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Flora and vegetation reconnaissance survey of Spoilbank Reserve

1. Introduction and scope

The Department of Transport (DoT) proposes to develop a marina complex on the western side of the 'Spoilbank' sand formation (the Proposal) located in the town of Port Hedland (Figure 1). The Spoilbank is a man-made coastal landform created in the late 1960s and early 1970s as a result of disposing of material associated with dredging activities within the Port Hedland Inner Harbour and Goldsworthy shipping channel. The site is currently identified as the 'Spoilbank Recreation Reserve,' but does not have formal reserve status.

The DoT is currently progressing the detailed design of the Proposal and is working towards a schedule that ensures the State Government commitment of a 2020 construction commencement is achieved.

DoT has commissioned Strategen-JBS&G to carry out a botanical site survey to inform the Proposal's botanical (flora and vegetation) characterisation of the site.

The scope of work included:

- desktop review
- site visit and assessment
- survey report.

2. Survey method

A desktop review of Government databases was undertaken to identify conservation significant flora and vegetation that might be present in the study area, in particular:

- Threatened flora and ecological communities listed under both State and Commonwealth legislation
- Priority Ecological Communities (PECs)
- Threatened and Priority listed flora species, i.e. Declared Rare Flora (DRF)
- invasive weed species.

The following database searches were carried out:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool (PMST) for Threatened Flora and TECs listed as Matters of National Environmental Significance (MNES)
- Department of Biodiversity, Conservation and Attractions (DBCA) NatureMap for Threatened and Priority Flora records

- DBCA and WA Herbarium Threatened and Priority Flora databases for Threatened and Priority Flora records
- DBCA Threatened and Priority Ecological Communities listings.

A senior Strategen-JBS&G botanist visited Spoilbank Reserve on 12 February 2020 and undertook a reconnaissance survey of the site. The site was traversed both by vehicle and on foot. Data was collected on GPS enabled tablets from six relevés, and opportunistic collections of flora were made throughout the site to inventory most species present. At each relevé, the following parameters were recorded:

- GPS location of relevés
- photographs of the site
- topography
- soil type and colour
- outcropping rocks and their type
- percentage cover and average height of each flora species
- vegetation condition, using the vegetation condition scale for the Eremaean and Northern Botanical Provinces (adapted from Keighery 1994 and Trudgen 1988).

Vegetation condition and vegetation units were mapped using aerial photography at a 1:5,000 scale and field notes.

Specimens collected at the site were dried and frozen under Western Australian Herbarium protocols, before identification by a taxonomist with experience in the bioregion.

All work was carried out in accordance with relevant State and Commonwealth policies, technical guidance documents and industry documentation, including EPA's Technical Guidance: Flora and vegetation surveys for Environmental Impact Assessment and EPA's Environmental Factor Guideline: Flora and vegetation.

3. Results

A database search found eleven Priority Flora taxa occurring within 20 km of Spoilbank Reserve (Table 1); however, only two of those taxa prefer coastal locations (*Tephrosia rosea* var. Port Hedland and *Gomphrena pusilla*) (Figure 1). No State or Commonwealth Threatened Flora were identified by the database searches.

Table 1: Conservation significant flora identified by desktop review

Species FAMILY	Conservation status		Description	Potential to occur
	EPBC Act	BC Act		
Abutilon sp. *Pritzelianum* MALVACEAE	-	P3	Perennial shrub growing to 1-1.5m high. Yellow/orange flowers produced in August. Drainage areas and red sand dunes	**Unlikely** due to absence of preferred habitat.
Bonamia oblongifolia CONVOLVULACEAE	-	P3	Perennial, herb or shrub. Fl. blue, Feb. Sandy or gravelly soils.	**Possible** due to presence of preferred habitat.
Bulbostylis burbidgeae CYPERACEAE	-	P4	Tufted, erect to spreading annual, grass-like or herb (sedge), hairy. Fl. brown, Mar or Jun to Aug. Granitic soils. Granite outcrops, cliff bases.	**Unlikely** due to absence of preferred habitat.
Eragrostis crateriformis POACEAE	-	P3	Annual, grass-like or herb, 0.17-0.42 m high. Fl. Jan to May or Jul. Clayey loam or clay. Creek banks, depressions.	**Possible** due to presence of clay.

Species FAMILY	Conservation status		Description	Potential to occur
	EPBC Act	BC Act		
Gomphrena leptophylla AMARANTHACEAE	-	P3	Prostrate or erect to spreading annual, herb, to 0.15 m high. Fl. white, Mar to Sep. Sand, sandy to clayey loam, granite, quartzite. Open flats, sandy creek beds, edges salt pans & marshes, stony hillsides.	**Possible** due to presence of preferred habitat.
Gomphrena pusilla AMARANTHACEAE	-	P2	Slender branching annual, herb, to 0.2 m high. Fl. white, Mar to Apr or Jun. Fine beach sand. Behind foredune, on limestone.	**Likely** due to presence of preferred habitat.
Goodenia nuda GOODENIACEAE	-	P4	Erect to ascending herb, to 0.5 m high. Fl. yellow, Apr to Aug.	**Possible** due to presence of preferred habitat.
Gymnanthera cunninghamii APOCYNACEAE	-	P3	Erect shrub, 1-2 m high. Fl. cream-yellow-green, Jan to Dec. Sandy soils.	**Possible** due to presence of preferred habitat.
Heliotropium muticum BORAGINACEAE	-	P3	Ascending to spreading perennial, herb, to 0.3 m high.	**Possible** due to presence of preferred habitat.
Rothia indica subsp. *Australis* FABACEAE	-	P3	Prostrate annual, herb, to 0.3 m high, densely covered in spreading hairs. Fl. Apr to Aug. Sandy soils. Sandhills and sandy flats.	**Possible** due to presence of preferred habitat.
Tephrosia rosea var. *Port Hedland* FABACEAE	-	P1	Erect, shrub, spindly shrub (broom-like). Flowers in July, August and September. Occurs in sandy and sandy loam soils, and often tan, deep sands in coastal dunes.	**Likely** due to presence of preferred habitat.

The reconnaissance survey found 39 species of flora at the site, including eleven introduced taxa, several of which were likely planted:

1. *Abutilon lepidum*
2. *Acacia ampliceps*
3. *Acacia ancistrocarpa*
4. *Acacia bivenosa*
5. *Acacia colei* var. *colei*
6. *Acacia sphaerostachya*
7. *Acacia stellaticeps*
8. *Acacia tumida* var. *pilbarensis*
9. **Aerva javanica*
10. **Agave* sp.
11. *Arecaceae sp. 1
12. *Arecaceae sp. 2
13. *Aristida contorta*
14. **Calotropis procera*
15. *Canavalia rosea*
16. **Cenchrus ciliaris*
17. *Corchorus laniflorus*
18. *Crotalaria cunninghamii*
19. *Cucumis variabilis*
20. *Dactyloctenium radulans*
21. *Eucalyptus camaldulensis*
22. *Evolvulus alsinoides* var. *villosicalyx*
23. *Gomphrena canescens*
24. *Indigofera ?linnaei*
25. *Ipomoea pes-caprae*
26. **?Jatropha gossypiifolia*
27. *Pluchea tetranthera*
28. Poaceae sp.
29. *Rhynchosia minima*
30. *Salsola australis*
31. *Sesbania cannabina*
32. *Sesbania formosa*
33. **Spathodea campanulata*
34. *Spinifex longifolius*
35. **Stylosanthes hamata*
36. **Tamarix aphylla*
37. **Trianthema portulacastrum*
38. *Trianthema turgidifolia*
39. *Triodia epactia*

Six species were incompletely identified, however, none of these species are considered to be of conservation significance based on their attributes and the desktop surveys conducted.

No conservation significant flora taxa were observed at the site. While a systematic targeted survey was not undertaken, any impacts to conservation significant flora are likely be insignificant based on the small area of proposed clearing, the degraded nature of the vegetation within the proposed clearing area and the likelihood of further disturbances from weeds.

There were several introduced palms (members of the family Arecaceae) at the site and a clump of athel pine (**Tamarix aphylla,* a declared pest) at the south of the reserve near Sutherland Street. dominant species in the reserve (Plate 1). **Calotropis procera* and **Jatropha gossypiifolia* are also declared pests and **Jatropha gossypiifolia* is a Weed of National Significance. Buffel grass (**Cenchrus ciliaris*), an aggressive weed which is widespread in the Pilbara, was dominant at the site.

Plate 1. Athel pine (left) and buffel grass (right)

No conservation significant vegetation communities were identified by the database searches as occurring within 20 km of the survey area, and vegetation present in the reserve did not meet criteria for any TEC or PEC listed as occurring in the Pilbara.

Two vegetation types were present within the survey area, an open shrubland, primarily of *Acacia* species, over grasses and Fabaceae species, and closer to the coast, species richness decreased until only *Spinifex longifolium* and *Ipomoea pes-caprae* were present (Figure 2). During the vegetation mapping process, it became apparent that aerial photography at different scales showed different tide levels and changes to dune locations and coastline of the Spoilbank caused by coastal erosion. This significantly altered the position of foredune vegetation at different scales so vegetation mapping of foredune vegetation should be considered indicative only.

No TECs or PECs are listed as occurring near the survey area, nor does the vegetation observed during the reconnaissance survey match the description of listed TECs and PECs in the Pilbara.

The vegetation was generally in Degraded condition, being dominated by buffel grass, and was fragmented by many four-wheel-drive tracks (Figure 3). In places, it was apparent that earthworks had been undertaken, with earth pushed up into piles which contained rubble (Plate 2). The site showed signs of extensive human use for dog walking and off-road and four-wheel motorbikes. The site is low-lying and some portions of the site which had low species diversity may be subject to periodic storm surges. There was also a patch of vegetation in the south-east of the reserve which was dead but there was no apparent cause (Plate 3). It is possible this was caused by herbicide or a storm surge. Areas closest to the coast were arguably in Good condition due to a lack of weeds; however, only two species were present throughout much of the foredunes.

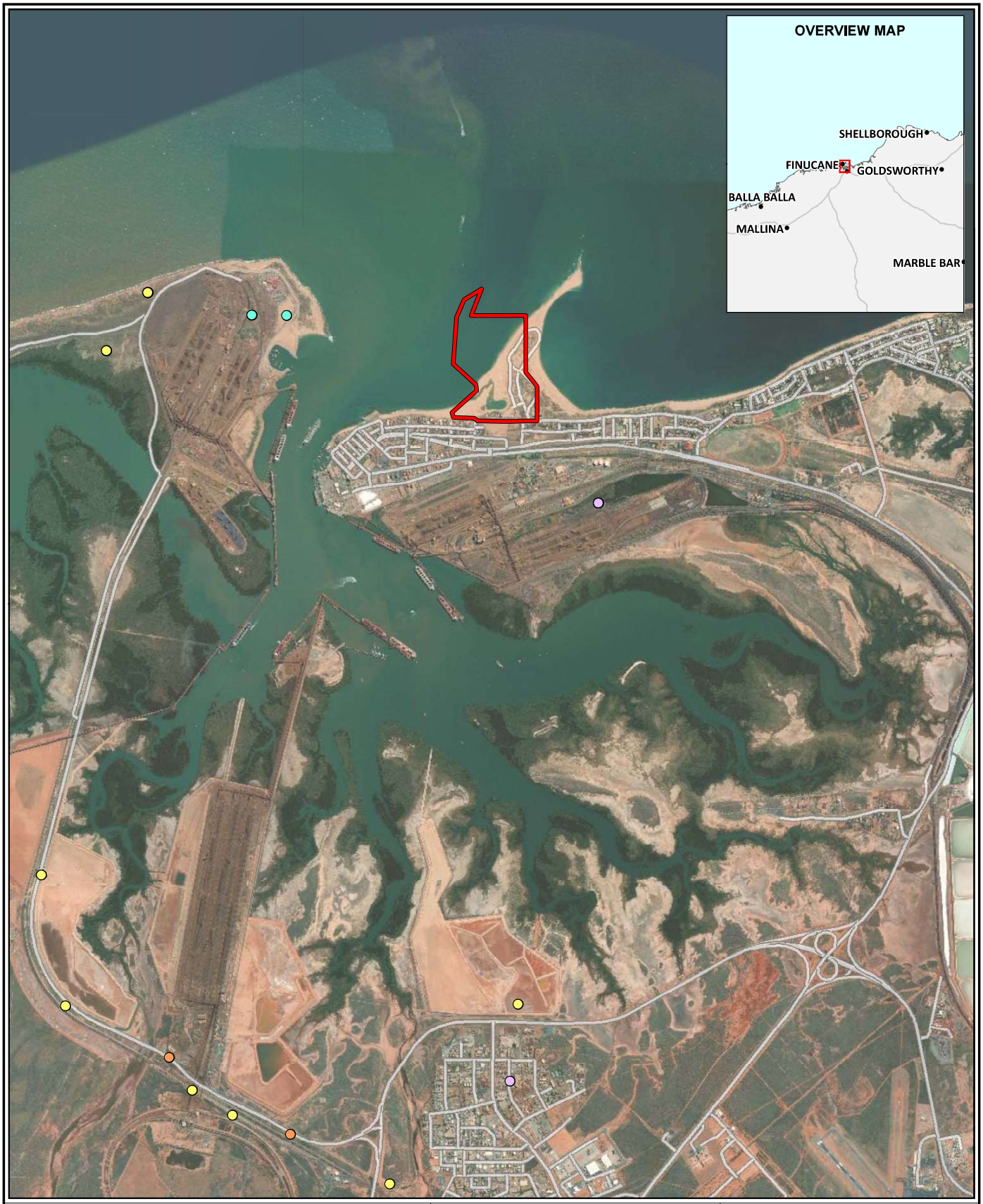
Plate 2. Earthworks

Plate 3. Dead vegetation in the south-east of the reserve

4. Conclusions and recommendations

Spoilbank Reserve is an artificial landform adjacent to the coast which has a low diversity of vascular flora species and high densities of aggressive weeds. The vegetation does not meet criteria for conservation significance, and no Priority Flora species were identified at the site - though this does not preclude their presence.

No obvious constraints to development were observed during the flora and vegetation survey, or identified by database searches; however, a targeted survey for conservation significant flora is recommended.



Legend:

- Proposal area
- Roads (MRWA)

Priority flora (Naturemap)

- *Bulbostylis burbidgeae*
- *Gomphrena pusilla*
- *Gymnanthera cunninghamii*
- *Tephrosia rosea* var. Port Hedland (A.S. George 1114)

Scale 1:50,000 at A4

0 0.5 1 Kilometres

Coord. Sys. GDA 1994 MGA Zone 50

Job No: 58244

Client: Department of Transport

Version: A | Date: 20-Feb-2020

Drawn By: cthatcher | Checked By: RP

Port Hedland Spoilbank Marina

LOCATION AND CONSERVATION SIGNIFICANT FLORA

FIGURE 1

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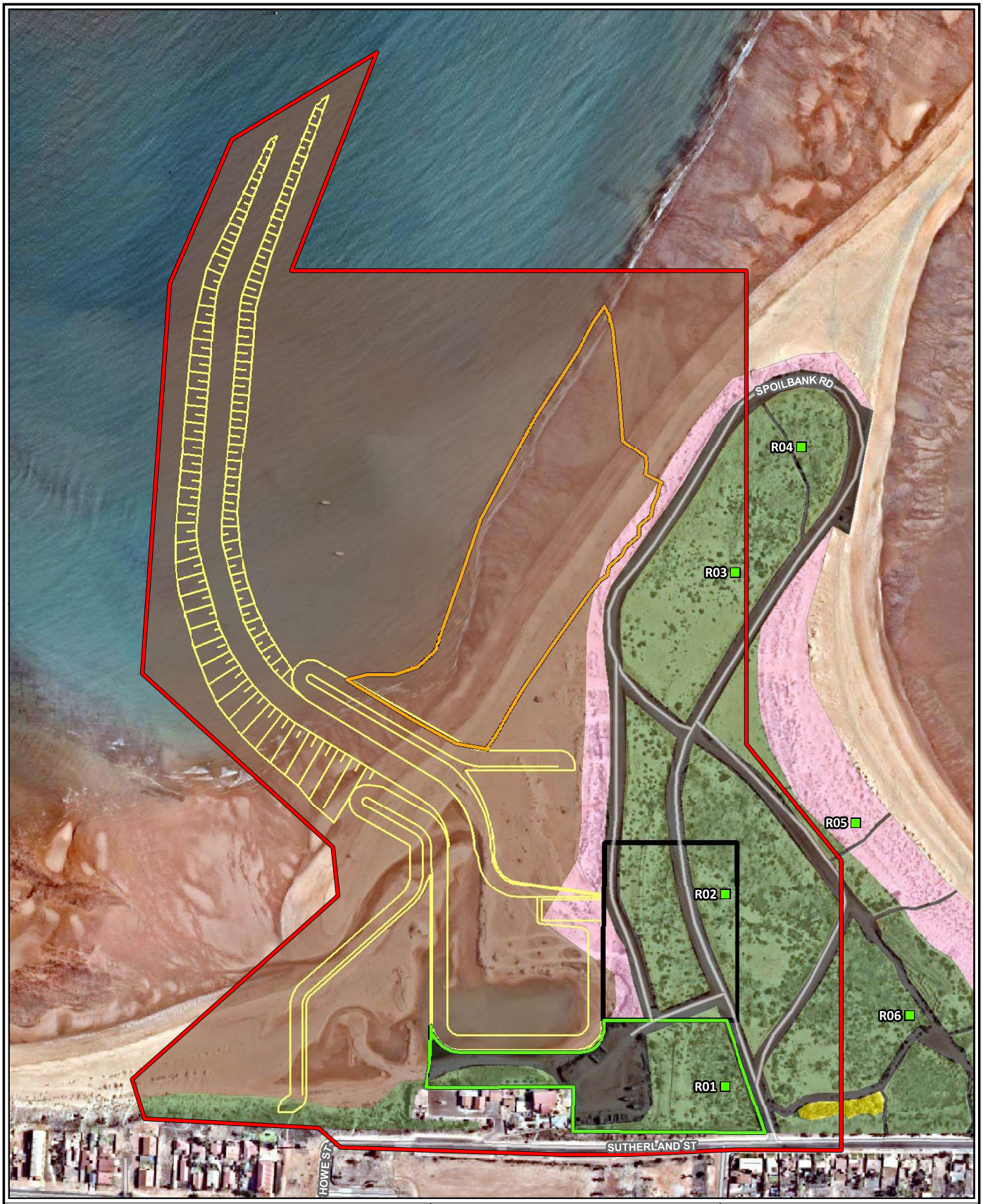

Legend:

- Proposal area
- Relevé locations

Indicative clearing areas
- Public open space
- Parking area
- Sand trap
- Marina
- Roads (MRWA)

Vegetation types
- Acacia Shrubland
- Cleared
- Foredune
- Stand of Athel Pine
- Unvegetated

Scale 1:6,000 at A4 (0 50 100 metres)	**Port Hedland Spoilbank Marina**
Coord. Sys. GDA 1994 MGA Zone 50	**VEGETATION UNITS AND PROPOSED DISTURBANCE**
Job No: 58244	
Client: Department of Transport	**FIGURE 2**
Version: A / Date: 20-Feb-2020	strategen JBS&G
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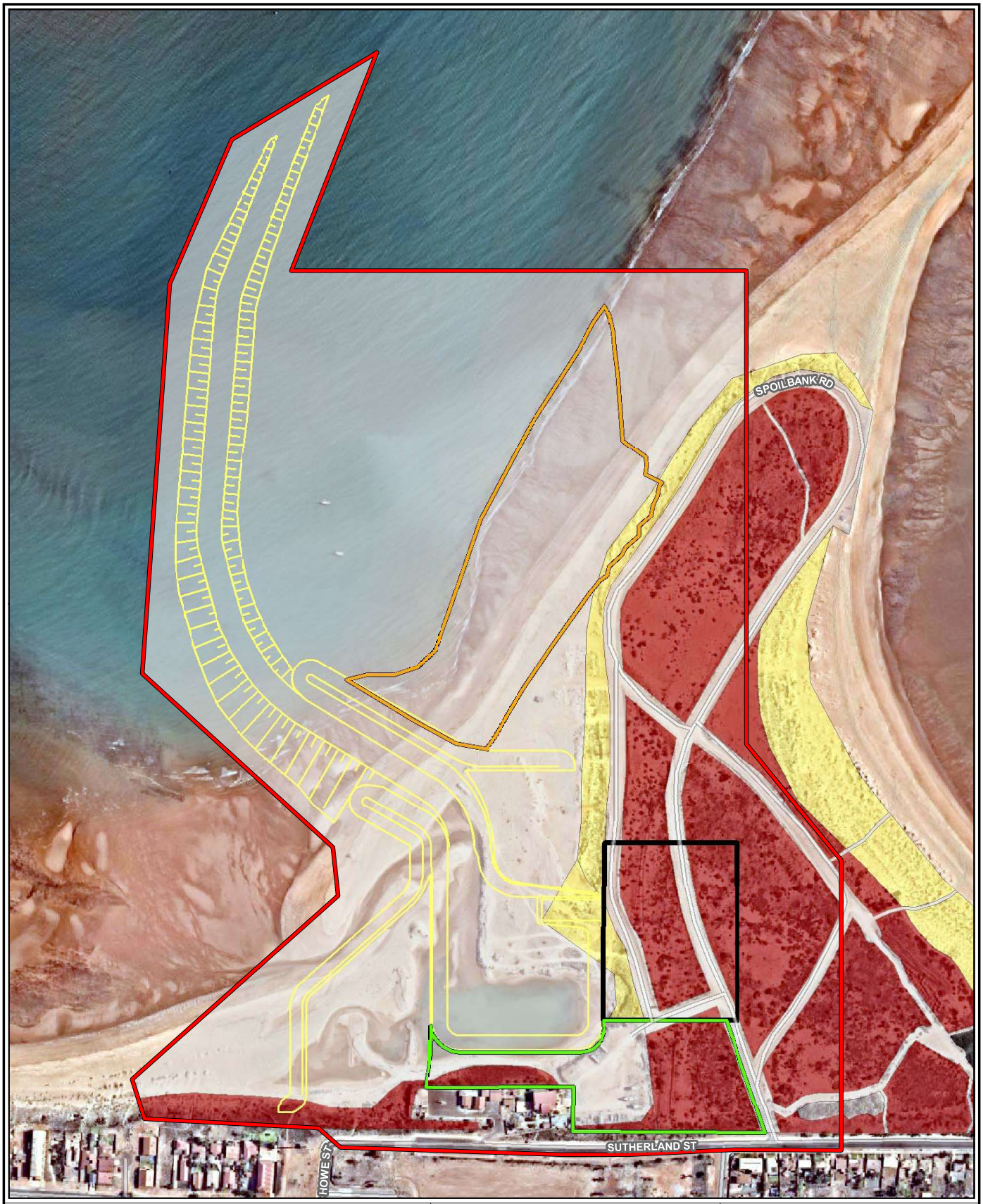

Legend:

- Proposal area
- Indicative clearing areas
  - Public open space
  - Parking area
  - Sand trap
- Marina
- Roads (MRWA)

Vegetation condition

- Good
- Degraded
- Completely Degraded
- n/a

Scale 1:6,000 at A4 (0 50 100 metres)		**Port Hedland Spoilbank Marina**
Coord. Sys. GDA 1994 MGA Zone 50		**VEGETATION CONDITION AND PROPOSED DISTURBANCE**
Job No: 58244		
Client: Department of Transport		**FIGURE 3**
Version: A	Date: 20-Feb-2020	strategen JBS&G
Drawn By: cthatcher	Checked By: CI	

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