

**ECOLOGICAL ASSESSMENT – PROPOSED METEOROLOGICAL MASTS
MODIFICATION TO APPROVED TARALGA WIND FARM
CONSIDERATION OF OE&H SUBMISSION**

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1. INTRODUCTION

This report concerns the proposal to construct 13 meteorological masts on the Taralga Wind Farm. Eight (8) masts would be permanent while five (5), located on already approved sites for wind turbine towers, are temporary. Following our previous report, a submission from the OE&H to the proposed project modifications sought more detailed information on the grassland on the proposed sites. Additional surveys were thus undertaken to record the grassland type on each of the eight permanent sites, including checking those sites already surveyed for the five approved turbines.

2. THE SURVEY

All of the 13 sites were visited on 14 October 2013 and a plant survey was completed at each location. The sites were located by GPS equipment. The five locations for the approved turbines were already pegged and numbered. The exact locations for each mast were thus surveyed.

At each new location, i.e. permanent mast sites, all native and exotic plant species were recorded in an area of 33 metres by 33 metres (0.1 hectare); this is the size of the area to be surveyed under the Commonwealth guidelines (Dept. Environment and Heritage 2006; updated by DECCW NSW 2010). The survey area was centred on the GPS point. A percentage cover score was assigned to each plant species; see survey sheets at **Appendix 1** for range of scores. The grassland between the mast site and the nearest approved turbine location was also surveyed, as a power cable is required between the two.

At the approved turbine sites, notes were made of the grassland. At these sites, the temporary mast will be constructed on the site of the pad for the turbine so will have no more impact than the turbines to be built later. The surrounding grassland was checked because three (3) guy ropes are required for each mast, 80 metres from the mast location to the north, southwest and southeast.

3. RESULTS

The results of the grassland surveys on the eight new sites were recorded on *pro forma* survey sheets developed by the consultant for such surveys; these survey sheets are provided in **Appendix 1**. There is also a photograph of each site and a plan showing the location of the site in relation to nearby approved turbine sites. Those plans also show the cable route to the nearest turbine location and the 1,000 square metre survey plot on each mast site (in red). Also in the appendix are the notes from the five temporary mast sites.

One problem with the surveys was that the paddocks were so heavily grazed by sheep and cattle that individual species of grass were difficult to identify with certainty. Given the definition quoted by OE&H in their submission and followed here, this is not critical in identifying native grassland or the condition of that grassland. Many paddocks support a good cover of native grasses; it is the presence of a reasonable number of non-grass native plant species (forbs) that determine its quality and whether it meets the criteria for an EEC.

Permanent Mast Sites

The results of the surveys at the permanent mast sites are summarised in **Table 1**. None of the sites meet the minimum criteria for derived native grassland as defined by the Commonwealth and as referred to in the OE&H submission.

Table 1
Summary of Plant Surveys at Permanent Mast Sites

<i>No.¹</i>	<i>No. natives</i>		<i>No.</i>	<i>Grassland</i>	<i>Original</i>	<i>EEC</i>
	<i>forbs</i>	<i>total</i>	<i>Exotics</i>	<i>Type</i>	<i>Community</i>	
SD1	1	3	14+	exotic grassland	Snow Gum Woodland	no
SD2	9	14	20	native pasture ²	Snow Gum Woodland (?)	no
SD3	3	6	15+	exotic grassland	Tablelands Basalt Forest	no
SD4	0	0	12	exotic grassland	Tablelands Basalt Forest	no
SD5	3	5	11	native pasture ²	Tablelands Basalt Forest	no
MET28	2	4	7	native pasture ²	Tablelands Basalt Forest	no
MET4243	1	1	11	exotic grassland	Tablelands Basalt Forest	no
MET4546	2	5	17	exotic grassland	Tablelands Basalt Forest	no

1. Note that the general area was also investigated as three guy rope anchors are required.

2. Depending upon the definition used, this could be native grassland or native pasture.

Temporary Mast Sites

The results of the surveys at the temporary mast sites are summarised in **Table 2**. These sites have been surveyed in the past and have received approval for the construction of wind turbines. None of the sites meet the minimum criteria for derived native grassland as defined by the Commonwealth and as referred to in the OE&H submission.

Table 2
Summary of Plant Surveys at Temporary Mast Sites

No.¹ (turbine no)	Grassland Type	Original Community	EEC
MET SC28 (T28)	native pasture ²	Tablelands Basalt Forest	no
MET SC42 (T42)	exotic grassland	Tablelands Basalt Forest	no
MET SC43 (T43)	exotic grassland	Tablelands Basalt Forest	no
MET SC45 (T45)	exotic grassland	Tablelands Basalt Forest	no
MET SC46 (T46)	exotic grassland	Tablelands Basalt Forest	no

1. Note that the general area was also investigated as three guy rope anchors are required.
2. Depending upon the definition used, this could be native grassland or native pasture.

4. ASSESSMENT

The OE&H submission quotes the definition of native grassland as set out by the Commonwealth for the Box-Gum Woodland community (Dept. Environment and Heritage 2006; updated by DECCW NSW 2010). This is a useful definition and we use it here. Their submission states:

“... a patch must have a predominantly native understorey. A predominantly native understorey is defined as having 50% of the perennial vegetation cover in the ground cover made up of native species. This means that 50% of the plant cover rather than 50% of the species. ... This community should also contain at least 12 native understorey species (such as forbs, shrubs, ferns, grasses and sedges). At least one of the understorey species should be an important species (e.g. grazing-sensitive, regionally significant or uncommon species; such as Kangaroo Grass or orchids) in order to indicate a reasonable condition.

This definition is extracted from the Commonwealth document *White Box-Yellow Box-Blakely's Red Gum grassy woodlands and derived native grasslands* (Dept. Environment and Heritage 2006; updated by DECCW NSW 2010). There is some misquoting, however, in that grasses are not to be included in the 12 native understorey species and one ‘important species’ must be present (flow chart provided in the above documents). The documents also state that a predominantly native understorey has at least 50 percent perennial native vegetation, rather than native species *per se*.

None of the grassland at the sites is of a condition that makes it derived native grassland of a quality that reaches the minimum set for an EEC. In fact, of the eight sites, five sites are exotic grassland and two additional sites were probably never an EEC in the first place (sites SD1 and SD2). All paddocks have been pasture improved; i.e. fertilised and sown with pasture species, such as Subterranean Clover.

The grassland sites were also assessed using the method in the document issued by the NSW Dept. of Environment and Climate Change (now OE&H) and prepared by Rehwinkel (2007) titled *A Method to Assess Grassy Ecosystem Sites: Using floristic information to assess a site's quality*. Employing this method, the grassland at all sites was found to be of very low quality. All sites except SD2 received a score of 0; SD2 receives a score of only 1.

5. CONCLUSION

None of the grassland at the sites for the proposed masts, both permanent and temporary, meets the minimum criteria as an EEC, i.e. Tablelands Basalt Forest. This includes the anchors points for the three guy ropes at each mast site, which in each case supports the same quality grassland or grassland of lower quality.

It is obvious from these results that the habitat value of the sites for native fauna is negligible and is of no importance to any species, including threatened species.

Given the very poor quality of the sites and the lack of any listed species or community, no assessment of significance as provided for under the NSW *Threatened Species Conservation Act 1995* is required.

6. REFERENCES

Department of Environment and Heritage (2006). *White Box-Yellow Box-Blakely's Red Gum grassy woodlands and derived native grasslands*. The Department, Canberra.

Rehwinkel, R. (2007). *A Method to Assess Grassy Ecosystem Sites: Using floristic information to assess a site's quality*. NSW Dept. of Environment and Climate Change (now OE&H), Queanbeyan.

APPENDIX 1

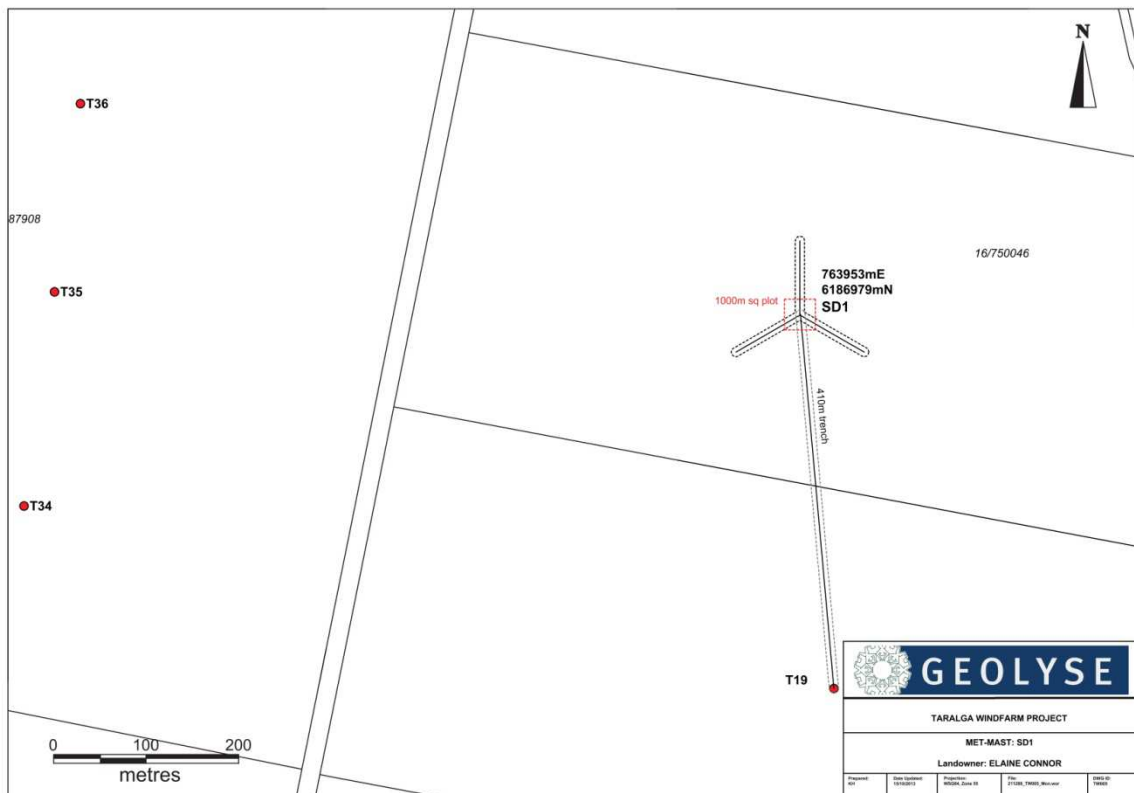
SURVEY SHEETS FOR THE EIGHT PERMANENT MAST SITES

Survey Sheet - Vegetation Plot		Plot Size: 33m x 33m		Kevin Mills & Associates	
Site Name: Taralga Wind Farm			Plot No. SD1		Photo: yes
Location: Proposed met. mast no SD1				Recorder: K. Mills	
Date: 14 / 10 /13		Community: Native Pasture or Native Grassland			
GPS (centre): 763953E, 6186 979N (WGS84, Z55)			Soil: Clayey and rocky		
Land Tenure: Freehold			Geology: Basalt		
Slope: Level		Aspect: East		Topography: Broad ridge	
Species Cover: 1:<5% (uncommon); 2:<5% (common), 3:5-25%; 4:25-50%; 5:50-75%; 6:75-100%.					
Natives			Exotics		
Microlaena stipoides		5	Acetosella vulgaris		1
Poa labillardieri		1	Bromus mollis		1
Rumex ? brownii		1	Carthamus lanatus		2
			Cerastium fontanum		1
Notes			Grasses		3
Previously Eucalyptus pauciflora			Holcus lanatus ?		1
Woodland.			Hypochaeris radicata		1
			Lolium sp.		1
			Melilotis sp.		1
			Silybum marianum		1
			Trifolium ? arvense		1
			Trifolium repens		1
			Unknown herb		1
			Trifolium subterraneum		2

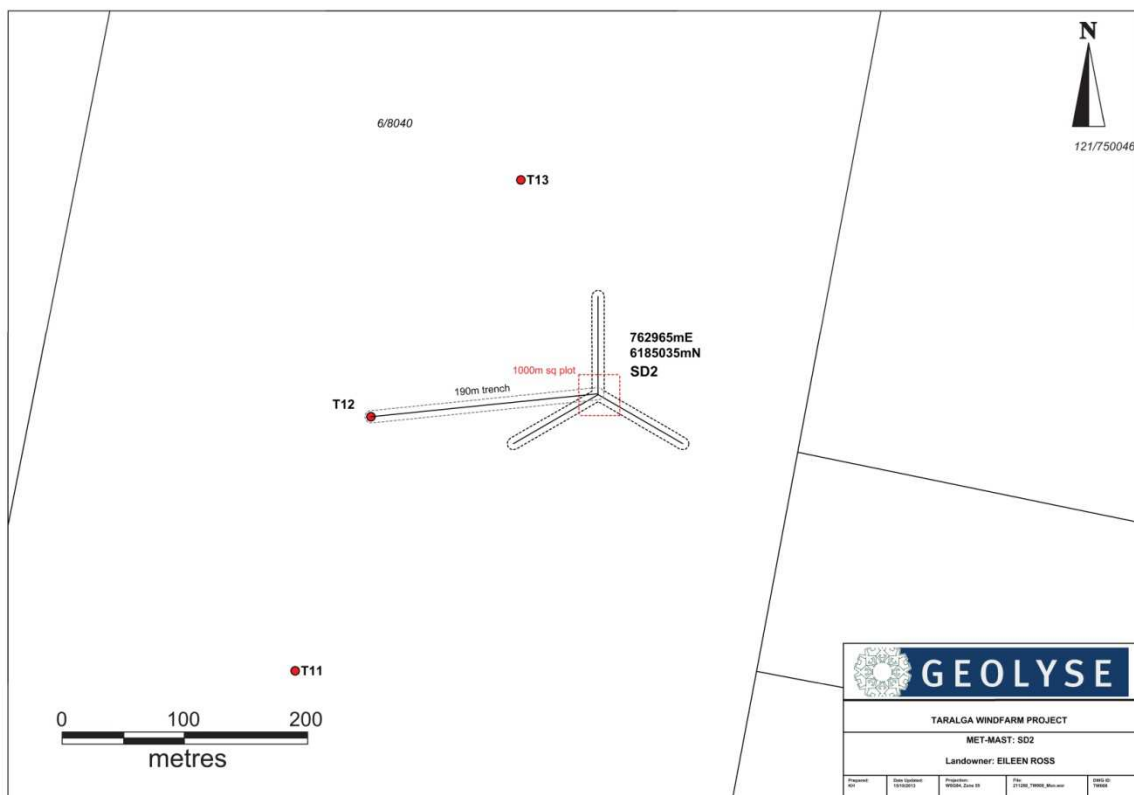


Survey Sheet - Vegetation Plot		Plot Size: 33m x 33m		Kevin Mills & Associates	
Site Name: Taralga Wind Farm			Plot No. SD2		Photo: yes
Location: Proposed met. mast no SD2				Recorder: K. Mills	
Date: 14 / 10 / 13		Community: Native Pasture or native grassland			
GPS (centre): 762965E 6185035N (WGS84, Z55)			Soil: Clayey and rocky		
Land Tenure: Freehold			Geology: Basalt		
Slope: Level		Aspect: North		Topography: Broad ridge crest	
Species Cover: 1:<5% (uncommon); 2:<5% (common), 3:5-25%; 4:25-50%; 5:50-75%; 6:75-100%.					
Natives			Exotics		
Acaena sp.	1	Acetosella vulgaris		2	
Asperula conferta	2	Bromus mollis		2	
Austrodanthonia sp.	3	Centaureum erythraea		1	
Bothriochloa macra	3	Carduus nutans		1	
Chrysocephalum apiculatum	1	Carthamus lanatus		3	
Convolvulus erubescens	1	Cerastium fontanum		1	
Crassula sieberiana	1	Crataegus monogyna		1	
Cyperus inversa	1	Erodium sp.		1	
Geranium sp.	1	Gamochaeta sp. 1		1	
Microlaena stipoides	2	Gamochaeta sp. 2		1	
Poa sieberiana	1	Grasses		2	
Scleranthus sp.	1	Hypochaeris radicata		1	
Solenogyne gunnii	1	Lolium sp.		1	
Themeda australis	3	Melilotis sp.		2	
Notes		Petrorhagia nanteuillii		1	
Heavily grazed; probably		Plantago lanceolata		2	
Eucalyptus pauciflora woodland		Poa bulbosa		2	
as it is on a similar topographic.		Rubus fruticosus		1	
location to SD1		Trifolium repens		1	
		Rosa rubiginosa		1	





Location of site SD1.



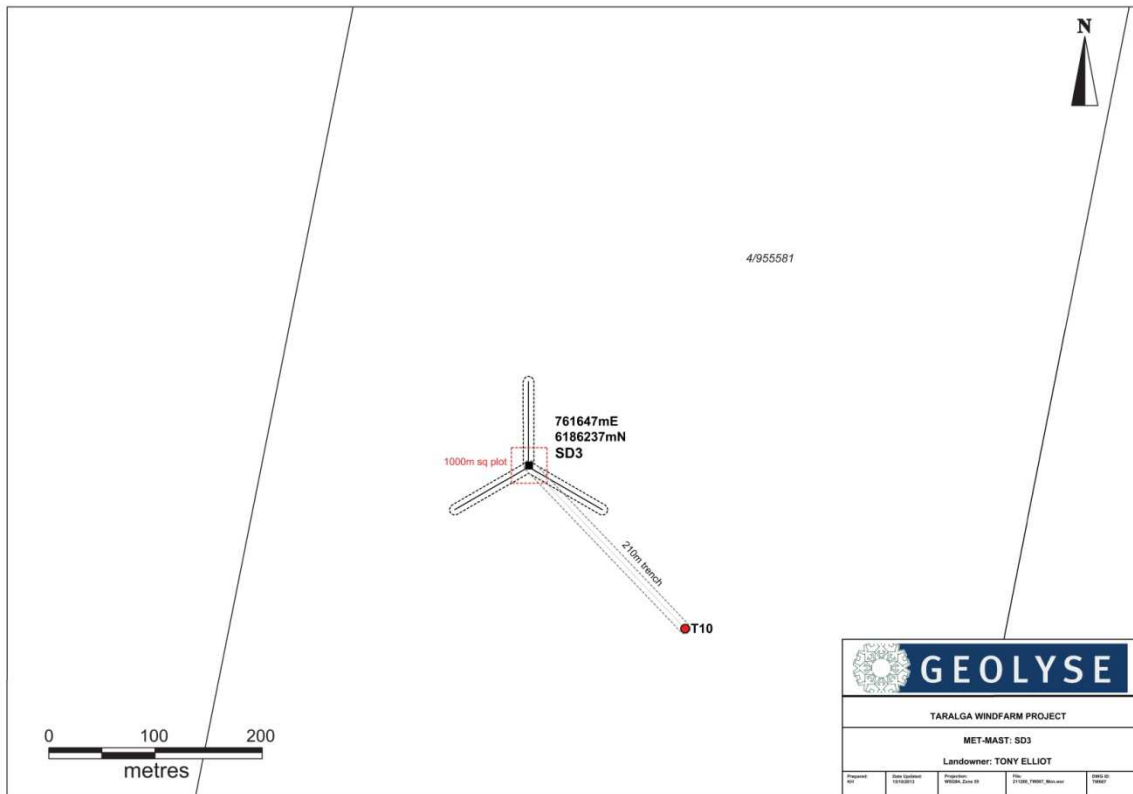
Location of site SD2.

Survey Sheet - Vegetation Plot		Plot Size: 33m x 33m		Kevin Mills & Associates		
Site Name: Taralga Wind Farm			Plot No. SD3		Photo: yes	
Location: Proposed met. mast no SD3				Recorder: K. Mills		
Date: 14 / 10 / 13		Community: Exotic Grassland/Native Pasture				
GPS (centre): 761647E, 6186237N (WGS84, Z55)			Soil: Clayey and rocky			
Land Tenure: Freehold			Geology: Basalt			
Slope: Level		Aspect: North		Topography: Broad ridge crest		
Species Cover: 1:<5% (uncommon); 2:<5% (common), 3:5-25%; 4:25-50%; 5:50-75%; 6:75-100%.						
Natives			Exotics			
Asperula conferta		1		Acetosella vulgaris		2
Austrodanthonia sp.		1		Bromus mollis		3
Crassula sieberiana		1		Carduus nutans		1
Dichondra repens		1		Carthamus lanatus		3
Microlaena stipoides		1		Erodium sp.		1
Poa sieberiana		1		Grasses		4
Notes				Hypochaeris radicata		1
Heavily grazed;				Lolium sp.		1
previously Tablelands Basalt Forest.				Melilotis sp.		1
				Petrorhagia nanteuillii		1
				Paronychia brasiliensis		1
				Plantago lanceolata		1
				Trifolium repens		1
				Trifolium subterraneum		4

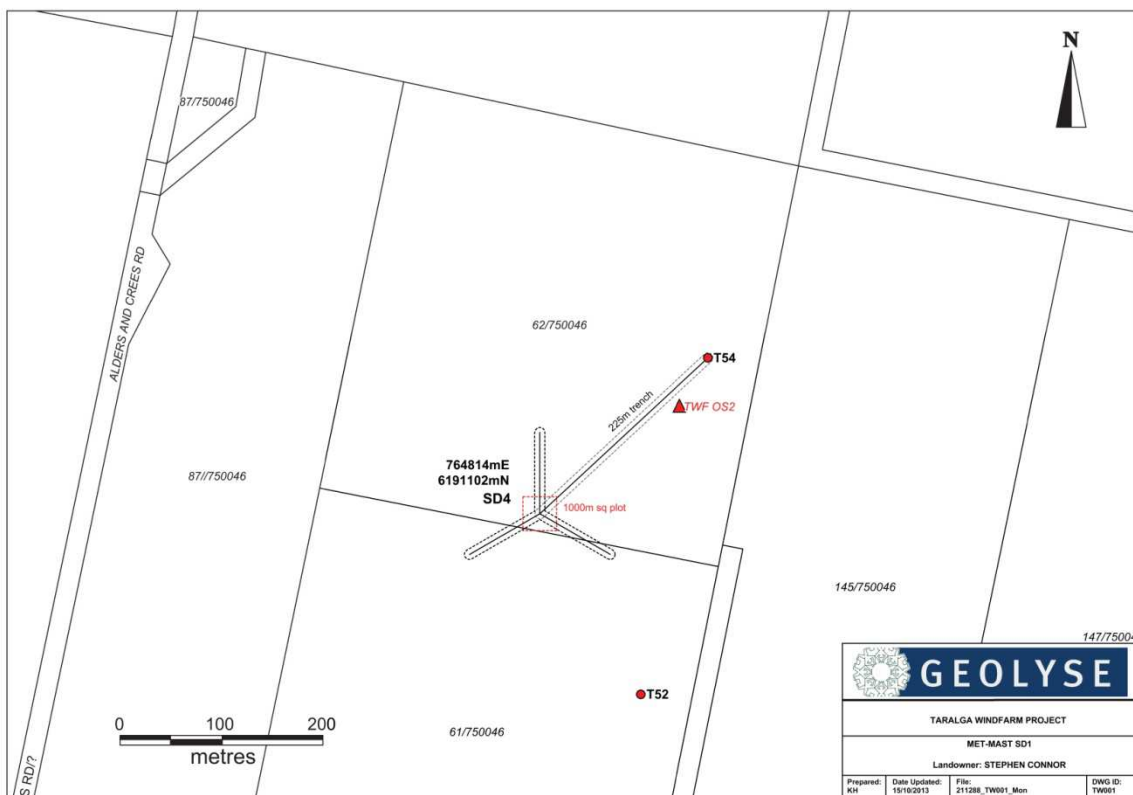


Survey Sheet - Vegetation Plot		Plot Size: 33m x 33m		Kevin Mills & Associates	
Site Name: Taralga Wind Farm			Plot No. SD4		Photo: yes
Location: Proposed met. mast no				Recorder: K. Mills	
Date: 14 / 10 /13		Community: Exotic Grassland			
GPS (centre): 764814E, 6191102N (WGS84, Z55)			Soil: Clayey and rocky		
Land Tenure: Freehold			Geology: Basalt		
Slope: Level		Aspect: North		Topography: Broad ridge crest	
Species Cover: 1:<5% (uncommon); 2:<5% (common), 3:5-25%; 4:25-50%; 5:50-75%; 6:75-100%.					
Natives			Exotics		
nil			Acetosella vulgaris		
			Carthamus lanatus		3
			Cerastium fontanum		1
			Erodium sp.		1
Notes			Hirschfeldia incana		1
Pasture improved; sown and			Hordeum sp.		3
fertilised; very heavily grazed;			Lolium sp. ?		3
previously Tablelands Basalt Forest			Onopordium acanthium		1
			Paronychia brasiliensis		1
			Poa bulbosa		2
			Unknown herb		1
			Sheperds purse		1
			Trifolium subterraneum		4





Location of site SD3.



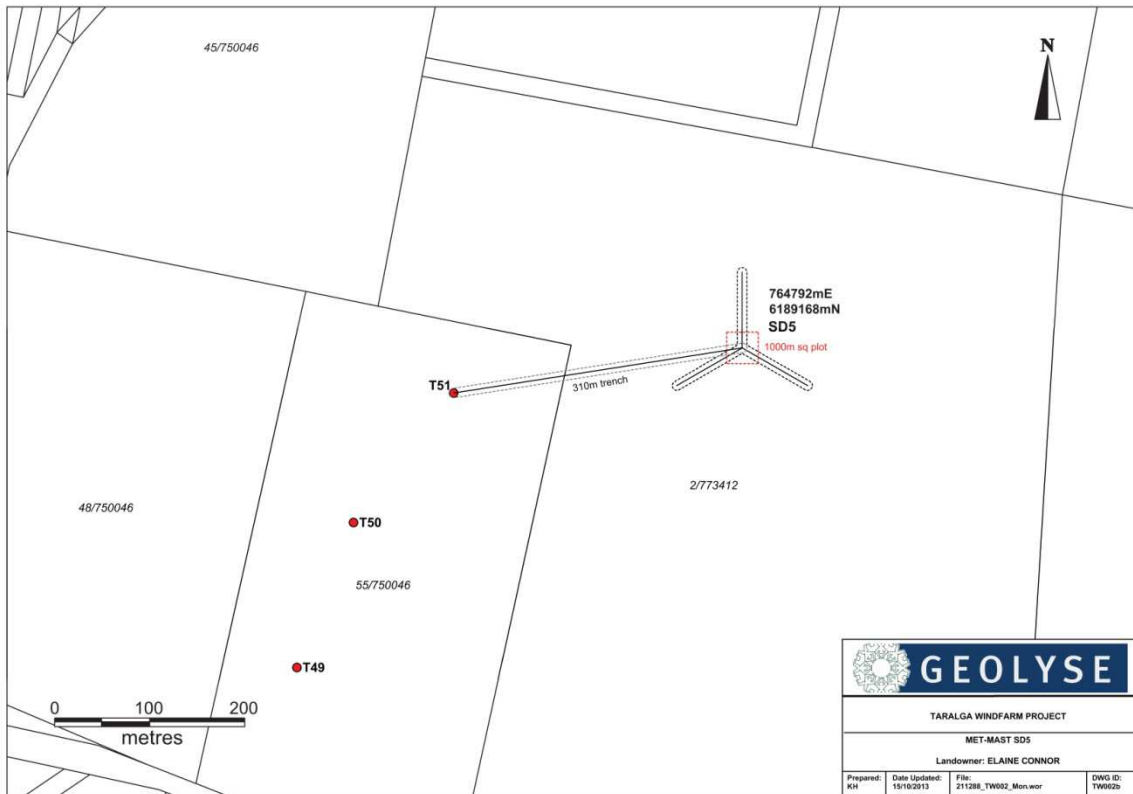
Location of site SD4.

Survey Sheet - Vegetation Plot		Plot Size: 33m x 33m		Kevin Mills & Associates	
Site Name: Taralga Wind Farm			Plot No. SD5		Photo: yes
Location: Proposed met. mast no SD5				Recorder: K. Mills	
Date: 14 / 10 /13		Community: Native Pasture or Native Grassland			
GPS (centre): 764792E 6189168N (WGS84, Z55)			Soil: Clayey and rocky		
Land Tenure: Freehold			Geology: Basalt		
Slope: Level		Aspect: North		Topography: Broad ridge crest	
Species Cover: 1:<5% (uncommon); 2:<5% (common), 3:5-25%; 4:25-50%; 5:50-75%; 6:75-100%.					
Natives			Exotics		
Hydrocotyle laxiflora		2	Acetosella vulgaris		2
Microlaena stipoides		5	Bromus mollis		1
Poa labillardieri		1	Carthamus lanatus		1
Pteridium esculentum		3	Cirsium vulgare		1
Stellaria pungens		2	Erodium sp.		1
			Holcus lanatus ?		1
Notes			Lolium sp.		1
Pasture improved;			Onopordium acanthium		1
previously Tablelands Basalt Forest			Trifolium repens		1
			Trifolium subterraneum		3
			Urtica urens		1

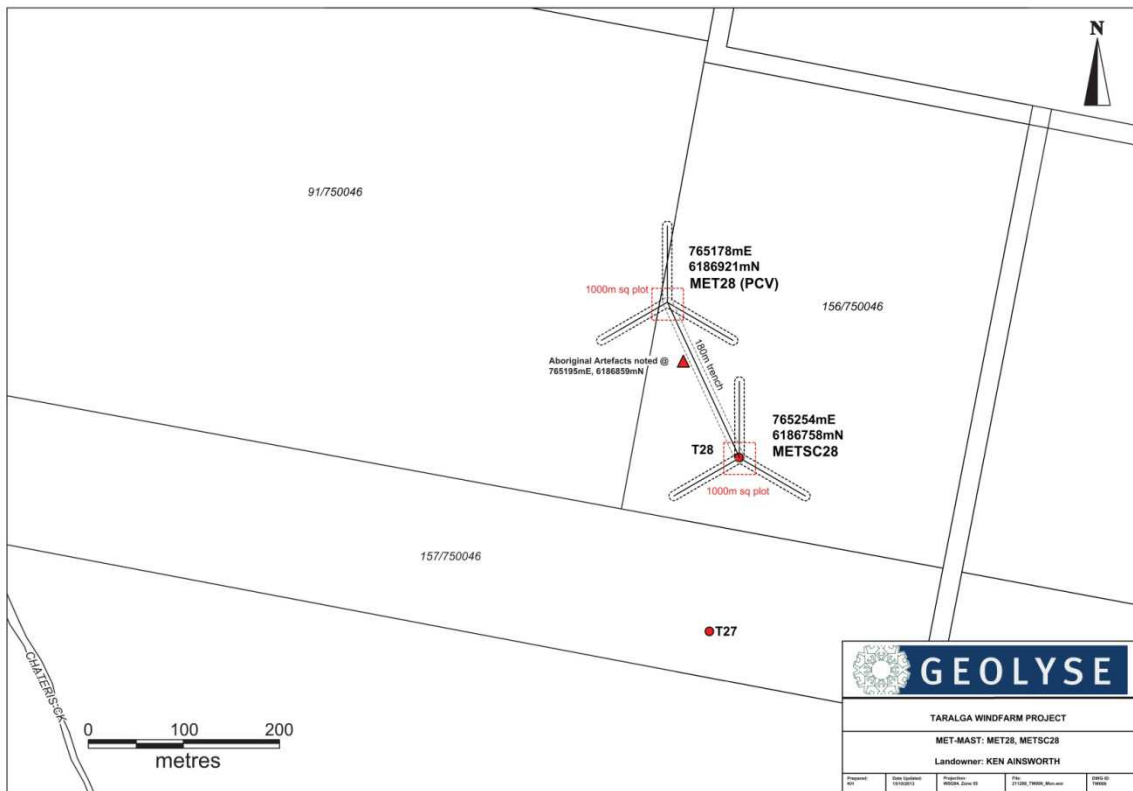


Survey Sheet - Vegetation Plot		Plot Size: 33m x 33m Kevin Mills & Associates	
Site Name: Taralga Wind Farm		Plot No. MET28	Photo: yes
Location: Proposed met. mast no MET28			Recorder: K. Mills
Date: 14 / 10 /13	Community: Native Pasture or Native grassland		
GPS (centre): 765178E, 6186921N (WGS84, Z55)		Soil: Clayey and rocky	
Land Tenure: Freehold		Geology: Basalt	
Slope: Level	Aspect: North	Topography: Broad ridge crest	
Species Cover: 1:<5% (uncommon); 2:<5% (common), 3:5-25%; 4:25-50%; 5:50-75%; 6:75-100%.			
Natives		Exotics	
Hydrocotyle laxiflora	1	Acetosella vulgaris	2
Microlaena stipoides	5	Hypochaeris radicata	1
Poa labillardieri	1	Lolium sp.	1
Pteridium esculentum	1	Melilotis sp.	1
Notes		Sonhus oleaceus	1
Pasture improved; heavily grazed;		Trifolium subterraneum	3
previously Tablelands Basalt Forest.		Unknown herb	1





Location of site SD5.



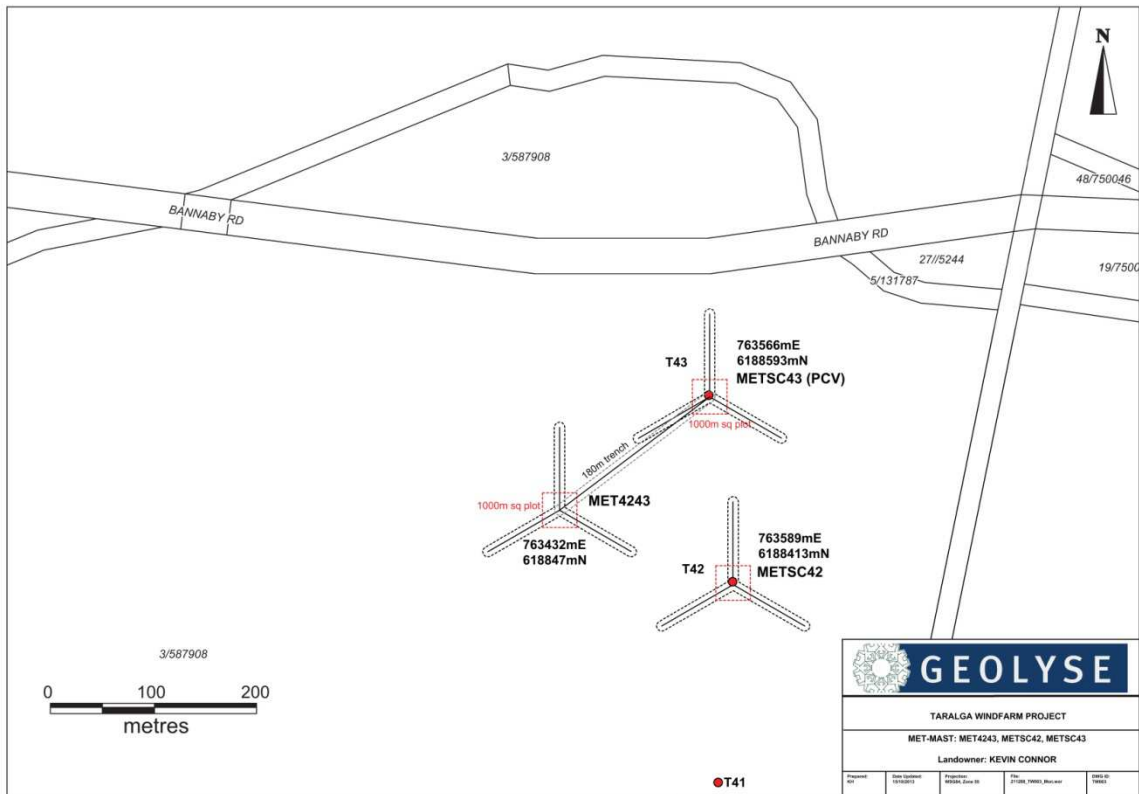
Location of site MET28 and METSC28.

Survey Sheet - Vegetation Plot		Plot Size: 33m x 33m		Kevin Mills & Associates			
Site Name: Taralga Wind Farm			Plot No.		MET4243	Photo: yes	
Location: Proposed met. mast no MET4243					Recorder: K. Mills		
Date: 14 / 10 /13		Community: Exotic Grassland					
GPS (centre): 763432E, 6188473N (WGS84, Z55)				Soil: Clayey and rocky			
Land Tenure: Freehold				Geology: Basalt			
Slope: Level		Aspect: North		Topography: Broad ridge crest			
Species Cover: 1:<5% (uncommon); 2:<5% (common), 3:5-25%; 4:25-50%; 5:50-75%; 6:75-100%.							
Natives				Exotics			
Rumex ? brownii		1		Acetosella vulgaris		1	
				Bromus mollis		1	
Notes				Carthamus lanatus		3	
Pasture improved; heavily grazed;				Erodium sp.		2	
sheep camp.; previously				Hordeum sp.		3	
Tablelands Basalt Forest.				Melilotis sp.		1	
				Paronychia brasiliensis		1	
				Poa bulbosa		1	
				Trifolium repens		1	
				Trifolium subterraneum		2	
				Unknown herb		1	

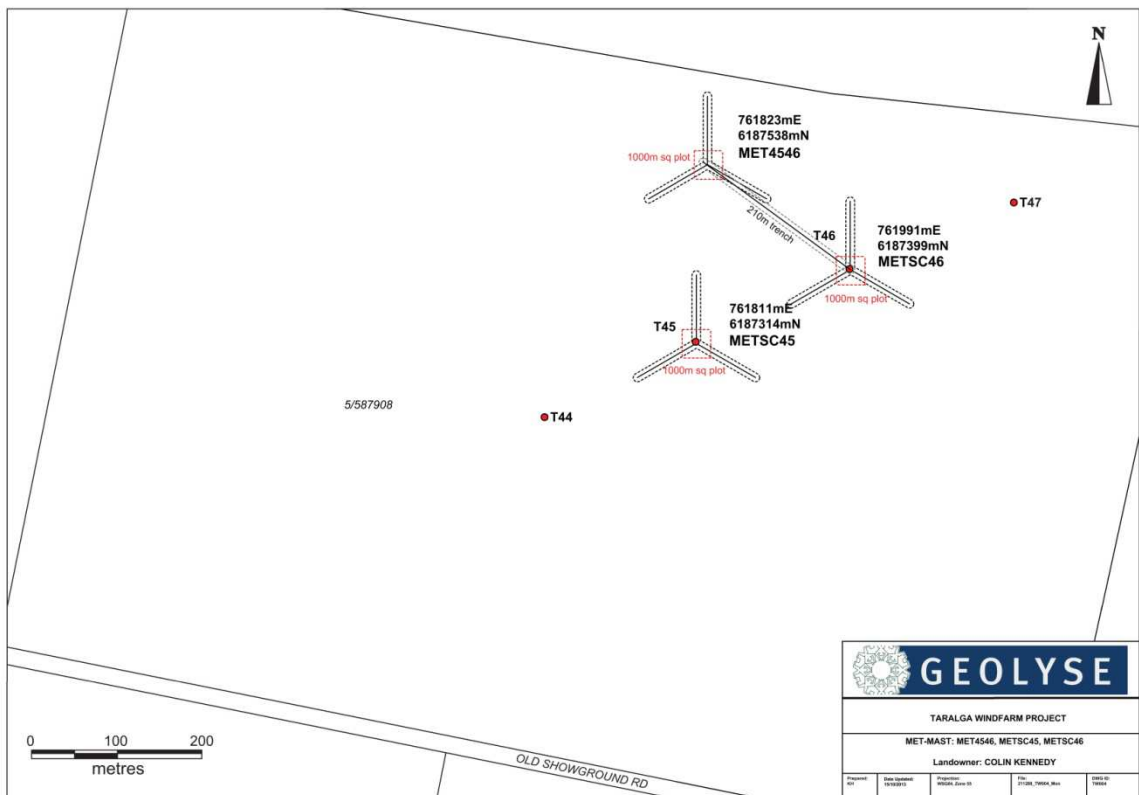


Survey Sheet - Vegetation Plot		Plot Size: 33m x 33m		Kevin Mills & Associates			
Site Name: Taralga Wind Farm			Plot No.		MET4546	Photo: yes	
Location: Proposed met. mast no MET4546					Recorder: K. Mills		
Date: 14 / 10 /13		Community: Exotic Grassland					
GPS (centre): 761823E 6187538N (WGS84, Z55)			Soil: Clayey and rocky				
Land Tenure: Freehold			Geology: Basalt				
Slope: Level		Aspect: North		Topography: Broad ridge crest			
Species Cover: 1:<5% (uncommon); 2:<5% (common), 3:5-25%; 4:25-50%; 5:50-75%; 6:75-100%.							
Natives			Exotics				
Austrodanthonia sp.		1		Acetosella vulgaris		3	
Austrostipa sp.		1		Avena sp.		2	
Crassula sieberiana		1		Bromus mollis		3	
Microlaena stipoides		2		Carduus nutans		2	
Pteridium esculentum		1		Carthamus lanatus		1	
				Erodium sp.		1	
Notes				Silybum marianum		2	
Pasture improved; heavily grazed;				Hirschfeldia incana		1	
previously Tablelands Basalt Forest.				Hypochaeris radicata		1	
				Lolium sp.		2	
				Melilotis sp.		1	
				Poa bulbosa		1	
				Trifolium subterraneum		2	





Location of site MET4243, METSC42, and METSC43.



Location of site MET4546, METSC45 and METSC46.

Notes from the five temporary mast sites

MET SC28 (T28)

Type: native pasture

Original community: Tablelands Basalt Forest

Similar cover to site MET28, i.e. native pasture (or native grassland), dominant is *Microlaena stipoides*, with very few other natives present.

MET SC42 (T42)

Type: exotic grassland

Original community: Tablelands Basalt Forest

Same paddock and similar plant cover as MET 43, below. There are small patches of *Microlaena stipoides* in places.

MET SC43 (T43)

Type: exotic grassland

Original community: Tablelands Basalt Forest

The plant cover is heavily grazed by sheep and cattle and the paddock has been pasture improved. The dominant plants are the exotics – *Onopordium acanthium*, *Trifolium subterraneum*, *Hordeum* sp., *Carthamus lanatus*, plus various small pasture weeds. No natives seen.

MET SC45 (T45)

Type: exotic grassland

Original community: Tablelands Basalt Forest

Ground cover is exotic grassland, key species are sub clover, *Silybum marianum*, *Carduus nutans*, *Lolium* sp., *Acetosella vulgaris*. Thistles very dense in places.

MET SC46 (T46)

Type: exotic grassland

Original community: Tablelands Basalt Forest

An exotic grassland with abundant thistles; *Silybum marianum*, *Carthamus lanatus*, *Trifolium subterraneum*, *Onopordium acanthium*, *Carduus nutans*, various small exotic forbs.