



96-166 Centre Road,
Narre Warren –
Dwarf Galaxias
habitat buffer

Year 2
Vegetation Monitoring

Prepared for
Narre Warren Central Pty Ltd
c/- The Fidus Group

May 2020
Report No. 14090 (13.1)



**Nature
Advisory**

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Contents

1. Introduction	1
2. Methods.....	3
3. Limitations.....	4
4. Results	5
5. Discussion and recommendations	9

Tables

Table 1: Monitoring quadrat data – Year 2.....	5
Table 2: Qualitative vegetation quadrat data – Year 2.....	6

Figures

Figure 1: Site and monitoring quadrats	8
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Appendices

Appendix 1: Species recorded within monitoring quadrats – Year 2	11
Appendix 2: Photos taken within the surveyed quadrats and representative photos of quadrat locations.....	12
Appendix 3: General photos taken within the survey site	15

1. Introduction

Nature Advisory (formerly Brett Lane & Associates) were engaged by Fidus Group, on behalf of Narre Warren Central Pty Ltd, to conduct vegetation monitoring within Dwarf Galaxias habitat buffer areas at 96-166 Centre Road, Narre Warren, approximately 37 kilometres south-east of Melbourne's CBD. The buffers of native vegetation have been retained for the purpose of protecting drainage channels known to support a population of Dwarf Galaxias from neighbouring construction. Dwarf Galaxias is listed as critically endangered under the commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The vast majority of the property has been approved for a residential subdivision, with construction having commenced in November 2016. Condition 4 of the EPBC Act approval for the project (EPBC 2014-7380) requires that buffer areas around Dwarf Galaxias habitat (Figure 1) are revegetated within 2 years of the commencement of construction and that vegetation cover is retained until the expiry of the approval.

The following targets were set to achieve this objective:

- Less than 10% weed cover 6 months from the commencement of construction; and
- Less than 5% weed cover and at least 90% native vegetation cover 2 years from the commencement of construction.

The following monitoring timeline was set in order to determine if these targets are being met:

- Prior to the commencement of construction to gain baseline data;
- Six months after the commencement of construction;
- Twelve months after the commencement of construction; and
- Two, three, five, seven, 10 and 15 years after the commencement of construction.

A baseline study was conducted in October 2016, before construction started in November 2016, during which 15 x 1m² quadrats were established within representative areas of the habitat buffers for future monitoring. The quadrats were surveyed again in September 2017 to collect monitoring data at six months post the commencement of construction, but it was actually undertaken 10 months after construction commenced. The twelve months survey (November 2017) was missed and the two-year survey (scheduled for November 2019) was delayed by six months (May 2020, i.e. this report). The current investigation collected monitoring data at two and a half years after the commencement of construction.

This report is divided into the following sections:

Section 2 describes the methods used for the field survey.

Section 3 describes the limitations of the assessment.

Section 3 describes the results of the field survey.

Section 4 provides a review of the monitoring program and makes alternative recommendations for the management of the habitat buffers.

This investigation was undertaken by a team at Nature Advisory comprising Emily Baldwin (Botanist), Verity Fyfe (Ecologist) and Inga Kulik (Senior Ecologist and Project Manager).

2. Methods

The field assessment was conducted on the 27th May 2020. During this assessment, the study area was surveyed on foot and the 16 of the 20 previously established quadrats/quadrat locations within the Dwarf Galaxias habitat buffer areas (Figure 1) were assessed.

During the baseline survey, quadrats were established in the following vegetation types:

- Swamp Scrub (EVC 53) – nine quadrats (1, 3, 4, 6, 7, 9, 10, 16, 19 & 20)
- Swampy Riparian Woodland (EVC 83) vegetation – two quadrats (11 & 15)
- Non-native vegetation – four quadrats (2, 5, 13 & 17)
- Quadrats 12, 14 and 18 are not to be surveyed anymore as it was decided during the 6-month assessment that they were too close to other monitoring quadrats and would not add any additional information. Quadrat 8 was removed after the area was disturbed and the marking stake lost.

Under Condition 4 of the EPBC Act, areas of non-native vegetation are required to be revegetated with indigenous species.

At the time of establishment, each quadrat was marked with a single wooden stake in the north-west corner and positioned along a north-south to east-west axis.

A photograph was taken at the north-west corner of the accessible quadrats at a height of approximately 1.3 metres, looking south-east over the quadrat, and the following data was collected:

- Total vegetation cover;
- Native vegetation cover;
- Weed cover;
- Cover of bryophytes, bare ground and litter; and
- Each flora species recorded.

This methodology was repeated during the current survey, however as is explained in the following section, there were significant limitations which prevented the quadrats from being accessed and assessed.

3. Limitations

Of the 16 quadrats, only four were able to be accessed and surveyed during the current survey, due to being surrounded by water and/or because of impenetrable vegetation.

One of the habitat buffers, which included quadrats 4, 5, 6, 7, 9 and 10, was unable to be accessed due to being surrounded by water. A swale had recently been excavated immediately north of the buffer and was full of water due to recent heavy rain. A bridge crossed this buffer at the intersection of Centre Road and Billy Buttons Drive – to the east of quadrats 4, 5 and 6, and to the west of quadrats 7, 9 and 10. An attempt was made to climb over this bridge onto the buffer, however it was not able to be done safely.

The buffer which ran between Centre Road and the Pakenham Railway line – which supported quadrats 11, 13, 15, 16 & 17 – was unable to be accessed from the south due to impenetrable vegetation. Access was possible at the northern end of the buffer, despite the large swale that ran immediately along it on the western side. Only one of the quadrats (16) was able to be surveyed as the rest were not able to be seen or visited due to impenetrable understorey vegetation comprising Swamp Paperbark (which was heavily recruiting) and Blackberry. In addition, dumped fill from the swale excavation works was piled up all the way along on western boundary of the buffer, creating a steep drop into the buffer which also compromised accessibility (particularly within the southern half of the buffer).

Finally, quadrats 19 & 20 could not be accessed from the west due to impenetrable vegetation and for being surrounded by deep water.

Even though the same methodology as applied during previous assessments (quadrat survey including cover estimates) could not be applied during this site assessment to 11 of the quadrats due to access issues and dense vegetation, a qualitative assessment of these locations was undertaken and photos taken to support the qualitative description of the condition of the vegetation at the sites.

4. Results

As stated within the limitations section, only four of the sixteen quadrats were able to be surveyed due to access constraints. Three of the quadrats able to be surveyed were located at the western end of the site. Of these, quadrats 1 and 3 were located within Swamp Scrub vegetation, while quadrat 2 was located within non-native vegetation. The remaining surveyable quadrat, 16, was located within the Swampy Riparian vegetation towards the north-eastern extent of the site.

Of the four quadrats surveyed, quadrat 1 exhibited the highest cover of indigenous vegetation and lowest cover of weeds. Quadrat 2 supported a similar cover of indigenous vegetation to quadrat 3 but a much lower cover of weeds (despite being in 'non-native vegetation'). Quadrat 16 exhibited the lowest cover of indigenous vegetation of all quadrats but also exhibited the lowest cover of weeds. Quadrats one and 16 were the only which exhibited $\leq 10\%$ weed cover.

Swamp Paperbark accounted for the majority of native vegetation cover within quadrats 1, 3 and 16, while Common Reed dominated the native vegetation cover in quadrat 2. Other indigenous species consisted of Variable Willow-herb, a native rush (*Juncus* sp.) and Slender Knotweed, though these occurred at very low densities within the quadrats. Blackberry accounted for the majority of weed cover within all quadrats. Other weeds in the quadrats consisted of Bridal Creeper, Panic Veldt-grass, Drain Flat-sedge and Toowoomba Canary-grass. A summary of the quadrat data is provided below in Table 1.

Table 1: Monitoring quadrat data – Year 2

Quadrat No.	1	2	3	16
Vegetation type	Swamp Scrub	Non-native	Swamp Scrub	Swamp Scrub
Total vegetation cover (%)	85	88	100	54
Native vegetation cover (%)	80	66	40	51
Weed cover (%)	5	22	60	3
Litter cover (%)	95	10	20	95
Bryophyte cover (%)	<1	0	0	0
Bare ground cover (%)	0	2	0	<1
Number of native species	1	3	1	2
Number of weed species	3	3	1	1

The number of different species recorded within the quadrats surveyed is provided in Appendix 1, while photos of the surveyed quadrats/general quadrat locations are provided in Appendix 2.

In addition to surveying quadrats, general observations of the site were made within areas of the remaining quadrats (see Table 2 and Appendix 2). General photos of the site are provided in Appendix 3.

Table 2: Qualitative vegetation quadrat data – Year 2

Quadrat No.	Vegetation Type	Description	Weed cover (estimated)	Native vegetation cover (estimated)
4	Swamp Scrub	Very dense, dominated by Swamp Paperbark (recruiting)	-	80
5	Non-native	Supported recruiting Swamp Paperbark and Common Reed	50	50
6	Swamp Scrub	Dominated by Swamp Paperbark (recruiting)	20	60
7	Swamp Scrub	Very dense, dominated by Swamp Paperbark (recruiting)	20	80
9	Swamp Scrub	Co-dominated by Swamp Paperbark (recruiting) and Blackberry	40	50
10	Swamp Scrub	Co-dominated by Swamp Paperbark (recruiting) and Blackberry	40	50
11	Swampy Riparian Woodland	Very dense, dominated by Swamp Paperbark (recruiting), high cover of Blackberry	20	80
13	Non-native	Dumped fill	50	0
15	Swampy Riparian Woodland	Very dense, dominated by Swamp Paperbark (recruiting), high cover of Blackberry	40	60
17	Non-native	Very dense, co-dominated by recruiting Swamp Paperbark and woody weeds	50	50
19	Swamp Scrub	Dominated by Swamp Paperbark (recruiting)	20	70
20	Swamp Scrub	Dominated by Swamp Paperbark (recruiting), high cover of Blackberry	40	60

The current level of native vegetation was mostly very high, up to 80%, and was mostly attributable to Swamp Paperbark (which was heavily recruiting), Common Reed and to a lesser extent, Slender Knotweed.

Some weed management of Blackberry has been undertaken according to the developer by using a boat allowing access to the sites that are surrounded by water.

Overall, weed cover was medium to high throughout the habitat buffers (20-50%) and was mostly attributable to the high threat species Blackberry and Flax-leaf Broom. Other high threat weeds included Hawthorn and to a lesser extent Desert Ash and Spear Thistle.

The area of non-native vegetation, which occurred at the western end of the site, was dominated by Common Reed (native), however this is assumed to have naturally colonised the area since the swale was established and became inundated.




A significant amount of hard rubbish was observed within or close to the buffer areas, including polystyrene, dumped timber, car tyres, general construction refuse and plastic bottles. This was both from within the site as well as from public the public road to the south of the site. In addition, sediment fencing between the habitat buffers and swales had collapsed and is beginning to break up.

Figure 1: Site and monitoring quadrats results



Project: 96-166 Centre Road, Narre Warren
Client: Narre Warren Central Pty Ltd
Date: 29/05/2020

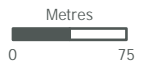
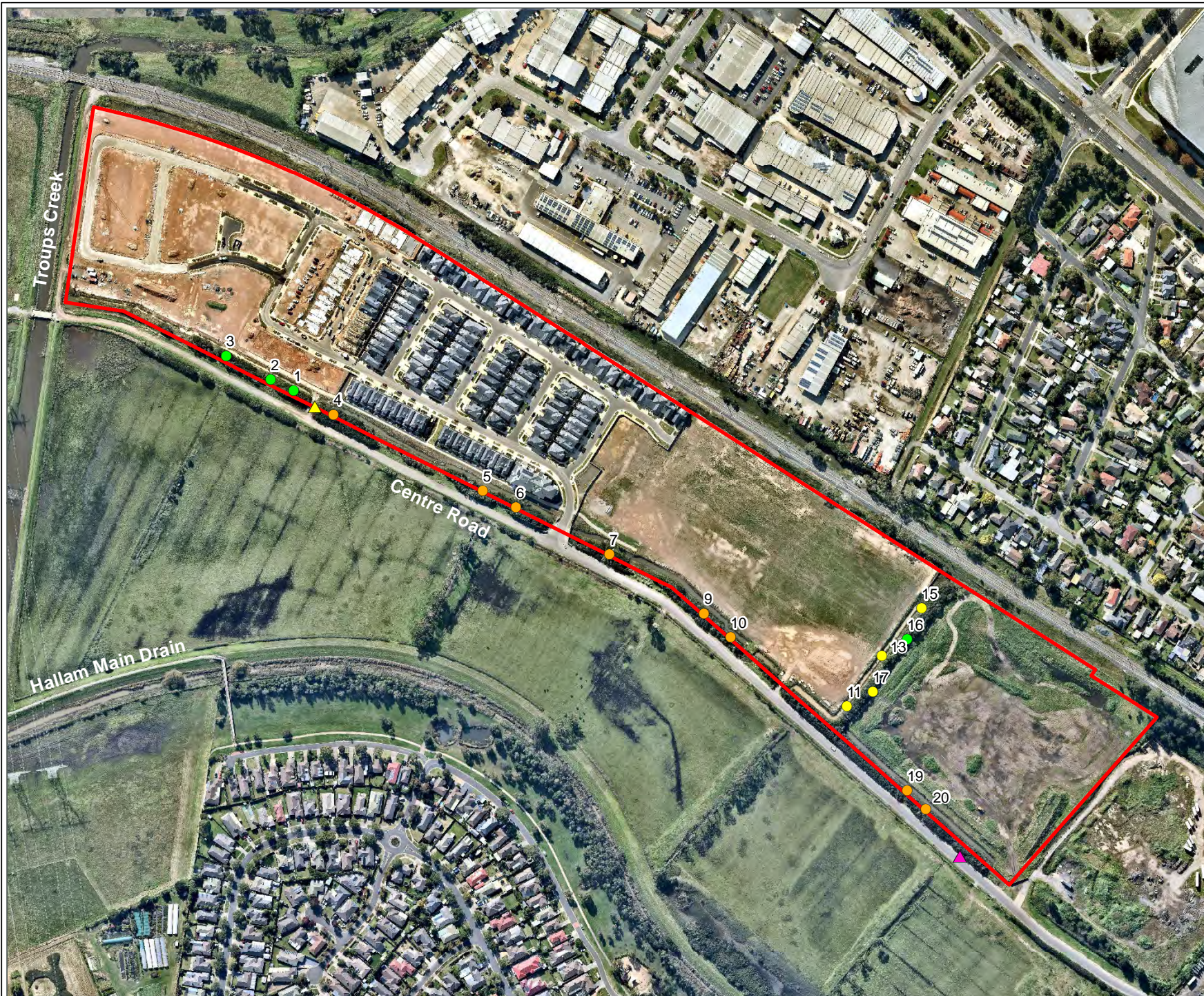
 Property boundary

Quadrats

-  Surveyed
-  Not accessible - dense vegetation
-  Not accessible - surrounding water

Rubbish

-  Polystyrene
-  Dumped timber



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5. Discussion and recommendations

The following EPBC Benchmarks were to be met:

- Ensure that buffer areas are revegetated within 2 years of commencement of construction; and
- Less than 5% weed cover and at least 90% native vegetation cover 2 years from the commencement of construction.

Active revegetation through planting was not undertaken due to the dense vegetation cover and difficulties in managing the blackberries. However, the current level of native vegetation was quite high, up to 80%, and was mostly attributable to Swamp Paperbark (which was heavily recruiting). In the western part of the site Common Reed was successfully recruiting and dominating some areas. Further revegetation is not considered to be required in most areas as natural recruitment is considered to be successful. Nature Advisory recommend revegetating any parts of the 'non-native' area that has not already been colonised by Common Reed (native) or Swamp Paperbark, i.e. areas around quadrats 2, 5, 13 and 17.

As described in the results, the current level of weeds on the site indicates that the EPBC Act approval benchmark has not been met as weed covers range between 3% and 60% within the surveyed quadrats and between 20 and 50% within the remainder of the buffer areas.

Weed management has been undertaken and evidence on site shows treatment of blackberries in some areas. Weed management within the buffer areas proved to be difficult given the access issues and weed management required to be undertaken by boat.

Nature Advisory recommends reconsidering whether this target is still viable for the site. This is mainly due to the high prevalence of Blackberry throughout the site. Unlike other woody weeds, Blackberry cannot be easily treated with herbicide via the cut and paste method, due to its scrambling habit and the fact that a single plant has many main stems. Although Blackberry can be sprayed with herbicide, this is not advised for the following reasons:

- The buffers are surrounded by a sensitive aquatic environment and the amount of herbicide that would need to be sprayed to effectively kill Blackberry could be harmful to aquatic and semi aquatic life, including Dwarf Galaxias.
- The Blackberry is intertwined with native vegetation and spraying it would cause a significant amount of off-target damage to native plants.
- The vegetation that the Blackberry is growing in is too dense and much of the Blackberry would not be able to be accessed.
- Blackberry provides protective habitat for wildlife, such as small birds and mammals, which is particularly important in heavily developed areas such as Narre Warren.

Alternatively, Nature Advisory recommend that weed control efforts should focus on the other woody weeds on the site that can be easily treated via the cut and paint method, providing they can be accessed.

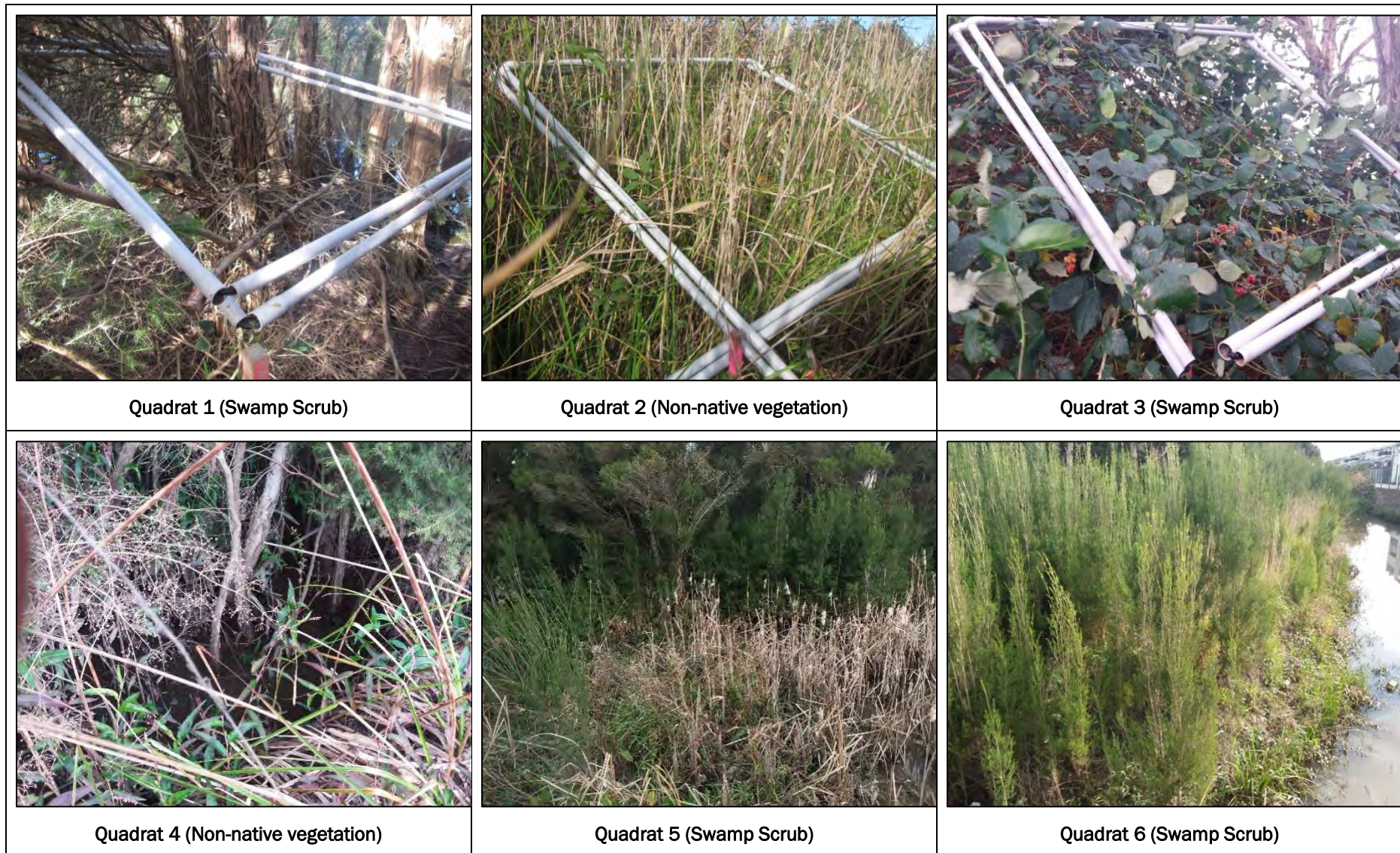
It is also recommended that all rubbish be removed from the site as soon as possible, especially polystyrene, by the proponent within private land and Council along the public road to the south and Centre Road drain,

Signage should be employed along the retained rains to deter rubbish dumping.

Appendix 1: Species recorded within monitoring quadrats – Year 2

Quadrat		1	2	3	16
Common name	Scientific name				
Native species					
Common Reed	<i>Phragmites australis</i>		Y		
Native Rush	<i>Juncus</i> sp.		Y		
Slender Knotweed	<i>Persicaria decipiens</i>				Y
Swamp Paperbark	<i>Melaleuca ericifolia</i>	Y		Y	Y
Variable Willow-herb	<i>Epilobium billardioreanum</i>		Y		
Introduced species					
Blackberry	<i>Rubus fruticosus</i> spp. agg.	Y	Y	Y	Y
Bridal Creeper	<i>Asparagus asparagoides</i>	Y			
Drain Flat-sedge	<i>Cyperus eragrostis</i>		Y		
Panic Veldt-grass	<i>Ehrharta erecta</i>	Y			
Toowoomba Canary-grass	<i>Phalaris aquatica</i>		Y		

Appendix 2: Photos taken within the surveyed quadrats and representative photos of quadrat locations



		
<p>Quadrats 9 & 10 (Swamp Scrub)</p>	<p>Quadrat 11 (Riparian Woodland)</p>	<p>Quadrat 13 (Non-native vegetation)</p>
		
<p>Quadrat 15 (Swampy Riparian Woodland)</p>	<p>Quadrat 16 (Swampy Riparian Woodland)</p>	<p>Quadrat 17 (Non-native vegetation)</p>



Quadrat s 19 & 20 (Swamp Scrub)

Appendix 3: General photos taken within the survey site



Swamp Scrub vegetation towards the western extent of the site (Quadrats 1 & 3)



Swamp Scrub vegetation at the eastern extent of the site (Quadrats 19 & 20)



Swamp Scrub vegetation at the north-eastern extent of the site (Quadrats 17 & 11)



Common Reed dominating the 'non-native vegetation' at the western end of the site



Polystyrene towards the western extent of the site



Dumped timber in the habitat buffer (location shown in Figure 1)



Silt fencing between habitat buffers and swales needs to be removed



Dumped construction material



Polystyrene



Polystyrene and construction refuse



Dumped fill between the north-south habitat buffer and abutting swale