



## 1. Application details

### 1.1. Permit application details

Permit application No.: 2530/1  
 Permit type: Purpose Permit

### 1.2. Proponent details

Proponent's name: Cardno BSD Pty Ltd

### 1.3. Property details

Property: ROAD RESERVE (MARDELLA 6125)  
 ROAD RESERVE (MUNDIJONG 6123)  
 Local Government Area: Shire Of Serpentine-Jarrahdale  
 Colloquial name: Webb Road Reserve

### 1.4. Application

|                    |           |                    |                                  |
|--------------------|-----------|--------------------|----------------------------------|
| Clearing Area (ha) | No. Trees | Method of Clearing | For the purpose of:              |
| 0.06               |           | Mechanical Removal | Road construction or maintenance |

## 2. Site Information

### 2.1. Existing environment and information

#### 2.1.1. Description of the native vegetation under application

| Vegetation Description   | Clearing Description  | Vegetation Condition   | Comment  |
|--|---|--|--|
| Beard Vegetation 968: Medium woodland; jarrah, marri & wandoo (Shepherd 2006).   | The proposal is to clear 0.06ha of native vegetation within the Webb Road road reserve, Mardella, for the construction and widening of (the existing) Webb road for an entrance into an adjacent residential subdivision.   | Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery 1994) | The vegetation condition and clearing description were obtained during a site inspection undertaken 27 June 2008 (DEC 2008). |
| Heddie Guildford Complex: A mixture of open forest to tall open forest of C. calophylla - E. wandoo - E. marginata and woodland of E. wandoo (with rare occurrences of E. lane-pooli). Minor components include E. rudis - M. raphiophylla (Heddie et al. 1980). | The area of vegetation under application can be separated into three distinct vegetated areas.<br><br>Area 1 (~0.01ha) is located within the southern portion of the applied area and comprises Corymbia calophylla (Marri), Allocasuarina sp. and Eucalyptus sp., over herbs, shrubs and sedges including, but not limited to, Hibbertia sp., Mesomelaena sp., Hypocalymma sp., Banksia nivea, Xanthorrhoea sp., Grevillea bipinnatifida, Daviesia sp., Hakea sp., Acacia sp.. Weeds were observed to varying densities across the site, ranging from 30-50% cover. Overall the vegetation within this area is considered to be in good condition. |  |  |
|  | Area 2 (~0.03ha), located within the middle portion of the applied area, contained an historic rehabilitation   | Degraded: Structure severely disturbed; regeneration to good condition requires  |  |

area on the eastern side of the road which comprises *Acacia saligna* and *Calothamnus quadrifidus* over a pasture grass understorey. The area under application on the western side of the road comprised of no overstorey, with an understorey of weed species. Overall the vegetation within this area is considered to be in degraded condition.

Area 3 (~0.02ha), located in the northern portion of the applied area, comprises a weed or bare understorey, with 3-5 individual *Allocasuarina* sp.. This portion of the applied area is located within Bush Forever Site 360. Overall this area is considered to be in a completely degraded condition.

intensive management (Keighery 1994)

Completely Degraded: No longer intact; completely/almost completely without native species (Keighery 1994)

### 3. Assessment of application against clearing principles

#### (a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

##### Comments

##### **Proposal is not likely to be at variance to this Principle**

The area under application comprises three distinct vegetated areas. The southern portion of the applied area (Area 1) (~0.01ha) comprises *Corymbia calophylla* (Marri), *Allocasuarina* sp. and *Eucalyptus* sp., over herbs, shrubs and sedges including, but not limited to, *Hibbertia* sp., *Mesomelaena* sp., *Hypocalymma* sp., *Banksia nivea*, *Xanthorrhoea* sp., *Grevillea bipinnatifida*, *Daviesia* sp., *Hakea* sp., *Acacia* sp., in good condition (DEC 2008). The middle (Area 2) and northern (Area 3) portions of the applied area (totalling ~0.05ha) comprise a homogenous rehabilitated vegetation area and a scattered *Allocasuarina* overstorey with a bare understorey, respectively (DEC 2008). These areas are considered to be in a degraded and completely degraded condition, respectively (DEC 2008).

The majority of the area under application (Areas 2 and 3, totalling ~0.05ha) comprises a low level of floral diversity, with only three flora species observed across this area during the site inspection (DEC 2008). In addition, whilst the vegetation within Area 1 was observed to comprise a higher diversity of native flora, edge effects from the existing road have resulted in high weed invasion in areas (up to 50% cover) and therefore, a reduced floral diversity within this area (DEC 2008).

The vegetation under application is also considered unlikely to provide habitat for a number of local fauna species due to the overall degraded condition of the vegetation (DEC 2008), lack of vegetated cover, and absence of flora species required for nesting and foraging.

Therefore, given the overall low floral diversity, and lack of suitable habitat for native fauna species, the vegetation under application is not considered likely to comprise a high level of biological diversity.

##### Methodology

##### References:

- DEC (2008)
  - Heddle et al. (1980)
- GIS Database:
- Heddle Vegetation Complexes

#### (b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

##### Comments

##### **Proposal is not likely to be at variance to this Principle**

The proposal is to clear up to 0.06ha of native vegetation for road construction and widening. The area under application can be equally separated into three distinct vegetated areas ranging in condition from good to completely degraded (DEC 2008).

Six fauna species of conservation significance have been recorded within the local area, including Quenda (*Isodon obesulus fusciventer*) (priority 5) which have been identified as a significant mammal species within Bush Forever Site 360, Mundijong and Watkins Road Bushland, Mundijong/Peel Estate (Government of Western Australia 2000), which is located within the northern portion of the applied area (Area 3).

A portion of the area under application (Area 1) comprises areas of dense understorey suitable for ground-dwelling fauna species such as *Quenda*, however the remaining two vegetated areas (Areas 2 and 3, totalling ~0.05ha) comprise a homogenous rehabilitated vegetation area and a scattered *Allocasuarina* overstorey with a bare understorey, respectively (DEC 2008). Therefore, the majority of the area under application (~0.05ha) is not considered to provide habitat for local indigenous fauna species due to the lack of vegetated cover, and absence of flora species required for nesting and foraging.

Given the relatively small size (0.06ha) and predominantly degraded condition of the area proposed to be cleared, the vegetation under application is not considered likely to comprise significant habitat for indigenous fauna.

**Methodology**    **References:**  
- DEC (2008)  
- Government of Western Australia (2000)  
**GIS Databases:**  
- Bushforever  
- SAC Bio Datasets, Accessed 07/08/2008

**(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.**

**Comments**    **Proposal is not likely to be at variance to this Principle**

Four rare flora species are known to occur within a 5km radius of the vegetation under application, being;

- *Diuris purdiei*;
- *Drakaea elastica*;
- *Tetraria australiensis*; and
- *Verticordia plumosa* var. *pleiobotrya*.

Of these, *Drakaea elastica*, *Tetraria australiensis* and *Verticordia plumosa* var. *pleiobotrya* are known to occur within the same vegetation complexes and soils as the vegetation under application, with populations of *T.australiensis* and *V.plumosa* var. *pleiobotrya* recorded within the adjacent Bush Forever Site 360, Mundijong and Watkins Road Bushland, Mundijong/Peel Estate (Government of Western Australia 2000, Western Australian Herbarium 1998-).

Notwithstanding, the majority of the area under application (0.05ha) is in an overall degraded condition, and comprises homogenous rehabilitated vegetation and a scattered *Allocasuarina* overstorey with a bare understorey, respectively (DEC 2008).

Therefore whilst species of rare flora have been recorded within close proximity to the area proposed to be cleared, given the overall lack of understorey within the applied area, the vegetation under application is not considered likely to comprise rare flora.

**Methodology**    **References:**  
- DEC (2008)  
- Government of Western Australia (2000)  
- Western Australia Herbarium (1998-)  
**GIS Databases:**  
- Heddle Vegetation Complexes  
- SAC Bio Datasets, Accessed 08/08/2008  
- Soils, Statewide

**(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.**

**Comments**    **Proposal is not likely to be at variance to this Principle**

Six Swan Coastal Plain (SCP) Threatened Ecological Communities (TEC) are known to occur within the local area (5km radius) being;

- Floristic Community Type (FCT) 2: Southern wet shrublands;
- FCT 3a: *Corymbia calophylla*-*Kingia australis* woodlands on heavy soils;
- FCT 3b: *Corymbia calophylla*-*Eucalyptus marginata* woodlands on sandy clay soils of the southern SCP;
- FCT 3c: *Corymbia calophylla*-*Xanthorrhoea preissii* woodlands and shrublands;
- FCT 8: Herb rich shrublands in clay pans; and
- FCT 20b: *Banksia attenuata* and/or *Eucalyptus marginata* woodlands of the eastern side of the SCP.

Of these, FCT 3a, 3b, 3c, 8 and 20b are known to occur within the same mapped vegetation complexes and soil types as the vegetation under application. In addition, FCT 3a, 8 and 20b have been identified within Bush Forever Site 360 (Mundijong and Watkins Road Bushland, Mundijong/Peel Estate) (Government of Western Australia 2000), with the closest occurrence of a TEC being FCT 3a located within the vegetation directly adjacent to Area 3 within the Bush Forever reserve.

During a site inspection undertaken in June 2008, the majority of the area under application was observed to be in a degraded to completely degraded condition, with only ~0.01ha (in Area 1) of the vegetation under application considered to be in good condition (DEC 2008).

Whilst the vegetation under application within Area 1 was observed to be in good condition (DEC 2008), the floral diversity of the vegetation within this area is considered to be low in comparison to the species richness and diversity of the locally known threatened ecological communities, and therefore the vegetation within this area is not considered to comprise a species composition representative of a TEC.

Therefore, the vegetation under application is not considered to comprise the whole, or a part of a threatened ecological community.

- Methodology**    **References:**
- DEC (2008)
  - Government of Western Australia (2000)
- GIS Databases:**
- Heddle Vegetation Complexes
  - SAC Bio Datasets, Accessed 08/08/2008
  - Soils, Statewide

**(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.**

**Comments      Proposal may be at variance to this Principle**

The vegetation under application is associated with Beard Vegetation Association 968 which has 32.7% pre-European vegetation extent remaining (Hopkins et al. 2001, Shepherd 2006). The vegetation under application is also associated with Heddle Guildford Complex (Heddle et al. 1980). Heddle's Guildford complex is recognised as having current representation levels of 5.0% within the System 6 region and Swan Coastal Plain portion of the System 1 Region (EPA 2006), and 6.0% within Swan Coastal Plain portion of the Perth Metropolitan Region (Government of Western Australia 2000).

The State Government is committed to the National Objectives and Targets for Biodiversity Conservation which includes a target that prevents a clearance of ecological communities with an extent below 30% of that present pre-European settlement (Commonwealth of Australia 2001). However, the EPA (2006) recognises the Perth Metropolitan Region as a 'constrained area', providing for the reduction of vegetation complexes to a minimum of 10% of the Pre-European extent.

Notwithstanding, EPA Position Statement No. 2 (EPA 2000) states that all jurisdictions (States) have committed to no further clearing of endangered ecological communities. Endangered ecological communities are those with less than 10% pre-European extent remaining (Department of Natural Resources and Environment 2002).

Heddle Guildford vegetation complex is below the State Government's 30% biodiversity conservation target, and whilst the proposal is acknowledged to be located within the 'constrained area', Heddle's Guildford Complex is classified as 'Endangered' with only 5.0% pre-European extent remaining on the Swan Coastal Plain (EPA 2006).

However, the majority of the vegetation under application (~0.05ha) is considered to be in a degraded to completely degraded condition, with only a small portion of the vegetation under application (Area 1) (~0.01ha) considered to be in good condition and comprising vegetation representative of the Guildford complex (DEC 2008).

Therefore given the low vegetation representation for the Guildford vegetation complex and small area of vegetation in good condition (~0.01ha) (DEC 2008), the area under application is considered to comprise vegetation that may be significant as a remnant of native vegetation.

|   | Pre-European<br>(ha) | Current extent<br>(ha) | Remaining<br>(%) | % In reserves/<br>DEC managed land |
|---|----------------------|------------------------|------------------|------------------------------------|
| IBRA Bioregion<br>Swan Coastal Plain**  | 1,501,456            | 571,758                | 38.1             |                                    |
| Shire of Serpentine-Jarrahdale*         | 90,240               | 48,699                 | 54.0             |                                    |
| Beard Vegetation Association<br>- 968** | 296,889              | 97,181                 | 32.7             | 55.7                               |
| Heddle Vegetation Complex               |                      |                        |                  |                                    |

|                                     |        |       |     |     |
|-------------------------------------|--------|-------|-----|-----|
| - Guildford (Swan Coastal Plain)*** | 92,497 | 4,662 | 5.0 | 0.2 |
| - Guildford (Perth Metro Area)****  | 24,513 | 1,369 | 6.0 |     |

\* (Del Marco et al. 2004)

\*\* (Shepherd 2006)

\*\*\* (EPA 2006)

\*\*\*\* (Government of Western Australia (2000))

**Methodology**

**References:**

- Commonwealth of Australia (2001)
- DEC (2008)
- Del Marco et al. (2004)
- Department of Natural Resources and Environment (2002)
- EPA (2006)
- Government of Western Australia (2000)
- Heddle et al. (1980)
- Hopkins et al. (2001)
- Shepherd (2006)

**GIS Databases:**

- Heddle Vegetation Complexes
- Interim Biogeographic Regionalisation of Australia
- Local Government Authorities
- Metropolitan Regional Scheme

**(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.**

**Comments**

**Proposal may be at variance to this Principle**

The area under application is located within a local palusplain (seasonally waterlogged flat) wetland area, with two separate management categories for protection applicable across the palusplain within the overall applied area.

The palusplain mapped within the northern portion of the applied area (Area 3, ~0.02ha) within Bush Forever Site 360 (Mundijong and Watkins Road Bushland, Mundijong/Peel Estate) (Government of Western Australia 2000) is classified as a Conservation Category Wetland (CCW), which is the highest level of protection for a wetland area. The palusplain associated with the remaining areas of vegetation under application (Areas 1 and 2, totalling ~0.05ha) is classified as Multiple Use palusplain. Multiple use wetlands are described as wetlands with few important ecological attributes and functions remaining (Water and Rivers Commission 2001).

Whilst the area under application is mapped within a palusplain (wetland) area, including an area of CCW, the majority of the area under application (Areas 2 and 3, totalling ~0.05ha) comprises a homogenous rehabilitated area and a scattered Allocasuarina overstorey with a bare understorey, respectively (DEC 2008). Area 1 (~0.01ha) is considered to be the only remnant vegetation area remaining, being in good condition with species representative of the mapped vegetation communities (DEC 2008).

A bitumen road exists within the majority of the northern portion of the applied area (Area 3) within the area mapped as a CCW, with a gravel road also present within the remaining applied area (Areas 1 and 2) associated with the multiple use palusplain. Therefore, whilst wetland mapping indicates that the area of vegetation under application is located within conservation and multiple use category wetlands (palusplain), the majority of the area under application (~0.05ha) comprises an existing road and sparse vegetation cover (within Areas 2 and 3).

However, a relatively small area of remnant vegetation (~0.01ha) exists within the southern portion of the applied area within the mapped Multiple Use palusplain area. Whilst this vegetation is not wetland dependent it may be considered to be growing in association with a wetland. Therefore, the proposal may be at variance to this Principle.

**Methodology**

**References:**

- DEC (2008)
- Government of Western Australia (2000)
- Water and Rivers Commission (2001)

**GIS Databases:**

- Geomorphic Wetlands (Mgt Categories), Swan Coastal Plain
- Heddle Vegetation Complexes
- Perth Metropolitan Area Central 20cm Orthomosaic - Landgate 2007

**(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.**

**Comments Proposal is not likely to be at variance to this Principle**

The area under application is located within the Bassendean Dune/Pinjarra Plain geological unit (Government of Western Australia 2000), and is associated with an undulating to hilly landscape with small creeks and river flood-plains, and gentle to moderately steep slopes of sandy acidic yellow mottled soils with some sandy soils (Northcote et al. 1960-68).

Bassendean sands are known to have a high risk of wind erosion due to their loose, porous nature, whilst soils within the Pinjarra Plain comprise more clay and silt soil compositions and are therefore more at risk of water erosion.

However, the proposal is to clear up to 0.06ha of predominantly sparse and degraded vegetation across a long, linear area (~175m long and 12m wide) (DEC 2008). Given the relatively small area proposed to be cleared and overall degraded condition of the vegetation, the proposed clearing is not considered likely to cause appreciable land degradation.

**Methodology References:**

- DEC (2008)
  - Government of Western Australia (2000)
  - Northcote et al. 1960-68)
- GIS Database:
- Soils, Statewide

**(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.**

**Comments Proposal may be at variance to this Principle**

The northern portion of the area under application (Area 3, ~0.02ha) is located within a conservation area, Bush Forever Site 360, known as Mundijong and Watkins Road Bushland, Mundijong/Peel Estate (Government of Western Australia 2000). This portion of the area under application is also mapped as a Conservation Category Wetland (CCW) (palusplain).

The vegetation under application within the boundaries of the Bush Forever site comprises 3-5 individual immature *Allocasuarina* sp. (DEC 2008). Therefore, whilst the proposal extends into the boundary of this Bush Forever site, the proposed clearing within this portion is not considered likely to have a direct impact on the environmental values of the Bush Forever site.

However, the proposed clearing of vegetation within and adjacent to Bush Forever Site 360 is considered likely to increase the risk of weed and dieback introduction to the remaining Bush Forever Site.

Therefore, whilst the area of vegetation under application within the Bush Forever Site is relatively small (~0.02ha) and in a completely degraded condition (DEC 2008), the proposed clearing may result in indirect impacts to the environmental values of Bush Forever Site 360 through the introduction and spread of weeds and dieback. Therefore, the proposal may be at variance to this Principle.

**Methodology References:**

- DEC (2008)
  - Government of Western Australia (2000)
- GIS Databases:
- Bushforever
  - Geomorphic Wetlands (Mgt Categories), Swan Coastal Plain

**(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.**

**Comments Proposal is not likely to be at variance to this Principle**

The area under application is located within the Bassendean Dune/Pinjarra Plain geological unit (Government of Western Australia 2000), and is associated with an undulating to hilly landscape with small creeks and river flood-plains, and gentle to moderately steep slopes of sandy acidic yellow mottled soils with some sandy soils (Northcote et al. 1960-68).

The area under application is also located within a local palusplain (seasonally waterlogged flat) wetland area, with the northern portion of the applied area (Area 3, ~0.02ha) classified as a Conservation Category Wetland (CCW), and the remaining areas of vegetation under application (Areas 1 and 2, totalling ~0.04ha) classified as Multiple Use Wetland (MUW).

Bassendean sands are known to have a low nutrient retention capacity, whilst the clay and silt soils within the Pinjarra Plain are more at risk of water erosion. Clearing of native vegetation on these geological units is

therefore considered likely to result in eutrophication and sedimentation/turbidity to underground and/or surface water respectively.

However, the proposal is to clear a relatively small (~0.06ha) long, linear strip of native vegetation, in an overall degraded condition (DEC 2008). Therefore, the proposed clearing is not considered likely to cause the deterioration in the quality of surface or underground water.

- Methodology**    **References:**
- DEC (2008)
  - Government of Western Australia (2000)
  - Northcote et al. 1960-68)
- GIS Databases:**
- Geomorphic Wetlands (Mgt Categories), Swan Coastal Plain
  - Soils, Statewide

**(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.**

**Comments      Proposal is not likely to be at variance to this Principle**

The area under application is located within the Bassendean Dune/Pinjarra Plain geological unit (Government of Western Australia 2000), and is associated with an undulating to hilly landscape with small creeks and river flood-plains, and gentle to moderately steep slopes of sandy acidic yellow mottled soils with some sandy soils (Northcote et al. 1960-68).

The area under application is also located within a local palusplain (seasonally waterlogged flat) wetland area, with the northern portion of the applied area (Area 3, ~0.02ha) classified as a Conservation Category Wetland (CCW), and the remaining areas of vegetation under application (Areas 1 and 2, totalling ~0.04ha) classified as Multiple Use Wetland (MUW).

Bassendean sands are known to have a low flooding risk due to the loose, porous nature of the soils, whilst clay soils within the Pinjarra Plain are more at risk of flooding due to their low permeability.

However, the proposal is to clear a relatively small (~0.06ha) long, linear strip of native vegetation, in an overall degraded condition (DEC 2008). Therefore, the proposed clearing is not considered likely to cause, or exacerbate, the incidence or intensity of flooding.

- Methodology**    **References:**
- DEC (2008)
  - Government of Western Australia (2000)
  - Northcote et al. 1960-68)
- GIS Databases:**
- Geomorphic Wetlands (Mgt Categories), Swan Coastal Plain
  - Soils, Statewide

**Planning instrument, Native Title, Previous EPA decision or other matter.**

**Comments**

The proposal is to clear 0.06ha of native vegetation for the widening of the existing Webb Road, and construction of an entrance to a future subdivision on Lot 9500.

The area of vegetation under application is located within the Environmental Protection (Peel Inlet-Harvey Estuary) Policy 1992 area. This Policy aims to limit nutrient loads entering the Peel Harvey Estuary through changes in land use within the catchment (Government of Western Australia 1992). As the proposed clearing is relatively small (0.3ha) the removal of this vegetation is not considered likely to significantly increase nutrient export from the site.

A portion of the vegetation under application is located within Bush Forever Site 360 (Government of Western Australia 2000). DPI, Strategic Biodiversity Planning (Bush Forever Office) (2008) raised concerns and did not support clearing the proposed clearing within Bush Forever Site 360 because of the proximity to a conservation category wetland, rare flora, threatened ecological communities, and the vegetation is mapped as Guildford complex. A site visit identified that the vegetation under application within the Bush Forever site is limited to 3-5 individual immature Allocasuarina with no under storey. The assessment did not consider that the proposed clearing would result in a significant impact on the bush forever site.

There are no other DEC approvals required for the proposed road construction.

- Methodology**    **References:**
- DPI Strategic Biodiversity Planning (2008)
  - Government of Western Australia (1992)
  - Government of Western Australia (2000)
- GIS Databases:**

- Aboriginal Sites of Significance
- Native Title Claims

#### 4. Assessor's comments

##### Comment

The assessable criteria have been addressed and the clearing as proposed may be at variance to Principles (e), (f) and (h).

#### 5. References

- Commonwealth of Australia (2001) National Targets and Objectives for Biodiversity Conservation 2001-2005, AGPS, Canberra.
- DEC (2008) Site Inspection Report for Clearing Permit Application CPS 2530/1, Webb Road road reserve, Mardella. Site inspection undertaken 27/06/2008. Department of Environment and Conservation, Western Australia (TRIM Ref. DOC58162).
- Del Marco, A., Miles, C., Taylor, R., Clarke, K. and Savage, K. (2004) Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region - Edition 1. Western Australian Local Government Association, West Perth.
- Department of Natural Resources and Environment (2002) Biodiversity Action Planning. Action planning for native biodiversity at multiple scales; catchment bioregional, landscape, local. Department of Natural Resources and Environment, Victoria.
- DPI Strategic Biodiversity Planning (2008) Direct Interest Submission for clearing permit application CPS 2530/1. Received 11 July 2008 (TRIM Ref. DOC57508).
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- Gibson N., Keighery B., Keighery G., Burbidge A. and Lyons M. (1994). A Floristic Survey of the Southern Swan Coastal Plain. Western Australian Department of Conservation and Land Management and the Western Australian Conservation Council.
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- Hopkins, A.J.M., Beeston, G.R. and Harvey J.M. (2001) A database on the vegetation of Western Australia. Stage 1. CALMScience after J. S. Beard, late 1960's to early 1980's Vegetation Survey of Western Australia, UWA Press.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Northcote, K. H. with Beckmann G G, Bettenay E., Churchward H. M., van Dijk D. C., Dimmock G. M., Hubble G. D., Isbell R. F., McArthur W. M., Murtha G. G., Nicolls K. D., Paton T. R., Thompson C. H., Webb A. A. and Wright M. J. (1960-68): 'Atlas of Australian Soils, Sheets 1 to 10, with explanatory data'. CSIRO and Melbourne University Press: Melbourne.
- Shepherd, D.P. (2006). Adapted from: Shepherd, D.P., Beeston, G.R., and Hopkins, A.J.M. (2001), Native Vegetation in Western Australia. Technical Report 249. Department of Agriculture Western Australia, South Perth. Includes subsequent updates for 2006 from Vegetation Extent dataset ANZWA1050000124.
- Shepherd, D.P., Beeston, G.R. and Hopkins, A.J.M. (2001) Native Vegetation in Western Australia, Extent, Type and Status. Resource Management Technical Report 249. Department of Agriculture, Western Australia.
- Water and Rivers Commission (2001). Position Statement: Wetlands, Water and Rivers Commission, Perth.
- Western Australian Herbarium (1998-). FloraBase - The Western Australian Flora. Department of Environment and Conservation. <http://florabase.calm.wa.gov.au/> (Accessed 07/08/2008).



## 6. Glossary

| Term  | Meaning  |
|-------|--|
| BCS   | Biodiversity Coordination Section of DEC                 |
| CALM  | Department of Conservation and Land Management (now BCS) |
| DAFWA | Department of Agriculture and Food                       |
| DEC   | Department of Environment and Conservation               |
| DEP   | Department of Environmental Protection (now DEC)         |
| DoE   | Department of Environment                                |
| DoIR  | Department of Industry and Resources                     |
| DRF   | Declared Rare Flora                                      |
| EPP   | Environmental Protection Policy                          |
| GIS   | Geographical Information System                          |
| ha    | Hectare (10,000 square metres)                           |
| TEC   | Threatened Ecological Community                          |
| WRC   | Water and Rivers Commission (now DEC)                    |