

ECOLOGICAL ASSESSMENT OF PROPOSED SHARED USE BRIDGE OVER THE MEREDITH RIVER (AND ASSOCIATED INFRASTRUCTURE), SWANSEA, TASMANIA



**Environmental Consulting Options Tasmania (ECOtas) for the
Dolphin Sands Ratepayers Association Inc.**

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COVER ILLUSTRATION

View across the Meredith River.

Please note: the blank pages in this document are deliberate to facilitate double-sided printing.

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SUMMARY

General

The Dolphin Sands Ratepayers Association Inc. engaged Environmental Consulting Options Tasmania (ECOtas) to undertake an ecological assessment of the project area associated with a proposed shared used pedestrian bridge across the Meredith River (and associated linking tracks), primarily to ensure that the requirements of the identified ecological values are appropriately considered during any further project planning under local, State and Commonwealth government approval protocols.

A field assessment was undertaken by Mark Wapstra (ECOtas) on 18 August 2019.

Summary of key findings

Threatened flora

- No plant species listed as threatened on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA) and/or the Tasmanian *Threatened Species Protection Act 1995* (TSPA) were detected, or are known from database information, from the project area.

Threatened fauna

- No fauna species listed as threatened on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA) and/or the Tasmanian *Threatened Species Protection Act 1995* (TSPA) were detected from the project area.
- The project area supports potential habitat of several species, as follows:
 - *Sarcophilus harrisii* (Tasmanian devil);
 - *Dasyurus maculatus* subsp. *maculatus* (spotted-tailed quoll);
 - *Dasyurus viverrinus* (eastern quoll);
 - *Perameles gunnii* subsp. *gunnii* (eastern barred bandicoot);
 - *Haliaeetus leucogaster* (white-bellied sea-eagle);
 - *Tyto novaehollandiae* (masked owl); and
 - *Prototroctes maraena* (Australian grayling).
- The project area (and nearby areas) also supports known and potential habitat of shore-nesting and migratory wading birds including *Thinornis rubricollis* (hooded plover) and *Sternula nereis* (fairy tern).

Vegetation types

- The project area supports the following TASVEG mapping units:
 - *Eucalyptus viminalis* – *Eucalyptus globulus* coastal forest and woodland (TASVEG code: DVC);
 - coastal scrub (TASVEG code: SSC);
 - succulent saline hermland (TASVEG code: ASS);
 - water, sea (TASVEG code: OAQ);
 - extra-urban miscellaneous (TASVEG code: FUM); and

- unverified plantations for silviculture (TASVEG code: FPU).
- Of the vegetation communities recorded, ASS can equate to the Threatened Ecological Community Subtropical and Temperate Coastal Saltmarsh, listed as Vulnerable the schedules of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA).
- Of the vegetation communities recorded, one is listed as a threatened vegetation type on Schedule 3A of the Tasmanian *Nature Conservation Act 2002*, namely *Eucalyptus viminalis* – *Eucalyptus globulus* coastal forest and woodland (TASVEG code: DVC).

Weeds

- Four plant species classified as declared weeds within the meaning of the Tasmanian *Weed Management Act 1999* and two plant species considered as environmental weeds were detected from the project area including:

declared weeds

- # *Ulex europaeus* (gorse);
- # *Lycium ferocissimum* (african boxthorn);
- # *Marrubium vulgare* (white horehound); and
- # *Cirsium arvense* var. *arvense* (creeping thistle)

environmental weeds

- *Verbascum thapsus* (great mullein); and
- *Pyracantha* sp. (firethorn).

Plant disease

- No evidence of *Phytophthora cinnamomi* (PC, rootrot) was recorded within the project area.
- No evidence of myrtle wilt was recorded from within the project area.
- No evidence of myrtle rust was recorded from within the project area.
- Evidence of “ginger tree syndrome” is present within the project area.

Animal disease (chytrid)

- The project area is not known to support frog chytrid disease and there is potential habitat for amphibian species.

Informal reserve

- Part of the project area is within an informal reserve on public land.

Individual native trees

- One larger and one smaller healthy *Eucalyptus viminalis* (white gum) were identified from the project area.

Recommendations

The recommendations provided below are a summary of those provided in relation to each of the ecological features described in the main report. The main text of the report provides the relevant context for the recommendations. At this stage of planning, it is recommended that this report be used to inform more detailed site planning. Once the designs are closer to a final stage, it may be prudent to review the content of this report (including the recommendations below) and provide a further statement on final recommendations.

Vegetation types

In a general sense, it is recommended that the clearance and conversion and disturbance of native vegetation be minimised as far as practical within the context of the configuration and topography of the project and constraints imposed by cadastral boundaries and physical features such as the Meredith River.

In particular, it is recommended that any areas of halophytic vegetation be avoided, wherever practical.

Threatened flora

Based on the field survey, no special management in relation to threatened flora is recommended.

Threatened fauna

Based on the field survey, no special management in relation to threatened fauna is recommended.

Weed and disease management

The key recommendation is to carefully manage vegetation debris and topsoil that may be contaminated with weed propagules.

Individual trees

It is recommended that mature and/or healthy *Eucalyptus viminalis* be avoided during construction works.

Other

It is recommended that signs be erected at relevant positions informing track users of the sensitivity of bird breeding habitat (halophytic vegetation and soft sand on the beach).

It is recommended that the track be considered a dog-on-lead area and signs erected informing of this.

It is recommended that the entry/exit points on the bridge be designed to minimise access of pedestrians and dogs to the river bank.

Legislative and policy implications

No formal referral to the relevant Commonwealth government agency under the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* is considered warranted but this should be confirmed by the client through their own consideration of the *Significant Impact Guideline* once the design plans are closer to completion.

It is assumed that the proposal will require a planning permit under the provisions of the *Glamorgan Spring Bay Interim Planning Scheme 2015*. Preliminary advice has been provided that indicates that it should be possible to satisfy the intent of the provisions of the Rural Resource, Rural Living and Environmental Management zoning and Biodiversity Code with limited specific permit conditions, but the specifics of this will need to be reviewed once the design is finalised.

It is assumed some form of Crown consultation/approval will be required in relation to the Crown land titles.

PURPOSE, SCOPE, LIMITATIONS AND QUALIFICATIONS OF THE SURVEY

Purpose

The Dolphin Sands Ratepayers Association Inc. engaged Environmental Consulting Options Tasmania (ECOtas) to undertake an ecological assessment of the project area associated with a proposed shared used pedestrian bridge across the Meredith River (and associated linking tracks), primarily to ensure that the requirements of the identified ecological values are appropriately considered during any further project planning under local, State and Commonwealth government approval protocols.

Scope

This report relates to:

- flora and fauna species of conservation significance, including a discussion of listed threatened species (under the Tasmanian *Threatened Species Protection Act 1995* and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*) potentially present, and other species of conservation significance/interest;
- vegetation types (forest and non-forest, native and exotic) present, including a discussion of the distribution, condition, extent, composition and conservation significance of each community;
- plant and animal disease management issues;
- weed management issues; and
- a discussion of some of the policy and legislative implications of the identified ecological values.

This report follows the government-produced *Guidelines for Natural Values Surveys – Terrestrial Development Proposals* (DPIPWE 2015) in anticipation that the report (or extracts of it) may be used as part of various approval processes that will be required.

The report format will also be applicable to other assessment protocols as required by the Commonwealth Department of the Environment & Energy (for any referral/approval that may be required under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*), under the local planning scheme (*Glamorgan Spring Bay Interim Planning Scheme 2013*), and for a Reserve Activity Assessment (RAA) if required through the Parks & Wildlife Service (although the Crown titles that may be included in the project are under the jurisdiction of Crown Land Services).

Limitations

The ecological assessment was undertaken on 18 August 2019. Many plant species have ephemeral or seasonal growth or flowering habits, or patchy distributions (at varying scales), and it is possible that some species were not recorded for this reason. However, every effort was made to sample the range of habitats present in the survey area to maximise the opportunity of recording most species present (particularly those of conservation significance). Late spring and into summer is usually regarded as the most suitable period to undertake most botanical assessments. While some species have more restricted flowering periods, a discussion of the potential for the site to support

these is presented. In this case, an initial consideration of database information and our knowledge of this area indicated that timed-targeted survey was not warranted.

The survey was also limited to vascular species: species of mosses, lichens and liverworts were not recorded. However, a consideration is made of threatened species (vascular and non-vascular) likely to be present (based on habitat information and database records) and reasons presented for their apparent absence.

Surveys for threatened fauna were largely limited to an examination of "potential habitat" (i.e. comparison of on-site habitat features to habitat descriptions for threatened fauna), and detection of tracks, scats and other signs.

Qualifications

Except where otherwise stated, the opinions and interpretations of legislation and policy expressed in this report are made by the author and do not necessarily reflect those of the relevant agency. The client should confirm management prescriptions with the relevant agency before acting on the content of this report. This report and associated documents do not constitute legal advice.

Permit

Any plant material was collected under DPIPWE permit TFL 19120 (in the name of Mark Wapstra). Relevant data will be entered into DPIPWE's *Natural Values Atlas* database by the author. Some plant material may be lodged at the Tasmanian Herbarium by the author.

No vertebrate or invertebrate material was collected.

STUDY AREA

The project area comprises private property and Crown land between the end of Shaw Street, Swansea, to Cambria Drive, Dolphin Sands, straddling the Meredith River (Figures 1-3). The relevant title details are as follows:

- 58 Shaw Street (PID 7856418; C.T. 19682/1): private
Southern side of Meredith River, incorporating the existing car park ate the end of Shaw Street utilised by the public to access Nine Mile Beach from the Swansea side. It is understood that the proposed shared use path will essentially follow the fenceline and existing tracks between the car park and the Meredith River.
- Shaw Street (PID 7856426; C.T. 19682/2): DPIPWE (Crown Land Services)
This title borders the private title on its northern and eastern boundaries and forms the edge of the Meredith River. Part of the title (including the fringe with the Meredith River) is shown as an informal reserve on other public land. This title appears to be under the jurisdiction of Crown Land Service (not the Parks & Wildlife Service), although the local arrangement is not known.
- Cambria Drive (PID 1510969; C.T. 110471/101): DPIPWE (Crown Land Services)
This title borders the Meredith River on its northern boundary. It is not shown as any form of reserve. This title appears to be under the jurisdiction of Crown Land Service (not the Parks & Wildlife Service), although the local arrangement is not known.

- C.T. 122591/135: private (footway)

The existing cleared ca. 20 m wide title that runs from the northern edge of the Meredith River and behind the Cambria Drive residential area is shown as a "Footway" under the authority field on TheList and under private ownership.

- Meredith River

The Meredith River is not shown as under any particular jurisdiction with no title information returned on examination of TheList's cadastral or reserve layers.

The project area comprises generally low-lying near-coastal vegetation, modified to varying degrees, generally all below ca. 10 m a.s.l.

The Meredith River is the only distinctive riparian feature present within the project area. This is a variable deep (depending on season and rain events) well-defined river that has its outfall directly into Great Oyster Bay. At the time of assessment, the river was not connected to the sea but this is a temporarily and geographically transient feature.

The geology of the project area is wholly mapped as Cainozoic-age "sand, gravel and mud of alluvial, lacustrine and littoral origin" (geocode: Qh), which was confirmed informally by site assessment (whole project area is on loose sand and/or mud). The geology is mentioned as it influences vegetation classification and characterisations and the potential for threatened species (especially threatened flora, and to a lesser extent, threatened fauna).

PROPOSAL

The proposal, as presently conceptualised, is to connect Swansea to the Cambria Drive part of Dolphin Sands via a shared use track that includes a pedestrian bridge across the Meredith River. The approximate route of the track is from the car park at the end of Shaw Street along the western boundary of 58 Shaw Street (generally following an existing track and/or with some new formation, depending on the final design) to the edge of the Meredith River.

The precise crossing point of the river is not yet designed but is unlikely to include the mid-river spit (separate private title). The northern end of the bridge is likely to be at the western limit of the Crown title, at the southern end of the footway title.

From the northern bank, the route will follow the footway north behind 187, 191, 207, 213, 219 & 223 Cambria Drive, before heading due east between 223 & 227 Cambria Drive to join Cambria Drive itself.

METHODS

Nomenclature

All grid references in this report are in GDA94, except where otherwise stated.

Vascular species nomenclature follows de Salas & Baker (2019) for scientific names and Wapstra et al. (2005+) for common names. Fauna species scientific and common names follow the listings in the cited *Natural Values Atlas* report (DPIPWE 2019).

Vegetation classification follows TASVEG 3.0, as described in *From Forest to Fjeldmark: Descriptions of Tasmania's Vegetation* (Kitchener & Harris 2013+).

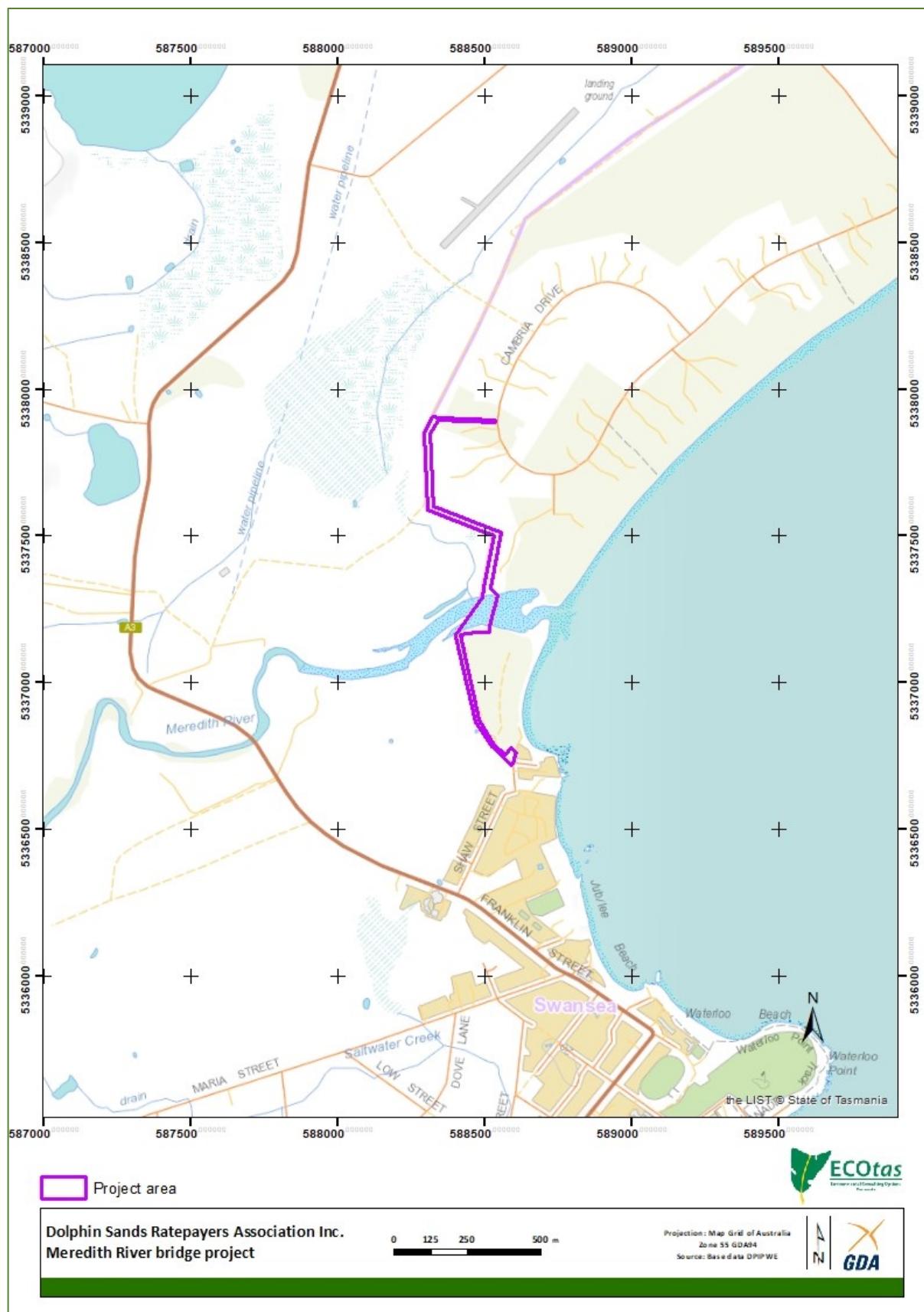


Figure 1. General location of the project area

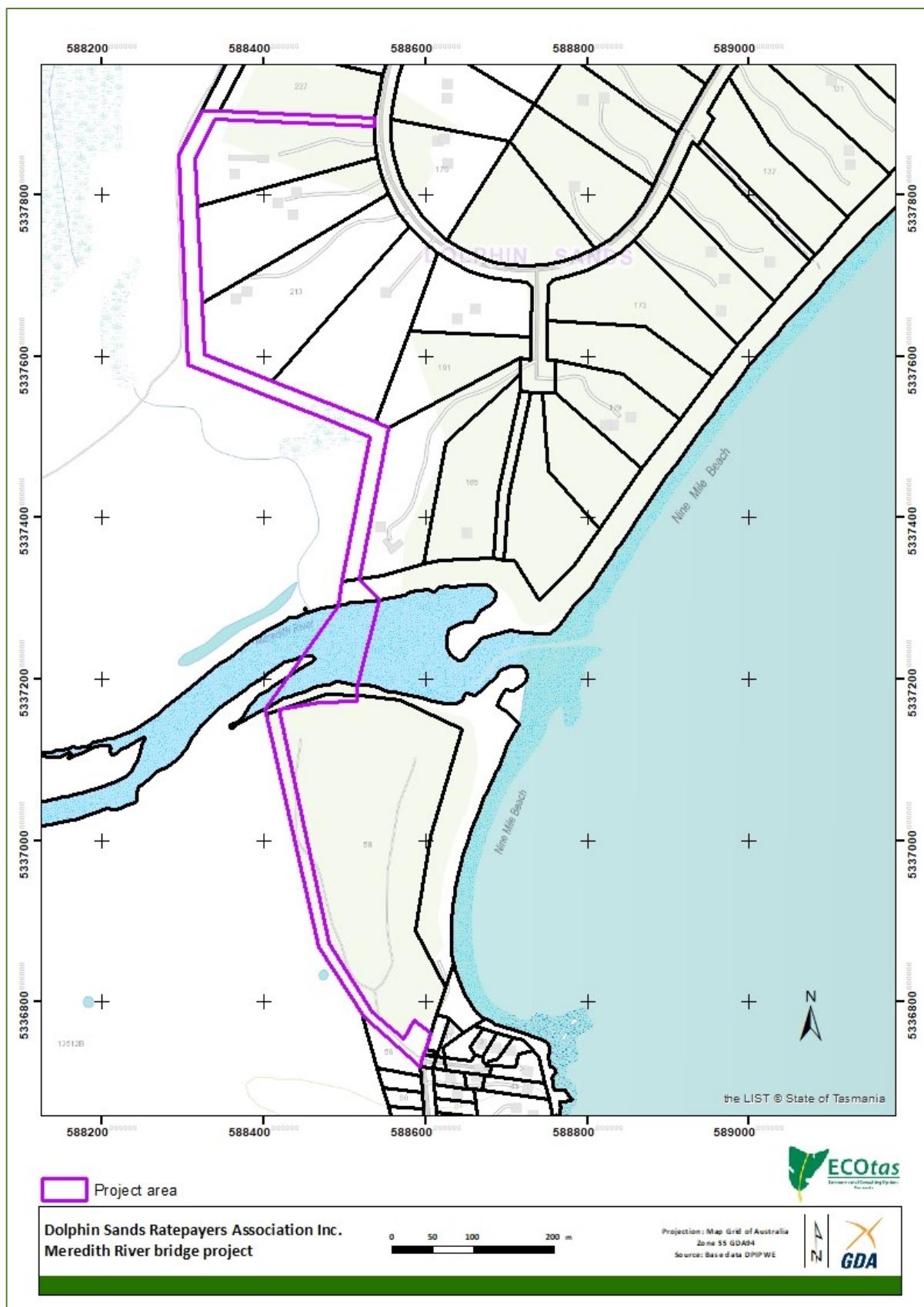


Figure 2. Detail of the project area (topographic and cadastral features shown)

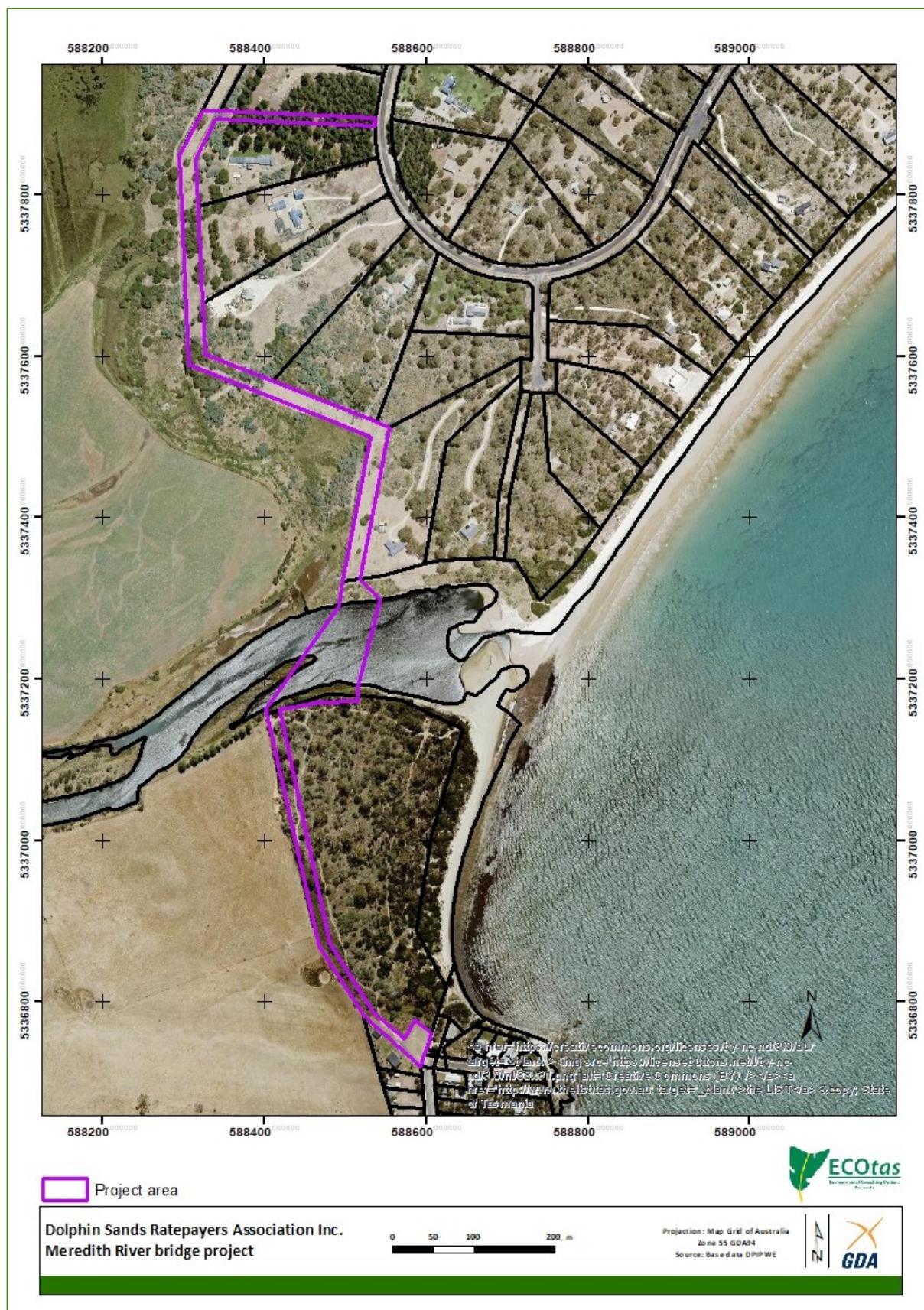


Figure 3. Detail of the project area (aerial imagery shown)

Preliminary investigation

Available sources of previous reports, threatened flora records, vegetation mapping and other potential environmental values were interrogated. These sources include:

- Tasmanian Department of Primary Industries, Parks, Water & Environment's *Natural Values Atlas* records for threatened flora and fauna (GIS coverage maintained by the authors current as at date of report);
- Tasmanian Department of Primary Industries, Parks, Water & Environment's *Natural Values Atlas* report ECotas_DSRPA_MeredithRiverPedestrianBridge for a line feature defining the approximate project area centred on 588442mE 5337392mN, buffered by 5 km, dated 13 August 2019 (DPIPWE 2019) – **APPENDIX E**;
- Forest Practices Authority's *Biodiversity Values Database* report, specifically the species' information for grid reference centroid 588442mE 5337392mN (i.e. the centroid of the study area), buffered by 2 km, hyperlinked species' profiles and predicted range boundary maps, dated 13 August 2019 (FPA 2019) – **APPENDIX F**;
- Commonwealth Department of the Environment & Energy's *Protected Matters Report* for a line feature defining the approximate project area, buffered by 5 km, dated 13 August 2019 (CofA 2019) – **APPENDIX G**;
- the TASVEG 3.0 and TASVEG Live vegetation coverage (as available through GIS coverage and via TheList);
- GoogleEarth and TheList aerial orthoimagery; and
- other sources listed in tables and text as indicated.

Field assessment

The assessment was undertaken by Mark Wapstra (ECotas) on 18 August 2019 in the company of Robyn Moore (Dolphin Sands Ratepayers Association Inc.). While the specific elements of the project are only loosely described at this juncture, sufficient information was available on the proposed route and likely crossing point of the Meredith River to facilitate a relatively detailed site assessment. That said, if the project design is altered significantly (e.g. a different route through the forested part of 58 Shaw Street and/or a substantially different southern and northern end point for the bridge across the Meredith River), a follow-up site assessment may become required. However, at this stage of planning, I am comfortable that the potential critical constraints (ecological matters) have been identified to inform further project planning.

Vegetation classification

Vegetation was classified by waypointing vegetation transitions using handheld GPS (Garmin Oregon 600) for later comparison to aerial imagery. The structure and composition of the vegetation types was described using nominal 30 m radius plots at a representative site within the vegetation types, and compiling "running" species lists between plots and vegetation types.

Threatened flora

With reference to the threatened flora, the survey included consideration of the most likely habitats for such species. Further methods are not provided because populations of threatened flora were not detected.

Threatened fauna

Surveys for threatened fauna were largely limited to an examination of "potential habitat" (i.e. comparison of on-site habitat features to habitat descriptions for threatened fauna), and detection of tracks, scats and other signs.

With reference to the masked owl, the survey included consideration of hollow-bearing trees with the intention to mark their location, if detected, using hand-held GPS. Such potential habitat elements were mapped as part of the vegetation mapping.

With reference to the species such as the Tasmanian devil, spotted-tailed quoll and eastern quoll, the survey included consideration of potential den/lay-up sites (recognising that these can be cryptic), with the intention to mark their location, if detected, using hand-held GPS. The final report does not include reports of any of these features so more detailed methods are not provided.

Weed and hygiene issues

The project area was also assessed with respect to plant species classified as declared weeds under the *Tasmanian Weed Management Act 1999*, Weeds of National Significance (WoNS) or "environmental weeds" (author opinion and as included in *A Guide to Environmental and Agricultural Weeds of Southern Tasmania*, NRM South 2017).

The project area was also assessed with respect to potential impacts of plant and animal pathogens, by reference to habitat types and field symptoms.

FINDINGS

Vegetation types

Comments on TASVEG mapping

This section, which comments on the existing TASVEG 3.0 and TASVEG Live mapping for the study area, is included to highlight the differences between existing mapping and the more recent mapping from the present study to ensure that any parties assessing land use proposals (via this report) do not rely on existing mapping. Note that TASVEG mapping, which was mainly a desktop mapping exercise based on aerial photography, is often substantially different to ground-truthed vegetation mapping, especially at a local scale. An examination of existing vegetation mapping is usually a useful pre-assessment exercise to gain an understanding of the range of habitat types likely to be present and the level of previous botanical surveys.

TASVEG 3.0 maps the study area as (Figure 4):

- agricultural land (TASVEG code: FAG)

The forested areas of 58 Shaw Street and adjacent paddocks (separate title) are mapped erroneously as FAG. This is corrected on TASVEG Live to DVC.

- saline sedgeland/rushland (TASVEG code: ARS)

A small lens of ARS is mapped at the approximate crossing point on the southern side of the Meredith River. This is a distinct patch on aerial imagery. The mid-river spit (unlikely to form part of the project area) is also mapped as ARS.

- water, sea (TASVEG code: OAQ)

The Meredith River is mapped as OAQ, with the polygon boundaries matching the river banks relatively well (within seasonal variation).

- urban areas (TASVEG code: FUR)

Some of the footway title and the western end of the Crown title on the northern side of the Meredith River is mapped as FUR, presumably because this highly modified ca. 20 m wide strip forms a somewhat integral part of the residential area of Cambria Drive. The car park at the end of Shaw Street is included in FUR.

- regenerating cleared land (TASVEG code: FRG)

Most of the footway title and adjacent areas are mapped as FRG, presumably reflecting the degree of modification but presence of some native species. The limit between FUR and FRG appears to be arbitrary.

- unverified plantations for silviculture (TASVEG code: FPU)

The *Pinus radiata* forest between 223 & 227 Cambria Drive (and extending north into the latter) is mapped as FPU, although the extent of FPU is excessive, no longer reflecting the actual extent of mature pine trees.

TASVEG Live maps the study area very similarly to TASVEG 3.0, with the differences being as follows (Figure 5):

- extra-urban miscellaneous (TASVEG code: FUM)

The car park at the end of Shaw Street has been re-coded from FUR to FUM, reflecting the miscellaneous use of the well-maintained gravelled area.

- *Eucalyptus viminalis* – *Eucalyptus globulus* coastal forest and woodland (TASVEG code: DVC)

The area of native forest covering 58 Shaw Street has been re-coded from FAG to DVC, better reflecting the presence of native vegetation. That said, aerial imagery clearly indicates that the canopy cover, especially of eucalypts, is highly variable, with substantial areas obviously dominated by silver wattle, weeds and/or bracken.

Importantly, however, TASVEG Live recognises the presence, at least in general terms, of a vegetation type classified as threatened under Schedule 3A of the Tasmanian *Nature Conservation Act 2002*.

Vegetation types recorded as part of the present study

Vegetation types have been classified according to TASVEG 3.0, as described in *From Forest to Fjeldmark: Descriptions of Tasmania's Vegetation* (Kitchener & Harris 2013+). Table 1 provides information on the vegetation types identified with notes on condition. **APPENDIX A** provides detailed descriptions of the native vegetation mapping units identified from the title and access track. Figure 6 shows the revised vegetation mapping of the study area.

Of the vegetation communities recorded, *Eucalyptus viminalis* – *Eucalyptus globulus* coastal forest and woodland (TASVEG code: DVC) is listed as a threatened vegetation type on Schedule 3A of the Tasmanian *Nature Conservation Act 2002*. As discussed in Table 1, however, installation of a narrow shared use track in this community, especially its most modified western extent, will not lead to the material loss of the community. Indeed, the project may provide an opportunity to enhance the ecological condition of the DVC through some weed removal. It is recommended that the larger mature trees and any patches of healthy eucalypt regeneration be retained.

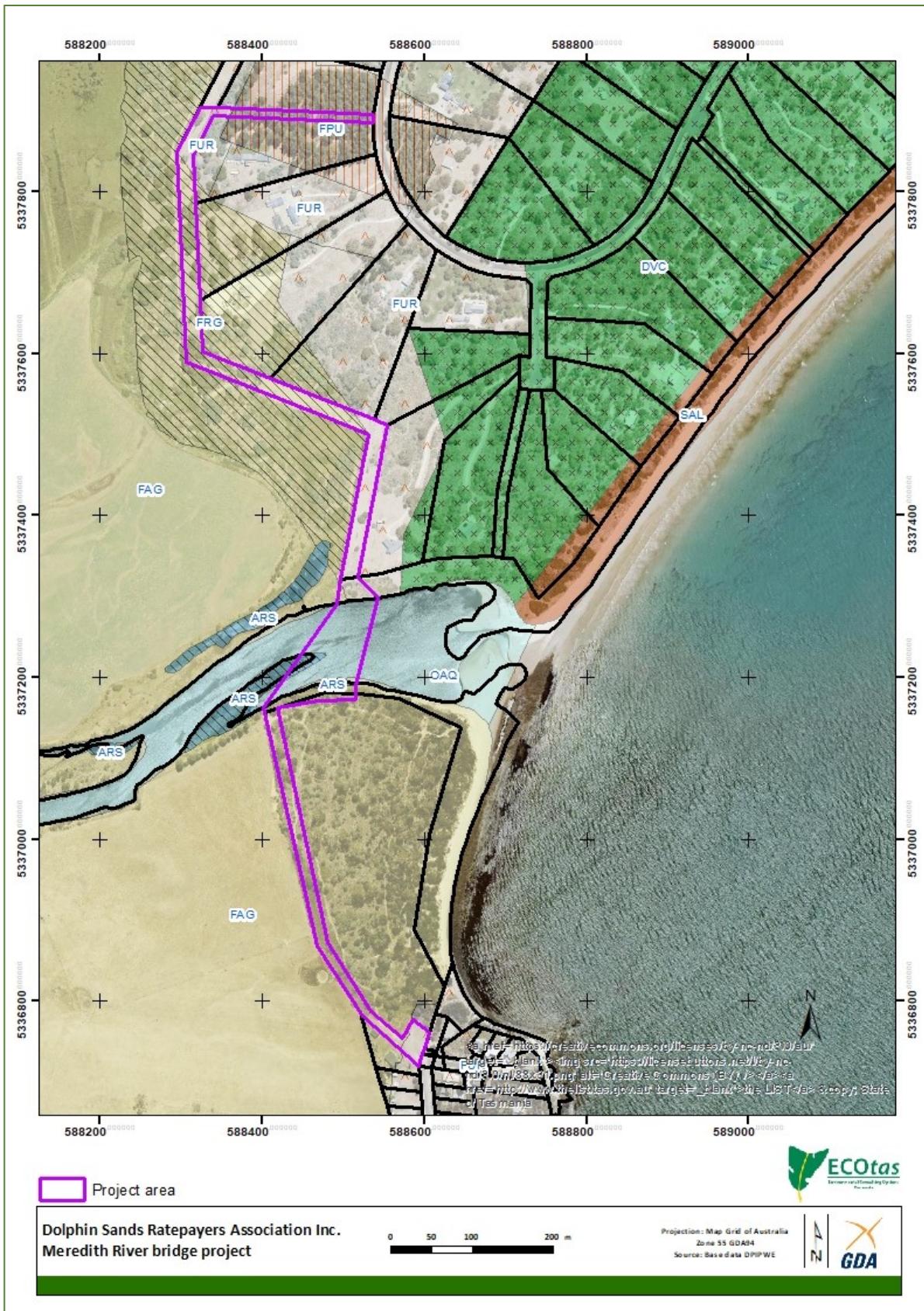


Figure 4. Project area and surrounds showing existing TASVEG 3.0 vegetation mapping (see text for codes)

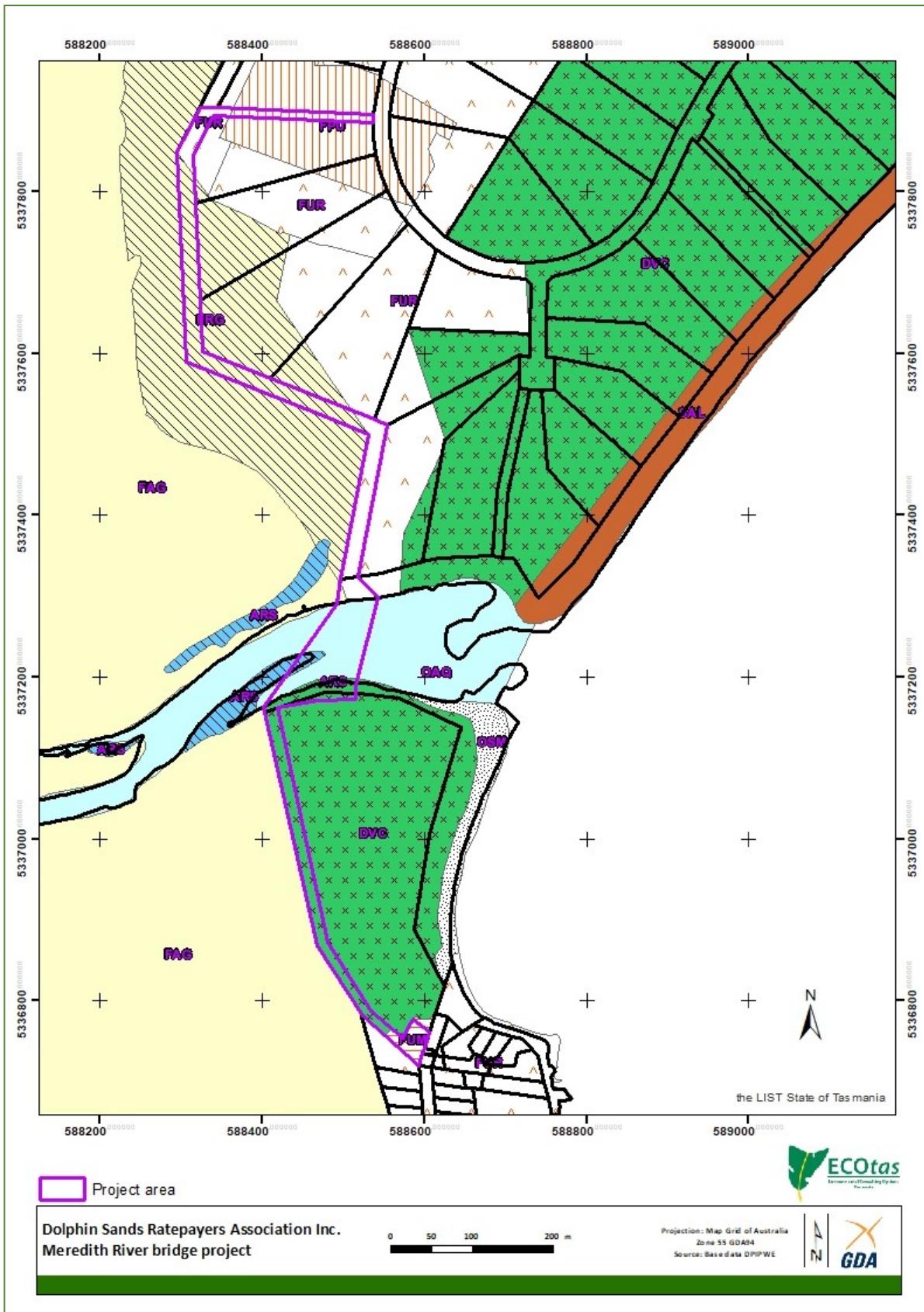


Figure 5. Project area and surrounds showing existing TASVEG Live vegetation mapping (see text for codes)

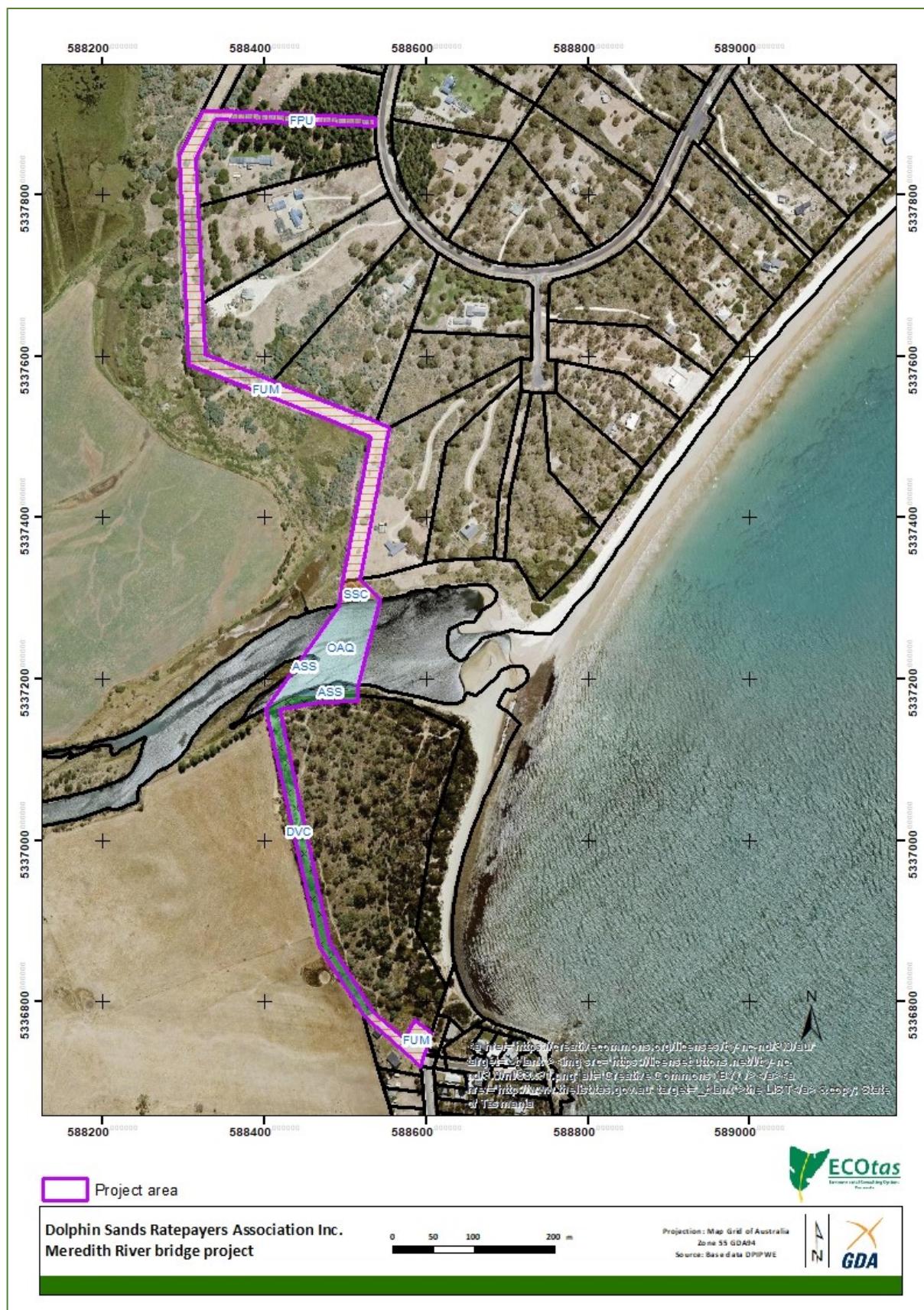


Figure 6a. Project area showing revised vegetation mapping (see text for codes)

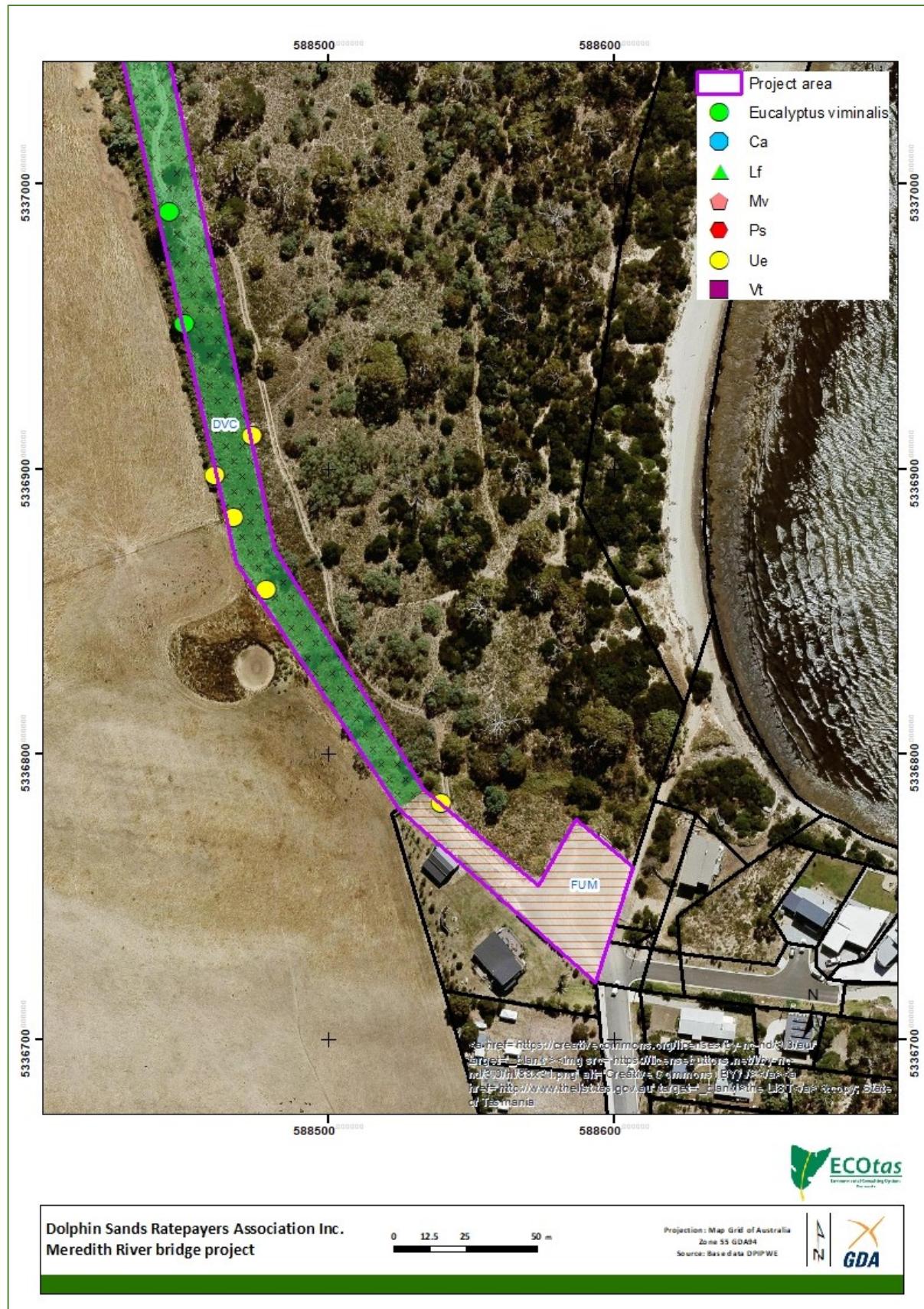


Figure 6b. Project area showing revised vegetation mapping: southern section (see text for codes)

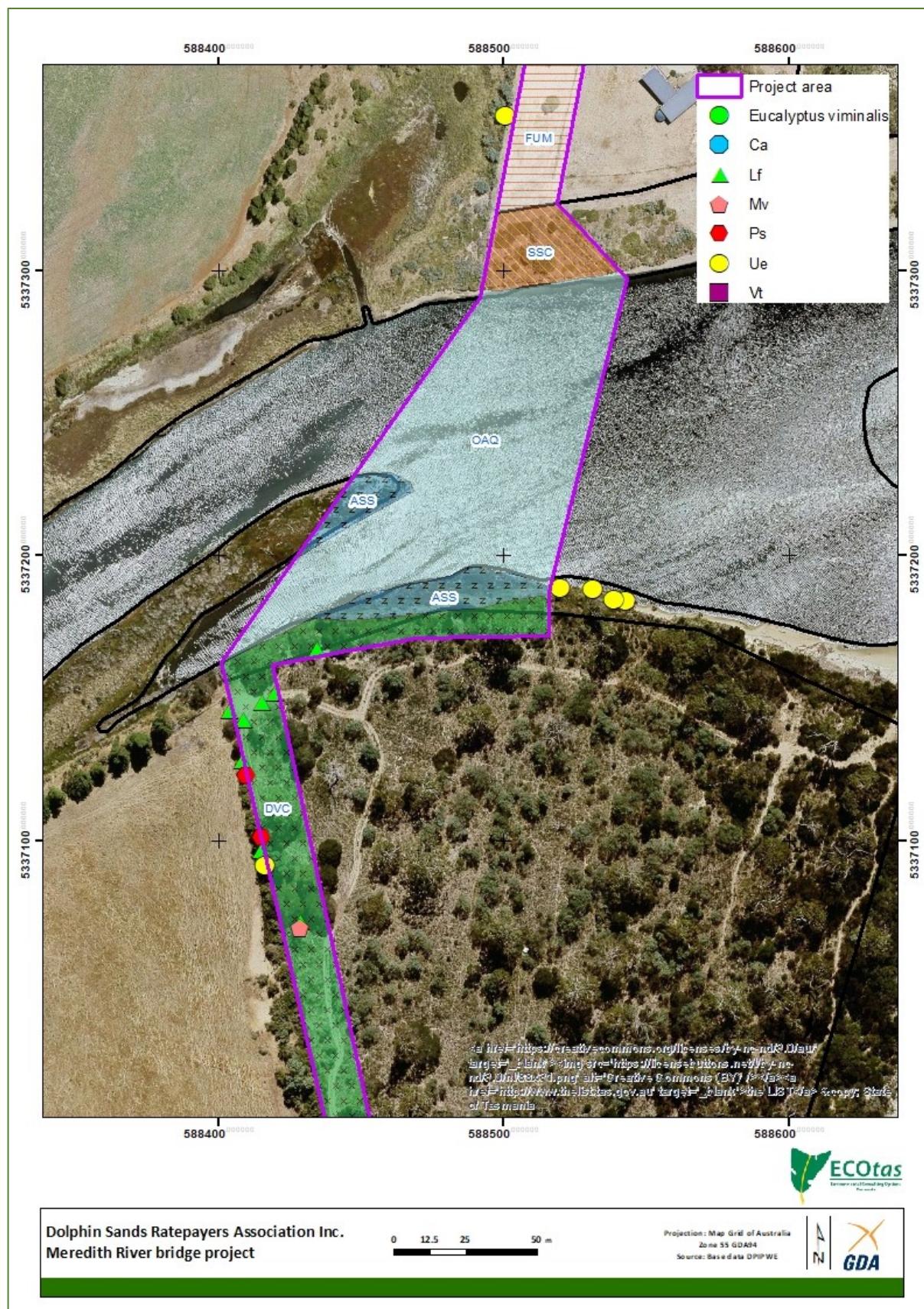


Figure 6c. Project area showing revised vegetation mapping: river section (see text for codes)

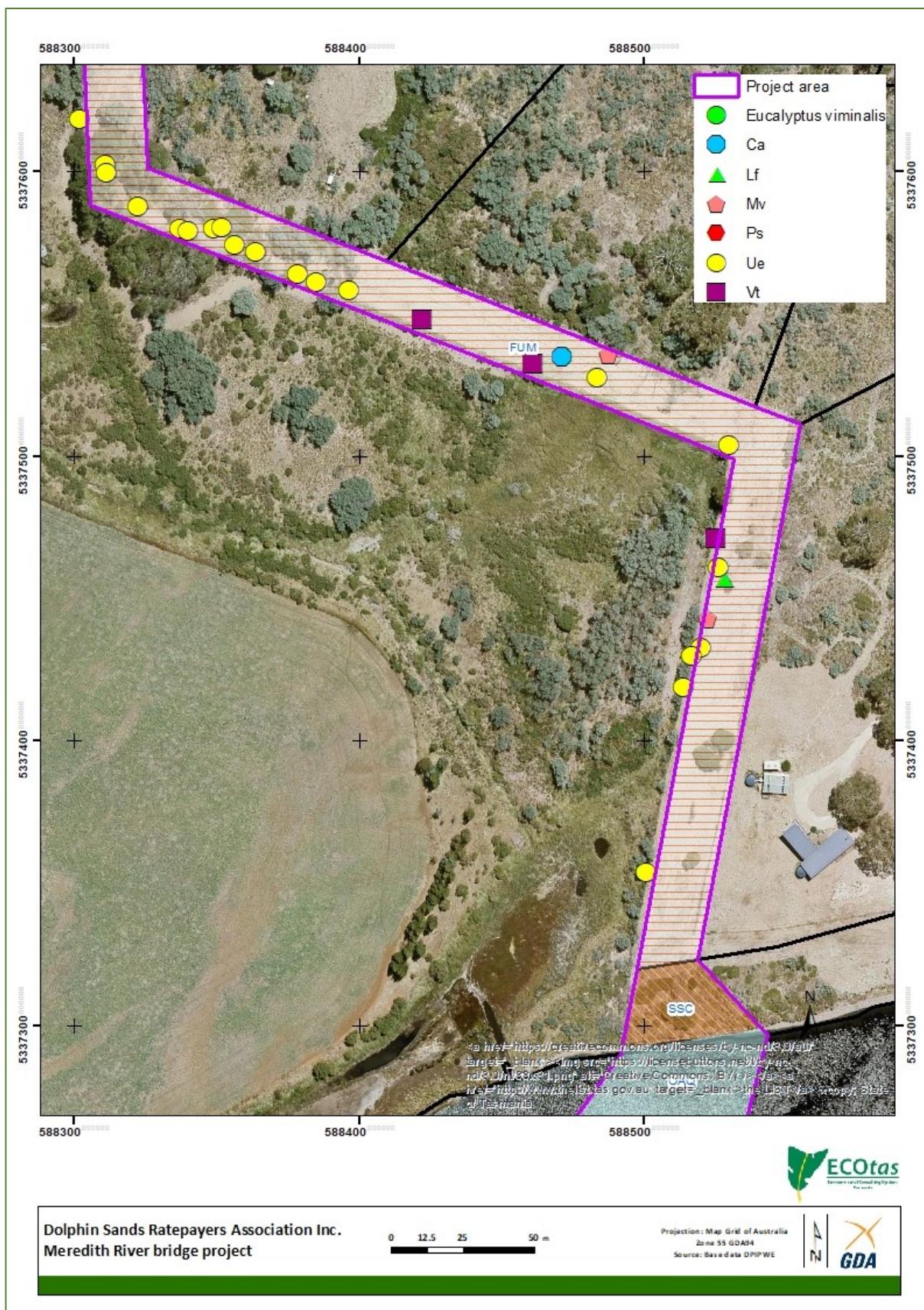


Figure 6d. Project area showing revised vegetation mapping: north of river section (see text for codes)

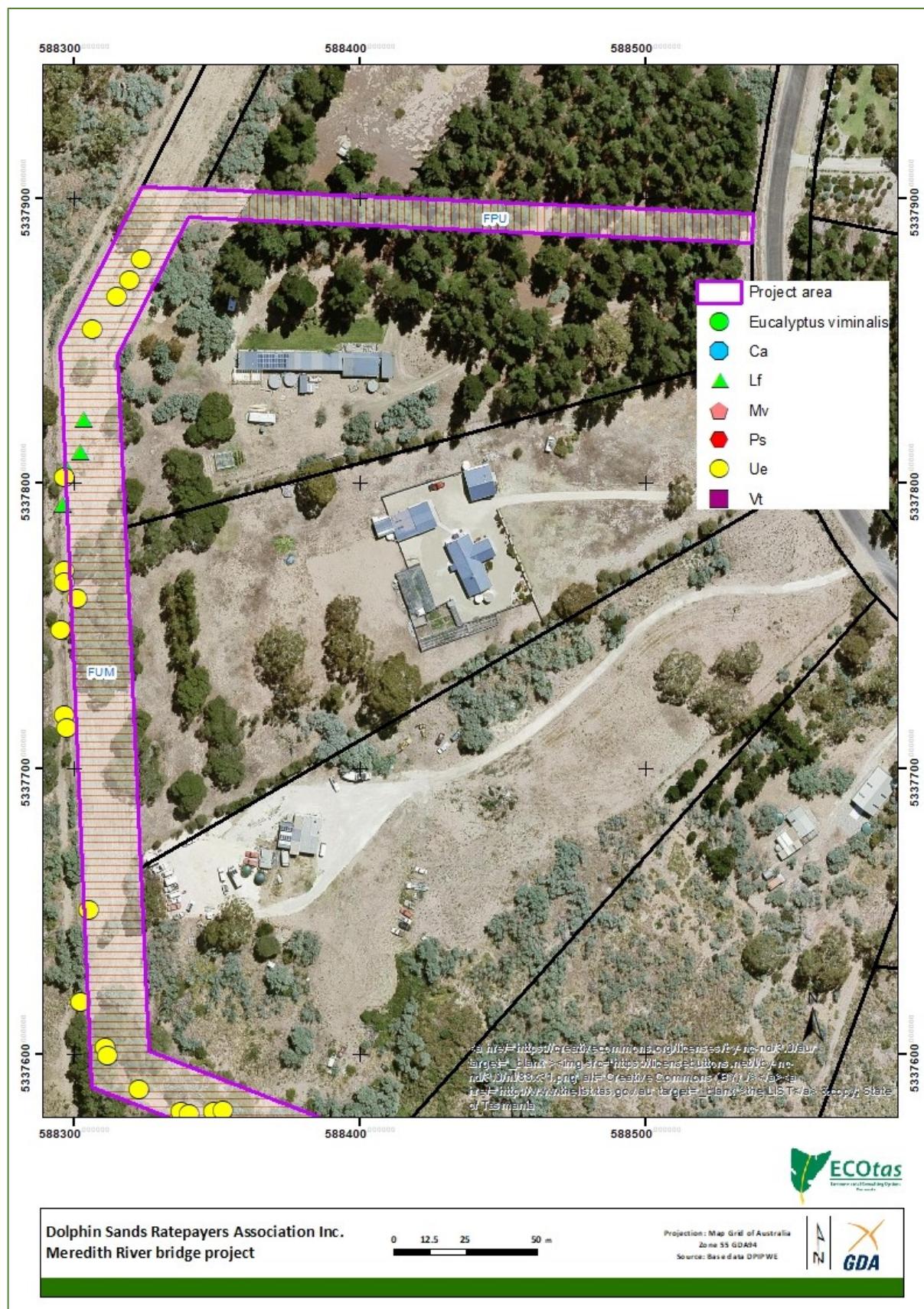


Figure 6e. Project area showing revised vegetation mapping: northern section (see text for codes)

While “wetlands” are listed as threatened under Schedule 3A of the Tasmanian *Nature Conservation Act 2002*, the concept extends only to the AHF, AHL, ASF and AWU TASVEG mapping units, not to the saltmarsh units of ARS, ASS and AUS (DPIPWE 2018). That said, the non-listing of saltmarsh vegetation appears to be unrelated to the extent of the component communities, their ongoing degradation and loss throughout Tasmania, and their ecosystem function (e.g. Kirkpatrick & Glasby 1981; Schahinger 2004 & 2009; Mount et al. 2010; Prahad & Pearson 2013).

Of the vegetation communities recorded, one may equate to a threatened ecological community listed on the schedules of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. ARS can equate to Subtropical and Temperate Coastal Saltmarsh, which is listed as Vulnerable under the Act, in some circumstances i.e. where the key diagnostic characteristics and condition thresholds are met (TSSC 2013). Key diagnostic characteristics and condition thresholds assist in identifying an area or patch of the threatened ecological community and when the Act is likely to apply to the ecological community. They provide guidance for when an area or patch of a threatened ecological community retains sufficient conservation values to be considered as a Matter of National Environmental Significance (MNES), as defined under the Act. This means that the referral, assessment and compliance provisions of the Act are focussed on the most valuable elements of Australia’s natural environment, while heavily degraded patches will be largely excluded. In the case of the project area and surrounds, the collective area of ASS on the mid-river spit and the small area fringing the southern bank of the Meredith River means that the key diagnostic characteristics and condition thresholds are met i.e. patch size greater than 0.1 ha with tidal connection.

Technically under the *Significant Impact Guidelines* of the EPBCA (CofA 2013), referral under the Act is only required for actions that may result in a significant impact on Critically Endangered or Endangered threatened ecological communities. The *Guidelines* do not refer to Vulnerable communities in any context, although the formal conservation advice (TSSC 2013) for the community note that the “key diagnostic characteristics and condition thresholds...provide guidance for when an area or patch of a threatened ecological community retains sufficient conservation values to be considered as a Matter of National Environmental Significance (MNES)”. In the case of the project area, it is understood that the project will avoid the mid-river spit of ARS. The degree to which the small area of fringing ARS will be affected is unknown at this stage but it is highly likely that it will be practical for the works to avoid most (if not all) of the halophytic vegetation.

Flora species

General information

A total of 120 vascular plant species were recorded from project area, comprising 73 dicotyledons (including 16 exotic species), 45 monocotyledons (including 15 exotic species), 1 gymnosperm (exotic) and 1 fern species (native) (**APPENDIX B**).

The high proportion of exotic species reflects the adjacent pasture and residential areas, as well as the various tracks throughout the project area. Additional surveys at different times of the year may detect additional short-lived herbs and grasses. However, follow-up surveys are not considered warranted due to the lack of suitable habitat for species with a high priority for conservation management (see also discussion under Threatened flora species potentially present (database information) and **APPENDIX C**).

Table 1. Vegetation mapping units present in the study area

[conservation status: NCA – as per Schedule 3A of the Tasmanian *Nature Conservation Act 2002*, using units described by Kitchener & Harris (2013+), relating to TASVEG mapping units (DPIPWE 2019); table headings are as per modules in Kitchener & Harris (2013+); EPBCA – as per the listing of ecological communities on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, relating to communities as described under that Act, but with equivalencies to TASVEG units]

TASVEG mapping unit (Kitchener & Harris 2013+)	Conservation priority NCA EPBCA	Comments
<i>Dry eucalypt forest and woodland</i>		
<i>Eucalyptus viminalis</i> – <i>Eucalyptus globulus</i> coastal forest and woodland (DVC)	threatened <i>not threatened</i>	<p>DVC occupies most of 58 Shaw Street. It is highly variable in structure and composition. Much of the area is dominated by a sparse canopy of mature <i>Eucalyptus viminalis</i> with a mainly <i>Acacia dealbata</i>/<i>Acacia mearnsii</i> understorey. The understorey is generally quite disturbed with variable amounts of regenerating <i>Eucalyptus viminalis</i>.</p> <p>Some parts of the area mapped as DVC could be excised and classified as some form of coastal scrub (TASVEG code: SSC), weed infestation (TASVEG code: FWU) or <i>Pteridium esculentum</i> fernland (TASVEG code: FPF) but overall, these areas comprise part of the broader concept of DVC. That said, at a local level (e.g. where the proposed track may be positioned), there is generally insufficient eucalypt canopy to be classifiable as DVC.</p> <p>Several tracks dissect the area of forest – these have all been subsumed into the concept of DVC because the canopy is virtually continuous, although the tracks are distinct on aerial imagery.</p> <p>Closer to the Meredith River, DVC grades into SSC but the band of scrub is very narrow and not distinct enough to warrant separate classification.</p> <p>The DVC within the likely project footprint is in generally poor condition because of the sparse canopy and modified understorey that includes locally dense patches of woody weeds such as gorse and boxthorn.</p>
<i>Scrub, heathland and coastal complexes</i>		
coastal scrub (SSC)	not threatened <i>not threatened</i>	<p>SSC occurs on the northern side of the Meredith River in the western section of the Crown land title. Historically, DVC would have fringed the river but this is now long-cleared and modified. Due to the presence of several native shrub species, the small area has been mapped as SSC.</p> <p>The patch is in poor condition because of the modified structure and composition, which includes woody weeds such as gorse.</p>
<i>Saltmarsh and wetland</i>		
succulent saline hermland (ASS)	not threatened <i>? threatened</i>	<p>ASS has been mapped on the mid-river spit and a small area fringing the southern margin of the Meredith River. It is dominated by <i>Sarcocornia quinqueflora</i> with a fringe of <i>Poa poiformis</i> (insufficient to warrant classification as a separate saltmarsh mapping unit).</p> <p>ASS has replaced TASVEG mapping of ARS, with its extent now slightly greater and better defined (based mainly on aerial imagery). It is unknown if the area of ASS will be affected by the project.</p>

TASVEG mapping unit (Kitchener & Harris 2013+)	Conservation priority NCA EPBCA	Comments
<i>Other natural environments</i>		
water, sea (OAQ)	not threatened <i>not threatened</i>	The open water of the Meredith River is mapped as OAQ. The extent may vary temporally dependent on seasonal conditions and flood events.
<i>Modified land</i>		
extra-urban miscellaneous (FUM)	not threatened <i>not threatened</i>	<p>The gravel car park at the end of Shaw Street has been mapped as FUM (consistent with TASVEG Live mapping).</p> <p>The footway title behind the residential dwellings of Cambria Drive has also been mapped as FUM, essentially because there are limited other options. The linear strip is ca. 20 m wide and highly variable, ranging from weed-dominated (mappable as FWU at a local scale) to grass-dominated (possibly mappable at a very local scale as a native grassland community) to bare ground. In some ways, the TASVEG mapping of regenerating cleared land (TASVEG code: FRG) and urban areas (TASVEG code: FUR) was somewhat appropriate, although not a reasonable reflection of the formal descriptions of these mapping units.</p> <p>For all intents and purposes, this linear strip is managed as modified land and the classification as FUM reflects this.</p>
unverified plantations for silviculture (FPU)	not threatened <i>not threatened</i>	The strip of <i>Pinus radiata</i> between 223 & 227 Cambria Drive is retained as FPU as per TASVEG mapping because it is essentially a non-commercial softwood "plantation".

Flora species continued...

Threatened flora species recorded from the study area

No plant species listed as threatened on the Tasmanian *Threatened Species Protection Act 1995* or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* were detected, or are known from database information, from the study area.

Threatened flora species potentially present (database analysis)

Figure 7 indicates threatened flora records near the study area and Table C1 (**APPENDIX C**) provides a listing of threatened flora from within 5,000 m of the study area (nominal buffer width usually used to discuss the potential of a particular study area to support various species listed in databases), with comments on whether potential habitat is present for the species, and possible reasons why a species was not recorded.

Fauna species

Threatened fauna species recorded from the study area

No fauna species listed as threatened on the Tasmanian *Threatened Species Protection Act 1995* and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* were directly detected from the study area.

Threatened fauna species potentially present (database analysis)

Figure 8 indicates threatened fauna species near to the study area and Table D1 (**APPENDIX D**) provides a listing of threatened fauna from within 5,000 m of the study area (nominal buffer width usually used to discuss the potential of a particular study area to support various species listed in databases), with comments on whether potential habitat is present for the species, and possible reasons why a species was not recorded.

Potential habitat (to some degree) is present for several species, as follows:

- *Sarcophilus harrisii* (Tasmanian devil);
- *Dasyurus maculatus* subsp. *maculatus* (spotted-tailed quoll);
- *Dasyurus viverrinus* (eastern quoll);
- *Perameles gunnii* subsp. *gunnii* (eastern barred bandicoot);
- *Haliaeetus leucogaster* (white-bellied sea-eagle);
- *Tyto novaehollandiae* (masked owl); and
- *Prototroctes maraena* (Australian grayling).

Refer to **APPENDIX D** for further discussion of additional species.

Any vegetation modification is unlikely to constitute a significant impact in relation to the mammalian species. There are no known nests of the white-bellied sea-eagle (or wedge-tailed eagle) and the proposed works (and eventual bridge/track) should not impact on the foraging behaviour of the species. The masked owl is known from the greater area and the more mature white gum forest of the Dolphin Sands spit may support nesting sites. The project area has limited potential nesting sites but it is recommended that the more mature hollow-bearing trees be retained.

The Meredith River is known to support the Australian grayling. It is unlikely that the proposed works will have a significant impact (CofA 2013) on the species or its habitat. However, once the design of the bridge and the manner in which it is to be constructed is better understood, this may need to be reviewed to ensure disturbance to potential habitat is minimised as far as practical.

Other species of potential conservation significance

The Meredith River presents as a relatively complex mosaic of habitats including open sands, a shifting river mouth, brackish to fresh water, fringing halophytic and shrubby vegetation, as well as various depth water. At the time of survey, the river was being used by several species of bird including the masked lapwing, white-faced heron, Pacific black duck, silver gull and Pacific gull. Database records indicate that the greater Meredith River-Nine Mile Beach area is utilised by shore-

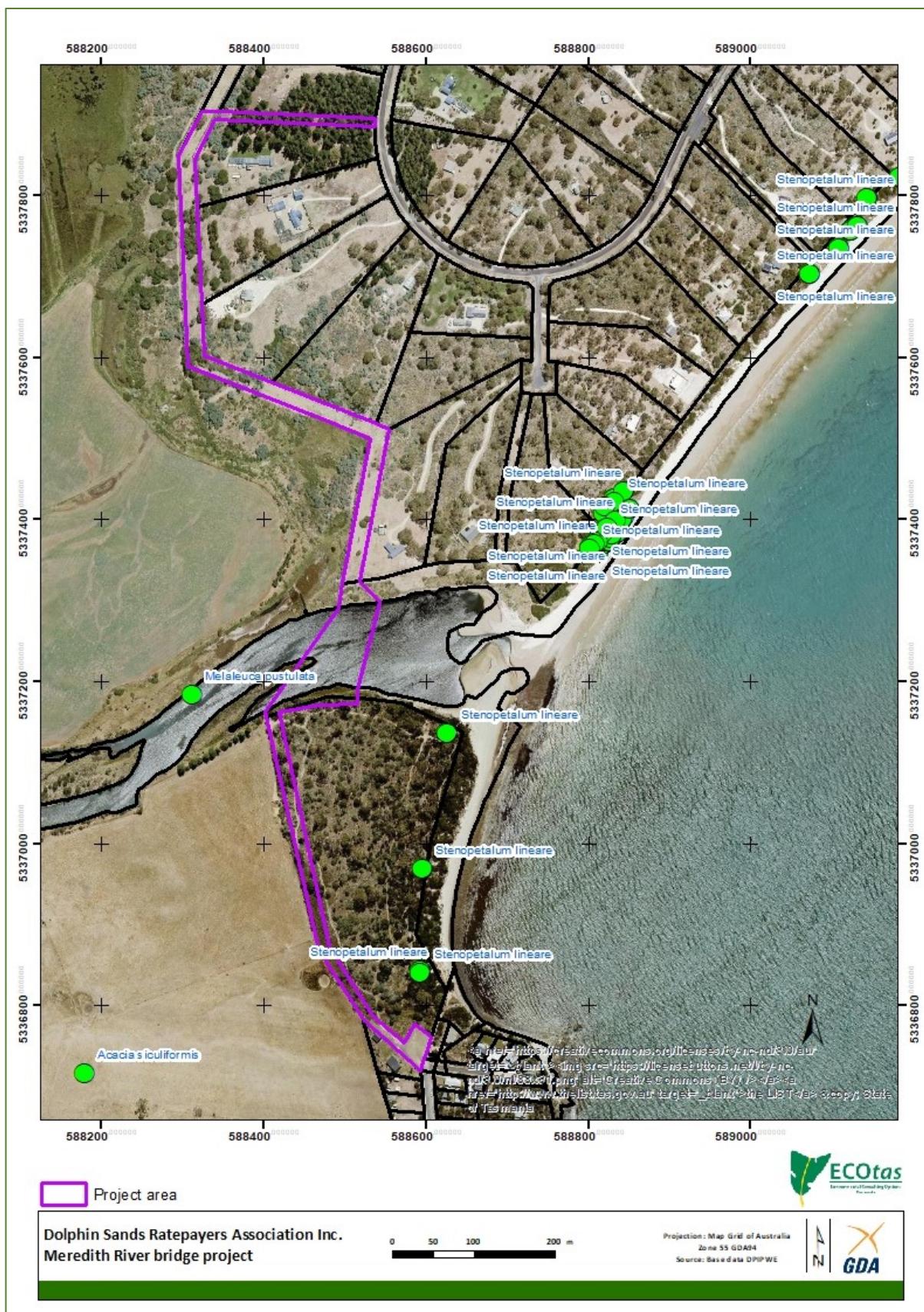


Figure 7. Distribution of threatened flora records near the study area

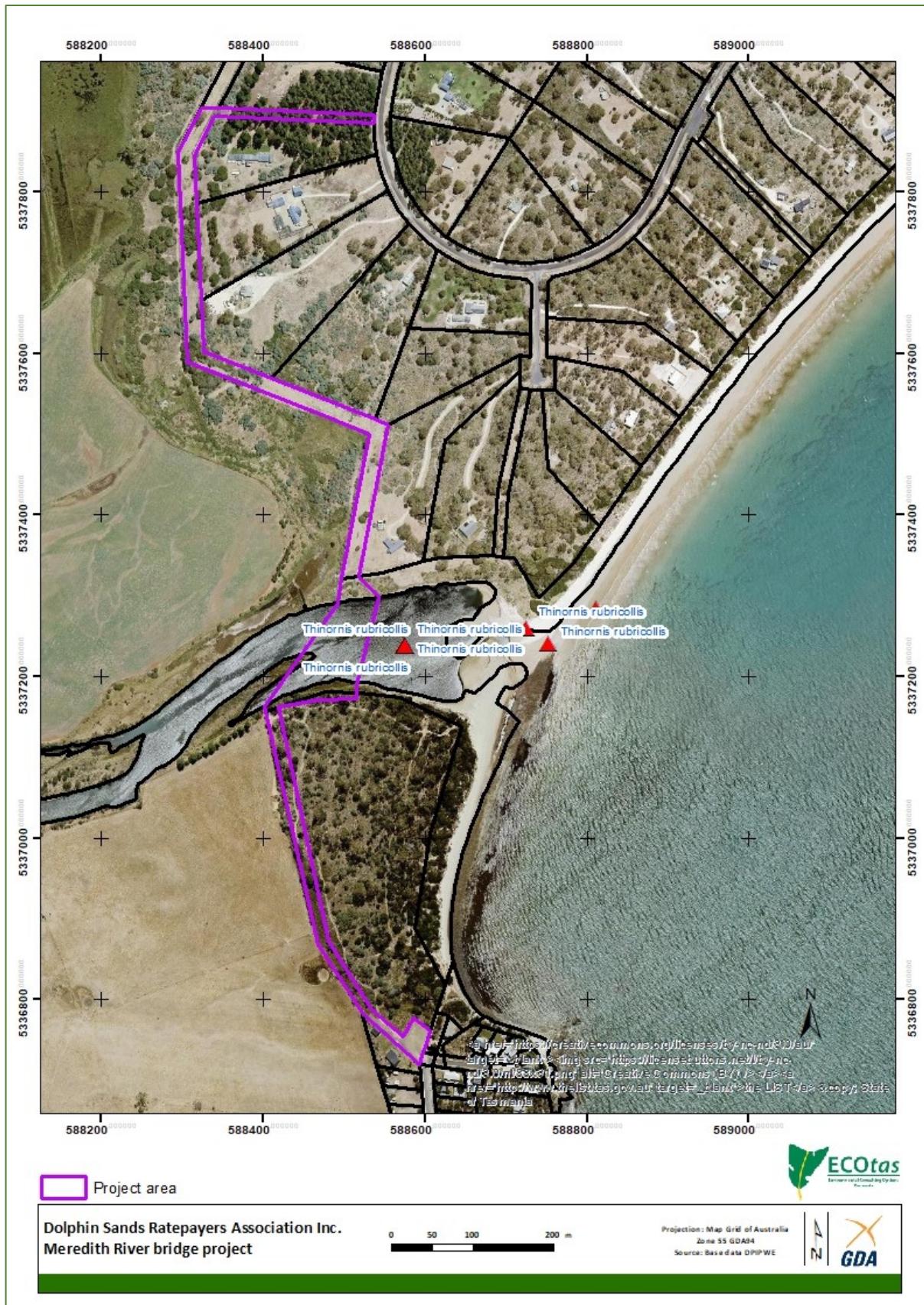


Figure 8. Distribution of threatened fauna records near the study area

nesting birds such as the hooded plover and fairy tern. The halophytic vegetation and coastal sandy foreshore may provide temporary foraging habitat for migratory shorebird and wading species.

The installation of a bridge across the Meredith River will in itself result in the loss of a very small area of native vegetation. It is possible that the foraging behaviour of birds may be affected by a short period during and after construction but it is expected that some form of near-natural equilibrium will be found in the months following cessation of disturbance. The new structure may provide additional perching opportunities for various species.

One possible benefit of the project is to direct at least some pedestrians and bike riders away from the river mouth and the soft sand i.e. away from potential nesting habitat of species such as the hooded plover (and other non-threatened species such as the pied oystercatcher). At present, in the absence of a formal link, all users must pass on to the beach and at least some soft sand.

A possible negative impact of an improved track/bridge is increased visitor access to the beach, including pedestrians with dogs. The project provides an educational opportunity and it is recommended that appropriate signs alerting users to the sensitivity of shore-nesting birds be erected at strategic points along the route. It is also recommended that the route be treated as a dogs-on-lead area to minimise the risk of uncontrolled dogs reaching the beach or river frontage (additional signs advising of this status are also recommended). The access to the start of the bridge (especially on the southern side where the river bank is gentle) could be designed to funnel walkers (especially dog walkers) on to the bridge rather than to the river's edge (e.g. continue the hand rail for several metres and fill in the gaps between rails with mesh).

Other ecological values

Weed species

The project area supports several plant species classified as "declared weeds" within the meaning of the Tasmanian *Weed Management Act 1999* any additional other potentially invasive species (author opinion and as included in *A Guide to Environmental and Agricultural Weeds of Southern Tasmania*, NRM South 2017), as follows (declared species indicated with #) (Figure 9, see also Figures 6b-e):

- # *Ulex europaeus* (gorse): locally abundant;
- # *Lycium ferocissimum* (african boxthorn): locally abundant;
- # *Marrubium vulgare* (white horehound): localised to the open linear area behind the houses;
- # *Cirsium arvense* var. *arvense* (creeping thistle): localised to a small patch of poorly-drained ground along the open linear area behind the houses;
- *Verbascum thapsus* (great mullein): localised to the open linear area behind the houses; and
- *Pyracantha* sp. (firethorn): planted strip along the western boundary of 58 Shaw Street (does not appear to be spreading, may be an infertile cultivar, none technically within the project area).

Given the current status of weeds within the project area and abundant sources of propagules from immediately adjacent sites, it is suggested that any works are highly unlikely to exacerbate the current distribution and abundance of weeds within the project area or surrounds. The key management issue is considered to be that vegetation debris and topsoil is effectively contaminated with weed propagules and should be disposed of such that the risk of weeds establishing outside the project area is minimised (e.g. dispose of on-site by burial and/or burning or at a refuse facility

that takes “green waste” that may include declared weeds, subject to municipal and other regulations). The project may provide an opportunity for some form of coordinated weed management between Glamorgan Spring Bay Council, DPIPWE (Crown Land Services and/or Parks & Wildlife Service), a local landcare (or equivalent) group, the Dolphin Sands Ratepayers Association Inc. and local residents.

Several planning manuals provide guidance on appropriate management actions to minimise the introduction of weeds and disease during works, which can be referred to develop site-specific prescriptions for the project, should these become necessary. These manuals include:

- Allan, K. & Gartenstein, S. (2010). *Keeping It Clean: A Tasmanian Field Hygiene Manual to Prevent the Spread of Freshwater Pests and Pathogens*. NRM South, Hobart;
- Rudman T. (2005). *Interim Phytophthora cinnamomi Management Guidelines*. Nature Conservation Report 05/7, Biodiversity Conservation Branch, Department of Primary Industries, Water & Environment, Hobart;
- Rudman, T., Tucker, D. & French, D. (2004). *Washdown Procedures for Weed and Disease Control*. Edition 1. Department of Primary Industries, Water & Environment, Hobart; and
- DPIPWE (2015). *Weed and Disease Planning and Hygiene Guidelines - Preventing the Spread of Weeds and Diseases in Tasmania*. Department of Primary Industries, Parks, Water & Environment, Hobart.

Rootrot pathogen, *Phytophthora cinnamomi*

Phytophthora cinnamomi (PC) is widespread in lowland areas of Tasmania, across all land tenures. However, disease will not develop when soils are too cold or too dry. For these reasons, PC is not a threat to susceptible plant species that grow at altitudes higher than about 700 metres or where annual rainfall is less than about 600 mm (e.g. Midlands and Derwent Valley). Furthermore, disease is unlikely to develop beneath a dense canopy of vegetation because shading cools the soils to below the optimum temperature for the pathogen. A continuous canopy of vegetation taller than about 2 metres is sufficient to suppress disease. Hence PC is not considered a threat to susceptible plant species growing in wet sclerophyll forests, rainforests (except disturbed rainforests on infertile soils) and scrub e.g. teatree scrub (Rudman 2005; FPA 2009).

The vegetation types identified from the project area are not considered particularly susceptible to the pathogen (Rudman 2005). No evidence of the pathogen was noted.

Note that the publications listed under Weed species provide relevant planning information related to management of *Phytophthora cinnamomi* (PC).

Ginger tree syndrome

“Ginger tree syndrome” occurs in *Eucalyptus viminalis* trees when they become distressed (Mitchell 2015). A significant heat wave in 2013 appears to have caused Statewide loss of white gum, concentrated, but not restricted to the north. *Eucalyptus viminalis* appears to be particularly susceptible to short-term heat stress as it has a reduced ability to close off stomata, resulting in water stress and hence shrinkage of the bark and trunk leading to the production of kino (this leads to the orange discolouration giving the condition its name). Trees will often suffer crown dieback and there is the potential for the whole tree to die. Reversing this impact is not necessarily possible, instead the identification of this issue allows these sites to be monitored to determine the degree of tree loss and recovery that occurs and whether any management intervention is required.

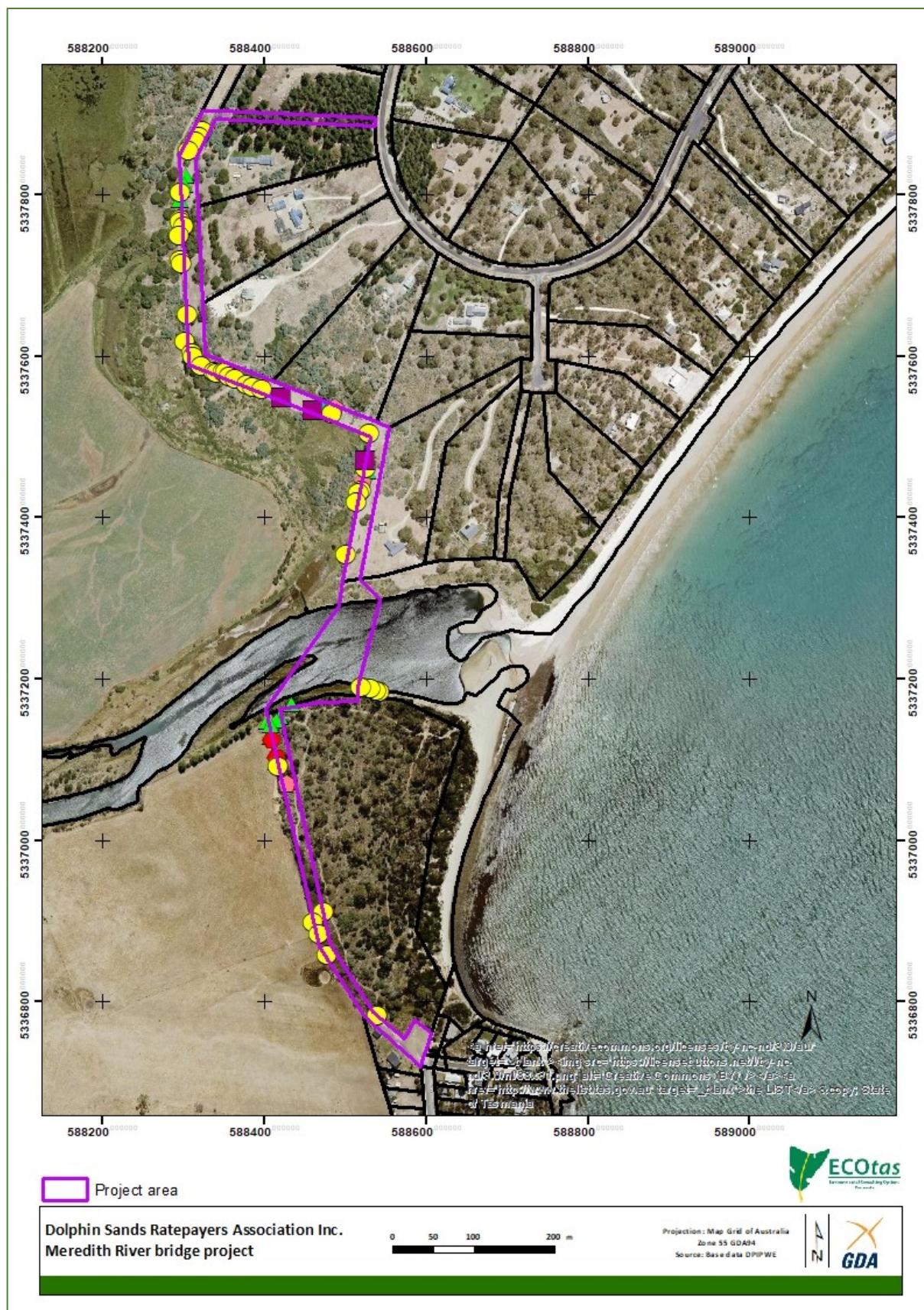


Figure 9. Distribution of weeds (short codes refer to genus and species – see text for full names)

Unfortunately, the project area is showing symptoms of ginger tree syndrome in various ages of white gums (Plate 1), although the large mature white gum along the western fenceline still appears healthy. At present, there is no identified management actions to mitigate the condition. However, it has been mentioned to alert land managers of the existing condition, which may inform suitable restoration/rehabilitation plantings (i.e. *Eucalyptus viminalis* may not be the most ideal species, rather tall understorey shrubs such as *Banksia marginata* may be more suitable for infill plantings).



Plate 1. Symptoms of "ginger tree syndrome" in *Eucalyptus viminalis* close to the project area

Myrtle wilt

Myrtle wilt, caused by a wind-borne fungus (*Chalara australis*), occurs naturally in rainforest where myrtle beech (*Nothofagus cunninghamii*) is present. The fungus enters wounds in the tree, usually caused by damage from wood-boring insects, wind damage and forest clearing. The incidence of myrtle wilt often increases forest clearing events such as windthrow and wildfire.

The project area does not support *Nothofagus cunninghamii*. No special management is required.

Myrtle rust

Myrtle rust is a disease limited to plants in the Myrtaceae family. This plant disease is a member of the guava rust complex caused by *Austropuccinia psidii*, a known significant pathogen of Myrtaceae plants outside Australia. Infestations are currently limited to NSW, Victoria, Queensland and Tasmania (DPIPWE 2015).

No evidence of myrtle rust was noted. No special management should be required in relation to the land use proposal.

Chytrid fungus and other freshwater pathogens

Native freshwater species and habitat are under threat from freshwater pests and pathogens including *Phytophthora cinnamomi* (root rot), *Batrachochytrium dendrobatis* (chytrid frog disease), *Mucor amphibiorum* (platypus Mucor disease) and the freshwater algal pest *Didymosphenia geminata* (Didymo) (Allan & Gartenstein 2010). Freshwater pests and pathogens are spread to new areas when contaminated water, mud, gravel, soil and plant material or infected animals are moved between sites. Contaminated materials and animals are commonly transported on boots, equipment, vehicles tyres and during road construction and maintenance activities. Once a pest pathogen is present in a water system it is usually impossible to eradicate. The manual *Keeping it Clean - A Tasmanian Field Hygiene Manual to Prevent the Spread of Freshwater Pests and Pathogens* (Allan & Gartenstein 2010) provides information on how to prevent the spread of freshwater pests and pathogens in Tasmanian waterways wetlands, swamps and boggy areas.

The project will include a crossing of the Meredith River. It is recommended to assume that freshwater pathogens are absent and to manage the area to minimise the risk of introducing such pathogens. At this site, the following specific actions are recommended:

- ensure that vehicles, machinery, equipment, materials and personnel adhere to the general hygiene protocols provided in *Keeping it Clean - A Tasmanian Field Hygiene Manual to Prevent the Spread of Freshwater Pests and Pathogens* (Allan & Gartenstein 2010);
- ensure that tracks are well-drained such that water does not pool for long periods, minimising the opportunity for any disease or pathogen to establish and persist; and
- ensure that the surface of any infrastructure sites is similarly appropriately drained to ensure no long-term pooling of water.

Individual native trees

As part of the assessment, I waypointed one mature *Eucalyptus viminalis* and one smaller *Eucalyptus viminalis*, both of which appeared healthy and not currently suffering from "ginger tree syndrome" (Figure 10, Plate 2). It is recommended that these trees be retained and the disturbance to soil around their bases be minimised.



Plate 2. Large mature *Eucalyptus viminalis* along the western boundary



Figure 10. Distribution of healthy individuals of *Eucalyptus viminalis*

Additional "Matters of National Environmental Significance" – Wetlands of International Importance (Ramsar)

CofA (2019) indicates that the project area is within 10 km of a Wetlands of International Importance (Ramsar), namely Moulting Lagoon. The Meredith River has its catchment and outfall outside the catchment of Moulting lagoon (discharges directly into Great Oyster Bay).

Additional "Matters of National Environmental Significance" – Threatened Ecological Communities

CofA (2019) indicates that the following threatened ecological communities are likely to, or may, occur within the project area:

- Giant Kelp Marine Forests of South East Australia (listed as Critically Endangered – likely to occur): not present;
- Lowland Native Grasslands of Tasmania (listed as Critically Endangered – likely to occur): not present;
- Tasmanian Forests and Woodlands dominated by Black Gum or Brookers Gum (*Eucalyptus ovata* / *E. brookeriana*) (listed as Critically Endangered – may occur) – not present; and
- Subtropical and Temperate Coastal Saltmarsh (listed as Vulnerable – may occur) – see discussion under **FINDINGS Vegetation types** Vegetation types recorded as part of the present study.

DISCUSSION

Summary of key findings

Threatened flora

- No plant species listed as threatened on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA) and/or the Tasmanian *Threatened Species Protection Act 1995* (TSPA) were detected, or are known from database information, from the project area.

Threatened fauna

- No fauna species listed as threatened on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA) and/or the Tasmanian *Threatened Species Protection Act 1995* (TSPA) were detected from the project area.
- The project area supports potential habitat of several species, as follows:
 - *Sarcophilus harrisii* (Tasmanian devil);
 - *Dasyurus maculatus* subsp. *maculatus* (spotted-tailed quoll);
 - *Dasyurus viverrinus* (eastern quoll);
 - *Perameles gunnii* subsp. *gunnii* (eastern barred bandicoot);
 - *Haliaeetus leucogaster* (white-bellied sea-eagle);
 - *Tyto novaehollandiae* (masked owl); and
 - *Prototroctes maraena* (Australian grayling).

- The project area (and nearby areas) also supports known and potential habitat of shore-nesting and migratory wading birds including *Thinornis rubricollis* (hooded plover) and *Sternula nereis* (fairy tern).

Vegetation types

- The project area supports the following TASVEG mapping units:
 - *Eucalyptus viminalis* – *Eucalyptus globulus* coastal forest and woodland (TASVEG code: DVC);
 - coastal scrub (TASVEG code: SSC);
 - succulent saline hermland (TASVEG code: ASS);
 - water, sea (TASVEG code: OAQ);
 - extra-urban miscellaneous (TASVEG code: FUM); and
 - unverified plantations for silviculture (TASVEG code: FPU).
- Of the vegetation communities recorded, ASS can equate to the Threatened Ecological Community Subtropical and Temperate Coastal Saltmarsh, listed as Vulnerable the schedules of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA).
- Of the vegetation communities recorded, one is listed as a threatened vegetation type on Schedule 3A of the Tasmanian *Nature Conservation Act 2002*, namely *Eucalyptus viminalis* – *Eucalyptus globulus* coastal forest and woodland (TASVEG code: DVC).

Weeds

- Four plant species classified as declared weeds within the meaning of the Tasmanian *Weed Management Act 1999* and two plant species considered as environmental weeds were detected from the project area including:

declared weeds

- # *Ulex europaeus* (gorse);
- # *Lycium ferocissimum* (african boxthorn);
- # *Marrubium vulgare* (white horehound); and
- # *Cirsium arvense* var. *arvense* (creeping thistle)

environmental weeds

- *Verbascum thapsus* (great mullein); and
- *Pyracantha* sp. (firethorn).

Plant disease

- No evidence of *Phytophthora cinnamomi* (PC, rootrot) was recorded within the project area.
- No evidence of myrtle wilt was recorded from within the project area.
- No evidence of myrtle rust was recorded from within the project area.
- Evidence of “ginger tree syndrome” is present within the project area.

Animal disease (chytrid)

- The project area is not known to support frog chytrid disease and there is potential habitat for amphibian species.

Informal reserve

- Part of the project area is within an informal reserve on public land.

Individual native trees

- One larger and one smaller healthy *Eucalyptus viminalis* (white gum) were identified from the project area.

Legislative and policy implications

Some commentary is provided below with respect to the key threatened species, vegetation management and other relevant legislation. Note that there may be other relevant policy instruments in addition to those discussed. The following information does not constitute legal advice and it is recommended that independent advice is sought from the relevant agency/authority.

Tasmanian Threatened Species Protection Act 1995

Threatened flora and fauna on this Act are managed under Section 51, as follows:

51. Offences relating to listed taxa

- (1) Subject to subsections (2) and (3), a person must not knowingly, without a permit –
 - (a) take, keep, trade in or process any specimen of a listed taxon of flora or fauna; or
 - (b) disturb any specimen of a listed taxon of flora or fauna found on land subject to an interim protection order; or
 - (c) disturb any specimen of a listed taxon of flora or fauna contrary to a land management agreement; or
 - (d) disturb any specimen of a listed taxon of flora or fauna that is subject to a conservation covenant entered into under Part 5 of the *Nature Conservation Act 2002*; or
 - (e) abandon or release any specimen of a listed taxon of flora or fauna into the wild.
- (2) A person may take, keep or process, without a permit, a specimen of a listed taxon of flora in a domestic garden.
- (3) A person acting in accordance with a certified forest practices plan or a public authority management agreement may take, without a permit, a specimen of a listed taxon of flora or fauna, unless the Secretary, by notice in writing, requires the person to obtain a permit.
- (4) A person undertaking dam works in accordance with a Division 3 permit issued under the *Water Management Act 1999* may take, without a permit, a specimen of a listed taxon of flora or fauna.

In the absence of an identifiable known location of a specimen of a threatened fauna or flora species from the project area, the Act has no application. The Act does not make reference to the clearance or disturbance of "potential habitat".

Commonwealth Environment Protection and Biodiversity Conservation Act 1999

The project area may support a small area of Subtropical and Temperate Coastal Saltmarsh (listed as Vulnerable), mapped as ARS (under TASVEG). In the case of the project area, it is understood that the project will avoid the mid-river spit of ARS. The degree to which the small area of fringing ARS will be affected is unknown at this stage but it is highly likely that it will be practical for the

works to avoid most (if not all) of the halophytic vegetation. It is highly unlikely that the project will require referral due to the presence of a small area of this threatened ecological community.

The study area does not support known sites or significant potential habitat of flora species listed on the Act.

The study area may support populations of threatened fauna listed on the Act, most notably the Tasmanian devil, spotted-tailed quoll, eastern quoll, eastern barred bandicoot, masked owl and Australian grayling. Nearby areas may also support shore-nesting and migratory bird species such as the hooded plover, fairy tern and wader species.

The Commonwealth Department of the Environment & Energy provides a *Significant Impact Guidelines* policy statement (CofA 2013) to determine if referral to the department is required. The *Guidelines* consider a “significant impact” to comprise loss that is likely to lead to a long-term decrease in the size of an important population of a species (unlikely to be the case); reduce the area of occupancy of an important population (also unlikely at any reasonable scale); fragment an existing important population into two or more populations (minor habitat loss will occur but not such that fragmentation will result); adversely affect habitat critical to the survival of a species (“critical habitat” has not been defined per se); disrupt the breeding cycle of an important population (unlikely); modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline (this seems unlikely – see previous commentary); result in invasive species that are harmful to a threatened species becoming established in the threatened species’ habitat (unlikely); introduce disease that may cause the species to decline (unlikely to introduce and/or exacerbate Devil Facial Tumour Disease); or interfere substantially with the recovery of the species (unlikely at any reasonable scale). On this initial review of the *Guidelines*, it seems unlikely that the proposal as notionally proposed will result in the need for a referral.

The *Significant Impact Guidelines* policy statement (CofA 2013) should be reviewed once the plans are further progressed to determine if a referral is necessary.

Tasmanian Forest Practices Act 1985 and associated Forest Practices Regulations 2017

The Act provides this definition of the concept of “clearing”:

clearing of trees means the removal of trees by–

- (a) clearing, cutting, pushing or otherwise removing; or
- (b) destroying the trees in any way.

The Act provides this definition of the concept of “trees”:

trees means –

- (a) any woody plants with a height or potential height of 5 metres or more, whether or not living, dead, standing or fallen, that are–
 - (i) native to Tasmania; or
 - (ii) introduced into Tasmania and used for the processing or harvesting of timber; and
- (b) tree ferns [where *tree fern* means a plant of the species *Dicksonia antarctica*].

Within the project area, on this basis, even the removal of seedlings, saplings, logs or trunks (dead or alive) of various species of trees and tall shrubs may constitute “clearing” of “trees” under the Act. In broad terms, however, an FPP is not required for areas less than 1 ha or 100 tonnes of timber per property per year, whichever is the lesser, unless the action is on “vulnerable land” (which includes various values including threatened vegetation types and riparian areas).

Section 4 of the *Forest Practices Regulations 2017* specifies the following circumstance in which an FPP is not required, as follows:

4. Circumstances in which forest practices plan, &c., not required
 - (a) the harvesting of timber or the clearing of trees, with the consent of the owner of the land, if the land is not vulnerable land and–
 - (i) the volume of timber harvested or trees cleared is less than 100 tonnes for each area of applicable land per year; or
 - (ii) the total area of land on which the harvesting or clearing occurs is less than one hectare for each area of applicable land per year–

whichever is the lesser;

- (j) the harvesting of timber or the clearing of trees on any land, or the clearance and conversion of a threatened native vegetation community on any land, for the purpose of enabling–
 - (i) the construction of a building within the meaning of the *Land Use Planning and Approvals Act 1993* or of a group of such buildings; or
 - (ii) the carrying out of any associated development–

if the construction of the buildings or carrying out of the associated development is authorised by a permit issued under that Act;

Section 4.(j) provides an exemption from an FPP for a land use proposal such as a residential dwelling, where “associated development” is defined in the *Regulations* as:

associated development means development that is related to the construction or use of a building, or to the construction or use of a group of buildings, and includes the development of–

- (a) water, sewerage, gas, electrical, telecommunications and other services to be provided to the building or group of buildings; and
- (b) roads, footpaths and cycle paths; and
- (c) firebreaks; and
- (d) recreational facilities, including but not limited to parks and sportsgrounds; and
- (e) facilities to enable the commercial use of the building or group of buildings;

On this basis, any development within the title that is subject to a planning permit issued under the *Glamorgan Spring Bay Interim Planning Scheme 2015* should not require a Forest Practices Plan provided it involves a “building” (which I would interpret as including the bridge).

Tasmanian Nature Conservation Act 2002

Schedule 3A of the Act lists vegetation types classified as threatened within Tasmania. The project area supports *Eucalyptus viminalis* – *Eucalyptus globulus* coastal forest and woodland (TASVEG code: DVC). Administration of listed communities is either through the Tasmanian *Forest Practices Regulations 2017* (see section above) or the Tasmanian *Land Use Planning and Approvals Act 1993* (see following).

Tasmanian Weed Management Act 1999

Four plant species classified as declared weed” within the meaning of the Tasmanian *Weed Management Act 1999* were detected from the project area. The provisions of the relevant

Statutory Weed Management Plans for the species will need to be considered as part of project planning. In summary, however, the key issue will be management of vegetation debris and topsoil contaminated with weed propagules. The project provides an opportunity to improve the current status of weeds in the area through a coordinated approach with various parties.

Tasmanian Wildlife (General) Regulations 2010

While the assessment of the project area indicated the presence of species listed on schedules of the Regulations (i.e. "specially protected wildlife", "protected wildlife", "partly protected wildlife"), no individuals, or products (e.g. nests, dens, etc.), of these species, are likely to be directly physically affected by the works.

Tasmanian Land Use Planning and Approvals Act 1993

The applicable planning scheme for the study area is the *Glamorgan Spring Bay Interim Planning Scheme 2015*.

The project area is zoned as Rural Resource (58 Shaw Street), Environmental Living (Crown titles and Meredith River) and Rural Living (Cambria Drive titles including the ca. 20 m wide linear strip).

Parts of the project area are subject to various overlays under the *Scheme*, most of which are outside my specific area of expertise to address provisions. However, only a small part of the project area is subject to the Biodiversity Protection Area, notionally the polygons mapped on TASVEG as ARS i.e. saltmarsh vegetation (Figure 11).

The APPLICATION of the Biodiversity Code is stated below:

E10.2 Application

This code applies to development involving clearance and conversion or disturbance of native vegetation within a Biodiversity Protection Area.

That is, the Code will only have application if native vegetation within the area indicated in Figure 11 will be subject to clearance and conversion or disturbance. Noting that any works on the river bank are likely to be extremely limited and likely to practically avoid the halophytic vegetation, it is unlikely that the Code will have direct application.

Recommendations

The recommendations provided below are a summary of those provided in relation to each of the ecological features described in the main report. The main text of the report provides the relevant context for the recommendations. At this stage of planning, it is recommended that this report be used to inform more detailed site planning. Once the designs are closer to a final stage, it may be prudent to review the content of this report (including the recommendations below) and provide a further statement on final recommendations.

Vegetation types

In a general sense, it is recommended that the clearance and conversion and disturbance of native vegetation be minimised as far as practical within the context of the configuration and topography

of the project and constraints imposed by cadastral boundaries and physical features such as the Meredith River.

In particular, it is recommended that any areas of halophytic vegetation be avoided, wherever practical.

Threatened flora

Based on the field survey, no special management in relation to threatened flora is recommended.

Threatened fauna

Based on the field survey, no special management in relation to threatened fauna is recommended.

Weed and disease management

The key recommendation is to carefully manage vegetation debris and topsoil that may be contaminated with weed propagules.

Individual native trees

It is recommended that mature and/or healthy *Eucalyptus viminalis* be avoided during construction works.

Other

It is recommended that signs be erected at relevant positions informing track users of the sensitivity of bird breeding habitat (halophytic vegetation and soft sand on the beach).

It is recommended that the track be considered a dog-on-lead area and signs erected informing of this.

It is recommended that the entry/exit points on the bridge be designed to minimise access of pedestrians and dogs to the river bank.

Legislative and policy implications

No formal referral to the relevant Commonwealth government agency under the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* is considered warranted but this should be confirmed by the client through their own consideration of the *Significant Impact Guideline* once the design plans are closer to completion.

It is assumed that the proposal will require a planning permit under the provisions of the *Glamorgan Spring Bay Interim Planning Scheme 2015*. Preliminary advice has been provided that indicates that it should be possible to satisfy the intent of the provisions of the Rural Resource, Rural Living and Environmental Management zoning and Biodiversity Code with limited specific permit conditions, but the specifics of this will need to be reviewed once the design is finalised.

It is assumed some form of Crown consultation/approval will be required in relation to the Crown land titles.

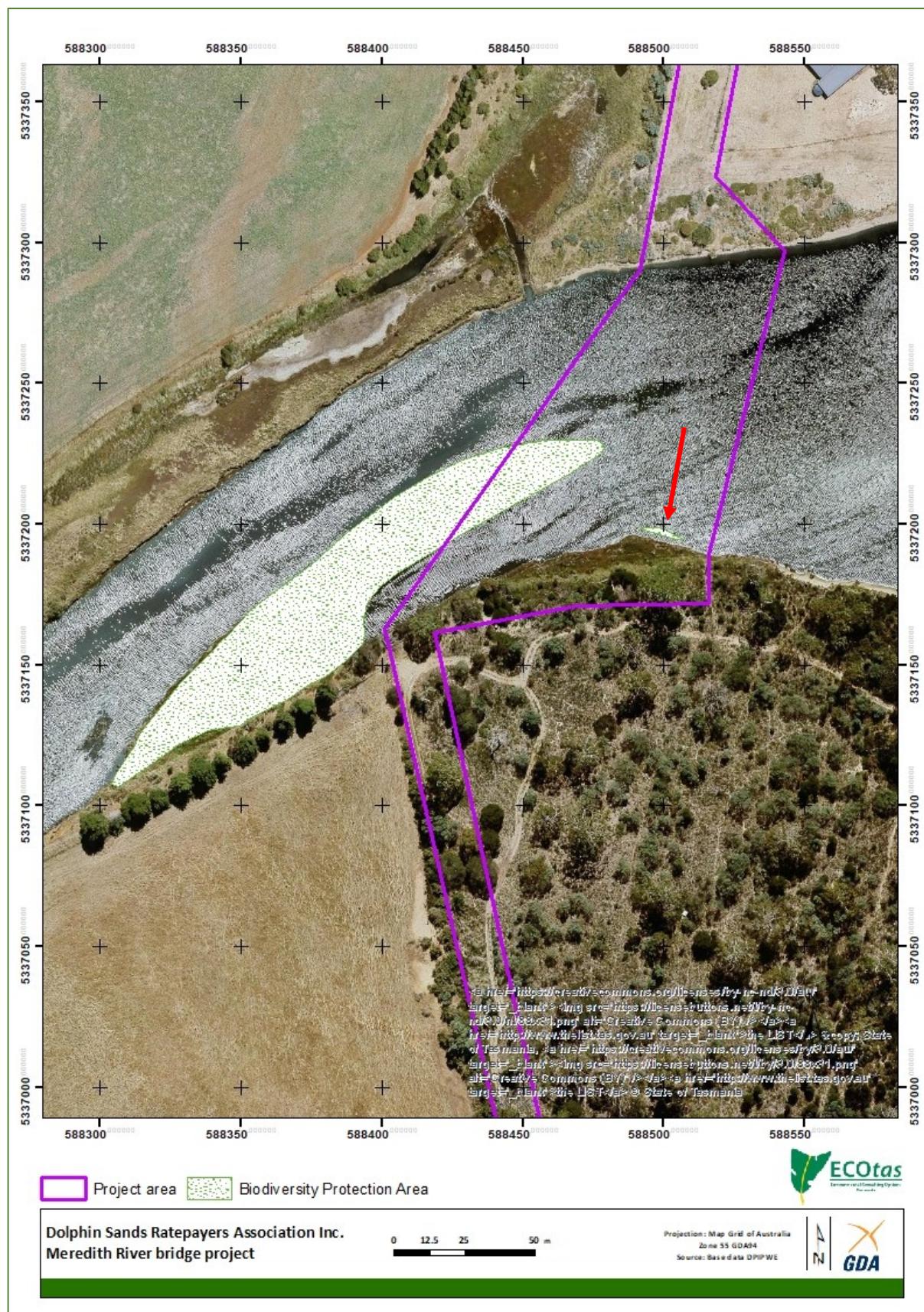


Figure 11. Extent of Biodiversity protection Area overlay (note arrowed polygon)

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APPENDIX A. Vegetation community structure and composition

The tables below provide basic information on the structure and composition of the native vegetation mapping units identified from the study area (refer also to Table 1).

***Eucalyptus viminalis – Eucalyptus globulus* coastal forest and woodland (TASVEG code: DVC)**

DVC occupies most of 58 Shaw Street. It is highly variable in structure and composition. Much of the area is dominated by a sparse canopy of mature *Eucalyptus viminalis* with a mainly *Acacia dealbata*/*Acacia mearnsii* understorey. The understorey is generally quite disturbed with variable amounts of regenerating *Eucalyptus viminalis*.

Some parts of the area mapped as DVC could be excised and classified as some form of coastal scrub (TASVEG code: SSC), weed infestation (TASVEG code: FWU) or *Pteridium esculentum* fernland (TASVEG code: FPF) but overall, these areas comprise part of the broader concept of DVC. That said, at a local level (e.g. where the proposed track may be positioned), there is generally insufficient eucalypt canopy to be classifiable as DVC.

Several tracks dissect the area of forest – these have all been subsumed into the concept of DVC because the canopy is virtually continuous, although the tracks are distinct on aerial imagery.

Closer to the Meredith River, DVC grades into SSC but the band of scrub is very narrow and not distinct enough to warrant separate classification.

The DVC within the likely project footprint is in generally poor condition because of the sparse canopy and modified understorey that includes locally dense patches of woody weeds such as gorse and boxthorn.



Examples of DVC on southern side of Meredith River

Stratum	Height (m) Cover (%)	Species (underline = dominant, parentheses = sparse or occasional)
Trees	35 m 5%	<i>Eucalyptus viminalis</i>
Trees	10-25 m 5-25%	<i>Eucalyptus viminalis</i> , <i>Acacia dealbata</i>
Tall shrubs	1-9 m 5-25%	<i>Eucalyptus viminalis</i> , <i>Acacia dealbata</i> <i>Acacia mearnsii</i> , <i>Acacia longifolia</i> subsp. <i>sophorae</i> , <i>Allocasuarina verticillata</i> , <i>Exocarpos cupressiformis</i> , <i>Banksia marginata</i> , <i>Monotoca elliptica</i>
Low shrubs	<1 m variable	<i>Rhagodia candolleana</i> , <i>Acacia</i> spp.
Grasses/graminoids	<1.5 m 30%	<i>Lomandra longifolia</i> , <i>Lepidosperma</i> spp., <i>Poa</i> spp., <i>Austrostipa</i> spp., <i>Dianella brevicaulis</i>
Herbs	+ 20%	<i>Viola hederacea</i> , <i>Lagenophora stipitata</i> , <i>Gonocarpus tetragynus</i> , <i>Oxalis perennans</i> , <i>Dichondra repens</i>
Ferns	variable	<i>Pteridium esculentum</i>

coastal scrub (TASVEG code: SSC)

SSC occurs on the northern side of the Meredith River in the western section of the Crown land title. Historically, DVC would have fringed the river but this is now long-cleared and modified. Due to the presence of several native shrub species, the small area has been mapped as SSC.

The patch is in poor condition because of the modified structure and composition, which includes woody weeds such as gorse.



Patch of SSC on northern side of Meredith River [source: TheList]

Stratum	Height (m) Cover (%)	Species (underline = dominant, parentheses = sparse or occasional)
Tall shrubs	1-4 m 20-40%	<i>Banksia marginata, Acacia dealbata, Allocasuarina verticillata, Monotoca elliptica, Rhagodia candolleana, Carpobrotus rossii</i>
Grasses/graminoids	<1 m 30-60%	<i>Lomandra longifolia, Lepidosperma spp., Poa spp., Austrostipa spp., Dianella brevicaulis, Ammophila arenaria</i>
Herbs	+	<i>Gonocarpus tetragynus, Oxalis exilis, Stellaria multiflora, Wahlenbergia multicaulis</i>
Ferns	<1 m +	<i>Pteridium esculentum</i>

succulent saline hermland (TASVEG code: ASS)

ASS has been mapped on the mid-river spit and a small area fringing the southern margin of the Meredith River. It is dominated by *Sarcocornia quinqueflora* with a fringe of *Poa poiformis* (insufficient to warrant classification as a separate saltmarsh mapping unit).

ASS has replaced TASVEG mapping of ARS, with its extent now slightly greater and better defined (based mainly on aerial imagery).

It is unknown if the area of ASS will be affected by the project.



Narrow fringe of ASS on southern side of Meredith River with more ASS on mid-river spit in background

Stratum	Height (m) Cover (%)	Species (underline = dominant, parentheses = sparse or occasional)
Shrubs	<0.2 m 80%	<i>Sarcocornia quinqueflora</i>
Grasses/graminoids	<1 m 5%	<i>Austrostipa</i> spp, <i>Poa</i> spp, <i>Distichlis distichophylla</i> , <i>Juncus kraussii</i> , <i>Apodasmia brownii</i> , <i>Gahnia filum</i>
Herbs	+	<i>Selliera radicans</i> , <i>Lobelia anceps</i>

APPENDIX B. Vascular plant species recorded from study area.

Botanical nomenclature follows *A Census of the Vascular Plants of Tasmania* (de Salas & Baker 2019), with family placement updated to reflect the nomenclatural changes recognised in the *Flora of Tasmania Online* (Duretto 2009+) and APG (2016); common nomenclature follows *The Little Book of Common Names of Tasmanian Plants* (Wapstra et al. 2005+, updated online at www.dpipwe.tas.gov.au).

i = introduced/naturalised; e = endemic to Tasmania

DW = declared weed within meaning of Tasmanian Weed Management Act 1999

EW = environmental weed (author opinion)

Table B1. Summary of vascular species recorded from the study area.

STATUS	ORDER			
	DICOTYLEDONAE	MONOCOTYLEDONAE	GYMNOSPERMAE	PTERIDOPHYTA
	57	30	1	1
e	-	-	-	-
i	16	15	-	-
Sum	73	45	1	1
TOTAL		120		

DICOTYLEDONAE**AIZOACEAE**

Carpobrotus rossii

native pigface

AMARANTHACEAE

?i *Chenopodium glaucum*

pale goosefoot

Einadia nutans subsp. *nutans*

climbing saltbush

Rhagodia candolleana subsp. *candolleana*

coastal saltbush

Sarcocornia quinqueflora subsp. *quinqueflora*

beaded glasswort

APIACEAE

Apium prostratum subsp. *prostratum* var. *filiforme*

slender sea-celery

Apium prostratum subsp. *prostratum* var. *prostratum*

creeping sea-celery

Hydrocotyle hirta

hairy pennywort

ASTERACEAE

Argentipallium dealbatum

white everlasting

Cassinia aculeata subsp. *aculeata*

common dollybush

i *Cirsium arvense* var. *arvense*

creeping thistle

DW

i *Cirsium vulgare*

spear thistle

i *Conyza bonariensis*

flaxleaf fleabane

Cotula australis

southern buttons

Euchiton japonicus

common cottonleaf

i *Hypochaeris radicata*

rough catsear

Lagenophora stipitata

blue botteldaisy

Leptinella longipes

coast buttons

Ozothamnus ferrugineus

tree everlastingbush

i *Sonchus oleraceus*

common sowthistle

BORAGINACEAE

Cynoglossum australe

coast houndstongue

CAMPANULACEAE

Lobelia anceps

angled lobelia

Wahlenbergia multicaulis

bushy bluebell

CARYOPHYLLACEAE

i *Cerastium vulgare*

common mouse-ear

Stellaria multiflora subsp. *multiflora*

rayless starwort

CASUARINACEAE

Allocasuarina verticillata

drooping sheoak

CELASTRACEAE		
<i>Stackhousia monogyna</i>	forest candles	
CONVOLVULACEAE		
<i>Dichondra repens</i>	kidneyweed	
CRASSULACEAE		
<i>Crassula sieberiana</i>	rock stonecrop	
DROSERACEAE		
<i>Drosera auriculata</i>	tall sundew	
ERICACEAE		
<i>Astroloba humifusum</i>	native cranberry	
<i>Epacris impressa</i>	common heath	
<i>Leucopogon parviflorus</i>	coast beardheath	
<i>Monotoca elliptica</i>	tree broomheath	
EUPHORBIACEAE		
i <i>Euphorbia peplus</i>	petty spurge	
FABACEAE		
<i>Acacia dealbata</i> subsp. <i>dealbata</i>	silver wattle	
<i>Acacia longifolia</i> subsp. <i>sophorae</i>	coast wattle	
<i>Acacia mearnsii</i>	black wattle	
<i>Daviesia sejugata</i>	leafy spiky bitterpea	
<i>Kennedia prostrata</i>	running postman	
i <i>Ulex europaeus</i>	gorse	DW
i <i>Vicia sativa</i> subsp. <i>sativa</i>	common vetch	
GERANIACEAE		
<i>Geranium solanderi</i>	southern cranesbill	
GOODENIACEAE		
<i>Goodenia lanata</i>	trailing native-primrose	
<i>Selliera radicans</i>	shiny swampmat	
HALORAGACEAE		
<i>Gonocarpus tetragynus</i>	common raspwort	
HYPERICACEAE		
<i>Hypericum gramineum</i>	small st johns-wort	
<i>Hypericum japonicum</i>	matted st johns-wort	
LAMIACEAE		
i <i>Marrubium vulgare</i>	white horehound	DW
LINACEAE		
<i>Linum marginale</i>	native flax	
MYRTACEAE		
<i>Calytrix tetragona</i>	common fringedmyrtle	
<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	white gum	
<i>Leptospermum scoparium</i>	common teatree	
ONAGRACEAE		
<i>Epilobium billardiereanum</i> subsp. <i>billardiereanum</i>	robust willowherb	
OXALIDACEAE		
<i>Oxalis exilis</i>	feeble wood sorrel	
<i>Oxalis perennans</i>	grassland wood sorrel	
PAPAVERACEAE		
i <i>Fumaria muralis</i> subsp. <i>muralis</i>	wall fumitory	
PLANTAGINACEAE		
<i>Plantago varia</i>	variable plantain	
POLYGALACEAE		
<i>Comeperma volubile</i>	blue lovecreeper	
POLYGONACEAE		
i <i>Acetosella vulgaris</i>	sheep sorrel	
PROTEACEAE		
<i>Banksia marginata</i>	silver banksia	
ROSACEAE		
<i>Acaena novae-zelandiae</i>	common buzzy	
i <i>Pyracantha</i> sp.	firethorn	EW
<i>Rubus parvifolius</i>	native raspberry	
RUBIACEAE		
i <i>Galium aparine</i>	cleavers	
<i>Galium australe</i>	coast bedstraw	
SANTALACEAE		
<i>Exocarpos cupressiformis</i>	common native-cherry	

SCROPHULARIACEAE		
i <i>Verbascum thapsus</i>	great mullein	EW
SOLANACEAE		
i <i>Lycium ferocissimum</i>	african boxthorn	DW
<i>Solanum laciniatum</i>	kangaroo apple	
THYMELAEACEAE		
<i>Pimelea glauca</i>	smooth riceflower	
VIOLACEAE		
<i>Viola hederacea</i> subsp. <i>hederacea</i>	ivyleaf violet	
GYMNOSPERMAE		
PINACEAE		
i <i>Pinus radiata</i>	radiata pine	
MAGNOLIDS		
LAURACEAE		
<i>Cassytha pubescens</i>	downy dodderlaurel	
MONOCOTYLEDONAE		
AMARYLLIDACEAE		
<i>Dianella brevicaulis</i>	shortstem flaxlily	
ASPARAGACEAE		
<i>Lomandra longifolia</i>	sagg	
CYPERACEAE		
<i>Baumea juncea</i>	bare twigsedge	
<i>Ficinia nodosa</i>	knobby clubsedge	
<i>Gahnia filum</i>	chaffy sawsedge	
<i>Isolepis platycarpa</i>	flatfruit clubsedge	
<i>Lepidosperma concavum</i>	sand swordsedge	
<i>Lepidosperma gladiatum</i>	coast swordsedge	
JUNCACEAE		
<i>Juncus kraussii</i> subsp. <i>australiensis</i>	sea rush	
<i>Juncus pallidus</i>	pale rush	
ORCHIDACEAE		
<i>Acianthus pusillus</i>	small mosquito-orchid	
POACEAE		
i <i>Agrostis capillaris</i> var. <i>capillaris</i>	browntop bent	
i <i>Agrostis stolonifera</i>	creeping bent	
i <i>Aira caryophyllea</i> subsp. <i>caryophyllea</i>	silvery hairgrass	
i <i>Aira praecox</i>	early hairgrass	
i <i>Ammophila arenaria</i> subsp. <i>arenaria</i>	marram grass	
<i>Anthosachne scabra</i>	rough wheatgrass	
<i>Austrostipa flavescens</i>	yellow speargrass	
<i>Austrostipa mollis</i>	soft speargrass	
<i>Austrostipa stipoides</i>	coast speargrass	
<i>Austrostipa stuposa</i>	corkscrew speargrass	
i <i>Briza maxima</i>	greater quaking-grass	
i <i>Briza minor</i>	lesser quaking-grass	
i <i>Bromus diandrus</i>	great brome	
i <i>Bromus hordeaceus</i>	soft brome	
<i>Deyeuxia quadriseta</i>	reed bentgrass	
<i>Dichelachne rara</i>	common plumegrass	
<i>Distichlis distichophylla</i>	australian saltgrass	
i <i>Ehrharta erecta</i> var. <i>erecta</i>	panic veldtgrass	
i <i>Festuca arundinacea</i>	tall fescue	
i <i>Holcus lanatus</i>	yorkshire fog	
<i>Lachnagrostis aemula</i>	tumbling blownglass	
<i>Lachnagrostis filiformis</i>	common blownglass	
i <i>Lagurus ovatus</i>	haretail grass	
<i>Microlaena stipoides</i> var. <i>stipoides</i>	weeping grass	
<i>Phragmites australis</i>	southern reed	
<i>Poa labillardierei</i> var. <i>labillardierei</i>	silver tussockgrass	
<i>Poa poiformis</i> var. <i>poiformis</i>	coastal tussockgrass	
<i>Poa sieberiana</i> var. <i>sieberiana</i>	grey tussockgrass	
<i>Rytidosperma pilosum</i>	velvet wallabygrass	
i <i>Sporobolus africanus</i>	ratstail grass	
<i>Tetraorrhena distichophylla</i>	hairy ricegrass	
i <i>Vulpia bromoides</i>	squirretail fescue	

RESTIONACEAE

Apodasmia brownii
Centrolepis strigosa subsp. *strigosa*

coarse twinerush
hairy bristlewort

PTERIDOPHYTA

DENNSTAEDIACEAE

Pteridium esculentum subsp. *esculentum*

bracken

APPENDIX C. Analysis of database records of threatened flora

Table C1 provides a listing of threatened flora from within 5,000 m of the study area (nominal buffer width usually used to discuss the potential of a particular study area to support various species listed in databases), with comments on whether potential habitat is present for the species, and possible reasons why a species was not recorded.

Table C1. Threatened flora records from within 5,000 m of boundary of the study area

Species listed below are listed as rare (r), vulnerable (v), endangered (e), or extinct (x) on the Tasmanian *Threatened Species Protection Act 1995* (TSPA); vulnerable (VU), endangered (EN), critically endangered (CR) or extinct (EX) on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA). Information below is sourced from DPIPWE's *Natural Values Atlas* (DPIPWE 2019) and other sources where indicated. Habitat descriptions are taken from FPA (2016) and TSS (2003+), except where otherwise indicated. Species marked with # are listed in CofA (2019).

Scientific name Common name	Status TSPA EPBCA	Tasmanian habitat description (and distribution)	Comments on study area and database records
<i>Acacia axillaris</i> midlands wattle	v VU # only	<i>Acacia axillaris</i> is mainly confined to riparian habitats such as dense riparian scrub and associated floodplains but also extends to paddocks and open grassy forests in frost hollows and areas of poor drainage, but also occasionally occurs on rocky slopes (there is a somewhat anomalous population on the midslopes of Mt Barrow in the northeast). All populations are strongly associated with dolerite. Records outside the core of the range (e.g. Prosser River, Broad River, River Clyde) need to be treated carefully as they may represent the more recently described <i>Acacia derwentiana</i> .	Potential habitat present, although the listing in CofA (2019) is likely to be erroneous, referring to east coast records better assigned to other species. This distinctive shrub was not detected (no seasonal restriction on detection or identification).
<i>Acacia siculiformis</i> dagger wattle	r -	<i>Acacia siculiformis</i> is found near watercourses (e.g. dense shrubby riparian scrubs along major rivers in the Midlands and surrounding uplands) and in dry sclerophyll forest. It is often associated with rocky dolerite sites. Care needs to be taken with outlier records not supported by herbarium specimens.	Potential habitat effectively absent (atypical of known sites). This distinctive shrub was not detected (no seasonal restriction on detection or identification).
<i>Bertya tasmanica</i> subsp. <i>tasmanica</i> tasmanian bertya	e EN # only	<i>Bertya tasmanica</i> subsp. <i>tasmanica</i> mainly occurs on riparian sites in the northern Midlands (e.g. St Pauls River) and east coast (e.g. Apsley River). It is associated with <i>Eucalyptus ovata</i> - <i>Callitris oblonga</i> forest on some sites. Other dominants include <i>E. rodwayi</i> and <i>E. viminalis</i> . A large population at Swanwick is atypical, with plants occurring within near-coastal vegetation dominated by <i>Allocasuarina verticillata</i> (drooping sheoak).	Potential habitat marginally present. This distinctive shrub was not detected (no seasonal restriction on detection or identification).
<i>Bolboschoenus caldwellii</i> sea clubsedge	r -	<i>Bolboschoenus caldwellii</i> is widespread in shallow, standing, sometimes brackish water, rooted in heavy black mud.	Potential habitat present (margins of Meredith River). This distinctive perennial graminoid was not detected (no seasonal restriction on detection or identification).

Scientific name Common name	Status TSPA EPBCA	Tasmanian habitat description (and distribution)	Comments on study area and database records
<i>Boronia gunnii</i> river boronia	v VU # only	<i>Boronia gunnii</i> is strictly riparian in habitat, occurring in the flood zone of the Apsley, St Pauls, and Dukes rivers (where extant) and the Denison Rivulet and South Esk River (where presumed extinct) in rock crevices or in the shelter of boulders. The base substrate is always dolerite.	Potential habitat absent. Site is also outside the recognised range of the species.
<i>Boronia hippopala</i> velvet boronia	v VU # only	<i>Boronia hippopala</i> occurs in the Eastern Tiers, in wet scrubby heath dominated by <i>Melaleuca</i> (paperbark) species, <i>Leptospermum</i> (teatree) species and <i>Gahnia grandis</i> (cutting grass), as well as in adjacent <i>Eucalyptus pauciflora-E. dalrympleana</i> woodland. The underlying substrate is dolerite, and drainage is moderate to poor.	Potential habitat absent and the listing in CofA (2019) is considered erroneous (not known from the east coast). This distinctive shrub was not detected (no seasonal restriction on detection or identification).
<i>Caladenia caudata</i> tailed spider-orchid	v VU # only	<i>Caladenia caudata</i> has highly variable habitat, which includes the central north: <i>Eucalyptus obliqua</i> heathy forest on low undulating hills; the northeast: <i>E. globulus</i> grassy/heathy coastal forest, <i>E. amygdalina</i> heathy woodland and forest, <i>Allocasuarina</i> woodland; and the southeast: <i>E. amygdalina</i> forest and woodland on sandstone, coastal <i>E. viminalis</i> forest on deep sands. Substrates vary from dolerite to sandstone to granite, with soils ranging from deep windblown sands, sands derived from sandstone and well-developed clay loams developed from dolerite. A high degree of insolation is typical of many sites.	Potential habitat effectively absent (atypical of all known sites). The survey was conducted outside the flowering period of the species (Wapstra 2018). Further timed-targeted surveys are not considered warranted based on the statistically low likelihood of the species being present.
<i>Callitris oblonga</i> subsp. <i>oblonga</i> south esk pine	v EN #	<i>Callitris oblonga</i> subsp. <i>oblonga</i> occurs predominantly in riparian scrub, woodland and forest (where it can extend away from rivers) in areas with low precipitation and usually sandy soil. It is local on the East Coast, particularly on the margins of the Swan, Apsley, South Esk, Cygnet and St Pauls rivers. A small population is also present in Cataract Gorge.	Potential habitat effectively absent (atypical of known sites). This distinctive small tree was not detected (no seasonal restriction on detection or identification).
<i>Calocephalus lacteus</i> milky beautyheads	r -	<i>Calocephalus lacteus</i> occurs in open, dry sites in lowland areas of eastern and northern Tasmania and on lower altitudes of the Central Plateau. It requires bare ground for recruitment, and may benefit from disturbance. It is often found on roadsides and beside tracks.	Potential habitat effectively absent (atypical of known sites). This distinctive low shrub was not detected (no seasonal restriction on detection or identification).
<i>Calystegia soldanella</i> sea bindweed	r -	<i>Calystegia soldanella</i> is recorded from coastal sands, mainly in the northeast of the State (but it is now also known from the northeast coast of King Island). It has also been found growing in granite soils and grazed coastal grasslands.	Potential habitat present (although mainly closer to the beach). This distinctive perennial herb was not detected (no seasonal restriction on detection or identification).

Scientific name Common name	Status TSPA EPBCA	Tasmanian habitat description (and distribution)	Comments on study area and database records
<i>Cryptandra amara</i> pretty pearlflower	e -	<i>Cryptandra amara</i> grows in some of the driest areas of the State and is typically associated with fertile rocky substrates (e.g. basalt). Its habitat ranges from near-riparian rockplates to grasslands or grassy woodlands.	Potential habitat absent.
<i>Damasonium minus</i> starfruit	r -	<i>Damasonium minus</i> occupies swampy habitat and farm dams and prefers slow-flowing or stationary water.	Potential habitat absent (does not occur in brackish water).
<i>Dianella amoena</i> grassland flaxlily	r EN # only	<i>Dianella amoena</i> occurs mainly in the northern and southern Midlands, where it grows in native grasslands and grassy woodlands.	Potential habitat marginally present (atypical of known sites). This perennial graminoid was not detected (no seasonal restriction on detection or identification).
<i>Eucalyptus barberi</i> barbers gum	r -	<i>Eucalyptus barberi</i> occurs on dolerite-derived soils on the central east coast of Tasmania, with disjunct populations occurring in the Wielangta area. The species tends to occur on broad ridgelines, saddles and flats, often with high surface rock cover (including at the edge of dolerite rock plates). <i>Eucalyptus barberi</i> generally occurs in localised stands in heathy/grassy eucalypt forest and woodland, typically dominated by <i>E. pulchella</i> , with <i>E. viminalis</i> and <i>E. ovata</i> also present on some sites.	Potential habitat absent.
<i>Glycine latrobeana</i> clover glycine	v VU #	<i>Glycine latrobeana</i> occurs in a range of habitats, geologies and vegetation types. Soils are usually fertile but can be sandy when adjacent to or overlaying fertile soils. The species mainly occurs on flats and undulating terrain over a wide geographical range, including near-coastal environments, the Midlands, and the Central Plateau. It mainly occurs in grassy/heathy forests and woodlands and native grasslands.	Potential habitat effectively absent (atypical of known sites) and the listing in CofA (2019) is considered erroneous (not known from the east coast). This perennial herb was not detected (no significant seasonal restriction on detection or identification).
<i>Haloragis heterophylla</i> variable raspwort	r -	<i>Haloragis heterophylla</i> occurs in poorly-drained sites (sometimes only marginally so), which are often associated with grasslands and grassy woodlands with a high component of <i>Themeda triandra</i> (kangaroo grass). It also occurs in grassy/sedgy <i>Eucalyptus ovata</i> forest and woodland, shrubby creek lines, and broad sedgy/grassy flats, wet pasture and margins of farm dams.	Potential habitat absent (does not occur in brackish water).
<i>Hyalosperma demissum</i> moss sunray	e -	<i>Hyalosperma demissum</i> grows on rock pavements or shallow sandy soils in some of Tasmania's driest regions, and also in scalded patches in <i>Eucalyptus amygdalina</i> heathy/grassy woodland. The underlying substrate is mostly Jurassic dolerite, with occasional occurrences on Triassic sandstone and also Cainozoic sediments with a laterite lag.	Potential habitat absent.

Scientific name Common name	Status TSPA EPBCA	Tasmanian habitat description (and distribution)	Comments on study area and database records
<i>Lasiopetalum micranthum</i> tasmanian velvetbush	r - 	<i>Lasiopetalum micranthum</i> occurs predominantly in open grassy forests and woodlands on dolerite-based ridges and slopes on the central east coast (e.g. forests dominated by <i>Eucalyptus amygdalina</i>). It can colonise track and road verges.	Potential habitat absent.
<i>Lepidium hyssopifolium</i> soft peppercress	e EN # only	The native habitat of <i>Lepidium hyssopifolium</i> is the growth suppression zone beneath large trees in grassy woodlands and grasslands (e.g. over-mature black wattles and isolated eucalypts in rough pasture). <i>Lepidium hyssopifolium</i> is now found primarily under large exotic trees on roadsides and home yards on farms.	Potential habitat marginally present (in the form of old pine trees). This perennial herb was not detected (no significant seasonal restriction on detection or identification).
<i>Lepilaena patentifolia</i> spreading watermat	r - 	<i>Lepilaena patentifolia</i> occurs in coastal lagoons, creeks, inlets and estuaries and brackish inland lagoons.	Potential habitat present (Meredith River). This species was not detected as part of the "seagrass" wash on the edges of the river but may be present. It is highly unlikely works within or on the edge of the river would materially impact on the species (if present).
<i>Leucochrysum albicans</i> var. <i>tricolor</i> grassland paperdaisy	e EN # only	<i>Leucochrysum albicans</i> var. <i>tricolor</i> occurs in the west and on the Central Plateau and the Midlands, mostly on basalt soils in open grassland. This species would have originally occupied <i>Eucalyptus pauciflora</i> woodland and tussock grassland, though most of this habitat is now converted to improved pasture or cropland.	Potential habitat absent.
<i>Lobelia pratioides</i> poison lobelia	v - 	<i>Lobelia pratioides</i> occurs in seasonally inundated to waterlogged soils at the margins of swamps, wetlands and drainage lines, and also in damp depressions within grassland and grassy woodland.	Potential habitat absent.
<i>Melaleuca pustulata</i> warty paperbark	r - 	<i>Melaleuca pustulata</i> occurs in a range of habitats including dry open woodland (often on dolerite in forests dominated by <i>Eucalyptus pulchella</i>), grassland and scrub, riparian zones and stable dunes in sparse coastal shrubbery. It is restricted to the State's Central East coast.	Potential habitat present. This distinctive shrub was not detected (no seasonal restriction on detection or identification).
<i>Ozothamnus lycopodioides</i> clubmoss everlastingbush	r - 	<i>Ozothamnus lycopodioides</i> is restricted to dry sclerophyll forest near the East Coast from Orford to Bicheno where it is restricted to dolerite.	Potential habitat absent.
<i>Phyllangium divergens</i> wiry mitrewort	v - 	<i>Phyllangium divergens</i> occurs in a wide variety of near-coastal habitats on a range of substrates, a common feature usually being bare ground (e.g. tracks) and rock exposures (e.g. outcrops, coastal cliffs, etc.).	Potential habitat marginally present (atypical of known sites). This ephemeral spring-flowering herb was not detected (marginally outside the peak flowering period). Further timed-targeted

Scientific name Common name	Status TSPA EPBCA	Tasmanian habitat description (and distribution)	Comments on study area and database records
			surveys are not considered warranted based on the statistically low likelihood of the species being present.
<i>Prasophyllum apoxychilum</i> tapered leek-orchid	v EN # only	<i>Prasophyllum apoxychilum</i> is restricted to eastern and northeastern Tasmania where it occurs in coastal heathland or grassy and scrubby open eucalypt forest on sandy and clay loams, often among rocks. It occurs at a range of elevations and seems to be strongly associated with dolerite in the east and southeast of its range.	Potential habitat absent.
<i>Pterostylis ziegeleri</i> grassland greenhood	v VU	<i>Pterostylis ziegeleri</i> occurs in the State's south, east and north, with an outlying occurrence in the northwest. In coastal areas, the species occurs on the slopes of low stabilised sand dunes and in grassy dune swales, while in the Midlands it grows in native grassland or grassy woodland on well-drained clay loams derived from basalt.	Potential habitat present. In the Dolphin Sands area, this species mainly occurs in mature <i>Eucalyptus viminalis</i> open woodland on sands but also occurs on frequently slashed and disturbed road verges. The initial survey on 18 August 2019 was marginally prior to the start of the peak flowering season (Wapstra 2018) but the rosette leaves were easily detected at a nearby known sites. This species was not detected from the project area.
<i>Rytidosperma indutum</i> tall wallabygrass	r -	<i>Rytidosperma indutum</i> is relatively widespread on mudstone and dolerite in dry sclerophyll woodlands and associated lowland grasslands in drier parts of the State.	Potential habitat widespread (albeit atypical of most known sites). This highly distinctive perennial grass was not detected (no significant seasonal restriction on detection or identification).
<i>Scaevola aemula</i> fairy fanflower	e -	<i>Scaevola aemula</i> is restricted to the East Coast between the Prosser and the Apsley rivers, where its habitat includes dry woodland/forest dominated by <i>Allocasuarina verticillata</i> (drooping sheoak) or 'half-barked' <i>Eucalyptus amygdalina</i> , with <i>Callitris rhomboidea</i> (oyster bay pine) also usually present. The species often occurs on rocky dolerite slopes.	Potential habitat absent.
<i>Senecio psilocarpus</i> swamp fireweed	e VU # only	<i>Senecio psilocarpus</i> is known from six widely scattered sites in the northern half of the State, including King and Flinders islands. It occurs in swampy habitats including broad valley floors associated with rivers, edges of farm dams amongst low-lying grazing/cropping ground, herb-rich native grassland in a broad swale between stable sand dunes, adjacent to wetlands in native grassland, herbaceous marshland and low-lying lagoon systems.	Potential habitat marginally present along the margins of the river. However, the listing in CofA (2019) is considered erroneous because the species is not known from this part of the State. This perennial herb was not detected (no significant seasonal restriction on detection or identification).

Scientific name Common name	Status TSPA EPBCA	Tasmanian habitat description (and distribution)	Comments on study area and database records
<i>Stenantherum pimeleoides</i> propeller plant	v VU #	<i>Stenantherum pimeleoides</i> is restricted to Tasmania's central East Coast and the Northern Midlands, where it occurs in dry sclerophyll forest or woodland with an open heathy or shrubby understorey. The topography tends to be flat to gently sloping. The species occurs in the drier parts of the State with rainfall between 500-800 mm per year, and usually at elevations below 100 m.	Potential habitat absent.
<i>Stenopetalum lineare</i> narrow threadpetal	e -	<i>Stenopetalum lineare</i> typically grows in grass-covered low dunes but it also extends to scrub-covered dunes (coast wattle), and there is one inland site on a rocky outcrop in dry sclerophyll forest.	Potential habitat present. I have spent considerable time mapping the occurrences of this species in the greater Dolphin Sands area, including the sites on the south and north sides of the Meredith River closer to the beach. This species was not detected from the project area. It appears to be detectable all year round, including from early seedlings.
<i>Stuckenia pectinata</i> fennel pondweed	r -	<i>Stuckenia pectinata</i> is found in fresh to brackish/saline waters in rivers, estuaries and inland lakes. It forms dense stands or mats, particularly in slow-flowing or static water. The species grows in water of various depth.	Potential habitat present (Meredith River). This species was not detected as part of the "seagrass" wash on the edges of the river but may be present. It is highly unlikely works within or on the edge of the river would materially impact on the species (if present).
<i>Teucrium corymbosum</i> forest germander	r -	<i>Teucrium corymbosum</i> occurs in a wide range of habitats from rocky steep slopes in dry sclerophyll forest and <i>Allocasuarina</i> (sheoak) woodland, riparian flats and forest.	Potential habitat absent.
<i>Vittadinia burbridgeae</i> smooth new-holland-daisy	r -	<i>Vittadinia burbridgeae</i> occurs in native grassland and grassy woodland.	Potential habitat marginally present. This distinctive perennial herb was not detected (no seasonal restriction on detection or identification).
<i>Vittadinia cuneata</i> var. <i>cuneata</i> fuzzy new-holland-daisy	r -	<i>Vittadinia cuneata</i> var. <i>cuneata</i> occurs in native grassland and grassy woodland.	As above.
<i>Vittadinia gracilis</i> woolly new-holland-daisy	r -	<i>Vittadinia gracilis</i> occurs in native grassland and grassy woodland.	As above.
<i>Xerochrysum palustre</i> swamp everlasting	v VU # only	<i>Xerochrysum palustre</i> has a scattered distribution with populations in the northeast, east coast, Central Highlands and Midlands, all below about 700 m elevation. It occurs in wetlands, grassy to sedgy wet heathlands and extends to associated heathy <i>Eucalyptus ovata</i> woodlands. Sites are usually inundated for part of the year.	Potential habitat absent.

APPENDIX D. Analysis of database records of threatened fauna

Table D1 provides a listing of threatened fauna from within 5,000 m of the study area (nominal buffer width usually used to discuss the potential of a particular study area to support various species listed in databases), with comments on whether potential habitat is present for the species, and possible reasons why a species was not recorded.

Table D1. Threatened fauna records from 5,000 m of boundary of the study area

Species listed below are listed as rare (r), vulnerable (v), endangered (e), or extinct (x) on the Tasmanian *Threatened Species Protection Act 1995* (TSPA); vulnerable (VU), endangered (EN), critically endangered (CR) or extinct (EX) on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA). Information below is sourced from the DPIPWE's *Natural Values Atlas* (DPIPWE 2019), Bryant & Jackson (1999) and FPA (2019); marine, wholly pelagic and species such as marine mammals, fish and offshore seabirds are excluded. Species marked with # are listed in CofA (2019).

Scientific name Common name	Status TSPA EPBCA	Tasmanian habitat description (and distribution)	Comments on study area and database records
<i>Accipiter novaehollandiae</i> grey goshawk	e -	Potential habitat is native forest with mature elements below 600 m altitude, particularly along watercourses. Significant habitat may be summarised as areas of wet forest, rainforest and damp forest patches in dry forest, with a relatively closed mature canopy, low stem density, and open understorey in close proximity to foraging habitat and a freshwater body (i.e. stream, river, lake, swamp, etc.).	Potential habitat absent. The species may occasionally utilise the greater project area as part of a home range and for foraging but small-scale development will not have a significant impact on this aspect of the life history of the species.
<i>Antipodia chaostola</i> tax. <i>leucophaea</i> chaostola skipper	e EN #	Potential habitat is dry forest and woodland supporting <i>Gahnia radula</i> (usually on sandstone and other sedimentary rock types) or <i>Gahnia microstachya</i> (usually on granite-based substrates).	Potential habitat absent (<i>Gahnia</i> species absent).
<i>Aquila audax</i> subsp. <i>fleayi</i> tasmanian wedge-tailed eagle	e EN #	Potential habitat comprises potential nesting habitat and potential foraging habitat. Potential foraging habitat is a wide variety of forest (including areas subject to native forest silviculture) and non-forest habitats. Potential nesting habitat is tall eucalypt trees in large tracts (usually more than 10 ha) of eucalypt or mixed forest. Nest trees are usually amongst the largest in a locality. They are generally in sheltered positions on leeward slopes, between the lower and mid sections of a slope and with the top of the tree usually lower than the ground level of the top of the ridge, although in some parts of the State topographic shelter is not always a significant factor (e.g. parts of the northwest and Central Highlands). Nests are usually not constructed close to sources of disturbance and nests close to disturbance are less productive. More than one nest may occur within a territory but only one is used for breeding in any one year.	There are no known nests within 1 km of the project area. Potential nesting habitat is limited to a few larger trees (all located in disturbed situations and nests not detected from any such trees). The species may utilise the greater project area as part of a home range and for foraging but small-scale development will not have a significant impact on this aspect of the life history of the species.

Scientific name Common name	Status TSPA EPBCA	Tasmanian habitat description (and distribution)	Comments on study area and database records
<i>Brachyopsilus ziebelli</i> ziebells handfish	e VU #	This species is restricted to the marine environment, at depths of 3-20 m.	Potential habitat absent (not reported from brackish waters).
<i>Botaurus poiciloptilus</i> australasian bittern	- EN # only	Potential habitat is comprised of wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. It favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and reeds (e.g. <i>Phragmites</i> , <i>Cyperus</i> , <i>Eleocharis</i> , <i>Juncus</i> , <i>Typha</i> , <i>Baumea</i> , <i>Bolboschoenus</i>) or cutting grass (<i>Gahnia</i>) growing over a muddy or peaty substrate (TSSC 2011).	Potential habitat absent.
<i>Calidris canutus</i> curlew sandpiper	- EN # only	Potential habitat is intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms.	Potential habitat may be marginally present along the fringes of the Meredith River and on the halophytic vegetation in the middle of the river. Refer to section on FINDINGS Fauna species <u>Other species of potential conservation significance</u> for more details on management of shore-dwelling and estuarine bird species.
<i>Calidris ferruginea</i> curlew sandpiper	- CR	As above.	Potential habitat may be marginally present along the fringes of the Meredith River and on the halophytic vegetation in the middle of the river. Refer to section on FINDINGS Fauna species <u>Other species of potential conservation significance</u> for more details on management of shore-dwelling and estuarine bird species.
<i>Ceyx azureus</i> subsp. <i>diemenensis</i> Tasmanian azure kingfisher	e EN # only	Potential habitat comprises potential foraging habitat and potential breeding habitat. Potential foraging habitat is primarily freshwater (occasionally estuarine) waterbodies such as large rivers and streams with well-developed overhanging vegetation suitable for perching and water deep enough for dive-feeding. Potential breeding habitat is usually steep banks of large rivers (a breeding site is a hole (burrow) drilled in the bank).	Potential habitat is technically present but the species is not known from the Meredith River (or nearby river systems) with only "vagrant" records of the species reported from the east coast (Wapstra et al. 2010). A targeted survey for the species is not considered warranted based on the absence of confirmed sightings, limited potential habitat and localised nature of the proposed works.
<i>Dasyurus maculatus</i> subsp. <i>maculatus</i> spotted-tailed quoll	r VU #	Potential habitat is coastal scrub, riparian areas, rainforest, wet forest, damp forest, dry forest and blackwood swamp forest (mature and regrowth), particularly where structurally complex and steep rocky areas are present, and includes remnant patches in cleared agricultural land.	Potential habitat present. No evidence (e.g. scats) of the species was observed. The project area is unlikely to support dens of the species because of the understorey lacking substantial large coarse woody debris, dense understorey, rock piles, and wombat burrows.

Scientific name Common name	Status TSPA EPBCA	Tasmanian habitat description (and distribution)	Comments on study area and database records
			The species may utilise the greater title area as part of a home range and for foraging but development at the scale proposed and within the context of surrounding land uses will not have a significant impact on potential habitat of the species.
<i>Dasyurus viverrinus</i> eastern quoll	- EN #	Potential habitat is a variety of habitats including rainforest, heathland, alpine areas and scrub. However, it seems to prefer dry forest and native grassland mosaics which are bounded by agricultural land.	See under spotted-tailed quoll.
<i>Galaxias fontanus</i> Swan galaxias	v VU	Potential habitat for is slow to moderately fast-flowing streams containing permanent water (even when not flowing), which have good instream cover from overhanging banks and/or logs, and shade from overhanging vegetation. A population can only be maintained where barriers have prevented establishment of trout and redfin perch. The nature of these barriers is variable and can include permanent natural structures such as waterfalls and chutes and also low flow-dependent features such as marshes, ephemeral water-losing and remnant channels, braided channel floodplain features.	Potential habitat absent (not known from brackish waters) and the site is outside the known range.
<i>Haliaeetus leucogaster</i> white-bellied sea-eagle	v -	Potential foraging habitat is any large waterbody (including sea coasts, estuaries, wide rivers, lakes, impoundments and even large farm dams) supporting prey items (fish). Potential nesting habitat is tall eucalypt trees in large tracts (usually more than 10 ha) of eucalypt or mixed forest within 5 km of the coast (nearest coast including shores, bays, inlets and peninsulas), large rivers (class 1), lakes or complexes of large farm dams. Scattered trees along river banks or pasture land may also be used.	There are no known nests within 1 km of the project area. Potential nesting habitat is limited to a few larger trees (all located in disturbed situations and nests not detected from any such trees). The species may utilise the greater project area as part of a home range and for foraging but small-scale development will not have a significant impact on this aspect of the life history of the species.
<i>Hirundapus caudacutus</i> white-throated needletail	- VU # only	Occasional non-breeding migrant to Tasmania only.	Potential habitat widespread but this is an aerially-foraging bird that rarely lands. No significant impact on this aspect of the species' life history is anticipated.
<i>Lathamus discolor</i> swift parrot	e CR #	Potential habitat comprises potential foraging habitat and potential nesting habitat. Potential foraging habitat comprises <i>Eucalyptus globulus</i> (blue gum) or <i>Eucalyptus ovata</i> (black gum) trees that are old enough to flower. For management purposes, potential nesting habitat is considered to comprise eucalypt forests that contain hollow-bearing trees.	Potential foraging habitat is absent (<i>Eucalyptus globulus</i> and <i>Eucalyptus ovata</i> are not present). While there is a small number of hollow-bearing trees, these are proposed for retention and the site is highly atypical of known nesting sites.

Scientific name Common name	Status TSPA EPBCA	Tasmanian habitat description (and distribution)	Comments on study area and database records
<i>Limosa lapponica</i> subsp. <i>baueri</i> western Alaskan bar-tailed godwit	- VU # only	Potential habitat is intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms.	Potential habitat may be marginally present along the fringes of the Meredith River and on the halophytic vegetation in the middle of the river. Refer to section on FINDINGS Fauna species <u>Other species of potential conservation significance</u> for more details on management of shore-dwelling and estuarine bird species.
<i>Limosa lapponica</i> subsp. <i>menzbieri</i> northern siberian bar-tailed godwit	- CR # only	As above.	As above.
<i>Litoria raniformis</i> green and golden frog	v VU #	Potential habitat is permanent and temporary waterbodies, usually with vegetation in or around them. Potential habitat includes features such as natural lagoons, permanently or seasonally inundated swamps and wetlands, farm dams, irrigation channels, artificial water-holding sites such as old quarries, slow-flowing stretches of streams and rivers and drainage features.	Potential habitat absent.
<i>Pardalotus quadragintus</i> forty-spotted pardalote	e EN	Potential habitat is any forest and woodland supporting <i>Eucalyptus viminalis</i> (white gum) where the canopy cover of <i>E. viminalis</i> is greater than or equal to 10% or where <i>E. viminalis</i> occurs as a localised canopy dominant or codominant in patches exceeding 0.25 ha.	Potential habitat is technically present, although the Dolphin Sands-Swansea area continues to be a long-term data gap for the species, despite some extensive areas of superficially ideal breeding and nesting habitat. Within the project area, <i>Eucalyptus viminalis</i> is present but is proposed for retention (especially the mature hollow-bearing trees), such that there will be no material impact on potential habitat.
<i>Perameles gunnii</i> subsp. <i>gunnii</i> eastern barred bandicoot	- VU #	Potential habitat is open vegetation types including woodlands and open forests with a grassy understorey, native and exotic grasslands, particularly in landscapes with a mosaic of agricultural land and remnant bushland.	Potential habitat present. Localised works on the existing tracks and open vegetation is highly unlikely to have a significant impact on the habitat of this species.
<i>Poliocephalus cristatus</i> subsp. <i>cristatus</i> great crested grebe	v -	This species lives in large, deep open bodies of fresh water, including river, lagoons, lakes, swamps, reservoirs, estuaries and bays. It nests in emergent aquatic vegetation, or sometimes on floating vegetation in deep water (TSS 2003+).	Potential habitat present. There is a single database record within 5,000 m from 30 Sep. 1981. The species may utilise the lower reaches of the Meredith River but is unlikely to be materially impacted by localised works that are restricted to two short sections of river bank.
<i>Prototroctes maraena</i> Australian grayling	v VU #	Potential habitat is all streams and rivers in their lower to middle reaches. Areas above permanent barriers (e.g. Prosser River dam, weirs) that prevent fish migration, are not potential habitat.	Potential habitat present (Meredith River). There are known sites in the Meredith River. It is unlikely that the proposed works will have a significant impact (CofA 2013) on the species or its habitat. However, once the design of the bridge and the manner in which it

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			is to be constructed is better understood, this may need to be reviewed to ensure disturbance to potential habitat is minimised as far as practical.
<i>Pseudemoia pagenstecheri</i> tussock skink	v -	Potential habitat is grassland and grassy woodland (including rough pasture with paddock trees), generally with a greater than 20% cover of native grass species, especially where medium to tall tussocks are present.	Potential habitat absent.
<i>Pseudemoia rawlinsoni</i> glossy grass skink	r -	Potential habitat is wetlands and swampy sites, including grassy wetlands, teatree swamps and grassy sedgelands, and margins of such habitat.	Potential habitat may be marginally present on the fringes of the Meredith River, although there are no records of the species from the east coast to support the notion that the species may be present.
<i>Pseudomys novaehollandiae</i> new holland mouse	e VU	Potential habitat is heathlands (mainly dry heathlands but also where dry heathlands form a mosaic with other heathland, moorland and scrub complexes), heathy woodlands (i.e. eucalypt canopy cover 5-20%), <i>Allocasuarina</i> -dominated forests on sandy substrates (not dolerite or basalt), and vegetated sand dunes. Key indicator plant species include (but are not restricted to) <i>Aotus ericoides</i> , <i>Lepidosperma concavum</i> , <i>Hypolaena fastigiata</i> and <i>Xanthorrhoea</i> spp.	Potential habitat absent.
<i>Sarcophilus harrisii</i> tasmanian devil	e EN #	Potential habitat is all terrestrial native habitats, forestry plantations and pasture. Devils require shelter (e.g. dense vegetation, hollow logs, burrows or caves) and hunting habitat (open understorey mixed with patches of dense vegetation) within their home range (427 km ²). Potential denning habitat is areas of burrowable, well-drained soil, log piles or sheltered overhangs such as cliffs, rocky outcrops, knolls, caves and earth banks, free from risk of inundation and with at least one entrance through which a devil could pass.	See under spotted-tailed quoll.
<i>Sternula nereis</i> subsp. <i>nereis</i> fairy tern	v VU	Potential habitat is sheltered sandy beaches, spits and banks above the high tide line and below vegetation.	There are several (virtually duplicate) records of the species from November 1998, reported as the "Meredith River mouth". Potential habitat is absent from the likely footprint of the works. Refer to section on FINDINGS Fauna species <u>Other species of potential conservation significance</u> for more details on management of shore-dwelling and estuarine bird species.
<i>Theclinesthes serpentata</i> chequered blue	r -	Potential habitat is saltmarshes, and beach and coastal habitats, supporting food plants including <i>Rhagodia</i>	There is a single database record within 5,000 m, attributed to Chris Gregory on 28 Mar. 2012. Prior to this, this infrataxon was thought to be restricted

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		<i>candolleana</i> (coastal saltbush) and species of <i>Atriplex</i> .	to the State's southeast around Barilla Bay and perhaps Lauderdale. Potential habitat marginally present (<i>Rhagodia candolleana</i> is scattered along the fringes of the Meredith River and in the DVC vegetation). However, localised works are unlikely to significantly impact on the species.
<i>Thymichthys politus</i> red handfish	e CR # only	This species is restricted to the marine environment, at depths of 1-20 m.	Potential habitat absent (not reported from brackish waters).
<i>Thinornis rubricollis</i> hooded plover	- VU	Potential habitat is mainly coastal sandy beaches and dunes.	Numerous database records within 5,000 m, most referring to sightings and breeding pairs on Nine Mile Beach (most other database records that land inland are erroneous due to precision errors). There are three database records of the species reported from the mouth of the Meredith River, one is imprecise, but the other two are of adult birds on 2 Nov. 2003 and 20 Dec. 2011. Potential habitat is absent from the likely footprint of the works. Refer to section on FINDINGS Fauna species <u>Other species of potential conservation significance</u> for more details on management of shore-dwelling and estuarine bird species.
<i>Tyto novaehollandiae</i> subsp. <i>castanops</i> masked owl	e VU #	Potential habitat is all areas with trees with large hollows (≥ 15 cm entrance diameter). Remnants and paddock trees (in any dry or wet forest type) in agricultural areas may constitute potential habitat. Significant habitat is any areas within the core range of native dry forest with trees over 100 cm dbh with large hollows (≥ 15 cm entrance diameter).	Potential nesting habitat marginally present. Large trees with large hollows are present (refer to mapped large trees) but these will be retained. The species may utilise the greater project area as part of a home range and for foraging but small-scale development will not have a significant impact on this aspect of the life history of the species.

APPENDIX E. DPIPWE's *Natural Values Atlas* report for the study area

Appended as pdf file.

APPENDIX F. Forest Practices Authority's *Biodiversity Values Atlas* report for the study area

Appended as pdf file.

APPENDIX G. CofA's Protected Matters report for the study area

Appended as pdf file.

ATTACHMENTS

- .shp file of revised vegetation mapping
- .shp file of weed locations
- .shp file of individual tree locations