



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 5320/1
Permit Holder:	Shire of West Arthur
Duration of Permit:	1 March 2013 to 1 March 2023

The Permit Holder is authorised to clear native vegetation subject to the following conditions of this Permit.

PART I – CLEARING AUTHORISED

1. Purpose for which clearing may be done

Clearing for the purpose of road widening, road maintenance, drainage works and infrastructure maintenance.

2. Land on which clearing is to be done

Lot 5127 on Plan 180003 (Darkan, 6392)

Trigwell Bridge Road reserve, Bowelling, 6225 (PIN 11518536, 11518537, 11518538 and 11518539)

Darkan South Road reserve, Darkan, 6392 (PIN 11243183 and 11249837)

Darkan South Road reserve, Duranillin, 6393 (PIN 11249831, 11281742, 11249832 and 11249833)

Howie Road reserve, Darkan, 6392 (PIN 11313851, 11313850, 11313846 and 11256245)

Boyup Brook-Arthur Road reserve, Moodiarrup, 6393 (PIN 1388893)

3. Area of Clearing

(a) The Permit Holder must not clear more than 6.1 hectares of native vegetation within the combined areas shaded yellow on attached Plan 5320/1a and Plan 5320/1b and Plan 5320/1c and Plan 5349/1d.

(b) The Permit Holder shall not clear more than one hectare of native vegetation within the area hatched yellow on attached Plan 5320/1e.

4. Application

This Permit allows the Permit Holder to authorise persons, including employees, contractors and agents of the Permit Holder, to clear native vegetation for the purposes of this Permit subject to compliance with the conditions of this Permit and approval from the Permit Holder.

5. Type of clearing authorised

This Permit authorises the Permit Holder to clear native vegetation for the activities described in condition 1 of this Permit to the extent that the Permit Holder has the power to carry out works involving clearing for those activities under the *Local Government Act 1995* or any other written law.

6. Maximum width of clearing

Clearing is only authorised under this permit to the extent that the maximum width of the cleared area within any road reserve described under condition 2 of this permit does not exceed 12 meters.

7. Period in which clearing is authorised

The Permit Holder shall not clear any native vegetation after 1 March 2022.

8. Compliance with Assessment Sequence and Management Procedures

Prior to clearing any native vegetation under conditions 1, 2 and 3 of this Permit, the Permit Holder must comply with the Assessment Sequence and the Management Procedures set out in Part II of this Permit.

PART II – ASSESSMENT SEQUENCE AND MANAGEMENT PROCEDURES

9. Avoid, minimise etc clearing

In determining the amount of native vegetation to be cleared authorised under this Permit, the Permit Holder must have regard to the following principles, set out in order of preference:

- (a) avoid the clearing of native vegetation;
- (b) minimise the amount of native vegetation to be cleared; and
- (c) reduce the impact of clearing on any environmental value.

10. Dieback and weed control

When undertaking any clearing or other activity authorised under this Permit, the Permit Holder must take the following steps to minimise the risk of the introduction and spread of *weeds* and *dieback*:

- (a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
- (b) shall only move soils in *dry conditions*;
- (c) ensure that no *dieback* or *weed*-affected soil, *mulch*, *fill* or other material is brought into the area to be cleared; and
- (d) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

11. Fauna management

(a) Prior to undertaking any clearing authorised under this Permit, the area(s) shall be inspected by a *fauna specialist* who shall identify *habitat tree(s)* suitable to be utilised by fauna species listed below:

- (i) *Calyptorhynchus banksii* subsp. *naso* (Forest Red-tailed Black-Cockatoo),
- (ii) *Calyptorhynchus baudinii* (Baudin's Cockatoo (long-billed black-cockatoo)),
- (iii) *Calyptorhynchus latirostris* (Carnaby's Cockatoo (short-billed black-cockatoo)),
- (iv) *Phascogale calura* (Red-tailed Phascogale, Kenngoor),
- (v) *Phascogale tapoatafa* subsp. *tapoatafa* (Southern Brush-tailed Phascogale, Wambenger) and
- (vi) *Platycercus icterotis* subsp. *xanthogenys* (Western Rosella (inland))

(b) Prior to clearing, any *habitat trees* identified by condition 11(a) shall be inspected by a *fauna specialist* for the presence of fauna listed under condition 11(a).

(c) Where fauna are identified in relation to condition 11(b) of this Permit, the Permit Holder shall ensure that:

- (i) no clearing of the identified *habitat tree(s)* occurs, unless first approved by the CEO; and
- (ii) no taking of identified fauna occurs unless first approved by the CEO.

(d) Within one week prior to undertaking any clearing authorised under this Permit, the Permit Holder shall engage a *fauna clearing person* to remove and relocate fauna identified under condition 11(b).

12. Planting

Where clearing of native vegetation authorised under this permit is within Trigwell Bridge Road reserve, Bowelling, 6225 (PIN 11518536, 11518537, 11518538 and 11518539), the Permit Holder shall establish and maintain for the term of this permit *local provenance* tree species upon lands vested, or otherwise under the control of the Shire of West Arthur located within Zone A of the Wellington Dam Catchment Area, in accordance with the following requirements:

- (a) *planting* is to commence within twelve months of any clearing authorised under this Permit; and
- (b) *planting* shall be to a density of 100 trees per hectare.

PART III - RECORD KEEPING AND REPORTING

13. Records must be kept

The Permit Holder must maintain the following records for activities done pursuant to this Permit:

- (a) In relation to the clearing of native vegetation authorised under this Permit:
 - (i) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA 94), expressing the geographical coordinates in Easting and Northing's or decimal degrees;
 - (ii) the date that the area was cleared; and
 - (iii) the size of the area cleared (in hectares).

- (b) In relation to fauna management pursuant to condition 11 of this Permit:
 - (i) the location of each *habitat tree* identified recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA 94), expressing the geographical coordinates in Easting and Northing's or decimal degrees; and
 - (ii) the species name of fauna reasonably likely to utilise, that have been observed utilising, or which were taken from the *habitat tree(s)*; and
 - (iii) the location and date where any taken fauna were released, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA 94), expressing the geographical coordinates in Easting and Northings or decimal degrees.

- (c) In relation to planting pursuant to condition 12 of this Permit:
 - (i) the location of any areas *planted*, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;
 - (ii) a description of the *planting* activities undertaken; and
 - (iii) the number of trees *planted*.

14. Reporting

- (a) The Permit Holder must provide to the CEO on or before 1 July of each year, a written report:
 - (i) of records required under condition 13 of this Permit; and
 - (ii) concerning activities done by the Permit Holder under this Permit between 1 July and 30 June in the financial year immediately preceding the reporting date.
- (b) If no clearing authorised under this Permit was undertaken between 1 July to 30 June of the preceding financial year, a report confirming that no clearing has been undertaken must be provided to the CEO.
- (c) Prior to 1 December 2022 the Permit Holder must provide to the CEO a written report of records required under condition 13 of this Permit where these records have not already been provided under condition 14(a) of this Permit.

DEFINITIONS

The following meanings are given to terms used in this Permit:

dieback means the effect of *Phytophthora* species on native vegetation;

dry conditions means when soils (not dust) do not freely adhere to rubber tyres, tracks, vehicle chassis or wheel arches;

environmental specialist means a person who is engaged by the Permit Holder for the purpose of providing environmental advice, who holds a tertiary qualification in environmental science or equivalent, and has experience relevant to the type of environmental advice that an environmental specialist is required to provide under this Permit;

fauna clearing person means a person who has obtained a licence from the Department, issued pursuant to the *Wildlife Conservation Regulations 1970* authorising them to take fauna;

fauna specialist means a person with training and specific work experience in fauna identification or faunal assemblage surveys of Western Australian fauna;

fill means material used to increase the ground level, or fill a hollow;

habitat tree(s) means trees that have a diameter, measured at 1.5m above the ground, of 50cm or greater, healthy but with dead limbs and broken crowns that are likely to contain hollows and roosts suitable for native fauna, or where these are not present then healthy but with the potential to contain hollows and roosts;

local provenance means native vegetation seeds and propagating material from natural sources within 30 kilometres of the area cleared;

mulch means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation;

planting means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species;

weed/s means any plant -

- (a) that is declared under section 37 of the *Agriculture and Related Resources Protection Act 1976*; or
- (b) published in the Department of Environment and Conservation's Regional Weed Assessments, regardless of ranking; or
- (c) not indigenous to the area concerned.

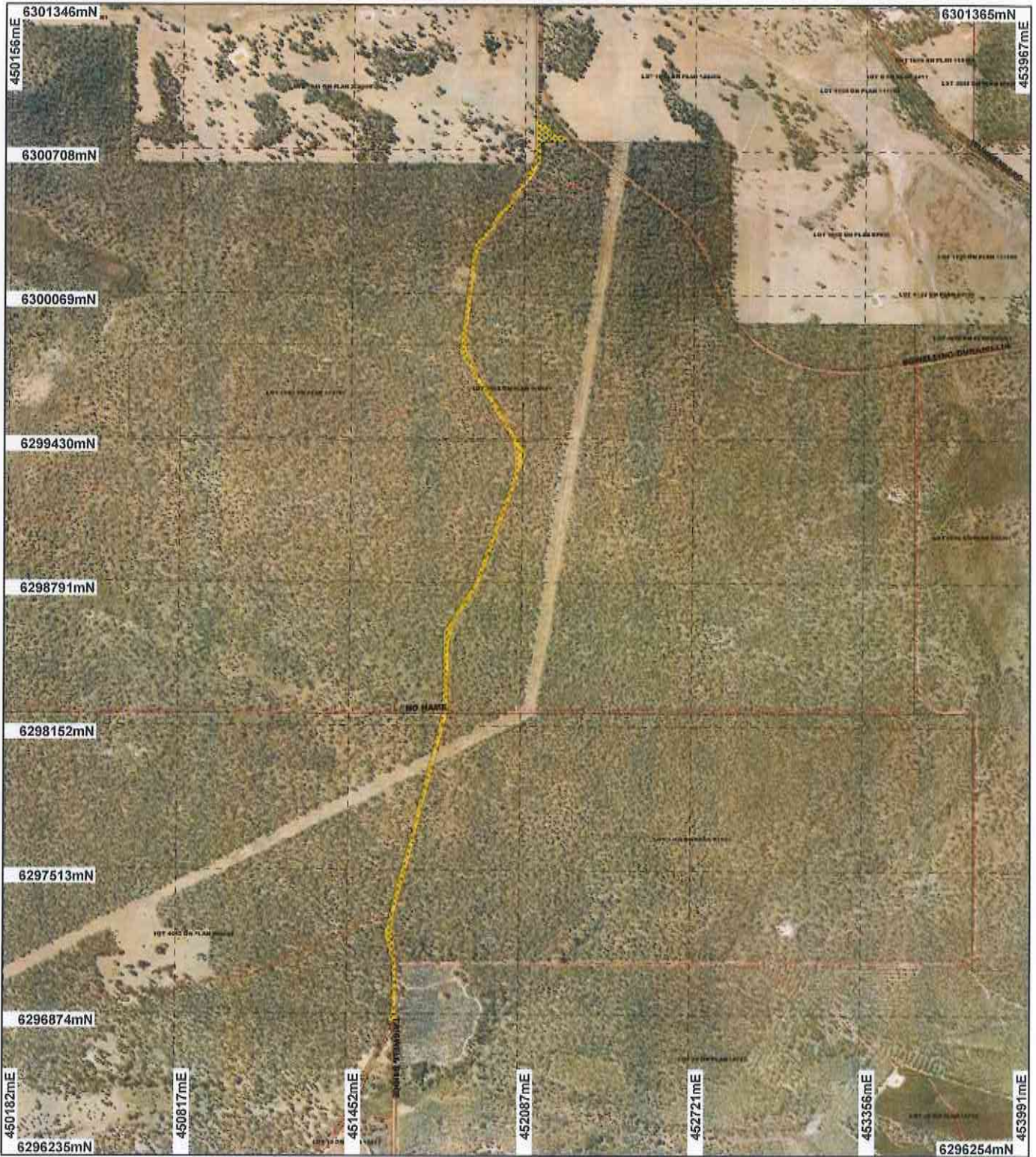


M Warnock
A/MANAGER
NATIVE VEGETATION CONSERVATION BRANCH

*Officer delegated under Section 20
of the Environmental Protection Act 1986*

7 February 2013

Plan 5320/1a



LEGEND

- | | |
|---|---|
| <ul style="list-style-type: none"> ✓ Cadastre for labelling Road Centrelines Darkan 50cm Orthomosaic - Landgate 2006 Collie 50cm Orthomosaic - Landgate 2006 | <ul style="list-style-type: none"> Clearing Instruments □ Areas Approved to Clear |
|---|---|



0 ————— 625 m

Scale 1:22542

(Approximate when reproduced at A4)

Geocentric Datum Australia 1994

Note: the data in this map have not been projected. This may result in geometric distortion or measurement inaccuracies.

M Warnock Date *7/2/13*
M Warnock

Officer with delegated authority under Section 20 of the Environmental Protection Act 1985

Information derived from this map should be confirmed with the data custodian acknowledged by the agency acronym in the legend.



Department of Environment and Conservation

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* Project Data is denoted by asterisk. This data has not been quality assured. Please contact map author for details.

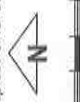
Plan 5320/1b



LEGEND

- Cadastral for labelling Road Centrelines
- Dinninup 50cm Orthomosaic - Landgate 2004
- Clearing Instruments
- Areas Approved to Clear

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 Please contact map author for details.



Scale 1:3048
 (Approximate when reproduced at A4)

Geocentric Datum Australia 1994

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approved Date 7/2/13
 M Waincock

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Plan 5320/1C



LEGEND

- Cadastre for labelling Road Centrelines
- Darkan 50cm Orthomosaic - Landgate 2006
- Clearing Instruments
- Areas Approved to Clear

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0 750 m

Scale 1:28000
(Approximate interpretation of A4)

Geocentric Datum Australia 1994

Note: the data in this map have not been projected. This may result in geometric distortion or measurement inaccuracies.

Reviewed Date *7/2/13*

M Warnock

Officer with delegated authority under Section 20 of the Environmental Protection Act 1986

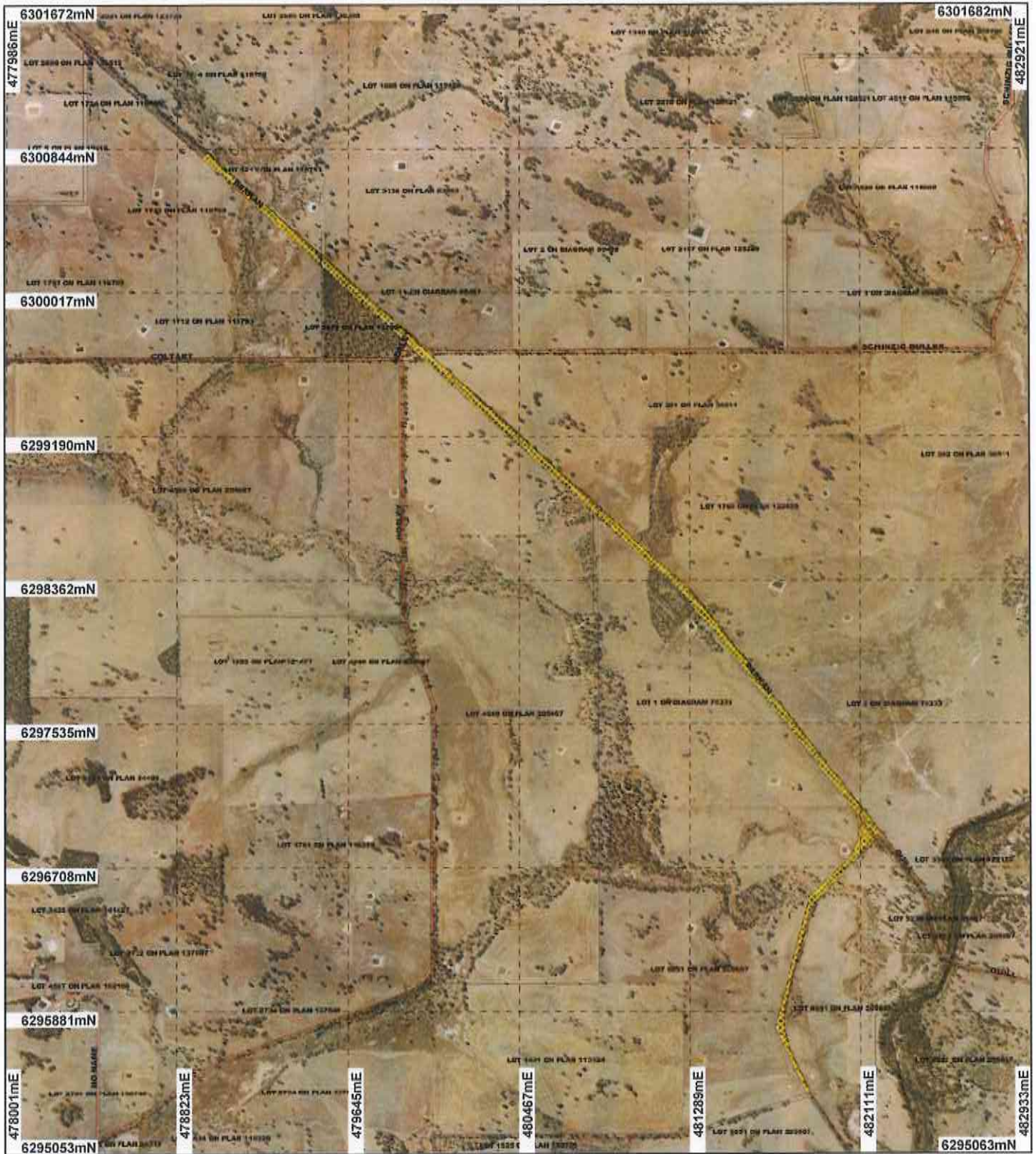
Information derived from this map should be confirmed with the data custodian acknowledged by the agency acronym in the legend.



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Plan 5320/1d



LEGEND

- Cadastre for labelling Road Centrelines
- Darkan 50cm Orthomosaic - Landgate 2006
- Clearing Instruments
- Areas Approved to Clear



0 750 m

Scale 1:29185

(Approximate when reproduced at A4)

Geocentric Datum Australia 1994

Note: the data in this map have not been projected. This may result in geometric distortion or measurement inaccuracies.

M Warnock Date 7/2/13

M Warnock

Officer with delegated authority under Section 20 of the Environmental Protection Act 1985

Information derived from this map should be confirmed with the data custodian acknowledged by the agency acronym in the legend.

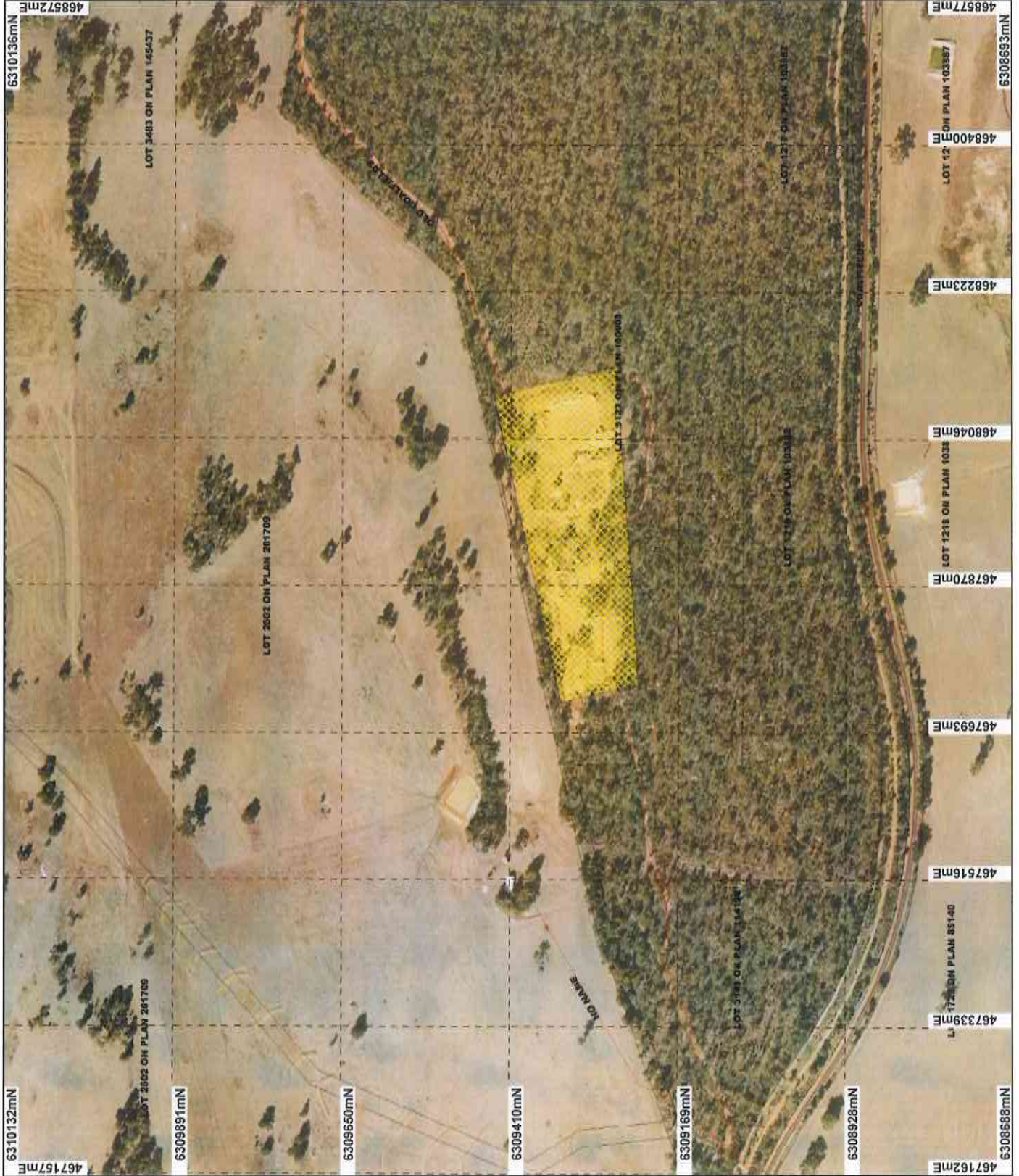


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Plan 5320/1e



LEGEND

- Cadastre for labelling Road Centrelines
- Darkan 50cm Orthomosaic - Landgate 2006
- Clearing Instruments
- Areas Approved to Clear

* Project Data is denoted by asterisk. This data has not been quality assured. Please contact map author for details.



0 200 m

Scale 1:6886

(Approximate when reproduced at A4)

Geocentric Datum, Australia 1994

Note: the data in this map have not been projected. This may result in geometric distortion or measurement inaccuracies.

approved Date *7/2/13*

M Wainock

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1. Application details

1.1. Permit application details

Permit application No.: 5320/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Shire of West Arthur

1.3. Property details

ROAD RESERVE (BOWELLING 6225)
ROAD RESERVE (DARKAN 6392)
ROAD RESERVE (DURANILLIN 6393)
ROAD RESERVE (MOODIARRUP 6393)
LOT 5127 ON DEPOSITED PLAN 180003 (DARKAN 6392)

Colloquial name: Trigwell Bridge Road, Darkan South Road, Howie Road, Boyup Brook-Arthur River Road and Darkan rubbish disposal site

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
1		Mechanical Removal	Infrastructure Maintenance
6.1		Mechanical Removal	Road construction or maintenance

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 7 February 2013

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
The vegetation under application at each site is mapped as the following Beard Vegetation Associations:	This application proposes to clear up to 7.1 hectares of native vegetation for the purpose of road maintenance and upgrades, drainage works and upgrading a rubbish disposal site within the Shire of West Arthur.	Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery 1994)	The vegetation condition was determined from aerial imagery and advice from the Shire of West Arthur (Shire of West Arthur, 2013; Darkan 50cm Orthomosaic 2006, Dinninup 50cm Orthomosaic (2004))
3 Medium forest; jarrah-marri (Darkan rubbish disposal site and Trigwell Bridge Road)	This application includes four road reserves and a rubbish disposal site.	Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery 1994)	
4 Medium woodland; marri & wandoo (Boyup Brook-Arthur River Road; Howie Road; Darkan South Road)		Degraded: Structure severely disturbed; regeneration to good condition requires 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 may be at variance to this Principle

The amended application is to clear up to 6.1 hectares (ha) of native vegetation along four road reserves for the purpose of road widening, maintenance and / or drainage works, and upgrade the Darkan rubbish disposal site. The amount of proposed clearing at each road reserve will be determined by the minimum Australia Road Design Standards for road construction and is estimated to be: Trigwell Bridge Road, 3ha over 5 kilometres; Howie Road, 2ha over 4 kilometres; Darkan South Road, 0.1ha over one kilometre (bridge approach); Darkan South Road, 1ha over 4.5 kilometres (drainage) and Boyup Brook-Arthur River Road, 0.02ha over 200 metres. Up to one hectare will be cleared at the Darkan rubbish disposal site.

Based on aerial imagery and advice from the Shire (Shire of West Arthur, 2013), the vegetation condition (using Keighery, 1994) at each site is noted as:

Trigwell Bridge Road – very good;
Howie Road – good to mostly degraded;
Darkan South Road (bridge approach) – degraded;
Darkan South Road (drainage) – degraded;
Boyup Brook-Arthur River Road – good; and
Darkan rubbish disposal site degraded to completely degraded.

Trigwell Bridge Road and Darkan rubbish disposal sites are within mapped Beard vegetation association 3, which has 68 per cent remnant vegetation remaining within the Jarrah Forest Bioregion. The remaining sites are within mapped Beard vegetation association 4 which has 28 per cent remaining for the same Bioregion. Vegetation association 4 is therefore considered to be below threshold levels for maintaining biodiversity (Commonwealth of Australia, 2001; Government of Western Australia, 2011).

Several priority listed flora species (*Caladenia* sp. – Priority One; *Banksia* sp.- Priority Two and *Tetratheca* sp.- Priority Three) occur on similar vegetation and soil type as present at the Trigwell Bridge Road site. One Priority Three listed flora species (*Stylidium* sp.) and one threatened species (*Tribonanthes* sp.) occur on similar vegetation and soil type as present at the Howie Road site. One Priority Three listed flora species (*Stylidium* sp.) occurs on similar vegetation and soil type as present at the Darkan South Road (bridge approach) site. None of these species are known from the application areas.

Roadside vegetation is known to play a key role in the conservation of flora and fauna by providing natural habitat for flora and fauna, serving as wildlife corridors that enable fauna to move between larger patches of remnant vegetation, and by providing essential habitat for rare flora populations (RCC, 2011). With the exception of Trigwell Bridge Road and the Darkan rubbish site, the road reserves under application all demonstrate a degree of vegetation decline, showing 'edge effects' associated with adjoining agricultural and road use activities resulting in some native vegetation death and weed/pasture invasion (Shire of West Arthur, 2013). Aerial imagery indicates these reserves are narrow with little remnant vegetation remaining. The five kilometre section of Trigwell Bridge Road under application is bounded on either side by state forest where the 'edge effects' associated only with the adjoining road use are significantly less. Where upperstorey vegetation (mature trees) are still present, these remnants are likely to act as wildlife corridors and habitat.

Threatened fauna species recorded within the Shire of West Arthur include *Bettongia penicillata* subsp. *ogilbyi* (Woylie, Brush-tailed Bettong), *Calyptorhynchus banksii* subsp. *naso* (Forest Red-tailed Black-Cockatoo), *Calyptorhynchus baudinii* (Baudin's Cockatoo (long-billed black-cockatoo)), *Calyptorhynchus latirostris* (Carnaby's Cockatoo (short-billed black-cockatoo)), *Dasyurus geoffroyi* (Chuditch, Western Quoll), *Myrmecobius fasciatus* (Numbat), *Phascogale calura* (Red-tailed Phascogale, Kenngoor), *Phascogale tapoatafa* subsp. *tapoatafa* (Southern Brush-tailed Phascogale, Wambenger) and *Platycercus icterotis* subsp. *xanthogenys* (Western Rosella (inland)). Some of these species may be more inclined to utilise the Trigwell Bridge Road reserve under application and to a much lesser extent that of the other road reserves under application.

The clearing as proposed may be at variance to this Principle.

Avoid and minimise measures, fauna management and restricting the clearing footprint in the road reserve will assist in mitigating the impacts clearing may have on biodiversity.

Methodology

References

- Commonwealth of Australia (2001)
 - RCC (2011)
 - Government of Western Australia (2011)
 - Shire of West Arthur (2013)
- ##### GIS Databases
- SAC Bio datasets (13 November 2012)
 - Darkan 50cm Orthomosaic (2006)
 - Dinninup 50cm Orthomosaic (2004)

(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 may be at variance to this Principle

With the exception of Trigwell Bridge Road and the Darkan rubbish site, the road reserves under application all demonstrate a degree of vegetation decline, showing 'edge effects' associated with adjoining agricultural and road use activities resulting in some native vegetation death and weed/pasture invasion (Shire of West Arthur, 2013). Aerial imagery indicates these reserves are narrow with little remnant vegetation remaining. The five kilometre section of Trigwell Bridge Road under application is bounded on either side by state forest where the 'edge effects' associated only with the adjoining road use are significantly less (Shire of West Arthur, 2013).

Threatened fauna species recorded within the Shire of West Arthur include *Bettongia penicillata* subsp. *ogilbyi* (Woylie, Brush-tailed Bettong), *Calyptorhynchus banksii* subsp. *naso* (Forest Red-tailed Black-Cockatoo), *Calyptorhynchus baudinii* (Baudin's Cockatoo (long-billed black-cockatoo)), *Calyptorhynchus latirostris* (Carnaby's Cockatoo (short-billed black-cockatoo)), *Dasyurus geoffroii* (Chuditch, Western Quoll), *Myrmecobius fasciatus* (Numbat), *Phascogale calura* (Red-tailed Phascogale, Kenngoor), *Phascogale tapoatafa* subsp. *tapoatafa* (Southern Brush-tailed Phascogale, Wambenger) and *Platycercus icterotis* subsp. *xanthogenys* (Western Rosella (inland)). Some of these species may be more inclined to utilise the Trigwell Bridge Road reserve under application and to a much lesser extent that of the other road reserves under application.

Other conservation significant fauna recorded within the Shire of West Arthur include *Actitis hypoleucos* (Common Sandpiper), *Ardeotis australis* (Australian Bustard), *Burhinus grallarius* (Bush Stone-curlew), *Calidris acuminata* (Sharp-tailed Sandpiper), *Calidris ferruginea* (Curlew Sandpiper), *Calidris ruficollis* (Red-necked Stint), *Falco peregrinus* (Peregrine Falcon), *Falco peregrinus* subsp. *macropus* (Australian Peregrine Falcon), *Falculculus frontatus* subsp. *leucogaster* (Western Shrike-tit, Crested Shrike-tit), *Hylacola cauta* subsp. *whitlocki* (Shy Heathwren (western)), *Isoodon obesulus* subsp. *fusciventer* (Quenda, Southern Brown Bandicoot), *Macropus eugenii* subsp. *derbianus* (Tammar Wallaby (WA subsp)), *Macropus irma* (Western Brush Wallaby), *Merops ornatus* (Rainbow Bee-eater), *Morelia spilota* subsp. *imbricata* (Carpet Python) and *Tringa glareola* (Wood Sandpiper).

The eastern extent of the Shire has been extensively cleared (18 per cent remaining) - Howie Road and Darkan South Road fall within this area. Roadside vegetation often acts as a corridor for native fauna in highly cleared landscapes. Aerial imagery indicates that each of these road reserves have, in some sections, a patchy vegetation distribution with significant gaps or no significant vegetation remaining in the corridor. Given the relatively small amount of clearing spread over several kilometres and keeping the road design to a width of 12 meters (as recommended by Australia Road Design Standards) impacts to the corridor should be minimal.

The Roadside Conservation Committee (RCC) surveyed several roads within the Shire of West Arthur in 1994 to determine the conservation value of the vegetation within the road reserves. The survey data recorded 326 standing trees with hollows (RCC, 2012). Tree hollows may provide suitable habitat for a range of parrots and cockatoo species including conservation significant species.

The clearing as proposed may be at variance to this Principle. Avoid and minimise measures and fauna management practices will assist in minimising impact to these fauna species.

Methodology

References

- Keighery (1994)
- RCC (2012)
- Shire of West Arthur (2013)
- GIS Databases
 - Darkan 50cm Orthomosaic (2006)
 - Dinninup 50cm Orthomosaic (2004)
 - SAC Bio datasets (accessed November 2012)
 - NatureMap
 - Pre-European vegetation
 - DEC Managed Lands

(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

Sixteen rare flora species are known to occur within the Shire of West Arthur. None of these species have been recorded from the application areas.

One rare flora species (*Tribonanthes* sp.) occurs on similar vegetation and soil type as present at the sparsely vegetated Howie Road site. However, the proposed clearing area is not the preferred habitat of this species.

Given the small amount of proposed clearing (up to two hectares spread over four kilometres) and the potential

of the road reserve vegetation to be demonstrate 'edge effects' associated with the adjoining agricultural land and road use, the application area within the road reserve is unlikely to support rare flora.

The proposed clearing is not likely to be at variance to this Principle.

Methodology GIS Databases
-SAC Bio datasets (accessed November 2012)

(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**
There are no records of threatened ecological communities within the Shire of West Arthur.

Therefore the proposed clearing is not likely to be at variance to this principle.

Methodology GIS Databases
-SAC Bio datasets (accessed November 2012)

Officer John Riley

(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 is not likely to be at variance to this Principle**

With the exception of Trigwell Bridge Road and Boyup Brook-Arthur River Road, Howie Road and Darkan South Road reserves demonstrate a significant degree of vegetation decline, showing 'edge effects' associated with adjoining agricultural and road use activities resulting in some native vegetation death and weed/pasture invasion. The proposed road works along the Darkan Road South involve either degraded vegetation, or sparsely distributed and seasonally waterlogged areas (Shire of West Arthur, 2013). Aerial imagery indicates in particular that Howie Road and Darkan South Road reserves have, in some sections, a patchy vegetation distribution with significant gaps or no significant vegetation remaining in the corridor. The five kilometre section of Trigwell Bridge Road under application is bounded on either side by state forest where the 'edge effects' associated only with the adjoining road use are significantly less (Shire of West Arthur, 2013). The section of the Boyup Brook-Arthur River Road adjoins a well vegetated reserve. The small amount of clearing for sight-line improvement (0.02 hectares over 200 metres) is unlikely to have any impact on this remnants 21.8 hectare size. The Darkan rubbish site contains scattered trees and shrubs and is currently utilised as a rubbish tip.

Trigwell Bridge Road and Darkan rubbish disposal sites are within mapped Beard vegetation association 3, which has 68 per cent remnant vegetation remaining within the Jarrah Forest Bioregion. The remaining sites are within mapped Beard vegetation association 4 which has 28 per cent remaining for the same Bioregion. Vegetation association 4 is therefore considered to be below threshold levels for maintaining biodiversity (Commonwealth of Australia, 2001; Government of Western Australia, 2011).

Vegetation in completely degraded or degraded (Keighery, 1994) condition, such as Howie Road and Darkan South Road reserves, are unlikely to represent the vegetation association characteristics of underrepresented vegetation associations and therefore is not likely to be at variance to this principle.

Given the application areas are part of existing transport corridors and the small amount of proposed clearing at each site spread over several kilometres, the potential reduction in vegetation representation is likely to be minimal.

Pre-European	Current Extent (ha)	Remaining Extent (ha)	Remaining Extent (%)
IBRA Bioregion*			
Jarrah Forrest	4,506,656.97	2,473,559.80	54
Shire*			
Shire of West Arthur	283,182.09	87,903.84	31
Beard Vegetation Association in Bioregion*			
Jarrah Forest			
3	2,390,591.58	1,641,271.67	68
4	1,022,712.69	293,207.75	28

*Government of Western Australia (2011)

- Methodology** References:
- Commonwealth of Australia (2001)
 - Keighery (1994)
 - Government of Western Australia (2011)
 - Shire of West Arthur (2013)
- GIS Databases:
- Darkan 50cm Orthomosaic (2006)
 - Dinninup 50cm Orthomosaic (2004)
 - Pre-European Vegetation
 - NLWRA, current extent of vegetation

(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 is at variance to this Principle**
- There are several non-perennial watercourses that intersect the Darkan South and Howie Road application areas.
- Therefore, the proposed clearing is at variance to this principle.
- Existing infrastructure, including culverts and bridges, occur within the applied clearing areas. The proposed clearing aims to upgrade drainage infrastructure at the Darkan South Road site.
- Measures to avoid and minimise the clearing along the watercourses, as well as the upgrade of infrastructure such as culverts, will assist in preventing any long term impacts to the waterways from the road widening or drainage works.

- Methodology** GIS Databases:
- Hydrography, linear
 - Hydrography, linear (Hierarchy)

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

- Comments** **Proposal may be at variance to this Principle**
- Several non-perennial watercourses intersect the Darkan South and Howie Road application areas and are within areas of low relief.
- Water repellence issues are most notable on sands with low organic matter content but are also observed on more clayey soils with higher organic matter content (DAFWA, 1988), both soil types occur within the areas under application.
- The Shire of West Arthur has hydrogeological features which include rocks of low permeability and surficial sediments and shallow aquifers. Both of these features predispose the land to water logging and salinity respectively.
- The proposed clearing for road construction and maintenance will occur over long, narrow, linear areas. Road infrastructure exists and will be upgraded to manage land degradation impacts to the road network. The Darkan rubbish disposal is unlikely to experience any land degradation issues as the site is managed for rubbish disposal.
- Given the above it is possible that the clearing of native vegetation may result in land degradation at a small and localised scale. The proposed clearing may be at variance to this Principle.
- Measures to avoid and/or minimise clearing where possible and strategic revegetation or re-planting programs will assist to mitigate potential salinity impacts.

- Methodology** References:
- DAFWA (1988)
- GIS database:
- Soils, Statewide
 - Hydrogeology, 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 is may be at variance to this Principle**
- The proposed road upgrade for Trigwell Bridge Road will occur adjacent to a 5 kilometre section of the Muja

State Forest.

The clearing of vegetation within this road reserve may increase edge effects to this conservation area via weed and disease dispersal.

Therefore the proposed clearing may be at variance to this principle.

Weed and dieback management practices will assist in reducing the potential for introduction or spread of invasive weed species and dieback.

Methodology GIS Databases
-DEC Managed Lands

(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 may be at variance to this Principle

The Trigwell Bridge Road and Darkan rubbish disposal site application areas occur within the Wellington District Dam Catchment (has no assigned priority level). In addition these sites also occur within a mapped groundwater area and irrigation district under the Rights in Water Irrigation Act 1914.

A number of watercourses flow through the Shire of West Arthur. In particular, several non-perennial watercourses intersect the Darkan South and Howie Road application areas that are within areas of low relief. Mapped salinity risk for the Shire of West Arthur in 1996 equated to approximately 3 per cent of land within the Shire having known risks of becoming saline. Approximately 26 per cent or 72,640 hectares of land was also mapped as salinity hazard areas (McFarlane et al. 2004). Despite an increase in salinity seen in the Shire of West Arthur between 1989 and 1996 some research shows that in many agricultural areas groundwater levels are falling which can be linked to a slowing in the rate of salinisation (George et al., 2008), however there is no evidence to demonstrate that groundwater levels within the Shire of West Arthur are falling.

Since 1998 the Land Monitor Project has progressively mapped the extent of salinity in the agricultural region of WA with spatial discrimination possible to 0.1 hectare (McFarlane and Williamson, 2002). The salinity mapping with the Shire of West Arthur identifies most salinity risk areas in association with shallow ground and surface water expressions.

The removal of native vegetation from a landscape currently expressing impacts from salinity is likely to exacerbate the issue. In particular McFarlane et al (2004) noted that streams emanating from agricultural lands with below 900mm per year rainfall (the Shire of West Arthur has 500-800mm per year) have rapidly increasing salinities which could continue to rise for at least another 50 years.

McFarlane and Williamson (2002) note several basic hydrological consequences relating to clearing of native vegetation including the development or exacerbation of water logging. Duplex soils are most susceptible to water logging (Cox and McFarlane, 1995) and these soils occupy approximately 60 per cent of the south west agricultural region of Western Australia (Tennant et al., 1992), including some areas within the Shire of West Arthur. In particular areas of low (or no) relief are particularly susceptible (Cox and McFarlane, 1995). Sections of the Darkan South and Howie Road application areas are subject to water logging.

Given the above it is likely that the clearing of native vegetation may exacerbate salinity in surface water expression areas and therefore may be at variance with this Principle.

The purpose of clearing is for upgrading road surfaces that will include the installation of appropriate drainage structures. As such the impacts of clearing on water logging may be mitigated at a local scale. Measures to avoid and/or minimise clearing where possible and strategic revegetation or re-planting programs will assist to mitigate potential salinity impacts.

Methodology References
-McFarlane et al (2004)
-George et al (2008)
-McFarlane and Williamson (2002)
-Cox and McFarlane (1995)
-Tennant et al (1992)
GIS Databases:
- Groundwater Salinity, Statewide
- Hydrography, linear (hierarchy)
- RiWI Act, Surface Water Areas, Irrigation Districts
- Topographic Contours, 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 clearing proposed may result in an increase in waterlogging as a result of the loss of native vegetation (McFarlane and Williamson, 2002) and in some areas as a result of low relief (Tennant et al., 1992). It is unlikely that waterlogging will occur on a scale significant enough to constitute flooding.

Therefore clearing of long, linear networks is unlikely to result in significant flooding and is not likely to be at variance with this clearing Principle.

Methodology

References

- McFarlane and Williamson (2002)
 - Tennant et al (1992)
- GIS Databases
- Soils, Statewide
 - Hydrography, linear

Planning instrument, Native Title, RIWI Act Licence, EP Act Licence, Works Approval, Previous EPA decision or other matter.

Comments

The Shire of West Arthur's strategic clearing permit application to clear up to 480 hectares to cover all road reserves within the Shire's boundaries was amended at the request of DEC. Given the large amount of proposed clearing over a vast area and the varying landforms, soil types and flora and fauna factors, DEC's clearing assessment identified a level of potential environmental harm that could not be appropriately managed under one clearing permit. The Shire provided its 2013 works program where funding was currently available which identified road works/maintenance along four road reserves and a rubbish disposal site. This assessment is based on these five sites.

One submission was received in relation to this proposal. The matters raised in the submission have been addressed under the clearing principles and below.

The proposed clearing is for the purpose of road widening, maintenance and / or drainage works to meet minimum recommendations of the Australia Road Design Standards (ARDS) (12 metre formation plus batter) regarding sealed roads, sight lines, drainage and vehicle speeds. To avoid clearing where possible the Shire of West Arthur has limited clearing of native vegetation for drainage from the recommended 1:4 (traversable) slope to less than a 1:1 slope. A slope less than 1:3 is not supported by ARDS.

The application areas fall within the EPA Position Statement No 2 agricultural area. The EPA doesn't support further clearing for agriculture in this area. While the proposal is not for broad-scale clearing for agriculture the EPA recommendation pertaining to all existing remnant native vegetation should be actively managed by landholders and managers so as to maintain environmental values is relevant to this proposal.

The Trigwell Bridge Road and Darkan rubbish disposal application areas are within Zone A of the Country Areas Water Supply Act 1947 Wellington Dam Catchment Area. Zone A areas are the highest salinity risk part of the catchment. Department of Water (DoW) Policy and Guidelines for the granting of licences to clear indigenous vegetation within Zone A areas provides for the grant of a licence to clear for government works subject to an equivalent area being re-planted within the same or higher salinity risk zones. DoW have suggested that rather than progressively re-plant small, individual clearing areas, approved clearing areas could be amalgamated over time so that more strategic re-plantings can be planned and implemented (DoW, 2012a).

The Trigwell Bridge Road and Darkan rubbish disposal application areas are mapped within a *Rights in Water Irrigation Act 1914* groundwater and irrigation area, as well as a Public Drinking Water Source Area (PDWSA) (Priority Not Assigned). DoW advises that any extraction or interference with the beds and/or banks of any major, minor or significant waterways will require a permit from DoW. DoW recommends that the Shire of West Arthur liaise with them for advice on legislative requirements and best management practices (DoW, 2012b).

There are a number of Aboriginal Sites of Significance which occur within the areas under application. The Shire should make contact with the Department of Indigenous Affairs to determine its statutory responsibilities

Methodology

References

- DoW (2012a)
 - DOW (2012b)
- GIS Databases

4. References

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- Stoneman, T.C. (1962) Loss of structure in Wheatbelt soils. *Journal of the Department of Agriculture and Food WA* 3:209
- Tennant, D., Scholtz, G., Dixon, J., and Purdie, B., (1992), Physical and chemical characteristics of duplex soils and their distribution in the south-west of western Australia, *Australian Journal of Experimental Agriculture*, 32:827-843.

5. 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)