

WIND MONITORING TOWER – MUSWELLBROOK

STATEMENT OF ENVIRONMENTAL EFFECTS

for Epuron Projects Pty Limited

26 March 2021



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1. INTRODUCTION

Epuron Projects Pty Limited (Epuron) is seeking development consent for the construction of a wind monitoring tower (the Development) near Bowmans Creek (see **Figure 1**). Epuron is investigating the suitability of the site for the development of a wind farm. The monitoring tower provides valuable data on the wind conditions in the area.

This Statement of Environmental Effects (SEE) supports an application for retrospective development consent for the Development under Section 4.12 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

2. DEVELOPMENT SITE

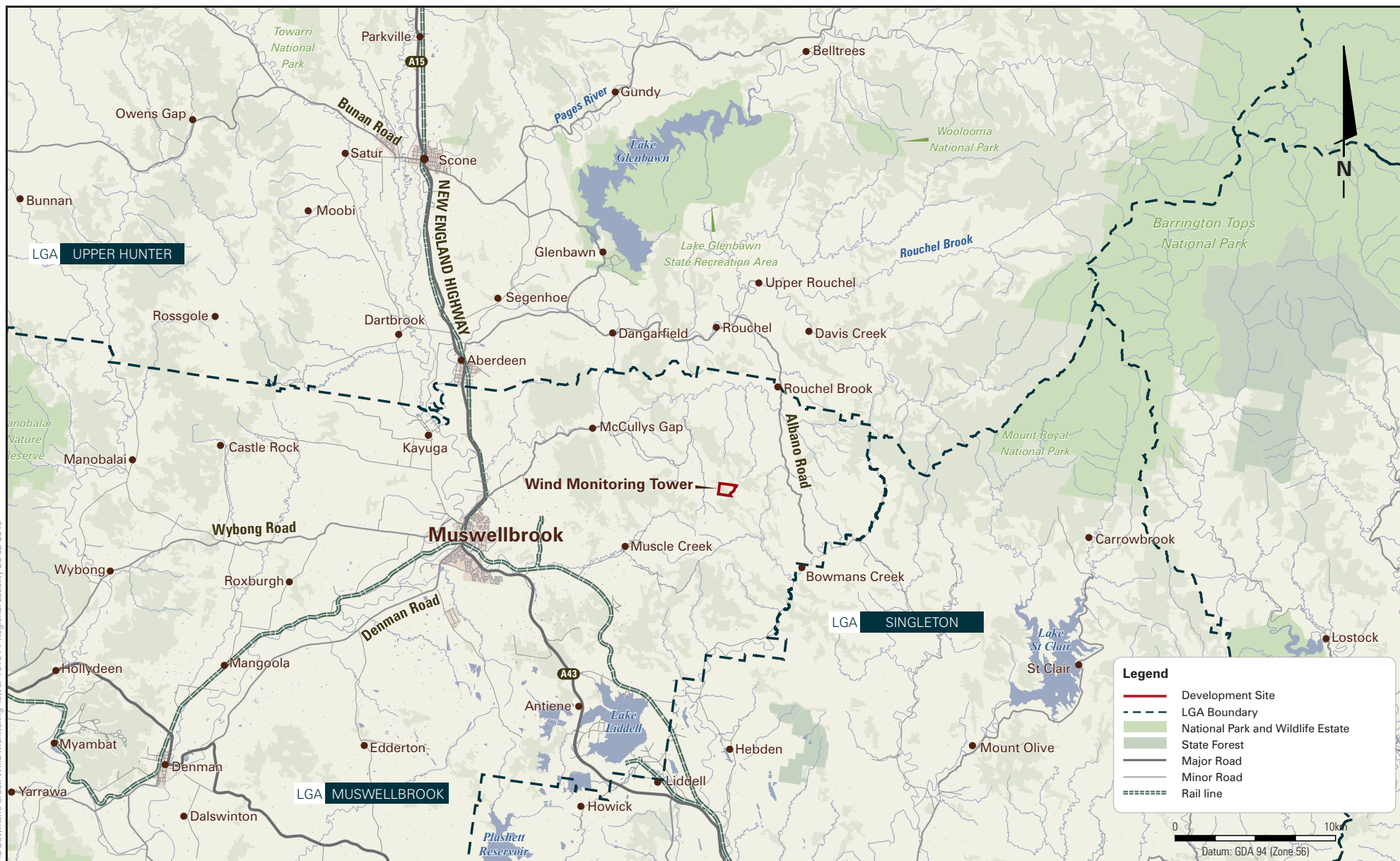
The Development is located on two rural lots (197/752444 and 199/752444) situated between Sandy Creek Road and Albano Road (see **Figure 2**). These two lots represent the Development Site.

The Development Site is zoned as RU1 Primary Production under the *Muswellbrook Local Environmental Plan 2009* (Muswellbrook LEP). The land is currently used for grazing.

The Development Site is located within the landscape known as the Scone – Gloucester Foothills. The elevation of this landscape generally ranges from 200 m to 600 m AHD. The elevation within the Development Site ranges from approximately 510 m to 680 m AHD.

The landscapes include extensive faulted carboniferous sandstone and pyroclastic, conglomerate, mudstone, lithic sandstone, some limestone and acid tuff. The soils are generally thin stony loams and red brown to yellow texture contrast soils with harsh subsoils in valleys (DECC, 2002).

The Development Site is located within the catchment of Sandy Creek, which is a tributary of the Hunter River. The main channel of Sandy Creek is located north west of the Development Site. Water drains towards Sandy Creek via Limestone Creek and its unnamed tributaries. The Bowmans Creek catchment is located immediately east of the Development Site.



BOWMANS CREEK WIND MONITORING TOWER

Regional Locality

FIGURE 1



BOWMANS CREEK WIND MONITORING TOWER

Site Layout

FIGURE 2

3. DESCRIPTION OF THE DEVELOPMENT

The monitoring tower consists of a steel lattice mast and supporting cables. The mast is less than 110 m in height and was installed on a concrete foundation. The mast is stabilised by a suite of tensioned cables (known as guy-wires). The guy-wires are attached to the mast at varying heights and to the ground at anchor footings located either 35 m or 70 m from the mast. The general design of the monitoring tower is illustrated in **Appendix A**.

To ensure its safety, the tower has been designed in accordance with the following Australian Standards:

- AS 3995 Design of steel lattice towers and masts; and
- AS/NZS 1170.2 Structural design actions Part 2: Wind actions.

The mast is fitted with instruments for measuring wind speed and direction, pressure and temperature. The mast is also equipped with a solar panel, lightning rod and data loggers. The mast and each of the guy-wire anchor points are contained within individual fences. The mast also is fitted with an anti-climb barrier.

3.1 CONSTRUCTION

The site of the monitoring tower is accessible via existing, unsealed access roads off Sandy Creek Road. No new access roads will be developed, although minor maintenance of existing tracks may be undertaken.

The foundation for the mast has a bearing capacity of at least 150 kPa. Loose materials such as topsoil and the upper strata will be excavated. A concrete slab of at least 100 mm thickness has been established as the foundation. The base plate of the mast will be fixed to the concrete foundation.

The pre-fabricated steel lattice sections are lifted into position using a gin-pole and winch and attached by construction personnel. The guy-wires and monitoring instruments are fitted during the mast assembling process.

Construction of the anchor footings involves the excavation of a small area. The anchoring device was installed into bedrock. The area is then backfilled and compacted to secure the anchor in place.

4. REGULATORY FRAMEWORK

4.1 PLANNING FRAMEWORK

4.1.1 EP&A Act

The EP&A Act is the principal legislative instrument governing development in NSW. The permissibility of developments is generally prescribed by Environmental Planning Instruments (EPIs) enacted under the EP&A Act. As explained in **Section 4.1.2** and **Section 4.1.3**, the Development is permissible with development consent.

The appropriate form of development application depends on whether the proposal is designated development. Designated development is defined under Section 4.10 of the EP&A Act as “*development that is declared to be designated development by an environmental planning instrument of the regulations*”.

Schedule 3 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) lists various classes of designated development. The Development does not conform to any of the classes of designated development under Schedule 3 of the EP&A Regulation. Given that the Development is not designated development, the appropriate form of application is a Development Application under Section 4.12 of the EP&A Act supported by an SEE.

4.1.2 Infrastructure SEPP

The monitoring tower is related to the potential establishment of a wind farm, which is classified as an “electricity generating work”. The development controls relevant to electricity generating works are outlined in *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP).

Clause 39 of the Infrastructure SEPP provides that a wind monitoring tower for assessing the feasibility of a wind farm is exempt development if it satisfies the following criteria:

- (i) *is erected in accordance with the manufacturer’s specifications, and*
- (ii) *has a height of not more than 110m, and*
- (iii) *is removed within 30 months after its erection is completed.*

The Development complies with the first two criteria. However, it has an operational lifespan of longer than 30 months and continues to provide valuable information for the Project. As such, the Development is not deemed to be exempt development. As it was installed more than 30 months ago it is now no longer exempt development.

Given that Clause 39 no longer applies, the relevant provision of the Infrastructure SEPP is Clause 34 which states that development for the purposes of electricity generating works is permissible with consent on any land in any prescribed rural, industrial or special use zone. The Development is on land within zone RU1 and is therefore permissible with development consent.

4.1.3 Muswellbrook LEP

The land use table in the Muswellbrook LEP lists the class of development that are permissible within each land zoning. The Muswellbrook LEP does not list ‘electricity generating works’ as a permissible class of development in zone RU1. That is, the Muswellbrook LEP is inconsistent with Clause 34 of the Infrastructure SEPP, which provides that ‘electricity generating works’ are permissible in any rural land zone.

Clause 1.9 of the Muswellbrook LEP states that the provisions of any SEPP will prevail over the LEP. Therefore, the Development is permissible with consent in zone RU1.

Part 4 of the Muswellbrook LEP outlines the principal development standards that apply within the Muswellbrook Local Government Area. In particular, Clause 4.3 of the Muswellbrook LEP imposes a height limitation for structures. The Development exceeds the designated maximum building height for the land on which it is located. Clause 4.6 of the Muswellbrook LEP provides that an application for a development contravening a development standard must be accompanied by a written request that justifies the contravention. A written request in accordance with Clause 4.6 is provided in **Appendix B**.

4.2 AVIATION SAFETY

Due to the height of the monitoring tower, the Commonwealth *Civil Aviation Safety Regulations 1998* (CAS Regulations) needs to be considered. Regulation 139.365 states that the Civil Aviation Safety Authority (CASA) must be notified of the construction of any structure with a height of greater than 110 m. Although the Development does not currently exceed this height threshold (as it has been reduced from the originally constructed 120 m to less than 110 m), Epuron notified CASA of the construction of the monitoring tower on 24 July 2018. CASA did not raise any issues that needed to be addressed in this SEE.

5. ENVIRONMENTAL IMPACTS

5.1 AIR QUALITY

The potential air quality impacts of the Development were assessed qualitatively using the following methodology:

- Identify the activities that may generate dust;
- Identify the nearest private receivers; and
- Qualitatively evaluate the magnitude of impact based on the scale of the activities, distance from the nearest private receivers and mitigating circumstances.

The construction phase for the Development has the potential to generate dust emissions for a short period. Dust emissions may arise as a result of ground disturbance or activities taking place on exposed ground. Sources of dust emissions during the construction phase may include:

- Vehicle movements along unsealed access roads;
- Excavation of the mast foundation and anchor pits; and
- Combustion of diesel fuels.

The construction site is accessible using existing access roads. No additional access roads are required to be cleared. Dust emissions due to vehicle movements along unsealed road can be reduced by controlling vehicle speeds.

The nearest private receiver is located a significant distance at approximately 3.4 km north-west of the mast. Other receivers are located at least 3.8 km south-west of the mast.

Earthworks are required for the construction of the mast foundation and anchor pits. These are relatively shallow excavations and can be undertaken using a small excavator or loader. Due to the small scale of the excavations and the significant distances to private receivers, the required earthworks are not expected to generate substantial dust emissions.

The operation of the monitoring tower will not result in any impacts to air quality. Therefore, the impacts of the Development will be limited to dust emissions during the short construction phase.

5.2 NOISE

The potential noise impacts of the Development were assessed qualitatively using the following methodology:

- Identify the activities that may generate noise;
- Identify the nearest private receivers; and
- Qualitatively evaluate the magnitude of impact based on the scale of the activities, distance from the nearest private receivers and mitigating circumstances.

The Development may result in short-term industrial noise during the construction period. Noise may be generated through the use of construction equipment. The equipment required for construction of the monitoring tower includes:

- Mobile crane;
- Delivery trucks (road registered);
- Small excavator or loader (e.g. Bobcat); and
- Power tools.

The construction activities that require larger equipment are located at ground level. There is dense bushland present within the Development Site (see **Figure 2**). This vegetation provides acoustic shielding for the nearest private residences. As a result, construction noise levels will be significantly attenuated as it propagates towards the nearest residences.

The assembly of the mast and supporting guy-wires will involve the use of power tools at significant heights. Any works taking place above the level of the surrounding vegetation will not benefit from the attenuation effects of vegetation. However, the only equipment used for activities at heights are handheld power tools. These sources generate significantly less noise than the larger equipment used at ground level.

Construction activities are only undertaken during standard construction hours, which are defined under the 'Interim Construction Noise Guideline' (DECCW, 2009) (or latest version). This ensures that there are no noise impacts during the night period.

There will be no noise impacts during the operational phase of the Development, as the monitoring instruments will not generate any discernible noise.

5.3 ECOLOGY

The potential impacts to flora and fauna were assessed by Ecosure (2019). This study is included in **Appendix C**. The study methodology included a desktop assessment of the ecology values at the Development Site and a strike risk assessment for fauna.

Ecosure's study considered two wind monitoring towers, one of which is the Development. The other monitoring tower is located within the Singleton Local Government Area and is therefore beyond the scope of this application. The Development is referred to in Ecosure's report as 'Mast1'.

The Development Site does not contain any land shown on the Biodiversity Values Map prepared pursuant to the *Biodiversity Conservation Regulation 2017*. As such, the Development does not trigger the requirement for a Biodiversity Development Assessment Report (Ecosure, 2019).

5.3.1 Vegetation

Four Threatened Ecological Communities (TECs) listed under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) are considered likely to occur:

- Central Hunter Valley eucalypt forest and woodland;
- Hunter Valley Weeping Myall (*Acacia pendula*) Woodland;
- Lowland Rainforest of Subtropical Australia; and
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

Based on vegetation mapping developed by the NSW Office of Environment and Heritage (OEH, 2018), there are areas of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland located within 200 m of the mast. The Development avoids impacts to this TEC by limiting ground disturbance to areas of grassland.

5.3.2 Threatened Species

A review of NSW BioNet was undertaken to identify the threatened species that have been recorded near the Development. One species has previously been recorded within 1.5 km of the mast. The Spotted-tailed Quoll (*Dasyurus maculatus*) is listed as vulnerable under the *Biodiversity Conservation Act 2016* (BC Act) and endangered under the EPBC Act.

A further seven species listed as either Vulnerable (V) or Endangered (E) under the BC Act or EPBC Act have been recorded in the surrounding region but not within 1.5 km of the mast:

- Brown Treecreeper (eastern subspecies) (*Climacteris picumnus victoriae*) (BC Act: V);
- Speckled Warbler (*Chthonicola sagittata*) (BC Act: V);
- Varied Sittella (*Daphoenositta chrysoptera*) (BC Act: V);
- Brush-tailed Phascogale (*Phascogale tapoatafa*) (BC Act: V);
- Koala (*Phascolarctos cinereus*) (BC Act: V, EPBC Act: V);
- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*) (BC Act: V); and
- *Cymbidium canaliculatum* (BC Act: E).

5.3.3 Strike Risk Assessment

Ecosure assessed the risk of birds and bats colliding with the monitoring tower. Ecosure's likelihood of occurrence assessment identified six species that are known to occur or have potential habitat near the Development. In addition, 17 species have the potential to occur (including one species that is likely to occur) near the tower. These species have the potential to be exposed to the tower.

The species that is potentially most exposed to the Development is the Grey-headed Flying Fox (BC Act: V, EPBC Act: V). This species consistently accesses airspace within the height range of the tower. The Swift Parrot (BC Act: E, EPBC Act: Critically Endangered) may also be exposed to risk. Overall, the potential for collision mortalities is low as most of the species that may occur are rare, do not use airspace associated with the Development or do not have habitat located within the range of the tower.

5.4 HERITAGE

A search of the State Heritage Inventory was conducted to determine if there are any listed heritage items within the Development Site. The State Heritage Inventory includes items listed under the State Heritage Register and Muswellbrook LEP. There are no listed heritage sites located in the vicinity of the Development.

If any unexpected items (which may be of heritage value) are encountered during the construction phase, Epuron will immediately cease work in the vicinity of the item and contact the appropriate authorities.

5.5 VISUAL

The visual impact of a development is determined by considering the sensitivity of potential viewing locations and the visual effect created by the development.

Due to the height of the mast, the monitoring tower will be visible to receptors in the vicinity of the Development Site. The closest residence is approximately 3.4 km from the mast. These residences are located in a rural setting and are therefore considered to be sensitive viewing locations.

The visual effect of a development is dependent on various factors including the level of contrast with the surrounding environment and the proportion of the view that it occupies. The mast is a very slender structure, with a width of approximately 0.55 m. The visual effect of the monitoring tower is negligible because it occupies only a very small proportion of the panoramic view. The monitoring tower is less prominent than other similar structures such as telecommunications structures and electricity transmission towers, which are prevalent in the region.

The monitoring tower is not fitted with any lighting. There will be no direct or diffuse lighting impacts during the night time.

6. CONCLUSION

Epuron seeks Development Consent in accordance with Section 4.12 of the EP&A Act for a wind monitoring tower located on land zoned as RU1.

Under the relevant provisions of the Infrastructure SEPP and Muswellbrook LEP, this infrastructure is permissible with development consent. Although the tower does not meet the criteria for exempt development, it is nonetheless a development that does not result in any significant environmental impacts.

Should you have any queries in relation to this SEE, please contact the undersigned on 02 6536 2999.

Regards

JAMES BAILEY & ASSOCIATES



Andrew Wu
Senior Environmental Engineer



Dianne Munro
Principal

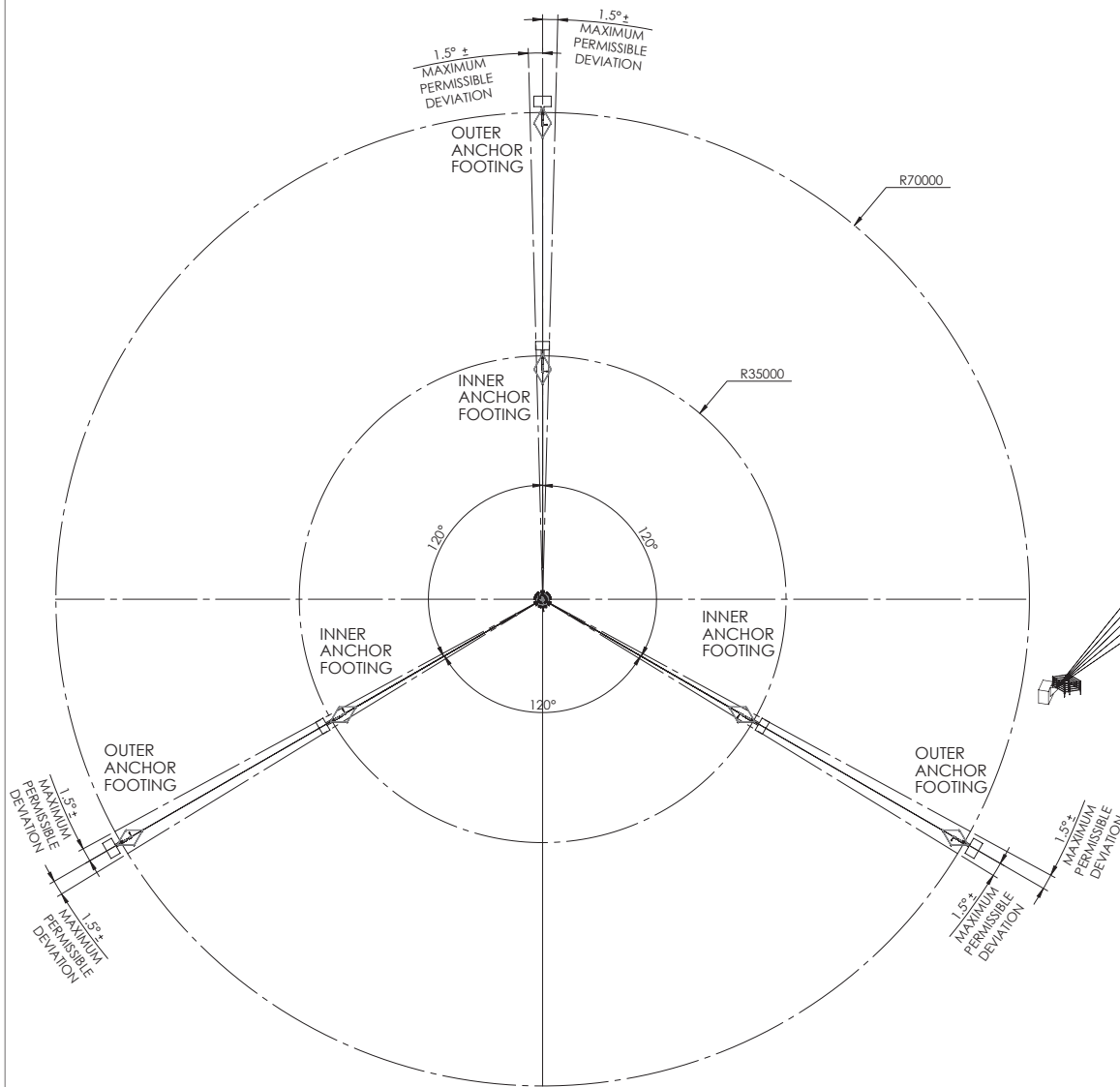
REFERENCES

- Department of Environment and Climate Change (2002), Descriptions for NSW (Mitchell) Landscapes Version 2 (2002).
- Department of Environment, Climate Change and Water (2009), Interim Construction Noise Guideline.
- Ecosure (2019), Bowmans Creek Wind Farm Meteorological Masts Risk Analysis Summary.

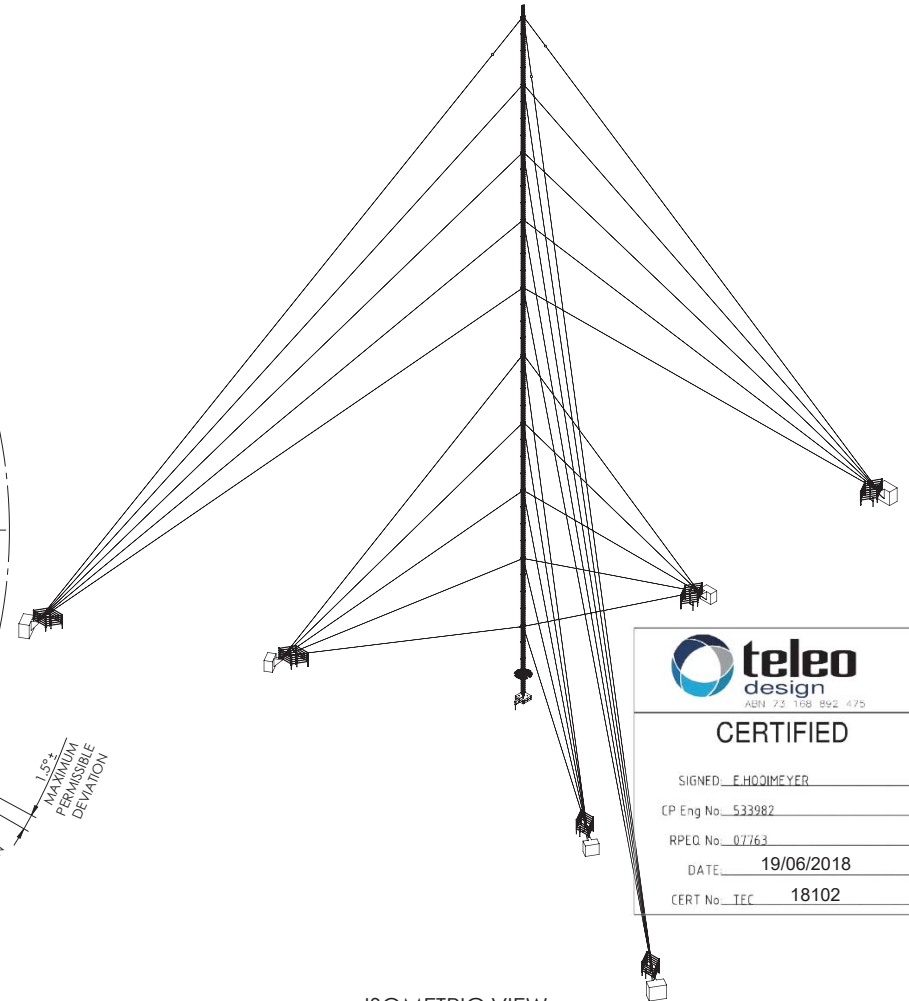
APPENDIX A

Monitoring Tower

Design Drawings



MUS1 & MUS2 MAST ASSEMBLY LAYOUT PLAN
SCALE 1 : 700



ISOMETRIC VIEW
SCALE 1 : 700

teleo design
ABN 73 108 892 475

CERTIFIED

SIGNED: E. HOQIMEYER

CP Eng No. 533982

RPLQ No. 07763

DATE: 19/06/2018

CERT No. TEC 18102

NOTE:
FOR ORIENTATION REFER TO WIND SYSTEM GA

REV	DATE	ORIGINAL ISSUE - PRELIMINARY	REVISIONS	DRAWN	CHK	APPROVED
A	30/05/18	ORIGINAL ISSUE - PRELIMINARY		DM	AK	JS

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SCALE 1:500	A3	DATE 30/05/18	DRAWING No. 18206-GA-TM-03	REV. A
DESIGNED DM	30/05/18	CHECKED AK	30/05/18	
APPROVED JS	30/05/18			
			MUSWELLBROOK GENERAL ARRANGEMENT (PLAN & ISOMETRIC VIEW)	
				SHEET 1 OF 1

ANCILLARY DESCRIPTION	MODEL	HEIGHT(m)
ANEMOMETER (A1 - RED)	THIES FIRST CLASS	120
THIES ANEMOMETER(A2 - BLUE)	THIES FIRST CLASS	120
TEMPERATURE PROBE: T1	VAISALA HMP11 T+H	116
WIND VANE	THIES COMPACT POT	116
ANEMOMETER	THIES FIRST CLASS	100
WIND VANE	VECTOR W200P	100
ANEMOMETER	THIES FIRST CLASS	80
WINDVANE	VECTOR W200P	80
ANEMOMETER	THIES FIRST CLASS	60
WIND VANE	VECTOR W200P	60
ANEMOMETER	THIES FIRST CLASS	40
ANEMOMETER	THIES FIRST CLASS	20
ANTI CLIMB	GL550R02	4
DATA LOGGER	CAMPBELL SCIENTIC	2
PRESSURE SENSOR	VAISALA HMP11 T+H+P	2

ANCILLARY GENERAL TYPE		ESA(m²)
LIGHTNING ROD		0.17
WIND VANE + ANEMOMETER + GOAL POST BOOM ARM		0.29
WIND VANE + ANEMOMETER + SINGLE BOOM ARM		0.17
SOLAR PANEL + SUPPORT		0.7
TEMPERATURE HUMIDITY SENSOR + SUPPORT		0.04
JUNCTION BOX		0.125
DATA LOGGER		0.5



CERTIFIED

SIGNED: E.HOJIMEYER

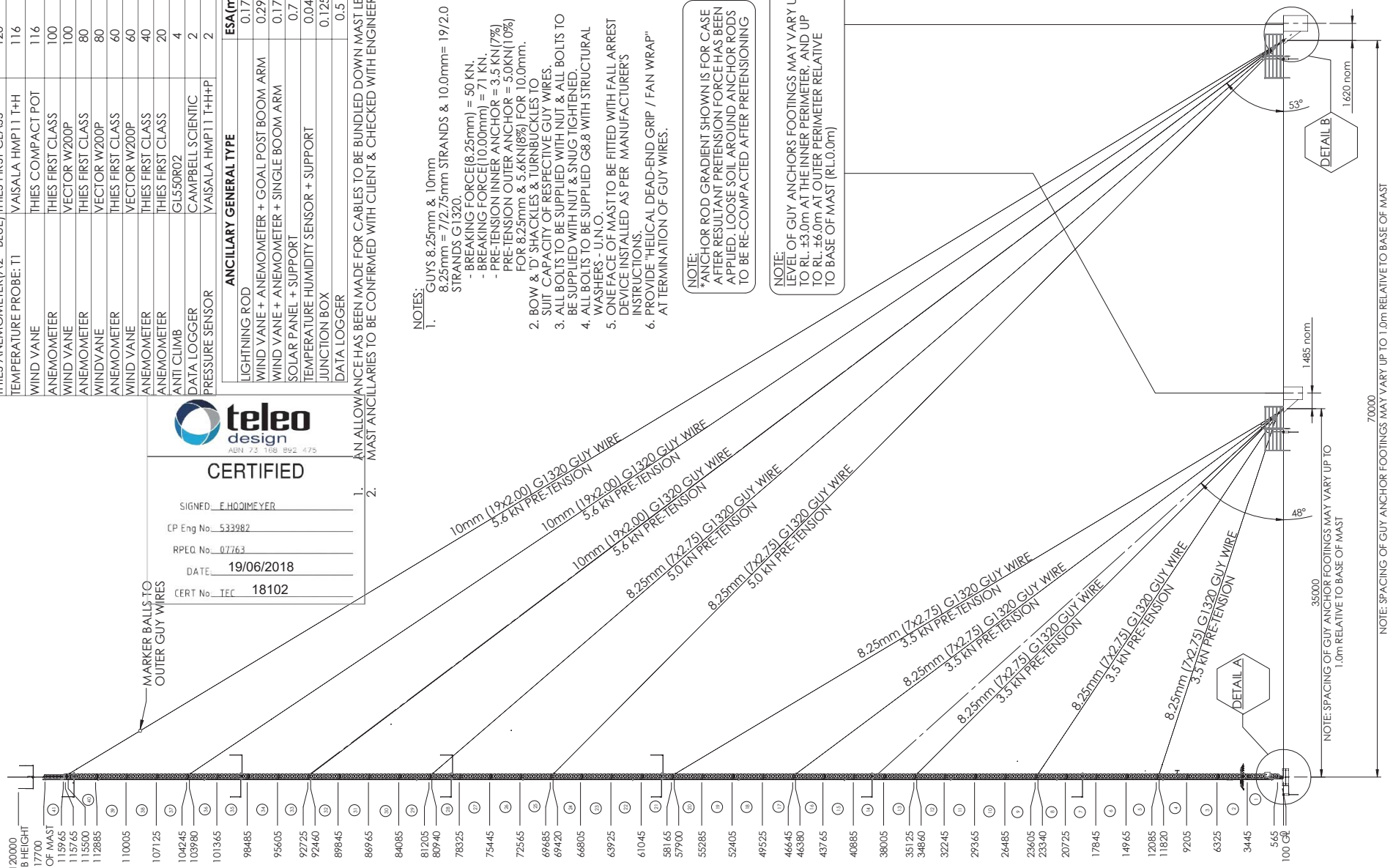
CP Eng No. 533982

RPEQ No. 07763

DATE: 19/06/2018

CERT No. TEC 18102

MARKER BALLS TO
OUTER GUY WIRES



MUS1 & MUS2 MAST ELEVATION
1 GUYS SET SHOWN ONLY
SCALE 1 : 350

REV	DATE	DESCRIPTION	DRAWN	CHK	APPROV
A	30/05/18	ORIGINAL ISSUE - PRELIMINARY	DM	AK	JS
REV	DATE	REVISIONS	DRAWN	CHK	APPROV

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SCALE 1:250	A3	DATE 30/05/18	DRAWING No. 18206-GA-TM-04	REV. A
DESIGNED DM	30/05/18	CHECKED AK	MUSWELLBROOK	SHEET 1 OF 1
APPROVED JS	30/05/18		MAST ASSEMBLY & ANCILLARY(INCL LOADINGS)	

APPENDIX B

Justification Report

25 March 2021

WIND MONITORING TOWER – MUSWELLBROOK **Request for Exception from Development Standards**

1 BACKGROUND

Epuron Projects Pty Limited (Epuron) is seeking development consent for the construction and operation of a wind monitoring tower (the Development) near Bowmans Creek. Epuron has engaged James Bailey and Associates (JBA) to prepare the required development application under Section 4.12 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the supporting Statement of Environmental Effects (SEE).

The Development exceeds the maximum building height prescribed by Clause 4.3 of the *Muswellbrook Local Environment Plan* (LEP). As required under Clause 4.6 of the LEP, JBA has prepared this written request to justify the contravention of the development standard.

2 RELEVANT REGULATORY PROVISIONS

Clause 4.3 of the LEP outlines the development standard that relates to the height of buildings within the Muswellbrook Local Government Area (LGA). Clause 4.3(2) of the LEP states:

- (2) *The height of a building on any land is not to exceed the maximum height shown for the land on the Height of Buildings Map.*

The Height of Buildings Map (which accompanies the LEP) indicates that the maximum building height at the site of the Development is 12 m. The Development has a height of less than 110 m.

Clause 4.6 of the LEP outlines the circumstances in which development consent can be granted to a development that contravenes the development standards under the LEP. Clause 4.6(3) relevantly states:

- (3) *Development consent must not be granted for development that contravenes a development standard unless the consent authority has considered a written request from the applicant that seeks to justify the contravention of the development standard by demonstrating—*
- (i) that compliance with the development standard is unreasonable or unnecessary in the circumstances of the case, and*
 - (ii) that there are sufficient environmental planning grounds to justify contravening the development standard.*

Section 3 provides the justification required by Clause 4.6 of the LEP.

3 JUSTIFICATION

3.1 Compliance with the development standard is unnecessary in the circumstances

Clause 4.3(1) of the LEP outlines the objectives that the development standard seeks to achieve:

- (a) *to limit the height of buildings,*
- (b) *to promote development that is compatible with the height of surrounding development and conforms to and reflects natural landforms by stepping development on sloping land to follow the natural gradient,*
- (c) *to promote the retention and, if appropriate, sharing of existing views,*
- (d) *to maintain solar access to new and existing dwellings and public recreation areas and to promote solar access to new buildings,*
- (e) *to maintain privacy for residents of existing dwellings and promote privacy for residents of new buildings.*

These objectives indicate that the purpose of Clause 4.3 is to minimise incompatibility with surrounding development, impacts on visual amenity, overshadowing (impacts on solar access) and loss of privacy.

Table 1 explains why the Development is consistent with the values that Clause 4.3 seeks to protect.

Table 1
Consistency with Objectives of Clause 4.3

Environmental Value	Impact of the Development
Compatibility with surrounding development	The Development is located at Bowmans Creek, which is distant from the urban centres in the Muswellbrook LGA. The Development is located within an area of agricultural or rural-residential land. Development in the locality is generally limited to rural-residential dwellings and farm infrastructure. The nearest residence is located approximately 3.4 km from the monitoring mast. Due to the significant setback from other developments, there is no incompatibility with other developments.
Retention of visual amenity	<p>The Development is a wind monitoring mast, which is a very slender structure (width of approximately 0.55 m). Due to its slenderness, the mast occupies a negligible portion of the panoramic views from the locality.</p> <p>The Development is similar in nature to communications towers and meteorological monitoring towers established by mines in the Muswellbrook LGA.</p> <p>For these reasons, the mast will not have a significant impact on visual amenity.</p>
Prevention of overshadowing (loss of solar access)	The mast is a slender, lattice structure. As such, it does not cast large shadows. The nearest residence is too distant from the mast to be affected by overshadowing. Therefore, the mast does not affect solar access to other buildings.
Privacy of residents	The mast is an unoccupied structure. As such, there is no potential for overlooking onto nearby residences. Therefore, the mast does not affect the privacy of existing or future residents.

The objectives of Clause 4.3 of the LEP suggest that this development standard is aimed at development within urban centres, rather than on rural land (as is the case for the Development). Notwithstanding, the Development does not materially affect the values that Clause 4.3 seeks to protect. Therefore, compliance with this development standard is unnecessary in the circumstances of the case.

3.2 Sufficient environmental planning grounds to justify contravention of the development standard

The Development facilitates the monitoring of wind speeds and directions, which will inform the potential development of a wind farm at Bowmans Creek. The proposed wind farm will be the subject of an application for State Significant Development under Division 4.7 of Part 4 of the EP&A Act.

The development of a wind farm within the Muswellbrook LGA is beneficial from a planning perspective because it will diversify the industry within the region and facilitate electricity production from renewable energy sources. The Development may culminate in the development of a wind farm and as such, there are sufficient environmental planning grounds to justify contravention of the development standard under Clause 4.3 of the LEP.

4 CONCLUSION

Clause 4.6 of the LEP outlines the circumstances in which development consent may be granted to a development that contravenes a development standard. This written request provides the justification required under Clause 4.6 of the LEP. Therefore, it is available to the consent authority to grant development consent despite the Development exceeding the maximum building height under Clause 4.3 of the LEP.

APPENDIX C

Ecosure Flora and

Fauna Study



Bowmans Creek Wind Farm

Meteorological Masts Risk Analysis Summary

January 2019

Epuron Projects Pty Ltd



Glossary, acronyms and abbreviations

BACI	Before After Control Impact
BAM	Biodiversity Assessment Method
BC Act	<i>Biodiversity Conservation Act 2016</i>
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offset Scheme
BV mapping	Biodiversity Values mapping
CA	Critical airspace
DPIF	Department of Primary Industries and Fisheries
IBRA	Interim Biogeographic Regionalisation for Australia
LGA	Local government area
NSW	New South Wales
OEH	Office of Environment and heritage
PCT	Plant Community Type
RA	Risk Assessment
SEPP	State Environmental Planning Policy
TEC	Threatened Ecological Community

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1 Introduction

Ecosure was engaged by Epuron Projects Pty Ltd to undertake a desktop risk assessment for two meteorological (met) masts installed at the proposed Bowmans Creek Wind Farm site, Hunter Valley, NSW. Although installation of met masts are exempt development in NSW, taller masts, over 110 m require approval under State Environmental Planning Policy (Infrastructure) 2007. In this instance a retrospective development consent is being sought for two masts which are 10 m taller than what is considered exempt development. This desktop assessment is required to determine the likely impact on native vegetation, threatened species and the risk of the structures to birds and bats to support the DA.

1.1 Project scope

The specific scope includes:

- desktop bird and bat strike assessment
- risk analysis summary of met masts
- desktop assessment of ecological values within 200 m of the masts.

1.2 Relevant legislation

1.2.1 State Environmental Planning Policy (Infrastructure) 2007

Development for the purpose of a wind monitoring tower used in connection with the investigation or determination of the feasibility of a wind farm that has a generating capacity of more than 1 MW is exempt development if:

- (a) it complies with clause 20, and
- (b) the tower:
 - (i) is erected in accordance with the manufacturer's specifications, and
 - (ii) has a height of not more than 110m, and
 - (iii) is removed within 30 months after its erection is completed.

The two existing met masts are 120 m in height thus slightly exceeding the exempt clause under the SEPP (Infrastructure) instrument by 10 m. Therefore, both masts will require planning approval under the SEPP.

1.3 Project site

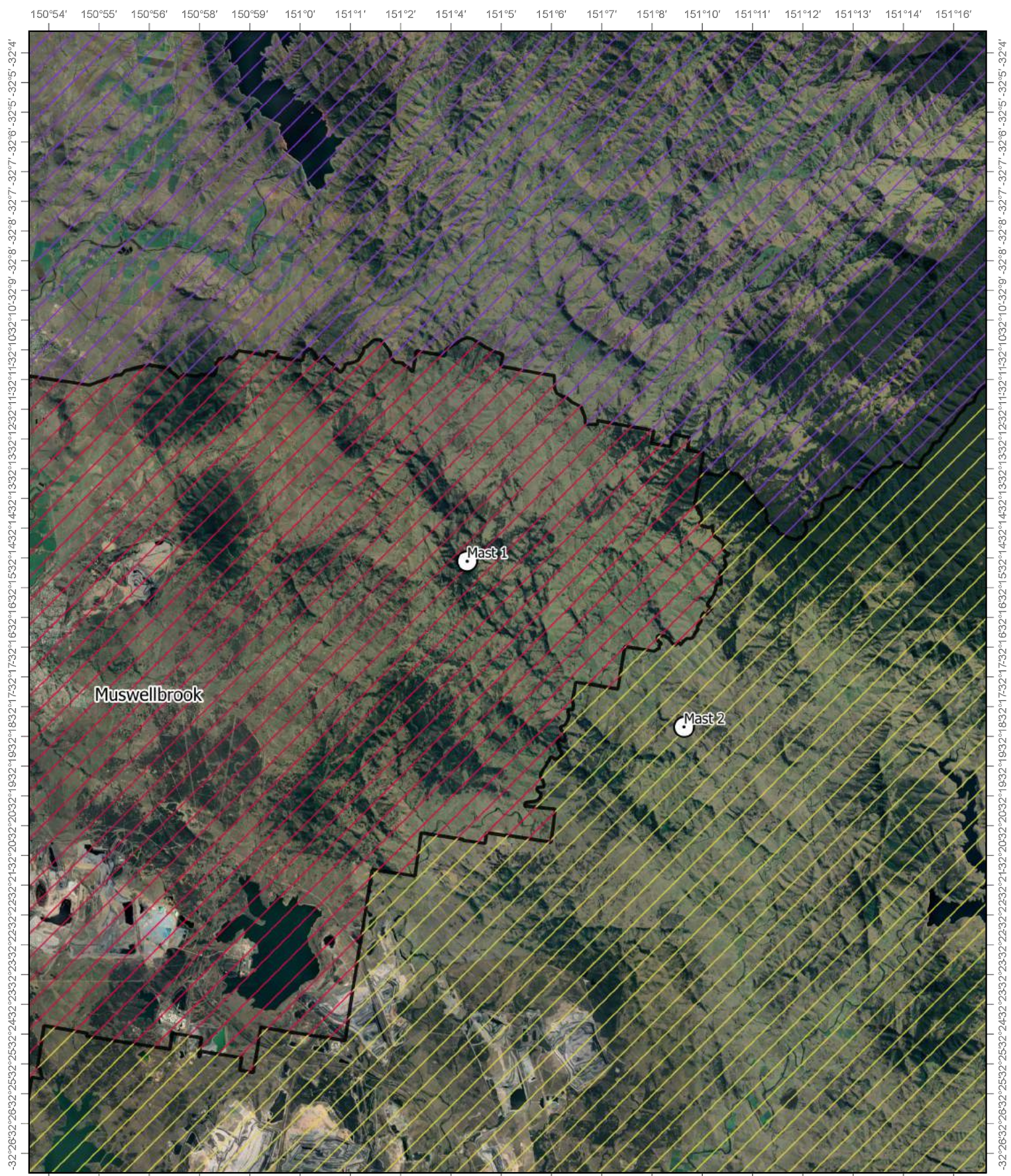
The site is located approximately 15km east of Muswellbrook, NSW. Met mast one (1) is in Muswellbrook local government area (LGA) and is associated with Lot 199 DP752444. Mast

two (2) falls in Singleton LGA and is associated with Lot 131 DP752460 (Figure 1).

Mount Royal National Park is located within 10km to the North East of the site. There are no significant wetlands associated with the met mast sites however, Bowmans Creek bisects the two met masts and Glennies Creek Dam, Lake Lidell and Lake Glenbawn occur within approximately 10km from the site.





The site is associated with Barrington-Muswellbrook Steppingstones Remnants and Valley floor linkages Climate Change Corridors (OEH, 2010). Both met masts are associated with NSW North Coast IBRA and Tomalla and Upper Hunter IBRA Sub-Regions (Figure 2).

New South Wales (NSW) Landscapes (Mitchell) associated with the site include Scone – Gloucester Foothills (Figure 3). These landscapes have a general elevation of 200 to 600 m and include extensive faulted carboniferous sandstone and pyroclastic, conglomerate, mudstone, lithic sandstone, some limestone and acid tuff. They contain thin stony loams and red brown to yellow texture contrast soils with harsh subsoils in valleys (Department of Environment and Climate Change [DECC] 2002).



Meteorological Mast Location

Epuron Projects Pty Ltd
Desktop Assessment
Bowmans Creek Wind Farm, NSW

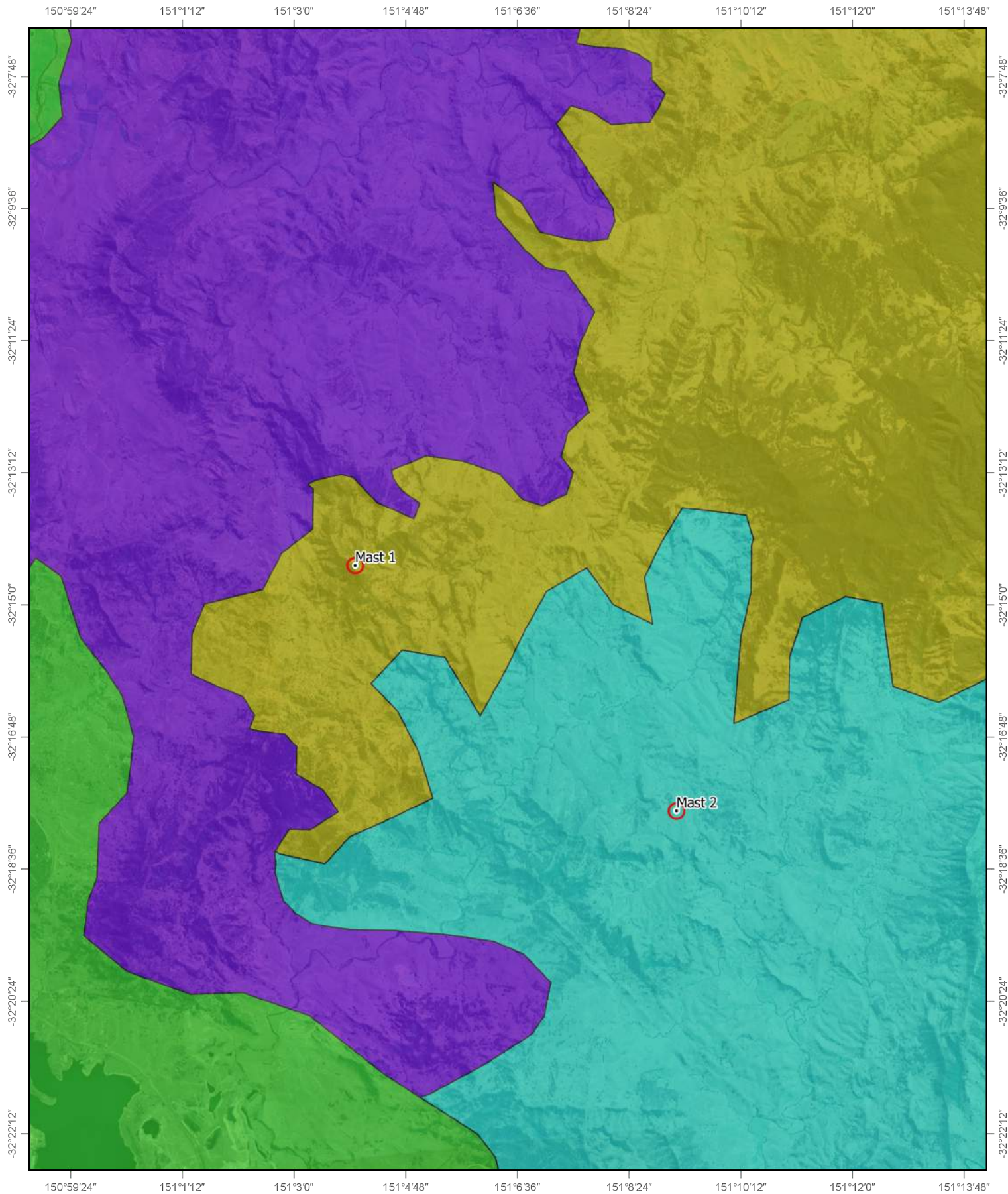
-  Meteorological Mast
-  Muswellbrook
-  Singleton
-  Upper Hunter



Job number: PR4017
revision: 0
author: JULY
date: 12/12/2018



GDA 1994 MGA Zone 56
projection: Transverse Mercator
datum: GDA 1994
units: Meter



IBRA Sub-Region Mapping

Epuron Projects Pty Ltd.
Desktop Assessment
Bowmans Creek Wind Farm, NSW

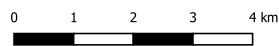
- 1.5 km site buffer
- Indicative site boundary

BRA Subregion

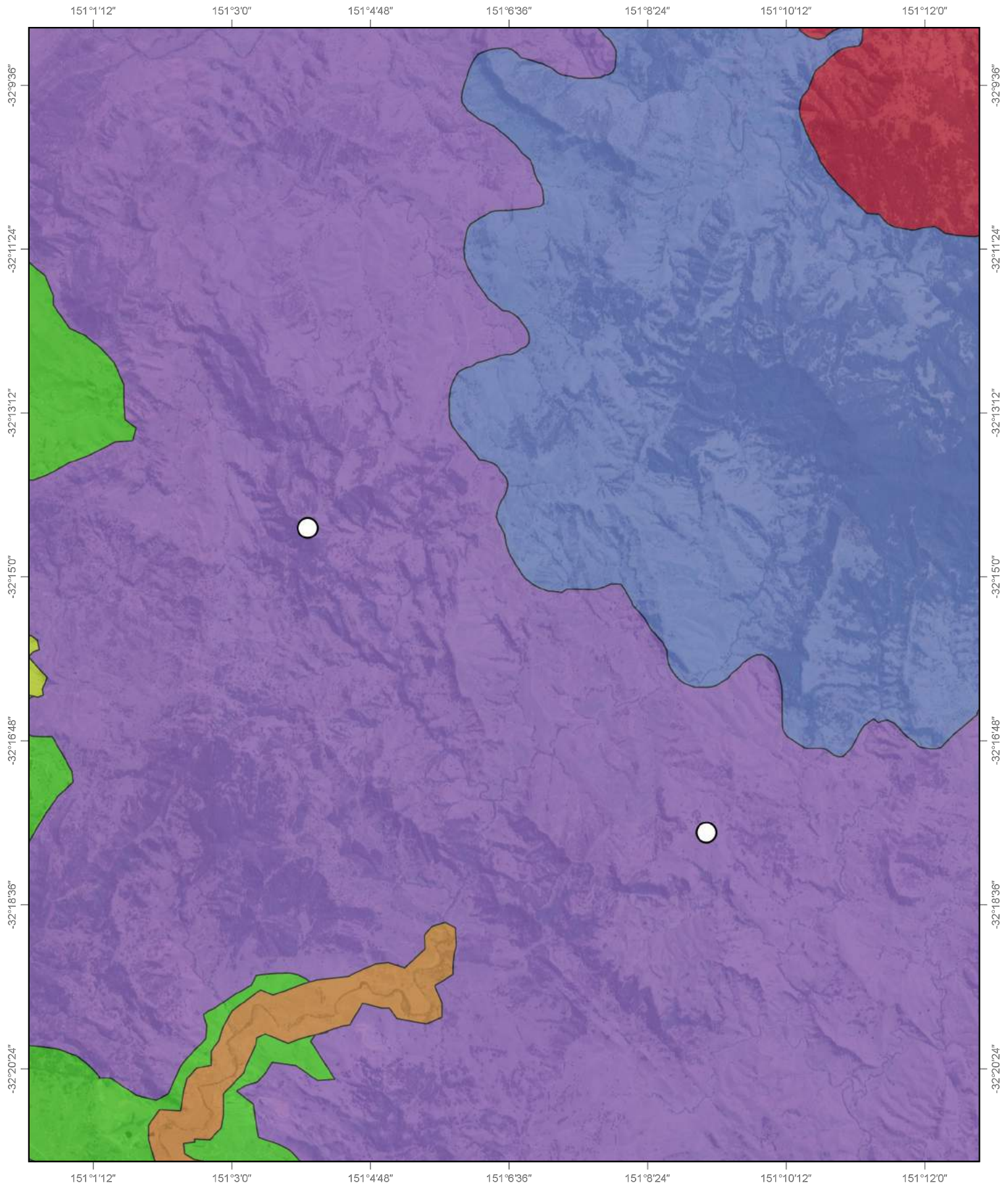
- Ellerston
- Hunter
- Tomalla
- Upper Hunter



Job number: PR4017
revision: 0
author: JLY
date: 05/12/2018



GDA 1994 MGA Zone 56
projection: Transverse Mercator
datum: GDA 1994
units: Meter



NSW (Mitchell) Landscapes

Epuron Projects Pty Ltd
Desktop Assessment
Bowmans Creek Wind Farm, NSW

○ Meteorological Mast Location

NSW Landscapes

■ Barrington Tops Meta-sediments

■ Central Hunter Alluvial Plains

■ Central Hunter Foothills

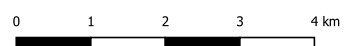
■ Manning Great Escarpment Southern Aspect

■ Scone - Gloucester Foothills

■ Upper Hunter Channels and Floodplain



Job number: PR4017
Revision: 0
Author: JLY
Date: 12/12/2018



GDA 1994 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 1994
Units: Meter

2 Methods

2.1 Desktop assessment

Inspection of NSW and Commonwealth environmental mapping and data was conducted. These included:

- NSW BioNet Vegetation Classification including Plant Community Types (PCT) and Threatened Ecological Communities (TEC)
- Biodiversity Values (BV) mapping
- IBRA
- Wetlands
- NSW Landscapes (Mitchell landscapes)
- Climate Change Corridors.

A review of the NSW BioNet records within a 1.5 km radius for each met mast, and 1.5 km radius of the greater project site, was completed to compile a list of threatened flora and fauna records. An EPBC Protected Matters Search was also undertaken (within 5 km of the sites).

Threatened species were assessed for their likelihood of occurrence based on:

- records in the local area
- presence of suitable habitat (determined using desktop data)
- presence of essential habitat
- species abundance, distribution and behaviour (sourced from published field guides, OEH species profiles and threats database profiles, scientific journal articles and known records).

Likelihood of occurrence was classified into four categories; unlikely, possible, likely and confirmed (Table 1). Marine species were excluded from the assessment.

2.2 Overview of strike risk assessment

The purpose of this assessment was to derive a semi quantitative estimate of relative collision risk for different species. In addition, 'risk' was qualitatively assessed in terms of risk to birds and bats, risk of collision and conservation risk. It is important to note that reliable risk estimates can only be derived from long term data that adequately represents seasonal and random variation in the way the birds and bats use the project site.

3 Results

Relevant threatened species databases and vegetation mapping resources were reviewed.

3.1 BV mapping

The BV map identifies areas of land with high biodiversity value, as defined by the Biodiversity Conservation Regulation 2017. Several creeks and some ridgelines surrounding the site are BV mapped. The two lots associated with the met masts do not contain any BV mapping (Appendix 1) and therefore do not trigger a Biodiversity Development Assessment Report (BDAR).

3.2 Vegetation

The EPBC Act recognised four Critically Endangered TEC communities that may occur or are likely to occur:

- Central Hunter Valley eucalypt forest and woodland
- Hunter Valley Weeping Myall (*Acacia pendula*) Woodland
- Lowland Rainforest of Subtropical Australia
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

For the purposes of this assessment a 200 m buffer was placed around each of the Met masts. These areas were assessed for mapped Plant Community Types (PCTs) based on OEH (2018) mapping.

Met mast 1

Mast one 200 m buffer is mapped PCT 1606 - White Box/ Narrow-leaved Ironbark/ Blakely's Red Gum shrubby open forest of the central and upper Hunter. This PCT is associated with the TEC White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

Met mast 2

No native vegetation is mapped at mast two, satellite imagery suggests no woody native vegetation exists within the 200 m buffer zone.

3.3 Threatened species

The NSW BioNet search returned one (1) threatened species within 1.5 km of met mast 1, the spotted-tailed quoll (*Dasyurus maculatus*). The quoll is listed as vulnerable under the BC Act and endangered under EPBC Act. Given the paucity of data an additional 1.5 km BioNet

search of the larger project site was undertaken which returned a further seven threatened species, Table 1.

Table 1 Threatened fauna species returned from a 1.5 km BioNet search of the project site

Class	Family	Scientific name	Common name	BC Act status	EPBC Act status
Bird	Climacteridae	<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V	
	Acanthizidae	<i>Chthonicola sagittata</i>	Speckled Warbler	V	
	Neosittidae	<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	
Mammal	Dasyuridae	<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V	E
	Dasyuridae	<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale	V	
	Phascolarctidae	<i>Phascolarctos cinereus</i>	Koala	V	V
	Vespertilionidae	<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing-bat	V	
Flora	Orchidaceae	<i>Cymbidium canaliculatum</i>	<i>Cymbidium canaliculatum</i> population in the Hunter Catchment	E2	

A likelihood of occurrence and strike risk assessment for relevant EPBC Act and BC Act threatened and migratory fauna species is included as Table 2

Table 2 Threatened fauna likelihood of occurrence and strike risk assessment

Class	Species	Common name	EPBC Act	BC Act	Likelihood of occurrence	Fauna linked to PCT
Bird	<i>Anthochaera phrygia</i>	regent honeyeater	CE	CE	possible	Yes
	<i>Botaurus poiciloptilus</i>	Australasian bittern	E	E	possible	
	<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)		V	confirmed	Yes
	<i>Chthonicola sagittata</i>	speckled warbler		V	confirmed	
	<i>Daphoenositta chrysoptera</i>	varied sittella		V	confirmed	Yes
	<i>Dasyornis brachypterus</i>	eastern bristlebird	E	E	unlikely	
	<i>Erythrorhynchus radiatus</i>	red goshawk	V	CE	unlikely	
	<i>Grantiella picta</i>	painted honeyeater	V	V	unlikely	
	<i>Lathamus discolor</i>	swift parrot	CE	E	possible	Yes
	<i>Numenius madagascariensis</i>	eastern curlew	E		unlikely	
	<i>Rostratula australis</i>	Australian painted-snipe	E	E	unlikely	
Bird (migratory)	<i>Apus pacificus</i>	fork-tailed swift	M		possible	
	<i>Hirundapus caudacutus</i>	white-throated needletail	MTS		possible	
	<i>Monarcha melanopsis</i>	black-faced monarch	MTS		Unlikely	
	<i>Monarcha trivirgatus</i>	spectacled monarch	MTS		Unlikely	
	<i>Motacilla flava</i>	yellow wagtail	MTS		Unlikely	
	<i>Myiagra cyano-leuca</i>	satin flycatcher	MTS		Unlikely	
	<i>Rhipidura rufifrons</i>	rufous fantail	MTS		Unlikely	
	<i>Actitis hypoleucos</i>	common sandpiper	MWS		possible	
	<i>Calidris acuminata</i>	sharp-tailed sandpiper	MWS		possible	
	<i>Calidris ferruginea</i>	curlew sandpiper	MWS	E	possible	
	<i>Calidris melanotos</i>	pectoral sandpiper	MWS		possible	
	<i>Gallinago hardwickii</i>	Latham's snipe	MWS		possible	
	<i>Numenius madagascariensis</i>	eastern curlew	CE, MWS		possible	
	<i>Pandion haliaetus</i>	osprey	MWS	V	possible	
	<i>Tringa nebularia</i>	common greenshank	MWS		possible	
Bats	<i>Chalinolobus dwyeri</i>	large-eared pied bat	V	V	possible	
	<i>Nyctophilus corbeni</i>	Corben's long-eared bat	V	V	possible	
	<i>Miniopterus schreibersii oceanensis</i>	eastern bentwing-bat		V	confirmed	Yes

Class	Species	Common name	EPBC Act	BC Act	Likelihood of occurrence	Fauna linked to PCT
	<i>Pteropus poliocephalus</i>	grey-headed flying-fox	V	V	likely	Yes
Marsupials	<i>Dasyurus maculatus maculatus</i>	spotted-tail quoll	E	V	confirmed	
	<i>Petauroides volans</i>	greater glider	V		possible	
	<i>Phascogale tapoatafa</i>	brush-tailed phascogale	V	V	confirmed	
	<i>Phascolarctos cinereus</i>	koala	V	V	confirmed	

V - Vulnerable; E - Endangered; CE - Critically Endangered; Migratory terrestrial species; MWS - Migratory wetland species;

The BioNet search includes actual records within 1.5 km of the site, whereas the EPBC Act Protected Matters Report includes species which may occur, based on modelled habitat requirements.

The EPBC Act Protected Matters Search Tool (within a 10 km buffer of the sites) returned one (1) Wetland of International Importance, four (4) threatened ecological communities, 32 listed threatened species and 15 listed migratory species (Appendix 2) which may occur or relate to the area.

3.4 Bird and bat collision risk

Despite this only being a desktop assessment some conclusions and recommendations can be made:

1. The project site is relatively poor in avifauna diversity and numbers.
2. The EPBC Act recognises a total of nine (9) bird species, thirteen (13) migratory bird species, one (1) flying-fox species and two (2) microbat species.
3. The BC Act recognises a total of three (3) bird species and four (4) mammals species including two (2) bats. The BioNet species return list is based on a search range of 1.5 km that includes the project site, an area much larger than the Met mast area of influence.
3. Significant water bodies for migratory wetland species are distant from the met masts and are therefore not within a potential flyway.
4. Based on initial analysis a first approximation collision Risk Assessment is:
 - a) The highest bird collision mortality risk is to raptors. This assessment ignores species variation in avoidance/vigilance capacity.
 - b) Threatened raptor species most likely to collide are the square-tailed kite and little eagle which are predicted to occur from the recorded PCT, however

neither of these species were returned by the BioNet or EPBC Protected Matters Report.

- b) The highest conservation risk is to grey-headed flying fox (vulnerable). This widespread species consistently accesses airspace within the height range of the masts and is potentially exposed to collision (Table 1).
- c) Large forest owls such as the barking owl, powerful owl and masked owl can use higher flight levels and may also be high conservation risk species. However, no large forest owls were returned in the BioNet or EPBC Protected Matters Report but are predicted for the PCT surrounding Met Mast 1.

4 Discussion

The bird and bat RA identified several species groups that are likely to be at risk of impact from the met masts. Species groups that are at high risk from the project include raptors, flocking psittacines, aerial foragers (including listed migratory species) and nocturnal species. These groups are known to utilise the airspace at this height for foraging and traversing.

Preliminary analysis of likelihood of occurrence of threatened species suggests there are six (6) confirmed, sixteen (16) possible and one (1) likely bird and bat species of having habitat requirements or mapped distribution that is likely to expose them to the Met mast infrastructure.

4.1 Flora

There was no requirement to remove any vegetation for construction of met masts and there were no threatened plant species considered at risk of construction associated with the Met masts. The *Cymbidium canaliculatum* population in the Hunter Catchment, and endangered population of orchid is not known to occur in the environments upon which the Met masts were constructed.

4.2 Fauna

4.2.1 Likelihood of occurrence assessment

Preliminary analysis for strike risk assessment indicates that there is low potential for collision mortalities for most of the majority of these species either because they are rare, do not use airspace that overlaps the met mast airspace or have habitat requirements that are not located within range of the met masts. Only two threatened species, the swift parrot and grey-headed flying fox would be considered at risk. Survey data would be required to consolidate qualitative and quantitative collision risk particularly in relation to the way in which threatened species use the airspace.

5 Conclusion

This desktop assessment has identified the significant flora, fauna and ecological values existing within the site and has identified values of significance at the Commonwealth, state and local levels. The site contains significant ecological values including:

- potential habitat for EVNT species listed under EPBC Act and/or BC Act
- potential habitat for migratory species listed under EPBC Act and/or BC Act
- potential habitat for resident and nomadic raptors and other birds of prey
- vegetation communities including potential TECs
- state and regionally significant terrestrial corridors

Under State Environmental Planning Policy (Infrastructure) 2007 the Met masts are not considered low impact minor infrastructure because they exceed the height limit by 10 m, but accord with the other provisions listed under Part 3 Division 4 Clause 39 of the policy.

This desktop assessment concludes that the Met mast are unlikely to have any significant impact on threatened fauna, flora or TECs.

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Appendix 1 BV mapping

Biodiversity Offset Scheme (BOS) Entry Threshold Map



0.6 0 0.31 0.6 Kilometers

GCS_GDA_1994

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Legend

- Biodiversity Values that have been mapped for more than 90 days
- Biodiversity Values added within last 90 days

Notes

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Biodiversity Values Map and Threshold Report

Results Summary

Date of Calculation	08/01/2019 11:46 AM	BDAR Required*
Total Digitised Area	17.58 ha	
Minimum Lot Size Method	Lot size	
Minimum Lot Size	15.95 ha	
Area Clearing Threshold	0.5 ha	
Area clearing trigger Area of native vegetation cleared	Unknown #	Unknown #
Biodiversity values map trigger Impact on biodiversity values map(not including values added within the last 90 days)?	no	no

*If BDAR required has:

- at least one 'Yes': you have exceeded the BOS threshold. You are now required to submit a Biodiversity Development Assessment Report with your development application. Go to <https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor> to access a list of assessors who are accredited to apply the Biodiversity Assessment Method and write a Biodiversity Development Assessment Report
- 'No': you have not exceeded the BOS threshold. You may still require a permit from local council. Review the development control plan and consult with council. You may still be required to assess whether the development is "likely to significantly affect threatened species" as determined under the test in s. 7.3 of the Biodiversity Conservation Act 2016. You may still be required to review the area where no vegetation mapping is available.

Where the area of impact occurs on land with no vegetation mapping available, the tool cannot determine the area of native vegetation cleared and if this exceeds the Area Threshold. You will need to work out the area of native vegetation cleared - refer to the BOSET user guide for how to do this.

Disclaimer

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The mapping provided in this tool has been done with the best available mapping and knowledge of species habitat requirements. This map is valid for a period of 30 days from the date of calculation (above).

Acknowledgement

I as the applicant for this development, submit that I have correctly depicted the area that will be impacted or likely to be impacted as a result of the proposed development.

Signature _____ Date: 08/01/2019 11:46 AM

Biodiversity Offset Scheme (BOS) Entry Threshold Map



0.6 0 0.31 0.6 Kilometers

GCS_GDA_1994

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Legend

- Biodiversity Values that have been mapped for more than 90 days
- Biodiversity Values added within last 90 days

Notes

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Biodiversity Values Map and Threshold Report

Results Summary

Date of Calculation	08/01/2019 11:51 AM	BDAR Required*
Total Digitised Area	24.17 ha	
Minimum Lot Size Method	Lot size	
Minimum Lot Size	24.17 ha	
Area Clearing Threshold	0.5 ha	
Area clearing trigger Area of native vegetation cleared	Unknown #	Unknown #
Biodiversity values map trigger Impact on biodiversity values map(not including values added within the last 90 days)?	no	no

*If BDAR required has:

- at least one 'Yes': you have exceeded the BOS threshold. You are now required to submit a Biodiversity Development Assessment Report with your development application. Go to <https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor> to access a list of assessors who are accredited to apply the Biodiversity Assessment Method and write a Biodiversity Development Assessment Report
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Signature _____ Date: 08/01/2019 11:51 AM