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FLORA AND VEGETATION ASSESSMENT
LOTS 1 AND 3, SOUTHERN ESTUARY ROAD LAKE CLIFTON

D. ALLNUTT AND J.F. TREMBATH

Prepared by:

Ecoscape (Australia) Pty Ltd

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		Name	Signature	Name	Signature	Date
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LOT 1 AND 3, SOUTHERN ESTUARY RD LAKE CLIFTON

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The owners of Lots 1 and 3, Southern Estuary Road, Lake Clifton are examining future subdivision options. As the landowners wish to reduce the lot yield to accommodate a greater total of lots across the subject land the proposal is now subject to an environmental assessment.

To provide information for this environmental assessment Ecoscape carried out a flora and vegetation assessment of the study land. This involved an examination of the composition and condition of the vegetation communities within the proposal area.

78 flora species from 28 different Families and 59 Genera were recorded for the survey area. No Declared Rare Flora species, pursuant to Subsection 2 of Section 23F of the *Wildlife Conservation Act 1950* and listed by CALM were located during the survey. No Priority Flora species were located during the survey. Therefore, no Endangered or Vulnerable species, pursuant to s179 of the EPBC Act were located.

The survey revealed 3 vegetation communities for the project area. None of these vegetation communities are registered as threatened with the DCLM nor federally listed under the EPBC Act (1999).

Due to the current survey detecting a lack of Threatened Ecological Communities and significant flora along with the small size and high disturbance level in some parts of the subject land, these bushland remnants do not fit the criteria for regionally significant bushland (DEP 2000). However these vegetation communities still have high conservation value due to the limited occurrence of comparable vegetation types remaining on the Swan Coastal Plain.

An ecologically sensitive development of this nature has the potential to increase the ecological value of the area if adequate management of runoff and weeds is undertaken along with the enforcement of setbacks and exclusion of disturbance from the retained natural areas. It will complement the role of the surrounding conservation reserves and potentially contribute to a linkage of natural areas between the Yalgorup and Peel-Harvey systems.

1.0 Introduction

Lake Clifton Flora and Vegetation Assessment

1.1 Project Setting

Lots 1 and 3 Southern Estuary Road are located approximately 40 km south of Mandurah in the Lake Clifton Area within the Shire of Waroona, 3km east of Lake Clifton townsite. The lots are bordered by Southern Estuary Road on the west and Clifton Road (Old Bunbury Road) on the South (**Figure One**).

The owners of Lots 1 and 3, Southern Estuary Road, Lake Clifton are examining future subdivision options. As the landowners wish to reduce the lot yield to accommodate a greater total of lots across the subject land the proposal is now subject to an environmental assessment.

The subject land occurs within the catchment area for the Peel-Harvey Inlet. The study area contains a sumpland, a seasonally inundated basin flowing east to a palusplain and into the Harvey River (Hill *et al.* 1996).

The study area lies on the western part of the Swan Coastal Plain, which is a regional geomorphic feature that extends from Moore River north of Perth down to Dunsborough in the south. Broad geomorphic elements made of sedimentary materials are arranged approximately parallel to the current coastline. In order of increasing age and distance from the coast these elements are the Quindalup, Spearwood and Bassendean Dune Systems followed by the Pinjarra Plain. Associated with the chain of coastal lakes and estuaries there are also unconsolidated estuarine and lacustrine sediments known as Vasse Deposits. (WAPC, 1999). The subject land is comprised of two landform types, the sands of the Bassendean Dune and the Pinjarra Plain. The sumpland within the project area is made up of Vasse Deposits.

1.2 Flora

There are no significant flora registered with the Department of Conservation and Land Management (CALM) for the subject area. However significant flora which has previously been recorded for the Waroona to Mandurah area that could potentially occur in the project area is presented in **Appendix One**.

Species of flora and fauna are defined as rare or priority conservation status where their populations are restricted geographically or threatened by local processes. CALM recognises these threats of extinction and consequently applies regulations towards population and species protection (**Table 1.2**).

Rare flora species are gazetted under subsection 2 of section 23F of the *Wildlife Conservation Act 1950* and therefore it is an offence to "take" or damage rare flora without Ministerial approval. Section 23F of the Act defines "to take" as "*... to gather, pick, cut, pull up, destroy, dig up, remove or injure the flora to cause or permit the same to be done by any means*". Flora and fauna species also have specific protection under the *Environment Protection and Biodiversity Conservation* (EPBC) *Act 1999*. Section 178 and 179 of the EPBC Act lists and categorises each species protected and **Table 1.3** presents the definitions of the categories of threatened species under the Act.

TABLE 1.1: Definition of Rare and Priority Flora Species (CALM, 2004)

Conservation Code	Category
R	**Declared Rare Flora – Extant Taxa.** Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection and have been gazetted as such.
P1	**Priority One – Poorly Known Taxa** Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P2	**Priority Two – Poorly Known Taxa** Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (ie. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but urgently need further survey.
P3	**Priority Three – Poorly Known Taxa** Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (ie. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but needs further survey.
P4	**Priority Four – Rare Taxa** Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years.

TABLE 1.2: Categories of Threatened Species (EPBC Act, Section 179, 1999)

Category Code	Category
1	**Extinct** Taxa which is known only to survive in cultivation, in captivity or as a naturalised population, well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
2	**Critically Endangered** Taxa which is facing a very high risk of extinction in the wild in the immediate or near future, as determined in accordance with the prescribed criteria.
3	**Endangered** Taxa which are not critically endangered and is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
4	**Vulnerable** Taxa which is not endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
5	**Conservation Dependant** A species that is the focus of a specific conservation program; the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

1.3 Vegetation

Corresponding to the soil descriptions by Churchward and McArthur (1980) the vegetation complexes from east to west for the study area as described by Heddle *et al.* (1980) are the:

- **Vasse Complex (estuarine)**: Mixture of the closed scrub of *Melaleuca* species, fringing woodland of Flooded Gum and *Melaleuca* species and open forest of Tuart, Jarrah and Marri;
- **Yoongarillup Complex (estuarine):** Tuart with some Jarrah and Marri over *Agonis flexuosa*.
- **Karrakatta Complex – Central and South (Spearwood dunes):** Predominately open forest of Tuart, Jarrah and Marri and woodland of Jarrah and *Banksia*; and
- **Cottesloe Complex – Central and South (Spearwood dunes):** Mosaic of woodland of Tuart and Open Forest of Tuart, Jarrah, and Marri with closed heath on exposed limestone.

To the south of the study area a band of the Bassendean complex is found:

- **Bassendean Complex – Central and South (Bassendean Sands):** Vegetation ranges from woodland of *E. marginata – A. fraseriana –Banksia* spp. to low woodland of *Melaleuca* species and sedgelands on the moister sites.

These broad community complexes are made up of discrete vegetation types which occur in repeating patterns within the vegetation complex. The most recent and detailed analysis of the patterning of plant communities on the Swan Coastal Plain was conducted by Gibson *et al.* (1994).

Floristic Community Types of Gibson *et al.* (1994) which were previously recorded in the vicinity of the subject land include:

3b *Corymbia calophylla – Eucalyptus marginata* woodlands on sandy clay soils. - **Vunerable**
4 *Melaleuca preissiana* damplands
8 Herb rich shrublands in clay pans - **Vulnerable**
10a Shrublands in dry clay flats - **Endangered**
13 Deeper wetlands on heavy soils
21a *Banksia attenuata – Eucalyptus marginata* woodlands
25 *Eucalyptus gomphocephala – Agonis flexuosa* woodlands
26a *Melaleuca huegelii – Melaleuca acerosa* shrublands of limestone ridges – **Endangered**

7, 13, 15 21a, 21c.

These Floristic Community Types are further made up of plant communities which are fine level mapping units which describe the structure and composition of the vegetation for each precise location. Trudgen (1991) mapped the vegetation communities in a costal strip of vegetation from singleton 10 km north of Mandurah to the southern boundary of the shire of Mandurah. Vegetation units mapped by Trudgen (1991) which occur in the proximity of the study area around the periphery of Lake Clifton and Boundary Lake, to the west of the study area include:

McG *Melaleuca cuticularis* Low Woodland over *Gahnia trifida* tussock sedgeland.
MrG *Melaleuca rhaphiophylla* Low Woodland over *Gahnia trifida* or *Baumea juncea* tussock sedgeland which occurs on the low lying parts of the Yoongarillup Plain around the periphery of lakes and in small seasonal swamps.
Ba *Banksia attenuata* with small amounts of *Allocasuarina* and *Eucalyptus marginata* woodland over *Acacia pulchella* and *Hibbertia hypericoides.*
EALO *Eucalyptus gomphocephala* open forest over Agonis flexuosa over *Acacia rostellifera* and *Xanthorrhea preissii.*

1.4 Conservation Value of the Vegetation

The vegetation complexes of Heddle *et al.* (1980) are regional mapping units and are appropriate for assessing the value of vegetation at a regional scale. Floristic community types that are found within these vegetation complexes are also broad level classifications that distinguish the significance of vegetation at a regional scale.

English and Blyth (1997) developed a method to identify whether these ecological communities are considered threatened. A Threatened Ecological Community (TEC) is one which is subject to processes that threaten to destroy or significantly modify it across much of its range and which is found to fit into on of the following categories: "presumed totally destroyed", "critically endangered, "endangered" or "vulnerable" (English and Blyth 1997). The ratings of the Gibson *et al.* (1994) community types is listed above.

Currently the Western Australian Government has no legislation dealing specifically with TEC's but the community can be considered for federal listing under the *Commonwealth's Environment Protection and Biodiversity Conservation Act* (1999) (EPBC Act). The Act provides for the strong protection of plant communities (TEC's), which are described as 'Critically Endangered' or "Endangered" under section 182 of the EPBC Act. None of the recognised floristic community types in the proximity of the subject land are listed under the EPBC Act.

Bushland remnants on the Swan Coastal Plain have also been selected for conservation on the basis of regional significance for Bush Forever (DEP 2000). Criteria for the selection of regionally significant bushland areas in Bush Forever, addresses the following points:

- A regional vegetation type which is threatened or poorly reserved or a site with special value for flora and fauna conservation.
- Possessing considerable biological diversity or supports a population of declared Rare Flora, Priority Flora or Threatened Flora.
- Vegetation in good condition or better but threatened vegetation types may be regionally significant even if in poor condition.
- Usually greater than 20ha but may be smaller in the case of threatened or poorly reserved vegetation types or areas with special significance for other purposes.

There is also variation in the vegetation structure within these regional floristic community types which will represent local significance and is determined by mapping plant communities at a fine level.

1.5 Purpose of the Report

The purpose of this report is to document the flora and vegetation communities of the project area. This information should assist in the assessment of biological values of the area for the development application.

The Flora and Vegetation Assessment of Lots 1 and 3, Southern Estuary Road encompassed the following stages:

- a field survey to assess flora and vegetation:
- assess the condition of the vegetation in the project area
- review the conservation status of the vascular plant species by reference to current literature, current listings by CALM and plants collections held at the State Herbarium.
- map the plant communities within the project area
- determine the regional significance of the vegetation

A botanist from Ecoscape visited the site in October 2003.

5 Quadrats (10m x 10m) were established in the dominant community type. This information could then be compared to Gibson *et al.* (1994) data if it was necessary for Threatened Ecological Community (TEC) determination.

The Vegetation Survey was based on the field interpretation of colour aerial photographs at a scale of 1:75 000. Although many of the community boundaries can be distinguished on the map, transverses were required to collect definitive information on the flora composition and structure.

Vegetation condition was determined for the project area assessing vegetation structure and composition also by transversing the project area on foot. Vegetation condition was recorded by Ecoscape according to the vegetation condition scale (Keighery, 1994) used in Bush Forever Vol. 2 (DEP, 2000). This condition rating refers to the degree of change in the structure, density and species present in the bushland in relation to undisturbed bushland of the same type. The descriptions of these ratings by Kieghery (1994) are listed below;

(1) Pristine
No obvious signs of disturbance.

(2) Excellent
Vegetation structure intact, disturbance affecting individual species and weeds are non aggressive species

(3)Very Good
Vegetation altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback and logging and grazing.

(4) Good
Vegetation structure significantly altered by very obvious signs of multiple disturbance. retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.

(5) Degraded
Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management.

(6) Completely degraded
The structure of the vegetation is no longer intact and the area is completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

3.0 Results

3.1 Flora

78 flora species from 28 different Families and 59 Genera were recorded for the survey area. No Declared Rare Flora species, pursuant to Subsection 2 of Section 23F of the *Wildlife Conservation Act 1950* and listed by DCLM (**Appendix One**) were located during the survey. No Priority Flora species were located during the survey. Therefore, no Endangered or Vulnerable species, pursuant to s179 of the EPBC Act were located.

The temporal limitations of this study must be taken into account when assessing the conservation status of the communities. The sampling of this study is biased towards perennial species as the timing of the survey meant that potentially some annual species were omitted from the vegetation site data. The possibility remains that significant flora (in particular annual species) may still occur in the study area which would raise the conservation value of the vegetation.

Five of these recorded taxa are weed species (Western Australian Herbarium 2004). However, it can be expected that additional weed species would be recorded at different times of the year. If adequate management of the natural areas is to be incorporated as part of the development proposal a comprehensive species list would need to be devised and the controls for each potential pest species addressed. The managers will have to take into account the likely profusion of weeds that will spread with the removal of grazing pressure.

3.2 Vegetation

The survey revealed 3 vegetation communities for the project area (**Figure 2**).

The main vegetation community was B1, *Banksia* – Jarrah – Marri woodland, which occurred in both Lots 1 and 3. It was dominated by *Banksia attenuata* with *Eucalyptus marginata* and *Corymbia calophylla* open woodland over *Hypocalymma robustum, Melaleuca thymoides* and *Xanthorrhoea brunonis* over *Conostylis aculeata* and *Dasypogon bromeliifolius*. This community is consistent with the vegetation of the Karrakatta complex, and the Floristic Community Type, FCT 21a, *Banksia attenuata - Eucalyptus marginata* woodlands. This community also corresponds to the Ba community of Trudgen (1991) found on the spearwood dunes in the Mandurah coastal strip.

The northern section of Lot 1 consisted primarily of *Melaleuca preissiana* damplands with various dominants in different areas including *Eucalyptus rudis, Melaleuca thymoides* and *Melaleuca rhaphiophylla*.

M1 *Melaleuca preissiana – Eucalyptus rudis* open woodland is a combination of FCT 4, *Melaleuca preissiana* damplands and FCT 11, Wet forests and woodlands due to the presence of *Eucalyptus rudis*.

M2 is most similar to FCT 13, Deeper wetlands on heavy soils due to the dominance of *Melaleuca rhaphiophylla* occurring with *Melaleuca laterita*. These community types correspond to the Vasse vegetation complex (Heddel *et al.* 1980).

M3 and the dominance *of Agonis flexuosa* infers the presence of a variant of FCT 25 Tuart – *Agonis flexuosa* woodland. This community is part of the Yoongarillup Vegetation Complex

None of these vegetation communities are registered as threatened with the CALM nor federally listed under the EPBC Act (1999).

The Wetland (sumpland) within the subject land was not assessed for it flora composition and condition as this community will not be directly impacted by the proposed development.

3.3 Condition

The vegetation within the subject land is either in a good to very good state over much of the area. There are a number of firebreaks and track which dissect the vegetation. The periphery of the sumpland is surrounded by completely degraded paddock. The vegetation within the sumpland was not assessed (**Figure 3**).
Vegetation in Lot 3 was in better overall condition than that of Lot 1.
Key disturbance factors that were noted included logging and cattle grazing. The understorey of Lot 1 was heavily weed infested. Indeed this dampland vegetation is more susceptible to disturbance caused by grazing, weed infestation and stock movement.

4.0 Discussion and Recommendations

Lake Clifton Flora and Vegetation Assessment

Due to the current survey detecting a lack of TECs and significant flora along with the small size and high disturbance level within parts of the subject land, these bushland remnants do not fit the criteria for regionally significant bushland (DEP 2000). However these vegetation communities still have high conservation value due to the limited occurrence of comparable vegetation types remaining on the Swan Coastal Plain.

The vegetation units described in this report are unique to the southwest of Western Australia and furthermore are unique to the costal areas in the south west.

Extensive clearing and degradation of the vegetation of the Swan Coastal Plain means that the coastal strip between Mandurah and Bunbury represents the largest area of natural vegetation remaining between Perth and Bunbury (Trudgen 1991). Indeed conservation of many of the vegetation types on the Swan Coastal Plain will never be adequately represented in reserves as sufficient stands of vegetation no longer exist. The following table documents the figures published by the WA Government on the status of vegetation complexes on the swan coastal plain;

Vegetation Complex (Heddle *et al.* 1980)	% remaining as Native Vegetation	
	Perth Metropolitan Area Bush Forever (DEP 2000)	Swan Coastal Plain System 6 Area (EPA 2003)
Yoongarrillup	72	45
Karrakatta Central and South	18	29.5
Cottesloe Central and South	36	41.1
Vasse	1	29.4
Bassendean Central and South	24	27

Within the local area the vegetation of the subject land can also be compared to previous studies in the area to evaluate the local significance of the bushland remnants.

Trudgen (1991) determined that within the Mandurah area Yoongarrillup vegetation types are not extensive and due to their variety and diversity have high conservation value. This complex often includes Melaleuca paperpark forests surrounding lakes, which also has an important ecological role (Trudgen 1991). *Agonis flexuosa* a dominant within the Yoongarrillup complex, is endemic to the south west of Western Australia and occurs on coastal dunes, limestone heaths and sandy soils along the coast from Perth southward to Bremer Bay and inland to Boyup Brook. Vegetation communities dominated by *Agonis flexuosa* are not well represented in conservation reserves between Perth and Bunbury. Yalgorup National Park is the only large park with significant stands of Agonis flexuosa (CALM 1995).

The Banksia community of the Karrakatta/Bassendean complex that occurs within the subject land is also considered to be of high conservation value due to the high level of previous clearing of this vegetation type, and the diversity of vegetation within the complex (Trudgen 1991). Again the only significant reserve of this vegetation type is in Yalgorup National Park.

The Yalgorup National Park is the largest conservation reserve on the Swan Coastal Plain. It contains Quindalup, Yoongarrillup and Karrakatta complexes in good condition, which are not well reserved outside of the Park. It also contains some of the few remaining near pristine freshwater lakes on the coastal plain. This park is under increasing pressure from surrounding development (CALM 1995). As is recognised that conservation reserves may be jeopardised by incompatible activities in adjacent privately owned land such that the Department of Conservation and Environment (DCE) (1981) suggested that buffer zones should be created where fencing and firebreaks, weed and vermin control, retention of natural vegetation and natural drainage patterns and water quality are controlled. Thus due to the proximity of the subject land to the National Park it is important to complement the ecological roles within the subject land by addressing each of these factors in a management plan.

The proposal also needs to be considered in the context of the Peel Harvey Estuary which is also within close proximity to the subject land. The subject land borders the southern boundary of the estuary which is covered by the proposed system 6 area C52, a proposed reserve to protect the inflow of freshwater into the Peel Harvey System (DCE 1981).

The Peel Harvey estuary is currently experiencing management problems due to the discharge of nutrient laden runoff into the system. The resulting eutrophication of the system has caused algal blooms and water quality problems. The proposed development is not expected to contribute to this problem as the proponents have stated that there will be no runoff into the sumpland on the subject land and that there will be adequate setbacks. It is recommended that a 50 m setback from the sumpland is enforced and that in this buffer area it is recommended that the vegetation is left unburnt for as long as possible. Land holders will have to be made aware of the sensitivity of the area to prevent damage to this buffer zone and to prevent weeds spreading. This will maintain as dense as vegetation as possible which filters nutrients that might otherwise enter the lake and to protect nesting areas (CALM 1995).

The Environmental Protection (Swan Coastal Plain Lakes) Policy prohibits the unauthorised filling, mining, drainage and effluent discharge into selected lakes across the Swan Coastal Plain. However the Swan Coastal Plain Lakes Environmental Protection Policy does not currently include many sumplands or any damplands under it jurisdiction as it only addresses the protection of wetlands with 1000m2 of standing water. To rectify this situation, in a review of the 1992 policy the EPA recommended that the environmental values and functions of all wetlands on the Swan Coastal Plain be protected in the new draft policy (EPA 1999). Thus the future management of Lots 1 and 3 will need to address these guidelines.

The Peel Harvey Estuary is recognised as an important for the conservation of waterbirds as indicated by its registration with the Ramsar Convention's List of Wetlands of International Importance. The sumpland of the study area contributes to the important ecological role of the area as the sumpland is dominated by *Melaleuca rhaphiophylla* and no tree or shrub is as well used by waterbirds (Powel 1990). The future management of the sumpland will need to address the health of these trees as a priority. The seedlings of which are killed by fire and the mature specimens can be severely damaged or even killed by fire and take an extremely long time to regenerate (Powell 1990).

In conclusion, an ecologically sensitive development of this nature has the potential to increase the ecological value of the wider area providing that adequate management of runoff and weeds is undertaken along with the enforcement of setbacks and exclusion of disturbance from the retained natural areas. It should complement the role of the surrounding conservation reserves and potentially contribute to a linkage of natural areas between the Yalgorup and Peel-Harvey Systems.

References

Lake Clifton Flora and Vegetation Assessment

Churchward H.M. and McArthur, W.M. (1980) Landforms and soils of the Darling System, Western Australia. In Atlas of Natural Resources, Darling System Western Australia. M.J. Mulcahy (ed.) pp 25-33 and accompanying map. Department of Conservation and Environment. Perth.

Department of Conservation and Land Management (2004). *Declared Rare and Priority Flora List.* Publicly available list prepared by the Department of Conservation and Land Management, Western Australia.

Department of Conservation and Land Management (1995). Yalgorup National Park Management Plan 1995-2005. Department of Conservation and Land Management, Western Australia.

Department of Conservation and Environment (1981). *The Darling System. Western Australia, Proposal for Parks and Reserves. The System 6 Study Report to the Environmental Protection Authority.* Department of Conservation and Environment, Perth.

Department of Environmental Protection. (2002). *Bush Forever*, Western Australian Government, Perth Western Australia.

English, V. and Blyth, J. (1997). *Identifying and conserving threatened ecological communities (TECs in the South West Botanical Province.* ANCA National Reserves System Cooperative Program: Project Number N702, Australian National Conservation Agency, Canberra.

Environmental Protection Authority (1999). *Review of the Environmental Protection (Swan Coastal Plain Lakes Policy 1992.* Government of Western Australia, Perth.

Environmental Protection Authority (2003). *Guidance Statement Number 10. Guidance Statement for level of assessment for proposals affecting natural areas within the System 6 region and Swan Coastal Plain portion of the System 1 region.* Government of Western Australia, Perth.

Gibson, N., Keighery, B., Keighery, G., Burbidge, A. and Lyons, M. (1994). *A Floristic Survey of the Southern Swan Coastal Plain.* Department of Conservation and Land Management, Perth, Western Australia.

Government of Western Australia (2000) *Bush Forever.* Department of Environmental Protection and Ministry for Planning, Perth, Western Australia.

Heddle, E.M., Longeragan, O.W., and Havel, J.J. (1980) Vegetation complexes of the Darling system Western Australia. In: *Atlas of Natural Resources, Darling System Western Australia.* M.J. Mulcahy (ed.) pp 25-33 and accompanying map. Department of Conservation and Environment. Perth.

Hill, A.L, Semeniuk, C.A, Semeniuk, V and Del Marco, A. (1996) *Wetlands of the Swan Coastal Plain Vol 12B: Wetland Atlas.* Department of Environmental Protection/Water and Rivers Commission, Perth.

Kieghery B. J. (1994). Bushland Plant Survey. *A Guide to Plant Community Survey for the Community.* Wildflower Society of WA (Inc.), Nedlands, Western Australia.

Powell, R. (1990). *Leaf and Branch. Trees and Tall Shrubs of Perth.* Department of Conservation and Land Management, Perth.

Western Australian Herbarium (2004). *Florabase.* Department of Conservation and Land Management. http://www.calm.wa.gov.au/science/florabase.html

Western Australian Planning Commission (WAPC) (1999) *Coastal and Lakelands Planning Strategy (Dawesville – Binningup).* Western Australian Planning Commission, Perth, Western Australia.

Trudgen, M. (1991). *A Flora and Vegetation Survey of the Coast of the City of Mandurah.* Department of Planning and Urban Development

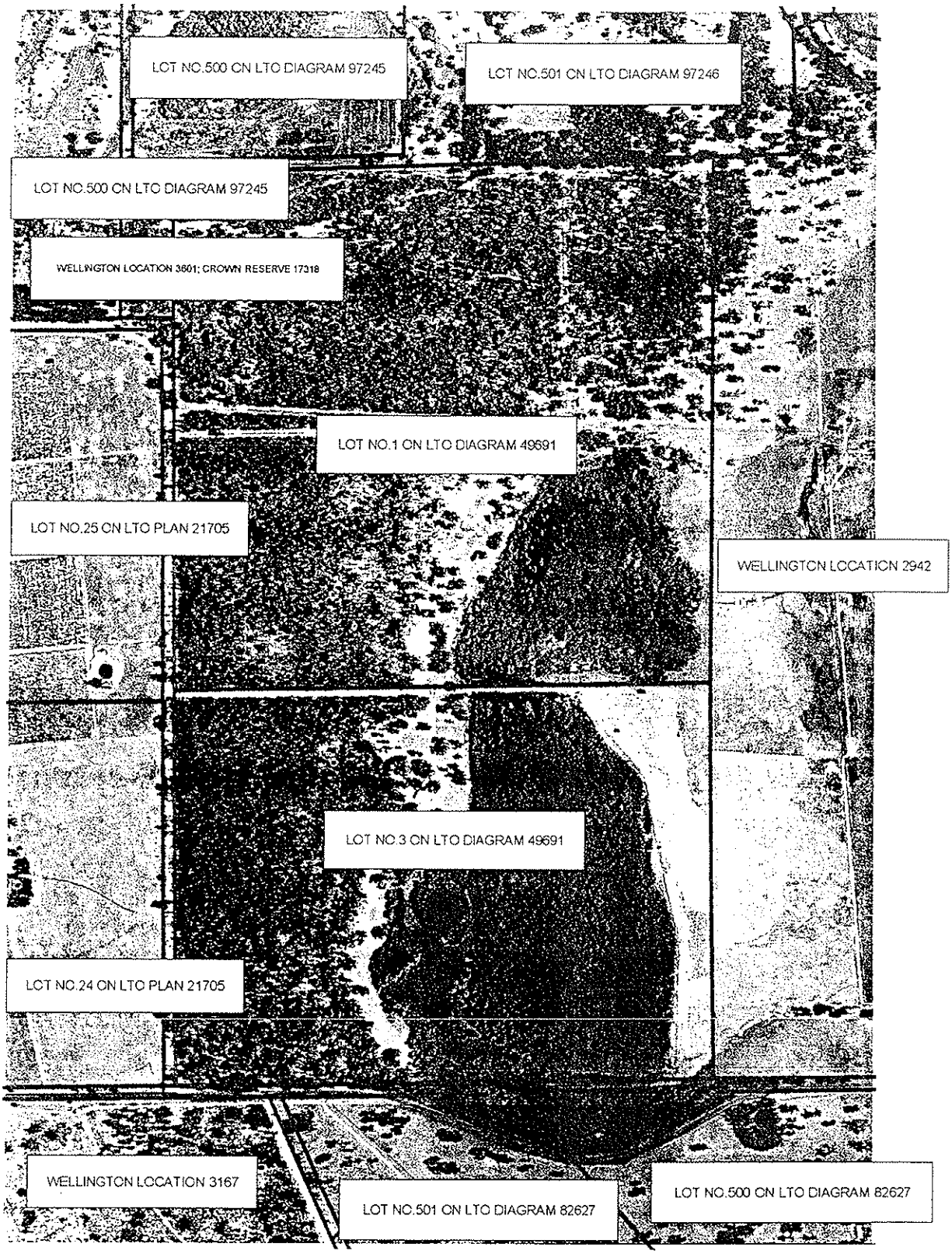

Figure 1

Cadastral Boundaries in Vicinity of Study Area

CLIENT:	SJB Town Planners
PROJECT:	Lots 1 & 3 Southern Estuary Rd
JOB NO:	1153-03
DATE:	02/03/04

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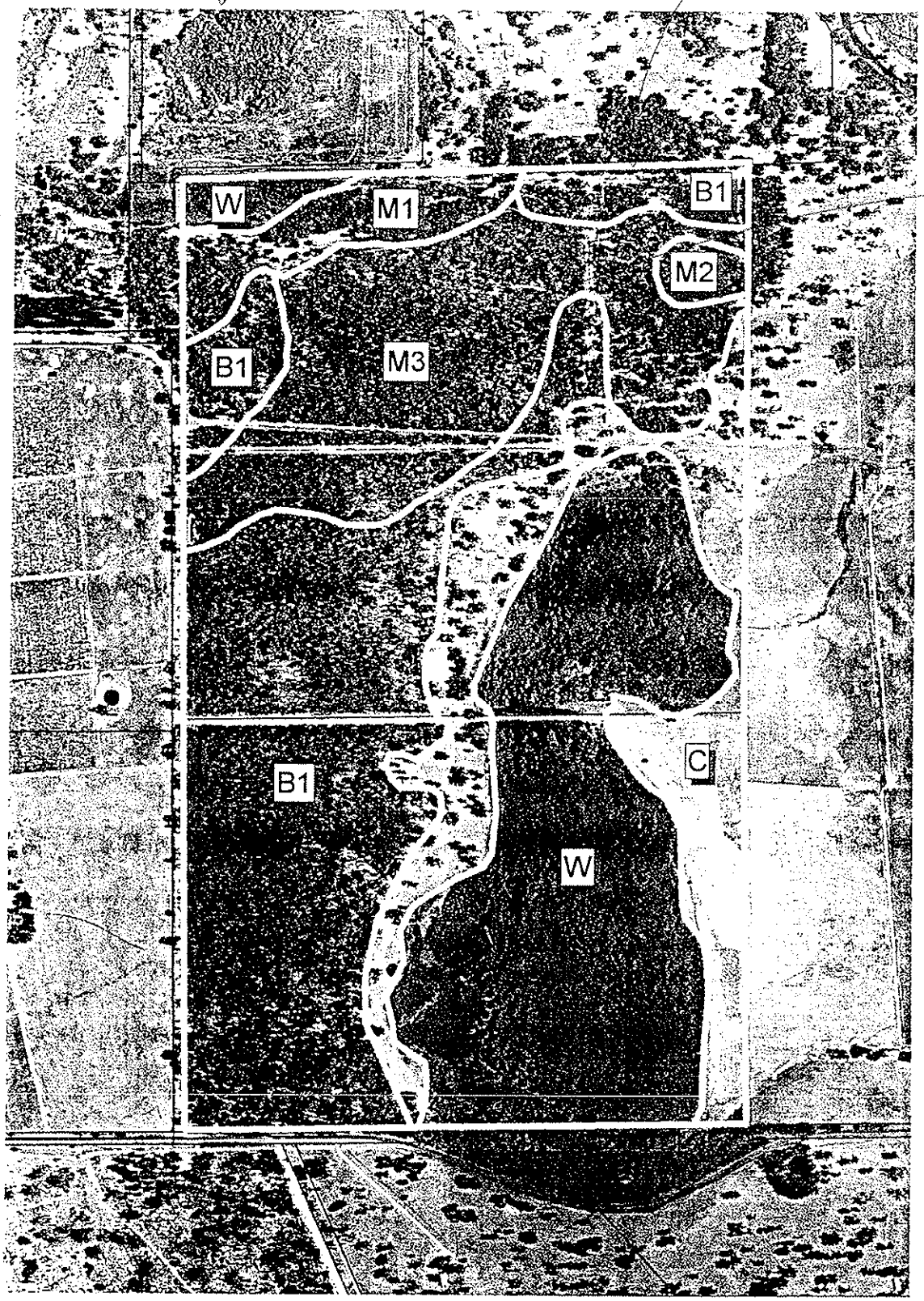

Legend

M1 - Melaleuca preissiana - Eucalyptus rudis Damplands	B1 - Banksia - Jarrah - Marri Woodland
M2 - Melaleuca rhaphiophylla Damplands	C - Cleared
M3 - Agonis flexuosa - Melaleuca thymoides Woodland	W - Wetland

N

50 0 50 100 150 200 250 300 350 400 450 500 Meters

Figure 2

Distribution of Vegetation Communities

CLIENT:	SJB Town Planners
PROJECT:	Lots 1 & 3 Southern Estuary Rd
JOB NO:	1153-03
DATE:	02/03/04

ecoscape
ENVIRONMENTAL SCIENCE LANDSCAPE ARCHITECTURE MAPPING SCIENCE
9 STIRLING HIGHWAY NORTH FREMANTLE WESTERN AUSTRALIA 6159
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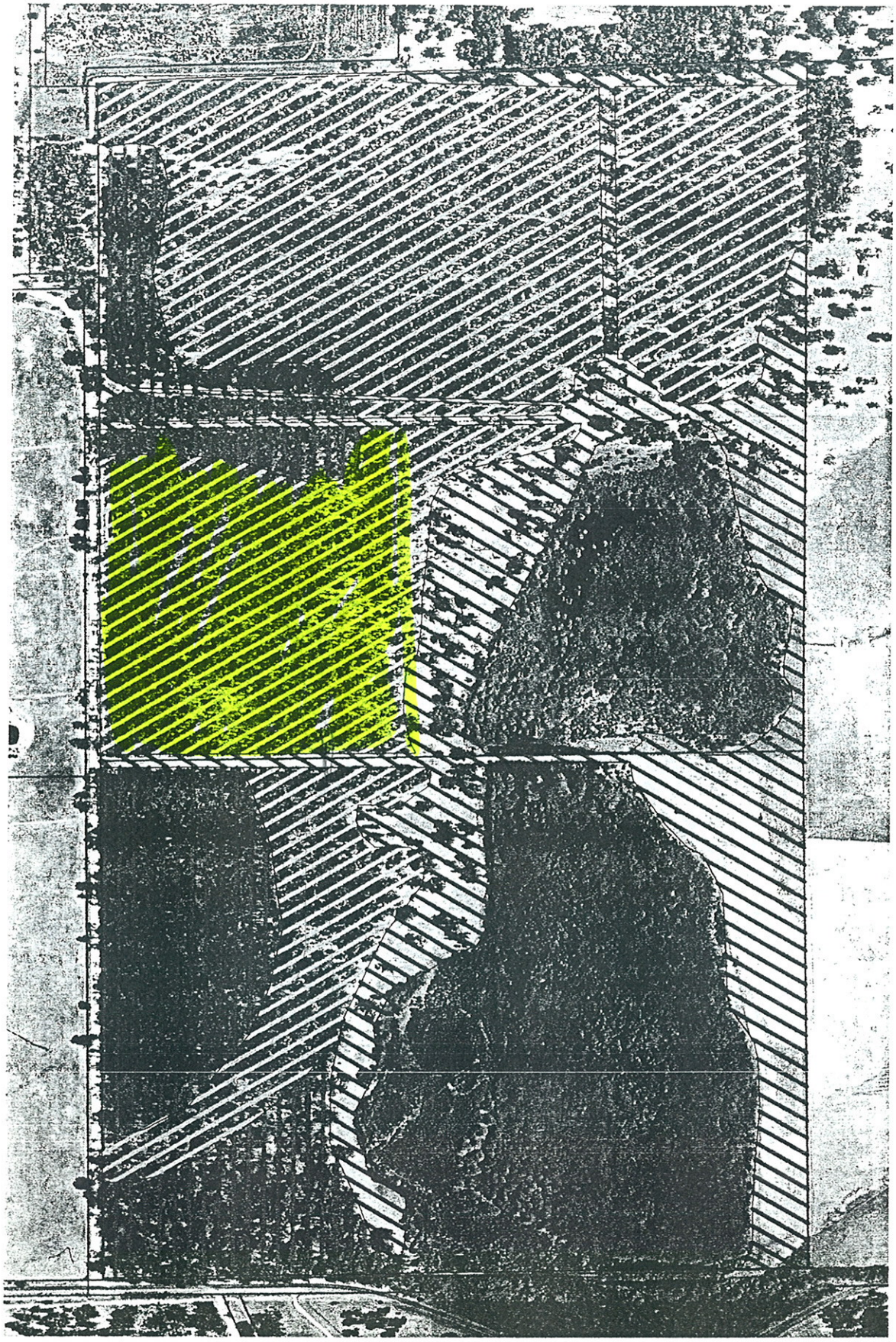

18/02
most

Figure 3

Vegetation Condition within Study Area

CLIENT:	SJB Town Planners
PROJECT:	Lots 1 & 3 Southern Estuary Rd
JOB NO:	1153-03
DATE:	02/03/04

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Appendix One: Significant Flora Previously Recorded for the Shires of Mandurah and Waroona March 2004

APPENDIX ONE: SIGNIFICANT FLORA PREVIOUSLY RECORDED FOR THE SHIRES OF MANDURAH AND WAROONA MARCH 2004

Anthotium junciforme	P4
Aponogeton hexatepalus	P4
Astroloma microcalyx	P3
Blennospora doliiformis	P3
Caladenia huegelii	R
Caladenia longicauda subsp. *clivicola*	P4
Caladenia speciosa	P4
Caladenia uliginosa subsp. *patulens*	P1
Conostylis pauciflora subsp. *euryrhipis*	P3
Conostylils pauciflora subsp. *pauciflora*	P4
Dillwynia dillwynioides	P3
Diuris purdiei	R
Drosera marchantii subsp. *marchantii*	P4
Eleocharis keigheryi	R
Eryngium ferox (ms)	P3
Eryngium subdecumbens (ms)	P3
Eucalyptus rudis subsp. *cratyantha*	P4
Grevillea bipinnatifida subsp. *pagna* (ms)	P1
Hakea sp. Yalgorup (pn)	P4
Hemigenia microphylla	P3
Hibbertia spicata subsp. *leptotheca*	P3
Jacksonia sericea	P3
Lasiopetalum membranaceum	P3
Phyllangium palustre	P2
Platysace ramosissima	P3
Pterostylis sp. Yalgorup (pn)	P2
Rhodanthe pyrethrum	P3
Schoenus capillifolius	P2
Schoenus natans	P4
Schoenus sp. Waroona	P3
Stylidium ireneae	P4
Stylidium maritimum	P3
Trichocline sp.Treeton (pn)	P2
Villarsia submersa	P4

Appendix Two: Vascular Plant Species List For Lots 1 and 3 Southern Estuary Road Lake Clifton March 2004

Lake Clifton Flora and Vegetation Survey

Need data on plots
& plot location.

APPENDIX TWO: VASCULAR SPECIES LIST FOR LOTS 1 AND 3
SOUTHERN ESTUARY RD LAKE CLIFTON MARCH 2004

Note: * indicates weed species

FAMILY	Species
ZAMIACEAE	*Macrozamia riedlei*
POACEAE	*Austrostipa flavescens*
	* *Avena barbata*
	* *Briza maxima*
	* *Bromus diandrus*
CYPERACEAE	*Baumea vaginalis*
Eleocharis kuroleng	*Lepidosperma leptostachyum*
	Lepidosperma longitudinale
	Lepidosperma squamatum
RESTIONACEAE	✓ *Desmocladus asper*
	✓ *Desmocladus fasciculatus*
	Hypolaena exsulca
	✓ *Lyginia barbata*
	Meeboldina scariosa
JUNCACEAE	*Juncus kraussii* Juncus pauciflorus
	Juncus pallidus
DASYPOGONACEAE	✓ *Dasypogon bromeliifolius* (Name)
	Lomandra hermaphrodita
	Lomandra nigricans
XANTHORRHOEACEAE	✓ *Xanthorrhoea brunonis*
ANTHERICACEAE	*Thysanotus dichotomus*
Thy patens	Thy. arbus.
COLCHICACEAE	*Burchardia umbellata*
HAEMODORACEAE	*Conostylis aculeata*
IRIDACEAE	*Patersonia occidentalis*
ORCHIDACEAE	*Prasophyllum* sp.
	Orchidaceae sp.
CASUARINACEAE	*Allocasuarina fraseriana*
PROTEACEAE	✓ *Banksia attenuata*
	✓ *Banksia grandis*
	✓ *Banksia illicifolia*
	Banksia prionotes
	Petrophile linearis
	✓ *Stirlingia latifolia*
	✓ *Xylomelum occidentale*

APPENDIX TWO: VASCULAR SPECIES LIST FOR LOTS 1 AND 3 SOUTHERN ESTUARY RD LAKE CLIFTON MARCH 2004

Note: * indicates weed species

LORANTHACEAE		*Nuytsia floribunda*
DROSERACEAE		*Drosera erythrorhiza*
PITTOSPORACEAE		*Pronaya fraseri*
		Sollya heterophylla
MIMOSACEAE		*Acacia extensa*
		Acacia pulchella
		Acacia rostillifera
		Acacia saligna
		Acacia willdenowiana
PAPLIONACEAE		*Bossiaea eriocarpa*
		Bossiaea ornata
		Gompholobium confertum
		Gompholobium tomentosum
		Hardenbergia comptoniana
		Hovea trisperma
		Jacksonia sternbergiana
		Kennedia prostrata
GERANIACEAE	*	*Pelargonium capitatum*
TREMANDRACEAE		*Tetratheca hirsuta*
POLYGALACEAE		*Comesperma calymega*
DILLENIACEAE		*Hibbertia huegelii*
		Hibbertia hypericoides
		Hibbertia racemosa
MYRTACEAE		*Agonis flexuosa*
		Calytrix flavescens
		Corymbia calophylla
		Eucalyptus marginata
		Eucalyptus rudis
		Hypocalymma robustum
		Kunzea ericifolia
		Kunzea recurva
		Melaleuca cuticularis
		Melaleuca lateritia
		Melaleuca preissiana
		Melaleuca rhaphiophylla
		Melaleuca systena
		Melaleuca thymoides
EPACRIDACEAE		*Astroloma pallidus*
		Conostephium pendulum

APPENDIX TWO: VASCULAR SPECIES LIST FOR LOTS 1 AND 3 SOUTHERN ESTUARY RD LAKE CLIFTON MARCH 2004

Note: * indicates weed species

GOODENIACEAE		*Dampiera linearis*
		Lechenaultia floribunda
STYLIDIACEAE		*Stylidium* sp.
ASTERACEAE	*	*Hypochaeris glabra*
		Podolepis gracilis
		Trichocline spathulata
		Waitzia suaveolens

ENTERED ON GIS

Name: Submission for Rezoning of Lot 3 Wellington Location 2942 Southern Estuary Road, Lake Clifton from "Rural 1 General Farming" to "Rural 6 - Rural - Residential"
Date: 08/05/2006
Capture Author: Thomas Leong

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

Accuracy Levels:

- High = Document contained visual and or described spatial references easily copied, resulting in little or no polygon boundary errors
- Acceptable = Document contained visual and or described spatial references with complex boundaries, resulting in minor boundary errors
- Low = Document contained little or no visual and or described spatial references, resulting in polygon boundary errors

Attributes
Report Info – Captured without problems
Custodial/Contact – Captured without problems
Content – Partial photocopy of original document, chapter 6 only, "Existing Environment", information entered cannot be taken as accurate

SHIRE OF WAROONA
TOWN PLANNING SCHEME NO. 7
AMENDMENT No. 4

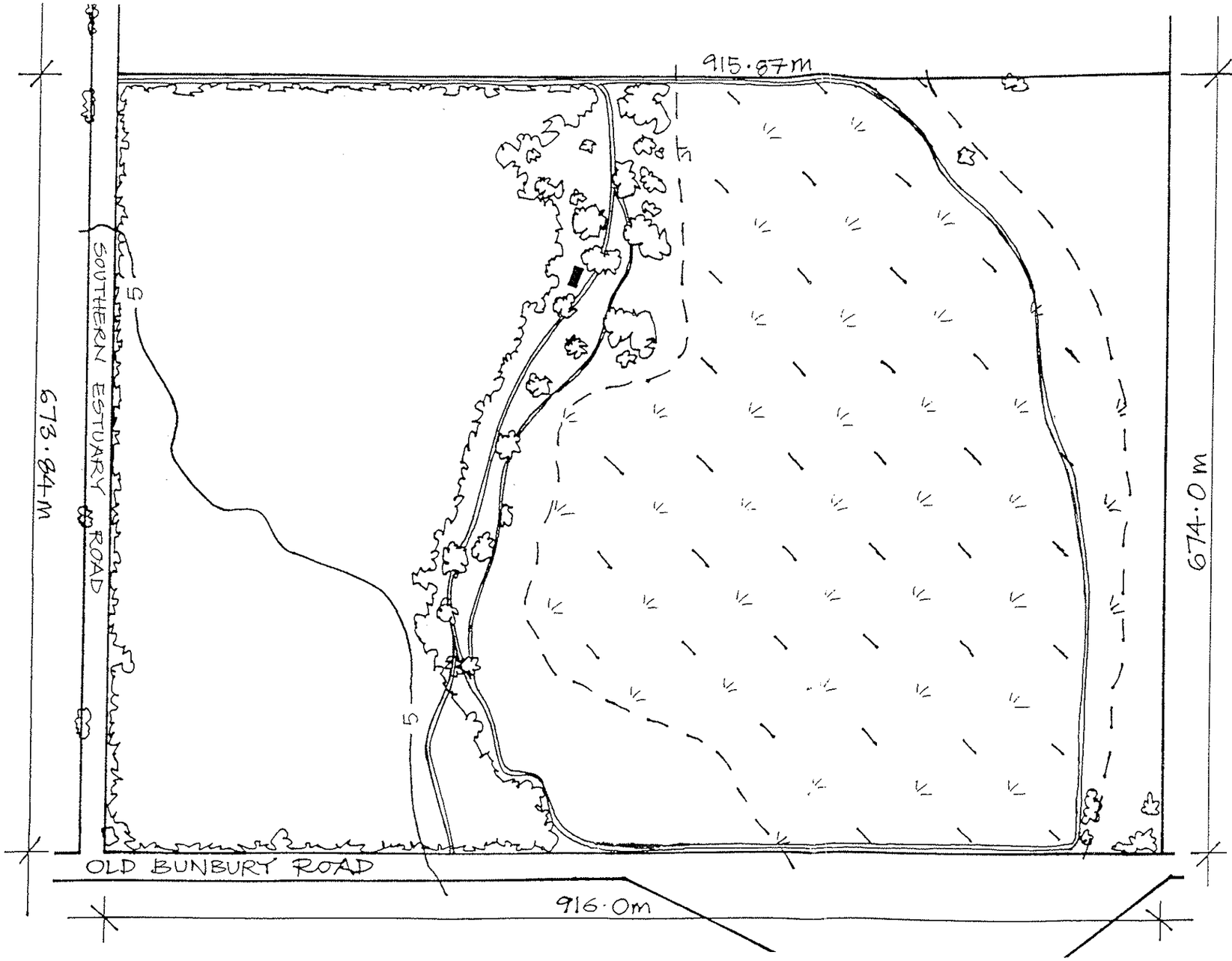
SUBMISSION FOR REZONING OF LOT 3 WELLINGTON LOCATION 2942 SOUTHERN ESTUARY ROAD. LAKE CLIFTON FROM 'RURAL 1 GENERAL FARMING' TO 'RURAL 6 - RURAL - RESIDENTIAL'

Prepared for: DAVID ALLNUTT

Prepared by: SJB TOWN PLANNERS
Chatsworth House
16 Chatsworth Road
HIGHGATE W.A. 6003
Ph/Fax (08) 9328 2378

Plate 1: Southern Estuary Road on western boundary of property.

Plate 2: Cleared grazing portion of property showing some regrowth



PLAN 2	LOT 3 LOCATION 2942 SOUTHERN ESTUARY ROAD	SITE PLAN	SJB · TOWN PLANNERS
SCALE 1:4000			CHATSWORTH HOUSE, 16 CHATSWORTH ROAD, HIGHGATE 6003 PH/FAX 328 2378

Plate 3 : Wetland Vegetation.

Plate 4: Driveway to Eastern Part of Property on Northern Boundary through the Wetland.

Plate 5: Existing shed on property

Plate 6: Eastern cleared portion of Property

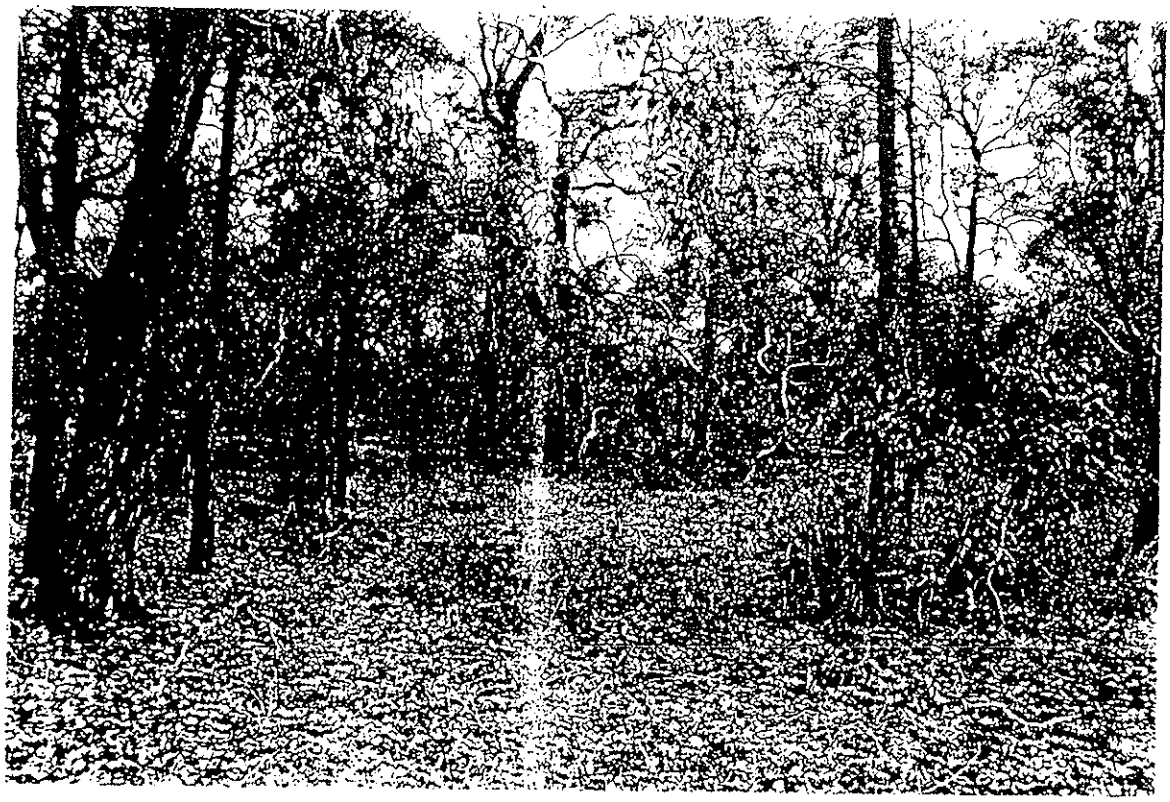


Plate 7: Western Bush Area

Plate 8: Old Bunbury Road on southern boundary of Property.

6.0 EXISTING ENVIRONMENT

The description of the existing environment targets those environmental components of relevance to the proposed subdivision of the subject land, namely:

- landform and soils;
- vegetation;
- drainage and nutrients;
- groundwater;
- wetlands and
- flooding;

6.1 Landforms and Soils

The subject land comprises of two landform types (see Plan 6) namely the Bassendean dune and sandplain system and the Pinjarra Plain. (Van Goole 1992).

The Bassendean dune and sandplain system occupy approximately 50% (or 30.5 hectares) of the subject land and are characterised by low relief dunes and gently undulating sandplains which range from about 4 - 9 metres above Australian Height Datum (AHD). The component land units and dominant soil types are as follow:

B2 Flat to gently undulating sandplain and broad, very low rises with well drained deep bleached grey sands with a pale yellow B horizon or weak iron organic hardpan at 1 - 2 metres.

The Bassendean dune and sandplain system is the oldest dune system having originated along a coastline as calcareous sands and then been subjected to extensive leaching which removed carbonates (McArthur and Bettenay, 1960).

The Pinjarra Plains occupy approximately 50% (or 30.5 hectares) of the subject land and are described as broad low relief plain west of the foothills, comprising predominantly Pleistocene flurial sediments and some Holocene alluviam associated wit current drainage system. Major soils are naturally poorly drained with many swamps. The component land unit and soils, which generally occur at (or below) 4 metres AHD, are as follow:

P1d Shallow pale sand to sandy loam over clay; imperfect to poorly drained and generally moderately susceptible to salinity.

P5 Poorly drained flats, commonly with gilgai microrelief and with deep black, grey to olive brown cracking clays with alkaline subsoils.

The soils of the Vasse estuarine and lagoon deposits are extremely variable, being formed on unconsolidated estuarine alluvium, and may be subject to periodic inundation.

SOUTHERN ESTUARY ROAD

N

B2

ROAD

SM

Pinjarra Plain: - Broad low relief plain west of the foothills, comprising predominantly Pleistocene fluvial sediments and some Holocene alluvium associated with major current drainage systems. Major soils are naturally poorly drained with many swamps.

P1 d. as for P1a, but moderately susceptible to salinity

P5 Poorly drained flats, commonly with gilgai microrelief and with deep black, grey to olive brown cracking clays with alkaline subsoils.

Bassendean dune and sandplain system: - Pleistocene sand dunes with very low relief, leached grey siliceous sand intervening sandy and clayey swamps and gently undulating plains. These occur immediately west of, and partly overlie, the Pinjarra Plain. Topography becomes more subdued from west to east.

B2 Flat to very gently undulating sandplain and broad very low rises with moderately well to well drained deep bleached grey sands with a pale yellow B horizon or a weak iron organic hardpan at 1-2 metres

LANDFORM & SOILS.

SJB · TOWN PLANNERS
CHATSWORTH HOUSE, 16 CHATSWORTH ROAD, HIGHGATE 6003 PHONE 328 2378

PLAN 6

SCALE 1:4000

6.2 Vegetation

The natural vegetation associated with the landforms and soils of the Mandurah - Bunbury Coastal Zone have been described previously by McArthur and Bartle (1980).

6.2.1 Dryland Vegetation

The dryland vegetation mainly consists of native overstorey species with a limited diversity of native understorey species. Marri (*Eucalyptus calophylla*) trees are the dominant overstorey species with jarrah (*E marginata*) scattered throughout (see Plate 7). A number of species forming a middle canopy include peppermints (*Agonis flexuosa*), wattles (*Acacia rostillifera*) and Christmas trees (*Nuytsia floribunda*).

The understorey has been subject to grazing with hardy species such as zamia palm (*Macrozamia riedlei*), prickly moses (*Acacia pulchella*) and *Jacksonia furcellata* still persisting.

The dryland vegetation types are proposed to be retained as important landscape features and enhanced through regrowth in the cleared areas.

6.2.2 Wetland Vegetation

The wetland vegetation is associated with the low lying estuarine deposits. The swamp of the subject land has small shrub and groundcover species and paperbarks (*Melaleuca rhaphiophylla*) which range from 2 - 3 metres in height.

Several clumps of native rushes, a section of bulrushes (*Typha domingensis*), scattered robin red breast bushes (*Melaleuca laterita*) and a tall thicket of paperbark. Naturally regenerating flooded gums were also noted within this wet area (see Plate 3).

6.3 Drainage and Nutrients

The soils of the subject land proposed for Rural - Residential development mostly belong to the Bassendean sands and are characteristically well drained.

Potential surface run would be associated with that collected from residences throughout the subject land and the internal subdivision road proposed. The requirement for houses to collect rainwater as the main water supply for drinking and other domestic purposes results in minimal additional discharge of stormwater to the environment.

The road will be designed so that stormwater discharges to the west, away from the wetland, to the Bassendean Sands.

A small portion of the site is included within the Pinjarra Plain which is notably poorly drained. There will be only one building envelope in this area and rainwater will be collected.

The drainage and nutrient risk will be minimised with the proposed re-vegetation of most of this area.

Consequently, no surface run-off is expected as a result of the development and drainage from the site is likely to flow naturally through subsurface sediments via the underlying superficial aquifer. The subject land is within the Peel-Harvey catchment which flows predominantly in an easterly direction toward the Harvey River.

The Peel-Harvey Estuary is currently under stress caused by the inflow of excessive nutrients, principally phosphorus and nitrogen. This state of nutrient enrichment or eutrophication has resulted in algal blooms and associated water quality problems within the estuarine system.

Care must be taken to limit the export of nutrients to the estuarine system in order to assist the estuary reach a healthy state which inhibits the incidence of algal blooms. Increased flushing associated with the recent opening of the Dawesville Channel is hoped will improve the water quality of the Peel-Harvey Estuarine System. More details in relation to groundwater hydrology and flooding are provided in the following sections.

6.4 Groundwater Hydrology

There is no available hydrological data found to date which specifically relates to the groundwater characteristics of the subject land. However, characteristics of the groundwater system in the vicinity has been described in a regional study of the relationship between groundwater and the coastal lakes between Mandurah and Bunbury (Commander 1988) and a local study of groundwater in relation to Lake Clifton (Moore and Turner 1988). These studies have determined that the lake and groundwater systems are closely related.

The subject land occurs within the South West Coastal Groundwater area as gazetted by the Water and Rivers Commission (WRC) who also manage usage of the underlying groundwater via water abstraction licences.

The groundwater consists of superficial formations which are primarily unconfined aquifers consisting of very thin freshwater lenses.

Hydrogeological information suggests that the groundwater flow over the site is generally in an easterly direction toward the Harvey River. The superficial groundwater aquifer flows under a very low hydraulic gradient which limits the rate of directional flow.

Drilling tests carried out in close proximity to the subject land (Commander 1988) indicate that the maximum water table levels associated with the superficial formations

range from 1.5 = 2.0m AHD. This corresponds to a watertable at 2 - 5 metres below ground surface in the areas proposed to support dwellings. According to WRC Allocation Policy (WRC 1989) the local availability of this groundwater resource for abstraction purposes is generally limited to 1500m3/lot/year on lots between 2 - 4 ha. However, details regarding precise abstraction rates, groundwater quality and availability for each lot would require site specific assessment and approval from WRC.

The superficial formations are underlain by the Leederville formation WRC information indicates there is little water available for private abstraction from this confined aquifer and that it should generally not be considered as a groundwater resource for allocation. In addition, it is proposed to prevent bores so as to reduce the risk of lowering the water levels in the wetland.

6.5 Wetlands

There is one wetland within the subject land.

The wetland is dominated by paperbark (*Melaleuca rhaphiophylla*) thickets and has had the understorey vegetation mostly intact (see Plate 3).

The wetlands are protected by the Environmental Protection (Swan Coastal Plain Lakes) Policy, 1992.

All of the wetland identified on the EPP is preserved.

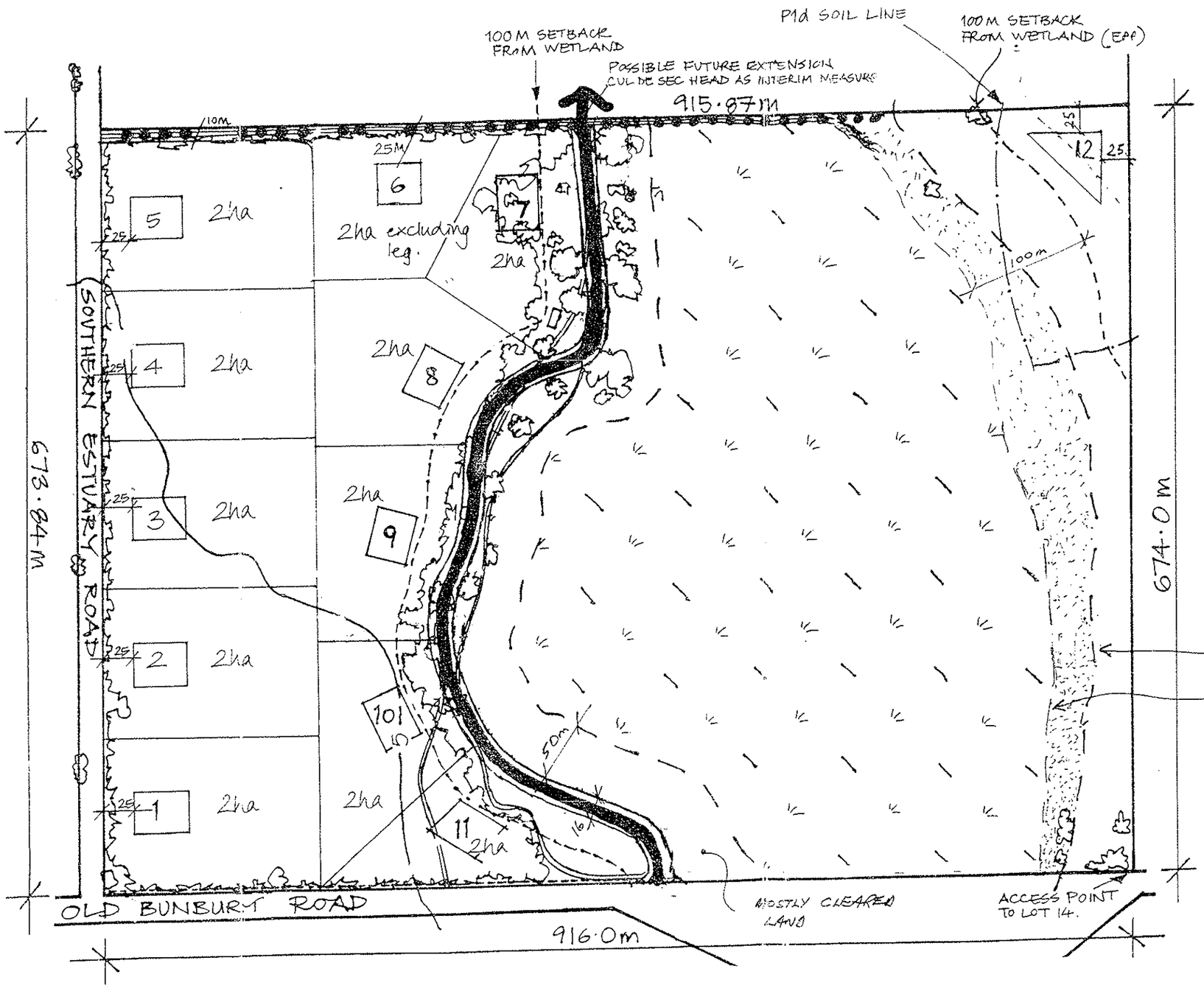
On the western side land is cleared abutting the wetland. This will be utilised for a road and will act as a buffer to the rural-residential land uses. It is already cleared and as such there is no buffer vegetation. Use of this area as a road will prevent further clearing of the natural bush area to the west.

The 20m wide road reserve and the 25m setback to residences provide a 45m buffer to the wetland, in line with the recommended 50m buffer to wetland vegetation.

6.6 Flooding

The low lying nature of the subject land suggests that it may be susceptible to flooding during the winter months. There are no flood maps available, however, discussions with officers at WRC Flood Management Branch indicate that the subject land is unlikely to experience flooding problems.

Inspection during winter indicates that water does not extend outside of the wetland. The bush area is completely dry.



N

LEGEND

- INTERMITTENT SWAMP
- NATURAL VEGETATION / TREE COVER
- SHED
- TRACK
- DEVELOPMENT ENVELOPE 2,000 m²
- STRATEGIC FIRE BREAK
- EPP BOUNDARY
- ACTUAL WETLAND BOUNDARY

ADOPTED BY RESOLUTION OF THE COUNCIL OF THE SHIRE OF WARDONA AT THE ORDINARY MEETING OF COUNCIL HELD ON _____

SHIRE PRESIDENT

CHIEF EXECUTIVE OFFICER

NOTE: ALL AREAS & DIMENSIONS ARE SUBJECT TO SURVEY.

PLAN 4	LOT 3 LOCATION 294-2 SOUTHERN ESTUARY ROAD	SUBDIVISION & GUIDELINE PLAN
SCALE 1:4000		

SJB · TOWN PLANNERS
CHATSWORTH HOUSE, 16 CHATSWORTH ROAD, HIGHGATE 6003 PH/FAX 328 2378

CONSERVATION BRANCH
INTRA DEPARTMENTAL ADVICE
NB: For Internal Use Only

TO: Julie Tilleke

SUBJECT: Lot 3 Southern Estuary Road, Shire of Waroona TPS 7 Amend 4

FROM: Natalie Thorning

DATE: 16 April 1999

Please could I be provided with a copy of your final advice. Thank you.

Following our site visit of the above property on 31 March 1999 I provide the following advise:

The vegetation on the property was mostly Very Good to Excellent condition and Good at the edges. There were few species of weed evident. The vegetation was not typical of the mapped vegetation complexes for the lot (Vasse and Yoongarillup) and was more typical of Bassendean Central and South which is even less remaining (12%) and very poorly represented in the conservation estate (less than 1% outside of the metropolitan area). This information suggests that the bushland area is of conservation significance.

If the proponent wishes to proceed wih the proposal in it's current design we consider that it would be environmentally unacceptable.It is suggested that the proponent may like to consider altering the proposal to include larger lot sizes greater than 10ha, rehabilitation of the wetland buffer, external road access, building envelopes, statutary covenants on the titles protecting the bushland etc., including a thorough vegetation and flora survey and assessment of the conservation value of the vegetation in a regional context. If the proposal doesn't meet these requirements it is likely to require formal assessment.

Regards Natalie.

DEP SYSTEM 6 UPDATE SUBMISSION SURVEY SHEET B.J. KEIGHERY 2/96

HLAND AREA Lot 3 Southern Estuary SITES YES/NO

ATE 31 March '99 RECORDERS NATALIE THORNING

also present - Julie Tulke (DEP)
Mari Ward (MEP)

Observations edge (transects)

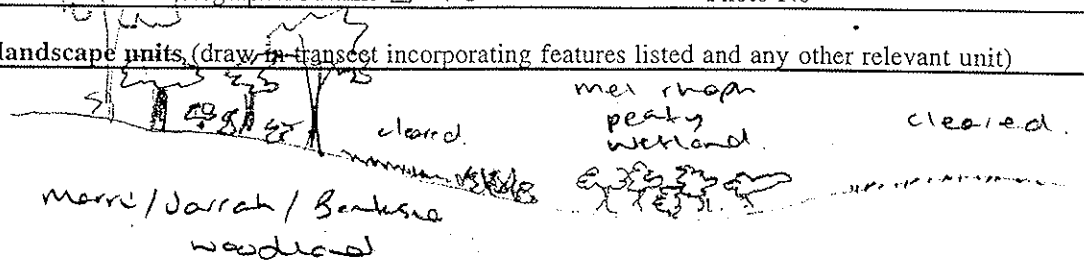
Geographic Location	Latitude	S Longitude	E
Reference Map			

Photograph	Photographer's Name Julie	Photo No

Transect of landscape units, (draw in transect incorporating features listed and any other relevant unit)

50 acres

dunes
dry/wet flats
sumplands
uplands
type



Soil - surface		sub -soil
Exposed rock	type	% area

FLORA/VEGETATION (list dominant and significant plants below, see over for vege association descriptions)

Eucalypts	*E. calophylla*	*E. wandoo*	*E. marginata*	*E. todtianna*	*E. rudis*	
	E. decipiens	*E. drummondii*	*E. haematoxylon*	*E. lanepoolei*	*E. gomphocephala*	
	E. accedens	*E. patens*	*E. laeliae*	*E. megacarpa*		
Sheoaks	*Allocasuarina fraserana*		*Casuarina obesa*			
Banksia	*B.attenuata*	*B. menziesii*	*B. prionotes*	*B. illicifolia*	*B. grandis*	*B. littoralis*
Melaleuca	*M. preissii*	*M. rhaphiophylla*	*M. lanceolata*		*M. cuticularis*	
Others	*Callitris preissii.*					
Mallees	Eucalypts	*E. argutifolia*	*E. petrensis*	*E. decurva*	*E. foecunda*	*E. latens*
SIGNIFICANT SPECIES						
	Xylomelum occidentale					
	Nuytsia floribunda					
						(see over for vegetaion descriptions)

Vegetation Condition - Keighery 1994 (Trudgen 1993) (show range and indicate predominant class)

1 = 'Pristine' (Excellent)
2 = Excellent (Very Good) most of upland bushland
3 = Very Good (Good)
4 = Good (Poor)
5 = Degraded (Very Poor)
6 = Completely Degraded

Specific aspects of disturbance

partial clearing around wetland + for shed.							
weeds (list): Briza maxima							
							purchased 1986
selective removal of species: timber cutting		mowing		fire >15 yrs ago	grazing	dieback	%area
fire frequency:							
'enrichment plantings' (list) none					grazing by cattle in bush		
animal impact: horse	foxes	rabbits	cats	dogs	goats	pigs	overgrazing by native mammals
soil movement:		mining		dumping	rubbish dumping		roadworks
changes in water regimes:				flooding	drainage	watering	nutrient influx
Tracks:		fire breaks		walk trails	off road vehicle use		animal tracks
Service corridors:		SEC		Main Roads		Water Authority.	Telecom
Other							

in winter when too wet on clear side of rd

LIFE FORM/HEIGHT CLASS	CANOPY COVER			
	DENSE 70-100%	MID-DENSE 30-70%	SPARSE 10-30%	VERY SPARSE 2-10%
Trees >30m Trees 15-30m Trees 5-15m Trees <5m	Dense Tall Forest Dense Forest Dense Low Forest A Dense Low Forest B	Tall Forest Forest Low Forest A Low Forest B	Tall Woodland Woodland Low Woodland A Low Woodland B	Open Tall Woodland Open Woodland Open Low Woodland A Open Low Woodland B
Mallee tree form Mallee shrub form	Dense Tree Mallee Dense Shrub Mallee	Tree Mallee Shrub Mallee	Open Tree Mallee Open Shrub Mallee	Very Open Tree Mallee Very Open Shrub Mallee
Shrubs >2m Shrubs 1.5-2.0m Shrubs 1.0-1.5m Shrubs 0.5-1.0m Shrubs 0.0-0.5m	Dense Thicket Dense Heath A Dense Heath B Dense Low Heath C Dense Low Heath D	Thicket Heath A Heath B Low Heath C Low Heath D	Scrub Low Scrub A Low Scrub B Dwarf Scrub C Dwarf Scrub D	Open Scrub Open Low Scrub A Open Low Scrub B Open Dwarf Scrub C Open Dwarf Scrub D
Mat plants Hummock Grass Bunch grass >0.5m Bunch grass <0.5m Herbaceous spp.	Dense Mat Plants Dense Hummock Grass Dense Tall Grass Dense Low Grass Dense Herbs	Mat Plants Mid-Dense Hummock Grass Tall Grass Low Grass Herbs	Open Mat Plants Hummock Grass Open Tall Grass Open Low Grass Open Herbs	Very Open Mat Plants Open Hummock Grass Very Open Tall Grass Very Open Low Grass Very Open Herbs
Sedges >0.5m Sedges <0.5m	Dense Tall Sedges Dense Low Sedges	Tall Sedges Low Sedges	Open Tall Sedges Open Low Sedges	Very Open Tall Sedges Very Open Low Sedges
Ferns Mosses, liverwort	Dense Ferns Dense Mosses	Ferns Mosses	Open Ferns Open Mosses	Very Open Ferns Very Open Mosses

VEGETATION (describe each unit of vegetation using dominants and life form/height class and canopy cover according to the Muir codes above)

upland - western side of wetland

A grey sand over pale yellow sand

noted / on aerial

marri + Jarrah woodland over ~~[illegible]~~ menz. B. attenuata Low forest with scattered woody Pear

understorey varying Hibbertia hypericoides
Stirlingia latifolia
Dasypogon
Xanthorrhoea gracilis ?
patches of Patersonia + Conostylis

larger trees cut out, alot of younger regrowth

B similar to A but more Banksia, less Jarrah, Marri
also Nuytsia
Allocasuarina humilis
less disturbance, more litter on ground

grey sand over pale grey sand

Fauna comments tiger snakes
2 sea eagles
swans, ibis

Adjacent bushland (refer to aerial photograph)

CONSERVATION BRANCH
INTRA DEPARTMENTAL ADVICE
NB: For Internal Use Only

TO: Julie Tilleke

SUBJECT: Lot 3 Southern Estuary Rd, Shire of Waroona TPS 7 Amend 4

FROM: Natalie Thorning

DATE: 25 March 1999

Please could I be provided with a copy of your final advice. Thank you.

The area proposed to be subdivided is part of a larger area of upland bushland surrounding a vegetated wetland that together is adjacent to System 6 area C51. The vegetation lies within the Vasse and Yoongarillup vegetation complexes which are less than 24% and 25% remaining from our latest calculations (which are calculated from figures as old as 1996 and make several assumptions so that the figures are overestimates). As stated in previous advice the area is also subject to the Peel Harvey and Swan Coastal Plain Lakes EPPs.

The existing proposal would be recommended to be formally assessed and is unlikely to be considered environmentally acceptable, as explained in previous advice. It may be possible for the proponent to subdivide the land into larger lots, of about 10 ha, with building envelopes, strategic fire breaks, covenants on the titles protecting vegetation, and rehabilitation of the wetland buffer, as conditions, though this would depend on the condition of the bushland to be assessed on Wednesday's site inspection. If the bushland is of good or better condition overall, then our advice is likely to be that a subdivision of any sized lots would not be appropriate.

There is also the factor of setting a precedent for other landholders adjacent to this one owning other parts of this block of bushland and wetland. Approving subdivision to any extent will basically be approving it for the adjacent lot to the north of this one and the whole bushland block would become dissected.

Regards, Natalie

Natalie this site is big & will be formally assessed when the proposal is modified to protect the big bushland / wetland.

POLICY DEVELOPMENT BRANCH & CONSERVATION BRANCH

INTRA DEPARTMENTAL ADVICE

TO: Julie Tilleke

SUBJECT: Shire Waroona - Amendment 4 - Proposed Rural Residential Rezoning

FROM: Nathan Malin, Natalie Thorning - G Whisson

DATE: 15 February 1999

Advice as follows:

i. The value of the remnant vegetation.

The vegetation subject to the proposed rezoning is not a System 6 recommendation, but is within the area subject to the System 6 Update Program. As a wetland with upland vegetation it may, with further study, be regarded as regionally significant. This block and the block immediately north have been identified as areas subject to further study in the Inner Peel Region Structure Plan. As such, the area should not be considered for rezoning unless this is considered to be appropriate following a comptrehensive assessment of the lands conservation and open space values.

The vegetation is, however, currently valued as important to the health of the adjacent Swan Coastal Plain Lakes EPP wetland and more generally the Peel-Harvey Coastal Plain Catchment.

ii. Appropriate buffer from the wetland.

Irrespective of the above, the current proposal is unlikely to be environmentally acceptable for the fllowing reasons. The wetland is listed in the Swan Coastal Plain Lakes EPP. The block is also within the Peel-Harvey Coastal Plain Catchment and thus is subject to the Peel-Harvey EPP and SPP. The SPP No. 2 provides guidance regarding planning requirements that are expected to be in place before development can proceed. Section 6.2 is specific to residential lots over 4000m^2. There are a number of specifics regarding the use of conventional on-site effluent disposal, retention of natural vegetation outside of defined building envelopes, and stocking rates. From the detail of the proposal it is unclear whether these specifics hav been incorporated into the proposal. For instance, for rural residential blocks over 4000m^2 conventional on-site effluent disposal can only be used if a number of criteria are met. One of which (sect 6.2.1d) is that there is at least 100m horizontal separation between the disposal system and the nearest water-body.

Aerial photography of the proposal area suggest that the remnant vegetation within the wetland buffer has suffered greater degradation as compared to the remaining upland vegetation on the block. This is an important factor to be considered in the development proposal. The designated

wetland buffer is inadequate, especially considering the present degraded condition of the buffer. The minimum dryland buffer recommended is at least 50 metres or 1 metre AHD higher than the furtherest extent of the wetland vegetation, which ever is the largest.

The rehabilitation of the buffer zone should be considered, to offset clearing of native vegetation elsewhere in the block. A trade-off exists between allowing development envelopes partly in degraded buffer zones, thus conserving more remnant bushland while increasing the risk to the wetland health, or alternatively enforcing the buffer in favour of clearing more remnant bushland. The degree of compromise will influence criteria for development.

iii. The subdivision design in relation to the conservation values.

Location of building envelopes on blocks should be more of a clustered arrangement adjacent to the roadways to optimise intact areas of bushland. If I understand the map correctly, the access road to building envelopes closest to the EPP wetland runs right along side the wetland boundary. This is inappropriate, given the damage to fringing vegetation, possibility of pollution runoff into wetland, and unspecified provision of appropriate drainage.

iv. Any other comments.

The proposed rural residential rezoning should incorporate a management plan for the remnant vegetation and EPP wetland, which incorporates appropriate land management practices including appropriate drainage, sewage etc.

It is recommended that horses not be allowed on the subdivision even if contained within the building envelopes and out of the bushland. The size of the building envelopes does not allow for an appropriate area to be assigned to keeping a horse and even though it is stated that the council has the right to order the removal of a horse if it causes damage to the bushland, it rarely works that way.

The subdivision should also
- adopt a strategic firebreak system;
- bushland should not be exposed to reticulation or fertiliser drift;
- there should be no fences between lots to allow free movement of fauna; and
- dieback hygiene should be used at all stages of the proposal and owners notified of appropriate measures to prevent spread of dieback.

RECOMMENDATION
This proposal should be treated as correspondance. The proponent should be required to undertake a comprehensive analysis of the flora, fauna and wetland values of the land to define the values of the site (consistent with the structure plan). Any revised proposal should reflect the values of this plan and demonstrate how these values could be retained. If the proposal were to proceed as it stands at present, it should be subject to formal assessment to achieve the above.

- ENV. REVIEW INSTRUCTIONS -

2.5 Environmental factors relevant to the scheme

The EPA has identified some environmental factors which are relevant to the scheme area and should be addressed in the Environmental Review document. These factors are listed below (see Table 1).

Table 1: Environmental factors relevant to the scheme

CONTENT		SCOPE OF WORK		
Factors	**Site specific factor**	**Work required for the environmental review**	**Objectives**	**Additional comments**
BIOPHYSICAL				
Vegetation Communities.	Vasse & Yoongarillup/ Bassendean Central & South	*How will the Town Planning Scheme ensure that Regionally Significant vegetation on the site is protected from any development resulting from this amendment and managed appropriately?* Survey native wetland and upland vegetation to provide information on the vegetation communities on the lot and their condition. The survey should be made in accordance with the floristic analysis methodology of Gibson *et al.* 1994 (Gibson N, Keighery BJ, Keighery GJ, Burbidge AH and Lyons MN 1994 *A Floristic Survey of the Southern Swan Coastal Plain.* Report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)) and should provide structural information also. Vegetation communities and their condition should be mapped and reference should be made to vegetation complexes as mapped by Heddle et al. 1984. Identify the impacts of future development consistent with the proposed zoning on the regionally significant vegetation. Identify appropriate measures to reduce impacts of such future development on the regionally significant vegetation, including the abutting foreshore reserve, and to ensure its ongoing protection and management, including foreshore management.	Maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities.	
Wetlands	**Swan Coastal Plain**	*How will the Town Planning Scheme ensure that the ecological and hydrological functions of the wetland (including as they relate to the Peel Inlet -Harvey Estuary system) are protected from any development resulting from this amendment?* Identify appropriate measures to ensure that the integrity, functions and environmental values will be maintained Determine an appropriate setback and floor levels for development from the wetland.	Maintain the integrity, functions and environmental values of wetlands.	

POLLUTION MANAGEMENT				
Water quality	impact of on-site effluent disposal	*How will the amendment ensure that ground water quality is not adversely affected as a result of any surface water contamination resulting from fill on the site and future development of the site?* Discuss potential nutrient exports from effluent disposal, management of nutrient inputs and transport pathways including surface water flow, the stormwater system and the wetland. Demonstrate that the proposal complies with the Western Australian Planning Commissions Statement of Planning Policy No2, The Peel-Harvey Coastal Plain Catchment. Demonstrate that the amendment will not result in adverse impact environmental values (including the Peel Inlet) due to adverse water quality from the site.	Ensure that the beneficial uses of groundwater can be maintained consistent with the draft WA Guidelines for Fresh and Marine Waters (EPA 1993)	Relates to water quality impacts arising from the proposed development
SOCIAL SURROUNDINGS				
Mosquitoes	The risk to human health from mosquito breeding areas.	*How will the amendment ensure that mosquito breeding on this site will be adequately controlled?* Identify potential mosquito and midge breeding areas on this site and adequate control measures. Demonstrate that the breeding of mosquitoes and midges on the site can be adequately controlled without adversely affecting other flora and fauna, with particular reference to potential impacts on areas with regionally significant vegetation and wetlands	Control the breeding of mosquitoes without adversely affecting other flora and fauna	Applies to the whole of the site.

2.6 Deferred environmental factors

- none identified at this stage

Terrestrial Ecosystems Branch
DEPARTMENT of ENVIRONMENT

DRAFT Memorandum

ATTENTION:	Glen McLeod-Thorpe
FROM:	Bridget Hyder-Griffiths
DATE:	28 October 2004
SUBJECT:	Shire of Waroona Amendment 4 – Lot 3 Southern Estuary Road, Lake Clifton

As discussed previously there are a series of issues associated with the Flora and Vegetation Assessment report Lots 1 and 3, Southern Estuary Road Lake Clifton, identified below.

The flora and vegetation report should be consistent with *EPA Guidance 51 Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in WA* (EPA 2004). The report is not always clear and it is difficult to determine what the values of the site are.

The species list is very limited given that 5 plots were completed. The plot data for the 5 10x10m plots should be included in an appendix to enable regional comparison. The report should also clearly identify the Heddle vegetation complexes for the site on a map and the percentage remaining of the original extent on the Swan Coastal Plain.

The criteria used to determine the regional significance of natural areas on the Swan Coastal Plain should be those identified in Appendix 3 of *EPA Guidance 10 Level of Assessment for proposals affecting natural areas within the System 6 region and Swan Coastal Plain portion of the System 1 Region* (EPA 2003) consistent with *Bush Forever* (Government of WA 2000). The criteria used in the flora and vegetation report do not appear to be the full *Bush Forever* criteria see statement below from the :

"Due to the current survey detecting a lack of TEC's and significant flora along with the small size and high disturbance level within parts of the subject land, these bushland remnants do not fit the criteria for regionally significant bushland (DEP 2000)." This statement is incorrect as it a lack of TEC etc does not mean a site is not regionally significant. In addition the reference DEP 2000 does not occur in the reference list so it is not clear what document is being referred to.

A flora and vegetation assessment should be made of the Conservation Category wetland on the site as it comprise part of the natural values of the site.

The ecological linkage values of the site should also be considered in any assessment.

Shire of Waroona Town Planning Scheme No. 7 – Amendment No. 4

Rezoning of Lot 3 Pt Wellington Location 2942 Old Bunbury and Southern Estuary Roads, Waroona from 'General Farming' to 'Rural Residential'

5 October 1998
The Shire of Waroona referred Amendment 4 to the EPA. The proposed rezoning of Lot 3 Pt Loc 2942 Old Bunbury and Southern Estuary Roads, Waroona from 'general farming' to 'rural residential' will facilitate the subdivision of the subject lot into 14 rural residential lots of approximately 2ha each.

13 November 1998
The Shire of Waroona faxed a copy of the Minutes of the Council Meeting of 27 October 1998, wherein Council resolved to initiate the amendment, and an unsigned (draft) copy of the Council Resolution following a phone call from DEP (now DoE) Officer on 29 October 1998.

15 January 1999
The Shire of Waroona faxed a signed copy of the initiating resolution to the EPA, following a phone call from DEP 26 November 1998.

2 February 1999
Proposal was referred to the Conservation Branch (now Ecological Systems – Terrestrial) for advice relating to remnant vegetation, appropriate buffer from wetland etc.

8 February 1999
The EPA wrote to the Shire requesting a modified subdivision plan which demonstrated compliance with the EPA's guidelines regarding wetland buffers.

15 February 1999
The Conservation Branch provided advice:
- Remnant vegetation: may, with further study, be considered regionally significant. Comprehensive assessment of site's conservation and open space values requested.
- Wetland buffer: currently inadequate, minimum dryland buffer is 50m or 1m AHD higher than the furthermost extent of the wetland vegetation, whichever is the greatest.
- Building envelopes: should be relocated.
- Management plan: required for remnant vegetation and EPP wetland.

15 March 1999
Simon Bain (planning consultant representing landowner) submitted a modified plan of subdivision showing a 50 metre dryland buffer and an overall decrease in the number of lots from 14 to 12.

18 March 1999
Revised proposal was referred to the Conservation Branch with a request for a site inspection.

25 March 1999
The Conservation Branch provided advice:
- Recommended formal assessment and noted it is unlikely to be considered environmentally acceptable.

31 March 1999
Site inspection.

16 April 1999
The Conservation Branch provided advice following site inspection:
- Vegetation on property mostly Very Good to Excellent Condition (Good at the edges). Few species of weed evident. Vegetation not typical of the mapped vegetation complexes (Vasse and Yoongarillup) and more typical of Bassendean Central and South which has 12% remaining and very poorly represented in the conservation estate (less than 1% outside metropolitan area). This suggests that the bushland area is of conservation significance.
- Current proposal considered environmentally unacceptable. Recommended that proponent alter design to include larger lots greater than 10ha, rehabilitation of the wetland buffer, external road

access, building envelopes, statutory covenants protecting bushland and a thorough vegetation and flora survey/assessment.

20 April 1999
Shire was advised of condition/status of vegetation on site and asked to confirm that the modified plan of subdivision submitted on 15 March 1999 was sent on behalf of the Shire, before EPA could set a level of assessment for the amendment.

4 May 1999
The Shire advised that they had not received a copy of revised plan of subdivision.

28 May 1999
The Shire advised that they were willing to support the revised plan of subdivision and asked that the amendment proceed.

18 June 1999
Level of assessment set by EPA as 'Level 3 – Assessed, Environmental Review Required'.

30 June 1999
Assessment Strategy Meeting held.

2 July 1999
Draft Instructions issued for comment, comments received from MfP, CALM, and WRC.

8 July 1999
Environmental Review Instructions issued.

20 July 1999
Simon Bain advised that a submission on the Peel Region Scheme had been lodged on behalf of the landowner and requested further consideration of the matter be deferred until the WAPC determined whether it would reserve the land under the PRS. If the matter is to be considered further, they would like an alternative plan with no roads to be considered.

23 July 1999
Appeals on instructions closed. Appeal lodged by the Conservation Council of Western Australia Inc.

29 July 1999
The Office of the Minister for the Environment forwarded a copy of the Conservation Council's appeal to the DEP, requesting a report on the matters raised.

10 August 1999
Letter sent to consultant/shire confirming that proponent no longer wishes to proceed with the proposal at this stage and may withdraw the proposed amendment. The appeals on the instructions should not progress until clarification is received from Council.

2 September 1999
The Shire confirmed acceptance that the amendment be suspended.

25 October 1999
The DEP advised the Minister for the Environment that further consideration of the matter is being deferred and that the appeal determination should be deferred pending further advice.

21 March 2000
DEP sent letter to Shire requesting an update on amendment.

31 March 2000
Shire confirmed that proponent wanted amendment held in abeyance awaiting outcome of PRS.

6 July 2000
A copy of the Shire's letter was forwarded to the Appeals Convenor's Office.

31 May 2001
Simon Bain submitted a modified plan of subdivision showing an overall decrease in the number of lots from 12 to 10 (9 x 2ha lots fronting Southern Estuary Road with the balance contained in 1 lot), asked for informal comment.

6 September 2001
Letter sent to Simon Bain advised that given that as a formal level of assessment had been set, the DEP was limited in its ability to give advice on the revised plan without going through the formal assessment process. It was noted that while the revised plan was likely to have a reduced environmental impact, insufficient scientific data was available to determine if this impact was acceptable. It was requested that a survey of the wetland and upland vegetation be carried out to enable the DEP to provide advice on the modified proposal, that the amendment and plan be justified in terms of the information collected and that scheme provisions be developed. It was also noted that the reactivation or modification of the proposal would need to be endorsed by the Shire.

23 May 2002
The Office of the Appeals Convenor wrote to the Shire asking if the amendment is to proceed or be withdrawn.

2 October 2002
The Shire advised the Appeals Convenor that no further action is required at the present time. Therefore, the Appeals Convenor's decision was 'withdrawn' (details: this proposal is not proceeding).

31 March 2004
Simon Bain submitted a copy of the flora and vegetation survey undertaken for Lot 3 and the adjoining property to the north. Attached was a revised plan of subdivision showing an overall decrease in the number of lots from 10 to 9.

8 April 2004
EPA Service Unit requested copy of colour maps via telephone.

13 April 2004
3 colour plans sent to the EPA Service Unit.

15 April 2004
Flora and Vegetation Assessment Report referred to Ecological Systems – Terrestrial Branch for comments/advice regarding adequacy of report and its findings.

27 September 2004
Landowner (David Alnutt) called EPA Service Unit for an update on survey analysis.

28 September 2004
Ecological Systems – Terrestrial Branch advised that no progress had been made, file returned to Planning and Infrastructure Branch. Landowner informed that no progress had been made, would now be made a priority by ES Branch in light of Environmental Review Instructions.

18 October 2004
Flora and Vegetation Assessment Report re-referred to Ecological Systems – Terrestrial Branch for advice in light of the Environmental Review Instructions issued by the EPA on 8 July 1999.

26 October 2004
EPA Service Unit spoke to the Office of the Appeals Convenor regarding outstanding appeal. Letter of 23 May 2002 and Shire's response 2 October 2002 faxed for records.

27 October 2004
EPA Service Unit spoke to Shire. New planning manager didn't know history of project, but amendment was still active (i.e. not withdrawn).

28 October 2004
Terrestrial Ecosystems Branch provided advice on Flora and Vegetation Assessment Report.

2 November 2004
Letter sent to Shire advising of project history and current status of amendment. The Shire was asked to confirm the status of the amendment so that an appropriate recommendation could be made to the Appeals Convenor and the Minister for the Environment regarding the outstanding appeal.

21 December 2004
Email sent to Shire asking for an update on when a response could be expected.

22 December 2004
Shire advised via email that the amendment is to proceed now. Simon Bain requested meeting to discuss prior to the outstanding appeal on the content of the instructions being determined.

1 February 2005
Meeting held to discuss amendment and process. Resolved to determine appeal on instructions and seek further advice from Terrestrial Ecosystems Branch regarding vegetation on site.

18 February 2005
Site inspection.

ENTERED ON GIS

Name: Submission for Rezoning of Lot 3 Wellington Location 2942 Southern Estuary Road Lake Clifton from "Rural 1 General Farming" to "Rural 6 – Rural – Residential"

Date:

Capture Author:

Comments:

Polygon

Created to match documented study area with high level of accuracy

Accuracy Levels:

- High = Document contained visual and or described spatial references easily copied, resulting in little or no polygon boundary errors
- Acceptable = Document contained visual and or described spatial references with complex boundaries, resulting in minor boundary errors
- Low = Document contained little or no visual and or described spatial references, resulting in polygon boundary errors

Attributes

Report Info – Captured without problems

Custodial/Contact – Captured without problems

Content – Captured without problems

SHIRE OF WAROONA
TOWN PLANNING SCHEME NO. 7
AMENDMENT No. 17

SUBMISSION FOR REZONING OF LOT 1 PT. WELLINGTON LOCATION 2942 SOUTHERN ESTUARY ROAD. LAKE CLIFTON FROM 'RURAL 1 GENERAL FARMING' TO 'RURAL 6 - RURAL - RESIDENTIAL'

Prepared for: J. F. TREMBATH

Prepared by: SJB TOWN PLANNERS
& URBAN DESIGN
Unit 17
D. & J. Fowler Building
33 Pakenham Street
FREMANTLE W.A. 6160
Ph/Fax (08) 9433-1130
e-mail: simonbai@icenet.com.au

JANUARY 2005

Plate 1: Southern Estuary Road on western boundary of property.

Plate 2: Cleared grazing portion of property showing some regrowth

* BRONWEN, AS DISCUSSED WE'LL MEET ON THE CORNER OF OLD BUNBURY + SOUTHERN ESTUARY ROAD AT ABOUT 10·15 AM ON FRIDAY 18/2 *

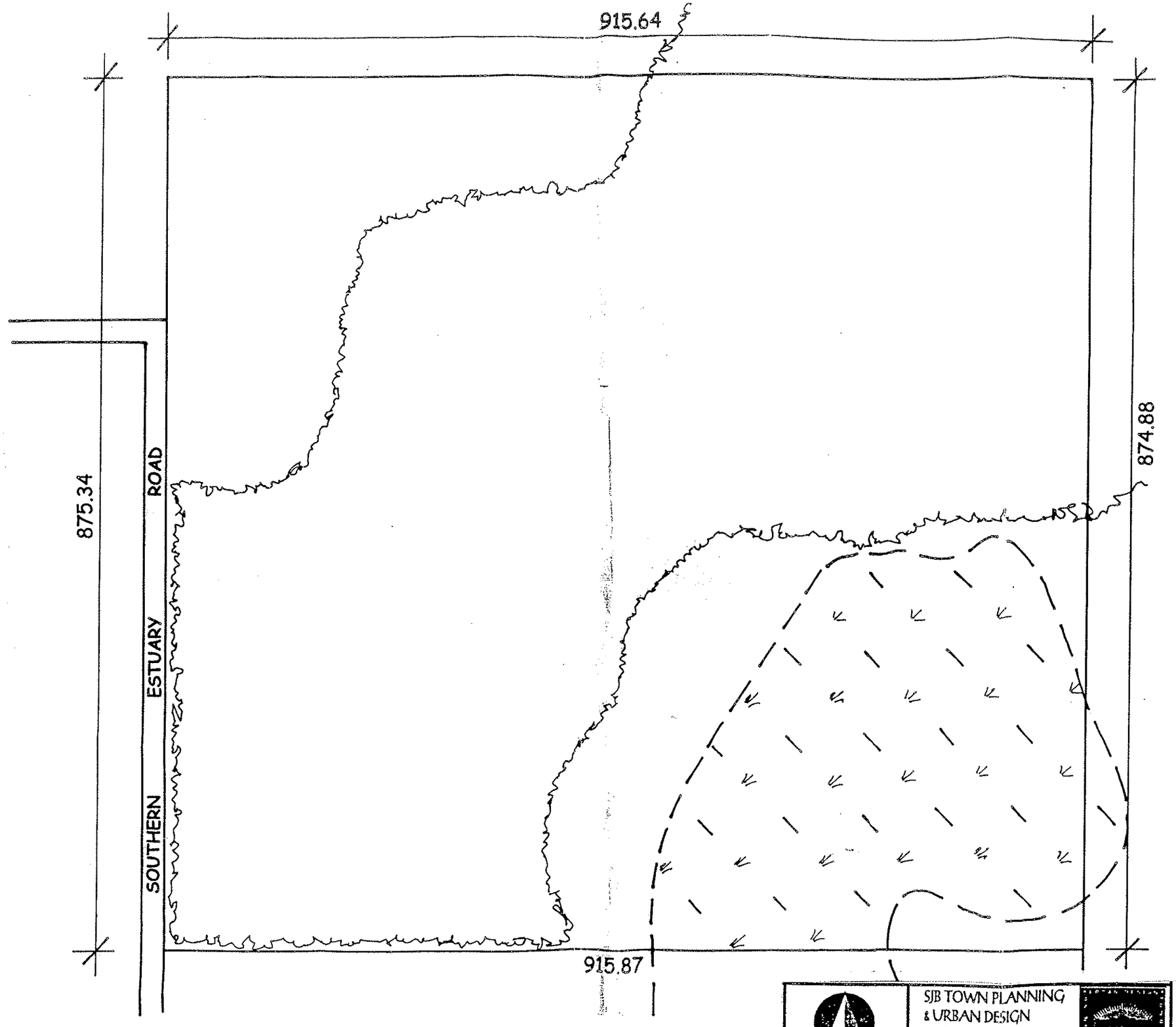
Figure 1

Cadastral Boundaries in Vicinity of Study Area

CLIENT:	SJB Town Planners
PROJECT:	Lots 1 & 3 Southern Estuary Rd
JOB NO:	1153-03
DATE:	02/03/04

ecoscape
ENVIRONMENTAL SCIENCE LANDSCAPE ARCHITECTURE MAPPING SCIENCE
5 STIRLING HIGHWAY NORTH FREMANTLE WESTERN AUSTRALIA 6159
TEL +61 8 9430 8955 FAX +61 8 9430 8977 EMAIL mail@ecoscape.com.au

- BRONWEN I'LL HAVE DIVISIONAL MOBILE - 0404 816 007 -



Note: All areas and dimensions are subject to survey.

SJB TOWN PLANNING & URBAN DESIGN
1st FLOOR, D & J FOWLER BUILDING
33 - 35 PAKENHAM STREET, FREMANTLE WA 6160
PH/FAX 9433 1130 MOBILE 0-19 915 652
DATE: OCTOBER 2004
SCALE 1:7500 PLAN 2

SITE PLAN

LOT 1, LOCATION 2942 - SOUTHERN ESTUARY ROAD

Plate 3 :Wetland Vegetation.

Plate 4: Driveway to Eastern Part of Property on Southern Boundary through the Wetland.

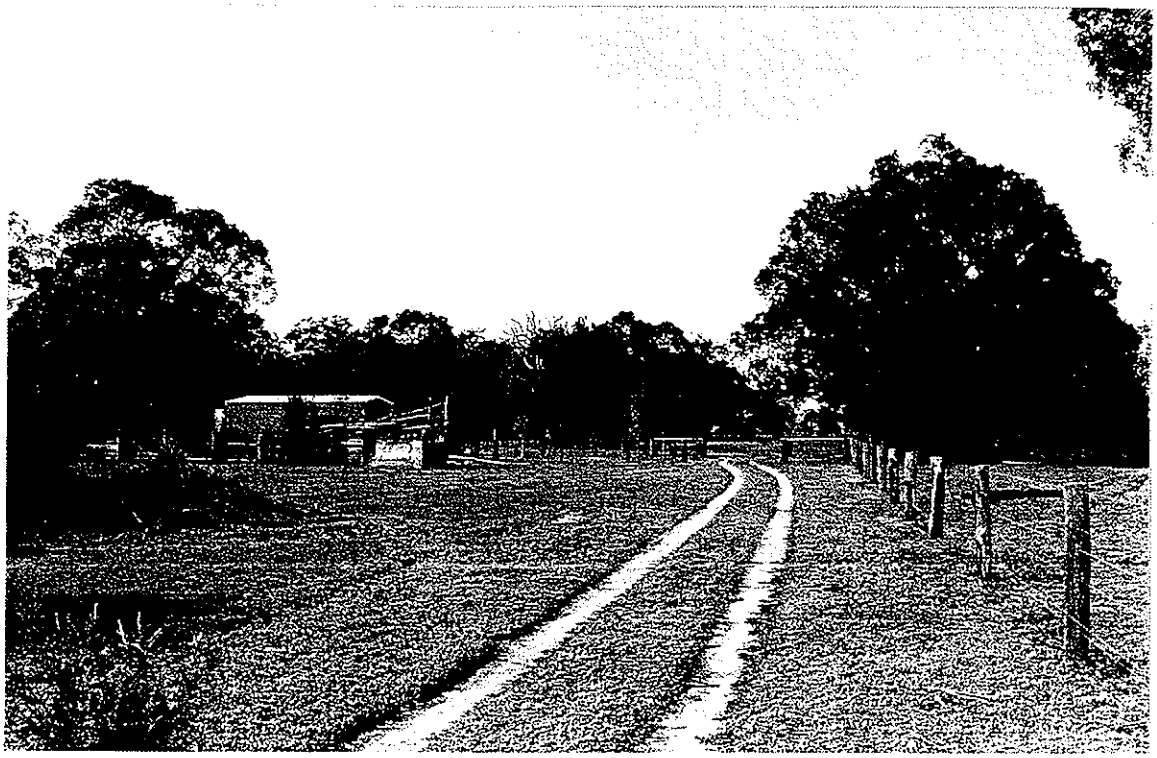
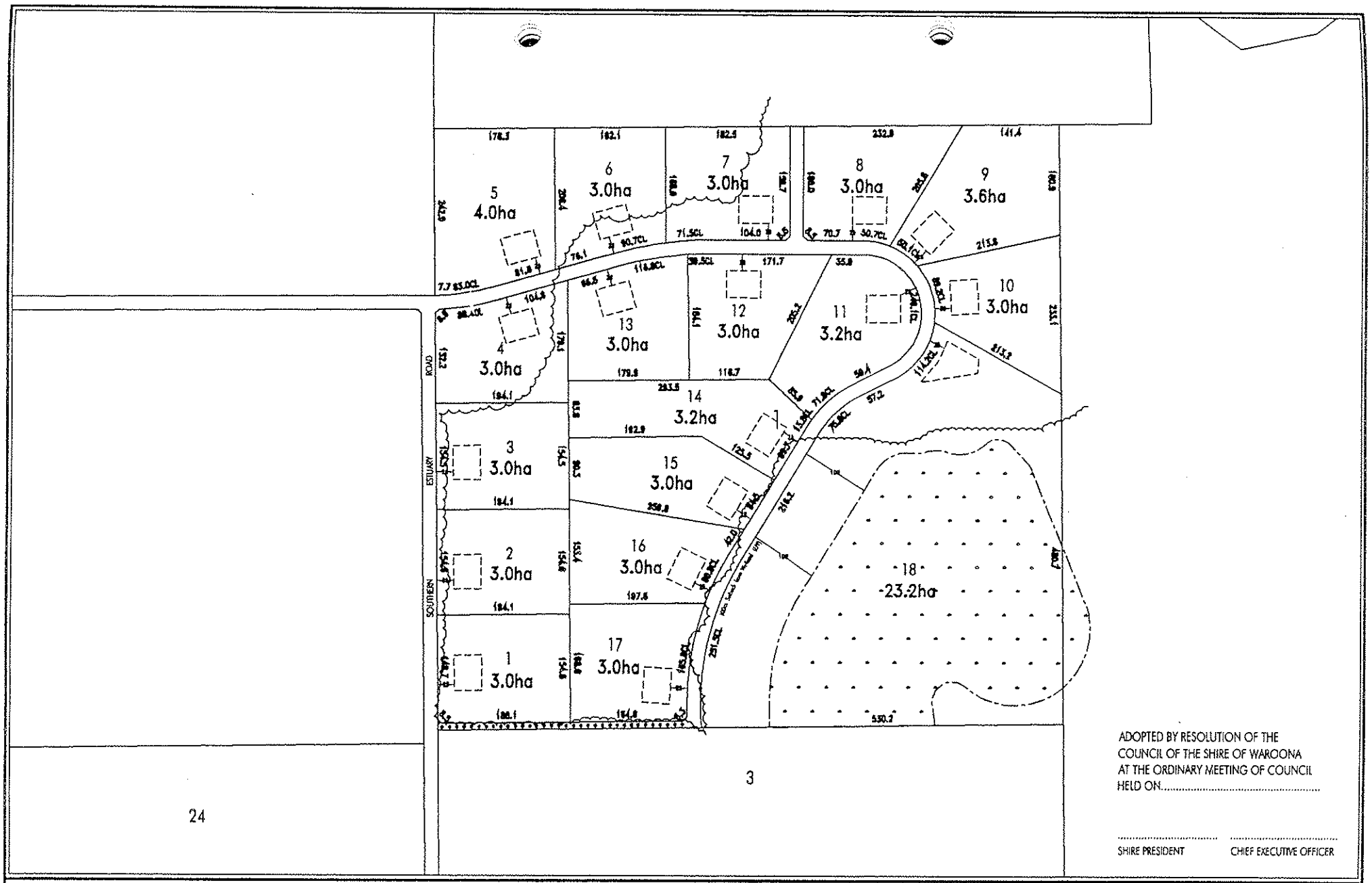


Plate 5: Existing shed on property

Plate 6: Central cleared portion of Property

Plate 7: Western Bush Area

Plate 8: Access track to central portion of Property.



ADOPTED BY RESOLUTION OF THE COUNCIL OF THE SHIRE OF WAROONA AT THE ORDINARY MEETING OF COUNCIL HELD ON.....

SHIRE PRESIDENT

CHIEF EXECUTIVE OFFICER

SUBDIVISION AND GUIDE PLAN

LOT 1, LOCATION 2942

SOUTHERN ESTUARY ROAD, WAROONA

LEGEND:

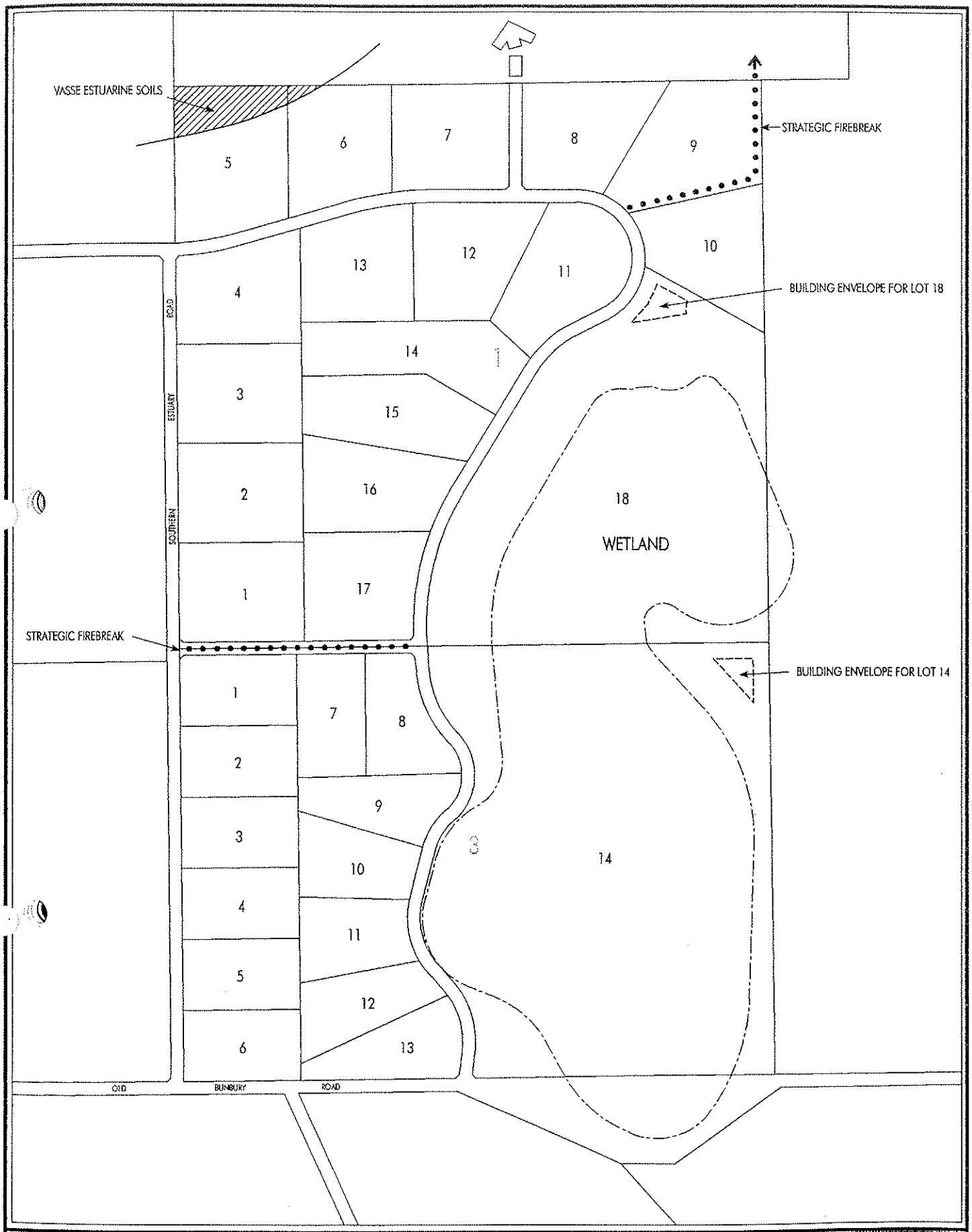
- REMNANT VEGETATION
- WETLAND
- DEVELOPMENT ENVELOPE (2000m²)
- STRATEGIC FIREBREAK

Note: All areas and dimensions are subject to survey.

SJB TOWN PLANNING & URBAN DESIGN

DATE: OCTOBER 2004

SCALE 1:5000 @ A3 PLAN 3



CONCEPT PLAN

LOT 1, LOCATION 2942
SOUTHERN ESTUARY ROAD
WAROONA

Australian Association of Planning Consultants

Note: All areas and dimensions are subject to survey.

SJB TOWN PLANNING & URBAN DESIGN
1st FLOOR, D & J FOWLER BUILDING
33 - 35 PAKENHAM STREET, FREMANTLE WA 6160
PH/FAX 9433 1130 MOBILE 0419 915 852

DATE: OCTOBER 2004
SCALE 1:7500 PLAN 4

6.0 EXISTING ENVIRONMENT

The description of the existing environment targets those environmental components of relevance to the proposed subdivision of the subject land, namely:

- landform and soils;
- vegetation;
- drainage and nutrients;
- groundwater;
- wetlands and
- flooding;

6.1 Landforms and Soils

The subject land comprises of three landform types (see Plan 5) namely the Bassendean dune and sandplain system and the Pinjarra Plain. (Van Goole 1992).

The Bassendean dune and sandplain system occupy approximately 50% (or 30.5 hectares) of the subject land and are characterised by low relief dunes and gently undulating sandplains which range from about 4 - 9 metres above Australian Height Datum (AHD). The component land units and dominant soil types are as follow:

B2 Flat to gently undulating sandplain and broad, very low rises with well drained deep bleached grey sands with a pale yellow B horizon or weak iron organic hardpan at 1 - 2 metres.

B6 Sandplain (and broad extremely low rises) similar to B4 with imperfectly drained soils.

The Bassendean dune and sandplain system is the oldest dune system having originated along a coastline as calcareous sands and then been subjected to extensive leaching which removed carbonates (McArthur and Bettenay, 1960).

The Pinjarra Plains occupy approximately 50% (or 30.5 hectares) of the subject land and are described as broad low relief plain west of the foothills, comprising predominantly Pleistocene flurial sediments and some Holocene alluviam associated wit current drainage system. Major soils are naturally poorly drained with many swamps. The component land unit and soils, which generally occur at (or below) 4 metres AHD, are as follow:

P1d Shallow pale sand to sandy loam over clay; imperfect to poorly drained and generally moderately susceptible to salinity.

The soils of the Vasse estuarine and lagoon deposits are extremely variable, being formed on unconsolidated estuarine alluvium, and may be subject to periodic inundation.

V3 Sand flats similar to V2, but marginally higher and commonly supporting standards of Melaleuca SPP.

6.2 Vegetation

The natural vegetation associated with the landforms and soils of the Mandurah - Bunbury Coastal Zone have been described previously by McArthur and Bartle (1980).

6.2.1 Dryland Vegetation

The dryland vegetation mainly consists of native overstorey species with a limited diversity of native understorey species. Marri (*Eucalyptus calophylla*) trees are the dominant overstorey species with jarrah (*E marginata*) scattered throughout (see Plate 7). A number of species forming a middle canopy include peppermints (*Agonis flexuosa*), wattles (*Acacia rostillifera*) and Christmas trees (*Nuytsia floribunda*).

The understorey has been subject to grazing with hardy species such as zamia palm (*Macrozamia riedlei*), prickly moses (*Acacia pulchella*) and *Jacksonia furcellata* still persisting.

The dryland vegetation types are proposed to be retained as important landscape features and enhanced through regrowth in the cleared areas.

6.2.2 Wetland Vegetation

The wetland vegetation is associated with the low lying estuarine deposits. The swamp of the subject land has small shrub and groundcover species and paperbarks (*Melaleuca rhaphiophylla*) which range from 2 - 3 metres in height.

Several clumps of native rushes, a section of bulrushes (*Typha domingensis*), scattered robin red breast bushes (*Melaleuca laterita*) and a tall thicket of paperbark. Naturally regenerating flooded gums were also noted within this wet area (see Plate 3).

6.3 Drainage and Nutrients

The soils of the subject land proposed for Rural - Residential development mostly belong to the Bassendean sands and are characteristically well drained.

Potential surface run would be associated with that collected from residences throughout the subject land and the internal subdivision road proposed. The requirement for houses to collect rainwater as the main water supply for drinking and other domestic purposes results in minimal additional discharge of stormwater to the environment.

The road will be designed so that stormwater discharges to the west, away from the wetland, to the Bassendean Sands.

A small portion of the site is included within the Pinjarra Plain which is notably poorly drained. There will be only one building envelope in this area and rainwater will be collected.

A small portion of the site is contained within the Vasse estuarine which is subject to periodic inundation. No building envelopes are proposed in this area. In addition, recently an access road was constructed along the northern boundary to provide access to Lot 501. This will separate this portion of the property from the wetland/floodplain to the north.

The drainage and nutrient risk will be minimised with the proposed re-vegetation of most of this area.

Consequently, no surface run-off is expected as a result of the development and drainage from the site is likely to flow naturally through subsurface sediments via the underlying superficial aquifer. The subject land is within the Peel-Harvey catchment which flows predominantly in an easterly direction toward the Harvey River.

The Peel-Harvey Estuary is currently under stress caused by the inflow of excessive nutrients, principally phosphorus and nitrogen. This state of nutrient enrichment or eutrophication has resulted in algal blooms and associated water quality problems within the estuarine system.

Care must be taken to limit the export of nutrients to the estuarine system in order to assist the estuary reach a healthy state which inhibits the incidence of algal blooms. Increased flushing associated with the recent opening of the Dawesville Channel is hoped will improve the water quality of the Peel-Harvey Estuarine System. More details in relation to groundwater hydrology and flooding are provided in the following sections.

A detailed vegetation survey was undertaken by Ecoscape Pty. Ltd. This report is contained in Appendix B.

6.4 Groundwater Hydrology

There is no available hydrological data found to date which specifically relates to the groundwater characteristics of the subject land. However, characteristics of the groundwater system in the vicinity has been described in a regional study of the relationship between groundwater and the coastal lakes between Mandurah and Bunbury (Commander 1988) and a local study of groundwater in relation to Lake Clifton (Moore and Turner 1988). These studies have determined that the lake and groundwater systems are closely related.

The subject land occurs within the South West Coastal Groundwater area as gazetted by the Water and Rivers Commission (WRC) who also manage usage of the underlying groundwater via water abstraction licences.

The groundwater consists of superficial formations which are primarily unconfined aquifers consisting of very thin freshwater lenses.

Hydrogeological information suggests that the groundwater flow over the site is generally in an easterly direction toward the Harvey River. The superficial groundwater aquifer flows under a very low hydraulic gradient which limits the rate of directional flow.

Drilling tests carried out in close proximity to the subject land (Commander 1988) indicate that the maximum water table levels associated with the superficial formations range from 1.5 = 2.0m AHD. This corresponds to a watertable at 2 - 5 metres below ground surface in the areas proposed to support dwellings. According to WRC Allocation Policy (WRC 1989) the local availability of this groundwater resource for abstraction purposes is generally limited to 1500m3/lot/year on lots between 2 - 4 ha. However, details regarding precise abstraction rates, groundwater quality and availability for each lot would require site specific assessment and approval from WRC.

The superficial formations are underlain by the Leederville formation WRC information indicates there is little water available for private abstraction from this confined aquifer and that it should generally not be considered as a groundwater resource for allocation. In addition, it is proposed to prevent bores so as to reduce the risk of lowering the water levels in the wetland.

6.5 Wetlands

There is one wetland within the subject land.

The wetland is dominated by paperbark (*Melaleuca rhaphiophylla*) thickets and has had the understorey vegetation mostly intact (see Plate 3).

The wetlands are protected by the Environmental Protection (Swan Coastal Plain Lakes) Policy, 1992 and also included Draft Policy Lakes boundary.

All of the wetland identified on the EPP is preserved.

On the western side land is cleared abutting the wetland. This will be utilised for a road and will act as a buffer to the rural-residential land uses. It is already cleared and as such there is no buffer vegetation. Use of this area as a road will prevent further clearing of the natural bush area to the west.

The 20m wide road reserve and the 25m setback to residences provide a 45m buffer to the wetland, in line with the recommended 50m buffer to wetland vegetation.

6.6 Flooding

The low lying nature of the subject land suggests that it may be susceptible to flooding during the winter months. There are no flood maps available, however,

discussions with officers at WRC Flood Management Branch indicate that the subject land is unlikely to experience flooding problems.

Inspection during winter indicates that water does not extend outside of the wetland. The bush area is completely dry.

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CRN 21289 4

DEPARTMENT OF ENVIRONMENTAL PROTECTION
RECORDS SECTION
21 MAR 2005
FILE NO TP130/3
NAME L. McLEOD-THORPE
FILE NO
NAME

15 March 2005

Our ref: 4862-1153-05L
Mr Glen McLeod - Thorpe
Environmental Protection Authority
PO Box K822
Perth WA 6842

SCANNED

Dear Sir,

RE: FLORA SURVEY LOTS 1 AND 3 SOUTHERN ESTUARY RD LAKE CLIFTON

Included for your information is a map of Lots 1 and 3 Southern Estuary Rd Lake Clifton showing the waypoints and quadrats of the flora survey undertaken on the 27th November/1st December 2003 by Ecoscape.

The coordinates of each of these waypoints is listed along with the vegetation community defined at that point and the assessment of vegetation condition (Please refer to included data base file).

The species recorded for each vegetation quadrat as presented in Figure 4 is listed in Appendix 2.

This information presented here is all the field based data that was used to assess vegetation communities and significance in the Ecoscape Report **FLORA AND VEGETATION ASSESSMENT LOTS 1 and 3, SOUTHERN ESTUARY ROAD LAKE CLIFTON (2004)** that was undertaken for D.Allnutt and J.F. Trembath.

Yours sincerely,
ECOSCAPE (AUSTRALIA) PTY LTD

Vanessa Yeomans
Botanist/Environmental Scientist

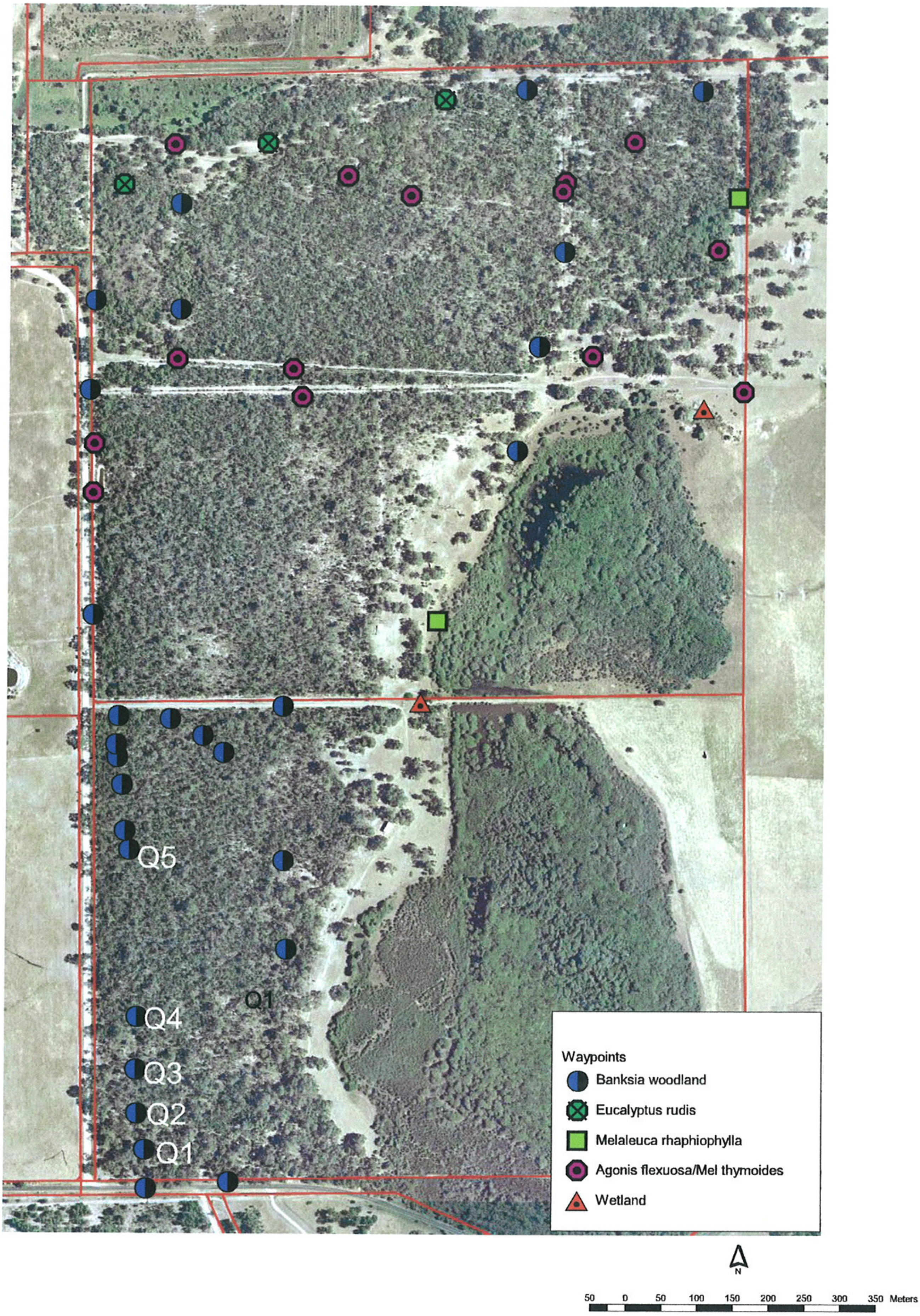

Figure 4

Waypoints and Quadrat Locations

CLIENT:	SJB Town Planners
PROJECT:	Lots 1 & 3 Southern Estuary Rd
JOB NO:	1153-03
DATE:	10/03/05

ecoscape

WAYPOINTS LAKE CLIFTON FLORA SURVEY

WAYPOINT	LAT	LONG	DATE	VEG_COMM	VEG_CON
001	-32.81777688	115.71654260	27-NOV-03 02:22	Banksia woodland	6
002	-32.81728336	115.71652642	27-NOV-03 02:25	Banksia woodland	3
003	-32.81682738	115.71640849	27-NOV-03 02:53	Banksia woodland	3
004	-32.81626948	115.71639776	27-NOV-03 03:18	Banksia woodland	4
005	-32.81559893	115.71641922	27-NOV-03 03:28	Banksia woodland	3
006	-32.81347998	115.71632266	27-NOV-03 04:28	Banksia woodland	3
007	-32.81323859	115.71625829	27-NOV-03 04:29	Banksia woodland	3
008	-32.81265386	115.71621537	27-NOV-03 04:35	Banksia woodland	3
009	-32.81230518	115.71615100	27-NOV-03 04:36	Banksia woodland	3
010	-32.81214424	115.71612954	27-NOV-03 04:38	Banksia woodland	3
011	-32.81177946	115.71616709	27-NOV-03 04:40	Banksia woodland	0
012	-32.81182238	115.71693957	27-NOV-03 04:42	Banksia woodland	3
013	-32.81204232	115.71742773	27-NOV-03 04:44	Banksia woodland	3
014	-32.81225690	115.71773350	27-NOV-03 04:45	Banksia woodland	3
015	-32.81363555	115.71862400	27-NOV-03 04:50	Banksia woodland	4
016	-32.81475672	115.71866146	27-NOV-03 04:52	Banksia woodland	4
017	-32.81770715	115.71777105	27-NOV-03 04:58	Banksia woodland	0
094	-32.80763813	115.71577013	01-DEC-03 01:37	Banksia woodland	5
095	-32.80726799	115.72329640	01-DEC-03 01:44	Pep/Kunzea	5
096	-32.80774006	115.72557092	01-DEC-03 01:48	Pep/Kunzea	6
097	-32.80593761	115.72520077	01-DEC-03 01:52	Pep/Kunzea	4
098	-32.80528315	115.72551191	01-DEC-03 01:55	Mel rhaphiophyll	4
099	-32.80391523	115.72497547	01-DEC-03 01:57	Banksia woodland	5
100	-32.80455359	115.72394550	01-DEC-03 02:00	Pep/Kunzea	5
101	-32.80381330	115.72295308	01-DEC-03 02:04	Corner Fence	0
102	-32.80506321	115.72290480	01-DEC-03 02:06	Pep/Kunzea	5
103	-32.80593761	115.72288334	01-DEC-03 02:08	Banksia woodland	4
104	-32.80713388	115.72249711	01-DEC-03 02:10	Banksia woodland	4
105	-32.80517587	115.72286725	01-DEC-03 02:13	Pep/Kunzea	4
106	-32.80387223	115.72232008	01-DEC-03 02:15	Banksia woodland	5
107	-32.80400106	115.72110772	01-DEC-03 02:18	E rudis	4
108	-32.80521342	115.72059274	01-DEC-03 02:20	Pep/Kunzea	5
109	-32.80495592	115.71964860	01-DEC-03 02:27	Pep/Kunzea	5
110	-32.80471453	115.71867228	01-DEC-03 02:28	Cleared Area	6
111	-32.80453213	115.71844697	01-DEC-03 02:29	E rudis	4
112	-32.80528852	115.71713805	01-DEC-03 02:31	Banksia woodland	4
113	-32.80454286	115.71705222	01-DEC-03 02:33	Pep/Kunzea	5
114	-32.80504175	115.71629047	01-DEC-03 02:36	E rudis	3
115	-32.80650624	115.71585596	01-DEC-03 02:40	Banksia woodland	3
116	-32.80662962	115.71712732	01-DEC-03 02:43	Banksia woodland	4
117	-32.80726262	115.71707904	01-DEC-03 02:45	Pep/Kunzea	3
118	-32.80740210	115.71881711	01-DEC-03 02:46	Pep/Kunzea	3
119	-32.80794390	115.72496474	01-DEC-03 02:51	Wetland	4
120	-32.80845352	115.72215915	01-DEC-03 03:05	Banksia woodland	6
121	-32.81061538	115.72095752	01-DEC-03 03:09	Mel rhaphiophyll	3
122	-32.81164535	115.72069466	01-DEC-03 03:11	Wetland	2
123	-32.81167218	115.71863472	01-DEC-03 03:13	Banksia woodland	4
124	-32.81049200	115.71579158	01-DEC-03 03:15	Banksia woodland	4
125	-32.80895242	115.71580768	01-DEC-03 03:15	Pep/Kunzea	4
126	-32.80833014	115.71582913	01-DEC-03 03:17	Pep/Kunzea	4
127	-32.80775615	115.71895123	01-DEC-03 03:19	Pep/Mel thymoide	3
128	-32.80779370	115.72060883	01-DEC-03 03:20	Jarrah	5

APPENDIX TWO: VASCULAR SPECIES LIST FOR LOTS 1 AND 3
SOUTHERN ESTUARY RD LAKE CLIFTON MARCH 2004

Note: * indicates weed species

FAMILY		Species	Quadrat 1	2	3	4	5
ZAMIACEAE		*Macrozamia riedlei*	x				
POACEAE		*Austrostipa flavescens*			x		
	*	*Avena barbata*	x				
	*	*Briza maxima*	x	x		x	x
	*	*Bromus diandrus*	x				
CYPERACEAE		*Baumea vaginalis*					
		Lepidosperma leptostachyum	x				
		Lepidosperma longitudinale					
		Lepidosperma squamatum		x			x
RESTIONACEAE		*Desmocladus asper*	x			x	
		Desmocladus fasciculatus	x	x			
		Hypolaena exsulca	x	x		x	x
		Lyginia barbata			x	x	x
		Meeboldina scariosa					
JUNCACEAE		*Juncus kraussii*					
		Juncus pallidus					
DASYPOGONACEAE		*Dasypogon bromeliifolius*	x	x	x	x	x
		Lomandra hermaphrodita		x	x	x	
		Lomandra nigricans		x			
XANTHORRHOEACEAE		*Xanthorrhoea brunonis*	x	x	x	x	x
ANTHERICACEAE		*Thysanotus dichotomus*			x	x	x
COLCHICACEAE		*Burchardia umbellata*	x			x	
HAEMODORACEAE		*Conostylis aculeata*	x	x	x	x	x
IRIDACEAE		*Patersonia occidentalis*				x	
ORCHIDACEAE		*Prasophyllum* sp.	x			x	
		Orchidaceae sp.	x			x	
CASUARINACEAE		*Allocasuarina fraseriana*				x	
PROTEACEAE		*Banksia attenuata*		x	x		
		Banksia grandis	x	x		x	
		Banksia illicifolia				x	x
		Banksia prionotes					x
		Petrophile linearis		x			x
		Stirlingia latifolia		x	x	x	x
		Xylomelum occidentale	x		x		x

APPENDIX TWO: VASCULAR SPECIES LIST FOR LOTS 1 AND 3
SOUTHERN ESTUARY RD LAKE CLIFTON MARCH 2004

Note: * indicates weed species

			Quadrat				
			1	2	3	4	5
LORANTHACEAE		*Nuytsia floribunda*					
DROSERACEAE		*Drosera erythrorhiza*					x
PITTOSPORACEAE		*Pronaya fraseri*		x			x
		Sollya heterophylla		x			
MIMOSACEAE		*Acacia extensa*					x
		Acacia pulchella			x		
		Acacia rostillifera					
		Acacia saligna					
		Acacia willdenowiana			x		
PAPLIONACEAE		*Bossiaea eriocarpa*	x	x		x	x
		Bossiaea ornata		x		x	
		Gompholobium confertum				x	x
		Gompholobium tomentosum		x	x		
		Hardenbergia comptoniana	x				x
		Hovea trisperma					x
		Jacksonia sternbergiana					
		Kennedia prostrata		x			x
GERANIACEAE	*	*Pelargonium capitatum*	x				
TREMANDRACEAE		*Tetratheca hirsuta*					
POLYGALACEAE		*Comesperma calymega*		x		x	x
DILLENIACEAE		*Hibbertia huegelii*				x	
		Hibbertia hypericoides		x			x
		Hibbertia racemosa		x	x	x	x
MYRTACEAE		*Agonis flexuosa*					
		Calytrix flavescens	x		x		
		Corymbia calophylla				x	
		Eucalyptus marginata			x	x	x
		Eucalyptus rudis					
		Hypocalymma robustum	x	x	x	x	
		Kunzea ericifolia					
		Kunzea recurva					
		Melaleuca cuticularis					
		Melaleuca lateritia					
		Melaleuca preissiana					
		Melaleuca rhaphiophylla					
		Melaleuca systena		x			
		Melaleuca thymoides	x		x	x	x
EPACRIDACEAE		*Astroloma pallidus*	x	x			x

APPENDIX TWO: VASCULAR SPECIES LIST FOR LOTS 1 AND 3 SOUTHERN ESTUARY RD LAKE CLIFTON MARCH 2004

Note: * indicates weed species

			Quadrat				
			1	2	3	4	5
		Conostephium pendulum				x	
GOODENIACEAE		*Dampiera linearis*				x	x
		Lechenaultia floribunda				x	
STYLIDIACEAE		*Stylidium* sp.					x
ASTERACEAE	*	*Hypochaeris glabra*	x				
		Podolepis gracilis			x		
		Trichocline spathulata					
		Waitzia suaveolens		x			

Lot 3 Southern Estuary Road

Local Government Authority Boundaries

0.06 0 0.06 0.12 0.18 0.24 0.3 Kilometers

GDA Projection: Map Grid of Australia (MGA94)

Glen's photos

Lot 1 Southern Estuary Road

3776

Very Good - Excellent

Local Government Authority Boundaries

B. Keighery
18/2/05

0.06 0 0.06 0.12 0.18 0.24 0.3 Kilometers

GDA Projection: Map Grid of Australia (MGA94)

DEP Internal Use Only
This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.

Environmental Protection Authority

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141 St Georges Terrace, Perth, Western Australia 6000.
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Postal Address: PO Box K822,
Perth, Western Australia 6842.
Website: www.epa.wa.gov.au

Bowen FY1.

Acting Director General
Department of Environment
PO Box K822
PERTH WA 6842

Our Ref 371/05
Enquiries Glen McLeod-Thorpe (9222 7182)

Attention: Gary Whisson

SCHEME/AMD TITLE: **Shire of Waroona Town Planning Scheme No. 7 Amendment No. 17 rezoning from 'Rural 1 – General Farming' to 'Rural 6 – Rural Residential'**

SCHEME/AMD LOCATION: **Lot 1 Southern Estuary Road**

LOCALITY: **Lake Clifton**

RESPONSIBLE AUTHORITY: **Shire of Waroona**

Please find attached for your information the instructions specifying the scope and content of the environmental review document for the above amendment. These instructions, which have been forwarded to the responsible authority, are not yet final as they are subject to appeal to the Minister for the Environment under Section 100 of the *Environmental Protection Act 1986*.

Any appeals should be lodged in writing, accompanied by the $10.00 appeal fee, to:

Office of the Appeals Convenor
13th floor, Allendale Square
77 St George's Terrace
PERTH WA 6000

Appeals on these instructions must be received by the Appeals Convenor by 5:00 pm on **7 July 2005**.

If there are no appeals you will be informed by the Environmental Protection Authority (EPA) Service Unit. The attached instructions would then become the final instructions.

In the event of there being appeals, there can be two outcomes:

a) The Minister may dismiss the appeals and would notify you accordingly. In this case the attached instructions would become the final instructions.

b) The Minister may uphold the appeals and would notify you accordingly. In this case the attached instructions would be modified and sent to you as the final instructions.

The environmental review document must be prepared in accordance with the final instructions. When this has been achieved, the document will be released for public review and you will be sent a copy.

Yours faithfully

Walter Cox
CHAIRMAN

23 June 2005

ENVIRONMENTAL ASSESSMENT OF PLANNING SCHEMES AND THEIR AMENDMENTS

Shire of Waroona Town Planning Scheme No. 7

Amendment No. 17

(Assessment No. 1567)

ENVIRONMENTAL REVIEW INSTRUCTIONS

1. Introduction

The *Environmental Protection Act 1986* (the Act) sets out that where a planning scheme, or an amendment to a scheme, is judged to have a significant environmental impact it will be subject to an assessment by the Environmental Protection Authority (EPA) under Section 48A of the Act. These schemes/amendments are being assessed because they raise significant environmental factors.

Where a scheme/amendment is subject to an assessment by the EPA, the responsible authority is required to produce an Environmental Review addressing the environmental factors relevant to the scheme/amendment. The EPA issues instructions for the scope and content of the Environmental Review. Below are the instructions for the above scheme amendment.

The Environmental Review is then made publicly available with the amendment document to enable members of the public and relevant agencies to comment on the possible environmental impacts of the scheme amendment. Additional information on the purpose and functions of environmental assessment of a scheme amendment is given in Attachment 1.

The scheme that is the subject of this assessment is called Shire of Waroona Town Planning Scheme No. 7. A map showing the location of the scheme amendment is shown as Attachment 2.

2. Instructions

2.1 Status of the instructions

The EPA, in its formulation of the instructions, endeavours to come to an agreement with the Responsible Authority and any other involved agency about the scope and content of the Environmental Review document. The EPA Service Unit provides services and facilities for the EPA. In many cases the EPA Service Unit will act for the EPA.

Other parties may also have a view about the contents of the instructions. To accommodate this additional input the instructions are subject to appeal to the Minister for the Environment.

Where an appeal is lodged and upheld the Chairman of the EPA will issue the final instructions, consistent with the appeal decision. Where no appeals are received or all appeals are dismissed, this document is the final instructions for the preparation of the Environmental Review.

2.2 General information

The fundamental requirements of the Environmental Review document are to:

a) describe the state of the environment affected by the scheme amendment, indicating at least the scheme amendment area and its immediate surroundings;

b) describe the purpose of any zoning or reservation;

c) identify those environmental factors which should be considered in relation not only to the scheme amendment being assessed but also to later levels of planning, such as subdivision and development;

d) identify those environmental factors which require alternative procedures or processes to address any requirements for on-going long-term management;

e) for those environmental factors not relevant to the scheme amendment being assessed, describe the process (approvals and the like) necessary to address those factors later, including likely referral to the EPA; and

f) for those factors relevant to the scheme amendment being assessed, describe the extent to which the environment could be protected from both direct and indirect impacts, including:
   - identifying the portions of the environment of highest conservation value and describing how the scheme amendment plans to protect them;
   - listing those land-uses that will be permitted without further environmental approval being required under proposed zoning;
   - predicting the potential environmental impacts of these land uses;
   - describing the scheme provisions which will allow management of those impacts to ensure the environment is protected to an acceptable level in the best manner possible; and
   - identifying potential conflicts of land uses having environmental implications and how the environmental impacts are to be managed.

The Environmental Review document should consist of sections that deal with the above requirements. The recommended format for the Environmental Review document is enclosed as Attachment 3.

An important aspect of the environmental impact assessment process is the review by the public. The EPA wants to receive public input into the possible environmental impacts of this scheme amendment and its implementation. To facilitate adequate public input, the Environmental Review should be made available as widely as possible and at a reasonable cost.

2.3 Environmental factors relevant to this scheme amendment and deferred environmental factors

The EPA, following consideration of the factors related to the scheme amendment , is likely to identify some key factors which need to be given special attention and which should form the principal basis of the EPA assessment report to the Minister for the Environment. These key factors are termed the "environmental factors relevant to the scheme amendment".

The EPA has also identified other environmental factors which it considers to be relevant to the scheme amendment but are likely to be best addressed at a later level of planning. These factors are considered to be significant enough to warrant attention as part of the environmental review of this scheme amendment to the extent that the Responsible Authority should show how these factors could be addressed at a later level of planning. These factors are called "deferred environmental factors". Please note that no deferred environmental factors have been identified at this stage.

The EPA, in consultation with the Responsible Authority and the relevant agencies, has identified a list of factors likely to be found to be the "environmental factors relevant to the scheme amendment" and those likely to be found to be "deferred environmental factors". This list is provided to assist with the preparation of the Environmental Review document, but during the course of the preparation of the document other factors may be found also to be relevant, and they should be included in the detailed discussion.

A copy of the form used to identify the environmental factors (the "filtering form") is included as Attachment 4.

2.4 General scope of the Environmental Review - Limit of the Environmental Review

The scheme amendment has been initiated to:

- rezone the subject land (Lot 1 Southern Estuary Road, Lake Clifton) within the Shire of Waroona Town Planning Scheme No. 7 from 'Rural 1 – General Farming' to 'Rural 6 – Rural Residential' to facilitate an eighteen (18) lot rural residential subdivision.

2.5 Environmental factors relevant to the scheme amendment

The EPA has identified some environmental factors which are relevant to the scheme amendment area and should be addressed in the Environmental Review document. These factors are listed over (see Table 1).

Table 1: Environmental factors relevant to the scheme amendment

CONTENT		SCOPE OF WORK
Factors	**Site specific factor**	**Work required for the environmental review**
BIOPHYSICAL		
Flora	Vegetation communities and flora	*How will any native vegetation and flora of conservation significance likely to be impacted by the Amendment, be protected?* • Identify and assess the values and significance of vegetation communities and flora within the Amendment area (including the wetlands on site) and immediate adjacent area and describe these values in a local, regional and State context. • Describe and assess the potential direct and indirect impacts that may result from any use or development, allowed by the Amendment, on any significant vegetation communities and flora within the Amendment area (including the wetlands on site) and adjacent area. • In the event that significant vegetation and flora is impacted, describe measures to be implemented, to ensure that the abundance, diversity, geographic distribution and productivity of significant vegetation and flora is maintained. The EPA's Guidance Statement No. 51 *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* is to be used. Baseline studies by appropriately trained and experienced persons under appropriate seasonal conditions to identify the diversity, distribution and condition of the existing flora species and vegetation communities that may be directly or indirectly impacted by the Amendment. The detail and timing of the baseline studies will be dependent upon the vegetation community type. Liaison with relevant DoE and CALM officers is recommended. In cases where a vegetation community's floristic composition is distinctive, more detailed information is required. Map and describe the vegetation and relate these mapped units to soil/ landform types. The survey should address all relevant regional datasets and reports/publications, detail the site specific vegetation and flora attributes, and identify the conservation significance of the site taking into consideration the EPA's Position Statement No. 3 *Terrestrial Biological Surveys as an Element of Biodiversity Protection*. Discuss the potential direct and indirect impacts of the Amendment on the existing environment, in a local and regional context, including adjacent reserves and ecological linkages. Consider cumulative impacts of habitat loss on terrestrial flora. Describe proposed management measures, including subdivision design, fire, weed, and dieback management, to minimise clearing or loss of vegetation. Detail how the management measures will be carried out, and to whose satisfaction this work will be done.

CONTENT		SCOPE OF WORK
Factors	**Site specific factor**	**Work required for the environmental review**
	Declared Rare and Priority Flora and other significant flora and communities (including threatened ecological communities)	Identify species of Declared Rare and Priority Flora that may be directly or indirectly impacted by the Amendment. Identify other species or communities of significance that may be impacted by the Amendment and discuss the reason for their conservation significance. These species or communities may include undescribed taxa; new records for the region; species or taxa that are endemic to the region or at the limit of their range; or species confined to specific sites of limited occurrence in the region. Subject to the appropriate permits, retain voucher specimens for all significant species and lodge them with the WA Herbarium. The EPA's Guidance Statement No. 51 *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* is to be used. Flora survey work should be undertaken during the flowering season (including a spring survey). Describe management measures to prevent impacts on Declared Rare Flora, Priority Flora, and other significant flora and communities (including threatened ecological communities), and to whose satisfaction the work will be done. It is recommended that Appendix 3 of the EPA's *Guidance No 10 Level of assessment for proposals affecting natural areas within the System 6 Region and Swan Coastal Plain portion of the System 1 Region* (EPA 2003) be used as guide to determining the regional or local significance of the vegetation, flora and fauna on the site.

CONTENT		SCOPE OF WORK
Factors	**Site specific factor**	**Work required for the environmental review**
Fauna	Faunal assemblages including Specially Protected (Threatened Fauna), Priority Fauna and other fauna of conservation significance	*How will any fauna assemblage and fauna of conservation significance likely to be impacted by the Amendment, be protected?* • Identify and assess the values and significance of faunal assemblages within the Amendment area (including the wetlands on site) and immediate adjacent area and describe these values in a local, regional and State context. • Describe and assess the potential direct and indirect impacts that may result from any use or development, allowed by the Amendment, on any significant fauna assemblages and species within the Amendment area (including the wetlands on site) and adjacent area. • In the event that significant fauna and faunal assemblages are impacted, describe measures to be implemented, to ensure that the abundance, diversity, geographic distribution and productivity of significant fauna is maintained. Undertake a suitable fauna survey to describe and map faunal habitats, determine fauna species present or likely to use habitats in the amendment area, and to identify any Specially Protected (Threatened) Fauna, CALM Priority Fauna and other regionally significant fauna (e.g. those species of vertebrate fauna listed in Bush Forever as declining on the Coastal Plain), which may utilise the proposed Amendment area (including the wetlands on site) or immediate adjacent areas and may be directly or indirectly impacted by the Amendment. The EPA's Guidance Statement No. 56 *Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* is to be used. The survey should utilise any regional datasets or regional publications on fauna. Liaison with relevant DoE and CALM officers is recommended. Identify and assess the potential impacts (direct and indirect) on these fauna as a result of the implementation of the proposed Amendment. Discuss the representation of habitat, in existing conservation reserves, suitable for any identified Specially Protected (Threatened) Fauna, CALM Priority Fauna and other regionally significant fauna that will be impacted by the proposal. Consider cumulative impacts of habitat loss on terrestrial fauna and role of remnant vegetation in ecological linkages in the area. Discuss what management measures are proposed to manage impacts.
Wetlands	Conservation Category Wetlands	*How will the ecological and hydrological functions of the wetlands likely to be impacted by the Amendment, be protected?* • Identify and assess the functions, values and significance of wetlands within the Amendment area and adjacent area. • Describe and assess the potential direct and indirect impacts that may result from any use or development, including use for drainage purposes, allowed by the Amendment, on any wetlands within the Amendment area and adjacent area. • In the event that significant wetlands may be impacted, describe appropriate measures and scheme provisions to be implemented, including but not limited to buffer requirements and setbacks, stormwater management, drainage, effluent management, rehabilitation and restoration, fencing, management plans and floor levels for development, to ensure that the integrity, functions, environmental values and long term viability of the wetlands will be maintained. This assessment of wetlands within the Amendment area is to be carried out in accordance with current DoE policy and guidelines.

CONTENT		SCOPE OF WORK
Factors	**Site specific factor**	**Work required for the environmental review**
POLLUTION MANAGEMENT		
Water	Surface and groundwater quality and quantity	*How will the Amendment ensure that surface and groundwater quality and quantity is not adversely affected as a result of any use or development allowed by the Amendment?* Detail site drainage, modifications to drainage and potential for contamination. Assess the implications this may have on local surface and ground water quality, including the risk of salinity problems, and surface and ground water quantity. Detail measures proposed to: • ensure the quality and quantity of surface and ground water is maintained so that existing and potential uses, including ecosystem maintenance are protected; and • manage impacts. Describe management measures, including: • effluent disposal; and • drainage and nutrient management, to be implemented to reduce the quantity of drainage runoff from the site and to prevent impacts on water quality. Demonstrate that the proposal complies with the EPA's *Environmental Protection (Peel Inlet – Harvey Estuary) Policy 1992* and the Western Australian Planning Commission's (WAPC) *Statement of Planning Policy 2.1 – The Peel-Harvey Coastal Plain Catchment.* Both policies require that future development within this catchment does not impact on the quality of water entering the Peel Inlet – Harvey Estuary. Document how stormwater management will be implemented in accordance with the Department of Environment's *Stormwater Management Manual.* The proposal is located in the South West Coastal Ground Water Area where groundwater use is limited to 1,500kl/ha/yr. Demonstrate that the proposal meets the requirements of the Department of Environment.

CONTENT		SCOPE OF WORK
Factors	**Site specific factor**	**Work required for the environmental review**
SOCIAL SURROUNDINGS		
Heritage	Aboriginal culture and heritage	*Are any areas significant to Aboriginal culture or heritage likely to be impacted by any use or development resulting from the Amendment? If so, how can these areas be protected in the long term?* • Identify and assess the values and significance of Aboriginal cultural and heritage sites within the Amendment area and immediate adjacent area. • Describe and assess the potential direct and indirect impacts that may result from any use or development, allowed by the Amendment, on any significant Aboriginal cultural and heritage sites. • In the event that significant Aboriginal cultural and heritage sites are impacted, describe measures to be implemented to avoid and protect such areas and/or manage potential impacts. It is recommended that suitably qualified consultants be engaged to conduct ethnographic and archaeological surveys of the Amendment and immediately adjacent areas, to ensure compliance with Section 17 of the *Aboriginal Heritage Act 1972*. The surveys should include consultation with all Aboriginal interest groups and the Department of Indigenous Affairs, so that all sites on or adjacent the designated land are avoided or identified. Surveys should involve archival research, consultations and on the ground inspections. If necessary, obtain any permits or Ministerial approvals required under the *Aboriginal Heritage Act 1972,* including a Section 18 permit from the Minister for Indigenous Affairs, or indicate at what stage of the planning process this will be done.
Visual amenity	Landscape	*How will the Amendment ensure that visual amenity is not adversely affected as a result of any use or development allowed by the Amendment?* Describe and assess landscape character and views of the Amendment area and adjacent area and describe how character and views may be affected by development within the Amendment area. Community values of the area should be considered as part of the landscape character assessment. Detail proposed measures to address these potential impacts on landscape character and affected views, including subdivision design. Provide details of potential impacts on visual character, including affected views from local vantage points, within the Amendment area, from the Amendment area, and to the Amendment area from outside the Amendment area. Detail proposed measures to mitigate visual impacts.
Mosquitoes		*How will the Amendment adequately control and manage mosquito breeding within the Amendment area so as to reduce the risk to human health?* Identify potential mosquito and midge breeding areas on this site, including those that may result from subsequent development, and detail adequate control measures. Demonstrate that the breeding of mosquitoes and midges on the site can be adequately controlled without adversely affecting other flora and fauna, with particular reference to potential impacts on areas with regionally significant vegetation and wetlands.

2.6 Deferred environmental factors

- none identified at this stage

Other environmental factors

For context, the Environmental Review should also provide at least a summary discussion of all environmental aspects of the scheme amendment area. For environmental factors not required to be addressed in detail (i.e. factors not listed in the table above, such as topography), the Environmental Review should provide an outline description and indication of the extent of environmental management.

During the environmental review process, should it appear that significant environmental impacts may be associated with any of these other factors, then the EPA Service Unit should be approached for advice on the work to address the factor.

Attachment 1

Information on the purposes and functions of the environmental assessment of schemes and their amendments

Purpose of the environmental assessment

The purpose of an environmental assessment is to ensure that the scheme takes proper account of the relevant environmental factors. To do this the EPA reports to the Minister for the Environment on the environmental factors relevant to the scheme, recommends environmental conditions under which the scheme may operate and provides other recommendations as it sees fit.

Functions of an Environmental Review

The primary function of the Environmental Review is to provide information about the environmental factors related to the proposed scheme to the EPA to enable it to evaluate the significant effects on the environment of the scheme and provide independent environmental advice to Government.

An additional function of the document is to clearly communicate details of the proposed scheme and its future implications to the public so that the EPA can obtain informed public comment on relevant environmental factors and their areas. Effective public information and involvement is an essential part of environmental impact assessment.

These instructions are issued to assist in identifying matters that should be addressed within the Environmental Review document. However, other relevant matters may arise during the preparation of the environmental review document and these should also be included.

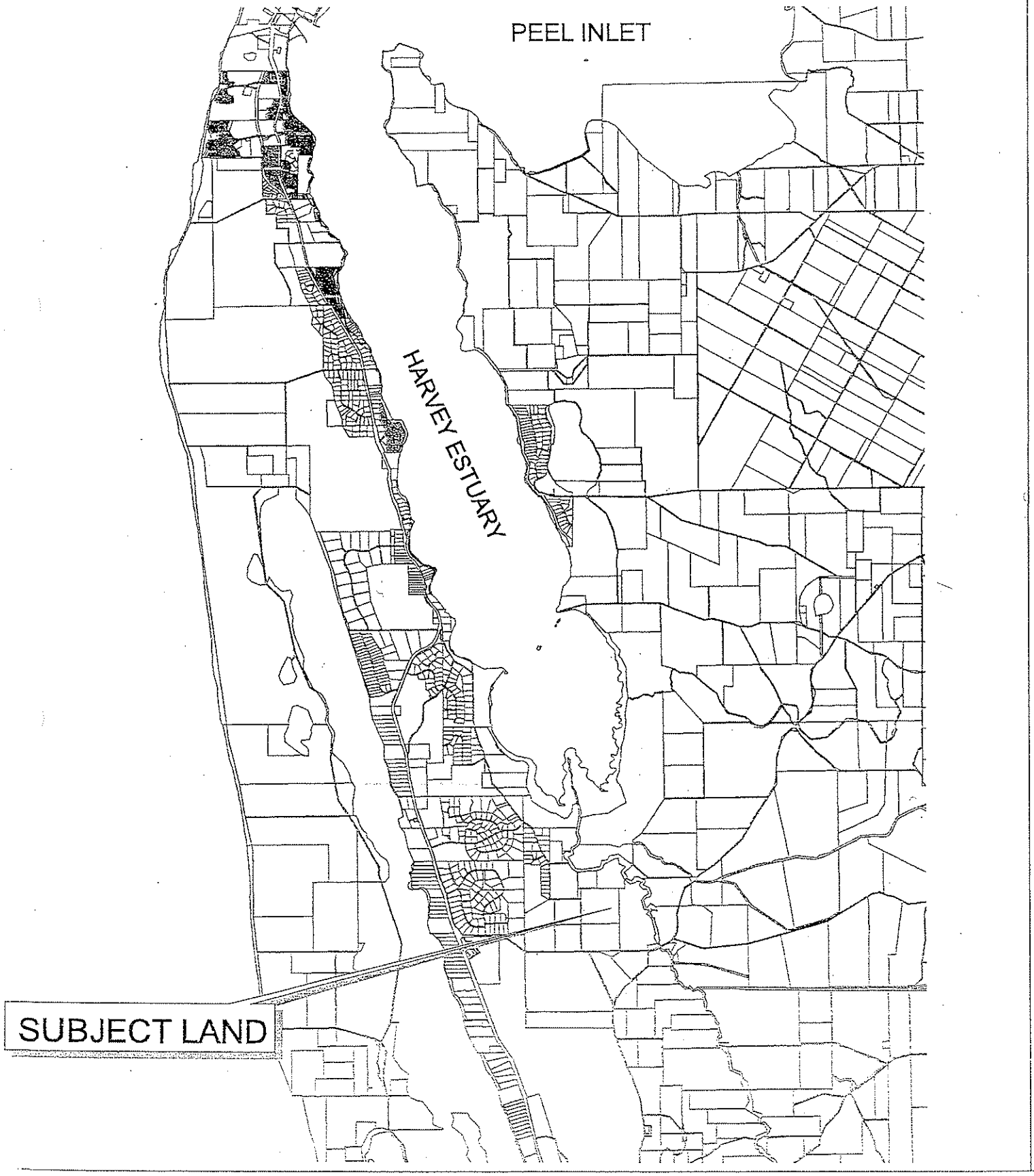
The Environmental Review document will be made publicly available during the advertised period for the scheme and submissions from other agencies and the public will be sought. The Responsible Authority is required to forward submissions relating to the Environmental Review to the EPA and respond to the EPA on environmental factors or conditions and procedures which may apply should the proposal be implemented that are raised in those submissions. Based on the information in the Environmental Review document, the response to submissions and its own investigations the EPA will then report to the Minister for the Environment.

Please note:

Statements of fact, conclusions or theories used to justify arguments should be substantiated and supported by technical work undertaken to prepare the Environmental Review. In addition, statements of fact, conclusions and arguments should be based on information that has a high degree of scientific certainty. Where these are not met the EPA will provide advice consistent with the precautionary principle.

Attachment 2

Location of Scheme/amendment



Attachment 3

Environmental Review Document Structure

The legislation requires that the Environmental Review Document be part of the amendment documentation. For our purposes it would be useful for it to be a separate volume, perhaps an appendix to the amendment document.

The following structure is suggested:

1. How to make a submission

- Include a standard sheet to guide the reader how to make a submission.

2. Introduction

- Clarify who is the Responsible Authority.
- Provide a paragraph or two to explain the background to the Environmental Review document and the process to date (see recent examples of Environmental Reviews) eg the Environmental Review Document is prepared in accordance with S48A of the *Environmental Protection Act* 1986; and, the Environmental Review Document should be read in conjunction with the amendment document.
- Refer the reader to a process flow chart, eg from the *Planning for People* document, which could be Appendix A1.

3. Summary of Amendment

- Should include a brief description of scheme / amendment and its purpose.
- Cross reference to the amendment document, particularly the scheme text / provisions, wherever possible.
- Include a clear location map and any other figures to describe the amendment.

4. Environmental Factors Relevant to the Scheme

These factors will be specified by the EPA in the final instructions. Each factor should be addressed using the following format:

4.1 Environmental factor: eg wetlands

- Provide background on the current state of the environment.
- Discuss any polices relevant to the environmental factor.

4.2 Preliminary EPA objective / proposed alternative objective

- The EPA objectives for each environmental factor will be provided to the Responsible Authority following the issuing of the final instructions.

4.3 Potential impacts

- This section should outline the potential impacts that could result from the implementation of the scheme / amendment.

4.4 Proposed management

- How the scheme / amendment, provisions or zoning pattern address the impacts on environment.
- How scheme provisions will be implemented and how subsequent planning stages will address the impacts on the environment.

4.5 Proposed outcome

- Given the proposed management, can the EPA objective be met?
- On evaluation of the above (4.1 to 4.4), if it appears the EPA objective cannot be met this section provides the opportunity to offer an alternative objective and justify why the EPA should accept the alternative objective.

5. Deferred Environmental Factors (if applicable)

- These will have been identified in the instructions
- Alternatively, the document may argue why an environmental factor relevant to the scheme, as determined by the EPA, is considered to be a deferred factor.
- This section should largely follow the same format as Section 4 above.

6. Summary of scheme provisions

- This Section should reiterate the proposed management of the environmental factors (from Section 4).

7. References

8. Glossary (if necessary)

Appendices

A1 Flow chart of process

A2 Instructions and objectives

A3 Other information

Attachment 4

Department of Environmental Protection — Monday May 9 2005 11:48 AM

Record of Section 48 referrals received

Records details: CRN 212246 — Date of Letter 03/02/2005 — Date Referred : 09/02/2005 — Date More Info 24/04/2005

Referral details: Proposal: Shire of Waroona TPS 7 Amendment 17 rezoning from Rural 1 General Farming to Rural 6 Rural Residential

TITLE AND LOCATION CORRECT GMT (initial)

Location : Lot 1 Southern Estuary Road

Locality : Lake Clifton

Environmental Factors : Refer attached documentation (Decision to Assess or Not Assess Form 2) in support of recommendation based on criteria for the determination of the need for and level of environmental impact assessment in Western Australia.

Responsible Authority :

Company : Shire of Waroona
Contact Person :
Address : PO Box 20
Suburb : WAROONA
State : WA — Post code : 6215
Phone : 9733 7800 — Fax : 9733 1883

Other Parties :

Local Government Authority : Shire of Waroona

Decision Making Authorities : Minister for Planning, WAPC

Involved Agencies : Ministry for Planning, DoE, CALM

CC:

Signatures

Evaluation Division

Assessment officer(s): Glen McLeod-Thorpe

Project Officer(s) : ..... Date : 9.5.05

Date :

Manager : MRH Date : 9/5/05

Other divisional input (Where applicable)

Manager /Director: ..... Date :

Branch / Division :

Manager / Director : ..... Date :

Branch / Division :

Other Infromation :

Assessment Number: 1567 — Date: 10/05/05

Checked by: AO

INFORMATION FOR USE IN DETERMINING LEVEL OF ASSESSMENT FOR SCHEMES AND SCHEME AMENDMENTS UNDER SECTION 48A

Summary	Yes	No	N/A
Does the scheme/amendment impact any biophysical factors?	☑	☐	
Does the scheme/amendment impact any pollution management factors?	☑	☐	
Does the scheme/amendment impact any social surroundings factors?	☐	☑	
Does the scheme/amendment conform to existing policies, guidelines and criteria for EIA?	☐	☐	☑
Is further information required to determine level of assessment?	☐	☑	
Has the Regional Office of the DoE been consulted?	☑	☐	

RECOMMENDED LEVEL OF ASSESSMENT:

DoE Correspondence	☐
EPA Referral – More Information Requested	☐
Level 1 Assessment - Not assessed, no advice given	☐
Level 2 Assessment - Not assessed, non-binding advice given	☐
Level 3 Assessment - Assessed, Environmental Review Required	☑
Incapable of Being Made Environmentally Acceptable	☐

Summary For Inclusion In Report To Chairman:

ENVIRONMENTAL FACTORS:

- REMNANT VEGETATION - VASSE, YOONGARILLUP + BASSENDEAN COMPLEX CENTRAL + SOUTH
- WETLANDS (2 CCW's - 1 IS NOMINATED IN LAKES EPP)

POTENTIALLY SIGNIFICANT EFFECTS:

- CLEARING OF REGIONALLY SIGNIFICANT VEGETATION
- IMPACT ON WETLANDS, DEVELOPMENT ENCROACHING ON WETLANDS + BUFFER, POLLUTION AND DRAINAGE DISCHARGE INTO WETLANDS

MANAGEMENT:

TO BE DETERMINED THROUGH ENVIRONMENTAL REVIEW PROCESS - LAND USE OPTIONS + APPROPRIATE MANAGEMENT MECHANISMS TO BE DETERMINED.

ENVIRONMENTAL SIGNIFICANCE	LOW	MEDIUM	HIGH

ENVIRONMENTAL MATTERS			COMMENTS AND POSSIBLE IMPACTS
SECTION A: BIOPHYSICAL			
1. Does the scheme/amendment impact on areas of highest conservation value?	YES ☑	NO ☐	
(If 'Yes' tick the appropriate box below; if 'No' then proceed to 2.)			
The area covered by the scheme/amendment involves or is adjacent to:	Incl.	Adj	
• Land covered by recommendations for protection in the System 'Red Book' report;	☐	☑	SITE IS PART OF REGIONALLY SIGNIFICANT ECOLOGICAL LINKAGE TO HARVEY RIVER/ESTUARY.
• Land vested in NPNCA for the purpose of:			
◦ conservation of flora and fauna;	☐	☐	
◦ National Park; or	☐	☐	
◦ Conservation Park.	☐	☐	
• Other areas recommended for reservation by CALM and endorsed by Govt. for inclusion in CALM's Estate;	☐	☐	
• Land reserved as "Parks and Recreation" under the MRS;	☐	☐	'RURAL' UNDER PEEL REGION SCHEME 'OTHER SENSITIVE AREAS SUBJECT TO CLOSER INVESTIGATION' UNDER COASTAL + LAKELANDS PLANNING STRATEGY
• Areas managed for multiple use where conservation is one defined use;	☐	☐	
• Areas with rare vegetation communities or assemblages not adequately represented in secure conservation areas (eg Bushplan, TOPRPC);	☑	☐	'NATURAL RESOURCE AREA - SUBJECT TO FURTHER STUDY' UNDER INNER PEEL REGION STRUCTURE PLAN
• Land known to contain declared rare flora and fauna;	☐	☐	UNKNOWN AT THIS STAGE
• Land containing areas thought to be the habitat of Specially Protected (Threatened) Fauna;	☐	☐	
• Areas known or suspected to contain karst landforms;	☐	☐	
• Land listed as World heritage; or	☐	☐	
• Land listed by the Australian Heritage Commission.	☐	☐	
Will the scheme/scheme amendment allow for any land clearing and, if so, does Commissioner for Soil and Land Conservation approval need to be obtained?	YES ☑	NO ☐	YES, N/A

ENVIRONMENTAL MATTERS	COMMENTS AND POSSIBLE IMPACTS
2. Does the area covered by the scheme/amendment include any water resources of highest conservation value? (YES / NO) (If 'Yes' proceed to 2.1 below; if 'No' proceed to Section B, page 7)	

2.1 Wetlands, Watercourses & Rivers

The area covered by the scheme/amendment involves a wetland, watercourse or river:	Incl	Adj	Drain into
• nominated for protection in the Environmental Protection (Swan Coastal Plain Lakes) Policy 1992;	☑	☐	☐
• nominated for protection in the draft EPP for Lakes and Swamps of the South West Agricultural Zone;	☐	☐	☐
• recommended for protection in the Systems 'Red Book' reports;	☐	☐	☐
• on land vested in the National Parks and Nature Conservation Authority for the purpose of Conservation of Flora and Fauna, National Park or Conservation Park, or areas recommended, and endorsed by Government, for inclusion in CALM estate for conservation purposes;	☐	☐	☐
• in areas reserved as "Parks and Recreation" under the Metropolitan Regional Scheme;	☐	☐	☐
• in areas with rare vegetation communities considered by the EPA not adequately represented in secure conservation areas, or rare flora and fauna and their habitats, eg those areas identified in Perth's Bushplan;	☐	☐	☐
• recognised by international agreements because of their importance primarily for waterbirds and their habitats.	☐	☐	☐

2 × CCW Wetlands within subject land. 1 is listed on Lakes EPP and nominated in draft Wetlands EPP also.

Conservation category (if known) _____

Further information: _____

_____

ENVIRONMENTAL MATTERS				COMMENTS AND POSSIBLE IMPACTS
2.2 Estuaries and Inlets				
The area covered by the scheme/amendment involves:	Incl	Adj	Drain into	MARKET RIVER + ESTUARY
• an estuary or inlet.	☐	☐	☐	
Name of estuary or inlet: _____				

2.3 Coastline and Near-shore Marine areas.			
The area covered by the scheme/amendment involves a coastline or near-shore marine area:	Incl.	Adj	
• recommended for protection in the Systems Red Books' reports;	☐	☐	
• with mangroves present;	☐	☐	
• identified by CALM for inclusion on the List of Wetlands of International Importance (RAMSAR);	☐	☐	
• recommended by CALM for inclusion in its estate for conservation purposes;	☐	☐	
• reserved for "Parks and Recreation" under the Metropolitan Region Scheme;	☐	☐	
• with rare vegetation communities considered by the EPA not adequately represented in secure conservation reserves, or rare flora and fauna and their habitats ;	☐	☐	
• where recreational usage is high, such as beaches in the metropolitan region.	☐	☐	
Further information: _____			

ENVIRONMENTAL MATTERS		COMMENTS AND POSSIBLE IMPACTS
2.5 Public Water Source Areas - Groundwater or Surface Water		
The area covered by the scheme/amendment involves:	Yes	
• a proposed or existing groundwater source area:		
• Priority 1 UWPCA;	☐	
• Priority 2 UWPCA;	☐	
• Priority 3 UWPCA.	☐	
either		
• Jandakot Mound, or	☐	
• Gnangara Mound	☐	
• a proposed UWPCA groundwater source area:		
• Priority 1;	☐	
• Priority 2;	☐	
• Priority 3;	☐	
• Water and Rivers Commission gazetted groundwater areas outside the Perth metropolitan area;	☐	
• Priority 1;	☐	
• Priority 2;	☐	
• Priority 3;	☐	
• hy surface catchments where water is collected for public water supply purposes.	☐	
Indicate priority (if known) _____		

2.6 Catchments (Surface and Ground Water) With Special Requirements		
The area covered by the scheme/amendment involves:	Yes	
• Lake Clifton;	☐	
• Swan Coastal Plain Catchment of the Peel-Harvey Estuary;	☑	
• Swan and Canning Rivers and Ellen Brook;	☐	
• Lake Forrestdale;	☐	
• Thomsons Lake;	☐	
• Other: _____		

ENVIRONMENTAL MATTERS	COMMENTS AND POSSIBLE IMPACTS

SECTION B:

POLLUTION MANAGEMENT

1. Would the scheme/amendment allow for a land-use which will or could discharge a pollutant? YES / NO

(If 'Yes' indicate the appropriate category(s) by ticking the boxes and give a brief description of industry/land-use; if 'No' proceed to question 2 below)

Type of pollutant:	Yes
• Gases	☐
• Noise	☐
• Dust	☐
• Odour	☐
• Other (specify): NUTRIENTS - ON SITE EFFLUENT DISPOSAL	☐

2. Would the scheme allow for a land-use which requires a buffer? YES / NO

(If 'Yes' give a brief description of land-use; if 'No' proceed to question 3 below)

What is the distance to the nearest residence? _____

What is the recommended buffer distance? _____

3. Would the scheme allow for a residential area to encroach into an existing buffer area? YES / NO

(If 'Yes' give a brief description below; if 'No' proceed to question 4 on page 8)

What is the industry involved? _____

ENVIRONMENTAL MATTERS		COMMENTS AND POSSIBLE IMPACTS
4. Has the site been the subject of a past land-use which could contaminate the soil or groundwater?	YES / NO (NO circled)	
(If 'Yes' indicate the appropriate category(s) by ticking the boxes; if 'No' proceed to question 5 below)		
4.1 Does the existing or past land-use include one of the following industries?		
acid/alkali plant	☐	
agricultural/horticultural activities	☐	
airport	☐	
asbestos production/disposal	☐	
chemicals manufacture & formulation	☐	
defence works	☐	
drum re-conditioning works	☐	
dry cleaning establishment	☐	
electrical manufacturing	☐	
electroplating & heat treatment	☐	
engine works	☐	
explosives industry	☐	
gas works	☐	
iron & steel works	☐	
landfill sites	☐	
metal treatment	☐	
mining & extractive industries	☐	
oil production/storage	☐	
paint formulation/manufacture	☐	
pesticide manufacture/formulation	☐	
pharmaceutical manufacture/formulation	☐	
power stations	☐	
railway yards	☐	
scrap yards	☐	
service stations	☐	
sheep and cattle dips	☐	
smelting and refining	☐	
tanning and associated trades	☐	
waste storage and treatment	☐	
wood preservation	☐	
other _____		

ENVIRONMENTAL MATTERS	COMMENTS AND POSSIBLE IMPACTS
5. Is the site on land which requires offsite disposal of drainage waters? YES / NO (NO circled) ie. Does the land have a high water table or is the soil predominantly clay? (If 'Yes' give a brief description of the land; if 'No' proceed to question 6 below)	
6. Would the scheme/amendment allow for the dredging of rivers and/or marine environments? YES / NO (NO circled) (If 'Yes' indicate the appropriate category by ticking the boxes and give a brief description of the extent of the project; if 'No' proceed to question 7 below) • developmental dredging ☐ • disposal of dredge material within a river system ☐ • other _____ ☐	
7. Would the scheme/amendment allow for a land-use change that is inconsistent with the Kwinana EPP for Atmospheric Wastes? YES / NO (NO circled) (If 'Yes' give a brief description of the change in land-use; if 'No' proceed to question 8 below)	
8. Would the scheme/amendment allow a land-use which requires special management? YES / NO (NO circled) (If 'Yes' indicate the appropriate category by ticking the boxes and give a brief description; if 'No' proceed to question 9 below) The land-use is one of the following: Yes • Horticulture ☐ • Heavy Industry ☐ • Marina ☐ • Aquaculture ☐ • Industry requiring licensing under Part V of the Environmental Protection Act ☐ • Other _____ ☐	

ENVIRONMENTAL MATTERS		COMMENTS AND POSSIBLE IMPACTS
SECTION C: **SOCIAL SURROUNDINGS**		
1. Does the scheme/amendment raise any issues known to be of concern or controversy to the community? (If 'Yes' indicate the appropriate category by ticking the boxes and give a brief description of the concern; if 'No' proceed to question 2 below)	YES NO	
Is the concern to the public related to: • an issue of environmental significance • another issue: _____ Give details (eg known public interest groups; environmental issue(s) of concern): Further information: _____	☐ ☐	
2. Would the scheme/amendment pose any threat to public safety or is it a generator of risk? (If 'Yes' please indicate by ticking the appropriate box; if 'No' proceed to question 3 below)	YES NO	
Is the threat to public safety the result of: • a new industry being located near an existing residential area; or • a new residential area being located near an existing industry? Further information: _____	☐ ☐	
3. Would the scheme/amendment impact any areas known to have cultural significance?	YES NO	
Please indicate: • Aboriginal culture and heritage • Non-indigenous heritage Further information: _____	☐ ☐	

LIST OF ENVIRONMENTAL FACTORS ON WHICH EPA HAS A POLICY/POSITION.

Biophysical

Terrestrial Flora
✓ Vegetation communities
- vegetation community types 3b and 20b

Declared Rare and Priority Flora

Terrestrial Fauna
Terrestrial Fauna
Subterranean Fauna
- stygofauna

Specially Protected (Threatened) Fauna

Marine Flora
Marine Flora
- seagrass
- mangroves
- macro-algae

Declared Rare and Priority Flora

Marine Fauna
Marine Fauna
- coral reefs

Specially Protected (Threatened) Fauna
- turtles
- dugongs

✓ Wetlands
Wetlands
- lakes

Watercourses
- rivers
- ephemeral streams

Estuaries
Underground wetlands
- cave pools

Groundwater
- unconfined aquifers

Coast
Dunes
Foreshore (beach)
Seabed
- banks

Sea level

Land
Soil
Landform
- karst

Pollution Management

Air
Odour
Particulates / Dust
Gases
- SO2
- NOx

Greenhouse gases
Haze
Smog

Water
✓ Groundwater quality
- nutrients
- pesticides

Surface water quality
- salinity
- sewage

Marine water and sediment quality

Land
Soil contamination
- solid waste

Non-chemical Emissions
Noise
Vibration
Radiation
- EMR

Light

Social Surroundings

Social
Public safety
- risk and hazard
- road traffic

Aesthetic
Visual amenity

Cultural
Aboriginal culture and heritage
Non-indigenous heritage

Economic

KEIGHERY Bronwen

From: McLEOD-THORPE Glen
Sent: Thursday, 16 June 2005 2:42 PM
To: DELL John
Cc: KEIGHERY Bronwen
Subject: RE: Formal Assessment - Lot 1 Southern Estuary Road, Waroona

Great, yes the changes showed up fine. Thanks for your input John and Bronwen.

-----Original Message-----
From: DELL John
Sent: Thursday, 16 June 2005 13:37
To: McLEOD-THORPE Glen
Subject: RE: Formal Assessment - Lot 1 Southern Estuary Road, Waroona

Hi Glen
I have added some Track Changes additions to Table 1 in the attached file. Hope you can read them ok. They are mostly on the fauna bit but also include a few on the flora bit after talking with Bronwen.
You have certainly prepared an excellent set of Environmental Review Instructions.
Cheers John

<< File: Shire of Waroona Amd 17 Lot 1 Southern Estuary Rd Instructions.doc >>

-----Original Message-----
From: McLEOD-THORPE Glen
Sent: Thursday, 16 June 2005 11:39 AM
To: DELL John
Subject: Formal Assessment - Lot 1 Southern Estuary Road, Waroona
Importance: High

Hi John,

The EPA is formally assessing the Shire of Waroona Town Planning Scheme No. 7 Amendment No. 17, which proposes to rezone Lot 1 Southern Estuary Road, Lake Clifton from 'Rural 1 - General Farming' to 'Rural 6 - Rural Residential' to facilitate an eighteen (18) lot rural residential subdivision.

The lot contains 2 CCW's (1 is an EPP) and regionally significant vegetation.

I've prepared draft Environmental Review Instructions which I was planning to fax to relevant agencies later today for informal comment, before the final instructions are released next Thursday. They will then be subject to a 2 week appeal period.

I was hoping that you could have a very quick look at the environmental factor of fauna, before I send it out, in case there's anything obvious that should be added/changed? If you can't look at it now, that's fine, you can provide your comments during the informal review period.

The relevant factor states:

Fauna - Specially Protected (Threatened fauna)

Undertake a suitable fauna survey to identify any Specially Protected (Threatened) Fauna and other significant fauna, which may utilise the proposed Amendment area (including the wetlands on site) or immediate adjacent areas and may be directly or indirectly impacted by the Amendment. The EPA's Guidance Statement No. 56 *Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* is to be used.

Identify and assess the potential impacts (direct and indirect) on Specially Protected (Threatened) Fauna and other significant fauna as a result of the implementation of the proposed Amendment.

Discuss the representation of habitat, in existing conservation reserves, suitable for any identified Specially Protected (Threatened) Fauna and other significant fauna that will be impacted by the proposal.

Consider cumulative impacts of habitat loss on terrestrial fauna.
Discuss what management measures are proposed to manage impacts.

<< File: Shire of Waroona Amd 17 Lot 1 Southern Estuary Rd Instructions.doc >>

If you do have any suggestions, do you think you could let me know by **3pm**? Sorry about the tight timeframe!

Thanks,

Glen

Glen McLeod-Thorpe

Environmental Officer

Planning + Infrastructure Assessment Branch
Environmental Impact Assessment Division
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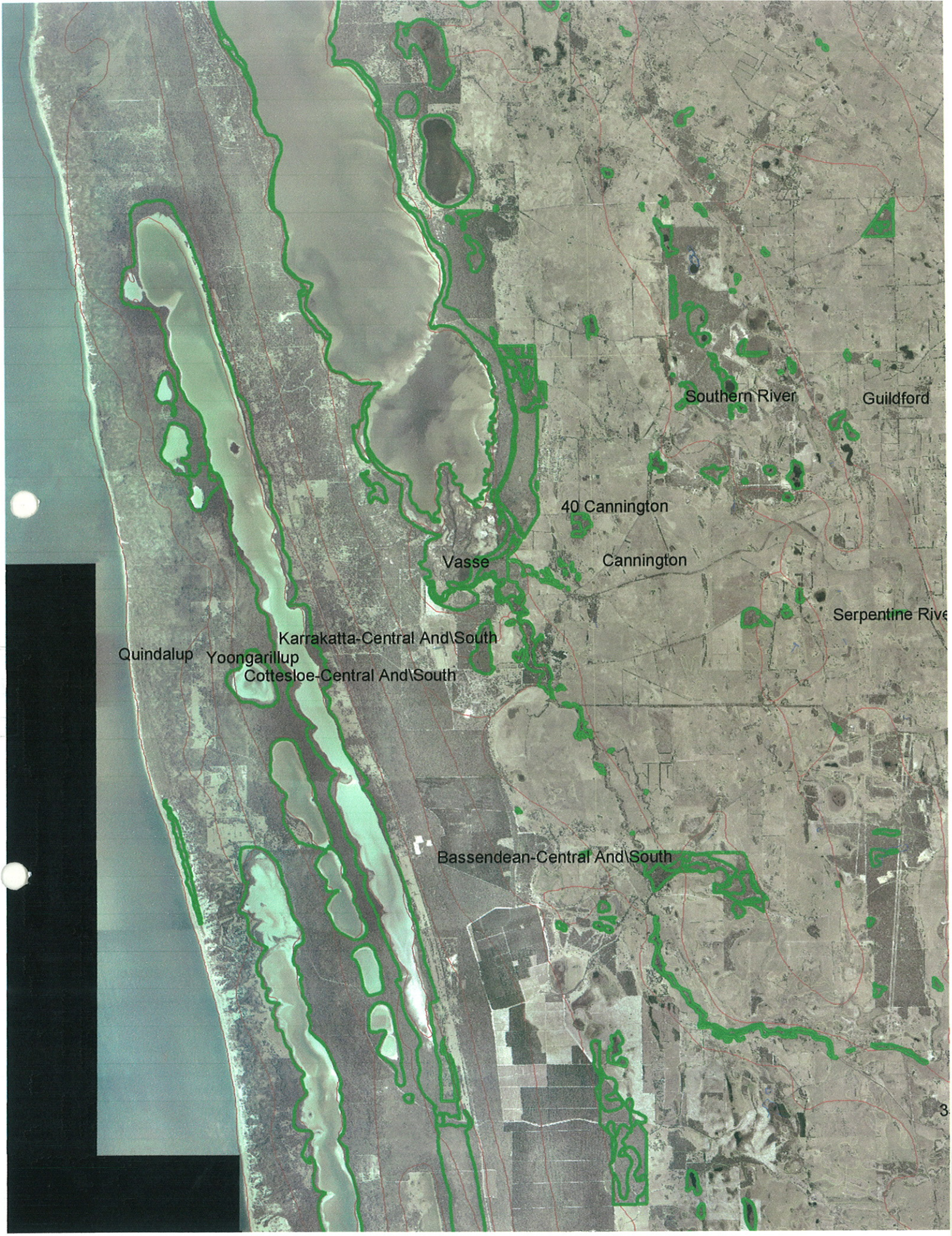
Southern River
Guildford
40 Cannington
Vasse
Cannington
Serpentine Rive
Karrakatta-Central And\South
Quindalup
Yoongarillup
Cottesloe-Central And\South
Bassendean-Central And\South

Linkage

Regionally Significant Area – eastern outlier tract

115°37'
115°40'
380000
115°45'
32°45'
6370000
32°50'
A

HARVEY ESTUARY
LAKE BOUNDARY
LAKE
Duck Pond
Island Point
LAKE POLLARD
LAKE CLIFTON
MARTINS TANK LAKE
LAKE PYALGORUP
Dunon Pool
HARVEY RIVER