FLORA AND VEGETATION OF YANGEDI RESERVE SHIRE OF SERPENTINE-JARRAHDALE

Prepared for

SHIRE OF SERPENTINE-JARRAHDALE

Thysanotus triandrus

Job: 07.388

Report: RP001

env
Australia

FLORA AND VEGETATION OF YANGEDI RESERVE SHIRE OF SERPENTINE-JARRAHDALE

Prepared for

SHIRE OF SERPENTINE-JARRAHDALE

Prepared by

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Scope of Services

This environmental site assessment report ("the report") has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and ENV.Australia Pty Ltd (ENV) ("scope of services"). In some circumstances the scope of services may have been limited by factors such as time, budget, access and/or site disturbance constraints.

Reliance on Data

In preparing the report, ENV has relied on data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise stated in the report, ENV has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or in part on the data, those conclusions are contingent upon the accuracy and completeness of the data. ENV will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, unavailable, misrepresented or otherwise not fully disclosed to ENV.

Environmental Conclusions

In accordance with the scope of services, ENV has relied on the data and has conducted environmental field monitoring and/or testing in the preparation of the report. The nature and extent of monitoring and/or testing conducted is described in the report.

Within the limitations imposed by the scope of services, the monitoring, testing, sampling and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, express or implied, is made.

Report for Benefit of Client

The report has been prepared for the benefit of the Client and for no other party. ENV assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of ENV or for any loss or damage suffered by any other party relying on the matters dealt with or conclusions expressed in the report). Other parties should not rely on the report or the accuracy or completeness of any conclusions, and should make their own enquiries and obtain independent advice in relation to such matters.

Other Limitations

ENV will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

The scope of services did not include any assessment of the title to or ownership of the properties, buildings and structures referred to in the report, nor the application or interpretation of laws in the jurisdiction in which those properties, buildings and structures are located.

EXECUTIVE SUMMARY

ENV.Australia Pty Ltd (ENV) was commissioned by the Shire of Serpentine-Jarrahdale ('SSJ') to undertake a Flora and Vegetation Assessment of Yangedi Reserve.

Sixty-two taxa (55 native flora taxa and seven introduced) were identified during the survey. No Declared Rare Flora species were located during the survey. A population of *Eucalyptus rudis* subsp. *Cratyantha,* a Priority Four Flora species, was collected. The population constitutes a small group of trees, located at: 394042mE 6415221mN (GDA94 Zone 51).

ENV recommends that this area be protected from any site works and preserved.

ENV identified 11 vegetation units, of which seven showed similarities to Floristic Community Types ('FCTs'; Gibson *et al.,* 1994). Four ENV vegetation units were not able to be correlated to FCTs, as they were degraded with very limited numbers of flora taxa, or did not constitute native vegetation units (*i.e.* they contained non-endemic tree species as the dominant stratum).

ENV considers that FCTs SCP04 and SCP23a are present at Yangedi Reserve. Neither of these FCTs is listed as a Threatened Ecological Community.

Condition of vegetation across the site ranged from Very Good to Completely Degraded. The main factors contributing to a decrease in vegetation condition are human use impacts, land clearing, adjacent land uses and associated weed invasion.

Five weed species were identified during the survey. No weed species located during the field survey are listed as Declared Plant species by the Agriculture Protection Board (Government of Western Australia, 2007).

Yangedi Reserve is mapped as Bush Forever Site 378. Bush Forever Sites aim to protect and maintain regionally significant vegetation within the Swan Coastal Plain portion of metropolitan Perth (Government of Western Australia, 2000). ENV therefore recommends that the proposed communications tower be restricted to already cleared or disturbed areas.

The site supports four wetlands, two of which are listed as Conservation Category. The other two wetlands at Yangedi Reserve are Resource Enhancement Category wetlands (REC). ENV is aware that Conservation Category Wetlands and their associated buffers are protected by State legislation from the potential impacts of development. Development within Resource Enhancement wetlands and associated buffers, whilst not formally covered by legislation or policy, is restricted by the Department of Environment and Conservation.

It is therefore suggested that the proposed communications tower not be constructed within the CCW or REC wetlands, or within 50m from their mapped boundaries.

1 INTRODUCTION

ENV.Australia Pty Ltd (ENV) was commissioned by the Shire of Serpentine-Jarrahdale ('SSJ') to undertake a Flora and Vegetation Assessment of Yangedi Reserve. It is understood that SSJ intends to construct a communications tower in the north-west corner of the Reserve, and this survey has been requested by the Department of Environment and Conservation (DEC) as a condition of the communication tower development proposal.

ENV understands that the site is approximately 63ha, and contains three distinct areas of remnant native vegetation (approximately 29ha in all). The remainder of the site is cleared or developed land, comprising a small airport and associated infrastructure.

1.1 LOCATION

Yangedi Reserve is approximately 55km south of Perth, in the Shire of Serpentine-Jarrahdale. The site is immediately west of Yangedi Road, and is bounded by rural properties to the north, south and west. (Figure 1).

The site is in the Darling District of the Southwest Botanical Province (Beard 1990). This region typically consists of forest country with related woodlands, in the southwest part of the Province. The Province is divided into four subregions or botanical subdistricts.

The site is in Swan Coastal Plain Subregion in the Drummond Botanical Subdistrict, which consists mainly of the following vegetation communities:

- Banksia Low Woodland on leached sands and Melaleuca Swamps in poorly drained areas;
- Woodland of Tuart (*Eucalyptus gomphocephala*); and
- Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) on the less leached soils (Beard 1990).

The climate of this region is warm Mediterranean, with winter precipitation of 600-1000mm, and five to six dry months per year (Beard 1990).

1.2 REGIONAL REPRESENTATION

For a development proposal to be assessed in terms of the flora and vegetation values that may be impacted, an understanding of the vegetation communities at the site in question is required. In Western Australia, there are various floristic reports that detail a region's botanical values.

A widely-used vegetation classification system that maps and describes vegetation communities in south-west Western Australia is *Vegetation of the*

Darling System in the *Atlas of Natural Resources, Darling System, Western Australia* (Heddle *et al.* 1980). This document describes vegetation communities as vegetation complexes, and maps the distribution of each complex.

The Environmental Protection Authority's document *Levels of Assessment for Proposals Affecting Natural Areas Within System 6 Region and Swan Coastal Plain Portion of the System 1 Region* (EPA 2006) gives an estimate of the percentage of each complex that remains compared to its pre-European settlement extent, so an estimate of the scarcity of each complex can be determined.

Vegetation complexes are defined as a combination of distinct site vegetation types, usually associated with a particular geomorphic, climatic, floristic and vegetation structural association. Vegetation complexes are based on the pattern of vegetation at a regional scale, as it reflects the underlying key determining factors of landforms, climate and soils.

The EPA recognises vegetation complexes that are not well represented in reserves as being significant. Vegetation complexes which have 10%-30% remaining are considered to be regionally significant. Proposals that would impact upon a vegetation complex with 10% or less remaining are likely to be formally assessed (EPA, 2006). The Vasse Complex, in which Yangedi Reserve lies, has 29.4% of its pre-European extent remaining (EPA, 2006). Yangedi Reserve is within the Bassendean Complex – Central and South. This complex has 27.0% of its pre-European extent remaining.

1.3 THREATENED AND SIGNIFICANT FLORA

In Western Australian, flora species acquire Declared Rare or Priority conservation status when populations are geographically restricted or threatened by local processes. The Department of Environment and Conservation (DEC) (previously the Department of Conservation and Land Management) enforces regulations under the Wildlife Conservation Act 1950 ('WC Act') to conserve Declared Rare Flora and to protect significant populations.

The WC Act provides for taxa of plants to be listed as 'threatened'. Threatened flora and vegetation lists are reviewed and changes recommended by DEC's Threatened Species Scientific Committee. Ministerial approval is necessary before changes are given legal status by means of a notice in the Government Gazette.

Declared Rare Flora species are gazetted under subsection 2 of section 23F of the WC Act, and it is an offence to "take" or damage Declared Rare Flora (DRF) without Ministerial approval. Section 23F of the WC Act defines "to take" as to: "gather, pick, cut, pull up, destroy, dig up, remove or injure the flora or to cause or permit the same to be done by any means".

Priority Flora are under consideration for declaration as 'rare flora', but are in urgent need of further survey (Priorities One to Three), or require monitoring every 5-10 years (Priority Four) (see Appendix A for definitions). Priority flora are considered significant, but are not specifically protected under the WC Act.

Flora is also classified according to its conservation status at a Federal level, and may be protected under the Environment Protection and Biodiversity Conservation Act 1999 (Cth) ('EPBC Act'). These categories of classification are summarised in Appendix A.

Species listed and protected under the EPBC Act are essentially a subset of those that are Declared Rare Flora at the State level.

1.4 THREATENED ECOLOGICAL COMMUNITIES

An ecological community is a naturally-occurring biological assemblage that occurs in a particular type of habitat. A vegetation community is considered a Threatened Ecological Community (TEC) if it is classified in one of the following categories:

- Presumed Totally Destroyed;
- Critically Endangered;
- Endangered; or
- Vulnerable.

The definitions of these categories are given in Appendix B.

Coordination of threatened species and ecological community conservation is carried out by DEC's Nature Conservation Division, primarily through the Species and Communities Branch.

The *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*, permits native flora, including individual plants or entire communities, to be taken only by either a clearing permit, or by a valid exemption. The exemption provisions are quite extensive, but do not usually apply to land development applications.

There are a number of Environmentally Sensitive Areas (ESAs) in Western Australia where exemptions do not apply. Section 51B of the Environmental Protection Act (1986) allows the Minister for the Environment to declare ESAs, and TECs may be considered as ESAs. Exemptions do not apply in ESAs, and therefore the presence of TECs in a site can become a constraint to development, under the Environmental Protection (Clearing of Native Vegetation) Regulations 2004.

There is currently no State legislation specifically for the protection of TECs, but there is a presumption against developments likely to impact on TECs which are on a list endorsed by the Minister for the Environment, and their conservation is encouraged in development approvals processes. The EPBC Act also lists TECs, and 16 Western Australian communities are currently listed under this Act.

1.5 WETLANDS

In an effort to protect wetlands on the Swan Coastal Plain, a dataset was developed by Western Australian Land Information System, mapping the location and management category of wetlands on the Swan Coastal Plain. A management category is assigned to each wetland based on an evaluation by the Department of the Environment (formerly the Water and Rivers Commission, and now the Department of Environment and Conservation), which provides guidance on the nature of the management and protection the wetland should be afforded. These categories are as follows:

- C category (Conservation): wetlands with high conservation value for natural and human use. The management objective is described as being to preserve wetland (natural) attributes and functions.
- R category (Resource Enhancement): are defined as being partially modified, but still supporting substantial ecological attributes and functions. The ultimate objective for Resource Enhancement wetlands is management, restoration and protection towards improving their conservation category.
- M category (Multiple-Use): wetlands that have few important ecological attributes and functions remaining. The management objective is described as being to use, develop in the context of water, town and environmental planning.

The site supports two Conservation Category wetlands and two Resource Enhancement Category wetlands (See Figure 2).

1.6 BUSH FOREVER

Bush Forever aims to develop a strategic plan for the conservation and preservation of regionally significant bushland and associated wetlands in Perth and its associated coastal plain. Bush Forever is concerned with the protection of regionally significant bushland and associated wetlands (Government of Australia, 2000).

Yangedi Reserve, excluding the outer extent of firebreaks, is listed as Bush Forever site 378 – Henderson Road Bushland, Peel Estate. The site is categorised as supporting Regionally Significant Bushland (Bush Forever 2000) (see Figure 3).

The EPA outlines how it will consider proposals that impact on regionally significant vegetation in a Bush Forever site and the likely level of assessment. In the case of Yangedi Reserve, the likely level of assessment is stated as being 'considered on a case by case basis. EPA would expect proposals to be designed to minimise or avoid direct loss of bushland, consistent with Bush Forever expectations' (Government of Australia, 2000).

1.7 INTRODUCED SPECIES

The Environmental Weed Strategy for Western Australia (Department of Conservation and Land Management, 1999) contains criteria for the assessment and ranking of weeds in terms of their environmental impact on biodiversity. These criteria are presented in Appendix C.

Plants may also be 'declared' by the Agriculture Protection Board under the Agriculture and Related Resources Protection Act 1979 ('ARRP Act'). Declared Plants are gazetted under five categories (P1-P5) which define the action required. Details of these categories are provided in Appendix D. The category may apply to the whole State, to districts, to individual properties, or even to paddocks. If a plant is Declared, landholders are obliged to control that plant on their properties in accordance with the declaration (Government of Western Australia, 2007).

2 SCOPE OF WORK

In accordance with DEC requirements, the flora and vegetation assessment focused on determining vegetation communities present, locating DRF and Priority Flora and TECs and conducting a condition assessment of existing vegetation. Specifically, this comprised:

- a database search for Rare and Endangered species and TECs that may occur in the area, by reference to information collected by SSJ from the DEC databases;
- a flora and vegetation field survey to determine the presence of DRF and/or Priority Flora and TECs, map vegetation community types, and conduct a vegetation condition assessment;
- a review of data collected against criteria established through State and Federal processes for species conservation;
- the production of an aerial photograph with vegetation mapping, vegetation condition, TECs and flora or vegetation of conservation significance (if identified) overlaid; and
- the production of a final report detailing results from the above, potential constraints given the available information, and recommendations for further work.

3 METHODS

The methodology for the work involved the following key steps:

PHASE 1

On 14 November 2007 a list of DRF and Priority Flora species, as well as TECs that occur in the area surrounding the site, was provided by the SSJ by reference to information collected from the DEC databases.

PHASE 2

On 26 November 2007 an ENV botanist visited the site and conducted a vegetation survey by traversing the property on foot. Data was collected from *relévés*[1] in the survey area, and geographic coordinates noted for changes in vegetation type. The sampling intensity was selected in consideration of the landforms, habitat, vegetation structure, diversity and seasonality. At each site a photograph was taken, the vegetation unit was described and a condition statement made. During the field survey, potential DRF and Priority Flora populations were described and their geographic coordinates noted.

PHASE 3

Where field identification of plant taxa was not possible, specimens were collected in a systematic manner for later identification at the Western Australian Herbarium by comparison with the reference collection and use of identification keys.

Vegetation unit descriptions were then tabulated, and these communities were mapped. The vegetation descriptions for all communities across the site were then referenced against Gibson *et al.* (1994) to determine the potential for the site to support TECs. Floristic communities were inferred from those available in Gibson *et al.* (1994) on the basis of species composition, soils, topography and, where known, hydrology.

3.1 FLORA SURVEY LIMITATIONS AND CONSTRAINTS

It is important to note the specific constraints imposed on individual surveys. Constraints are often difficult to predict, as is the extent to which they influence survey effort. Survey constraints of the Yangedi Reserve flora and vegetation survey are detailed in Table 1.

[1] For the purposes of this flora and vegetation assessment, a *relévé* is defined as an unconfined survey area in which a general statement about the floristic composition of the location can be made.

Table 1: Limitations and constraints associated with the site Flora and Vegetation Survey

Variable	Impact on Survey Outcomes
Access Problems	No access problems were encountered
Experience levels	The botanists who executed the survey were practitioners suitably qualified in their respective fields. • Coordinating Botanist: Natalie Pawley (Environmental Scientist/Botanist); • Field Staff: Natalie Pawley; • Taxonomy: Rachael Pratt (Senior Botanist); and • Data Interpretation: Natalie Pawley.
Timing[2], weather, season.	The survey was undertaken in spring (26 November 2007). The area had received 681.2 mm of rainfall in the year to date (January 2007 to November 2007) (Bureau of Meteorology 2007).
Sources of information	The area of each vegetation unit to be impacted upon by any proposals associated with this survey area has not been presented as a percentage of local and regional vegetation because of the lack of information available about the total area of different types of vegetation, variation in vegetation mapping at different scales and the tentative nature of proposals when these surveys were commissioned.
Completeness	Dead plants were not recorded. A comprehensive species list has not been prepared for areas that do not constitute a natural vegetation area, such as gardens or areas that have been totally cleared. Flora composition changes over time, as flora species have specific growing periods, especially annuals and ephemerals (some plants last for a markedly brief time - some only a day or two). Therefore the results of future botanical surveys in this location may differ from the results of this survey.
Determination	This survey makes inferences about vegetation types that have the

[2] EPA *Guidance Statement No. 51* (2004) stipulates that flora and vegetation surveys should be undertaken following the season that contributes the greatest rainfall in the region. In the South-west Province the main rain is in winter, requiring surveys to be undertaken in spring. Short-term variances in normal weather patterns (e.g. drought) may necessitate supplementary survey work at other times of year or in later years to account for temporal changes in diversity.

Variable	Impact on Survey Outcomes
	potential to be TECs: however, a definitive decision as to the presence or absence of TECs at the site remains the responsibility of the DEC's Species and Communities Branch. The taxonomy and conservation status of the Western Australian flora are dynamic: this report was prepared on the basis of its current status, which may change.

3.2 PERMITS

Specimens collected during the survey were taken by permit of and subject to the conditions of the following licence issued under section 23C and section 23F of the Wildlife Conservation Act 1950:

- SL007826 Ms Natalie Pawley.

4 RESULTS

4.1 DATABASE SEARCH

A database search of the area resulted in no Declared Rare or Priority Flora species being identified as potentially occurring in the area.

The search also resulted in no known occurrences of Threatened Ecological Communities in the survey area.

The database information was obtained from a survey conducted as part of the South West Biodiversity Project - *Potentially Locally Significant Natural Areas and Features within the Shire of Serpentine – Jarrahdale*, provided by SJJ.

4.2 FIELD SURVEY

4.2.1 Flora

Twenty-eight families, 52 genera and 62 taxa were recorded in the survey area (55 native flora taxa and seven introduced). The flora species list is presented in Appendix E.

The dominant plant families recorded in the survey were as follows:

- Myrtaceae 12 species;
- Proteaceae six species;
- Papilionaceae four species; and
- Anthericaceae four species.

4.2.2 Declared Rare and Priority Flora

No plant taxa gazetted as Declared Rare pursuant to subsection 2 of section 23F of the WC Act (1950) (Atkins 2006) were located in the survey area.

No Endangered or Vulnerable species pursuant to section 178 of the EPBC Act (1999) were located during the survey.

A small group of *Eucalyptus rudis* subsp. *?cratyantha* was recorded during the survey. This species is listed as a Priority Four taxon, and was collected from 394042mE 6415221mN (GDA94 Zone 51).

All flora taxa recorded during the survey, are from known population ranges, and therefore no other significant flora species occur within the site.

4.2.3 Vegetation

The site consisted of 11 vegetation units (Figure 2). See Appendix E for species within each community. The 11 communities were:

BmBiBa - Woodland of *Banksia menziesii, Banksia ilicifolia* and *Banksia attenuata* over *Jacksonia furcellata, Dasypogon bromeliifolius* and *Patersonia occidentalis* over *Loxocarya cinerea;*

Bm*PpNf - Low Open Woodland of *Banksia menziesii, *Pinus pinaster* and *Nuytsia floribunda* over *Allocasuarina humilis, Dasypogon bromeliifolius, Anigozanthos manglesii* over *Loxocarya cinerea;*

NfAcXg - Low Open Woodland of *Nuytsia floribunda* and *Adenanthos cygnorum* over *Xanthorrhoea gracilis* over *Dasypogon bromeliifolius;*

BmBaJf - Open Woodland of *Allocasuarina humilis, Banksia menziesii* and *Banksia ilicifolia* over *Banksia attenuata, Nuytsia floribunda* and **Pinus pinaster* over *Jacksonia furcellata, Melaleuca thymoides* and *Regelia ciliata* over *Loxocarya cinerea, Lyginia imberbis* and *Lechenaultia biloba;*

BlKgXg - Tall Open Scrub of *Banksia ilicifolia* and *Kunzea glabrescens* over *Xanthorrhoea gracilis;*

MpRcEl - Tall Open Shrubland of *Melaleuca preissiana* over *Regelia ciliata, Kunzea glabrescens over Euchilopsis linearis, Hibbertia vaginata* and **Briza maxima;*

Nf*CcKg - Open Woodland of *Nuytsia floribunda* and **Corymbia citriodora* over *Kunzea glabrescens, Melaleuca thymoides* and *Regelia ciliata;*

BmKg - Low Open Woodland of *Banksia menziesii, Kunzea glabrescens* over **Ehrharta calycina* and **Briza maxima;*

Mp – Low Open Woodland of *Melaleuca preissiana* over weeds;

EmMpMt - Woodland of *Eucalyptus marginata* over *Melaleuca pressiana, Melaleuca thymoides* and *Kunzea glabrescens* over *Lepidosperma* sp; and

CcMtXg – Woodland of *Corymbia calophylla* over *Melaleuca thymoides* over *Xanthorrhoea gracilis.*

Refer to Appendix F for site photographs.

4.2.4 Floristic community Types

Of the above described 11 vegetation units, seven were able to be correlated against two main Floristic Community Types (Gibson *et al.*, 1994). The FCTs ENV considers present at Yangedi are:

SCP04 – *Melaleuca preissiana* damplands (similarities to ENV vegetation units MpRcEl, EmMpMt and CcMtXg); and

SCP23a – Central *Banksia attenuata – Banksia menziesii* woodlands (similarities with ENV vegetation units BmBiBa, Bm*PpNf, NfAcXg and BmBaJf)

4.2.5 Threatened Ecological Communities

Floristic Community Types SCP04 and SCP23a are not listed as TECs under Western Australian criteria, and are not listed under the EPBC Act.

For further discussion and interpretation of the site floristics, see section 5 (below).

4.2.6 Vegetation Condition

Condition of vegetation across the site ranged from Very Good to Completely Degraded (Figure 3). The main factors contributing to a decrease in vegetation community condition are human use impacts, land clearing, adjacent land uses and associated weed invasion (refer to Appendix G for condition scales).

4.2.7 Introduced Flora

The table below contains the dominant weed species identified during the field survey, with their ratings and criteria according to the Environmental Weed Strategy for Western Australia (refer to Appendix C for the criteria used for ranking).

Table 2: Dominant Weed Species Identified

Taxon	Common Name	Rating	Criteria		
			Invasiveness	Distribution	Impacts
**Ehrharta calycina*	Perennial veldt grass	High	√	√	√
**Carpobrotus edulis*	Hottentot Fig	Moderate	√	√	-
**Cyperus congestus*	Dense Flat-sedge	Moderate	√	√	-
**Hypochaeris glabra*	Smooth catsear	Moderate	√	√	-
**Pinus pinaster*	Pinaster pine	Moderate	√	√	-

There were no Declared Plant species found within the site.

5 DISCUSSION

Sixty-two taxa (55 native flora taxa and seven introduced) were identified during the survey. This is fewer than expected, as 89 native flora taxa were recorded during a previous survey, as published in the Bush Forever document (Government of Western Australia, 2000). This can be attributed to the fact that the previous survey was of an area larger than Yangedi Reserve.

No Declared Rare Flora species were located during the survey. A specimen of *Eucalyptus rudis* subsp. *cratyantha,* a Priority Four tree species, was collected from a small population of trees, located at: 394042mE 6415221mN (GDA94 Zone 51).

ENV considers, that as the proposed communications tower is planned to be constructed away from the location of these Priority Four listed trees, ENV does not deem this issue to warrant any particular concern. It is suggested, however, that this area be protected from any future site works.

ENV identified 11 vegetation units, of which seven showed similarities to Floristic Community Types (Gibson *et al.,* 1994). Four ENV vegetation units were not able to be correlated to FCTs, as they were degraded, with very limited numbers of flora taxa, or did not constitute native vegetation units (i.e. they contained non-endemic tree species as the dominant stratum).

ENV considers FCTs SCP04 and SCP23a are present at Yangedi Reserve. SCP04 is considered similar to ENV vegetation units MpRcEl, EmMpMt and CcMtXg, as these ENV vegetation units contain typical and other common species known to occur within SCP04. Similarly, ENV vegetation units BmBiBa, Bm*PpNf, NfAcXg and BmBaJf contain typical and other common species known to occur within SCP23a (Gibson *et al.,* 1994). Neither of these FCTs is listed as a Threatened Ecological Community.

Condition of vegetation across the site ranged from Very Good to Completely Degraded. The main factors contributing to a decrease in vegetation community condition are human use impacts, land clearing, adjacent land uses and associated weed invasion.

Five weed species were identified during the survey. Pursuant to Section 37 of the ARRP Act, the Agriculture Protection Board lists the classes of plants currently subject to a declaration made under Section 35 of the Act. No weed species located during the field survey are listed as Declared Plant species by the Agriculture Protection Board (Government of Western Australia, 2007).

Yangedi Reserve is mapped as Bush Forever Site 378. Bush Forever Sites aim to protect and maintain regionally significant vegetation within the Swan Coastal

Plain portion of metropolitan Perth (Government of Western Australia, 2000). ENV therefore recommends that the proposed communications tower be restricted to already cleared or disturbed areas.

The site supports four wetlands, two of which are listed as Conservation Category, and two as Resource Enhancement Category wetlands (REC). Conservation Category wetlands are defined as wetlands that support a high level of ecological attributes and functions. They are the highest priority wetlands, and any activity that may lead to further loss or degradation of such a wetland will be opposed by the DEC.

Similarly, Resource Enhancement Category (REC) wetlands are defined as being partially modified, but still supporting substantial ecological attributes and functions. The ultimate objective for REC wetlands is management, restoration and protection towards improving their conservation category, and therefore development in or close to REC wetlands is usually opposed.

Conservation Category wetlands and Resource Enhancement wetlands usually attract buffers of 50-100 m and 30-50 m respectively. However, it is noted that there has been recent development within the mapped boundary and the buffer zone of one of the REC wetlands. In ENV's experience, any development within REC and Conservation Category Wetlands and their associated buffers will be opposed. Conservation Category wetlands are protected by State legislation from the potential impacts of development. It is therefore recommended that the proposed communications tower be constructed away from the CCW and REC wetlands, with a buffer of at least 50 m from their mapped boundaries.

6 CONCLUSIONS AND RECOMMENDATIONS

In conclusion, the flora and vegetation survey undertaken by ENV.Australia determined that:

- sixty-two taxa (55 native flora taxa and seven introduced) were identified during the survey;
- no Declared Rare Flora species were located during the survey;
- a population of *Eucalyptus rudis* subsp. *cratyantha* was recorded. *Eucalyptus rudis* subsp. *cratyantha* is a Priority Four Flora species;
- it is recommended that this population be protected from any future site works;
- ENV considers FCTs SCP04 and SCP23a to be present at Yangedi Reserve. Neither of these FCTs are is listed as a Threatened Ecological Community;
- Condition of vegetation across the site ranged from Very Good to Completely Degraded;

6.1 RECOMMENDATIONS

ENV recommends the following:

- Construction of the proposed communications tower be restricted to already cleared and disturbed areas, because:
    - The site supports a population of *Eucalyptus rudis* subsp. *cratyantha* (P4). This population should be avoided;
    - Yangedi Reserve is mapped as Bush Forever Site 378. Bush Forever Sites aim to protect and maintain regionally significant vegetation within the Swan Coastal Plain portion of metropolitan Perth (Government of Western Australia, 2000). ENV therefore recommends that the proposed communications tower be restricted to already cleared or disturbed areas; and
    - The site supports four wetlands, two of which are listed as Conservation Category, and two as RECs. Any development within the mapped boundaries of these wetlands or within their buffers will be opposed.

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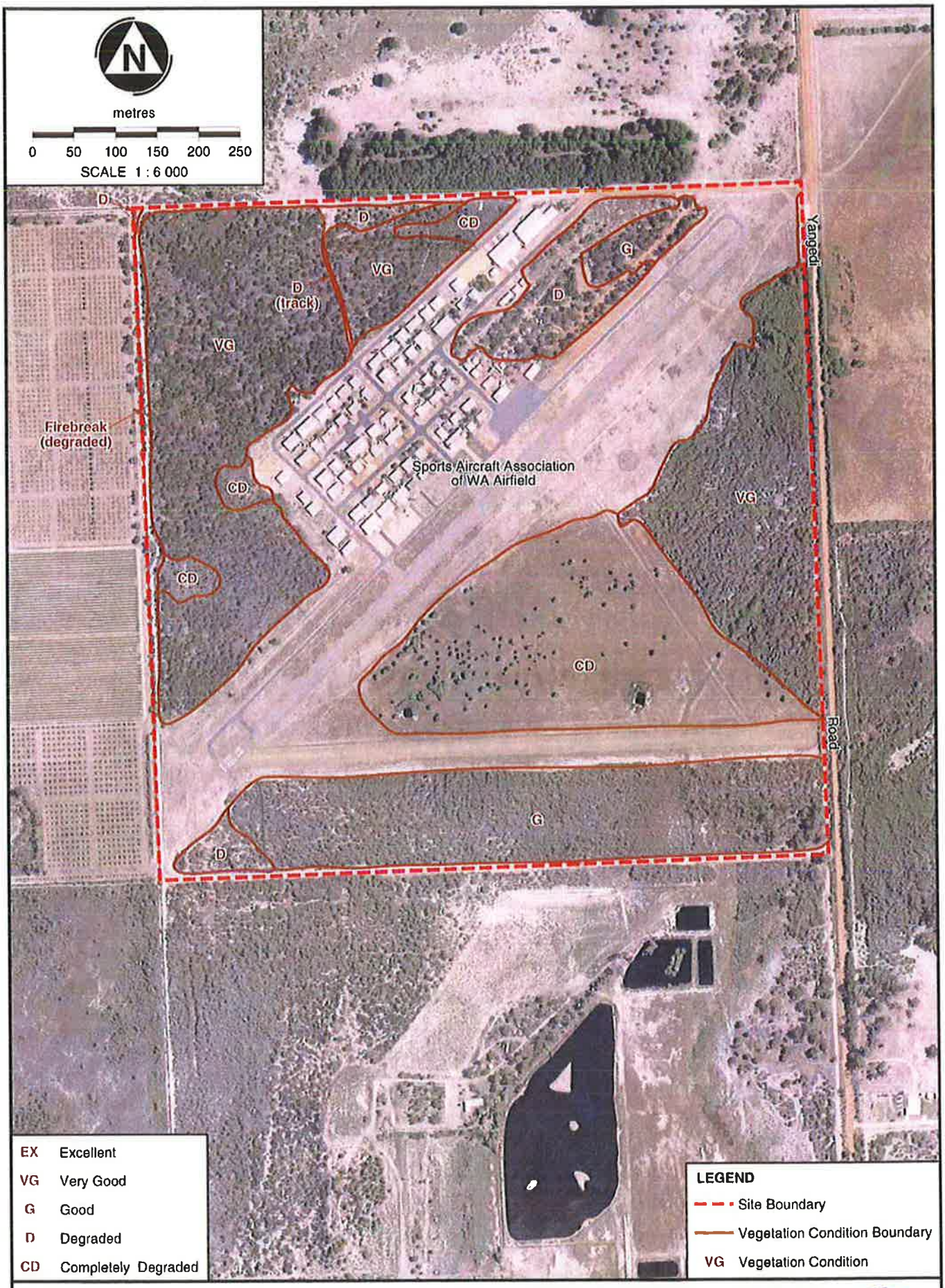
FIGURES

APPENDIX A

DEFINITIONS OF DECLARED RARE AND PRIORITY FLORA SPECIES

PRINTED: Thu 07 Feb 08



07-388-1-f05.dgn
DATUM: MGA50
DRAWN: CR 07-02-08
AUTHOR: NP 04-02-08

Shire of Serpentine - Jarrahdale
FLORA AND VEGETATION OF YANGEDI RESERVE
SHIRE OF SERPENTINE - JARRAHDALE
VEGETATION CONDITION
FIGURE 5

env Australia

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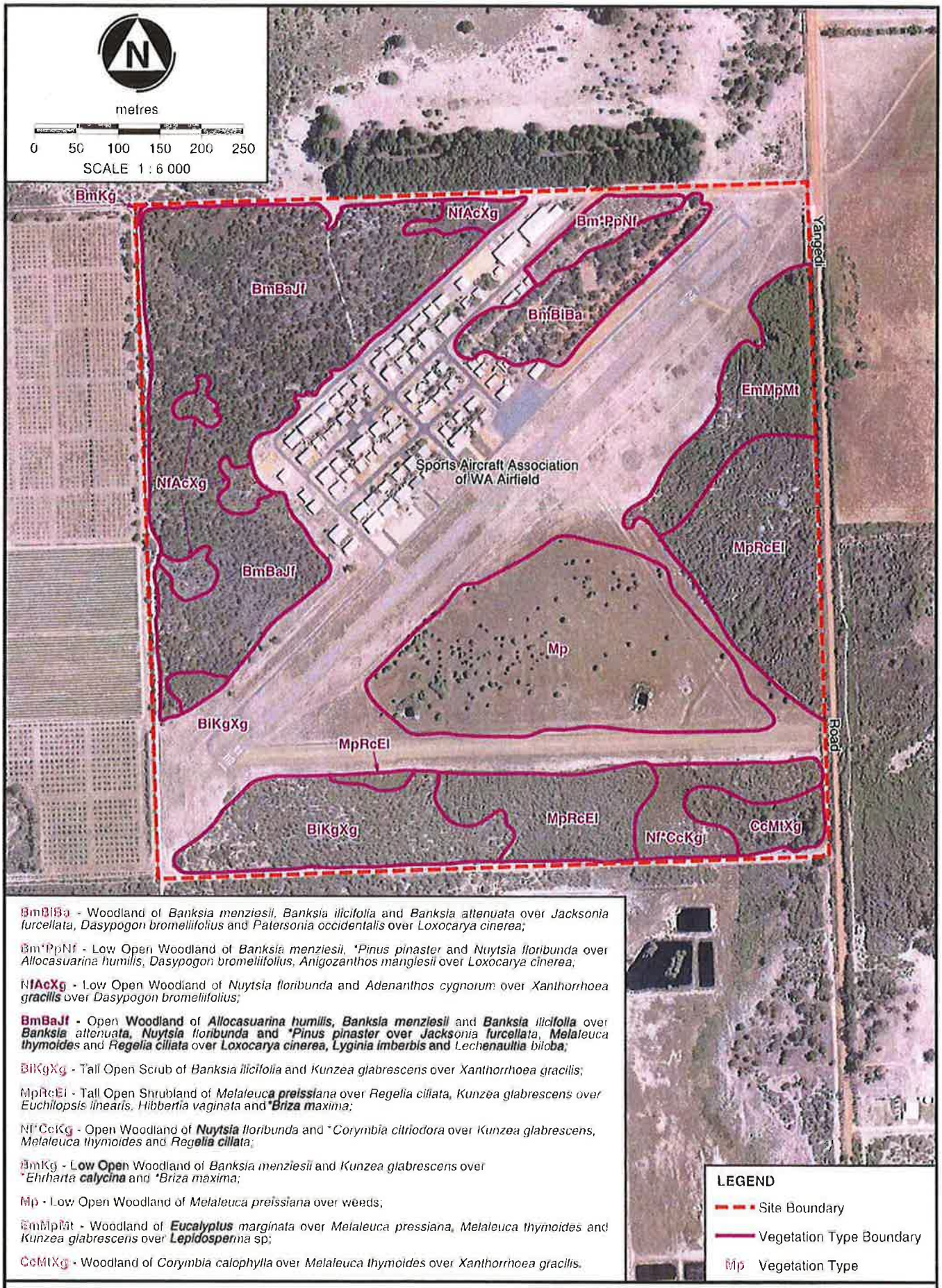


BmBiBa - Woodland of *Banksia menziesii*, *Banksia ilicifolia* and *Banksia attenuata* over *Jacksonia furcellata*, *Dasypogon bromeliifolius* and *Patersonia occidentalis* over *Loxocarya cinerea*;

Bm*PpNf - Low Open Woodland of *Banksia menziesii*, **Pinus pinaster* and *Nuytsia floribunda* over *Allocasuarina humilis*, *Dasypogon bromeliifolius*, *Anigozanthos manglesii* over *Loxocarya cinerea*;

NfAcXg - Low Open Woodland of *Nuytsia floribunda* and *Adenanthos cygnorum* over *Xanthorrhoea gracilis* over *Dasypogon bromeliifolius*;

BmBaJf - Open **Woodland** of ***Allocasuarina humilis, Banksia menziesii*** and ***Banksia ilicifolia*** over ***Banksia attenuata, Nuytsia floribunda*** and ****Pinus pinaster*** over ***Jacksonia furcellata, Melaleuca thymoides*** and ***Regelia ciliata*** over ***Loxocarya cinerea, Lyginia imberbis*** and *Lechenaultia biloba*;

BiKgXg - Tall Open Scrub of *Banksia ilicifolia* and *Kunzea glabrescens* over *Xanthorrhoea gracilis*;

MpRcEl - Tall Open Shrubland of *Melaleuca preissiana* over *Regelia ciliata*, *Kunzea glabrescens* over *Euchilopsis linearis*, *Hibbertia vaginata* and **Briza maxima*;

Nf*CcKg - Open Woodland of ***Nuytsia*** *floribunda* and **Corymbia citriodora* over *Kunzea glabrescens*, *Melaleuca thymoides* and ***Regelia ciliata***;

BmKg - **Low Open** Woodland of *Banksia menziesii* and *Kunzea glabrescens* over **Ehrharta calycina* and **Briza maxima*;

Mp - Low Open Woodland of *Melaleuca preissiana* over weeds;

EmMpMt - Woodland of ***Eucalyptus*** *marginata* over *Melaleuca pressiana*, *Melaleuca thymoides* and *Kunzea glabrescens* over ***Lepidosperma*** sp;

CcMtXg - Woodland of *Corymbia calophylla* over *Melaleuca thymoides* over *Xanthorrhoea gracilis*.

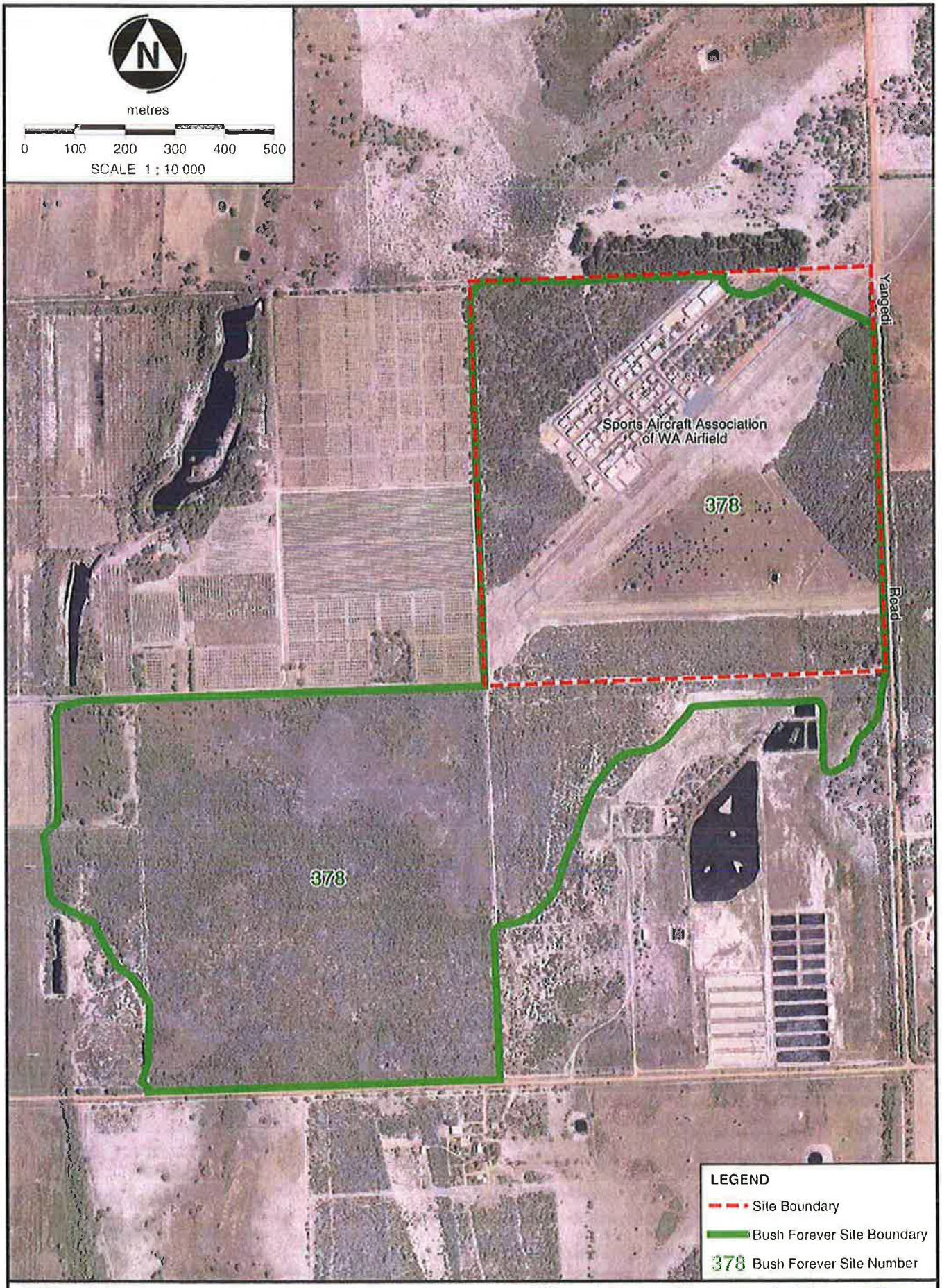
LEGEND

- Site Boundary
- Vegetation Type Boundary
- Mp Vegetation Type

07-388-1-f04.dgn
DATUM: MGA50
DRAWN: CR 08-02-08
AUTHOR: NP 08-02-08

Shire of Serpentine - Jarrahdale
FLORA AND VEGETATION OF YANGEDI RESERVE
SHIRE OF SERPENTINE - JARRAHDALE
VEGETATION MAP
FIGURE 4

env Australia



PRINTED: Thu 07 Feb 08

07-388-1-f03.dgn
DATUM: MGA50
DRAWN: CR 07-02-08
AUTHOR: NP 04-02-08

BUSH FOREVER SOURCE: WAPC, Bush Forever, December 2000.

Shire of Serpentine - Jarrahdale
FLORA AND VEGETATION OF YANGEDI RESERVE
SHIRE OF SERPENTINE - JARRAHDALE
BUSH FOREVER LOCATION MAP
FIGURE 3

env Australia

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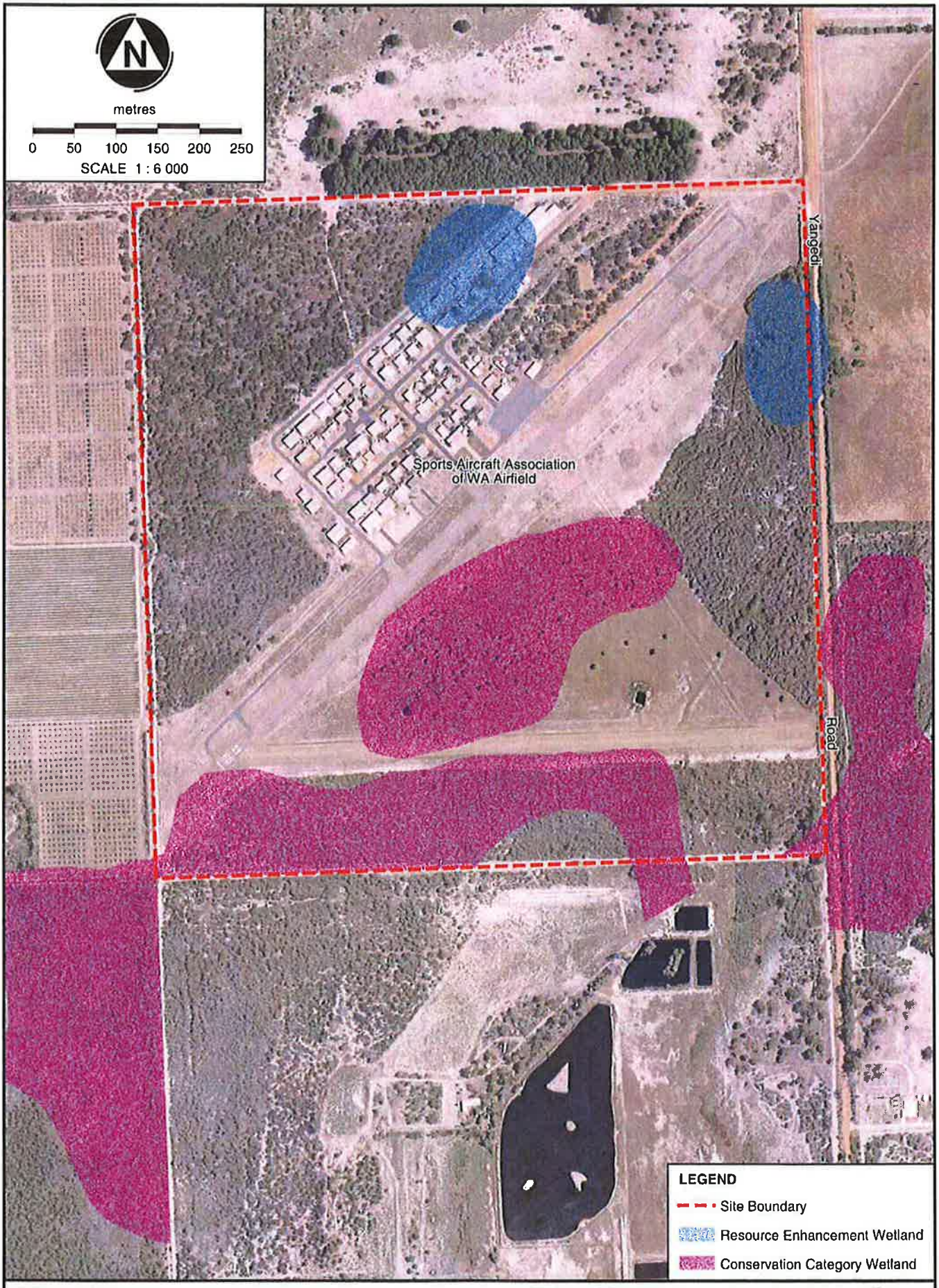

07-388-1-f02.dgn
DATUM: MGA50
DRAWN: CR 07-02-08
AUTHOR: NP 04-02-08

WETLAND SOURCE: DEC, April 2005.

Shire of Serpentine - Jarrahdale
FLORA AND VEGETATION OF YANGEDI RESERVE
SHIRE OF SERPENTINE - JARRAHDALE

GEOMORPHIC WETLANDS OF THE SWAN COASTAL PLAIN

FIGURE 2

env Australia

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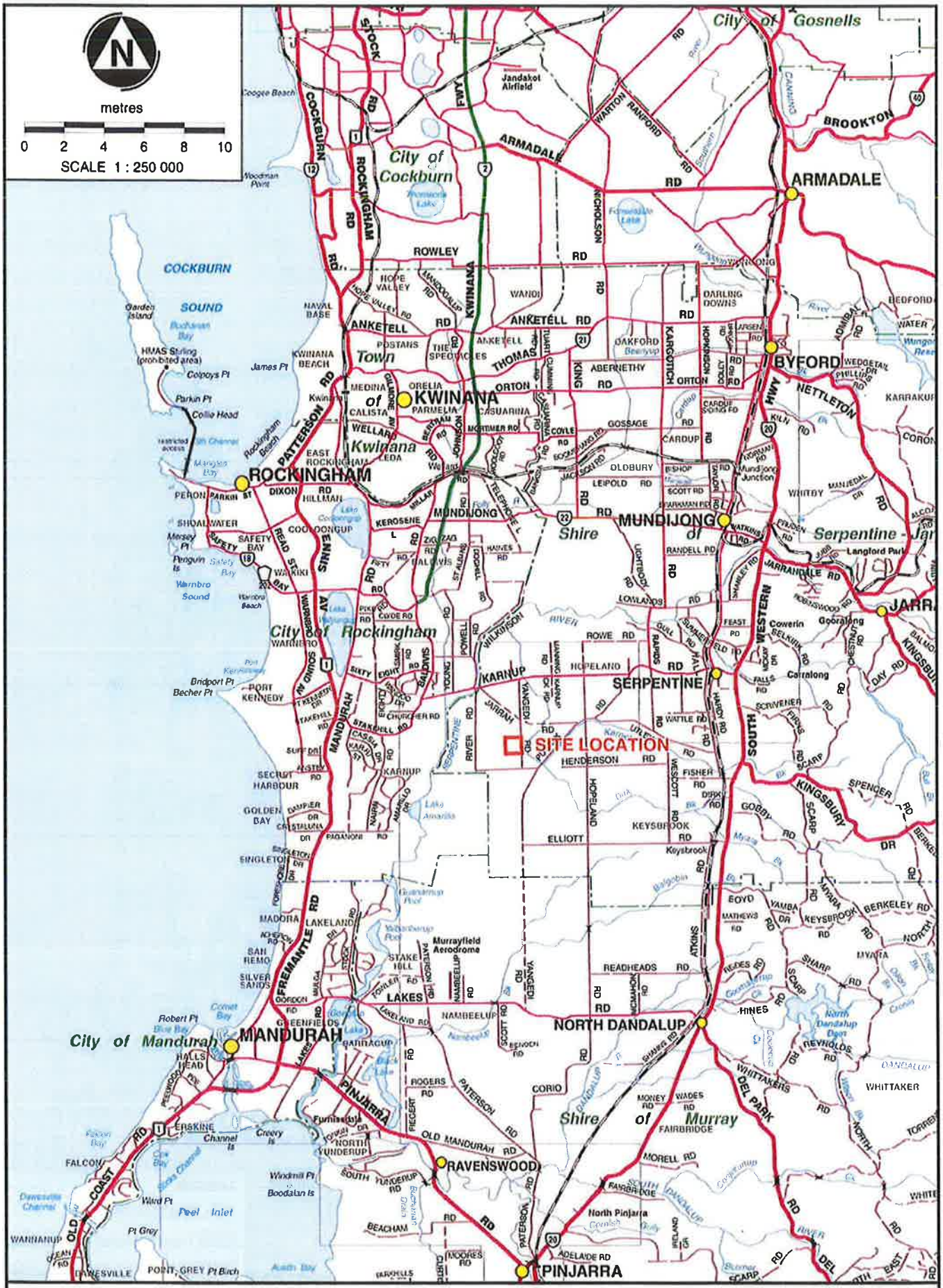

07-388-1-f01.dgn
DATUM: MGA50
DRAWN: CR 07-02-08
AUTHOR: NP 04-02-08

SOURCE: Landgate, StreetExpress 2007.

Shire of Serpentine - Jarrahdale
FLORA AND VEGETATION OF YANGEDI RESERVE
SHIRE OF SERPENTINE - JARRAHDALE

SITE LOCATION

FIGURE 1

env Australia

APPENDIX A
Definitions of Declared Rare and Priority Flora Species
(Department of Conservation and Land Management, 2003)

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."
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."
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, 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 urgently need 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 (i.e. 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 (i.e. not currently endangered), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but need 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."

Categories of Threatened Flora Species (Environmental Protection and Biodiversity Conservation Act, 1999)

Category Code	Category
Ex	Extinct Taxa which at a particular time if, at the time, there is no reasonable doubt that the last member of the species has died.
ExW	Extinct in the wild 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.
CE	Critically Endangered Taxa which at a particular time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
E	Endangered Taxa which is not critically endangered and it is facing a very high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
V	Vulnerable Taxa which is not critically endangered or 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.
CD	Conservation Dependent Taxa which at a particular time if, at that time, the species 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.

APPENDIX B

DEFINITIONS OF THREATENED ECOLOGICAL COMMUNITIES

APPENDIX B

Definitions of Threatened Ecological Communities (Department of Conservation and Land Management, 2001)

Threatened Ecological Communities

Presumed Totally Destroyed (PD)

An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant **and either** of the following applies (A or B);

A) Records within the last 50 years have not been confirmed despite thorough searches or known or likely habitats **or,**

B) All occurrences recorded within the last 50 years have since been destroyed.

Critically Endangered (CR)

An ecological community will be listed as **Critically Endangered** when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting **any one or more** of the following criteria (A, B or C):

A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and **either or both** of the following apply (i or ii);

   i) geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 5 years),

   ii) modification throughout its range is continuing such that in the immediate future (within approximately 5 years) the community is unlikely to be capable of being substantially rehabilitated.

B) Current distribution is limited, and **one or more** of the following apply (i, ii or iii);

   i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 5 years),

   ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes,

   iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes.

C) The ecological community exists only as highly modified occurrences which may be capable of being rehabilitated if such work begins in the immediate future (within approximately 5 years).

APPENDIX B (cont)

Priority Ecological Community List

Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community Lists under Priorities 1, 2 and 3. These three categories are ranked in order of priority for survey and/or definition of the community, and evaluation of conservation status, so that consideration can be given to their declaration as threatened ecological communities. Ecological Communities that are adequately known, and are rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

Priority One: Poorly known ecological communities Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.

Priority Two: Poorly known ecological communities. Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, State forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation.

Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.

Priority Three: Poorly known ecological communities

(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or:

(ii) Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or;

(iii) Communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes.

Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.

Priority Four: Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.

(a) Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands.

(b) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.

APPENDIX B (cont)

Endangered (EN)

An ecological community will be listed as **Endangered** when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information, by it meeting **any one or more** of the following criteria (A, B or C):

A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 70% and **either or both** of the following apply (i or ii);

i) geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term (within approximately 10 years),

ii) modification throughout its range is continuing such that in the short term future (within approximately 10 years) the community is unlikely to be capable of being substantially restored or rehabilitated.

B) Current distribution is limited, and **one or more** of the following apply (i, ii or iii);

i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 10 years),

ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes,

iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes.

C) The ecological community exists only as highly modified occurrences which may be capable of being rehabilitated if such work begins in the short term future (within approximately 10 years).

Vulnerable (VU)

An ecological community will be listed as **Vulnerable** when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction in the medium to long term future. This will be determined on the basis of the best available information, by it meeting **any one or more** of the following criteria (A, B or C):

A) The ecological community exists largely as modified occurrences which are likely to be capable of being substantially restored or rehabilitated.

B) The ecological community can be modified or destroyed and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.

C) The ecological community may still be widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.

(c) Ecological communities that have been removed from the list of threatened communities during the past five years.

Priority Five: Conservation Dependent ecological communities Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

APPENDIX C

CRITERIA USED FOR RANKING ENVIRONMENTAL WEEDS

APPENDIX C

Criteria used for Ranking Environmental Weeds

The Environmental Weed Strategy for Western Australia (CALM 1999) contains criteria for the assessment and ranking of weeds in terms of their environmental impact on biodiversity. These criteria are as follows:

- **Invasiveness** – ability to invade bushland in good to excellent condition or ability to invade waterways. (Score as yes or no).
- **Distribution** – wide current or potential distribution including consideration of known history of wide spread distribution elsewhere in the world. (Score as yes or no).
- **Environmental Impacts** – ability to change the structure, composition and function of ecosystems. In particular an ability to form a monoculture in a vegetation community. (Score as yes or no).

The rating of each weed is determined by the following scoring system:

- **High** - a weed species would have to score yes for all three criteria. Rating a weed species as high would indicate prioritising this weed for control and/or research i.e. prioritising funding to it.
- **Moderate** -a weed species would have to score yes for two of the above criteria. Rating a weed species as moderate would indicate that control or research effort should be directed to it if funds are available, however it should be monitored (possibly a reasonably high level of monitoring).
- **Mild** – a weed species scoring one of the criteria. A mild rating would indicate monitoring of the week and control where appropriate.
- **Low** – a weed species would score none of the criteria. A low ranking would mean that this species would require a low level of monitoring.

APPENDIX D

STANDARD MEANINGS OF DECLARED PLANT CATEGORIES

APPENDIX D

Standard Meanings of Declared Plant Categories

P1

Prohibits movement.

The movement of plants or their seeds is prohibited within the State.

This prohibits the movement of contaminated machinery and produce including livestock and fodder.

P2

Aim is to eradicate infestation.

Treat all plants to destroy and prevent propagation each year until no plants remain. The infested area must be managed in such a way that prevents the spread of seed or plant parts on or in livestock, fodder, grain, vehicles and/or machinery.

P3

Aims to control infestation by reducing area and/or density of infestation.

The infested area must be managed in such a way that prevents the spread of seed or plant parts within and from the property on or in livestock, fodder, grain, vehicles and/or machinery.

Treat to destroy and prevent seed set all plants:

* Within 50m inside of the boundaries of the infestation;
* within 50m of roads and high water mark on waterways;
* within 50m of sheds, stock yards and houses.

Treatment must be done prior to seed set each year.

Properties with less than 20ha of infestation must treat the entire infestation.

Additional areas may be ordered to be treated.

P4

Aims to prevent infestation spreading beyond existing boundaries of infestation

The infested area must be managed in such a way that prevents the spread of seed or plant parts within and from the property on or in livestock, fodder, grain, vehicles and/or machinery.

Treat to destroy and prevent seed set all plants:

* within 50m inside of the boundaries of the infested property for one-leaf and 20m for two-leaf;
* within 50m of roads and high water mark on waterways;
* within 50m of sheds, stock yards and houses.

Treatment must be done prior to seed set each year. Properties with less than 20ha of infestation must treat the entire infestation.

Additional areas may be ordered to be treated.

Special considerations.

In the case of P4 infestations where they continue across property boundaries there is no requirement to treat the relevant part of the property boundaries as long as the boundaries of the infestation as a whole are treated. There must be agreement between neighbours in relation to the treatment of these areas.

P5

Aims to control infestations on public lands.

APPENDIX E
FLORA SPECIES LIST

APPENDIX E
FLORA SPECIES LIST

*: denotes introduced species

FAMILY	Coll No		TAXA	CONS. CODE	PRESENCE/ABSENCE										
					BiKgXg	Bm*PpNfLc	BmBaJfLc	BmBiDbPo	BmKg*Ec*Bm	MpMtKgLs	KgRcEl	Mp	NfAcXgDb	NfCcKgMt	CcMtXg
ZAMIACEAE		*Macrozamia*	*nedlei*				+	+							
PINACEAE	*	*Pinus*	*pinaster*			+	+								
CUPRESSACEAE		*Actinostrobus*	*pyramidalis*		+										
POACEAE	*	*Briza*	*maxima*		+	+		+	+		+		+		+
	*	*Ehrharta*	*calycina*		+	+	+	+	+	+				+	+
		Neurachne	*alopecuroidea*				+								
CYPERACEAE	*	*Cyperus*	*congestus*											+	
		Evandra	*pauciflora*											+	
		Lepidosperma	sp.			+	+	+		+					
RESTIONACEAE		*Hypolaena*	*exsulca*		+					+				+	
		Loxocarya	*cinerea*			+	+	+							
		Lyginia	*imberbis*				+						+		
JUNCACEAE		*Juncus*	*pallidus*							+				+	
DASYPOGONACEAE		*Dasypogon*	*bromeliifolius*		+	+	+	+					+		
XANTHORRHOEACEAE		*Xanthorrhoea*	*gracilis*		+								+		+
ANTHERICACEAE		*Arnocrinum*	*preissii*			+									
		Johnsonia	sp.				+								
		Laxmannia	*squarrosa*			+	+	+							
		Thysanotus	*triandrus*			+	+	+		+			+		
HAEMODORACEAE		*Anigozanthos*	*manglesii*			+	+	+					+		
		Conostylis	*aculeata*			+		+							
		Haemodorum	*spicatum*										+		
IRIDACEAE		*Patersonia*	*occidentalis*			+	+	+					+		
CASUARINACEAE		*Allocasuarina*	*humilis*			+	+								
PROTEACEAE		*Adenanthos*	*cygnorum*			+							+		
		Banksia	*attenuata*				+	+							
		Banksia	*ilicifolia*		+		+	+							
		Banksia	*menziesii*			+	+	+	+						+
		Petrophile	*linearis*				+	+							
		Stirlingia	*latifolia*			+		+							
LORANTHACEAE		*Nuytsia*	*floribunda*			+	+						+	+	
AIZOACEAE	*	*Carpobrotus*	*edulis*			+		+		+				+	
MOLLUGINACEAE		*Macarthuria*	*australis*					+							
DROSERACEAE		*Drosera*	*?paleacea subsp. paleacea*		+										
MIMOSACEAE		*Acacia*	*huegelii*					+							

FAMILY	Coll No		TAXA	CONS. CODE	PRESENCE/ABSENCE										
					BiKgXg	Bm*PpNfLc	BmBaJfLc	BmBiDbPo	BmKg*Ec*Bm	MpMtKgLs	KgRcEl	Mp	NfAcXgDb	NfCcKgMt	CcMtXg
PAPILIONACEAE		*Bossiaea*	*eriocarpa*		+	+		+							
		Euchilopsis	*linearis*		+					+	+			+	
		Gompholobium	*tomentosum*		+		+	+							
		Jacksonia	*furcellata*		+	+	+	+					+		
DILLENIACEAE		*Hibbertia*	*hypericoides*			+									
		Hibbertia	*sp.*					+							
		Hibbertia	*vaginata*		+						+				
MYRTACEAE		*Calytrix*	*angulata*				+								
		Calytrix	*fraseri*				+								
		Corymbia	*calophylla*												+
	*	*Corymbia*	*citriodora*			+		+						+	
		Eucalyptus	*marginata*							+					
	NP51	*Eucalyptus*	*rudis subsp. ?cratyantha*	P4						+					
		Eucalyptus	*sp. (planted)*			+									
		Kunzea	*glabrescens*		+		+	+	+	+	+		+	+	
		Melaleuca	*preissiana*		+					+	+	+			
		Melaleuca	*thymoides*		+		+	+		+				+	-
		Regelia	*ciliata*		+		+				+			+	
		Scholtzia	*involucrata*				+								
APIACEAE		*Trachymene*	*pilosa*					+					+		
EPACRIDACEAE		*Conostephium*	*pendulum*					+							
LAMIACEAE		*Hemiandra*	*pungens*			+									
GOODENIACEAE		*Dampiera*	*linearis*					+							
		Lechenaultia	*biloba*			+	+								
STYLIDIACEAE		*Stylidium*	*repens*				+								
		Stylidium	*neurophyllo*					+							
ASTERACEAE	*	*Hypochaeris*	*glabra*					+							

APPENDIX F
SITE PHOTOS

APPENDIX F
Site Photos

Photo 1: ENV Vegetation unit BmBlDbPo

Photo 2: ENV Vegetation unit Bm*PpNfLc

Photo 3: ENV Vegetation unit NfAcXgDb

Photo 4: ENV Vegetation unit BmBaJfLc

Photo 5: ENV Vegetation unit BlKgXg

Photo 6: ENV Vegetation unit MpKgRcEl

Photo 7: ENV Vegetation unit NfCcKgMt

Photo 8: ENV Vegetation unit BmKg*Ec*Bm

Photo 9: ENV Vegetation unit Mp

Photo 10: ENV Vegetation unit MpMtKgLs

Photo 11: ENV Vegetation unit CcMtXg

Photo 12: *_Pinus pinaster_ crop adjacent to ENV Vegetation unit Bm*PpNfLc

Photo 13: Yangedi Reserve's associated infrastructure

APPENDIX G

BUSH FOREVER CONDITION SCALES

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Bush Forever Condition Scales

Condition scale used in BUSH FOREVER VOL 2, from Keighery BJ (1994)	Condition scale used to derive Keighery BJ (1994) and Connell (1995) after Trudgen (1991)	Condition scale used in PEP MAPPING after Connell (1995)
Pristine (1) Pristine or nearly so, no obvious signs of disturbance	**Excellent (E)** Pristine or nearly so, no obvious signs of damage caused by the activities of European man.	No equivalent unit.
Excellent (2) Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.	**Very Good (VG)** Some relatively slight signs of damage caused by the activities of European man. For example, some signs of damage to tree trunks caused by repeated fires and the presence of some relatively non-aggressive weeds such as *Ursinia anthemoides* or *Briza* species, or occasional vehicle tracks.	**Very Good (VG)** Evidence of localised low level damage to otherwise healthy bush. Seedling recruitment and generally healthy population size (age/stage) structure apparent. Weed and grazing damage is confined (<20% of area). Some modification to vegetation structure due to changes in fire regimes may be apparent. Evidence of logging or firewood collection may be found. High likelihood that vegetation structure and species richness can be maintained.
Very Good (3) Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.	**Good (G)** More obvious signs of damage caused by the activities of European man, including some obvious impact on the vegetation structure such as caused by low levels of grazing or by selective logging. Weeds as above, possibly plus some more aggressive ones.	**Good (g)** Evidence of localised high level damage to otherwise low level damaged bush. Recruitment is localised and the populations of some species may be senescent. Weed and grazing damage is apparent in 20-50% of the area. Modification to vegetation structure due to changes in fire regimes may be apparent. Localised gall and parasitic plant damage may be apparent. Evidence of logging or firewood collection. Moderate likelihood that vegetation structure and species richness can be maintained.
Good (4) 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 some very aggressive weeds at high density, partial clearing, dieback and grazing.	**Poor (P)** Still retains basic vegetation structure or ability to regenerate to it after very obvious impacts of activities of European man such as grazing or partial clearing (chaining) or very frequent fires. Weeds as above, probably plus some more aggressive ones such as *Ehrharta* species.	**Poor (p)** Widespread high level damage. Recruitment is disrupted and most woody species appear senescent. Weed and grazing damage may be apparent throughout >50% of the area. Modification to vegetation structure due to changes in fire regimes may be apparent. Locally some vertical strata are absent. Gall and mistletoe damage apparent. Evidence of logging or firewood collection. Low likelihood that vegetation structure and species richness can be maintained or re-established.
Degraded (5) Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.	**Very Poor (VP)** Severely impacted by grazing, fire, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species including aggressive species.	**Very Poor (p)** Widespread high level damage. Recruitment is disrupted and most species appear senescent. Weed and grazing damage apparent throughout the area. Modification to vegetation structure due to changes in fire regimes apparent. Widespread loss of vertical strata. Gall and mistletoe damage apparent. Evidence of logging or firewood collection. Little to no likelihood that vegetation structure and species richness can be re-established.
Completely Degraded (6) The structure of the vegetation is no longer intact and the area is completely or almost 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.	**Completely Degraded (D)** Area that are completely or almost completely without native species in the structure of their vegetation, i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.	Not used – does not apply to bushland.