-2016
Lepidium hyssopifolium	soft peppercress	e	EN	n	2	29-Oct-2004
Limonium australe var. australe	yellow sea-lavender	r		n	2	14-Feb-1966
Ruppia tuberosa	tuberous seatassel	r		n	68	19-Oct-2017
Rytidosperma indutum	tall wallabygrass	r?		n	3	07-Jul-1996
Scleranthus fasciculatus	spreading knawel	v		n	9	04-Mar-2011
Stuckenia pectinata	fennel pondweed	r		n	2	01-Apr-1978
Stylidium despectum	small triggerplant	r		n	1	26-Nov-1958
Triglochin minutissima	tiny arrowgrass	r		n	5	14-Nov-2016
Vittadinia gracilis	woolly new-holland-daisy	r		n	2	13-Dec-2011
Vittadinia muelleri	narrowleaf new-holland-daisy	r		n	17	01-Aug-2018
Wilsonia rotundifolia	roundleaf wilsonia	r		n	1	04-May-1998

Several of the species previously recorded from the vicinity have the potential to occur on site based on habitat suitability. Some of these were deliberately targeted in surveys conducted for this project but were not found to occur. None of the species not recorded in this study warrant targeted survey. The likelihood of any being impacted by the footprint of the proposed subdivision is considered very remote.

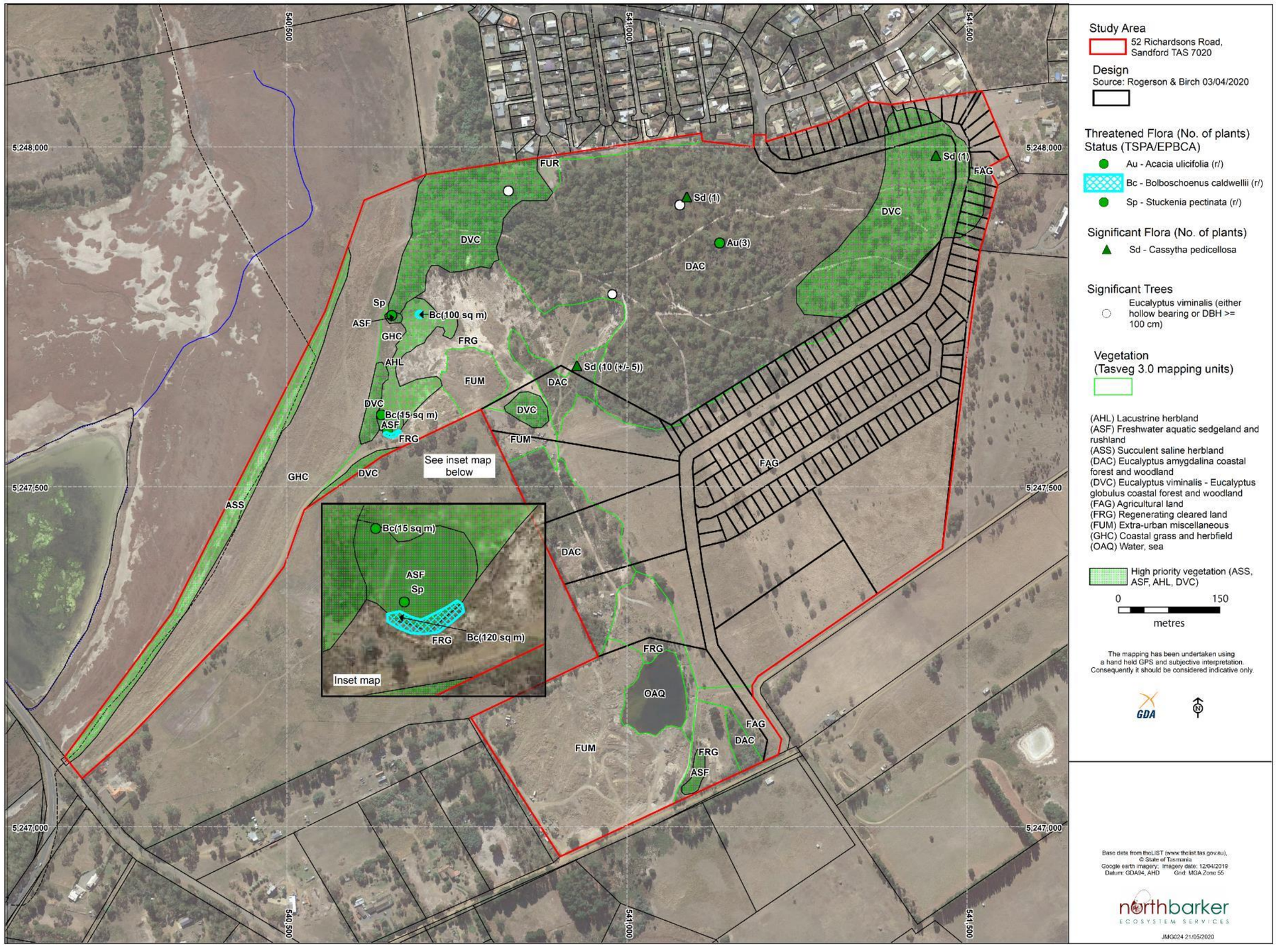


Figure 4: Threatened Flora and Vegetation

3.3 Weeds

Our surveys recorded 32 introduced plant species including 8 declared weeds. These include several environmental weeds, most of which were concentrated within (but not restricted to) modified land (Table 2 and Figure 5). Note the south west corner of the property in and around the existing land fill site has not been included in the survey. This includes a wide range of weeds.

None of the declared weeds are targeted for eradication measures based on the WMA or Clarence Weed Management Strategy[18]. The focus of management for these species is containment.

Table 2: Declared weeds within survey area

Species	Comment	WONS[19]	Zone within Clarence Council[20]	Priority under CWMS[21]
Carduus pycnocephalus slender thistle	Localised within previously cleared land in the area of the old sand mine		Zone B containment	3 containment
Chrysanthemoides monilifera boneseed	Occasional plants browsed by cattle in disturbed sites		Zone B containment	4 Site specific containment
Erica lusitanica spanish heath	Dense patch around margins of old sand mine in regenerating cleared land and local infestations in DAC		Zone B containment	4 Site specific containment
Genista monspessulana montpellier broom	Localised near track sides in DAC	YES	Zone B containment	4 Site specific containment
Lycium ferocissimum African boxthorn	Some large plants in north east comer at top of Richardson's Hill	YES	Zone B containment	4 Site specific containment
Marrubium vulgare horehound	Recorded in old pasture in far north east corner on north face of the crest of Richardsons Hill. Potentially elsewhere in old pasture		Zone B containment	4 Site specific containment
Nassella trichotoma serrated tussock	Extensive , with scattered infestation across all of the pasture in the south of the property and along the roadside in the west	YES	Zone B containment	4 Site specific containment
Rubus fruticosus agg. blackberry	Occasional	YES	Zone B containment	4 Site specific containment

[18] Clarence Weed management Strategy (NBES 2016)
[19] Weeds of National Significance
[20] Tasmanian *Weed Management Act 1999*
[21] Clarence Weed Management Strategy (NBES 2016)

- CWMS Clarence Council Weed Management Strategy
    - Priority 3 - Eradicate isolated infestations, contain infestations to ensure no further spread within term of the action plan
    - Priority 4 - Control and contain where threatening important values, aim to control dense infestations within term of the action plan (15 years) Considered response for all species

The Clarence Local List (CLL) includes locally important weeds not declared under the WMA. "Control and contain where practical through landowner partnerships with Council. Target eradication of small infestations during term of the action plan". Most of these where they occur in land identified for Public open Space are worth targeting for eradication.

Table 3: Clarence Local List Weeds within survey area

Species	Comment	Strategic Objectives CWMS[22]
Acacia provincialis (syn A retinodes) wirilda	One mature individual located on the interface between ARS/DVC	1 3
Billardiera heterophylla bluebell creeper	Widespread and locally dense infestations in DAC. Potentially the most significant environmental weed on site	1
Chamaecytisus palmensis tree lucerne	Localised to southern boundary	1 3
Pinus radiata radiata pine	Single young tree on southern boundary.	2 3
Psoralea pinnata Blue butterfly bush	Localised to site in old sand mine area	1 3

Strategic Objective

1: Localised species of high threat that should be targeted for eradication

2: Entrenched species requires a 'containment' style of management. In this scenario localised species may be targeted for eradication or control in order to protect identified assets from further infestations. Areas currently free of these weeds should also be kept free.

3. Planted exotics that should have a strategy for replacement.

[22] Clarence Weed Management Strategy (NBES 2016)



Horehound *Marrubium vulgare*



Slender thistle *Carduus pycnocephalus*



Serrated tussock Nassella trichotoma



Spanish heath *Erica lusitanica*





African boxthorn *Lycium ferocissimum*

Plate 16: Declared weeds



Wirilda *Acacia provincialis*



Blue butterfly bush *Psoralea arborea*



Bluebell creeper *Billardiera heterophylla*
The most prolific environmental weed in the proposed Reserve

Plate 17: Environmental Weeds - Clarence Local Weed List

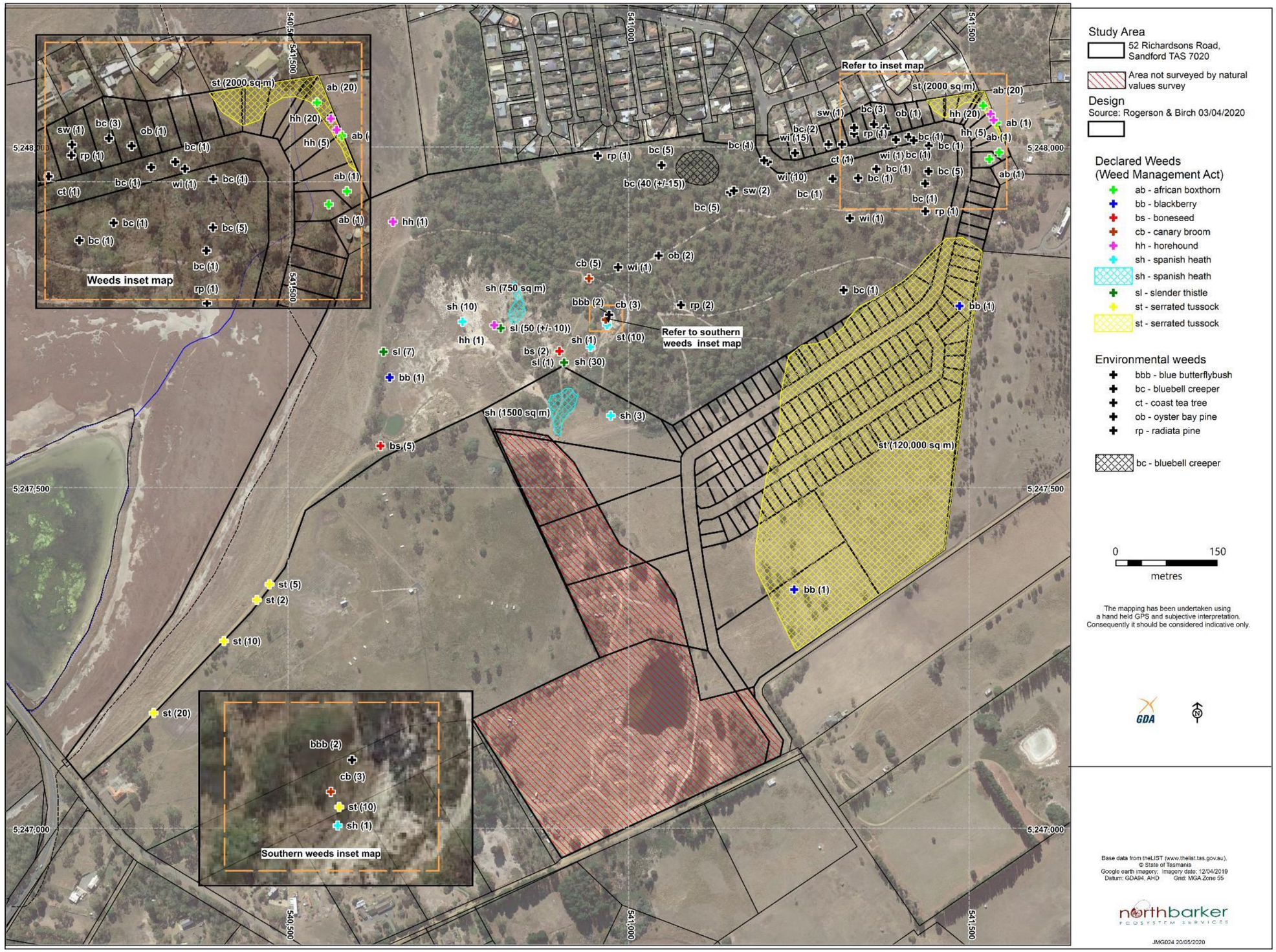


Figure 5: Weeds

3.4 Threatened Fauna and Habitat

The site supports a range of fauna habitats. Although no detailed fauna surveys were conducted anecdotal observations were recorded. The bushland areas provide shelter for a number of vertebrate fauna including brush-tail possums, ring-tailed possums (a carcass of this species was observed on site), rufous wallabies, and bandicoots, as evidenced by diggings.

The wetlands provide limited cover for aquatic birds for foraging and nesting.

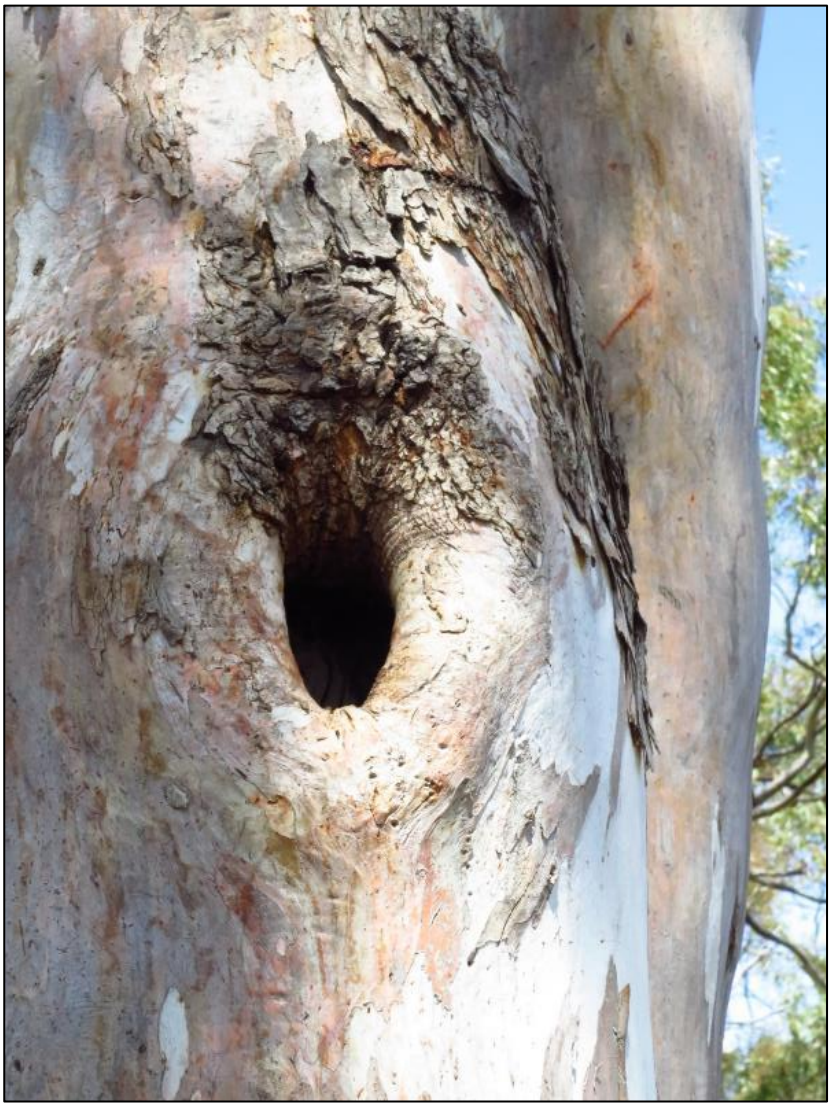


Plate 18: Tree hollows in *Eucalyptus viminalis*

The most likely threatened fauna to use the site for both breeding or foraging include the eastern barred bandicoot, the Tasmanian devil, the eastern and spotted-tail quoll and Tasmanian masked owl.

The forested areas (DAC and DVC) support foraging and nesting habitats. There are occasional large mature or senescing white gums that could provide significant habitat for nesting birds and arboreal mammals in the form of numerous hollows. Most of the DAC forest is regrowth with smaller younger trees.

The wetland and saltmarsh communities provide habitat for various specialist fauna, although their extent on the property is small. Threatened species associated with these habitats have abundant areas of habitat on the adjacent saltmarshes to the north west.

3.4.1 Threatened Fauna Recorded in Vicinity

Below are lists taken from a Natural Values Report for the site

Threatened fauna within 500 metres

Verified Records

Species	Common Name	SS	NS	Bio	Observation Count	Last Recorded
Amelora acontistica	chevron looper moth	v			1	02-Feb-2007
Eubalaena australis	southern right whale	e	EN	m	1	12-Jun-1995
Perameles gunnii	eastern barred bandicoot		VU	n	1	26-Dec-1976
Theclinesthes serpentata subsp. lavara	Chequered Blue	r		e	1	11-Feb-2013

Threatened fauna within 500 metres

(based on Range Boundaries)

Species	Common Name	SS	NS	BO	Potential	Known	Core
Lathamus discolor	swift parrot	e	CR	mbe	1	0	1
Antipodia chaostola	chaostola skipper	e	EN		1	0	0
Dasyurus maculatus subsp. maculatus	spotted-tail quoll	r	VU	n	1	0	0
Litoria raniformis	green and gold frog	v	VU	n	1	0	0
Chrysolarentia decisaria	tunbridge looper moth	e		e	1	0	0
Pseudemoia pagenstecheri	tussock skink	v		n	1	0	0
Haliaeetus leucogaster	white-bellied sea-eagle	v		n	2	0	0
Amelora acontistica	chevron looper moth	v			1	0	1
Tyto novaehollandiae subsp. castanops	masked owl (tasmanian)	e	VU	e	1	0	1
Pardalotus quadragintus	forty-spotted pardalote	e	EN	e	1	0	0
Sarcophilus harrisii	tasmanian devil	e	EN	e	1	0	0
Accipiter novaehollandiae	grey goshawk	e		n	1	0	0
Perameles gunnii	eastern barred bandicoot		VU	n	1	0	1
Aquila audax subsp. fleayi	tasmanian wedge-tailed eagle	e	EN	e	1	0	0
Dasybela achroa	saltmarsh looper moth	v		e	1	0	0
Brachionichthys hirsutus	spotted handfish	e	CR	e	1	0	0
Dasyurus viverrinus	eastern quoll		EN	n	0	0	1

- Eastern-barred bandicoot

This species is listed under the EPBCA but not listed as threatened in Tasmania due to a stable and widespread population. It is resilient to various types of human disturbance and can reach higher than natural densities in peri urban environments. The combination of open pasture for foraging, surrounded by dense cover provides ideal habitats.

- Tasmanian devil

There are few confirmed records from the vicinity (3 within 5km). The site includes a range of suitable habitat and plenty of prey (rabbits and wallabies).

No evidence in the form of dens or scats / latrines was found in the survey.

- Quolls

As with the devil this study area could form part of a home range. There are no records of spotted-tail quoll and just 2 records of eastern quoll (5km radius) although their presence cannot be discounted without targeted survey.

- Tasmanian masked owl

The Tasmanian masked owl had been recorded in the vicinity. Very few large trees are present with one or two over mature specimens that may include hollows large enough (>15cm). However, nothing suitable was discernible from the ground inspections. It is more likely masked owls limit the activity on site to hunting for prey.

- Chequered Blue Butterfly

This species has close association with the preferred larval foodplant coastal saltbush *Rhagodia candolleana* which is present in the site. There are records from the immediate vicinity (500m) and so this species could occur, most likely in the western half where the foodplant is most prominent in open terrain close to saltmarsh where adult butterflies prefer to congregate.

4 IMPACT ASSESSMENT and MITIGATION

The design of the subdivision considered from the outset the distribution of native vegetation and took into account threatened vegetation and species as a priority with the intent of minimising that impact to high priority biodiversity values. Early layouts included an access road that would bisect the forest continuing the current alignment of Bayview Road. The chosen road alignment skirts around the edge of the forest avoiding bisecting the retained bushland and leaving it in one single larger block. Limiting lots to just one side of the road reduces the footprint on the vegetation and also provides a more visible and accessible bushland for the public to appreciate and use.



Plate 19: Main area for residential subdivision - pasture with scattered serrated tussock -

The General residential lots are placed south of the bushland in low priority ex pasture.

4.1 Vegetation communities

The extent of vegetation types that will impacted and retained in a reserve allocated to Public Open Space is summarised in Table 4.

Table 4: Impact to vegetation

Community Type	Threatened	Impact – Lots, Roads, Playground	Retain - POS	Ratio Retain:Loss
DAC		4.64	14.58	3.1:1
DVC	yes	1.18	5.98	5.1:1
AHL/ASF/ASS	yes	0.12	2.71	21.6:1
GHC		0	7.43	No impact
FAG/FUM/FUR/OAQ		31.45	4.91	n/a
TOTAL		37.39	35.61	

There is a bias towards the impact being concentrated in the areas of forest in the poorest condition. The impacted DAC includes all of the 2.45 ha in poor condition, whilst the retained proportion includes 90 % of the nearly 16 ha of area determined to be in excellent condition. Likewise, with the DVC all of the excellent condition areas are retained whilst half of the impact is affecting all of the patches considered to be in poor or moderate condition. So, if condition is taken into account the offset ratios would be even higher than presented in Table 4.

The small patch of wetland that is impacted was remotely mapped and not inspected on the ground. It is possible this would not qualify as this threatened vegetation community, although in the absence of that confirmation we have taken the conservative approach.

All bushfire hazard management is likely to be able to be contained within the proposed lots. It is likely a management track will be required along the rear of the lots. Should clearance for a management track extend for 5 m from the rear of the lots this will impact on an additional 2250 sq m of forest.

4.2 Threatened plants

Three threatened plant species have been identified on the site. The known locations of all three will be retained.

No impact is anticipated to any habitat for the two wetland plants (*Bolboschoenus caldwellii* or *Stuckenia pectinata*). Potential habitat for *Acacia ulicifolia* is limited to the DAC community, 75% of which is to be retained.

4.3 Threatened fauna habitat

No specific areas of threatened fauna habitat have been identified. In a general sense all non forest vegetation habitat will be retained and 78% of forested habitats will be captured within the Public Open Space.

4.4 Mitigation and offset

The current proposal presents an opportunity to secure the long-term conservation of a significant proportion of natural values on the property. This area provides significant recreational opportunities



Plate 20: Walking tracks extend through the open forest to be part of the Public Open Space

The creation of a Public Open Space Reserve provides a means to direct management to facilitate the rehabilitation some legacy issues arising from previous land use practices. It will also put a stop to adverse impacts resulting from cattle grazing, especially to sensitive wetland vegetation. Furthermore, it provides real opportunity to tackle some serious environmental weeds that will if left unmanaged in time degrade the integrity of the bushland. Important declared agricultural weeds such as serrated tussock present a broader threat to the adjoining lands. This proposal present opportunity to tackle this infestation.

The property currently suffers from neglect. No active management has taken place over a long period resulting in a perception by some of the local community that the land has no intrinsic value. For some it is used as wasteland or a place for informal unapproved activities. These include dumping of garden waste, deposition of household rubbish and building waste, bike tracks including jumps and firewood gathering including felling of trees. One 'enterprising' neighbouring resident has even gone to lengths to construct poultry sheds. The consequence of these activities is the ongoing degradation of the site through burial and erosion plus the introduction of weeds.

The continuation of these practices will result in further degradation of the site. The weed infestations are actively spreading and expanding. It can be anticipated that the perpetuation of the status quo will not benefit the natural values of the area in the long term.



Plate 21: Wood hooking goes on in the forest



Plate 22: Tracks used as mountain bike course with jump ramps



Plate 23: Poultry shed in bushland behind residences. This is located in the study area.



Plate 24: Informal camp

5 LEGISLATIVE REQUIREMENTS

5.1 Commonwealth Environment Protection and Biodiversity Conservation Act 1999

The EPBCA is structured for self-assessment; the proponent must determine whether or not the project is likely to have a significant impact on a matter of national environmental significance (MNES) such as a listed threatened species or community. If this is likely then the Department of Environment and Energy may consider the proposed activity is a 'controlled action' which would require approval from the Commonwealth Minister.

No MNES will be impacted and so there is no reason to assess this proposal under the EPBCA.

5.2 Tasmanian *Threatened Species Protection Act 1995*

Any impact on threatened plant species listed under the TSPA will require a 'permit to take' from the Policy and Conservation Assessments Branch (PCAB) at the Department of Primary Industries, Parks, Wildlife and the Environment (DPIPWE).

No impacts to known locations supporting threatened species are anticipated.

5.3 Tasmanian *Nature Conservation Act 2002*

Threatened vegetation communities are listed under Schedule 3A on the NCA. Several threatened communities have been occurring of which one will be impacted: *E. viminalis* coastal forest (DVC).

The NCA does not regulate impacts to these communities but informs relevant criteria in some of the local Planning Schemes (refer 5.5).

5.4 Tasmanian *Weed Management Act 1999*

Clarence is a Zone B municipality for all eight of the species of declared weed observed on site (blackberry, serrated tussock and boneseed). According to the provisions of the *Weed Management Act 1999,* Zone B municipalities are those which host widespread infestations where control and prevention of spread is the principle aim. The containment principles of this Act should be sufficiently met with best practice construction hygiene that prevents the transport of contaminated material off site.

5.5 Clarence Interim Planning Scheme 2015

Figure 6 identifies the extent of coverage of two overlays with implications for natural values covered in this assessment. The Biodiversity Protection Area overlay includes most of the forested area, plus the land adjoining the Racecourse Flats saltmarsh. The Waterways and Coastal Protection overlay is confined to the north western border of the property adjoining the adjacent saltmarsh.

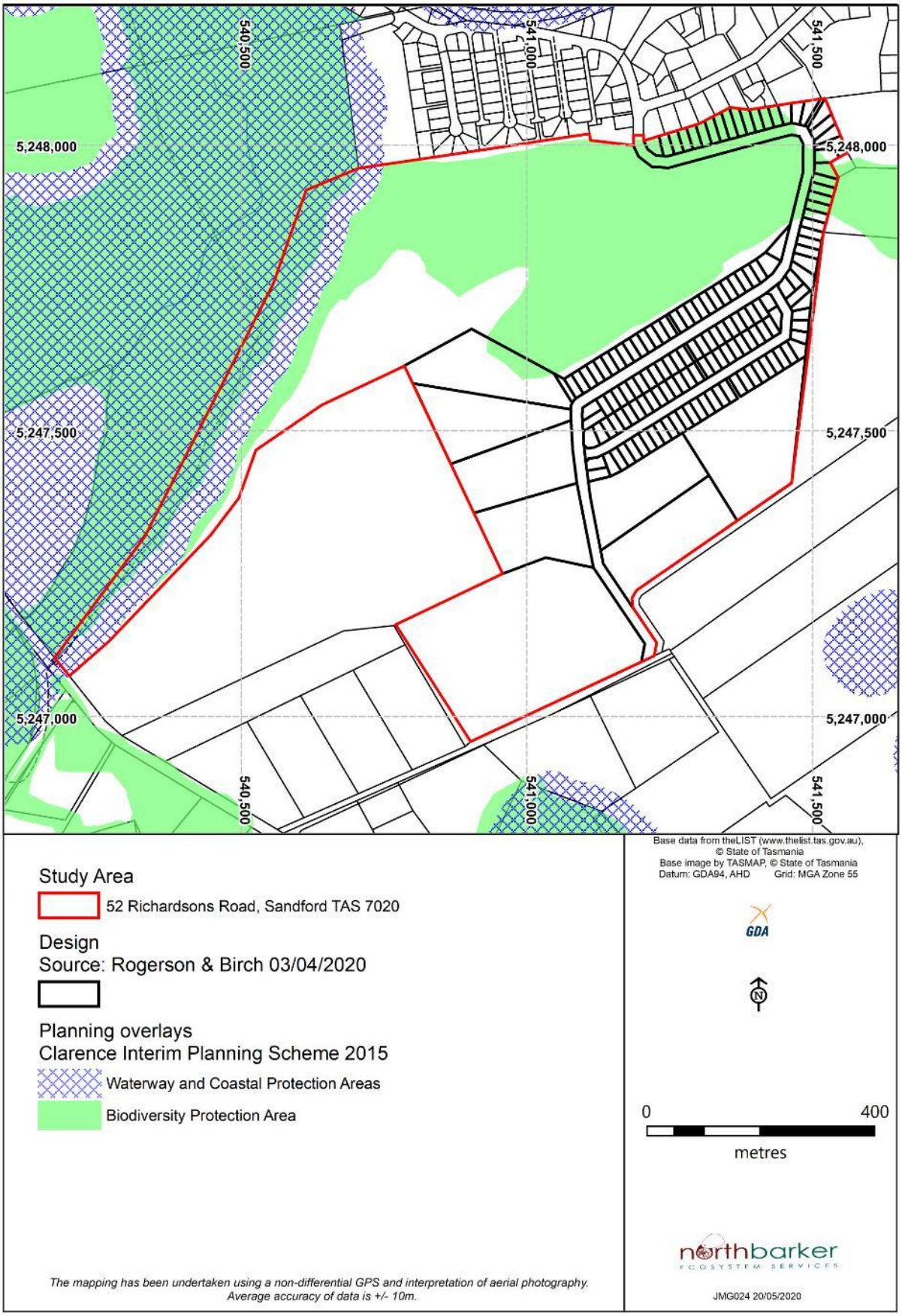


Figure 6: Biodiversity Protection Are and Waterway and Coastal Protection Area overlays

Waterways and Coastal Protection Code E11

The narrow sliver of saltmarsh and the coastal grassland along the north west boundary of the site is captured within the Waterways and Coastal Protection overlay triggering this code.

The Acceptable Solution for Subdivision within a Waterway and Coastal Protection Area (E11.8.1 A1) can be met because it will be

(b) for the creation of a lot for public open space, public reserve or utility

Natural Assets Code E27

As a portion of the site falls within the area covered by the Biodiversity Protection Area overlay and as such triggers a requirement to address the Natural Assets Code (E27) of CIPS.

E27.2 Application

This code applies to all use or development, including subdivision and the clearance or disturbance of vegetation, on land wholly or partially within a Biodiversity Protection Area (BPA) shown on the planning scheme maps.

Given the BPA partially extends over the site, E27.2 suggests The Natural Assets Code applies to the entire property irrespective of whether or not any part is outside the BPA.

The general purpose of the provision of the E27 is to:

(a) protect identified threatened native vegetation communities and threatened flora species;

(b) conserve threatened fauna by minimising habitat clearance and managing environmental impact; and

(c) protect other native vegetation recognised as locally significant by the Planning Authority.

Specifically, the proposal must meet the standards relating to development (E27.8.1), to ensure that:

(a) Priority vegetation is adequately protected

(b) Loss of vegetation is minimised;.

(c) Long term management plans are implemented; and

(d) Impacts from construction and development activities are minimised and residual impacts appropriately managed.

Impacts are classified as either being Major, Minor or Negligible depending on their impact to 'priority vegetation'

Priority vegetation means vegetation that has high biodiversity value because it:

(a)	forms an integral part of threatened vegetation;
yes	The vegetation mapped as DVC, ASS, ASF and AHL are threatened communities and so are priority vegetation.
(b)	is a threatened flora species;
yes	Three threatened flora species occur on site.

(c)	provides habitat for a threatened fauna species; or
maybe	Evidence of threatened fauna is limited although potential habitat for several species is present and almost certainly occurs for at least one species. The eastern barred bandicoot. Some question on applicability of this species given its absence from Tasmanian TSPA.
(d)	is otherwise identified by the Planning Authority as locally significant.
no	No locally significant sites or values have been identified in this area by Council

E27.6 Impact Classification

The vegetation on site is priority vegetation based on several criteria.

For an Impact to be deemed **negligible** it must fulfil the following:

(a) No priority vegetation will be cleared;

(b) The use or development (including construction activities) will not involve blasting or significant noise or vibration impacts; and

(c) Any subdivision works or the future development upon the proposed lots are unlikely to cause an impact upon priority vegetation.

No. This proposal cannot be deemed to have a negligible impact as some clearance of threatened vegetation (DVC) is proposed.

For an Impact to be deemed **minor** it must fulfil the following:

(a) The use or development, including the likely need to clear for bushfire hazard reduction, is likely to only result in a minor impact on priority vegetation

Impacted priority vegetation is limited to 1.18ha of DVC, threatened vegetation community and possibly a small unconfirmed patch of ASF (0.12 ha). This scale of impact to is considered to be minor.

(b) Mitigation measures, including biodiversity offsets, are proposed which reduce the impact on priority vegetation to a minor level

The generous Public Open Space allocation includes a significant quantity of priority values including three threatened flora, just under 6 ha of DVC threatened vegetation plus three wetland communities totalling 2.6 ha. Management of the POS will enhance the biodiversity values providing a very effective biodiversity offset.

(c) Any subdivision works or the future development upon the proposed lots is likely to only cause a minor impact on priority vegetation

Impacted priority vegetation is limited to 1.18ha of DVC, threatened vegetation community and possibly a small unconfirmed patch of ASF (0.12 ha). This scale of impact to is considered to be minor.

For an Impact to be deemed **major** it must fulfil the following:

The use or development, including subdivision works or the anticipated development upon the proposed lots, is likely to cause a significant impact upon priority vegetation irrespective of mitigation.

The proportionate loss of 1.18 ha of DVC (priority vegetation) is small relative to the offset which captures more than 5 x the impacted amount and ensures an improved management regime for the offset. This is not a significant impact.

In conclusion the proposed activity is considered to accord to a 'minor impact' to 'priority vegetation'.

E27.9 Subdivision standards

There is no Acceptable Solution for Minor Impacts A1.

The current proposal must therefore meet the "Performance Criteria" P1 for Minor Impact.

(a) Subdivision works, including accesses, fences and service locations are designed to minimise the clearance of native vegetation; and

Access from Lauderdale via Bayview Road cannot avoid impacting on vegetation entirely. The main residential area has been located on cleared land. The access road bypasses around the edge of the vegetated land and limits lots to one side to minimise the extent of clearance.

(b) Lots must be designed to contain a building envelope which reduces clearance of native vegetation to the minimum extent necessary to contain the anticipated use and any clearance required for bushfire management.

Dependent on BHM plan but opportunity with space for adequate setbacks to building envelopes on lots backing on to native vegetation.

(c) No burning, blasting or construction works involving excavators or multiple truck movements are to occur within 500 m (or 1 km if in line-of-sight) of an active raptor nest during the breeding season between July to January inclusive.

There are no raptor nests within 1km of the subject land

(d) Additional mitigation measures are proposed to ensure that the development will satisfactorily reduce all remaining impacts on priority vegetation.

The boundary of Public Open Space facing on to the new access road could be defined on site. Fencing of this boundary will reduce any risk of inadvertent damage, especially during the period of civil works. A construction and environmental management plan that prescribes strict controls on civil works would effectively mitigate any risk of inadvertent impacts.

(e) Conservation outcomes and long term security of any offset is consistent with the Guidelines for the use of Biodiversity Offsets in the local planning approval process, Southern Tasmanian Councils Authority 2013.

The offset will be incorporated into Reserve which is intended to become Public Open Space. A Reserve Management Plan can be prepared that articulates clear measures to manage and secure the land. The plan can be prepared in line with Clarence Councils Reserve Activity Plans format. Further consideration of the Tasmanian Councils Authority offset Guidelines are provided below.

Guidelines for the use of Biodiversity Offsets in the local planning approval process, Southern Tasmanian Councils Authority 2013

The offset guidelines referred to in 27.9 (e) include a set of principles which can be applied to the proposal. Each principle is considered below.

1. Offsets are the final component of a mitigation hierarchy

1.1 Offsets should only be pursued where all opportunities to avoid and minimise adverse effects on biodiversity values have been exhausted. This approach suggests that:

- Impacts should be avoided to obviate the need for an offset.
- The extent of impact should be limited to the maximum degree possible, thus reducing the scale of any offset.
- Opportunities for rectification and repair such as site rehabilitation following the impact should be investigated.
- Only offset the residual impact (provided that all other principle are met).

The most significant and best sustainable and ongoing area of priority vegetation has been allocated to POS. The area identified for residential development avoids impacting this to a reasonable extent. A Construction and Environmental Management Plan will provide opportunity to rectify any impacts such as rehabilitation of road cuttings.

1.2 The offsetting of impacts of Threatened Vegetation Communities as listed in Schedule 3A of the *Nature Conservation Act 2002* (Tas) is to be avoided in preference to no-impact except:

- The planning authority is satisfied there are 'special circumstances';
- The patch of affected vegetation is of poor or very poor condition, that despite ecological restoration works us unlikely to be viable in the long term; and
- The patch of vegetation is limited in extent in proportion to the total area remaining of that vegetation community on the site.

Special circumstances are only applied in CIPS for major impacts. We have determined this proposal to be a minor impact and so Special circumstances do not have to be met.

Most of the impacted vegetation is of poor or moderate condition. In contrast to most of the good and excellent condition vegetation is located within the offset.

2. Offsets must deliver a net benefit for biodiversity conservation

2.1 The impact must be properly estimated taking into account both direct and indirect impacts brought about by the action:

- Direct impact is the 'footprint of the development'.
- Indirect impact includes associated outcomes resulting from the action. For example subdivision in a residential area implies future housing development with changes to land management associated with permanent human occupancy.

This assessment has considered both direct and indirect impacts taking into account the footprint of the development, likely fire management requirements and consequence of the subdivision.

The bushland area is already being used by the public, not always appropriately. The outcome of this proposal will formalise and legalise appropriate public use, providing a social benefit. But it will also provide a means of eliminating misuse.

2.2 If the offset is unlikely to result in a net positive gain then the development application should not be approved.

The offset will result in net positive gain as the management of the offset area can be formalised ensuring degrading processes, eg weeds and illegal dumping of garden waste, can be controlled and informal public use is regulated.

2.3 Offsets should be consistent with the State principles and policies and should aim to contribute to comprehensive, adequate and representative (CAR) reserve system.

The purpose of CAR Reserve system aims to increase the extent and protection of under reserved vegetation communities. The offset has the potential to contribute protection of 6 ha of *E. viminalis* coastal forest which is currently underserved.

2.4 Use established standards (such as the Protected Areas on Private Land criteria) and reservation targets to identify where an offset can contribute to the (CAR) reserve system.

The proposed offset captures all native vegetation outside the impact area thus maximising the size of the offset and securing an area of vegetation that well exceeds the preferred minimum of 10ha that are applied under the PAPL criteria.

As a Council Reserve it can be recognised as part of the CAR Reserve system if it is secured under a covenant through the *Nature Conservation Act 2002*, which is the case for other reserves in Clarence such as Glebe Hill Bushland Reserve.

2.5 Offsets should be of a size to ensure that they are ecologically viable and can be managed effectively in the long term.

Land to be protected through covenants is assessed by the Protected Areas on Private Land Advisory Committee. As a general rule covenants for protection of forest communities are a minimum of 10ha. The proposed reserve extends over more than 35 ha of which more than 20 ha is forest and 10 ha is native non forest vegetation. .

2.6 To deliver a net benefit, a direct offset should exceed the impact in value of environmental service as a minimum. As a guide the offset ratio should aim for the conservation of an area:

- 1:1 of similar value for non-threatened vegetation communities;
- 3:1 to 5: 1 for threatened vegetation communities; or
- or other ecological values determined to be of significant by the planning authority within the planning area (such as threatened species habitat).

The offset area is secures an offset of more than more than 5: 1 of threatened forest vegetation, more than 3:1 for impact to non-threatened forest vegetation and virtually 100% of non-forest vegetation.

2.7 The management of the offset is as important as the security of the offset:

- Offsets should include costed management actions which are compared with the equivalent management costs of the impacted area.
- Offset should include financial contribution or commitment to management costs for a minimum of 5 years.

The proposed offset will include a Reserve Activity Plan in line with those developed for other bushland reserves in Clarence. This format includes costed actions. The specifics of the funding will be determined in the Council permit.

2.8 Where the planning authority believes a proposed offset has a high risk of failing to return a 'net benefit' over time due to such things as the effort and cost involved in managing the offset, consideration should be given to:

- Not allowing the use or development to proceed; or
- Incorporating multipliers that reduce the risk such as higher offset ratios that provide some redundancy or additional direct actions that are complementary to indirect offset.

There is no reason to think the offset has a high risk of failing to return a net benefit.

2.9 Offsets that are largely reliant upon the future success of actions may include:

- Replacement of loss through additional planting and revegetation works.
- Restoration of existing secured area that requires management actions.
- Fencing of degraded areas to improve habitat condition.

The viability of the offset is not reliant on any specific management actions. Fencing works and other restoration opportunities can be included in the commitments in the Reserve Activity Plan.

> 2.10 An offset should include a suite of actions designed to minimise risk and create a net benefit for biodiversity conservation. These actions may be direct or indirect and include a combination of some or all of the following: protection in situ, protection offsite, restoration, rehabilitation, research, monitoring and financial contributions. When taken as a whole, the benefit of the offset actions must be greater than the scope of the adverse impacts on biodiversity value.

The offset provides the most preferred mechanism of *protection in situ* supplemented with weed management and control of degrading activities (rubbish dumping etc). An outcome of the proposal will be increased surveillance that will reduce the likelihood of degrading activities such as illegal public activities.

> 2.11 The condition of the biodiversity value(s) potentially impacted and the condition of any biodiversity value(s) proposed to be protected or enhance must be considered and compared when determining whether a proposed offset will achieve a net benefit.

The condition of the offset vegetation is in much better condition that the impacted vegetation. The offset clearly achieves a net benefit.

> 2.12 The existing vulnerability of any biodiversity value(s) proposed to be protected or enhanced must be considered when determining whether a proposed offset will achieve a net benefit.

A mechanism that protects and prescribes appropriate management of the offset will ensure net positive conservation outcome in the long term. The provision of signs demarking the change of tenure along with anticipated publicity will promote this awareness to the general public to cease misuse.

3. Offsets must aim to be permanent

> 3.1 All proposed offset measures must be included as a condition on the permit authorising the use or development causing the impact. The condition should:
>
> - Identify the location of the offset by title reference.
> - Identify what and how values are to be conserved.
> - Identify the means to secure that offset.

The identity, location, values and means of security can be easily defined in the planning permit.

> 3.2 Legally enforceable mechanisms to secure, monitor and enforce any offset must be provided. Preferred mechanism in descending order:
>
> - Covenant under *Nature Conservation Act 2002*—subject to acceptance from State Government. and where the offset is greater than 10ha in area.
> - Conservation Agreement under *Environment Protection and Biodiversity Conservation Act 1999.*
> - Part 5 Agreement under *Land Use Planning and Approvals Act 1993* (where a Part 5 Agreement is used, it must be recorded on the title of the offset site).
> - Condition of approval on the planning permit.
> - Covenant between Council and the title holder.
> - Term Management Agreement under *Nature Conservation Act 2002.*

The incorporation of the land into Public Open Space will mean its transfer to Council ownership will provide confidence in the likely outcome of the land being managed in accordance with the principles of management of other bushland reserves in Clarence. Most of the mechanisms in the list above pertain to private land offsets.

> 3.3 Management of the offset is usually necessary to ensure it delivers a permanent conservation outcome;

- Implementation of offset should be audited by the applicant/developer and reported to those party to the offset agreement.
- Management of the offset should be subject to reporting after Year 1, 2, 5 and 10.
- Management of the offset should be available to the broader community where the land is provided for public use.

Generally, responsibility for management of the offset falls to the landowner. With handover to Council this level of reporting falls with Council. The Reserve Activity Plans are updated every 5 years.

3.4 Implementation and management of the offset over time must be demonstrated. This may require funding and contractual agreements to be in place prior to the approval.

The offset will be under Council ownership ensuring high level of confidence in appropriate management of the offset. Implementation of the offset can be ensured through a condition of permit. Any funding arrangements can be made part of the approval.

3.5 Consideration should be given to the transfer of the offset site to the Council or other public authority, where significant management measures are not required or where funding is available to the public authority to cover the cost of the required management action. Examples include:

- Acquisition of the offset site as a public open space contribution for subdivision approved under the *Local Government (Building and Miscellaneous Provisions) Act 1993*
- Incorporation of the offset site into an existing Council or State reserve or other component of an existing open space network, provided that public use of the land will not jeopardise the biodiversity value(s) intended to be protected.

The proposed outcome for the offset accords to the first dot point as it is intended for it to become Public open Space.

4. Offsets must aim to be 'like for like'

4.1 Offsets should generally be for the same species, habitat or vegetation community that is being impacted.

The vegetation impacted and being used for the offset are the same – DAC and DVC.

4.2 The Vegetation Condition Assessment Method is to be used as a basis for categorising and comparing the condition of vegetation communities.

Detailed condition assessment has not been undertaken although some qualitative commentary on condition has bene made.

4.3 Offsets that are not 'like for like' are only appropriate where:

- No suitable offset that provides 'like for like' is available or appropriates;
- An offset will provide a net benefit for a biodiversity value of equal or greater ecological significance in the bioregion; and
- It is in accordance with a Council endorsed biodiversity conservation strategy for the planning area

The offset is like for like.

4.4 Offsets are designed to assist in the conservation of biodiversity values. However, where consistent with this principle, consideration can be given to offsets that also conserve other 'social values' that may be impacted upon such as:

- Offsets that also conserve important skyline or hill face areas
- Offsets that conserve biodiversity values in the same neighbourhood, suburb or catchment as that within which the impact is proposed
- Offsets that provide some recreational or other open space value to the local community.

This offset will provide recreational value through formalising a network of recreational trails. These will provide new links through to the Tangara Trail

4.5 Offsets that are not like for like should be subject to third party validation, by the State or other peer review body, to ensure their appropriateness.

Not applicable

5. Indirect offsets (financial contributions) are acceptable in limited circumstances where direct offsets are unachievable

Not applicable

6. Retention of native vegetation onsite is preferred.

6.1 Preference should be given to offsets that secure the formal protection and management of conservation values on the same property that is subject to the impact, except where a greater biodiversity benefit can be gained through an offsite offset.

The offset secures the formal protection and management of conservation values on the same property that is subject to the impact.

6.2 In circumstances where there is a limited opportunity for an adequate offset to be implemented onsite, then off-site offsetting should be pursued.

Not applicable

6.3 Where offsite offsetting is pursued, preference is given to:

- Offsets that are contiguous with, or near to, other reserved or managed habitat; or
- Offset in the same neighbourhood, suburb or catchment as the impact.

Not applicable.

6.4 Unless the offset forms part of a package developed at the State or Federal level, the offset must be within the planning area of the relevant planning authority.

The offset falls within Clarence Council.

6.5 The location of an offset, being either onsite or offsite, is a balance between implementation and management of the offset, and the best location where conservation gains can be made within the planning area.

The chosen location for the offset provides a good opportunity to consolidate existing conservation area boundaries and is the best location for an offset on site.

7. Offsets are formulated and approved in the context of the established planning system.

7.1 Recognise where native vegetation clearance is regulated by other 'authorities':

- Ensure planning schemes avoid unnecessary duplication of assessment; and
- Where there are dual assessment responsibilities between a local planning authority and other authority, avoid duplication in the development of offset packages.

The offset will form part of the development application thus complying with this principle. NO additional state or commonwealth permits (eg TSPA or EPBCA)will be required..

7.2 Provided a planning scheme controls native vegetation clearance, planning authorities should regulate non-threatened native vegetation clearance based on local biodiversity values.

The vegetation includes non threatened and the regulation and offsetting of the clearance forms part of the process.

7.3 Local planning authorities may set thresholds for loss of non-threatened native vegetation (where is does not contain habitat for threatened species) in some areas, or for some communities, below which approval may either not be required or may be 'permitted'.

□□ Offset packages should not be developed for impacts that are below these thresholds. In other words use or development subject to offset packages, are identified as 'discretionary' applications.

Not applicable as the vegetation includes threatened vegetation.

7.4 For threatened species and significant habitat for threatened species:

□□ Impacts to State and Commonwealth threatened species and habitat are best addressed by the appropriate regulating authority. The proponent should inform the planning authority of the advice/determination made by the relevant authority to help inform appropriate planning decisions. The mechanisms for approval and offsetting in these instances are addressed outside of the *Land Use Planning and Approvals Act 1993*.

□□ Recognise however the *Threatened Species Protection Act 1995* is limited to regulating direct impacts and cannot regulate impacts to habitat.

No impact to threatened species.

7.5 All proposed offsets must form part of the development application resulting in the adverse impact.

The offset will form part of the application.

7.6 All consents required to facilitate a proposed offset should be obtained prior to the approval of the development application.

The offset requires consent of the future landowner of the offset, which in this case is Clarence Council. It is understood that Council are supportive of the process.

7.7 Where an off-site offset is proposed, the development application must be treated (and advertised) as relating to both the site of the use or development and the offset site.

The offset is NOT offsite. As the offset is part of the application it will form part of the advertised application

In conclusion, it is considered that the proposed development meets the performance criteria of the E27 Natural Assets Code in relation to minor impacts to priority biodiversity values.

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APPENDIX A: Plant species recorded in the study area

Status codes:

ORIGIN	NATIONAL SCHEDULE	STATE SCHEDULE
i - introduced	EPBC Act 1999	TSP Act 1995
d - declared weed WM Act	CR - critically endangered	e - endangered
en - endemic to Tasmania	EN - endangered	v - vulnerable
t - within Australia, occurs only in Tas.	VU - vulnerable	r - rare

Sites:

1	DAC - Eucalyptus amygdalina coastal forest - E541010, N5247670	29/11/2019	Andrew J. North
2	FRG - Regenerating cleared land - E540800, N5247750	29/11/2019	Andrew J. North
3	AHL - Lacustrine wetland - E540670, N5247700	29/11/2019	Andrew J. North
4	ASF - Freshwater aquatic sedgeland and rushland - E540650, N5247750	29/11/2019	Andrew J. North
5	ASS - succulent saltmarsh - E540460, N5247540	29/11/2019	Andrew J. North
6	GHC - Coastal grass - E540450, N5247400	29/11/2019	Andrew J. North
7	DVC - E. viminalis coastal forest - E540740, N5247880	29/11/2019	Andrew J. North
8	DVC - E. viminalis coastal forest - E541500, N5247950	29/11/2019	Andrew J. North
9	DAC - additional species - E, N	29/11/2019	Andrew J. North

Site	Name	Common name	Status
	DICOTYLEDONAE		
	AIZOACEAE		
3 8	*Carpobrotus rossii*	native pigface	
3 5	*Disphyma crassifolium subsp. clavellatum*	roundleaf pigface	
9	*Tetragonia implexicoma*	bower spinach	
	APIACEAE		
3	*Eryngium vesiculosum*	prickfoot	
3	*Lilaeopsis polyantha*	jointed swampstalks	
	ASTERACEAE		
8	*Brachyscome aculeata*	hill daisy	
9	*Brachyscome spathulata*	spoonleaf daisy	
2	*Carduus pycnocephalus*	slender thistle	d
8	*Cassinia aculeata subsp. aculeata*	dollybush	
2	*Chrysanthemoides monilifera subsp. monilifera*	boneseed	d
2	*Cirsium vulgare*	spear thistle	i
9	*Coronidium scorpioides*	curling everlasting	
3	*Cotula coronopifolia*	water buttons	i
2	*Leontodon saxatilis*	hairy hawkbit	i
2 3	*Vellereophyton dealbatum*	white cudweed	i
	BORAGINACEAE		
9	*Cynoglossum australe*	coast houndstongue	
	CAMPANULACEAE		
3	*Lobelia anceps*	angled lobelia	
8	*Wahlenbergia sp.*	bluebell	
	CASUARINACEAE		
1 8	*Allocasuarina littoralis*	black sheoak	
1	*Allocasuarina monilifera*	necklace sheoak	en
	CHENOPODIACEAE		
3	*Atriplex prostrata*	creeping orache	i
2 7	*Rhagodia candolleana subsp.*	coastal saltbush	
5	*Sarcocornia blackiana*	thickhead glasswort	
	CONVOLVULACEAE		
9	*Dichondra repens*	kidneyweed	
5	*Wilsonia backhousei*	narrowleaf wilsonia	
	DILLENIACEAE		
1 7 8	*Hibbertia acicularis*	prickly guineaflower	
1	*Hibbertia procumbens*	spreading guineaflower	

1 7 8	*Hibbertia prostrata*	prostrate guineaflower	
	DIPSACACEAE		
2	*Dipsacus fullonum*	wild teasel	i
	DROSERACEAE		
2	*Drosera pygmaea*	dwarf sundew	
	ERICACEAE		
1 7 8	*Astroloma humifusum*	native cranberry	
1	*Brachyloma ciliatum*	fringed heath	
1	*Epacris impressa*	common heath	
1	*Epacris lanuginosa*	swamp heath	
2	*Erica lusitanica*	spanish heath	d
1	*Leucopogon ericoides*	pink beardheath	
1 8	*Leucopogon virgatus*	common beard-heath	
	EUPHORBIACEAE		
1 7	*Amperea xiphoclada var. xiphoclada*	broom spurge	
	FABACEAE		
1 7	*Acacia dealbata subsp. dealbata*	silver wattle	
1 8	*Acacia genistifolia*	spreading wattle	
9	*Acacia howittii*	howitt's wattle	i
1 8	*Acacia mearnsii*	black wattle	
2 7	*Acacia melanoxylon*	blackwood	
2	*Acacia provincialis*	wattle	i
1	*Acacia suaveolens*	sweet wattle	
9	*Acacia ulicifolia*	juniper wattle	r
1 7 8	*Aotus ericoides*	golden pea	
1 7 8	*Bossiaea cinerea*	showy bossiaea	
1	*Dillwynia glaberrima*	smooth parrotpea	
2	*Genista monspessulana*	canary broom	d
9	*Gompholobium huegelii*	common wedgepea	
7	*Indigofera australis subsp. australis*	native indigo	
8	*Kennedia prostrata*	running postman	
2	*Medicago lupulina*	black medick	i
2	*Psoralea arborea*	blue butterfly bush	i
	GENTIANACEAE		
3	*Centaurium tenuiflorum*	slender centaury	i
	GOODENIACEAE		
3	*Scaevola hookeri*	creeping fanflower	
3	*Selliera radicans*	shiny swampmat	
	HALORAGACEAE		
2	*Gonocarpus micranthus subsp.*	creeping raspwort	
4	*Myriophyllum salsugineum*	lake watermilfoil	
	HEMEROCALLIDACEAE		
8	*Dianella revoluta*	spreading flaxlily	
2	*Thelionema caespitosum*	tufted lily	
	LAURACEAE		
1	*Cassytha glabella*	slender dodderlaurel	
2 9	*Cassytha pedicellosa*	stalked dodderlaurel	en
1	*Cassytha pubescens*	downy dodderlaurel	
	LYTHRACEAE		
2 3	*Lythrum hyssopifolia*	small loosestrife	
	MENYANTHACEAE		
3	*Ornduffia reniformis*	running marsh flower	
	MYRTACEAE		
1 8	*Eucalyptus amygdalina*	black peppermint	en
1 7 8	*Eucalyptus viminalis subsp. viminalis*	white gum	
1	*Euryomyrtus ramosissima*	heath-myrtle	

1	*Leptospermum glaucescens*	smoky teatree	en
9	*Leptospermum laevigatum*	coast teatree	
1 7	*Leptospermum scoparium*	common tea-tree	
	OXALIDACEAE		
2	*Oxalis sp.*	woodsorrel	
	PHRYMACEAE		
3	*Thyridia repens*	creeping monkeyflower	
	PITTOSPORACEAE		
7 8	*Billardiera heterophylla*	bluebell creeper	i
7 8	*Bursaria spinosa subsp. spinosa*	prickly box	
	PLANTAGINACEAE		
2 3 6	*Plantago coronopus*	buckshorn plantain	i
9	*Veronica calycina*	hairy speedwell	
3	*Veronica gracilis*	slender speedwell	
	PRIMULACEAE		
3	*Samolus repens var. repens*	creeping brookweed	
	PROTEACEAE		
1 7	*Banksia marginata*	silver banksia	
	RANUNCULACEAE		
4	*Ranunculus trichophyllus*	water fennel	
	RESEDACEAE		
7	*Reseda lutea*	cutleaf mignonette	i
	ROSACEAE		
8	*Acaena echinata*	spiny sheeps burr	
2	*Acaena novae-zelandiae*	common buzzy	
2	*Cotoneaster pannosus*	velvet cotoneaster	i
9	*Rubus fruticosus*	blackberry	d
	RUBIACEAE		
2	*Galium aparine*	cleavers	i
	SANTALACEAE		
7	*Exocarpos cupressiformis*	common native-cherry	
	SAPINDACEAE		
8	*Dodonaea viscosa subsp. spatulata*	broadleaf hopbush	
	SOLANACEAE		
9	*Lycium ferocissimum*	african boxthorn	d
2	*Solanum vescum*	gunyang	
	THYMELAEACEAE		
8	*Pimelea humilis*	dwarf riceflower	
1	*Pimelea linifolia*	slender riceflower	
	TREMANDRACEAE		
1	*Tetratheca labillardierei*	glandular pinkbells	
	MONOCOTYLEDONAE		
	ASPARAGACEAE		
1 7 8	*Lomandra longifolia*	sagg	
	ASPHODELACEAE		
8	*Bulbine glauca*	bluish bulbine-lily	
	CENTROLEPIDACEAE		
2	*Centrolepis strigosa*	hairy centrolepis, bristlewort	
	CYPERACEAE		
3	*Bolboschoenus caldwellii*	sea clubsedge	r

3 4	*Eleocharis acuta*	common spikesedge	
2 6 8	*Ficinia nodosa*	knobby clubsedge	
2 3	*Isolepis cernua*	nodding clubsedge	
2 3	*Isolepis levynsiana*	fan clubsedge	?i
1 7 8	*Lepidosperma concavum*	sand swordsedge	
1	*Lepidosperma longitudinale*	spreading swordsedge	
3	*Schoenoplectus pungens*	sharp clubsedge	
2	*Schoenus apogon*	common bogsedge	
2	*Schoenus lepidosperma subsp. lepidosperma*	slender bogsedge	
3	*Schoenus nitens*	shiny bogsedge	
	IRIDACEAE		
1	*Patersonia fragilis*	short purpleflag	
2	*Sisyrinchium iridifolium*	blue pigroot	i
	JUNCACEAE		
2	*Juncus amabilis*	gentle rush	r
3	*Juncus articulatus*	jointed rush	i
3	*Juncus kraussii subsp. australiensis*	sea rush	
2	*Juncus pallidus*	pale rush	
2	*Juncus planifolius*	broadleaf rush	
9	*Luzula densiflora*	dense woodrush	
	LAXMANNIACEAE		
8	*Arthropodium milleflorum*	pale vanilla-lily	
	ORCHIDACEAE		
8	*Diuris sulphurea*	tiger orchid	
2	*Microtis parviflora*	slender onion-orchid	
8	*Thelymitra sp.*	sun-orchid	
	POACEAE		
8	*Aira caryophyllea*	silvery hairgrass	i
7 8	*Austrostipa mollis*	soft speargrass	
7	*Austrostipa rudis subsp. australis*	southern speargrass	
1	*Austrostipa sp.*	speargrass	
8	*Austrostipa stuposa*	corkscrew speargrass	
2	*Bromus hordeaceus*	soft brome	i
3	*Cynosurus echinatus*	rough dogstail	i
6 8	*Dactylis glomerata*	cocksfoot	i
1	*Deyeuxia quadriseta*	reed bentgrass	
3	*Hemarthria uncinata*	hooked matgrass	
2	*Holcus lanatus*	yorkshire fog	i
3 5	*Lachnagrostis filiformis*	common blowngrass	
8	*Microlaena stipoides*	weeping grass	
9	*Nassella trichotoma*	serrated tussock	d
2	*Paspalum dilatatum*	paspalum	i
2	*Phalaris aquatica*	toowoomba canarygrass	i
7	*Poa labillardierei*	silver tussockgrass	
3 6	*Poa poiformis*	coastal tussockgrass	
1	*Poa rodwayi*	velvet tussockgrass	
8	*Poa sieberiana*	grey tussockgrass	
6 8	*Rytidosperma geniculatum*	kneed wallabygrass	
9	*Rytidosperma setaceum*	bristly wallabygrass	
8	*Tetrarrhena distichophylla*	hairy ricegrass	
8 9	*Themeda triandra*	kangaroo grass	
	POTAMOGETONACEAE		
4	*Potamogeton ochreatus*	blunt pondweed	
4	*Stuckenia pectinata*	fennel pondweed	r
	RESTIONACEAE		
1	*Leptocarpus tenax*	slender twinerush	
	TYPHACEAE		
4	*Typha sp.*		

	PTERIDOPHYTA	
	DENNSTAEDTIACEAE	
1 7 8	*Pteridium esculentum subsp. esculentum*	bracken
	SELAGINELLACEAE	
2	*Selaginella uliginosa*	swamp spikemoss

APPENDIX B: SITE SURVEYS

Site: 1 DAC - Eucalyptus amygdalina coastal forest

Grid Reference:	541010E, 5247670N
Accuracy:	within 100 metres
Recorder:	Andrew J. North
Date of Survey:	29 Nov 2019
Trees:	*Eucalyptus amygdalina, Eucalyptus viminalis subsp. viminalis*
Tall Shrubs:	*Acacia dealbata subsp. dealbata, Acacia mearnsii, Allocasuarina littoralis, Allocasuarina monilifera, Banksia marginata, Leptospermum glaucescens, Leptospermum scoparium*
Shrubs:	*Acacia genistifolia, Acacia suaveolens, Amperea xiphoclada var. xiphoclada, Bossiaea cinerea, Dillwynia glaberrima, Epacris impressa, Epacris lanuginosa, Euryomyrtus ramosissima, Leucopogon ericoides, Pimelea linifolia*
Low Shrubs:	*Aotus ericoides, Astroloma humifusum, Brachyloma ciliatum, Hibbertia acicularis, Hibbertia procumbens, Hibbertia prostrata, Leucopogon virgatus, Tetratheca labillardierei*
Graminoids:	*Lepidosperma concavum, Lepidosperma longitudinale, Leptocarpus tenax, Lomandra longifolia, Patersonia fragilis*
Grasses:	*Austrostipa sp., Deyeuxia quadriseta, Poa rodwayi*
Ferns:	*Pteridium esculentum subsp. esculentum*
Climbers:	*Cassytha glabella, Cassytha pubescens*

Site: 3 AHL - Lacustrine wetland

Grid Reference:	540670E, 5247700N
Accuracy:	within 50 metres
Recorder:	Andrew J. North
Date of Survey:	29 Nov 2019
Herbs:	*Carpobrotus rossii, Disphyma crassifolium subsp. clavellatum, Eryngium vesiculosum, Lilaeopsis polyantha, Lobelia anceps, Lythrum hyssopifolia, Ornduffia reniformis, Samolus repens var. repens, Scaevola hookeri, Selliera radicans, Thyridia repens, Veronica gracilis*
Graminoids:	*Bolboschoenus caldwellii, Eleocharis acuta, Isolepis cernua, Juncus kraussii subsp. australiensis, Schoenoplectus pungens, Schoenus nitens*
Grasses:	*Hemarthria uncinata, Lachnagrostis filiformis, Poa poiformis*
Weeds:	*Atriplex prostrata, Centaurium tenuiflorum, Cotula coronopifolia, Cynosurus echinatus, Isolepis levynsiana, Juncus articulatus, Plantago coronopus, Vellereophyton dealbatum*

Site: 4 ASF - Freshwater aquatic sedgeland and rushland

Grid Reference:	540650E, 5247750N
Accuracy:	GPS (within 10 metres)
Recorder:	Andrew J. North
Date of Survey:	29 Nov 2019
Herbs:	*Myriophyllum salsugineum, Potamogeton ochreatus, Ranunculus trichophyllus, Stuckenia pectinata*
Graminoids:	*Eleocharis acuta, Typha sp.*

Site: 5 ASS - succulent saltmarsh

Grid Reference:	540460E, 5247540N
Accuracy:	within 50 metres
Recorder:	Andrew J. North
Date of Survey:	29 Nov 2019
Shrubs:	*Sarcocornia blackiana, Wilsonia backhousei*
Herbs:	*Disphyma crassifolium subsp. clavellatum*
Grasses:	*Lachnagrostis filiformis*

Site: 6 GHC - Coastal grass

Grid Reference:	540450E, 5247400N
Accuracy:	within 50 metres
Recorder:	Andrew J. North
Date of Survey:	29 Nov 2019
Graminoids:	*Ficinia nodosa*
Grasses:	*Poa poiformis, Rytidosperma geniculatum*
Weeds:	*Dactylis glomerata, Plantago coronopus*

Site: 7 DVC - E. viminalis coastal forest - northwestern patch POS

Grid Reference:	540740E, 5247880N
Accuracy:	within 100 metres
Recorder:	Andrew J. North
Date of Survey:	29 Nov 2019
Trees:	*Acacia melanoxylon, Eucalyptus viminalis subsp. viminalis*
Tall Shrubs:	*Acacia dealbata subsp. dealbata, Banksia marginata, Bursaria spinosa subsp. spinosa, Exocarpos cupressiformis, Leptospermum scoparium*
Shrubs:	*Amperea xiphoclada var. xiphoclada, Bossiaea cinerea, Rhagodia candolleana subsp. candolleana*
Low Shrubs:	*Aotus ericoides, Astroloma humifusum, Hibbertia acicularis, Hibbertia prostrata, Indigofera australis subsp. australis*
Graminoids:	*Lepidosperma concavum, Lomandra longifolia*
Grasses:	*Austrostipa mollis, Austrostipa rudis subsp. australis, Poa labillardierei*
Ferns:	*Pteridium esculentum subsp. esculentum*
Weeds:	*Billardiera heterophylla, Reseda lutea*

Site: 8 DVC - E. viminalis coastal forest – eastern upper slope in subdivision

Grid Reference:	541500E, 5247950N
Accuracy:	within 50 metres
Recorder:	Andrew J. North
Date of Survey:	29 Nov 2019
Trees:	*Eucalyptus amygdalina, Eucalyptus viminalis subsp. viminalis*
Tall Shrubs:	*Acacia mearnsii, Allocasuarina littoralis, Bursaria spinosa subsp. spinosa, Dodonaea viscosa subsp. spatulata*
Shrubs:	*Acacia genistifolia, Bossiaea cinerea, Cassinia aculeata subsp. aculeata*
Low Shrubs:	*Aotus ericoides, Astroloma humifusum, Hibbertia acicularis, Hibbertia prostrata, Leucopogon virgatus, Pimelea humilis*
Herbs:	*Acaena echinata, Arthropodium milleflorum, Brachyscome aculeata, Bulbine glauca, Carpobrotus rossii, Dianella revoluta, Diuris sulphurea, Kennedia prostrata, Thelymitra sp., Wahlenbergia sp.*
Graminoids:	*Ficinia nodosa, Lepidosperma concavum, Lomandra longifolia*
Grasses:	*Austrostipa mollis, Austrostipa stuposa, Microlaena stipoides, Poa sieberiana, Rytidosperma geniculatum, Tetrarrhena distichophylla, Themeda triandra*
Ferns:	*Pteridium esculentum subsp. esculentum*
Weeds:	*Aira caryophyllea, Billardiera heterophylla, Dactylis glomerata*

APPENDIX C: SURVEY COVERAGE

Yellow line is GPS track log

