# PORT KENNEDY

**Boundary Definition:** protected area/bushland (part taken to cadastre) boundary (Areas of bushland within the boundaries of the Site are not accurately mapped. The boundary has been drawn to include any unmapped bushland.)

## *SECTION 1: LOCATION INFORMATION*

**Bush Forever Site no.** 377 **Area (ha):** bushland 674.9

**Map no.** 74, 79

**Map sheet series ref. no.** 2033–II SW, 2033–III NE, 2033–III SE

**Other Names:** Becher Point Wetlands, part of Port Kennedy and Rockingham Lakes Regional Parks

**Local Authorities (Suburb):** City of Rockingham (Port Kennedy, Secret Harbour)

**Includes CALM Managed Land:** Nature Reserve 44077 (Conservation of Flora and Fauna), 45041 (Conservation of Flora and Fauna)

**System 6 (1983):** Part M106 area of bushland goes beyond System area boundaries, only bushland described

## *SECTION 2: REGIONAL INFORMATION*

**LANDFORMS AND SOILS**

**Quindalup Dunes** (Holocene dunes)

Safety Bay Sands (Qhs: S2, S13)

**Wetlands (within the Quindalup Dunes)**

Holocene Swamp Deposits (Qhw: Cps)

**VEGETATION AND FLORA**

**Vegetation Complexes**

**Quindalup Dunes**

Quindalup Complex

**Floristic Community Types:** *not sampled, types inferred

**Supergroup 2: Seasonal Wetlands**

19a Sedgelands in Holocene dune swales (DEP 1996, equivalent to 19 in Gibson *et al.* 1994, English and Blyth 1997)

**Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes**

29b *Acacia* shrublands on taller dunes

*S13 Northern *Olearia axillaris* — *Scaevola crassifolia* shrublands

*S14 *Spinifex longifolius* grassland and low shrubland

**WETLANDS**

**Wetland Types:** dampland, sumpland

**Natural Wetland Groups**

**Quindalup**

Cooloongup (Qu.1)

Becher (Qu.2)

Peelhurst (Qu.3)

**Wetland Management Objectives:** Conservation (19.5ha)

**Swan Coastal Plain Lakes EPP:** none identified

**THREATENED ECOLOGICAL COMMUNITIES**

Not assessed, Critically Endangered (floristic community type 19 as defined by Gibson *et al.* 1994), Not determined

## *SECTION 3: SPECIFIC SITE DETAIL*

**Landscape Features:** coastal dunes

**Vegetation and Flora:** detailed survey (Keighery, GJ, and Keighery 1993c; part Site — Trudgen 1989); limited survey (Gibson *et al.* 1994 (PB 01–06))

**Structural Units:** mapping (part Site — Trudgen 1989)

Quindalup Dunes

Uplands — Beach ridge plain: *Olearia axillaris* Open Shrubland to Closed Heath to Closed Tall Scrub; *Scaevola crassifolia* and *Olearia axillaris* Low Open heath to Closed Heath to Open Scrub; Open Heath to Open Low Heaths dominated by *Acacia rostellifera, A. lasiocarpa* var. *lasiocarpa, Melaleuca systena, Olearia axillaris, Jacksonia furcellata* and combinations of these over *Austrostipa flavescens* Grassland

Wetlands — Beach ridge plain: *Juncus kraussii* Closed Sedgeland, at times over *Sarcocornia quinqueflora* Closed Herbland; *Isolepis nodosa* and *Baumea juncea* Closed to Open Sedgeland, generally with an overstorey of *Xanthorrhoea preissii*

Strand: *Spinifex longifolius* Grassland

**Scattered Native Plants:** not assessed

**Vegetation Condition:** >60% Very Good to Pristine, <40% Good to Degraded, with areas of severe localised disturbance

**Total Flora:** 172 native taxa, 68 weed taxa (Keighery, GJ, and Keighery 1993) (estimated >90% expected flora)

**Significant Flora:** Keighery, GJ, and Keighery 1993 — *Cryptandra mutila* and *Zygophyllum fruticulosum* (southern range end), *Hibbertia cuneiformis* (most northern known population); *Jacksonia furcellata* (floriferous shrub form)

**Fauna:** limited surveys for birds (22 species), native mammals (5 species), reptiles (7 species) and amphibians (3 species) (Binnie & Partners 1988, Tingay, Alan & Associates 1997). Significant mammal species: Western Brush Wallaby and Quenda

**Linkage:** adjacent bushland to the north and east (Site 356, across road); part of Greenways 1, 83 (Tingay, Alan & Associates 1998a); part of a regionally significant fragmented bushland/wetland linkage (Part A, Map 7)

**Other Special Attributes**

Meets all six of the specific criteria for coastal reserves —

(i) Quindalup Dune types: beach ridge plain
(ii) Continuing natural processes: 764.2ha (657.9ha bushland) of Quindalup Dunes extending to 4km inland
(iii) Shoreline: soft (sandy)
(iv) Linkage: through adjacent Site 356 to Spearwood Dunes
(v) Vegetation: two regional floristic groups, one of which is a threatened community, areas of vegetation in apparently Pristine condition
(vi) Habitats: see Fauna section above;

Part Site recommended to be declared an A-class Nature Reserve for the protection of flora and fauna in Gibson *et al.* (1994); wetlands of 'national and international significance' (Semeniuk, V&C Research Group 1991b); majority of Site included in Port Kennedy and Rockingham Parks proposal (Tingay, Alan & Associates 1997)

## *SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE*

Directory of Important Wetlands in Australia; Entered in the Register of the National Estate; subject to protection under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

## *SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS*

**Criteria:** Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, Scientific or evolutionary importance, General criteria for the protection of wetland, streamline and estuarine fringing vegetation and coastal vegetation

**Recommendation:** Site with Some Existing Protection; the care, control and management of this Site (Reserves 44077, 45041) for conservation purposes within Port Kennedy and Rockingham Lakes Regional Park is endorsed (see Table 3, Volume 1).

# PORT KENNEDY

**Boundary Definition:** protected area/bushland (part taken to cadastre) boundary (Areas of bushland within the boundaries of the Bushplan Site are not accurately mapped. The boundary has been drawn to include any unmapped bushland.)

*SECTION 1: CADASTRAL INFORMATION*

(Lots, locations and derived information to be updated in the public submission period)

**Bushplan Site no.** 377 **Map no.** 92, 98, 99 **Map sheet series ref. no.** 2033–II SW, 2033–III NE, 2033–III SE

**System 6 (1983):** Part M106 area of bushland goes beyond System area boundaries, only bushland described

**Other Names**
Becher Point Wetlands

**Area (ha):** total 785.2; bushland 674.9

**Local Authorities (Suburb)**
City of Rockingham (Port Kennedy, Secret Harbour)

**Zoning**
**MRS:** Urban, Parks and Recreation, Waterways, Public Purposes-Special Uses
**TPS:** Development Zone, Landscape, Ocean

**Ownership Categories**
State Government

**Lot/Location/Reserve numbers (Purpose), Street name**
132, 133 Forty Rd; 138, 213, 1377 street not identified
Crown Reserve

CALM Managed Land

Nature Reserve 44077 (Conservation of Flora and Fauna), 45041 (Conservation of Flora and Fauna)

*SECTION 2: REGIONAL INFORMATION*

**LANDFORMS AND SOILS**

**Quindalup Dunes** (Holocene dunes)
Safety Bay Sands (Qhs: S2, S13)
**Wetlands (within the Quindalup)**
Holocene Swamp Deposits (Qhw: Cps)

**VEGETATION AND FLORA**

**Vegetation Complexes**
**Quindalup Dunes**
Quindalup Complex

**Floristic Community Types:** *not sampled, types inferred
**Supergroup 2: Seasonal Wetlands**
19a Sedgelands in Holocene dune swales (DEP 1996, equivalent to 19 in Gibson *et al.* 1994, English and Blyth 1997)
**Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes**
29b *Acacia* shrublands on taller dunes
*S13 Northern *Olearia axillaris* — *Scaevola crassifolia* shrublands
*S14 *Spinifex longifolius* grassland and low shrubland

**WETLANDS**

**Wetland Types:** dampland, sumpland
**Natural Wetland Groups**
**Quindalup**
Cooloongup (Qu.1)
Becher (Qu.2)
Peelhurst (Qu.3)
**Wetland Management Objectives:** Conservation (19.5ha)
**Swan Coastal Plain Lakes EPP:** none identified

**THREATENED ECOLOGICAL COMMUNITIES**

Not assessed, Critically Endangered (floristic community type 19 as defined by Gibson *et al.* 1994), Not determined

*SECTION 3: SPECIFIC SITE DETAIL*

**Landscape Features:** coastal dunes

**Vegetation and Flora:** detailed survey (Keighery, GJ, and Keighery 1993c; part Bushplan Site — Trudgen 1989); limited survey (Gibson *et al.* 1994 (PB 01–06))
**Structural Units:** mapping (part Bushplan Site — Trudgen 1989)
Quindalup Dunes
Uplands - Beach ridge plain: *Olearia axillaris* Open Shrubland to Closed Heath to Closed Tall Scrub; *Scaevola crassifolia* and *Olearia axillaris* Low Open heath to Closed Heath to Open Scrub; Open Heath to Open Low Heaths dominated by *Acacia rostellifera*, *A. lasiocarpa* var. *lasiocarpa*, *Melaleuca acerosa*, *Olearia axillaris*, *Jacksonia furcellata* and combinations of these over *Austrostipa flavescens* Grassland

Wetlands - Beach ridge plain: *Juncus kraussii* Closed Sedgeland, at times over *Sarcocornia quinqueflora* Closed Herbland; *Isolepis nodosa* and *Baumea juncea* Closed to Open Sedgeland, generally with an overstorey of *Xanthorrhoea preissii*
Strand: *Spinifex longifolius* Grassland
**Scattered Native Plants:** not assessed
**Vegetation Condition:** >60% Very Good to Pristine, <40% Good to Degraded, with areas of severe localised disturbance
**Total Flora:** 172 native taxa, 68 weeds (Keighery, GJ, and Keighery 1993c) (estimated >90% expected flora)
**Significant Flora:** (Keighery, GJ, and Keighery 1993c): *Cryptandra mutila* and *Zygophyllum fruticulosum* (southern range end), *Diplolaena dampieri* and *Hibbertia cuneiformis* (northern range end); *Jacksonia furcellata* (floriferous shrub form)

**Fauna:** limited survey by Binnie & Partners (1988) and Tingay, Alan & Associates (1997a) for birds (22), native mammals (5), reptiles (7) and amphibians (3). Significant mammal species: Western Brush Wallaby and Quenda
**Linkage:** adjacent bushland to the north, south and east (BS356); part of proposed Greenways 1, 98 (Tingay, Alan, & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

**Other Special Attributes**

Meets all six of the specific criteria for coastal reserves —

(i) Quindalup Dune types: beach ridge plain
(ii) Continuing natural processes: 764.2ha (657.9ha bushland) of Quindalup Dunes extending to 4km inland
(iii) Shoreline: sandy (soft)
(iv) Linkage: through adjacent BS356 to Spearwood Dunes
(v) Vegetation: two regional floristic groups, one of which is a threatened community, areas of vegetation in apparently Pristine condition
(vi) Habitats: see Fauna section above;

Part Bushplan Site recommended to be declared an A-class Nature Reserve for the protection of flora and fauna in Gibson *et al.* 1994; wetlands of 'national and international significance' (Semeniuk, V&C Research Group 1991b); majority of Bushplan Site included in Port Kennedy and Rockingham Parks proposal (Tingay, Alan & Associates 1997b)

***SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE***

Directory of Important Wetlands in Australia; Listed on the Register of the National Estate

***SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS***

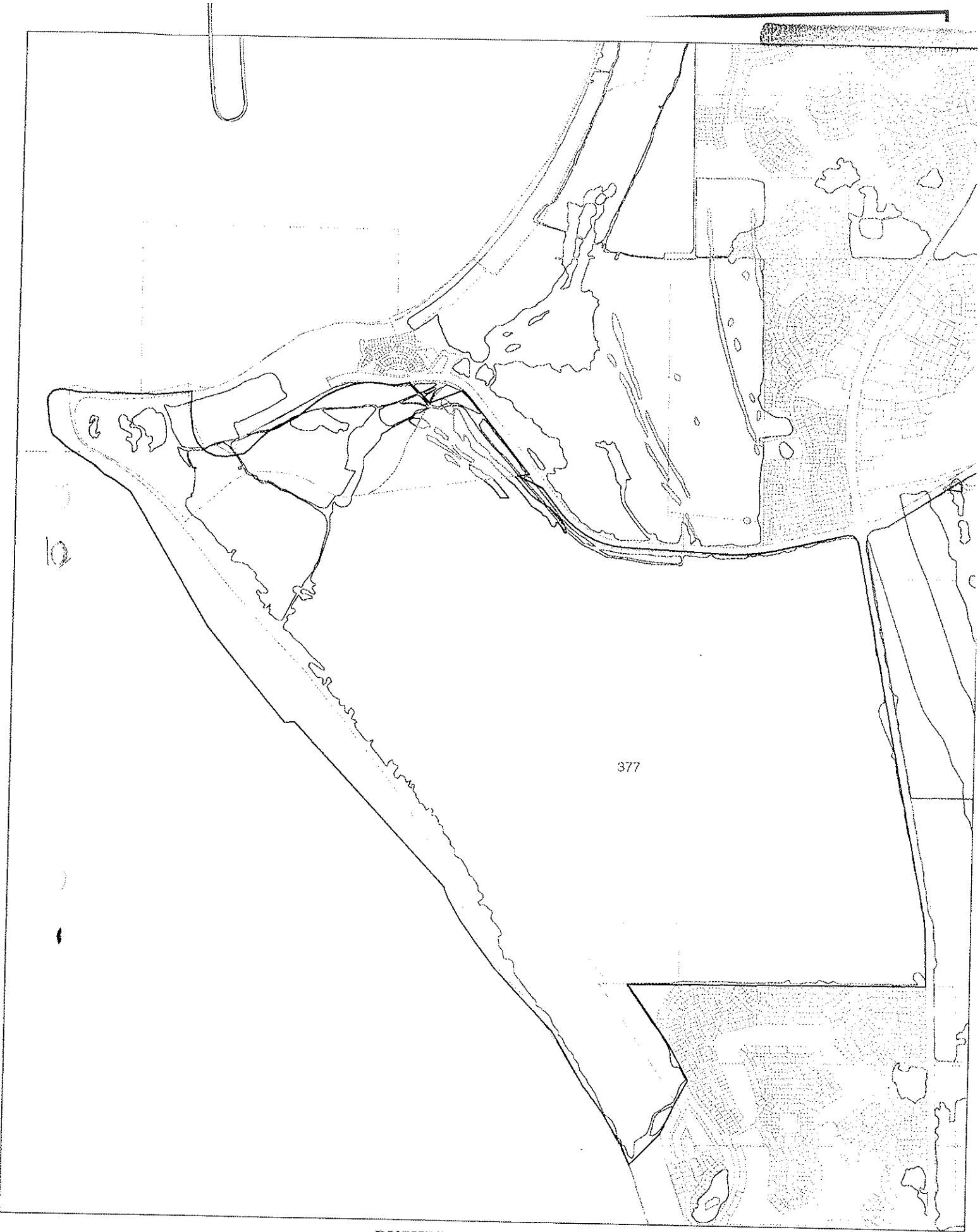
**Criteria:** Representation of ecological communities, Diversity, Rarity, Maintaining ecological processes or natural systems, Scientific or evolutionary importance, General criteria for the protection of wetland, streamline and estuarine fringing and coastal vegetation

**Opportunities and/or Constraints**

Opportunities: Bushplan Site/part Bushplan Site location of conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning, Crown Reserve
Constraints: under MRS Urban zoning

**Recommendation:** The care, control and management of this Bushplan Site (Reserves 44077, 45041) for conservation purposes within Port Kennedy and Rockingham Lakes Regional Park is endorsed.

Note Critically Endangered On National List of TEC's Inform MP /Homework.




**BUSHPLAN SITES CORRECTED**

THE GOVERNMENT OF WESTERN AUSTRALIA

WESTERN AUSTRALIAN PLANNING COMMISSION

CUSTOMER FOCUS WESTRAC AUSTRALIA

B 76 28/10/98

N

WA 3165 (C) METRO REGIONAL AREA & EXT. RUN 7 (5001-5078) 1:20000 10-DEC-92 920676


Bush Forever Sites
Local Government Authority Boundaries
Lakes EPP
Geomorphic Wetlands Feb04 by Evaluation
Conservation
Resource Enhancement
Multiple Use
Floristic Survey Sites of the Southern Swan Coastal Plain
GJKENV (Keighery 1996)
GRIFFIN (Griffen 1994)
SCP (Gibson et al 1994)
SYS6ENV (DEP 1996 and Trudgen & Keighery 1995)
SYS6ENV2 (DEP 1996 and Trudgen & Keighery 1995)
CALM Threatened Ecological Communities 2002
Roads - Perth Metropolitan
5 Metre, South West WA

# Bush Forever Site 377: Port Kennedy

0 400 800 1200 1600 Meters

N

1:25000

Department of Environment

Data Sources:
Cadastre DLI
Aerial Phototography : Skyview DLI

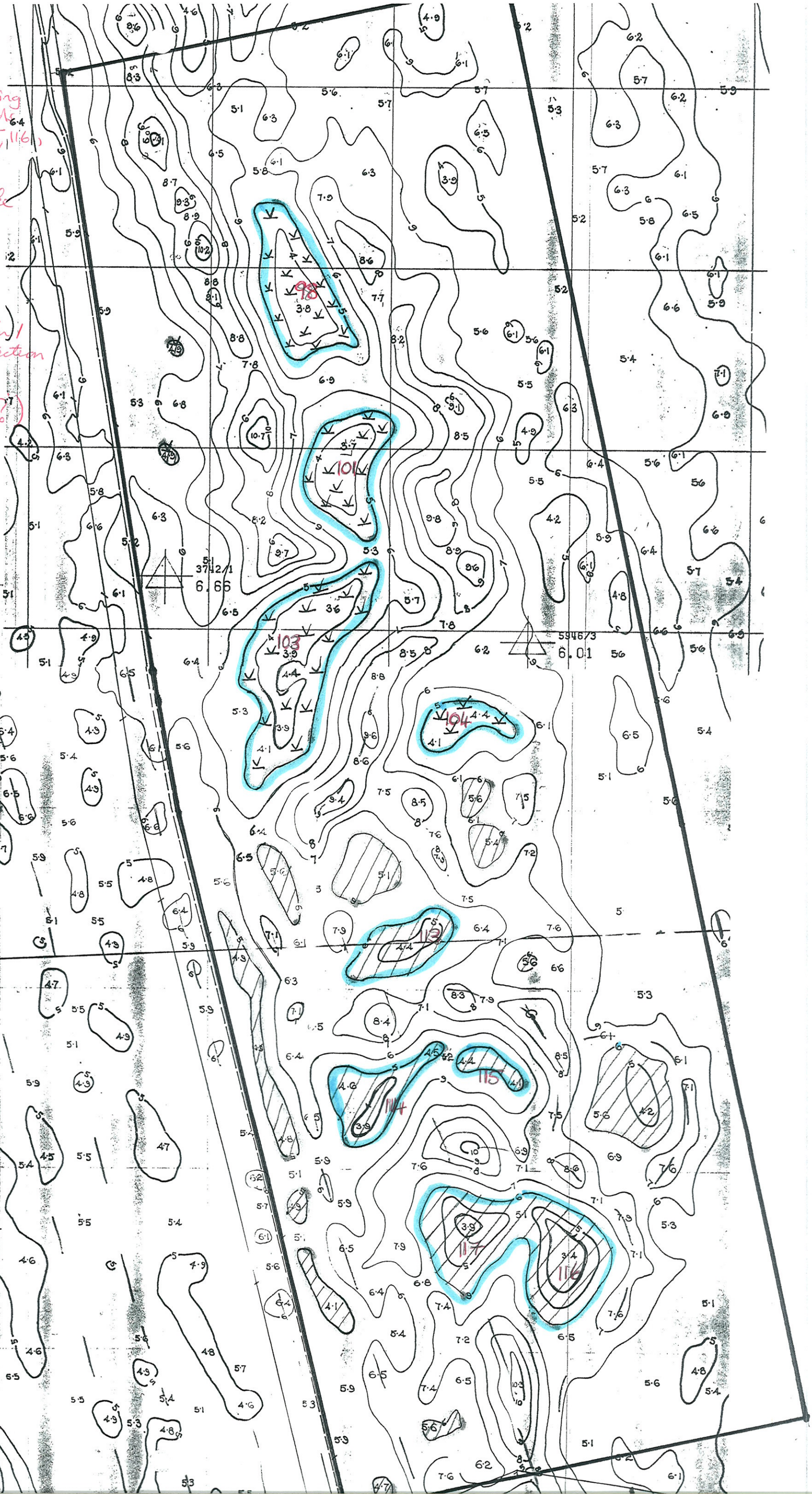
Datum: GDA - Projection: MGA Zone 50

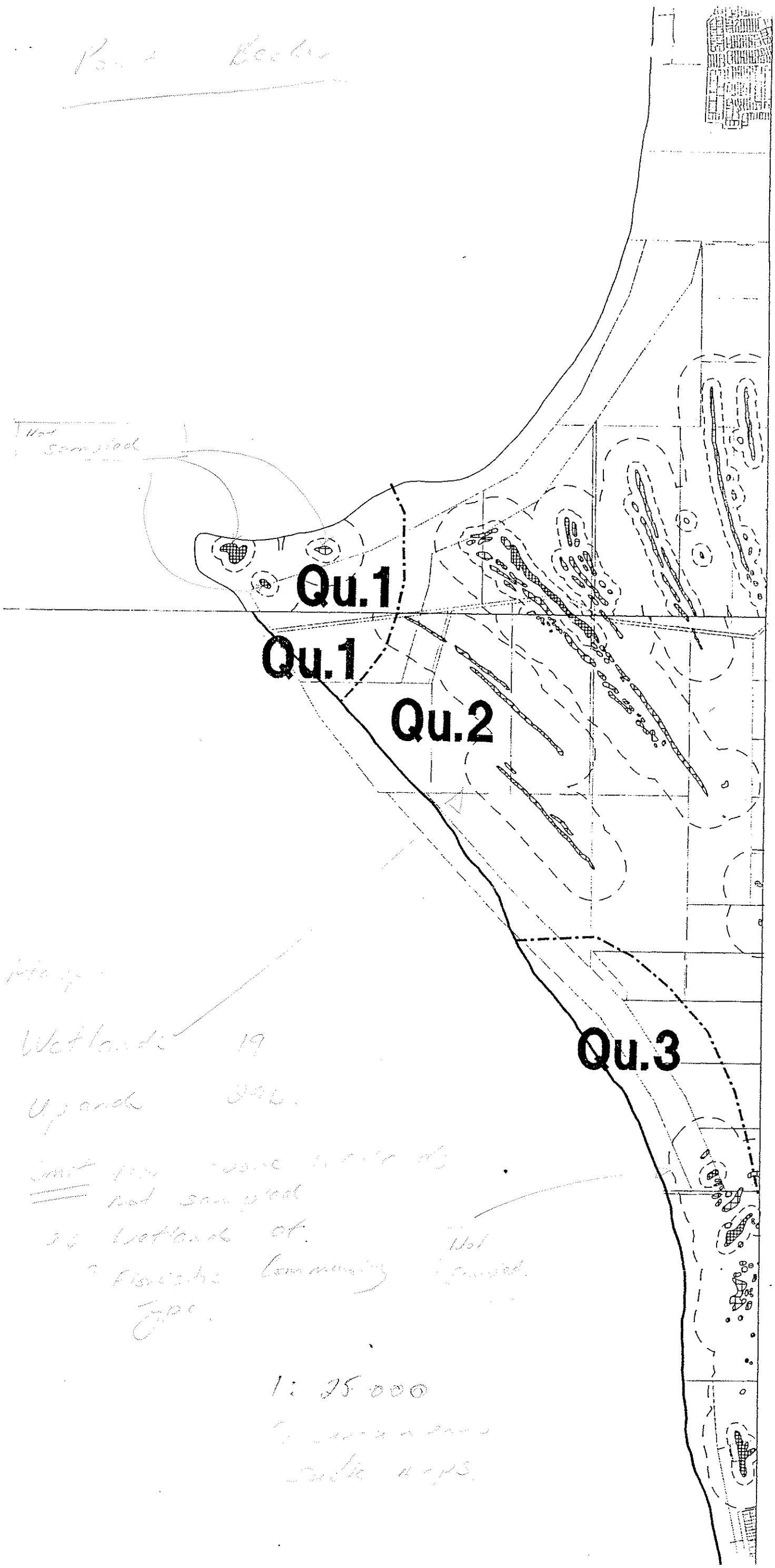
Notes for 20/5/02 & Ministerial received from Cockburn Wetlands Study Group requesting protection of Wetlands 98, 101, 103, 104, 113, 114, 115, 116, 117, 120 & 121

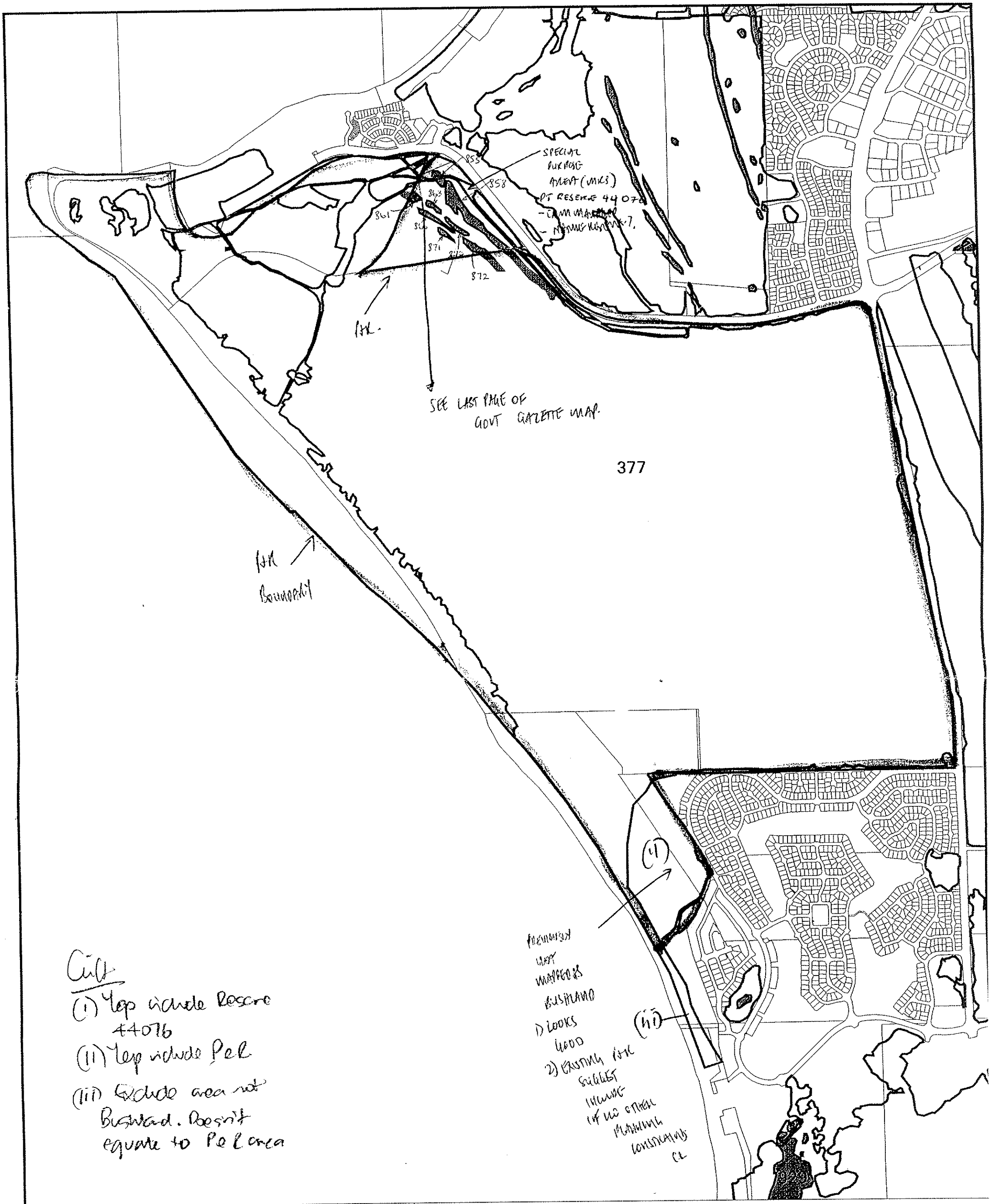
* Interpretation (this map) by Karen Clarke of where these wetlands are in relation to Semeniuk's Option 1 recommended protection areas (Location of Wetland 120 & 121 ?)

Option 1.

21.06 ha




Qu.1
Qu.1
Qu.2
Qu.3




Cl:-
(i) Map include Reserve 44076
(ii) Map include Pel
(iii) Exclude area not Bushland. Result equate to Pel area

## bp site 377

| | |
|---|---|
| Map Ident: plot980603_1 | DATE: 03 Jun 98 |
| Prepared By: Andrea Zappacosta | Prepared For: |
| Scale 1:AUTO | MFP INTERNAL USE ONLY |

0 500 m

- AG VEG 1998 BOUNDARY THEME
- Cadastre
- Bushplan sites refno 1-500 SCP BOUNDARY THEME
- cons category wetlands
- Verified CCWs

# bp site 377

| | |
|---|---|
| Map Ident: plot980603_1 | DATE: 03 Jun 98 |
| Prepared By: Andrea Zappacosta | Prepared For: |
| Scale 1:AUTO | MFP INTERNAL USE ONLY |

0 500 m

- AG VEG 1998 BOUNDARY THEME
- Cadastre
- Bushplan sites refno 1-500 SCP BOUNDARY THEME
- cons category wetlands
- Verified CCWs

DES EXCISE ACCORDING TO CROWN RESERVE BOUNDARY

VEG

INCLUDE TO CR BOUNDARY HERE

SPECIAL PURPOSE AREA (MKS) PT RESERVE 44076 - CAMMARAY NATURE RESERVE

?VEG

VEG

INCLUDE

INCLUDE

(I) Yep include Reserve 44076

(II) Yep include Pel

(III) Exclude area not Bushland. Doesn't equate to Pel area

DES; BRIGHTON PARK

- MFP SECTION OF PARK IN SOUTH UNDONE INDICATES
- MFP CROWN RESERVE 'BLUE' LINE IN NORTH EXCLUDE PORTION INDICATED AS * REFERRING TO CROWN RESERVE BOUNDARIES SEE STRIKE MAP IT SEE

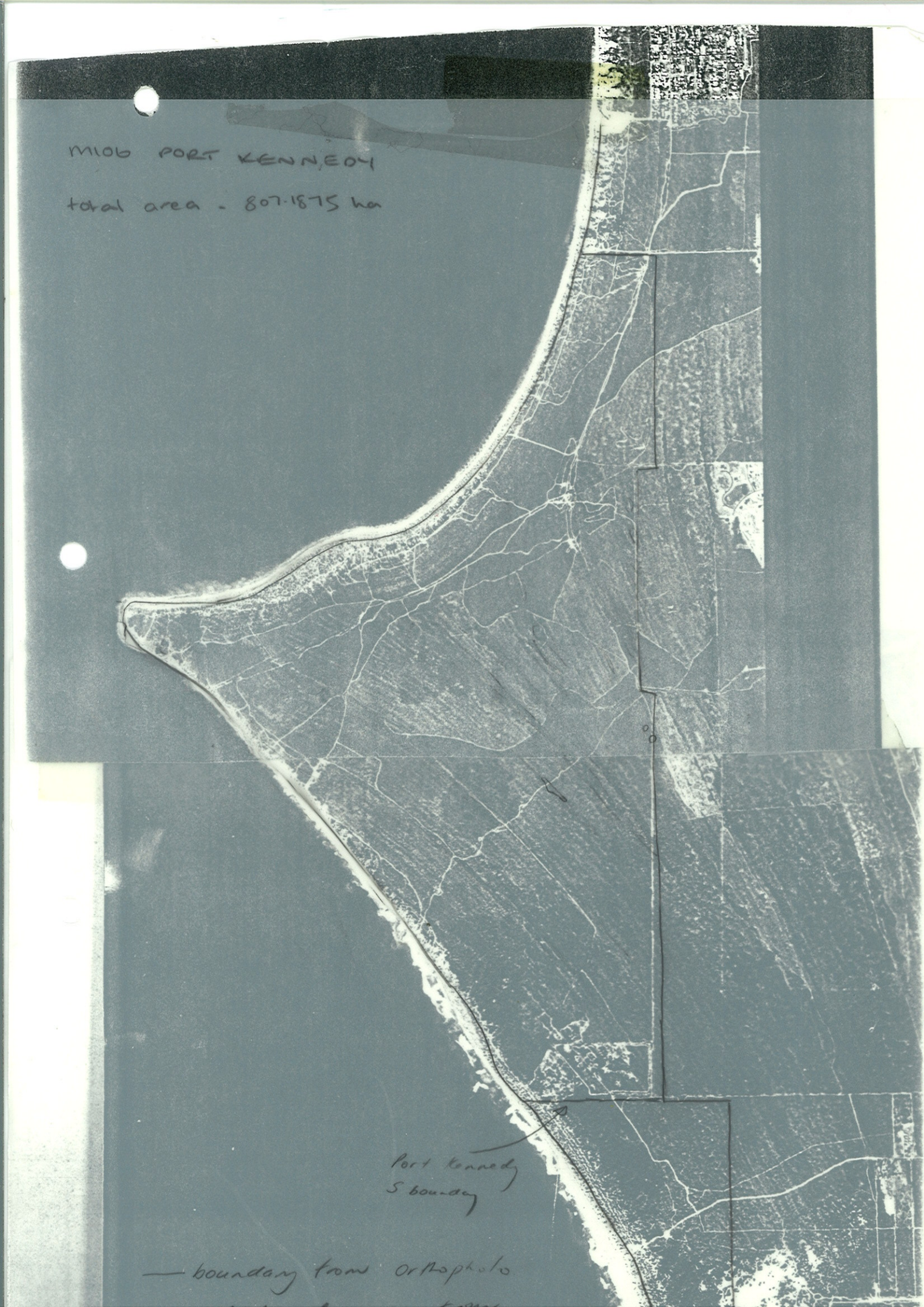
1) LOOKS GOOD

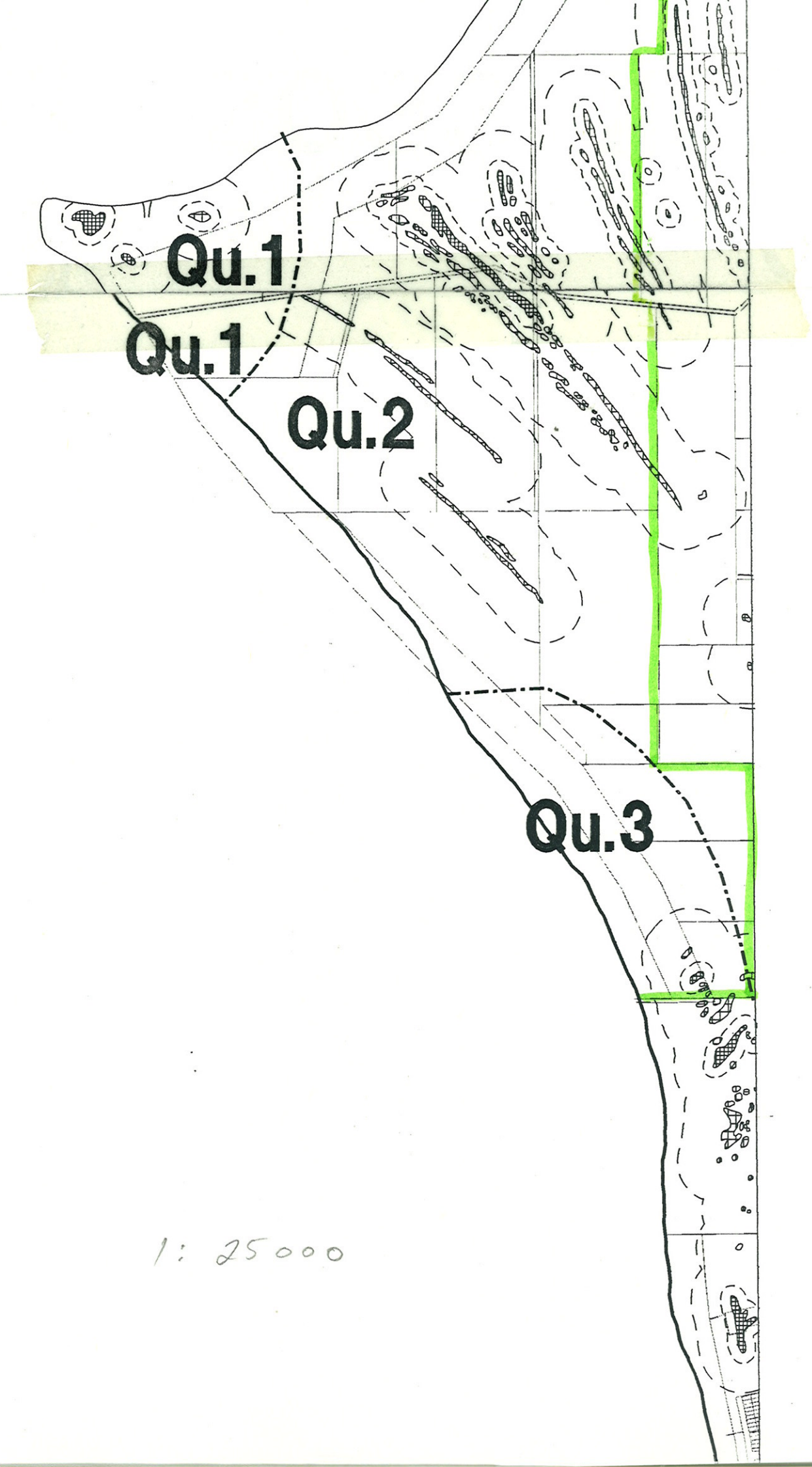
2) EXISTING PARK SUGGEST INCLUDE IF NO OTHER PLANNING CONSIDERATIONS CE

(II)

(III)

929


M106 PORT KENNEDY
total area - 807.1875 ha
Port Kennedy
S boundary
— boundary from Orthophoto




1: 25000

- SURVEY RECORDING SHEET Please use pencil

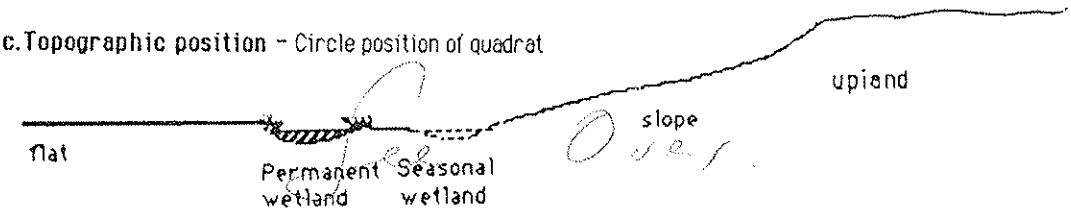
QUADRAT No. [illegible] VEGETATION TYPE [illegible]
DATE FIRST TRIP [illegible] VOLUNTEERS [illegible]
DATE SECOND TRIP [illegible] VOLUNTEERS [illegible]
BOTANIST [illegible]

## 1. LOCATION of the QUADRAT

a. **Mud Map** Draw a sketch of the location of the quadrat the back of this sheet →

b. **Photograph** Photographer's name _____

c. **Topographic position** – Circle position of quadrat




Keighery and Keighery, 1990
Adapted from Griffin and Keighery, 1989
MOORE RIVER to JURIEN SANDPLAIN SURVEY. WILDFLOWER SOCIETY of WA

## 2. SITE DATA – Circle the correct response

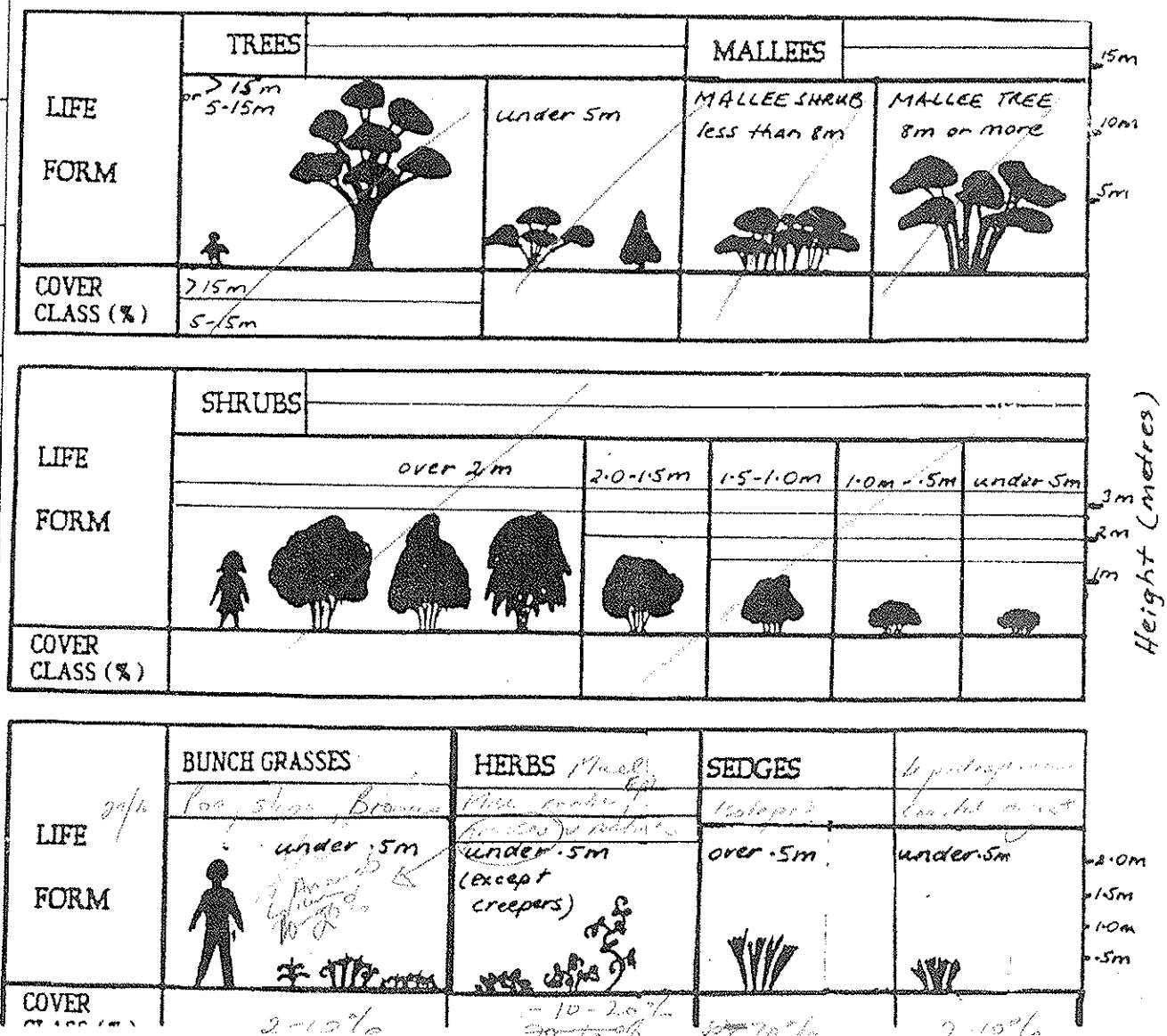
**Slope** flat gentle steep **Aspect** N NE E SE S SW W NW

**% Bare ground**____ **Drainage** well mod poor **Wet** All year winter/spring

**Litter** (% cover)____ **Surface soil**_____ **Sub-surface soil** _____

## 3. VEGETATION STRUCTURE AND COVER Record appropriate cover class

Cover Class – percentage classes: 0% | under 2% | 2–10% | 10–20% | 20–30% | 30–50% | 50–70% | over 70%



PB-1

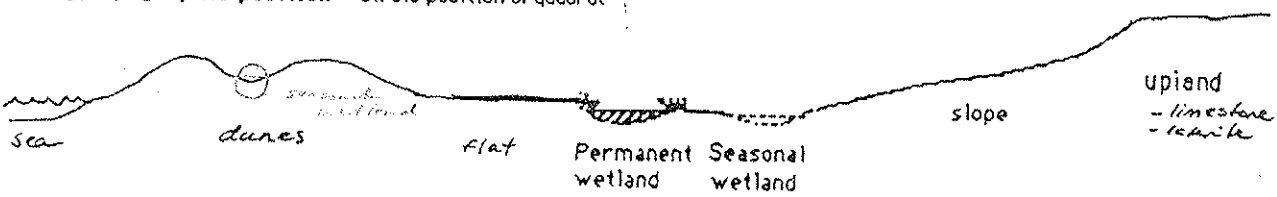
N

PB 1

| b Road Location | c. Latitude | Longitude |
|---|---|---|
| via gravel pit track | 32° 23' 09.7" | 115° 44' 06.1" |
| | +- 30m | Altitude 5m |

d. Photograph Photographer's name _____ Photo No _____

e. Topographic position – Circle position of quadrat




2. SITE DATA – Circle the correct response

Slope (flat) gentle steep

Aspect N NE E SE S SW W NW

Surface soil humus | red sandy "clay"

Sub-surface soil _____

Drainage well mod (poor)

Wet All year (winter/spring)

Litter (% cover) 0%

% Bare ground 60%

4. VEGETATION CONDITION

| | |
|---|---|
| EXCELLANT | |
| VERY GOOD | |
| GOOD | ✓ |
| POOR | |
| VERY POOR | |

Comments
Under weed

General comments area
wetlands have probably been highly disturbed through

## 4. SPECIES PRESENCE

- **work systematically through the vegetation**, start with the tallest stratum, i.e. trees
- within each stratum try to record the **most common species first** and the most uncommon last.
- as each species is collected **label** it with a numbered tag and use this number on your recording sheet
- indicate if the species is in **flower**

QUADRAT No.
PL 01

Keighery and Keighery, 1990
Adapted from Griffin and Keighery, 1989
MOORE RIVER to JURIEN SANDPLAIN SURVEY. WILDFLOWER SOCIETY of WA

### Trees

| | No | ID |
|---|---|---|
| | | |

### Mallees

| | No | ID |
|---|---|---|
| | | |

### SHRUBS

| | No | ID |
|---|---|---|
| 1 Leucopogon conostephioides subsp. conostephioides | | |
| 1 Petrophile linearis | | |

### SHRUBS

| | No | ID |
|---|---|---|
| spp | | |
| 1 Hibbertia sp. | | |
| 1 Calothamnus sp. | | |
| 1 Banksia sp. | | |
| 1 Grevillea glomerata | X | |

### Bunch Grasses

| | No | ID |
|---|---|---|
| 1 Ehrharta longiflora | X | |
| 1 Schismus barbatus Poa spp. | X | |
| 1 Weed | ✓ | |
| 1 Weed Trachyandra sp. | ✓ | |

### Herbs

| | No | ID |
|---|---|---|
| 1 Mesembryanthemum aequilaterale | | |
| 1 Lomandra maritima | ✓ | |
| 1 Lyginia barbata | ✓ | |
| 1 Conostylis glomerata | | |
| 1 Rumex sp. | ✓ | |
| 1 Trachyandra glaucifolia (Weed) | ✓ | |
| 1 Romulea sp. | | |

### Herbs

| | No | ID |
|---|---|---|
| | | |

### Sedges

| | No | ID |
|---|---|---|
| 1 Isolepis nodosa | | |
| 1 Tetraria octandra | ✓ | |
| 1 Lepidosperma gunnii | ✓ | |
| 1 Juncus pallidus | | |

- SURVEY RECORDING SHEET Please use pencil

(N)

QUADRAT No. RB 02 VEGETATION TYPE

DATE FIRST TRIP 3/2/94 VOLUNTEERS

DATE SECOND TRIP VOLUNTEERS

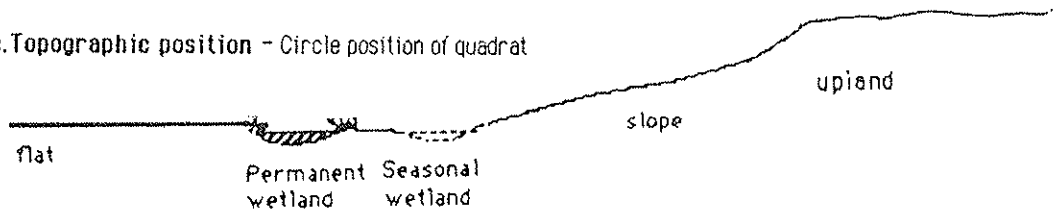
BOTANIST NC, BSK

## 1. LOCATION of the QUADRAT

**a. Mud Map** Draw a sketch of the location of the quadrat the back of this sheet →

**b. Photograph** Photographer's name

**c. Topographic position** - Circle position of quadrat




Keighery and Keighery, 1990
Adapted from Griffin and Keighery, 1989
MOORE RIVER to JURIEN SANDPLAIN
SURVEY. WILDFLOWER SOCIETY of WA

## 2. SITE DATA - Circle the correct response

Slope flat gentle steep Aspect N NE E SE S SW W NW

% Bare ground Drainage well mod poor Wet All year winter/spring

Litter (% cover) Surface soil Sub-surface soil

## 3. VEGETATION STRUCTURE AND COVER Record appropriate cover class

Cover Class - percentage classes: 0% | under 2% | 2-10% | 10-20% | 20-30% | 30-50% | 50-70% | over 70%

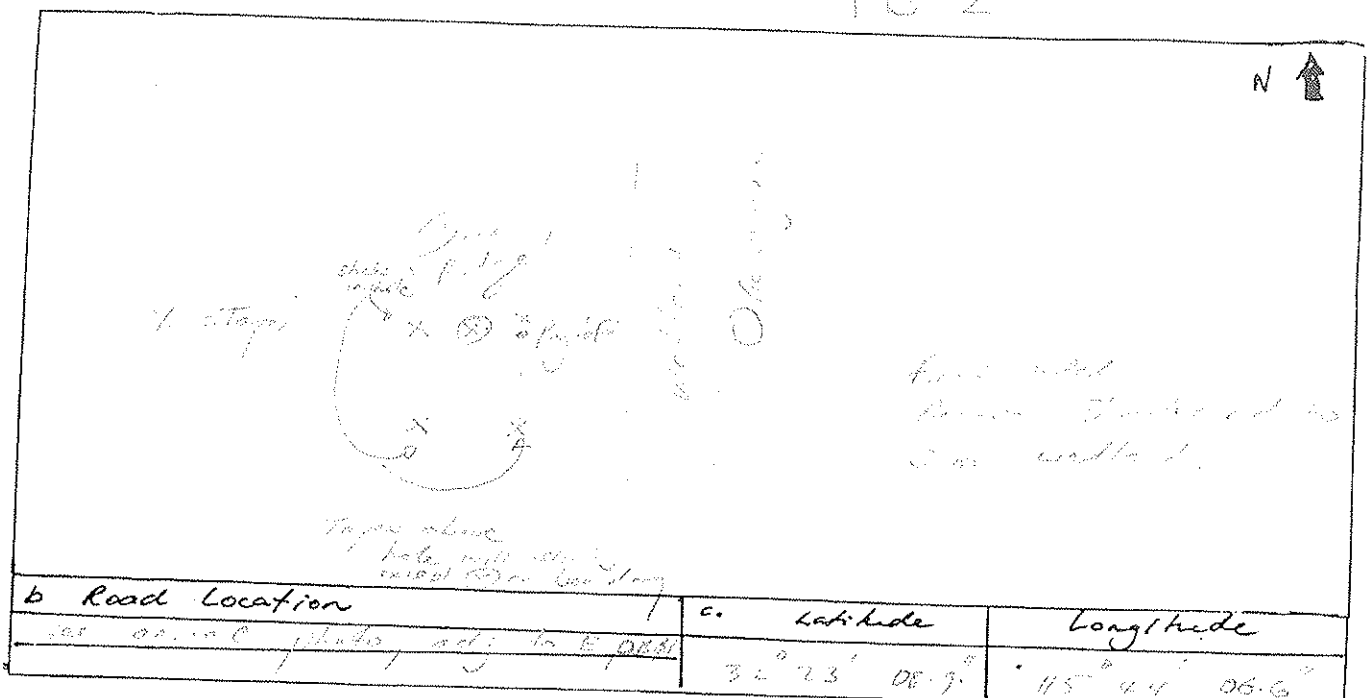
Height (metres)

| LIFE FORM | TREES | MALLEES | | |
|---|---|---|---|---|
| | >15m or 5-15m | under 5m | MALLEE SHRUB less than 8m | MALLEE TREE 8m or more |
| COVER CLASS (%) | >15m<br>5-15m | | | |

| LIFE FORM | SHRUBS | | | | |
|---|---|---|---|---|---|
| | over 2m | 2.0-1.5m | 1.5-1.0m | 1.0m - .5m | under .5m |
| COVER CLASS (%) | | 30-70% | | 10-20% | |

| LIFE FORM | BUNCH GRASSES | HERBS | SEDGES | |
|---|---|---|---|---|
| | under .5m | under .5m (except creepers) | over .5m | under .5m |
| COVER | 30-50% | 10-20% | <2% | |

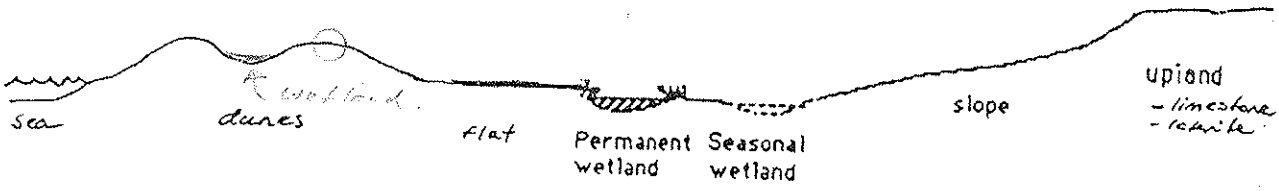
PB-2




| b Road Location | c. Latitude | Longitude |
|---|---|---|
| | 32° 23' 08.7" | 115° 44' 06.6" |

d. Photograph Photographer's name NC Photo No +/- 30m Altitude 5m

e. Topographic position – Circle position of quadrat




2. SITE DATA – Circle the correct response

Slope flat gentle steep

Aspect N NE E SE S SW W NW

Surface soil cream | sand

Sub-surface soil

Drainage well mod poor

Wet All year winter/spring

Litter (% cover) 20%

% Bare ground 10%

4. VEGETATION CONDITION

| | |
|---|---|
| EXCELLANT | |
| VERY GOOD | ✓ |
| GOOD | |
| POOR | |
| VERY POOR | |

Comments

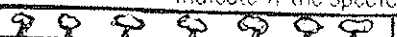
## 4. SPECIES PRESENCE

- **work systematically through the vegetation**, start with the tallest stratum, i.e. trees
- within each stratum try to record the **most common species first** and the most uncommon last.
- as each species is collected **label** it with a numbered tag and use this number on your recording sheet
- indicate if the species is in **flower**

QUADRAT No.
PC D2

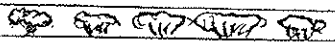
Keighery and Keighery, 1990
Adapted from Griffin and Keighery, 1989
MOORE RIVER to JURIEN SANDPLAIN SURVEY. WILDFLOWER SOCIETY of WA

### Trees



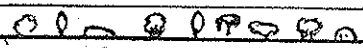
| | No | ID |
|---|---|---|
| | | |

### Mallees



| | No | ID |
|---|---|---|
| | | |

### SHRUBS

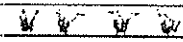


| | No | ID |
|---|---|---|
| Acacia cochlearis | | |
| Acacia lasiocarpa | | |
| Acacia saligna | | |
| Banksia sp6 | | |
| Beyeria lasiocarpa (foliage form) | | |
| Jacksonia "bushfield" | ✓ | |
| Conostylis candicans | Yes | 2 plots |
| Dodonaea aptera | | |
| Hibbertia amplexicaulis | | |
| Hibbertia hypericoides | | |
| Lasiopetalum ovatifolium | | |

### SHRUBS

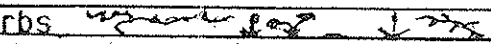
| | No | ID |
|---|---|---|
| 2 plots | | |
| 1 Poa sp. | | |

### Bunch Grasses



| | No | ID |
|---|---|---|
| Stipa blackiana | | |

### Herbs



| | No | ID |
|---|---|---|
| Brachyscome perpusilla | | |
| Conostylis candicans | | |
| Conostylis setigera | | |
| Crassula closiana | ✓ | |
| Crassula glomerata | ✓ | |
| Daucus glochidiatus | | |
| Hypochaeris glabra | | |
| Lomandra micrantha | ✓ | |
| Trachymene pilosa | ✓ | |
| Waitzia acuminata | | |
| Calandrinia corrigioloides | X | |
| Erodium cygnorum | | |
| Carex preissii | | |
| Hibbertia sp. | | |
| Lomandra trichophylla | | |
| Gastrolobium glomeratum | X | |
| Wurmbea dioica | X | |
| Drosera erythrorhiza | | |

### Herbs

| | No | ID |
|---|---|---|
| | | |

### Sedges

| | No | ID |
|---|---|---|
| Isolepis cernua | | |
| Schoenus sp. | | |
| Schoenus sp. | | |

PB-2

- SURVEY RECORDING SHEET Please use pencil

QUADRAT No. _____ VEGETATION TYPE _____

DATE FIRST TRIP _____ VOLUNTEERS _____

DATE SECOND TRIP _____ VOLUNTEERS _____

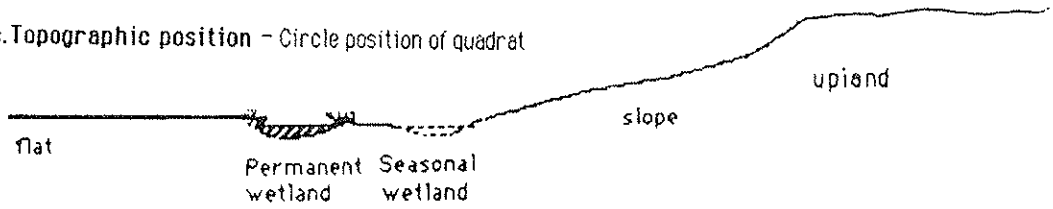
BOTANIST _____

## 1. LOCATION of the QUADRAT

a. **Mud Map** Draw a sketch of the location of the quadrat the back of this sheet →

b. **Photograph** Photographer's name _____

c. **Topographic position** – Circle position of quadrat




Keighery and Keighery, 1990
Adapted from Griffin and Keighery, 1989
MOORE RIVER to JURIEN SANDPLAIN
SURVEY. WILDFLOWER SOCIETY of WA

## 2. SITE DATA – Circle the correct response

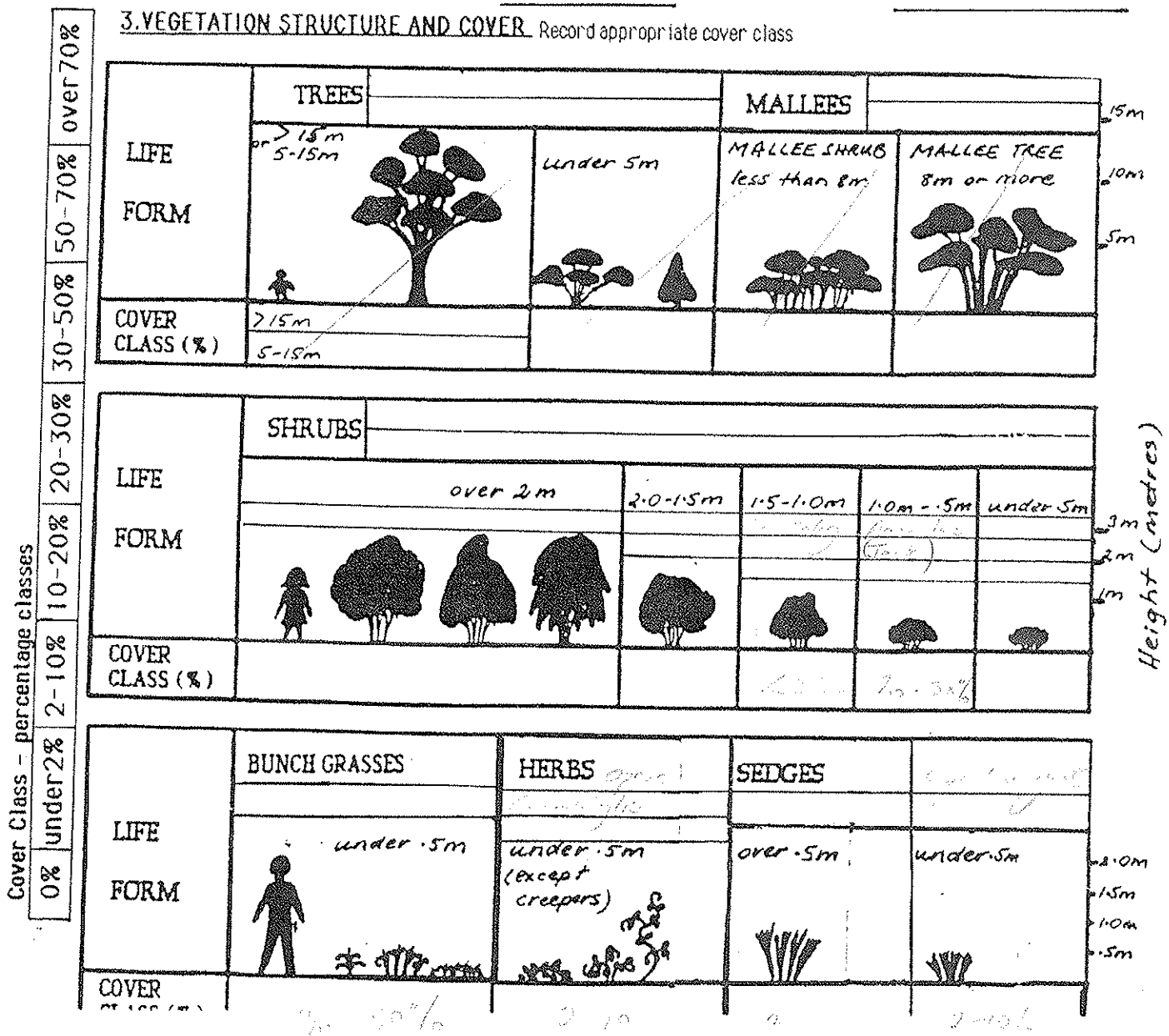
Slope flat gentle steep **Aspect** N NE E SE S SW W NW

% Bare ground____ Drainage well mod poor **Wet** All year winter/spring

Litter (% cover)_____ Surface soil_____ Sub-surface soil _____

## 3. VEGETATION STRUCTURE AND COVER Record appropriate cover class

Cover Class – percentage classes: 0% | under 2% | 2–10% | 10–20% | 20–30% | 30–50% | 50–70% | over 70%



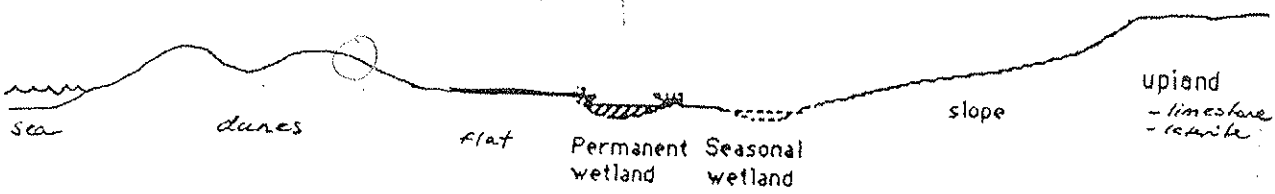
PB-3

N

| b Road Location | c. Latitude | Longitude |
|---|---|---|
| | | |

d. Photograph Photographer's name _____ Photo No _____ Altitude _____

e. Topographic position – Circle position of quadrat




2. SITE DATA – Circle the correct response

Slope flat gentle steep

Aspect N NE E SE S SW W NW

Surface soil _____

Sub-surface soil _____

Drainage well mod poor

Wet All year winter/spring

Litter (% cover) _____

% Bare ground _____

4. VEGETATION CONDITION

| | | Comments |
|---|---|---|
| EXCELLANT | | |
| VERY GOOD | | |
| GOOD | | |
| POOR | | |
| VERY POOR | | |

## 4. SPECIES PRESENCE

- work systematically through the vegetation, start with the tallest stratum, i.e. trees
- within each stratum try to record the **most common species first** and the most uncommon last.
- as each species is collected **label** it with a numbered tag and use this number on your recording sheet
- indicate if the species is in **flower**

QUADRAT No.
PB 03

Keighery and Keighery, 1990
Adapted from Griffin and Keighery, 1989
MOORE RIVER to JURIEN SANDPLAIN
SURVEY. WILDFLOWER SOCIETY of WA

| Trees | No | ID |
|---|---|---|
| | | |

| Mallees | No | ID |
|---|---|---|
| | | |

| SHRUBS | No | ID |
|---|---|---|
| Acacia saligna | | |
| Jack Cucullata | | |
| Ac. lasia | | |
| Ac. cyclops | | |
| Ac. pulchella | | |
| Exocarpos sparsa | X | |
| Hyalosperma sp. | | |
| Olearia axillaris | VSP | |
| Grevillea hakeoides = cirsiodes | X | |
| Calothamnus sp. | | |

| SHRUBS | No | ID |
|---|---|---|
| 23/10 = PB 05 | | |
| Poss. prob. Conostylis sp. | | |
| Dampiera lavandulacea | | |
| Trachymene sp. | | |
| Verticordia sp. | | |
| Hibbertia sp. SMART | | |
| Stirlingia latifolia | | |
| 24/10 | | |

| Bunch Grasses | No | ID |
|---|---|---|
| Stipa flavescens | X | |

| Herbs | No | ID |
|---|---|---|
| Kennedia prost. | | |
| Gompholobium sp. | | |
| Acacia sp. | | |
| Stylidium sp. | VSP | |
| Lyginia barbata | | |
| Conostylis glomerata | | |
| Patersonia sp. | | |
| Hibbertia psilocalyx | | |
| Pultenaea sp. | | |
| Dichopogon capillipes | X | |

| Herbs | No | ID |
|---|---|---|
| 23/10 PB 02 | | |
| Poa sp. | | |
| Brachyscome sp. | | |

| Sedges | No | ID |
|---|---|---|
| Tetraria capillaris | | |
| Lepidosperma sp. | X | |
| Lobocarpus sp. | | |
| ADJ 3/5/93 | | |
| Cyathochaeta avenacea | (V) | |

[illegible]

[illegible]

[illegible]

[illegible]

Note

- [illegible]
  2 specimens seen
- Velvet [illegible] Not seen

Most [illegible] wood
[illegible]
of Burma

- SURVEY RECORDING SHEET Please use pencil

QUADRAT No. PB 04 VEGETATION TYPE Low open Mallee

DATE FIRST TRIP 3/9/92 VOLUNTEERS

DATE SECOND TRIP 5/10/92 VOLUNTEERS

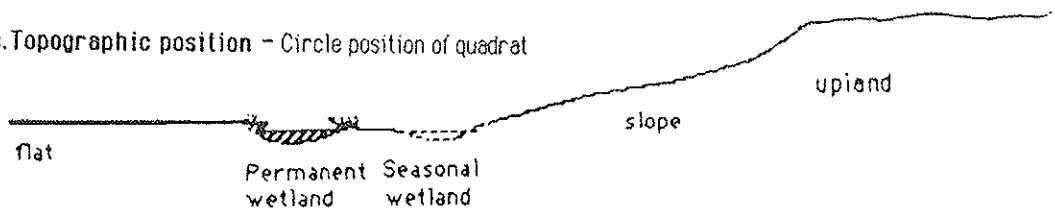
BOTANIST N. Dixon (Scribe)

## 1. LOCATION of the QUADRAT

a. **Mud Map** Draw a sketch of the location of the quadrat the back of this sheet →

b. **Photograph** Photographer's name _____

c. **Topographic position** – Circle position of quadrat




Keighery and Keighery, 1990
Adapted from Griffin and Keighery, 1989
MOORE RIVER to JURIEN SANDPLAIN
SURVEY. WILDFLOWER SOCIETY of WA

## 2. SITE DATA – Circle the correct response

Slope flat gentle steep Aspect N NE E SE S SW W NW

% Bare ground____ Drainage well mod poor Wet All year winter/spring

Litter (% cover)____ Surface soil_____ Sub-surface soil _____

## 3. VEGETATION STRUCTURE AND COVER Record appropriate cover class

Cover Class – percentage classes: 0% | under 2% | 2–10% | 10–20% | 20–30% | 30–50% | 50–70% | over 70%

| | TREES | MALLEES | |
|---|---|---|---|
| LIFE FORM | >15m or 5-15m | under 5m | MALLEE SHRUB less than 8m / MALLEE TREE 8m or more |
| COVER CLASS (%) | >15m<br>5-15m | | |

15m, 10m, 5m

| | SHRUBS | | | | |
|---|---|---|---|---|---|
| LIFE FORM | over 2m | 2.0-1.5m | 1.5-1.0m | 1.0m - .5m | under .5m |
| COVER CLASS (%) | | 20-30 | | 5-10 | |

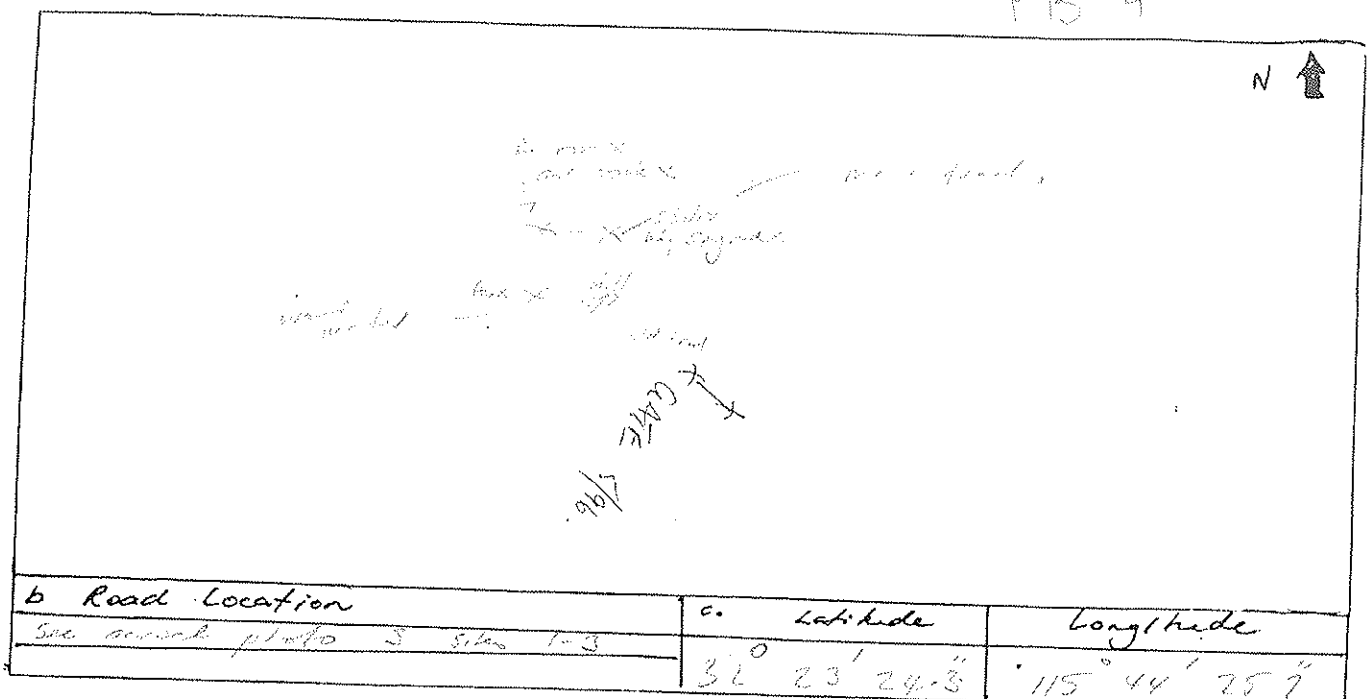
3m, 2m, 1m

Height (metres)

| | BUNCH GRASSES | HERBS | SEDGES | |
|---|---|---|---|---|
| LIFE FORM | 2 types a Poa (sp) | Conostylis sp. | | |
| | under .5m | under .5m (except creepers) | over .5m | under .5m |
| COVER | 10-20% | <2% | 1 | <2% |

2.0m, 1.5m, 1.0m, .5m

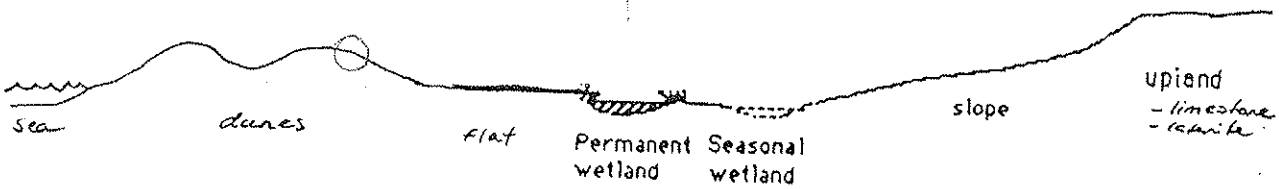
PB-4




| b Road Location | c. Latitude | Longitude |
|---|---|---|
| See accurate photo of Site 1-3 | 31° 23' 24.5" | 115° 44' 25.1" |

d. Photograph Photographer's name NG Photo No +-30m Altitude 5m

e. Topographic position – Circle position of quadrat




2. SITE DATA – Circle the correct response

Slope flat (gentle) steep

Aspect (N) NE E SE S SW W NW

Surface soil Orange | Sand

Sub-surface soil pale orange Sand

Drainage (well) mod poor

Wet All year winter/spring

Litter (% cover) 5%

% Bare ground 30%

4. VEGETATION CONDITION

| | | Comments |
|---|---|---|
| EXCELLANT | | |
| VERY GOOD | ✓ | |
| GOOD | | |
| POOR | | |
| VERY POOR | | |

## 4. SPECIES PRESENCE

- **work systematically through the vegetation**, start with the tallest stratum, i.e. trees
- within each stratum try to record the **most common species first** and the most uncommon last.
- as each species is collected **label** it with a numbered tag and use this number on your recording sheet
- indicate if the species is in **flower**

QUADRAT No.
VB #4

Keighery and Keighery, 1990
Adapted from Griffin and Keighery, 1989
MOORE RIVER to JURIEN SANDPLAIN SURVEY. WILDFLOWER SOCIETY of WA

### Trees

| | No | ID |
|---|---|---|
| | | |

### Mallees

| | No | ID |
|---|---|---|
| | | |

### SHRUBS

| | No | ID |
|---|---|---|
| | | |

### SHRUBS

| | No | ID |
|---|---|---|
| | | |

### Bunch Grasses

| | No | ID |
|---|---|---|
| | | |

### Herbs

| | No | ID |
|---|---|---|
| | | |

### Herbs

| | No | ID |
|---|---|---|
| | | |

### Sedges

| | No | ID |
|---|---|---|
| | | |

- SURVEY RECORDING SHEET **Please use pencil**

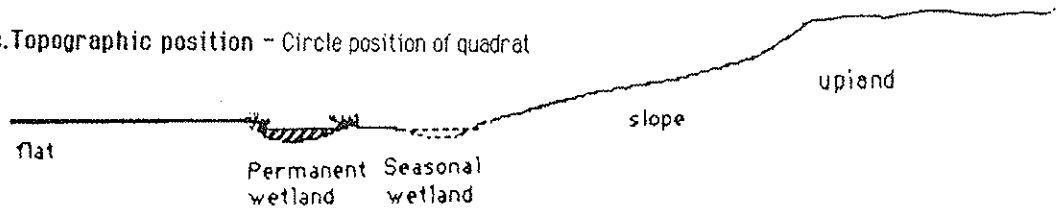
**QUADRAT No.** PB 95 **VEGETATION TYPE** Mallee Shrubland
**DATE FIRST TRIP** 2/9/92 **VOLUNTEERS**
**DATE SECOND TRIP** **VOLUNTEERS**
BOTANIST: MC & CH

## 1. LOCATION of the QUADRAT See over.

**a. Mud Map** Draw a sketch of the location of the quadrat the back of this sheet →

**b. Photograph** Photographer's name

**c. Topographic position** – Circle position of quadrat




Keighery and Keighery, 1990
Adapted from Griffin and Keighery, 1989
MOORE RIVER to JURIEN SANDPLAIN SURVEY. WILDFLOWER SOCIETY of WA

## 2. SITE DATA – Circle the correct response

**Slope** flat gentle steep **Aspect** N NE E SE S SW W NW

**% Bare ground**____ **Drainage** well mod poor **Wet** All year winter/spring

**Litter** (% cover)____ **Surface soil**____ **Sub-surface soil**____

## 3. VEGETATION STRUCTURE AND COVER. Record appropriate cover class

Cover Class – percentage classes: 0% | under 2% | 2–10% | 10–20% | 20–30% | 30–50% | 50–70% | over 70%

| | TREES | | MALLEES | |
|---|---|---|---|---|
| LIFE FORM | >15m or 5–15m | under 5m | MALLEE SHRUB less than 8m | MALLEE TREE 8m or more |
| COVER CLASS (%) | >15m<br>5–15m | | | |

15m · 10m · 5m

| | SHRUBS | | | | |
|---|---|---|---|---|---|
| LIFE FORM | over 2m | 2.0–1.5m | 1.5–1.0m | 1.0m – .5m | under .5m |
| | | Often multi | | Acac to 3 | |
| | | Spindly | | Mel 0.5m | |
| COVER CLASS (%) | | 30–50% | | 20–30% | |

3m · 2m · 1m

Height (metres)

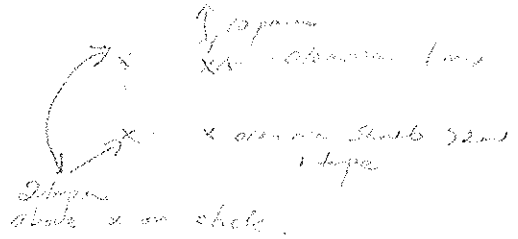
| | BUNCH GRASSES | HERBS | SEDGES | |
|---|---|---|---|---|
| | 09/10 | | | |
| LIFE FORM | Poa & Stipas under .5m | Low annuals under .5m (except creepers) | over .5m | under .5m |
| COVER | 2–10% | 10–20% | | |

2.0m · 1.5m · 1.0m · .5m

PB-5

N

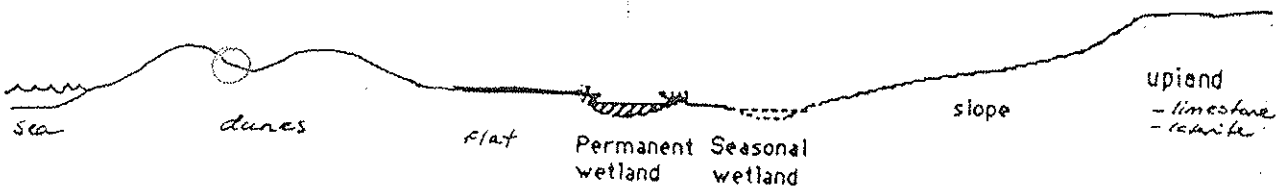
No PEGS



| b Road Location | c. Latitude | Longitude |
|---|---|---|
| Site central photo, Start transect as 1–3 direct 494 m to Site 3 (bearing 55°) | 32° 03' 17.2" | 115° 03' 53.3" |

d. Photograph Photographer's name NC Photograph No ± 30m Altitude 5m

e. Topographic position – Circle position of quadrat




2. SITE DATA – Circle the correct response

Slope flat gentle steep

Aspect N NE E SE S SW W NW

Surface soil grey sand

Sub-surface soil grey sand – cream sand

Drainage well mod poor

Wet All year winter/spring

Litter (% cover) 10-20%

% Bare ground 2%

4. VEGETATION CONDITION

| | |
|---|---|
| EXCELLANT | |
| VERY GOOD | ✓ |
| GOOD | |
| POOR | |
| VERY POOR | |

Comments

Mixed in bush but patchy and weedy in parts. Some patches have no plants visible but cover good.

## 4. SPECIES PRESENCE

- **work systematically through the vegetation**, start with the tallest stratum, i.e. trees
- within each stratum try to record the **most common species first** and the most uncommon last.
- as each species is collected **label** it with a numbered tag and use this number on your recording sheet
- indicate if the species is in **flower**

QUADRAT No.
MB05

Keighery and Keighery, 1990
Adapted from Griffin and Keighery, 1989
MOORE RIVER to JURIEN SANDPLAIN
SURVEY. WILDFLOWER SOCIETY of WA

### Trees

| | No | ID |
|---|---|---|
| | | |

### Mallees

| | No | ID |
|---|---|---|
| | | |

### SHRUBS

| | No | ID |
|---|---|---|
| Dean anill | | |
| Spyrid obt | | |
| Hac sulcata | | |
| Hac. [illegible] | | |
| Melal acerosa | | |
| Grevillea [illegible] | X | |
| Leucop. parvi | | |
| Rhamnodendron bace | | |
| Velleia [illegible] | | |
| Acrotriche prisc | | |

### SHRUBS

| | No | ID |
|---|---|---|
| Lasio | | |
| Pax hookeri | | |
| Conostylis aculeata | | |
| Dryandra sessilis | | |
| Hibbertia [illegible] | | |
| Persoonia [illegible] | | |
| Hibbertia [illegible] | | |
| Conostylis [illegible] | | |

### Bunch Grasses

| | | |
|---|---|---|
| Cyno pumilus = Poa | | |
| Stipa flavescens = Veld | | |

### Herbs

| | | |
|---|---|---|
| Rhodanthe [illegible] | ✓ | VP |
| Rhodanthe [illegible] | ✓ | |
| Lomandra maritima | | |
| Hydrocotyle = 02 | | |
| Senecio lautus [illegible] | ✓ | |
| Daucus | | |
| Podolepis [illegible] | | |
| Craspedia glomerata | | |
| Trachymene pilosa | | |
| Thysanotus [illegible] | ✓ | |
| Hypo [illegible] | | |

### Herbs

| | No | ID |
|---|---|---|
| 29/10 | | |
| Billardiera [illegible] | X | |
| Dampiera [illegible] | X | |
| [illegible] | X | |
| Appium [illegible] | | |

### Sedges

| | | |
|---|---|---|
| Lepid [illegible] | | |

- SURVEY RECORDING SHEET **Please use pencil**

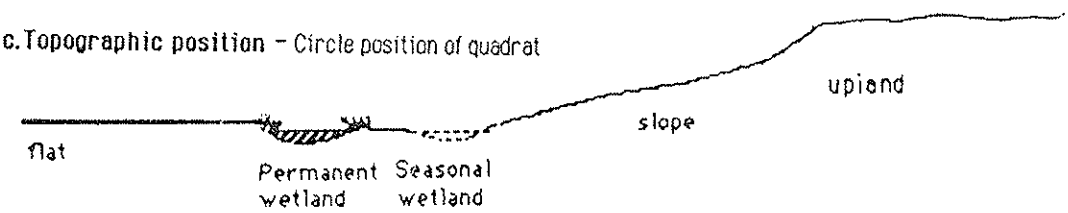
**QUADRAT No.** PB 06 **VEGETATION TYPE** South east Wetland
**DATE FIRST TRIP** 3/9/92 **VOLUNTEERS** [illegible]
**DATE SECOND TRIP** [illegible] **VOLUNTEERS** [illegible]
BOTANIST

## 1. LOCATION of the QUADRAT

**a. Mud Map** Draw a sketch of the location of the quadrat the back of this sheet →

**b. Photograph** Photographer's name

**c. Topographic position** – Circle position of quadrat




Keighery and Keighery, 1990
Adapted from Griffin and Keighery, 1989
MOORE RIVER to JURIEN SANDPLAIN
SURVEY. WILDFLOWER SOCIETY of WA

## 2. SITE DATA – Circle the correct response

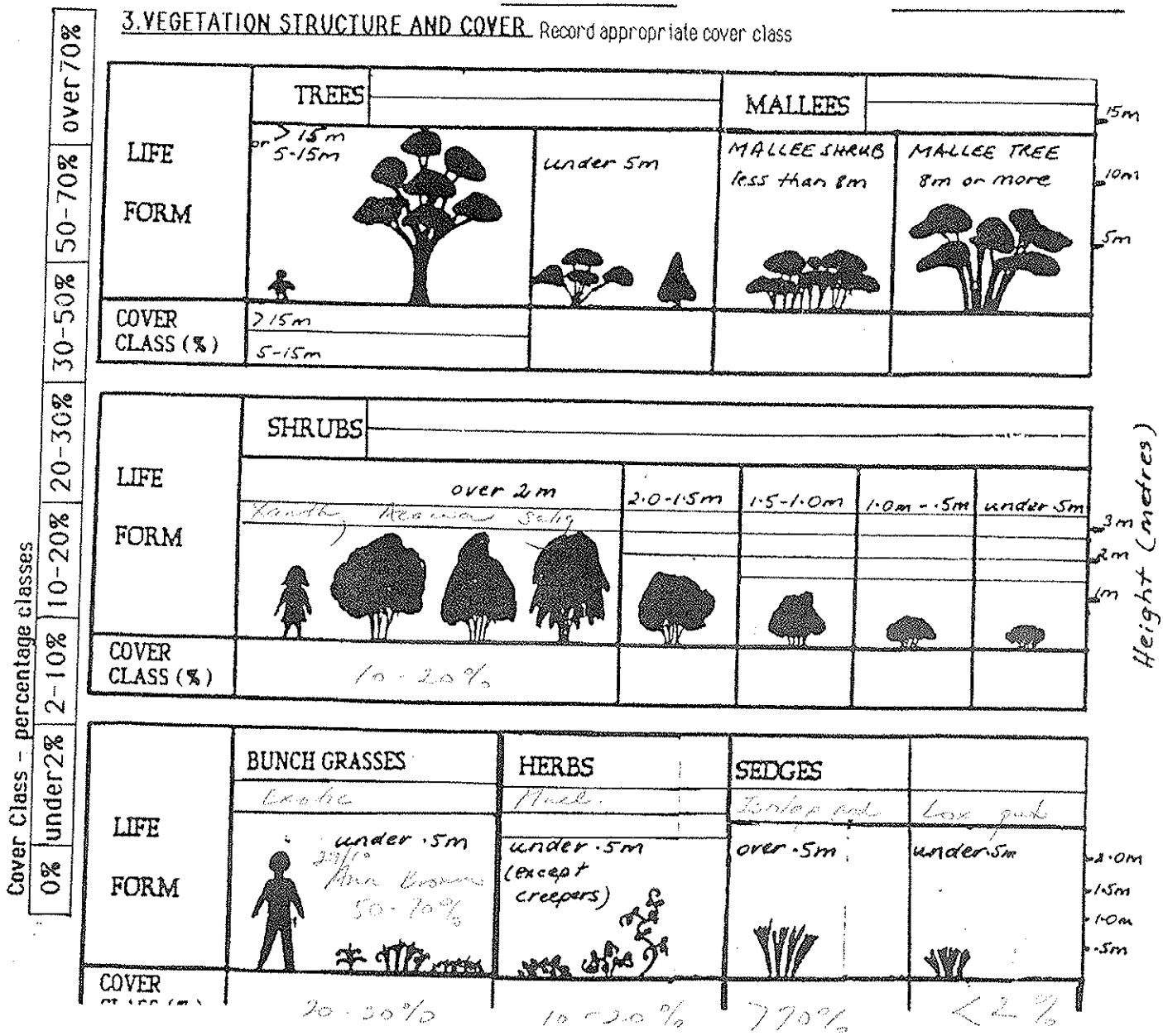
Slope flat gentle steep Aspect N NE E SE S SW W NW

% Bare ground____ Drainage well mod poor Wet All year winter/spring

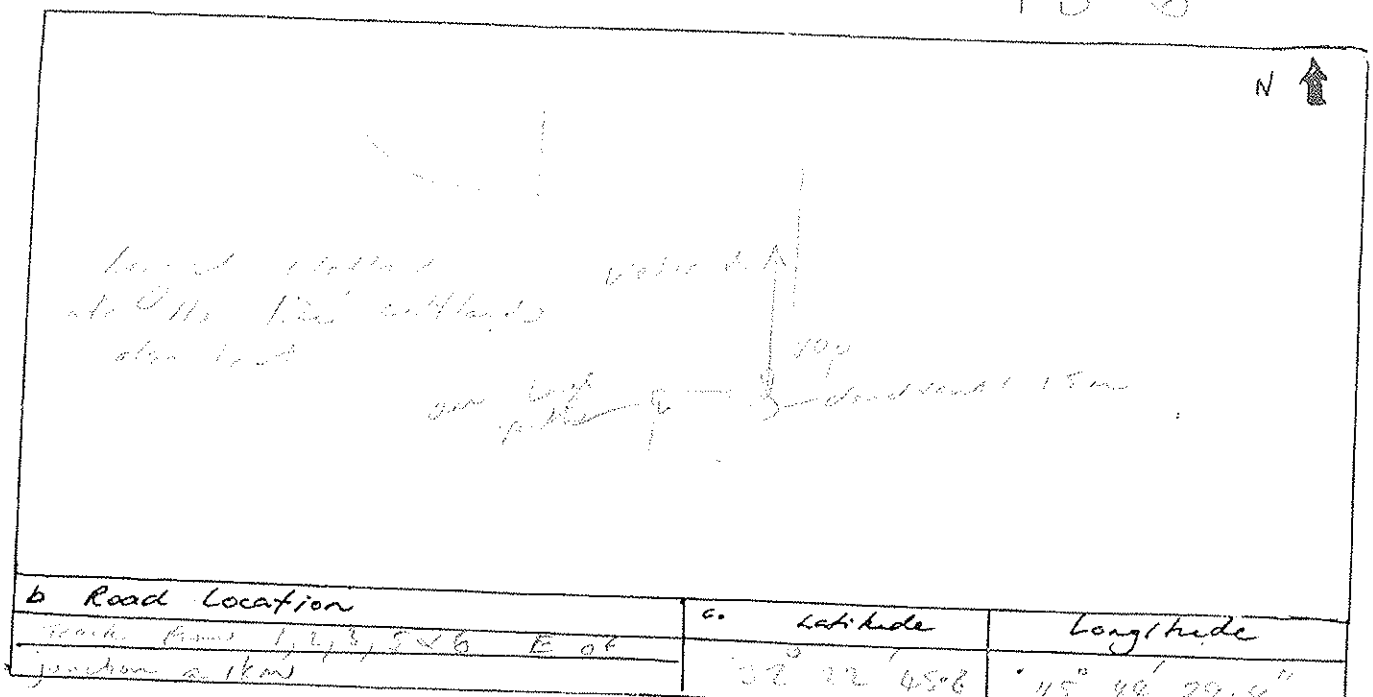
Litter (% cover)____ Surface soil____ Sub-surface soil____

## 3. VEGETATION STRUCTURE AND COVER Record appropriate cover class

Cover Class – percentage classes: 0% | under 2% | 2-10% | 10-20% | 20-30% | 30-50% | 50-70% | over 70%



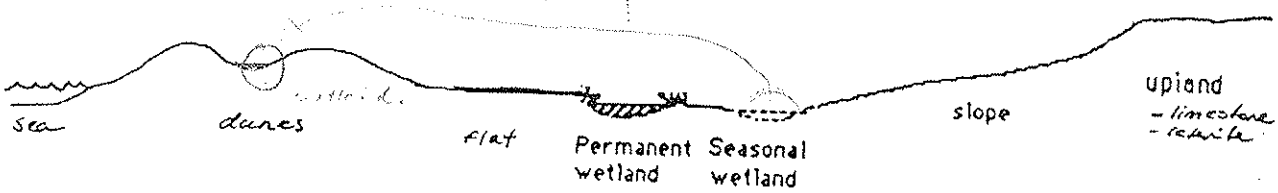
PB-6




| b Road Location | c. Latitude | Longitude |
|---|---|---|
| Beach Access 1, 2, 3, 5 & 6 E of junction at Ikm | 32° 32' 45.6" | 115° 44' 29.9" |

d. Photograph Photographer's name _____ Photo No 1 30m Altitude 5m

e. Topographic position – Circle position of quadrat




2. SITE DATA – Circle the correct response

Slope (flat) gentle steep

Aspect N NE E SE S SW W NW

Surface soil dunes / rock clayey sand

Sub-surface soil _____

Drainage well mod (poor)

Wet All year (winter/spring)

Litter (% cover) 20% (most leaves only dead)

% Bare ground 0%

4. VEGETATION CONDITION

| | | Comments |
|---|---|---|
| EXCELLANT | | Grass weeds (annual) |
| VERY GOOD | | |
| GOOD | ✓ | |
| POOR | | |
| VERY POOR | | |

## 1. SPECIES PRESENCE

- **work systematically through the vegetation**, start with the tallest stratum, i.e. trees
- within each stratum try to record the **most common species first** and the most uncommon last.
- as each species is collected **label** it with a numbered tag and use this number on your recording sheet
- indicate if the species is in **flower**

QUADRAT No.
PC P6

Keighery and Keighery, 1990
Adapted from Griffin and Keighery, 1989
MOORE RIVER to JURIEN SANDPLAIN SURVEY. WILDFLOWER SOCIETY of WA

### Trees

| | No | ID |
|---|---|---|
| | | |

### Mallees

| | No | ID |
|---|---|---|
| | | |

### SHRUBS

| | No | ID |
|---|---|---|
| Acacia [illegible] | | |
| [illegible] | | |
| Logania [illegible] | | |
| Leptospermum [illegible] | | |
| Hakea [illegible] | | |

### SHRUBS

| | No | ID |
|---|---|---|
| Dryandra | | |
| [illegible] | | |
| * Orthrosanthus laxus | X | |
| * Lasiopetalum [illegible] | | |
| Conostylis [illegible] | | |
| Lechenaultia [illegible] | | |
| ~~Conostylis~~ Conostylis glauca | X | PC |
| ~~Conostylis~~ | | |
| Conostylis stylidioides | VSP | X |
| Stackhousia pubescens | ✓ | |
| | | |
| Tetratheca ciliata | X | |
| * Tetratheca [illegible] | | |

### Bunch Grasses

| | No | ID |
|---|---|---|
| Ehrharta calycina | X | |
| Poa [illegible] | VP | VP |
| Spyridium [illegible] | X | |
| Grass | ✓ | |

### Herbs

| | No | ID |
|---|---|---|
| Dampiera [illegible] | ✓ | |
| * Trachymene [illegible] | | |
| Lechenaultia [illegible] | | |
| * Goodenia [illegible] | | |
| Hibbertia [illegible] | | |
| Velleia [illegible] | | |
| * Pentaschistis [illegible] | | |
| * Briza [illegible] | | |
| Podotheca [illegible] | | |
| * Tolpis [illegible] | | |
| Lobelia [illegible] | | |
| Pelargonium [illegible] | X | |
| * Carrichtera [illegible] | ✓ | |
| Daucus glochidiatus | | |

### Herbs

| | No | ID |
|---|---|---|
| | | |
| PDT | | |
| ~~Stackhousia~~ [illegible] | | |

### Sedges

| | No | ID |
|---|---|---|
| Lepidosperma [illegible] | X | |
| Mesomelaena [illegible] | | |
| Schoenus nodosus | | |

Block to be mapped. LCD.

PB

PB

## M106 Port Kennedy

Bulletins 281 (Westport Project), 398 (Port Ken Rec centre), 734 (changes to 398 boundaries).

Friends  Advocate  Management

Other Names:

Specific Study/studies  Miscellaneous studies

Flora

Vegetation Map  1  2  3

Flora list  1  2  3  4

Significant Taxa  done / suitable / doubtful

Fauna

Mammals  1  2
Birds  1  2  RAOU
Reptiles and Amphibia  1  2
Invertebrates  1  2

Vegetation Condition  Map  Sites  Comment

Disturbance Factors  Comment  Management

Swan Coastal Plain Floristic Survey

AHC: National Estate - Listed / Interim / Nominated / Notified  NT (WA): Heritage Classification

| Notes |
| --- |
| |
| |
| |
| |

| **M106 Port Kennedy**<br>Bulletins 281 (Westport Project), 398 (Port Ken Rec centre), 734 (changes to 398 boundaries). | | |
|---|---|---|
| M106.1 Regional park recommendations be applied to this area. | Unresolved Issues | Proposed to be a regional park in Metroplan (December 1990). |
| M106.2 DPUD consider reserving those portions not already reserved for Parks and Recreation under Metropolitan Region Scheme. | Unresolved Issues | Portion of the area is proposed to be developed as a tourist resort, with most of the area to be set for conservation.<br><br>Port Kennedy Land Conservation District Committee, Friends of Port Kennedy, Conservation Council, Wetlands Conservation Society and Waterbird Conservation Group have an interest in this area. |

SHEET 1: System 6 - REPORT Information Search  Date 13/5/94 BJK

Please circle the appropriate response or respond in the space provided.

Area M/06 Name Port Kennedy - Beecher Point
91, 46 Naval Base; Swanbourne

Title The Flora of Three Coastal Bushland Areas (System 6 Areas M46, M91 and M/06). PART IX

(Published) / Unpublished  Date June 1993

Author/s G.J. Keighery & B.J. Keighery

Location of Publication CALM (Woodvale), EPA

Purpose (why was the report prepared?) Flora Survey

Government CALM, Heritage Commission

Corporate

Community Group Wildflower Society

Management Plan

Soils

Units  mapped  (described)  (referenced)

Landscape

Features  (described)  (referenced)

Flora

Vegetation Map

Units  Site based (no)

Mapped

Veg Units  Comparable Heddle *et al*  Compared Heddle *et al*  Unit not mapped by Heddle *et al*

Flora list comparison between the 3 areas

Timing  %completion 90%  (Significant Taxa)

2yrs  (Trees)  (Shrubs)  (Herbs)  (Sedges)  (Weeds)  DRF  CALM Priority  Other

Fauna

Timing  %completion  Significant Taxa

Mammals  Birds  Sched1  Sched2  Other

Reptiles  Invertebrates

Vegatation Condition general description

Site based  Mapped  Units Trudgen

Disturbance Factors

Phytophthora  observed  Other  incidental

tested  itemised

Notes

SHEET 2: System 6 - VERBAL Information Search  Date 5/94

| | | | | |
|---|---|---|---|---|
| Area M/06 Name Port Kennedy | | | | |
| Source Swan Coastal Plain Floristic Survey (Mangamma) | | | | |
| **Purpose** (why was the study done?) | | | | |
| Government | | | | |
| Corporate | | | | |
| Community Group | | | | |
| Management Plan | | | | |
| Publication Planned | Yes | No | Date | |
| Planned Location | | | | |

| | | |
|---|---|---|
| Soils | | |
| Units | described | referenced |

| | | |
|---|---|---|
| Landscape | | |
| Features | described | referenced |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Flora** | | | | | | |
| **Vegetation Map** | | | | | | |
| Units | | | | Site based (no) (9) | 10x10 | |
| Mapped | | | | | | |
| Veg Units | Comparable Heddle *et al* | | Compared Heddle *et al* | Unit not mapped by Heddle et *al* | | |
| **Flora list** | | | | | | |
| Timing | %completion | | | | Significant Taxa | |
| | Trees | Shrubs Herbs | Sedges | Weeds | DRF | CALM Priority Other |

| | | | |
|---|---|---|---|
| **Fauna** | | | |
| Timing | %completion | | Significant Taxa |
| | Mammals | Birds | Sched1 Sched2 Other |
| | Reptiles | Invertebrates | |

| | | | | |
|---|---|---|---|---|
| **Vegetation Condition** | | | | |
| Site based | Mapped | Units | | |
| | | | | |
| Disturbance Factors | | | | |
| Phytophthora | observed | | Other | Incidental |
| | tested | | | Itemised |

| |
|---|
| Notes |
| |
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| |

SHEET 1: System 6 - REPORT Information Search Date 30/5/94

Please circle the appropriate response or respond in the space provided.

Area M106 Name Port Kennedy

Title A Report on the Flora and Vegetation of the Port Kennedy Area

Published/(Unpublished) Date May 1988

Author/s

Location of Publication

Purpose (why was the report prepared?)

Government

Corporate Bowman-Bishaw & Associates

Community Group

Management Plan

Soils

Units mapped (described) (referenced)

Landscape

Features (described) (referenced)

Flora

Vegetation Map

Units Aplin Site based (no) at least one each unit

Mapped 13 units mapped

Veg Units (Comparable Heddle *et al*) Compared Heddle *et al.* Unit not mapped by Heddle *et al.*

Flora list

Timing %completion 60% - 70% (Significant Taxa)

Any/ Winter 1988 (Trees) (Shrubs) (Herbs) (Sedges) (Weeds) partial DRF CALM Priority Other

Fauna

Timing %completion Significant Taxa

Mammals Birds Sched1 Sched2 Other

Reptiles Invertebrates

Vegatation Condition

Site based ✓ (Mapped) Units Treagen

Disturbance Factors

Phytophthora observed Other (incidental)

tested (itemised)

Notes

- Vegetation units discuss/cover flora and cover each unit.
- Comments on perception of conservation values

Adjoining Area: 'St Clair' Development for Peet & Co May 1992 (unpublished)

# A Report

# on the Flora

# and Vegetation

# of the Port Kennedy area

Prepared for

Bowman- Bishaw

and Associates

Rokeby Rd., Subiaco

by

Malcolm Trudgen

Consultant Botanist

113 Park Street, Subiaco

May 1988

SHEET 2: System 6 - VERBAL Information Search  Date 5/94

| | | | | |
|---|---|---|---|---|
| Area M106 Name Port Kennedy, Secret Harbour, Golden Bay, Singleton | | | | |
| Source Bob Holze (Naturalist) | | | | |
| | | | | |
| **Purpose** (why was the study done?) | | | | |
| Government | | | | |
| Corporate | | | | |
| Community Group | | | | |
| Management Plan | | | | |
| | | | | |
| Publication Planned | (Yes) | No | Date ? 1994 Sept | |
| Planned Location | | | | |

| | | |
|---|---|---|
| Soils | | |
| Units | described | referenced |

| | | |
|---|---|---|
| Landscape | | |
| Features | described | referenced |

| | | | | | |
|---|---|---|---|---|---|
| **Flora** | | | | | |
| **Vegetation Map** | | | | | |
| Units | | | | Site based (no) | |
| Mapped | | | | | |
| Veg Units | Comparable Heddle *et al* | | Compared Heddle *et al.* | | Unit not mapped by Heddle et *al.* |
| **Flora list** | | | | | |
| Timing | %completion | | | | Significant Taxa |
| | Trees | Shrubs Herbs Sedges | | Weeds | DRF CALM Priority Other |

| | | | | | |
|---|---|---|---|---|---|
| **Fauna** trapping and observations, traplines marked | | | | | |
| Timing | %completion | | | | (Significant Taxa) |
| 18 mths | (Mammals) | 98% | (Birds) | 95% | Sched1 Sched2 Other |
| (every weekend) | (Reptiles) | 90% | Invertebrates | | |

| | | | |
|---|---|---|---|
| **Vegetation Condition** | | | |
| Site based | Mapped | Units | |
| | | | |
| Disturbance Factors | | | |
| Phytophthora | observed | Other | incidental |
| | tested | | itemised |

| Notes | |
|---|---|
| ?6 taxa on List | Dunnart |
| Fox baiting | Black Gloved Wallaby |
| - Cat trapping/baiting | Bandicoot |
| | Children's Python |
| Faunal work at: M53 (area), Ellis Brook, Ellen Brook Bushland, Snake Swamp, Koodoola, Kenwick Wetlands, Whitemans Park | |

M106 PORT KENNEDY PUBLICATIONS DEP Lib 5/93

Port Kennedy region recreation centre, Port Kennedy Joint Venture : report and recommendations of the Environmental Protection Authority. Bull 398, 711.559(941) WES

Port Kennedy regional recreation centre design concept. Western Australia. Metropolitan Region Planning Authority. 711.455(941) WES

Port Kennedy Regional Recreation Centre : environmental review and management programme. Binnie & Partners. 711.559(941.1) BIN

Port Kennedy regional recreation centre: design concept: approved draft, amended. Western Australia. Metropolitan Region Planning Authority. 712.256 WES

Port Kennedy recreation centre design concept, prepared by the Town Planning Department on behalf of the Metropolitan Region Planning Authority. Western Australia. Town Planning Department. 712.256 WES

Compliance and progress report volume 1 : Port Kennedy Regional Recreation Centre stage 1. Bowman Bishaw Gorham [for Fleuris Pty Ltd]. 711.559(941) BOW

Compliance and progress report volume II : sand dune stabilisation and management programme Port Kennedy Regional Recreation Centre. Bowman Bishaw Gorham [for Fleuris Pty Ltd]. 711.559(941) BOW

Compliance and progress report volume III : fire management plan Port Kennedy Regional Recreation Centre. Bowman Bishaw Gorham [for Fleuris Pty Ltd]. 711.559(941) BOW

Change to environmental conditions for regional recreation centre Stage 1 Boundary, Port Kennedy Fleuris Pty Ltd : report and recommendations of the Environmental Protection Authority. Bull 734. 711.559(941) WES

Author: Binnie and Partners Pty. Ltd.
Date: 1988
Title: Port Kennedy Regional Recreation Centre ERMP, Volume I: Summary Report
Source: Unpublished report Binnie and Partners to the E.P.A.

Author: Binnie and Partners Pty. Ltd.
Date: 1988
Title: Port Kennedy Regional Recreation Centre. Environmental Review and Management Programme Volume III: Appendices
Source: Binnie and Partners ERMP

Author: Semeniuk V. Cresswell I.D. Wurm P.A.S.
Date: 1989
Title: The Quindilup Dunes: The regional system, physical framework and vegetation habitats
Source: Journal of the Royal Society of Western Australia 71: 23-47

711.559 (941)

S... ...ate - Floristic Community Type Mapping Information DRAFT ONLY

## AREA INFORMATION

System 6 Area (C or M) or Update Area (Update) M106

| |
|---|
| Conservation Area |
| Nature Reserve |
| Reserve No |
| National Park |
| Reserve No |
| Local Government |
| Reserve No |
| Other |
| Proposed Conservation Areas |
| Local Government |
| Reserve No |
| Other DOLA unvested C20716 Minister for community Welfare - C33837 |

Conservation Area PRIVATE - lots 1092-94

| |
|---|
| Nature Reserve |
| Reserve No |
| National Park |
| Reserve No |
| Local Government |
| Reserve No |
| Other |

## TOTAL AREA

| | |
|---|---|
| Bushland Area | hectares |
| Completely Degraded | |
| | |
| | |

## AREA MAPPED FLORISTIC UNITS

| Units | Site (Condition) Code G PB | Bound | Area (ha) |
|---|---|---|---|
| 19 | Ø1 (3) Ø6 (3) | | |
| | | | |
| 29B | Ø2 (2) Ø3 (2) Ø4 (2) | | |
| | Ø5 (2) | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Boundaries determined by use of

| |
|---|
| aerial photograph Melway Street Directory run 6 5043-49 5/1/91 |
| orthophoto 2033 II SW, III NE Aug 1991 |
| vegetation map |
| soil map |

CONTACT DR N. GIBSON CALM WOODVALE for further information.
Flora list for M106 (extracted from Swan Coastal Plain database, PB sites 1 - 6, 2/1995).

**Department of Environmental Protection System 6 Update: Site Based Flora List M106 Port Kennedy**
(extracted from the CALM Swan Coastal Plain database, 85 taxa, Pb sites 1-6, 2/95)

Aizoaceae
- Carpobrotus virescens

Apiaceae
- Apium annuum
- Daucus glochidiatus
- Hydrocotyle sp. scps
- Trachymene pilosa

Asteraceae
- * Conyza albida
- * Hypochaeris glabra
- Olearia axillaris
- Senecio lautus subsp. dissectifolius
- Senecio lautus subsp. maritimus
- * Sonchus asper
- * Sonchus oleraceus
- Waitzia aurea
- Waitzia citrina

Brassicaceae
- * Heliophila pusilla

Caryophyllaceae
- * Cerastium glomeratum

Chenopodiaceae
- Rhagodia baccata subsp. baccata

Crassulaceae
- * Crassula glomerata

Cyperaceae
- Baumea juncea
- Carex preissii
- Isolepis cernua
- Isolepis nodosa
- Lepidosperma "coastal terete" scps (BJK&NG 231)
- Lepidosperma angustatum
- Schoenus grandiflorus

Dasypogonaceae
- Acanthocarpus preissii
- Lomandra maritima

Epacridaceae
- Leucopogon australis
- Leucopogon parviflorus

Euphorbiaceae
- Phyllanthus calycinus

CONTACT DR N. GIBSON CALM WOODVALE for further information.
Flora list for M106 (extracted from Swan Coastal Plain database, PB sites 1 - 6, 2/1995).

Geraniaceae
* Geranium molle
Geranium retrorsum
* Pelargonium capitatum
Pelargonium littorale

Goodeniaceae
Scaevola anchusifolia

Haemodoraceae
Conostylis aculeata
Conostylis candicans

Iridaceae
* Romulea rosea

Juncaceae
Juncus kraussii

Juncaginaceae
Triglochin trichophorum

Lamiaceae
Hemiandra pungens

Lauraceae
Cassytha flava

Lobeliaceae
Lobelia alata

Loganiaceae
Logania vaginalis

Mimosaceae
Acacia lasiocarpa
Acacia rostellifera
Acacia saligna

Myrtaceae
Melaleuca acerosa

Onagraceae
Epilobium billardierianum

Orchidaceae
Prasophyllum fimbria
Pterostylis barbata
Pterostylis brevisepala ms sthcst

Papilionaceae
Gompholobium tomentosum
Hardenbergia comptoniana
Jacksonia furcellata
Kennedia prostrata
* Trifolium glomeratum

CONTACT DR N. GIBSON CALM WOODVALE for further information.
Flora list for M106 (extracted from Swan Coastal Plain database, PB sites 1 - 6, 2/1995).

Poaceae
* Bromus diandrus
Danthonia occidentalis
Danthonia sp. scps
* Holcus sp. scps
* Lagurus ovatus
* Lolium rigidum
Poa porphyroclados
Poa sp. scps
Sporobolus virginicus
Stipa flavescens

Polygalaceae
Comesperma confertum

Polygonaceae
Muehlenbeckia adpressa
* Rumex crispus

Portulacaceae
Calandrinia corrigioloides
Calandrinia liniflora

Primulaceae
* Anagallis arvensis

Restionaceae
Loxocarya flexuosa
Loxocarya pubescens

Rhamnaceae
Cryptandra mutila
Spyridium globulosum
Trymalium albicans

Rubiaceae
Opercularia vaginata

Santalaceae
Exocarpos sparteus

Scrophulariaceae
* Bellardia trixago
* Dischisma arenarium
* Parentucellia viscosa

Stackhousiaceae
Stackhousia monogyna

Xanthorrhoeaceae
Xanthorrhoea preissii

41

BS377

PB176

# CITY OF ROCKINGHAM

Civic Boulevard, Rockingham
Western Australia

OUR REF: TP11-2-44 PM.mw
YOUR REF:

ENQUIRIES TO: Mr Monks

23rd April 1999

Manager
Environmental Planning Branch
Ministry for Planning
469 Wellington Street
PERTH WA 6000

MINISTRY FOR PLANNING
27 APR 1999
805-2-1-32 PH/2
FILE

Dear Sir

**Re: Submission on the Draft Perth's Bushplan**

I refer to your letter dated the 27th November 1998 inviting comment on the draft Perth's Bushplan. The report and plans were presented to Council at its ordinary Meeting held on the 23rd March 1999, where it was resolved to submit the following comments, which are divided into four sections:-

1. Principles and Recommendations.
2. Comments on specific sites nominated in the City of Rockingham.
3. General Comments.
4. Implementation.

1. PRINCIPLES AND RECOMMENDATIONS

The retention of regionally and locally significant bushland is an important measure that has the support of the City of Rockingham, and the draft Perth Bushplan provides important information and recommendations to achieve this objective.

The methodology used to establish which sites are of regional significance is clear, once the reporting structure of the various volumes of the documents is understood.

Council has attended a number of briefing sessions organised by the Ministry for Planning and WAMA and these sessions have played a very important role in understanding both the implications of the recommendations of Perth Bushplan, and the views of the various parties that are affected by the Report.

SUBMISSION NO. 501

(xiii) Bushplan Site No.367 - Penguin, Seal, Bird and Gull Islands and Shag Rock

These sites are part of the Shoalwater Islands Marine Park and are reserved in the MRS as 'Parks and Recreation'. The sites are subject to a management strategy prepared by CALM which is responsible for protection and ongoing management.

(xiv) Bushplan Site No. [redacted] - Doghill Road Bushland, Baldivis

This site contains significant remnant vegetation and is wholly contained within private ownership. It is appropriate that Council, the Bushplan Co-ordinator and the Ministry for Planning liaise with the landowners on a negotiated planning solution that enables the retention of the significant vegetation whilst catering for the aspirations of the affected landowners.

Council's Rural Land Strategy permits subdivision of lots in the precinct within which these lots are located, to a minimum size of 2ha, however, it is a usual part of any planning process to identify physical features worthy of preservation and this should also occur in this instance.

It should be noted that Council has received copies of submissions from two of the affected landowners. Council supports the need for all the above parties to meet to determine the future development potential of the various landholdings, after taking into account the significant on-site vegetation.

(xv) Bushplan Site No. [redacted] - Port Kennedy

The Port Kennedy area is reserved in the MRS as 'Parks and Recreation' and is an 'A' Class Reserve for Scientific Purposes. The site is also part of the Rockingham Lakes Regional Park, for which CALM is currently preparing a Management Plan.

(xvi) Bushplan Site No. [redacted] - Anstey Swamp, Karnup

Anstey Swamp is currently reserved 'Parks and Recreation' in the MRS. The swamp is also an EPP and Conservation status sumpland and is appropriately nominated as a Bushplan site.

(xvii) Bushplan Site No. [redacted] - Folly Pool, Baldivis

Folly Pool is vested with the Water Corporation and as such, management responsibilities should primarily rest with this authority, in consultation with other relevant authorities, including the City. The site is a nominated EPP and Resource Enhancement status sumpland.

**V. & C. SEMENIUK RESEARCH GROUP**

*RESEARCH AND EDUCATIONAL CONSULTANTS IN ENVIRONMENTAL AND NATURAL SCIENCES*

PRINCIPAL POSTAL ADDRESS:
21 GLENMERE ROAD
WARWICK 6024
TELEPHONE (09) 447 3708

SUBSIDIARY ADDRESS:
123 FITZGERALD STREET
WEST PERTH 6005

12th July 2000



Mr G Whisson
Dept Environmental Protection
Allendale Square
St Georges Tce
Perth
WA. 6000

**RE: PROTECTION OF IMPORTANT WETLANDS AND BEACHRIDGE DUNES, PORT KENNEDY LOT 17.**

Dear Mr Whisson

I write to you in response to a request from Mrs C Edwardes MLA in a letter received 20th June 2000. In this letter Mrs Edwardes requested the following information regarding the wetland and beachridge sites located on Port Kennedy Lot 17, currently under freehold title to Landcorp:

- specific location of the wetlands of particular significance
- information on the site, its significance, and its sensitivities
- the forms of development or changes to the local environment that would threaten their scientific values
- the size of the area that needs to be protected, and
- management requirements to maintain the scientific values of the site.

I herein submit a brief synopsis of the situation, values and processes from current knowledge and understanding, as well as accompanying maps and diagrams.

***Specific location of the wetlands of particular significance***

There are several wetland basins in the swale nearest and parallel to the proposed Bakewell Drve., Port Kennedy. These basins are sumplands and damplands. Three of these wetlands have been the subject of intense scientific research for the period 1991-2000. These specific wetlands are located on Map Sheet 2033 II NW in the Wetland Atlas (Hill et al 1996), and are circled on the enclosed 1:25,000 aerial photograph. They are:

- Wetland 98
- Wetland 101
- Wetland 103

***Information on the site, its significance, and its sensitivities***

Already, much information and significant argument have been put forward regarding the international significance and scientific heritage value of the wetlands in this setting, the time period of the earth's history that they span, and the unusual and variable ecological relationships which occur between sediments, hydrology and vegetation response (Rockingham Report to AHC 1991, correspondence to DEP 1989-95, testimony to Hansard Committee 1992, presentation to Federal Minister for Conservation, presentation to WA Parliament 1992, SW Environmental audit to Ministry for Planning 1993, correspondence to Conservation Council of WA 1991-94, presentation and correspondence to Rockingham City Councillors 1991-4, etc.). Although it is not the intention of this letter to repeat such arguments, a brief summary of points is presented:

1. The Becher Cuspate Foreland and its beachridges contain part of the Holocene record of the changing coastline of this region for the.period 7,000 years BP to the present. The Becher Cuspate Foreland is the largest sedimentary deposit of coastal deposits in the southern part of Western Australia, and as such contains the best archive of Holocene history in the southern Indian Ocean. Information from the beachridge sediments provides an understanding of past climates and sealevel history, and allows the impacts of future climatic and sea level changes to be predicted. In this context, wetlands developed on the Cuspate Foreland are part of this unique setting.

2. Wetlands in the inter-ridge depressions of the Holocene Quindalup Dunes geomorphic unit are rare on the Swan Coastal Plain, and only occur in the Becher Cuspate Foreland.

3. Wetland development on the Swan Coastal Plain generally commenced approximately 10,000-7,000 yrs BP, as watertables rose with rising sealevels into an undulating dune terrain. At that time, the Becher Cuspate Foreland was not yet in existance. Once the beachreidge plain began to form, wetlands also began to develop. Wetland development on the Becher Cuspate Foreland commenced 5,000 years BP to the present. Pollen records which are recent and continuous are contained in the sediments. Pollen records are crucial for unravelling the past climatic record and predicting future climatic trends.

4. Wetlands on the Becher Cuspate Foreland exhibit a wide range as well as unusual vegetation communities for the Quindalup Dunes. There are 11 wetland vegetation types, all related to the unique carbonate and quartz sand nature of the Quindalup Dunes.

5. Sedimentary fill *in* the wetlands of the Becher Cuspate Foreland contain carbonate muds, as well as peat. Carbonate muds are commonly associated with shallow seas, marine systems, lagoons and saline lakes. Around the world, humic sands are the typical wetland sediments in this setting.

The features documented above and the unique and undisturbed setting of the Becher Suite wetlands makes them internationally scientifically unique and valuable.

The wetlands which are the focus of this letter should be viewed in the context of the information provided above.

The objective of this letter is to provide specific additional information on the wetlands of Port Kennedy Lot 17.

*Specific information on wetlands 98, 101, 103*

1. **Most importantly, wetland 98, one of the three wetlands in the linear swale, is the oldest of the Becher Suite wetlands dated so far.**

2. **Each of the wetlands adjacent to each other within the same linear swale began their history at different times, and as such indicate differing histories in the Holocene**

3. **Wetlands 98, 101, and 103 contain unequivocal evidence of climatic change within the last four and a half thousand years.**

4. **The three wetland basins contain clear evidence of wetland subsidence, wetland sediment cut-and-fill, dissolution, alternating with sedimentary filling - which is not observable in the younger wetlands of the Scientific Park. This is a feature, not documented elsewhere, globally, and one which will become important nationally and globally in the story of wetland evolution.**

5. **The vegetation in each of the wetlands is completely dissimilar, and illustrates the subltle effects of the variation of sedimentary fill, hydroperiod evolution, geochemical evolution, and the resulting hydrochemical evolution of the wetland.**

6. **The small scale hydrological mechanisms are different in each wetland, and different to the younger wetlands within the Scientific Park.**

These points are amplified below.

As noted above, the three wetland basins, although in the same swale and in close proximity are different ages (4,350 yrs BP, 4,100 yrs BP, 2,900 yrs BP). Wetland 98 is the oldest of wetland fills in the Becher Suite wetlands dated so far. Therefore it contains the most complete record of the Holocene time period for the Becher Suite of wetlands. In addition, the occurrence of wetlands so close, and yet, of different ages, is crucial information in unravelling the model of wetland evolution in the Becher Suite.

The stratigraphic logs in the three wetlands reveal carbonate mud deposits overlain by peaty/humic sediments. Carbonate muds are known to be precipitated in semi-arid to arid conditions, during times of inundation. In contrast, peat and humic material are products of humid climatic conditions. The presence of these two types of sediment in the same basin are evidence for climatic change.

The three wetlands contain the most clear and convincing evidence for wetland formation resulting from basin subsidence due to carbonate dissolution. This is a new discovery in wetland science, and will have global importance in the understanding of wetland evolutionary processes.

The three basins exhibit different vegetation associations even though they are in close proximity (*Baumea articulata* sedgeland, *Melaleuca teretifolia* closed heath, and *Juncus kraussii* sedgeland). Understanding plant distribution in wetlands has been a major, and as yet unresolved quest, and the example afforded in the Becher area is a particularly interesting, important and challenging occurrence, in that within an inherently complex soil system, it provides information and insights into the effect of soils, soil evolution, geochemistry, hydrochemistry, and the hydroperiod in defining the range and tolerance limits for wetland vegetation.

Although the major recharge and discharge mechanisms of all the Becher Suite wetlands are similar, the three basins exhibit different small scale hydrological mechanisms. For example, wetland 98 exhibits a sharp vertical cliffed contact between wetland and beachridge sediments, wetland 101 exhibits onlapping of wetland sediments by beachridge sediments, and wetland 103 exhibits interfingering of wetland and beachridge sediments. There is evidence that these variable contacts affect water movement and water availability within the wetlands. This evidence is crucial to understanding how the Becher Suite wetlands are maintained, and may be important in the preservation of other wetlands on the Swan Coastal Plain.

The significance of the points raised above is noted in the Table below. Levels of significance are provided by applying criteria from the Ramsar Convention and the Water Resources Council (1988) for International Significance, criteria from Australian Heritage Commsission and the Water Resources Council (1988) for National Significance, and the Water Resources Council (1988) for State-wide to Regional Significance.

| **Feature** | **Implications** | **Significance** |
|---|---|---|
| Wetland 98 is the oldest of the Becher Suite wetlands | contains the oldest sequence of sediment fill in the Becher Suite, and given that it contains the complexities outlined above, this will be the most important archive | Nationally to Regionally Significant |

| | | |
|---|---|---|
| Wetlands adjacent to each other within the same linear swale began their history at different times, | indicate differing histories in the Holocene | Nationally to Regionally Significant |
| Wetlands 98, 101, and 103 contain unequivocal evidence of climatic change within the last four and a half thousand years. | contains the best achive of Holocene history in wetlands | Nationally to Regionally Significant |
| There is evidence of wetland subsidence, sediment cut-and-fill, dissolution, alternating with sedimentary filling | a feature, not documented elsewhere, globally, and one which will become important nationally and globally in the story of wetland evolution | Globally Significant |
| The vegetation in each of the wetlands is completely dissimilar | illustrates the subltle effects of the variation of sedimentary fill, hydroperiod evolution, geochemical evolution, and the resulting hydrochemical evolution of wetlands | State-wide Significance |
| The small scale hydrological mechanisms are different in each wetland, and different to the younger wetlands within the Scientific Park. | in combination with geochemical variation noted above, this illustrates the subltle effects of the variation of sedimentary fill, hydroperiod evolution, geochemical evolution, and the resulting hydrochemical evolution of wetlands | State-wide Significance |

***The forms of development or changes to the local environment that would threaten their scientific values***

Change to process alters product. The forms of development detrimental to the scientific values of the wetlands are those which would alter the geomorphology, the hydrology and the sedimentology of the wetlands.

Geomorphology

The geomorphology would be altered if human impact on the wetland were to intensify, or if the wetland basin, slopes, depth, or surrounds to the wetland were flattened, infilled, dissected or in any way, modified.

Hydrology

The hydrology would be altered if any of the following conditions were to change.

- the recharge mechanisms are altered
- the water quality is altered
- the period of water availability is altered
- the water volumes are altered

The wetlands are currently recharged by groundwater rise as a result of rain infltration. If surface runoff were to increase, sheet wash deposition is likely. If drainage is directed into the wetland, the hydroperiod will be altered. Groundwater rise is relatively slow and the balance between peat formation, continued dissolution of the carbonate grains and preservation of the carbonate muds is dependent upon the groundwater and the surface soil waters being separated for some specific length of time.

The wetlands are products of freshwater dominated conditions. Salts, nutrients, heavy metals are either very low or absent. Input of contaminants through regional groundwater flow will increase the toxicity of the wet ecosystems. As flow through of groundwater in these wetlands is very slow due to low hyraulic gradients, they are virtually closed systems. Therefore whatever contaminants enter the wetlands are likely to be permanent.

Changes to the length of time that water is available to plants and macro and soil fauna would alter the vegetation assemblages. There is much evidence to support this finding (Armstrong 1975, Breen et al 1988, Froend et al 1993). Although plants are tolerant to a range of water levels and inundation frequency, competition from other coastal dune species and invasive species is intense. The vegetation is unaltered largely because of the density of cover within the wetlands. Stress from altered water levels and hydroperiod, lowers this density through decreased productivity, and in many cases, death. As these plants propagate through vegetative reproduction, introduced seed banks of other species will be very competitive and difficult to remove.

Water volume changes will probably have the least impact in the short term as the wetland cycle naturally incorporates these fluctuations.

Sedimentology

In the long term, water volume changes will probably have a more serious impact by altering the chemical and sedimentological/hydrological interactions through changes to oxidation-reduction processes and effects on the carbonate equilibrium. The groundwaters are slightly alkaline which preserves the carbonate mud, but an influx of rainwater, even if uncontaminated, would alter the pH of the soil waters and probably initiate rapid changes to the sediment composition.

***The size of the area that needs to be protected.***

Ideally, the size of the area to be protected would be that which includes all the wetland basins in this swale (98, 101, 103, 104, 113, 114, 115, 116, 117), and this is

labelled in the diagram called Option 1. The area includes adjacent beachridges and swales west and east of the wetlands. This area is approximately 21 ha.

Option 2 includes only the wetlands which have been the focus of this letter, i.e.,98, 101, 103. The area is highlighted in the diagram labelled Option 2. Again, adjoining beachridges and swales are included. This area is approximately 11.4 ha.

***Management requirements to maintain the scientific values of the site***

The major management requirement is to preserve the existing setting and processes which are occurring in the wetlands. Another way of stating this is to preserve the way the wetland functions in its present natural state. The greatest risk to wetland scientific values is of course altered hydrology. This is also the most difficult factor to manage. We do not have successful models to emulate. Therefore, as this resource is so important, the first step is to err on the side of caution. An example of this type of action is to provide buffer zones wider than the normal regulated buffer. Although, through flow is extremely slow, it does occur. The minimum water levels in these wetlands are still within one metre of the surface. Therefore, even in the dry season, when it would appear that management of hydrology would be easier, the wetlands are susceptible to damage. The following recommendations are presented for your consideration, although I am happy to discuss any additional ideas you might have for wetland protection.

*Recommendations*

1. **It is recommended that drainage from developed areas be transported off site and not allowed to enter the local groundwater.**

2. **It is recommendedthat the surrounding beachridges be maintained and that their vegetation be protected to ensure similar infiltration rates and volumes to the surrounding areas.**

3. **It is recommended that the three wetlands are preserved without alienation, i.e., the current track which separates wetland 98 and wetland 101 should be moved.**

I do hope that you will contact me if there are questions arising from this letter, or if you require more information, and that you will keep me informed as to the progress being made with respect to the conservation of these important wetlands.

Yours sincerely

C. Semeniuk

Christine Semeniuk

INDIAN OCEAN

MAP
2033 III NE

MAP
2033 II NW

MAP
2033 III SE

MAP
2033 II SW

ENNIS AVE

MANDURAH ROAD

# BECHER POINT WETLANDS

NOTE: In high density areas Basin & Flat Wetlands are **Dc** unless shown otherwise.

BASIN AND FLAT WETLANDS

- lake (permanently inundated), estuary (permanently inundated)
- sumpland, floodplain (seasonally inundated), estuary (peripheral)
- vegetated section of extensive wetland
- dampland, palusplain (seasonally waterlogged)
- vegetated section of extensive wetland
- other basin wetlands

CHANNEL WETLANDS

- River (permanently inundated)
- Creek (seasonally inundated)
- Artificial channel
- Gravity or Pressure Drainage Pipes (metro area)

WETLAND TYPE

| | |
|---|---|
| L | Lake |
| CR | Creek |
| S | Sumpland |
| D | Dampland |
| AL | Artificial Lake |
| F | Floodplain |
| P | Palusplain |
| R | River |
| EW | Estuary (Waterbody) |
| E | Estuary (Peripheral) |
| PS | Paluslope |

PRELIMINARY WETLAND MANAGEMENTCATEGORY

| | |
|---|---|
| c | Conservation |
| r | Resource Enhancement |
| m | Multiple Use |
| na | Not Assessed |

Note: All vegetated sections of extensive wetlands are assigned a Management Category of Conservation.

ZONES OF INFLUENCE

- Zone of Critical Influence 50 metre boundary
- Zone of Secondary Influence 200 metre boundary

Road Boundary — Property Boundary

WETLAND MAP IDENTIFICATION NOS. EG. 12, 12-V1

Map Identification Numbers have been assigned to each wetland according to their type and method of classification.
Map Identification Numbers less than 300 represent wetlands mapped by the V & C Semeniuk Research Group for the Water Authority.
'V' denotes a vegetated selection of a wetland. eg. 12-V2

Map Identification Numbers ranging from 301 to 600 have been assigned to basin wetlands (mostly rock pools and dams) and numbers 601 and greater to channel wetlands (rivers, creeks, and artificial channels). Wetlands numbered 301 and greater have been described from complimentary DOLA digital hydrographic mapping.

SCALE 1:25 000

0 0.5 1 1.5 2
kilometres

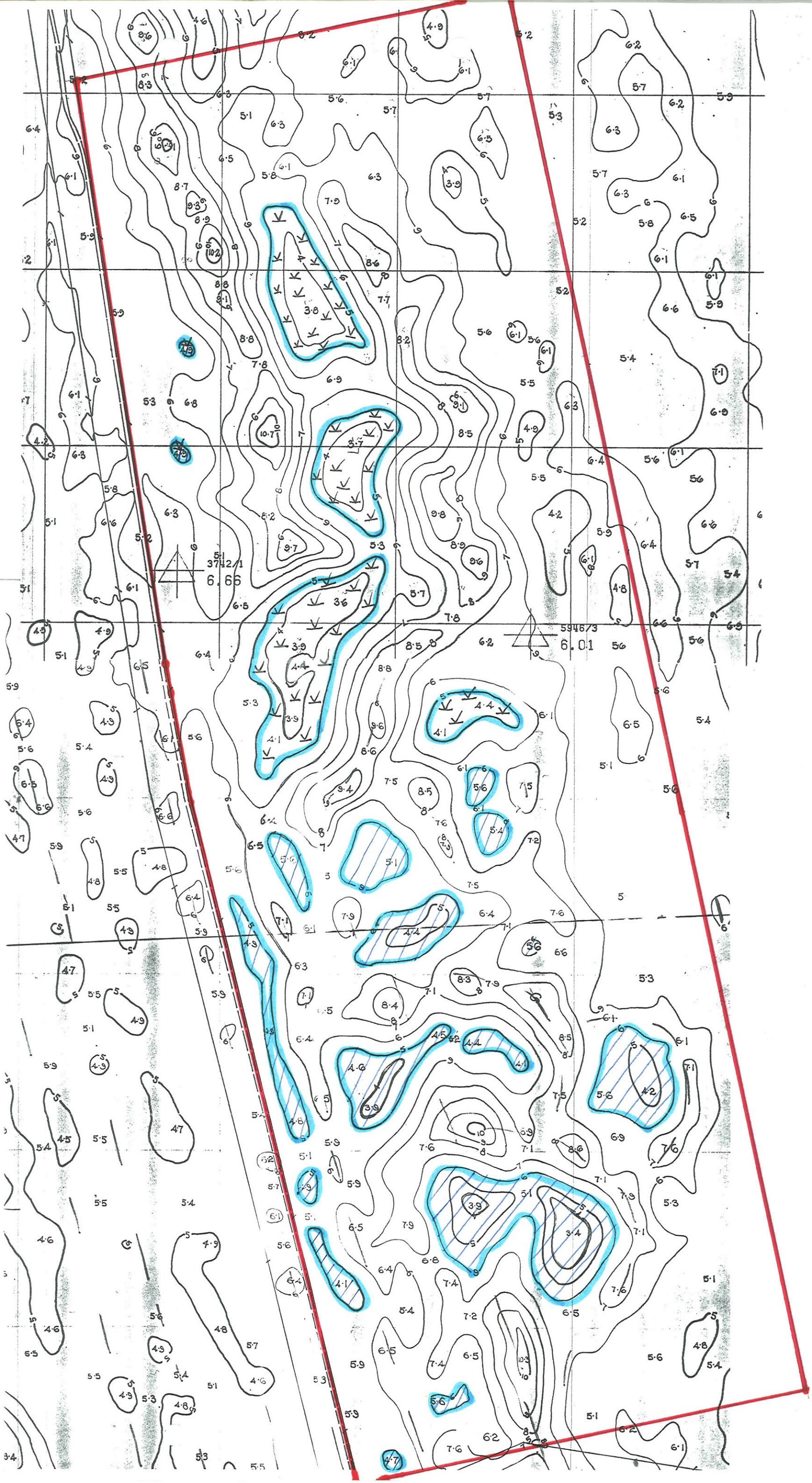
NORTH

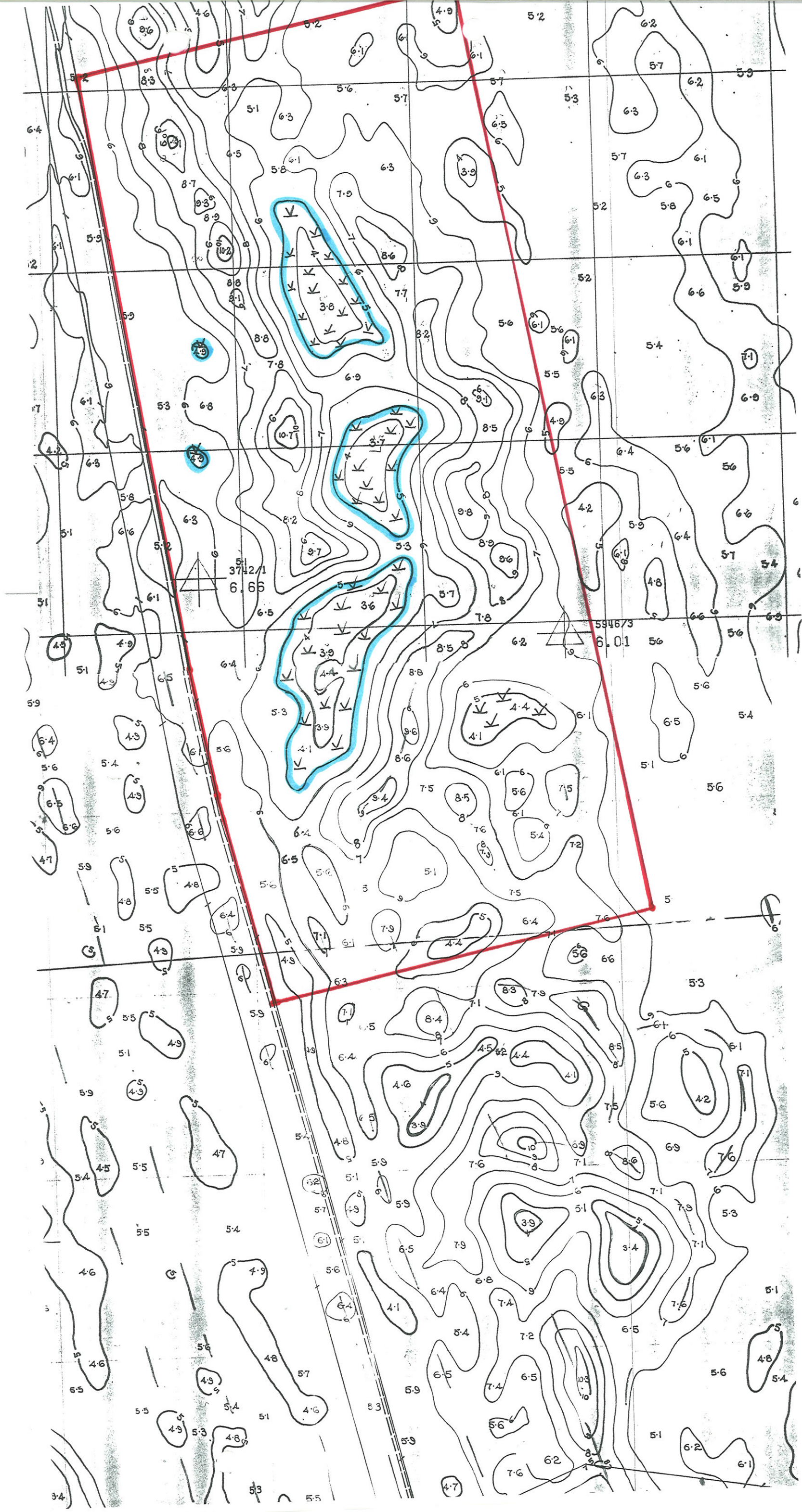

98
101
103

↑N 1:25,000

Option 1.

21.06 ha






Option 2
11.44 ha

(197)

M107

# CITY OF ROCKINGHAM

**Civic Boulevard, Rockingham,**
**Western Australia**

OUR REF: TP11-2-11 PM.mw
YOUR REF:

ENQUIRIES TO: Mr Monks

3rd October 1995

The System Six Study Team
Department of Environmental Protection
141 St George's Terrace
PERTH WA 6000

ATT: Mr K McAlpine

Dear Sir

**Re: System Six Update**

The current review of the System Six recommendations were considered by Council at its ordinary Meeting held on the 26th September 1995. Council resolved that the following modifications and additions to the System Six Areas be submitted for consideration:-

1. Modification of Existing System Six Areas

(i) M107 - Peelhurst, Singleton and Madora

The recommendations of the System Six Report have in part been overturned by the EPA and the Minister for the Environment in approving urban development at Singleton and Golden Bay.

It is recommended that the boundaries of this recommendation should be modified to exclude the east-west transects where urban development has been approved. It is desirable, however, that the System Six recommendations remain over the land currently zoned Rural in the Metropolitan Region Scheme and Special Rural under Town Planning Scheme No.1, this being the Peelhurst and Singleton Special Rural Zones (see attached plan).

(ii) Similarly M103 should be modified to delete the area between Green Meadows and the Port Kennedy Business Park recently rezoned to Urban and Industrial under the Metropolitan Region Scheme, a portion of which is currently being rezoned to Development Zone under Town Planning Scheme No.1. M103 should, however, be extended to take into account the MRS Parks and Recreation Reserve around Tamworth Swamp (see attached plan).

(iii) M106 at Port Kennedy should be modified to exclude that portion of Secret Harbour approved for urban development and to rationalise the boundaries to coincide with the boundaries of the 'Scientific Park' to the west of the Warnbro Sound Avenue extension (see attached plan).

The recommendations applicable to Garden Island, Cape Peron, Lake Richmond and the Serpentine River remain relevant and should remain.

2. Additional Areas to Be Included in System Six

(i) An additional area within the City that should be investigated for possible inclusion within the System Six Report is the Paganoni and Anstey Swamp area which is a Regional Reserve for Parks and Recreation under the Metropolitan Region Scheme and classified by the National Trust.

The above wetland is currently protected by an Environmental Protection Policy, however, incorporating it into a System Six recommendation may provide additional benefits in terms of its protection.

Council also resolved to consider the recommendations contained within the Red Book (Status Report 1993) for System Six with the view towards pursuing those recommendations that remain outstanding. A submission on Council's approach to implementing the recommendations will be forwarded to you following consideration of the Report.

As Council does not have a copy of the above Report, could a copy be forwarded to Council so that this matter can be progressed.

Should you have any enquiries with respect to this advice please do not hesitate to contact Mr Peter Monks on 528 0330.

Yours faithfully

G G HOLLAND
CHIEF EXECUTIVE OFFICER

DOLA

Department of LAND ADMINISTRATION

MIDLAND SQUARE, MIDLAI
WESTERN AUSTRA
Postal Address: PO Box 22
Midland, Western Australia 6C

Your Ref: ~~807-2-28~~-30 V3
Our Ref : 2687/1996
Telephone: 273 7291
Enquires: Mr N.BUKHARY

MINISTRY FOR PLANNING
469 WELLINGTON STREET
PERTH WA 6000

ATT : BRUCE CUNNINGHAM

Dear Sir

**RE RESERVE 45041**

Further to your letter dated 4 June 1997 I advise that all necessary EXCO action has been completed and Port Kennedy Lot 213 is set aside as Reserve 45041 for the designated purpose of "Conservation of Flora and Fauna".

This reserve is automatically vested in N.P.N.C.A. pursuant to Section 7 of the CALM Act 1984.

Notice to this effect was published in the Government Gazette dated 5 August 1997, and I enclose a print of the said reserve .

Yours faithfully

for T.THOMSON
MANAGER
ACQUISITIONS, ROADS AND RESERVES
LAND OPERATIONS DIVISION
11 AUGUST 1997

Encl

08NBR7

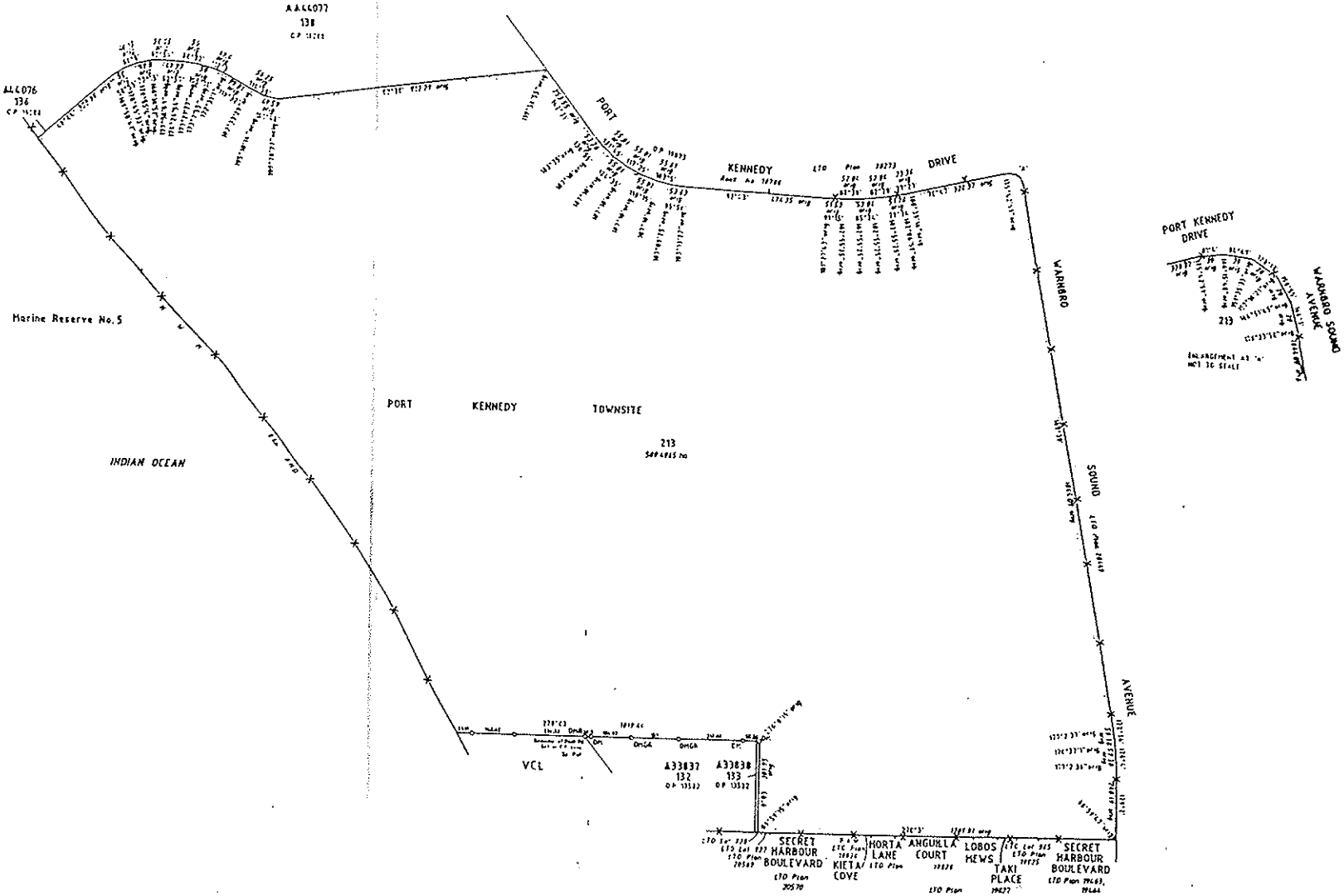
C C CITY OF ROCKINGHAM

ERNIE
Please note & copy
into correct
file

18/8/97

MINISTRY FOR PLANNING
13 AUG 1997
FILE 807-2-28-83

133







KEY

WATERLINE HEREON DOES NOT NECESSARILY DEPICT AN EXACT CADASTRAL BOUNDARY

| | | |
|---|---|---|
| LAND DISTRICT<br>COCKBURN SOUND | PORT KENNEDY LOT 213 | DEPT. OF LAND ADMINISTRATION<br>PLAN 19520 |
| SURVEYOR'S CERTIFICATE<br>Declared Surveyor<br>Date 15 1997 | SCALE 1:7500<br>PLAN CERTIFIED CORRECT REG 24A1 | FILE 2687/996<br>DEPARTMENT OF LAND ADMINISTRATION<br>PLAN 19520 |

PRINT POST APPROVED PP665002/00041

WESTERN AUSTRALIAN GOVERNMENT

# Gazette

4421

PERTH, TUESDAY, 5 AUGUST 1997 No. 132

PUBLISHED BY AUTHORITY JOHN A. STRIJK, GOVERNMENT PRINTER AT 3.30 PM

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# PROCLAMATIONS

AA101

## PUBLIC AND BANK HOLIDAYS ACT 1972

PROCLAMATION

WESTERN AUSTRALIA
P. M. Jeffery,
Governor.
[L.S.]

} By His Excellency Major General Philip Michael Jeffery, Companion of the Order of Australia, Officer of the Order of Australia (Military Division), Military Cross, Governor of the State of Western Australia.

I, the Governor, acting under section 7 of the Public and Bank Holidays Act 1972 and with the advice and consent of the Executive Council, declare that Monday, 2 October, shall be the Celebration Day for the Anniversary of the Birthday of the Reigning Sovereign in the year 2000.

Given under my hand and the Public Seal of the State on 29 July 1997.

By His Excellency's Command,

G. D. KIERATH, Minister for Labour Relations.

GOD SAVE THE QUEEN !

---

AA201*

## TRANSFER OF LAND ACT 1893

TRANSFER OF LAND (REVESTMENT)

PROCLAMATION

WESTERN AUSTRALIA
P. M. Jeffery,
Governor.
[L.S.]

} By His Excellency Major General Philip Michael Jeffery, Companion of the Order of Australia, Officer of the Order of Australia (Military Division), Military Cross, Governor of the State of Western Australia.

DOLA File: 02687-1996-01RO.

UNDER Section 243 of the Transfer of Land Act 1933, I, the Governor acting with the advice and consent of the Executive Council, do hereby revest in Her Majesty as of her former estate, the land described as (a) Lot 1 on Plan 20449 being the whole of the land in Certificate of Title Volume 2034 Folio 870 (now portion of Port Kennedy Lot 213) and (b) Lot 3 on Plan 20273 being the whole of the land in Certificate of Title Volume 2043 Folio 1000. (now portion of Port Kennedy Lot 213).

Given under my hand and the Seal of the State on 29 July 1997.

By His Excellency's Command,

D. SHAVE, Minister for Lands.

GOD SAVE THE QUEEN !

---

## TRANSFER OF LAND ACT 1893

TRANSFER OF LAND (REVESTMENT)

PROCLAMATION

WESTERN AUSTRALIA
P. M. Jeffery,
Governor.
[L.S.]

} By His Excellency Major General Philip Michael Jeffery, Companion of the Order of Australia, Officer of the Order of Australia (Military Division), Military Cross, Governor of the State of Western Australia.

DOLA File: 01224-1937-01RO.

UNDER Section 243 of the Transfer of Land Act 1933, I, the Governor acting with the advice and consent of the Executive Council, do hereby revest in Her Majesty as of her former estate, the land described as Port Hedland Lot 77 being the whole of the land comprised in Certificate of Title Volume 1063 Folio 522.

Given under my hand and the Seal of the State on 29 July 1997.

By His Excellency's Command,

D. SHAVE, Minister for Lands.

GOD SAVE THE QUEEN !

AA202*

## LAND ACT 1933

### CLASSIFICATION OF RESERVED LANDS

### PROCLAMATION

WESTERN AUSTRALIA
P. M. Jeffery,
Governor.
[L.S.]

} By His Excellency Major General Philip Michael Jeffery, Companion of the Order of Australia, Officer of the Order of Australia (Military Division), Military Cross, Governor of the State of Western Australia.

DOLA File: 02079-1962-01RO.

UNDER Section 31 (1)(A) of the Land Act 1933, I, the Governor acting with the advice and consent of the Executive Council, hereby classify as of Class 'A' Reserve No 29432 Comprising Edel Location 85 with an area of 58.1833 hectares for the designated purpose of "National Park".

Local Authority: Shire of Shark Bay.

DOLA File: 01673-1997-01RO.

UNDER Section 31 (1)(A) of the Land Act 1933, I, the Governor acting with the advice and consent of the Executive Council, hereby classify as of Class 'A' Reserve No 45023 Comprising Perth Lot 1082 with an area of 1660 square metres for the designated purpose of "Use and Requirements of the Parliament and Government".

Local Authority: City of Perth.

DOLA File: 01674-1997-01RO.

UNDER Section 31 (1)(A) of the Land Act 1933, I, the Governor acting with the advice and consent of the Executive Council, hereby classify as of Class 'A' Reserve No 45024 Comprising Perth Lots 836 and 1083 with an area of 477 square metresfor the designated purpose of "Parliamentary Buildings".

Local Authority: City of Perth.

DOLA File: 02304-1996-01RO.

UNDER Section 31 (1)(A) of the Land Act 1933, I, the Governor acting with the advice and consent of the Executive Council, hereby classify as of Class 'A' Reserve No 45035 Comprising Swan Location 12751 with an area of 6.1235 hectares for the designated purpose of "Conservation of Flora and Fauna".

Local Authority: Shire of Gingin.

DOLA File: 02687-1996-01RO.

UNDER Section 31 (1)(A) of the Land Act 1933, I, the Governor acting with the advice and consent of the Executive Council, hereby classify as of Class 'A' Reserve No 45041 Comprising Port Kennedy Lot 213 with an area of 589.4965 hectares for the designated purpose of "Conservation of Flora and Fauna".

Local Authority: City of Rockingham.

Given under my hand and the Seal of the State on 29 July 1997.

By His Excellency's Command,

D. SHAVE, Minister for Lands.

GOD SAVE THE QUEEN !

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AA203*

## LAND ACT 1933

### CANCELLATION OF "B" CLASSIFICATION

### PROCLAMATION

WESTERN AUSTRALIA
P. M. Jeffery,
Governor.
[L.S.]

} By His Excellency Major General Philip Michael Jeffery, Companion of the Order of Australia, Officer of the Order of Australia (Military Division), Military Cross, Governor of the State of Western Australia.

DOLA File: 11066-1898-01RD.

UNDER Section 31 (2) of the Land Act 1933, I, the Governor acting with the advice and consent of the Executive Council, hereby cancel the "B" classification of Reserve 6245 ((Perth Lot N131) ) for the designated purpose of "Police".

Given under my hand and the Seal of the State on 29 July 1997.

By His Excellency's Command,

D. SHAVE, Minister for Lands.

GOD SAVE THE QUEEN !

**AA202***

## LAND ACT 1933

### CLASSIFICATION OF RESERVED LANDS

### PROCLAMATION

WESTERN AUSTRALIA
P. M. Jeffery,
Governor.
[L.S.]

} By His Excellency Major General Philip Michael Jeffery, Companion of the Order of Australia, Officer of the Order of Australia (Military Division), Military Cross, Governor of the State of Western Australia.

DOLA File: 02079-1962-01RO.

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Local Authority: Shire of Shark Bay.

DOLA File: 01673-1997-01RO.

UNDER Section 31 (1)(A) of the Land Act 1933, I, the Governor acting with the advice and consent of the Executive Council, hereby classify as of Class 'A' Reserve No 45023 Comprising Perth Lot 1082 with an area of 1660 square metres for the designated purpose of "Use and Requirements of the Parliament and Government".

Local Authority: City of Perth.

DOLA File: 01674-1997-01RO.

UNDER Section 31 (1)(A) of the Land Act 1933, I, the Governor acting with the advice and consent of the Executive Council, hereby classify as of Class 'A' Reserve No 45024 Comprising Perth Lots 836 and 1083 with an area of 477 square metresfor the designated purpose of "Parliamentary Buildings".

Local Authority: City of Perth.

DOLA File: 02304-1996-01RO.

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Local Authority: Shire of Gingin.

DOLA File: 02687-1996-01RO.

UNDER Section 31 (1)(A) of the Land Act 1933, I, the Governor acting with the advice and consent of the Executive Council, hereby classify as of Class 'A' Reserve No 45041 Comprising Port Kennedy Lot 213 with an area of 589.4965 hectares for the designated purpose of "Conservation of Flora and Fauna".

Local Authority: City of Rockingham.

Given under my hand and the Seal of the State on 29 July 1997.

By His Excellency's Command,

D. SHAVE, Minister for Lands.

GOD SAVE THE QUEEN !

---

**AA203***

## LAND ACT 1933

### CANCELLATION OF "B" CLASSIFICATION

### PROCLAMATION

WESTERN AUSTRALIA
P. M. Jeffery,
Governor.
[L.S.]

} By His Excellency Major General Philip Michael Jeffery, Companion of the Order of Australia, Officer of the Order of Australia (Military Division), Military Cross, Governor of the State of Western Australia.

DOLA File: 11066-1898-01RD.

UNDER Section 31 (2) of the Land Act 1933, I, the Governor acting with the advice and consent of the Executive Council, hereby cancel the "B" classification of Reserve 6245 ((Perth Lot N131) ) for the designated purpose of "Police".

Given under my hand and the Seal of the State on 29 July 1997.

By His Excellency's Command,

D. SHAVE, Minister for Lands.

GOD SAVE THE QUEEN !

**Lark Hill Equestrian Complex - New Proposal**

Timeline of Events

**July 1994**

The subject land was first included in an omnibus amendment to the Metropolitan Region Scheme was formally assessed by the EPA.

EPA Formal Assessment resulted in Statement No.368 and the following condition being imposed upon the site which is as follows;

| | |
|---|---|
| 368:M4.22:2 Area west of Ennis Avenue and within System 6 area M103 | Action Secure and manage for recreational and conservation purposes, the land owned by the State Planning Commission reserved under the Metropolitan Region Scheme for Public Purposes generally known as Lark Hill shown on Figure 13 (copy attached to the Minister's Statement) east of Warnbro Sound Avenue, south of Port Kennedy Drive and west of Ennis Avenue and Mandurah Road. |

**May 2000**

ATA Environmental submitted Larkhill Regional Sport and Recreation Complex Management Strategy to EPA for assessment and approval.

**July 2000**

EPA Audit conditionally clears M4.22.2 in part subject to the following;

*"Prior to the use of groundwater from the site commencing, a Contingency Plan for responding to reaching the maximum and minimum investigation levels is required upon advice from the WRC. Similarly further information upon the impact on the Lark Hill wetlands from the use of groundwater on site will also be required prior to the use of groundwater on the Lark Hill site commencing".*

**March 2004**

After consultation with Inter-Agency, BFO advised ATA Environmental that the proposal that the BFO considered the proposal generally presented an improved environmental outcome. EPA Service Unit concurred and considered the proposal did not need further assessment.

**July 2004**

WAPC approved Development Application.

**June 2005**

Racing and Wagering WA presented the Racing and Training Complex proposal to BFO for comment.

ATA Environmental
environmental scientists

Dilhorn House
2 Bulwer Street
Perth WA 6000
Tel: (08) 9328 3488
Fax: (08) 9328 3588
Email: info@ataenvironmental.com.au
Website: www.ataenvironmental.com.au

30 June 2005

RWW-2005-001-ENAD_002_pvdm

Karen Sanders
Senior Environmental Planner
Bush Forever Office
Department of Planning & Infrastructure
469 Wellington St
Perth WA 6000



Dear Karen

**RE: LARK HILL EQUESTRIAN COMPLEX**

Thank you for meeting with Dianne Begg and myself to discuss the proposed Master Plan for the Lark Hill Equestrian Complex. As discussed, the current approved plan for Lark Hill includes provision for a number of equestrian related items including:

- Construction of parking and a grandstand to the north of the track, accessed from Forty Road (to be constructed);
- The construction of additional race tracks internal to the existing grass track;
- Upgrade of the existing stables and maintenance shed area;
- Establishment of short stay accommodation along Mandurah Road;
- Provision for a horse training area in the cleared land to the south of the track adjacent to Forty Road.
- Possible upgrade of the horse training area into a future commercial stabling area;
- An agistment area east of the track on cleared land;
- Horse exercise tracks throughout the site; and
- Provision for Riding for the Disabled to the south-east of the existing track.

The Western Australian State Government has recently confirmed its intent to upgrade the current training facility into an all-weather racetrack, most probably for mid-week race meets. Racing and Wagering Western Australia (RWWA) has taken over the lease of the site and is in the process of preparing a Master Plan for the intended upgrade. RWWA has employed Dalton Consulting Engineers to prepare the Master Plan. The detailed planning of the site has revealed that the generic location of some of the items listed above is not adequate to meet the requirements of the intended use. Of most concern is the possible location for commercial stabling on the approved Master Plan. Dalton Consulting has designed a facility that will accommodate 380 horses in a stabling area. The horses would reside in the stables during their intensive training periods then return off-site while they are not training. A residential stabling area of this capacity is necessary for the commercial viability of the equestrian complex upgrade.


# OPTION 1:
# EXISTING CHUTE

## VEGETATION BALANCE

**Vegetation Lost:**

| | |
|---|---|
| 6.3ha | Stable Development |
| 0.9ha | New Stake Hill access road |

**Vegetation Gain:**

| | |
|---|---|
| 2.5ha | Mandurah Rd boundary |
| 1.4ha | Revegetated access roads |
| 3.3ha | Northern boundary (as shown) |

**Nett Vegetation Gain/Loss: 0.0ha**

## LEGEND

- Remnant Vegetation (Interp'd from Dec 2003 Air Photo)
- Vegetation Attributed to Wetlands (Interp'd from Dec 2003 Air Photo)
- Buffer zone Wetland Vegetation (50m)
- Possible Development Sites
- Degraded area to be returned to Natural Vegetation to compensate development
- Depression contours (<=5m AHD)
- Lease boundary

DCE
DALTON CONSULTING EN

| REF | REVISION | DATE | APP'D. |
|---|---|---|---|
| A | ISSUED FOR DISCUSSION | 10/6/05 | D.A. |

Designed . AN .
Verified . AN .
Audited . AN .
Approved . AN .

FOR DISCUSSION PURPOSES ONLY
ISSUE DATE: 10/6/05

0m 25m 50m 100m 150m

Coords: .
Levels: .

Scale @ A1/A3 SCALE(S) 1:2500/1:5000

**RACING & WAGERING WESTERN AUSTRA**
LARK HILL RACING & TRAINING FACILITY
MANDURAH ROAD, LARK HILL
**ENVIRONMENTAL RESTRAINTS PLAN**
**SITE ANALYSIS OVERVIEW**
**Drawing No. 7378-OP-1 Rev A**
Sheet No. 1



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Ac (G-VG)

Ac (VG)

Ac GD

Deg

Ac (VG)

Proposed Residential Stabling Option 1

Previous Conservation Area to be Cleared

Previous Development Area to be Retained

Conservation Area to be Retained

Protected in Lakehill Master Plan

Scale 1:4000

# Lark Hill
## Bush Forever Site 356


Bush Forever 2000 - Site Boundaries

Bush Forever 2004 - (Draft) Protection Areas

Map Ident: plot050721_1

Prepared By: Hermione Scott

Prepared For:

Date: 21 Jul 2005

Scale 1:11000

0 500 m

DPI INTERNAL USE ONLY

# COMPLIANCE AND PROGRESS REPORT

## VOLUME I

## PORT KENNEDY
## REGIONAL RECREATION CENTRE
## STAGE 1

**Prepared for:**

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**Report No: MA3145**

**September, 1993**

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# WESTPORT PROJECT

## DELTA HOLDINGS PTY LTD



Report and Recommendations
by the
Environmental Protection Authority



Environmental Protection Authority
Western Australia
Bulletin 281 May 1987

# PORT KENNEDY

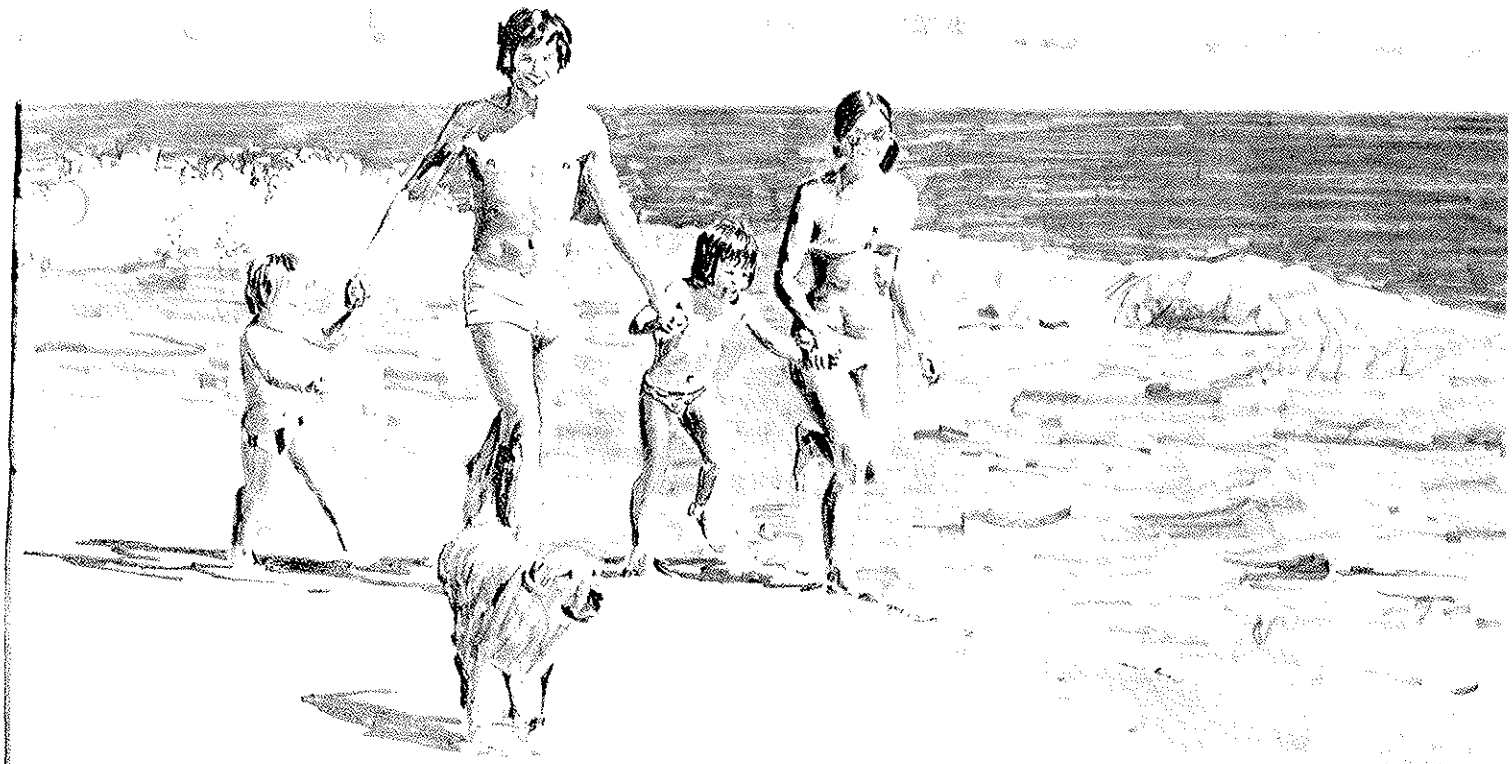
## REGIONAL RECREATION CENTRE

## DESIGN CONCEPT



...LITAN REGION PLANNING AUTHOR...
PERTH WESTERN AUSTRALIA DECEMBER

Pt. Kennedy
+ index
BS377
no fauna





# FOREWORD

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## PHOTOS, TABLES, MAPS




## ACKNOWLEDGEMENT

Some of the sketches used in this report were modelled from photographs purchased from *West Australian Newspapers Ltd.*, and some from photographs supplied by the *Sunday Times*.

PORT KENNEDY
BS377

ANSTEY SWAMP
BS 379

PAGANONI SWAMP
BS395

LAKES COOLOONGUP + WALYUNG
BS 356

LAKE RICHMOND
BS 358

TAMWORTH HILL SWAMP

# Proposed Port Kennedy and Rockingham Parks Management Framework

Includes the Port Kennedy Scientific Park, Lake Richmond, Anstey Swamp, Paganoni Swamp, Tamworth Hill Swamp, Lake Cooloongup and Lake Walyungup



Prepared for

CITY OF ROCKINGHAM

WESTERN AUSTRALIAN PLANNING COMMISSION

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

PORT KENNEDY BOARD OF MANAGEMENT

By

Alan Tingay & Associates
environmental scientists

August 1997

# PORT KENNEDY REGIONAL RECREATION CENTRE

PORT KENNEDY JOINT VENTURE



Report and Recommendations
of the
Environmental Protection Authority



Environmental Protection Authority
Perth Western Australia
Bulletin 398 September 1989

Karen Clarke

# FLORISTICS of RESERVES and BUSHLAND AREAS of the PERTH REGION (SYSTEM 6)

## Parts V - IX



G.J. Keighery and B.J. Keighery

The Wildflower Society of Western Australia has published these papers, parts of a continuing series, in the interest of the conservation of our unique flora. The Society considers it essential that decision makers and managers have available the necessary flora information before making irreversible land use decisions.

The Floristic Survey of the Swan Coastal Plain, of which the surveys of the flora of these areas was part, was carried out with the assistance of funds made available by the Commonwealth of Australia under the National Estate Grants Programme, and by the Australian Heritage Commission.

Wildflower Society of Western Australia (Inc.)
PO Box 64 Nedlands WA 6009

ISBN 0 9595443 8 0

# Change to environmental conditions for regional recreation centre Stage 1 Boundary, Port Kennedy

Fleuris Pty Ltd



Report and recommendations
of the Environmental Protection Authority



Environmental Protection Authority
Perth, Western Australia
Bulletin 734
February 1994

PORT KENNEDY

PORT KENNEDY JOINT VENTURE

# PORT KENNEDY REGIONAL RECREATION CENTRE

# ENVIRONMENTAL REVIEW AND MANAGEMENT PROGRAMME

## Volume II: Main Report



DECEMBER 1988

Binnie & Partners Pty Ltd
CONSULTING ENGINEERS

PORT KENNEDY REGIONAL RECREATION CENTRE

# ENVIRONMENTAL REVIEW AND MANAGEMENT PROGRAMME

## VOLUME I: SUMMARY REPORT



Prepared for Port Kennedy Joint Venture

by Binnie & Partners Pty Ltd

Project Co-ordinator: RI Allan Architect Pty Ltd

December 1988

BUSH SITE 377 : PORT KENNEDY

BUSH SITE : PORT KENNEDY


5024 WA 3165 (C) METRO REGIONAL AREA & EXT. RUN 7 (5001-5078) 1:20000 10-DEC-92 920676


5025 WA 3165 (C) METRO REGIONAL AREA & EXT. RUN 7 (5001-5078) 1:20000 10-DEC-92 920676


5254 WA 3164 (C) METRO REGIONAL AREA & EXT. RUN 6 CENTRE (5245-5256) 1:20000 10-DEC-92 920676