

CLAYTON DRIVE RESERVE, SPREYTON DEVONPORT CITY COUNCIL

***ENGAEUS GRANULATUS* MONITORING PLAN JULY 2018**



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Summary

An assessment of the land designated as the Offset Site for project EPBC 2011/6095, known as 'Clayton Reserve', at 39 Clayton Drive Spreyton was conducted on 3 July 2018.

Project EPBC 2011/6095, which was approved by the Department of Sustainability, Environment, Water, Population and Communities, included –

- The translocation of *Engaeus granulatus* from an area of roadworks on Sheffield Road to Clayton Reserve; and
- Habitat improvement works at Clayton Reserve to increase the number of *Engaeus granulatus* at that location.

The following observations were made in the July 2018 assessment -

- *Engaeus* burrows/chimneys were recorded across all areas where habitat had been created and/or improved in 2012.
- Most *Engaeus* burrows were hidden by the dense grass – sedge – rush ground layer.
- There is no evidence of erosion occurring from areas of created and improved *Engaeus* habitat.
- Areas of created habitat remain wet and/or have surface water for sufficiently long periods of time to support the presence of an aquatic water milfoil species (*Myriophyllum* sp.).
- *Engaeus* burrows were observed in locations where they had not been observed before, such as a drainage line installed when the site was initially established – the drain when constructed lacked organic material and vegetative cover, but now it has grass and herb coverage.
- Plantings have grown very well, and losses remain low – losses are localised to those areas where the soil dries quickly and was highest in those species which have less tolerance to dry conditions (eg *Tasmannia lanceolata*) or are shorter lived perennials (eg *Cassinia aculeata*).
- Some areas of blackberry and intertwined native species were noted to be dead, probably from spraying activities. Care needs to be applied in spraying only the target species to prevent the loss of well-established native plants. Cut and pasting of the stem with herbicide (while time consuming) can reduce the impact of spray-drift to surrounding native plants;
- There are several willows in the creekline, especially near areas of habitat created for *Engaeus*. It is recommended that these be removed via a cut and paste herbicide technique.
- Spurge (a *Euphorbia* species) remains in some areas of disturbed ground and those areas where the full extent of vegetative cover has been sprayed – this weed should be removed, and the area monitored for regrowth, which should then also be removed.
- Natural seedfall and subsequent recruitment of trees and shrubs has been sporadic across the reserve, with the most obvious species being *Cassinia aculeata*, *Pomaderris apetala*, *Acacia dealbata*, *Acacia melanoxylon*, *Eucalyptus ovata* and *E. viminalis*.

It is recommended that –

1. the two areas identified in June 2016 containing *Engaeus* be physically identified on-ground (eg using wooden stakes with blue tape, comparable to other areas identified in this way) and be left undisturbed from mechanical activities including slashing, mowing etc.
2. weed spraying works be conducted in Spring 2018 to target thistles, spurge and dense blackberry thickets along fencelines. Blackberries within and near waterways and areas occupied by *Engaeus* should not be sprayed.
3. Caper spurge (*Euphorbia lathyris*) should be removed, and the area monitored for regrowth, which should then also be removed as it appears (NB – *Euphorbia* produces a toxic/irritating white liquid when the leaves/stem are damaged. Always wear gloves and wash your hands thoroughly after handling plants).

1. SCOPE OF REPORT

This report compiles the monitoring results from a survey conducted in July 2018 for project EPBC 2011/6095 which was approved by the Department of Sustainability, Environment, Water, Population and Communities on 7 June 2012.

The Offset Management Plan (the 'OMP') prepared and approved for 39 Clayton Drive (Clayton Reserve – Figure 1) outlines the monitoring program.

The project included –

- The translocation of *Engaeus granulatus* from an area of roadworks on Sheffield Road to Clayton Reserve; and
- Habitat improvement works at Clayton Reserve to increase the numbers of *Engaeus granulatus* at that location.

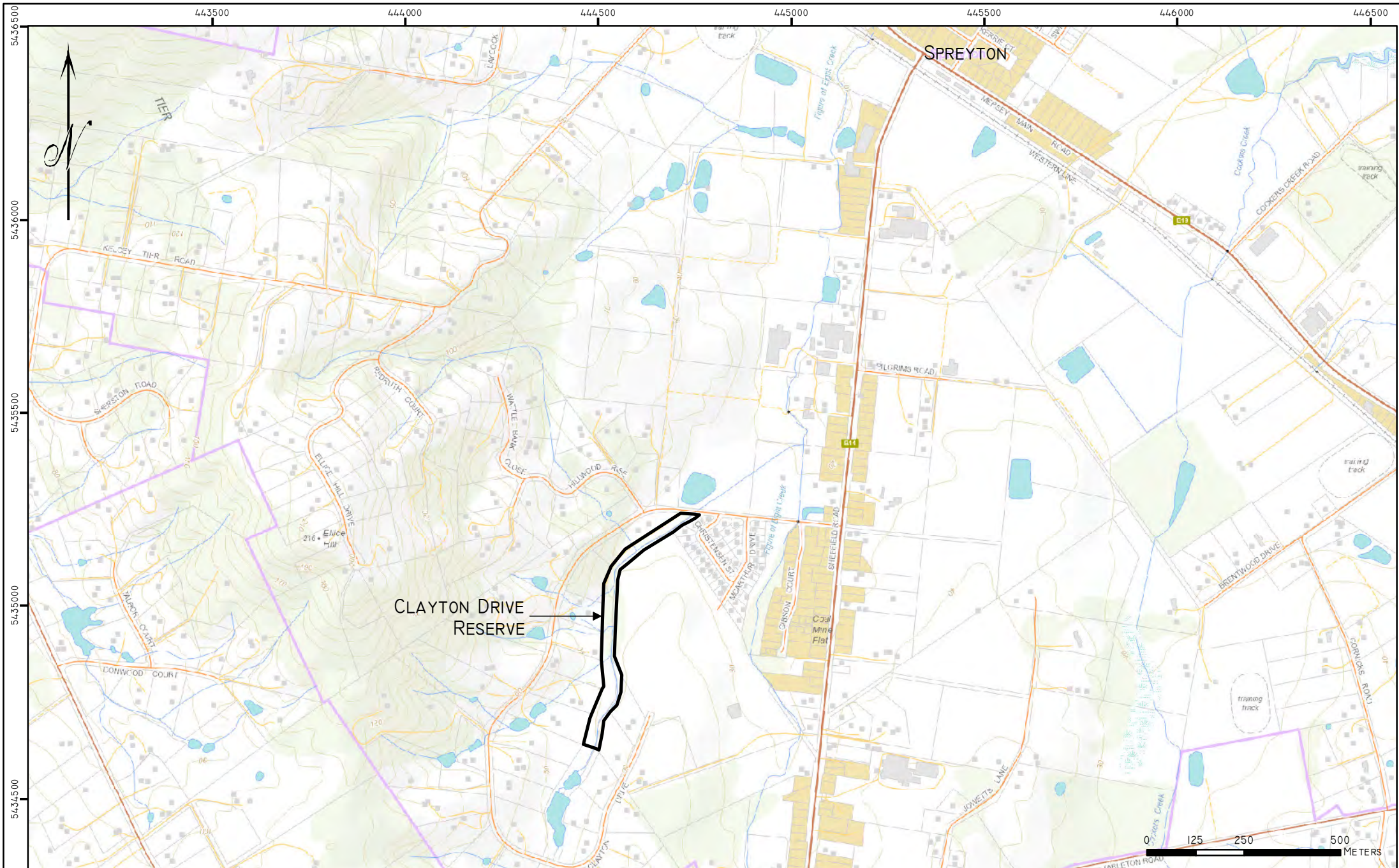
The objectives of the OMP were to;

1. Protect existing Central North burrowing crayfish in the Offset Site;
2. Translocate Central North burrowing crayfish to the Offset Site from the Activity Site to increase the overall number of Central North burrowing crayfish at the Offset Site;
3. Create new habitat for Central North burrowing crayfish within the Offset Site to increase the carrying capacity of the site to accommodate enough animals to compensate for the loss of Central North burrowing crayfish at the Activity Site;
4. Create a geographic area of new habitat for Central North burrowing crayfish within the Offset Site to compensate for the loss of habitat at Sheffield Road;
5. Provide a practical opportunity to investigate the merits and methods of habitat creation and translocation for Central North burrowing crayfish, including information on the techniques to create habitat and the rate of population expansion into created habitats, and the techniques and success of translocation;
6. Improve habitat condition and landscape connectivity in the Offset Site for Central North burrowing crayfish and other species of conservation significance, including Tasmanian devil, swift parrot and eastern barred bandicoot;
7. Manage non-native areas of the site for fuel reduction purposes and passive recreational activities without impacting on the natural values in the Offset Site; and
8. Provide a 'nature conservation' educational resource for community groups, land managers, school groups, visitors and the broader community.

The OMP committed to providing progress reports to DSEWPaC and the Policy and Conservation Assessment Branch (DPIPWE) every:

- 6 months from the commencement of the project for 2 years (4 reporting periods); and then
- annually for the next 8 years (8 reporting periods).

Tasks to be completed for each monitoring period are those listed in Table 1.



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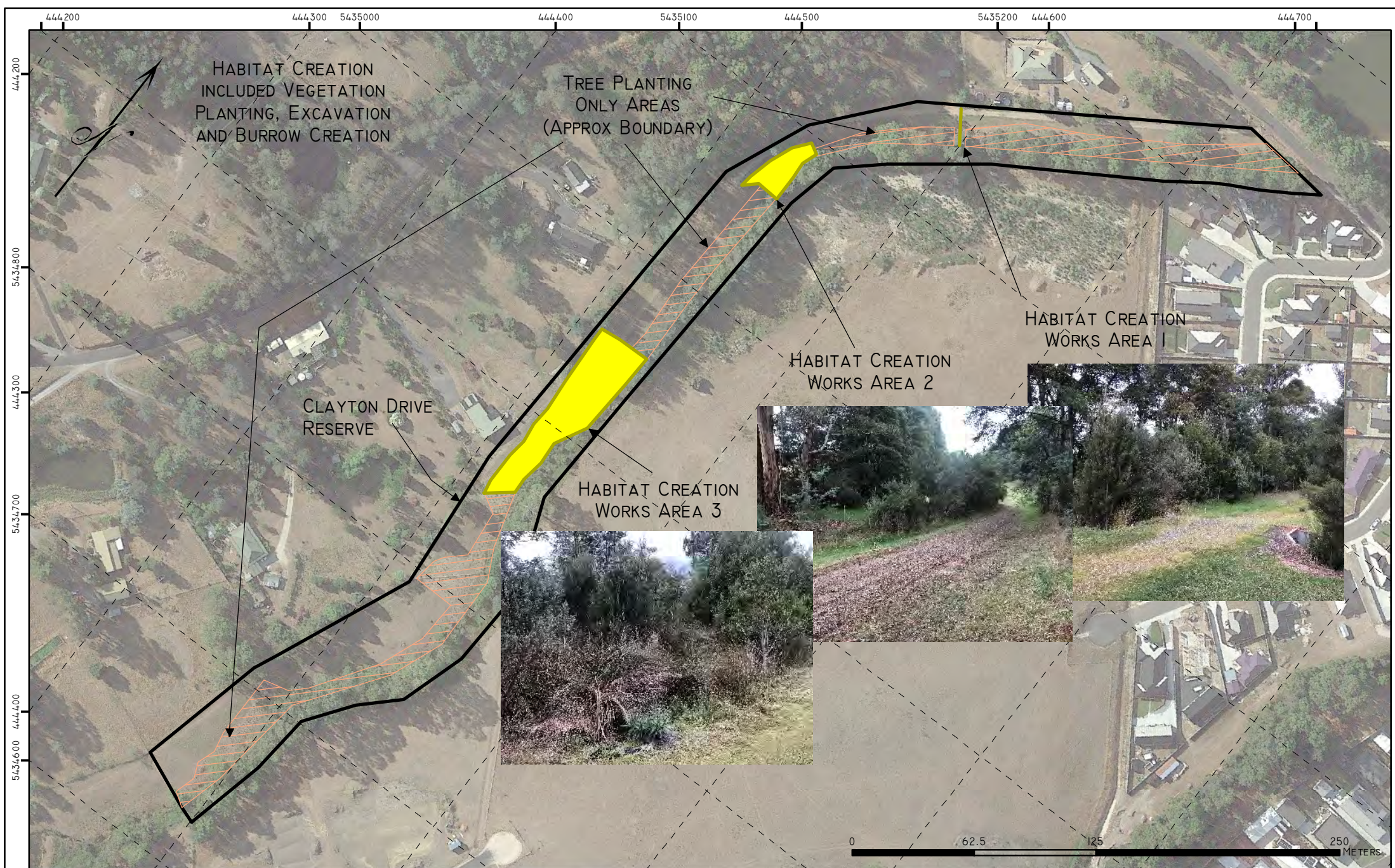
FIGURE I: LOCATION OF CLAYTON DRIVE RESERVE



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FIGURE 2: LOCATION OF WORKS AREAS AT THE CLAYTON DRIVE RESERVE



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Table 1. Monitoring regime for the Offset Site based on project phase

Items in Yellow have reached the Completion Criteria for the project but still require annual assessment until October 2022. Items highlighted in Orange have been completed.

Parameter	Tasks	Zone and frequency	Responsible
Translocation			
Survivorship	<ul style="list-style-type: none"> Burrow Count Photopoints 	Zone 4; 2, 4, 6, 8, 10, 12, 24, 36 and 52 weeks from translocation (1 year monitoring total)	Suitably qualified ecologist
Habitat Creation			
Burrow increase	<ul style="list-style-type: none"> Burrow Count Photopoints 	Zone 4; 4, 8, 12, 36 and 52 weeks from translocation then every 12 months (timed for October - November) which is after the breeding and dispersal period of CNBC) for a further 9 years	Suitably qualified ecologist
Erosion	<ul style="list-style-type: none"> Photopoints 	Zone 4; 4, 8, 12, 36 and 52 weeks from translocation then every 12 months for a further 9 years	Suitably qualified ecologist
Wetness	<ul style="list-style-type: none"> Observation of surface flow areas Auger to water table 	Zones 1-4; Every 6 months from planting for 5 years, then every 12 months for a further 5 years	Suitably qualified ecologist
Plant survival	<ul style="list-style-type: none"> Count Losses Photopoints 	Zones 1-4; Every 6 months from planting for 10 years	Suitably qualified ecologist
Habitat Improvement			
Burrow increase	<ul style="list-style-type: none"> Burrow Count Photopoints 	Zones 2 and 4; 4, 8, 12, 36 and 52 weeks from translocation then every 12 months (timed for October - November) for a further 9 years	Suitably qualified ecologist
Plant survival	<ul style="list-style-type: none"> Count Losses Photopoints 	Zones 1-4; Every 6 months from planting for 10 years	Suitably qualified person
Other Fauna	<ul style="list-style-type: none"> Den and Nest Search Swift parrot survey* 	Zones 2/3; Every 12 months from planting for 10 years (*during peak breeding period for swift parrot; Nov - Feb)	Suitably qualified person

2. SITE INFRASTRUCTURE AND PLANNING

2.1 SIGNAGE AND SITE ACCESS

Signage and site access were reported in the 12-month report and there have been no changes since then.

No additional signage is required to be installed under the OMP.

2.2 SITE INFRASTRUCTURE

No infrastructure has been established in the reserve.

2.3 PLANNING

THE OMP stated –

The offset site will be appropriately re-zoned (as Environmental Management Zone or similar) for the conservation of fauna at the site under the new planning scheme to be submitted for approval by the Tasmanian Minister for Planning in August 2012.

The site will be managed as Public Open Space in accordance with the DCC Public Open Space Service Level 2011/12 Plan and this Plan. The DCC Public Open Space Service Level 2011/12 (POSSL) Plan is reviewed annually and outlines the type of land and its function; Section 3 Asset Inventory can include the primary function of the Conservation of Flora and Fauna (code CFF in the Function column), such as the Mary Street Wetland and Bridge Road Reserve. A description of CCF is in section 3.3 of the DCC Public Open Space Service Level 2011/12 Plan.

Compliance for DCC Public Open Space Service Level 2011/12 Plan is outlined in Section 9 of the POSSL, whereby legislation and other documents of DCC need to be applied and also the existing Plans for key sites, such as the Don Reserve and Kelcey Tier. The Plan for this project will be added to this list and related to the approvals (conditions etc.) given by the State and Commonwealth Governments.

The site will be added to the GIS layer maintained by Council and Council staff will be advised of the conservation importance of the site and this Plan. DCC is to ensure that no unauthorised DCC works occur at the site. Active management of the site will be performed by the DCC Works Crew in accordance with the OMP with funding and other resources provided through the DCC Annual Works Program.

The Devonport City Council Interim Planning Scheme came into force on 19 October 2013. The reserve is zoned 'Environmental Management' which is consistent with the commitment made by the Devonport City Council during the assessment process under the EPBC Act.

Management of the site, and its associated management plan, were added in to the list of reserves managed by DCC under the DCC Public Open Space Service Level 2014/15 (the current version of the SL) Plan prior to the 6-month monitoring event. Compliance for DCC Public Open Space Service Level 2014/15 Plan is outlined in Section 11.13.

The management of the reserve has been in accordance with the OMP. There has been no change to the zoning of the reserve and it remains on the DCC Public Open Space Service Level Plan.

DCC is currently preparing the Local Planning Provisions (zone maps, local area objectives etc) for the new Scheme which must be in accordance with the Tasmanian Planning Scheme. It is likely that this process will see the reserve retain the same zoning of 'Environmental Management'.

2.4 COMMUNITY AWARENESS AND ADJOINING LANDS

There have been ongoing discussions between DCC staff and adjacent landowners as to the works being undertaken at the site for the CNBC. The Council has discussed with new owners of properties

adjacent to the reserve its' management intent such that they are aware of the values present in the reserve.

Locals continue to frequent the site for recreational activities and are aware of the sites' natural values and significance for *Engaeus granulatus*.

3. CENTRAL NORTH BURROWING CRAYFISH TRANSLOCATION

3.1 HABITAT CREATION FROM THE PROJECT

The habitat created from the on-ground works associated with the project was mapped using a GPS in 2013. Created habitat was assessed (15 months from when the site was 'modified' to create habitat) as being 6,046 square metres. This is more than double the required amount of created habitat by the Completion Criteria (which requires 3,000 square metres).

Engaeus burrows were observed in early 2014 in all of the areas of created habitat which confirms the suitability of habitat for the species as no *Engaeus* were present in these areas prior to the habitat creation works (mostly drainage works to create wet areas) in mid-2012. *Engaeus* burrows were again observed in these areas, and others, in the assessment conducted in July 2018.

The following images show various stages (2011 to 2018) of rehabilitation since the on-ground works were completed. There has been considerable improvement in the quality and quantity of habitat available for *Engaeus* and for other native fauna, such as bandicoots. In effect, what was pasture in the habitat creation/improvement areas has become, in most parts, damp to wet habitat for *Engaeus* dominated by native plant species – sedges, sagg and trees/shrubs. These areas should continue to improve over time with little intervention and no remedial works.

This assessment (July 2018) conducted a search of area in the reserve where there were plant species indicative of damp soaks and wet areas. It is these areas where *Engaeus* were most likely to colonise without any intervention or translocation by this project. The same assessments were conducted in May 2016, 2015 and 2013.

Figure 4 shows the two areas where *Engaeus* were observed to have colonised in June 2016, and they are still present in July 2018 – no animals were translocated to these areas, and none were present in these areas when the project commenced. It is recommended that the two areas ('new habitat area') identified in Figure 4 be physically identified on-ground (eg using wooden stakes with blue tape, comparable to other areas identified in this way) and left undisturbed from mechanical activities including slashing, mowing etc.

3.2 ASSESSMENT AGAINST TARGETS

It is important that the success or otherwise of the project be assessed against key criteria. These are:

- No Declared Weeds* or Weeds of National Significance present in or adjacent to the habitat created for CNBC;
- More than 3,000 m² of created habitat (potential or actual);
- More than 430 additional *Engaeus* burrows present in the created habitat**; and
- No moderately to highly erosive surfaces present in the created habitat (indicated by areas of recent sediment accumulation, or sediment removal).

* As defined by the Tasmanian *Weed Management Act* 1999.

** based on the assumptions of survivorship outlined in the Preliminary Documentation for the project.

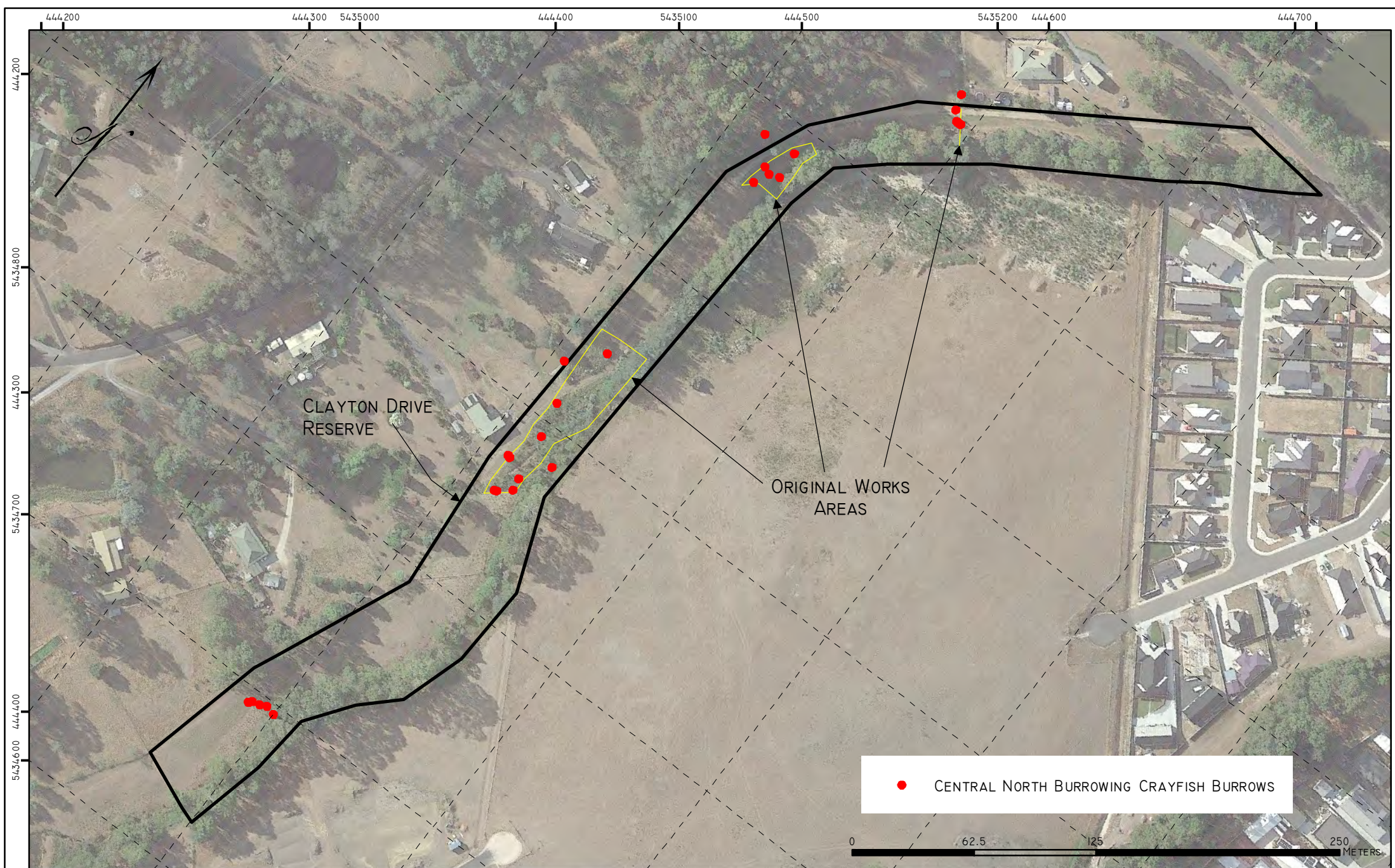
As the project has been successful in achieving the required *Engaeus* survival target and offset number of new burrows (to offset the losses incurred in the translocation process) within the allocated timeframe, a passive approach to locating burrows was again adopted in this monitoring event; a search was conducted for chimneys/burrows without removing much if any of the grass/sedge vegetation cover.

The assessment proved extremely difficult to locate burrows due to the dense grass – sedge sward that covered most of the areas of habitat intentionally created by the project. The images below

highlight the dense nature of the sward and the hidden nature of the burrows/chimneys. It quickly became apparent during searching that no matter how much care was applied damage was being caused to the chimneys that had been built underneath or inter-twined with the sward.

On this basis, and in the interest of maintaining chimneys intact and the keep the site as 'functional' as possible as habitat areas were selected to locate burrows to determine the spatial extent of burrows ('presence') within the areas of habitat created as opposed to trying to generate a number of 'abundance'.

Figure 2 shows the areas where burrows were located during the searching, which shows that *Engaeus* are widespread across the site which is comparable to the results from the previous annual monitoring event.



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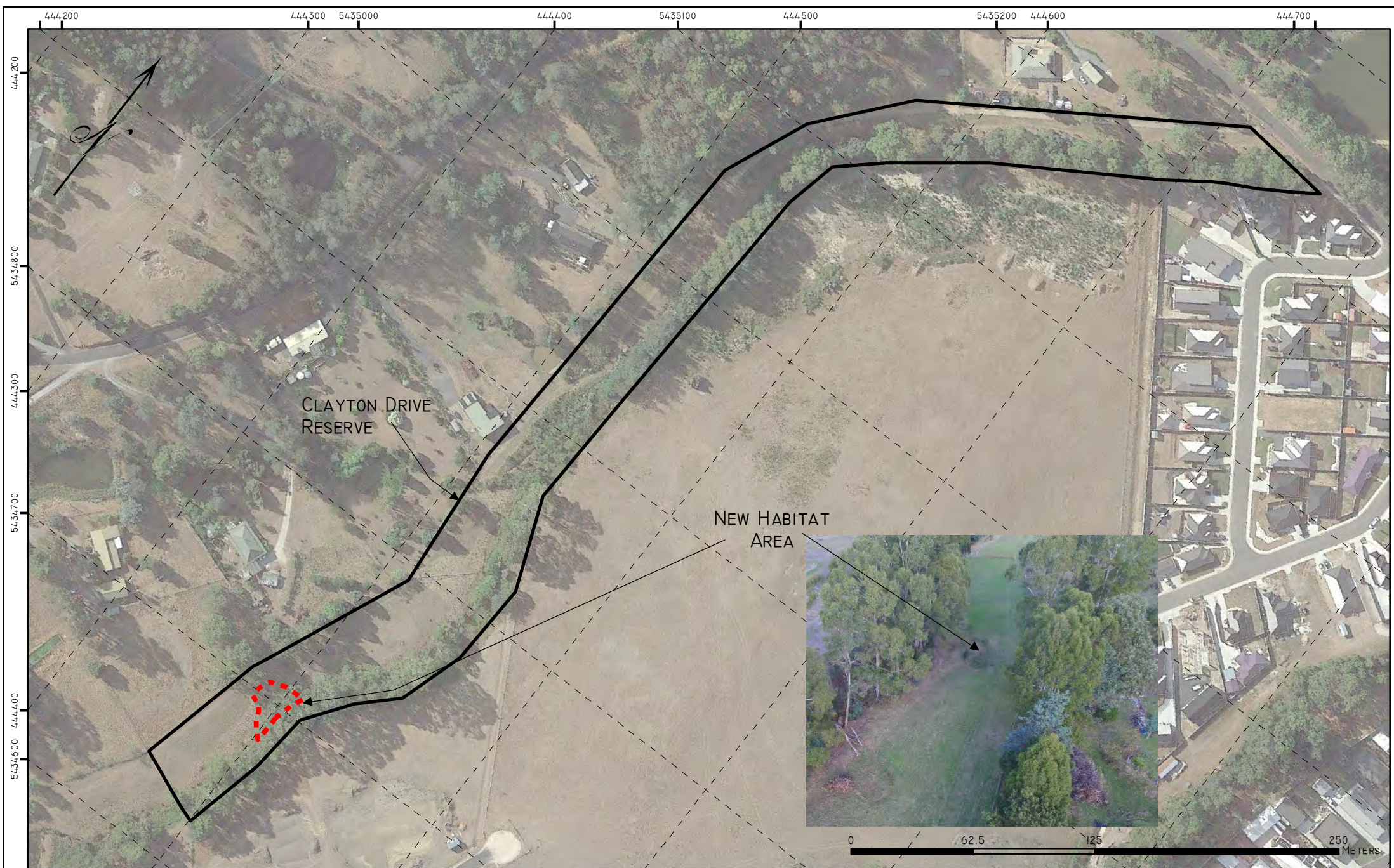
FIGURE 3: CENTRAL NORTH BURROWING CRAYFISH BURROWS (OBSERVED JULY 2018)



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FIGURE 4: NEW CENTRAL NORTH BURROWING CRAYFISH HABITAT AREAS
(AREAS WHERE ANIMALS WERE NOT RELEASED BUT HAVE APPEARED SINCE 2016)



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Translocation Area 1 Images from 2011, 2012, 2015 and 2016 (Works Areas 1 on Figure 2)



Post-works – 14 May 2016

Adjoining creek with burrows – 14 May 2016



Post-works – 3 July 2018



Translocation Area 2 (Works Area 2 on Figure 2) * viewed from southern side

Pre-works – October 2011



Post-works - 13 July 2012



Pre-works – 6 July 2013



Post-works – 30 May 2015



Post-works – 14 May 2016



Post-works – 14 May 2016*



Post-works – 5 June 2017



Post-works – 3 July 2018



Translocation Area 3 Images from 2011, 2012, 2015, 2016 and 2018 (Works Areas 3 on Figure 2)

Pre-works – October 2011



Post-works - 26 July 2012



Post-works – 30 May 2015



Post-works – 14 May 2016



Post-works – 3 July 2018



Pre-works – October 2011



Post-works - 26 July 2012



Post-works – 30 May 2015



Post-works – 14 May 2016



Pre-works – October 2011



Post-works - 26 July 2012



Post-works – 30 May 2015



Post-works – 14 May 2016



Post-works – 5 June 2017



Post-works – 3 July 2018



New Habitat Areas in May 2016 (see Figure 4)

The southern-most damp area within the reserve was observed in May 2016 to have been colonised by *Engaeus* species. Six burrows were observed in May 2016.

The same location in June 2017 also supported burrows but they were very hard to find due to the dense grass cover from grass slashing.



The area to the immediate north of the southern-most damp area within the reserve was observed in May 2016 to be colonised by *Engaeus*. Most burrows lacked chimneys, probably due to the area being mown. Ten burrows were observed, mainly in and around rank pasture grasses.

The same location in June 2017 also supported burrows but they were very hard to find due to the dense grass cover from grass slashing. None were observed in July 2018.



4. PLANTINGS

A visual assessment was made of the number of plant losses for each species that has been planted. There have been no mortalities since the last assessment in 2017. Trees and shrubs have grown well and have become well established. Some blackwood and silver wattles have flower buds which indicates that seed set is likely to occur this summer – further adding to the amount of seed that falls onto the site which may then further perpetuate natural recruitment of tree and shrub species at the reserve.

Many areas have experienced natural recruitment of blackwood (*Acacia melanoxylon*), silver wattle (*Acacia dealbata*) and eucalypts (mainly *E. ovata*). The native shrub 'Dolly bush' (*Cassinia aculeata*) has become dominant in some areas associated with the creek itself – this is an early coloniser and produces huge volumes of seeds.

Some paperbark and blackwood are now over >6 m tall and have in places developed a semi-closed canopy which will further create a micro-climate within which the *Engaeus* at the site should thrive.

5. EROSION

A visual assessment was made of the channels and watercourses that flow through areas of created and improved habitat before entering the main watercourse that flows into Figure of Eight Creek.

Erosion has virtually ceased in the main channel and associated pooling areas as a grass and herb cover has formed which stabilises the surface over which water is flowing. Those areas where grass has not been able to grow are relatively flat and areas where water ponds, enabling sediment to drop out and accumulate – these areas have accumulated silt which has enabled aquatic species to take root and grow, such as water milfoil (*Myriophyllum*).



Water is ponding in the deepest parts of the drainage system which supports aquatic species such as water milfoil (*Myriophyllum*)



6. WATER TABLE

Visual assessments have been made of the approximate water table across those areas where *Engaeus granulatus* were translocated. To date no auger samples have been necessary as all monitoring events except for 28 January 2013 have had surface water present in the main pools and channels between pools. The water table on 28 January 2013 was assessed as being 'just below the surface' as the burrows along the edge of the pools and channels retained water just below their level with natural ground level. Water was flowing well throughout the channels and pools on 30 October 2013 because of good spring rains.

Water was abundant in the watercourses flowing through the created habitat areas, and along Figure of Eight Creek itself. During the May 2015, May 2016, June 2017 and July 2018 monitoring events, water milfoil (*Myriophyllum*) was observed in water ponding areas which demonstrates that water is persistent within the system.

7. OTHER FAUNA

As at May 2015, no nests of terrestrial mammals or dens have been observed within the reserve. A search was undertaken during the May 2015 assessment of the site and none were observed. A search in May 2016 found several grass-modified shelters in and amongst areas where rehabilitation works had occurred for this project. Comparable structures were observed in the June 2017 survey. These structures are likely to be the nests of bandicoots, possibly eastern barred bandicoot which has been seen in the reserve and area generally.

Numerous bandicoot diggings were observed in the reserve in May 2015, May 2016, June 2017 and July 2018, especially in the mown grass areas and moss on slightly elevated areas of the reserve. Diggings were also observed for the first time in July 2018 in areas where trees had been planted and a leaf litter layer had partially formed.

Numerous animal 'runs' were observed through the sedge – rush dominated areas of the created habitat in May 2015, May 2016 and June 2017 – demonstrating that there are native animals in the area.



8. WEEDS

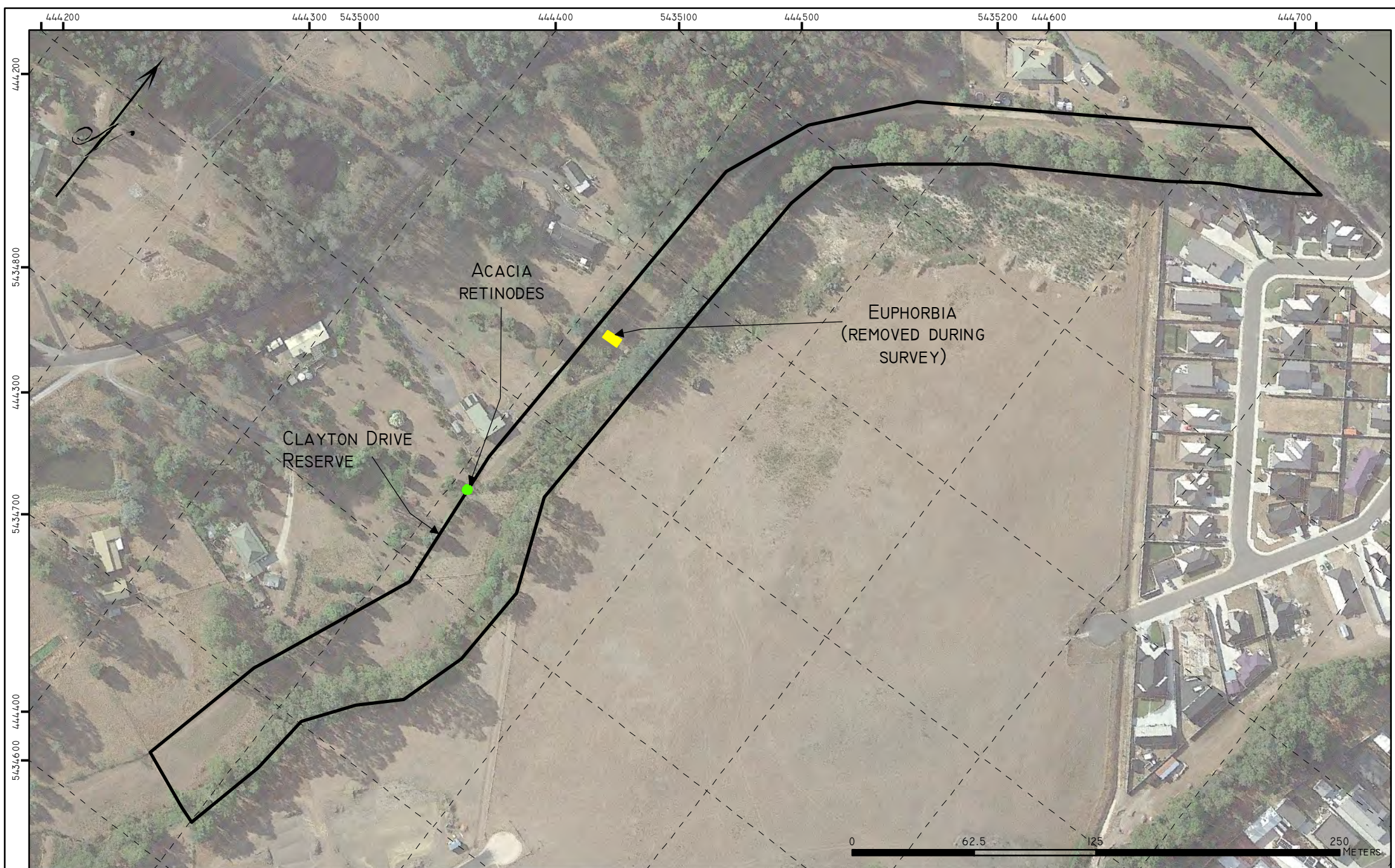
Significant weeds observed in the July 2018 survey are shown in Figure 5.

Blackberries remain the dominant weed along fencelines and in some areas of pasture regrowth. They have also started to become locally dominant in areas of created habitat due to the high rainfall and warming temperatures throughout spring. In some areas, as expected, their cover has reduced as the cover of trees, grasses and shrubs has increased – blackberries are high light requiring plants which do not generally grow or fruit well under a dense cover of grass or shrubbery.

The mature bushes of Montpelier broom that had been recorded near the western boundary in one location all appeared dead in June 2017 and July 2018. The site should continue to be monitored for regrowth as a few seedlings were observed near the dead parent trees (these were removed by hand when the survey was conducted).

There are several willows in the creekline, especially near areas of habitat created for *Engaeus*. It is recommended that these be removed via a cut and paste herbicide technique.

A weed spraying program should be done in spring 2018 to further target thistles and blackberry – care must be exercised when spraying blackberry such that **only** the target plant is sprayed. Blackberry should mainly be sprayed along the edge of the rehabilitated areas where there are high light conditions for their growth and the fencelines along the western boundary. Neighbours should first be advised that the spraying is going to occur such that they are aware of the use of herbicides along the boundary line.



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FIGURE 5: SIGNIFICANT WEEDS WITHIN THE CLAYTON DRIVE RESERVE



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Caper spurge

The poisonous weed spurge (*Euphorbia* species) was observed in areas where the existing vegetative cover had been lost due to spraying. This is a very opportunistic species which can colonise areas of disturbed ground very quickly.

These plants should be pulled out whilst wearing gloves as the sap (white) of the plant can be toxic. Hands and clothing should be thoroughly washed afterwards, or throw-away overalls used.



Blackberry

Vines and small thickets of this woody weed occur mainly on the edge of rehabilitated areas and fencelines to the west of the reserve.

Care should be taken when spraying this weed such that other, desirable plants are not impacted upon. There were several areas observed where native species (eg *Carex appressa* and *Juncus pauciflorus*) had been sprayed and were consequently dead or unhealthy.

Cutting and pasting blackberry stems, while time consuming, can minimise secondary impacts to surrounding vegetation.



Willow

A few willows occur on the creekline near the major area of rehabilitation works for *Engaeus*. These should be removed.

Cutting and pasting the stem is the most effective way of treating willow. It is important to not allow any small fragments of stem or branches to become liberated in the stream as they may establish as new plants further downstream.

9. REMEDIAL ACTIONS

Plant guards and bamboo stakes should be removed from those plants which no longer require them.

The two areas identified in May 2016 as now containing *Engaeus* (see Figure 4) should be physically identified on-ground (eg using wooden stakes with blue tape, comparable to other areas identified in this way) and be left undisturbed from mechanical activities including slashing, mowing etc. These areas could (optional) be planted with sedges and sagg to encourage further colonisation by *Engaeus*.

10. CONTINGENCY

Given the success of the project in terms of survivorship, creation of habitat and recruitment of enough animals to offset the translocated losses a contingency is not needed for the project.

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To the best of VDC's knowledge, the report presented herein represents the Client's intentions at the time of completing the document. However, the passage of time, manifestation of latent conditions or impacts of future events may result in changes to matters that are otherwise described in this document. In preparing this document VDC has relied upon data, surveys, analysis, designs, plans and other information provided by the client, and other individuals and organisations referenced herein. Except as otherwise stated in this document, VDC has not verified the accuracy or completeness of such data, surveys, analysis, designs, plans and other information.

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Document Status

Revision	Author	Reviewer and Organisation	Date
1	R Barnes C McCoull	R Barnes, VDC	4-8-2018
1	R Barnes C McCoull	M Mouat, DCC	4-8-2018