GUILDERTON PYP GRASS (*Ehrharta villosa)* MANAGEMENT PLAN

Western Botanical for the Moore Catchment Council
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EXECUTIVE SUMMARY

Pyp Grass (*Ehrharta villosa*) was introduced into Australia for use in dune stabilisation. However, as an aggressive invader with biological adaptations to dry situations it is known to smother and replace native vegetation, threatening the biodiversity of the Western Australian coastal ecological communities. The coastal dunes at Guilderton are a key natural asset, providing ecosystem services to the town including coastal protection, tourism and ecological services.

The dunes at Guilderton have had Pyp Grass mapped, and the infestation extends continuously over one kilometre north from the mouth of the Moore River, with a further population a few hundred metres further north. There is also a population on the dunes to the south of the Moore River visible from the Lookout, although its mapping was outside the scope of this Management Plan, and access was difficult in any case because of the flow of the Moore River into the ocean at the time. Artificial population boundaries were drawn to provide discrete sections for planning and management purposes. This Management Plan details these locations and the density of the infestations and provides Management Options for their control and the re-establishment of native vegetation in affected areas. These options include (but are not limited to) spraying of affected areas and monitoring of sample quadrats placed in affected areas to assess the efficacy of control measures and the return of native vegetation.

Spraying using Verdict™ 520 is presented as the primary Management Option. Other options including manual removal and 'weed wiping' are discussed and the suggestion is made that these are activities that local community groups can become involved in as a low cost option to achieve eradication. A monitoring program using the NACCs Smartphone App 'Photomon' is also outlined, with suggestions for photo-monitoring points made and discussed.

Weed control activities and the area of application have been prioritised, in consultation with local community members, to provide a planning tool for management of Pyp Grass at Guilderton. A staggered program of work is outlined as a suggestion for proceeding with management.

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1. INTRODUCTION

Guilderton is a small coastal town approximately 95 kilometres north of Perth, in Western Australia. First Gazetted as a town in 1951, it is named after a cache of 17th century silver Guilders, thought to be from the wreck of the *Gilt Dragon*, that were found in the sandhills near the mouth of the Moore River in 1931.

1.1 Project Background

Native vegetation on coastal dunes provides stabilisation of mobile sands through the establishment of complex, deep root systems. In Guilderton, as in other coastal areas of the south-west of Western Australia, the integrity of the indigenous dunal vegetation is being impacted by the invasion of Pyp Grass (*Ehrharta villosa*), resulting in a loss of biodiversity and degradation of native habitat.

Baseline data of areas infested with Pyp Grass was collected in 2016, with the aim of informing a Management Plan for the Guilderton Pyp Grass that can be used by the Moore Catchment Council (MCC), Northern Agricultural Catchments Council (NACC) and community to progress control of the weed.

1.2 Project Brief

The objective of this project is to develop a Management Plan which provides clear guidance and a practical strategy to manage and remove Pyp Grass from the coastal reserves and backstreets of Guilderton.

The Management Plan provides a staged works program detailing the works, locations and timing required for Pyp Grass eradication as well as indicative costings to inform funding applications.

A photo-monitoring program using NACC's Smartphone App 'Photomon' will be established as part of the Management Plan, including suggestions for monitoring points to gauge the success of eradication and rehabilitation works.

1.3 Significance of Coastal Dunes

Coastal beaches and dunes provide humans with important 'ecosystem services' such as raw materials, coastal protection, erosion control, water catchment and purification, carbon sequestration, tourism, recreation, education and research (Barbier *et al*, 2011) as well as 'non-use value' services such as wildlife habitat and biodiversity conservation.

Coastal protection is one of the most valuable services provided by sand shore ecosystems, especially in the context of extreme storms and sea level rise. Waves are attenuated by the beach slope, dissipating their energy and protecting the hinterland beyond. In the case of storms, the foredune assists this function.

Dunes provide sediment stabilisation and soil retention in vegetation root structures, thereby controlling coastal erosion and protecting recreational beaches, tourism-related business, real estate and wildlife habitat.

The coastal dunes at Guilderton provide these 'ecosystem services' to the town and its hinterland.

1.4 Pyp Grass (*Ehrharta villosa*)

Origin

Pyp Grass is endemic to South Africa, and was introduced to Western Australia for use in dune stabilisation. Its quick growth and long lateral rhizomes were thought to be ideal for fast establishment and sand binding in mobile environments.

Environmental Weed Ranking

Ehrharta villosa is rated as a Moderate environmental weed by the *Environmental Weed Strategy for Western Australia* (CALM 1999). Criteria used to assign this ranking were developed as part of the National Weed Strategy and are:

Invasiveness - possessing the ability to invade bushland in good to excellent condition, or the ability to invade waterways;

Distribution – having a wide current or potential distribution including consideration of known history of widespread distribution elsewhere in the world;

Environmental Impacts – possessing the ability to change the structure, composition and function of ecosystems, in particular an ability to form a monoculture in a vegetation community.

These criteria are scored as a Yes or No. *Ehrharta villosa* scores Yes for two categories, Invasiveness and Distribution, and is therefore ranked as Moderate. A species ranked as moderate "would indicate that control or research effort should be directed to it if funds are available, however it should be monitored (possibly a reasonably high level of monitoring)" (CALM 1999, Appendix 1 p58).

This document has not been updated since its publication in 1999, with other weed rankings becoming available. Therefore, while the information and conclusions contained in it were valuable at the time they are now dated. Observations of Pyp Grass at locations at Guilderton and previously at Jurien Bay and Cervantes have recorded the grass often at greater than 50% Projected Foliage Cover (PFC), and restricting or choking out indigenous species to form a monoculture. This Management Plan suggests that the ranking of this weed should be upgraded to High as it fulfils the criterion and scores Yes for the third category of Invasiveness. A High ranking would indicate prioritising this weed for control and/or research, which is the aim of this Management Plan.

Ehrharta villosa is not currently a Declared Pest in Western Australia under the *Biosecurity and Agriculture Management Act 2007* (DAFWA, 2016). It is not a Weed of National Significance (Weeds Australia, 2014).

Ecology

Pyp Grass is a perennial grass, which colonises sandy conditions by its fast-growing rhizome system. It is adapted to warm conditions, a range of light intensities and habitats with mobile sand (WAH, 2014). Its vigorous rhizomatous habit can spread the plant up to 9 metres in one year (Harrington *et al*, 1998), but the plant rarely sets viable seed (Herbiguide, 2014).

The plant has morphological adaptations to dry environments, with sunken stomata shielded by cuticular flanges and in-rolled leaves that present only adaxial surfaces with very few stomata to the sun and wind. These adaptations help to prevent water loss from the leaf and provide a selective advantage to the plant. With these adaptations, Pyp Grass is an aggressive coloniser, out-competing indigenous species and reducing species and habitat diversity.

Pyp Grass occurs in sandy soil close to the coast, and appears to prefer mobile environments as senescence has been noted in the species where sand movement has been reduced (FAO, 2014). This observation aligns with the author's experience of the weed, for example where *Ehrharta villosa* is observed occurring in dense *Acacia* regrowth on secondary stable dunes with no sand movement at Jurien Bay. However, the ecology of the species may not be so simply described, as at least one observed population at Guilderton, established on stable dunes hundreds of metres away from the coastal zone, appeared vigorous and actively growing. This observation is perhaps worrying in terms of defining search parameters for the species in future. Plates 1 & 2 illustrate the structure and habit of *Erharta villosa* to aid identification of the weed in the field.

Plate 1 *Ehrharta villosa* showing structure of leaf and plant (© Trevor James, Flora of New Zealand)

Plate 2 Guilderton Pyp Grass (Caravan Park)

1.5 Methods

Populations of Pyp Grass were searched for and mapped over a four day period in early April 2016. Boundaries were marked with waypoints taken using a hand-held GPS unit (Garmin Cx60) and where appropriate cadastral boundaries were noted (generally roads and tracks).

Initially during mapping, three densities of Pyp Grass were searched for in order to align with the Jurien Bay Pyp Grass Management Plan: <5%. 5-50%, and over 50%. It was observed that densities were such that <5% barely existed. The two higher densities were thereafter mapped as <50% and >50%.

Digital photos were taken of sites and populations to illustrate densities and coverage, and permission to use a photograph exhibited at the Guilderton Caravan Park was sought and obtained.

Once mapped and with this Management Plan in a Draft form, a public workshop held in Guilderton discussed and prioritised populations for treatment, with treatment options discussed in this Management Program.

1.6 Limitations

While all efforts were made to locate and map Pyp Grass populations at Guilderton, it is possible that populations not accessible by track near the coast may have been missed. Given the ecology and distribution method of this species this is considered unlikely, but it is possible.

The Scope of this Project included the town of Guilderton and the bushland to the north for almost two kilometres until a boundary with private farmland was reached. It was also noticed that Pyp Grass has established on the southern side of the mouth of the Moore River. This population was not mapped as it was not part of the Scope, however access would have been difficult in any case as the Moore River was flowing to the ocean at the time of the survey in April of 2016.

This Management Plan has been prepared using current, publicly available knowledge regarding *Ehrharta villosa* as of 2016. Any change to this knowledge that may invalidate the information and conclusions contained within this document are not the responsibility of Western Botanical. The document was prepared using the Jurien Bay Pyp Grass Management Plan as a template, and information relating to the ecology and management of Pyp Grass may have been used in both without adjustment. The description of NACCs Photomon app remains unchanged.

Costings for work undertaken under this Management Plan are offered as at current 2016 rates. These rates may change during the term of this Management Plan, and Western Botanical does not accept responsibility for subsequent variations in proposed costings.

1.7 Pyp Grass in Guilderton

Pyp Grass has been established at Guilderton for over three decades. Plate 3 is an image of a photograph on display at the Guilderton Caravan Park that was taken in or around 1980. Taken from the Lookout, looking upriver across the Caravan Park, Pyp Grass is very much evident in the foreground despite the quality of the reproduction.

Plate 3 Guilderton Caravan Park circa 1980 from Lookout. Pyp Grass in foreground.

Seven Pyp Grass infestations were classified and named for the purpose of this Management Plan to aid prioritisation and management strategies. These are presented and discussed below, with maps of the populations following, Figures 3-9. Figure 2 presents an overview of the Guilderton infestations, and Figure 10 shows land Tenure of areas where the infestations occur.

Lookout

Area: 0-50%: 1.42 ha

50-100% 1.3 ha

Description: The area around the Lookout over the Moore River including the car park, the foreshore in front of the Caravan Park and the foredunes below the limestone cliff.

Caravan Park

Area: 0-50% 0.2 ha

50-100% 1.74 ha

Description: The area immediately west of the Lookout covering the slopes overlooking the Caravan Park and extending along Edward St. to the Gordon St. intersection. Includes a section at the Moore River's edge facing the Caravan Park.

Gordon St Sth

Area: 0-50% 1.55 ha

50-100% 0.47 ha

Description: Area to the north of the Lookout in foredunes along the coast, following Gordon St from the Anderson St to Fraser St intersections.

Gordon St Nth

Area:	0-50%	2.56 ha
	50-100%	1.58 ha

Description: Foredunes between the beach and Gordon Rd from the Fraser St intersection north. and on both sides of the Mortimer Rd leading to the beach access.

Lighthouse

Area:	0-50%	0.32
	50-100%	0.33

Description: The northern-most population mapped, between the beach and the Lighthouse track. Multiple tracks nearby show that this area gets a lot of use. The internal portion of this infestation has reached over 50% density and it has potential to colonise a large area if not controlled.

Gabbadah Park (including Anderson/Jones/Brandis)

Area:	0-50%	0.69 ha

Description: Gabbadah Park is north of the Caravan Park, across Gordon Rd.. Pyp Grass was mapped in bushland in the southern and northern parts of the Park, infesting bushland adjacent to bordering roads. This population includes infestations on the verge of private property fronting Anderson St, Brandis St and Jones St adjacent to Gabbadah Park, although weed control here may involve tenure issues.

Heritage Park

Area:	0-50%	0.3 ha

Description: An ‘out of context’ site, possibly the result of contaminated soil movement. This site is isolated in the ‘back blocks’ of Guilderton near the original settlement and the Golf Course. While the infestation is not dense and is currently confined by road boundaries on two sides and a limestone track on the other, adjacent bushland may provide an avenue for this population to spread if not controlled.

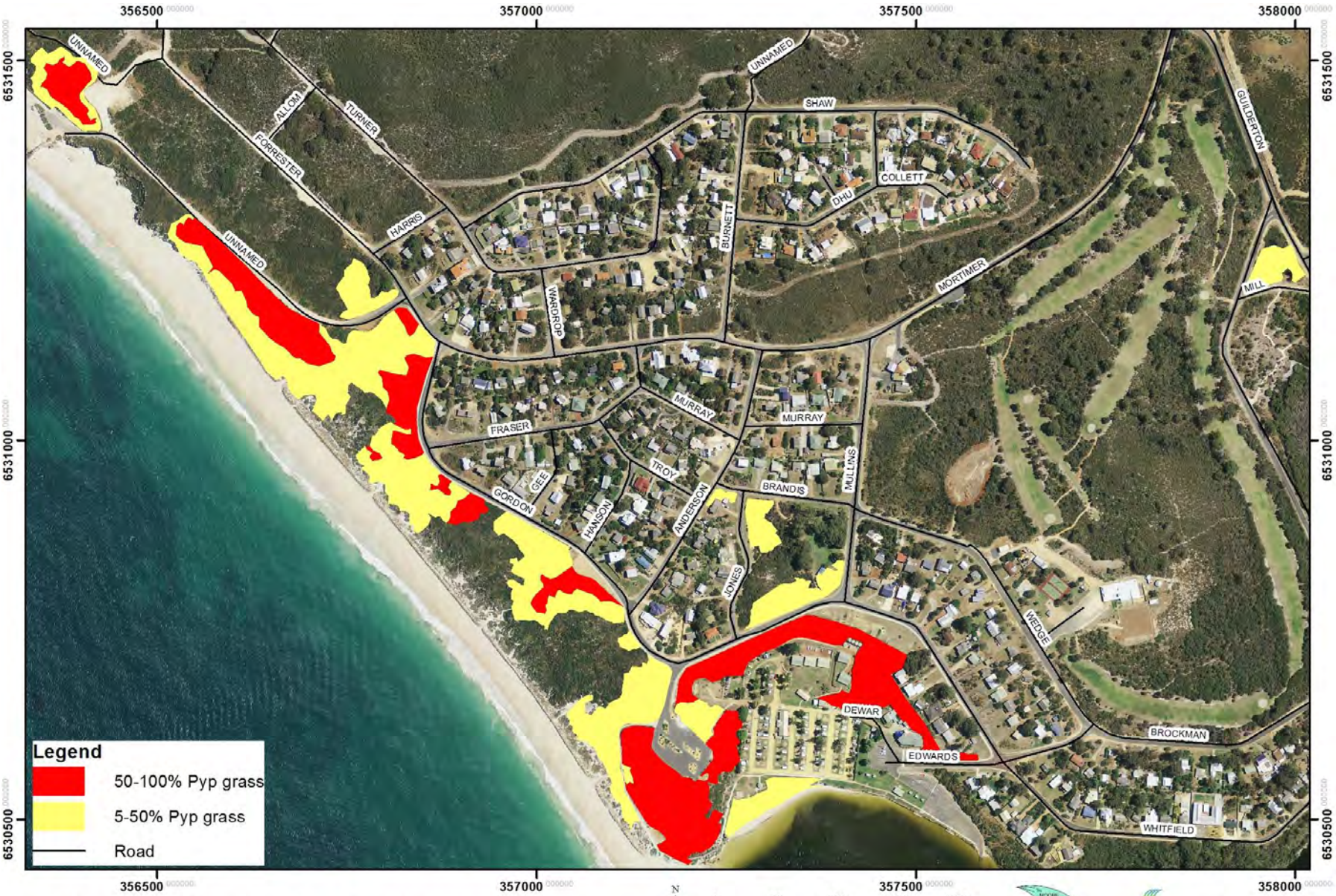

Figure 2: Pyp grass, Guilderton

Figure 3: Lookout

N

0 20 40 60 80
Metres

Figure 4: Caravan Park

Figure 5: Gordon St Sth

N

0 25 50 75 100
Metres

Figure 6: Gordon St Nth

N

0 25 50 75 100

Metres

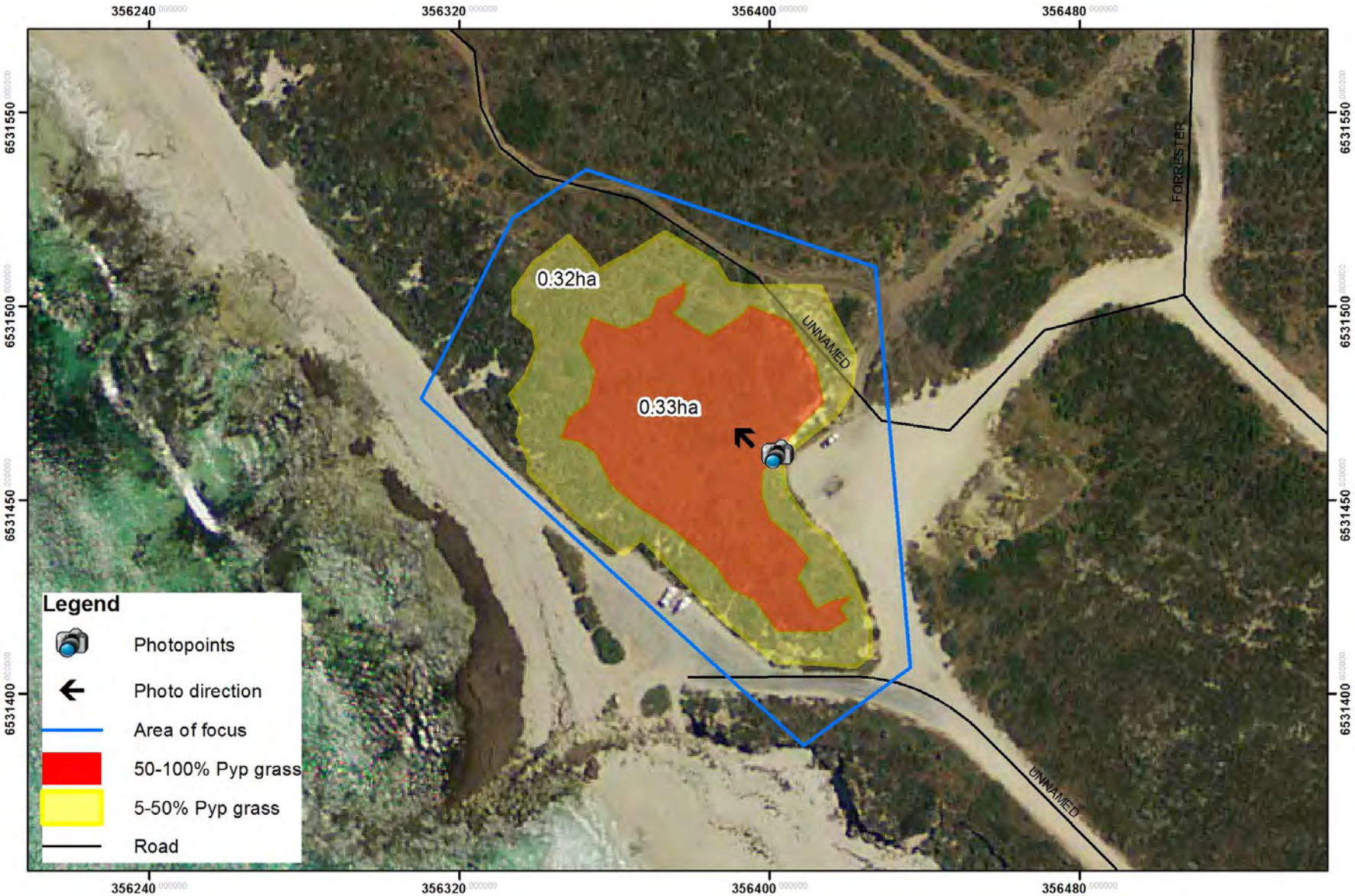

Figure 7: Lighthouse

N

0 10 20 30 40
Metres

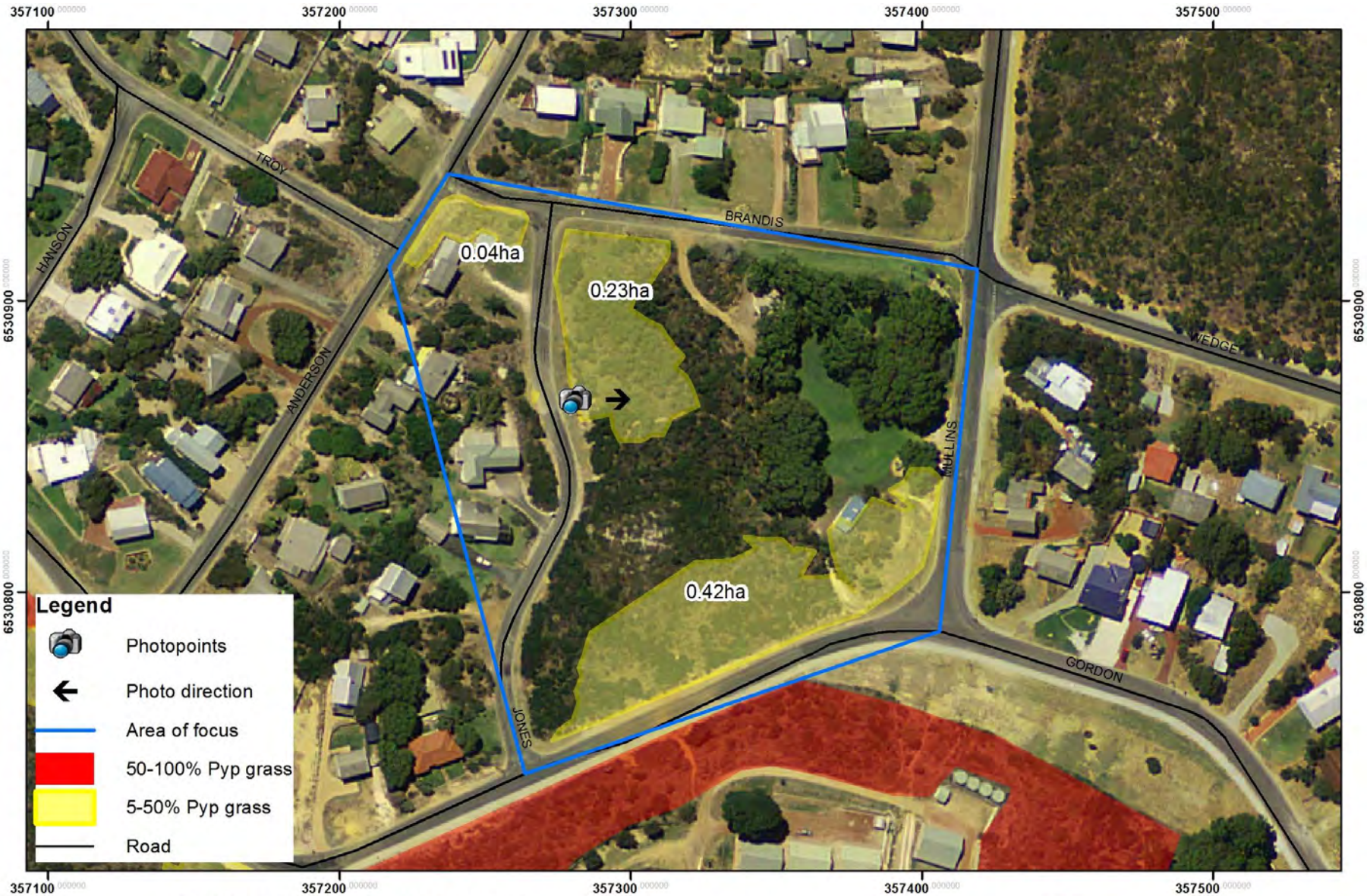

Figure 8: Gabbadah Park (including Anderson/Jones/Brandis Sts.)

N

0 20 40 60 80

Metres

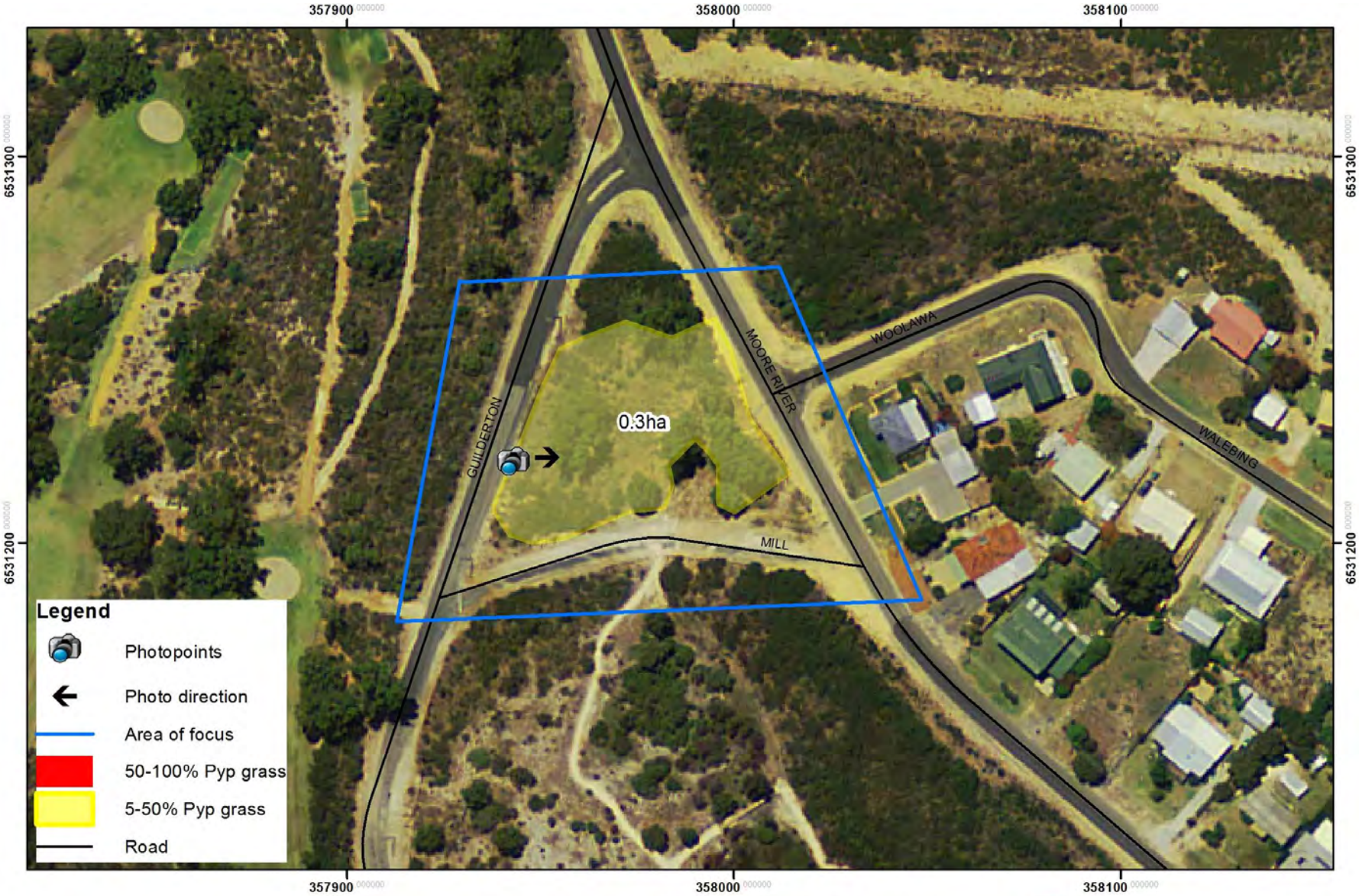

Figure 9: Mill st.

N

0 10 20 30 40
Metres

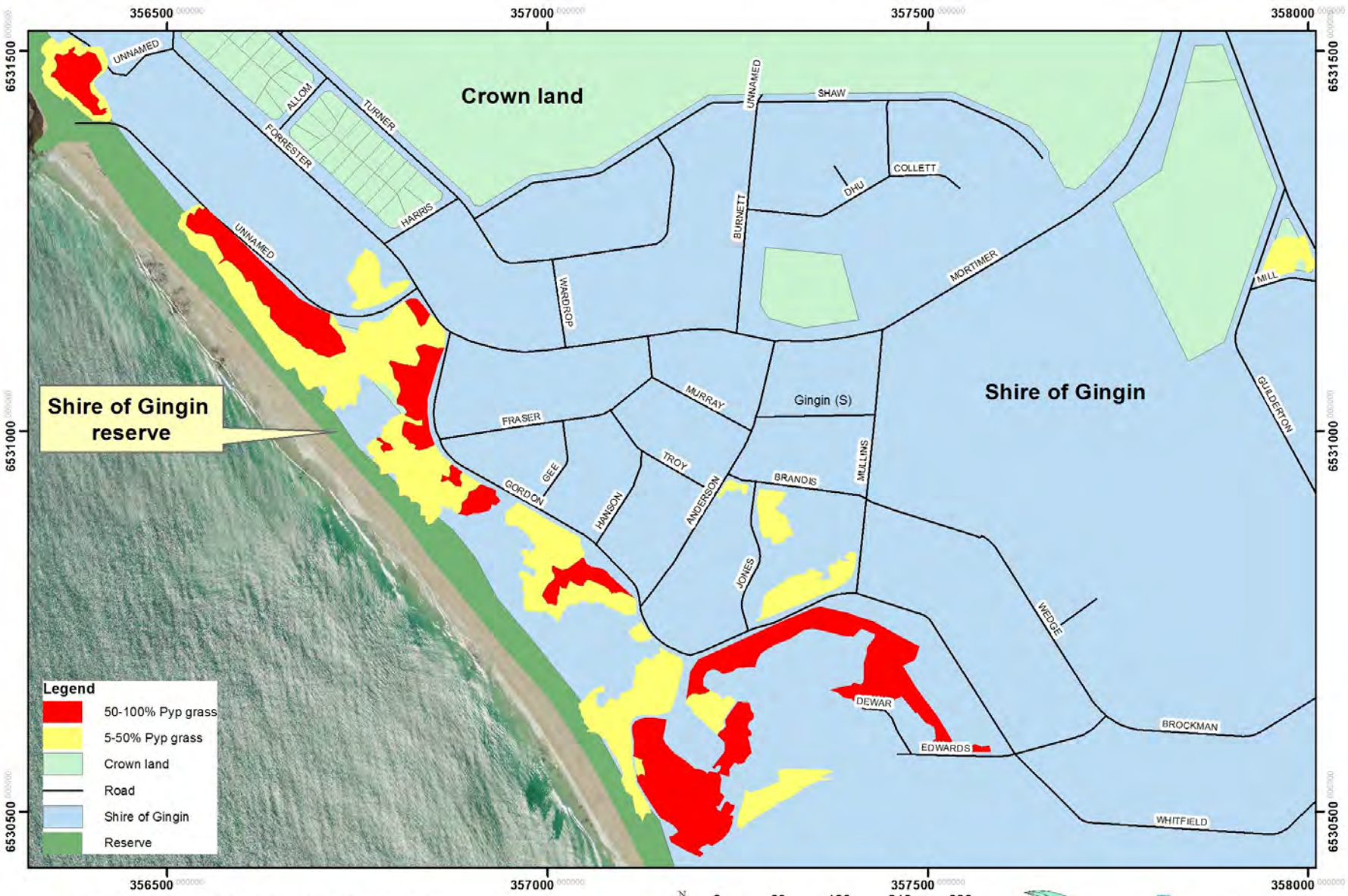

Figure 10: Tenure, Guilderton

2 Management Objectives and Strategies

2.1 Management Objectives

a) to prevent the further establishment of Pyp Grass in new locations at Guilderton;
b) to prevent the further spread of existing infestations of Pyp Grass at Guilderon;
c) to eradicate existing populations of Pyp Grass from the dunes and hinterland at Guilderton; and
d) to monitor existing populations and ensure that new infestations are recorded and allocated a treatment program.

2.2 Management Options

Options available for management and treatment of Pyp Grass, either singly or in combination, in Guilderton are:

- Physical removal;

  May be undertaken manually or mechanically. This method unfortunately can cause considerable damage to native vegetation occurring in the same location, as rhizomes are followed through the soil. The areas where it may be most effective, for example where there is little or no native vegetation, are more amenable to the use of herbicide. This method has been suggested in previous Management Plans, and is discussed here solely to discount it, and it is not considered further in this Management Plan.

- Installation of root barriers;

  Can be labour intensive and impact on native vegetation due to the need for trenching to install barrier. Effective if installed correctly, however needs monitoring to ensure Pyp Grass is contained and may only be effective in the short term. The use of compacted crushed limestone in trenches is suggested if this method is to be trialled.

- Physical treatment then spraying of regrowth (e.g. brushcutting)

  Brushcutting, slashing or burning of Pyp Grass and then spraying of the regrowth has been suggested as a potential control measure. This option would only work in high density infestations with little or no remaining native vegetation that are unable to be sprayed. Anecdotally, trials conducted in South Australia by the City of Onkaparinga (2015-2016) have found this method to be successful and consideration should be given to the method as an option at Guilderton. It should be noted, however, that experience has shown that stands of mature Pyp Grass are susceptible to spraying with Verdict™ 520.

- ‘Weed wiping’ chemical application

  This option has potential for use where Pyp Grass infestations are in stands of sensitive plants such as *Spinifex longifolius* or *Austrostipa elegantissima*. However, the waxy cuticle of the Pyp Grass leaf may reduce the pesticide uptake to the point where it is ineffective, and trials of this method are being made. The point of entry of the pesticide to the Pyp Grass leaf is given as being at the leaf axils where the cuticle is thinner or absent (Bright, 2012), supported by DAFWA advice (NACC 2012) and weed wiping may not provide sufficient chemical to ensure a ‘kill’. If proved effective, this option may be suitable for use by volunteers.
- Spraying only;

  Verdict™ 520, a chemical brand with the active ingredient Haloxyfop, is registered as a spray treatment for post-emergent control of a wide range of grass weed species and has been previously trialled by NACC for Pyp Grass. This option provides an effective, relatively low cost treatment but has the potential to impact native grass species occurring in the target areas. Use of this option relies on the skill, knowledge and experience of the pesticide operator and their ability to recognise susceptible native species to reduce unintended impacts.

  Control by spray application or weed wiping is limited by the ability of the plant to absorb the chemical.
- Biological;

  No biological control for Pyp Grass is currently known.
- Targeted Replanting

  Management of Pyp Grass by herbicide spraying may impact native vegetation through spray drift or overspray depending on the wind conditions and despite the best efforts and skill of the operator.

  In this circumstance, the return of native species can be enhanced by the planting of selected species to replace the losses. Plants grown for this purpose should be propagated from locally collected seed or cutting material so as to protect the provenance of the plants and provide plants grown from stock completely adapted to the local conditions. Early planning for this activity is recommended.
- Education/Awareness:

  Education to increase awareness of the Pyp Grass problem at Guilderton may help to prevent establishment of new infestations and reporting of as yet unrecorded sites. Consideration should be given to signage and perhaps a presentation to local government and their contractors.

- Monitoring;

  Treatment should be monitored to gauge its success and inform the future management program for the Pyp Grass. The use of control and impact quadrats is suggested. NACC has also been behind the production of the Smart Phone App 'Photomon', for Android and iPhone platforms, that can be used by volunteers to monitor changes in vegetation over time.

2.3 Management Strategies

Four Management Strategies are considered for management of Guilderton Pyp Grass.
1) Spraying with Verdict™ 520: this will be the prime method of control as it can cover large areas in a relatively short period of time and therefore appears the most cost-effective.
2) Weed wiping: will be trialled to target Pyp Grass that is in close proximity to vulnerable native species in the foredune infestations.
3) Targeted replanting: Areas in which chemical control of Pyp Grass will impact vulnerable native species will be replanted with selected native species grown from local stock.
4) Monitoring: Monitoring photo points will be established and marked to facilitate volunteers photo monitoring with Photomon.

2.4 Prioritisation

When deciding the order in which management of the Guilderton Pyp Grass infestations is undertaken, the following criteria were used to decide the order of treatment of Guilderton Pyp Grass populations in consultation with community members:

Outer populations: where the potential for expansion of the populations into virgin areas is high if treatment isn't undertaken as a high priority;
Inner populations: where populations, while still having the potential for expansion, are more or less contained and can't expand into new areas;

Following these criteria, the Guilderton sites have been prioritised for treatment as follows:
Priority 1.

Heritage Park

A small site with easy access due to roads or tracks on each side. Existing native vegetation should benefit from Pyp Grass removal and recover quickly. As a tourist site and with the potential for Pyp Grass to spread into uncontaminated areas, Heritage Park should be considered a high priority.

Lighthouse

With easy access due to multiple tracks, treatment of this site should present no difficulty. Existing native vegetation in relatively good condition and revegetation is currently being conducted in the

surrounding dunes and can be extended to include this site once control complete and if considered necessary.

Tuart Hollow (part of Gordon Rd South)

This site is part of the Gordon Rd South population but is separated by a limestone road. The infestation is unconfined on its northern boundary, giving it the potential to spread into a clear area if it isn't controlled, as opposed to the rest of Gordon Rd Sth which is bounded by roads and the coast.

Gabbadah Park (including Anderson/Jones/Brandis)

The Gabbadah park infestation is in bushland surrounding grassed areas with relatively easy access. The Anderson/Jones/Brandis components are on verges and partly on private property.

Priority 2.

Gordon St Sth

This site covers a broad area bounded by the beachfront and Gordon St, with large areas of over 50% density infestation. The undulating nature of the sandhills adds a degree of difficulty to control, but there appears to be native vegetation (*Acacia* scrub) suppressed under the Pyp Grass that should resume dominance quickly once the influence of the weed is lessened.

Gordon St Nth

As for Gordon St. Sth. Distances here may make control difficult as beach access with hundreds of litres of chemical mix in a vehicular spray tank may not be feasible. Spray vehicles will need 100m hoses to be effective if spraying from the road side of the population, and backpacks may be necessary to cover the area effectively. This area also has young *Acacia* scrub under the Pyp Grass that should recover quickly.

Lookout

As the area that arguably gets the most public exposure and with a high density of Pyp Grass covering foredune habitat, the Lookout infestation should be tackled as a priority.

Caravan Park

The Caravan Park has the highest consistent density of Pyp Grass infestation, and is also in the public eye. Management of Pyp Grass here may also involve supplementary planting as large areas will be denuded of cover once the Pyp Grass is eradicated. This area wil be sensitive as it has high usage as a commercial operation.

2.5 Management Strategy 1: Spraying with Verdict™ 520

Following Section 2.4, priority should be given to spraying infestations in the order suggested. Spraying will be the primary management tool used under this Management Plan.

2.6 Management Straegy 2: Weed Wiping

Weed wiping is presented as an option in areas where susceptible native species are present in a proximity to Pyp Grass that would result in them being impacted during spraying operations. Use of this method will reduce or eliminate impact to native vegetation. A trial using glyphosate is currently being undertaken at Cervantes, and results will be used to inform any treatments at Guilderton.

This strategy is perhaps best suited to community groups and/or the Green Army supervised by MCC/NACC Officers, and can be considered following assessment of the results of the implementation of the first Management Strategy, and following the Cervantes trials. In order to supervise pesticide application in this manner MCC/NACC personnel (or one of the volunteers) would need to hold a Pest Management Technician Licence under the Health (Pesticides) Regulations 2011, issued by the Western Australian Department of Health, with a Bushland/Minesite Weeds endorsement. Attainment of this Licence will require attendance at a one-day course provided by a Registered Training Organisation.

2.7 Management Strategy 4: Targeted Replanting

Species used for targeted replanting should be indigenous to the area to be planted, and sourced from seed or cutting stock local to the area, with seed stock preferred. This will produce plants specifically adapted to local conditions. This Management Strategy should be used from the second or third year of management under this Management Plan, allowing time for assessment of first year spraying and planning of seed collection and propagation.

2.8 Management Strategy 5: Monitoring

Monitoring needs to be undertaken in order to measure the effectiveness of the management strategies. Two monitoring options are presented here, and it is suggested that a combination of both be used where resources will allow.

Monitoring Quadrats

Monitoring quadrats of 10m x 10m should be established and assessed in both unaffected areas (control) and affected areas (impact) prior to weed control commencing. It is suggested that at least one quadrat should be established in each Pyp Grass density at each site, but depending on resources a higher number of quadrats will provide more reliable and comprehensive data in the long term. Once weed control has been implemented, quadrats should be monitored at least annually to assess the efficacy of treatments and the re-establishment of native species.

Quadrat assessment will provide a complete species list for each quadrat, measure the projective foliage cover of each species and include edaphic data such as aspect, bare ground and leaf litter percentage. These measurements will provide data that can be statistically analysed if required at a later time.

Specific location of monitoring quadrats should be decided in consultation with MCC/NACC prior to establishment and following on-ground assessment. It is envisaged the community be involved in the ongoing monitoring of these sites with the support of MCC and NACC.

Photo-monitoring Reference Points

Use of the Photomon Smartphone App

Photomon is a Smartphone application, currently supported by iPhone and Android platforms, which has been designed by NACC to improve the quality of data collected in environmental photo-monitoring programs. Photomon won the Digital Innovation category of the Goodness Sustainability and Innovation Awards in 2013. Funding for development of Photomon was provided by Coastwest, an initiative of Planning Western Australia.

Photomon improves the quality of photo-monitoring data by:

- The overlay of transparent reference photos (selected by the user) for a consistent Field of View in each photograph;
- Automatic labelling and uploading of monitoring photos to the NACC database, using the cellular network or wifi;
- Allowing program coordination to occur via the NACC database; and
- A reminder function to prompt regular monitoring.

In the context of Guilderton Pyp Grass management, the Photomon app will allow volunteers to monitor Pyp Grass management and native vegetation recovery using a Smartphone connected to the NACC database without the purchase or loan of more expensive equipment.

It is suggested that photo-monitoring points are marked with a plaque or similar device at each of the populations of Pyp Grass documented in this Management Plan. These points can then be used to monitor, at a minimum annually, the results of management options undertaken as a result of this Management Plan. Exact locations and numbers of photo-monitoring points will be selected after consultation with MCC, the community and other stakeholders, but suggestions are made here and included in **Figures 3-9:**

1. <u>Lookout</u>

Two photopoints are suggested here to capture different densities of Pyp Grass:

- At the southern corner of the parking area to capture the high density;
- On the coastal side of the vehicle access track from the car park to the river mouth, looking westward to capture the lighter density infestation.

2. Caravan Park

Two photopoints are suggested here:

- At the back of the Caravan Park facing up the slope where the densest infestations are;
- At the western end below the Lookout car park, facing south-west taking in the boundary between <50% and >50% densities.

3. Gordon St Sth

Two photopoints are suggested here:

- Towards the northern end of the site, observing a boundary between the <50% and >50% densities.
- Looking north towards Tuart Hollow.

4. Gordon St Nth

One photopoint is suggested here, although others could be addes due to the size of the area:

- On the unnamed road to the beach facing south-west towards the lower-density population of the infestation.

5. Lighthouse

One photopoint is suggested here:

- Near the entrance of the track leading to the lighthouse, looking northwards across both densities of the infestation.

6. Gabbedah Park

One photopoint may be sufficient for the Gabbedah Park site. As the infestation is uniformly <50%, it may be placed at any point but the suggested photopoint is:

- On Jones St, looking eastwards downslope.

7. Heritage Park

Heritage Park is a very small site and only one photopoint would be necessary here. It is suggested the this point is:

- On Guilderton Rd, looking eastwards.

2.9 Costing of Management Strategies

Costing of items for this Management Plan has been restricted to Spraying and Monitoring components over 3 years. Management Strategies involving volunteers and community groups have not been costed as the extent and nature of costs is unable to be quantified. Targeted replanting programs will be costed when species and numbers are known, which is expected for the second or third year of implementation after the success of the spraying program is assessed.

Management Strategy 1: Spraying with Verdict™ 520

Table 1 Indicative Costing for Spraying Works

Priority	Location	Action	Recommended Timing	Area (ha)	Cost Estimate
1	Heritage Park	Spray all Pyp Grass	Autumn 2017	0.3	$1,378.00
1	Lighthouse	Spray all Pyp Grass	Autumn 2017	0.98	$2,438.00
1	Tuart Hollow	Spray all Pyp Grass	Autumn 2017	0.3	$1,378.00
1	Gabbedah Park	Spray all Pyp Grass	Autumn 2017	0.71	$1,778.00
2	Gordon St Nth	Spray all Pyp Grass	Autumn 2017	3.81	$8,528.00
1	Heritage Park	Respray all Pyp Grass	Spring 2017	0.3	$964.50*
1	Lighthouse	Respray all Pyp Grass	Spring 2017	0.98	$1,707.00
1	Tuart Hollow	Respray all Pyp Grass	Spring 2017	0.3	$964.50
1	Gabbedah Park	Respray all Pyp Grass	Spring 2017	0.71	$1,245.00
2	Gordon Rd Nth	Respray all Pyp Grass	Spring 2017	3.81	$5,695.00
2	Lookout	Spray all Pyp Grass	Spring 2017	2.37	$3,650.50
2	Caravan Park	Spray all Pyp Grass	Spring 2017	2.44	$4,530.50
2	Gordon Rd Sth	Spray all Pyp Grass	Spring 2017	2.07	$5,215.00
1	Heritage Park	Respray all Pyp Grass	Autumn 2018	0.3	$964.50
1	Lighthouse	Respray all Pyp Grass	Autumn 2018	0.98	$1,707.60
1	Tuart Hollow	Respray all Pyp Grass	Autumn 2018	0.3	$964.50
2	Gabbedah Park	Respray all Pyp Grass	Autumn 2018	0.71	$1,245.00
2	Gordon Rd Nth	Respray all Pyp Grass	Autumn 2018	3.81	$5,969.60
2	Lookout	Respray all Pyp Grass	Autumn 2018	2.37	$3,650.00
2	Caravan Park	Respray all Pyp Grass	Autumn 2018	2.44	$4,530.60
2	Gordon Rd Sth	Respray all Pyp Grass	Autumn 2018	2.07	$3,650.00
1	Heritage Park	Respray all Pyp	Spring 2018	0.3	$964.50

		Grass			
1	Lighthouse	Respray all Pyp Grass	Spring 2018	0.98	$1,707.60
1	Tuart Hollow	Respray all Pyp Grass	Spring 2018	0.3	$964.50
2	Gabbedah Park	Respray all Pyp Grass	Spring 2018	0.71	$1,245.00
2	Gordon Rd Nth	Respray all Pyp Grass	Spring 2018	3.81	$5,969.60
2	Lookout	Respray all Pyp Grass	Spring 2018	2.37	$3,650.00
2	Caravan Park	Respray all Pyp Grass	Spring 2018	2.44	$4,530.60
2	Gordon Rd Sth	Respray all Pyp Grass	Spring 2018	2.07	$3,650.00
1	Heritage Park	Spot Spray	Autumn 2019	0.3	$675.00**
1	Lighthouse	Spot Spray	Autumn 2019	0.98	$857.00
1	Tuart Hollow	Spot Spray	Autumn 2019	0.3	$675.00
2	Gabbedah Park	Spot Spray	Autumn 2019	0.71	$1,195.00
2	Gordon Rd Nth	Respray all Pyp Grass	Autumn 2019	3.81	$4,179.00
2	Lookout	Respray all Pyp Grass	Autumn 2019	2.37	$3,650.00
2	Caravan Park	Respray all Pyp Grass	Autumn 2019	2.44	$4,530.60
2	Gordon Rd Sth	Respray all Pyp Grass	Autumn 2019	2.07	$3,650.00
1	Heritage Park	Spot Spray	Spring 2019	0.3	$675.00**
1	Lighthouse	Spot Spray	Spring 2019	0.98	$857.00
1	Tuart Hollow	Spot Spray	Spring 2019	0.3	$675.00
2	Gabbedah Park	Spot Spray	Spring 2019	0.71	$1,195.00
2	Gordon Rd Nth	Respray all Pyp Grass	Spring 2019	3.81	$4,179.00
2	Lookout	Respray all Pyp Grass	Spring 2019	2.37	$3,650.00
2	Caravan Park	Respray all Pyp Grass	Spring 2019	2.44	$4,530.60
2	Gordon Rd Sth	Respray all Pyp Grass	Spring 2019	2.07	$3,650.00

*There is an expected 30% reduction in spraying costs after the initial year of treatment.

**There is a further expected 30% cost reduction once a site only requires Spot Spraying.

Subsequent treatments and costings depend on the efficacy of previous treatments, and may differ from those outlined in Table 1.

Management Strategy 5: Monitoring

Table 2 provides provisional costings for a potential monitoring program to assess the success of the spray program by monitoring the foliar cover and species composition of the vegetation both before and after the program commences. This costing relies on two contractors undertaking the work, however the initial survey could be made by one botanist supervising and training interested community members who will then undertake the work in the second and subsequent years.

Table 2 Indicative Costing for Proposed Vegetation Monitoring (First Year)

Guilderton Pyp Grass Monitoring Program Year One: Establishment					
HSEC and Project Management	Project Manager	6	hrs	100	$ 600
Field Visit	Senior Botanist	20	hrs	100	$2,000
	Botanist	20	hrs	90	$1,800
Mobilisation/Demobilisation	Botanist	2	hrs	90	$180
Specimen Identifications	Senior Botanist	4	hrs	100	$400
Data Management	Botanist	8	hrs	90	$720
Reporting	Senior Botanist	32	hrs	100	$3,200
Vehicle	FRCP Nissan Patrol	2	days	110	$220
Mileage	$0.55/km	500	km	0.55	$165
Accommodation	Guilderton Caravan Park	1	allow	130	$160
Meals	$50 pp/day	2	ea	50	$100
Consumables	(Stakes etc)	allow		150	$180
Subtotal					**$9,725**
GST					**$972.5**
TOTAL					**$10,697.5**

2.10 Staggered Works Program

Table 3 presents a staggered work program suggested for Guilderton, that attempts to deal with Priority sites while spreading the cost over different years. Timing of different options and suggestions regarding personnel to be used are made, with the aim of providing MCC with a program that will not require immediate mobilisation of resources and allow a more gradual implementation of management for the Guilderton Pyp Grass.

Table 3 Proposed Staggered Works Program

Year	Season	Activity	Cost	Notes
2017	Autumn	Establish and Monitor Quadrats	$10,697.50	Encourage Community Involvement, with the aim of training community members to undertake this work
2017	Autumn	Spray Priority 1 and 2 Sites	$15,500.00	Contractor
2017	Spring	Respray Priority 1 and 2 Sites	$10,576.00	Contractor
2017	Spring	Spray remaining Priority 2 Sites	$13,395.00	Contractor
2018	Autumn	Respray Priority 1 and 2 Sites	$23,971.00	Contractor
2018	Winter	Targeted Replanting	TBA	Volunteers supervised by MCC/NACC
2018	Spring	Respray Priority 1 and 2 sites	$23,971.60	Contractor
2018	Spring	Weed wiping if required	TBA	Volunteers supervised by MCC/NACC
2018	Spring	Monitoring of Quadrats	TBA	Volunteers supervised by MCC/NACC
2019	Autumn	Respray Priority 1 and 2 Sites	$19,411.00	Contractor
2019	Autumn	Monitoring of Quadrats	TBA	Volunteers supervised by MCC/NACC
2019	Winter	Targeted Replanting	TBA	Volunteers supervised by MCC/NACC
2019	Spring	Monitoring of Quadrats	TBA	Volunteers supervised by MCC/NACC
2019	Spring	Respray Priority 1 and 2 sites	$19,411.00	Contractor

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