FORESHORE MANAGEMENT PLAN

Central East Busselton

- Scout Road to Ford Road –

ADOPTED SEPTEMBER 2009

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on behalf of the Shire of Busselton.

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1. INTRODUCTION

1.1 BACKGROUND

The Shire of Busselton manages a large area of coastal reserves to ensure that important environmental and social values are maintained and enhanced. In order to guide, plan and direct management of these areas, the Shire, in consultation with the community, prepares management plans for specific foreshore reserves.

This document, the Central East Busselton Foreshore Management Plan (the Management Plan), represents a detailed management plan for the Scout Road to Ford Road portion of the Busselton foreshore (the Study Area). The majority of this area is made up by the recently created Reserve 49652 (formerly Lots 500 and 501) for which the Shire has accepted a management order from the Minister for Lands.

The planning process for the development of the Management Plan involved the following:

1. Preparation of draft Management Plan by the consultant.
2. Draft Management Plan reviewed and approved for advertisement by the Shire of Busselton.
3. Public advertising of the draft document and formal community consultation process.
4. Final Management Plan prepared after consideration of received submissions.
5. Final Management Plan adopted by Council and implemented by Shire of Busselton.

1.2 PURPOSE AND SCOPE OF THE MANAGEMENT PLAN

Litoria Ecoservices prepared the plan between December 2008 and April 2009, following consultation with local residents, community stakeholders and relevant Shire staff. The Management Plan provides detailed site information and management strategies for the area to supplement the broad direction of the Geographe Bay Foreshore Management Plan[1].

Development of the plan has involved:

- assessment of the current physical and ecological state of the site including native vegetation, weed burden, coastal erosion, pedestrian and vehicular access and recreational facilities and usage;
- consultation with local residents and both community and agency stakeholders; and
- development of detailed, prioritised management recommendations for improving and preserving the site values.

The purpose of this management plan is to identify management recommendations to maintain and improve the key qualities of the foreshore site, namely:

- recreation values;
- social values;
- conservation values; and
- erosion buffer function.

The objectives are to:

1. facilitate sustainable recreation;
2. maintain and enhance conservation values of the site; and
3. foster community ownership of and responsibility for the foreshore.

Limitations must be acknowledged in relation to the term and timing of the project (for example, outside of flowering time for many native plants and winter weeds). The scope of the works did not include a detailed flora and fauna survey of the site, nor did it include a detailed analysis of major coastal erosion trends or risks.

1.3 THE STUDY AREA

This management plan covers the Geographe Bay foreshore area between Scout Road and Ford Road, Busselton (Figure 1). It is approximately 1.2 kilometres in length and is bounded to the south by Geographe Bay Road. It varies in width from approximately 40 metres at the western end to approximately 120 metres at the eastern end.

1.4 LEGISLATIVE AND POLICY FRAMEWORK

A broad range of legislation and policy has been considered in the preparation of this plan including:

- Wildlife Conservation Act (1950);
- Busselton District Town Planning Scheme No. 20 (1999);
- Shire of Busselton Reserves and Foreshores Local Law; and
- State Coastal Planning Policy 2.6.

In addition, a large number of relevant documents and guidelines apply to foreshore areas and the following have been particularly relevant in the preparation of this plan:

- Geographe Bay Foreshore Management Plan (2001);
- East Busselton Foreshore Management Plan (2008);
- Coastal Planning and Management Manual (2003);
- Shire of Busselton Town Centre Streetscape Manual; and
- Shire of Busselton Community Infrastructure Division Technical Standards and Specifications.

1.4.1 Geographe Bay Foreshore Management Plan

In 2001, the Shire of Busselton in conjunction with Geocatch had the Geographe Bay Foreshore Management Plan (GBFMP)[1] prepared. This overarching document covered the Geographe Bay foreshore area from Dunsborough to Port Geographe and in addition to generic recommendations on foreshore management throughout Geographe Bay, the report provided a number of recommendations for each foreshore 'precinct'.

The study area for the Management Plan falls within the 'Busselton' precinct (Dolphin Road to Ford Road) and the following GBFMP recommendations relate to the study area:

- **Proposal 78:** The dune vegetation in front of the Georgette Street carpark should be rehabilitated with brush and fenced to ensure revegetation.
- **Proposal 79:** Some of the grassed area should be replaced with garden beds of selected native shrubs. This should be implemented in a manner that creates a buffer zone between the grassed areas and the beach with protective fencing.
- **Proposal 80:** Signs should be erected along the dual use path to the east of the small jetty, requesting the public not to walk to the beach over the dunes. Alternatively, fencing should be erected.
- **Proposal 81:** Beach access paths should be reviewed on the basis of one path per 100 metres, approximately. Surplus paths should be closed, brushed and possibly fenced. Fencing of entry and exit points of access paths should be undertaken to prevent peripheral damage. Signs requesting beach users to take the formal paths should be erected.

1.4.2 Busselton Ironman and Half Ironman Events

The study area represents a focal area for both the Busselton Ironman and Half Ironman events. These events are very significant, long-term, iconic events for Busselton, drawing competitors and visitors from interstate and internationally. As such it is important that the ongoing management of the study area complements the requirements of the Ironman events.

Consultation was undertaken with representatives of both Ironman events in order to ensure that the management plan complemented the requirements of the events.

1.5 BUSSELTON FORESHORE REDEVELOPMENT

It is important to note that at the time of preparation, a separate planning and consultation process was being undertaken regarding the broader Busselton Foreshore Redevelopment (BFR). This State Government-led process is focused on the 'foreshore' area bounded by Marine Terrace, Brown Street and West Street and as such, overlaps with the western 100 metres (approximately) of the foreshore area covered by this management plan.

At this preliminary stage, it is understood that any redevelopment within the study area to occur as a result of the BFR is likely to be focused south of Geographe Bay Road and that the proposals within this plan for the area of overlap are likely to be broadly consistent with the direction of the BFR[2]. The BFR process is due to be finalised in early 2010. As such, it is advised that the implementation of the Management Plan recommendations relevant to this western portion of the site be delayed until such time as the BFR planning process is complete to ensure consistency and that future land management complements the final outcome for adjoining areas.

1.6 STAKEHOLDER CONSULTATION

The development of the Management Plan has involved a significant consultation effort including:

- 'one-on-one' conversations with key stakeholders who were identified as having a specific interest in the area;
- input from discussions with locals and visitors encountered during site work;
- submissions received by the Shire during the preparation of the plan; and
- individual and group comments received during three consultation sessions held on-site on Thursday January 29, Sunday February 1 and Thursday February 5. The consultation sessions were promoted through the "Council for Community" page of the Busselton - Dunsborough Mail, signage at key locations throughout the study area and media releases distributed to a range of local media outlets.

Along with Indigenous representatives, representatives from the following organisations were contacted for input into the plan:

- Geocatch;
- Busselton Dunsborough Environment Centre;
- Ironman and Half Ironman organisers;
- Forest Rally;
- Volunteer Marine Rescue;
- Commercial hire site licensees; and
- Sea Scouts.

2. CURRENT STATE AND RECOMMENDATIONS: BIOPHYSICAL FEATURES

2.1 SITE DESCRIPTION, VESTING AND PURPOSE

The study area encompasses approximately 10 hectares of dunal and near coastal vegetation bordered to the south by Geographe Bay Road and the adjoining sporting fields, recreational parks and public open space of Barnard Park. Similar recreation reserves lie to the west and east. The Busselton Jetty lies to the west of the site.

A shared use pathway (SUP) runs the length of the site. Six formal carparks exist within the site with informal parking common on the edge of Geographe Bay Road and under the adjacent plantings of Norfolk Island pines.

The area covers a number of reserves and areas including:

- Reserve 49652 currently under a Management Order with the Shire of Busselton, as 'C' class reserve for the purpose of 'Recreation and Foreshore Management';
- Portions of Reserve 8485 currently vested with the Shire of Busselton as 'A' class reserves for the purpose of 'Camping and Recreation'; and
- Portions of the Geographe Bay Road Reserve north of the existing bitumen road extent.

2.2 CLIMATE

Located in Western Australia's south-west, the area experiences a Mediterranean climate with hot dry summers and cool wet winters. Busselton has an average annual rainfall of 817 mm with 85% of this rain falling between May and October.

Geographe Bay generally experiences one tidal exchange per day with tidal movements averaging 0.5m. The passage of low pressure systems and associated northerly winds through the area in winter can generate storm surges and associated northerly wind swells with the ability to cause considerable erosion[1]. Typically the area experiences five or six erosive storms each year[1].

2.3 COASTAL PROCESSES AND EROSION

The Geographe Bay foreshore is a low energy but dynamic, sandy coastline in the lee of Cape Naturaliste with a unique northerly aspect[1]. A longshore drift from west to east predominates along the Bay. The Geographe Bay coast experiences zones of accretion and erosion with an overall trend towards accretion since 1941[3]. "Sacrifice areas" downdrift of groynes are commonly identified as potential localised erosion problems. Similarly, areas updrift of groynes are often areas of localised accumulation of sand. Due to the normally low wave energy and subsequent restricted sediment supply, recovery from erosion events can be slow[4].

The seagrass meadows and sandbars just offshore are noted for their contribution to 'bottom resistance' and a resultant reduction in wave impact on the foreshore. In addition, the dead seagrass or wrack that accumulates on the shoreline with the winter storms serves to reduce the wave impact on the foreshore. Furthermore, seagrass decline in Geographe Bay is of significant concern as the Geographe Bay Foreshore Management Plan suggests that "this leads to coastal accretion that will continue until the (offshore) sediment supply (previously stabilised by healthy seagrass beds) is exhausted, at which point coastal erosion rates will become very high"[1].

Many locals reported during the consultation that the area had in general accreted over its recent history. This is supported by the Shoreline Scoping Study Geographe Bay (Busselton)[5] recently undertaken by the Department of Planning and Infrastructure (DPI) and the Shire of Busselton. This document represents a significant study into the issue of erosion and the dynamic nature of the Busselton coast. Appendix 1 contains a figure from the study showing the vegetation line and the approximate waterline through the study area from 1941, 1975, 1985 and 1993. The figure shows that over that period the area east of Milne Street has progressively accreted. However, the area west of Milne Street has experienced more variation in its shoreline with the current shoreline and vegetation line extending no further north than in 1941.

It is noted, however, that zones of accretion and erosion can move laterally along the Geographe Bay foreshore in the long-term due to the gradual longshore movement of 'slugs' of sand from west to east.[1,6] As such recent patterns of accretion do not guarantee continued accretion into the future.

The areas east and west of the Busselton Jetty have been the subject of many coastal protection projects including more than eleven groynes and foreshore walls. More recently an additional coastal protection project (refer to Appendix 2) has been implemented updrift of the study area. This project involved the construction of a series of three short, low profile, geotextile groynes immediately east and west of the Busselton Jetty during 2008; the eastern-most of these is located on the border of the study area (see Figure 2A). While it is too early to assess the impact that this structure is having on the foreshore to the east, the project's three-monthly beach surveys updrift and downdrift of the structures will identify any implications for the site.

The prospect of significant sea level rise in the coming decades has the potential to seriously impact on the existing shoreline and while this prospect warrants broad consideration beyond the scope of this report, it adds justification to efforts to enhance and stabilise the foreshore area. In particular, *Climate Change 2007*[7], the Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC) predicts sea level rises of between 0.18 and 0.59m by 2090 (with additional rises possible depending on ice sheet movements). It projects that coasts will be exposed to increasing risks such as coastal erosion due to climate change and sea-level rise. Recent monitoring of Fremantle sea level has shown rises of 20cm since 1915 at a rate of 1.38mm/year, with the past 30 years showing an average rise of approximately 3.0mm/year.

It was beyond the scope of this report to investigate long-term erosion risks or threats, or to address the need for major coastal works in relation to sand capture. However, the following points have influenced the recommendations made in other parts of this report:

1. Relatively recent patterns of accretion east of Milne Street provide no guarantee that erosion will not impact this stretch of foreshore in the future.
2. Vegetation is identified as essential to the long term stability of the coastline and implementation of the revegetation recommendations will aid in the long term stabilisation of the foreshore area.
3. The potential for future coastal erosion and storm surge impacts north of Geographe Bay Road should limit and restrict the nature and type of infrastructure installed here.

2.4 TOPOGRAPHY

The study area is characterised by low coastal dunes typically less than 2.5 metres in height. These generally consist of a beach and intertidal zone and low incipient foredune followed by a wide area (up to 50 metres) of undulating low dunes with shallow intervening swales which rise to a low foredune and swale.

2.5 GEOLOGY

The study area lies within the southern portion of the Swan Coastal Plain, characterised by low lying marine and fluvial sediments. The site is characterised by unconsolidated calcareous sands of Holocene origin.

2.6 SITE VEGETATION

2.6.1 Existing Vegetation

Vegetation is an important factor in coastal planning and management due to its role in buffering against coastal erosion, enhancing the appeal of the area and creating a 'sense of place', and providing habitat for fauna. Dune and foreshore vegetation is easily damaged by pedestrian and other traffic, and protection and careful management is therefore necessary where potential for damage to vegetation exists.[1]

Vegetation is relatively uniform and consistent across the length of the site with vegetation grading from an open or closed herbland where vegetation commences above the high water mark at the incipient foredune, through to open heathland at the back of the foredunes near Geographe Bay Road. The area generally has a sparse vegetative cover dominated by herbaceous weed and introduced species. Due to the dominance of introduced and weed species, the vegetation condition of most of the site would be considered 'degraded' according to Keighery's[8] condition rating scale provided in Appendix 3.

Appendix 4 shows flora, both native and introduced species, noted during the site assessment. Dominant species vary along the length of the site and include Sea Rocket* (*Cakile maritima*), Rose Pelargonium* (*Pelargonium capitatum*), Sea Spurge* (*Euphorbia paralias*), Dune Onion Weed* (*Trachyandra divaricata*), Hairy Spinifex (*Spinifex hirsutus*), Marram Grass* (*Ammophila arenaria*), Couch* (*Cynodon dactylon*), Sea Spinach* (*Tetragonia decumbens*) and Rigid Wattle (*Acacia cochlearis*). (* indicates weed or introduced species).

Occasional specimens or isolated clumps of local native species occur, scattered throughout the area. In general, these are found along the landward edge of the study area or in the swale behind the incipient foredune. The native species more commonly found within these areas include: Rigid Wattle (*Acacia cochlearis*), Shark's Tooth Wattle (*Acacia littorea*), Coastal Wattle (*Acacia cyclops*), WA Peppermint (*Agonis flexuosa*), Coastal Sword-sedge (*Lepidosperma gladiatum*), Knotted Club Rush (*Ficinia nodosa*), Berry Saltbush (*Rhagodia baccata* subsp. *baccata*), Rottnest Teatree (*Melaleuca lanceolata*) and Thick-leaved Fan Flower (*Scaevola crassifolia*).

2.6.2 Weed Burden

As already mentioned above, introduced and weed species dominate much of the site vegetation and in some areas represent over 90% of the vegetation cover. However, it must be noted that many of the introduced species serve a valuable role in this environment in

assisting the stabilisation and colonisation of dunes. As a general rule, complete control of the weed species dominating the site vegetation is not considered a priority until such time as locally native vegetation has successfully been established throughout the site. The control of small areas or patches of weeds to facilitate planting of native vegetation is highly recommended prior to revegetation.

Several weed species do however represent a moderate to high priority for control or close monitoring, namely:

- An isolated patch of Victorian Teatree (*Leptospermum laevigatum*) due to the relatively low current levels of this highly invasive weed (Figure 2B);
- An isolated patch of Buffalo Grass (*Stenotaphrum secundatum*) due to the potential invasiveness of this species (Figure 2C);
- Scattered patches of Couch (*Cynodon dactylon*) through areas recommended for revegetation and regeneration (Figure 2A).

Appendix 5 summarises recommended weed control methods for weed species identified on site.

2.6.3 Damage to Vegetation

Whilst illegal vegetation damage is not evident within the study area, reports of illegal damage to native vegetation within the Geographe Bay foreshore is a common occurrence. Illegal damage to vegetation represents a significant threat to foreshore vegetation along the Geographe Bay foreshore. Ensuring that the management of native vegetation within the study area occurs in accordance with the Shire's policies is critical in preserving the values of the area and should ensure that decisions surrounding the maintenance and management of vegetation occur in the interest of the area as a whole and with consideration of all foreshore users.

Any work involving damage to native vegetation within the foreshore area should only be undertaken by the Shire and local landholders should contact the Shire to ensure that legitimate issues requiring attention can be assessed and where necessary acted upon.

2.6.4 Revegetation

There is significant scope to re-establish native vegetation throughout much of the foreshore area in order to improve the amenity, the stability of the dunes during future storm events and habitat value. Ideally, revegetation would include the full range of locally native species that occur in similar areas of Geographe Bay.

<u>Revegetation Planting</u>
Figures 2A-C identify areas of native vegetation within the largely weed-dominated site and show four priority areas recommended for revegetation over the next five years. Area 1 contains patches of reasonable condition native vegetation and includes four small sections to be fenced (to prevent vehicle and pedestrian access and damage) and supplementary planted; Areas 2 and 3 contain very little native vegetation and represent a high priority for revegetation in order to establish the east-west corridor of vegetation. Area 4 contains areas that have already been subject to revegetation planting over the last three years. These areas have been planted by local schools (co-ordinated and supervised by Ribbons of Blue and Geocatch) and have had a high survival rate. Some minor infill planting in this area and extending the existing revegetation is considered a high priority to consolidate revegetation in this stretch.

Within the areas identified for revegetation, ample bare ground is available for planting into without the need for site preparation. The one exception to this is some minor patches of Couch within Area 1 which is recommended for control prior to planting. In general, broader weed control is not considered appropriate until native species are well-established.

Consultation with Indigenous representatives highlighted a strong desire to see the Quandong (*Santalum acuminatum*) (a significant local bush food species) included in revegetation so that it can become part of the native vegetation on the site consistent with many other foreshore areas around and in Busselton.

Species to make up the core of the revegetation plantings would include*:

- Berry Saltbush (*Rhagodia baccata*)
- Rigid Wattle (*Acacia cochlearis*)
- Coastal Wattle (*Acacia cyclops*)
- Prickle Lily (*Acanthocarpus preissii*)
- Knotted Club Rush (*Ficinia nodosa*)
- Shark's Tooth Wattle (*Acacia littorea)*
- Quandong (*Santalum acuminatum*)
- Rottnest Teatree (*Melaleuca lanceolata*)
- Coastal Sword Sedge (*Lepidosperma gladiatum*)
- Thick-leaved Fan Flower (*Scaevola crassifolia*)
- Coastal Daisybush (*Olearia axillaris*)
- Coastal Pigface (*Carpobrotus virescens*)
- WA Peppermint (*Agonis flexuosa*)

*Appendix 4 identifies a broad range of species appropriate for use in revegetation plantings.

Shade and amenity plantings

Shade and amenity plantings of WA Peppermints and Rottnest Teatree are recommended around and through the site's six carparks and adjacent seating.

It is recommended that these plantings be strategically located and maintained by the Shire to maximise the amenity and habitat value of the area. This may include 'lift pruning' once the trees reach an appropriate height.

Native garden beds

Throughout the proposed parkland area (see Section 3.3.3) and around the Georgette Street carpark, a number of 'native garden beds' are recommended, to be made up primarily of WA Peppermints and dense understorey plantings of a range of understorey species identified in Appendix 4.

2.7 NATIVE FAUNA AND FERAL ANIMALS

It was beyond the scope of this project to conduct a detailed assessment of the fauna inhabiting the site. However, the degraded nature of the site vegetation is considered to significantly limit the habitat value of the site for many species. Two mammals of significance found in other areas of Busselton's foreshore reserves are the Nguara or Western Ringtail Possum (*Pseudocheirus occidentalis*) and Quenda or Southern Brown Bandicoot (*Isoodon obesulus*). No sightings or traces of these species were recorded during the site assessment or reported by locals during the consultation. However, significant populations of Western Ringtail Possum are known immediately south of the site (eg. at Kookaburra Caravan Park) and it is possible that these species utilise the site to some extent periodically travelling from better habitat to the west and south.

The Shire Foreshore Reserves have previously been identified as representing some of the last opportunities to establish or maintain east-west faunal corridors along the Shire. Given the recognition of the Western Ringtail Possum under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* and the Western Australian *Wildlife*

Conservation Act 1950 as Threatened, there is sound justification for enhancing the habitat and corridor value of the site for this species.

Addressing the weed burden of the site, along with the recommendations regarding revegetation, will improve the habitat and corridor value of the site for a range of native species.

Rabbits were identified through the consultation and site assessment as utilising the study area. Although they do not currently appear to be significantly impacting on vegetation in the area, the impact on revegetation efforts will need to be monitored. The heavy use of the area by young children and domestic animals make traditional control methods such as 1080 baiting, Pindone baiting, fumigation, or harbourage destruction inappropriate.

Given the minimal current impact on the foreshore itself and the inability to undertake traditional baiting, monitoring of the current population and its impact is recommended. Should the population become a significant management issue in the future, potential control options include:

- introduction of a myxomatosis infected rabbit into the colony;
- baiting with RCD (Calicivirus); and
- capture and injection with RCD (Calicivirus) of rabbits and re-release.

It should be noted that these methods really need to be considered within the broader context of the rabbit problem within the local area and should be planned with a much broader area in mind than just this site.

Foxes are identified to be present in many adjoining foreshore areas of Geographe Bay and may utilise the site. However, given that no signs were recorded during the site assessment and the consultation stage did not identify this as a problem, they are not considered likely to represent a significant issue. Residents should be encouraged to report fox sightings in the area in order to ascertain if management is warranted in the future. It is noted that feral and/or wandering domestic **cats** are likely to utilise the site. Both foxes and cats represent significant threats to Western Ringtail Possums.

2. 8 FIRE MANAGEMENT

Fire currently represents a low risk throughout the study area. It is identified that standard Shire policy and practice does not support prescribed burns in foreshore areas and this appears to be appropriate management practice for the study area particularly given the low fuel loads at present. Community feedback in adjacent areas has supported the exclusion of prescribed burning in the area due to the length of time taken for vegetation to recover and the associated weed infestation.

3. CURRENT STATE AND RECOMMENDATIONS: HUMAN USE ATTRIBUTES

3.1 INDIGENOUS HERITAGE

The Geographe Bay foreshore area has been used extensively by Nyungar people with their occupation of the region dating back at least 47,000 years[1]. As such, protection and enhancement of Indigenous values associated with the foreshore area is considered critical.

As part of the preparation of this plan, a search of the Department of Indigenous Affairs Aboriginal Heritage Inquiry System was conducted on Tuesday 30 December 2008. This search highlighted many registered Aboriginal Heritage Sites in the Shire of Busselton, but no existing registered sites located within 1km of the foreshore study area. It is noted, however, that many significant sites are not yet formally registered and found on the system. It was beyond the scope of this report to undertake a detailed heritage survey.

Feedback from local aboriginal elders from the Geographe Bay coastline was sought and the South West Aboriginal Land and Sea Council was contacted for input.. A site inspection was undertaken with a local representative of the Webb Family (of the South West Boojarah) and following this visit a written submission was received commenting on the management of this and other foreshore areas around Busselton.

While no major earthworks are proposed for the study area, if any significant earthworks are to be undertaken as part of future management, Indigenous representatives including the South West Aboriginal Land and Sea Council should be informed and all requirements under relevant legislation (including both the State and Commonwealth Heritage Acts and the Native Title Act 1993) should be met.

It is considered that significant potential exists within this stretch of foreshore (and the broader Geographe Bay foreshore) for raising awareness of the Indigenous values and perspectives of the foreshore areas of Geographe Bay through interpretive signage (following consultation and the permission of local elders).

3.2 RECREATIONAL USE

The study area encompasses reserves that are to be managed for the primary purpose of recreation, with the area readily and frequently accessed by local residents and visitors.

The study area is utilised for:

- Walking, cycling and exercising
- The Busselton Ironman and Half Ironman
- Promenading
- Fishing
- Boating
- Beach Soccer
- Dog exercise
- Swimming, snorkelling and other water pursuits, including jetskiing, kitesurfing and sailboarding
- General beach activities

These uses are generally well catered for although there was a belief among many participating in the consultation that the foreshore could better cater to recreational use in particular through the provision of increased seating, shade and designated picnic/ BBQ areas.

Although summertime is the peak period for recreational use, locals and smaller numbers of visitors recreate in the area year-round.

Each year the Busselton Half Ironman and the Busselton Ironman, in May and December respectively, represent peak days of usage. The events start and finish within the study area, the run leg utilises the shared use path, the bike leg utilises Geographe Bay Road and the swim leg finishes through the study area.

These events attract large numbers of competitors, spectators and volunteers. The consultation reported trampling of dune vegetation as having occurred in the past where large numbers of spectators congregate. It is identified that sensitive areas of vegetation and areas undergoing revegetation, where not already fenced, should be temporarily fenced for these events to minimise the potential for disturbance.

3.3 FACILITIES AND INFRASTRUCTURE

3.3.1 Pedestrian and Bicycle Access

Pedestrian and bicycle access is facilitated by the shared use pathway (SUP) which runs the entire east–west length of the study area. This path accommodates access by people with disabilities and using mobility aids. It is popular with locals for exercising, socialising and commuting and with visitors for appreciating Geographe Bay. It is also identified as a key component of the Ironman and Half Ironman events.

The SUP is a bitumen surface and in general is in good order and requires little maintenance. One small stretch is noted as requiring repair/ resurfacing (Figure 2C). It is identified that at some stage in the future, in order to safely accommodate the volume and nature of traffic utilising the SUP, widening to 3 metres may become necessary. Through the majority of the site there is ample space to accommodate such widening without significantly compromising the surrounding areas.

Figures 2A-C show the major beach access paths running approximately perpendicular to the SUP, including:

End of Scout Rd: Sand track from the Scout Rd gravel car park to the SUP.
Ironman Beach Access: Partly bituminised/ partly sand track is utilised by the ironman events and commercial hire operators in the area.
West of Milne St: This sandy access track traverses from the carpark west of Milne St to the foreshore.
End of Milne St: Sandy access track from the carpark to the beach.
End Carey St: Sandy path from Carey St carpark to the beach.
West of Georgette St: Sandy path immediately west of the VMR (Volunteer Marine Rescue) building.
Georgette St: Gravel/ sand boat ramp apparently with a timber base.
East of Georgette St: Angular gravel path to beach from the eastern end of Georgette Street carpark.
End of Ford Rd: Sandy track from bitumen carpark. Fenced on eastern side of the track only.

The site does not experience the multitude of informal access paths associated with other parts of the Busselton foreshore where residential land adjoins; the few minor beach access tracks are marked on Figures 2A-C. The following recommendations are made, as identified on Figures 2A-C:

1. Funnel fencing to complement the fencing along the SUP to guide people towards the designated beach access tracks;

2. Close the western-most minor pathway between Georgette St and Carey St;
3. Close the minor pathway going in a north-westerly direction from the carpark between Scout Rd and Milne St;
4. Formalise the eastern-most minor pathway between Georgette St and Carey St into a major pathway;
5. Create a new major pathway from the SUP to the beach midway between Carey and Milne St;
6. Create a new major pathway from the SUP to the beach midway between Ford Rd and the pathway east of the Georgette St carpark; and
7. Closely monitor the establishment of informal beach access tracks and where necessary close with brushing (and replanting as appropriate).

Fencing and bollarding

Minimal fencing/ bollarding currently exists within the study site and much of what does exist represents post and rail fencing around carpark areas and is generally in poor condition. Replacement is recommended with either bollards or post and wire fencing as detailed below. Currently, fencing along the SUP to direct pedestrian access does not exist.

The following fencing is recommended in order to direct pedestrian access through the site, as identified on Figures 2A-C:

1. Post and wire fencing around revegetation Area 1 to protect it from pedestrian traffic and vehicle access; and
2. Post and wire fencing along the shoreward side of the SUP from Ford Rd to Milne St. (This will become particularly important in future years as use increases).
3. Post and wire 'funnel' fencing delineating major beach access tracks as per Figure 2.

Fencing should be constructed in accordance with the design specifications detailed in the Busselton Streetscape Manual and its location should allow at least 1.5m space either side of the SUP to:

- allow for overtaking and passing of pedestrian and bicycle traffic;
- facilitate spectator access during the ironman events; and
- allow for the potential widening of the SUP.

The following bollarding is recommended in order to control and guide vehicle access, as identified on Figures 2A-C:

- the shoreward edge of the Milne Street carpark; and
- along the Geographe Bay Road side of the recommended parkland area between Milne Street and the VMR building.

The bollarding should be in accordance with the specifications of the Busselton Streetscape Manual and along the Geographe Bay Road edge it should be placed 3m from the road edge in order to allow for parallel parking when needed.

Georgette Street boat ramp

The existing Georgette Street boat ramp caters to small craft and was observed to be frequently used by recreational boats over the summer period. While the boat ramp is immediately adjacent to the Busselton Volunteer Marine Rescue, it is noted that they generally utilise the ramp facilities located at Port Geographe as it is considered to be more appropriate for large boats.

The surface of the Georgette Street boat ramp is predominantly sand based with some gravel areas. Some locals suggested that there is an original timber structure underneath portions of

the current surface. The predominant sand base creates problems for some users with VMR members reporting regular boggings of vehicles. Additionally, the lack of fencing along the ramp creates the potential for degradation and destabilisation of dune vegetation.
A Shire-wide review of boat ramp facilities is proposed[9] which will provide significant direction as to the management, upgrading or otherwise of existing facilities. Until such a review is undertaken, it is unlikely that major changes or works on existing structures will be supported.

A large portion of stormwater runoff from the impervious Georgette Street carpark drains down to the ramp and it is understood that this creates erosion problems during winter. It is recommended that this stormwater drainage issue be addressed to help preserve the integrity of the surface and minimise the maintenance requirements. This may involve diverting runoff to a range of other areas surrounding the car park; engineering advice should be sought.

Fencing along the sides of the boat ramp and the shoreward end is recommended in order to direct traffic and protect the dunes and the proposed revegetation.

Bicycles
Given the high usage of the area by cyclists and a current lack of bike racks along the site (other than at the Georgette Street carpark), it is recommended that the Shire consider the provision of bike racks at key locations eg. Ford Road and Milne Street.

Viewing Areas
Two small 'viewing areas' are proposed to be located on the northern side of the SUP. These small, low key areas would incorporate interpretive signage and seating to allow for pedestrians to stop, enjoy and learn about the foreshore and Geographe Bay without damaging vegetation or inhibiting traffic on the SUP. During ironman and other events these areas would provide excellent viewing areas.

Recommended locations are:

- just east of the Milne Street carpark (Figure 2B); and
- between Georgette Street and Ford Road (Figure 2C).

Design of these areas should be guided by the Busselton Streetscape Manual.

3.3.2 Vehicle Access and Parking

Six formal car parking areas are provided at regular intervals along the length of the study area:

- Scout Road: A gravel parking area accommodating approximately 14 vehicles. **Recommendations**: 1. Formalise and bituminise this carpark. 2. Fence to delineate vehicle access and non-access areas. 3. Plan for shade and amenity by planting shade trees (primarily WA Peppermints) around the carpark. Note, outcomes of the 'Busselton Foreshore Redevelopment' process should be considered before implementing recommendations for this portion of the site.
- West of Milne Street: This represents a gravel carpark for approximately 6 cars. **Recommendations**: 1. Formalise and bituminise this carpark. 2. Fence to delineate vehicle access and non-access areas. 3. Plan for shade and amenity by planting shade trees (primarily WA Peppermints) around the carpark.
- Milne Street: gravel carpark for 10+ cars. **Recommendations**: 1. Formalise and bituminise this carpark. 2. Fence and bollard to delineate vehicle access and non-access areas. 3. Plan for shade and amenity by planting shade trees (primarily WA Peppermints) around the carpark.
- Carey Street: gravel carpark providing 6-7 parking spaces. **Recommendations**: 1. Convert the existing gravel area to parkland. 2. Bollard southern edge to provide for parallel verge parking and modify existing, underutilised garden bed to the south along Geographe Bay Road to provide additional parking.
- Georgette Street: this bituminised carpark provides parking for many cars and boat trailers. **Recommendations**: 1. Delineate parking spaces within the bitumen area to co-ordinate parking. 2. Provide some accommodation for stormwater runoff from the bitumenised area – much of the current runoff flows to the boat ramp and necessitates high maintenance of this area. 3. Plan for shade and amenity by planting shade trees (primarily WA Peppermints) around the carpark and undertake native landscape plantings within the vacant garden beds surrounding the carpark. 4. Bollard the eastern and edges of the carpark to prevent access to the adjacent proposed parkland areas.
- Ford Road: a bitumen carpark for approximately 5-6 cars. This area is considered sufficient given the large provision of formal and informal parking spaces immediately to the west of Ford Road.

Informal parallel parking is also possible along most of Geographe Bay Road.

3.3.3 Facilities

Toilets

Two public amenities blocks are located within the Georgette Street carpark – one stand alone block and the other attached to the VMR building. Additional public amenities are located approximately 300m west of the study area. It is considered that the existing toilet facilities are sufficient given the current usage and nature of facilities within the foreshore. The location of the existing toilets within the Georgette Street carpark makes it an obvious node to locate additional facilities such as picnic tables, shelters and BBQs.

It is recommended that a mural or artwork be considered for the stand alone amenities block.

Parkland

Currently no parkland areas are maintained within the study area, with the large cleared areas between Geographe Bay Road and the SUP all accessible to cars resulting in intermittent carparking and poor grass establishment. There is an opportunity to exclude vehicle access

from some of these areas and establish lawn/ turf in order to create a parkland area and so maximise the recreational value of this stretch. The area proposed for this 'parkland' establishment and management runs from immediately west of the Georgette Street VMR building to the Milne Street carpark as shown on Figure 2B.

It is recommended that as part of this parkland establishment that the following also be established:

1. Extensive (~25% of the area) native garden beds as detailed in Section 2.6.4. This is recommended in order to minimise the longterm water needs for the area, provide shade, shelter and amenity and to supplement the corridor and habitat value of the adjoining revegetation areas;
2. Multiple picnic tables and seating (an issue repeatedly raised during the community consultation);
3. Two electric BBQs (an issue repeatedly raised during the community consultation); and
4. Multiple shade and rain shelters effectively aligned to buffer summer sun and prevailing winds (an issue repeatedly raised during the community consultation); and
5. Installation of additional rubbish bins.

Seating

Existing seating within the area is generally limited to bench seating alongside the SUP at street ends/ major access ways (exact locations are shown on Figures 2A-C). It is recommended to supplement the existing bench seating with additional bench seats:

- adjacent to the beach access track from the Scout Road carpark;
- at the proposed viewing platforms; and
- between Ford Road and the Georgette Street carpark.

Additionally, picnic tables and seating are recommended throughout the parkland area, as proposed above.

Shade and Shelter

Other than under the existing plantings of Norfolk Island Pines, very little shade or shelter exists within the study area. Provision of shade and shelter areas within the site was considered a high priority of many of the community consultation participants. Section 2.6.4 details a range of shade and amenity plantings focused around carpark and seating areas. It is also recommended to provide appropriate covered areas through the parkland area.

Shade structures on the beach are considered inappropriate due to the potential for damage during storm events.

Showers

Beach showers are provided at Ford Road and Georgette Street. It is recommended that water conservation be promoted and water saving devices be utilised at these locations.

Picnic Areas

No picnic or BBQ facilities are provided within this stretch of the foreshore. The provision of BBQ facilities at the proposed parkland area is recommended.

3.3.4 Rubbish and Dog Waste

During the assessment of the foreshore, litter was observed at a number of locations and in particular to the east of the Georgette Street boat ramp, north of the SUP. Some of this litter was obviously quite old and it does not appear to be the case that large amounts of rubbish are

being dropped through the study area. Nevertheless, a clean up is recommended either as part of Clean Up Australia Day in March each year, or to coincide with the Capes Beach Clean Up held in October annually, or as part of an initial 'Friends of' group activity. Additionally, it is recommended that this area be checked by Shire staff to ensure the foreshore is maintained in a clean and tidy manner.

Rubbish bins are currently provided and maintained by the Shire of Busselton's Parks and Gardens staff, at most carparks or major beach access tracks. It is recommended that these existing bins be supplemented with new bins within the proposed parkland area.

The entire site is designated as a dog exercise area and dog waste bags are located intermittently along the site.

Green waste dumping has the potential to degrade the reserve, introduce weed species (especially grasses) into the area and impact on the visual amenity of the area. Unlike many other areas of the Busselton foreshore, green waste dumping was not a common occurrence in the study area, with a small patch noted adjacent to the VMR building. This practice should be discouraged.

3.3.5 Signage

Currently signage through the area is relatively minimal with the exception of the signs around the Georgette Street boat ramp. It is recommended to review and consolidate the signs at the boat ramp.

Social, recreational and conservation values of the study can be promoted and improved via interpretive signage. It is recommended that a short series of interpretive signs be developed covering European heritage, flora and fauna facts, Indigenous cultural facts, marine coastal processes etc. As a minimum, this interpretive signage is recommended at the two proposed 'viewing deck' locations.

4.0 MANAGEMENT ACTIONS

4.1 INTRODUCTION

The following management actions have been developed based on the stated objectives, site assessment, literature reviews and stakeholder consultation. The actions have been grouped according to the four key values/aspects of the foreshore: recreational, social, conservation and erosion values/ functions. They have been identified as high, medium or low priority and many of the recommendations meet more than one of the three stated objectives. Guiding principles provide the overarching framework and rationale behind the selection and prioritisation of the specific management actions.

4.2 GUIDING PRINCIPLES

4.2.1 Recreation

- Recognise 'recreation' as a designated purpose and a priority value of the study area. As per the Geographe Bay Foreshore Management Plan, 'recreational activities should be given a high priority as a beach use along the Geographe Bay Foreshore'[1].
- Recognise the regional significance of the annual Busselton Ironman and Half Ironman events and ensure foreshore management complements event management.
- Residential development and densification south of the area means use of the study area will increase over time and management must address the associated pressures.
- Existing informal tracks and beach access paths to be closed only where there are clear signs of damage or degradation.
- There are generally sufficient beach access tracks in place, with only two new paths proposed.
- Public vehicle access north of the SUP (other than in the immediate vicinity of the Georgette Street boat ramp and with permission from the Shire of Busselton) is not considered appropriate in the study area.
- Signs and maps should be utilised at strategic points to direct movement through the foreshore and to enhance the recreational experience. They should enhance the landscape rather than detract from it.
- Safe access should be facilitated along and to the SUP, including for disabled users. This includes widening of the existing path.

4.2.2 Social/ Community

- Recognise the importance of local ownership of the area, and the associated sense of place and pride, which contribute to a stronger sense of community and a sense of responsibility for the area.
- Recognise the concern for, and interest in, the area expressed by local residents and provide ongoing opportunities for involvement in foreshore management.
- Recognise the long-term significance of the Geographe Bay Foreshore to the Nyungar people.
- Recognise the opportunity and value for people to recreate in and experience the natural coastal environment.
- Recognise the constraints on financial and other resources available to the Shire of Busselton to manage the foreshore, and encourage collaborative actions and community involvement.

4.2.3 Conservation

Weed Management

- Weed management should start in areas of good condition and work outwards towards heavily infested/ degraded areas.
- Site and soil disturbance should be minimised as it promotes further weed growth.
- The rate of native plant regeneration should determine the rate of weed removal.
- Weed management should focus primarily on priority weeds not yet extensively established within the site and with the greatest potential to degrade the site.
- Recognise that preventing weeds entering or establishing at the site is one of the most effective and efficient methods of weed control.
- Recognise that weed species can have positive benefits on the site (eg. foredune stabilisation).

Revegetation

- Natural regeneration is favoured over revegetation. However, most parts of the site are sufficiently degraded to suggest that revegetation is needed in order to re-establish or supplement native vegetation.
- Revegetation should only utilise locally native species and stock of local provenance. Species appropriate for revegetation within the recommended areas are identified in Appendix 4. It is noted that the Geographe Community Landcare Nursery can supply native species of local provenance if pre-arranged and ordered.
- Planting should utilise the deep dune planting method which is being used successfully throughout the South-West. This method utilises where possible tall tube stock and minimises drying of the root ball by placing at depth such that up to 2/3rds of the stem and leaf height is covered. The use of tree bags is recommended only if grazing by rabbits is shown to be seriously impacting establishment.
- Planting should be scheduled to coincide with winter rainfall (ie. late May – August) in order to increase survival rates and minimise ongoing maintenance and wherever possible coincide with recent, forecast or current rain.
- Planting should be coordinated and guided by someone with local coastal revegetation experience to ensure appropriate placement and density for each species at each site.

Fauna

- The area has potential to contribute significant habitat and wildlife corridor values for a range of fauna species including the Western Ringtail Possum and Quenda if strategic revegetation is undertaken.
- Recognise the potential of feral fauna, namely foxes and rabbits, to impact on the conservation and recreation values of the site.

Fire

- In accordance with general Shire practice within foreshore areas, prescribed burning is not recommended within the foreshore area.
- Open fires are inappropriate for the site and are prohibited under Shire by-laws.

4.2.3 Coastal Erosion

- While erosion is not an immediate concern for the area it is considered appropriate to vegetate and stabilise dunes as protection against large storm events and changing coastal conditions including predicted sea level rise.
- Relatively recent patterns of accretion east of Milne Street provide no guarantee that erosion will not impact this stretch of foreshore in the future.
- The potential for future coastal erosion and storm surge impacts north of Geographe Bay Road should limit and restrict the nature and type of infrastructure implemented here.

4.3 RECOMMENDED ACTIONS

	#	MANAGEMENT ACTIONS	Priority
GENERAL	G1	Consider excising the portion of R8485 north of Geographe Bay Road (not considered appropriate for a 'Camping and Recreation' purpose) and amalgamating with R49652.	L
	G2	Incorporate outcomes of the Busselton Foreshore Redevelopment process into the Management Plan.	H
CONSERVATION	C1	Eradicate isolated Victorian Teatree patches around the Carey St beach access track (Refer to Appendix 4).	H
	C2	Control Buffalo Grass east of the Georgette St boat ramp.	H
	C3	Control Couch Grass at the various locations identified for revegetation.	H
	C4	Undertake planting and fencing of revegetation Area 1 (Figure 2A).	H
	C5	Undertake planting of revegetation Areas 2 and 3 (Figures 2B).	H
	C6	Consolidate and undertake infill planting of revegetation Area 4 (Figure 2C).	M
	C7	Undertake shade, amenity and habitat plantings as identified and detailed in Sections 2.6.4 and 3.3.2.	H
	C8	Monitor the impact of rabbits on revegetation efforts. Undertake appropriate control as required (Refer to Section 2.7).	M
	C9	Encourage residents to report fox and feral cat sightings and implement management program as necessary.	M
EROSION	E1	Implement appropriate responses to the 3-monthly beach surveys monitoring the effectiveness of the low profile geotextile groynes recently constructed updrift of the site.	M
	E2	Undertake revegetation works described in section 2.6.4 in order to assist stabilisation efforts and protect dunes.	H
SOCIAL	S1	Advertise and support the establishment of a 'Friends of Central East Busselton Foreshore' group to participate in ongoing management of the precinct.	H
	S2	Develop a series of coastal interpretive signs to be placed along the SUP, in consultation with Indigenous representatives to incorporate appropriate cultural knowledge.	M

Priorities: L = low, M= medium, H = high

	#	MANAGEMENT ACTIONS continued	Priority
RECREATION	R1	Install post and wire fencing along the shoreward edge of the SUP from Ford Rd to Milne St.	M
	R2	Install post and wire fencing around the native vegetation and revegetation Area 1 east of Milne Street.	M
	R3	Identify and delineate all major beach access tracks with the installation of post and rail fencing in a funnel formation at the entrance of each major beach access track as indicated on Figure 2.	H
	R4	Install bollards along the shoreward edge of the Milne St carpark and along the Geographe Bay Rd side of the recommended parkland area between Milne St and the VMR building.	H
	R5	Until such time as the permanent post and wire fencing is completed, ensure that all dune areas and native vegetation and are temporarily fenced off during the Full and Half Ironman events to avoid trampling.	H
	R6	Monitor the development of any new informal beach access tracks through the area, and discourage use/ close.	H
	R7	Undertake resurfacing of unstable section of SUP (Figure 2C).	M
	R8	Consider widening the SUP to cater for increased traffic.	L
	R9	Review and address stormwater management around the Georgette St boat ramp and car park.	H
	R10	Install fencing along both sides of the Georgette St boat ramp to protect adjoining dunes.	M
	R11	Adopt the relevant recommendations of the pending review of boat ramp facilities across the Shire.	M
	R12	Consider installation of bike racks at Ford Rd and Milne St.	H
	R13	Construct two 'viewing and interpretation areas' at the locations (Figure 2) including interpretive signage and seating.	M
	R14	Formalise carpark surfaces at Scout Rd, west of Milne St and Milne St.	M
	R15	Modify the existing garden bed running parallel to the Geographe Bay Road immediately south of Carey St to facilitate parking while still allowing for amenity landscape planting.	M
	R16	Delineate parking spaces at Georgette St carpark.	M
	R17	Consider artwork project for the stand alone amenities block at Georgette St car park.	L
	R18	Establish 'parkland' area between Milne St and the VMR building as detailed in section 3.3.3 and located on Figure 2 incorporating lawn areas, native garden beds, fencing, picnic/BBQ facilities, seating, rubbish bins and covered areas.	H
	R19	Install additional seating: • adjacent to the beach access track from the Scout Road carpark; • at the proposed viewing platforms; and • between Ford Road and the Georgette Street carpark.	M
	R15	Install Waterwise shower devices and signage or logos at showers at Ford Rd and Georgette St.	M
	R16	Undertake initial cleanup of litter hotspots, namely east of Georgette St boat ramp.	L
	R17	Review signage requirements at Georgette St boat ramp	M

Priorities: L = low, M= medium, H = high

REFERENCES

1. CoastWise (2001). *Geographe Bay Foreshore Management Plan: Technical Report.* Prepared for the Shire of Busselton and the Geographe Catchment Council.

2. Personal Communication with Paul Martin, Shire of Busselton, April 2009.

3. Samson, GC. (1982). *Proposals for Coastal Management at East Busselton.*

4. Extract from *Busselton Foreshore – Erosion Management of Residential Development* report provided by Shire of Busselton.

5. Department of Planning and Infrastructure (2007) *Shoreline Scoping Study Geographe Bay (Busselton).*

6. Personal Communication with I. Elliot, Coastal Scientist, University of Western Australia, November 2006.

7. Intergovernmental Panel on Climate Change (2007). *Climate Change 2007: The IPCC Fourth Assessment Report (AR4).*

8. Keighery, BJ. (1994). *Bushland Plant Survey: A guide to plant community survey for the community.* Wildflower Society of Western Australia (Inc.), Nedlands.

9. Personal Communication with Jennifer May, Shire of Busselton, April 2009.

10. Brown, K. and Brooks, K. (2002). *Bushland Weeds: A practical guide to their management.* Environmental Weeds Action Network (Inc.), Greenwood.

APPENDIX 1: SHORELINE AND VEGETATION LINE COMPARISONS 1941- 1993

Source: Shoreline Scoping Study (Busselton)[5]

APPENDIX 2: INFORMATION ON COASTAL PROTECTION PROJECT

APPENDIX 3: VEGETATION CONDITION SCALE

CONDITION	DESCRIPTION
Pristine	Pristine or nearly so, no obvious signs of disturbance
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non aggressive
Very Good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas re often described as 'parkland cleared' with the flora composing weed or crop species with isolated native trees or shrubs.

Source: Keighery (1994)[8]

APPENDIX 4: SPECIES LIST

Species	Common Name	Recommended for Revegetation Area	Recommended for Native Garden Beds/ Landscaping areas
Acacia cochlearis	Rigid Wattle	X	
Acacia Cyclops	Coastal Wattle	X	
Acacia littorea	Shark's Tooth Wattle	X	
Acanthocarpus preissii	Prickle Lilly	X	X
Agonis flexuosa	WA Peppermint	X	X
Alyxia buxifolia	Sea Box		
Carpobrotus virescens	Coastal Pigface	X	
Ficinia nodosa (formerly Isolepis)	Knotted Club Rush	X	X
Hardenbergia comptoniana	Native Wisteria	X	
Lepidosperma gladiatum	Coastal Sword Sedge	X	X
Leucopogon parviflorus	Coastal Beardheath	X	X
Melaleuca lanceolata	Rottnest Teatree	X	X
Olearia axillaris	Coastal Daisybush	X	
Rhagodia baccata subsp. Baccata	Berry Saltbush	X	X
Scaevola crassifolia	Thick-leaved Fan Flower	X	X
Spinifex hirsutus	Hairy Spinifex		
Spinifex longifolius	Beach Spinifex		
Sporobolus virginicus	Marine Couch		
Spyridium globulosum	Basket Bush	X	
*Santalum acuminatum**	Quandong	X	

INTRODUCED/WEED SPECIES	
Ammophila arenaria	Marram Grass
Avena spp	Wild/ Bearded Oats
Cakile maritima	Sea Rocket
Cynodon dactylon	Couch
Euphorbia paralias	Sea Spurge
Gazania linearis	Gazania
Lagurus ovatus	Hare's Tail Grass
Leptospermum laevigatum	Victorian Teatree
Pelargonium capitatum	Rose Pelargonium
Pennisetum clandestinum	Kikuyu
Stenatophrum secundatum	Buffalo Grass
Tetragonia decumbens	Sea Spinach
Trachyandra divaricata	Dune Onion Weed

Notes: This list is not intended to be comprehensive but rather indicative and useful for planning and implementing revegetation and weed control efforts. *Quandong (*Santalum acuminatum*) is no longer present on site but is recommended for inclusion in revegetation plantings.

APPENDIX 5: METHODS OF WEED CONTROL

Species	Nature of Infestation	Some suggested methods of management and control*
Buffalo Grass *Stenotaphrum secundatum*	Scattered	Spray with 1% Glyphosate or Fusilade 8ml/L plus wetting agent; repeat 2-3 times over the growing season.
Couch *Cynodon dactylon*	Scattered	Spray with 1% Glyphosate or Fusilade 5ml/L plus wetting agent, in late spring/summer; repeat in autumn.
Dune Onion Weed *Trachyandra divaricata*	Widespread	Wipe with 50% Glyphosate solution before flowering.
Gazania spp.	Widespread	Spray with 1% Glyphosate.
Kikuyu *Pennisetum clandestinum*	Scattered	Spray with 1% Glyphosate or Fusilade 10ml/L plus wetting agent; repeat 2-3 times over the growing season.
Rose Pelargonium *Pelargonium capitatum*	Widespread	Hand-pull isolated plants removing the entire stem, spot spraying with Metsulfuron methyl 5g/ha + Pulse.
Soursob *Oxallis pes-caprae*	Scattered	Spot spray with 0.2g/15L plus wetting agent or 1% Glyphosate.
Victorian Teatree *Leptospermum laevigatum*	Isolated	Manually remove seedlings and very small plants. Cut larger plants and paint immediately with neat Glyphosate. Remove cut material to safe location as branches hold seed for a long period.

***Notes: 1.** These management methods are adapted from those suggested within *Bushland Weeds: A practical guide to their management.*[10]

2. Before commencing, check that the suggested methods are still currently recommended and that the chemical is registered for the intended purpose.

3. Only appropriately trained, qualified and equipped people should undertake chemical control. It is recommended that chemical use within the study area only occur under the supervision of, or by appropriately trained Shire of Busselton staff or by a qualified contractor.

346088.410 mE 6277998.073 mN

350088.940 mE 6277998.073 mN

346088.410 mE 6275498.047 mN

350088.940 mE 6275498.042 mN

RECORDS

CALCS N/A

SVY BOOKS N/A

ORIG SIZE A1

SURVEY RECORDS

DRAFTING NOTES

CONTOURS

SCALE 1 : 5000

METRES

DATUM

VERTICAL N/A

COMPILED

RECOMMENDED

APPROVED

AUTHORISED

Department for Planning and Infrastructure

Coastal Asset Management

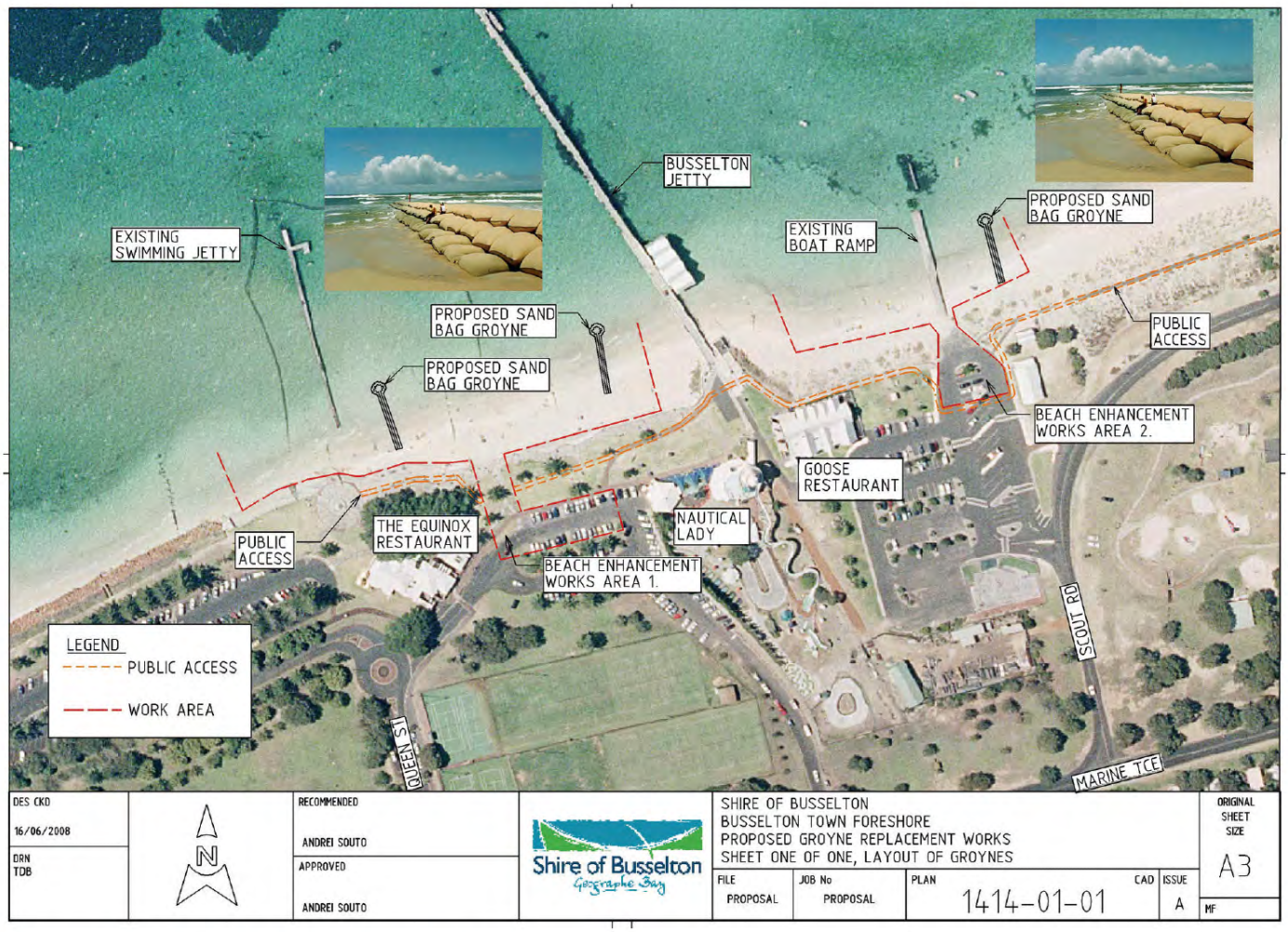
SHIRE OF BUSSELTON
PROPOSED EROSION SETBACK LINE
EAST BUSSELTON

DRAWING NUMBER 433 - 09 - 05

REVN C

Town Beach Geofabric Groynes

Week Starting 21/7/08



Town Beach Enhancement Project

About the project
This project involves the construction of 3 geofabric sand container groynes to replace the old timber groynes and placement of more than 7,500 cubic meters of sand at Town Beach.

Why groynes?
The timber groyne structures at Town Beach protected the foreshore promenade from storm damage and ensured there was a wide sandy beach adjacent to the Busselton Jetty.
The timber groynes have now deteriorated and are no longer protecting the foreshore promenade. The beach has narrowed and sections of the promenade collapsed during a severe storm in July 2007.
The replacement groynes will perform the same function as the original timber groynes.
The placement of sand on the beach, a term called beach nourishment, will also assist in maintaining a wide usable beach for the public, protect the foreshore promenade and minimise the risk of down drift erosion.

Why use Geotextile Sand Containers?
A condition assessment of the timber groynes at Town Beach by GHD in 2007 revealed that they had degraded to an extent that refurbishment was not feasible. A subsequent report considered a range of options to replace these timber groynes and stabilise the beach. The geotextile sand containers (GSCs), a specialised product for coastal applications, were the preferred option based on consideration of cost, design life, effectiveness and amenity. These types of structures have performed successfully in South Australia and on the east coast of Australia.

Where?
One groyne will be placed on the eastern side of the jetty, close to the existing boat ramp. Two groynes will be placed on the western side of the jetty, in front of the restaurants and car park area. Sand nourishment will be progressively undertaken on the western side of each groyne during construction.

When will works start?
The works will start in late July 2008 and will take in the order of 3 months to be completed, subject to weather conditions. The construction will normally take place Monday to Friday, and weekends if required (determined by weather conditions).

Access to the beach
Access along the foreshore will be maintained during the project.
However, public access to work areas will be restricted to ensure safety.
Whilst the Shire will try to minimise inconvenience to beach and foreshore users during the works, we seek your understanding whilst we undertake this beach enhancement project.

Keeping you up to date

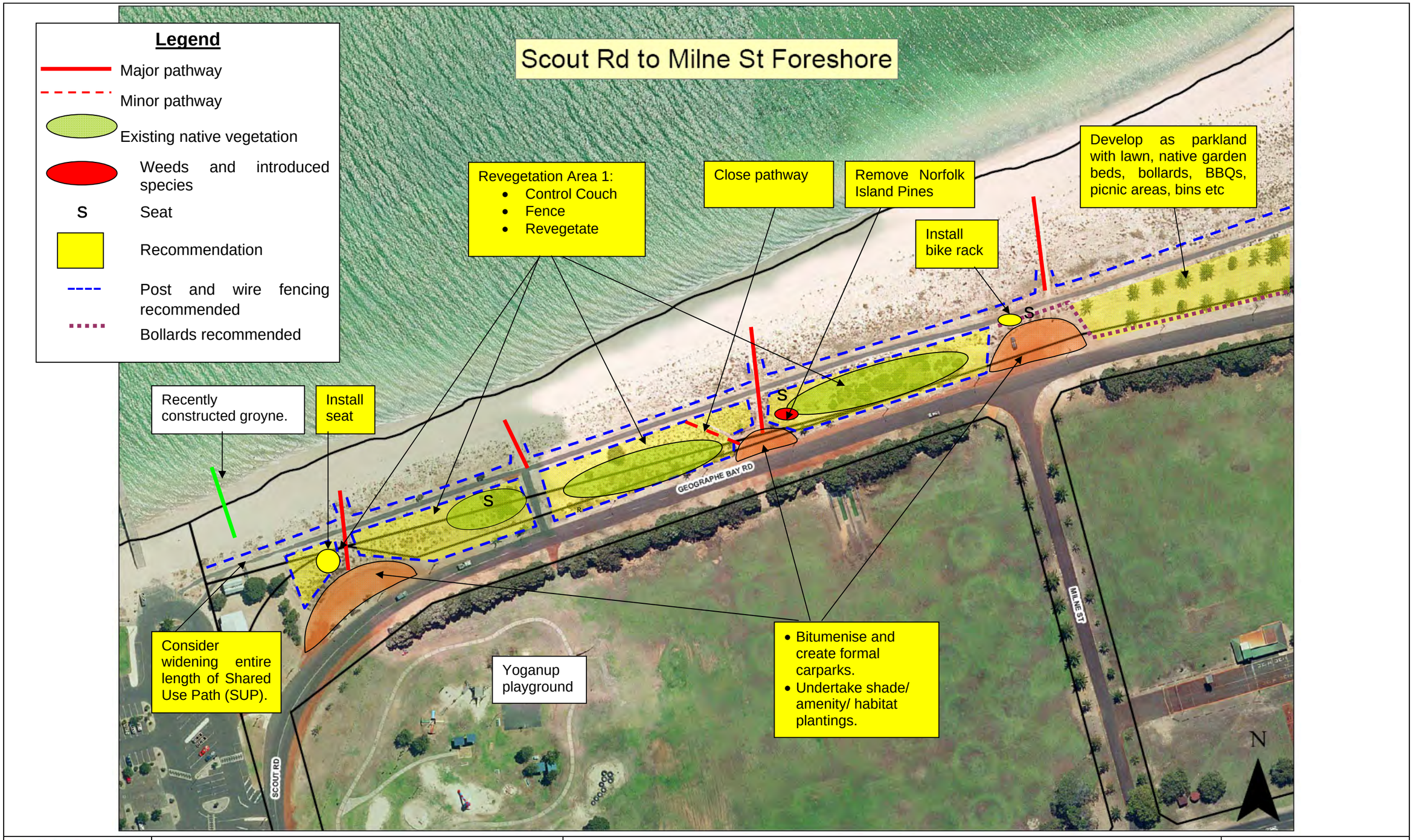
For more information contact:
Shire of Busselton
Manager for Infrastructure Development
Neema Premji Ph 97810 379.

Shire of Busselton
Geographe Bay

Disclaimer: All effort have been made to make the information displayed here as accurate as possible. This process is ongoing and the information is therefore ever changing and can not be disseminated as accurate. Care must be taken not to use this information as correct or legally binding. To verify information contact the Shire of Busselton office.

East Central Busselton Foreshore Management Plan
(Scout Road to Ford Road)
Figure 1: Study Area

Produced March 2009
Map Scale:
Approx. 1: 6000



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East Central Busselton Foreshore Management Plan
Figure 2A: Site Features and Recommendations
(Scout Road to Milne Street)

Produced March 2009

Map Scale:
Approx. 1:2250 at A4

Legend

- Major pathway
- Minor pathway
- Existing native vegetation
- Weeds and introduced species
- S — Seat
- Recommendation
- Post and wire fencing recommended
- Bollards recommended

Milne St to Georgette St Foreshore

Revegetation Area 3: revegetate

Brush and close path

Georgette St. boat ramp

Bike rack

Weed Control: Victorian Teatree

Formalise path

Revegetation Area 2: revegetate

Create new formal path

Consider installing bike rack

Install viewing/ interpretive area

Refer to Figure 2C for recommendations for this area.

Bitumenise and create formal carparks.

Undertake native garden bed planting, as per 2.6.4.

Delineate parking spaces

Recent revegetation: "Peppys for Possums" project.

Develop as parkland with lawn, native garden beds, bollards, BBQs, picnic areas, bins etc

VMR

GEOGRAPHE BAY RD

MILNE ST

CAREY ST

GEORGETTE ST

S

R

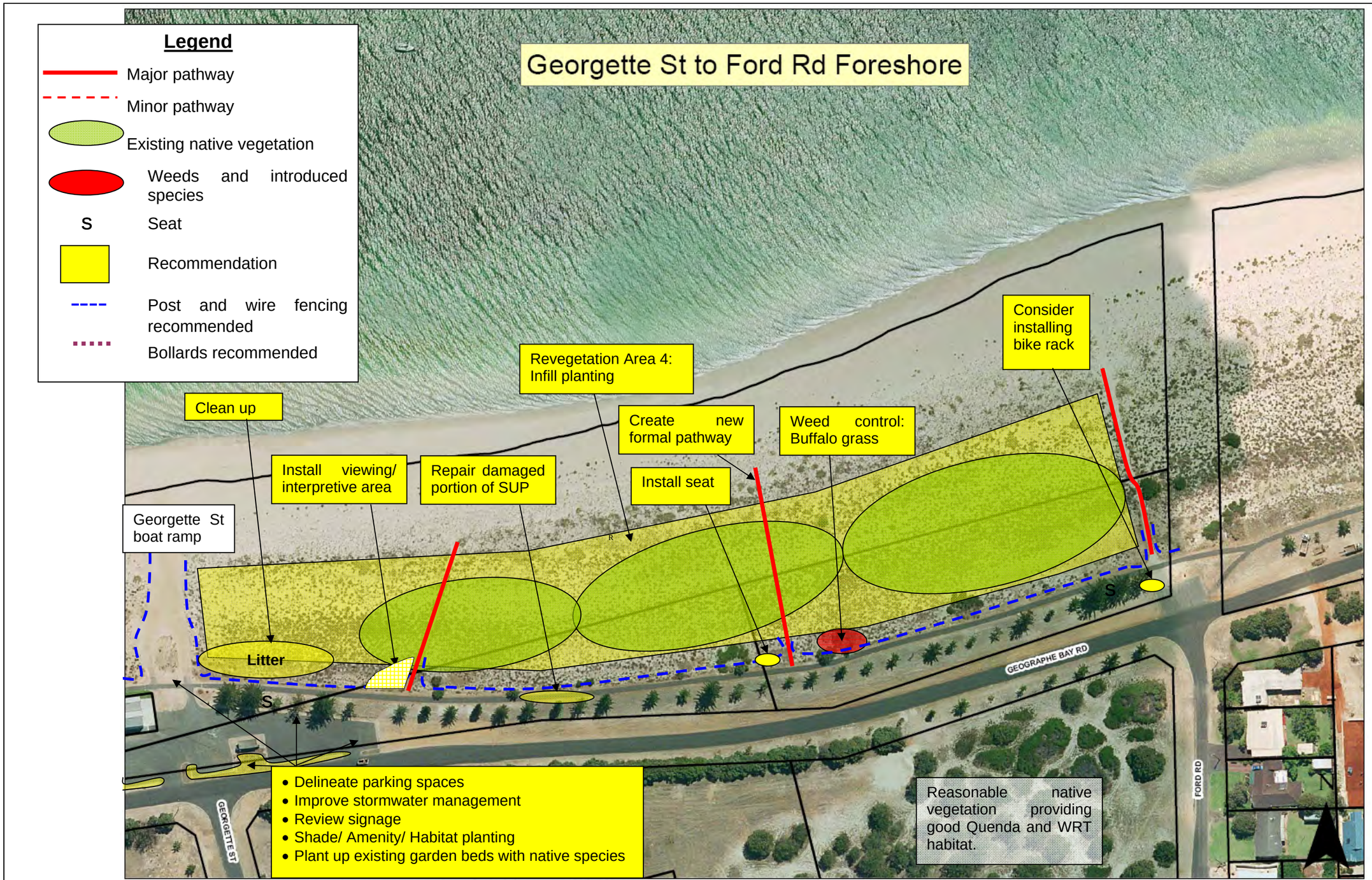
Shire of Busselton
Geographe Bay

Disclaimer: All effort have been made to make the information displayed here as accurate as possible. This process is ongoing and the information is therefore ever changing and can not be disseminated as accurate. Care must be taken not to use this information as correct or legally binding. To verify information contact the Shire of Busselton office.

East Central Busselton Foreshore Management Plan
Figure 2B: Site Features and Recommendations
(Milne Street to Georgette Street)

Produced March 2009

Map Scale:
Approx. 1:2250 at A4



Shire of Busselton
Geographe Bay

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East Central Busselton Foreshore Management Plan
Figure 2C: Site Features and Recommendations
(Georgette Street to Ford Road)

Produced March 2009

Map Scale:
Approx. 1:2250 at A4