

# **VEGETATION SURVEY LOCATION 215 GWINDINUP PROJECT**

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Fig. 3 Distribution of Vegetation Communities

Fig. 4 Vegetation Condition

## **i**      **SUMMARY**

Location 215 occurs on the Whicher Scarp within the Shire of Capel, bounded on the east side by Gavins Road and on the other three sides by farmland. It consists of cleared farmland, a seasonal creek and areas of native vegetation in varying condition with overhead powerlines and a service corridor bisecting the property.

Three vegetation complexes were recorded from the site. Whicher Vegetation complex on sandy slopes; Whicher Vegetation complex in sandy valleys; and Kingia Vegetation complex on upland lateritic gravels. The vegetation condition ranged from pristine to completely degraded. One of the areas classified as degraded had an excellent tree storey but the understorey had been completely removed (Appendix B, Figure 4).

If a decision is made to use the area to store soil, eg as a topsoil stockpile, it will be essential to undertake a weed removal program of the stockpile area and extended environs prior to any dumping. Prior to spreading this stored soil it may also be necessary to treat it with herbicide before application on site. Any stockpiles need to be placed at a sufficient distance from the seasonal creek.

Preferably for soil storage the areas that should be used are those classified as very degraded or degraded, retaining the pristine areas in the north of the site for conservation purposes.

# 1. BACKGROUND

An assessment of the landforms, vegetation and flora of the Gwindinup Project area was prepared in 1999 by Environmental Survey and Management Pty Ltd. The conservation values of the vegetation communities in the project area were also determined to assist in ensuring the areas of high conservation value were not unduly disturbed. Progression of the mine development showed that Wellington Location 215 may be available for mining and the placement of mine infrastructure. Consistent with earlier approaches, Bennett Environmental Consulting Pty Ltd was commissioned by Cable Sands to undertake a vegetation, condition and dieback survey of this area.

Environmental Survey and Management Pty Ltd (1999) from the regional mapping by Matiske and Havel, described six vegetation units and three disturbed units from the overall project area. These are Kingia Vegetation complex on upland lateritic gravels; Kingia Vegetation complex on shallow sands over laterite; Whicher vegetation complex on sandy slopes; Whicher Vegetation complex in sandy valleys; Rosa Vegetation complex in the valley floors and Cartis vegetation complex on lower slopes and sandplains. The site surveyed in 2000 is surrounded to the east by Kingia Vegetation complex on upland lateritic gravels and to the south by Kingia Vegetation complex on upland lateritic gravels, Whicher Vegetation complex on sandy slopes and Whicher Vegetation complex in sandy valleys.

This report will follow the format of that of Environmental Survey and Management Pty Ltd in describing the vegetation units. The following report lists the dominant overstorey and understorey plant species for each vegetation complex allowing a comparison to be made with the data collected in the field.

## 2. OBJECTIVES

The objectives of this study were to:

- map the vegetation of Location 215;
- describe the flora of Location 215;
- search for Declared Rare and Priority flora;
- assess the condition and conservation value of the vegetation; and
- indicate the presence or otherwise of dieback.

### 3. METHODS

Field work was undertaken on 4<sup>th</sup> and 5<sup>th</sup> October 2000. The area was traversed by car along tracks and by foot where there was no vehicle access. An aerial photograph of the site, which indicated the presence of degraded vegetation, was provided before the fieldwork was undertaken. Eight 100m<sup>2</sup> sample sites were established and the species presence, foliage cover, vegetation structure and map references recorded using a GPS. Plant taxa unknown in the field were collected, pressed and later identified using plant keys and by comparison with the collection housed at the Western Australian Herbarium. The condition of the vegetation was assessed in the field and mapped using aerial photography. It was found by traversing the areas on foot that the condition of some areas could not be assessed from the aerial photographs as the upper storey was in good condition but the understorey had been completely removed (See Appendix B).

### 4. RESULTS

#### 4.1 VEGETATION

Following the information provided in Environmental Survey and Management Pty Ltd (1999) the following vegetation units were present. Kingia Vegetation Complex on upland lateritic gravels, Kingia Vegetation Complex on upland lateritic gravels and Rosa Vegetation Complex. A generalised soil description of each of these is below.

- **Kingia Subsystem** occurs on the highest ridges and is associated with good quality jarrah forest and areas of heavy lateritic outcrops and gravels.
- **Whicher Subsystem, midslopes and valleys** (mapped as 2 systems by Environmental Survey and Management Pty Ltd, 1999) has extensive areas of gentle slopes and open jarrah forest. The major difference between the midslopes and valleys is possibly the valleys staying wetter later in the season.

Mattiske and Havel (1999) define the three vegetation complexes associated with these soils as below.

- **Kingia Vegetation Complex:** Open forest of *Eucalyptus marginata* subsp. *marginata* – *Corymbia calophylla* – *Allocasuarina fraseriana* – *Banksia grandis* – *Xylomelum occidentale* on lateritised uplands in perhumid and humid zones.

- **Whicher Scarp Vegetation Complex:** Open forest of *Eucalyptus marginata* subsp. *marginata* – *Corymbia calophylla* on escarpment with some *Corymbia haemotoxylon*, *Banksia attenuata* and *Xylomelum occidentale* in the humid zone.
- **Whicher Scarp Vegetation Complex (Valleys):** Open forest of *Eucalyptus marginata* subsp. *marginata* - *Corymbia calophylla* with some *Xylomelum occidentale* on valleys dissecting escarpment in the humid zone.

The above three complexes were located in the area during the survey as indicated in Appendix B, Figure 3. The Whicher Scarp Vegetation Complex occurred as a small area only along the north eastern boundary; Whicher Scarp Vegetation Complex (Valleys) occurred along the creek but the Kingia Vegetation Complex (KI(1) of Environmental Survey and Management Pty Ltd, 1999) was the dominant vegetation complex.

Environmental Survey and Management Pty Ltd (1999) listed species strongly associated with each of the vegetation complexes and by reference to these and to the descriptions given by Matiske and Havel (1999) the above vegetation complexes were determined.

## 4.2 CONDITION OF VEGETATION COMPLEXES

Environmental Survey and Management Pty Ltd (1999) used the scale devised by Trudgen and outlined in Figure 4 in Appendix B of this report. The condition of the study area had been influenced by human activities through clearing especially of the lower sandy areas, however most of the rocky areas remained in good to excellent condition. The same method as applied by Environmental Survey and Management Pty Ltd (1999) was used. In this report the species richness of the understorey and structural diversity were considered important attributes while the alteration to the upper storey was given less importance.

The condition is mapped in Appendix B, Figure 4. Pristine areas included most of the Kingia Vegetation Complex and Whicher Scarp Vegetation Complex, the Very Good was the Whicher Scarp Vegetation Complex (Valleys) whilst the Good included part of the Kingia and Whicher Scarp Vegetation Complex. A section of the Kingia Vegetation Complex was classed as degraded due to the understorey being completely removed whilst the upper storey was still intact.

### 4.3 FLORA

As the survey was taken at a different time of year to that of the previous surveys an additional 62 flora species to those recorded by Environmental Survey and Management Pty Ltd (1999) are listed in Appendix A. Of these 15 were introduced species.

### 4.4 RARE AND PRIORITY FLORA

Additional populations of previously recorded Priority flora were recorded during this survey as indicated in Table 4.1. No additional rare or priority flora species were located. *Acacia mooreana* listed as Priority 2 flora (Environmental Survey and Management Pty Ltd, 1999) is no longer on the Department of Conservation and Land Management Priority Flora list (Western Australian Herbarium, 2000).

**Table 4.1 Location of Priority Flora**

<b>PLANT SPECIES</b>	<b>EASTING</b>	<b>NORTHING</b>
<i>Acacia flagelliformis</i>	50 380700	6287586
	50380618	6287733
	50 381832	6287365
<i>Boronia humifusa</i>	50 380700	6287586
	50380618	6287733
	50 381107	6287529
<i>Jacksonia sparsa</i>	50 380658	6287547
	50380914	6287212

### 4.5 INTRODUCED FLORA

Introduced flora was restricted to the degraded areas and the edges of native vegetation abutting these degraded areas. The 'track' into the site from Gavins Road had many introduced species along the edge and in the track itself. A small dam near the entrance had been planted with several exotic species none of which had spread into the surrounding areas. As recorded by Environmental Survey and Management Pty Ltd (1999) no aggressive colonisers were observed.

## 5. DISTRIBUTION OF DIEBACK

Dieback was assessed during the fieldwork by observing the condition of indicator species including *Banksia attenuata*, *B. grandis*, *Persoonia longifolia*, *Xanthorrhoea grandis*, *X. gracilis*, *Xylomelum occidentale* and *Isopogon sphaerocephalus*. A formal dieback survey by a qualified dieback interpreter was not undertaken, however field observations by an experienced botanist suggest that dieback is not present within the study area.

## 6. DISCUSSION

Three vegetation complexes were recorded from the site. Whicher Vegetation complex on sandy slopes; Whicher Vegetation complex in sandy valleys; and Kingia Vegetation complex on upland lateritic gravels. The vegetation condition ranged from pristine to completely degraded.

A section of the site is proposed as an overburden stockpile. It is recommended that this be established on the sandy ground along the current entrance track classified as very degraded (Appendix B, Figure 4) ensuring there is sufficient distance from the creek. However to acquire a sufficiently large area for the stockpile some of the good to pristine areas along this central corridor may need to be used. If this is required, there would still be sufficient of the pristine vegetation retained, including examples of all the vegetation complexes.

Preferably for the overburden stockpile the areas that should be used are those classified as very degraded or degraded, retaining the pristine areas in the north of the site for conservation purposes.

## 7. REFERENCES

Environmental Survey and Management Pty Ltd (1999) *Gwindinup Environmental Assessment, Landforms, Vegetation And Flora*. Unpublished report for Cable Sands (WA) Pty Ltd

Mattiske, E.M. and Havel, J.J. (1999) *Regional Forest Agreement Vegetation Complexes Collie Western Australia*. Environment Australia and Department of Conservation and Land Management

Western Australian Herbarium (2000). *MAX* Department of Conservation and Land Management

# **APPENDIX A**

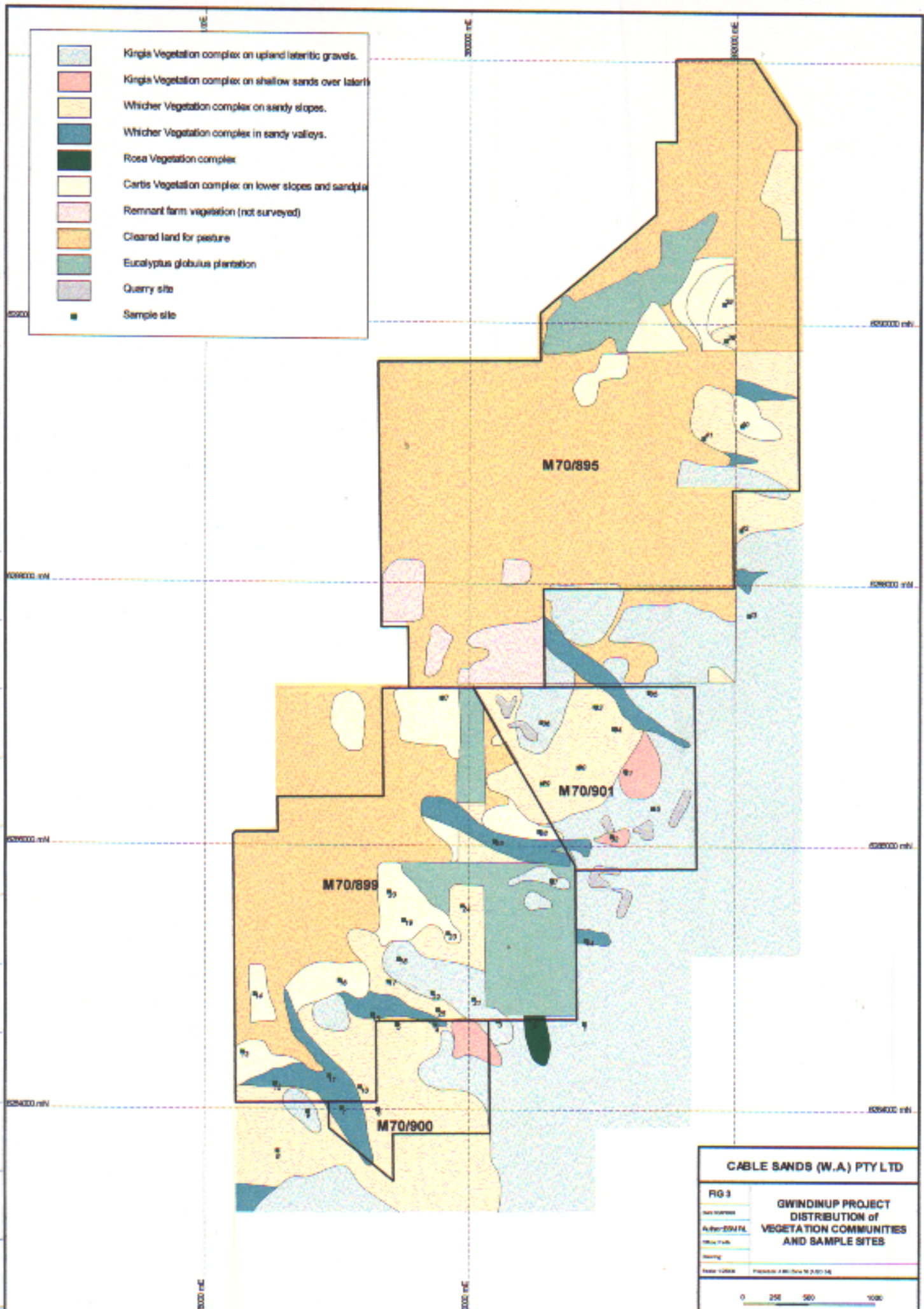
## **Additional Flora Species**

FAMILY	TAXON
ANTHERICACEAE	<i>Thysanotus manglesii</i>
APIACEAE	<i>Hydrocotyle callicarpa</i>
	<i>Trachymene pilosa</i>
ASTERACEAE	* <i>Arctotheca calendula</i>
	* <i>Cotula turbinata</i>
	* <i>Hypochaeris radicata</i>
	<i>Lagenifera huegelii</i>
	<i>Millotia</i> sp.
	<i>Quinetia urvillei</i>
	<i>Rhodanthe citrina</i>
	<i>Trichocline spathulatum</i>
	* <i>Ursinia anthemoides</i>
CYPERACEAE	<i>Tetraria octandra</i>
DILLENIAEAE	<i>Hibbertia cunninghamii</i>
DROSERACEAE	<i>Drosera glanduligera</i>
DROSERACEAE	<i>Drosera menziesii</i>
	<i>Drosera stolonifera</i>
EPACRIDACEAE	<i>Astroloma ciliatum</i>
EUPHORBIACEAE	<i>Monotaxia grandiflora</i>
GERANIACEAE	* <i>Erodium botrys</i>
GOODENIACEAE	<i>Lechenaultia biloba</i>
	<i>Scaevola calliptera</i>
HAEMODORACEAE	<i>Haemodorum paniculatum</i>
JUNCACEAE	<i>Luzula meridionalis</i>
LINDSAEACEAE	<i>Lindsaea linearis</i>
LOGANIACEAE	<i>Logania serpyllifolia</i>
ORCHIDACEAE	<i>Caladenia attingens</i> subsp. <i>atingens</i>
	<i>Caladenia macrostylis</i>
	<i>Diruis longifolia</i>
	<i>Microtis media</i> subsp. <i>media</i>
	* <i>Monadenia bracteata</i>
	<i>Pyrorchis nigricans</i>
	<i>Thelymitra mucida</i>
	<i>Thelymitra ? antennifera</i>
PAPILIONACEAE	<i>Daviesia cordata</i>
	<i>Daviesia hakeoides</i>
	<i>Daviesia horrida</i>
	<i>Daviesia incrassata</i>
	* <i>Lotus suaveolens</i>
	* <i>Trifolium repens</i>
	* <i>Trifolium subterraneum</i>
PITTIOSPORACEAE	<i>Billardiera variifolia</i>
	<i>Pronaya elegans</i>
POACEAE	* <i>Aira caryophyllea</i>
	* <i>Briza minor</i>
	* <i>Ehrharta longiflora</i>
	* <i>Hordeum vulgare</i>
	* <i>Lolium perenne</i>

<b>FAMILY</b>	<b>TAXON</b>
POACEAE (cont.)	<i>Neurachne alopecuroidea</i> <i>*Vulpia myuros</i>
PROTEACEAE	<i>Hakea cyclocarpa</i> <i>Hakea prostrata</i> <i>Hakea stenocarpa</i> <i>Petrophile linearis</i> <i>Synaphaea damopsis</i>
STACKHOUSIACEAE	<i>Stackhousia pubescens</i>
STYLIDACEAE	<i>Stylidium brunonis</i> <i>Stylidium amoenum</i> <i>Stylidium calcaratum</i> <i>Stylidium schoenoides</i>
THYMELAEACEAE	<i>Pimelea suaveolens</i>
VIOLACEAE	<i>Hybanthus cymulosus</i>

# **APPENDIX B**

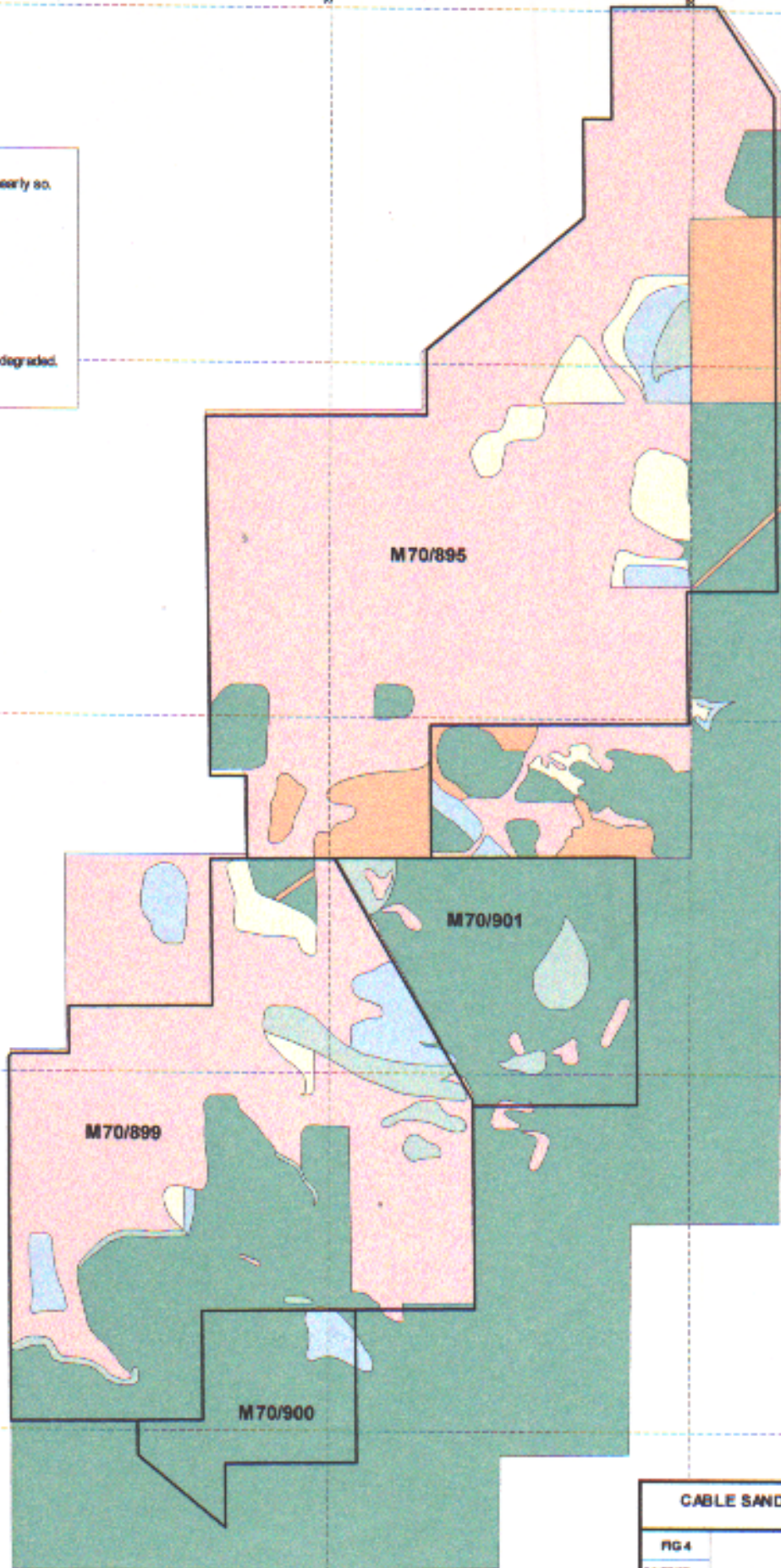
## **Vegetation Communities and Vegetation Condition Maps**



**CABLE SANDS (W.A.) PTY LTD**

**FIG 3**  
**GWINDUP PROJECT**  
**DISTRIBUTION OF**  
**VEGETATION COMMUNITIES**  
**AND SAMPLE SITES**





<b>CABLE SANDS (W.A.) PTY LTD</b>	
<b>FIG 4</b> Date: 20/10/09 Author: BSM/PL Check: PLP Drawing: Scale: 1:5000      Projection: AHD Zone 5014 20 04	<b>GWINDINUP PROJECT VEGETATION CONDITION</b>