



Lot 8 Wattle Ave  
Nowergup

# Flora and Vegetation Assessment

*October 2006*

Report for Oakford Land Company



Regeneration  
Technology Pty Ltd

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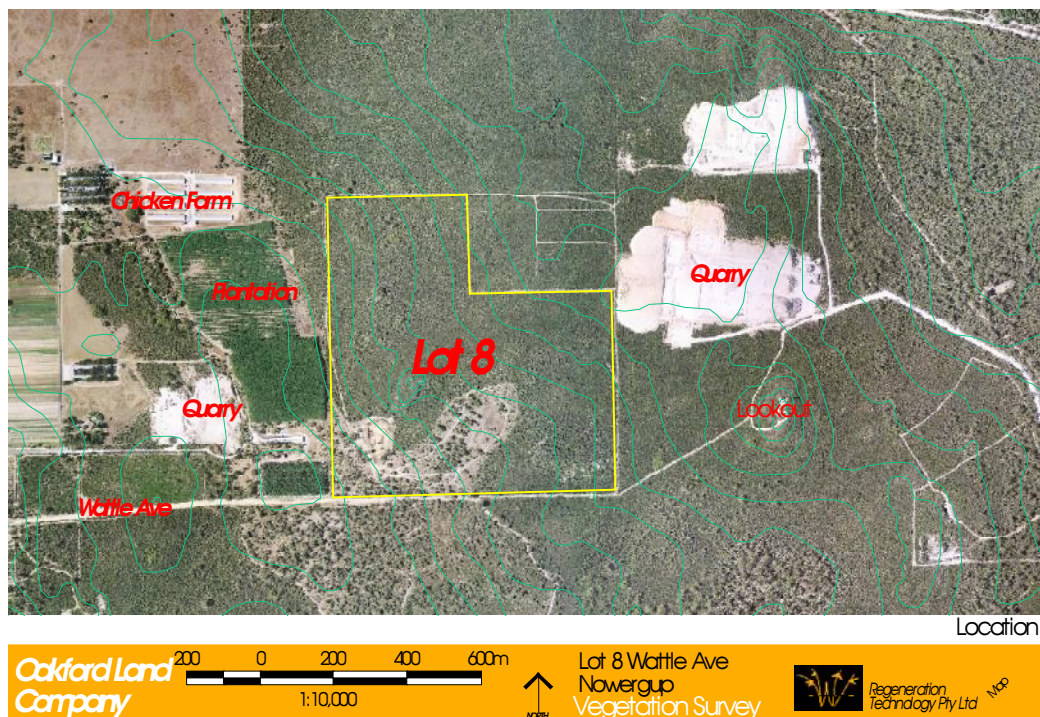
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## BACKGROUND

Lot 8 Wattle Ave, Nowergup, (Figure 1) in the City of Waneroo is the site of a development proposal for sand and limestone extraction. The development proponents have commissioned Regeneration Technology to undertake an independent assessment of the flora and vegetation as a component of the application.

This study has been undertaken to satisfy a “Level 2 Survey” in accordance with the EPA guidance statement No 51 “Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia” to determine the suitability of the subject land for limestone extraction purposes.

The areas surrounding the remnant bushland of Lot 8 Wattle Ave includes existing quarries to the north east and west of the site, powto nia tree plantation and timber mill to the immediate west of the property and chicken farming and processing sheds. Bushland to the immediate east and south of the site is a Bush Forever site that forms part of a regional link within the proposed Gnangarra Park between Swan Hill to the west and Lake Neerabup to the east.



**Figure 1. Location – Lot 8 Wattle Rd Nowergup**

## SITE DESCRIPTION

Lot 8 Wattle Ave Nowergup is a 52.5 ha lot that has been used for a variety of pursuits in the past. The lot is gently sloping from the southwestern corner (AHD 50m) on Wattle Ave to the north east (AHD 85m). The southern portion of the property has been cleared; old fencing through the bushland indicates the property may have been used for grazing and other agricultural purposes. Within the cleared southern section of the property is an abandoned sand quarry that contains numerous tracks and has been used for motor cross. Within the sand quarry and elsewhere on the property there are numerous dumped and burnt out cars indicative of illegal and uncontrolled access. There is a small limestone hill in the center of the cleared section of the property that rises to the north of the sand quarry.

## CLIMATE

Nowergup lies on the Swan Coastal Plain and has a warm Mediterranean climate characterized by having 5-6 dry summer months per year and winter precipitation averaging 600-100 mm per annum.

## INTERIM BIOGEOGRAPHIC REGION (IBRA)

Biogeographic Regions for Australia is a framework for conservation based on a bioregional context. Eighty-five bioregions within Australia have been recognized of which 26 occur within Western Australia. Lot 8 Wattle Rd Nowergup is within the middle portion of **SWA – Swan Coastal Plain Bioregion**, which is described as

*“Low lying coastal plain, mainly covered with woodlands. It is dominated by Banksia or Tuart on sandy soils, Allocasuarina obesa on outwash plains, and paperbark in swampy areas. In the east, the plain rises to duricrusted Mesozoic sediments dominated by Jarrah woodland. Warm Mediterranean. Three phases of marine sand dune development provide relief. The outwash plains, once dominated by A. obesa-marri woodlands and Melaleuca shrublands, are extensive only in the south”*

## SOILS

The underlying geology of the area is Tamala Limestone, which is formed from calcareous beach sands. Calcrete can occur on ridges with the re-precipitation of calcium carbonate, this can result in minor pinnacle formation. Sands derived from the Tamala limestone make up the geomorphological system known as Spearwood Dunes (after McArthur and Bettenay 1960). This system typically occurs beyond the primary coastal dune system (Quindalup dunes).

The soils of Lot 8 Wattle Ave, Nowergup were not mapped as part of this study but were recorded as; white and yellow sands with limestone boulders. Cleared fire breaks and access tracks across the site showed blocky limestone in amongst the sand.

## VEGETATION

The importance of the soils with regard to the vegetation is that vegetation units often closely approximate the distribution of particular soil types. Vegetation complexes have been arranged by Heddl et al (1980) in accordance with the major geomorphic units. The geomorphic unit of Lot 8 Wattle Ave, (as per Heddl et al (1980)) is the Spearwood Dunes - Cottesloe complex central and southern. The Cottesloe complex – Central and South is described as : ‘*Mosaic of woodland of E. gomphocephala and open forest of E. gomphocephala - E. marginata – C. calophylla; and closed heath on limestone outcrops*’

## FLORISTIC COMMUNITY TYPES

Floristic Community Types (FTC's) of the Swan Coastal Plain have been determined as a result of a study by Gibson et al (1994). This study considered patterning of plant distribution based on analysis of species occurrence in 509 100m<sup>2</sup> plots and used multi-variant analysis to group the occurrence of species. The grouping of the species has been used to assign FTC's to vegetation complexes on the Swan Coastal Plain.

Three FTC's as described in Gibson et al (1994) inferred as occurring on within the vicinity of Lot 8 Wattle Ave Nowergup, they are:

1. FTC 24 - Southern *Eucalyptus gomphocephala* – *Agonis flexuosa* woodlands;
2. FTC 26a – *Melaleuca huegellii* – *Melaleuca systema* shrublands on limestone ridges;
3. FCT 27 – Species poor mallees and shrublands on limestone.
4. FTC 28 – Spearwood *Banksia attenuata* or *Banksia attenuata* – *Eucalyptus* Woodlands.

These FTC's are centered on the uplands of Spearwood and Quindalup dunes.

## THREATENED ECOLOGICAL COMMUNITIES

There are twenty-eight Threatened Ecological Communities listed by the Department of Conservation and Environment's Threatened Ecological Community database as occurring on the Swan Coastal Plain. Of these one is known to occur within proximity of Lot 8 Wattle Rd. This is Floristic Community Type 26a as described by Gibson et al (1994).

Floristic Community Type 26a (see above) is listed as an Endangered Ecological Community with CALM. FTC 26a is not listed as a TEC under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

An endangered community has been defined by English and Blyth (1999) as:

“An ecological community which has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future”

(See Appendix 1 for explanation of all categories of communities)

### **DECLARED RARE AND PRIORITY LISTED FLORA SPECIES**

A database search of the Department of Conservation and Land Management's Declared Rare and Priority Flora records indicated there are possibly seven priority taxa (see Appendix 2 for explanation of Conservation Codes for Rare and Priority Listed Flora) that may be present on the site. They are listed in Table 1.

<b>Species</b>	<b>Conservation Status Code</b>
<i>Eucalyptus agutifolia</i>	R
<i>Chorizema vaium</i>	R
<i>Diuris micrantha</i> ms	R
<i>Haloragis aculeolata</i>	2
<i>Hibbertia spicata</i> subsp <i>leptotheca</i>	3
<i>Melaleuca</i> sp Yanchep (GJ Keighery 11242)	2

**Table 1. Results of rare and priority listed flora search for Lot 8 Wattle Rd, Nowergup.**

## **SURVEY METHOD**

### **RARE AND PRIORITY LISTED FLORA**

Species identified by the CALM's data base search were studied prior to ground truthing the property to ensure familiarization with the species that may be present.

### **FIELD SURVEY**

A recent aerial photo was examined before visiting the site to determine the context of the property in the regional setting and to identify major structural units present. A grid system of waypoints was set up over the aerial photo and downloaded into a GPS to ensure a thorough coverage of the site during ground truthing. The site was visited on 3 separate occasions (8 Sep 2006, 20 Sep 2006 and 4 Oct 2006) by Georgina Nielssen.

The survey area was traversed along transects by foot. Flora was systematically collected from across the property ensuring that all structural units identified from aerial photography were sampled.

The following information was recorded;

- waypoint number;
- photo number;
- plant species;
- vegetation condition;

- aspect, landform and soil.

Dominant species and vegetation structure were recorded and referenced using a GPS at numerous locations across the property in order to map the vegetation units.

In addition 5 10x10m quadrats were set up and examined in detail using the Gibson et al (1994) methodology. Each of these quadrats was marked in the north western corner with a 10 inch steel nail for future reference if required. Species were recorded directly onto field sheets. Where they could not be readily identified a sample was collected for further identification.

Vegetation condition was scored using Keighery's scale (Bush Forever, Vol 2, 1994), which assigns the following scales;

Scale		Description
1	Pristine	No obvious sign of disturbance
2	Excellent	Vegetation structure intact, disturbance affecting individual species and are no aggressive weed species.
3	Very Good	Vegetation structure altered, obvious signs of disturbance.
4	Good	Vegetation structure significantly altered by obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it.
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 or almost without native species. These areas are often described as parkland cleared with the flora comprising of weed or crop species with isolated native trees or shrubs.

## WETLANDS

The *Geomorphic Wetlands of the Swan Coastal Plains* dataset was used to identify the location and proximity of wetlands to the site.

## TUARTS

The *Tuart Atlas* dataset was used to identify the location and proximity of tuart populations that may be of conservation significance.

## MAPPING

All mapping was undertaken in Arcview over an aerial photo base at a scale of 1:2000. Field data collected and referenced using a GPS was used as an aid to identify the boundaries of the vegetation units and bushland condition.

## RESULTS

### FLORA

A total of 35 families and 96 plant taxa (appendix 3) were recorded in the study area. Of these 10 taxa were recorded as weed species.

### DECLARED RARE AND PRIORITY LISTED FLORA

No declared rare flora was identified as being present on the site. Several groves of small mallees occur on Lot 8 Wattle Ave. These mallees were identified as being *Eucalyptus petrensis* and *Eucalyptus foecunda* and not the rare species, *Eucalyptus agutifolia*.

One priority-listed flora species were identified as being present on the site: *Jacksonia sericea* (P3).

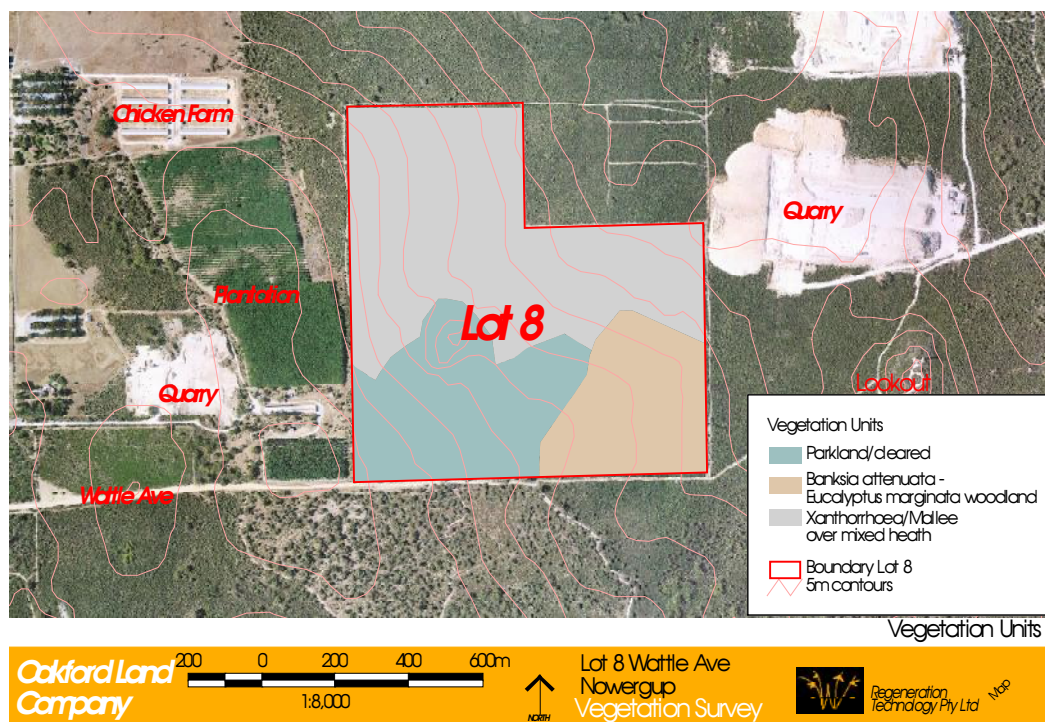
### VEGETATION UNITS

Three vegetation units were defined and mapped within the survey area (Figure 2). They are:

1. **Open heath** - Open heathland of *Xanthorrhoea preissii* and *Dryandra sessilis* over *Acacia pulchella* and *Hibbertia hypericoides* on grey to yellow sands with limestone.
2. **Woodland** - *Eucalyptus marginata* and *Banksia attenuata* woodland over *Hibbertia hypericoides*, *Acacia pulchella* and weed species on grey to yellow sands; and
3. **Open Woodland** - *Eucalyptus marginata* open woodland over cleared pasture on grey to yellow sands;

The open woodland over cleared pasture is most likely to have been similar to the *Eucalyptus marginata* and *Banksia attenuata* woodland prior to clearing however with no native understorey and few remaining trees it is difficult to assign a vegetation community and this vegetation unit has been mapped as parkland cleared (Figure 2)





**Figure 2 Vegetation units – Lot 8 Wattle Ave Nowergup.**



**Photo 1. *Xanthorrhoea preissii* and *Dryandra sessilis* Heath**



**Photo 2. *Eucalyptus marginata* – *Banksia* Woodland**



**Photo 3. *Eucalyptus marginata* open woodland (Parkland Cleared)**

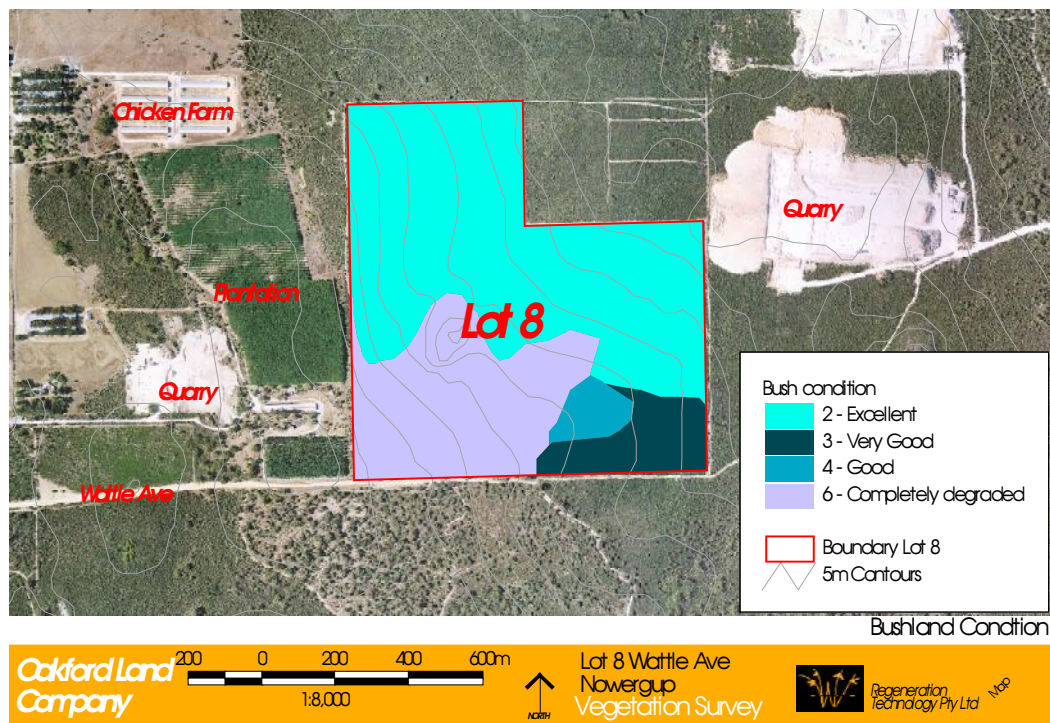
### ***BUSHLAND CONDITION***

The bushland condition of Lot 8 Wattle Ave Nowergup ranged from 2 (excellent) to 6 (completely degraded or parkland cleared) (Figure 3). The bushland condition of the northern section of the site was the least disturbed with only minor weed encroachment. It is possible this section is regenerated bushland and may have been completely cleared in the past. There is evidence of old fencing in the midst of the bushland as well as scattered bulbous weeds such as *Gladioli* that would normally not penetrate beyond the edges. Grass weeds were present throughout the condition - 2 bushland however the weed load was not considered to have significantly impacted upon the overall bushland condition.

The southern section of the property been impacted by multiple ongoing disturbance factors and is in poorer condition than the northern section of the property. There are areas within the southern section of the property that have been completely cleared of all vegetation and areas that have only trees and occasional *Xanthorrhoea* present. These areas were assessed as having a bushland condition of 6 (completely degraded or parkland cleared).

The bushland on southeastern section of the property was identified as being the most complete remnant on the southern section of Lot 8 Wattle Ave, having both an overstorey and understorey, however the weed load in this area was recorded as being significantly higher than in the northern section of the property. The high weed load is most likely to be due to past land management practices such as clearing, grazing, uncontrolled access, and frequent fires.

It is evident from the large numbers of dumped burnt out cars that illegal and uncontrolled access has been ongoing for a number of years and has contributed to the decline in the bushland condition especially in the southern section of the property. In addition an abandoned sand quarry with burnt out cars and a high weed load has negatively impacted on the bushland condition of the site.



**Figure 3 Bushland Condition – Lot 8 Wattle Rd, Nowergup**



**Photo 4 Abandoned sand quarry**



**Photo 5 Dumped cars**

## **WETLANDS**

No wetlands were identified on the site during ground truthing. No vegetation indicative of wetlands or damplands was found on the site. The *Geomorphic Wetlands of the Swan Coastal Plains* has no wetlands mapped on Lot 8 Wattle Ave.

## TUARTS

The *Tuart Atlas Dataset* has Tuart populations mapped to the south and west of Lot 8 Wattle Ave. A single Tuart tree was recorded as being present on the site and as such there is no population of Tuarts of conservation significance (as defined by Ecoscape 2004) found to occur on the site.

## DISCUSSION

Lot 8 Wattle Ave, Nowergup, occurs within the Cottesloe complex of the Spearwood dunes. The property is roughly divided into the northern and southern sections. The northern section of the property supports a more complete remnant with minimal disturbance and the southern section of the property, which has a different vegetation community to the north but has been impacted over a long period of time by multiple high impact disturbances.

Land use in the surrounding area includes, market gardens to the west, exotic timber plantations, chicken farming and processing, and limestone quarrying to the east. Lot 8 Wattle Ave, is at the end of an isolated sparsely populated road that has been subject to antisocial activities such as rubbish and car dumping.

## FLORA

The site was visited on three occasions during the Spring of 2006. Systematic ground truthing on foot was undertaken on each occasion and notes on the species present and collections (where required for further identification) were made during each of the visits.

A total of 35 families and 96 species were identified as being present on the site. Of these 10 species were identified as weeds. Weed species were only collected and identified from the bushland remnants and as such the ten identified species may be an under representation of weeds present in the cleared areas.

No declared Rare Flora species were located during this survey. One priority listed species that was not identified in the database search were identified as being present they are: *Jacksonia sericea* (P3). This species is currently considered to be endangered (see definitions Appendix 1). *Jacksonia sericea* is restricted to the Swan Coastal Plain making it vulnerable. It occurs in the *Eucalyptus marginata* – *Banksia* woodland in the south eastern corner of Lot 8 Wattle Ave.



## VEGETATION COMMUNITIES

Three vegetation units were recorded identified on Lot 8 Wattle Ave (Figure 2). They are:

1. **Open heath** Open heathland of *Xanthorrhoea preissii* and *Dryandra sessilis* over *Acacia pulchella* and *Hibbertia hypericoides* on grey to yellow sands with limestone.
2. **Woodland** *Eucalyptus marginata* and *Banksia attenuata* woodland over *Hibbertia hypericoides*, *Acacia pulchella* and weed species on grey to yellow sands; and
3. **Open Woodland** *Eucalyptus marginata* open woodland over cleared pasture on grey to yellow sands;

The vegetation units of Lot 8 Wattle Rd, Nowergup followed the Cottesloe Complex central and south as identified by Heddle et al (1980). The delineation of the vegetation units identified was based on a thorough system of ground truthing the site on foot along transects. There was no distinct boundary between the vegetation communities with the understorey component changing subtly with the change in the overstorey. On the northern sections of the property there was very little overstorey present, where the overstorey was present it occurred as patches of *Banksia* and *Mallees* mainly on the higher ridges. The understorey to on the western side of Lot 8 Wattle supported species more commonly found in coastal communities such as *Acanthocarpus preissii* and *Hemianandra pungens* however the difference in the species composition did not warrant allocation of a separate vegetation unit.

The vegetation units identified on Lot 8 Wattle Ave most closely approximate the following vegetation communities as described by Gibson et al (1994).

1. **FCT – 26b** Woodlands and Mallees on Limestone; and
2. **FCT – 28** Spearwood *Banksia attenuata* – *Eucalyptus* woodlands.

Quadrat data from five randomly selected locations across the site as well as the overall species collection was compared to the Gibson et al dataset in order to assign a Floristic Community Type (FCT). The closest FCT match for the quadrats was determined by the number of species the Gibson et al dataset and the quadrats had in common no weighting was given to individual species or groups of species in the analysis. The closest approximation in terms of species composition and site description was FCT – 26b Woodlands and Mallees on limestone.

## BUSHLAND CONDITION

Bushland condition across the site ranged from 2 (Excellent) to 6 (Completely degraded) (Figure 3). The southern section of the site has been impacted by multiple disturbances over an extended period of time including: clearing, grazing, sand quarrying activities, uncontrolled access, fire, weeds (in particular Patersons Curse) and rubbish dumping. The impact of the disturbance factors has rendered the bushland in a condition that would be difficult without major intervention to return it to near natural state.

The bushland to the north of the site is in better condition with minimal disturbances noted. Old fencing, the lack of an overstorey, the dominance of *Xanthorrhoea* and the presence of weeds throughout the site such as grasses and *Gladioli* indicate the northern section of the property may have been cleared in the past (20years+) and or grazed.

There is no evidence of recent or frequent fires in the northern section of the property. Frequent fires in this type of vegetation will often result in monocultures of some of the pioneering species such as *Dryandra sessilis*. No dominance of *Dryandra sessilis* was noted during this survey however the lack of size of the individual plants was indicative that the vegetation had either been cleared or burnt in the past (10years+).

### **FRAGMENTATION**

Lot 8 Wattle Rd Nowergup is a partially cleared lot that occurs within a larger remnant that extends to the north and east of the property. The southeastern corner of the property and land to the south of Lot 8 Wattle Ave has been mapped as being part of Bush Forever site 293. The Bush Forever site 293 is as part of the proposed Gngarra Park and forms a link between Swan Hill and Lake Neerabup. The section of Lot 8 that is within the Bush Forever site 293 supports the *Eucalyptus marginata* – *Banksia* woodland, (which closely approximates **FCT – 28** Spearwood *Banksia attenuata* – *Eucalyptus* woodlands). FCT 28 is considered as well reserved and low risk (Gibson et al, 1994).

To the east of Lot 8 Wattle Ave is a deciduous exotic timber plantation and mill. With no native understorey this plantation provides no habitat or refuge for local flora or fauna.

### **WETLANDS**

There are no wetlands (Geomorphic wetlands of the Swan Coastal Plan dataset) on Lot 8 Wattle Ave Nowergup. Neerabup Lake occurs approximately 1.5km to the west of Lot 8. There are no surface drainage lines from Lot 8 that flow directly towards Neerabup Lake

### **RECOMMENDATIONS/GUIDELINES**

It is recommended that if a license for an extractive industry be granted for this site that:

- Unnecessary clearing of vegetation beyond that which is strictly required be avoided;
- Clearing and site layout design should ensure the minimization of edge effects and should where possible utilise areas that are already cleared or degraded;
- Topsoil, logs, and plant material cleared from the site should be directly replaced elsewhere on the site in disturbed areas, where this is not possible they should be stockpiled and used for rehabilitation works on the site within a year.

- The site should be rehabilitated using species listed for each community in appendix 3;
- Seed collection and plant propagules for rehabilitation works should be collected from the site or bushland within the surrounding area to ensure local provenance of species replanted.;
- A vegetated buffer should be maintained where practical along the northern and western boundaries of the site to reduce noise and dust effects on neighbours.

## REFERENCES

- Department of Environmental Protection (2000) Bush Forever Volume 2. Department of Environmental Protection. Perth Western Australia.
- Environment Australia (2000) *Revision of Interim Biogeographic Rationalisation for Australia (IBRA) and Development of Version 5.1. Summary Report.*
- Gibson, N., Keighery, B., Keighery, G., Burbidge, A., and Lyons, M. (1994) A Floristic Survey of the Swan Coastal Plain. Unpublished Report for the Australian Heritage Commission.
- Hedde, E.M., Loneragan, O.W., and Havel, J.J., (1980) Vegetation Complexes of the Darling System, Western Australia. Atlas of Natural Resources Darling System Western Australia. Department of Conservation and Environment.
- Ecoscape (2004) Tools for Identifying Tuart populations of conservation significance on the Swan Coastal Plain.



## APPENDIX 1

The Department of Conservation and Land Management's conservation codes for Flora in Western Australia

### CONSERVATION CODES

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.

X: Declared Rare Flora - Presumed Extinct Taxa

**Taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently,** and have been gazetted as such.

1: 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, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

2: 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** (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

3: Priority Three - Poorly Known Taxa

**Taxa which are known from several populations, and the taxa are not believed to be under immediate threat** (i.e. 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 are in need of further survey.

4: 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.

## APPENDIX 2

Definitions of the status of the threat to ecological communities (English and Blyth 1999) in Bush Forever (2000)

Category	Definition
1 – Presumed Totally Destroyed	<i>“An ecological community which has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future”</i>
2 - Critically Endangered	<i>“An ecological community which has been adequately surveyed and found to have been subject to a major contraction and/or was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated”</i>
3 - Endangered	<i>“An ecological community which has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.”</i>
4 - Vulnerable	<i>“An ecological community which has been adequately surveyed and found to be declining and/or has declined in the distribution and/or condition and whose ultimate security has not been assured and/or a community which is still widespread but is believed to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.”</i>
5 – Data Deficient	<i>“An ecological community for which there is an inadequate data to assign it to one of the above categories and/or which is not yet evaluated. (Usually an ecological community with poorly known distribution or biology that is suspected to belong to any of the above categories. These ecological communities have a priority for survey and/or research.)”</i>
6 – Lower Risk	<i>“A community which has been adequately surveyed and evaluated and available information suggests that it does not qualify”</i>

### APPENDIX 3

#### Species list for Lot 8 Wattle Ave Nowergup

\*Denotes a weed species

Family	Species
ANTHERIACEAE	<i>Sowerbaea laxiflora</i> <i>Thysanotus manglesianus</i> <i>Tricoyne elatior</i>
ASPARAGACEAE	* <i>Asparagus aparagoides</i>
ASTERACEAE	<i>Podolepis gracilis</i> * <i>Ursinia anthemoides</i> <i>Waitzia citrina</i> * <i>Arthoteca calendula</i>
BORAGINACEAE	* <i>Echium plantagineum</i>
BRASSICAEAE	<i>Heliophila pulsilla</i>
CARYOPHYLLACEAE	* <i>Petrorhagia relutina</i>
CASUARINACEAE	<i>Allocasuarina fraseriana</i> <i>Allocasuarina humilis</i>
COLCHICACEAE	<i>Burchardia umbellata</i>
CYPERACEAE	<i>Lepidosperma squamatum</i> <i>Mesomelaena stigia</i> <i>Schoenus gandiflorus</i>
DASYPOGONACEAE	<i>Acanthocarpus preissii</i> <i>Lomandra hermaphrodita</i>
DILLENACEAE	<i>Hibbertia hypericoides</i> <i>Hibbertia racemosa</i>
EPACRIDACEAE	<i>Leucopogon assimilis</i> <i>Leucopogon parviflorus</i> <i>Leucopogon pendulus</i> <i>Leucopogon polymorphis</i> <i>Leucopogon propinquus</i> <i>Lysinema ciliatum</i>
EUPHORBIACEAE	* <i>Anagalis arvensis</i> <i>Phyllanthus calycinus</i>
GERANIACEAE	<i>Gernaium solonderi</i> <i>Pelargonium capitatum</i>
GOODENIACEAE	<i>Leschenaultia linariodes</i>
HAEMODORACEAE	<i>Anigozanthos humilis</i> <i>Conostylis aculeata</i> <i>Conostylis candicans</i>

IRIDACEAE	<i>Conostylis setigia</i>
	* <i>Gladiolus caryophyllaceus</i>
	<i>Orthrosanthus laxus</i>
	<i>Patersonia occidentalis</i>
	* <i>Romulea rosea</i>
LAMINACEAE	<i>Hemiandra pungens</i>
LORANTHACEAE	<i>Nuytsia floribunda</i>
MENYANTHACEAE	<i>Opercularia vaginata</i>
MIMOSACEAE	<i>Acacia cochlearis</i>
	<i>Acacia pulchella</i>
MIMOSACEAE	<i>Acacia rostellifera</i>
MYRTACEAE	<i>Eucalyptus foecunda</i>
	<i>Eucalyptus gomphocephala</i>
	<i>Eucalyptus marginata subsp marginata</i>
	<i>Eucalyptus petrensis</i>
	<i>Kunzea ericifolia</i>
	<i>Melaleuca huegelii</i>
	<i>Melaleuca systema</i>
ORCHIDACEAE	<i>Caladenia flava</i>
	<i>Diuris magnifica</i>
	<i>Drosera macrantha</i>
	<i>Elythanthera brunonis</i>
	<i>Pterostylis aff nana</i>
PAPILIONACEAE	<i>Bossiaea eriocarpa</i>
	<i>Dillwynia sp "A Perth Flora"</i>
	<i>Gompholobium tomentosum</i>
	<i>Hovea trisperma</i>
	<i>Jacksonia sericia</i>
	<i>Kenneida prostrata</i>
	<i>Nemcia reticulata</i>
	<i>Sphaerolobium medium</i>
	<i>Trifolium campestre</i>
	<i>Viminaria juncea</i>
PHORMIACEAE	<i>Dianella revolta</i>
POACEAE	<i>Austrostipa flavescens</i>
	* <i>Briza maxima</i>
	* <i>Ehrharta longifolia</i>
POLYGONACEAE	<i>Comesperma cconfertum</i>
PROTEACEAE	<i>Banksia attenuata</i>
	<i>Banksia grandis</i>
	<i>Calothamnus quadrifidus</i>
	<i>Calothamnus sanguineus</i>

	<i>Dryandra linleyana subsp lindleyana</i>
	<i>Dryandra sessilis</i>
	<i>Grevillea preissii</i>
	<i>Hakea lissiocarpa</i>
	<i>Hakea prostrata</i>
	<i>Hakea ruscifolia</i>
	<i>Hakea trifuncata</i>
	<i>Hakea varia</i>
	<i>Petrophile macrostachya</i>
	<i>Petrophile macrostachya</i>
RESTIONACEAE	<i>Desmocalsus flexuosa</i>
RHAMINACAE	<i>Spyridium globulosum</i>
STACKHOUSIACEAE	<i>Tripteroccus brunonis</i>
STYLIDACEAE	<i>Stylidium sp</i>
	<i>Stylidium violaceum</i>
XANTHORRHOEACEAE	<i>Xanthorrhoea preissii</i>
ZAMIACEAE	<i>Macrozamia riedlei</i>