Doddi's Beach Revegetation Plan (5-Year Approach).

1. Introduction

This Revegetation Plan has been prepared to support clearing associated with the Hotspot Coastal Adaptation and Protection (HCAP) Program coastal protection works at Doddis Beach.

The purpose of revegetation is to:

- Restore disturbed dune vegetation following construction works
- Stabilise coastal landforms and support erosion control
- Re-establish native coastal vegetation communities comparable to pre-clearing condition
- Ensure long-term resilience of the beach system and coastal infrastructure

2. Background

2.1 Project Overview

Doddi's Beach is located in Halls Head, Mandurah, immediately to the west of the Mandurah Ocean Entrance Channel. The beach is a valued community asset due to its relatively low wave environment, which results from its northerly aspect. Despite this relatively calm environment, the beach has been significantly impacted by high water levels and severe storm events, resulting in erosion of the foreshore. At present, the rock groyne at Janis Street is the only beach control structure in the study area frontage.

A specialist coastal engineering consultant, MP Rogers & Associates, has undertaken a detailed design process for the frontage. Changes to the beach management, with the addition of new, upgraded control structures are shown in the Figure below. It is important to note that the construction of this coastal protection regime, most specifically the Janis Street groyne extension, is expected to result in an increase in beach width of between 10 to 20 m. It is estimated that this would correspond to a trapping of an additional 17,000 m^3 to 22,000 m^3 of sand along Doddi's Beach.



The project involves staged coastal protection works to:

- Retain the existing beach system
- Reduce erosion impacts
- Improve resilience to storm surge and sea level rise
- Maintain public access and recreational amenity

2.2 Staged Works

- **Stage 1 (2026–27):**
  - GSC revetment at Robert's Point car park
  - Janis Street groyne extension
- **Stage 2 (Future):**
  - Potential GSC groyne (subject to Stage 1 performance outcomes)

2.3 Vegetation Clearing

Clearing is required for construction and includes the following species:

- *Acacia rostellifera*
- *Scaevola crassifolia*
- *Olearia axillaris*
- *Spyridium globulosum*
- *Rhagodia baccata*
- *Spinifex longifolius*
- *Spinifex hirsutus*
- *Carpobrotus virescens*

3. Avoidance Measures

To minimise impacts:

- Clearing footprint will be strictly confined to construction areas
- Vegetation outside work zones retained
- Machinery exclusion zones established around retained vegetation
- Project Laydown area's will be confined to existing carparks and grassed areas
- Existing access tracks used wherever possible

4. Revegetation Objectives

1. Re-establish native coastal vegetation using local provenance species
2. Achieve a self-sustaining dune system
3. Replicate pre-clearing vegetation structure (groundcover, shrub layers)
4. Stabilise dunes and reduce erosion risk
5. Maintain weed cover below 20%

5. Species for Revegetation

The following species will be used:

Primary dune stabilisers:

- *Spinifex longifolius*
- *Spinifex hirsutus*
- *Acanthocarpus preissii*
- *Carpobrotus virescens*

Shrub layer species:

- *Acacia rostellifera*
- *Scaevola crassifolia*
- *Olearia axillaris*
- *Spyridium globulosum*
- *Rhagodia baccata*

6. Methodology

6.1 Site Preparation

- Weed control prior to planting (minimum 3–6 months)

6.2 Vegetation Establishment

The plan integrates avoidance, mitigation, staged rehabilitation, and long-term monitoring. This staged revegetation ensures that impacts from coastal protection works are mitigated, native coastal vegetation communities are restored, and the dune system improves its stability and resilience.

- Tubestock planting
- Planting to occur May–June (optimal period for WA coastal areas)

6.3 Planting Density (Indicative)

- Spinifex: 4–6 plants/m² (high density for dune binding)
- Shrubs: 1–2 plants/m²

7. Staged 5-Year Revegetation Implementation Plan

Year 1 (2027–28):

- Weed control program begins
- Initial dune planting/ Primary revegetation of Stage 1 areas

Year 2 (2028–29)

- Secondary revegetation of Stage 1 areas
- Initial monitoring

Year 3 (2029–30)

- Infill planting where establishment is poor
- Continued weed control

Year 4 (2030–31)

- Continued Infill planting where establishment is poor
- Ongoing maintenance
- Monitoring of vegetation structure and density

Year 5 (2031–32)

- Final infill planting
- Performance assessment against completion criteria
- Transition to self-sustaining vegetation or continued revegetation required

Planting Area's (Indicative).



8. Mitigation Measures

8.1 Weed Management

- Pre- and post-planting weed control
- Annual weed mapping and treatment
- Aim for <20% weed cover
- Weed control prior to establishment is critical to reduce competition

9. Monitoring Program

Methods

- Permanent quadrats

- Photo point monitoring

Indicators

- Species richness
- Plant density
- Survival rates
- Weed cover
- Monitoring will be consistent and repeatable to detect changes over time

10. Completion Criteria (5-Year Targets)

- ≥60% of target native species established
- ≥70% vegetation cover across revegetated areas
- ≥70% survival of planted tubestock
- Weed cover ≤20%
- Improved dune stabilisation

11. Maintenance and Contingency Measures

- Annual weed control
- Replacement planting if survival <70%
- Additional erosion control if instability detected

12. Reporting

Annual monitoring reports includes:

- Quadrat results
- Photo points
- Weed Cover visual estimate assessment per quadrat
- Reporting continues until completion criteria achieved

Completion Criteria Table (Doddis Beach)

Measure	Baseline/Reference (Coastal Dune System)	Target	Completion Criteria (5 Years)
Total species richness	Coastal dune system dominated by Spinifex spp. and 6–10 shrub species	≥60% of native species returned	Minimum 6 native species established
Quadrat species richness	4–8 species per quadrat	≥60% of baseline	≥3–5 species per quadrat
Key species presence	Dominant dune binders and shrubs present	All dominant species reinstated	Presence of: *Spinifex longifolius*, *Spinifex hirsutus*, *Acacia rostellifera*, *Scaevola crassifolia*
Groundcover density	High density Spinifex cover	≥70% relative density	Continuous cover of Spinifex across dune
Shrub density	Low–moderate shrub density	≥60% of baseline	1–2 shrubs/m² across revegetation areas
Vegetation cover	Variable dune cover (50–90%)	≥70% vegetation cover	≥70% native vegetation cover

Weed cover (minor)	<20%	Maintain or reduce	≤20% weed cover
Major weeds	Absent or low	Not present	No declared or major weeds present
Bare ground	Natural sand exposure	Stabilised	No active erosion; dune stable
Vegetation structure	Groundcover + shrub layers	Replicated	Functional dune system established
Survival rate	N/A	≥70% survival	≥70% survival of planted tubestock

5-Year Schedule of Actions

Stage	Action	Timing	Year 1	Year 2	Year 3	Year 4	Year 5
Site Preparation	Weed control (pre-planting)	Autumn/Winter	✓	✓	✓		
Vegetation Establishment	Tubestock procurement	Summer	✓	✓	✓		
	Primary planting (Spinifex, groundcovers)	May–July		✓	✓		
	Secondary planting (shrubs)	May–July		✓	✓	✓	
	Infill planting	May–July			✓	✓	✓
Monitoring	Establish quadrats & photo points	Spring	✓				
	Annual monitoring surveys	Spring		✓	✓	✓	✓
Maintenance	Weed control	Spring/Autumn	✓	✓	✓	✓	✓
	Remedial planting	May–July		✓	✓	✓	✓
	Erosion repair (if required)	Ongoing	✓	✓	✓	✓	✓
Reporting	Annual report	June each year		✓	✓	✓	✓

Monitoring Requirements Table

Scale	Monitoring Type	Data Collected	Method	Frequency	Duration
Quadrat-level	Species richness	Number of native species	Quadrat survey	Annual	5 years
	Species density	Plants per m²	Quadrat counts	Annual	5 years
	Vegetation cover	% native vs bare ground	Visual estimate	Annual	5 years
	Weed cover	% weed cover	Quadrat assessment	Annual	5 years
Site-level	Vegetation condition	Keighery condition rating	Visual estimate	Annual	5 years
	Dune stability	Presence of erosion	Visual inspection	Annual	5 years
	Photo points	Visual change over time	Fixed photo locations	Annual	5 years
Reporting	Data analysis	Progress vs completion criteria	Comparative analysis	Annual	Until criteria met

Maintenance & Contingency Triggers

Issue	Trigger	Action	Timing
Low survival (<70%)	Monitoring results	Infill planting	Next planting season

Issue	Trigger	Action	Timing
High weed cover (>20%)	Weed survey	Targeted weed control	Within 3 months
Erosion observed	Dune instability	Replant Spinifex/use of brushing	Brushing – immediate / Replant Spinifex -Next planting season
Poor vegetation cover	<50% cover by Year 3	Additional planting & mulching	Following winter
Pest/grazing impacts	Evidence of damage	Install guards	As required

Costings

1. Planting Density & Quantities

Spinifex (primary dune binders)

- Density: 4–6 plants/m² → assume 5/m² (midpoint)
- Quantity:
  2,967 m² × 5 = 14,835 plants

Shrubs

- Density: 1–2 plants/m² → assume 1.5/m²
- Quantity:
  2,967 × 1.5 = 4,451 plants

Total tubestock

- **19,286 plants**

2. Cost Assumptions

Item	Unit Cost (AUD)	Notes
Tubestock (Spinifex)	$6.10each	Bulk coastal species
Tubestock (shrubs)	$3.50 each	Native shrubs
Planting labour	$1.50 / plant	Includes handling & install
Weed control initial	$2,500 / ha	Per treatment
Monitoring	$2,500 / year	Includes reporting
Infill planting	10–20% of stock	Based on survival criterion
Site prep (setup, logistics)	Lump sum	$3,000

3. Revegetation Costing

<u>Tubestock supply</u>

Spinifex: 14,835 × $6.10 = $90,494

Shrubs: 4,451 × $3.50 = $15,579

Total plants = $90,494 + $15,579 = $106,073

Planting labour; 19,286 plants × $1.50 = $28,929

Site preparation; $3,000

Initial revegetation total; $106,073 + $28,929 + $3,000 = **$138,002**

4. Weed Control Costs (5 Years)

Pre-plant weed control (3–6 months)

- Area: 0.2967 ha
- Rate: $2,500/ha/treatment
- Assume 2 treatments
- 0.2967 × 2,500 × 2 = $1,484

Ongoing weed control (annual, 5 years)

- Assume 2 visits/year; 0.2967 × 2,500 × 2 visits × 5 yrs = $7,418
- Total weed control; $8,902

5. Infill & Contingency Planting

Assume 15% replacement (to maintain ≥70% survival)
19,286 × 15% = 2,893 plants
Avg $3 supply + $1.5 planting ≈ $4.5/plant
2,893 × 4.5 = $13,019 (Potential).

6. Total Project Cost (5-Year Program)

Component	Cost (AUD)
Revegetation (plants + labour + setup)	$138,002
Weed control (5 years)	$8,902
Monitoring & reporting	$12,500
Infill planting	$13,019
TOTAL	**$172,423**

7.Unit Rate Summary

Metric	Cost
Cost per m²	**$58.10/m²**
Cost per hectare	**$581,000/ha**
Cost per planted unit	**$172,423 ÷ 19,286 plants = $8.94 per plant**