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FALCON BUSHLAND MANAGEMENT PLAN

Eldora Reserve
UBD 2006 533 (534) G14
SB Tile 440

Cooranga Reserve (= Ralcoa Reserve on UBD)
UBD 2006 543 N1
SB Tile 430/431

Yeedong - Panamura Reserve
UBD 2006 543 G6/7
SB Tile 422

Linville Reserve
UBD 2006 543 J8
SB Tile 422

Flavia Reserve
UBD 2006 543 M5/6
SB Tile 422/430

Prepared for:

City of Mandurah

Prepared by:

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2422-0540

December, 1999

3. ELDORA RESERVE

3.1. Physical Environment

3.1.1. Soils and Geology

The following information has been obtained from Geological Survey of WA (1977) and all statement of fact made in this section should be attributed to this source. The Eldora Reserve is within the Spearwood Dune System, lying on the undulating landscape composed of Tamala Limestone, with shallow sands overlying limestone on the western face of the dunes, and deeper sands supporting taller shrubland and woodland in more protected areas.

The limestone is mainly calcarenite of aeolian origin, and is composed of shell fragments, quartz grains and small amounts of feldspar. It is porous, friable and cavernous in parts. Structureless travertine and caprock outcrop in places.

3.2. Biological Environment

3.2.1. Vegetation

Eldora Reserve is a coastal reserve that contains at least four vegetation types ranging from coastal foredune heaths to Banksia woodland (Figure 2). The type of vegetation in any particular location on the reserve is determined both by topography and distance from the ocean. The naming and identification of vegetation communities present is based, as far as possible, on the Floristic Survey of the Southern Swan Coastal Plain (Gibson *et al*, 1994)

The *Banksia* woodland occur on the east-facing lower to mid-slopes of the dune, merging into Acacia Shrubland on the crest of the dune. The *Acacia* Shrublands give way to Coastal Shrublands on the west-facing dune slope.

Foredune Heaths (Not assessed by Gibson *et al*, 1994)

Typical native species in this community include *Scaevola crassifolia, Myoporum insulare, Acacia cyclops, Lepidosperma gladiatum* and *Spinifex longifolius.* Dominant lifeforms are low shrubs, herbs, grasses and sedges. Vegetation structure is low open heath, though in some areas with taller shrubs the structure is that of open heath, or where the vegetation is sparse, it may be classified as shrubland or low shrubland.

***Acacia* Shrublands on Taller Dunes (Community Type 29b)**

The *Acacia* shrublands are dominated by Summer Scented Wattle (*Acacia rostellifera*), which forms an open to closed canopy. Understorey species include shrub species such as Coastal Daisy (*Olearia axillaris*), Coastal Honey Myrtle (*Melaleuca acerosa*) and herbs such as Grey Cottontails (*Conostylis candicans*). In some areas, the *Acacia rostellifera* forms dense thickets that exclude most other shrub species.

Coastal Shrublands on Shallow Sands (Community Type 29)
Coastal Shrublands were distinguished from *Acacia* Shrublands by the lower density, or absence, of *Acacia rostellifera*. Typical species recorded in this community include *Acacia lasiocarpa* and *Melaleuca acerosa*, together with a range of species including Basket Bush (*Spyridium globulosum*) and *Isolepis nodosa*. *Lepidosperma gladiatum* is also a common understorey element. Quandongs (*Santalum acuminatum*) are noticeable on the northern boundary.

***Banksia attenuata* Woodlands**
This community may one of a number of variants of *B attenuata* woodlands identified by Gibson *et al* (1994) in the Floristic Survey of the Southern Swan Coastal Plain. It is not possible to accurately identify the community type using the naming system of Gibson *et al* (1994) based on the species list currently available. Species present include *Allocasuarina fraseriana, Hibbertia hypericoides* and *Spyridium globulosum*. Several succulent species are established in the margins of this area.

3.2.2. Flora

The flora list for Eldora Reserve includes species from the four community groups listed above. It can be seen that several species are common to more than one community type. In addition, the perimeter of the reserve carries a high load of exotic species. Some of these are common environmental weeds found at many bushland reserves on the Swan Coastal Plain. However, several species present are garden plants that have generated from garden rubbish dumped in the bush. These species are indicated in Table 1 on the following page.

3.2.3. Bushland Condition

The bushland condition of this reserve is good to excellent over the centre of the reserve, though the margins of tracks are degraded. The perimeter of the reserve varies between moderately and severely degraded. Dumping of garden rubbish and the subsequent establishment of garden escapees within the bushland is an ongoing degradation process that increases both the weed load and the fuel load of the reserve. This is particularly noticeable near the corner of Eldora and Philante Streets, where both garden and household rubbish have been dumped.

3.2.4. Fauna Habitats

The Eldora Bushland includes several vegetation types that provide a diverse range of habitats. These include the coastal dunes, the coastal shrublands and *Acacia* thickets, as well as the small area of Banksia Woodland. The main feeding guilds likely to be represented in the avifauna include honeyeaters, insectivores, seed-eaters and carnivores. The reserve provides food resources for a range of honeyeaters, including Red Wattlebirds (*Anthochaera carunculata)*, Singing Honeyeaters (*Lichenostomus virescens)* and Brown Honeyeaters (*Lichmera indistincta).*

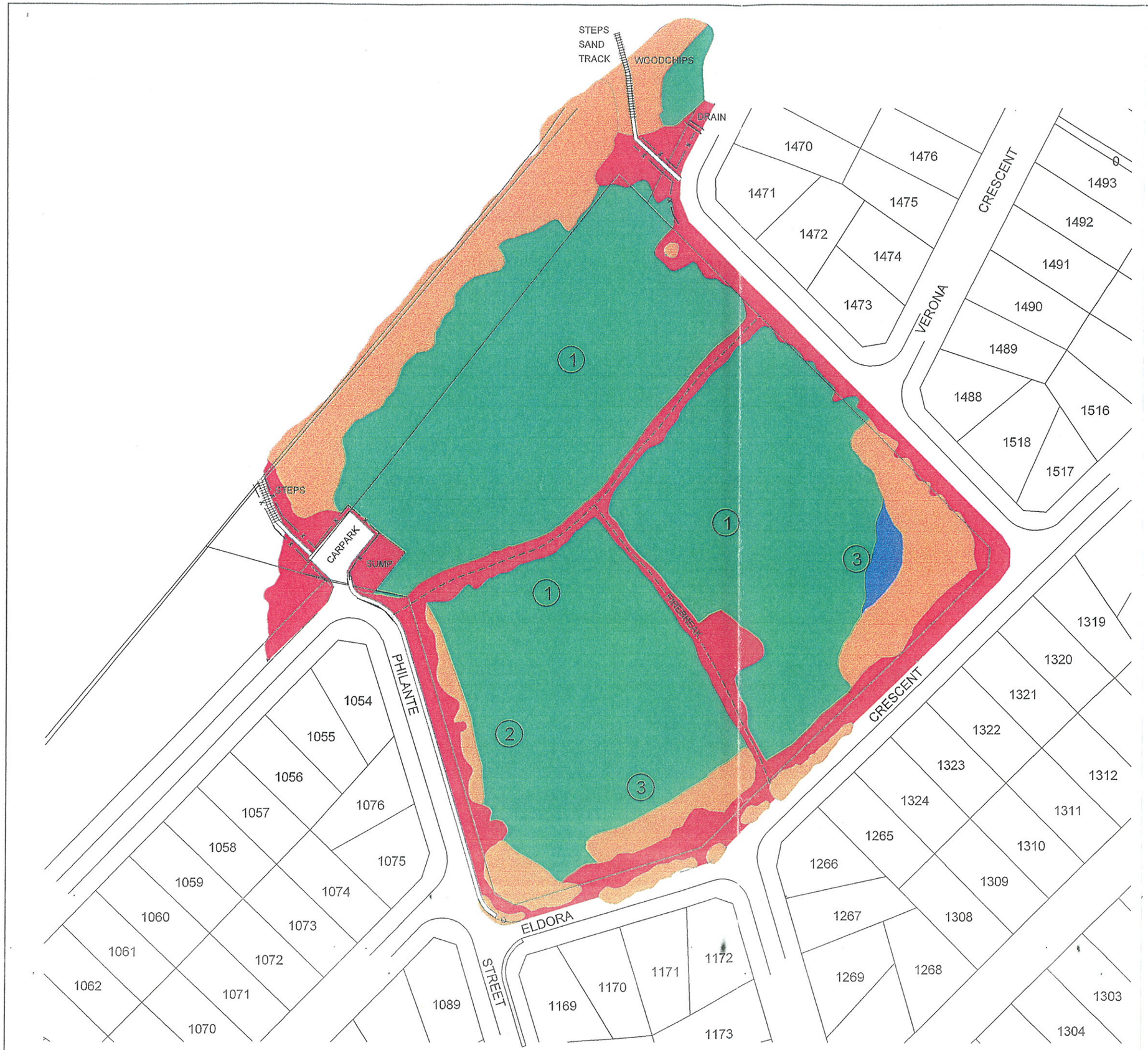
The Coastal Shrubland provides habitats for small bushbirds that require shelter from predators. The Red-eye Wattle, *Spyridium globulosum,* and other prolific seeders provide food resources for seed-eaters, as does the grassy understorey. The lattice of fine branches provides nesting sites.

The sheltered sands will support an assemblage of small reptiles. Based on the results of How and Dell (1994) in their survey of reptiles of several areas of remnant urban

bushland on the Swan Coastal Plain, it may be expected that the reserve would have a reasonable diversity of Skink species (Scincidae), with some representatives of geckoes (Gekkonidae) and Legless Lizards (Pygoponidae). A number of Front-fanged Snakes (Elapidae) favour the type of habitat found within the Eldora Reserve, though the area of the reserve is unlikely to support a large population. These species include the Black-striped Snake (*Neelaps calonotus*), the Banded Sand Snake (*Simoselaps bertholdi*) and the Narrow-banded Snake (*Simoselaps fasciolatus*). These snakes are small, shy and rarely seen. A larger elapid snake, the Dugite (*Pseudonaja affinis*) may also be present.

Table 1 Flora species list for Eldora Reserve, Falcon

Species Name	Common Name	Banksia Wood	Acacia Shrub	Coastal Shrub	F'dune Heaths
Acacia cyclops	Red-eye Acacia		●	●	
Acacia rostellifera	Narrow-leaved Acacia		●		
Acanthocarpus preissii	Prickle Lily				
**Agave ?angustifolia*	Narrow-leaved Agave	●			
**Agave americana*	Agave	●			
Allocasuarina fraseriana	Sheoak	●			
**Aloe vera*	Aloe Vera				
Banksia attenuata	Candlestick Banksia	●			
Beaufortia squarrosa	Sand Bottlebrush	●			
Briza maxima	Bee Grass	●	●	●	●
Cassytha sp	Dodder		●	●	
**Citrullus lanatus*	Piemelon				
**Cynodon dactylon*	Couch	●			
Dianella divaricata	Flax Lily	●		●	
**Dracaena ?marginata*					●
Grevillea crithmifolia				●	
Hardenbergia comptoniana	Native Wisteria	●		●	
Hibbertia hypericoides	Yellow Buttercups	●			
Jacksonia furcellata	Grey Stinkwood	●		●	
?floriferous form					
**Lagurus ovatus*	Hare's Tail Grass	●	●	●	●
**Limonium sinuatum*	Statice	●			
Macrozamia reidlei	Zamia Palm	●			
Olearia axillaris	Coastal Daisy Bush	●	●	●	●
**Opuntia vulgaris*	Prickly Pear	●			
**Osteospermum ?ecklonis*	White African Daisy			●	
Rhagodia baccata	Seaberry Salt Bush	●	●	●	●
Santalum acuminatum	Quandong	●	●	●	
Spyridium globulosum	Basket Bush	●	●	●	
**Tetragonia decumbens*	Sea Spinach				●
Xanthorrhoea preissii	Grass tree	●		●	



REV	DATE	REVISION

BUSHLAND CONDITION SCALE

Very Good - Excellent
80 -100% Native Flora composition
Cover/abundance of weeds less than 5%
Minor signs of disturbance

Fair - Good
50-80% Native Flora composition
Vegetation structure modified or nearly so.
Disturbance influence moderate.
Cover/abundance of weeds 5-20%

Poor
20-50% Native Flora composition.
Vegetation structure completely modified.
Disturbance incidence high.
Cover/abundance of weeds 20-60%

Very Poor
0-20% Native Flora composition.
Vegetation structure disappeared.
Disturbance incidence very high.
Cover/abundance of weeds 60-100% cover

OTHER

- - - - - Track

Concrete D.U.P.

—— x —— Fence

VEGETATION COMMUNITIES

1. Coastal Shrubland
2. Acacia Shrubland
3. Banksia Woodland

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CLIENT:
CITY OF MANDURAH

PROJECT:
FALCON BUSHLAND

FIGURE 2:
ELDORA RESERVE
BUSHLAND CONDITION AND VEGETATION COMMUNITIES

SCALE: 1:1500 | DATE: 9-8-99

DRAWING No: FIG2_540_1.DGN

ORIGINAL DRAWING SIZE A3

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4. COORANGA RESERVE

4.1. Physical Environment

4.1.1. Soils and Geology

The following information has been obtained from Geological Survey of WA (1977) and all statement of fact made in this section should be attributed to this source. The Cooranga Reserve is mainly within the Spearwood Dune System, lying on the undulating landscape composed of Tamala Limestone, with shallow sands overlying limestone on the western face of the dunes, and deeper sands supporting taller shrubland and woodland in more protected areas.

The limestone is mainly calcarenite of aeolian origin, and is composed of shell fragments, quartz grains and small amounts of feldspar. It is porous, friable and cavernous in parts. Structureless travertine and caprock outcrop in places.

Along its western margin are mobile dunes of the Quindalup Dune System. These dunes are receiving sand from windblown beach sand, however, in some areas where vegetation is sparse, wind erosion is reducing the dunes. Geological Survey of WA (1977) note that there appears to be a balance between the seasonal accretion and erosion of the coastline in the area between Miami and Mandurah, and that the balance appears to be very delicate, possibly because the sand supply is small. Anecdotal observations by Mandurah residents suggest that the Dawesville Channel has changed this balance, and that the coast is now erosional.

4.2. Biological Environment

4.2.1. Vegetation

The vegetation of Cooranga Reserve is Coastal Shrubland (Community Type 29a of Gibson *et al*, 1994) with foredune heaths to the west (Figure 3). The structure is Tall Closed Scrub (or Shrubland) and Closed Heaths. Many of the shrubs form dense mounds of either deep green or silver, often more than 2 m high. On the foredunes, Low Open Shrubland is present, though in many areas the original vegetation cover has been disturbed and the area is brush mulched to reduce erosion and encourage re-establishment of vegetation.

Typical species include Basket Bush (*Spyridium globulosum*), *Rhagodia baccata*, Coastal Daisy (*Olearia axillaris*) and Prickle Lily (*Acanthocarpus preissii*). A few stunted specimens of Peppermint (*Agonis flexuosa)* are also present. Common *Acacia* species present include Narrow-leaved Acacia (*A rostellifera*) and Red-eye Wattle (*A cyclops*).

An understorey of herb and grassy weed species is present, however the mature growth of the shrub species has ensured that the weeds do not currently dominate the vegetation. The presence of shrubby weeds such as Japanese Pepper (*Schinus terebinthifolia)* present a threat to the existing native shrub species.

4.2.2. Flora

A species list for this reserve is presented in Table 2 below. It should be noted that the list is based on limited fieldwork carried out during summer, and that additional species are certainly present.

Table 2 Flora species list for Cooranga Reserve, Falcon.

Species Name	Common Name
**Asphodelus fistulosus*	Onion Weed
**Avena barbata*	Barbed Oats
**Bromus maritimus*	Brome
**Cynodon dactylus*	Couch
**Euphorbia peplus*	Petty Spurge
**Gazania sp.*	Gazania
**Lagurus ovatus*	Hare's Tail grass
**Leptospermum laevigatum*	Victorian Tea Tree
**Limonium sinuatum*	Statice
**Oenothera drummondii*	Beach Evening Primrose
**Pelargonium capitatum*	Rose Pelargonium
**Schinus terebinthifolia*	Japanese Pepper
**Thelkeldia diffusa*	Wallaby Salt Bush
**Trachyandra divaricata*	Onion Weed
Acacia cyclops	Red-eye Wattle
Acacia rostellifera	Narrow-leaved Wattle
Acacia saligna	Coojong
Acanthocarpus preissii	Prickle Lily
Agonis flexuosa	Peppermint
Carpobrotus sp	Pigface
Cassytha sp.	Dodder
Hardenbergia comptoniana	Native Wisteria
Hemiandra pungens	Snake Bush
Isolepis nodosa	Knotted Club Rush
Jacksonia furcellata	Grey Stinkwood
Leucopogon parviflorum	Coastal Beard Heath
Lomandra maritima	
Mesembryanthemum crystallinum	Iceplant
Olearia axillaris	Coastal Daisy Bush
Rhagodia baccata	Seaberry Salt Bush
Scaevola crassifolia	Thick-leaved Fan Flower
Spyridium globulosum	Basket Bush

*indicates introduced species.

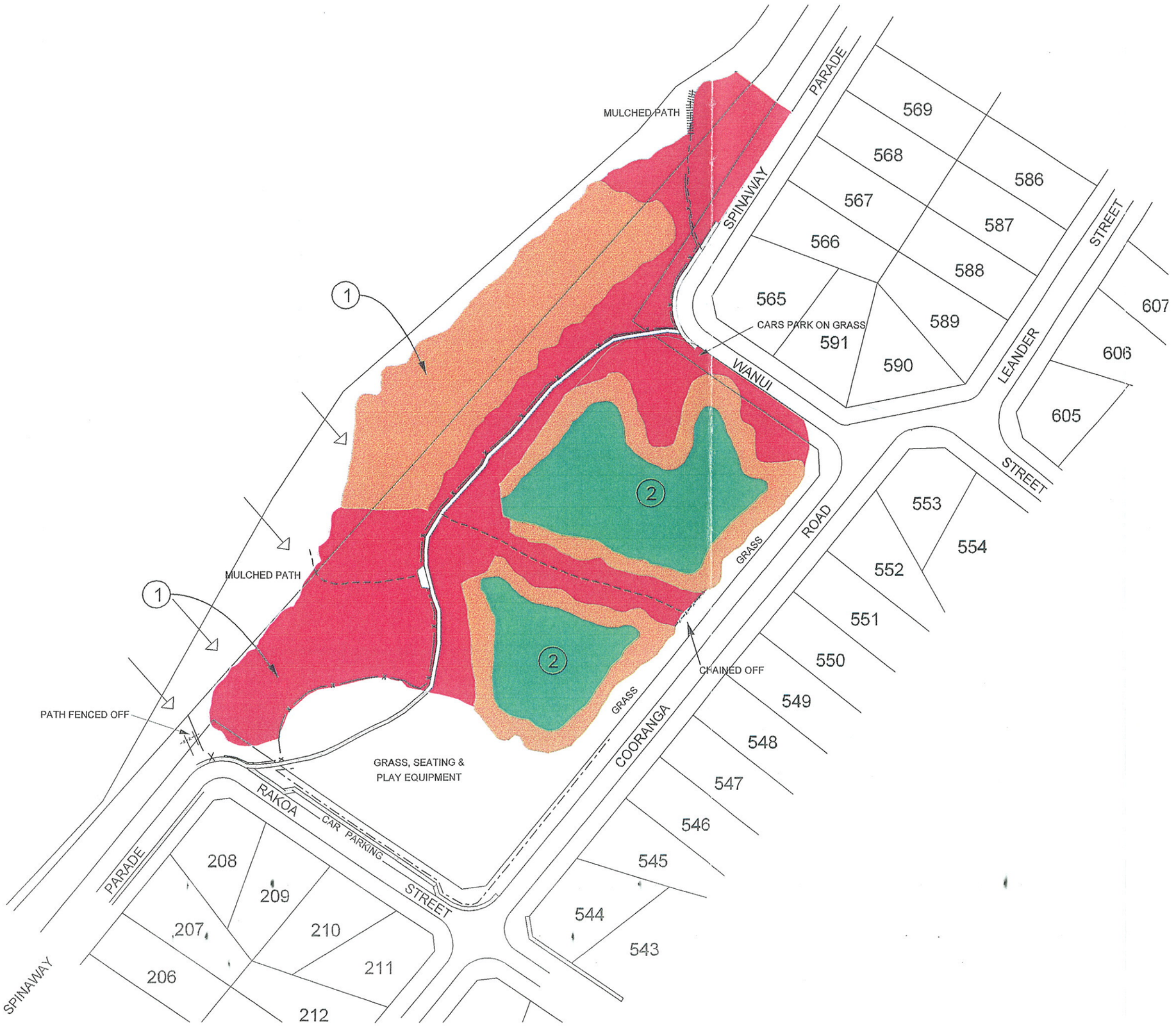
4.2.3. Bushland Condition

Bushland condition varies throughout the reserve from very poor in part of the foredunes to very good to excellent in central areas of shrubland away from tracks and other disturbances (Figure 3). Although a range of serious weed species are present, the closed canopy of the native shrub species are currently suppressing weed growth. However, the assemblage of invasive weed species present means that should the area be burnt, bushland condition could deteriorate markedly. A small area at the northern end appears to have been filled.

4.2.4. Fauna and Fauna Habitats

Due to the evenness of the canopy and vegetation structure within the reserves, two main fauna habitats are present, one of which contains diverse microhabitats. The grassland of the playground area provides feeding grounds for open ground-foraging bird species such as Magpie Larks. The Coastal Shrubland provides habitats for small bushbirds that require shelter from predators. The Red-eye Wattle, *Spyridium globulosum* and other prolific seeders provide food resources for seed-eaters, as does the grassy understorey. The lattice of fine branches provides nesting sites. The sheltered sands will support an assemblage of small reptiles.

Based on the results of How and Dell (1994) in their survey of reptiles of several areas of remnant urban bushland on the Swan Coastal Plain, it may be expected that the reserve would have a reasonable diversity of Skink species (Scincidae), with some representatives of geckoes (Gekkonidae) and Legless Lizards (Pygoponidae). Possibly either Blind Snakes (Typhlopidae) or Front-fanged Snakes (Elapidae) may be present, though the area of the reserve is unlikely to support a population.



REV	DATE	REVISION

BUSHLAND CONDITION SCALE

Very Good - Excellent
80 -100% Native Flora composition
Cover/abundance of weeds less than 5%
Minor signs of disturbance

Fair - Good
50-80% Native Flora composition
Vegetation structure modified or nearly so.
Disturbance influence moderate.
Cover/abundance of weeds 5-20%

20-50% Native Flora composition.
Vegetation structure completely modified.
Disturbance incidence high.
Cover/abundance of weeds 20-60%

Very Poor
0-20% Native Flora composition.
Vegetation structure disappeared.
Disturbance incidence very high.
Cover/abundance of weeds 60-100% cover

OTHER

- Track
- Concrete D.U.P.
- Barrier rail
- Fence
- Erosion

VEGETATION COMMUNITIES

1. Dune Heath
2. Coastal Shrubland

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CLIENT:
CITY OF MANDURAH

PROJECT:
FALCON BUSHLAND

FIGURE 3:
COORANGA RESERVE
BUSHLAND CONDITION AND
VEGETATION COMMUNITIES

SCALE: 1:1500 | DATE: 9-8-99

DRAWING No: FIG3_540_1.DGN

ORIGINAL DRAWING SIZE A3

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5. YEEDONG-PANAMUNA RESERVE

5.1. Physical Environment

5.1.1. Soils and Geology

The following information has been obtained from Geological Survey of WA (1977) and all statement of fact made in this section should be attributed to this source. The Yeedong-Panamuna Reserve is mainly within the Safety Bay Sands of the Quindalup Dune System.

Along its western margin are mobile dunes. These dunes are receiving sand from windblown beach sand, however, in some areas where vegetation is sparse, wind erosion is reducing the dunes. Geological Survey of WA (1977) note that there appears to be a balance between the seasonal accretion and erosion of the coastline in the area between Miami and Mandurah, and that the balance appears to be very delicate, possibly because the sand supply is small. Anecdotal observations by Mandurah residents suggest that the Dawesville Channel has changed this balance, and that the coast is now erosional.

The majority of the reserve lies on stabilised dunes of the Safety Bay Sands. The sands are composed of medium to coarse calcareous grains, with shell fragments as the major component. Small amounts of heavy minerals may also be present. Tamala limestone is present beneath the sands, as evidenced by pebbles and small rocks of limestone scattered on the surface.

The eastern-most corner of the reserve lies on the Spearwood Dune System, with shallow sands overlying limestone.

The limestone is mainly calcarenite of aeolian origin, and is composed of shell fragments, quartz grains and small amounts of feldspar. It is porous, friable and cavernous in parts. Structureless travertine and caprock outcrop in places.

5.2. Biological Environment

5.2.1. Vegetation

The vegetation of Yeedong-Panamuna Reserve is Coastal Shrubland (Community Type 29a of Gibson *et al*, 1994) (Figure 4). The structure is Tall Closed Scrub (or Shrubland) and Closed Heaths. Many of the shrubs form dense mounds of either deep green or silver, often more than 2 m high. On the foredunes, Low Open Shrubland is present, though in many areas the original vegetation cover has been disturbed and the area is brush mulched to reduce erosion and encourage re-establishment of vegetation.

Typical species include Basket Bush (*Spyridium globulosum*), *Rhagodia baccata*, Coastal Daisy (*Olearia axillaris*) and Prickle Lily (*Acanthocarpus preissii*). A few small specimens of Peppermint, (*Agonis flexuosa)* are also present as stunted individuals. Common *Acacia* species present include Narrow-leaved Acacia (*A rostellifera*) and Red-eye Wattle (*A cyclops*).

An understorey of herb and grassy weed species is present, however the mature growth of the shrub species has ensured that the weeds do not currently dominate the vegetation. The presence of shrubby weeds such as Japanese Pepper present a threat to the existing native shrub species. An area in the southwest has been cleared previously. This area now supports weed species only.

5.2.2. Flora

A species list for this reserve is presented in Table 3 below. It should be noted that the list is based on limited fieldwork carried out during summer, and that additional species are certainly present.

5.2.3. Bushland Condition

Bushland condition varies throughout the reserve from very poor where the vegetation has been cleared in the southwest and around the perimeter to very good to excellent in central areas of shrubland away from tracks and other disturbances (Figure 4). Although a range of serious weed species are present the closed canopy of the native shrub species are currently suppressing weed growth. However, the assemblage of invasive weed species present means that should the area be burnt, bushland condition could deteriorate markedly.

The coast adjacent to the reserve is eroding. The original foredunes and their vegetation has been lost. Coastal Shrubland is now present on the exposed foredunes and is showing signs of vegetation stress.

5.2.4. Fauna and Fauna Habitats

Due to the evenness of the canopy and vegetation structure within the reserves, two main fauna habitats are present, one of which contains diverse microhabitats. The grassland of the playground area provides feeding grounds for open ground-foraging bird species such as Magpie Larks. The Coastal Shrubland provides habitats for small bushbirds that require shelter from predators. The Red-eye Wattle, *Spyridium globulosum* and other profilic seeders provide food resources for seed-eaters, as does the grassy understorey. The lattice of fine branches provides nesting sites.

The sheltered sands will support an assemblage of small reptiles. Based on the results of How and Dell (1994) in their survey of reptiles of several areas of remnant urban bushland on the Swan Coastal Plain, it may be expected that the reserve would have a reasonable diversity of Skink species (Scincidae), with some representatives of geckoes (Gekkonidae) and Legless Lizards (Pygoponidae). Possibly either Blind Snakes (Typhlopidae) or Front-fanged Snakes (Elapidae) may be present, though the area of the reserve is unlikely to support a population.

Table 3 Flora species list for Yeedong-Panamuna Reserve, Falcon.

Species Name	Common Name
**Asphodelus fistulosus*	Onion Weed
**Avena barbata*	Barbed Oats
**Bromus maritimus*	Brome
**Cynodon dactylon*	Couch
**Euphorbia peplus*	Petty Spurge
**Euphorbia sp.*	
**Gazania sp.*	Gazania
**Lagurus ovatus*	Hare's Tail grass
**Lavatera arborea*	
**Oenothera drummondii*	Beach Evening Primrose
**Pelargonium capitatum*	Rose Pelargonium
**Schinus terebinthifolia*	Pepper
**Sporobolus virginicus*	Saltwater Couch
**Tetragonia decumbens*	Sea Spinach
**Trachyandra divaricata*	Onion Weed
Acacia cyclops	Red-eye Wattle
Acacia rostellifera	Narrow-leaved Wattle
Acacia saligna	Golden Wreath Wattle
Acanthocarpus preissii	Prickle Lily
Agonis flexuosa	Peppermint
Alyxia buxifolius	Dysentry Bush
Carpobrotus sp	Pigface
Cassytha ?racemosa	Dodder
Hakea lissocarpha?	Honey Bush
Hakea prostrata	Harsh Hakea
Hakea trifurcata	Two-leaf Hakea
Hardenbergia comptoniana	Native Wisteria
Hemiandra pungens	Snake Bush
Isolepis nodosa	Knotted Club-rush
Jacksonia furcellata	Grey Stinkwood
Lomandra maritima	
Olearia axillaris	Coastal Daisy Bush
Ozothamnus cordatus	Tangle Daisy
Phyllanthus calycinus	False Boronia
Rhagodia baccata	Seaberry Salt Bush
Scaevola crassifolia	Thick-leaved fan Flower
Spyridium globulosum	Basket Bush
Threlkeldia diffusa	

*indicates introduced species.

REV	DATE	REVISION

BUSHLAND CONDITION SCALE

Very Good - Excellent
80 -100% Native Flora composition
Cover/abundance of weeds less than 5%
Minor signs of disturbance

Fair - Good
50-80% Native Flora composition
Vegetation structure modified or nearly so.
Disturbance influence moderate.
Cover/abundance of weeds 5-20%

20-50% Native Flora composition.
Vegetation structure completely modified.
Disturbance incidence high.
Cover/abundance of weeds 20-60%

Very Poor
0-20% Native Flora composition.
Vegetation structure disappeared.
Disturbance incidence very high.
Cover/abundance of weeds 60-100% cover

OTHER

- Track
- Concrete D.U.P.
- Fence
- Unused Track

VEGETATION COMMUNITIES

1. Dune Heaths
2. Coastal Shrublands

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CLIENT:
CITY OF MANDURAH

PROJECT:
FALCON BUSHLAND

FIGURE 4:
YEEDONG - PANAMUNA RESERVE
BUSHLAND CONDITION AND
VEGETATION COMMUNITIES

SCALE: 1:1500 | DATE: 9-8-99

DRAWING No: FIG4_540_1.DGN

ORIGINAL DRAWING SIZE A3

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6. LINVILLE RESERVE

6.1. Physical Environment

6.1.1. Soils and Geology

The following information has been obtained from Geological Survey of WA (1977) and all statement of fact made in this section should be attributed to this source. The Linville Reserve is entirely within the Spearwood Dune System, lying on the gently undulating landscape composed of weathered sands overlying Tamala Limestone. The sand has been weathered from the limestone and is variably leached. The sand colour varies according to the degree of leaching, iron-staining and the amount of humus present.

6.2. Biological Environment

6.2.1. Vegetation

Two vegetation communities are present within the Linville bushland (Figure 5). *Agonis flexuosa* Woodlands are present in the southwestern section of the reserve. In the northern and eastern section, Jarrah-Banksia Woodland is present.

***Agonis flexuosa* Woodlands**

The *Agonis flexuosa* woodlands in the Linville Reserve are possibly a part of the Central I Woodlands (type 21a of Gibson *et al*, 1994) or Southern *Eucalyptus gomphocephala – Agonis flexuosa* Woodlands (type 25). More detailed floristic survey work would be required to provide a definitive grouping.

Spearwood *Eucalyptus– Banksia attenuata* Woodlands (type 28)

This community occupies the north eastern portion of the reserve. Gibson *et al* (1994) states that this community type has a high average weed frequency, however at the Linville Reserve, this community is generally in good condition, with weeds noticeable around the edges. As can be seen from the flora list, it has many understory species in common with the Tuart - Agonis Woodland.

6.2.2. Flora

The flora list is presented with separate listings for the two main vegetation communities (Table 4). It should be noted that due to the small size of the reserve, the high number of species in common may be a result of transitional zoning between the two communities.

One species in particular should be noted, *Brachysema praemorsum.* This species is common in the *Agonis* community within the reserve, although its usual habitat is in heavier soils of the eastern coastal plain. This species was observed in flower at Linville Reserve in March / April, though the normal flowering period elsewhere is August to November.

Table 4 Flora species list for Linville Reserve, Falcon

Species Name	Common Name
**Avena barbata*	Barbed Oats
**Briza maxima*	Blowfly Grass
**Ehrharta calycina*	Veldt Grass
**Gazania sp.*	
**Osteospermum clandestinum*	
**Pennisetum clandestinum*	Kikuyu
**Poa sp.*	
**Solanum nigrum*	
?Brachysema praemorsum	
Acacia pulchella	Prickly Moses
Acacia rostellifera	Summer Scented Wattle
Acacia saligna	Golden Wreath Wattle
Acacia willdenowiana	Grass Wattle
Agonis flexuosa	Peppermint
Allocasuarina frasuriana	Sheoak
Banksia attenuata	Candlestick Banksia
Banksia grandis	Bull Banksia
Burchardia umbellata	Milkmaids
Clematis linearis	Old Man's Beard
Conostylis sp.	
Corymbia calophylla	Marri
Dianella divaricata	Flax Lily
Eucalpyptus marginata	Jarrah
Eucalyptus gomphocephala	Tuart
Grevillea bipinnatifida	Fuschia Grevillea
Grevillea thelmanniana	Spidernet Grevillea
Hakea lissocarpha	Honey Bush
Hakea prostrata	Harsh Hakea
Hardenbergia comptoniana	Native Wisteria
Hibbertia hypericoides	Yellow Buttercups
Hovea trisperma	Common Hovea
Hybanthus calycinus	
Jacksonia furcellata	Grey Stinkwood
Jacksonia sternbergiana	Stinkwood
Kennedia prostrata	Running Postman
Loxocarya flexuosa	
Lyginia barbata	
Macrozamia reidlii	Zamia Palm
Melaleuca acerosa	Coastal Honey-myrtle
Olearia axillaris	Coastal Daisy
Ozothamnus cordatus	Tangle Daisy
Persoonia saccata	Snottygobble
Petrophile serruriae	
Phyllanthus calycinus	False Boronia
Spyiridium globulosum	Basket Bush
Thysanotus sp.	Fringe Lily
Xanthorrhoea preissii	Grass tree

* indicates introduced species

6.2.3. Bushland Condition

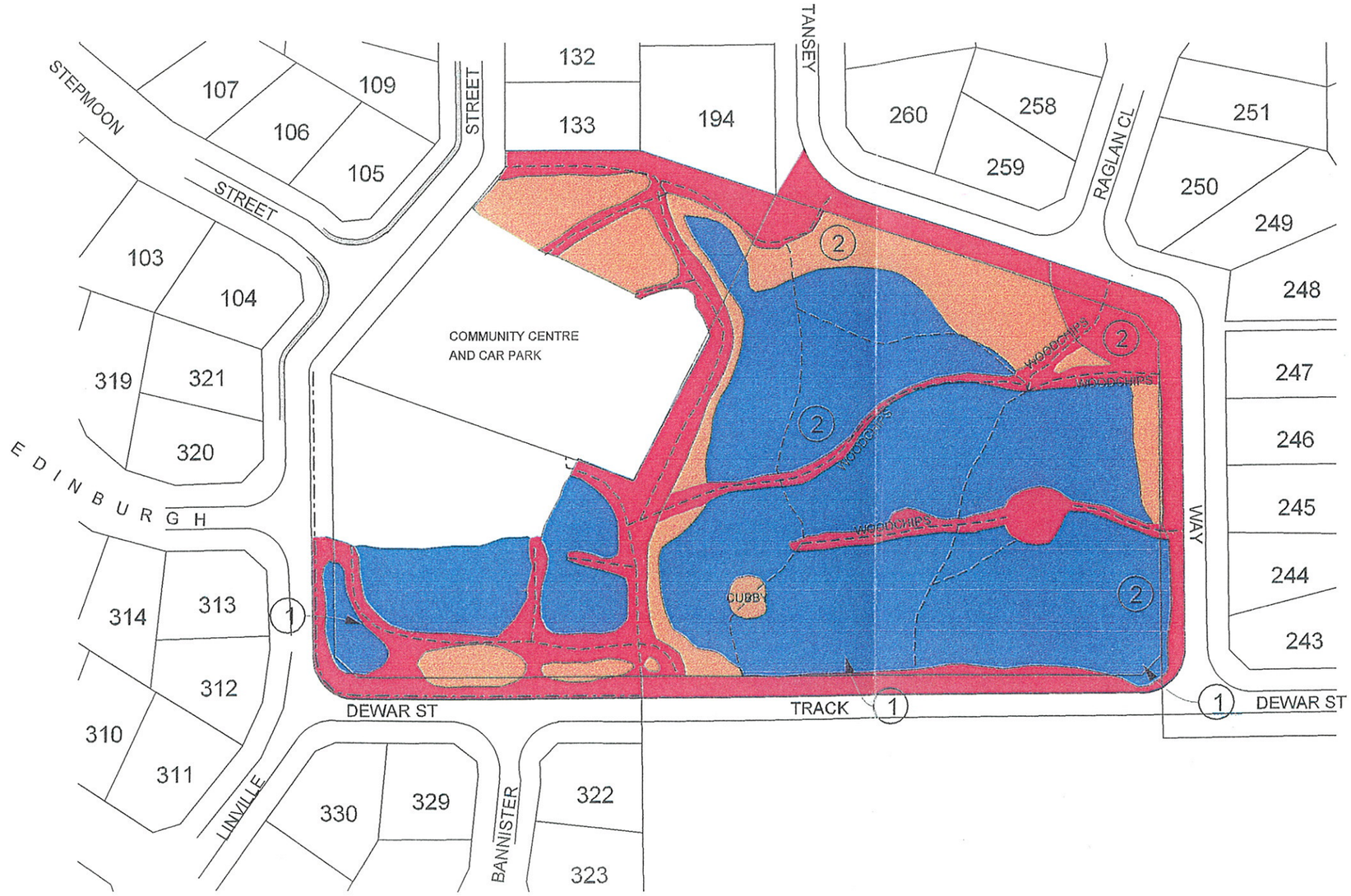
Bushland condition in the Linville Reserve is good for a small reserve in a largely urban setting (Figure 5). Edge effects along street verges have resulted in poorer condition, particularly along Tansey Way. The presence of major grassy weeds such as Veldt Grass and Barbed Oats in the degraded areas means that the bushland is very vulnerable to degradation, should the area be burnt.

6.2.4. Fauna Habitats

The Linville Reserve contains a high proportion of nectar bearing plants that would provide resources for many bush birds, such as the nectivorous Red Wattlebirds *(Anthochaera carunculata)*, New Holland *(Phylidonyris novaehollandiae)* and Brown Honeyeaters *(Lichmera indistincta)*.

The Reserve would also support insectivorous birds. Canopy insectivores such as Pardalotes and Thornbills would feed on the tree species, while shrub and understorey insectivores such as the Grey Fantail *(Rhipidura fuliginosa)* would make use of the shrub layer.

A pair of Grey Currawongs *(Strepera versicolor)* was observed in the reserve, and may nest there or nearby. A number of mature Eucalypts are present in the reserve, many with small to medium sized hollows. These hollows would provide nesting sites for birds such as Striated Pardalotes *(Pardalotus striatus)*, Ring-necked Parrots *(Barnardius zonarius zonarius)* and Kestrels *(Falco species)*, if any are present, as well as Brush-tail Possums *(Trichosaurus Vulpecula)*. The seeds of Tuarts, Banksias and Hakeas provide food for Carnaby's Black Cockatoo *(Calyptorhynchus latirostris)*. The flowers of *Agonis flexuosa* are pollinated by various Jewel Beetles, for which it provides a food resource.



REV	DATE	REVISION

BUSHLAND CONDITION SCALE

Very Good - Excellent
80 -100% Native Flora composition
Cover/abundance of weeds less than 5%
Minor signs of disturbance

Fair - Good
50-80% Native Flora composition
Vegetation structure modified or nearly so.
Disturbance influence moderate.
Cover/abundance of weeds 5-20%

20-50% Native Flora composition.
Vegetation structure completely modified.
Disturbance incidence high.
Cover/abundance of weeds 20-60%

Very Poor
0-20% Native Flora composition.
Vegetation structure disappeared.
Disturbance incidence very high.
Cover/abundance of weeds 60-100% cover

OTHER

- Track
- Concrete D.U.P.
- Barrier rail

VEGETATION COMMUNITIES

1. Agonis flexuosa woodland
2. Jarrah - Banksia woodland

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21A Pakenham Street Fremantle Western Australia, 6160
Telephone (08) 9430 8955 • Facsimile (08) 9430 8977
email: ecoscape@wantree.com.au

CLIENT:
CITY OF MANDURAH

PROJECT:
FALCON BUSHLAND

FIGURE 5:
LINVILLE RESERVE
BUSHLAND CONDITION AND
VEGETATION COMMUNITIES

SCALE: 1:1500 | DATE: 9-8-99

DRAWING No: FIG5_540_1.DGN

ORIGINAL DRAWING SIZE A3

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7. FLAVIA RESERVE

7.1. Physical Environment

7.1.1. Soils and Geology

The following information has been obtained from Geological Survey of WA (1977) and all statement of fact made in this section should be attributed to this source. The Flavia Reserve is entirely within the Spearwood Dune System, lying on the gently undulating landscape composed of weathered sands overlying Tamala Limestone. The sand has been weathered from the limestone and is variably leached. The sand colour varies according to the degree of leaching, iron-staining and the amount of humus present.

7.2. Biological Environment

7.2.1. Vegetation

The Flavia St Reserve has a complex and interesting array of vegetation. Due to the small size of the reserve it is not possible to accurately map the vegetation, given that there are no distinguishable and well-defined delineations between vegetation types. The basic structure of the vegetation is Eucalypt woodland, with an understorey of smaller trees and tall shrubs. However, the species composition varies across the site. Jarrah- Marri woodland is the most common vegetation unit, with an understorey of Sheoak (*Allocasuarina fraseriana*), Bull Banksia (*Banksia grandis*), Golden Wattle (*Acacia saligna*) and Candlestick Banksia (*Banksia attenuata*). Near the carpark for the hall is a small stand of Narrow-leaved Acacia (*Acacia rostellifera*) occurring as a small patch of shrubland. Along the western margins of the reserve is a stand of Tuart woodland with an understorey of *B attenuata* and grassy weeds.

This reserve showed the greatest level of weed incursion into the understorey, however, it also retains a highly diverse shrub layer, though it is possible that, without intervention, this will gradually be replaced by the weeds.

7.2.2. Flora

Although this reserve is badly affected by weed invasion along its margins and the Tuart Woodland component, the flora remains diverse, as indicated in Table 5. The species listed below are not an exhaustive list of the species likely to be present, and it is probable that it considerably under estimates the total diversity within the reserve. Ephemeral and annual species were not present at the time of field assessment and should add considerably to the species list. Weed species present belong to two general groups: grassy weeds and garden escapees. Both categories are addressed in the weed management strategies.

The flora includes elements often associated with near-coastal vegetation, such as Basket Bush, *Spyridium globulosum,* and Summer Scented Wattle, *Acacia rostellifera*, as well as species typically associated with woodlands on the Spearwood System, such as Native Buttercups, Hibbertia hypericoides.

The species tentatively identified as *Brachysema praemorsum* is also present. This species is more common on the heavier soils of the eastern margins of the Swan Coastal Plain. Specimens have been forwarded to the WA Herbarium for confirmation.

Table 5 Flora species list for Flavia Reserve, Falcon

Species Name	Common Name
?Chasmanthe floribunda	
**Avena barbata*	Wild Oats
**Briza maxima*	Blowfly Grass
**Chamaelaucium uncinatum*	Geraldton Wax
**Conyza albida*	Fleabane
**Cynodon dactylon*	Couch
**Ehrharta calycina*	Veldt Grass
**Eragrostis curvula*	African Love Grass
**Eucalyptus sp.*	
**Euphorbia peplus*	Petty Spurge
**Gazania sp*	Gazania
**Leonotus leonurus*	Lions Tail
**Lupinus cosentinii*	Lupin
**Melaleuca nesophila*	
**Osteospermum clandestinum*	African Daisy
**Oxalis glabra*	
**Oxalis pes-caprae*	Soursob
**Pelargonium capitatum*	Rose Pelargonium
**Schinus terebinthifolia*	Japanese Pepper
**Solanum nigrum*	Deadly Nightshade
?Brachysema praemorsum	
Acacia pulchella	Prickly Moses
Acacia rostellifera	Summer Scented Wattle
Allocasuarina fraseriana	Sheoak
Banksia attenuata	Candlestick Banksia
Banksia grandis	Bull Banksia
Burchardia umbellata	Milkmaids
Caladenia flavia	Cowslip Orchid
Clematis linearis	Old Man's Beard
Corymbia calophylla	Marri
Dianella divaricata	Flax Lily
Eucalyptus gomphocephala	Tuart
Eucalyptus marginata	Jarrah
Hakea lissocarpha	Honey Bush
Hakea prostrata	Harsh Hakea
Hardenbergia comptoniana	Native Wisteria
Hibbertia hypericoides	Buttercups
Hovea trisperma	Common Hovea
Jacksonia furcellata	Grey Stinkwood
Jacksonia sternbergiana	Green Stinkwood
Kennedia prostrata	Running Postman
Lepidosperma sp	Sword Sedge
Loxocarya flexuosa	
Lyginia barbata	

Species Name	Common Name
Macrozamia reidlei	Zamia Palm
Melaleuca heugellii	Chenille Honeymyrtle
Microphylla linearoides	Old Man's Beard
Olearia axillaris	Coastal Daisy
Ozothamnus cordatus	Tangle daisy
Phyllanthus calycinus	False Boronia
Spyridium globulosum	Basket Bush
Stipa elegantissima	Feather Speargrass
Xanthorrhoea preissii	Grass Tree

* Indicates introduced species

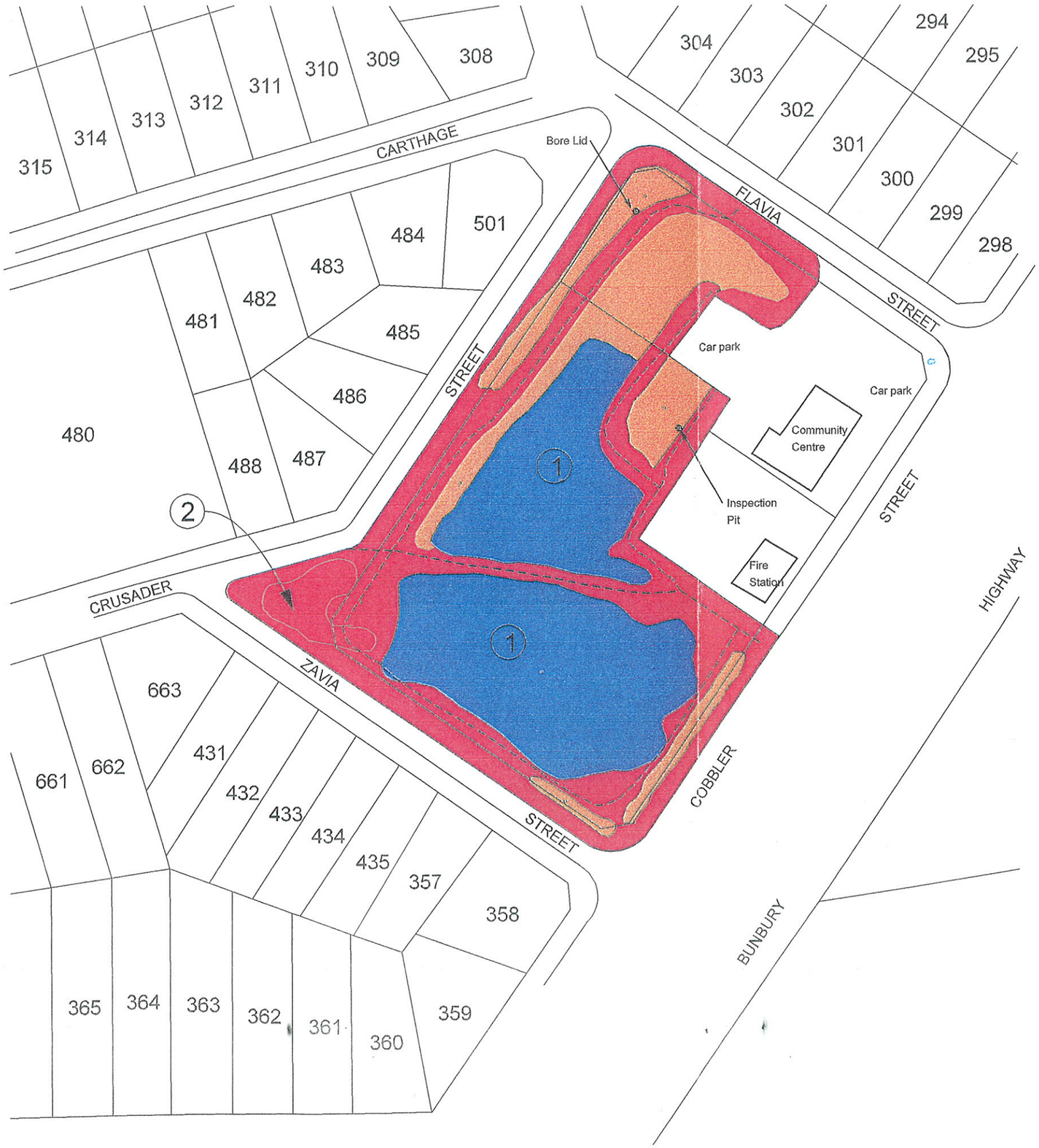
7.2.3. Bushland Condition

Although there are areas of bushland in good condition in small patches, the majority of the bushland is in fair condition (Figure 6). This is a result of the large number of tracks that sub-divide this small area. Other possible factors may include frequent fires or grazing prior to the urbanisation of the area. Either of these factors, or both in combination, would explain the heavy loads of grassy weeds through the bushland. The vegetation structure is changing; the original shrub understorey is progressively being replaced by weeds. This process will continue unless halted by active management.

7.2.4. Fauna Habitats

The Reserve would support insectivorous birds. Canopy insectivores such as Pardalotes and Thornbills would feed on the tree species, while shrub and understorey insectivores such as the Grey Fantail *(Rhipidura fuliginosa)* would make use of the shrub layer.

A number of mature Eucalypts are present in the reserve, many with small to medium sized hollows. These hollows would provide nesting sites for birds such as Striated Pardalotes *(Pardalotus striatus)*, Ring-necked Parrots *(Barnardius zonarius zonarius)* and Kestrels *(Falco species)*, if any are present, as well as Brush-tail Possums *(Trichosaurus Vulpecula)*. The seeds of Tuarts, Banksias and Hakeas provide food for Carnaby's Black Cockatoo *(Calyptorhynchus latirostris)*.



REV	DATE	REVISION

BUSHLAND CONDITION SCALE

Very Good - Excellent
80 -100% Native Flora composition
Cover/abundance of weeds less than 5%
Minor signs of disturbance

Fair - Good
50-80% Native Flora composition
Vegetation structure modified or nearly so.
Disturbance influence moderate.
Cover/abundance of weeds 5-20%

Poor
20-50% Native Flora composition.
Vegetation structure completely modified.
Disturbance incidence high.
Cover/abundance of weeds 20-60%

Very Poor
0-20% Native Flora composition.
Vegetation structure disappeared.
Disturbance incidence very high.
Cover/abundance of weeds 60-100% cover

OTHER

- - - - - Track
(2) Geralton Wax

VEGETATION COMMUNITIES

(1) Jarrah Marri Woodlands

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CITY OF MANDURAH

PROJECT:
FALCON BUSHLAND

FIGURE 6:
FLAVIA RESERVE
BUSHLAND CONDITION AND VEGETATION COMMUNITIES

SCALE: 1:1500 | DATE: 9-8-99

DRAWING No: FIG6_540_1.DGN

ORIGINAL DRAWING SIZE A3

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ENTERED ON GIS

Name: Lot 501 Old Coast Road, Falcon Foreshore Reserve and Public Open Space Management Plan
Date: 26/05/2006
Capture Author: Thomas Leong / Ian Steward

Comments:
Polygon
Created to match documented study area with high level of accuracy

Accuracy Levels:

- High = Document contained visual and or described spatial references easily captured, resulting in little or no polygon boundary errors
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LOT 501 OLD COAST ROAD, FALCON FORESHORE RESERVE AND PUBLIC OPEN SPACE MANAGEMENT PLAN

(Map 788)

UBD 2006
Map 543/544
P/Q 11 – A/B/C 11-9

SB Tile 423

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CITY OF MANDURAH

VERSION 4

OCTOBER 2002

REPORT NO: 2002/11

ATA Environmental
environmental scientists

2. THE FORESHORE ENVIRONMENT

2.1 Landform and Soils

The study area is located on the coastal fringe of the Swan Coastal Plain. Unlike the dunal landform to the west of the site, the foreshore and POS areas are generally flat and low-lying rising to a maximum of 1.1mAHD at the western boundary of the POS and 0.5mAHD at the eastern boundary of the Superlot subdivisions.

The foreshore area comprises soils of the Vasse System which are of estuarine origin and consist of saline sands subject to periodic inundation.

The soils of the western upland region of the site which are not subject to inundation belong to the Spearwood Dune System. These soils are shallow to moderately deep siliceous yellow-brown and grey-brown sands.

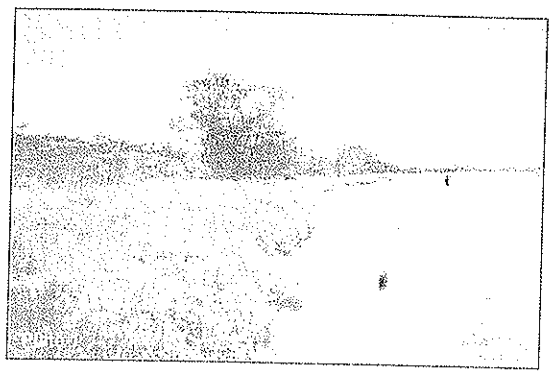
2.2 Hydrology

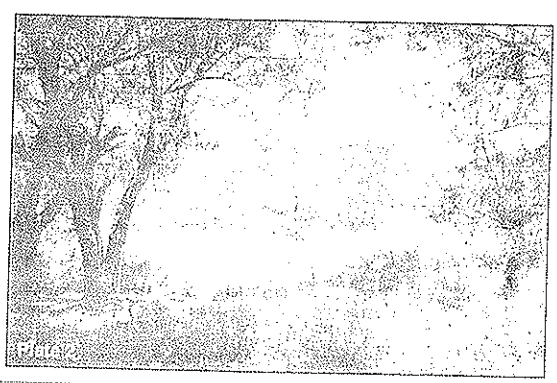
Groundwater beneath the site consists of a thin layer of fresh-brackish water over saline water. A groundwater mound occurs over the peninsula and promotes the movement of groundwater from west to east under the study area with eventual discharge into the estuary. The rate of groundwater flow, however, is expected to be very slow given the topography of the site and the nature of the clay subsoils.

The study area is located immediately adjacent to the Peel Inlet. The annual maximum winter storm surge levels are typically around RL 1.0m (Peter Hill Consulting Engineers, 2002). On this basis, the finished floor level of the development is not less than 2.7mAHD.

2.3 Vegetation

The foreshore area on Lot 501 Old Coast Road comprises vegetation typical of an estuarine environment. The vegetation immediately adjacent to the Peel Inlet (Plate 1) includes a fringing band dominated by Seablite (*Suaeda australis*). This narrow band is backed by other salt tolerant species (Plate 2) including an overstorey of Saltwater Paperbark (*Melaleuca cuticularis*), Freshwater Paperbark (*M. rhaphiophylla*) and Swamp Sheoak (*Casuarina obesa*) over an understorey of succulents including *Sarcocornia quinqueflora* and *Halosarcia lepidosperma*.





Rushes including Sea Rush (*Juncus kraussii*) and Knotted Club Rush (*Isolepis nodosa*) are also common in the foreshore reserve and extend into the proposed POS area. The rushes are the dominant vegetation under scattered Tuarts (*Eucalyptus gomphocephala*) and Swamp Sheoaks in the POS area, as shown in Plate 3.

The installation of fencing along the foreshore reserve boundary has ensured that this area has been retained in good to excellent condition. Clearing of native vegetation, particular overstorey species, has occurred in the adjacent Outline Development Plan POS area, as weeds including Annual Veldt Grass (*Ehrharta longiflora*), Wild Melon (*Citrullus lanatus*), Fleabane (*Conyza albida*) and Dock (*Rumex* sp.) are common among the rushes.

2.4 Fauna

A fauna survey of the foreshore area has not been conducted, however a review of previous studies conducted in the vicinity of the study area reveal the site may provide habitat to a variety of species (Ecoscape, 2000).

It is anticipated the site provides suitable habitat to a number of frog species including the Sandplain Frog (*Crinia insignifera*), *Litoria moorei, Limnodynastes dorsalis* and *Heleioporus eyrei*. The dense vegetation in the foreshore area is also likely to support lizards and snakes such as the Tiger Snake (*Notechis scutatus*), Dugite (*Pseudonaja affinis*) as well as several species of skinks and geckos.

The shallow intertidal area and associated riparian vegetation provides habitat for waterbirds such as Pelicans, Cormorants, Herons, Mountain Ducks, Black Ducks, White-faced Herons and Black Swans. Other avifauna likely to utilise the site include Pardalotes, Willy Wagtails, Honeyeaters, Wattlebirds and Ravens.

ENTERED ON GIS

Name: Classification of Flora and Fauna – Falcon Reserve 9893 No 2-10 Zavia Street
Date: 26/05/2006
Capture Author: Thomas Leong

Comments:
Polygon
Created to match documented study area with high level of accuracy

Accuracy Levels:

- High = Document contained visual and or described spatial references easily captured, resulting in little or no polygon boundary errors
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Classification of Flora and Fauna

Falcon Reserve 9893
No 2-10 Zavia Street

= Flavia Reserve in Ecoscape 1999 ?

UBD 2006
Map 543 M6

SB Tile 430/422 ?

By A. Dixon Dip Hort

Last updated June, 2001

COMMON NAME	SCIENTIFIC NAME	DENSITY
TREES		
Marri	Eucalyptus Calophylla	medium
Holly Banksia	Eucalyptus Gomphocephala	high
Menzies Banksia	Banksia Menziesii	high
Yellow Banksia	Banksia Attenuata	high
Bull Banksia	Banksia Grandis	low
Woody Pear	Xylomelum Occidentale	low
Wreath Wattle	Acacia Saligna	high
Fraser's Sheoak	Allocasuarina Fraseriana	low
CYCADS		
Zamia Palm	Macrozamia Riedlei	low
WOODY PLANTS LESS THAN 2 METRES TALL AND MUCH BRANCHED FROM THE BASE		
Tangle Daisy	Helichrysum Cordatum	medium
Dwarf Sheoak	Casuarina Humilis	low
	Hibbertia Hugelii	low
Yellow Buttercup	Hibbertia Hypericoides	low
False Boronia	Phyllanthus Calycinus	medium
Common Brown Pea	Bossiaea Eriocarpa	medium
Broad Leaved Brown pea	Bossiaea Ornata	medium
	Daviesia Decurrens	low
Common Hovea	Hovea Trisperma	medium
Granny Bonnets	Isotropis Cuneifolia	medium
Stinkwood	Jacksonia Sternbergiana	medium
	Jacksonia Sericea	medium
Bacon and Egg	Oxylobium Capitatum	high
Rose Pelargonium	Pelargonium Capitatum	low
Common Dampiera	Dampiera Linearis	medium
Grey Scaevola	Scaevola Canescens	low
Silky Scaevola	Scaevola Holosericea	low
Snake Bush	Hemiandra Pungens	medium
Swan River Myrtle	Hypocalyma Robustum	low
Blueboy	Stirlingia Latifolia	medium
Couch Honeypot	Dryandra Niver	low
Parrot Bush	Dryandra Sessilis	high
Honey Bush	Hakea Lissocarpha	medium
Snottygobble	Persoona Sccata	low
Pepper and Salt	Eriostermon Spicatus	medium
Wild Violet	Hybanthus Calycinus	low
Milkmaids	Burchardia Umbellata	medium
Small Flowered Mat Rush	Lomandra Micrantha	low
Vanilla Likely	Sowerbaea laxiflora	medium
Slender Lobelia	Lobelia Tenuior	medium
Lesser Broomrape	Orobanche Minor	low
Pink Trigger Plant	Stylidium Brunonianum	low

Common Name	Scientific Name	Area	Density
gum emperor moth	antheraea helena	trees	low
mad hatterpillers	uraba sp	shrubs & trees	medium
jarrah leaf miner	perthida glyphopa	trees	low
ichneumon wasp		orchids, shrubs	medium
bird-of-paradise fly	callipappus sp	shrubs	low
witchetty grub	cossidae	trees	low
looper caterpiller	oenochroma sp	shrubs	medium
case moth caterpiller	psychodidae	shrubs, trees	medium
jewel beetle	thenognatha conspicillata	shrubs, trees	medium
lady bird	leis conformis	shrubs, trees	medium
transverse lady bird	coccinella transversalis	shrubs, trees	medium
green carab beetle	calasoma schayeri	shrubs	low
rhino beetle	blackburnium reichei	trees	low
dragonfly		ground, shrubs & trees	low
long-horned grasshopper		ground	low
mole cricket	gryllotalpa nitidula	ground	low
stick insect	didymura violescens	shrubs, trees	low
earwig	labidura riparia	ground	medium
mantid	orthadera ministralis	shrubs	low
cockroach	blattaria sp	ground	medium
termites		ground	low
shield bug	omyta centrolineata	ground, shrubs	low
tlatid bug	siphanta acuta	ground, shrubs	low
eurybrachid bug	platybrachys decemmaculatus	ground, shrubs	low
treee hopper	sextius kurandae	shrubs, trees	medium
cottony cusion scale	icerya purchasi	shrubs, trees	medium
white wax scale	ceroplastes destructor	shrubs, trees	medium
	cylindrococcus spiniferus	shrubs	low
toad bug	nerthra alaticollis	ground	low
brown lacewing	drepanacra humilis	shrubs	low
scorpionfly	harpobittacus tiilyordi	shrubs	low
catterpiller	epicoma sp	shrubs, trees	low
catterpiller	chlenias sp	shrubs, trees	low
catterpiller	antheraea eucalypti	trees	medium
cup moth	doratifera	shrubs	low
white stemmed gum moth		trees	low
orchard swallowtail butterfly	papilip aegeus	ground, shrubs, trees	medium
caper white butterfly	anaphaeis java	ground, shrubs, trees	low
hawk moth	coequosa triangularis	shrubs, trees	medium
robber fly	cerdistus canstrictus	ground	medium
bee fly	comptosia lateralis	ground, shrubs	low
sawfly	pltypsectra aralis	ground, shrubs	medium
braconid wasp	bracon capitator	ground, shrubs	low
paper wasp	polistes humilis	shrubs, trees, bark	low
bull ant	myrmecia nigriceps	ground	medium
sugar ant	camponotus consobrinus	flowers, trees, ground	medium
chrysomelid beetle	brachychaulus klugi	shrubs, trees	low
lycid beetle	metriorrhynchus rhipidius	ground, shrubs, trees	medium
fungus beetle	episcaphula pictipennis	ground	low

COMMON NAME	SCIENTIFIC NAME	DENSITY
TWINING AND PROSTRATE PLANTS		
Bridal Rainbow	Drosera Macrantha	medium
Pale Sundew	Drosera Pallida	low
Pink Rainbow	Drosera Penicillaris	high
Native Wisteria	hardenbergia Comptoniana	medium
Red Runner	Kennedia Prostrata	low
FERNS		
Annual Fern	Angoramma Leptophylla	low
GRASSES AND GRASSLIKE PLANTS		
Coast Sward-Sedge	Lepidosperma Gladiatum Lepidosperma Scabrum	medium
African Lovegrass	Eragrostis Curvula	medium
Annual Veldgrass	Ehrharta Longiflora	medium
ORCHIDS		
Blue Fairy	Caladenia Deformis	low
Cowslip	Caladenia Flava Xflava	medium
Coastal White Spider	Caladenia Longicauda	low
Common Spider	Caladenia Varians	low
Tuart Spider	Caladenia Georgei	medium
Bunny	Eriochilus Dilatatus	low
Dark Banded Greenhood	Pterostylis Sanguinea	low
Jug	Pterostylis Recurva	low

• Baudin's Black Cockatoo	12	sighted
• Brush-tailed Possum	6	sighted
• Pink and Grey Galah	15	sighted
• Red-capped Parrots	12	sighted
• Regent Parrots	5	sighted
• Ringneck Parrot	12	sighted
• Ringneck Parrot		
Subspecies C zonarius	8	sighted
Subspecies D semitorquatus	14	sighted
• Grey Fantails	11	sighted
• Splendid Fairywren	8	sighted
• Western Silver-eye	10	sighted
• Bronzewing Pigeon	23	sighted
• Pied Butcherbird	3	sighted
• Magpielark	7	sighted
• Australian magpie	14	sighted
• Australian Raven	4	sighted
• Sacred Kingfisher	2	sighted
• Australian Owlet-nightjar	2	sighted
• Tawny Frogmouth	3	sighted
• Boobook Owl	1	sighted
• New Holland Honeyeater	7	sighted
• White-naped Honeyeater	6	sighted
• Western Spinebill	2	sighted

REPTILES

• Tiger Snake	2	sighted
• Shingle Back Lizard	5	sighted
• Blue Tongue Lizard	4	sighted

FROGS

At least 3 different species I have sighted in this area

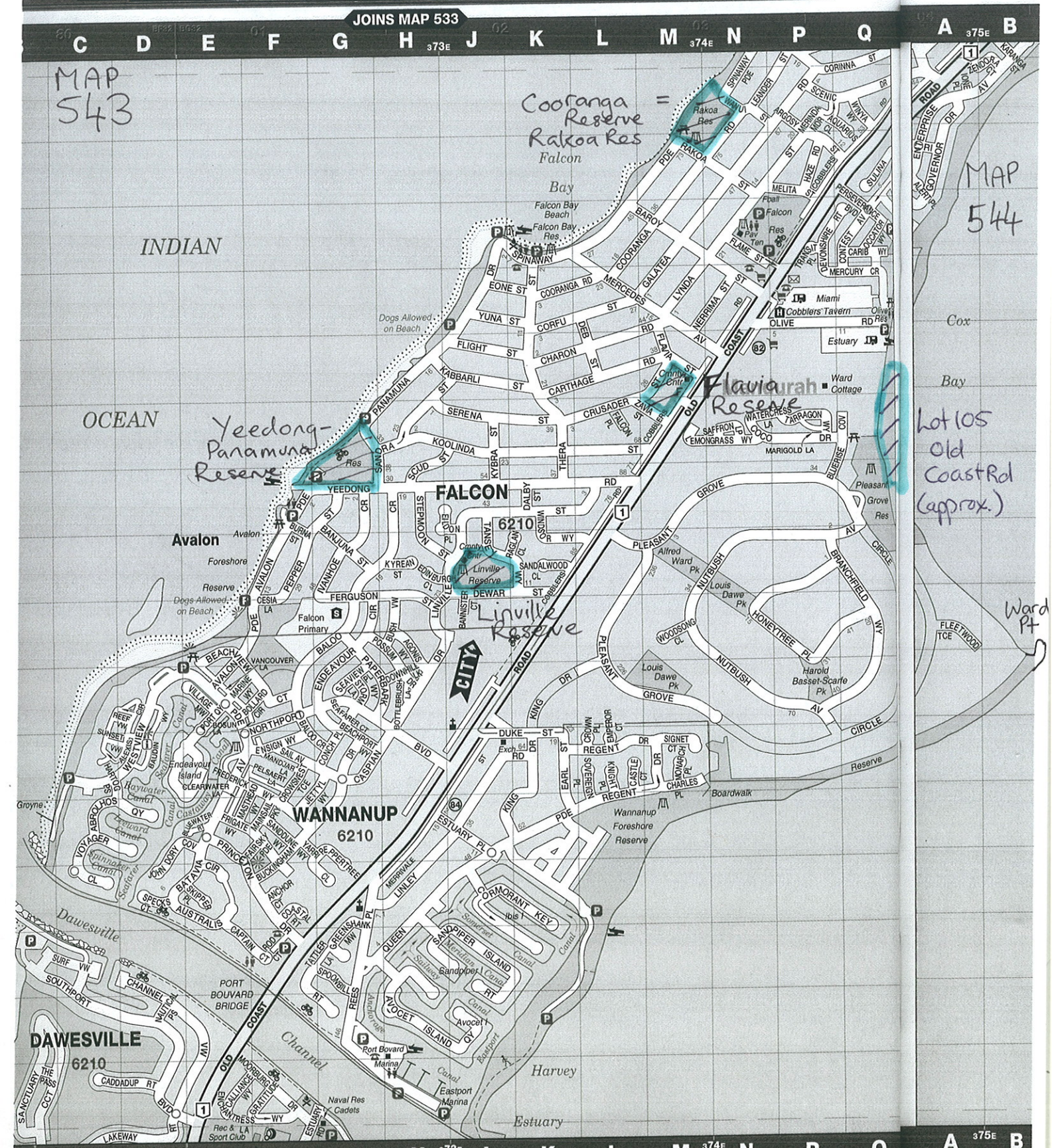
BATS	14	sighted

Over a one month period of observation, frequent fly-overs of the rare and endangered white-tailed Black Cockatoo, also known as Baudin's Black Cockatoo, this reserve is one of the feeding and nesting areas.

As this area is quite rich in flora as well as fauna, I recommend that the reserve be left as a nature or an ecological park, as these small plots of remnant bushland are becoming quite rare. Also there are a least 10 to 12 breeding and nesting sites in and around the reserve of various avifauna, relevant to this coastal area.

JOINS MAP 533

C D E F G H 373E J K L M 374E N P Q A 375E B



JOINS MAP 553

1km
500 1000

ANGLE MURRAY BF32
ANGLE MURRAY BG32

FREEWAY
PROPOSED FREEWAY
HIGHWAY or MAIN ROUTE
ALTERNATE ROUTE
TRAFFICABLE ROAD
PROPOSED ROAD

PARK, RESERVE, OVAL
SCHOOL, HOSPITAL
MISCELLANEOUS AREA
MALL, PLAZA
SWAMP

AMBULANCE STATION
BARBECUE
BOAT RAMP
BOWLING CLUB/GREEN
CAMPING AREA
CARAVAN PARK

CAR PARK
COLLEGE - PRIVATE
COLLEGE - PUBLIC
CYCLEWAY
DISTANCE FROM GPO
EMERGENCY TELEPHONE

EXPRESS POST BO
FIRE STATION
GOLF COURSE
GUIDES
HOSPITAL
HOTEL

JOINS MAP 524

JOINS MAP 544

PARK ..... P
EGE - PRIVATE C
EGE - PUBLIC C
EWAY 28
ANCE FROM GPO 28
RGENCY TELEPHONE ..

EXPRESS POST BOX ..... F
FIRE STATION ..... F
GOLF COURSE ..... F
GUIDES ..... F
HOSPITAL ..... H
HOTEL ..... H

INFORMATION CENTRE I
LIBRARY L
LOOKOUT 180 , 360 ..... F
MASONIC CENTRE ..... F
MEMORIAL / MONUMENT ..... F
MOTEL ..... M

ONE-WAY TRAFFIC ROUTE ..... F
PICNIC AREA ..... F
PLACE OF WORSHIP ..... F
PLAYGROUND ..... F
POLICE STATION ..... F
POST OFFICE ..... F

ROUNDABOUT ..... F
SCHOOL - PRIVATE ..... S
SCHOOL - PUBLIC ..... S
SCOUTS ..... F
SERVICE STATION ..... F
SHOPPING CENTRE ..... F

SWIMMING POOL ..... F
TELEPHONE ..... F
TOILETS ..... F
TRAFFIC LIGHT ..... F
WEIGHBRIDGE ..... W
WINERIES ..... F