



1. Application details

1.1. Permit application details

Permit application No.: 870/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: LionOre Australia (Avalon) Pty Ltd

1.3. Property details

Property: M25/77
M25/76
M25/78
Local Government Area: City Of Kalgoorlie/Boulder
Colloquial name: Avalon Plant Site

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
74		Mechanical Removal	Mineral Production

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 Association 20: Low woodland; mulga mixed with <i>Allocasuarina cristata</i> & <i>Eucalyptus</i> sp. (Shepherd et al, 2001; Hopkins et al, 2001).	74ha of native vegetation is proposed to be cleared using a bulldozer (LionOre, 2005a). The purpose of clearing is to develop infrastructure for modifications to the existing Process Plant to accommodate new Activox® technology developed by Western Minerals technology. Vegetation will be crushed and stockpiled. Topsoil removed will be stockpiled. Subsoil (where present) will be removed and stockpiled. Seven vegetation communities in various levels of distribution exist as follows: <u>Woodlands:</u> * Open Low Woodland dominated by <i>Eucalyptus salmonophloia</i> to 15m tall with <i>E lesouefii</i> to 10m tall; over Chenopodiaceae shrubs. * Open Low Woodland dominated by <i>Eucalyptus lesouefii</i> and <i>E griffithsii</i> to 12m tall; over Open Scrub to Scrub; over Open Low Scrub; Over Dwarf Scrub. * Low Woodland dominated by <i>Eucalyptus griffithsii</i> , <i>E horistes</i> and <i>E transcontinentalis</i> to 15m tall; over Scrub to 4m tall; over Open Low Scrub; Over Open Dwarf Scrub. *Low Forest dominated by <i>Eucalyptus stricklandii</i> , <i>E griffithsii</i> and <i>E horistes</i> to 15m tall; Over Thicket of <i>Acacia burkittii</i> ; over Open Low Scrub; Over Open Dwarf Scrub with patchy Hummock Grass. <u>Shrublands:</u> * Scattered tall shrubs 2-4m tall; Over Open Low Scrub; Over Dwarf Scrub. * Scattered <i>Eucalyptus transcontinentalis</i> to 6m tall; Over Scrub dominated by <i>Casuarina pauper</i> to 6m tall; over Low Scrub to Open Low Scrub; Over Open Dwarf Scrub. * Scattered <i>Eucalyptus griffithsii</i> to 12m tall; Over Scrub dominated by <i>Acacia quadrimarginea</i> to 4m tall; Over Open Low Scrub; Over Open Dwarf Scrub. (Armstrong, 2005).	Degraded: Structure severely disturbed; regeneration to good condition requires intensive management (Keighery 1994)	Paul Armstrong and Associates conducted a site vegetation survey on 2-3 May 2005 (Armstrong, 2005). The survey was carried out over the five areas of the proposed development, these being: * Residue Storage facility; * Bunds for Criterion Pit; * Bunds for Federal Pits; * Process Plant modifications; and * Proposed airstrip and access. A large portion of the site has already been cleared over a period of time for mining activities and existing infrastructure (Armstrong, 2005). As a consequence, most of the remaining vegetation is in a degraded state. Some portions of the project area are heavily infested with weeds and the soil surface is largely exposed as few native vegetation species remain.

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 at variance to this Principle**

As a large portion of native vegetation within the project area has previously been cleared for existing infrastructure and mining development, with few native species remaining and soil largely exposed, the area is not of high biological diversity. A heavy infestation of weeds also contributes to the level of degradation (Armstrong 2005).

No Threatened Ecological Communities (TECs) were identified in the CALM database search or in the survey of proposed high impact areas (Armstrong 2005), nor are any of the vegetation communities regarded as Regionally Significant.

The areas of proposed clearing are therefore not considered to have high biodiversity values.

Methodology Armstrong 2005.
Florabase, Online, CALM, 2005.

GIS Databases:

Clearing Regulations - Environmentally Sensitive Areas - DoE 30/05/05

Clearing Regulations - Schedule One Areas - DoE 10/03/05

Declared Rare and Priority Flora List - CALM 01/07/05

Pre-European Vegetation - DA 01/01

Threatened Ecological Communities - CALM 12/04/05

Threatened Plant Communities - DEP 06/95

(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**

A fauna survey was conducted in June 1995 by Ecologia for the Bulong Nickel Laterite Project (BNLP) (the project was acquired by LionOre and renamed to Avalon Nickel Project). The area and extent of the survey covered various Bulong area tenements within which the current application area is included.

Three scheduled bird species which potentially occur in the BNLP area (CALM, 1994 cited in Kinhill Engineers, 1996), but not recorded during the survey include:

- * Grey Falcon (*Falco hypoleucos*) (Schedule 1);
- * Mallee Fowl (*Leipoa ocellata*) (Schedule 1); and
- * Peregrine Falcon (*Falco peregrinus*) (Schedule 4) (Ecologia 1995).

In a desktop fauna assessment which was undertaken to update the survey of 1995, Ecologia (2005) reviewed data from the following sources:

- * The Biological Survey of the Eastern Goldfields of Western Australia. Part 8 Kurnalpi-Kalgoorlie Study Area (McKenzie & Hall, 1992, cited in Ecologia, 2005);
- * Bulong Nickel Project Notice of Intent: Biological Assessment Survey (Ecologia, 1995);
- * The Western Australian Museum's Faunabase;
- * The Department of Environment and Heritage's Protected Matters database; and
- * The Department of Conservation and Land Management's Threatened Species Database.

Based on the literature review from the first three sources, it is estimated that 13 native animals, 104 birds, 59 reptiles and 2 frogs may potentially utilise the proposed Avalon Project area. However, the degraded condition of the habitat suggests that only a small proportion of these species are likely to be present.

With respect to significant fauna and their habitat, the review (Ecologia, 2005) found that:

- * The Rainbow Bee-eater (*Merops ornatus*, listed under Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds in Danger of Extinction and their Environment, or JAMBA) may occur within the project area. This species has varied habitat preferences and has a wide distribution covering the majority of the continent, and is therefore unlikely to be significantly impacted by the development at a regional level.
- * Malleefowl (*Meipoa ocellata*, Vulnerable nationally and Schedule 1 in WA) mounds, both active and inactive, were not recorded in a visual assessment of the clearing area (Muir, cited in Ecologia, 2005). Due to the small home ranges of this species, the close proximity to Bulong Nickel operations and the poor vegetation quality, it is unlikely to utilise the project area.
- * The Samphire Thornbill (*Acanthiza iredalei iredalei*, Vulnerable nationally) is known from six populations in the southern half of Western Australia. The presence of this species within the application area is highly unlikely, as Johnstone and Storr (2004, cited in Ecologia, 2005) describe the distribution of this species as not including the project area.
- * The Peregrine Falcon (*Falco peregrinus*, Schedule 4) is nomadic and sedentary and is widely distributed in Australia. This species may be a transient visitor to the application area and is unlikely to be impacted by the development.
- * The Carpet Python (*Morelia spilota imbricata*, Schedule 4 and Priority 4), if it occurs, will be at the northern

- extent of its range. It occurs in a wide variety of habitats, and therefore if present, is unlikely to be impacted.
- * Four CALM Priority species may potentially occur in the project area. Of these, the Western Rosella (*Platycercus icterotis xanthogenys*, P3), Western Shrike-tit (*Falcunculus frontatus leucogaster*, P4) and Princess Parrot (*Polytelis alexandrae*, P4) are unlikely to occur in the application area. The Australian Bustard (*Ardeotis australis*, P4) is known to occur in open or lightly wooded country in Australia, but is now extinct in south-eastern Australia.
 - * It is unlikely that any CALM Priority listed invertebrate fauna species occur within the application area.
 - * It is unlikely that stygofauna occur within the application area.

Considering the degraded condition of the vegetation and localised habitat loss experienced over the majority of the vegetation applied to be cleared there is a low probability of the area being significant habitat for conservation category fauna. As such the proposal does not appear to be at variance with this Principle (CALM, 2005b).

Methodology Ecologia 1995.
Ecologia 2005.
Kinhill Engineers 1996.
CALM 2005b.

(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

A CALM database search for Declared Rare and Priority Flora species was conducted covering an area 50kms to the north, south and east and 60kms west of the area of proposed impact (Armstrong 2005). The search identified twenty Priority Flora species from the general area of the project however the search did not identify any Declared Rare Flora or Priority Flora within the project area.

CALM's Declared Rare and Priority Flora List (01/07/05) database search conducted by DoIR's Environmental Assessor reflected Armstrong's findings that no Declared Rare or Priority Flora are known in the areas of proposed clearing.

The site survey was conducted on 2 and 3 May 2005 therefore ephemerals species were dormant and few annual species were identifiable (Armstrong 2005). No Declared Rare or Priority Flora were recorded during the site inspection. Three ephemeral species that may have been present but were not recorded due to the timing of the survey are:

- * *Elachanthus pusillus* (P2);
- * *Gnephosis intonsa* (P1); and
- * *Lepidium fasciculatum* (P1).

Methodology Armstrong 2005
West Australian Herbarium (1998-2005)

GIS Databases:
Clearing Regulations - Environmentally Sensitive Areas - DOE 30/05/05
Declared Rare and Priority Flora List - CALM 01/07/05
Pre-European Vegetation - DA 01/01

(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 at variance to this Principle

No Threatened Ecological Communities (TECs) were identified as occurring in the CALM database within the search covering an area 50kms to the north, south and east and 60kms west of the application area (Armstrong 2005). However four TECs were recorded from within 50km of the search area boundary. These TECs were:

- * Woodline Hills Vegetation Complex;
- * Fraser Range Vegetation Complex;
- * Southern Hills Vegetation Complex; and
- * Plant Assemblages of the Bremer Range System.
(as described in Beard's vegetation mapping)

None of the vegetation communities observed in the survey are classified as TECs or listed by either CALM or Environment Australia (Armstrong 2005). None of the vegetation communities recorded are regarded as Regionally Significant.

Methodology Armstrong 2005.

GIS Databases:
 Clearing Regulations - Environmentally Sensitive Areas - DOE 30/05/05
 Threatened Ecological Communities - CALM 12/04/05
 Threatened Plant Communities - DEP 06/95

(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 at variance to this Principle

The State Government is committed to the National Objectives Targets for Biodiversity Conservation which includes a target that prevents clearance of ecological communities with an extent below 30% of that present pre-European settlement (Department of Natural Resources and Environment, 2002; EPA, 2000).

While the benchmark of 15% representation in conservation reserves (JANIS Forests Criteria, 1997) has not been met for Beard vegetation association 20, 99.6% of the pre-European extent remains for this association and it is therefore of 'least concern' for biodiversity conservation (Department of Natural Resources and Environment, 2002).

	Pre-European area (ha)	Current extent (ha)	Remaining %*	Conservation Status**	% in IUCN Class I-IV reserves
IBRA Bioregion - Murchison	28,206,195*	28,206,195*	100%	Least concern	
Shire of Kalgoorlie-Boulder	No information available				
Beard vegetation association - 20	1,558,296	1,552,012	99.6%	Least concern	13.1%

* Shepherd et al. (2001)

** Department of Natural Resources and Environment (2002)

Methodology Shepherd et al., 2001
 Department of Natural Resources and Environment, 2002
 EPA, 2000
 JANIS Forests Criteria, 1997

GIS Database:
 Pre-European Vegetation - DA 01/01

(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

A number of non-perennial water courses cross the application area which has a relatively flat topography. When flowing, these water courses will flow in a generally northerly direction. The average rainfall in the Kalgoorlie-Boulder area is 260mm in an average of 65 days however rainfall varies from one year to another (BOM, 2005). Although rare, the Goldfields can experience sporadic heavy rainfall events associated with storms and sometimes flooding as a result of tropical cyclones originating off the northwest coast.

Therefore, there is a limited risk at the time of clearing, of elevated levels of sedimentation, erosion and turbidity in these water courses. In the long term there is a need to manage drainage in the application area. To this effect, the applicant has submitted the erosion control commitments for LionOre's Avalon Notice of Intent (LionOre, 2005b), and this states that they will:

* Improve and contain runoff from surface drainage around the plant to minimise the impact on stormwater quality; and

* Monitor the plant site and tenements for erosion and remediate as necessary.

A number of specific actions are attached to achieve each of these commitments.

Methodology BoM 2005
 LionOre, 2005b.

GIS Databases:
 Hydrography, Linear - DOE 01/02/04
 Topographic Contours, Statewide - DOLA 12/09/02

(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

Much of the original vegetation of the project area has already been cleared during previous mining operations and infrastructure development over an extended period (waste dumps, tailings storage facilities, process

plant) (Armstrong 2005). As a result the condition of existing vegetation is degraded, characterised by few trees, bare soil and loss of surface soil.

The Department of Agriculture (DAWA, 2005) has advised that:

- * The sites are likely to comprise alluvial and loamy plain land units with deep red duplex and calcareous loamy earth soils. The soils of the alluvial plain land unit that occur below the low hills and rises are susceptible to soil erosion. The other soils are regarded as being slightly susceptible to soil erosion by may also be vulnerable to loss of native vegetation if the natural flow regime is disturbed.
- * It is concluded that the proposed clearing may be at variance with principle (g) for soil erosion and loss of native vegetation.
- * If a permit is granted, it is recommended that conditions requiring maintenance of natural flow regimes be imposed. Diversion structures may be required to safely convey surface water flows around infrastructure and other developments on the sites to be cleared.

To this effect, the applicant has submitted the erosion control commitments for LionOre's Avalon Notice of Intent (LionOre, 2005b), and this states that they will:

- * Improve and contain runoff from surface drainage around the plant to minimise the impact on stormwater quality; and
- * Monitor the plant site and tenements for erosion and remediate as necessary.

A number of specific actions are attached to achieve each of these commitments.

Portions of the project area have a moderate to heavy infestation of weeds. The Declared plant, *Marrubian vulgare* (horehound), was recorded from one location with the application area and it is likely to occur in other disturbed areas (Armstrong 2005). According to the Department of Agriculture (2005) this weed is classified as Category P1 and P4 in the Kalgoorlie area. As explained in Appendix 7 of Armstrong (2005), great care will need to be taken to limit further spread of this weed.

The risk of weeds spreading is particularly of concern in vehicle traffic areas (Armstrong 2004), and needs to be carefully managed to avoid further detrimental environmental impact (Armstrong 2005). The applicant has submitted the weed management commitments for LionOre's Avalon Notice of Intent (LionOre, 2005b), and this states that:

- * LionOre commits to undertake a weed and plant disease survey every fourth year during operation; and
- * Weed control will be undertaken as necessary.

A number of specific actions are attached to achieve each of these commitments.

Methodology Armstrong 2004.
Armstrong 2005.
Department of Agriculture 2005.
LionOre, 2005b.
DAWA, 2005.
Environ 2004.

GIS Databases:
Hydrography, Linear - DoE 01/02/2004
Pre-European Vegetation - DA 01/01
Topographic Contours, Statewide - DoLA 12/09/02

(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 not at variance to this Principle

The Karrawang Nature Reserve is located within a 50km radius of the proposal (CALM, 2005a). However, based on the scale and proximity of the application, this reserve is unlikely to be impacted by the proposal.

Methodology CALM 2005a.

GIS Database:
CALM Managed Lands and Waters - CALM 01/07/05

(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 proposed clearing is not expected to impact on groundwater tables. However, as a number of non-perennial water courses are located within the application area, there is a limited risk at the time of clearing, of elevated levels of sedimentation, erosion and turbidity in these water courses. In the long term there is a need to manage drainage in the application area. To this effect, the applicant has submitted the erosion control commitments for LionOre's Avalon Notice of Intent (LionOre, 2005b), and this states that they will:

- * Improve and contain runoff from surface drainage around the plant to minimise the impact on stormwater quality; and
- * Monitor the plant site and tenements for erosion and remediate as necessary.

A number of specific actions are attached to achieve each of these commitments.

Methodology Armstrong 2005.
LionOre, 2005b.

GIS Database:
Hydrography, Linear - DoE 01/02/2004

(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

Minor non-perennial water courses are located within the project area and the topography is generally flat (GIS, DOLA, 2002). The average rainfall in the Kalgoorlie-Boulder area is 260mm in an average of 65 days however rainfall varies from one year to another (BOM, 2005). An average of 32.2mm of rainfall occurs during June, the wettest month. Although rare, the Goldfields can produce heavy rains and sometimes flooding as a result of tropical cyclones originating off the northwest coast. It is these sporadic events that cause flooding in the Goldfields, and the proposed clearing is not likely to exacerbate the incidence of flooding.

Methodology BoM 2005.

GIS Databases:
Hydrography, Linear - DOE 01/02/04
Topographic Contours, Statewide - DOLA 12/09/02

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

Comments

There are two Native Title Claims over the area under application; WC98/027 and WC99/030. These claims have been registered with the National Native Title Tribunal on behalf of the Widji and Central East Goldfields claimant groups respectively. However, the mining tenements have been granted, and the clearing is for a purpose consistent with the tenement type, therefore the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There is a current Works Approval for the area under application (DoE 2005) granted in accordance with the *Environmental Protection Act 1986*. The area is subject to a Water licence (No. 61047) granted in accordance with the *Rights in Water and Irrigation Act 1914*, which expires on the 15 July 2010. There are no special conditions attached to the licence that that are relevant to the granting of a clearing permit.

Note that clearing must not commence until all other environmental approvals have been obtained. This may include approvals under other acts, such as the *Mining Act 1978*.

Methodology DoE 2005.

GIS Database:
Native Title Claims - DLI 19/12/04.

4. Assessor's recommendations

Purpose	Method	Applied area (ha)	Decision	Comment / recommendation
Mineral Production	Mechanical Removal	74	Grant	<p>The assessing officer recommends that a clearing permit be granted.</p> <p>74ha of native vegetation is proposed to be cleared using bulldozer. The purpose of clearing is to develop infrastructure for modifications to the existing Process Plant to accommodate new Activox technology developed by Western Minerals technology. Vegetation will be crushed and stockpiled. Topsoil removed will be stockpiled. Subsoil (where present) will be removed and stockpiled.</p> <p>The assessable criteria have been addressed and the clearing as proposed may be at variance to Principles f, g and i. The issues identified relate specifically to erosion control and weeds. LionOre has provided the commitments relating to these aspects from the Avalon Notice of Intent (LionOre, 2005b), and the assessor is satisfied that the aspects will be managed and controlled through this process.</p> <p>Two general conditions which are attached to this permit relate to recording and reporting clearing of native vegetation undertaken within the application area, and are:</p> <p>1. The Permit Holder shall record the following for each instance of clearing: location where clearing occurred (using Geocentric Datum Australia 1994); purpose of the clearing; area cleared in hectares; and area rehabilitated in hectares.</p>

2. The Permit Holder shall provide a report to the Director, Environment Division of the Department of Industry and Resources each year setting out the records gathered against condition 1 of this permit in relation to clearing carried out the previous year. This report can be included as an addendum to the Annual Environmental Review.

5. References

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- 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.
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6. Glossary

Term	Meaning
CALM	Department of Conservation and Land Management
DAWA	Department of Agriculture
DEP	Department of Environmental Protection (now DoE)
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 DoE)

7. Definitions:

{Atkins, K (2005). *Declared rare and priority flora list for Western Australia, 22 February 2005*. Department of Conservation and Land Management, Como, Western Australia} :-

- 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 are in urgent need of further survey.
- P2 Priority Two - Poorly Known taxa:** taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

{Wildlife Conservation (Specially Protected Fauna) Notice 2005} [Wildlife Conservation Act 1950] :-

- Schedule 1 Schedule 1 – Fauna that is rare or likely to become extinct:** being fauna that is rare or likely to become extinct, are declared to be fauna that is need of special protection.
- Schedule 2 Schedule 2 – Fauna that is presumed to be extinct:** being fauna that is presumed to be extinct, are declared to be fauna that is need of special protection.
- Schedule 3 Schedule 3 – Birds protected under an international agreement:** being birds that are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction, are declared to be fauna that is need of special protection.
- Schedule 4 Schedule 4 – Other specially protected fauna:** being fauna that is declared to be fauna that is in need of special protection, otherwise than for the reasons mentioned in Schedules 1, 2 or 3.

{CALM (2005). *Priority Codes for Fauna*. Department of Conservation and Land Management, Como, Western Australia} :-

- P3 Priority Three: Taxa with several, poorly known populations, some on conservation lands:** Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P4 Priority Four: Taxa in need of monitoring:** Taxa which are considered to have been adequately surveyed, or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.

Categories of threatened species (Environment Protection and Biodiversity Conservation Act 1999)

- VU Vulnerable:** A native species 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.