



## CLEARING PERMIT

*Granted under section 51E of the Environmental Protection Act 1986*

<b>Purpose Permit number:</b>	CPS 4439/1
<b>Permit Holder:</b>	Commonwealth Scientific and Industrial Research Organisation
<b>Duration of Permit:</b>	5 September 2011 to 5 September 2016

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 installing the Murchison Widefield Array Project.

**2. Land on which clearing is to be done**

Lot 502 on Plan 55945 (South Murchison 6635)

**3. Area of Clearing**

The Permit Holder must not clear more than 33.84 hectares of native vegetation within the area cross hatched yellow on attached Plan 4439/1.

**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 activities to the extent that the Permit Holder has the power to clear native vegetation for those activities under the *Land Administration Act 1997* or any other written law.

**6. 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

**7. 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:

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

#### 8. 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*:

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

#### DEFINITIONS

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

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

*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;

*weed/s* means a species listed in Appendix 3 of the "Environmental Weed Strategy" published by the Department of Conservation and Land Management (1999), and plants declared under section 37 of the *Agriculture and Related Resources Protection Act 1976*.

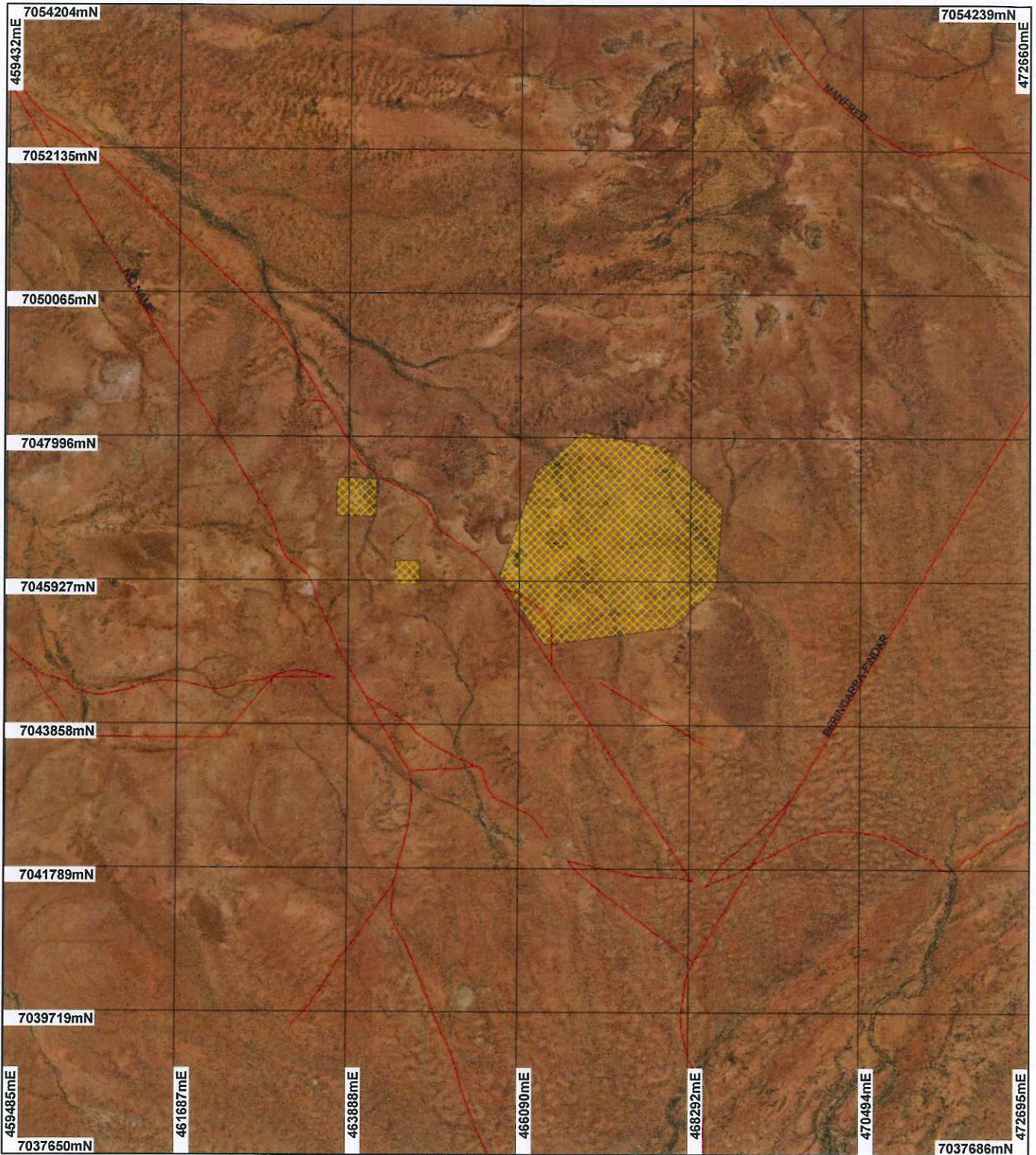


M Warnock  
A/ MANAGER  
NATIVE VEGETATION CONSERVATION BRANCH

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

11 August 2011

# Plan 4439/1



## LEGEND

### Clearing Instruments

-  Areas Approved to Clear
-  Road Centrelines
-  Cadastre
-  Boolardy 50cm Orthomosaic - Landgate 2005



0 1 2 km

Scale 1:74902  
(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 11/8/11  
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.



Department of Environment and Conservation

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## 1. Application details

### 1.1. Permit application details

Permit application No.: 4439/1  
Permit type: Purpose Permit

### 1.2. Proponent details

Proponent's name: Commonwealth Scientific and Industrial Research Organisation

### 1.3. Property details

Property: LOT 502 ON PLAN 55945 (SOUTH MURCHISON 6635)  
Local Government Area: Shire of Murchison  
Colloquial name: Murchison Widefield Array Project

### 1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
33.84		Mechanical Removal	Building or Structure

### 1.5. Decision on application

Decision on Permit Application: Grant  
Decision Date: 11 August 2011

## 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 area under application comprises of Beard Vegetation Associations 29, 39 and 341. Shepherd (2009) describes these vegetation types as:	This application proposes to clear up to 33.84 hectares of native vegetation from within a footprint area of approximately 690 hectares.	Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery 1994)	The condition and description of the area under application was determined via the use of aerial imagery and flora and vegetation surveys conducted by Alexander Holm & Associates (2008).
Association 39: Shrublands; mulga scrub.	A Preliminary Environmental and Vegetation Clearing Assessment conducted by Parsons Brinckerhoff (2011) identified four land units within the application area:		
Association 29: Sparse low woodland; mulga, discontinuous in scattered groups.	3: Saline lower foot slopes below breakaways - Low patchy shrubland or annual herbfield with isolated to very scattered shrubs <i>Acacia victoriae</i> , <i>Maireana glomerifolia</i> , <i>Ptilotus beardii</i> and <i>P. obovatus</i> .		
Association 341: Low woodland over scrub; mulga over <i>Acacia sclerosperma bowgada</i> , <i>A. victoriae</i> & <i>minnieritchie</i> ( <i>A. grasbyi</i> ).	5: Non saline stony or gritty surfaced plains - Very scattered mixed height shrubland of <i>Acacia aneura</i> , <i>A. tetragonophylla</i> , <i>Eremophila platycalyx</i> , <i>E. macmillaniana</i> , other <i>eremophilas</i> , <i>Senna</i> spp. And <i>Ptilotus obovatus</i> .		
	6: Hardpan plains - Often weakly banded. Very scattered to scattered tall shrubland of <i>Acacia aneura</i> , also <i>A. tetragonophylla</i> with mid height and low shrubs <i>Senna artemisioides</i> ssp. <i>Helmsii</i> , <i>Eremophila fraserii</i> ssp. <i>parva</i> , <i>E. forrestii</i> , <i>E. phyllopoda</i> ssp. <i>phyllopoda</i> and <i>Ptilotus</i> .		
	7: Uncahhelled drainage tracts - Moderately close to tall shrubland of <i>Acacia craspedocarpa</i> , <i>A. aneura</i> , <i>A. tetragonophylla</i> and low shrubs <i>Eremophila</i> and <i>Senna</i> spp, <i>Grevillea deflexa</i> and <i>Ptilotus obovatus</i> .		
	The majority of the clearing associated with this project occurs within land unit 5 (Parsons Brinckerhoff, 2011).		



### 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**

This application proposes to clear up to 33.84 hectares of native vegetation within Lot 502 on Plan 55945, South Murchison (Boolarady Pastoral Lease), for the purpose of constructing the Murchison Widefield Array Project.

The Murchison Widefield Array Project involves the construction of the array itself as well as support facilities, including;

- construction of the radio telescope, known as the Murchison Widefield Array (MWA), composed of up to 512 antennas and 64 receivers distributed over the site
- associated infrastructure, including a MWA central hub, as well as requiring an expansion of existing infrastructure, solar power field, and geothermal cooling bore field
- trenching, cabling and access tracks to allow for ongoing maintenance, power supply and data transfer between the central control compound, the MWA central hub, and the receivers and antennas (Parsons Brinckerhoff, 2011).

An Environmental Assessment conducted by Alexander Holm & Associates (2008) over Boolardy Station identified the priority three flora species *Ptilotus beardii*. In 2008 this species was widely distributed throughout land unit 3 (Saline lower foot slopes below breakaways) (Alexander Holm & Associates, 2008), however, these known locations are not within the areas proposed to be cleared. No other rare or priority species have been recorded within a 20km radius of the application areas.

Numerous fauna species have been recorded within a 40km radius of the application area, including Western Spiny-tailed Skink (*Egernia stokesii* subsp. *badia*), Peregrine Falcon (*Falco peregrinus*), Australian Bustard (*Ardeotis australis*) and Bush Stone-curlew (*Burhinus grallarius*) (DEC, 2007). The fauna habitats within the area proposed to be cleared are well represented elsewhere within the local and regional area, and no significant loss of habitat for fauna indigenous to Western Australia is expected.

No priority or ecological communities have been recorded within the local area.

The disturbance resulting from the proposed clearing will increase the risk of weeds spreading into adjacent land. Weed management practices would assist in mitigating this risk.

The application area is unlikely to represent an area of higher biodiversity value when compared to representative vegetation in a local and regional context.

Considering the above, the proposed clearing is not likely to be at variance to this Principle.

##### Methodology

##### References:

Alexander Holm & Associates (2008)  
DEC (2007)  
Parsons Brinckerhoff (2011)

##### GIS Database:

- SAC Biodatasets - Accessed 20 July 2011  
- Pre European Vegetation

#### (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**

Ten fauna species of conservation significance are predicted or known to occur within the vicinity of the lease area (Parsons Brinckerhoff, 2011). An ecological assessment of Boolardy station suggests that five of these species are likely to occur within the application area; Western Spiny-tailed Skink (*Egernia stokesii* subsp. *badia*), Peregrine Falcon (*Falco peregrinus*), Australian Bustard (*Ardeotis australis*), Rainbow Bee-eater (*Merops ornatus*) and Bush Stone-curlew (*Burhinus grallarius*) (Parsons Brinckerhoff, 2011).

The Western Spiny-tailed Skink was observed in granite outcrops within Boolardy station during field surveys in October 2007 (Alexander Holm & Associates, 2008).

The fauna habitats within the area proposed to be cleared are well represented elsewhere within the local and regional area, and no significant loss of habitat for fauna indigenous to Western Australia is expected. The proposed clearing will not sever any wildlife corridors and therefore the clearing will not remove an ecological linkage that is necessary for the maintenance of fauna.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

**Methodology**    References:  
 Alexander Holm & Associates (2008)  
 Parsons Brinckerhoff (2011)

GIS Database:  
 - SAC Biodatasets - Accessed 20 July 2011  
 - Pre European Vegetation

**(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**  
 There were no known records of rare flora within the local area (20km radius).

The proposed clearing is not likely to be at variance to this principle

**Methodology**    GIS Database:  
 - SAC Biodatasets - Accessed 20 July 2011  
 - Pre European Vegetation

**(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 known threatened ecological communities recorded within the local area (20km radius) or on Boolardy Station (Alexander Holm & Associates, 2008).

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

**Methodology**    References:  
 Alexander Holm and Associates (2008)

GIS Database:  
 - SAC Biodatasets - Accessed 20 July 2011  
 - Pre European Vegetation

**(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 area under application is located within the Murchison Interim Biogeographic Regionalisation of Australia (IBRA) bioregion. This IBRA bioregion has approximately 100 per cent of its Pre European vegetation extent remaining (Shepherd, 2009).

The vegetation under application is mapped as Beard Vegetation Associations 29, 39 and 341 all of which have approximately 100 percent of their Pre European extent remaining in the Murchison bioregion (Shepherd, 2009).

Given the vegetation extent remaining within the local area the vegetation under application is not significant as a remnant in an extensively cleared landscape.

Therefore, the clearing as proposed is not at variance to this principle.

	Pre-European (ha)	Current Extent (ha)	Remaining (%)
<b>IBRA Bioregion*</b>			
Murchison	28 120 587	28 120 587	100
<b>Shire*</b>			
Shire of Murchison	4 504 591	4 503 952	100
<b>Beard Vegetation Association in Bioregion*</b>			
29	2 956 382	2 956 382	100
39	1 148 400	1 148 400	100
341	10 421	10 421	100

\*Shepherd (2009)

**Methodology**   References:  
Shepherd (2009)

GIS Database:  
- Boolardy 50cm Orthomosaic - Landgate 2005  
- Local Government Authority  
- Pre European Vegetation  
- SAC Biodatasets - Accessed 20 July 2011

**(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 not likely to be at variance to this Principle**  
Murchison River is the closest major river and is located approximately 28km north west of the application area.

Three minor, non perennial watercourses are mapped within the clearing footprint. These drainage lines are very shallow channels or completely flat drainage tracts, directing surface sheet water after occasional downpours (Parsons Brinckerhoff, 2011).

No wetlands of national or sub-regional significance exist within the application area (Parsons Brinckerhoff, 2011).

Clearing for an access track may occur within a drainage area however no other works associated with the Murchison Widefield Array Project are located within or adjacent to any waterways. Although some minor clearing may occur within a drainage line, no vegetation growing in association with a watercourse that has been identified as having significant environmental value will occur.

Therefore, this proposal is not likely to be at variance to this principle.

**Methodology**   References:  
Parsons Brinckerhoff (2011)

GIS Database:  
- 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 is not likely to be at variance to this Principle**  
The areas under application have been mapped as occurring on soil types Mz23 and BE2 (Northcote et al, 1960-68). Northcote et al (1960-68) describes these soil types as;

Mz23 - Extensive flat and gently sloping plains with a scatter of surface gravels. Red-brown hardpan occasionally outcrops and is normally present within a depth of 30 m.

BE2 - Generally undulating terrain on granites with rocky granitic hills, bosses and tors, some breakaways, and a surface stone mantle: chief soils seem to be shallow earthy loams underlain by a red-brown hardpan.

The majority of the proposed clearing is for installing up to 512 antennas, each measuring 5m x 5m. These antennas consist of a 'ground plate' which is made up of a heavy steel mesh with an array of small antennas attached. The antennas will be placed on the ground across a 2km diameter site (Parsons Brinckerhoff, 2011). This mesh 'ground plate' will allow grasses etc to grow up through it. This infrastructure will stabilise the soil, reducing the risk of erosion.

No appreciable land degradation is predicted. However, some short term, localised issues such as erosion of disturbed soils through wind, rain and flowing water may occur following clearing (Parsons Brinckerhoff, 2011).

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

**Methodology**   References:  
Northcote et al (1960-68)  
Parsons Brinckerhoff (2011)

GIS Database:  
- Mean Annual Rainfall Isohytes  
- SAC Biodatasets - Accessed 20 July 2011  
- Topographic Contours, 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 not at variance to this Principle**  
There are no conservation areas within the local area (20km radius).  
  
The proposed clearing is not at variance to this principle.

**Methodology**    GIS Database:  
- DEC Tenure  
- Pre European Vegetation

**(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 groundwater salinity within the application area ranges between 1,000 - 3,000 (northern portion of application area) and 300-7000 (southern portion of application area) milligrams per litre of Total Dissolved Solids (TDS). This level of groundwater salinity is considered to be brackish to saline. The clearing of up to 33.84 hectares of vegetation within a footprint area of 690 hectares is not likely to have a significant impact on the quality of groundwater in the local area.

In high rainfall events sedimentation levels in surface water runoff may increase. Any increase in sedimentation levels will only occur in the short term and is not likely to have any significant effect on the quality of surface water.

Considering the above, the proposed clearing is not likely to be at variance to this principle.

**Methodology**    GIS Database:  
- Groundwater Salinity Statewide  
- Hydrography linear  
- Hydrography linear (hierarchy)

**(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 of up to 33.84 hectares within a larger footprint area of approximately 690 hectares is unlikely to cause, or exacerbate, the incidence or intensity of flooding.

Water crossings will be designed so as to maintain flow patterns and therefore not increase the incidence or intensity of flooding (Parsons Brinckerhoff, 2011).

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

**Methodology**    References:  
Parsons Brinckerhoff (2011)  
  
GIS Database:  
- Hydrography linear  
- Mean Annual Rainfall Isohytes

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

**Comments**  
No public submissions have been received in relation to this application.  
  
Commonwealth Scientific and Industrial Research Organisation are the primary interest holders over Lot 502 on Deposited Plan 55945 and they hold a lease which outlines the permitted use of the sites as being; radio-astronomy projects and ancillary works and activities, including radio science studies, associated with but not limited to the MWA Project.  
  
The application is in line with lease requirements, however the applicant is advised to contact the Shire of Murchison to ensure no approvals are required.  
  
The area under application is located within the Gascoyne Groundwater Area which is an area proclaimed under the Rights in Water and Irrigation Act 1914. This project does not involve the abstraction of groundwater and therefore does not require licensing from the Department of Water.  
  
No Aboriginal sites of significance are located within the proposed clearing area.



- Methodology** GIS Database:
- Aboriginal Sites of Significance
  - RIWI Act, Groundwater Areas

#### 4. References

- Alexander Holm & Associates (2008) Radio Astronomy Project Murchison Region Western Australia, Environmental Assessment. 18 January 2008 (DEC Ref: A405599).
- DEC (2007) NatureMap: Mapping Western Australia's Biodiversity. Department of Environment and Conservation. URL: <http://naturemap.dec.wa.gov.au/>. Accessed July 2011.
- 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.
- Parsons Brinckerhoff (2011) Murchison Widefield Array Project, Preliminary Environmental and Vegetation Clearing Assessment. Prepared for the CSIRO. June 2011 (DEC Ref: A405599).
- Shepherd, D.P. (2009) 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.

#### 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)