September 2009

PROJECT APPLICATION

Sapphire

PREFERRED PROJECT REPORT AND STATEMENT OF COMMITMENTS

Report

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PROJECT APPLICATION 09-0060

PREFERRED PROJECT REPORT AND STATEMENT OF COMMITMENTS

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Contents

1 Introduction

On 9 May 2007, the Minister for Planning approved a concept plan for a site on the Pacific Highway Coffs Harbour. An application has been submitted to make some amendments to the concept plan to remove the tourist element from the development and to replace the residential flat buildings with dwellings. A project application has also been submitted for the demolition of the existing structures on the site and the carrying out of some site works.

It is proposed to demolish all the existing structures on the site as follows:

- The 114 room hotel building which includes the restaurant and conference centre and all back of house facilities.
- All ancillary buildings associated with the hotel primarily located around the existing swimming pool
- Former Seafood Mamas Restaurant at the entrance to the site
- The swimming pool & spa
- The tennis & volley ball courts
- All redundant services either above or below ground
- All bitumen or concrete car parks and footpaths
- Any vegetation outside the dune area and 7A environmental zone not marked for reuse or transplanting

No earthworks are proposed as part of this application. However, clean brick, rubble and concrete construction materials will be retained for fill on the site.

The Environmental Assessment Report for the above development has been exhibited and submissions have been received on the proposal. These have been provided to the proponent. Section 75 (6) of the Environmental Planning and Assessment Act provides as follows:

(6) The Director-General may require the proponent to submit to the Director-General:

(a) a response to the issues raised in those submissions, and
(b) a preferred project report that outlines any proposed changes to the project to minimise its environmental impact, and
(c) any revised statement of commitments

This report contains the response of Sapphire Beach Development Pty Ltd to the issues raised and outlines the proposed changes to the project as a result of the examination of the submissions. In relation to certain matters, additional information is provided which it is considered resolves the issues identified. Where changes to the project are proposed, these are assessed in relation to the provisions of the Environmental Planning and Assessment Act.

2 Summary of Key Issues

2.1 Introduction

No major issues were raised in relation to the project application. Submissions related generally to proposed conditions of consent and the timing of works. Issues raised were as follows

2.2 Foredune Management

The Department of Planning indicated that it considered that dune rehabilitation work should be undertaken earlier to allow species greater time to grow and dunal areas to become established. A detailed dune management plan was requested to form part of the consent for the project application. This has been provided and is included in Appendix 1 to this report.

2.3 Coffs Harbour Council Issues

Coffs Harbour Council raised the following issues in relation to the application :

(a) A 24 hour liaison officer to be appointed for the demolition works. This has been provided for in the Site Management Plan (Appendix 3 EAR)

(b) Neighbours and CHCC, RTA and Marine Park Authority to be provided with 72 hours notice of commencement of works. This has been added to the Statement of Commitments (Commitment 4.3.1)

(c) Stockpile to be located a reasonable distance from neighbouring properties and the height to be restricted so not to cause visual impact on neighbours. This has been added to the Statement of Commitments (Commitment 4.8)

(d) Demolition matters. All of these matters have been covered in the Site Management Plan and the Statement of Commitments.

(e) Site Security. This matter is covered in the Site Management Plan and the Statement of Commitments

(f) Addition of standard conditions.

3 Changes To Proposal

No major changes have been made to the proposal as a result of the examination of the submissions apart from the inclusion of a Dune Management Plan in the application and minor changes to the Statement of Commitments.

4 Statement Of Commitments

4.1 Introduction

This draft Statement of Commitments identifies those matters, which it is proposed will be dealt with at this stage of the proposed project in order to minimise impacts on the environment.

If approval to the application is granted under Part 3A of the Environmental Planning and Assessment Act 1979, the Proponent will commit to the following controls for the demolition and site work sof the proposed project.

4.2 The Project

The proponent will undertake the project generally in accordance with:
(a) The Environmental Assessment Report dated June 2009, prepared by Janet Thomson

(b) All supporting technical reports included in the Appendices to the above report

(d) This Statement of Commitments

If there is any inconsistency between the conditions of this Statement of Commitments and a document listed above the conditions of this Statement of Commitments shall prevail to the extent of the inconsistency.

4.2.1 Statutory Requirements

(a) All approvals, licences and permits required by legislation will be obtained and kept current as required.
(b) The proposal will generally comply with the planning controls, which relate to the site except as set out in this EAR.

(c) The project will generally comply with the concept plan approval 06-0148 dated 9 May 2007 as amended

4.2.2 Consultation

(a) Consultation will continue throughout the development process with Coffs Harbour City Council and relevant Government departments as necessary

(b) Surrounding residents will be informed of the demolition and site works programme prior to the commencement of work on the site and will be advised of details of contacts should there be any issues in relation to the works once they commence on the site

4.3 Site Works

4.3.1 Notification of Works

Neighbours, Coffs Harbour Council ,the Roads and Traffic Authority and the Marine Park Authority will be given 72 hours notice of commencement of works on the site

4.3.2 Site Security

To prevent the unauthorised entry of people into the construction site(s)and prevent damage to the environment, security for the construction site(s) will include:

- Lockable security gates
- A security fence around the perimeter
- Security lighting on site and
- Controlled access to the site through the site control office, visitor reception area and site management personnel

4.3.3
Hazardous Materials

The findings of the Hazardous Materials Survey and Register prepared by David Lane and Associates and dated June 2009 are to be implemented at all stages of the demolition and removal of waste from the site.

4.3.4
Site Management

The findings and management procedures set out in the Site Management Plan dated June 2009 and attached to this EAR are to be implemented at all stages of the demolition and site clean up works. The following require further approval by the Director general prior to the commencement of demolition works on the site:

(a) A Work Plan for hazardous material management and removal
(b) A Noise and Vibration Study in relation to the concrete masonry recycling facility which demonstrates that there will be no adverse noise or vibration impacts outside the boundaries of the site
(c) A Health and Safety Plan prepared in accordance with the requirements of the New South Wales Health and Safety Act Regulations
(d) An Environmental Monitoring Plan including methods for monitoring dust, noise and vibration, surface water, site run off and methods for reporting and addressing any issues which may arise

4.3.5
Protection of Sensitive Areas

Prior to the commencement of work on the site the dunal area and the 7A Environment Protection area are to be fenced to ensure that there is no damage to these areas during the demolition and site clearance work.

4.3.6
Dune Rehabilitation Work

The dune rehabilitation work will be done in accordance with the Dune Management Plan as part of the Stage 1 works to allow the species greater time to grow and dunal area to become established.

4.4
Training Programme

All construction personnel must undergo an indigenous cultural heritage induction conducted by the Coffs Harbour Local Aboriginal Land Council prior to the commencement of works

4.5
Traffic and Transport

4.5.1
Access to the Site

Prior to the commencement of any works on the site the proponent is to reach agreement with the RTA in relation to detailed plans of the line marking to provide right and left hand turning lanes of the access way to the site. The access way to the site must be line marked to provide right and left hand turning lanes from the Pacific Highway.

4.5.2
Traffic Management

Prior to the commencement of works on the site a Traffic Management Plan is to be prepared and approved by the Director General, which shows the following:

(a) Truck routes to be used to access the site
(b) Control of access to the site
(c) Volumes of trucks and traffic to access the site
(d) Washing facilities for trucks on the site
(e) Hours of access to the site

4 Statement Of Commitments

4.6 Hours of Operation

Hours of operation on the site are limited to 7.00am to 5pm Monday to Friday. No work is permitted on Saturday or Sunday.

4.7 Survey of 100 Year Hazard Line

Prior to the commencement of works on the site a registered surveyor must determine the location of the 100 year coastal hazard planning line (as per Willing and Partners Map 1 Campbell's Beach Hazard Lines September 1999) on the site. All buildings are to be constructed landward of this line.

4.8 Stockpile

Stockpile site to be located reasonable distance from neighbouring properties and the height to be restricted so not to cause visual impact on neighbours

4.9 Demolition

(a) All works in accordance with Site Management Plan, Hazardous Material Survey & Register, Phase 2 Detailed Environmental Site Assessment

(b) Prior to commencement of demolition works a site specific 'Construction (& Demolition) Noise and Vibration Assessment and Management Plan' shall be prepared an approved by PCA and a copy to CHCC and incorporated into the overall SMP.

(c) All works to comply with appropriate AS including 'AS 2601-2001 Demolition of Structures' and any Workcover NSW requirements.

(d) All waste material to be classified in accordance with DECCW 'Waste Classification Guidelines, 2009'. Records to be kept.

(e) Maintain access to the sewer pumping station for CHCC at all times

Appendix

Dune Management Plan

DUNE MANAGEMENT PLAN

PELICAN BEACH REDEVELOPMENT

LOTS 100 & 101 DP 629555

AND LOT 2 DP 800836

PACIFIC HWY, COFFS HARBOUR.

SEPTEMBER 2009

PREPARED BY

BUSHFIRESAFE (AUST) P/L

ENVIRONMENTAL SERVICES

TABLE OF CONTENTS

1.0 INTRODUCTION

This Dune Management Plan (DMP) outlines the strategies for initial rehabilitation works and ongoing maintenance for the dune and foreshore of Cambpell's Beach. It is required as part of the development application for the proposed residential development at Pelican Beach Resort (06-0148 Mod 1). This DMP contributes to, and should be read in conjunction with the Vegetation Management Plan completed for this development (Bushfiresafe, 2009).

It is important to acknowledge that any dune system is a dynamic system displaying natural variability. In particular, the dune and foreshore are likely to have been eroded during past storm events; and are likely to be eroded in the future. The DMP needs to be robust to accommodate such changes as well as providing the framework to adjust to future changes relating to possible climate change (higher sea levels and possibly increased frequency of severe storms).

1.1 Coastal Hazards

The DMP must consider the mitigation of potential impacts of a number of identified coastal hazards that are likely to impact upon Campbell's Beach and the proposed residential development.

Beach Erosion

Beach erosion can significantly impact upon the amenity value of the Campbell's Beach foreshore. Beach erosion is influenced by wave conditions; the presence of 'rip' cells; the existing beach conditions (i.e. amount of rebuilding since the last storm event); the condition of the dune vegetation; and the presence of adjacent headlands of other rock outcrops (Soil Conservation Service, 1990).

Sand Drift

Windborne sediment transport can result in the permanent loss of sand from a beach or can result in sand abrasion of motor vehicles, buildings and associated gardens and infrastructure. Dune vegetation can reduce the potential impacts of sand drift through: creating a natural aerodynamic barrier that deflects salt laden wind over the dunes reducing its erosive ability; or any vegetation can trap any wind blown sand increasing the dune stability (Soil Conservation Service, 1990).

The importance of maintaining suitable dune vegetation is paramount to any mitigating of possible coastal hazards and is the key objective of this DMP.

1.2 Coastal Management Goals

The NSW Coastal Dune Management manual (DLWC, 2001) outlines the following actions to be addressed in any coastal dune management plan.

Dune Planning

Detailed geomorphological assessment of changes in beach and dune morphology, coupled with temporal analysis from historical photogrammetry is essential to define the background conditions and coastal processes affecting each section of coastline. Coffs Harbour City Council have commissioned this background investigation as a requirement for the preparation of the Campbell's Beach Coastline Management Plan (WP Geomarine, 1999a,b). Replication of this research is not warranted for the preparation of this DMP. However, ongoing management of this DMP has the potential to contribute to reviews and refinements of regional-scale coastal management plans.

Community Involvement

Community involvement is critical to developing a successful, long-term improvement in the coastal environment. The local community should be given the opportunity to comment on, and participate in any proposed actions. This will assist with the determination of aspects of the Campbell's Beach foreshore that the community values. In addition, the wider community, through the Coffs Regional Landcare (Dunecare groups) should be involved from the earliest possible time. Public awareness of the importance of the coastal zone is essential; this is currently a major focus of the Government agencies and Coffs Harbour City Council, but could also be addressed through this DMP.

Dune Reconstruction

The reconstruction of the foreshore system is not applicable for this development since the existing dune system is recognisable and has undergone previous rehabilitation works as part of the initial construction of the Pelican Beach Resort. Dune reconstruction tends to be applicable following sand mining or extraction activities where micro-relief has been obscured.

Dune Vegetation

The maintenance of a stable, self perpetuating vegetation community is essential for the stabilisation of the dune system. The selection of appropriate species that will protect against wind erosion whilst also being adapted for conditions of: shifting sands, strong winds; salt spray and infertile soils is essential. Rehabilitation of the dune system with appropriate species is the key focus of the DMP and is addressed in the following sections.

Dune Protection

The protection of the dune system from inappropriate activities is critical for long-term environmental benefits. This involves the exclusion of development activities upon the foredunes; formalisation of public access and signposting; and the provision of an active community awareness programme; all of which are part of this DMP.

Maintenance

Ongoing maintenance represents the greatest challenge to a long-term improvement to the coastal environment, particularly since the limited timeframes for required actions imposed by any development consent conditions do not equate with the timeframes for suggested climate-induced changes as outlined in the NSW draft sea-level policy (see McInnes *et al*., 2007). Actions that may be required in the future tend to involve repairs to fences and signage, replanting following storm events, fire management and community awareness campaigns. Consequently any management actions recommended as part of this DMP should seek to reduce the requirements for ongoing maintenance.

1.3 Management Objectives

The key management objectives of this DMP include to:

- provide for a range of coastal-orientated activities without degrading the existing resource base;
- retain existing biodiversity, protecting the structural integrity of any plant communities;
- provide plant populations that are self perpetuating, reducing the need for replanting;
- maintain the existing plant populations, particularly the listed threatened species, Silverbush.

1.4 Legislative framework

NSW Coastal Policy 1997

The NSW Coastal Policy was adopted in November 1997 and provides a policy framework through which effective, balanced and co-ordinated management of the N.S.W. Coastal Zone can occur. The central focus of the policy is the Ecologically Sustainable Development (ESD) of the Coastline. The Coastal Council of NSW is a body set up by the NSW Government which is responsible for ensuring all parties involved in the implementation of the Coastal Policy (State agencies, local councils, other public authorities and non-governmental organisations) perform their tasks effectively.

Objectives and key actions from the Policy of particular relevance to this plan are:

- To identify coastal lands with conservation values and implement management strategies and controls to ensure that those values are protected

- To identify and protect areas of high natural or built aesthetic quality
- To ensure that risks to human safety from the use of coastal resources is minimized
- To encourage towns to reinforce or establish their particular identities in a form which enhances the natural beauty of the coastal zone
- Beaches, frontal dunes and undeveloped headlands will be protected and only minor developments will be permitted for essential public purposes e.g. surf life saving facilities.
- To design and locate development to complement the surrounding environment and to recognise good aesthetic qualities
- Development proposals will have to conform to specified design and planning standards to control height, setback and scale to ensure public access and to ensure that beaches and foreshore open spaces are not overshadowed.
- State Government agencies, when preparing policies, programs and procedures for coastal zone planning and management, will be required to ensure they are consistent with the Coastal Policy and have regard for national and international strategies, policies and agreements.

Sea Level Rise Policy

The draft sea level rise policy proposes the benchmark for a 40cm rise in sea level by 2050 in response to predicted global climate change; increasing to 90cm by 2100. The implications for such a rise on the proposed development; stability of the foredune; the revegetation of the Campbell's Beach foreshore must be considered. The concept plan delineates a Sea Rise Protection Zone within which measures may be placed to protect the property.

Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) forms the framework within which planning occurs within NSW. Works proposed on the reserve may require development consent under Part 4 of the EP&A Act. The EP&A Act sets up environmental planning instruments which provide a basis for development control at state-wide (State Environmental Planning Policy- SEPP), regional (Regional Environmental Plans-REP) and local levels (Local Environmental Plans-LEP and Development Control Plans-DCP). Consent granted by Council must be in accordance with the planning instruments gazetted for the area.

State Environmental Planning Policy No 71- Coastal Protection (SEPP 71)

The *State Environmental Planning Policy No 71- Coastal Protection* (SEPP 71) commenced in November 2002. SEPP 71 has been made under the Environmental Planning and Assessment Act 1979 and aims to ensure that the coastal zone is protected in accordance

with the principles of ecologically sustainable development. SEPP 71 provides for the Minister for Natural Resources to have over-riding consent authority for developments up to 100m above the mean high water mark of the sea, a bay or an estuary.

2.0 THE CAMPBELL'S BEACH DUNE SYSTEM

The Campbell's Beach foreshore and dunes consists of the following four distinct landform units; definitions being obtained from the Coastal Plant Regeneration (NSW) webpage.

Beach

The beach is constantly adjusting to rates of sand accumulation and removal during storm events; each of which can affect the width and condition of the beachfront, foredune and sandplain. Sand supply is influenced by the general longshore drift of sand along the East Australian coastline and specifically by the rocky headland at the south of the beach (Figure 1). The extent of the beach face is generally defined by the high water mark. The width of the beach varies between 16 and 32 metres along the length of the foreshore.

Figure 1: Campbell Beach looking north (Left image) and south towards the rocky headland (Right image).

Incipient Dune

The incipient dune represents the area immediately seaward of the frontal dune crest and is often separated from the beach by a small erosional scar or breakaway. This small bench or platform of accumulated windblown sand at the back of the beach it is the most transient of all the dune types and can grow rapidly upwards and towards the sea under favourable conditions. Similarly it can be completely removed during storm events under the influence of high seas. Vegetation cover tends to be dominated by quickly colonising species able to trap sand and allow quick recovery after erosional events.

The incipient dune along Campbell's Beach at the time of inspection was relatively narrow and inclined, but is vegetated by mostly native species (Figure 2)

Figure 2: The incipient dune along Campbell's Beach is narrow and steeply inclined but vegetated.

Foredune

The foredune lies between the incipient foredune and the hind dune and is usually quite large in undisturbed landscapes where sand constantly accumulates along the crest. It can be attacked by waves during particularly severe or prolonged storm events and can be affected by sand blows on the leeward side when vegetation is lost. Woody shrubs and trees, such as Coast Banksia and Coastal Wattle dominate these dunes, providing anchorage and stability. Shallow-rooted species (*e.g*. *Casuarina* sp.) can be undercut during storm events and topple over, resulting in dune instability and rapid erosion of the foredune. Ultimately, the size, shape and stability of the foredune depends upon the extent of the vegetation cover. The foredune in front of the Pelican Beach Resort is vegetated by a mixture of native and non-native species, including landscape plantings and escapes (Figure 3).

Figure 3: Left: Foredune vegetation showing effects of windshear; Right: weed and garden escapes dominate the vegetation in parts).

Hind Dune

The Dunal area behind the foredune usually consists of a swale (depression running parallel to the shoreline) immediately behind foredune followed by elevated or horizontal sand deposits (sandplain). Whilst this area can be vegetated by littoral rainforest, wet and dry sclerophyll forests, coastal heath communities, Banksia, Melaleuca and Casuarina forests in natural areas, the hind dune and sand plain have been modified by the Resort as open grassland and recreation areas (Figure 4).

Figure 4: View from the Pelican Beach Resort towards Campbell's Beach showing the managed hind dune and sandplain areas presently utilised from recreational activities

The foredunes and sandplain comprise undulating vegetated ridges and level ground between high water mark and approximately 6m above mean sea level. The vegetation on the dunes is very important in stabilizing the sand dune and providing a visual buffer between the beach and the proposed adjacent residential area. The Resort initiated the establishment of the dune vegetation when it was first developed. Since then there has been regeneration of native indigenous trees, shrubs and groundcover species and some spread of exotic plants, typically those plants that are garden escapees.

2.1 Existing vegetation

The vegetation structure observed is generally open coastal scrub with a grassy and scattered understorey and is typical of natural foredune vegetation (Figure 5). This vegetation can be referred to as the permanent tertiary structure responsible be the anchoring of the sand dune. The dominant species includes: Coastal Banksia (*Banksias integrifolia*), Coastal She-Oak (*Casuarina equisetifolia ssp incana*) and Coastal Wattle (*Acacia longifolia* subsp. *Sophorae*) with an understorey comprising Sword or Mat grass (*Lomandra longifolia*), Spinifex (*Spinifex sericeus*), Kangaroo Grass (*Themeda australis*) and Coastal Pigface (*Carpobrotus glaucescens*).

Figure 5: View of foredune from Pelican Beach Resort showing two levels of native and non-native vegetation

The vegetation on the dune in some cases has been modified by activities such as pruning or removing of trees to open views to the beach and bay. The understorey is also largely dominated by exotic 'weed' species and includes: Agapantha (*Agapanthus* sp.), Yakka (*Agave americana*), Bridle Creeper (*Asparagus asparagoides*), Climbing Asparagus Fern Weed (*Asparagus plumosus*), Pampas Grass (*Cortaderia selloana*), Penny wort (*Hydrocotyle conariensis*) and Kikuya.

At three locations along the foredune, either single plants or clumps of several individuals of Silverbush (*Sophora tomentosa* subsp. *australis*) were recorded (Figure 5). Silverbush is an endangered species listed in Schedule 2 of the Threatened Species Conservation Act as an endangered plant. This Dune Management Plan is consistent with the priority actions developed for the long-term recovery of this species.

Figure 5: Silverbush growing as clumps of several plants within weed species on the foredune to Campbell Beach.

3.0 DUNE REHABILITATION

The *Coastal Dune Management: A Manual of Coastal Dune Management and Rehabilitation Techniques* (Department of Land and Water Conservation, 2001) is the primary reference material for the creation of suitable pedestrian access ways and ecological restoration of degraded dunal systems. This report is recognised by relevant State Government agencies as providing "best practice" guidance in management and rehabilitation of dunal complexes. The following ecological restoration works will be undertaken for the rehabilitation of the Campbell's Beach foreshore, in accordance with the Coastal Dune Management manual:

1. Strategic and targeted control of environmental weeds 20 metres either side of the dunal area.
2. Revegetation of the foredune with an appropriate selection of local provenance, fire retardant species. The establishment of mixed plantings of small to medium height, local provenance species will retard any potential bushfires and enhance habitat values of the area in and around landscaped areas close to the rehabilitation area.
3. Protect and rehabilitate the identified Silverbush populations occurring on the foredune through fencing; signage; and encouraging natural regeneration.

3.1 Weed Removal

A detailed flora and fauna survey of the Pelican Beach Resort area as part of the development application identified a number of declared and environmental weeds present within the existing vegetation on the dune system (Bushfiresafe, 2006). These weed species are listed in Appendix 1 of the accompanying Vegetation Management Plan.

3.1.1 Bitou Bush control

Bitou Bush is a weed of national significance; Winkler *et al*. (2008) have produced a Bitou Bush Management manual that provides the most up-to-date techniques and strategies for controlling Bitou Bush and is directly applicable to Mid-North Coast region. Winkler *et al*. (2008) outline four aspects of any long-term Bitou Bush control programme: Planning and pre-control considerations; Control; Linking with restoration activities; and follow up and ongoing management.

Planning and Pre-control considerations

It is necessary to plan a management strategy to achieve both short- and long-term goals. In part this will be dictated by available funding and commitment, but can also be directed by the existing site conditions, access, extent of weed problem and the presence of native vegetation both within and adjoining the Bitou Bush infested areas. Success can be enhanced through liaison with, for example, the Coffs Regional Landcare Group regarding successful results and/or failures achieved elsewhere in the region to devise the most appropriate control techniques.

Control

Control of Bitou Bush can best be achieved through manual and/or chemical techniques, by compartmentalising the problem area and working progressively. Winkler et al. (2008) list the following techniques, the first two being manual methods and the remainder involve chemical applications: hand removal; crowning of plants; cut and painting of the stem; stem injection; scrape and paint; and foliar spraying.

The manual removal of small plants by hand is generally the preferred method as it removes only the Bitou Bush with minimal soil disturbance and can be performed without training by volunteers at any time of the year.. It involves the physical removal of the entire plant that an be subsequently used as a mulch or erosion control. As the Bitou Bush stem bends at almost 90° once emerging from the soil, care should be applied to ensure that the plant does not break at this point during removal, leaving the root mat in place. Manual removal is labour intensive and only suited to young plants.

Crowning involves the cutting of the stem below the ground surface and can be successful for plants too large to be effectively pulled out. The fibrous root mat will not reshoot. This technique is also labour intensive, targets only the Bitou Bush with minimal soil disturbance but may not be appropriate is large areas of infestation of in areas adjacent to headlands (safety issues).

Given the extent of Bitou Bush infestation along the foredune in front of the Pelican Beach Resort, and the presence of native species including the threatened Silver Bush, manual removal using a combination of both above techniques is recommended.

The application of chemicals licensed for use on Bitou Bush in NSW is less labour intensive and hence better suited to treating larger areas. The drawbacks include the need to receive appropriate training, limitations on the timing of any application to coincide with plant growing periods; potential to affect non-targeted native plants, impacts on biodiversity due to chemical accumulation; and the logistics of transporting necessary equipment (spraying, water, chemicals) to the area. In a discussion of the choice of chemical, Winkler *et al*. (2008) discuss glyphosate and metasulfuron methyl as the most appropriate and readily available chemicals for use on Bitou Bush. It is important that up-to-date chemical dosage rates be obtained from a relevant Weeds Authority prior to undertaking any application. Both these chemicals target broad-leaved weeds that are likely to be present in the foredune area. Whilst there is the potential for metasulfuron methyl to remain within the soil and limit natural regeneration; the impacts are unlikely to be of great significance giving the freely-draining sand dune and high rainfall of the Coffs region.

The cut and paint method involves the cutting of the Bitou Bush above ground and covering the cut stem with the selected chemical. The chemical needs to be applied as soon as possible to ensure maximum uptake by the plant. The Stem injection method involves drilling a small hole into the sapwood at a 45° downwards and filling the reservoir with chemicals. Drilling deeper into the plant will not result is chemical uptake and be unsuccessful. Scrape and paint involves the removal of *c*. 15cm of bark on the trunk and applying the chemical on

the exposed material. All three methods are highly successful but leave the dead Bitou Bush in situ creating a potential fire issue in thick infestations. The other technique (Foliar Spraying) is not recommended for the control of the existing Bitou Bush weed issue at Pelican Beach Resort given the potential to affect non-targeted plants including Silver Bush.

Linking with Restoration

By integrating the weed removal with revegetation activities, the potential for Bitou Bush to reinfest an area is greatly reduced. This is particularly so where the species plants can rapidly cover the exposed area to naturally prevent any subsequent Bitou Bush establishment. The replanting of the foredune is discussed in the next section.

Follow up

Success in any weed control programme requires subsequent monitoring of the success or failure of any control method. Complete eradication with one application cannot be assumed and hence follow up applications may be required. Where manual removal is possible, inspection at 3 to 6 monthly intervals to remove any recently germinated plants is required. Where chemical methods have been applied, the results should become apparent almost immediately. If a high success was not achieved during the initial application, the technique should be modified in consultation with other weed management organisations to better target the weed problem.

Ongoing monitoring should be undertaken for a minimum of 3 years, preferably at 6-monthly intervals throughout this time.

3.1.2 Other environmental weeds

The techniques described above for Bitou Bush control are directly applicable for the control of other environmental weeds within the foredune area at Pelican Beach Resort.

3.2 Recommended Weed Control Strategy

- Undertake a weed control programme involving manual removal and/or chemical application (metasulfuron methyl) using the cut and paint method with on-site mulching of the Bitou Bush and other identified environmental weeds.
- Follow up inspections carrier out at 6-monthly intervals for 3 years
- Involve a community landcare / dunecare organisation to continue the weed control indefinitely

3.3 Sea Rise Protection Zone

To accommodate the potential sea level rise in response in global climate change over the next 90 years, as outlined in the NSW Draft Sea Level Rise Policy Statement, a delineated Sea Rise Protection Zone is identified in the concept plan. This Zone is seaward of the proposed dwelling locations and Asset Protection Zone and comprises open space / managed grassland with retained Pandanus trees and the dune system. It is proposed that this area will be monitored and managed as part of the dune rehabilitation works. The proposed revegetation of the foredune will assist this dune to accrete naturally in response to sea level rise by trapping and retaining wind blown sand, and, when combined with the management of the hind dune areas, will create a natural barrier from the affects of increased wave heights for the proposed dwellings. The grassed open space behind the dune rehabilitation works will act to reduce any affects of storm surges on these dwellings.

4.0 PLANTING STRATEGY

The dunal area is subdivided into three zones: Incipient dune; foredune and hind dune as illustrated in Attachment 1. It is envisaged that planting arrangement for these areas will use native species recommended by Coastal Plant Regeneration (NSW) for the Coffs Region. It is important to consider the requirements for bushfire protection when revegetating an area in residential areas, however, the accompanying Bushfire Risk Management Plan (Bushfiresafe 2006) identifies a 10m Asset Protection Zone to be implemented between the hind dune rehabilitation zone and proposed future dwellings in anticipation of the revegetation of the dunal system. The following species are recommended for planting in the respective zones (Table 1).

Primary species that rapidly stabilise exposed sand following storm events should be considered for the Incipient Dune area. Secondary species that possess adaptive growth habits whilst being prolific seed producers are more appropriate for the foredune crest. These species cannot establish quickly and rely on the primary species for stabilising the dune, but once established, develop a substantial seed bank to allow subsequent regeneration. The final component of the planting scheme involves the Tertiary species. These species are generally the long-lived tree and shrubs that occur in the foredune and hind dune areas providing the anchoring of the dune system.

Table 1: Recommended species for replanting in the identified morphological zones

Botanical Name	**Common Name**
Incipient Dune	
Canavalia rosea	Coastal Jack Bean
Carex pumila	Dune Sedge
Carpobrotus glaucescens	Coast Pigface

Ipomoea pes-caprae subsp*. brasiliensis*	Coastal Morning Glory
Spinifex sericeus	Hairy Spinifex
Vigna marina	Dune Bean
Foredune	
Acacia longifolia subsp*. sophorae*	Coastal Wattle
Actinotus helianthi	Flannel Flower
Banksia integrifolia subsp*. integrifolia*	Coast Banksia
Breynia oblongifolia	Coffee Bush
Canavalia rosea	Coastal Jack Bean
Casuarina equisetifolia subsp*. incana*	Horsetail Sheoak
Leucopogon parviflorus	Coastal Bearded-heath
Melanthera biflora	Sea Daisy
Scaevola calendulacea	Scented Fan Flower
Spinifex sericeus	Hairy Spinifex
Tetragonia tetragonoides	New Zealand Spinach
Vigna marina	Dune Bean
Hind Dune	
Acacia longifolia subsp*. sophorae*	Coastal Wattle
Acmena smithii	Lilly Pilly
Acronychia imperforata	Beach Acronychia, Logan Apple
Alectryon coriaceous	Beach Alectryon, Beach Birds-eye
Banksia aemula	Wallum Banksia
Breynia oblongifolia	Coffee Bush
Cupaniopsis anacardioides	Tuckeroo
Polyscias elegans	Celery Wood, Silver Basswood
Sophora tomentosa	Coastal Sophora
Syzygium luehmannii	Riberry

Source: Adapted from list provided by Coastal Plant Regeneration (NSW)

4.1 Preparation

Appropriate site preparation is necessary to ensure success of any revegetation programme. This should involve the removal of all weeds from the intended planting site and applying mulch to limit competition with planted species. Bitou Bush cannot be transported as it is a declared noxious weed and hence must be used or destroyed on site. Bitou Bush can be mulched to provide a weed mat for subsequent plantings. However, the decomposition and subsequent release of nutrients may provide an advantage to environmental weeds over native species that have been adapted to nutrient-poor soils; the mulching of Bitou Bush should be considered where large amounts of this weed have been removed.

4.2 Planting

Tubestock of the recommended species listed above will be suitable for the revegetation of the foredune at Pelican Beach Resort. An experience bush regenerator or Landcare Support Officer should be consulted regarding the most appropriate spacings; this in part will be dictated by the native vegetation cover. Planting should occur between Late Spring and Early Summer when rainfall is likely to be more frequent. This will negate the need to water plants

during the early establishment period, and should coincide with the weed removal activities. The inclusion of tree guards will provide additional protection from wind, salt spray and herbivores.

4.3 Follow up Actions

It is unrealistic to assume complete success at the first planting and hence follow up actions will be required over a 3 year period. This should involve weed management and replanting where initial success was not achieved. It is important to encourage natural plant regeneration. Early colonising species such as *Acacia* may be over-represented in the early stages of regeneration with other species only becoming apparent after considerable time. Furthermore, the ability of plants to move into the area from adjoining areas of native vegetation is dependent upon the dispersal mechanisms and may take considerable time before becoming established.

There is the opportunity to obtain seed from existing native species on the foredune and propagating to reduce expenses. However, a permit from Department of Environment, Climate Change and Water (DECCW) is required to obtain seeds from Silver Bush as this plant is listed as a threatened species; no other threatened species were recorded during the flora survey (Bushfiresafe (Aust) 2006).

4.4 Relocation of Pandanus trees

A number of Pandanus trees are identified for removal to accommodate the proposed building envelopes, access roads and landscaping. These trees were planted within the Pelican Beach Resort as part of initial landscaping and will need to be removed for the proposed change of land use. 51 Pandanus trees located along the foredune will be retained. All removed trees will be relocated and incorporated into the landscape planting on the site as outlined in the Landscape Master Plan. Active Tree Services have advised that relocation of this plant is relatively straight forward process given the tight root-ball that is developed. Furthermore, Pandanus trees can be successfully planted in a temporary location, prior to relocation to their final position.

It is recommended that the removal of Pandanus trees be performed during the first stage of the dune rehaibilation. The removal will require the use of lifting equipment that may damage existing vegetation during the operation; the affected area should be revegetated as soon as practical afterwards.

5.0 FENCING AND SIGNAGE

It is important to limit the public access to Campbell's Beach to formalised access paths to prevent continued degradation of the foredune system. The Landscape Management Plan (Jackie Amos, 2009) outlines a central green spine through the development area. This spine includes the vehicle access and pedrestrian pathway and continues as a managed open space beyond the limit of residential development, providing public access to Campbell Beach and the Solitary Islands Coastal Walk. A second access path is to be located along the northern boundary. These beach access points will be located where weed infestation of the dune system is high and damage to antive vegetation will be minimised. It is proposed to discourage random traversing of the dune system, potentially leading to vegetation destruction and dune instability; this will best be achieved through the fencing of the foredune area using appropriate materials. The choice of materials and design of the fencing should consider the need for longevity of the structures, aesthetic impact on the coastal vista, safety of the public as well as not interrupting the free movement of fauna utilising the foredune area and any potential contamination of the dune by leachates from treated timber.

To improve on-site information about beach access and compliment the proposed fencing, it is recommended that directional signage be installed along the access paths advising of the beach entry points. Signage should also be installed advising of the restoration works being undertaken. The public should be requested not to enter the target areas. By developing a community awareness campaign in consultation with DECCW, Coffs Harbour City Council, Coffs Regional Landcare and Dunecare organisations, inadvertent destruction of the dune system can be minimised.

6.0 BUDGET

The rehabilitation works outlined in this DMP require a preliminary budget of approximately $58,000 for the implementation. This will involve the weed control programme, revegetation of the dunal areas, fencing and signage as recommended in the above sections. This amount is recommended as a guide, the final amount should be calculated once final specifics of any work to be completed have been determined. Furthermore, this amount does not include any in-kind support provided by the developer for activities required as part of the Pelican Beach Resort and also from community groups willing to participate in any rehabilitation programme.

Action	Details	Cost ($)
Weed Management	Remove Bitou Bush and other environmental weeds from the dunal areas	20,000
	Ongoing follow up management at 6-monthly intervals over 3 year period	10,000
Replanting	Planting of 500 tubestock over 3 day period	6,000
	Replanting as required during 3 year period	3,000
Fencing	Erect fences along length of foredune and for designated beach access	16,000
Signage	Installation of directional signs for beach access	2,000
	Installation of information signs for rehabilitation works	1,000
	Total	S58,000

7.0 IMPLEMENTATION AND REVIEW

This DMP should be implemented at the earliest possible time to provide the greatest opportunity for the revegetation of the foredune to become established. It is recommended that the implementation of this DMP should be a requirement of Stage 1 on the proposed development once development approval has been granted. The DMP covers a 3-year time interval during which implementation will be the responsibility of the developer. After this period ongoing management of the Campbell Beach foreshore should rest with the Community Association.

A report outlining the activities and achievements should be submitted annually to the Coffs Harbour City Council. This will allow a review of the DMP to be undertaken, ensuring that the goals are achieved. A final report should be prepared and submitted to the Coffs Harbour City Council after the completion of the third year's activities. It is important to incorporate both the local community as well as the wider Coffs Harbour region in the ongoing management of the Campbell Beach foreshore. It is only though the participation of community organisations such as the Coffs Regional Landcare Group that a long-term improvement of the coastal environment can be achieved.

7.1 Community Involvement

The involvement of community Landcare organisations such as Coffs Regional Landcare Group and Coffs Dunecare should be sort to provide: assistance and recommendation on species selection; advice on weed removal techniques that are most appropriate for the subject site and weed conditions; and to support ongoing management of the dune area by the Community Association.

8.0 DUNE MANAGEMENT PLAN

Table 2 outlines the recommended management actions for the DMP.

Table 2: Summary Actions for the Dune Management Plan

Action	Techniques / Strategies	Follow up actions	Community involvement
Bituo Bush control	Manual (Hand pulling) removal	6 monthly	Yes
	Manual (Crowning) removal	6 monthly	Yes
	Chemical (Cut and Paint) application using metasulfuron methyl during summer growing period	3 monthly Oct to Mar	Yes if trained in chemical use
Other Environmental Weeds	Manual (Hand pulling) removal	6 monthly	Yes
Planting	Tubestock of recommended species	Annually during Summer if required	Yes
Fencing	Construct fence along foredune and beach access	As required	No
	Install temporary fencing to revegetation areas as required	As required	No
Signage	Install directional signs for beach access	As required	No
	Install information signs for rehabilitation works	As required	No
Community Awareness	Contribute to DECCW, CHCC, Landcare information packages and community participation	As required	Yes

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