



Attadale Bushland Reserve Management Plan

March 2003



— City of —
Melville

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EXECUTIVE SUMMARY

The Attadale Foreshore is a unique public open space in that it includes large tracts of reticulated grass and remnant bushland set against the backdrop of the Swan River. The foreshore itself is an “A” class Nature Reserve while the river is part of the Swan Estuary Marine Park. The entire area from Pt Walter to Pt Waylen is also a Bush Forever site.

The Attadale Bushland Reserve consists of 3.15 hectares of remnant bush and open Casuarina woodland. The bushland Reserve is a small, degraded, but none-the-less significant and potentially valuable bushland environment in an otherwise highly developed area.

This management plan has identified two (2) distinct management zones – conservation and recreation.

The Conservation area is approximately 2.2 hectares in size and is bordered by the western boundary of the water corporation reserve opposite Roberts Road extends west along Burke Drive to a point opposite the boundary of numbers 32 and 34 Burke Drive. The shared use path on the northern edge defines the boundary between the Swan River Marine Estuary Park and adjoining Nature Reserve. This area will be managed for the purpose of conservation.

The recreation area is approximately 0.95 hectares in size and extends from the point opposite the boundary of numbers 32 and 34 Burke Drive, west to the road reservation opposite Paige St. The recreation area is also bordered to the north by the shared use path that is the boundary between the Swan Estuary Marine Park and the adjoining Nature Reserve. The recreation area includes the open stand of Casuarina trees and grassland. This area will be managed for recreation and will be largely left as it is with management consisting mainly of controlling the new growth resulting from the suckering habit of the larger trees.

The reserve itself has been largely neglected over the years with little or no management. While there is a reasonably good foundation to build on the impact of outside effects is evident.

This management plan aims to address the issues of management over a five-year period. Ultimately the long term aim is to put in place a system of management procedures that will educate and inform users of the area as well as engage the community in rehabilitation and revegetation activities in a n effort to restore the reserve to as close to its original condition as is feasible. In the pursuit of this a works plan has been included at the end of the document that will be implemented and monitored over this time frame.

SUMMARY OF THE RECOMMENDATIONS.

Recommendation 1

- 1a) In terms of management the Attadale Bushland Reserve has been identified as having two distinct areas that will be managed accordingly.
- 1b) The Conservation Area will be managed for the purposes of conservation and protection of existing vegetation and ongoing restoration activities to reduce weeds, improve biodiversity of wildlife and vegetation
- 1c) The Recreation Area will be largely left as it is with management extending to the control of new growth from suckering of the larger trees.

Recommendation 2

Dogs will be allowed within the Attadale Bushland Reserve but must be on a lead at all times within the Conservation area. In the Recreation area dogs will be required to be under the effective control of their owner. The City of Melville will actively enforce this law if users fail to comply. Adequate bins will be provided for the disposal of dog faeces

Recommendation 3

The shared use path will be widened from the current 1.8 metres to 3.0 metres to make the pathway safer. Widening this path will ensure that it is safer for all users and further protects the foreshore values in the area.

Recommendation 4

An education campaign informing residents of the problems associated with cats and the suggestion of a voluntary curfew may help reduce the impact of cats on the fauna in the conservation reserve over the long term.

Recommendation 5

In an effort to discourage illegal damage to trees, species chosen for rehabilitation will be native to the area, suitable to potential flooding and or salt inundation, and wherever possible with heights that will cause as little interference as possible with views.

Recommendation 6

Ongoing weed control will be necessary, particularly around the edges of the Reserve. Weed control will be undertaken by Council and by members of the active Friends groups under City of Melville supervision.

Recommendation 7

Modification of the linear drain in the conservation area and rehabilitation of sedgeland vegetation will help improve the quality of the water both in the drain area and of that discharging into the Swan River.

Recommendation 8

The border between the recreation area and the conservation area should be defined by signage and/or a physical barrier to help prevent the couch grass from further encroaching into the conservation area.

Recommendation 9

- 9a) Weed control and revegetation should be conducted on an annual basis and will need to continue until the indigenous natives replace the introduced species, and the remaining persistent weeds are under controlled management.
- 9b) In the short to medium term only a relatively small number of species, known as “core species”, should be planted as a part of the revegetation programme.

Recommendation 10

Temporary fencing will need to be erected around the revegetation zone each time it is extended to ensure young seedlings are protected from mowing and other activities occurring within the conservation area.

Recommendation 11

Consult with CALM and the Swan River Trust on the specifications and construction of the modified drain outfall zone.

Recommendation 12

Investigate the option for future environmental drainage infrastructure upgrade works of amalgamating the two adjacent stormwater outfall points to utilise the modified wetland filter.

Recommendation 13

Stormwater discharging through the modified wetland filter will be regularly monitored.

Recommendation 14

A full vegetation survey of the foreshore area adjacent to the Attadale Bushland Reserve is recommended during spring.

Recommendation 15

In view of the work already done by the community, CALM and the City of Melville, in restoring the area of foreshore adjacent to the Attadale Bushland Reserve, it is recommended that this collaborative effort be maintained and continues into the future.

Recommendation 16

- 16a) The grass verge immediately adjacent to the conservation area will be replaced with native vegetation and some formal parking bays
- 16b) The verge adjacent to the recreation area will remain as grass but will be upgraded with reticulation and some formal car parking.

Recommendation 17

The creation of diverse habitat is a cornerstone to the rehabilitation process. Logs from trees being removed should be used wherever possible to create habitat.

Recommendation 18

As part of the revegetation and other rehabilitation works in the Conservation area, public access will need to be controlled so that users are encouraged to stay on recognised paths. This will be done using a variety of methods including fencing, kerbing, strategic placement of logs, vegetation and signage.

Recommendation 19

A programme will be set in place to provide information and education both on site and through the City of Melville website.

Recommendation 20

Council will support and encourage the local “Friends group” and the community to be involved in a positive manner with the activities taking place in the conservation reserve.

Recommendation 21

Interpretive aids such as signs, notice boards, species plaques etc should be used to impart information to users about the Reserve. These could be placed alongside paths, seats, alongside picnic and public recreation areas to provide an insight into the local ecosystem and will help to develop peoples’ enthusiasm for the protection of its values.

Recommendation 22

Funding opportunities should be sought from appropriate agencies and should be based on a collaborative partnership between the community and the City of Melville.

1.0 INTRODUCTION

Attadale Bushland Reserve is a 3.15 -hectare parkland situated in Attadale, Perth Western Australia, on the Swan River foreshore part way between Point Walter and Point Waylen (Appendix 1 – Location Map). The Attadale Bushland Reserve is a small, degraded, but none-the-less significant and potentially valuable bushland environment in an otherwise highly developed area.

The reserve and its immediate surrounds can be viewed as four quite different ecological ‘zones’, though all are interconnected. This makes the habitat surprisingly diverse, given its limited area and development history. The zones referred to are:

- dry bushland,
- seasonal wetlands and an open drain (including a permanent pond fed by a fresh water spring),
- a salt patch and
- sedgeland/marshes.

In terms of management the Attadale Bushland Reserve has been identified as having two distinct areas that will be managed accordingly (Appendix 2 – Management Zones).

The Conservation Area

The eastern extent of the Conservation area is bordered by the western boundary of the water corporation reserve opposite Roberts Road, west along Burke Drive to a point opposite the boundary of numbers 32 and 34 Burke Drive. The shared use path on the northern edge defines the boundary between the Swan River Marine Estuary and adjoining Nature Reserve. This area will be managed for the purposes of conservation and protection of existing vegetation and ongoing restoration activities to reduce weeds, improve biodiversity of wildlife and vegetation. There will be no restriction to community use in this area, however users will be encouraged to support the conservation ethos of the area.

The Recreation Area

The recreation zone extends from the point opposite the boundary of numbers 32 and 34 Burke Drive west to the road reservation opposite Paige Street. The recreation area is also bordered to the north by the shared use path that also forms the boundary between the Swan Estuary Marine Park and adjoining Nature Reserve. The recreation area includes the open stand of Casuarina species and grassland south of the foreshore path. This area will be managed for recreation and will be largely left as it is with management extending to the control of new growth from suckering of the larger trees.

Managed sensitively, the entire area could become a haven for a wide variety of fauna, providing habitat for frogs, lizards, birds, turtles and native mammals, as well as expanding the biodiversity of the sedgeland and flora in the area.

Recommendation 1

- 1a) In terms of management, the Attadale Bushland Reserve has been identified as having two distinct areas that will be managed accordingly.**
- 1b) The Conservation Area will be managed for the purposes of conservation and protection of existing vegetation and ongoing restoration activities to reduce weeds, improve biodiversity of wildlife and vegetation**
- 1c) The Recreation Area will be largely left as it is with management extending to the control of new growth from suckering of the larger trees.**

1.1 SITE HISTORY

Prior to European settlement, the Attadale Bushland Reserve area would have been utilised by the local Beeliar people as a summer food source. The relatively small strip of fertile clay and silt flats would have yielded a wide variety of crustaceans, turtles, frogs, lizards, birds, mammals and fish (Cooper and McDonald, 1989).

When European farmers moved into the Melville area in the early 1830s, conflict arose almost immediately between the traditional Aboriginal occupiers and the newcomers. Years of tense cohabitation with sporadic outbreaks of violence ensued, until sheer numbers of white settlers finally forced the Beeliar people, who numbered only 60 in the 1830s from their traditional lands (Cooper and MacDonald, 1989).

In 1894, the stretch of land west of Alfred Cove (including the current site of the Attadale Bushland Reserve) was earmarked for residential development. However the swampy foreshore and relative isolation of the site (in terms of its distance from Perth City) deterred investors, and Attadale remained largely undeveloped until the 1950s (Cooper and MacDonald, 1989).

During 1964/65, a major land reclamation project was undertaken on the Swan River foreshore between Point Walter and Point Waylen. In a bid to improve the area for recreational usage, over 263 000 cubic metres of sand fill was dumped on the Attadale foreshore (Riggert, 1976). This effectively buried the fertile swamps and mudflats, and produced instead a much more sterile though, in the eyes of planners and developers, aesthetically pleasing beachfront environment.

Over the last 35 years, a combination of revegetation and regeneration has in part replaced the low-lying mudflats and swamps. Today the reserve is dominated by a combination of bushland, mainly by *Melaleuca raphiophylla*, sedgeland, and couch lawn parklands.

1.2 GEOLOGY

Underlying the sand fill that now forms the topsoil of the Attadale Bushland Reserve is a deep layer of depositional silts and clays, which make up Vasse soils. These extend eastward in a relatively thin margin along the river foreshore from the Reserve to the eastern side of Alfred Cove. In their natural state, these soils supported a rich and fertile wetland system. West of the reserve, Vasse soils give way to Spearwood (or Cottesloe) sands over limestone, which are typified by the soils of Point Walter Bushland and Blackwall Reach Reserve.

The overlying fill consists largely of sterile sands, not dissimilar to those of the Bassendean soils system. These soils are poor in nutrients and structure and are notoriously difficult to work with because of this.

1.3 HYDROLOGY

The natural hydrology of the area was irreparably altered by the reclamation project in the mid-1960s. Traditional mudflats and swamps of the estuarine system have been buried under over quarter of a million tonnes of sand fill, raising the low-lying areas of the old floodplain by several feet. This shoring up of the banks, together with the construction of numerous dams upstream, have reduced the flow of the Swan River to the point where the floodplain at Attadale Reserve, once a thriving wetland system, is now dominated by dry bushland and seasonally active damp/wetlands.

Today an open, linear drain, situated approximately 150 metres west of the Roberts Road intersection, traverses the Attadale Bushland Reserve and discharges storm water runoff into the Swan River (Appendix 1 – Location map; Appendix 3 – Site map and photographs). The drain is fed by pipes that terminate in a sediment trap at the boundary of the road verge and the Reserve. A fresh water spring also feeds the sediment trap pool all year round.

Another notable hydrological feature in the area is a pit situated in the sedgelands on the western side of the Reserve, set back approximately ten (10) metres from the shoreline. For a distance of approximately seven (7) metres along the high tide mark, odorous black silt appears in small quantities over the sand, and healthy algae growth, which occurs along the remainder of the reach, does not occur in this small section. The likely source is an old storm water drain. This could possibly be corrected through draining, dredging and rehabilitation, allowing filtered flow through rushes into the river. Research is currently underway to determine the cause. Further testing of water from the pit by an assay laboratory is recommended.

A patch of salt land also exists at the site (Appendix 3 – Site map and photographs). Covering little more than 300m², the area is most likely the result of leaching of salts from the original wetlands below. Prior to reclamation in the 1960s, salts would have been deposited in low-lying marshes during high tide periods. Evaporation of interstitial water results in an area of salt land that, without appropriate management, may spread to the surrounding areas.

1.4 VEGETATION

The original chain of seasonal and permanent wetlands along the Attadale foreshore and floodplain would have supported a range of distinct vegetative communities. The limits of these would have been defined predominantly by the topography of the site and proximity to the river and tidal zone. The saltmarsh and tidal areas (such as the one still existing at Alfred Cove) would have been colonised by samphire, saltbush and salt tolerant shrubs and rushes, as well as taller species such as *Casuarina obesa* (Saltwater paperbark) and *Melaleuca cuticularis* (Salt or River Sheoak). These would have provided shade and protection for aquatic fauna and vegetation. Mudflats – areas of bared out tidal ground kept free of vegetation by waders – would also have been a significant feature of the original foreshore.

Out on the floodplain, away from the tidal zone, salt tolerant species would have given way to freshwater permanent and seasonal wetland plants. These areas would have been dominated by an overstorey of *Eucalyptus rudis* (Flooded gum), *Acacia saligna* (Golden wreath wattle), *Melaleuca preissiana* (Stout paperbark), *Melaleuca raphiophylla* (Fresh water paperbark) and *Melaleuca viminea* (Mohan). The understorey would have been diverse and would have included, amongst other species, *Hypocalymma augustifolium* (White myrtle), *Regelia ciliata*, *Centella asiatica* and a range of fresh water reeds and rushes in the wet zones. *Nuytsia floribunda* (Christmas tree), *Xanthorrhoea preisii* (Grasstree) and *Regelia inops* would have been dominant colonisers of the freshwater wetland banks and damp zone (Appendix 6 – Complete list of species suitable for revegetation of the Reserve).

In the higher and drier areas, vegetation would have graded into a Marri and Tuart woodland, interspersed with pockets of *Agonis flexuosa* (WA peppermint), *Nuytsia floribunda* (Christmas tree), *Gyrostemon ramulosus* (Corky bark), *Jacksonia sternbergiana* (Green stinkwood) and *Acacia* species. The understorey would have included *Conostylis candicans* (Grey cottonheads), *Eremaea pauciflora*, *Sollya heterophylla* (Australian Bluebell), *Spyridium globulosum* (Basket bush) and *Xanthorrhoea* (Grasstree/ (Appendix 7 – complete list of species suitable for revegetation of the Reserve).

Following the reclamation project of the 1960s, the once thriving estuarine mudflats were replaced with a long, narrow stretch of sandy shore. Today this shoreline remains more-or-less devoid of vegetation. The open ground, shallow waters and spectacular city views have made the area very popular with recreational users, and constant foot traffic has prevented vegetation from becoming re-established in this area (Appendix 3 – Site map and photographs).

South of the beach a lip marks the high tide zone and effectively divides the estuarine from the floodplain environment. Here a small expanse of Paperbark and Sheoak woodland dominates the reserve's vegetative communities.

In the northwest corner of the reserve, a very dense stand of sheoaks with little understorey competes for light (Appendix 3 – Site map and photographs). Although this species has the general appearance of *Casuarina Obesa* (Saltwater or River sheoak), its growth habit and evidence of suckering in the absence of fire suggest it is actually a different species. Dr John Beard has identified the species as *Casuarina pauper* (Appendix 8 – Letter from Dr John Beard regarding the weed status of *Casuarina pauper*), which apparently is an eastern states native, whose suckering habit makes it invasive.

The remainder of the designated reserve area is colonised by fragmented clumps of *Melaleuca raphiophylla* interspersed and underlaid by mown couch lawn. While numerous Melaleucas grow at the site, the observation was made that the population in general does not look healthy. Large numbers of dead branches and yellowing foliage may be the result of poisoning by one or a few dissatisfied local residents. A thorough vegetation survey should be carried out in spring to get a more thorough idea of the full complement of vegetative species at the site. A rudimentary survey was conducted during December, when this plan was commissioned, and the following species were noted:

1.4.1 DRYLAND AREAS

Native species

- *Melaleuca raphiophylla* (Freshwater paperbark)
- *Acacia cyclops* (Red eyed wattle)
- *Dryandra sessilis* (Parrot bush)
- *Hardenbergia comptoniana* (Hardenbergia)

Weed species

- *Cynodon dactylon* (Couch grass)
- *Washingtonia filifera* (Cotton palm)
- *Eucalyptus cladocalyx* (Sugar gum)
- *Lupinus sp.* (Lupins)
- *Rumex sp.* (Dock weed)
- Single Palm tree (not identified)
- *Pelargonium spp.*
- *Avena fatua* (Wild oats)
- *Casuarina pauper* (Appendix 8 - Letter from Dr John Beard regarding the weed status of *Casuarina pauper*)

1.4.2 SEASONAL WETLANDS, DAMPLANDS AND OPEN DRAIN

Native species

- *Melaleuca raphiophylla* (Freshwater paperbark)
- *Dryandra sessilis* (Parrot bush)
- *Eucalyptus rudis* (Flooded gum) – sapling likely from revegetation effort
- *Melaleuca viminea* (Mohan) – saplings and young plants likely from revegetation
- *Lobelia alata* (Ribbed lobelia)
- *Isolepis nodosa* (Knotted club rush)
- *Schoenoplectus validus* (Lake club rush)
- *Acacia cyclops* (Red eyed wattle)
- *Juncus kraussii* (Shore rush)
- *Juncus pallidus* (Pale rush)
- *Centella asiatica* (Centella)

Weed species

- *Casuarina obesa*
- *Cynodon dactylon* (Couch grass)
- *Pennisetum clandestinum* (Kikuyu)
- *Paspalum distichum* (Paspalum)
- *Miscanthus sinsensis*
- *Pelargonium spp.*
- *Avena fatua* (Wild oats)
- *Rumex sp.* (Dock weed)
- *Casuarina pauper* (Appendix 8 - Letter from Dr John Beard regarding the weed status of *Casuarina pauper*)
- *Other unidentified Casuarina species.*
- *Schinus terebinthifolia* (Japanese pepper)
- *Watsonia bulbifera* (Watsonia)
- *Cortaderia selloana* (Pampas grass)
- *Typha orientalis* (Cumbungi)
- *Lupinus sp.* (Lupins)
- *Gomphocarpus fruticosus* (Swan plant, Cottonbush)
- *Gladiolus spp.* (Wild Gladiola)

1.4.3 SALT LAND

Native species

- *Halosarcia indica* (*ssp. bidens*) (Samphire)
- *Juncus kraussii* (Shore rush)
- *Melaleuca raphiophylla* (Freshwater paperbark) Note: dead and dying individuals of the edge of the salt patch suggest area is spreading.
- *Melaleuca viminea* (Mohan) Note: Possibly revegetated varieties. Appear to be dying – but could also be result of poisoning or other cause)

- *Eucalyptus rudis* (Flooded gum) Note: Also appears to be revegetated, and is not coping in the saline environment.

-

Weed species

- *Avena fatua* (Wild oats)
- *Rumex sp.* (Dock weed)

1.4.4 REED BEDS/ MARSHES

Because these exist outside of the reserve boundary, a survey was not conducted in this area. However a number of native reed species appear to exist in the area, *Juncus krausii* and *Schoenoplectus validus* among them. Wild oats, and possibly some weed reeds, amongst others, appear to be a problem in the reed beds.

1.5 FAUNA

The original fauna of the Attadale foreshore would have been as diverse as the vegetation. Access to fresh water, damp soils and relatively lush vegetation, variety of habitat, and proximity to the river, would have made the area suitable for a wide variety of aquatic and terrestrial organisms.

The area is also an important site for migratory, nomadic and sedentary birds. There is, however, a lack of fringing and emergent aquatic plants and other in-stream habitat along the Reserve foreshore. This, combined with a shortage of nesting and feeding areas in the reserve itself, has meant the Alfred Cove foreshore (where a larger pocket of estuarine marshland runs down to the water's edge) has become a more popular site for breeding and feeding birds.

Even with the lack of suitable habitat dozens of species still utilise the Attadale foreshore area (Birds Australia Western Australia, 1987). These include:

- | | |
|-----------------------|----------------------|
| - Red-capped Plovers | - Rainbow Bee Eaters |
| - Red-capped Parrots | - Darters |
| - Thornbills | - Cormorants |
| - Common Greenshanks | - Terns |
| - Galahs | - Ibis |
| - Black Swans | - Pelicans |
| - Striated Pardalotes | - Herons |
| - Tree martins | - Honey eaters |

1.6 ENVIRONMENTAL THREATS AND IMPACTS

The following is a list of some of the more obvious threats to the site and the impact of these on the two reserve areas and adjoining foreshore. The issues raised here are addressed in Section 2.0.

1.6.1 LEISURE ACTIVITIES

Dog Walking

Both the recreation and conservation area are very popular with dog owners. The heavy traffic along the beach area and tracks in the conservation reserve is preventing regeneration and further exacerbating erosion in several areas, particularly for sedgeland species.

The shared use path to the north of the conservation reserve defines the boundary between CALM managed land and Council managed land. The CALM land to the north of the path is Nature Reserve and Marine Park. This area is defined by state government policy as ‘dog free’. During two field trips to the site, dogs were observed chasing birds on the shore and in the water. At low tide, both dogs and people utilised the low-lying mud/sand flats as an extension of the beach front, trampling any emerging vegetation. Dogs are actively discouraged from the mudflat area through the installation of a low-lying fence to demarcate the two areas. Interpretive signage has now been installed by CALM and the City of Melville. CALM undertakes patrols of the Nature Reserve and Marine Park area on a regular basis to enforce the “no dogs” status.

Dogs are allowed within the Attadale Bushland Reserve but must be on a lead at all times within the Conservation area. In the Recreation area, dogs are required to be under the effective control of their owner at all times. Dog owners, in accordance with the Dog Act, should remove all dog faeces. Adequate bins will be provided for the disposal of dog faeces. The City of Melville will take an active role in policing the area to make sure this law is observed.

Recommendation 2

Dogs will be allowed within the Council controlled reserve but must be on a lead at all times within the Conservation area. In the Recreation area dogs will be required to be under the effective control of their owner. The City of Melville will actively enforce this law if users fail to comply. Adequate bins will be provided for the disposal of dog faeces

Cycling and Walking

Currently, a shared use path runs along the length of the Attadale foreshore, parallel to the beach (Appendix 3 – Site map and photographs). At present many recreational users of the area are failing to keep to the formal pathway. Numerous tracks have been formed through the bushland, trampling vegetation and preventing regrowth. Homemade bike jumps were also observed on the eastern side of the drain (Appendix 3 – Site map and photographs).

The shared use path will be widened from the current 1.8 metres to 3.0 metres to make the pathway safer. Widening this path will ensure that it is safer for all users and further protects the foreshore values in the area. (Appendix 4 – Reserve concept plan). A formal path is essential in the park, as is encouraging users to keep to its boundaries (Appendix 3 – Site map and photographs).

Recommendation 3

The shared use path will be widened from the current 1.8 metres to 3 0 metres to make the pathway safer. Widening this path will ensure that it is safer for all users and further protects the foreshore values in the area.

Other leisure activities

Picnicking, kite flying, bird watching, canoeing etc.

As with cycling, walking and dog exercising, these activities all impact on the local area, and at present are being conducted without restriction throughout the conservation reserve. It is hoped that with more signage and definition between the recreation area and the conservation area that users will be more inclined to use the recreation areas or the large oval area to the east of Roberts Road.

1.6.2 CATS

The close proximity of housing to an area that is prolific with bird life ensures the presence of cats in the Reserve. In the absence of laws dictating curfews for cats, their presence is likely to be an ongoing management issue. Education of the local community (Section 2.5) may assist to some degree. An education campaign informing residents of the problems associated with cats and suggestions along with the suggestion of a voluntary curfew may help reduce the impact of cats on the fauna in the conservation reserve over the long term.

Recommendation 4

An education campaign informing residents of the problems associated with cats and the suggestion of a voluntary curfew may help reduce the impact of cats on the fauna in the conservation reserve over the long term.

1.6.3 ILLEGAL POISONING OF VEGETATION

Numerous Melaleucas and some casuarinas at the site were observed to be sick, even those on apparently non-saline soils. This is unlikely to be due to disease such as Phytophthora, (because phytophthora is much less likely to be present in limestone and quartz rich soils devoid of clay). The problem is far more likely to be the result of illegal herbicide use and the determination of some individuals to maintain views of the city. Given land values in the surrounding residential area and the close proximity of houses to the foreshore, vegetation height will be an ongoing issue for managers of the site, unless reasonable compromises between managers and landowners can be reached.

Future restoration activities within the conservation reserve will need to consider tree heights so that future vandalism on restored vegetation can be prevented. In an effort to discourage illegal damage to trees, the species chosen will be native to the area, suitable to potential flooding and or salt inundation, and wherever possible with heights that will cause as little interference as possible with views.

Recommendation 5

In an effort to discourage illegal damage to trees, species chosen for rehabilitation will be native to the area, suitable to potential flooding and or salt inundation, and wherever possible with heights that will cause as little interference as possible with views.

1.6.4 WEED INFESTATION

Weeds occur in almost all areas of the Reserve and being rapid colonisers of disturbed areas, have become a major component of the vegetative communities at the site (Section 1.4). A number of factors render the reserve susceptible to weed invasion. These include the high pedestrian usage, the adjacent large expanse of turfed parkland, and open drainage running through the centre (Appendix 3 – Site map and photographs). Ongoing weed control will therefore be necessary, particularly around the edges of the Reserve (Section 2.9 – Maintenance and monitoring). Weed control will be undertaken by Council and by members of the active Friends groups under City of Melville supervision, as part of the program as outlined in Section 2.9 of this plan. Weed species will be correctly identified prior to removal, including the exotic Casuarina species (the latter by a professional botanist).

Wherever possible, local seed will be utilised in restoration activities, which will be collected by trained professionals to ensure viability and suitability.

Recommendation 6

Ongoing weed control will be necessary, particularly around the edges of the Reserve. Weed control will be undertaken by Council and by members of the active Friends groups under City of Melville supervision.

1.6.5 STORM WATER DRAINAGE

In its current state the open linear stormwater drain running through the Reserve (Appendix 3 – Site map and photographs) contributes only a small portion of its full potential as a thriving seasonal wetland habitat, particularly during the summer months. Further, it is one of several points of entry for weeds, rubbish, and also storm water pollutants into the reserve and river. Pools left in the drain, particularly following a storm event, provide potential mosquito breeding sites. Lack of appropriate vegetation on the banks and in-stream, are currently limiting the numbers and varieties of predators necessary for effective pest control. The drain becomes a narrow, eroded gully at its northern end, close to its discharge point into the Swan River, caused by large volumes of water rushing down the narrow linear channel during storm events.

Clean up of the drain and rehabilitation of sedgeland vegetation in the conservation area will help improve the quality of the water both in the drain area and of that discharging into the Swan River.

Recommendation 7

Modification of the linear drain in the conservation area and rehabilitation of sedgeland vegetation will help improve the quality of the water both in the drain area and of that discharging into the Swan River.

1.6.6 MAINTENANCE ACTIVITIES

Regular maintenance of the park environment, particularly the turfed areas, is critical. However, mowing close to and into tree lines has had the effect of increasing the grass areas and preventing natural regeneration from occurring. It is recommended that the border between the recreation area and the conservation area be defined by signage and/or a physical barrier to help prevent the couch grass from further encroaching into the conservation area. Following past maintenance practices of the drainage area, sediments were dumped rather than removed on the western side of the drain. This has now become a weedy mound with *Typha orientalis* (Bullrush) colonising the pool below the water line.

Recommendation 8

The border between the recreation area and the conservation area should be defined by signage and/or a physical barrier to help prevent the couch grass from further encroaching into the conservation area.

2.0 MANAGEMENT STRATEGIES

2.1 WEED CONTROL

Weed invasion is a serious issue throughout the conservation reserve and should be addressed at the outset of the management programme. In some instances it may be necessary to conduct weed control for several years before any other follow-up works can be attempted.

Species occurring in low densities or as scattered individuals should be removed at the beginning of the weeding programme, preventing them from becoming too well established. Several species in the Reserve fit this category, such as the palm species. The remaining weeds, most of which are well entrenched, will be controlled only through a concentrated ongoing programme. Species which fall into this category include pelargonium spp, couch grass, Kikuyu, etc

Follow-up control is very important, as seeds and corms of some species may persist in the ground for several years. Given the range of weed species present at the site, an integrated attack combining physical removal, natural suppression and containment and, chemical control will provide the most efficient and sustainable solution to the weed problem, over time.

Approximate time guidelines for completing weeding tasks/achieving outcomes are suggested in Section 2.8 – Schedule of works.

2.1.1 DRY BUSHLAND

Low density and scattered individual species or clumps

Washingtonia filifera (Cotton palm)

Hand pull or grub out (using machinery if necessary on larger individuals), ensuring that all parts are removed.

Eucalyptus cladocalyx (Sugar gum, single plant only)

Introduced eastern states variety. At present it poses no immediate threat to the reserve. Removal would therefore be up to the group and/or council. This could be achieved by lopping to ground level and painting with glyphosate. Further monitoring to prevent resprouting and the removal of any seedlings would be required.

Palm tree (species not identified, single plant only)

See control for *W. filifera* (above).

Higher density and scattered individual species or clumps

Lupinus sp. (Lupins)

Target initially with an intensive hand grubbing programme. Follow-up in successive years (say three to five) by hand pulling/ grubbing re-emerging plants prior to seeding.

Pelargonium sp.

See control for *Lupinus sp.* (above).

Cynodon dactylon (Couch grass)

Where couch extends into the bushland areas, spraying with flauzifop-butyl (Swan River Trust, 1995) or a strong mix of glyphosate is recommended. Spray regularly during its main growth period (up to five times, whenever new growth begins to re-emerge) until new growth ceases to appear.

Over the long-term period, spraying may be required at intervals to control couch, particularly around bushland borders where it is likely to creep back in (Section 2.9 – Maintenance and monitoring). Recommend spraying of couch around existing clumps, gradually extending the lawn-free area over a number of years (Appendix 6 – Revegetation plan).

A flat concrete or log border should be placed along the native vegetation boundary. This will aid in preventing couch from creeping back into the bushland and will more clearly define recreation/public access areas and mowing edges. While Couch is in the process of being eradicated (a process that will take around four to five years), temporary fencing should be erected around revegetated areas to protect seedlings and delineate paths for mowers.

Avena fatula (Wild oats)

Spray wild oats with fusilade, and repeat over successive years during main growth period prior to setting seed. Seeds of this species are known to exist in the soil for up to seven years before germinating.

Rumex sp. (Dock weed)

Dock is very difficult to hand weed. Best method of control is to cut back and remove seed heads every year. Continual cutting will eventually eliminate the plant (Swan River Trust, 1995).

Casuarina pauper

See section 2.1.2.

2.1.2 SEASONAL WETLANDS AND OPEN DRAIN

Low density and scattered individual species or clumps

Watsonia bulbifera (Watsonia)

Hand pull or grub small clumps when soil is moist, making sure corms are removed, through sieving or similar process. Cut persistent clumps and wipe with glyphosate just prior to flowering. Prune and remove any seed heads from the site.

Cortaderia selloana (Pampas grass)

Best way to remove this species is by utilising a backhoe to rip out the entire plant, roots and all. Spray any new regrowth (though none should occur) with glyphosate. Ensure all flower heads are pruned and removed from the site.

Typha orientalis

Occurs on the site only in the spring-fed sediment trap/pond and in patches along the drain. Recommend cutting stems as low as possible in late summer. Flooding during winter will drown the typha, providing it is submerged for several weeks.

Higher density and wide spread species

Pennisetum clandestinum (Kikuyu)

In more sparsely colonised areas, spot spray with glyphosate. Two applications may be necessary for some areas. Where plants clump densely in the wetter areas, rake out and dig to remove thatch, then cover with pinned black plastic and allow it to drown. Spray live runners the following summer. Kikuyu is not a shade lover, and as overstorey revegetation becomes more established it will shade the Kikuyu and thus help to control its spread.

Paspalum distichum

See control for *Pennisetum clandestinum* (above).

Cynodon dactylon (Couch grass)

See section 2.1.1.

Rumex sp. (Dock weed)

See section 2.1.1

Pelargonium sp.

See section 2.1.1

Lupinus sp.

See section 2.1.1

Casuarina pauper

(Appendix 8 – Letter from Dr John Beard regarding the weed status of *Casuarina pauper*).

This species occurs both in the conservation and the recreation area. In the conservation area the trees should be removed gradually, over say, a seven year period in order to maintain some of the area's shade, habitat, and soil protection, whilst revegetated species become established (Appendix 6 – Revegetation plan).

Removed logs could be utilised in the bushland (Section 2.3 – Habitat creation; Appendix 4 – Reserve concept plan) to provide habitat, Cut to stump and paint with glyphosate. Follow-up cutting and painting may be required. .

In the recreation area the main trees will be left, however due to the prolific suckering habit of the tree and the tendency to spread over a large area, the suckers should be poisoned immediately by stem injection and eventually removed.

Schinus terebinthifolia (Japanese pepper)

Cut to stump and paint (see treatment for *Casuarina pauper* above). Small plants can be hand pulled.

Gomphocarpus fruticosus (Swan plant; Cottonbush)

Hand pull and grub plants prior to flowering and setting seed in spring. Follow-up hand weeding will be necessary over several years. Remove any flowers and seedpods from the site.

Gladiolus sp. (Gladiola)

Hand grub thoroughly in the first year of control. Spreading rapidly from both seeds and corms, Gladiolas will require follow-up weeding by grubbing/ hand pulling in successive years. Remove any flowers and seed heads from site.

2.1.3 SALT LAND

Avena fatua (Wild oats)

See section 2.1.1.

Rumex sp. (Dock weed)

See section 2.1.1.

2.1.4 REED BEDS/ MARSH LAND

A thorough survey of this area, which is outside of the reserve boundary, has yet to be conducted. Wild oats are a problem in the marshes; however spraying with fusilade would not be appropriate owing to the presence of reeds and grasses. Long-term management will probably involve hand removal of some species and planting over species such as Wild oats and in bare areas with native reeds and rushes. A thorough vegetation survey, carried out in spring, is recommended.

2.1.5 FORESHORE

While most of the foreshore beachfront is devoid of vegetation, weeds have encroached on the area via the drain and spreading from the adjoining bushland (Appendix 3 – Site map and photographs). Treat according to individual species treatments mentioned above where appropriate and in conjunction with targeted weed management undertaken by CALM.

2.1.6 ROAD VERGE

See section 2.1.1 – control of *Cynodon dactylon* (Couch grass). Scalping may also be an option in this area (Section 2.2.6).

NOTE:

- *Above recommendations intended as a guide only. Consult a professional spray operator regarding appropriate usage, dilution and application of chemicals.*
- *Be cautious when spraying around native vegetation, use only professional bushland spraying contractor with experience.*
- *Avoid spraying near water. Wetland spraying should only be conducted during the drier months, and then only when unavoidable.*
- *Manual control methods should always be utilised in preference to chemical solutions. With the help of active Friends group, this may be more achievable.*

2.2 REVEGETATION

Once the weed management programme has commenced, revegetation becomes the next priority, with one immediately following on from the other. For five to seven years at least, weed control and revegetation will need to be conducted on an annual basis. This will need to continue until the indigenous natives replace the introduced species, and the remaining persistent weeds are under controlled management (section 2.8 – Schedule of works, and section 2.9 – Maintenance and Monitoring). Working in partnership with the local Friends’ Group will aid in obtaining outside funding to complete this work over a number of years.

In the short to medium term (Section 2.8 – Schedule of works) only a relatively small number of individuals, known as core species, should be planted as a part of the revegetation programme. These are listed, along with suggested planting locations, in Appendix 6 – Revegetation Plan. All of these are local endemic species to this area. Because the Reserve is situated in a botanically diverse area (where Spearwood, or Cottesloe, sands meet Vasse soils) the range of endemic species that could be grown at the site is extensive. Some of these should be added over the medium to long term, once core species are established and shade is present.

Given the original soils found in this area, long term restoration of species which are not currently present at the site (due to degradation and or loss of biodiversity) should be undertaken in an effort to return the area to as close to its original condition as possible. A complete list of suitable species, taking into account traditional and overlying soils of the Reserve, is provided in Appendix 7.

Recommendation 9

- 9a) Weed control and revegetation should be conducted on an annual basis and will need to continue until the indigenous natives replace the introduced species, and the remaining persistent weeds are under controlled management.**
- 9b) In the short to medium term only a relatively small number of species, known as “core species”, should be planted as a part of the revegetation programme.**

2.2.1 DRY BUSHLAND

The dominant understorey of the bushland area is Couch. It is critical that this species is under control prior to commencing any revegetation in this area. Couch is notoriously difficult to eliminate (Section 2.1.1). Couch may require four or five chemical applications before weakening and finally dying off (Section 2.1 – Weed control).

Once couch and other bushland weeds have been sufficiently diminished, core species planting can commence. Begin initially by planting within the current melaleuca borders as couch begins to come under control. Continue planting out from current clumps (say, 10m or so per year in each direction), following the receding Couch, right up to the recreation area (Appendix 4 – Reserve plan; Appendix 6 – Revegetation plan).

Temporary fencing will need to be erected around the revegetation zone each time it is extended to ensure young seedlings are protected from mowing and other activities occurring within the conservation area.

Other species, listed in Appendix 7, can be added to provide more diversity of habitat in the medium to long term.

Recommendation 10

Temporary fencing will need to be erected around the revegetation zone each time it is extended to ensure young seedlings are protected from mowing and other activities occurring within the conservation area.

2.2.2 SEASONAL WETLANDS AND OPEN DRAIN

Road drainage and seasonal flooding are issues in the Conservation Reserve. Thorough filtering of sediments and runoff pollutants as well as control of water flows is required to enhance habitat values of the drain and to protect the river at the point of discharge. Consultation with CALM and the Swan River Trust will need to be undertaken to work out the details of this activity as it is currently outside of the scope of this plan.

Recommendation 11

Consult with CALM and the Swan River Trust on the specifications and construction of the modified drain outfall zone.

To achieve this, reshaping of the drain into meanders and wide, shallow vegetated pools is recommended (Appendix 5 – Constructed Wetland Filter Concept Plan). Planting of sedge beds through these pools (or settling/overflow flood ways) will filter discharging flows, as well as slowing the water down. This will considerably reduce the risk of erosion during peak flow periods. Planting of other appropriate wetland species on the banks (Appendix 6 – Revegetation plan) will further reduce erosion risks, as well as providing additional habitat, which will diversify insect predator populations at the site, reducing considerably the number of mosquitoes and midges in the area.

Two catchments also feed into areas east and west of the reserve. The City of Melville Stormwater Management Strategy, adopted in 1997, identified that the outfall from the two adjacent catchments should be treated via natural filtration systems. There is great potential to add the runoff from these catchments into the constructed wetland. This will be investigated for future environmental drainage infrastructure upgrade works.

Recommendation 12

Investigate the option for future environmental drainage infrastructure upgrade works of amalgamating the two adjacent stormwater outfall points to utilise the modified wetland filter.

Any drainage works undertaken will need to consider community safety and access issues. Monitoring of the water quality will provide an indication of the effectiveness of this treatment.

Recommendation 13

Stormwater discharging through the modified wetland filter will be regularly monitored.

2.2.3 SALT LAND

Dying and dead Melaleucas were observed at the edge of the salt patch situated east of the open drain (Appendix 3 – Site map and photographs). This is a good indication that the salt patch may be spreading. As long as understorey in the area remains sparse, and soils are exposed to the elements, the patch could continue to expand. Dense stands of vegetation over salt patches are the best method of controlling their expansion. Revegetation of this area should be considered a priority management action (Appendix 6 – Schedule of works). Salt-tolerant species that would be suitable for planting in this area are listed in Appendix 6 – Revegetation plan.

2.2.4 REED BEDS/ MARSH LAND

A full vegetation survey of the area outside of the Attadale Bushland Reserve is recommended during spring. This should be done prior to planning any conservation works or revegetation programmes in the area.

Recommendation 14

A full vegetation survey of the foreshore area adjacent to the Attadale Bushland Reserve is recommended during spring.

2.2.5 FORESHORE

The Department of Conservation and Land Management together with the Friends of Attadale Foreshore are working together to undertake revegetation of the foreshore area by planting a variety of sedges, including *Isolepis nodosa*. In the last 12 months, CALM, Attadale Primary School, the Friends of Attadale Foreshore and the City of Melville have planted over 12,000 sedge species that are being regularly watered by the Friends.

It is important to recognise this link between State Government, Local Government and the community in helping preserve this area along the foreshore. Continued planting of sedges and rushes over successive summers (when they are active) down to and past the low tide mark is recommended.

While some of the current low islands should remain bared, planting of others (in carefully selected areas; Appendix 6 – Revegetation plan) with *Juncus kraussii*, *Gahnia trifida*, *Atriplex cinerea* and other salt-tolerant semi-aquatic local natives would provide a rich and varied habitat for feeding and nesting birds.

As *Casuarina pauper* and other *Casuarina* species are gradually removed from the foreshore and reserve, they should be replaced, though much more sparsely, with an overstorey of *Casuarina obesa* (Salt water/River Sheoak), *Melaleuca cuticularis* (Salt water paperbark) and a range of understorey species. When placed at reasonable distances apart the *Casuarina obesa* has a drooping habit, and does not stand upright, obscuring views and blocking all sunlight from the understorey, as is currently the case with the non-native species. Furthermore, the line of *Casuarina obesa* should be extended down to the shoreline (Appendix 6 – Revegetation plan). Here it will droop out over the water, providing valuable shade and cover for some species of aquatic animals, as well as providing protection and providing conditions suitable for establishment of surrounding vegetation.

Liaison with CALM will be necessary to undertake this work as this is outside the scope of this plan. Riverside *Casuarina obesa* also provide habitat for Darters, which can be seen nesting in branches over-hanging the Harvey River (Powell, 1990).

Recommendation 15

In view of the work already done by the community, CALM and the City of Melville, in restoring the area of foreshore adjacent to the Attadale Bushland Reserve, it is recommended that this collaborative effort be maintained and continues into the future.

2.2.6 ROAD VERGE

Total removal of the couch lawn along the verge immediately adjacent to the conservation area is recommended and should be replaced with native vegetation. (Appendix 4 – Site concept plan). This could be done by scalping (ie. removal of all vegetative material, seeds and corms by taking off the top layer of soil). Spraying of Couch is another alternative, however it is a notoriously difficult species to remove and can only be achieved by repeated application (up to five times on all new growth) of a high concentration of glyphosate or by using flauzifop-butyl (Swan River Trust, 1995) (Section 2.1.1).

In place of the couch, an attractive border of select local native species (Appendix 6 – Revegetation plan) should be planted out. This, combined with well-defined parking areas (Appendix 4 – Reserve concept plan), will provide a practical buffer between the bushland and the road as well as being an attractive, landscaped addition to the current foreshore views. The addition of rocks was considered, however a softer approach using native shrubs and parking bays will look neater and be safer for visitors to use.

The verge adjacent to the recreation area will remain as grass but should be upgraded with reticulation and some additional formal car parking.

Recommendation 16

16a) The grass verge immediately adjacent to the conservation area will be replaced with native vegetation and some formal parking bays

16b) The verge adjacent to the recreation area will remain as grass but will be upgraded with reticulation and some formal car parking.

2.3 HABITAT CREATION

While revegetation will go a long way toward redressing the habitat imbalance at the site, it will be decades before the Reserve is able to provide its own diverse range of habitats, such as those provided by fallen and hollow logs.

Logs are particularly important in wetland areas as they provide shelter and protection for a wide variety of aquatic animals, aquatic and semi-aquatic plants and nesting and feeding birds. Logs in wetlands also assist in the regulation of water flow as well as protecting both banks and bed from erosion (Appendix 4 - Reserve concept plan; Appendix 5 – Constructed Wetland Filter Concept Plan).

The open drain area, once reshaped, will provide an excellent habitat for a variety of wetland species, particularly frogs. Reed beds, dense bank vegetation, riffles and logs will improve the ecological value of the drain, increasing the diversity of the wetland areas, and reducing problems of nuisance mosquitoes and midges in the area.

Logs could also be used on the higher ground in the reserve, delineating picnic areas, mower paths and parking areas from the surrounding bush conservation area, as well as providing additional habitat for terrestrial animals and vegetation (Appendix 3 – Reserve concept plan; Appendix 6 – Revegetation plan).

Recommendation 17

The creation of diverse habitat is a cornerstone to the rehabilitation process. Logs from trees being removed should be used wherever possible to create habitat.

2.4 PUBLIC AREAS AND ACCESS POINTS

As part of the revegetation and other rehabilitation works in the Conservation area, it is recommended that public access be controlled so that users are encouraged to stay on recognised paths. It is a well-established fact that unimpeded access is one of the main degrading processes in natural areas (Appendix 4 – Reserve Concept Plan). A combination of strategies would best be utilised to achieve this outcome. These would include:

- Fencing
Temporary fencing (star picket and chain or other similar) may need to be erected around specific revegetation areas in the conservation reserve to ensure young seedlings are protected from mowing activities and other users in the area until they are established. This method will be employed as a short to medium term option. Long term, vegetation borders will be utilised.
- Flat concrete borders (kerbing) or logs
Low borders do not prevent the public from entering the conservation areas, however they do clearly demarcate areas and help to more clearly define pathways and access areas. They can also act as a physical barrier to prevent couch grass from spreading into weed free areas. The most aesthetically appropriate treatments will be utilised to cause a minimal visual impact on the conservation area.
- ‘Sleeping Beauty’ borders
These are created by planting a narrow zone of prickly native shrubs (eg. *Dryandra sessilis*, *Hakea sp.*, *Xanthorrhoea preissii* etc) around the areas to be protected. These are the most suitable options and will be employed the most frequently in order to create borders between the conservation area, car parks and/or recreation areas.
- Carparks:
The installation of car parking bays along Burke Drive (Appendix 4 – Reserve Concept Plan) has been identified in other foreshore plans as appropriate. It will encourage visitors to avoid parking on grassland recreation areas or proposed conservation zone land. The size and exact location of the car parks will be determined at a later stage when an overall parking plan is drawn up for the Burke Drive area.
- Signage
Signs are an obvious way of alerting people to restrictions (eg. ‘Keep to the walkways’, ‘Dogs on leash’ etc) and can also make them aware of areas in the reserve or nearby that they can access (eg. ‘Picnic area’, ‘Dog exercise area’ etc). Directive signs such as these, particularly in a conservation area, work best when accompanied by interpretive/educational signs and notices (section 2.5 – Education and interpretation). Signage in the area needs to be reviewed and possibly upgraded to ensure that the conservation and recreation areas are well defined and users are aware of possible implications of such signage.
- Fines
As a last resort, fines could be imposed on people who persist in ignoring signs and borders in the Reserve. The system of warnings and fines will be considered for those not adhering to the laws relating to removal of dog faeces. This would need to be enforced by Council Rangers.
- Seating
There are a limited number of seats along the path in this area. A review of the number of seats and their location under shade trees needs to be undertaken, and additional seats should be spaced at regular intervals along the path.

Recommendation 18

As part of the revegetation and other rehabilitation works in the Conservation area, public access will need to be controlled so that users are encouraged to stay on recognised paths. This will be done using a variety of methods including fencing, kerbing, and strategic placement of logs, vegetation and signage.

2.5 EDUCATION

Preservation of the area for conservation will only be possible in the long term if the local community and other regular users of the Reserve develop an understanding of the area, in all its intricacy, and an appreciation of its values. This can only be achieved through education.

2.5.1 PUBLIC INFORMATION AND EDUCATION

The area is used extensively by a broad cross section of the community. Many users come from outside of the City of Melville to enjoy the unique large open space. Education and information about the reserve and its management is important particularly if we are to engender a sense of ownership of the area and encourage people to do the right thing.

A programme of education and information should include interpretive signage on site and regular updates on the City of Melville website that would include a copy of the Management Plan and a description of any planned works and community working days.

Recommendation 19

A programme will be set in place to provide information and education both on site and through the City of Melville website.

2.5.2 RESOURCING AND EXPANDING THE CURRENT 'FRIENDS' GROUP

Comprised totally of local volunteers, 'Friends' groups frequently act as intermediaries between state and local government and the local community. They are generally experts on the local environment, and have a wealth of combined knowledge about the area. Often, they provide advice and information to neighbours and other users of the area in the course of their works at the site.

Given sufficient resources (together with Council support – Section 2.7 – Funding and labour) and increased participation from volunteers, the Friends of Attadale Foreshore Reserve could provide an excellent source of information about the site, its protection and maintenance, for all users of the Reserve.

This could be achieved through organisation of general meetings, information days, working days etc, and could include local residents, local schools and other community groups as well as hired labour. Encouraging the Friends and all the community to be involved in a positive manner with the activities taking place in the conservation reserve should be a high priority. Letter drops, information days and working bees will all help to foster an understanding of what the group is trying to achieve and will result in faster environmental returns.

Recommendation 20

Council will support and encourage the local “Friends group” and the community to be involved in a positive manner with the activities taking place in the conservation reserve.

2.5.3 INTERPRETIVE AIDS

Interpretive aids (including signs, notice boards, species plaques etc) are an excellent method of imparting information about the Reserve and developing people’s enthusiasm for protection of its values.

Information signs and boards placed alongside paths (perhaps near seats, alongside paths or in picnic and public recreation areas) can provide an insight into the local ecosystem, and include topics such as:

- Plant names and other information (primarily for core species) – flowering times, flower colours, use by fauna etc.
- Fauna information - aquatic and terrestrial fauna in the reserve, their habits, lifecycles, etc.
- Ecology – purpose, function and interesting facts about the wetlands, foreshore and floodplain.
- History of the Reserve
A plaque dedicated to William de Vlamingh and discussion about the area may be of interest to users and should be considered in this plan as it will enhance the education of the community about the area and it’s importance.

Recommendation 21

Interpretive aids such as signs, notice boards, species plaques etc should be used to impart information to users about the Reserve. These could be placed alongside paths, seats, alongside picnic and public recreation areas to provide an insight into the local ecosystem and will help to develop peoples’ enthusiasm for the protection of its values.

2.6 COMMUNITY INVOLVEMENT

People are more likely to protect this valuable local resource if it fulfils their needs. The only way to ensure this occurs is to encourage open dialogue between the community and the managers of the site; in this case the Friends of Attadale Foreshore Reserve and the City of Melville. Annual General Meetings of the 'Friends' group, inviting all interested stakeholders to participate, may be one way of ensuring that all people are included in the process and understand the importance of the ecological restoration activities on this site.

2.7 FUNDING AND LABOUR

Funding for conservation works on public lands is generally in the form of State and Federal Government Grants. Availability of funding usually depends on the project aims and methods and regional (as well as state and federal) priority issues. Generally a well thought out project with lots of public input and support is more likely to attract funding than a hastily prepared application.

Most funding bodies expect a dollar for dollar contribution by grant applicants and/ or community volunteers. Voluntary labour, equipment, time, travel and other contributions, as well as council support in terms of staff time, equipment and labour, are all valued as dollar contributions. Generally little or no monetary input is required of the community or the managing body (provided the project is of obvious public benefit). Types of projects that have received funding in the past include:

- Conserving, managing and re-establishing native vegetation
- Controlling weeds and introduced pest fauna
- Establishing protected areas (national parks, reserves etc)
- Restoring and/or protecting the ecological health of rivers and wetlands
- Coordinating community waterway monitoring and action programmes
- Floodplain management
- Sustainable land management and Landcare activities
- Protecting and restoring native fish populations and their habitats in freshwater, estuarine and marine environments
- Strategic planning for conservation and sustainable use of natural resources
- Helping community group development and project support
- Skills development, training, education or public awareness-raising activities
- Investigations, surveys, trials or demonstrations with broader regional or national implications
- Interpretive materials, signs and information shelters that inform the community about activities being undertaken at the site.

Some of the more prominent funding bodies likely to fund or part fund the restoration of the Attadale Bushland Reserve and surrounding areas are listed below.

- Natural Heritage Trust
- Swan Urban Landcare Programme

- Gordon Reid Foundation (Lotteries Commission)
- Land and Water Research and Development Corporation

Some state and federal government agencies may also provide assistance in terms of community group support, provision of information, planning assistance and, on occasion, funding for research and development oriented projects.

As well as voluntary labour (community and school groups and local residents), groups often elect to utilise a paid labour force. A number of private and government-funded agencies provide labour for conservation works in and around the Perth metropolitan region. Providing the project meets regional priorities and is of public benefit, part or full funding may be available to cover the costs of work teams.

Recommendation 22

Funding opportunities should be sought from appropriate agencies and should be based on a collaborative partnership between the community and the City of Melville.

2.8 MAINTENANCE AND MONITORING

2.8.1 WEED CONTROL AND LAWN MOWING

Weed control in the reserve should be intensive in the short term (Section 2.9 – Schedule of works), and in the long term will require regular treatment and prompt action in order to keep pest plants under control. Where lawns exist in the reserve, they should be segregated from the conservation area, and mowing should be kept strictly to the inside of these. Any lawn or other weeds escaping into the bushland should be promptly treated. Lawns (particularly Couch) should be regularly mowed, not only for aesthetics, but to prevent the development of seed heads.

2.8.2 VEGETATION MONITORING

Monitoring of vegetation in the reserve should be a priority, particularly in the first 5 – 10 years of the project. This will enable managers to get an idea of what is happening in the reserve, and to ensure a balance of species is, to a certain degree, maintained. Of particular importance is the maintenance of an understorey, which will support a diverse range of biota, as well as protecting soils from eroding and weeds from re-establishing control in the area. Establishment of overstorey will also ensure that shade issues from park users in the area are recognised, and that most native understorey species require a measure of shade to grow successfully. Ideally, vegetation surveys would be carried out on a regular basis.

Note: Photographic monitoring is an excellent method of recording general changes in the vegetation population over time. Establishment and maintenance of a herbarium for the area would also be useful for long-term management.

2.8.3 REVEGETATION

Revegetation of the Conservation areas of the Reserve is essential in the short term. Further revegetation may be required up to ten years after the initial revegetation effort, however after approximately seven years, the Reserve should become more-or-less self-sustaining. Revegetation will be an ongoing maintenance requirement for the road verge and will depend on foot and animal traffic through this area.

2.8.4 FAUNA MONITORING

As with vegetation monitoring, an understanding of fauna usage and movement through the reserve is a useful tool for long-term management of the area.

2.8.5 WATER QUALITY MONITORING – DRAIN

Water in the drain should be monitored several times a year as a part of an ongoing programme to protect the river environment from pollutants discharging from terrestrial sources. Schools are often involved in monitoring projects (through Ribbons of Blue, Waterwatch, Frogwatch etc) as a practical addition to their science curriculum, and may also be interested in fauna and vegetation monitoring at the site. The Swan River Trust can be contacted about this as part of an ongoing project.

2.8.6 DREDGING

Occasional dredging of the open drain system is likely to be required, as sediment is built up in the first pond over time. (Appendix 5 – Constructed Wetland filter Concept Plan). This should be able to be carried out without excessive damage to the vegetation in the channel (only the first few metres of vegetation should be affected, and regrowth should occur relatively quickly). Waste material should be removed from the site, and the area should be monitored on a regular basis to prevent the re-establishment of *Typha orientalis* in the channel and other potential weeds such as blackberry.

2.8.7 PATHS, SIGNS AND OTHER INFRASTRUCTURE

As with all parks, maintenance of paths, signs, borders, infrastructure etc. are critical to the aesthetics and safety of the users of the area. A regular check

should be made of all 'non-biological' additions to the Reserve area. Efficiency of these should also be regularly assessed and further degradation of the site or misuse of the area should be addressed accordingly.

2.9 SUGGESTED SCHEDULE OF WORKS

<u>PROJECT YEAR</u>	<u>PROJECT AREA</u>	<u>JOB</u>	<u>SPECIFIC TASKS</u>	<u>RESPONSIBILITY</u>	<u>VOLUNTARY OR PAID LABOUR</u>
1	General	Education/information	<ul style="list-style-type: none"> Send mailout/brochure to local residents/groups. Conduct an annual general meeting inviting participation from the broader local community. 	City of Melville	City of Melville
1	Paths and infrastructure	Relocate path	<ul style="list-style-type: none"> Remove areas of the old dual-purpose path where it encroaches on CALM nature reserve and rebuild according to agreed design. 	City of Melville	City of Melville
1	Marshland/reedbeds	Vegetation survey	<ul style="list-style-type: none"> Establish and note presence of native and alien species during spring. Recommend weed control and revegetation programme for the site. Add this to remainder of the work plan. 	City of Melville	City of Melville
1	Dryland	Weed control	<ul style="list-style-type: none"> Hand pull or grub out <i>Washingtonia filifera</i> (Cotton palm) <i>Lupinus sp.</i> (Lupins) <i>Pelargonium sp.</i> <i>Rumex sp.</i> (Dock weed) – remove flower heads. Spray <i>Cynodon dactylon</i> (Couch grass) and Wild oats within the boundaries of the current tree line Begin removing <i>Casuarina paupers</i> (say 20%), working towards the foreshore from the Burke Drive side of the reserve. 	City of Melville	City of Melville

<u>PROJECT YEAR</u>	<u>PROJECT AREA</u>	<u>JOB</u>	<u>SPECIFIC TASKS</u>	<u>RESPONSIBILITY</u>	<u>VOLUNTARY OR PAID LABOUR</u>
1	Dryland	Revegetation	<ul style="list-style-type: none"> • Begin planting core species (late Autumn/ early Winter) in bared out areas in treed or around tree clumps, not colonised by Couch (leave planting of sprayed Couch areas until the second year). • Erect temporary fencing around areas of newly-planted seedlings. 	City of Melville	City of Melville
1	Saltland	Weed control	<ul style="list-style-type: none"> • Spray <i>Avena fatua</i> (wild oats) during Spring before they set seed. • Cut back and remove flowers/seed heads of <i>Rumex sp.</i> (Dock weed) before they set seed. 	City of Melville	City of Melville
1	Seasonal wetlands and open drain	Weed control	<ul style="list-style-type: none"> • Remove <i>Schinus terebinthifolia</i> (Japanese peppers) and 20% of <i>Casuarina pauper</i> (beginning Burke Drive side of the park). 	City of Melville	City of Melville
1	Road verge	Weed control	<ul style="list-style-type: none"> • Remove couch from road verge. • Mulch vegetation areas. • Gravel or concrete over parking islands. 		
1 2	Road verge General	Revegetation Education and information	<ul style="list-style-type: none"> • Plant out road verge • Send out general letter to all local residents/ groups advising of project updates. • 2nd Annual General Meeting. 	City of Melville	City of Melville

<u>PROJECT YEAR</u>	<u>PROJECT AREA</u>	<u>JOB</u>	<u>SPECIFIC TASKS</u>	<u>RESPONSIBILITY</u>	<u>VOLUNTARY OR PAID LABOUR</u>
2	Dryland	Weed control	<ul style="list-style-type: none"> • Respray Couch, where necessary, within the current vegetation boundary. • Extend control of Couch beyond the borders of the tree line by, say 10 - 15m in each direction. • Follow up control on all other species treated in the first year. • Remove a further 20% of <i>Casuarina pauper</i>, continuing to progress toward the river side of the Reserve. Inject or cut and paste any regrowth from year 1. 	City of Melville	City of Melville
2	Dryland	Revegetation	<ul style="list-style-type: none"> • Continue to plant out core species, revegetating where Couch has been successfully controlled. 	City of Melville	City of Melville
2	Dryland	Infrastructure	<ul style="list-style-type: none"> • Mark out picnic/public access areas (flat concrete kerb or logs to define edges). Logs from <i>Casuarina obesa</i> lopping (years 1 and 2) may be useful for this purpose. 	City of Melville	City of Melville
2	Saltland	Weed control	<ul style="list-style-type: none"> • Follow-up control on <i>Rumex sp.</i> (Dock weed) and <i>Avena fatua</i> (Wild oats). 	City of Melville	City of Melville
2	Saltland	Revegetation	<ul style="list-style-type: none"> • Begin planting out core species in clumps in areas of the salt patch, which are not heavily colonised by wild oats. Do not plant reeds or rushes near wild oats still being controlled with fusilade. 	City of Melville	City of Melville
2	Seasonal wetlands and open drain	Reconstruction	<ul style="list-style-type: none"> • Conduct earthworks as per the open drain concept plan during summer, when water levels are at their lowest. Remove topsoil and waste from site. 	City of Melville	City of Melville

<u>PROJECT YEAR</u>	<u>PROJECT AREA</u>	<u>JOB</u>	<u>SPECIFIC TASKS</u>	<u>RESPONSIBILITY</u>	<u>VOLUNTARY OR PAID LABOUR</u>
2	Seasonal wetlands and open drain	Revegetation	<ul style="list-style-type: none"> • Begin revegetating with reeds and rushes immediately, planting in clumps, initially in the damp areas. • In late autumn/ early winter, begin planting up banks with shrubs and groundcovers. 	City of Melville	City of Melville
2	Seasonal wetlands and open drain	Habitat creation	<ul style="list-style-type: none"> • Place and pin logs (from <i>Casuarina pauper</i>) in stream, as per the plan. 	City of Melville	City of Melville
2	Road verge	Weed control	<ul style="list-style-type: none"> • If scalping method was used, follow up weed control will most likely only be required on the current road verge/ couch lawn border, to prevent invasion of the mulched/ gravelled areas. • If spray method was utilised, follow-up control (at least spot spraying) will most likely be required. 	City of Melville	City of Melville
2	Road verge	Revegetation	<ul style="list-style-type: none"> • Assuming couch is more or less under control in revegetation areas as per the plan. 	City of Melville	City of Melville
2	General	Signage	<ul style="list-style-type: none"> • Begin erecting signs in the park – initially these should be a combination of area restriction signs and information about what is being to rehabilitate the area, and how the general public can assist. 	City of Melville	City of Melville
3	General	Education/ information	<ul style="list-style-type: none"> • Send out general letter to all local residents/ groups advising of project updates. • 2nd Annual General Meeting. 	City of Melville	City of Melville

<u>PROJECT YEAR</u>	<u>PROJECT AREA</u>	<u>JOB</u>	<u>SPECIFIC TASKS</u>	<u>RESPONSIBILITY</u>	<u>VOLUNTARY OR PAID LABOUR</u>
3	Dryland	Weed control	<ul style="list-style-type: none"> • Respray Couch where necessary in areas treated during years 1 and 2. • Extend control of Couch beyond the year 2 borders by a further 10 – 15m in each direction. • Follow up control on all other species treated in the first and second years. • Remove a further 20% of <i>Casuarina pauper</i>, continuing to progress toward the river side of the Reserve. Inject or cut and paste any regrowth from years 1 and 2. 	City of Melville	City of Melville
3	Dryland	Revegetation	<ul style="list-style-type: none"> • Finish core species revegetation within the original tree line, – continue to replace lost seedlings where required. • Revegetate beyond the tree line into areas sprayed in year 2 (providing no re-emergence has occurred). 	City of Melville	City of Melville
3	Saltland	Weed control	<ul style="list-style-type: none"> • Respray <i>Avena fatua</i> (Wild oats) and prune <i>Rumex sp.</i> (Dock weed) where required. Control any other weeds, which may be colonising the area. 	City of Melville	City of Melville
3	Saltland	Revegetation	<ul style="list-style-type: none"> • Continue planting around clumps planted in the second year (gradually extending them to the edges of the salt patch). 	City of Melville	City of Melville
3	Foreshore	Habitat creation	<ul style="list-style-type: none"> • Place and pin logs around drain outlet point, as per the plan. 	City of Melville	City of Melville

<u>PROJECT YEAR</u>	<u>PROJECT AREA</u>	<u>JOB</u>	<u>SPECIFIC TASKS</u>	<u>RESPONSIBILITY</u>	<u>VOLUNTARY OR PAID LABOUR</u>
3	Seasonal wetlands and open drain	Weed control	<ul style="list-style-type: none"> Hand pull or, where necessary, spray any emerging or encroaching weed species. Extend weed control into the outer areas. For this year concentrate on <i>Watsonia bulbifera</i> (Watsonia) <i>Coraderia selloana</i> (Pampas grass) <i>Typha orientalis</i> <i>Cynodon dactylon</i> <i>Rumex sp.</i> <i>Pelargonium sp.</i> <i>Lupinus sp.</i> Begin exterminating <i>Casuarina pauper</i> (taking out up to 30% of any remaining species following earthworks) 	City of Melville	City of Melville
3	Seasonal wetlands and open drain	Revegetation	<ul style="list-style-type: none"> Continue planting in channel with recommended species; concentrate on establishing taller shrubs and <i>Melaleucas</i> on the banks to begin with. 	City of Melville	City of Melville
3	Seasonal wetlands and open drain	Habitat	<ul style="list-style-type: none"> Check position of logs. Re-pin any that have shifted. Ensure drain area is free of any rubbish, particularly plastic bags, cans, bottles etc., which endanger wildlife. 	City of Melville	City of Melville
3	Road verge	Weed control	<ul style="list-style-type: none"> Spot spray any re-emerging plants 	City of Melville	City of Melville
3	Road verge	Revegetation	<ul style="list-style-type: none"> Replace any lost individuals. Fill in gaps as necessary. 	City of Melville	City of Melville
3	General	Signage	<ul style="list-style-type: none"> Continue erecting directional, safety and educational signs along public access areas. 	City of Melville	City of Melville

<u>PROJECT YEAR</u>	<u>PROJECT AREA</u>	<u>JOB</u>	<u>SPECIFIC TASKS</u>	<u>RESPONSIBILITY</u>	<u>VOLUNTARY OR PAID LABOUR</u>
4	General	Education/ information	<ul style="list-style-type: none"> • Send out general letter to all local residents/ groups advising of project updates. • 3rd Annual General Meeting. 	City of Melville	City of Melville
4	Dryland	Weed control	<ul style="list-style-type: none"> • Respray Couch where necessary in areas treated during years 2 and 3. Check area 1 to ensure all Couch has been removed.. • Extend control of Couch beyond the year 3 borders by a further 10 – 15m in each direction. • Follow up control on all other species treated in the first and second years. • Remove a further 20% of <i>Casuarina pauper</i>, continuing to progress toward the river side of the Reserve. Inject or cut and paste any regrowth from years 1, 2 and 3. 	City of Melville	City of Melville
4	Dryland	Revegetation	<ul style="list-style-type: none"> • Replace any species lost from plantings in years 1, 2 and 3. Fill in any gaps. Continue planting core species out to the edge of the treated couch area. 	City of Melville	City of Melville
4	Saltland	Weed control	<ul style="list-style-type: none"> • Respray <i>Avena fatua</i> (Wild oats) and prune <i>Rumex sp.</i> (Dock weed) where required. Control any other weeds, which may be colonising the area. 	City of Melville	City of Melville
4	Saltland	Revegetation	<ul style="list-style-type: none"> • Continue planting around clumps planted in the 2nd and 3rd years (gradually extending them to the edges of the salt patch). 	City of Melville	City of Melville

<u>PROJECT YEAR</u>	<u>PROJECT AREA</u>	<u>JOB</u>	<u>SPECIFIC TASKS</u>	<u>RESPONSIBILITY</u>	<u>VOLUNTARY OR PAID LABOUR</u>
4	Seasonal wetlands and open drain	Weed control	<ul style="list-style-type: none"> • Hand pull or, where necessary, spray any emerging or encroaching weed species, particularly those of focus of year 3. Continue to extend weed control into the outer areas. • Continue removing <i>Casuarina pauper</i> (taking out up another 30%). Inject or cut and paint any emerging seedlings. 	City of Melville	City of Melville
4	Seasonal wetlands and open drain	Revegetation	<ul style="list-style-type: none"> • Continue revegetation as per the plan. Ensure removed <i>Casuarina paupers</i> are replaced by a sparser stand of <i>Casuarina obesa</i> with shrubs and other understorey in between. 	City of Melville	City of Melville
4	Road verge	Weed control	<ul style="list-style-type: none"> • Spot spray any re-emerging plants 	City of Melville	City of Melville
4	Road verge	Revegetation	<ul style="list-style-type: none"> • Replace any lost individuals. Fill in gaps as necessary. 	City of Melville	City of Melville
4	General	Signage	<ul style="list-style-type: none"> • Continue erecting signs, notices etc. as required/ deemed necessary 	City of Melville	City of Melville
5 and ongoing	General		<ul style="list-style-type: none"> • Continue works conducted in first 4 years according to the Revegetation and Reserve Concept Plan. • Ongoing weed control and habitat maintenance will be an ongoing requirement for the reserve. Monitoring of fauna, vegetation and water control will also be useful tools for management of the reserve in the long term. 	City of Melville	City of Melville

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