

Boco Rock Wind Farm Stage Two  
**Application for Modification**  
Response to Submissions

February 2020



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## Acronyms

AHMP	Aboriginal heritage management plan
AWA	Australian Wind Alliance
BAM	Biodiversity assessment method
BC Act	<i>Biodiversity Conservation Act, 2016</i>
BCD	Biodiversity Conservation Division of Department of Planning, Industry and Environment (formerly Office of Environment and Heritage)
BDAR	Biodiversity development assessment report
BMP	Biodiversity management plan
CCC	Community consultative committee
CWP	CWP Renewables
DEE	Department of Environment and Energy
DPE	Department of Planning and Environment
DPIE	Department of Planning, Industry and Environment
EA	Environmental Assessment
EMS	Environmental management strategy
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
ERP	Emergency response plan
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act, 1999</i>
Ha	Hectare
IPC	Independent Planning Commission
LGA	Local government area
LEMC	Local emergency management committee
Km	Kilometre
MW	Megawatt
NSW	New South Wales
OEH	Office of Environment and Heritage
OSOM	over-size over-mass
PPR	Preferred project report

RMS	Roads and Maritime Services
RTS	Response to submissions
SMRC	Snowy Monaro Regional Council
SSD	State Significant Development
TMP	Traffic management plan
WTG	Wind turbine generator

# 1 Introduction

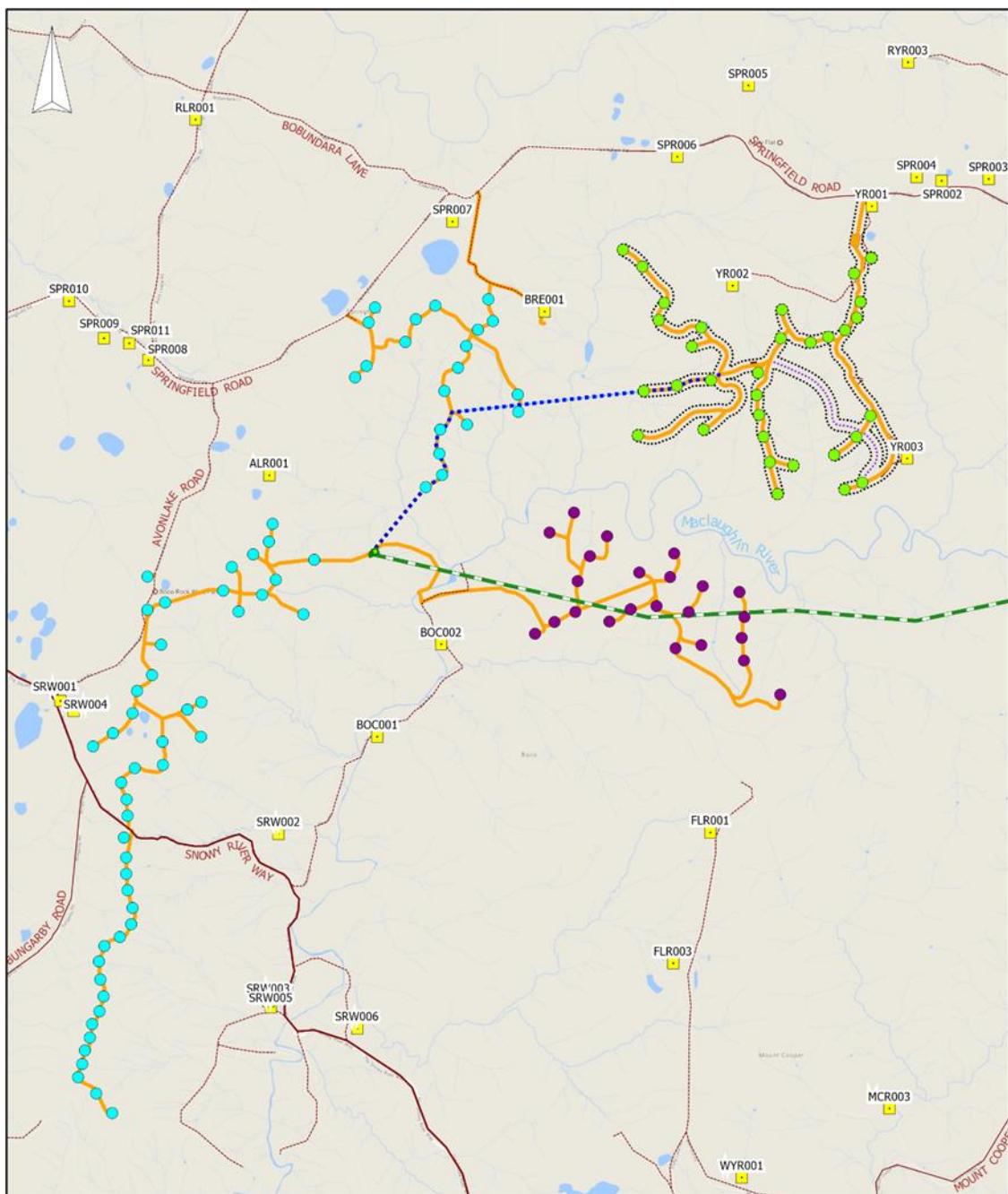
## 1.1 Background

Boco Rock Wind Farm (the Project) is an operating wind farm located approximately 6 km south west of Nimmitabel and 30 km north of Bombala in NSW within Snowy Monaro Regional Council (SMRC) area. The Project Approval was issued on 9 August 2010 permitting up to 122 wind turbine generators (WTGs) (Major Project Application 09\_0103). Stage One of the Project commenced construction in 2013 and operation of 67 WTGs commenced in 2015. Fifty-five remaining approved WTG locations in the Project, located within the Boco and Yandra clusters, are yet to be constructed. Figure 1 shows the design of the Project under the Project Approval.

In March 2018 amendments to the *Environmental Planning and Assessment Act 1979* (EP&A Act) took effect which removed the ability for Part 3A Project approvals to be modified under the former Section 75W of the Act. As a result of these amendments, the Project was declared a State Significant Development (SSD) by NSW Department of Planning, Industry and Environment (DPIE), formerly known as NSW Department of Planning and Environment (DPE) under clause 6 of Schedule 2 to the *Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017*. The declaration of the Project as an SSD does not change the Project Approval conditions.

Boco Rock Stage Two Pty Ltd (the Proponent) has applied to modify the Project Approval for the Yandra cluster only, Stage Two of the Project. The application for modification (the Modification) was prepared under Section 4.55 of the EP&A Act. The Modification was prepared giving due consideration to the existing Project Approval and the NSW Wind Energy Guidelines (DPE 2016a).

The Project Approval currently permits two alternate layouts within the Yandra cluster, comprising 32 WTGs in Layout Option 1 and 27 WTGs in Layout Option 2 (see Figure 2). The Modification confirms Layout Option 1 as the selected option and proposes fewer but larger WTGs than the original layout to accommodate technological advances in WTG design and manufacture. Layout Option 2 will no longer form part of the Yandra cluster. Details of the Modification are further discussed in Section 1.4.

**Figure 1: Project Overview****LEGEND**

- Stage 1 As Constructed - 67 WTG
- Stage 2 (Yandra Cluster) - 32 WTG
- Boco Cluster - 23 WTG
- Dwellings
- Substation
- Concrete Batching Plant
- Temporary Construction Compound
- ..... 100m Development Corridor
- Internal Road Layout
- Existing Sealed Rd
- - - Existing Unsealed Rd
- 132kV Double Circuit TL (existing)
- Cables (approved):
- Overhead Cables
- Underground or overhead

**SCALE BAR**

0

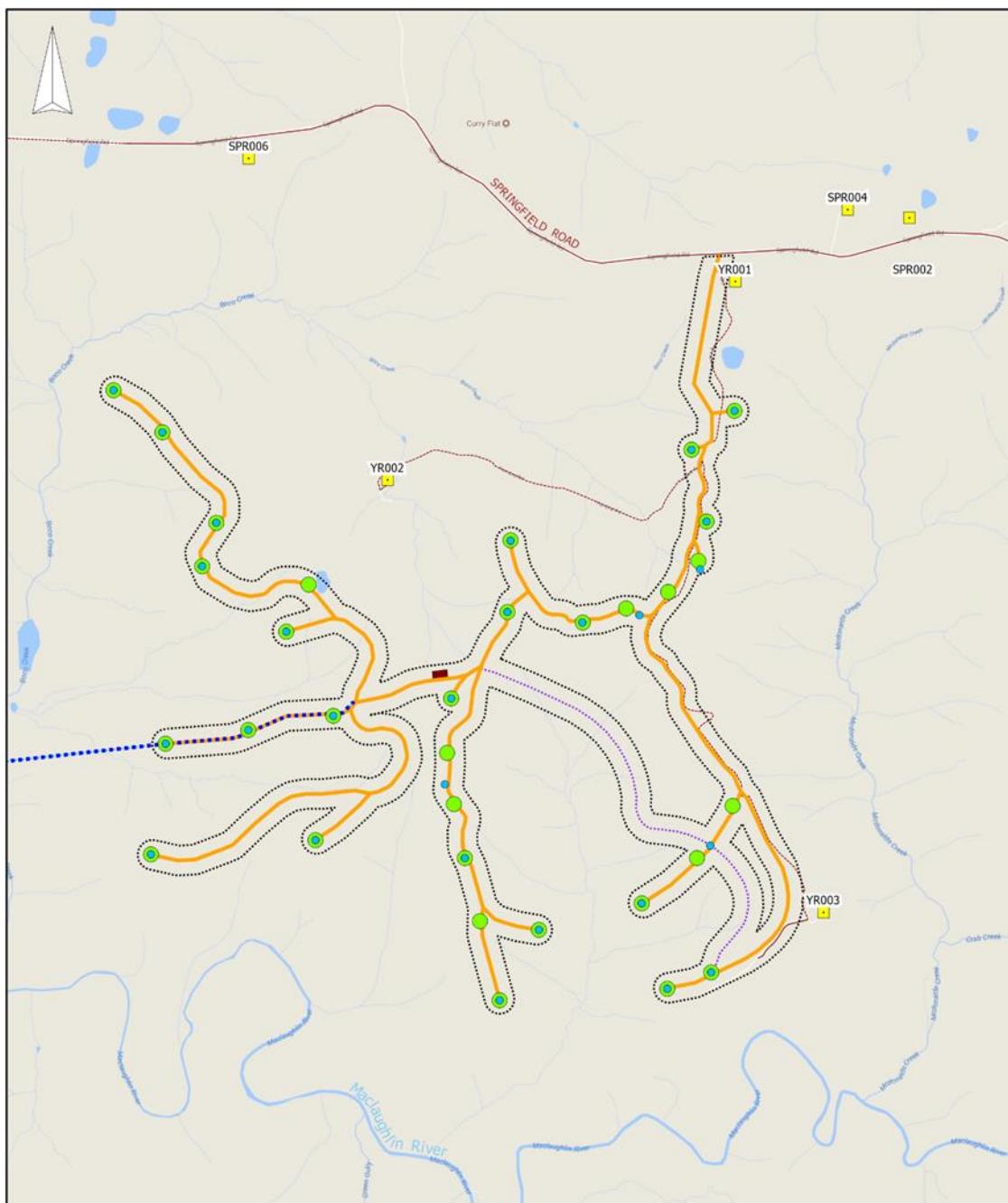
5 km

**COMPANY**

BOCO ROCK STAGE TWO PTY LTD

**TITLE**Figure 1:  
PROJECT OVERVIEW

DATE	SCALE	DWG NO	REV	VER
30 Aug 2018	1:110000	BRST013	A	3
DRAWN BY	CHECKED BY	SHEET	JOB NO	SIZE
J PETERSEN	M BRANSON	1 OF 1	130607	A4

**Figure 2: Yandra cluster as Approved****LEGEND**

- |                         |       |                                              |
|-------------------------|-------|----------------------------------------------|
| <b>Layout Option 1:</b> |       | 100m Development Corridor Cables (approved): |
| ● 32 WTG Locations      | ..... | Underground or overhead                      |
| <b>Layout Option 2:</b> | ----- | Overhead Cables                              |
| ● 27 WTG Locations      | ----- | Existing Roads:                              |
| ■ Dwelling              | —     | Sealed                                       |
| — Internal Road Layout  | —     | Unsealed                                     |
| ■ Concrete Batch Plant  |       |                                              |

**SCALE BAR**
**COMPANY**

BOCO ROCK STAGE TWO PTY LTD

**TITLE**
**Figure 2:  
YANDRA CLUSTER AS APPROVED**

DATE	SCALE	DWG NO	REV	VER
30 Aug 2018	1:45000	BRST014	A	3
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J PETERSEN	M BRANSON	1 OF 1	130607	A4

## 1.2 Public Exhibition

The request for Modification was made to the DPIE in the *Boco Rock Wind Farm Stage Two. Application for Modification; Environmental Assessment* (CWP, 2018) and was publicly exhibited over a period of 14 days from November 29 until December 13, 2018. The Modification was available online through the DPIE Major Projects website and in hard copy at the SMRC Cooma and Bombala offices. DPIE organised advertising material in the local paper and letters sent directly to neighbours of the project.

A total of 66 submissions were received from the public, organisations and government agencies. Fifty-one individual submissions, four organisation submissions and 11 government agency submissions were received. It is noted that two of the public submissions (one support and one comment) were duplicates and have therefore been excluded from the statistical analysis.

Of the individual submissions 47 % were in support, 49 % in objection and 4 % provided comment. 42 individual submissions (82 %) came from within the SMRC region, of which 45 % were in support, 50 % objected and 5 % provided comment. Of the four organisation submissions there were two objections, one submission in support and one comment. Eleven government agencies provided comment.

The Proponent's community engagement efforts prior to the Public Exhibition are documented in section 3.1 and included direct communication, community flyers and newsletters, a public open day, and local radio and newspaper publications.

## 1.3 Purpose of the Report

This Response to Submissions (RTS) has been prepared to document how the issues raised in the submissions have been considered and, where relevant, what actions have been taken. The RTS has been prepared in accordance with DPIE's *Responding to Submissions: Draft Environmental Impact Assessment Guidance Series (June 2017)* (2017 Guidance).

All issues raised in the submissions have been acknowledged and a response provided proportionate to the relevance of the issue. Statistical analysis of the submissions is presented in Section 2 using tables, figures and graphs to clearly identify the origins of the submissions, proximity to the Project / location, support for the Project and types of issues raised.

Submissions have been categorised as follows: government agency submissions (section 4.1), organisation / special interest group submissions (section 4.2) and public submissions (section 4.3). Separate and detailed responses have been provided for each of the government and agency /

organisation submissions. Public submissions have been categorised by issue type and a response by issue type provided to avoid repetition and allow a holistic response in accordance with DPIE's 2017 Guidance.

Where submissions have raised issues that have already been assessed in the Environmental Assessment (EA) and approved under the Project Approval, this is stated in the response and a reference to the relevant section of the EA provided. Similarly, where an issue has been raised that is unrelated to the proposed Modification, it is stated in the response.

Submissions are referred to by their Submission Statement Number (SSN) (a five-digit number, assigned by the DPIE) and listed in the Submissions Matrix located in Appendix A. A submissions Register located in Appendix B provides a cross reference for each submission made and issue addressed in this RTS for easy reference.

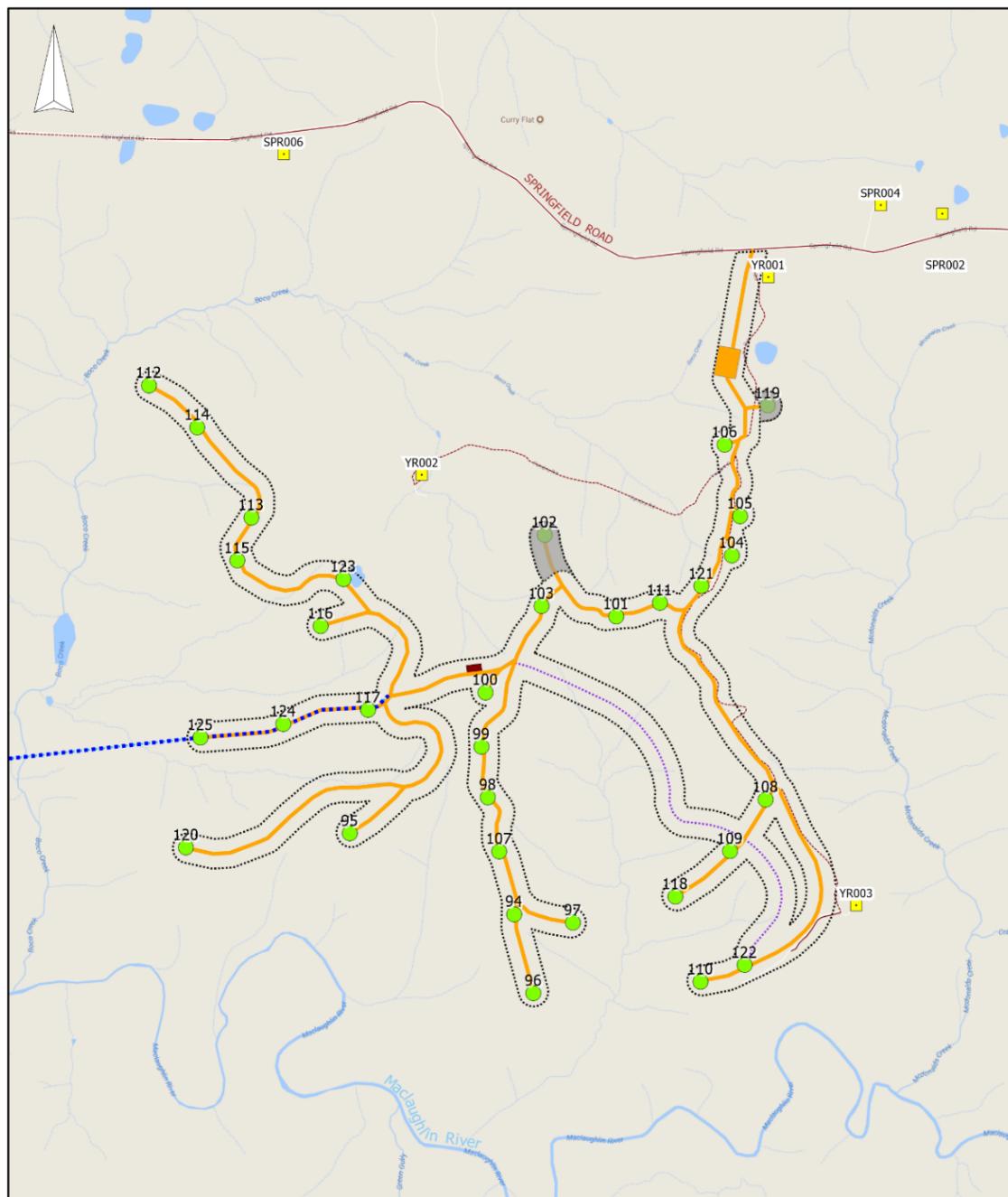
## 1.4 Overview of Exhibited Project

As described in the *Boco Rock Wind Farm Stage Two. Application for Modification; Environmental Assessment* (CWP: 2018), the proposed Modification (as exhibited) includes:

- A reduction in the number of approved locations for the Yandra Cluster from 32 to 30 (removing locations 102 and 119);
- A reduction in the number of approved WTGs to be constructed for Yandra Cluster from 32 to 20 (maximum);
- An increase in the size and capacity of WTGs to a 200 m tip height, to accommodate modern technology;
- Removing the 3.3 megawatt (MW) generating limit on individual WTGs; and
- Inclusion of a temporary construction compound within the Yandra cluster to minimise traffic and construction impacts.

It was proposed, consistent with the Project Approval, that flexibility be afforded to select up to 20 WTG locations from a possible 30 approved locations. Refer **Figure 3**.

**Figure 3: Proposed modification to Yandra cluster, 2018**



LEGEND		COMPANY			
<span style="color: green;">●</span> 30 WTG Locations	<span style="color: orange;">—</span> Internal Road Layout	BOCO ROCK STAGE TWO PTY LTD			
<span style="color: yellow;">■</span> Dwelling	<span style="color: orange;">—</span> Existing Roads:				
<span style="border: 1px dashed black; padding: 2px;">—</span> 100m Development Corridor	<span style="color: red;">—</span> Sealed				
<span style="border: 1px dashed grey; padding: 2px;">—</span> WTG locations removed	<span style="color: black;">- - -</span> Unsealed				
<span style="background-color: orange; color: white; padding: 2px;">—</span> Temp Construction Compound	<span style="color: black;">- - - -</span> Cables (approved):				
<span style="background-color: darkred; color: white; padding: 2px;">■</span> Concrete Batch Plant	<span style="color: blue;">· · · ·</span> Overhead Cables				
	<span style="color: black;">· · · · ·</span> Underground or overhead				
SCALE BAR		DATE	SCALE	DWG NO	REV
		30 Aug 2018	1:45000	BRST015	A
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		J PETERSEN	M BRANSON	1 OF 1	SIZE
					A4
0		1 km			

Following public exhibition and additional environmental assessment, additional project amendments are proposed as follows:

- A reduction in the number of approved WTG locations for the Yandra Cluster from 32 to 25 (removing locations 108, 109, 110, 118, and 122 in addition to 102 and 119);
- Locating the temporary construction compound slightly to the south of the location proposed in the Modification;
- Increasing the height of monitoring masts to WTG hub height;
- A commitment to contribute to the Community Enhancement Fund based on a 32 WTG layout; and
- Subdivision of the Project site to allow for the registration of long-term leases over the WTG locations.

It is now proposed, consistent with the Project Approval, that flexibility is afforded to install up to 20 WTGs from a possible 25 approved locations and removal of the south eastern cluster. These amendments are discussed and assessed separately in the Amendment Report (CWP 2020).

## 2 Analysis of Submissions

### 2.1 Submissions Received

A total of 51 individual, 4 organisation and 11 government agency submissions were received, analysed and addressed in this RTS as summarised in Table 1.

It is noted that two pairs of duplicate submissions were received. Only one of each pair has been included in the statistical analysis to remove bias from the analysis: one in support (submission 300703 was retained and 300707 was removed) and one providing comment (Organisation submission 300307 was retained and Individual submission 300864 was removed). Additionally, one submission which was hand delivered at SMRC office in Cooma was originally classified as a comment (303742), however the submission clearly states support for the Modification and has been re-categorised accordingly.

**Table 1: Submissions by type and position**

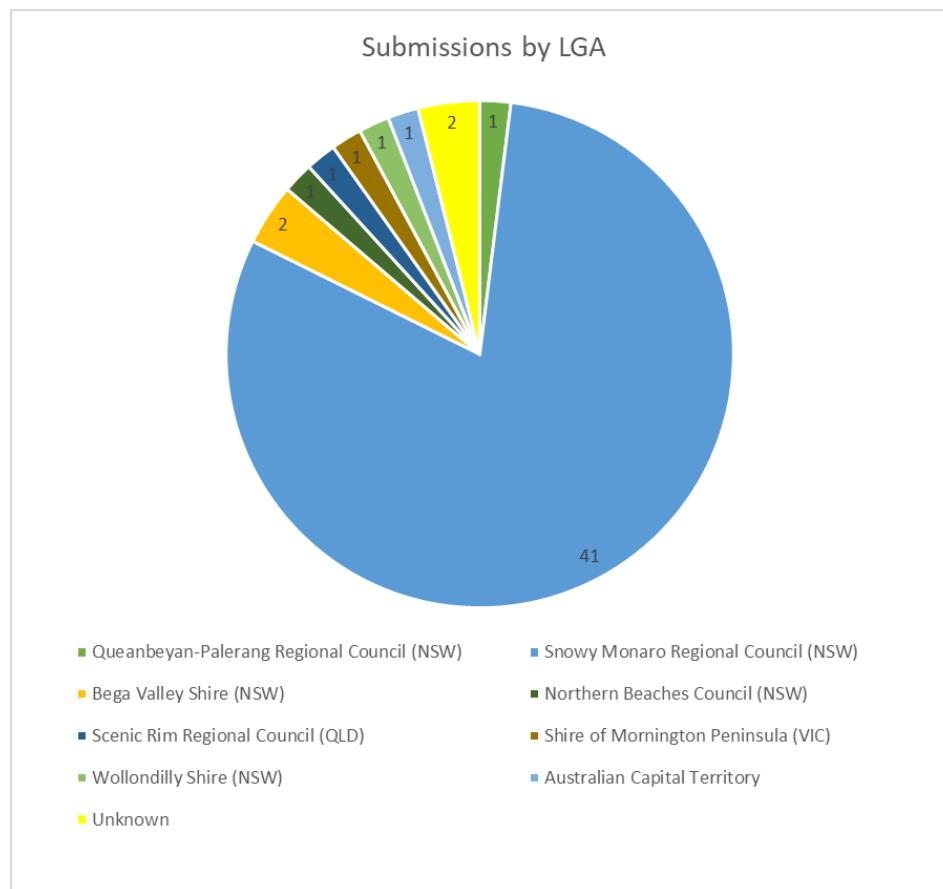
Type	Position	Number
<b>Government agencies</b>	Comment	11
	Support	0
	Objection	0
<b>Organisations</b>	Comment	1
	Support	1
	Objection	2
<b>Individuals</b>	Comment	2
	Support	24
	Objection	25
<b>Total</b>		<b>66</b>

## 2.2 Geographical Analysis

Individual submissions were analysed by the local government area (LGA) from which they were received.

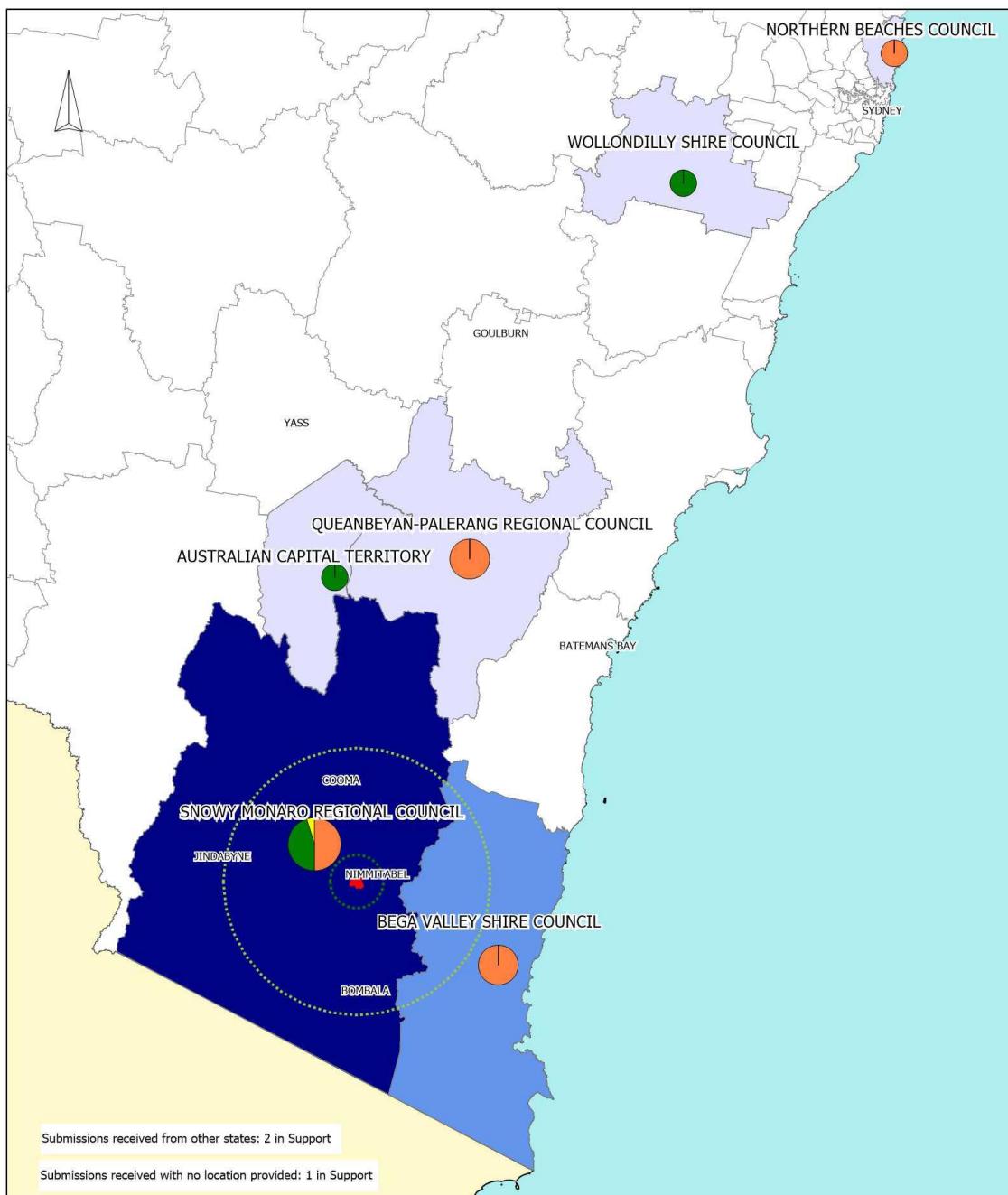
Figure 4 shows submissions originating from a total of eight LGAs (from Queensland, to Sydney, south to the NSW / Victorian border) and the number of submissions received within each LGA. A significantly large proportion of the submissions were received from the SMRC LGA, 41 of the 51 individual submissions, equivalent to 80 %. From each of the other seven LGAs only one or two submission were received. Two submissions were received from undisclosed locations in NSW.

Figure 4 and Table 2 further show the submissions received by LGA and categorises them by the position of the submission, be it an objection, support or comment. Of the 41 submissions received within SMRC LGA 51 % were objections (25), 44 % were in support (24) and 5 % (2) were comments.

**Figure 4: Pie chart showing number of submissions by LGA****Table 2: Submissions from Individuals by LGA**

LGA	Total number	Objects	Supports	Comment
Snowy Monaro Regional Council	41	21	18	2
Queanbeyan-Palerang Regional Council	1	1	0	0
Bega Valley Shire	2	2	0	0
Northern Beaches Council	1	1	0	0
Scenic Rim Regional Council	1	0	1	0
Shire of Mornington Peninsula	1	1	0	1
Wollondilly Shire	1	0	1	0
Australian Capital Territory	1	0	1	0
Unknown	2	0	1	0
<b>Total</b>	<b>51</b>	<b>25</b>	<b>24</b>	<b>2</b>

**Figure 5: Number of public submissions by LGA**



LEGEND		COMPANY	
Boco Rock Yandra Cluster 10 km project buffer 50 km project buffer Local Government Areas	Pie-chart showing number & stance of submissions: Support Objection Comment 1 submission 2 submissions 42 submissions	<b>BOCO ROCK STAGE TWO PTY LTD</b> 	
TITLE		NUMBER OF PUBLIC SUBMISSIONS BY LGA	
DATE	SCALE	DWG NO	REV
09 JAN 2019	1:1400000	BRST	A
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J PETERSEN	M BRANSON	1 OF 1	1
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			080401
			A3

## 2.3 Key issues

Submissions providing comment were received from 11 government agencies. Each of the agency submissions are included and addressed in detail in Section 4.1.

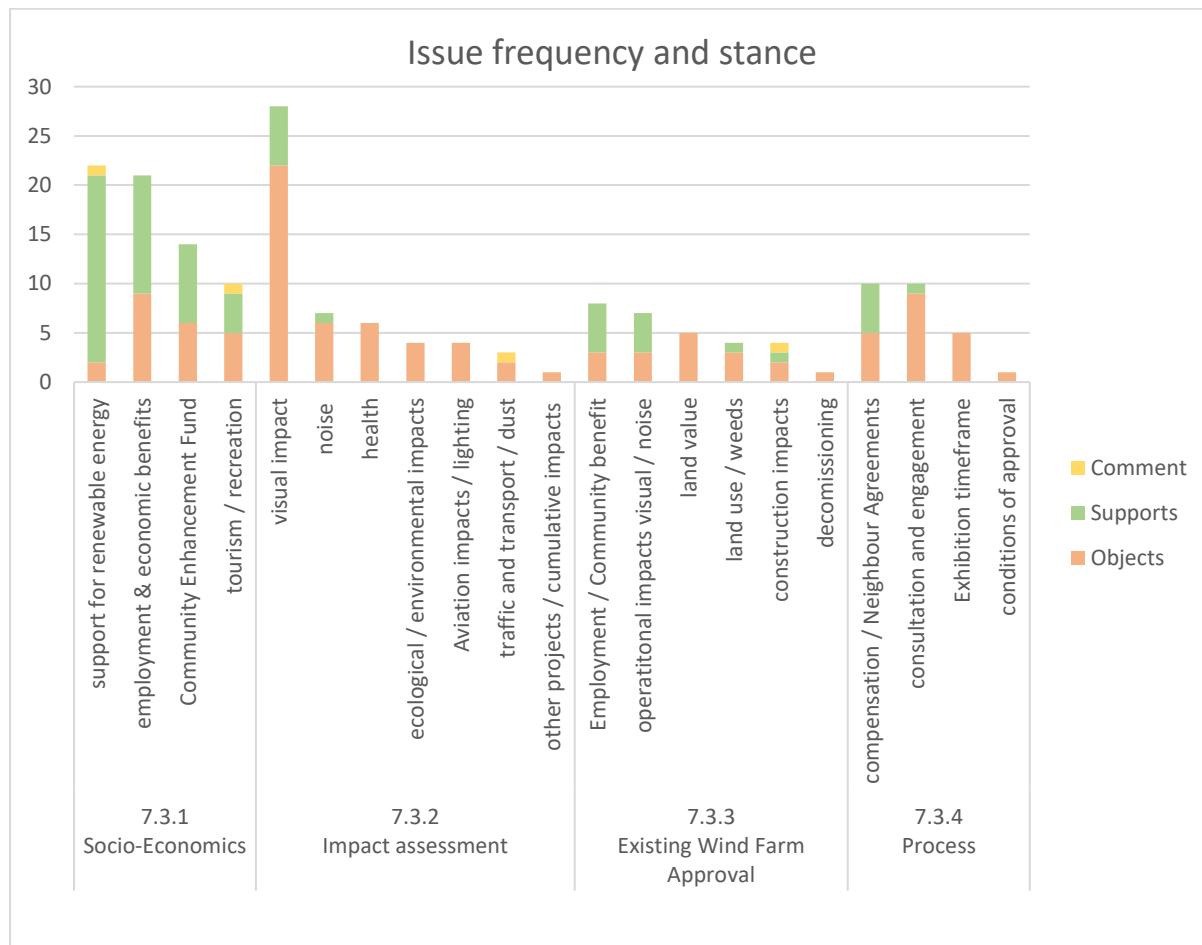
Four organisation / special interest group submissions were received of which one was in support, one contained comment and two objected to the Modification. Each of the organisation / special interest group submissions are included and addressed in detail in Section 4.2.

Each of the individual submissions were reviewed and considered in detail to identify the issues being raised, with an aim to understand the underlying issue for each individual community member or stakeholder. Key issues were identified and categorised into common themes for analysis in accordance with the DPIE's 2017 Guidance. Each theme is identified below and addressed in Section 4.3.

The four common themes arising from public submissions, listed in descending order of the frequency of issues raised, are:

1. Socio-economics (67): including employment, community enhancement fund, tourism/recreation and renewable energy.
2. Impact Assessment (53): including the anticipated impacts as well as methods and outcomes of the impact assessment.
3. Existing Wind Farm Approval (29): including matters which have already been assessed and approved under the Project Approval issued in 2010.
4. Process (26): including community consultation and engagement, duration of the public exhibition period and the use of Neighbour Agreements.

Figure 6 illustrates the number of public responses according to issues raised, grouped by themes and the stance of the submitter in relation to the Modification (support/object/comment).

**Figure 6: Issue Frequency and Stance**

A summary of each theme and its relationship to the proposed Modification is discussed below. Each of the identified issues are addressed in Section 4.3.

### **2.3.1    Socio-economics**

Socio-economics was the most referenced theme with 67 references within the submissions received. The majority of the submissions (64 %) were in support of the Project on the basis of support for renewable energy (19 submissions), employment and economic benefit (12 submissions), the community enhancement fund (eight submissions) and tourism generation (four submissions).

Nine Socio-economic objections to the Modification were also received in relation to employment and economics. Secondly, objections were made about the level of financial contribution paid to the Boco Rock Community Enhancement Fund (Community Enhancement Fund) (six submissions). Other objections were made in relation to lost tourism opportunity (five submissions) and renewable energy (two submissions).

These issues are addressed individually in Section 4.3. Specifically, the Community Enhancement Fund and the Proponents response is further described in ‘Community Enhancement Fund’, Section 4.3.1 and section 2 of the *Boco Rock Stage Two: Amended Modification Report*, February 2020 (Amendment Modification Report).

### **2.3.2 Impact Assessment**

53 submissions were made referencing the environmental impact assessment with 84 % being objections (45 submissions). The most common objection was in relation to visual impact (22 submissions), nine of which claimed deception and provision of misleading information by the Proponent during a community meeting. Other objections related to noise impact (six submissions), health impacts (six submissions), ecological (four submissions), aviation / hazard lighting (four submissions), traffic and transport (two submissions) and cumulative impact (one submission).

Section 4.3.2 summarises the issues and provides responses. Further comment from related government agencies is provided as follows: CASA (section 4.1.8); Airservices Australia (section 4.1.9) and the Department of Defence (section 4.1.11).

### **2.3.3 Existing Wind Farm Approval**

The Existing Wind Farm Approval theme captured submissions relating to impacts from the approved or operating wind farm which were addressed as part of the original project application and approved under the Project Approval. Twenty-nine submissions were received identifying land use / weeds, visual and noise, construction impacts, decommissioning, land value and employment / community benefit. 37 % of these submissions were in support of the Modification.

These issues are considered to be beyond the scope of the Modification and broadly represent personal views and opinions on the approved Project and wind farms in general. They are considered less relevant to the key themes of the proposed Modification and have been addressed accordingly in section 4.3.3.

### **2.3.4 Process**

The Process theme, for which 26 submissions were received, relate to the over-arching planning process in NSW and the requirements for modifications of State Significant Developments of which 80 % of the submissions objected to the Modification. The objections relate to consultation and engagement (nine submissions), compensation and the use of neighbour agreements (five submissions), the exhibition timeframe (five submissions) and conditions of approval (one submission).

Support for the Modification was received in relation to compensation and the use of neighbour agreements (five submissions) and consultation and engagement by the Proponent (one submission).

The issues are addressed in Section 4.3.4. Where submissions have a direct link with the proposed Modification the responses are more detailed and include references to the Modification and Project Approval where relevant.

## 3 Actions taken during and after exhibition

The following actions have been undertaken by the Proponent prior to, during and after public exhibition and in response to submissions received:

### 3.1 Engagement

The Proponent has engaged with the local community, Council and agencies to share information about the proposal, hear community feedback and review the proposal to address concerns.

#### 3.1.1 Agency Consultation

##### *Snowy Monaro Regional Council*

A meeting was held between the Proponent, the Manager of Works and the General Manager of SMRC in Cooma on March 7<sup>th</sup>, 2019 to discuss and address the comments in the Council submission. There was general agreement that the road dilapidation and maintenance measures implemented for Stage One could be improved. Further correspondence with the Council works team identified process improvements to be implemented for Stage Two to ensure road condition is adequately assessed, monitored and managed throughout construction (See Section 4.1.1 for submission and response).

##### *Office of Environment and Heritage (OEH) (now known as the Biodiversity Conservation Division of the DPIE)*

Phone and email correspondence was undertaken with the (then) OEH in relation to their submission to gain further understanding of the issues within the submission (refer Section 4.1.7 for submission and response).

#### 3.1.2 Community Consultation

##### *Snowy Monaro Regional Council*

The Proponent met with and presented to the Council and the public gallery at the General Meeting on 7 March 2019 at the Council Chambers in Cooma. The Proponent provided a presentation showing the results and key issues raised in public submissions, as well as information on visual impacts. The presentation included a question and answer session in relation to aspects of the proposal and views of the community and responses. A discussion was held in relation to the Community Enhancement Fund, as well as the wind farm approval process and information provided in the Modification. These issues are further addressed in the response to issues in Section 4.3.

The Proponent also consulted directly with Council regarding the Community Enhancement Fund, including discussions at recent CCC meetings with Council representatives and a letter to Council expressing the concerns reported to the Proponent about the current Community Enhancement Fund.

#### *Community Consultative Committee*

Three CCC meetings have been held since the public exhibition and submissions phase allowing time for the Proponent to consider submissions, meet with individuals and receive further feedback from the community. CCC meetings were held in Nimmitabel on 19 March 2019, 20 June 2019 and at the Boco Rock Wind Farm site office on 11 November 2019.

At the March meeting the Proponent provided a presentation including a summary of the results of the public exhibition process including the key issues raised in the submissions. Issues related to the Community Enhancement Fund and visual impacts were discussed in detail, as well as the adequacy of information within the Modification, all of which are further addressed in the response to issues in Section 4.3.

At the June meeting the Proponent provided an update on the responses to key submission themes, as well as further information on the Community Enhancement Fund approach.

The newly elected Mayor of Snowy Monaro Regional Council was present at the November meeting. The Proponent provided some background about the approved Project and the proposed Modification as well as an update on the status of the response to submissions. There was also a long discussion regarding the current Community Enhancement Fund and the impact of the Project benefiting recipients/programs.

CCC meeting minutes for all meetings are available on the Boco Rock Wind Farm website:  
<https://www.bocorockwindfarm.com.au/community-consultative-committee>.

#### *Landowners and Neighbours*

During and following the exhibition period some members of the community and local landowners contacted the Proponent to seek further information and raise concerns further to their submissions. Email responses and phone calls were used to provide information during the exhibition phase and offers were made to meet in person. Meetings were arranged and attended in March 2019 to respond to questions and clarify information for the community members.

Typically, issues raised in these meetings related to the visual impact of the Project on the landscape, as well as the potential effects of the Modification on the surrounding region which have been captured in the response to issues in Section 4.3.

## 3.2 Environmental Assessment

### 3.2.1 Noise Impact Assessment

The NSW Environment Protection Authority (EPA) requested a number of changes to the noise impact assessment report to provide greater clarity around the methodology used in the impact assessment and an explanation of the results. The background noise monitoring regression analysis has been explained and the compliance method for monitoring activities was expanded to require a Noise Compliance Test Plan to be prepared prior to commissioning of Stage Two. A further explanation of the update is described in Section 4.1.5 and the updated report is included as Appendix D.

It is noted that the Noise Impact Assessment is based on a layout of 30 possible WTG locations and does not incorporate the removal of WTG 108, 109, 110, 118 and 122. As such the resultant noise will be reduced in this south east section of the Yandra Cluster.

### 3.2.2 Traffic and Transport Impact Assessment

The Traffic and Transport Impact Assessment contained in Appendix G of the Modification Report has been updated to reflect an error in relation to the width of internal access roads. Previously the report stated that 12 m wide formed roads would be required, whereas the Modification requires internal access roads with an average carriageway width of 6 m. The report has been amended to refer to 6 m wide formed roads and is included as Appendix C.

### 3.2.3 Construction footprint review

The Proponent engaged a civil and electrical review of internal roads, electrical cables and associated infrastructure to assess the expected ground disturbance footprint. This review has been undertaken in response to the submission received from OEH which '*recommend that clarification be sought as to exact road widths and total vegetation clearing*'.

This review took into account wind farm components and increased WTG size, site access and onsite transport requirements, site topography and construction related impacts (including crane and assembly areas, cut and fill requirements, site compound and storage and laydown areas) and the revised WTG layout. This has provided further certainty of the construction infrastructure requirements and associated ground disturbance impacts to confirm the proposed Modification (as revised following public exhibition) meets the clearing requirements of the Project Approval and that the biodiversity offset requirements have been met.

The civil and electrical review estimate the following infrastructure requirements can be generally applied across the Yandra cluster:

- Average 6 m wide internal roads;
- Cut and fill batters assumed at 1 in 3, drainage at 1 in 3 and an additional 4 m provided for construction related impacts either side of the internal roads;
- 35 x 60 m hard stands, areas for crane pads, vehicle turning areas and erection and maintenance of WTGs;
- 24 m diameter WTG footings and associated construction areas;
- 150 x 200 m temporary site compound; and
- Electrical cables and associated construction areas up to 10 m wide.

Based on a worst-case 20 WTG layout and the civil and electrical infrastructure requirements outlined above, there will be an overall reduction in clearing resulting from the Modification. The review confirms that the net vegetation clearing is no greater than that assessed in the Project Approval and that clearing limits are expected to be met.

Table 3 shows a comparison between the 32 WTG layout assessed in the Project Approval and the 20 WTG layout, the subject of this Modification. The vegetation calculations in Table 3 have been revised from what was originally predicted in the Modification Report to more accurately reflect the civil and electrical infrastructure requirements (following this review) and the revised layout.

The indicative vegetation calculations for the 20 WTG layout assumes a worst-case layout for which it is not expected that there will be an exceedance of the approved 32 WTG clearing limits i.e. 62.51 ha of total vegetation clearing, 37.73 ha of Derived Grassland and 24.78 ha of Ribbon Gum-Snow Gum Open Forest. There may be minor variations to the clearing quantities between each of the vegetation types shown in Table 3, following micrositing and selection of the temporary compound location.

**Table 3: Vegetation impact comparison**

	Derived Grassland (Low)	Derived Grassland (Mod-Good)	Ribbon Gum- Snow Gum Open Forest (Low)	Ribbon Gum- Snow Gum Open Forest (Mod-Good)	Total (ha)
<b>Approved layout (32 WTGs)</b>					
<b>Total (ha)</b>	<b>8.60</b>	<b>31.67</b>	<b>6.10</b>	<b>19.62</b>	<b>65.99</b>
<b>Modification worst-case layout (20 WTGs)</b>					
<b>Total (ha)</b>	<b>5.65</b>	<b>32.08</b>	<b>6.38</b>	<b>18.40</b>	<b>62.51</b>
<b>Balance of change</b>	<b>Reduced by 2.95 ha</b>	<b>Increased by 0.41 ha</b>	<b>Increased by 0.28 ha</b>	<b>Reduced by 1.22 ha</b>	<b>Reduced by 3.48 ha</b>

## 4 Response to submissions

### 4.1 Government Agency Submissions

Eleven government agency comments were received which are replicated and addressed below.

#### 4.1.1 Snowy Monaro Regional Council

Reference	302886
Issue	<p>The engineering (roads) section provided comments in relation to the roads conditions in the original Part 3A consent for consideration:</p> <ul style="list-style-type: none"> <li>• <i>'The road dilapidation reports were less than effective, and this was agreed by both parties. The reports were disregarded early in the construction;</i></li> <li>• <i>The nomination of a suitably qualified expert to assess existing conditions produces a generic report of limited use;</i></li> <li>• <i>Traffic and Transport Impacts conditions 2.28 &amp; 2.29 refer to the Pre-Operational Dilapidation Report being done in consultation with Council, which is the opportunity to provide input and identify known problem or weak areas. These areas may appear satisfactory but will not perform well under additional Heavy vehicle volumes;</i></li> <li>• <i>Traffic and Transport Impacts condition 2.29 refers to the Pre-Operational Report identifying damage attributable to the construction but no reference is made to the Post-Operational Report. It is recommended that this be included in the modified approval if issued;</i></li> <li>• <i>The addition of an increased frequency of the construction vehicles will have a far greater impact than a small volume of overweight/oversize vehicles performing deliveries. For example, while the number of oversized vehicles may be reduced due to the reduction in the number of towers, the day to day increase in construction vehicles (concrete trucks, delivery vehicles etc) will have a significant impact on existing road conditions;</i></li> <li>• <i>The last stage required continuous monitoring and maintenance to maintain the level of service, and if this is done effectively by Council, then the developer will be left with a Post-Construction Dilapidation Report showing that all is acceptable, and the project has had no impact on the local road network;</i></li> <li>• <i>The concept that damage that occurs can wait to the end of a project and be remediated following the post construction dilapidation inspection, will not meet Community, or the contractor's requirements. Opportunities for the developer to contribute to ongoing maintenance of the local roads they impact should be put in place. It is recommended that this be incorporated into amended conditions; and</i></li> <li>• <i>The route clearance is of less concern as that will be assessed in detail to ensure no damage to the equipment.'</i></li> </ul> <p><i>One of our major concerns in relation to the modification proposal is the ongoing maintenance of the Council road network damaged during construction. The project must budget for and participate in maintaining the surrounding road network impacted by the construction.</i></p>

*We ask that the initial dilapidation report to be carried out in conjunction with Council and that regular road inspections are carried out in consultation with Council during construction on a monthly basis, as well as a commitment to maintain affected roads prior to the next inspection.*

*If the roads are maintained during construction, the Post-Construction Dilapidation Report should have little to identify. This will also reduce the impact on the community.'*

<b>Response</b>	<p>A meeting was held between the Proponent, the Manager of Works and the General Manager of SMRC in Cooma on March 7 2019 to discuss and address the comments in the SMRC submission. There was general agreement that the road dilapidation and maintenance measures implemented for Stage One could be improved to ensure the road condition was adequately assessed, monitored and managed.</p> <p>Correspondence included in Appendix E demonstrates agreement on the following commitments that would assist in delivering a better outcome for Council and road users throughout and following construction of Stage Two:</p> <ul style="list-style-type: none"> <li>• A pre-construction dilapidation assessment of Springfield Road (between Monaro Highway and Yandra Road) shall be undertaken by the Proponent in consultation with SMRC to determine the pre-existing road condition.</li> <li>• Visual inspection of Springfield Road to be undertaken throughout Project construction by SMRC at regular intervals (i.e. monthly) to monitor road condition and identify areas for repair.</li> <li>• The Proponent will be responsible for maintenance and repair of Springfield Road in response to issues identified in the visual inspections during construction of Yandra cluster.</li> <li>• Following construction, the Proponent will undertake a post construction dilapidation assessment and return Springfield Road to the pre-existing condition identified in the pre-construction dilapidation assessment.</li> <li>• The Traffic Management Plan will identify any other Council roads to be used for heavy vehicle or over-dimensional vehicle traffic during construction of Stage Two, once the source of supply materials is known, and the above dilapidation requirements will similarly apply to those roads.</li> </ul> <p>These requirements have been included in the Project's revised SoCs.</p>
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#### 4.1.2 Roads and Maritime Services

<b>Reference</b>	<b>301123</b>
<b>Issue</b>	The RMS notes having completed an assessment of the modification on the key state road Monaro Highway / Snowy Mountains Highway.
<p><i>'Noting the project approval for the Boco Rock Wind Farm Pty Ltd (SSD09_0103) including the applicants' commitment to the Boco Rock Wind Farm Preferred Project Report and the Response to Submissions, specifically relating to the Traffic Management Plan and over-size over-mass vehicle permits, RMS will not object to the state significant development modification in principle.'</i></p>	
<b>Response</b>	The Proponent thanks the RMS for their comment and notes the secondary approval requirements for a Traffic Management Plan and transport permits within the existing Project Approval.

#### 4.1.3 Department of Planning & Environment - Division of Resources & Geoscience

<b>Reference</b>	<b>301625</b>
<b>Issue</b>	<p>The Division of Resources &amp; Geoscience notes:</p> <p><i>'As the proposal does not intend to increase the foot print area of the wind farm nor intend additional biodiversity offsets (both of which have the potential to preclude access to known resources or exploration for future resource discovery and extraction), the Division has no concerns or issues to raise in relation to resource sterilisation at this stage.'</i></p>
<b>Response</b>	<p>The Proponent thanks the Division of Resources &amp; Geoscience for their comment, noting no further action is required at this stage.</p>

#### 4.1.4 Department of Industry

<b>Reference</b>	<b>308034</b>
<b>Issue</b>	<p><i>The department provides the following recommendations for consideration in assessment of the proposal.</i></p> <p><b>Recommendations:</b></p> <ul style="list-style-type: none"> <li>• <i>Temporary ancillary infrastructure construction sites should be located away from water courses, and any works on waterfront land should be undertaken in accordance with the Guidelines for Controlled Activities;</i></li> <li>• <i>Erosion and sediment controls should be addressed in the Contractors Environmental Management Plan.</i></li> </ul>
<b>Response</b>	<p>The Proponent thanks the Department of Industry for their comment and notes that the Project Approval currently requires a Construction Environmental Management Plan (CEMP). The CEMP shall include erosion and sedimentation control procedures and measures to locate temporary ancillary infrastructure away from watercourses. The Guidelines for Controlled Activities will be addressed when preparing the CEMP.</p> <p>These requirements have been included in the Projects revised SoCs.</p>

#### 4.1.5 Environment Protection Authority

<b>Reference</b>	<b>308028</b>
<b>Issue</b>	<p><b>Noise:</b></p> <ul style="list-style-type: none"> <li>• <i>Project criteria have not been derived and predicted noise levels have not been assessed for integer wind speeds at hub height, from cut-in to rated power, in accordance with the NSW Wind Farm Guidelines (2016).</i></li> </ul>
<b>Response</b>	<p>The background noise monitoring regression analysis was performed for wind speeds at wind turbine hub height. The predictions have been completed for a reference condition of 8m/s at 10m AGL which equates to 11.1 m/s at hub height. All relevant wording in the text, tables, assessment graphs and noise contours have been updated in the noise impact assessment report included as Appendix D. The following report sections have been updated: Section 1.1.3, Table 6, Table 9, Section 5.2 and Appendices A – C.</p>

<b>Issue</b>	<ul style="list-style-type: none"> <li>• <i>The predicted noise level increases over Stage 1 for the two different models of WTG considered (V150 and GE 5.3) show unexpected results in light of the sound power levels for these models as shown in Table 9 of the RNA. The GE 5.3 WTG has higher sound power levels at all wind speeds, and yet the predicted noise levels for the GE 5.3 are typically slightly lower in most cases, compared with the V150. The proponent should discuss the predicted WTG noise level increases in Table 11 of the RNA for the two different WTG models.</i></li> </ul>
<b>Response</b>	<p>The reason for the apparent inconsistency between the WTG sound power level differential and the differential changes in received noise level at receptors is a result of the frequency spectrum of each WTG model. Higher frequencies attenuate more readily over distance primarily due to air absorption. A WTG may have a higher sound power level than another WTG model, however, if the spectrum shape of the 'louder' WTG model is more dominant with mid and high frequencies then the received noise at a distant receptor (say 2-4 km away) may well be lower. At closer distances, where the effect of air absorption will not be as significant, the WTG with the highest sound power level will more likely have the highest received noise level.</p> <p>This can be seen in Table 11 of the report where at a close receptor, for example Benbullen, the increase due to Stage 2 shows the GE 5.3 scenario is 0.5 dBA higher compared to the V150 scenario. At most distant receptors the opposite can be the case.</p> <p>Table 9 has been updated and amended to include both 10m AGL as well as hub height (80m AGL) wind speeds.</p>
<b>Issue</b>	<ul style="list-style-type: none"> <li>• <i>The proponent should discuss how the noise performance of the Project will be validated post commissioning, and the steps that will be taken in the event of higher than expected noise levels at sensitive receivers.</i></li> </ul>
<b>Response</b>	<p>The Noise Impact Assessment has been updated with the following compliance method included as Section 6.1: A comprehensive Noise Compliance Test Plan (NCTP) will be prepared prior to commissioning of Stage 2 of the wind farm. The NCTP shall provide all details of the monitoring including considerations of the requirements of the 'Noise Monitoring' section of the NSW Department of Planning and Environment's <i>Wind Energy: Noise Assessment Bulletin</i> (December 2016), other the relevant guideline at the time. Post-commissioning noise performance validation will be completed within the time frame required by the Project Approval.</p> <p>The measures that will be undertaken in the event of a noise exceedance at sensitive receivers are identified in Section 6.2 "Adaptive Management" of the Noise Impact Assessment.</p>
<b>Issue</b>	<p><b><i>Variation of EPA Licence 20434:</i></b></p> <p><i>The EPA also notes that as the premises subject to this proposal is already licensed by the EPA, if the proposal is approved the proponent will need to submit separate formal application to the EPA to vary Licence 20434.</i></p>
<b>Response</b>	<p>Prior to commencement of construction of Stage Two, the Proponent shall engage with the EPA to secure all necessary licences, or variations to existing licences, under the relevant legislation at the time.</p>
<b>Issue</b>	<p><b><i>Water Pollution</i></b></p> <p><i>The proposal includes the construction and/or operation of a temporary construction compound, concrete batching plant and unsealed roads. To prevent water pollution at the</i></p>

premises, any construction, commissioning and operational activities at the premises should be undertaken and managed to prevent water pollution consistent with the publications:

- *Managing Urban Stormwater: Soils and Construction, Volume 1, 4th Edition (Landcom 2004) commonly referred to as the 'Blue Book'; and*
- *Managing Urban Stormwater: Soils and Construction, Volume 2C, Unsealed Roads (DECC, 2008).*

<b>Response</b>	The Project Approval currently requires preparation of a CEMP prior to commencement of construction, which shall include measures to prevent water pollution at the premises in accordance with the two documents identified above.  These requirements have been included in the Projects revised SoCs.
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#### 4.1.6 Office of Environment and Heritage – Heritage Division

<b>Reference</b>	<b>301621</b>
<b>Issue</b>	The OEH Heritage Division submission in its entirety:  <i>'The Heritage Division has no issues or concerns in relation to State Heritage matters.'</i>
<b>Response</b>	The Proponent thanks the OEH Heritage Division for their comment, noting that there are no issues to address in relation to State Heritage matters.

#### 4.1.7 Office of Environment and Heritage

<b>Reference</b>	<b>301127</b>
<b>Issue</b>	<p><i>The most notable issue is that the impact of the modification and the resulting offset requirement was not determined using the Biodiversity Assessment Method (BAM) as required by section 7.17 of the Biodiversity Conservation Act 2016 (BC Act).</i></p> <p><i>There are savings provisions that allow SSD modification applications to be considered under the previous legislation but only if:</i></p> <ul style="list-style-type: none"> <li>• <i>substantial environmental assessment was undertaken before 25 August 2017 (as determined in writing by the Secretary of the Department of Planning and Environment) and the application is made within 18 months of the Secretary's determination, or</i></li> <li>• <i>environmental assessment requirements were issued before 25 August 2017 and the application is made before 25 February 2019. If the environmental assessment requirements are reissued, the application must instead be made within 18 months of the reissue, but no later than 24 August 2020.</i></li> <li>• <i>if the authority or person determining the application for modification (or determining the environmental assessment requirements for the application) is satisfied that the modification will not increase the impact on biodiversity values.</i></li> </ul> <p><i>It is OEH's view that the mod will result in an increased impact on biodiversity values, through increased likelihood of bird and bat strike and potential increased vegetation clearing.</i></p> <p><i>Given this it is OEH's opinion that a Biodiversity Development Assessment Report (BDAR) is necessary to assess both the on-ground impacts and the prescribed impacts of bird and bat strike in a manner which complies with s 7.17 of the BC Act.'</i></p>

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<b>Response</b>	<p>The Modification includes an assessment of potential impacts to biodiversity and biodiversity values as defined under the <i>Biodiversity Conservation Act 2016</i> (BC Act) as well as additional biodiversity values prescribed in the <i>Biodiversity Conservation Regulation 2017</i> (BC Regulation). This was undertaken to ascertain the need for a Biodiversity Development Assessment Report (BDAR) in accordance with the BC Act. Potential impacts of the Modification on habitat suitability were assessed for each threatened bird and bat species considered likely to occur or known to occur in the Project area in accordance with the definition in Section 1.5 (2) of the BC Act.</p> <p>The Proponent submits that the consent authority can be satisfied that the Modification will not increase the impact on biodiversity values, and therefore that a BDAR is not required. Notably the results of an additional civil and electrical design review (summarised in Section 3.2.3) indicate that there is likely to be an overall reduction in vegetation clearing resulting from the Modification. This and additional reasons are detailed below.</p>
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#### **Bird and Bat Strike**

A Bird and Bat Impact Assessment has been undertaken by Brett Lane and Associates (BLA) to analyse the potential above-ground impacts of the Modification on biodiversity (refer Appendix D of the Modification report).

The Bird and Bat Impact Assessment considered not only the original baseline data for the Project, but also the results from four years of detailed operational bird and bat monitoring that has been undertaken by NGH in accordance with the Project's approved Bird and Bat Adaptive Management Plan (BBAMP). The report considered all bird and bat species having been recorded on site, as well as those with any potential to occur, and evaluated the risk of collision for those species.

#### **Bird Species**

With regards to bird species, the assessment states the following:

*Most birds recorded at BRWF were common, widespread species of partly wooded agricultural landscapes in south-eastern Australia. No species listed as rare or threatened under the EPBC Act were recorded. Of the BC Act listed species recorded or considered likely to occur, none have a significantly increased risk of collision with the modified turbines in Stage 2. Overall the proposed modification will decrease risk to species flying below 100 metres as the total extent of the RSA below 100 metres has decreased across the wind farm.*

*In the Yandra cluster the minimum RSA has been lifted from 30 metres to 40 metres and the number of turbines reduced from 32 to 20. For these reasons, the proposed modification is not likely to lead to additional impacts of concern at a population scale. This will result in a decrease in risk will not have a significant impact on any populations given the low frequency of occurrence of at-risk BC Act listed species in the area.*

*The modification will increase the risk of collision for those few species typically recorded flying over 100 metres including Wedge-tailed Eagles (WTE), other high-flying raptors and White-throated Needletails (WTNT). Overall, the risk to the WTE and WTNT from collision with turbines was considered to be low given the low number of birds utilising the site, the low frequency with which these flights occur and the non-threatened status of these species in mainland Australia.*

#### **Bat Species**

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Two threatened bat species have been recorded on site during pre-construction or operational surveys: Eastern Bentwing Bat and Eastern False Pipistrelle. The assessment found that the Modification will reduce the extent of turbine RSA below 100 metres and thus will reduce the risk of collision with WTGs for these species. Two other threatened bats (Yellow-bellied Sheathtail Bat and Large-footed Myotis) have the potential to occur on site but have not been recorded on site during any of the pre or post-construction surveys between 2008 and 2018. Collision risk for these species is therefore considered negligible and any change in collision risk is unlikely to have a significant impact on the population of either species given they are yet to be recorded on site.

The assessment found that for non-threatened bats, the increased RSA above 100 meters will increase potential for interaction with WTG:

*Only two bat species are regularly recorded above one hundred meters, these are the White-striped Freetail Bat and Gould's Wattled Bat...It is likely that an increase to RSA area and height through turbine modifications will increase collision risk for these species. As these species are widespread and common across Australia, this increase is unlikely to impact significantly upon their populations.*

As a result of their detailed assessment, using the original baseline data as well as four years of operational BBAMP monitoring data as a basis, BLA concluded the following for birds and bats:

- a) *The overall impacts to threatened species and consequently their abundance as a result of the modification will not increase;*
- b) *Overall there is a net reduction in impacts to habitat suitability as a result of the proposed Modification;*
- c) *the Modification will reduce the overall impact of the wind farm on vegetation abundance;*
- d) *the modification will not increase the overall impact of the wind farm on habitat connectivity*
- e) *overall the modification will not impact negatively on threatened species of birds and bats insofar as the movement over the site would contribute to the species lifecycle, particularly as few species of threatened birds and bats regularly use the site;*
- f) *flight path integrity is considered not to be affected by the proposed Modification. Fewer turbines will present fewer potential barriers to flight paths.*
- g) *The modification does not propose any changes that would influence impacts to water sustainability.*

#### **Vegetation Clearing**

During the development of Stage Two, an approach of avoidance was adopted to ensure that on-ground impacts to biodiversity would not exceed the Project Approval despite the increase in WTG, hardstand and footing dimensions and the addition of a temporary construction compound. This was achieved by reducing the number of WTGs to be installed (from 32 to up to 20), reducing the average road width from 12 m to 6 m, removing the south eastern section of the Yandra cluster and removing unnecessary roads, cable routes hardstands and footings.

A civil and electrical review has been conducted since the Modification Report which confirms the following infrastructure requirements can generally be applied across the Yandra cluster:

- Average 6 m wide internal roads;
- Cut and fill batters assumed at 1 in 3, drainage at 1 in 3 and an additional 4 m provided for construction related impacts either side of the internal roads;
- 35 x 60 m hard stands, areas for crane pads, vehicle turning areas and erection and maintenance of WTGs;
- 24 m diameter WTG footings and associated construction areas; and
- Electrical cables and associated construction areas up to 10 m wide.

Based on these assumptions, there will be an overall reduction in clearing resulting from the Modification. The review confirms that the net vegetation clearing is no greater than that assessed in the Project Approval and that clearing limits are expected to be met. Refer Section 3.2.3.

#### **Summary**

It is not expected that the proposed Modification will contribute to an increased impact on biodiversity values as defined under the BC Act or BC Regulation compared to the approved Project based on:

- the BLA assessment on bird and bat strike, which concludes that the Modification will be reducing the number of turbines, and associated infrastructure, thus will not increase impacts to the biodiversity values identified in Section 1.4 of the BC Regulation compared with the previously approved project and associated turbine specifications (see section 4 of Appendix D of the Modification Report for the full conclusion);
- confirmation through the civil and electrical design review that there is likely to be an overall reduction in vegetation clearing resulting from the Modification; and
- the offsets established for the Project in 2015 have offset all impacts for the Project, despite only 67 of the 122 approved WTGs being constructed. Therefore, the impacts from both Stage One and Stage Two of the Project have already been offset in full.

Therefore, it is considered that a BDAR is not required.

<b>Issue</b>	<b>Aboriginal Cultural Heritage:</b>
	<ul style="list-style-type: none"> <li>• <i>The proposed modification will increase harm to Aboriginal objects, but the harm has already been considered during the 2009 assessment.</i></li> <li>• <i>OEH cannot comment on any possible impacts to Aboriginal cultural values as no information has been supplied regarding whether the Registered Aboriginal Parties have been consulted as part of the proposal.</i></li> <li>• <i>OEH support the preparation of a Heritage Management Plan to ensure all construction impacts, including unexpected finds, are managed appropriately during construction and throughout the life of the Project.</i></li> </ul>
<b>Response</b>	<p>The impacts of the proposed Modification to the approved Project have been assessed (see section 4.4 of the Modification Report) and impacts were found to be the same as permitted under the 2010 Project Approval (ie. no increase harm due to the Modification).</p> <p>The Heritage Impact Report included as Appendix E in the Modification states:</p> <p style="padding-left: 40px;"><i>Seven Aboriginal object locales are present in the 11 Survey Units of the Yandra Cluster. They are all assessed to be of low heritage significance and a management</i></p>

*strategy of unmitigated impact was originally recommended and remains valid. That is, impacts are permissible, and impact mitigation is not required.*

*An updated AHIMS site search has been undertaken which has identified no additional sites in the Stage 2 area other than those recorded in 2009*

Due to the very minor on-ground changes to the Project footprint, and the outcome of the Heritage Impact Assessment (i.e. that none of the changes will affect heritage values), it was deemed that consultation with the Registered Aboriginal Parties (RAPs) in relation to the Modification was not warranted.

The Proponent notes that preparation of a Heritage Management Plan prior to commencement of construction is a requirement of the Project Approval, and such plan would be prepared in consultation with the RAPs.

<b>Issue</b>	<b>Habitat Associations:</b>  The Yandra cluster is situated in a patch of Ribbon Gum - Snow Gum open forest with a much higher proportion of trees than Stage 1 of the wind farm, providing very different fauna habitat.
<b>Response</b>	<p>The Yandra cluster is situated in a patch of Ribbon Gum - Snow Gum open forest with a much higher proportion of trees than Stage 1 of the wind farm, providing very different fauna habitat. This is a low, open forest type which is characterised by the dominance of Snow Gum (<i>Eucalyptus pauciflora</i>) and Ribbon Gum (<i>Eucalyptus viminalis</i>) to 30 m with the occasional Mountain Gum (<i>Eucalyptus dalrympleana</i>) (ELA 2009).</p> <p>Habitat associations within a low open forest are more pronounced for fauna species with forest-dependant characteristics, such as those reliant on hollows or whom forage amongst foliage within the canopy. Fauna habitats at Yandra have been identified to have a greater prevalence of arboreal and hollow dependant fauna with hollow bearing trees which are largely undergoing senescence and showing no signs of recruitment (ELA 2009).</p> <p>The Modification has demonstrated that there will be reduced on-ground impacts to fauna habitat and the proposed Modification is expected to generate a net gain in habitat suitability, as defined under Section 1.5 of the BC Act, for terrestrial species within the Project site. In section 4.3.1 of the Modification Report which notes:</p> <p><i>Forest-dependant bird species and those which may fly at canopy height are more likely to be found at Yandra than in other clusters. However, these species are less susceptible to rotor strike impacts than birds and bats which fly at height and forage over a larger range and can be found widely across a range of habitats. Despite the vegetation communities differing across the Project site, Yandra cluster is only approximately 2 km from Stage 1 and the regional fauna associations for birds and bats which may fly at or above RSA are consistent across the Project site.</i></p> <p>In the Bird and Bat Impact Assessment, BLA noted that:</p> <ul style="list-style-type: none"> <li>• <i>Between 30-40 metres the cumulative area of the RSA in this height bands will be decreased by 27% with a reduction in risk to birds and bats. This is an area where a higher level of birds and bat activity is recorded compared to higher heights where birds and bats may fly.</i></li> <li>• <i>Between 40-100 metres cumulatively there will be a decrease in RSA across the wind farm between 1% and 16% when compared to the approved turbines. This is an area where higher flying species of birds and a few species of bats are recorded; and</i></li> </ul>

- Over 100 metres in height the risk to birds and bats will incrementally increase, albeit with fewer turbines. There are few flights at these heights, however if they do occur, they are typically high-flying bat species and higher-flying birds, e.g. raptors and the White-throated Needletail. These are discussed in the following section.

Therefore, by removing RSA below 40 m, and decreasing the cumulative RSA below 100 m, the Modification will reduce impacts to low-flying bird and bat species associated with the low-open forest types found at Yandra. Increased impacts to birds and bats flying above 100 m are likely to be experienced by those species which are higher-flying such as raptors and White-throated Needletail which are more influenced by landscape scale influences than local habitat associations.

<b>Issue</b>	<b>Rotor Swept Area Increase:</b>  There will be a 48% increase in the RSA in the Yandra cluster of 130,288 m <sup>2</sup> . Bird and bat strike is a prescribed impact in the BAM, and should be assessed accordingly. While the Mod states that this is an increase of 8% in RSA across the entire wind farm, it is a significant increase in impact at Yandra.
<b>Response</b>	The Project Approval granted in 2010 permits the construction of up to 122 WTGs and was granted based on the impact assessment which evaluated biodiversity impacts across the entire Project site. The Project established an offset for the Project in accordance with the Project Approval, which commenced management in 2015. The offset accounts for 100 % of the approved Project impacts across the original 122 WTG sites and associated infrastructure, despite only 55 % of the WTG sites being constructed.  It is important to note that the Modification of Stage Two, when combined with the existing operational Stage One infrastructure, would remain within 90 % of the approved RSA limits (refer to Table 4 below). In their submission OEH fails to note the time-gain benefits to biodiversity associated with establishing 100 % of the biodiversity offset prior to any of the Yandra or Boco cluster impacts being incurred. If the modified Yandra cluster is approved, and if all 20 WTG sites are constructed (noting that currently 32 WTGs are approved), the RSA impacts considered in the biodiversity offset remain within the approved limits as accounted for within the Project offsets established in 2015.

**Table 4: Rotor Swept Area comparisons**

	<b>Project Approval</b>	<b>Stage One (as built)</b>	<b>Stage Two (proposed)</b>	<b>Stage One and Two combined</b>
WTGs	122	67	20	87
RSA (m <sup>2</sup> total)	1,036,374	526,217	402,124	928,341
Percentage of approved RSA	100 %	51 %	39%	90 %

For the reasons stated above in response to ‘Habitat Associations’, the changes at RSA height above Yandra cluster are expected to reduce impacts to those species which have strong habitat associations with the low open forest types found there. The removal of RSA below 40 m has removed the potential for interactions with low flying species below this height and the decrease in cumulative RSA below 100 m will further reduce impacts to species flying up to 100 m.

Despite the changes in RSA, the independent assessment undertaken by BLA, which evaluated the baseline studies as well as the four years of operational BBAMP monitoring undertaken by NGH, has concluded that overall impacts would not be increased due to the Modification as summarised above. The report conclusion states:

*it is not considered that the proposed modification represents a significant change in impact on habitats, connectivity, movements, water quality, turbine collision risk and vehicle impacts compared with the previously approved project and associated turbine specifications and layout for the listed species recorded or with the potential to occur in the affected area.*

<b>Issue</b>	<p><b>Road width and impact calculations:</b></p> <p><i>The EA states that the impact of the roads will be halved as the road width will be reduced to six metres reducing the impact by 13.2 hectares of road area. The EA states that this reduction is based on the developer's experience constructing stage 1 (page 10). However, it is difficult to understand how this can be the case as the rotors are much longer than those used in stage 1 and OEH staff observed road widths of 20-30 metres on this wind farm when attending a compliance inspection on 17/12/14. We are concerned that these adjustments may not be realistic and that the reduction in clearing may be significantly over-estimated.</i></p> <p><i>OEH notes that Appendix G (transport assessment) shows no change to the approved road width of 12m (page 6).</i></p> <p><i>It is unlikely that the fringing disturbance area along roadsides will be rehabilitated to its original vegetation type, thus making them permanent impacts. Cut and fill and shoulder areas should also be considered in impact calculations.</i></p> <p><i>We recommend that clarification be sought as to exact road widths and total vegetation clearing.</i></p>
<b>Response</b>	<p>To confirm the road widths and total vegetation clearing, the Proponent has engaged a civil and electrical review of internal roads, electrical cables and associated infrastructure (eg. roads, hardstands, crane pads, footings, turning areas, temporary construction compound) to ascertain the likely ground disturbance footprint as detailed in Section 3.2.3.</p> <p>The review has confirmed that on average 6 m roads are appropriate for construction and operation of the project despite the transportation of longer blades on site. The initial Project Approval predicted that 12 m wide roads may be required for the use of track-mounted 'crawler' cranes (refer section 3.5.2 of the EA). It has since been confirmed that mobile tyre mounted cranes will be used which will not require 12 m wide roadways, rather 6 m.</p> <p>As such, it is predicted that an average 6 m wide roadway will be required, and the estimated disturbance footprint will vary depending on site topography and the final WTG layout. Cut batters have been assumed at 1 in 3 and fill batters have been assumed at 1 in 3, drainage at 1 in 3 and an additional 4 m provided for construction related impacts (fringe disturbance). All these areas have been included in the impact calculation prediction including area that will be rehabilitated e.g. both temporary and permanent impact areas.</p> <p>On review of the design it is acknowledged that clearing will not be reduced by 13.2 ha as previously stated in the Modification Report and that this was an over-estimation. The review has confirmed however, that it is not anticipated that clearing will exceed a total of 65.99 ha of clearing, nor the Project Approval limits. Based on a worst-case 20 WTG layout, it is estimated that 62.51 ha of vegetation will be cleared. <b>Error! Reference source not found.</b></p>

shows the approximate parameters for Project Components in the Yandra cluster and a comparison of the vegetation impact in Table 3.

The Transport Assessment has been updated to reflect the average 6 m road widths on the Project site.

#### 4.1.8 Civil Aviation Safety Authority (CASA)

<b>Reference</b>	<b>301629</b>
<b>Issue</b>	<i>'As the Wind Farm is remote from any certified or registered aerodromes, there are no identified visual flight rules air routes in the area and no significant aerodrome pairs that would generate aircraft passing directly over the site, the proposal is unlikely to constitute a hazard to aviation safety and CASA does not recommend the need for aviation hazard lighting.'</i>
<b>Response</b>	The Proponent thanks CASA for their comment and notes that aviation hazard lighting is not recommended.
<b>Issue</b>	<i>As military aircraft operate to lower heights than civilian aircraft, the Department of Defence should be consulted to ensure that they do not have concerns with the wind farm not being lit. Should the planning authority or Defence require lighting CASA would recommend that the wind farm be lit with steady red medium intensity lighting at night as per subsection 9.4.7 of the CASA Manual of Standards (MOS) Part 139</i>
<b>Response</b>	Noted. The Department of Defence has been consulted regarding the Modification and their response is included in section 4.1.11 below.
<b>Issue</b>	<i>The coordinates and estimated survey heights of each turbine must be reported to the Airservices Australia by email at vod@airservicesaustralia.com for publication on aviation charts. The proponent must also provide advice to Airservices at least one month before construction commences so that a NOTAM (Notice to Airmen) can be published advising pilots that tall structures will be constructed in the area.</i>
<b>Response</b>	Noted. The Proponent will provide the final coordinates of the WTGs to the relevant aviation authorities in accordance with the Project Approval requirements.

#### 4.1.9 Airservices Australia

<b>Reference</b>	<b>303547</b>
<b>Issue</b>	<i>'With respect to procedures designed by Airservices in accordance with ICAO PANS-OPS and Document 9905, at a maximum height of 1298m (4259ft) AHD, the wind turbines will not affect any sector or circling altitude, nor any instrument approach or departure procedure at Cooma-Snowy Mountains Airport or Cooma-Polo Flat landing site. The wind turbines will not affect any air route or lowest safe altitude (LSALT). Note that procedures not designed by Airservices at Cooma-Snowy Mountains Airport or Cooma-Polo Flat landing site were not considered in this assessment.' This wind farm, to a maximum height of 1298m (4259ft) AHD, will not adversely impact the performance of Precision/Non-Precision Navigational Aids, HF/VHF Comms, A-SMGCS, Radar, PRM, ADS-B, WAM or Satellite/Links.</i>
<b>Response</b>	The Proponent thanks Airservices Australia for their comment.

#### 4.1.10 NSW Rural Fire Service

<b>Reference</b>	<b>308030</b>
<b>Issue</b>	<p>The New South Wales Rural Fire Service (NSW RFS) has reviewed the information provided and raises no objections to the proposed modification subject to the development complying with the following conditions:</p> <ol style="list-style-type: none"> <li>1. Essential equipment should be designed and housed in such a way as to minimise the impact of bush fire on the capabilities of infrastructure to provide communication during bush fire emergencies. In this regard, the substation and other new buildings shall be constructed to comply with Australian Standard AS3959-2009 <i>Construction of buildings in bushfire-prone areas</i>.</li> <li>2. A minimum of 20,000 litres of water shall be provided for fire fighting purposes in accordance with Section 4.1.3 of <i>Planning for Bush Fire Protection 2006</i>.</li> <li>3. A 10metre Asset Protection Zone (APZ) shall be provided around the proposed turbines, substation and control building to the standard of an Inner Protection Area (IPA) as outlined within section 4.1.3 and Appendix 5 of Planning for Bush Fire Protection 2006 and the NSW Rural Fire Service's document Standards for asset protection zones.</li> <li>4. An operation plan shall be prepared which details measures to prevent fires igniting during the construction phase and the operation of the wind farm including: <ul style="list-style-type: none"> <li>• Work involving risk of ignition that should not be carried out during a total fire ban;</li> <li>• Availability of fire suppression equipment;</li> <li>• Storage and maintenance of fuels and other flammable materials; and</li> </ul> </li> </ol> <p>Notification of the local NSW RFS Fire Control Centre for works propose to be carried out during high fire danger periods to ensure weather conditions are appropriate.</p>
<b>Response</b>	<p>The Proponent thanks the NSW Rural Fire Service for their comment and notes the compliance conditions discussed, the Proponent appreciates the importance of emergency response and hazard risk management. Prior to the commencement of construction of Stage Two, the existing Emergency Response Plan (ERP) for the Project will be amended to specifically address the requirements stated above. The ERP will be stored in a prominently located 'emergency information cabinet' during construction and will form part of the induction for all site personnel.</p>

#### 4.1.11 Department of Defence

<b>Reference</b>	<b>325382</b>
<b>Issue</b>	<p><i>Defence's review of the proposed stage 2 modification has not identified any adverse impacts on Defence flying operations or communications. Whilst Defence has not identified a specific requirement for aviation hazard lighting, should this be installed in future, any lighting and marking of the towers should be in accordance with Section 9.4 of the CASA Manual of Standards 139. Should the proposal incorporate any LED obstruction lighting, Defence requests that the frequency range of the LED light emitted falls within the range of wavelengths 655 to 930 nanometres. This will assure the towers are visible to aircrew using night vision devices.</i></p>

<b>Response</b>	The Proponent thanks the Department of Defence for their comment and notes that aviation hazard lighting is not recommended by CASA and is not proposed to be installed by the Proponent.
<b>Issue</b>	<i>Defence would like to highlight the National Airports Safeguarding Framework Guideline D: "Managing the Risk to Aviation Safety of Wind Turbine Installations (Wind Farms) / Wind Monitoring Towers". It provides appropriate guidelines to address the risk to aviation arising from the development, presence and use of wind farms and wind monitoring towers.</i>
<b>Response</b>	The Proponent has reviewed the guidelines referenced above and notes that the Aviation Impact Assessment in the Modification included an assessment of risks to aviation from the Project consistent with these guidelines.
<b>Issue</b>	<p><i>There is an ongoing need to obtain and maintain accurate information about tall structures so that this information can be marked on aeronautical charts. Marking tall structures on aeronautical charts assists pilot navigation and enhances flight safety. Air Services Australia (ASA) is responsible for recording the location and height of tall structures. The information is held in a central database managed by ASA and relates to the erection, extension or dismantling of tall structures the top of which is above:</i></p> <ul style="list-style-type: none"> <li><i>a. 30 metres AGL, that are within 30 kilometres of aerodrome, and</i></li> <li><i>b. 45 metres AGL elsewhere.</i></li> </ul> <p><i>The 200 metre turbines meet the requirements for reporting of tall structures. Defence therefore requests that the applicant provide ASA "as constructed" details.</i></p>
<b>Response</b>	Noted. The Proponent will provide the final coordinates of the WTGs to the relevant aviation authorities in accordance with the Project Approval once construction is completed.

## 4.2 Organisation Submissions

Four submissions were received from organisations and special interest groups. One submission supported the Modification, one submission made comment and two submissions objected to the Modification. Issues raised in each of the organisation submissions are provided below with corresponding responses to each issue.

### 4.2.1 Australian Wind Alliance

Australian Wind Alliance (AWA) is a community-based organisation with over 700 financial members including landowners, businesses and community members.

<b>Reference</b>	<b>300770</b>
<b>Issue</b>	The Australian Wind Alliance provides support for the Modification due to reduced impact to visual and noise amenity, and reduction in vegetation disturbance. The submission notes that the extensive monitoring on the operating wind farm allows the population and behaviour of birds and bats in the area to be well understood and states the modification appears to be an improvement for birds and bats.

The submission notes the significant community enhancement fund contribution, comprehensive community consultation undertaken and states 'The offer of neighbour agreements out to four kilometres is particularly noteworthy and exceeds standard industry practice. The almost universal take-up of these agreements suggests engagement has been genuine and has accommodated neighbours' views and concerns.'

<b>Response</b>	The Proponent thanks the Australian Wind Alliance for their informed submission, and their efforts in promoting best practice community engagement across the wind energy industry.
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#### 4.2.2 The Federal Hotel Nimmitabel

The Federal Hotel is the sole licensed accommodation, restaurant, bar and function facility in the Nimmitabel district. The proprietor and licensee of the hotel has provided comment regarding the Modification. Issues addressed in the comment are directly transposed below. Corresponding responses are provided to each issue.

Reference	300307
<b>Issue</b>	<p>I see strong merit in the Boco Rock Wind Farm Stage 2 project, both from environmental and economic benefits associated with its development and operational phases.</p> <p>We would appreciate a preferred supplier relationship of accommodation, meals and catering to the Boco Rock Wind Farm project.</p> <p>With regard to the proposed modification that relates to the Yandra Cluster, I express no substantive additional opinion as the proximity and visual aspect of the project are of limited relevance to our business. I defer to the owners of rural properties directly and adjacent to the proposed modification for comment on such proposed alterations in number and scale of turbines and towers.</p>
<b>Response</b>	<p>The Proponent thanks the owners of the Federal Hotel for their informed submission regarding the Modification including the acknowledgement of environmental and economic benefits of the Project. Of all the stages of a wind farm development, the construction and decommissioning stages of the Project will generate the largest economic gain for the greatest number of people and businesses in the local area.</p> <p>The Proponent acknowledges the value of the local supply chain and the economic benefits the Project can have on the town of Nimmitabel. The Proponent will provide a local services and suppliers register and local content plan to encourage the contractors awarded to use local providers where possible and welcomes the opportunity to work with local businesses to share the benefits of the Project.</p>

#### 4.2.3 Nimmitabel Bakery

Local bakery based on the Bombala street in Nimmitabel. The submission objects to the proposed Modification identifying issues which are directly transposed below. Corresponding responses are provided to each issue.

Reference	300279
<b>Issue</b>	<p>The increase of the turbines from 152 to 200m has the potential to negatively impact more local residents than the previous plan. This has the potential to reduce land values which impacts income generation for community members.</p> <p>Reducing income in the region also puts pressure on all local businesses.</p> <p>Also this creates huge division in our small community which creates stress, anxiety and distress amongst our local community.'</p>
<b>Response</b>	<p>The Proponent recognises that seeking a larger rotor and higher blade tip height can potentially increase associated visual impacts. Impacts assessments regarding the change to WTG dimensions are included in the Modification (chapter 4 and appendices). As such, the reduction in the total number of proposed WTG locations from 32 to 20 has been integral to the Proponent's approach to offset these potential impacts and reduce the severity of impacts on the surrounding community.</p> <p>The Modification was developed and assessed consistent with the NSW Wind Energy Framework (DPE 2016) and has been assessed by Green Bean Design as being acceptable within current guidelines.</p> <p>Section 19.1 of the EA covers the potential impact of wind turbines on land value, including independent reports exploring the matter. DPIE have also commissioned a report investigating regional land values which identified no clear evidence that wind farms impact land values in regional areas (Urbis 2016).</p> <p>The Project is expected to bring direct and indirect economic benefits to the local community, especially during construction. The Modification will provide 80 full time equivalent jobs during the construction period and up to 8 additional operational jobs</p>

#### 4.2.4 Nimmitabel Chamber of Commerce

Nimmitabel Chamber of Commerce Incorporated was established as a non-profit community-based organisation promoting business activities in the Nimmitabel district. The submission objects to the proposed Modification identifying issues which are directly transposed below. Corresponding responses are provided to each issue.

Reference	300836
<b>Issue</b>	<p>The Nimmitabel Chamber of Commerce (NCC) objects to the proposed changes to this development on the grounds that the impacts of the increased sized turbines will be extremely detrimental to the environment, to those living within sight and hearing distance of the turbines, and to the beauty of the local landscape and its value as a tourist attraction in this region.</p> <p>We feel the project managers have been misleading in their presentation of the proposed changes, which may have confused or even deceived some of the affected parties with regard to the true impacts these changes will have. The use of not to scale diagrams, comparisons against non-existent (within this environment) benchmarks, and the withholding of information until very late in the process are all designed to confuse and obstruct affected residents and stakeholders from making decisions and comments about the impacts of these proposed changes. An increase in height of 65 metres is difficult to visualise and understand,</p>

but it is an enormous amount of machinery just on its own, let alone as an addition to something which is already enormous.

The impacts to the environment of the extra height, and larger turbine head, must be different from the impacts that were detailed in Environmental Impact studies done based on the original proposal.

Further to the environmental impacts, the extra size makes each turbine more visually impactful on the landscape - a landscape which has been a very large draw card for tourism in this area.

Even further, the extra size must have an impact on light aircraft traffic in the area - air traffic that is crucial to bush fire management and to emergency medical responses, as well as for transport and recreation. The NCC feels that the increased size renders any impact studies done for the original proposal as meaningless.

<b>Response</b>	<p>The impacts of the modification to the approved WTG dimensions including environmental, visual, noise and aviation impacts have been assessed by qualified practitioners as part of the Modification EA (see chapter 4 Impact Assessment).</p> <p>The Proponent takes its relationship with the local community very seriously and strongly refutes the allegation that there has been any intention to mislead the community.</p> <p>During the development of the Modification, the Proponent has been heavily engaged with the local community and Council to share information as it became available, hear community feedback and amend the proposal to address concerns. The submission above refers to a drafting error in a WTG comparison diagram presented at a CCC meeting which showed the constructed WTG dimensions as 152m instead of 130m. The approved tip height for the Project is 152 m whereas the WTGs constructed for Stage One were 130 m in height. The diagram was promptly amended and provided to the CCC the day after the meeting. The correct diagram was included in all subsequent presentations and newsletters and is included as Figure 4 in the Modification.</p> <p>Visual impacts of the Modification have been considered by landscape and visual impact consultants Green Bean Design. A comprehensive modification assessment is provided in Appendix A of the Modification. In order to address potential visual impacts, a commitment has been made to install no more than 20 WTGs from the approved 32 WTG locations within Yandra cluster, and to remove two of the approved WTG locations nearest to dwellings on Springfield Road and remove 5 of the approved WTG locations nearest to dwellings towards the south east on Old Bombala Road and Monaro Highway increasing the setback distances from neighbouring residences. All existing dwellings within 4 km of Yandra cluster are involved in either Stage One or Two of the Project.</p> <p>The Modification includes an assessment of noise impacts undertaken by SLA Consulting which demonstrates that the Modification would enable the existing noise criteria to be met at all receptors.</p> <p>Environmental impacts due to proposed changes in WTG dimensions have been assessed and detailed in the Environmental Assessment in the Modification. Without a specific comment, the Proponent can make no detailed response but refers the submitter to review the Modification documentation in detail.</p> <p>Aviation impacts of the Modification were assessed by aviation consultants Landrum and Brown. There are not expected to be any impacts to aviation due to the Modification. The Aviation Impact Assessment was provided to CASA, Airservices Australia and the Department of Defence during the exhibition phase and their comments are available in Section 4.1 above.</p>
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The WTGs would be classified as Tall Structures and formal notification to CASA and Department of Defence is required.

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## 4.3 Public Submissions

Public submissions are grouped by themes described and analysed in sections 2 and 3, with a response provided for each issue raised in the submissions. The order of the themes corresponds to the frequency of the issues raised. Each issue and response are identified in the table and further referenced in the Submissions Matrix in Appendix A and Appendix B.

### 4.3.1 Socio-economics

Reference	Issue and response
300644, 300657, 300597, 300646, 300601, 300634, 300677, 300724, 300760, 300703, 300756, 303742	<p><b>Issue: Employment Generation / Economic Benefit.</b></p> <p><b>General support for the proposed modification subject to employment generation, local and regional growth opportunities and economic flow on effects.</b></p> <p>Proponent Response:</p> <p>The proposed Modification will contribute to ongoing temporary and permanent employment generation and broader economic benefits.</p> <p>Predicted economic benefits for the proposed Modification include:</p> <ul style="list-style-type: none"> <li>• 80 full-time equivalent jobs during construction (1-2 years);</li> <li>• 8 full-time equivalent jobs during operations (25+ years);</li> <li>• \$130m capital investment value;</li> <li>• indirect economic benefits to the local region including food and accommodation services; and</li> <li>• additional contributions to the existing Boco Rock Wind Farm Community Benefit Fund of \$80,000 per annum CPI adjusted from 2015.</li> </ul>
300283, 299616, 300291, 300303, 299042, 300880, 300464, 300326, 300531	<p><b>Issue: Employment Generation / Economic Benefit.</b></p> <p><b>Objection was received on the belief that the proposed Modification will not provide any additional employment generation or economic benefits.</b></p> <p>Based on the numbers above the Project is anticipated to generate significant local economic stimulus and employment opportunities in this rural area. Although the Modification proposes a reduction in WTG numbers, the economic assessment in the Project Approval remains consistent with the proposed Modification and expected to generate similar employment opportunities to the approved Project. Local contractors will be used where it is feasible, which will allow the Proponent to utilise the full potential of local resources.</p> <p>Community and business groups in the Nimmitabel area have been directly contacted by the Proponent and provided with information about the proposed Modification. The business community has expressed genuine interest in the Modification and has expressed support for any future construction and operations contracts which would generate employment and income for the region.</p>
	<b>Issue: Community Enhancement Fund</b>

300644, 300669,  
300597, 300601,  
300744, 300760,  
300703, 303742

**Support for the proposed Modification was received, praising the contributions the fund has made to community projects and welcomed an increase in contributions from the Modification to the existing Boco Rock Community Enhancement Fund.**

Proponent Response:

The operational Project has been contributing \$2,500 annually (CPI adjusted from 2015) for 67 installed WTGs into the Boco Rock Community Enhancement Fund since commencement of operations in 2015. This funding will continue for the operational life of the Project.

In the 2018/19 financial year, over \$443,000 from the fund was available for funding community applications. Over \$388,000 has been disbursed to community projects in 2019, with the remaining funds to be carried over to the 2019/20 round of allocations. The following groups received funds in 2019:

**Bombala Shire Council:**

- Delegate Pony Club
- Delegate Progress Association
- Rotary Club Bombala
- Lions Club of Bombala
- Bombala Golf Club

**Cooma-Monaro Shire Council:**

- Australian National Busking Championships
- Bredbo Cemetery Committee
- Bredbo Community Progress Association
- Cooma Golf Club
- Cooma Multicultural Centre
- Cooma Pistol Club
- Country Women's Assoc Nimmitabel
- Lifegate Church
- Monaro Community Access service
- Monaro Community Radio Inc
- Nimmitabel Chamber of Commerce
- Nimmitabel Public School P&C
- St Andrew's Uniting Church Cooma
- Cooma Athletics
- Cooma Lambie Preschool
- Cooma United RLFC
- Nimmitabel Advancement Group
- Rotary Club Cooma
- Nimmitabel Show Society
- Nimmitabel Lions Club

**Issue: Community Enhancement Fund**

299616, 300247,  
299042, 300880,  
300464, 300365

**Objection on the grounds of a reduced payment to the Boco Rock Community Benefit Fund as a consequence of the proposal to construction less WTGs.**

Proponent Response:

Per Condition 2.51 of the Project Approval, it is a requirement for the Project to contribute \$2,500 for every WTG installed, annually and uplifted by CPI from the commencement of operations in 2015.

If the proposed Modification is approved, the Proponent will commit to make contributions to the existing Community Enhancement Fund for each of the 32 WTG locations originally approved in Yandra cluster, regardless of the total number of WTGs to be installed for Stage Two.

The Proponent has adopted this position to address concern that the Community Enhancement Fund would be disadvantaged by the Modification which has sought to reduce the number of approved WTG locations.

This commitment is further detailed in section 2 the Amended Modification Report.

299411, 299401,  
300644, 300669,  
300554, 300597,  
300601, 300634,  
300686, 300677,  
300673, 300812,  
300716, 300724,  
300744, 300736,  
300754, 300760,  
300703, 300756,  
300764, 300728

**Issue: Renewable Energy.**

**Support for renewable energy in the region.**

Proponent Response:

Overall, the operation of up to 20 WTGs in Yandra cluster is anticipated to increase the capacity of the Boco Rock Wind Farm by around 80 MW. The advancements in renewable technology over the years have led to a greater generating capacity and larger WTGs rotors. This enables the Project to generate more electricity with fewer WTGs and a lower capital cost. Currently the Boco Rock Wind Farm is fully contracted, however the power from the Stage Two project is likely to be sold into the market at the spot price, displacing existing fossil fuel generation and reducing greenhouse gas emissions.

299411, 300283,  
299467, 299042,  
300720

**Issue: Tourism / recreation**

**Objection to the impact to the Monaro Plains as a tourism destination and recreation area.**

Proponent Response:

The Yandra cluster is approved for up to 32 WTGs which can be constructed at any stage. The proposed Modification for up to 20 larger WTGs is unlikely to have any influence on the regional tourism benefits compared to the approved Project.

#### 4.3.2 Impact Assessment

Reference	Issue and response
299411, 300219,	<b>Issue: Visual impact – increased WTG dimensions</b>
300271, 300283,	<b>Objection to the increase in height and rotor diameter of the proposed WTGs and related visual impact.</b>
299616, 300291,	
300247, 299473,	Proponent Response:
300174, 299467,	Visual impacts regarding the proposed modification have been assessed by the independent landscape and visual impact consultant Green Bean Design (refer section 4.1 and Appendix A of the Modification Report). The assessment considers the proposed maximum wind turbine height of 200m from ground to blade tip.
299723, 300303,	
300275, 299583,	

299401, 299042, 300880, 300464, 300365, 300326, 300531, 300720, 300174	The assessment concludes the potential for the proposed Modification to result in any additional significant cumulative visual impact is considered to be low with an overall low-level change in visual impact rating in accordance with the approved Yandra cluster. Project Approval Conditions 2.23, 2.24, 2.25 and 2.27 relate to visual amenity conditions and mitigation measures which remain valid to the Modification.
299411, 300219, 299616, 299723, 299042, 300880, 300464, 300365, 300326	<p><b>Issue: Visual Impact - Adequacy of visual assessment</b></p> <p><b>Objection based on the visual assessment adequacy and diagrams presented to the community portrayed deceptive or misleading information and were not provided to the community prior to the Modification public exhibition.</b></p>
	<p>Proponent's response:</p> <p>The Modification Visual Impact Assessment (Appendix A of the Modification) was conducted with consideration of NSW Wind Energy Framework and, in particular, the <i>Wind Energy: Visual Assessment Bulletin (DPE 2016b)</i>. Section 4.1 of the Modification discusses the visual impact assessment methods and a summary of the findings. The full assessment by Green Bean Designs is included as Appendix A of the Modification.</p> <p>A number of tools were used to represent the potential visual impact of the proposed modification compared to the Approval including, a Zone of Theoretical Visual Influence (ZVI) assessment, wireframe analyses, photomontages of the proposed Modification and an analysis of how the proposed Modification would impact visual receptors as compared to the approved Project. This material was presented to the community at:</p> <ul style="list-style-type: none"> <li>• a Council meeting in July 2018;</li> <li>• CCC meetings in July and November 2018;</li> <li>• the Community Open Day August 2018;</li> <li>• landowner meetings; and</li> <li>• community newsletter.</li> </ul> <p>During the development of the Modification, the Proponent has engaged with the local community and Council to share information as it becomes available, hear community feedback and where possible amend the proposal to address concerns.</p> <p>Submissions referencing the adequacy of diagrams refer to a drafting error in a WTG comparison diagram presented at 1 CCC meeting which showed the constructed WTG dimensions as 152m instead of 130m. The approved tip height for the Project is 152 m whereas the WTGs constructed for Stage One were 130 m in height. The diagram was promptly amended and provided to the CCC the day after the meeting.</p> <p>The correct diagram was included in all subsequent presentations, publicly available in newsletters and is included as Figure 4 in the Modification. The purpose of the diagram was to demonstrate the increase in height of the proposed WTGs compared to the Approved WTG height and the installed WTGs. The diagram also included at 30m tree for reference to allow those who were unfamiliar with Stage One of the project to understand the height of the WTGs more clearly.</p> <p>Visual impacts of the Modification have been considered by landscape and visual impact consultants Green Bean Design (Appendix A of the Modification). In order to address potential visual impacts, a commitment has been made to install no more than 20 WTGs from the approved 32 WTG locations within Yandra cluster, and to remove two of the approved WTG locations nearest to dwellings on Springfield Road, and remove 5 of the</p>

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approved WTG locations nearest to dwellings towards the south east on Old Bombala Road and Monaro Highway increasing the setback distances from neighbouring residences. All existing dwellings within 4 km of Yandra cluster are involved in either Stage One or Two of the Project.

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300271, 300174,  
299467, 300275,  
300301, 300886

**Issue: Noise****Health concerns related to perceived Infrasound Low Frequency noise impacts of the proposed Modification's increase in WTG size**

Proponent's response:

Operational noise impacts associated with the approved Project are governed by Condition 2.17 to 2.22 of the Project Approval.

A detailed Noise Impact Assessment was prepared by independent consultants SLR Consulting for the proposed Modification and is discussed in section 4.2 of the Modification (Appendix B to the Modification). The assessment is considered highly conservative for the proposed Modification as it considered noise impacts from all 32 approved WTG locations within Yandra cluster. Section 4.3 of SLR 2018 includes an assessment of Tonality and Infrasound, stating that modern WTG's do not exhibit significant infrasound emissions and infrasound testing is not required under current guidelines.

The Australian Medical Association (AMA), the National Health and Medical Research Centre (NHMRC) and the Independent Scientific Committee on Wind Turbines (ISCOWT), have all released statements regarding this in the last 5 years. The NSW Government's position regarding wind farms and health is informed by the findings of NHMRC and NSW Health. The current NSW Wind Energy Guidelines do not require assessment of low frequency noise impacts as the level of risk is not considered to be applicable.

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300283, 299473,  
300174, 300880

**Issue: Ecological / environmental impacts****Objection on the grounds of additional environmental impact associated with the Modification and potential impact to the McLaughlan River.**

Proponent Response:

An approach of minimisation and avoidance was adopted during the design of the proposed Modification to reduce, where possible, environmental impacts. This was achieved by reducing the number of WTGs to be installed (from 32 to up to 20) rationalising the road design, hardstand areas and footings.

A review of the construction footprint is discussed in section 3.2.3 to demonstrate that the proposal is expected to remain within the assessed disturbance footprint and already offset vegetation impacts. It is anticipated that the environmental impacts associated with the proposed Modification will be no greater than the approved Project.

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300219, 300247,  
299723, 300303

**Issue: Aviation impacts / lighting****Submissions were received regarding aviation safety and potential aviation hazard lighting due to the proposed increase in turbine height.**

Proponent Response:

An aviation impact assessment was prepared by Landrum & Brown Worldwide (Australia) Pty Ltd included in the Modification section 4.5 (refer Appendix F of Modification Report) Landrum and Brown found that the WTGs would not infringe on

any Obstacle Lighting Surface, Procedures for Air Navigation Services - Aircraft Operations surface, contingency procedures or Lowest Safe Altitude surfaces. The project is located outside the clearance zones associated with any aeronautical navigation aids, will not have a significant impact on local flying activities and will provide a significant visual navigation feature in the region.

There are not expected to be any impacts to aviation, however the WTGs would be classified as Tall Structures and formal notification to CASA and Department of Defence is required.

CASA has advised that aviation hazard lighting is not required for the Modification see section 4.1.8 above)

Consistent with the condition 2.34 of the Approval, the Proponent will provide the final coordinates and heights of the WTGs to Airservices Australia 1 month prior to construction, and with final coordinates once construction is completed. Airservices Australia will publish the location on aviation charts and provide a Notice to Airmen advising pilots that tall structures will be constructed in the area.

299411, 300301, 300695	<p><b>Issue: Traffic and Transport / dust</b></p> <p><b>There was concern among submissions in relation to safety, dust, road repairs and increased traffic on the public roads during construction of the project.</b></p> <p>Proponent Response:</p> <p>The management of traffic and heavy vehicle movements during construction would be via a Traffic Management Plan (TMP) and engagement of a licensed transport contractor for the transport of OSOM wind turbine components.</p> <p>Furthermore, the traffic assessment (Appendix G of the Modification) concluded that there would not be a significant adverse impact with respect to transport issues such as traffic operations, road capacity on the surrounding road network, site access and road safety. It is also expected that there will be reduced transport impacts and traffic movements associated with construction of the proposed Modification.</p> <p>The Project will work closely with Council and the relevant roads authorities to avoid, minimise and manage road impacts during construction, including implementing the dilapidation and maintenance measures identified in Section 4.1.1.</p>
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299583	<p><b>Issue: Cumulative impacts</b></p> <p><b>One submission noted the cumulative impacts of other wind farms in development in the local area</b></p> <p>Proponent Response:</p> <p>Cumulative impacts of the Project were assessed in the EA and approved in 2010. It is not expected that the proposed Modification will contribute a greater cumulative impact than the Approved Project.</p>
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#### 4.3.3 Existing Wind Farm / Approval

This section relates to issues raised which were not directly relevant to the proposed Modification, therefore have been addressed minimally. The issues raised were related to the existing Boco Rock Wind Farm or the existing Project Approval.

Reference	Issue and response
299411, 299723, 300880	<p><b>Issue: land use / weeds</b></p> <p><b>Objections to the approved Project suggesting that it is inappropriate development for the region, reduces the ability to manage weeds and impacts aerial agricultural operations.</b></p>
	<p>Proponent Response:</p> <p>The proposed Modification involves a reduction in the number of approved WTGs and associated ancillary infrastructure at Yandra cluster. Impact to land and agricultural activities such as obstruction to aerial spraying are expected to be less than the approved Project.</p>
300283, 299723, 300531	<p><b>Issue: Operational impacts - visual / noise</b></p> <p><b>Objection to the visual impact of the existing Boco Rock Wind Farm.</b></p>
	<p>Proponent's Response:</p> <p>Conditions 2.23, 2.24, 2.25, 2.26 and 2.27 of the Approval are in place to address visual amenity.</p>
299411, 300301	<p><b>Issue: Construction impacts</b></p> <p><b>Objections with concerns based onto increased traffic and dust during construction.</b></p>
	<p>Proponent's Response:</p> <p>It is expected that the Modification will reduce traffic movements, given there will be a reduction of at WTGs and associated infrastructure. The updated project layout shows a reduction of 4.5 km length of road</p>
299411	<p><b>Issue: Decommissioning</b></p> <p><b>Objection received as there is no guarantee that the Project would be decommissioned.</b></p>
	<p>Proponent's Response:</p> <p>Decommissioning of the Project is stipulated by Conditions 1.7, 1.8 and 1.9 of the Approval. The ability to comply with condition is not altered by the proposed Modification.</p>
300291, 299723, 300303, 300275, 300880	<p><b>Issue: land value</b></p> <p><b>Submissions were received regarding the potential decrease in land value due to the visual impacts of the Project.</b></p>
	<p>Proponent's Response:</p> <p>Section 19.1 of the EA covers the potential impact of wind turbines on land value, including independent reports exploring the matter.</p> <p>Many factors can influence the perceived and actual property value. In most rural areas the main determinant for property and land values is the agricultural productivity of the land, both to sustain animals and to grow crops. Such productivity is not linked to the</p>

development of a wind farm in the area but is dependent on the innate quality of the land and the farming practices used in operating an agricultural business upon it.

299616, 300247,  
300303

**Issue: Employment / community benefit fund**

**Objection based on a lack of indirect economic benefits to the town of Nimmitabel from the existing wind farm during construction and operations.**

Proponent's response:

The economic impacts of the approved Project assessed in the EA remain valid. The Proponent acknowledges the concerns from submissions regarding indirect economic benefits to the town of Nimmitabel. Local contractors will be used where it is feasible and the Proponent will provide a list of local Nimmitabel service providers (accommodation, meals etc) to the engineering, procurement and construction (EPC) contractors awarded to construct Stage Two, however the Proponent cannot impact the contractor's selection of goods and services. Due to Nimmitabel's limited access to essential services such as fuel, groceries and accommodation, it is likely that contractors will have to go to a larger town (expected to be within the SMRC LGA). The Project may, however, inspire opportunities for new local enterprises or allow existing providers to increase their offerings.

The Proponent has discussed concerns regarding the distribution of the Boco Rock Community Enhancement Fund with local council staff and the Boco Rock Wind Farm Community Consultative Committee. The Proponent will continue to work with the CCC and Council with the aim of ensuring the fund is put to best use for those community members who are impacted by the development in accordance with the Project Approval.

#### 4.3.4 Process

Reference	Issue and response
299411	<p><b>Issue: Conditions of approval</b></p> <p><b>One objection has alleged that there has been a breach of the Conditions of Consent in relation to the Limits of Approval, specifically condition 1.5 and timing of commencement of construction.</b></p> <p>Proponent Response:</p> <p>Project Approval was received on 9 August 2010. Under the Limits of Approval, section 1.5, the Project must commence construction within 5 years of the date of approval granted. Stage One of the Project commenced construction in 2013 and became operational in 2015, consisting of 67 WTGs. The Project remains within the Limits of Approval under the Project Approval.</p>
299616, 300303, 300275, 299042, 300464	<p><b>Issue: Exhibition timeframe</b></p> <p><b>It is alleged that the exhibition timeframe was timed in such a way to discourage submissions.</b></p> <p>The Proponent did not strategically time lodgement of the Modification application to discourage public submissions. The Proponent actively engaged with the local community prior to the exhibition period and encouraged community members to have</p>

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their say regarding the proposed Modification. Section 3 of the Modification further outlines consultation that was undertaken.

299616, 299473,  
300303, 299042,  
300880, 300716,  
300724, 300754,  
300703, 303742

**Issue: Compensation / Neighbour Agreements**

**Many submissions were in support of the agreements by the Project to neighbours impacted by the proposed modification.**

**Objection based on the assumption that neighbour agreements prevent individuals from expressing their view on the Project.**

Proponent Response:

The practice of offering ‘negotiated agreements’ is endorsed by the National Wind Farm Commissioner and recommended in section 5.2.1 of the NSW Wind Energy Guidelines (DPE 2016a) see below. They enable community members close to the wind farm to share in the benefits of the Project and to mitigate potential impacts to their dwelling.

Negotiated agreements are confidential, completely voluntary and a provision for legal advice is allowed for landowner’s solicitor fees. The agreements do not prevent landowners from raising concerns about any breaches of the Project Approval.

All landowners within 4 km of a proposed WTG location have been contacted directly and mitigation options discussed. The Proponent has offered Negotiated Agreements to all dwellings (including dwelling entitlements) within 4km of the approved turbine locations of the 30 approved WTG locations in Yandra cluster.

299616, 299473,  
300303, 300275,  
299583, 299075,  
299042, 300880,  
300464

**Issue: Consultation and Engagement**

**Objections siting insufficient public consultation and that information on the proposed modification had not been provided directly by the Proponent**

Proponent’s Response:

A detailed description of the consultation and engagement activities undertaken in the lead up to the preparation of the Modification is included in Section 3 of the Modification. Direct consultation with landowners, neighbours and local community groups regarding the Modification (not included in the timeline below) has been ongoing since early 2018.

A detailed timeline of public engagement activities to inform the community about the Modification is available here:

**June 2018:**

- contact with Snowy Monaro Regional Council (SMRC) to arrange meetings with General Manager and relevant staff

**July 2018:**

- Meeting at Snowy Monaro Regional Council (SMRC) identifying the proposed changes to Stage
- Letter to Community Consultative Committee (CCC) identifying the proposed changes to Stage 2. Request to setup extraordinary meeting with the CCC
- Meeting with General Manager of SMRC to explain the proposed changes and seek feedback on the proposed Modification.
- Presentation to public Council General Meeting in Berridale.
- Various meetings with neighbours to explain the proposed Modification, discuss impacts to their dwellings, and request input/feedback

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**August 2018**

- Met with President of the Nimmitabel Advancement at the Community Centre and provided hard copy newsletters to have available at the Community Centre and distribute to NAG and other points of interest
- Met with Nimmitabel General Store and Post Office owner.
- Copies of the newsletter left at Council offices and sent to state/federal members and all SMRC Councillors.
- CCC Extra-ordinary meeting called to discuss proposed modification. Minutes are publicly available on the [Boco Rock Wind Farm website](#).
- Public Open Day advertised in the Monaro Post newspaper
- Open Day flyer sent via Australia Post Unaddressed Mail service to all addresses within the region (227 copies sent)
- Email to CCC members with the updated turbine comparison image. Comment received from a CCC member noting an error in the dimensions of the installed turbines.
- Image corrected and resent to CCC confirming the drafting error.
- Updated CCC presentation sent to independent CCC chairperson for distribution containing corrected image
- Public Open day 2pm-7pm – 4 staff from CWP Renewables there throughout the day to answer questions. The open day was well attended. Printed material included: 10x A1 posters demonstrating the Modification, including two Photomontages, ZVI and noise contour mapping, project layout maps, project transport and an explanation of the EA process. Updated newsletters were also available for people to take home. Map posters were kept in the window of the Community Centre available for viewing from outside the centre.

**October 2018:**

- Article in the Nimmity News thanking the community for attending the Public Open Day and those who supported on the day. The article also included a description of the proposed Modification and advised about the Modification exhibition period.

**November 2018:**

- November CCC presentation. Included description of community consultation on the project to date, an explanation of the planning and approvals process and the timeline for the modification public exhibition. Meeting minutes for all CCC meetings are available on the Boco Rock Wind Farm website
- radio interview with Proponent and ABC South East, discussing Modification and public exhibition period.

**December 2018:**

- Advertising material for the Modification exhibition period was organised by the NSW Department of Planning and Environment.
- Direct communication with locals and community groups leading up to the public exhibition period ensuring they knew about the opportunity to submit and had the resources available (eg. Some people read the hard copy of the

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report in the Cooma SMRC office and submitted in person due to no or intermittent internet connections at home)

- Numerous emails and phone calls providing responses to information requests during the exhibition period.

**January – March 2019:**

- Emails, phone calls and meetings with neighbours and landowners to answer questions and address concerns
- Consultation with government agencies regarding their submissions. Details in section 4.1 above.
- CCC meeting. Presented results of exhibition period and discussed opportunities for improving the community enhancement fund for Stage Two (see section 3.1.2 above).

**June - November 2019**

- June CCC meeting. Presented further information on traffic control measures agreed with SMRC, and commitments relating to the community enhancement fund.
- November CCC meeting - The Mayor of Snowy Monaro Regional Council was present. The Proponent provided some background about the Approved Project and the proposed Modification as well as an update on the status of the response to submissions.

Community engagement during and after exhibition period is discussed further in section 3.1.

1 submission referenced lack of engagement with the Ngarigo people. Chapters 6 and 11 of the Environmental Assessment include the consultation with local Aboriginal stakeholder groups and their participation during the environmental assessment. The EA was conducted in accordance with consultation process as outlined in the Interim Guidelines for Aboriginal Community Consultation - Requirements for Applicants (NSW DEC 2004). The field survey was undertaken with the assistance of Yukembruk Merung Ngarigo Consultancy Pty Ltd (YMNC) and Eden Local Aboriginal Land Council (ELALC).

Section 4.4 of the Modification includes an assessment of the Modification on heritage matters. Conditions 2.40 to 2.42 of the Approval include requirements regarding ongoing engagement with indigenous stakeholders and remain valid to the Modification.

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## 5 Conclusion

### 5.1 Project Evaluation and Acceptability

The Proponent has applied to modify the Project Approval for Yandra cluster only, which would comprise Stage Two of the Project. The purpose of the Modification is to contemporise the allowances and parameters of Stage Two of the Project in order to construct fewer but larger wind turbine generators (WTGs), whilst minimising impacts and maximising the efficiency of the Project design. The Modification seeks flexibility to select up to 20 WTG locations to be constructed from 25 of the approved locations in Yandra cluster, as well as an increase in the size and capacity of WTGs at Yandra to a 200m tip height, consistent with modern technology.

The community has been informed of the proposed changes through the extensive consultation identified in the Modification. Following a 14-day exhibition period, a total of 51 individual submissions, four organisation submissions and 11 government agency comments were received, analysed and addressed following the public exhibition of the Modification. Approximately 82 % of the submissions came from within the SMRC region, of which 45 % were in support, 50 % objected, and 5 % commented.

The four common themes arising from public submissions, listed in the order according to the number of submissions in which they are referenced, are:

- Socio-economics;
- Modification Impacts Assessment;
- Process; and
- Existing Wind Farm Approval.

Following receipt of submissions, the Proponent has met with many of the objectors to listen to their concerns, met with and presented to Council, held three Community Consultative Committee meetings and held further agency consultation.

Importantly the Proponent has agreed to increase the Community Enhancement Fund contributions for Stage Two, honouring the community expectation that \$80,000 per annum (CPI adjusted in accordance with the Project Approval) would be made available for the Yandra Cluster, regardless of how many WTGs are constructed.

Based on the findings of the Modification Environmental Assessment, as well as the further actions undertaken, as described in Section 3 of this RTS, it is considered that the Modification is unlikely to

result in adverse environmental or community impact and there will be a net benefit to the community and the environment compared to the approved 32 WTGs at Yandra Cluster.

## References

- Boco Rock Wind Farm Project Approval, 2010, Major Projects Application 09\_0103
- CWP Renewables (CWP) 2018, Boco Rock Wind Farm Stage Two. Application for Modification; Environmental Assessment.
- CWP Renewables (CWP) 2020, Boco Rock Stage Two: Amended Modification Report.
- Department of Planning Industry and Environment (DPIE) 2017, Draft Environmental Impact Assessment Guidance Series: Responding to Submissions.
- Department of Planning, Industry and Environment (DPE) 2016a, Wind Energy Guideline, For State significant wind energy development.
- Department of Planning, Industry and Environment (DPE) 2016b, Wind Energy: Visual Assessment Bulletin, For State significant wind energy development.
- Department of Planning and Environment (DPE) 2016c, Wind Energy: Noise Assessment Bulletin, For State significant wind energy development.
- Eco Logical Australia (ELA) 2009, Boco Rock Wind Farm, Ecological Assessment, Prepared for Wind Prospect CWP Pty Ltd.
- NGH Environmental 2016, Boco Rock Wind Farm Bird and Bat Monitoring, Annual Report 2015, prepared for CWP Renewables Pty Ltd.
- NGH Environmental 2017a, *Bird and Bat Adaptive Management Plan, Boco Rock Wind Farm*, prepared for CWP Renewable Pty Ltd.
- NGH Environmental 2017b, Boco Rock Wind Farm Bird and Bat Monitoring, Annual Report 2016, prepared for CWP Renewables Pty Ltd.
- NGH Environmental 2017c, Risk Analysis: Eastern Bentwing-bat, Boco Rock Wind Farm, prepared for CWP Renewables Pty Ltd.
- NGH Environmental 2018a, Boco Rock Wind Farm Bird and Bat Monitoring Program – Year Three, Boco Rock Wind Farm BBMP Annual Report 2017, prepared for CWP Renewables Pty Ltd.
- NGH Environmental 2018b, Boco Rock Wind Farm Bird and Bat Monitoring, Technical Report – 1<sup>st</sup> Quarter, 4<sup>th</sup> Year, 2018, prepared for CWP Renewables Pty Ltd.
- South Australia Environmental Protection Authority (SA EPA) 2009, Wind Farms Environmental Noise Guidelines.

Wind Prospect CWP Pty Ltd, 2009, Boco Rock Wind Farm Environmental Assessment (EA).

Wind Prospect CWP Pty Ltd, 2010, Boco Rock Wind Farm Preferred Project Report and Response to Submissions.

## Appendices

## Appendix A Submissions Matrix

### Agency / Organisation Submissions:

Stakeholder Type	Reference Number	Name	Stance
Government Agency	301629	Civil Aviation Safety Authority (CASA)	Comment
Government Agency	301625	NSW Department of Planning and Environment Division of Resources & Geoscience	Comment
Government Agency	301123	NSW Roads and Maritime Services	Comment
Government Agency	301621	Office of Environment and Heritage - Heritage Division	Comment
Government Agency	303547	Airservices Australia, Canberra, ACT	Comment
Government Agency	302886	Snowy Monaro Regional Council, Cooma, NSW	Comment
Government Agency	301127	Office of Environment and Heritage	Comment
Government Agency	308030	Rural Fire Service	Comment
Government Agency	308034	Division of Land and Water	Comment
Government Agency	308028	Environment Protection Authority	Comment
Government Agency	325382	Department of Defence	Comment
Organisation	300770	Australian Wind Alliance	Supports
Organisation	300279	Nimmitabel Bakery	Objects
Organisation	300307	The Federal Hotel Nimmitabel (Kelvin Fahey)	Comment
Organisation	300836	Nimmitabel Chamber of Commerce	Objects

**Public Submissions:**

Reference number	Submitter	Location	Stance	Impact assessment			Existing Wind Farm Approval			Process
				Socio-Economics	Community Enhancement Fund	Employment / Community benefit	other projects / cumulative impacts	traffic and transport / dust	operational impacts visual / noise	
299411	Alan Gillespie-Jones	Bombala, NSW	x	x	x	x	x	x	x	x
300219	Anthony Gardner	Braidwood, NSW	x				x		x	x
300271	Caroline Jardine	Nimmitabel, NSW	x			x	x	x		
300283	Charles Taylor	Nimmitabel, NSW	x		x	x		x		x
299616	Fiona Taylor	Nimmitabel, NSW	x		x	x				x

<b>300291</b>	Graeme Bryce	Glen Allen, NSW	x		x		x	x		x		x			
<b>300247</b>	India Taylor	Nimmitabel, NSW	x		x		x		x		x		x		
<b>299473</b>	James Litchfield	Cooma, NSW	x				x		x					x	x
<b>300864*</b>	Kelvin Fahey	Nimmitabel, NSW		-			-				-			-	-
<b>300174</b>	Michaela Samman	Bemboka, NSW	x				x	x	x	x					
<b>299467</b>	Paul Scherek	Bemboka, NSW	x			x	x	x	x						
<b>299723</b>	Peter Taylor	Nimmitabel, NSW	x				x		x			x	x	x	
<b>300303</b>	Richard Taylor	Nimmitabel, NSW	x		x		x		x		x	x		x	x
<b>300217</b>	Susan Jardine	Nimmitabel, NSW	x												
<b>300275</b>	William Jardine	Nimmitabel, NSW	x				x	x	x			x		x	x
<b>300301</b>	Name withheld	Nimmitabel, NSW	x				x	x		x		x			
<b>299583</b>	Name withheld	Nimmitabel, NSW	x				x			x				x	
<b>299075</b>	Name withheld	Cooma, NSW	x											x	
<b>299401</b>	Name withheld	Steeple Flat, NSW	x		x		x								

<b>299042</b>	Name withheld	Cooma, NSW	x		x	x	x	x						x	x	x
<b>300880</b>	Allan Walker	Nimmitabel, NSW	x		x	x		x	x	x			x	x	x	x
<b>300644</b>	Brad Jachmann	NSW		x	x	x	x									
<b>300464</b>	Charlie Taylor	Manly East, NSW	x		x	x		x							x	x
<b>300365</b>	Duncan Taylor	Nimmitabel, NSW	x			x		x								
<b>300886</b>	Howard Charles	Cooma, NSW		x					x	x			x			
<b>300669</b>	Katrina Taylor	Berridale, NSW		x	x	x	x									
<b>300554</b>	Kirk Petersen	Jindabyne, NSW		x	x		x	x				x				
<b>300657</b>	Luke Williams	Kalbar, NSW		x		x					x					
<b>300583</b>	Mick Findlay	Middlingbank, NSW		x				x								
<b>300326</b>	Paige Taylor	Nimmitabel, NSW	x			x			x							
<b>300597</b>	Richard McIntyre	Mooroooduc, VIC		x		x	x	x								
<b>300646</b>	Sam Herbert	NSW		x		x										
<b>300601</b>	Susan Petersen	Jindabyne, NSW		x	x	x	x	x	x							
<b>300634</b>	Name withheld	Mount Hunter, NSW		x		x	x									

<b>300695</b>	Name withheld	Nimmitabel, NSW		x		x		x		x		x	
<b>300686</b>	Name withheld	Berridale, NSW		x		x							
<b>300677</b>	Name withheld	Berridale, NSW		x		x	x						
<b>300673</b>	Name withheld	Middlingbank, NSW		x		x							
<b>300531</b>	Name withheld	Nimmitabel, NSW	x			x		x			x		
<b>300812</b>	Name withheld	Jindabyne, NSW		x		x							
<b>300716</b>	Christine Haylock	Springfield, NSW		x		x			x			x	x
<b>300724</b>	Indi Herbert	Fisher, ACT		x		x	x						x
<b>300744</b>	Isabel Harrington	Nimmitabel, NSW		x		x		x			x		x
<b>300736</b>	John Bowe	Cooma, NSW		x	x								
<b>300754</b>	John Harrington	Nimmitabel, NSW		x		x							x
<b>300760</b>	Leon & Margaret Weston	Nimmitabel, NSW		x		x	x	x	x		x		
<b>300703</b>	Rodney Anderson	Nimmitabel, NSW		x		x	x	x				x	
<b>300707*</b>	Rodney Anderson	Nimmitabel, NSW		-				-			-		-
<b>300720</b>	Sidney Downie	Cooma, NSW	x					x	x				

<b>300756</b>	Susan Bailey	Cooma, NSW	x	x	x					x	x				
<b>300764</b>	Name withheld	Cooma, NSW	x	x							x				
<b>300728</b>	Name withheld	Jindabyne, NSW	x	x											
<b>303742</b>	Margaret Haylock	Nimmitabel, NSW	x		x	x				x			x	x	
<b>Total</b>	<b>51</b>		<b>25</b>	<b>24</b>	<b>2</b>										
			<b>Total</b>	<b>22</b>	<b>21</b>	<b>14</b>	<b>10</b>	<b>28</b>	<b>7</b>	<b>6</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>1</b>	<b>8</b>
			Objects	2	9	6	5	22	6	6	4	4	2	1	3
			Supports	19	12	8	4	6	1	0	0	0	0	0	5
			Comment	1	0	0	1	0	0	0	0	0	1	0	0

\* Duplicate submissions removed from analysis as discussed in section 2.1

\*\* submission did not include a reason for their stance on the Modification.

## Appendix B Register of Submitters

Where a large number of submissions have been received and it is difficult to detail responses to each submission individually, a register of submitters should be included in an appendix to show where and how the issues raised by individual community members and other stakeholders have been addressed.

Stakeholder type	Reference Number	Submitter	Where issues are addressed (Section number)
Government Agency	302886	Snowy Monaro Regional Council, Cooma, NSW	4.1.1
Government Agency	301123	NSW Roads and Maritime Services	4.1.2
Government Agency	301625	NSW Department of Planning and Environment - Division of Resources & Geoscience	4.1.3
Government Agency	308034	Department of Industry - Division of Land and Water	4.1.4
Government Agency	308028	Environment Protection Authority	4.1.5
Government Agency	301621	Heritage Division - Office of Environment and Heritage	4.1.6
Government Agency	301127	Office of Environment and Heritage	4.1.6
Government Agency	301629	Civil Aviation Safety Authority (CASA)	4.1.8
Government Agency	303547	Airservices Australia, Canberra, ACT	4.1.9
Government Agency	308030	NSW Rural Fire Service	4.1.10
Government Agency	325382	Department of Defence	4.1.11
Organisation	300770	Australian Wind Alliance	4.2.1
Organisation	300279	Nimmitabel Bakery	4.2.2
Organisation	300307	The Federal Hotel Nimmitabel	4.2.3
Organisation	300836	Nimmitabel Chamber of Commerce	4.2.4
Individual	299411	Alan Gillespie-Jones	4.3.1, 4.3.2, 4.3.3, 4.3.4
Individual	300219	Anthony Gardner	4.3.2
Individual	300271	Caroline Jardine	4.3.2
Individual	300283	Charles Taylor	4.3.1, 4.3.2, 4.3.3

<i>Individual</i>	299616	Fiona Taylor	4.3.1, 4.3.2, 4.3.3, 4.3.4
<i>Individual</i>	300291	Graeme Bryce	4.3.1, 4.3.2, 4.3.3
<i>Individual</i>	300247	India Taylor	4.3.1, 4.3.2, 4.3.3
<i>Individual</i>	299473	James Litchfield	4.3.2, 4.3.4
<i>Individual</i>	300864	Kelvin Fahey	4.2.2
<i>Individual</i>	300174	Michaela Samman	4.3.2
<i>Individual</i>	299467	Paul Scherek	4.3.1, 4.3.2
<i>Individual</i>	299723	Peter Taylor	4.3.2, 4.3.3
<i>Individual</i>	300303	Richard Taylor	4.3.1, 4.3.2, 4.3.3, 4.3.4
<i>Individual</i>	300217	Susan Jardine	<i>No issue raised</i>
<i>Individual</i>	300275	William Jardine	4.3.2, 4.3.3, 4.3.4
<i>Individual</i>	300301	Name withheld	4.3.2, 4.3.3
<i>Individual</i>	299583	Name withheld	4.3.2, 4.3.4
<i>Individual</i>	299075	Name withheld	4.3.4
<i>Individual</i>	299401	Name withheld	4.3.1, 4.3.2
<i>Individual</i>	299042	Name withheld	4.3.1, 4.3.2, 4.3.4
<i>Individual</i>	300880	Allan Walker	4.3.1, 4.3.2, 4.3.3, 4.3.4
<i>Individual</i>	300644	Brad Jachmann	4.3.1
<i>Individual</i>	300464	Charlie Taylor	4.3.1, 4.3.2, 4.3.4
<i>Individual</i>	300365	Duncan Taylor	4.3.1, 4.3.2
<i>Individual</i>	300886	Howard Charles	4.3.2
<i>Individual</i>	300669	Katrina Taylor	4.3.1
<i>Individual</i>	300554	Kirk Petersen	4.3.1
<i>Individual</i>	300657	Luke Williams	4.3.1, 4.3.3
<i>Individual</i>	300583	Mick Findlay	<i>No issue raised</i>
<i>Individual</i>	300326	Paige Taylor	4.3.1, 4.3.2
<i>Individual</i>	300597	Richard McIntyre	4.3.1
<i>Individual</i>	300646	Sam Herbert	4.3.1
<i>Individual</i>	300601	Susan Petersen	4.3.1, 4.3.2
<i>Individual</i>	300634	Name withheld	4.3.1

<i>Individual</i>	300695	Name withheld	4.3.1, 4.3.2, 4.3.3
<i>Individual</i>	300686	Name withheld	4.3.1
<i>Individual</i>	300677	Name withheld	4.3.1
<i>Individual</i>	300673	Name withheld	4.3.1
<i>Individual</i>	300531	Name withheld	4.3.1, 4.3.2, 4.3.3
<i>Individual</i>	300812	Name withheld	4.3.1
<i>Individual</i>	300716	Christine Haylock	4.3.1, 4.3.2, 4.3.3, 4.3.4
<i>Individual</i>	300724	Indi Herbert	4.3.1, 4.3.4
<i>Individual</i>	300744	Isabel Harrington	4.3.1, 4.3.3
<i>Individual</i>	300736	John Bowe	4.3.1
<i>Individual</i>	300754	John Harrington	4.3.1, 4.3.4
<i>Individual</i>	300760	Leon & Margaret Weston	4.3.1, 4.3.3
<i>Individual</i>	300703	Rodney Anderson	4.3.1, 4.3.4
<i>Individual</i>	300707	Rodney Anderson	Duplicate (as above)
<i>Individual</i>	300720	Sidney Downie	4.3.1, 4.3.2
<i>Individual</i>	300756	Susan Bailey	4.3.1, 4.3.3
<i>Individual</i>	300764	Name withheld	4.3.1, 4.3.3
<i>Individual</i>	300728	Name withheld	4.3.1
<i>Individual</i>	303742	Margaret Haylock	4.3.1, 4.3.3, 4.3.4

## Appendix C Revised Transport Assessment



## **Boco Rock Stage 2 Wind Farm Project – Modification**

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### **Revised Transport Assessment**

April 2019

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## **Appendices**

### **A Proposed Wind Farm Layout Diagrams**

## 1. Introduction

### 1.1 Project Background

---

Boco Rock Wind Farm (the Project) is classified as State Significant Development (SSD) under the *Environmental Planning and Assessment Act 1979* (the Act). The Project Approval was issued on 9<sup>th</sup> August 2010 permitting up to 122 wind turbines. Stage 1 of the Project commenced construction in 2013 and became operational in 2015, consisting of 67 turbines. The remaining 55 turbine locations in the Boco and Yandra clusters are yet to be constructed.

CWP Renewables (CWPR) is preparing a Modification under Section 4.55 of the Act for Stage 2 of the wind farm. The purpose of the Modification is to contemporise Stage 2 of the Project to minimise impacts and maximise the efficiency of the Project design.

The proposed Modification will include changes to the Yandra cluster only including:

- Construction, operation and decommissioning of up to 20 wind turbine generators (WTGs).
- Increase in WTG tip height of up to 200 m.
- Increase in WTG rotor diameter within the revised tip height.
- Addition of a temporary construction compound within the Yandra Cluster.
- All road and ancillary infrastructure will be consistent with the previously approved project infrastructure, with the exception of a temporary construction compound within the Yandra cluster.

The 20 turbines (maximum) to be constructed at the 32 available locations within Yandra cluster will be selected following a detailed energy assessment and turbine tender process, after the Modification has been approved.

This report (prepared by Samsa Consulting – *Transport Planning and Traffic Engineering Consultants*) is a revised transport assessment that aims to provide a comparative evaluation of the Approved project against the proposed Modification to evaluate the appropriateness of the changes and identify any key transport and traffic risks associated with wind farm component and equipment haulage. The report relies on the previous Traffic and Transport Study (completed by Bega Duo Designs)<sup>1</sup> and Transport Management Plan (completed by Rex J Andrews – RJA)<sup>2</sup> for much of the site assessment but in addition, reviews and identifies preferred road network routes for the over-size / over-mass (OSOM) transportation of the larger turbine components between delivery ports to the Yandra cluster site access point.

The report will serve as a supporting background paper to the Project's Modification assessment document.

---

1. Bega Duo Designs “Proposed Boco Rock Wind Farm – Traffic and Transport Study”, March 2009

2. RJA “GE Boco Rock Windfarm, Transport Management Plan: Port of Eden to Boco Rock (Rev.1)”, 17/12/2013

## **1.2 Director General's & Other Authority Requirements**

---

Planning NSW's Director General's Requirements (DGRs) for the Modification remain the same as those for Stage 1 of the Boco Rock wind farm project.

While the Stage 1 Boco Rock wind farm project fell within two Local Government Areas (LGAs), namely Cooma-Monaro Shire Council and Bombala Council, this Stage 2 Modification of the Project only affects Snowy Monaro Regional Council.

## **1.3 Assessment Scope & Methodology**

---

The scope of the assessment included the following tasks:

- Review of project background information.
- Project discussions with the CWPR project team.
- Discussions with relevant transport contractors.
- Comparative evaluation of the Approved project against the proposed Modification to evaluate the appropriateness of the changes and identify any key transport and traffic risks related to OSOM transportation.
- Desktop assessment (using available mapping applications) of potential road network routes between delivery ports and the Stage 2 wind farm site access point.
- Assess the over-dimensional transport options for turbines specifications including blade lengths of up to 78 m.
- Comparative review of previous assessment including traffic generation during construction and operational phases of the Project, traffic distribution onto the surrounding local and regional road network and assessment of transport impacts on the surrounding road network including site access, road safety, road capacity and road conditions.
- Identify any additional required road upgrades, road furniture amendments, bridge upgrades or other infrastructure constraints which would need to be addressed in order to deliver the revised project equipment to site
- Discussion of mitigation measures to address potential additional transport impacts identified.
- Preparation of this Revised Transport Assessment Report to be used as part of the Project's Modification assessment document.

## **1.4 Report Structure**

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The remainder of this assessment report is presented as follows:

**Chapter 2** provides an overall project description as well as general details of the wind farm equipment components.

**Chapter 3** describes the potential transport modes as well as existing transport conditions including transport routes and site access locations.

**Chapter 4** assesses the transportation impacts during the construction and operation phases of the Project.

**Chapter 5** discusses mitigation measures to address potential transport impacts identified.

**Chapter 6** provides a summary and conclusions to the assessment.

## **2. Project Details**

### **2.1 Project Description**

---

The Proponent seeks approval for a Modification to the Yandra Cluster only, which will comprise Stage Two of the Boco Rock Wind Farm Project. The purpose of the Modification is to accommodate larger but fewer wind turbine generators (WTGs) to reduce the cost of energy produced and minimise impacts on the surrounding community and environmental values. No changes to the operational Project or the Boco Cluster are proposed in the subject Modification.

The Project Approval currently permits two alternate layouts within the Yandra Cluster (refer to Project figures in *Appendix A: Proposed Wind Farm Layout Diagrams*):

- Layout Option 1: 32 WTG locations
- Layout Option 2: 27 WTG locations

In order to provide certainty to stakeholders, the subject Modification seeks only to address Layout Option 1 with Layout Option 2 no longer forming part of the Yandra Cluster.

The Yandra Cluster is proposed to be modified as follows (as shown in *Appendix A: Proposed Wind Farm Layout Diagrams*):

- Removal of two approved WTG locations, reducing the available WTG locations from 32 to 30 within Yandra Cluster.
- Construction, operation and decommissioning of up to 20 WTGs within these 30 locations.
- Increase in WTG tip height of up to 200m.
- Increase in WTG rotor diameter within the revised tip height.
- Addition of a temporary construction compound within the Yandra Cluster.

The Project Approval permits a wind farm with a total capacity of 270 megawatts (MW) and associated infrastructure, including up to 122 wind turbine generators with a maximum capacity of 3.3 MW and a maximum tip height of 152 m.

The subject Modification seeks to increase the size and capacity of turbines consistent with current industry standards and technology. Approval is sought for a turbine tip height of up to 200 m (48 m greater than the current approval) including an increased rotor diameter. It is anticipated that turbines will have a nameplate capacity of 4 MW or greater, as turbine technology continues to advance rapidly. The Modification seeks to remove the limit on the generating capacity of individual turbines, as the limits are counter-productive in lowering the levelized cost of energy.

The Stage 2 turbine specifications will be determined following a competitive tender process, which will involve detailed modelling to determine the most cost effective and energy efficient design for the selected turbine. For this reason, the Modification seeks flexibility to select up to 20 WTG locations to be constructed from 30 potential locations identified following approval of the Modification. The selected turbines will be constructed within the micro-siting allowance of 100 m from the approved turbine locations.

The subject wind farm would also consist of permanent and temporary ancillary infrastructure and equipment, which would be positioned in accordance with the existing approval. These will typically include:

- Access roads (internal site road network) connecting the public road network to the wind turbine locations and substations.
- Overhead and underground electrical cabling and control cables connecting to the main collector substation.
- Mobile concrete batching plant.
- Cleared areas to store construction materials and wind turbine components (construction laydown areas).
- Construction site offices, associated facilities and site parking.
- Appropriate wind farm signage both during the construction and operational phases of the proposed development.
- Crane hardstand areas for the erection, assembly, commissioning, maintenance, recommissioning and decommissioning of the wind turbines.

All ancillary infrastructure will remain within the approved development corridor as previously approved for Stage 1 of the project in 2010 and will be constructed within the 100 m micro-siting allowance permitted under the Project Approval. Given the reduction in turbine numbers, the on-ground impacts of ancillary infrastructure would be less than the balance of impacts permitted under the Project Approval.

Table 2.1 following, identifies the Project components and provides a comparison between the parameters of the approved Project and the proposed Stage 2 Modification for Yandra Cluster.

**Table 2.1: Project Components in Yandra Cluster Only**

Project Component	Current Project Approval	Modification	Comparison
<b>Project Site</b> Area of land within the cadastre boundaries of all properties subject to this Stage 2 Modification proposal	5,121 ha	5,121 ha	No change
<b>Development Corridor</b> Area within the Project Site within which the Stage 2 Development Footprint is contained	467 ha	457 ha	Reduced by 10 ha
<b>Development Footprint</b> Area of all Permanent and Temporary Stage 2 Project infrastructure including temporary disturbances within the Development Corridor	65 ha	63 ha	Reduced by 2 ha
<b>Project Capacity</b>	270 MW	270 MW	No change

Project Component	Current Project Approval	Modification	Comparison
<b>Permanent Project Infrastructure</b>			
Wind turbine generators (Yandra)	Up to 32	Up to 20	Reduced by 12
Tower height	Approx. 101.5 m	Approx. 130m	Increase of 28.5 m
Rotor diameter	Approx. 104 m	Approx. 160m	Increase of 56m
Tip height	Up to 152 m	Up to 200 m	Increase of 48 m
Hardstands (individual wind turbine)	1,250 sqm	1,250 sqm	No change
Footings (individual wind turbine)	400 sqm	625 sqm	Increase of 225 sqm
Road length	78 km	54 km	Reduced by 24 km
Road width	12 m	6 m (average)	Reduced by 6 m
Overhead electrical reticulation and control cables	16.6 km	16.6 km	No change
<b>Temporary Project Infrastructure</b>			
Earthworks alongside Permanent Infrastructure (cut and fill which also envelopes the Temporary Project Infrastructure detailed below) <sup>3</sup>	148.0 ha	75.5 ha	Reduced by 72.5 ha
Concrete batch plant	1 x 0.5 ha	1 x 0.5 ha	No change
Construction compound (additional) <sup>3</sup>	0	1	Increase of 1

1. Included within permanent Development Footprint calculation and relates to the approximate area (per turbine) that will remain a permanent impact adjacent to the hardstand area. Temporary impacts associated with construction of the footings have been captured in the temporary earthworks area calculation.
2. Construction of the internal road and hardstand network will require earthworks that are beyond the limits of the permanent road impact however remain within the Development Corridor. This is required to level areas of steep gradient to a design suitable for safely transporting Project components into position. Detailed civil designs have been prepared for the Project that include impacts associated with permanent road, hardstand, footings and turning head areas in addition to the area considered the extent of the earthworks.
3. The construction compound will consist of a fenced-off area for the storage / lay-down of tools, vehicles, equipment, construction materials, turbine components, etc. Following construction, the compound may be retained as a permanent area for the operational life of the wind farm for component storage.

The project site is currently used as rural farm land and this would continue to be the case after construction. Once the wind farm is operational it would be monitored remotely, with maintenance staff undertaking regular services in line with the selected wind turbine.

The life span of a wind farm is approximately 25 years, after which time there would be an option to either decommission the site, restoring the area to its previous land use with regard to consent conditions and lease requirements, or to upgrade the equipment and extend the wind farm's operational life.

## **2.2 Wind Farm Components**

---

The wind turbine components generally comprise a nacelle and gearbox assembly, hub, three (3) blades and the tower in up to six sections. Transport of blades would be typically undertaken one at a time with a length of up to 78 m, however some newer turbine models involve a two-piece turbine blade meaning that the transport of blade lengths is less of a logistical constraint. The nacelle and gearbox assembly are transported separately to limit transport weights. To facilitate transportation and ease of installation the tower support structure would be manufactured in three sections.

The larger dimension wind turbine items such as the blades, nacelles and the larger diameter lower tower components may, when transported, exceed the road standard clearance restrictions and require special transportation permits. There is anticipated to be no issues for transporting the smaller sections of the smaller sized wind turbine components.

### **2.2.1 *Turbine Rotor***

Potentially, the turbines to be used for the Project would be three-bladed, semi-variable speed, pitch-regulated machines with rotor diameters up to 160 m.

Wind turbine blades are typically made from glass fibre reinforced with epoxy or plastic attached to a steel hub, and include lightning rods for the entire length of the blade. The blades typically rotate at about 12 rpm at low wind speeds and up to 18 rpm at higher wind speeds.

### **2.2.2 *Towers***

The supporting structure is comprised of a reducing cylindrical tower made out of either a welded steel shell or a concrete steel hybrid, fitted with an internal ladder or lift. The tower sections are approximately 5 m in diameter and range in length up to approximately 40 m. Coupled with the maximum blade length of 78 m, the maximum proposed blade tip height would be approximately 200 m. Alternative tower heights are also under consideration however, this is not exhaustive since new models and certified designs are continually entering the market place. The tower will be manufactured and transported to site in multiple sections for on-site assembly.

### **2.2.3 *Nacelle***

The nacelle is the housing constructed of steel and fibreglass that is mounted on top of the tower, with approximate dimensions of 12 m long x 4.5 m high x 4.5 m wide. It encloses the gearbox, generator, transformers (model dependant), motors, brakes, electronic components, wiring and hydraulic and lubricating oil systems. Weather monitoring equipment located on top of the nacelle will provide data on wind speed and direction for the automatic operation of the wind turbine.

### **2.2.4 *Footings***

Foundation types for the wind turbines will be considered pending geotechnical investigation of the ground conditions at the Project site.

Slab (gravity) foundations would typically involve the excavation of ground material to a depth of approximately 2.5 m. Some of this excavated material would, if suitable, be used as backfill around the turbine base. Remaining excavation material will be used for the on-site road infrastructure, where necessary. A slab foundation would involve installation of

shuttering and steel reinforcement, followed by the pouring of concrete.

If slab plus rock anchor foundations are required, the construction of the foundation for each machine would reduce the volume of excavated ground material, albeit to a similar depth of approximately 2.5 m. Slab plus rock anchor foundations require shuttering and steel reinforcement, drilling of rock anchor piles up to a depth of approximately 20 m, concrete pour, after which the rock anchors are stressed and secured once the concrete has cured sufficiently.

Detailed geotechnical surveys will be carried out during pre-construction work to determine the necessary foundation type per wind turbine. It is feasible that more than one type of foundation may be required for the Project, following the assessment of the individual wind turbine locations. New wind turbines are continually coming on to the market and it is possible that minor variations to these typical dimensions could occur prior to final wind turbine selection.

#### **2.2.5 *Crane Hardstand and Assembly Areas***

Site access roads would have areas of hardstand (approximately 25 m by 60 m) adjacent to each wind turbine for use during component assembly and by cranes during installation. The clearing of native vegetation for the construction of access roads and hardstand areas will be avoided where possible.

The roads would be surfaced with local stone material to required load-bearing specifications. The nature and colour of surface stone would be selected to minimise visual impact prior to construction. The roads and hardstand areas would be maintained throughout the operational life of the Project and used principally for the periodic maintenance of the wind turbines.

#### **2.2.6 *Overhead and Underground Cabling***

The electrical cables from the wind turbine sites will comprise a mix of underground and overhead cabling and will connect directly to an existing main collector substation.

The underground cable routes will generally be between the turbines and follow the route of the internal access roads. The final route will minimise vegetation clearing and avoid potential erosion and heritage sites, and will also depend on the ease of excavation, ground stability and cost. In some locations overhead line will be used to link clusters of turbines together and bring power back to the main collector substation.

Control cables will interconnect the wind turbine generators and the operation facilities building. Computerised controls within each wind turbine will automatically control start-up, speed of rotation and cut-out at high wind speeds and during faults. Recording systems will monitor wind conditions and energy output at each of the turbines. Remote monitoring and control of the Project will also be employed. Control cables will consist of optic fibre, twisted pair or multi-core cable and will be located underground within the groups of turbines.

The installation of buried earthing conductors and electrodes will also be required in the vicinity of the turbines, the facilities building and the sub-stations as required.

### **3. Existing Conditions**

#### **3.1 Transport Modes**

---

The assessment of transportation of wind turbine components to site involves the separate consideration of the transport mode between:

- Australian ports for international imports and other local manufacturing plants located in Australia to the Boco Rock wind farm site;
- Transportation through towns / villages along the transport routes; and
- Site access off the public road network to the internal road network of the Boco Rock wind farm site.

The sea port of entry for imported wind turbine equipment and/or the location of manufacturing sites has not yet been fully resolved / confirmed. Therefore, this assessment evaluates all potential transport routes from all directions around NSW and beyond, if applicable.

Air, rail and road transport modes were considered for transporting the imported and locally manufactured wind turbine and sub-station transformer components during the previous assessment and Stage 1 project approval. Road transport was determined to be the only feasible option for transporting the larger wind turbine components and the heavy mass transformers.

All road routes to the Stage 2 project site (Nimmitabel area) are primarily by either National Routes or State Highways and, subject to statutory permit conditions, can accommodate the proposed wind turbine components generating OSOM vehicles, ie. the routes are part of the *NSW Oversize Overmass Load Carrying Vehicles Network Approved Roads* or the *ACT Oversize Vehicles Exemption Notice*.

A NSW Roads & Maritime Services (RMS) permit is required to be obtained for road access for OSOM vehicles along the NSW major road network (National Routes or State Highways) from areas of local component manufacture or international import to the Nimmitabel area. As per the Stage 1 project approval, the nominated transport contractor would be responsible for a detailed route assessment and subsequently obtaining all necessary transport permits, arranging escort services and any other third-party services as required by applicable regulations.

Transport of wind farm components manufactured elsewhere in Australia, would be by road via the national highway network, with the obvious transport routes being via the Monaro Highway / Snowy Mountains Highway. The road network has the flexibility to provide a single transportation mode from origin to the wind farm site without the need for additional loading and handling operations.

## **3.2 Road Transport Routes**

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### **3.2.1 Wind Farm Site Access Location**

There is proposed to be a single site access point off the public road network serving all the wind turbine locations for the Yandra cluster portion of the Project – refer to *Figure 3.1* below. An internal site road network would allow access within the wind farm site linking the public road network (Yandra Road / Benbullen Road) with the wind turbine locations.

The site access is proposed to be via Yandra Road, which runs off the southern side of Springfield Road, approximately 5.8 km west of Monaro Highway / Snowy Mountains Highway.

### **3.2.2 Major Road Network Route Options**

This transport assessment does not include a detailed route assessment for the transportation of the OSOM turbine and transformer components along the routes from the major manufacturing centres. This assessment would be required to be produced as part of the permit system by the haulage contractor and approved by the relevant roads authorities prior to the commencement of the construction phase, if required.

Two sea ports have been identified for importation of the major wind farm turbine components: Port of Eden on the NSW Far South Coast and Port Kembla in the NSW Illawarra Region. The main advantage of the Port of Eden is its relative proximity to the wind farm location while Port Kembla has advantages with respect to its size of operations and associated infrastructure. The potential major road network route options for both ports are described below. It should be noted that alternate ports of entry may be considered once the turbine tender is undertaken, the transport haulage provider is engaged and the port handling capacity is confirmed during the scheduled import and construction window.

#### **Port of Eden**

A detailed route assessment has been previously undertaken for the OSOM transport route between the Port of Eden and the Boco Rock wind farm project area for Stage 1 of the Project<sup>3</sup>. Approval was granted from Forestry NSW and Roads and Maritime Services (RMS) for the use of the relevant roads. It is noted that the assessment considered the Stage 1 wind farm components with blade lengths in particular, only being a maximum of 48.7 m long.

The detailed information is not repeated in this assessment but the route assessed was Edrom Road (from Port of Eden wharf), Princes Highway, Imlay Road, Monaro Highway (via Bombala town local roads – Maybe Street, Forbes Street, Mahratta Street) and onto Springfield Road.

The previous route assessed is some 167 km in length. A desktop assessment of this route up to Springfield Road has been undertaken as part of this report revision and an assessment of a site video was undertaken for the Springfield Road section. The subject route is considered to still be the best route between the Port of Eden and the Boco Rock wind farm site for component sizes used during Stage 1 of the Project but would be problematic for the longer 78 m blades that may potentially be used for Stage 2 of Boco Rock wind farm. Potential issues for transport of these longer wind farm components have been identified including:

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3. RJA “GE Boco Rock Windfarm, Transport Management Plan: Port of Eden to Boco Rock (Rev.1)”, 17/12/2013

- Navigation out of the port area onto Edrom Road.
- Relatively tight curve alignment between Imlay Road and Monaro Highway.
- Monaro Highway at Delegate Road – power pole on inside of curve.
- Travel through Bombala township especially at the Maybe Street / Forbes Street roundabout.

In any case, it is understood that the Port of Eden may not be able to accommodate the delivery and storage of longer blade lengths (up to 78 m) that potentially may be used for this Stage 2 of the Project because of storage area limitations. However it is noted that some turbines are now being manufactured and transported with two-piece blades, which will simplify storage and transport.

An alternative and similar length route using NSW Class 1 OSOM approved roads (via Princes Highway and Snowy Mountains Highway) has potential alignment concerns along sections of Snowy Mountains Highway (between approximately 38 km and 49 km west of Princes Highway), which may restrict the transport of the longer blades.

#### **Port Kembla**

Between Port Kembla and the Stage 2 Boco Rock wind farm project area at Yandra Road, there are a number of potential transportation routes. The most obvious (and preferred) route is via Princes Highway, Picton Road, Hume Highway, Federal Highway, Majura Parkway, Monaro Highway via Polo Flat Road (bypassing to the east of Cooma) and then continuing along Monaro Highway / Snowy Mountains Highway to Springfield Road via Nimmitabel township (approximately 404 km in length).

Apart from the relatively short section of Polo Flat Road bypassing Cooma to the east, the remainder of the route is along NSW Class 1 OSOM approved roads. The use of Polo Flat Road to bypass the Cooma urban area is considered to be preferable to using Monaro Highway and Bombala Street to travel through the Cooma urban area because of the numerous road furniture and alignment restrictions that would be encountered.

It is anticipated that Port Kembla will have the capacity to accommodate the delivery of longer blade lengths (up to 78 m) that potentially may be used for this Stage 2 of Boco Rock wind farm. Notwithstanding, for the preferred route described above, several restricted road network sections for transport of wind farm components of this length have been identified including:

- Tight curve alignments for transportation out of the port area onto Princes Motorway either via Five Islands Road interchange or via Springhill Road and Masters Road interchange.
- Relatively tight curve alignment between Mount Ousley Road and Picton Road.
- Relatively tight curve alignment with street light poles on inside of curve between Picton Road and Hume Highway.
- It is assumed that all underpasses along the major road network (ie. Princes Motorway, Mount Ousley Road, Hume Highway, Federal Highway, Majura Parkway and Monaro Highway) would have adequate height clearances.
- Travel between Polo Flat Road and Monaro Highway / Snowy Mountains Highway via eastern access road – travel through Cooma urban area is not feasible due to the relatively sharp turn at the Sharp Street (Monaro Highway) / Bombala Street roundabout.

It is noted that for the overall route, other relatively minor, localised intersection amendments may be required (eg. sign post relocations) as well as some temporary raising of power lines along Polo Flat Road and through Nimmitabel township. These matters would be identified and addressed in consultation with the relevant roads authorities during preparation of the Stage 2 Transport Management Plan.

An alternative route between Port Kembla and the Stage 2 Boco Rock wind farm project area would be to travel south from Port Kembla along Princes Highway before turning west onto Snowy Mountains Highway and Monaro Highway. While this route is slightly shorter (approximately 396 km), it has the same potential alignment concerns along sections of Snowy Mountains Highway (between approximately 38 km and 49 km west of Princes Highway), which may restrict the transport of the longer blades. Moreover, there are limited access locations for OSOM Class 1 transport vehicles approaching the North Narooma bridge crossing (across Wagonga Inlet) as well as south along Princes Highway from Narooma (between Old Highway junction and Cobargo).

The Princes Highway route also has potential transport restrictions across the Shoalhaven River bridge (North Nowra) and Clyde River bridge (Batemans Bay) as well as several assorted minor amendments required through urban township areas along the NSW South Coast, eg. Milton, Moruya, Narooma.

Other route options include transportation along roads that are not NSW Class 1 OSOM approved roads. These generally have restrictions / limitations along their routes including horizontal and vertical alignment restrictions, intersection restrictions and township / village impacts as well as surrounding land use impacts.

In order to minimise road upgrade works, transport routes are likely to focus on the shortest routes to the proposed site access point from the major road network. Therefore, the major and local road networks that would provide transport routes to the wind farm project site access location include Monaro Highway and Springfield Road as shown in *Figure 3.1* following.

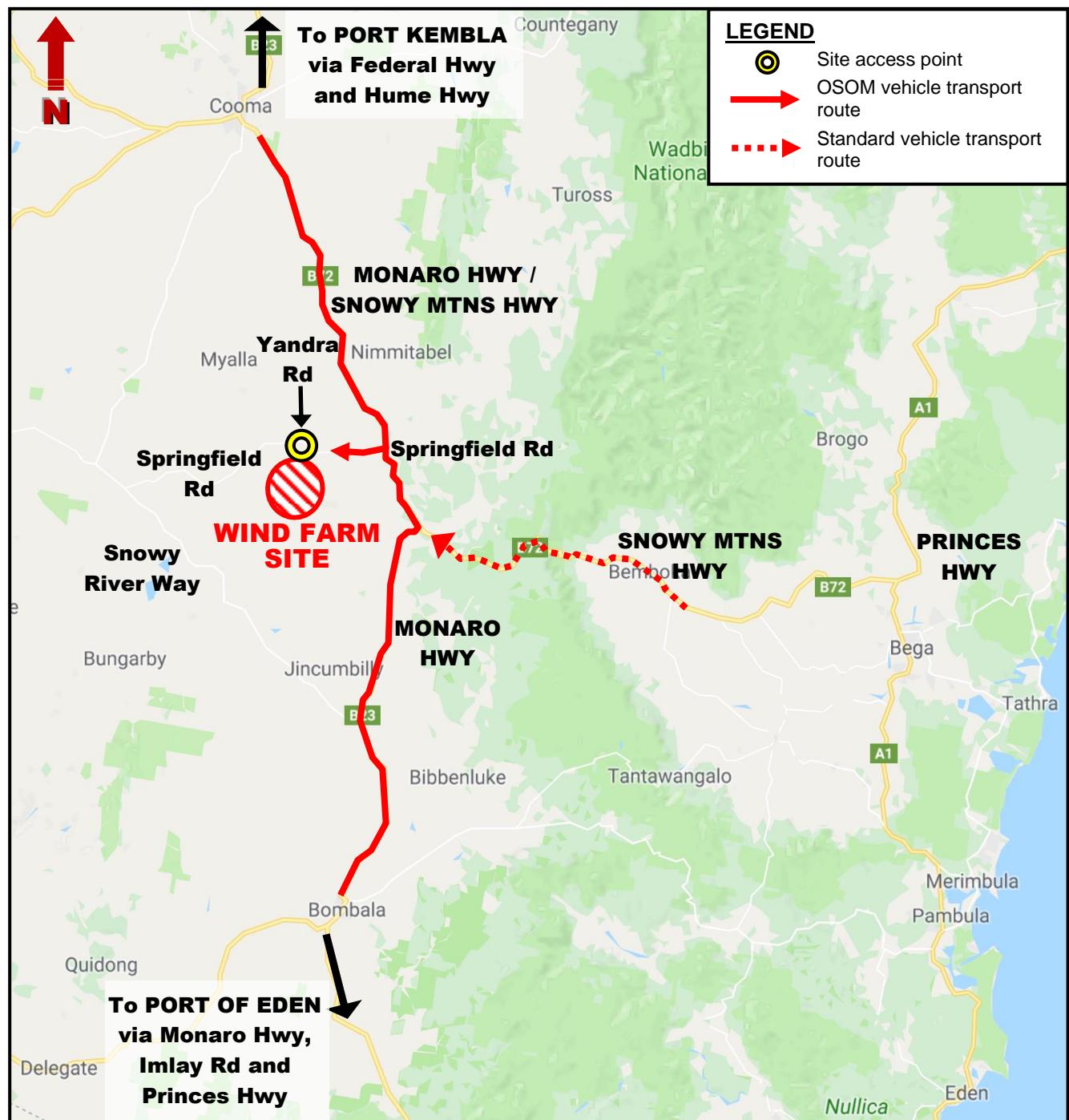


Figure 3.1: Regional Major Road Network & Transport Routes

### **3.2.3 Local Road Network Routes**

Apart from the major road network described above, all other roads are maintained by Snowy Monaro Regional Council. This includes Springfield Road, which will be the access route to the site off Monaro Highway from nearby Nimmitabel.

Because of the relatively large increase in the number of vehicles using the local road network route, there are several impacts to be considered as follows:

- Larger vehicles required for OSOM loads would occupy most of the carriageway width at many locations increasing the potential for 'head-on' collisions.
- For nearby property owners, stock would need to be controlled from straying onto the roads that are not fenced, eg. Yandra Road.
- Structural damage may occur to some of the culverts, concrete causeway crossings and stock grids.
- Roadside trees and other road furniture / objects may obstruct the passage of longer / wider loads and high loads.
- Lack of roadside delineation in some locations may impact traffic safety during periods of poor visibility.
- Some intersections have inadequate pavement width to safely accommodate the turning manoeuvres of the over-size vehicles.

It should be noted that the above impacts would be temporary, as the equipment haulage is not a continuous program during the construction timeframe. Most of the heavy haulage would be in the form of convoys and would be managed through the mitigation measures contained in this report.

#### ***Transport Along Springfield Road***

Springfield Road acts as a minor connecting route between Monaro Highway in the east and The Snowy River Way in the west. It intersects with Monaro Highway at a T-junction some 500 m south of Nimmitabel township. The intersection has adequate sight distance and turning movement radii.

In general, Springfield Road is of a consistently average condition and standard (for its road status) along its length with a width varying between approximately 5 m and 7 m. It has no centreline and edgeline markings and no street lighting. The pavement conditions are generally average apart from occasional rutting / potholes.

The general alignment for the subject section between Monaro Highway and Yandra Road is relatively gentle (larger radius) horizontal curves on a relatively flat terrain with some gentle undulations.

Current daily traffic volumes (estimated from the previous Bega Duo Designs assessment) are approximately 250 vehicles per day (vpd).

Increased usage by drivers unfamiliar with the Springfield Road route (eg. construction staff) could result in excessive speed through some of the curved sections especially during winter months when snow and frost occur. It is considered that there are no major deficiencies along the alignment for the transport of longer turbine components although minor, localised works may be necessary, eg. trimming roadside tree canopies, some localised widening on tighter curves.

The junction layout with Yandra Road has inadequate turning swept paths for the increased numbers of turning traffic and especially for the longer turbine components. Widening of the access across the cattle grid immediately off Springfield Road would be required. It is envisaged that a new, appropriately sized site entrance off Springfield Road onto Yandra Road would be designed in consultation with Council during pre-construction by the successful contractor.

Movement toward the side of the road to avoid oncoming heavy vehicles could result in excessive wear of the road shoulders. This edge wear can result in vehicles losing some steering control.

Refer to *Section 5.4* for typical examples of upgrade works and other risk mitigation measures along OSOM transport routes.

### ***Transport Along Yandra Road***

Yandra Road is an unclassified local road providing access to three properties to the south of Springfield Road including 'Glenfinnan' property near the Springfield Road junction through to 'Yandra' property approximately 3.15 km from Springfield Road.

Yandra Road is a low-speed, gravel access road of 3.0 m to 4.0 m width and intersects with an access to 'Benbullen' property approximately 1.5 km south of Springfield Road, which is proposed to provide access to all of the turbine sites within the subject Yandra cluster.

Both Yandra Road at Springfield Road and Yandra Road at Benbullen access are uncontrolled T-junctions. Sight distance along Springfield Road to / from Yandra Road is adequate. The turning radii are restricted by the proximity of the cattle grid to the edge of bitumen on Springfield Road.

Yandra Road is not fenced and there is a stock grid 3.0 metres wide at approximately 1.43 km from Springfield Road. There is no street lighting available.

Traffic volumes (from the previous Bega Duo Design assessment) are less than 30 vpd along Yandra Road, which would seem to still be realistically current considering the number of properties that the access road serves.

In general, the Yandra Road / Benbullen route alignment and road environment are considered to be conducive for the transport of wind farm components without the need for significant road upgrade works. However, minor localised widening and clearing works (to allow adequate swept turning paths for the longer turbine components through the tighter curve radii) as well as trimming of roadside tree canopies would be required. Site access roads will be designed by the project construction contractor and where they interact with Council-owned roads in this area, consultation with Council will be undertaken.

Refer to *Section 5.4* for typical examples of upgrade works and other risk mitigation measures along OSOM transport routes.

### 3.3 Existing Traffic Flows

Existing traffic volumes were obtained from RMS data and the previous Bega Duo Designs transport assessment. In the study area surrounding the project site, RMS data was available along Monaro Highway, just north of Nimmitabel township<sup>4</sup>. This was from the RMS *Traffic Volume Viewer* website, which provides data in various formats including average daily traffic, weekday, weekend and public holiday traffic and hourly peak period traffic volumes. Existing traffic volumes in vehicles per day (vpd) and vehicles per peak hour (vph) for the surrounding road network are shown in *Table 3.1* below.

**Table 3.1: Existing Traffic Volumes**

Road Section	Vehicles Per Day (vpd)	Vehicles Per Hour (vph)	Traffic Volume Source
Monaro Highway: 450 m north of Mason Street, Nimmitabel	2,594	716	RMS <i>Traffic Volume Viewer</i> website (2018)
Springfield Road	250	35 *	2018 estimate based on previous Bega Duo Designs assessment
Yandra Road	30	5 *	Based on previous Bega Duo Designs assessment

\* Peak hourly traffic flows have been estimated to be between 10% and 15% of daily traffic flows.

4. RMS permanent counter – Station ID: 08171

## **4. Impact Assessment**

In general, construction of the wind farm would include the following activities:

- Transport of construction machinery and labour to the Project site.
- On-site civil works for internal access roads, crane pads, lay-down areas, wind turbine footings and cable trenching.
- Road upgrade works (as required) to the public road network to allow OSOM transportation.
- Transport of wind turbine infrastructure to the Project site.
- Transport of raw materials to the Project site including gravel, aggregate and cement.
- Installation of wind turbines on site using cranes.
- Restoration and revegetation of disturbed areas.

The Project Approval currently requires construction would to be limited to the following times:

- Monday to Friday, 7:00 am to 6:00 pm;
- Saturday, 8:00 am to 1:00 pm; and
- No construction on Sundays or public holidays.

### **4.1 Construction Vehicle Types**

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The type of construction vehicles proposed to access the Project site depends on the equipment and/or personnel being transported and their function on the site. Access to construction site offices and facilities buildings would generally be available for conventional two-wheel drive vehicles. Access to individual wind turbine locations may be restricted to four-wheel drive or multiple wheel drive vehicles depending on the internal road network conditions.

Due to the size and weight of the wind turbine components it is expected that many of the delivery vehicles would be 'over-size' (width and/or length), 'over-mass' or both. These vehicles would be regarded as restricted access vehicles (RAVs) and will require special RMS operating permits to allow them to travel on public roads.

'Over-mass' loads would be carried on trailers, or combinations of trailers, with sufficient axle groups to ensure compliance with point load and overall load limits for the road surface. As a point of reference, the heaviest load based on an assessment of current turbine specifications from a variety of turbine manufacturers is 125 tonnes (comprising the entire nacelle / gearbox configuration in one unit). Such loads are typically carried on trailers with 10-plus axles, with each axle having up to 8 tyres. Allowing for the weight of the trailers themselves, typical axle weights under such configurations are in the range of 12 to 13 tonnes, or less than 2 tonnes per tyre. This is less than a typical semi-trailer with 11 tonnes per axle but only 4 tyres per axle, resulting in 2.75 tonnes per tyre.

Over-size vehicles therefore incur less loading stress on the road surface, especially when run under escort with limited speed, than normal heavy vehicle traffic. Furthermore, both 'over-size' and 'over-mass' vehicles feature trailers with steering on some or all rear axles.

This technology ensures improved manoeuvrability, minimises stress on the equipment and the load, and reduces or eliminates tyre scrubbing and the associated stresses on the road surface when cornering.

The fleet of vehicles engaged to deliver oversize components would typically consist of:

- Extendable blade trailers of standard semi-trailer width (2.5 m) with the ability to extend to 45 m with up to 4 rear axles, some or all of which will be steerable;
- Heavy duty low loaders, with up to 10-plus rear axles and with each axle having 8 or more tyres to spread the load of the heavier WTG components. These low loaders may have the ability to carry loads up to 30 m in length, and may widen up to 5 m to reduce pressures on the road surface. Depending on the extendable length of these trailers, some of the rear axles may be self-steering;
- Dolly / jinker arrangements to carry loads longer than 30 m, where permitted to do so by permits and the WTG supplier. The rear axle groups on the jinker arrangements are steerable; and
- A variety of high power prime movers, typically rated 130 to 200 tonnes gross combination mass (GCM), as required depending on the total combination weight, ie. WTG load + trailer + prime mover.

Refer to *Figure 4.1* following for typical transport vehicles that are used for wind farm component delivery.

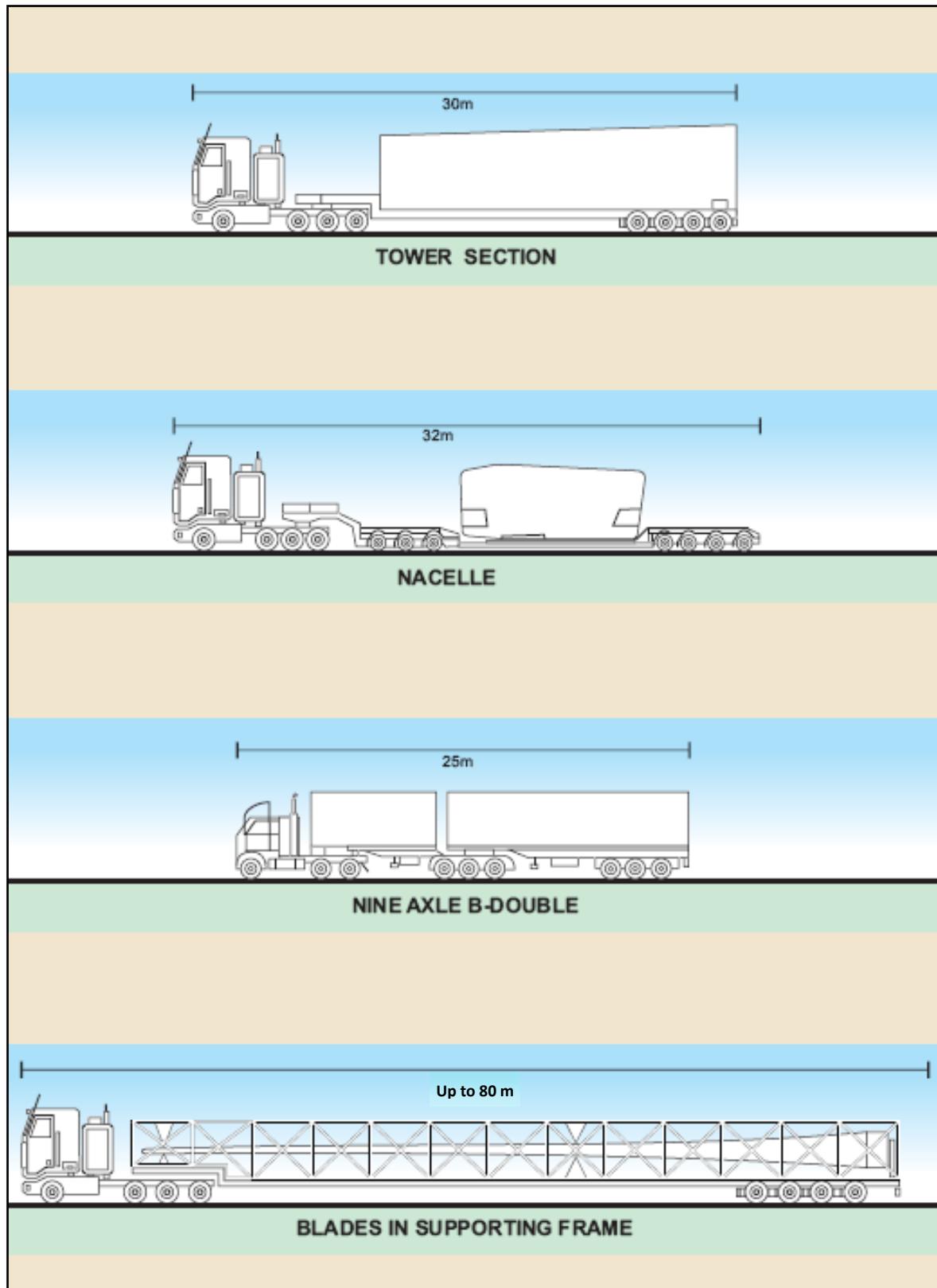
Over-size vehicles are those over 19 metres in length, 2.5 metres in width and/or 4.3 metres in height and their operating permits would require one or more escort vehicles to accompany them. Over-mass vehicles are those with a gross mass greater than 42.5 tonnes.

As mentioned previously, each wind turbine generator comprises a nacelle (approximately 125 tonnes), hub (approximately 25 tonnes), three blades (approximately 7 tonnes each and up to 78 m long) and three tower sections (approximately 50 tonnes each).

The components would typically be carried on specially designed trailers with axles that extend up to 4.2 metres in total width to carry the hubs and nacelles. The blades, which may be up to 78 m long, are carried on specialised trailers which have steerable rear axles allowing negotiation of relatively small radius curves provided that the inside of the curve is clear of obstacles.

The standard design vehicle for swept path adequacy in the provision of intersections and the design of parking and turning areas would generally be (as a minimum) the Austroads single unit truck / bus of 12.2 m length. However, provision would be made, where possible, to allow for a 'B-double' swept path, which requires a wider area allowing for manoeuvring by semi trailers and over-size vehicles.

The design of access roads and junctions would need to allow for widths of up to 4.5 metres and weights complying with NSW Roads and Maritime Services (RMS) maximum loading.



**Figure 4.1: Typical Transport Vehicles**

## **4.2 Construction Phase Traffic Generation**

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During the construction phase, which is expected to extend over twelve (12) months, several tasks would generate traffic. These are categorised as follows:

- Wind farm component delivery
- Construction material delivery
- Construction staff transport

Traffic-generating tasks include:

- Initial site set-up and access construction during the pre-construction period;
- Construction staff movements between the site and the local centres;
- Wind farm component deliveries (including OSOM transport);
- Concrete material deliveries and other general deliveries during construction works;
- Operational staff movements during operation and maintenance; and
- Decommissioning and reinstatement construction activities.

### **4.2.1 Transport of Construction Materials**

Apart from the transport of OSOM turbine components, the major construction materials to be transported include gravel/road base for construction of site access roads, constituent materials for the on-site concrete batch plant, steel reinforcement deliveries for foundation construction, water for dust suppression activities and other miscellaneous materials deliveries for site offices and the like.

It is assumed that construction material trip distribution would be mainly from the Cooma area to the north although there could potentially be some material deliveries travelling from the south (Bombala area) and east (Bega area).

### **4.2.2 Construction Staff Traffic**

For the majority of the 12-month construction period, it is anticipated that construction staff numbers would be approximately 60 staff. During peak construction periods, it is anticipated that construction staff numbers would increase to approximately 80 staff for an approximate four-month period coinciding with the turbine installation phase.

It is assumed that construction staff trip distribution would be mainly from the Cooma area to the north although there would potentially be some staff travelling from the south (Bombala area) and east (Bega area).

### **4.2.3 Traffic Generating Construction Activities**

The transport of the various wind farm components and construction materials as well as construction staff to/from the sites would generate traffic from various sources. The traffic generation is based around a continuous pouring of a turbine footing in a single day and the installation of an average 2.5 towers per week. It has been based on information from the previous Bega Duo Designs assessment, which would still be relevant for this project assessment and is shown in *Table 4.1* following.

**Table 4.1: Project Traffic Generation**

Activity	Maximum Trips Per Day	Comments
Construction and management staff	<u>54</u>	Assuming an average of 3 employees per vehicle
Precinct set up	10	
Road construction	30	Includes delivery of gravel road base
Foundation construction	<u>102</u>	Includes delivery of constituent concrete materials, reinforcing steel delivery, etc.
Dust suppression	4	Assuming water is sourced locally
Internal Cabling	6	
Turbines erection	<u>58</u>	

The trips shown underlined in *Table 4.1* above, could be concurrent, resulting in a potential maximum of 218 vehicle trips per day (vtpd) split into 54 light vehicle trips (construction staff traffic) and 164 heavy vehicle trips (remainder of construction-related trips). This maximum would potentially occur during peak construction periods (eg. concrete pours) and is a conservative (high) scenario because it assumes that all construction activities would use the same routes into and out of the wind farm access point. In reality, construction staff and material deliveries are likely to arrive along a number of routes, which would dissipate the traffic generation.

The estimated maximum hourly trips generated is approximately 33 vehicle trips per hour (based on 15% of the maximum daily traffic generation) and would likely occur during peak construction activities such as concrete pours and the like. This peak traffic generation would be predominantly heavy vehicles and be split into three (3) light vehicle trips and 30 heavy vehicle trips.

### **4.3 Impacts of Construction Phase Traffic Generation**

#### **4.3.1 Road Capacity**

In order to assess the potential impacts on road capacity, the Project traffic generation has been added to existing daily and peak hour traffic flows to obtain future traffic flows along the affected road network.

Future traffic volumes in vehicles per day and vehicles per hour for roads along the proposed access routes are shown in *Table 4.2* following. As mentioned previously, it should be noted that these future traffic volumes are conservative (high) because they assume that all construction activities would use the same routes into and out of the wind farm access point.

**Table 4.2: Future Traffic Volumes**

Traffic Scenario		Monaro Highway	Springfield Road	Yandra Road
<i>Daily Traffic – vehicles per day</i>				
Existing traffic <sup>1</sup>	LV	2,284	225	25
	HV	310	25	5
Wind farm traffic generation	LV	54	54	54
	HV	164	164	164
Combined future traffic	LV	2,338	279	79
	HV	474	189	169
<i>Hourly (Peak) Traffic – vehicles per hour</i>				
Existing traffic <sup>1</sup>	LV	630	30	4
	HV	86	5	1
Wind farm traffic generation	LV	3	3	3
	HV	30	30	30
Combined future traffic	LV	633	33	4
	HV	116	35	31

1. Existing traffic derived from *Table 3.1*. HV % assumed to be between 10% and 15% of total traffic volume.

Road capacity can be expressed and qualified along a section of the rural road network as its ‘level of service’ (LoS). Typically, the LoS is based on road capacity analysis as described in Austroads’ “*Guide to Traffic Engineering Practice, Part 2 – Roadway Capacity*”. Road capacity can be expressed in total vehicles per day and/or vehicles per hour.

The level of service descriptions are as follows:

LOS A: Free flow conditions, high degree of freedom for drivers to select desired speed and manoeuvre within traffic stream. Individual drivers are virtually unaffected by the presence of others in the traffic stream.

LOS B: Zone of stable flow, reasonable freedom for drivers to select desired speed and manoeuvre within traffic stream.

LOS C: Zone of stable flow, but restricted freedom for drivers to select desired speed and manoeuvre within traffic stream.

LOS D: Approaching unstable flow, severely restricted freedom for drivers to select desired speed and manoeuvre within traffic stream. Small increases in flow generally cause operational problems.

LOS E: Traffic volumes close to capacity, virtually no freedom to select desired speed or manoeuvre within traffic stream. Unstable flow and minor disturbances and/or small increases in flow would cause operational break-downs.

LOS F: Forced flow conditions where the amount of traffic approaching a point exceeds that which can pass it. Flow break-down occurs resulting in queuing and delays.

Road capacity for two-lane, two-way sections of a rural road network is largely based on a combination of design speed, travel lane and shoulder width, sight distance restrictions, traffic composition, directional traffic splits and terrain<sup>5</sup>. This provides a basic level of service and associated service flow rate under prevailing road and traffic conditions. For the minor unsealed roads, service flow rates are not applicable as they have significant variations in standards of formed lanes and carriageways.

Based on their road and traffic characteristics, the levels of service and flow rates for the affected sections of the rural road network along the relevant transport routes are shown in *Table 4.3* following.

**Table 4.3: Rural Road Network Service Flow Rates**

<b>Road Section</b>	<b>Level of Service (LoS)</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
Monaro Highway	240 vph 2,400 vpd	470 vph 4,800 vpd	765 vph 7,900 vpd	1,260 vph 13,500 vpd	2,250 vph 22,900 vpd
Springfield Road	105 vph 1,050 vpd	260 vph 2,850 vpd	480 vph 5,250 vpd	730 vph 7,800 vpd	1,440 vph 13,800 vpd
Yandra Road	not applicable	not applicable	not applicable	not applicable	not applicable

Based on the above service flow rates and the existing and additional wind farm generated construction traffic volumes of the rural roads along the subject access routes, ‘before and after’ levels of service can be expected as shown in *Table 4.4* following.

**Table 4.4: Rural Road Network – Existing and Future Levels of Service**

<b>Road Section</b>	<b>Existing LoS</b>	<b>Future LoS</b>
Monaro Highway	B / C	B / C
Springfield Road	A	A
Yandra Road	not applicable	not applicable

From the above table, it can be seen that the relevant road network to be used has spare capacity and is operating at adequate levels of service. It is clearly evident that operating conditions (levels of service) along the road network would change insignificantly from existing conditions, even after the addition of a conservative (high) scenario of wind farm generated construction traffic.

For Yandra Road, which is effectively a minor unsealed property access, service flow rates are not applicable as it does not have formed lanes and carriageways. However, it would be operating at a high level of service with significant spare capacity, due to its very low existing traffic volumes (up to only 30 vpd). While the addition of construction-related traffic generation temporarily increases traffic volumes significantly along Yandra Road during the

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5. Austroads “Guide to Traffic Engineering Practice: Part 2 – Roadway Capacity”, Section 3

construction period, the controlled nature of existing traffic generation (from only a handful of rural properties) and its ample spare capacity would allow the wind farm traffic to be readily absorbed.

In summary, the addition of heavy vehicles and construction staff traffic during peak construction periods would not change the existing levels of service nor significantly affect road network operations and intersection performance pertaining to capacity issues. The temporary increase in traffic volumes due to construction-related activities is able to be readily absorbed by the subject road network with appropriate road infrastructure upgrades and construction traffic management.

#### **4.3.2 Site Access and Road Safety**

Construction traffic is proposed to access the wind turbine sites via an internal site road network off the Yandra Road / Benbullen site access point (described previously in Section 3.2.1).

Suitable on-site manoeuvring areas would be available so that larger vehicles are able to safely manoeuvre into the site off the public road network, around the site and out of the site onto the public road network. The location and layout of the Yandra Road site access junction with Springfield Road would be confirmed with the relevant road authorities considering set back of property boundaries and swept path turn radii for over-size (length) loads.

It is envisaged that for the OSOM vehicles to be used for wind farm component delivery, escort vehicles, transport restrictions and appropriate traffic management would be adopted to ensure safe passage from the public road network onto the site. These issues would be resolved in detail by the selected transport contractor when seeking approvals from relevant road authorities.

All vehicles would enter and exit the site to/from the public road network in a forward direction only. All vehicles generated by construction staff would be accommodated within on-site parking areas.

To ensure adequate road safety is maintained, a comprehensive Traffic Management Plan (TMP) would be prepared in conjunction with the successful transport contractor and relevant road authorities. The TMP would detail appropriate construction traffic controls and management measures and all aspects would be implemented in co-ordination with the Councils and RMS. It is acknowledged that on occasions local traffic will be inconvenienced. However, the management measures within the TMP would endeavour to mitigate any impacts. The TMP would include, but not be limited to, provisions for:

- Management of transport deliveries to minimise impacts on other transport operations, eg. school bus routes;
- Undertaking community consultation before and during all transport and haulage activities, including contact details to ensure community concerns are logged and addressed;
- Clear communication of road closures (if required);
- Letterbox drop along affected routes;
- Minimising disruption to local vehicles by ensuring average and maximum wait times due to project traffic along local roads are stipulated by the chosen transport contractor (typically an average maximum of 3 minutes wait time);

- Upgrading road infrastructure including designing and implementing temporary modifications to intersections and roadside furniture as appropriate;
- Managing transport operations including provision of warning and guidance signage, traffic control devices, temporary construction speed zones and other temporary traffic control measures;
- Preparation of a 'Transport Code of Conduct' for all staff and contractors detailing designated transport routes, road behavioural requirements, speed limits and local climatic conditions that may affect road safety, eg. snow / ice, fog, etc.;
- Procedure to monitor traffic impacts and respond to impacts rapidly; and
- Reinstatement of pre-existing road conditions after construction phase is complete.

#### **4.3.3 Internal Access Roads**

The construction and maintenance of the wind farm would require the construction of an internal site road network to reach each of the wind turbine locations. In some cases the site road network works would involve upgrading existing access tracks and in others constructing new ones. Route selection for the access roads has been determined taking into consideration topography, drainage and potential erosion impacts.

The internal site road network would consist of private roads and will not be accessible to the public. Access would be controlled by locked gates. The internal site access roads would generally be 6.0 m wide with regular passing bays and turning heads to accommodate construction vehicles and the crane required to assemble the wind turbines. Hardstand areas would be required around each turbine site for the safe operation of large cranes. These areas would also provide turning opportunities for delivery vehicles.

The roads would be an all-weather graded surface. Ongoing operational maintenance of on-site roads would be undertaken by the wind farm operator.

#### **4.3.4 Road Condition Maintenance**

There are a number of public road works that would be required to enable transport of components and materials to the wind farm sites. These have been identified in general previously in this assessment but would be confirmed and resolved in detail by the successful transport contractor when seeking approvals from relevant road authorities.

The condition and maintenance of roads used for transport of major wind farm components would be covered by existing conditions and requirements of the current Project approval. This would provide the basis for identifying any road damage and subsequent restoration works after the construction period is complete. Regular inspections would be undertaken and any significant damage resulting from construction traffic, except that resulting from normal wear and tear, would be repaired to pre-existing conditions.

A permit system requires transport contractors to state the registration details of the trucks / trailers used for each load, so the link between permissions and equipment is very tight.

Trucks being used for all escorted loads are given an inspection by the escort at the start of every trip, while other trucks are required to meet regulated maintenance requirements and these procedures are regularly audited to ensure compliance. Under these operating procedures, there would be no further actions required by local Councils to ensure that trucks are fit for purpose. Notwithstanding, the transport contractor would be expected to comply with any additional requirements from any party (ie. Councils, RMS, etc.), if requested to do so.

#### **4.4 Operational Phase Traffic Generation**

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Traffic generation during operations would be relatively minor. The operational / maintenance staff are likely to be based in the local area and it is envisaged that the majority would be from the currently operating Stage 1 of the Project. Aspects of the Project operation to be dealt with by on-site staff would include safety management, environmental condition monitoring, landowner management, routine servicing, malfunction rectification and site visits. Other remote monitoring functions would typically include turbine performance assessment, wind farm reporting, remote re-setting and maintenance co-ordination.

It is understood operational traffic would consist of 4WD-type service vehicles travelling between individual wind turbine sites along the internal road network off Yandra Road / Benbullen access. It is envisaged that this would amount to up to an additional 10 trips per day, which would readily be absorbed into the spare capacity of the existing road network. This additional trip generation is conservative (high) because, as mentioned previously, it is likely that the majority of staff would be from the currently operating Stage 1 of the Project.

There is the possibility that the operational wind farm may attract tourist traffic along the roads surrounding the sites. However, it is considered that this would not significantly increase traffic volumes or cause any unfavourable impacts.

#### **4.5 Effect of Operation Phase Traffic Generation**

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Based on the relatively minor traffic generation during operations described above, traffic and road network impacts would be negligible. The current road network has significant spare capacity and is used by 4WD-type vehicles, which are proposed to be used for servicing the various sites.

All vehicles generated by operations staff would be accommodated within on-site parking areas.

#### **4.6 Cumulative Impacts**

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At present there is a proposed nearby major project (wind farm) at Granite Hills that may potentially result in cumulative impacts to the Boco Rock Stage 2 wind farm project. The Granite Hills wind farm project has received SEARs but has not yet lodged an Environmental Assessment. The precise timing for construction and operation is unclear at this stage, however it is expected to occur later than Stage 2 of Boco Rock wind farm.

Notwithstanding, it is understood that the Granite Hills wind farm project proposes to use the major and minor road network in the surrounding area, some of which is similar to the transport routes proposed to be used for the Boco Rock Stage 2 wind farm project, eg. Monaro Highway. This has the potential to exacerbate any traffic and transport impacts if both projects proceed simultaneously.

Once progression of the Granite Hills wind farm project is confirmed, other possible major developments in the surrounding area are determined, and also when the construction dates / timetables are finalised for the Boco Rock Stage 2 wind farm project, the cumulative impact of any simultaneous development would need to be considered with respect to transport and traffic operations. Possible mitigation measures may include scheduling of

construction activities and deliveries to minimise road transport movements, region-wide traffic management and/or shared road upgrades, for example.

## **5. Mitigation Measures**

### **5.1 General Management of Potential Impacts**

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The management of potential impacts caused by the proposed wind farm project would cover the construction, operation and decommissioning phases of the Project. With respect to the potential traffic impacts during the decommissioning phase, these essentially mirror the construction phase impacts, although would occur over a shorter time period.

For management of potential impacts during the construction phase, the following general measures would need to be undertaken:

- Engage a licensed and experienced transport contractor with experience in transporting similar wind farm component loads. The contractor would be responsible for obtaining all required approvals and permits from the RMS and local Councils and for complying with conditions specified in the approvals. Transport contractors would also conduct any dilapidation surveys and arrange for detailed pavement and infrastructure inspections (eg. bridge loading adequacy) to ensure all access routes are suitable prior to carrying out the transport tasks.
- Develop a Traffic Management Plan (TMP) in conjunction with the transport contractor and relevant road authorities and implement all aspects of the TMP in co-ordination with the local Councils and RMS. Refer to previous *Section 4.3.2* for typical details to be included in the TMP.
- Undertake road infrastructure upgrade works to allow OSOM transport along the proposed transport routes to access the site, as required. Details of specific upgrade works follow in *Section 5.3* below.
- There are some locations along the relevant transport routes (eg. Springfield Road) where road alignments and/or narrow carriageway widths would require over-size vehicles to use the full carriageway width. This would require traffic management in the form of temporary, short-term full road closures ('rolling' road closures as vehicles pass critical locations) aided by escort vehicles.
- Identification of any significant road damage and subsequent restoration works after the construction period is complete.
- Consider establishing a 'car pool' initiative for construction staff from nearby centres to minimise construction staff trips.
- For decommissioning, similar general measures would be necessary as those detailed for construction. However, the TMP for decommissioning would need to be revised to address traffic operation and volume changes in the future years during the decommissioning phase.

For management of potential impacts during the operations phase, the following general measures would need to be undertaken:

- Establish a procedure to ensure the ongoing maintenance of the internal on-site access roads during the operation phase. This maintenance would include sedimentation and erosion control structures, where necessary.

## **5.2 Road Authority Approvals**

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The use of licensed and experienced contractors for transporting wind farm equipment is essential to ensure the minimisation of any impacts on the road network and traffic operations. There are a number of transport contractors who are experienced in the specialised transport of OSOM loads. These contractors operate closely with road authorities and are able to arrange all required permits for undertaking the transport tasks. They would also carry out detailed transport route assessments and confirm the requirement for any road infrastructure upgrades and/or bridge strengthening works.

NSW RMS would typically have the following requirements for transporting OSOM loads:

- Generally, the wider and longer over-size transport would require two pilot vehicles and contact with NSW Police for further guidance (pilot vehicles).
- Over-size permits are required to be ‘specific’ permits for each vehicle if they would be travelling along designated roads or locations. Additional and specific over-size permits may be required for loads with greater dimensions than covered by a General Class 1 Oversize Notice.
- A specific permit:
  - prescribes the travel conditions that apply to a particular vehicle;
  - identifies the vehicle to which the permit applies; and
  - identifies the registered operator of the vehicle.
- The permit may also specify conditions to secure payment for:
  - damage caused to roads, bridges or other property by the over-size vehicle;
  - road work that must be conducted before the vehicle can travel on a particular route; or
  - costs incurred by the RMS to evaluate the proposed route or provide any special escort services.
- An over-mass permit will be required for each nacelle component.
- An over-size (length) permit will be required for each blade component. The requirement for over-mass permits for blade components will depend on the type of vehicle used to transport them. However, preliminary assessment indicates that over-mass permits may not be required for blade components.
- Transport of blade components will most likely utilise a rear-end steering system on a trailer or low loader.
- An over-mass permit will be required for each tower component.
- An over-mass permit will be required for each crane.
- Night transport is generally available along the major road network (between 1 am and sunrise or 6 am, whichever is earlier).
- Transport through any urban areas must generally occur during daylight periods. It is recommended that if the transport routes pass through any school zones or adjacent to any schools, transport also be restricted to outside school drop-off and pick-up times (8:00 am to 9:30 am and 2:30 pm to 4:00 pm) to prevent conflicts with these activities.
- As part of the transport permit process, the RMS and local Councils are likely to require a detailed sufficiency assessment of all bridges and other structures along the transport route to identify and specify strengthening requirements, if any. This may

apply to a number of bridge / causeway crossings along Monaro Highway / Snowy Mountains Highway.

### **5.3 Potential Road Infrastructure Upgrades**

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As well as the construction of an internal on-site road network that links up the various wind turbine sites and associated wind farm infrastructure, road upgrade works are likely to be required at a number of locations to accommodate the increased heavy vehicle volumes and OSOM transport vehicles. The latter issue would be confirmed by a licensed transport contractor as part of their transport route assessment based on specific vehicles to be used.

The potential road infrastructure upgrades that may be required and/or would need to be considered by the successful transport contractor include the following (refer to *Section 5.4* below for typical examples of upgrade works and other risk mitigation measures along OSOM transport routes).

#### *Monaro Highway (north of Springfield Road)*

- Adjustment works including some temporary raising of power lines for the route between Polo Flat Road and Monaro Highway / Snowy Mountains Highway via the eastern access road.
- Possible adjustment of overhead power lines through Nimmitabel township.

#### *Monaro Highway (south of Springfield Road)*

- Adjustment / relocation of power pole and other intersection signage and road furniture at the Delegate Road junction, south of Bombala.
- Potential significant works for over-size transport through Bombala township especially at the Maybe Street / Forbes Street roundabout, Bombala River bridge crossing and at the Mahratta Street junction for longer wind farm components.

#### *Springfield Road*

- Some minor signage adjustments at the Monaro Highway junction area to allow over-size vehicle transport.
- At a number of locations, trimming of roadside tree canopies and foliage is likely to be required to allow over-size vehicle transport, eg. possible locations include (with distances west of Monaro Highway) at 800 m, between approximately 3.1 km and 3.5 km, at 3.9 km and between approximately 5.1 km and 5.3 km.
- There are a number of small culverts running under the road along the route, which would need to be checked for structural adequacy from heavier loads.

#### *Yandra Road*

- The intersection at Springfield Road will need some widening work to allow adequate swept path for longer vehicles entering Yandra Road. This will include adjustments to a cattle grid near the site entry at Yandra Road.

## 5.4 Typical Transport Route Upgrade & Risk Mitigation Measures

Full structural road upgrades are not normally required for the routes intended to provide wind farm access. Exceptions include where access is via an under-rated bridge or where there are obstructions that overhang the road or limit the width of the vehicle / load that can pass. Mitigation strategies typically comprise the following.

### Road Surface

As a general rule, ground clearances as low as 300 mm should be considered for over-mass trailers. Depending on the details of the transport equipment to be used, road camber, rise, fall and undulations may require review. Placing limits on vehicle speed ensures that even with heavy loads, the stresses on the road surface can be minimised. Whilst a sealed road surface is ideal, the vehicles are designed to and capable of travelling on unsealed surfaces such as those found on wind farm sites during construction – see *Figure 5.1* below. Therefore, temporary surfaces of crushed rock or similar material are normally adequate, on the basis that any such surface is properly drained to prevent loaded vehicles becoming bogged. There is not anticipated to be any significant impacts to road safety and/or traffic operations as a result of this type of road surfacing measure.



**Figure 5.1: Typical unsealed access road within wind farm site**

### Road width

Larger WTG loads require a road width of up to 5 m, which is sometimes more than the width of minor roads that service remote wind farm sites, eg. Yandra Road. Consideration needs to be given to ensure adequate road width for over-size transport, although it is not normal to increase the width of a sealed surface if it already exists at less than 5 m. Where the road width is restricted (be it sealed or unsealed), the common approach is to clear sufficient vegetation from the sides of the road to allow shoulders of crushed rock to be laid. The level of the surface of any such preparation needs to match the edge of the existing road, to prevent tyre damage (and in the case

of sealed roads, the break-up of the edge of the sealed section) when the vehicle is required to run wide for corners or to move over for on-coming traffic – see *Figure 5.2* below for increased unsealed road width.



**Figure 5.2: Typical unsealed increase in width of (public) road**

#### *Intersection Layouts*

Swept path analysis is generally undertaken once the WTG has been determined for the project, to ensure that any obstacles such as ditches, signage or traffic furniture can be identified and remedied ahead of time. Where further road modifications are required to allow for ‘cutting in’ of vehicle rear wheels, crushed rock in-fill is normally sufficient on the basis that the vehicles are travelling slowly enough on the curves / turns to ensure minimum road stresses. Where temporary or crushed rock road surfaces are used, a regime of regular maintenance should be employed when OSOM vehicles are travelling to / from the wind farm site.

Once construction is complete, any temporary modifications can be removed and/or reinstated to ensure the intended swept path and traffic control devices of the road for typical usage are maintained, ie. to maintain safe operations. This could include reinstatement of temporary infill areas and relocation of road furniture, signage, etc.

#### *Overhead obstacles*

Over-size vehicles can travel with a combined total height of 5.2 m without the need for an overhead pilot. Any obstructions or height risks such as low bridges, overhead power lines, hanging wires or tree branches would be identified. Where there is a bridge risk, detailed calculations would be done to ensure the loads as specified by the selected WTG manufacturer do not present any risk of a bridge strike. If this is possible, alternative route(s) should be sought. Overhanging wires can be provided with additional temporary support if required, whereas any overhanging tree branches would be cut back or restrained away from the path of the vehicle.

### *Bridges and culverts*

In the event that there are bridges and/ or culverts which are deemed not strong or wide enough (typically less than 5 m travel path width) to support WTG transport equipment, the options are as follows:

- Build a temporary diversion with a structure to provide the necessary support, whilst leaving the original structure in place.
- Reinforce the existing structure by means of steel plates / girders as required to provide the necessary support. Reinforcement can be provided either below the structure, or as additional support on top of the existing road surface.
- As a last resort, if other options are not feasible or practicable, consideration may be given to the replacement of the bridge / culvert with a structurally suitable permanent upgrade to support the projected wind farm component loads.

The selection of any of the above options is dependent on a full technical assessment from a qualified structural engineer which typically occurs during the detailed design phase of the project, once the dimensions and loads are known precisely.

## 6. Summary & Conclusions

The following pertinent issues summarise the transport impact assessment for the proposed Stage 2 of the Boco Rock Wind Farm project:

- The wind farm would consist of up to 20 wind turbines within a single cluster to be located on rural land approximately 6 km south-west of Nimmitabel township and approximately 35 km south of Cooma, NSW.
- Road transport is the preferred method of transport. Rail transport has been considered but is not feasible.
- The preferred transport route for over-size / over-mass (OSOM) vehicles is via Monaro Highway / Snowy Mountains Highway and Springfield Road to the site access location at Yandra Road.
- The minor road network of Springfield Road and Yandra Road / Benbullen access have significant spare capacity along the road network.
- There is proposed to be a single site access point off Springfield Road at Yandra Road serving the Yandra cluster location and some other ancillary facilities.
- All wind turbine locations and ancillary infrastructure would be able to be accessed from the site access point via the internal road network.
- During the construction phase, several tasks would generate traffic including wind farm component delivery, construction material delivery, concrete pours and construction staff transport. The potential maximum daily traffic generation would be 54 light vehicle trips and up to 164 heavy vehicle trips per day. This maximum would potentially occur during peak construction periods only and is a conservative (high) scenario because it assumes that all construction activities would use the same routes to access the Project site. In reality, construction staff and material deliveries are likely to arrive along a number of routes, which would dissipate the traffic generation.
- During peak construction activities, all affected roads on the road network would maintain their levels of service and adequately absorb construction-generated traffic.
- It is proposed that during peak traffic generation activities such as concrete pours and for OSOM vehicles to be used for wind farm component delivery, escort vehicles and appropriate traffic management would be adopted to ensure safe passage from the public road network onto the site.
- Traffic generation during operations would be minimal resulting in up to an additional 10 trips per day. Consequently, traffic and road network impacts would be negligible during the operational phase.
- For the OSOM transport routes, road infrastructure upgrades are likely to be required at a number of locations along Monaro Highway, Polo Flat Road, Springfield Road and Yandra Road / Benbullen access to accommodate the increased heavy vehicle volumes and/or OSOM transport vehicles.
- Along the OSOM transport routes via the minor road network, where vehicles may require the use of the full carriageway width, traffic management would be required in the form of temporary, short-term full road closures ('rolling' road closures as vehicles pass critical locations) aided by escort vehicles.

- A Traffic Management Plan (TMP) would be prepared in conjunction with the transport contractor and relevant road authorities and all aspects would be implemented in co-ordination with the local Council and RMS. The TMP would typically address:
  - Management of transport deliveries to consider other transport operations;
  - Community consultation and issue logging;
  - Clear communication of road closures (if required);
  - Letterbox drop along affected routes;
  - Minimising disruption to local vehicles by ensuring average and maximum wait times due to project traffic along local roads;
  - Road infrastructure upgrade requirements;
  - Traffic management of transport operations;
  - Preparation of a ‘Transport Code of Conduct’ for all staff and contractors;
  - Procedure to monitor traffic impacts and respond to impacts rapidly; and
  - Reinstatement of pre-existing road conditions after construction is complete.
- The use of licensed and experienced contractors for transporting wind farm components would ensure a minimisation of transport impacts. They would arrange required OSOM vehicle permits, carry out a detailed transport route assessment and confirm the requirement for any road / bridge infrastructure upgrades.

This Transport Assessment has addressed Planning NSW’s Director General’s Requirements (DGRs), for the construction and operational impacts of the project as follows:

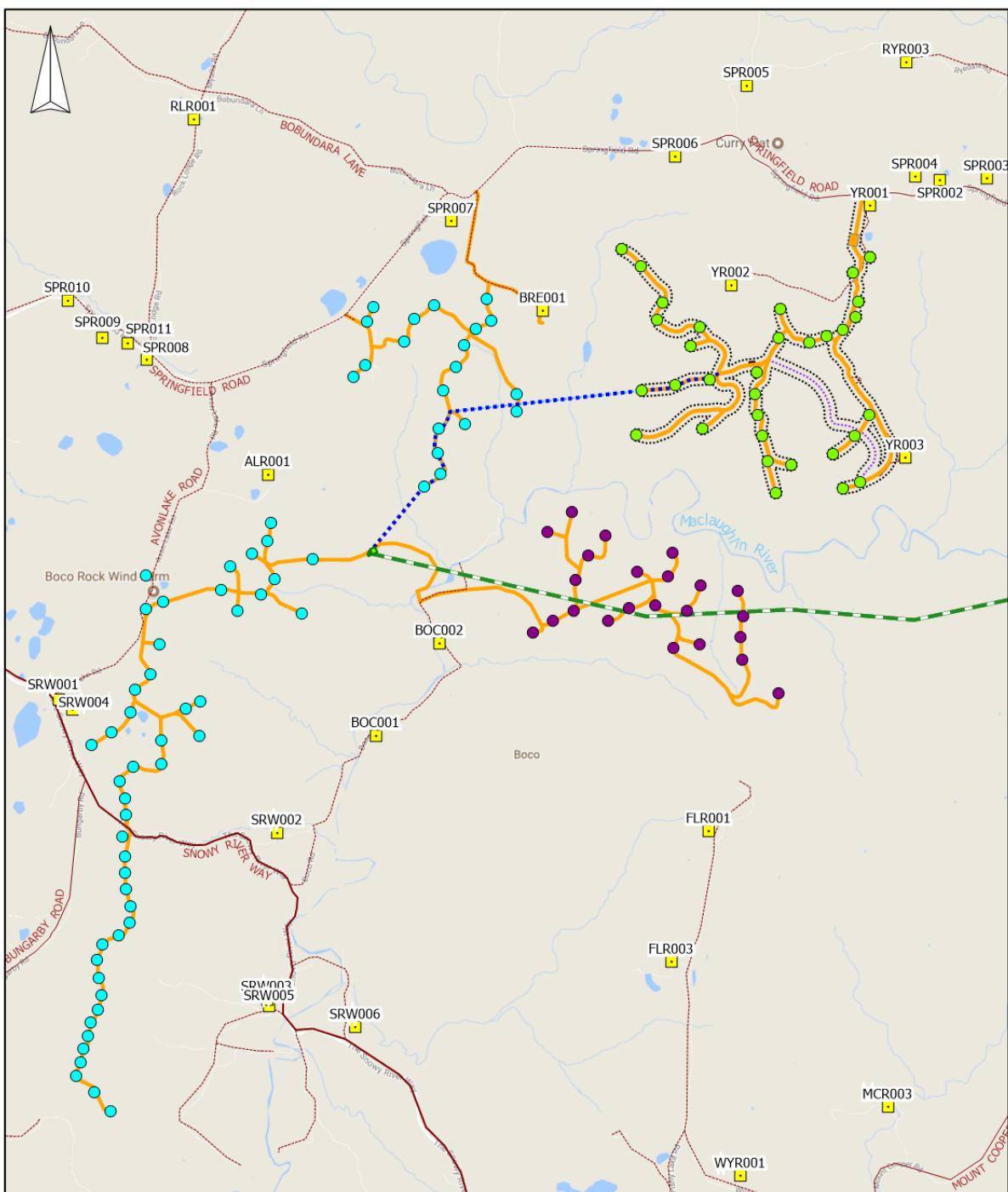
- Details of light and heavy vehicle traffic volumes generated during construction and operation – refer to *Section 4.2* (specifically *Tables 4.1 and 4.2*) and *Section 4.4*.
- Details of transport routes during construction and operation – refer to *Section 3.2*.
- Assess potential impacts on road network function (including intersection level of service) and road safety – refer to *Section 4.3.1* and *Section 4.3.2*.
- Assess the capacity of the existing road network to accommodate the type and volume of traffic generated by the project (including OSOM vehicles) during construction (refer to *Section 4.3.1*) and operation (refer to *Section 4.5*), including full details of any required upgrades to roads, bridges, site access provisions (for safe access to the public road network) or other road features (refer to *Section 5.3*).
- Details of measures to mitigate and/or manage potential impacts – refer to *Section 5*, particularly *Section 5.3*.
- Details of internal site access roads and connections to the existing public road network, including ongoing operational maintenance for on-site roads – refer to *Section 3.2.1*, *Section 4.3.2* and *Section 4.3.3*.
- Consideration of relevant Council traffic / road policies – refer to *Section 1.2*
- Any cumulative impacts from other proposed and approved developments in the surrounding area – refer to *Section 4.6*.

In conclusion, it is considered the proposed Boco Rock Stage 2 Wind Farm Project would not create any significant adverse impacts with respect to transport issues such as traffic operations, road capacity on the surrounding road network, site access and road safety. The management of heavy vehicle movements during construction would be appropriately covered by a TMP to be prepared prior to construction starts, while the use of a specialised and licensed transport contractor would ensure that the transport of OSOM wind turbine components would be carried out in an appropriate manner.

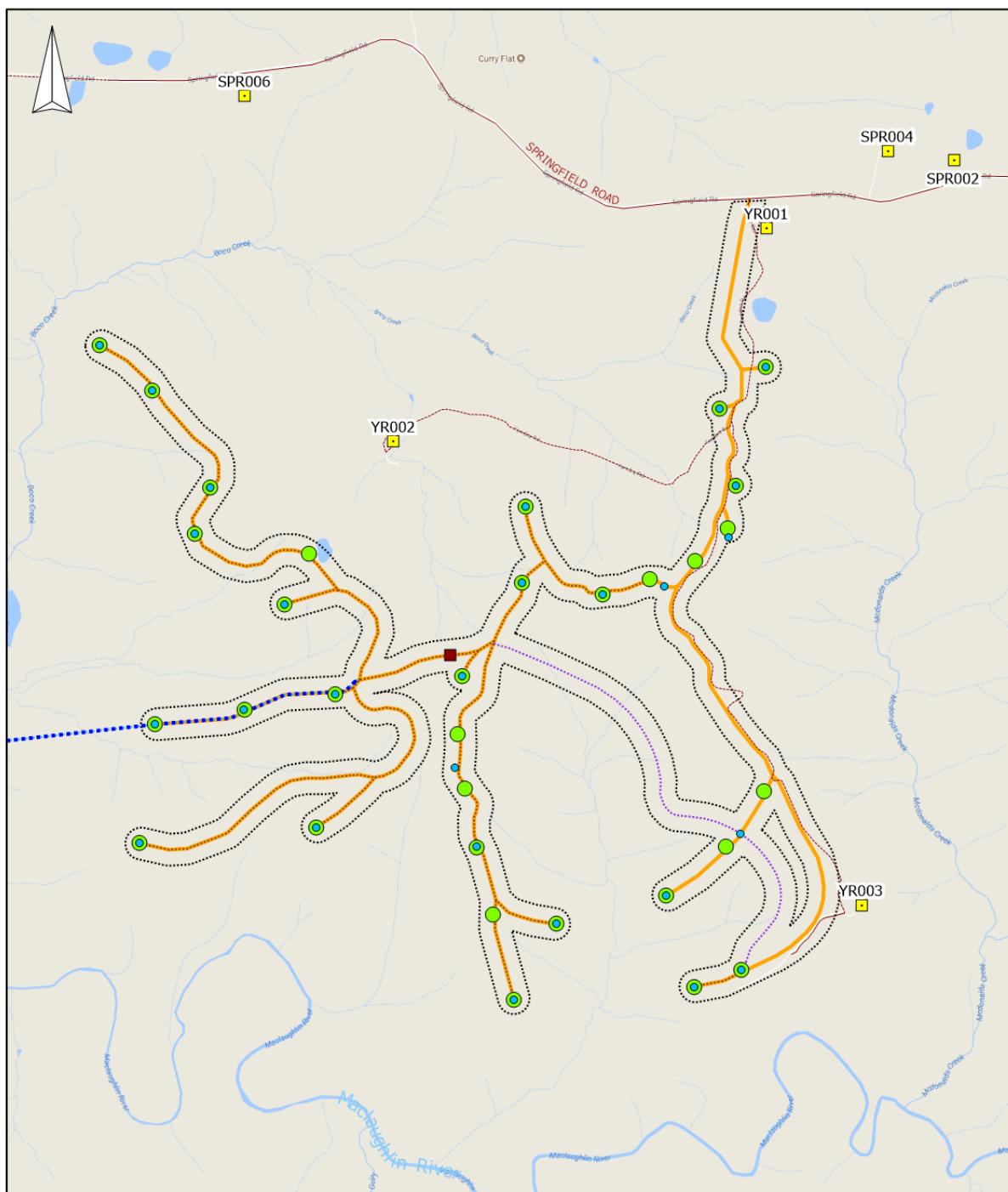
## **Appendix A**

# **Proposed Wind Farm Layout Diagrams**

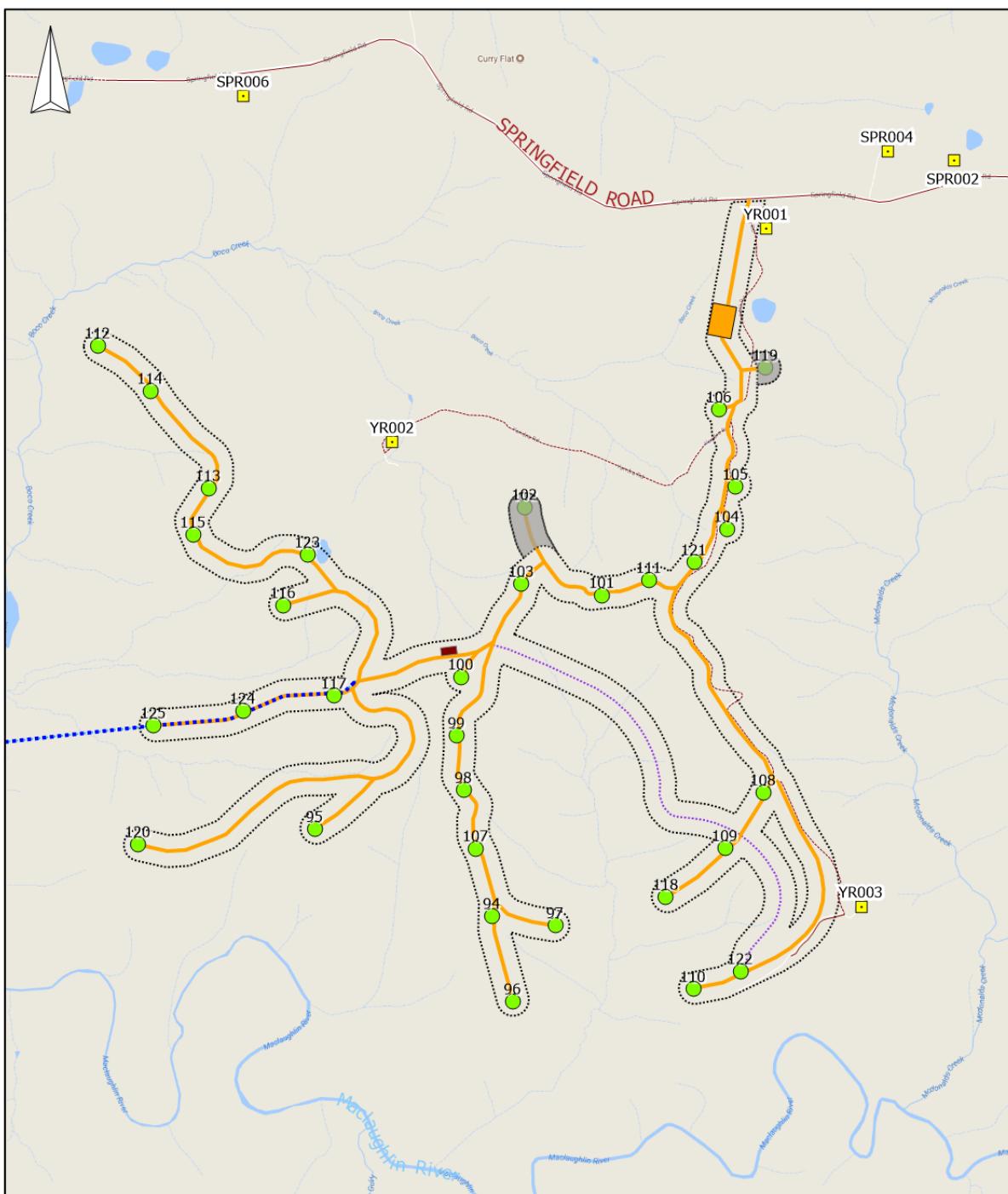
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LEGEND		COMPANY				
● Stage 1 As Constructed - 67 WTG	■ Internal Road Layout	BOCO ROCK STAGE TWO PTY LTD				
● Stage 2 (Yandra Cluster) - 32 WTG	— Existing Sealed Rd					
● Boco Cluster - 23 WTG	- - - Existing Unsealed Rd					
■ Dwellings	— 132kV Double Circuit TL (existing)					
■ Substation	— Cables (approved):					
■ Concrete Batching Plant	— Overhead Cables					
■ Temporary Construction Compound	— - - Underground or overhead					
■ 100m Development Corridor						
SCALE BAR		DATE	SCALE	DWG NO	REV	VER
0	5 km	30 Aug 2018	1:110000	BRST013	A	3
		DRAWN BY	CHECKED BY	SHEET	JOB NO	SIZE
		J PETERSEN	M BRANSON	1 OF 1	130607	A4



LEGEND		COMPANY				
<b>Layout Option 1:</b>		BOCO ROCK STAGE TWO PTY LTD				
● 32 WTG Locations						
<b>Layout Option 2:</b>						
● 27 WTG Locations						
■ Dwelling						
— Internal Road Layout						
■ Concrete Batching Plant						
— Overhead Cables						
- - - Underground or overhead Roads						
— Sealed Road						
- - - Unsealed Road						
100m Development Buffer Cables (approved)						
SCALE BAR						
0						
1 km						
TITLE		Figure 2: YANDRA CLUSTER AS APPROVED				
DATE		ISCALE	DWG NO	REV	VER	
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LEGEND		COMPANY				
●	30 Wind Turbine Locations	BOCO ROCK STAGE TWO PTY LTD				
■	Dwelling					
-----	100m Development Buffer					
██████	Turbine locations removed					
■	Temporary construction compound					
■	Concrete Batching Plant					
SCALE BAR		0	1 km	TITLE		
				Figure 3: PROPOSED MODIFICATION OF YANDRA CLUSTER		
				DATE	SCALE	DWG NO
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						REV A
						VER 1
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				1 OF 1	130607	SIZE A4

## Appendix D Revised Noise Impact Assessment

# BOCO ROCK WIND FARM - MOD

## Revised Noise Assessment - Stage 2 Modification

**Prepared for:**

Boco Rock Stage Two Pty Ltd  
c/- CWP Renewables Pty Ltd  
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## BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Boco Rock Stage Two Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

## DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
640.11757.00000-R01-v1.3	21 March 2019	Benjamin French	Gustaf Reutersward	Gustaf Reutersward
640.11757-R01-v1.2	20 March 2019	Benjamin French	Gustaf Reutersward	Gustaf Reutersward
640.11757-R01-v1.1	15 November 2018	Benjamin French	Gustaf Reutersward	Gustaf Reutersward

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## 1 Introduction

SLR Consulting Australia Pty Ltd (SLR), has been engaged by CWP Renewables on behalf of Boco Rock Stage Two Pty Ltd (the Proponent) to provide a Noise Impact Assessment for a proposed Modification to the Project Approval for Boco Rock Wind Farm.

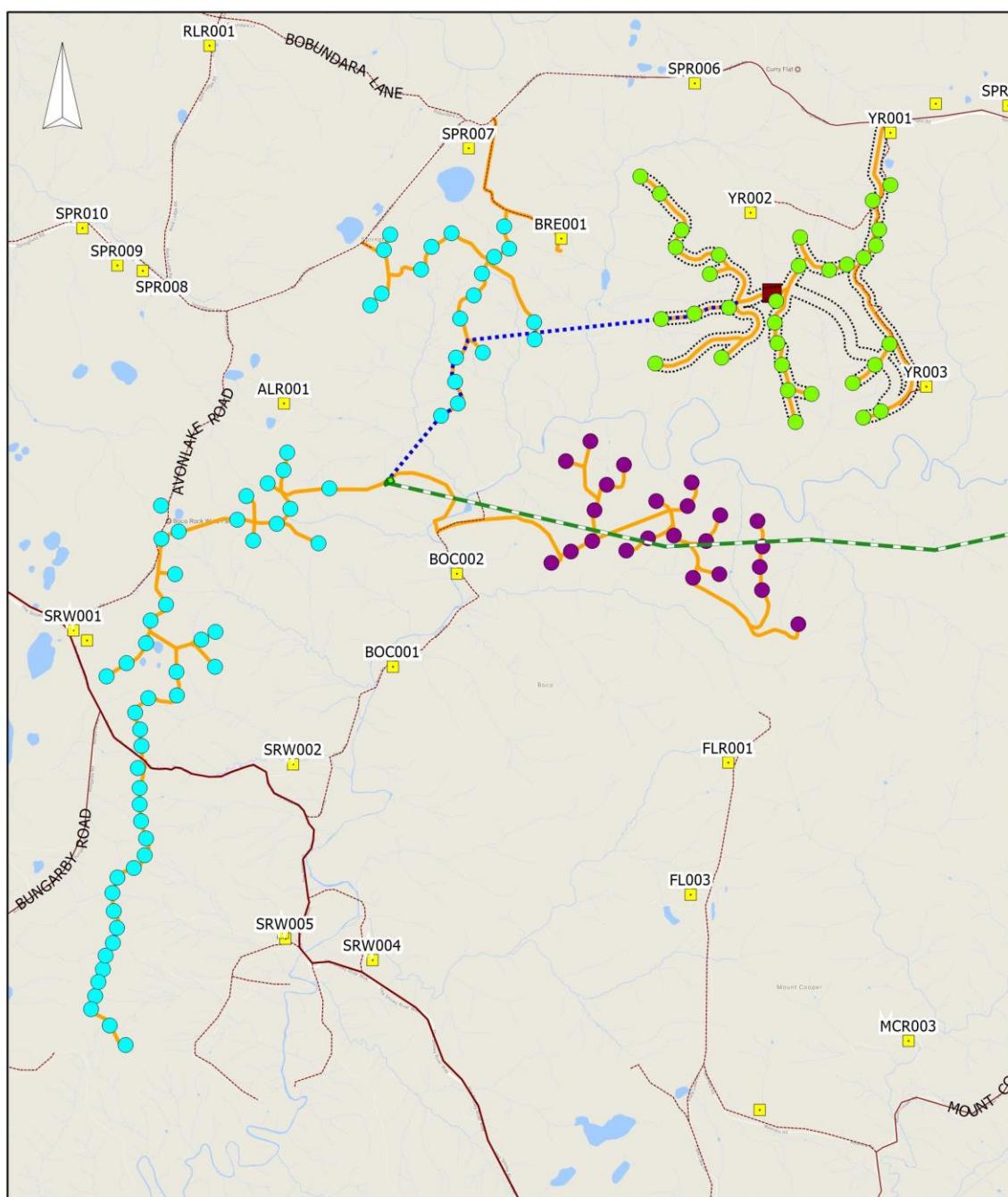
The Project Approval was issued on 9 August 2010 permitting up to 122 wind turbine generators (WTGs). Stage 1 of the Project commenced construction in 2013 and became operational in 2015, consisting of 67 WTGs. The remaining 55 approved WTGs in the Boco and Yandra Clusters are yet to be constructed.

A previous Revised Noise Assessment report on the wind farm (report number 640.10799-R1R1) was completed for Stage One of the project which became operational in 2015.

The Yandra Cluster (see **Figure 1**) comprises Stage Two of the Project. The Project Approval currently permits a 32 WTG layout within the Yandra Cluster. The Proponent seeks to modify the Yandra Cluster as follows:

- Removal of two approved WTG locations, reducing the available WTG locations from 32 to 30 within Yandra Cluster.
- Construction, operation and decommissioning of up to 20 WTGs within these 30 locations.
- Increase in WTG tip height of up to 200m.
- Increase in WTG rotor diameter within the revised tip height.
- Addition of a temporary construction compound within the Yandra Cluster.

This report provides a Noise Impact Assessment for the above proposed Modification. It is important to note that although the proposed Modification includes the operation of 20 WTGs within the 30 locations, this impact assessment assumes that all 30 locations are utilised simultaneously as a worst-case scenario. Furthermore this assessment models the noise emissions from the 67 WTG from the existing Stage One development.

**Figure 1 Project Overview**

LEGEND		COMPANY		
● Stage 1 As Constructed - 67 WTG	■ Dwelling	BOCO ROCK WIND FARM PTY LTD		
● Stage 2 (Yandra Cluster) - 32WTG	— Sealed Road			
● Boco Cluster (N/A) - 23 WTG	- - - Unsealed Road			
— Internal Road Layout	□ Development Corridor (S2)			
■ Substation	— 132KV Double Circuit TL			
■ Concrete Batching Plant	··· Overhead Cables			
SCALE BAR		PROJECT OVERVIEW		
0	5 km	DATE	SCALE	REV
		24 JUL 2018	1:110000	A
		DWG NO	SHEET	VER
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## 1.1

### 1.1 Wind Farm Assessment Methodology

#### 1.1.1 Acceptability Limit Criteria

The methodology and acceptability limit criteria that have been applied to this study are based upon the *South Australia Environment Protection Authority (SA EPA) Wind Farms Environmental Noise Guidelines (July2009)* (SA EPA Guidelines), as the NSW Department of Planning & Environment (DPE) has adopted these guidelines with specific variations to account for the NSW environment.

The NSW Government recognises that rural land use zones in NSW are often more densely settled than those of South Australia and that there is a relatively high density of rural residential living in parts of regional NSW with reliable wind resources.

Therefore only the lower base noise criteria in SA 2009 will be applied in NSW. This criteria is defined as:

*"The predicted equivalent noise level ( $LA_{eq,10\text{ minute}}$ )\*, adjusted for tonality and low frequency noise in accordance with these guidelines, should not exceed 35 dB(A) or the background noise ( $LA_{90}(10\text{ minute})$ ) by more than 5 dB(A), whichever is the greater, at all relevant receivers for wind speed from cut-in to rated power of the wind turbine generator and each integer wind speed in between."*

\* Determined in accordance with SA 2009, Section 4.

Note: While the noise criteria is established on the basis of a 24-hour period, noise readings are taken at 10 minute intervals.

#### 1.1.2 Wind Farm Noise Level Prediction

The noise emission model used in this study to predict wind farm noise levels at sensitive receptors is based on ISO 9613-2:1996 as implemented in the SoundPLAN computer noise model. The model predicts noise levels through spherical spreading and includes the effect of air absorption (as per ISO 9613), ground attenuation and shielding.

Predicted  $LA_{eq}$  noise levels were calculated based upon sound power levels determined in accordance to the recognised standard IEC-61400-11:2002 (*Wind Turbine Generator Systems - Part 11: Acoustic Noise Measurement Techniques*), where available, for the wind range 5 to 10 m/s.

### 1.1.3 Ambient Noise Monitoring

Noise monitoring was previously conducted in 2009 as part of the original Noise Impact Assessment and background noise versus hub height wind speed regression curves established for the site. **Table 1** shows the derived curves for All Data (day and night) and Night-time only Data.

**Table 1 Background Noise Regression Curves (derived 2009)**

Location Name	All Data	Night only
Benbullen*	$-0.0165x^3 + 0.4281x^2 - 1.7523x + 25.428$	$-0.0301x^3 + 0.8541x^2 - 5.6006x + 33.564$
Boco*	$-0.0045x^3 + 0.2046x^2 - 1.6301x + 33.927$	$-0.0011x^3 + 0.1021x^2 - 0.5072x + 26.385$
Brooklyn*	$-0.0233x^3 + 0.5751x^2 - 2.7598x + 28.904$	$0.0107x^3 - 0.0837x^2 + 0.5524x + 22.767$
Coopers Hill*	$-0.0227x^3 + 0.5367x^2 - 2.5401x + 25.468$	$-0.0084x^3 + 0.1698x^2 - 0.0393x + 19.197$
Glenfinnan*	$-0.0063x^3 + 0.1063x^2 + 1.15x + 21.287$	$0.0098x^3 - 0.1249x^2 + 1.6304x + 19.202$
Old Springfield*	$-0.0303x^3 + 0.753x^2 - 4.2573x + 33.82$	$0.0283x^3 - 0.5203x^2 + 3.6303x + 15.092$

## 2 Environmental Noise Criteria

### 2.1 NSW DPE Wind Farm Noise Guidelines

The NSW DPE Guidelines (December 2016), (based on the SA EPA Guidelines (July 2009)) recommends the following noise criteria for new wind farms,

*"The predicted equivalent noise level ( $LA_{eq,10\text{ minute}}$ )\*, adjusted for tonality and low frequency noise in accordance with these guidelines, should not exceed 35 dB(A) or the background noise ( $LA_{90}(10\text{ minute})$ ) by more than 5 dB(A), whichever is the greater, at all relevant receivers for wind speed from cut-in to rated power of the wind turbine generator and each integer wind speed in between.*

*\* Determined in accordance with SA 2009, Section 4."*

These guidelines also provide information on measuring the background noise levels, locations and requirements on the number of valid data points to be obtained and the methodology for excluding invalid data points. It also outlines the process for determining lines of best fit for the background data, and determination of the noise limit.

The SA Guideline explicitly states that the "swish" or normal modulation noise from wind turbines is a fundamental characteristic of such turbines; however, it specifies that tonal or annoying characteristics of turbine noise should be penalised.

In NSW, tonality is defined as when the level of one-third octave band exceeds the level of the adjacent bands on both sides by:

- 5 dB or more if the centre frequency of the band containing the tone is in the range 500 Hz to 10,000 Hz; •
- 8 dB or more if the centre frequency of the band containing the tone is in the range 160 Hz to 400 Hz; and/or
- 15 dB or more if the centre frequency of the band containing the tone is in the range 25 Hz to 125 Hz.

A 5 dBA penalty should be applied to the measured noise level if tonality is an issue..

The Guideline does not provide an assessment for the potential of low frequency noise or infrasound, but it does state that recent turbine designs do not appear to generate significant levels of infrasound, as the earlier turbine models did.

The Guideline accepts that wind farm developers commonly enter into agreements with private landowners in which they are provided compensation. The guideline is intended to be applied to premises that do not have an agreement with the wind farm developers. This does not absolve the obligations of the wind farm developer entirely as appropriate action can be taken under the *Environmental Protection Act* if a development 'unreasonably interferes' with the amenity of an area. The guideline lists that there is unlikely to be unreasonable interference if:

- a formal agreement is documented between the parties

- the agreement clearly outlines to the landowner the expected impact of the noise from the wind farm and its effect on the landowner's amenity
- the likely impact of exposure will not result in adverse health impacts (e.g. the level does not result in sleep disturbance)

The Proponent has discussed the possible noise implications of the project with the involved residents whose property the turbines would be located on and has entered into agreements with these parties. Agreements have also been offered to all landowners with residences within 4km of a wind turbine for Stage Two. The full noise assessment will be made available to all residents as part of the exhibited application for Modification.

These agreements constitute a noise agreement which satisfies the requirements of the SA Guidelines, by acknowledging any noise which may be experienced by the Landowner at the Residence must be within the parameters set out in the WHO Guidelines.

## 2.2 World Health Organisation (WHO) Guidelines

The WHO publication '*Guidelines for Community Noise*' identifies the main health risks associated with noise and derives acceptable environmental noise limits for various activities and environments.

The appropriate guideline limits are listed in **Table 2** below.

**Table 2 WHO Guideline values for environmental noise in specific environments**

Specific Environment	Critical Health Effect(s)	L <sub>eq</sub> (dBA)	Time base (hours)	L <sub>Max</sub> (dBA, Fast)
Outdoor living area	Serious Annoyance, daytime & evening	55	16	-
	Moderate annoyance, daytime & evening	50	16	-
Dwelling indoors	Speech Intelligibility & moderate annoyance, daytime & evening	35	16	
Inside bedrooms	Sleep disturbance, night-time	30	8	45
Outside bedrooms	Sleep disturbance – window open, night-time	45	8	60

Where noise levels at project-involved residences do not comply with the SA EPA Guidelines, the proponent intends to enter into agreements with the owners of those residences to achieve noise criteria in accordance with World Health Organisation (WHO) Guidelines. The proponent will apply those guidelines as necessary to ensure that the project does not result in an 'unreasonable interference' with the amenity or cause any adverse health effects at those residences. (See **Section 2.1**)

For the assessment of project involved residences the adopted external criteria of 45 dBA or the level given by the SA EPA Guideline criteria, where higher, will be adopted. Effectively this becomes 45 dBA or background + 5 dBA, whichever is the higher.

## 3 General Site Description

Boco Rock Wind Farm (the Project) is an operating wind farm located approximately 6km south west of Nimmitabel and 30km north of Bombala in NSW within the Snowy-Monaro Regional Council.

### 3.1 Characteristics of the site

The site incorporates farming properties across four land holdings accessed from Springfield Road.

Topographically, the site broadly includes a number of rolling hills to the north and a single ridge/escarpment, Sherwin Range, to the south which all run approximately in a north-south direction. The Maclughlin River runs through the north of the site and runs to the east of the escarpment in the southern part of the site. The Snowy River runs to the west of the site. The surrounding district is primarily used for agricultural (grazing) purposes.

The Monaro Highway is sufficiently far away to the east of the project site that background noise levels would not be affected by road traffic noise for the majority of receptor locations. All properties surrounding the proposed site have an ambient background noise environment that is determined by pre-dominantly natural sources which are largely wind influenced.

### 3.2 Dwelling Locations

SLR has been provided with the receiver locations to be assessed by the proponent and the 30 turbine Stage 2 Modification WTG positions. **Table 3** lists the receiver locations during Stage One of the project, their positions and identifies those that are project involved. **Table 4** lists the additional receiver locations not included in the Stage One assessment. All eastings and northings use reference WGS84, Zone 55.

**Table 3 Surrounding Receivers – Stage One**

Location	Easting (m)	Northing (m)
Belmore	680461	5941821
Benbullen*	699314	5951354
Boco*	691374	5948433
Brooklyn*	688326	5942494
Bungee	688606	5941567
Clifton	704525	5953058
Coombala	685402	5937496
Coopers Hill*	684531	5940643
Curry Flat*	699524	5957935
Edendale	682127	5951369
Glenfinnan*	698804	5955622
H1	680925	5942328

Location	Easting (m)	Northing (m)
Monastery	683155	5935393
Mountain View	682479	5948755
Nestlebrae*	688537	5951337
Old Curry Flat*	696738	5957694
Old Springfield*	686537	5953315
Peters Park	680341	5941115
Riverside*	690289	5946823
Rockybah*	693247	5953985
Roselea*	691826	5955463
Rosemount	695166	5942991
Roslyn	680312	5938990
Sherwood*	688579	5945345

Location	Easting (m)	Northing (m)
H2	688457	5935512
H3	703854	5951128
Hyland Grange	703866	5953807
Kangaroo Camp Retreat	689115	5936116
Kanoute	691256	5939524
Kenilworth	685288	5954313
Lofty Vale	689125	5959604
Lynndarra	687266	5957378
Mia Mia*	700779	5956037
Mohawke	703603	5950719

Location	Easting (m)	Northing (m)
Springfield*	685789	5953700
Telembugrm *	687560	5939773
Tinbery Lodge	682470	5949856
Windella*	689840	5942014
Wodburn	680399	5942869
Woodbine*	699584	5956091
Wyuna*	695544	5956531
Xenmor	683772	5936565
Yandra*	696387	5954178

Note: \* Denotes the location is involved with the project

Note that two additional locations, Avonlake and Kelton Plain have been listed as uninhabited ruins and therefore have not been included in the assessment.

**Table 4 Additional Receivers in the vicinity of Stage Two**

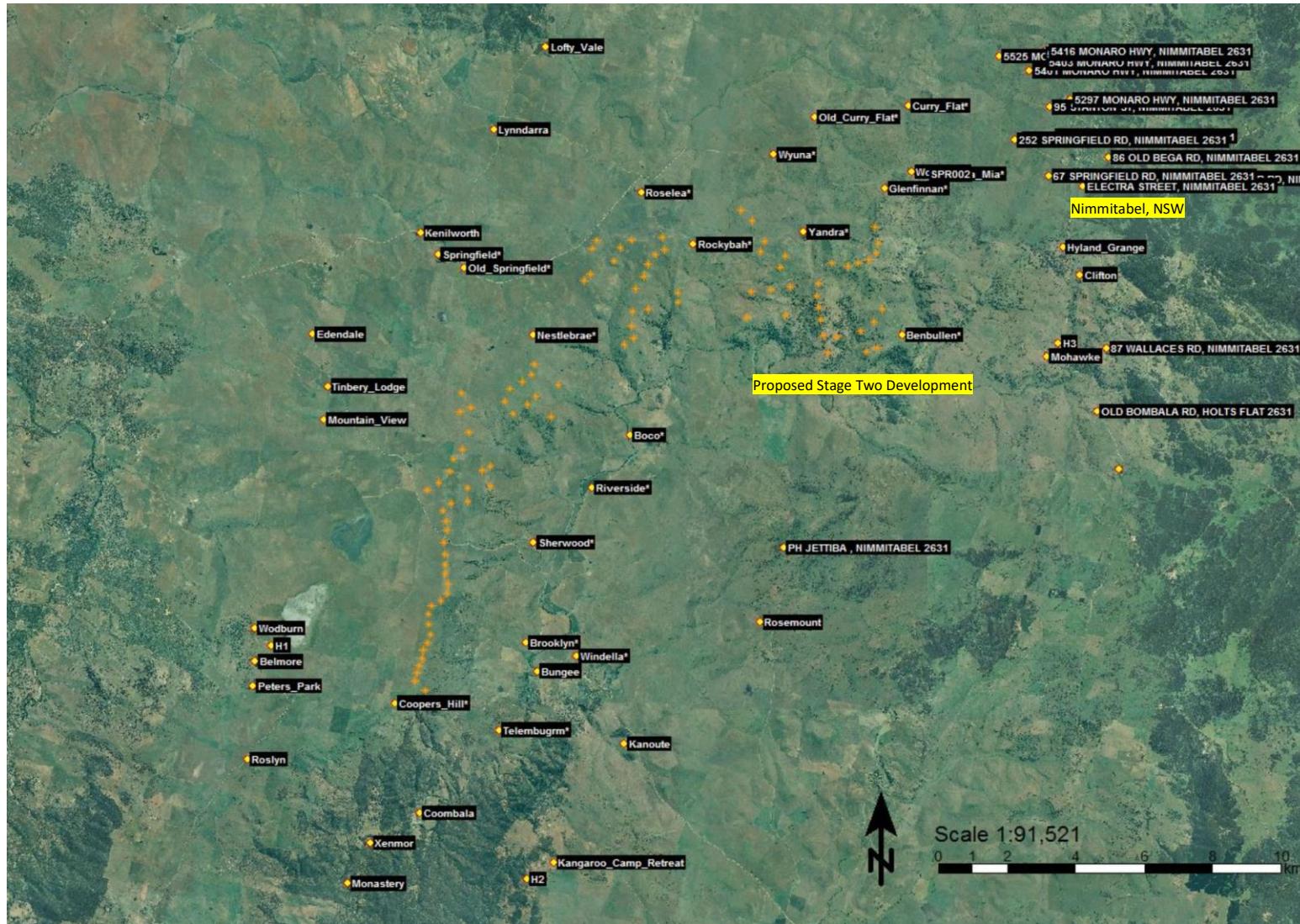
Location	Easting (m)	Northing (m)
Unnamed property	705605	5947452
45 Clark St, Nimmitabel	703872	5957133
51 Clark St, Nimmitabel	703683	5957140
67 Springvale Rd, Nimmitabel	703579	5955976
86 Old Bega Rd, Nimmitabel	705315	5956526
87 Wallaces Rd, Nimmitabel	705260	5950960
95 Stanton St, Nimmitabel	703604	5957978

Location	Easting (m)	Northing (m)
5297 Monaro Hwy, Nimmitabel	704189	5958187
5401 Monarno Hwy, Nimmitabel	703011	5959032
5403 Monaro Hwy, Nimmitabel	703435	5959269
5416 Monaro Hwy, Nimmitabel	703396	5959519
5416 Monaro Hwy, Nimmitabel	703491	5959619
5525 Monaro Hwy, Nimmitabel	702115	5959459
Electra St, Nimmitabel	704556	5955692

Location	Easting (m)	Northing (m)
111 Warregal Corner Rd, Nimmitabel	705963	5955903
174 Ryedale Rd, Nimmitabel	702733	5957068
252 Springfield Rd, Nimmitabel	702578	5957018

Location	Easting (m)	Northing (m)
Ph Jettiba, Nimmitabel	695848	5945175
Old Bombala Rd, Holts Flat	704974	5949134
SPR002	700001	5956028

**Figure 2** shows a map of the layout considered and all locations assessed.

**Figure 2 Dwelling Locations and WTG Layout**

## 4 WIND FARM LAYOUT

### 4.1 Stage One WTG Type and Details

The Stage One layout comprises a total of 67 Wind Turbine Generators (WTGs) which includes:

48 X General Electric 1.7 MW-100

10 X General Electric 1.7 MW -100 with Low Noise Trailing Edge (LNTE) Blades

9 X General Electric 1.6 MW -100 with Low Noise Trailing Edge (LNTE) Blades

All three WTGs considered are three bladed, upwind, pitch regulated and active yaw. **Table 5** and **Table 6** summarise the relevant turbine input data used for noise level prediction.

**Table 5 Stage Two WTG Manufacturers Data**

Make, model, power	GE 1.7 MW	GE 1.7 MW + LNTE	GE 1.6MW + LNTE
Rotor diameter	100 m	100 m	100 m
Hub height	80 m	80 m	80 m
Cut-in wind speed	3 m/s	3 m/s	3 m/s
Rated wind speed	11.0 m/s	11.0 m/s	10.5 m/s
Cut-out wind speed	23 m/s	23 m/s	25 m/s
Rotor speed	9.75 – 16.7 rpm	9.75 – 16.7 rpm	9.75 – 17.5 rpm
‘Standard Mode’ Sound Power Level, LWA,ref 8 m/s	107 dBA	105 dBA	103 dBA

**Table 6 Stage One WTG Sound Power Levels (dBA)**

Wind Turbine Model	Ref height AGL	Wind speed Vs						
		10m	5 m/s	6 m/s	7 m/s	8 m/s	9 m/s	10 m/s
	Hub height	7.0 m/s	8.4 m/s	9.7 m/s	11.1 m/s	12.5 m/s	13.9 m/s	
GE 1.7 MW-100		98.2	102.8	106.1	107	107	107	
GE 1.7 MW-100 LNTE blades		96.5	100.9	104.3	105	105	105	
GE 1.6 MW-100 LNTE blades		95.8	100.5	102.8	103	103	103	

Noise emissions for the General Electric WTGs have been provided by the manufacturer and have been independently tested according to International Standard IEC 61400-11. Copies of the certification test or manufacturers documentation that give the sound power level variation with wind speed, frequency spectra and tonality assessment have been provided by the Proponent and will be made available on request.

The Stage One layout presented in this report is a 67 WTG layout, as specified in **Table 7** below.

**Table 7 Layout Rev4 WTG details**

Turbine Name	Easting (m)	Northing (m)	Turbine Model
T-01	685651	5940690	1.6-100 LNTE
T-02	685086	5941303	1.6-100 LNTE
T-2A	685413	5941036	1.6-100 LNTE
T-03	685158	5941522	1.6-100 LNTE
T-04	685215	5941754	1.7-100 LNTE
T-05	685297	5941966	1.6-100 LNTE
T-06	685343	5942192	1.7-100 LNTE
T-07	685472	5942402	1.6-100 LNTE
T-08	685544	5942653	1.7-100 LNTE
T-09	685501	5942933	1.7-100 LNTE
T-10	685480	5943238	1.7-100 LNTE
T-11	685575	5943492	1.7-100 LNTE
T-12	685845	5943645	1.7-100 LNTE
T-13	686036	5943853	1.6-100 LNTE
T-14	686064	5944127	1.7-100 LNTE
T-15	685985	5944422	1.7-100
T-16	685973	5944698	1.7-100
T-17	685978	5944973	1.7-100
T-18	685950	5945309	1.7-100
T-19	686019	5945675	1.7-100
T-20	686007	5945949	1.7-100
T-21	685924	5946234	1.7-100
T-22	686152	5946469	1.7-100
T-23	686630	5946509	1.7-100
T-24	686634	5946898	1.7-100
T-25	687282	5946971	1.7-100
T-26	687062	5947430	1.7-100
T-27	687305	5947553	1.7-100
T-28	685462	5946852	1.7-100
T-29	685799	5947060	1.7-100
T-30	686134	5947390	1.7-100
T-31	686219	5947764	1.7-100
T-32	686480	5948025	1.7-100
T-33	686647	5948528	1.7-100

Turbine Name	Easting (m)	Northing (m)	Turbine Model
T-34	686429	5949123	1.7-100
T-35	686725	5949239	1.7-100
T-36	686437	5949679	1.7-100
T-37	687710	5949418	1.7-100
T-38	687869	5949807	1.7-100
T-39	688233	5950012	1.7-100
T-40	688506	5950225	1.7-100 LNTE
T-41	688569	5950519	1.7-100 LNTE
T-42	687965	5949062	1.7-100
T-43	688370	5949329	1.7-100
T-44	688607	5949577	1.7-100
T-45	689060	5948990	1.7-100
T-46	689264	5949903	1.7-100
T-47	690021	5952945	1.7-100
T-48	690216	5953133	1.7-100
T-49	690269	5953865	1.7-100
T-50	690378	5954117	1.7-100
T-51	690882	5953523	1.7-100
T-52	691064	5953898	1.7-100
T-53	691404	5954122	1.7-100
T-54	691191	5951073	1.7-100
T-55	691452	5951277	1.7-100
T-56	691417	5951635	1.7-100
T-57	691437	5952042	1.7-100
T-58	691890	5952113	1.7-100
T-59	691518	5952717	1.7-100
T-60	691759	5953070	1.7-100
T-61	691877	5953432	1.7-100
T-62	692111	5953706	1.7-100
T-63	692370	5953842	1.6-100 LNTE
T-64	692295	5954209	1.6-100 LNTE
T-65	692760	5952311	1.7-100
T-66	692762	5952598	1.7-100

## 4.2 Stage Two WTG Type and Details

The proposed Stage Two development comprises up to 20 WTGs within 30 approved WTG locations which are being considered as either:

- Vestas V150 – 4.2 MW blades with serrated trailing edge, power optimised mode
- General Electric 5.3 MW-158

These models are three bladed, upwind, pitch regulated and active yaw.

Both turbine types were simulated in the noise prediction model. **Table 8** and **Table 9** summarise the turbine input data used in the noise prediction model.

**Table 8 Stage One WTG Manufacturers Data**

Make, model, power	V150–4.2 MW	GE 5.3-158
Rotor diameter	150 m	158 m
Hub height	125 m	125 m
'Standard Mode' Sound Power Level, LWA, ref 8 m/s	104.9 dBA	106 dBA

**Table 9 Stage Two WTG Sound Power Levels (dBA)**

Wind Turbine Model	Ref height AGL	Wind speed Vs					
		10m	5 m/s	6 m/s	7 m/s	8 m/s	9 m/s
	Hub height	7.0 m/s	8.4 m/s	9.7 m/s	11.1 m/s	12.5 m/s	13.9 m/s
V150–4.2 MW		99.9	103.9	104.9	104.9	104.9	104.9
GE 5.3-158		101	104.6	106	106	106	106

Noise emissions for the WTGs have been provided by the manufacturer and are based on testing or estimates according to International Standard IEC 61400-11. Copies of the certification test or manufacturers documentation that give the sound power level variation with wind speed, frequency spectra and tonality assessment have been provided by the Proponent and will be made available on request.

The proposed WTG locations for the Stage Two development are shown in **Table 10**.

**Table 10 Layout of Stage Two WTG**

WTG ID	Easting (m)	Northing (m)
<b>Yandra Cluster</b>		
94	696989	5951367
95	695888	5951937
96	697108	5950831
97	697385	5951300
98	696829	5952159
99	696793	5952502

WTG ID	Easting (m)	Northing (m)
<b>Yandra Cluster</b>		
110	698243	5950882
111	698025	5953446
112	694594	5954992
113	695268	5954084
114	694917	5954701
115	695166	5953796

WTG ID	Easting (m)	Northing (m)
100	696828	5952868
101	697727	5953359
102*	697254	5953921
103	697222	5953441
104	698520	5953754
105	698582	5954018
106	698490	5954502
107	696897	5951793
108	698712	5952101
109	698463	5951758

WTG ID	Easting (m)	Northing (m)
116	695722	5953341
117	696029	5952768
118	698084	5951461
119*	698787	5954759
120	694775	5951867
121	698310	5953551
122	698542	5950987
123	695883	5953654
124	695453	5952686
125	694890	5952608

\* Identifies an approved turbine location which is proposed to be removed by this Modification.

## 4.3 Assessment of Tonality and Infrasound

The NSW DPE Guideline states noise assessments for wind energy projects shall report the results of tonality assessments under IEC 61400-11 for each turbine type being considered.

WTG manufacturers are obliged to conduct independent tests in accordance with IEC 61400-11. A part of this assessment is to conduct a tonal audibility test. The tonal audibility  $\Delta L_{t,a}$  is assessed using the methodology outlined in *Joint Nordic Method Version 2 – Objective Method for Assessing the Audibility of Tones in Noise*.

The tonal audibility data  $\Delta L_{A,k}$  values for the turbines were not specified by the manufacturer but are stated as less than 2 dB. This is below the minimum reporting level in the SA EPA Guidelines and as such, no tonality penalty has been applied.

Infrasound is not tested as an obligatory part of IEC 61400-11. It is noted that, in general, modern WTG's do not exhibit significant infrasound emissions.

## 5 Operational Noise Levels

### 5.1 Introduction

As discussed in **Section 1.1.2**, a three-dimensional computer noise model was used to predict L<sub>Aeq</sub> noise levels from all WTG's at all surrounding residential dwellings.

The ISO 9613 noise model incorporates a 'hard ground' assumption and includes one-third octave band calculated effects for air absorption, ground attenuation and topographic shielding. It is noted that ISO 9613 equations predict for average downwind propagation conditions and also hold for average propagation under a well-developed moderate ground-based temperature inversion.

The estimated accuracy of the prediction model is approximately ±3 dBA.

### 5.2 Wind Turbine Noise

For indicative purposes the WTG noise levels from the proposed WTG layout was calculated for the reference wind condition of 8 m/s at 10m AGL (equivalent to 11.1 m/s at hub height) and listed in **Table 11**. The increase in noise levels with the inclusion of Stage Two WTGs are also shown, locations where there is no increase in noise level when the Stage Two turbines are introduced are denoted with a dash. The predicted noise contour plot is presented in **Appendix C**.

**Table 11 Predicted WTG noise level increase with Stage Two at reference wind condition**

Location	Stage 1 dBA	V150 Increase dBA	GE 5.3 Increase dBA	Location	Stage 1 dBA	V150 Increase dBA	GE 5.3 Increase dBA
Unnamed location	10.9	1.0	1.0	Kangaroo Camp Retreat	25.8	-	-
45 Clarke St	14.0	2.1	2.0	Kanoute	27.6	-	-
51 Clarke St	14.2	2.2	2.0	Kenilworth	28.5	-	-
67 Springfield Rd	14.7	1.6	1.6	Lofty Vale	23.1	0.1	0.1
86 Old Bega Rd	12.5	1.4	1.3	Lynndarra	26.0	-	-
87 Wallaces Rd	12.6	1.4	1.3	Mia Mia*	18.5	5.5	5.6
95 Stanton St	14.0	1.1	1.0	Mohawke	15.2	2.0	1.9
111 Warregal Corner Rd	10.1	1.4	1.3	Monastery	21.3	-	-
174 Ryedale Rd,	15.2	1.9	1.8	Mountain View	29.3	-	-
252 Springfield Rd	15.4	1.7	1.6	Nestlebrae*	40.8	-	-
5297 Monaro Hwy	13.4	1.6	1.5	Old Bombala Rd	12.8	2.9	2.7
5401 Monaro Hwy	14.5	1.0	0.9	Old Curry Flat*	22.5	1.7	1.7

Location	Stage 1 dBA	V150 Increase dBA	GE 5.3 Increase dBA	Location	Stage 1 dBA	V150 Increase dBA	GE 5.3 Increase dBA
5403 Monaro Hwy	13.6	0.8	0.7	Old Springfield*	30.5	-	-
5416 Monaro Hwy	13.3	0.7	0.9	Peters Park	27.7	-	-
5416 Monaro Hwy	13.6	0.9	0.6	Ph Jettoba	26.8	0.1	0.1
5525 Monaro Hwy	14.7	0.9	0.8	Riverside*	33.7	-	-
Belmore	29.5	-	-	Rockybah*	38.7	0.5	0.6
Benbullen*	21.8	15.0	15.5	Roselea*	37.6	0.1	0.1
Boco*	34.3	-	-	Rosemount	25.9	-	-
Brooklyn*	34.2	-	-	Roslyn	26.3	-	-
Bungee	32.7	-	-	Sherwood*	36.9	-	-
Clifton	14.2	2.1	2.0	Springfield*	29.9	-	-
Coombala	26.5	-	-	Telembugrm*	31.5	-	-
Coopers_Hill*	38.7	-	-	Tinberry Lodge	33.0	-	-
Curry_Flat*	18.7	1.6	1.6	Windella*	32.6	-	-
Edendale	26.6	-	-	Wodburn	30.5	-	-
Electra St	13.8	1.3	1.2	Woodbine*	20.0	4.6	4.8
Glenfinnan*	21.5	9.3	10.0	Wyuna*	27.0	2.3	2.5
H1	31.1	-	-	Xenmor	22.9	-	-
H2	21.0	-	-	Yandra*	26.6	10.5	11.1
H3	14.9	1.8	1.8	SPR002	19.4	3.9	4.1
Hyland Grange	14.6	1.9	1.8				

\* Denotes the location is involved with the project

## 6 Assessment of proposed wind farm Noise

An assessment of the acceptability of wind farm noise levels at all assessment receivers using the required noise limit set in SA EPA Guidelines has been completed. Dwellings further than these receptors are deemed to comply if dwellings closer to turbines comply with the SA EPA noise limit.

For the assessment of project involved residences the adopted external criteria of 45 dBA (as per the WHO guidelines) or the level given by the SA EPA Guideline criteria, where higher, will be adopted. Effectively this becomes 45 dBA or background + 5 dBA, whichever is the higher. (See **Section 2.2** for details)

Predicted external noise levels will be further mitigated by shielding effects of the building, with the anticipated internal noise levels similarly reduced by the façade of the dwelling.

---

It should be noted that all predicted noise levels are considered to be conservative with the model assuming 'hard ground' and average downwind propagation from all WTG's to each receiver or a well-developed moderate ground based temperature inversion.

Predicted noise levels for a reference wind speed of 8 m/s are shown in **Table 11** (See **Section 5.2**), based on the sound power levels provided by the manufacturer at this wind speed.

The assessment figures contained in **Appendix A** and **Appendix B** depict the predicted WTG noise level curves including the proposed Stage Two WTG layout for the Vestas V150 and the General Electric GE 5.3 WTGs respectively. The noise level curves are superimposed over SA EPA Guideline Criteria and WHO based noise limits. Previously derived background noise curves for the sites are shown in **Table 1** in **Section 1.1.3**.

All receiver locations are predicted to comply with their respective criteria.

## 6.1 Compliance Measurements

A comprehensive Noise Compliance Test Plan (NCTP) will be prepared prior to commissioning of Stage 2 of the wind farm. The NCTP shall provide all details of the monitoring including considerations of the requirements of the 'Noise Monitoring' section of the NSW Department of Planning and Environment's *Wind Energy: Noise Assessment Bulletin* (December 2016).

Post-commissioning noise performance validation will be completed within the time frame dictated by the project approval.

## 6.2 Adaptive Management

If undue WTG noise impacts are identified during operations due to temperature inversion, atmospheric stability or other reasons, then an 'adaptive management' approach could be implemented to mitigate or remove the impact. This process could include:

- Receiving and documenting noise impact complaint through 'hotline' or other means.
- Investigating the nature of the reported impact.
- Identifying exactly what conditions or times lead to undue impacts.
- Operating WTG's in a reduced 'noise optimised' mode during identified times and conditions (sector management).
- Providing acoustic upgrades (glazing, façade, masking noise etc) to affected dwellings.
- Turning off WTG's that are identified as causing the undue impact.

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## 7 Conclusion

Noise from the proposed Modification for Boco Rock Wind Farm Stage Two development has been predicted and assessed against the relevant noise limits.

WTG noise has been predicted to comply at all receptors.

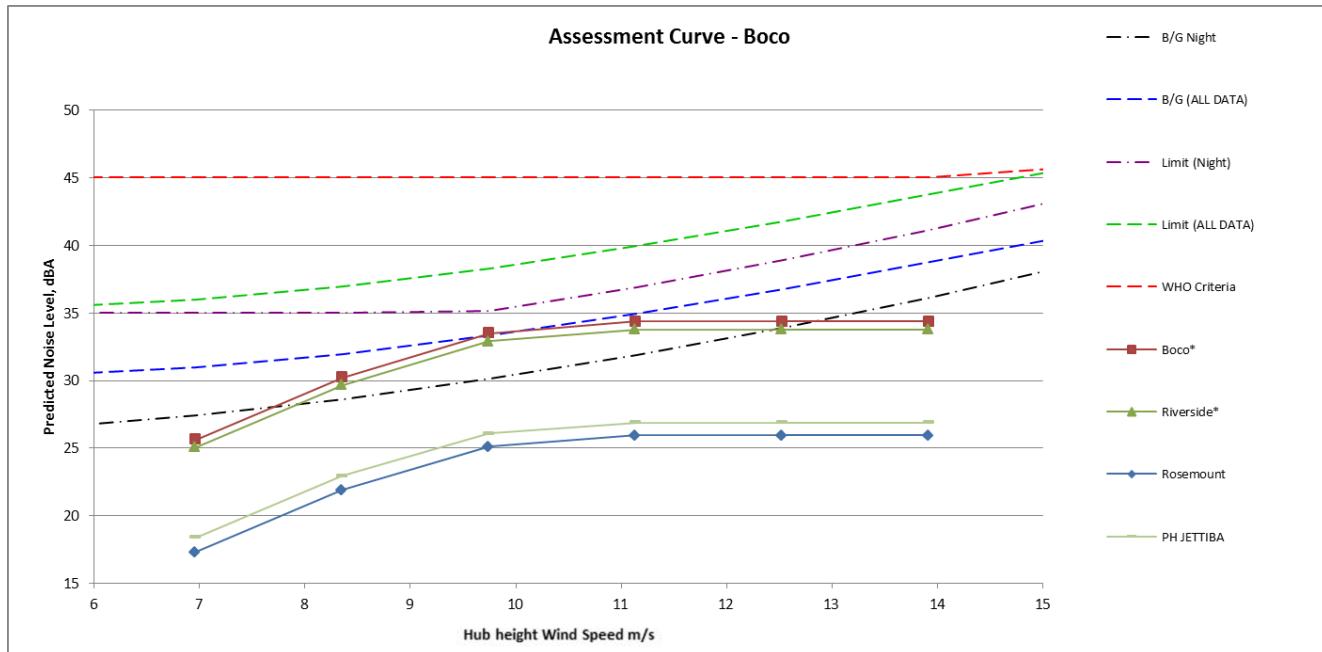
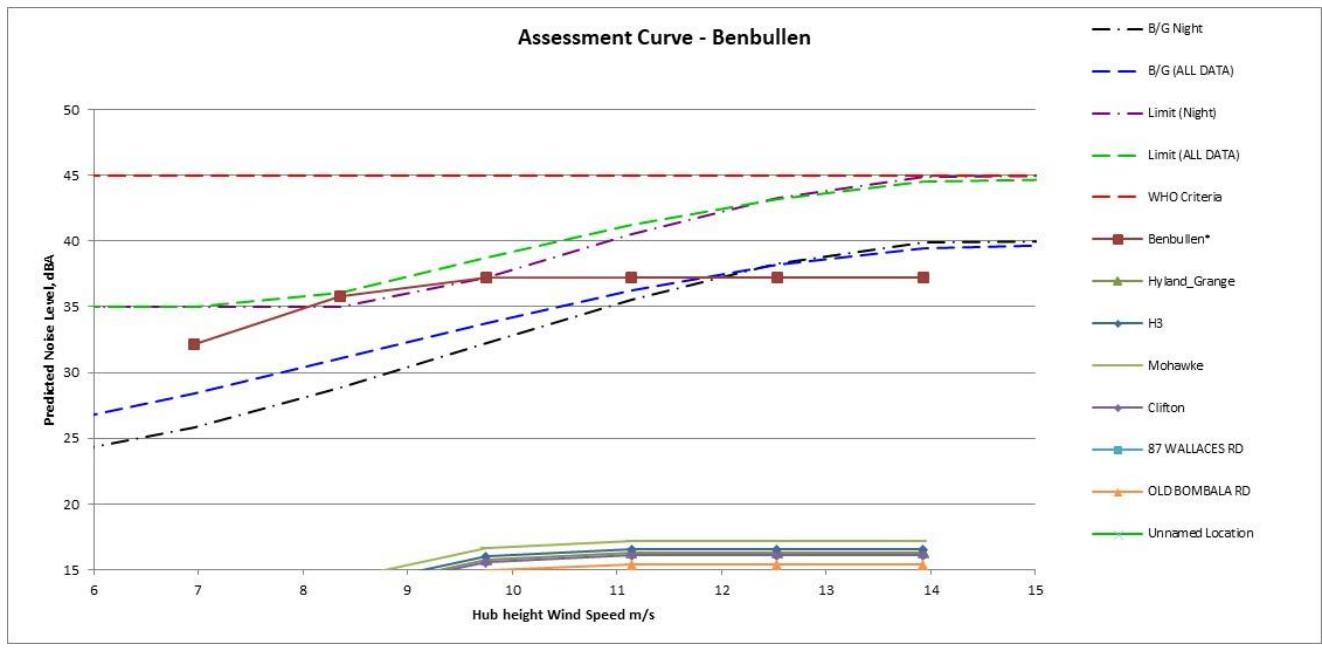
It is anticipated that post-construction noise levels will be monitored to evaluate if the wind farm is compliant, as per the planning conditions set for the project.

# **APPENDIX A**

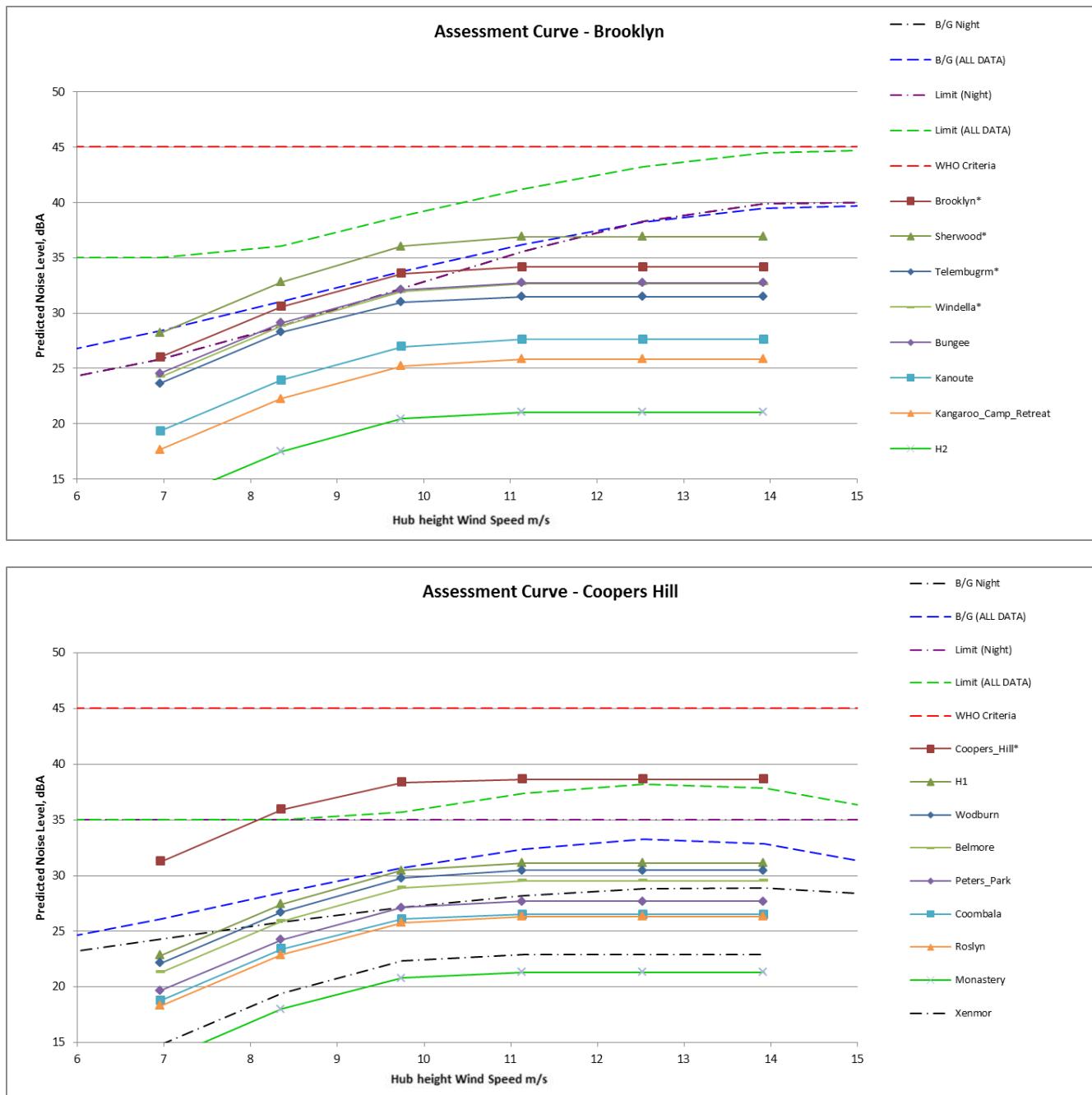
Noise Assessment Curves

Vestas V150 – 4.2MW

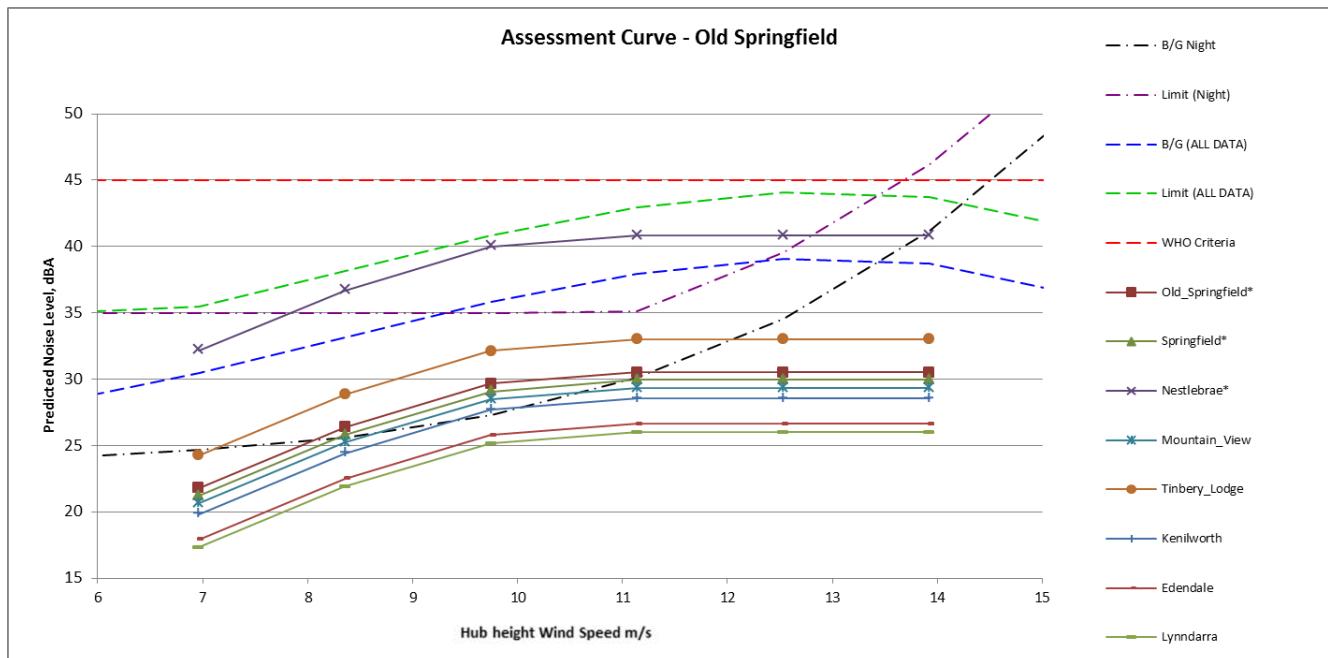
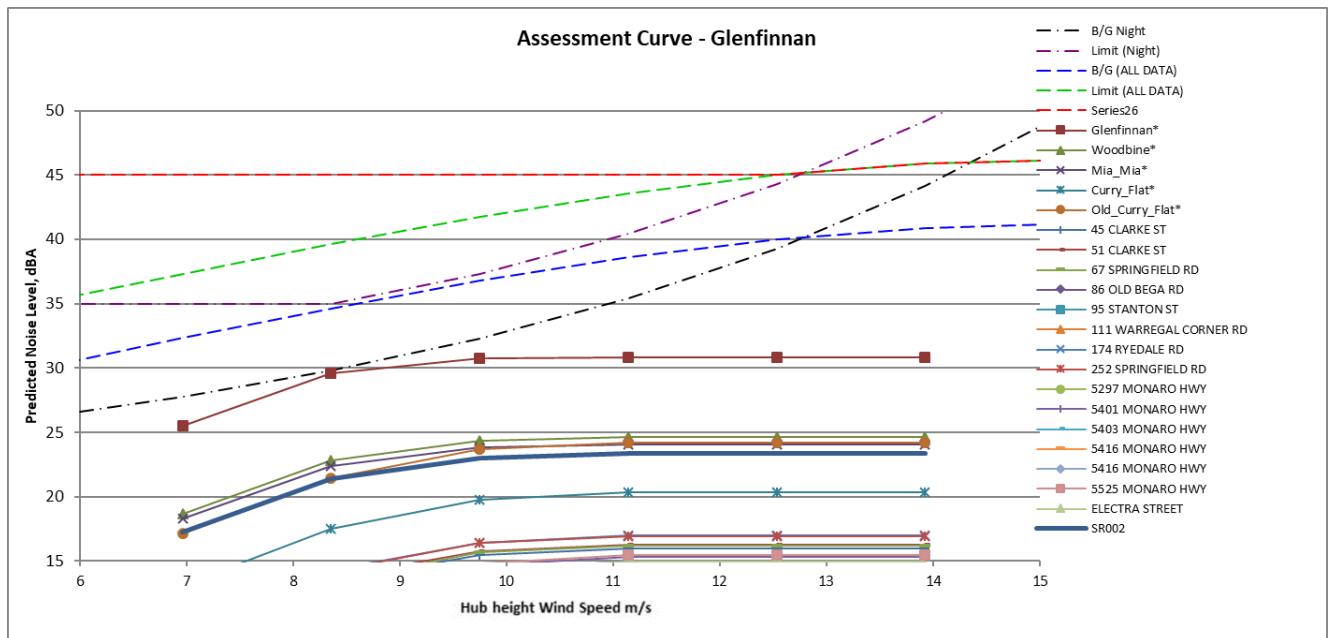
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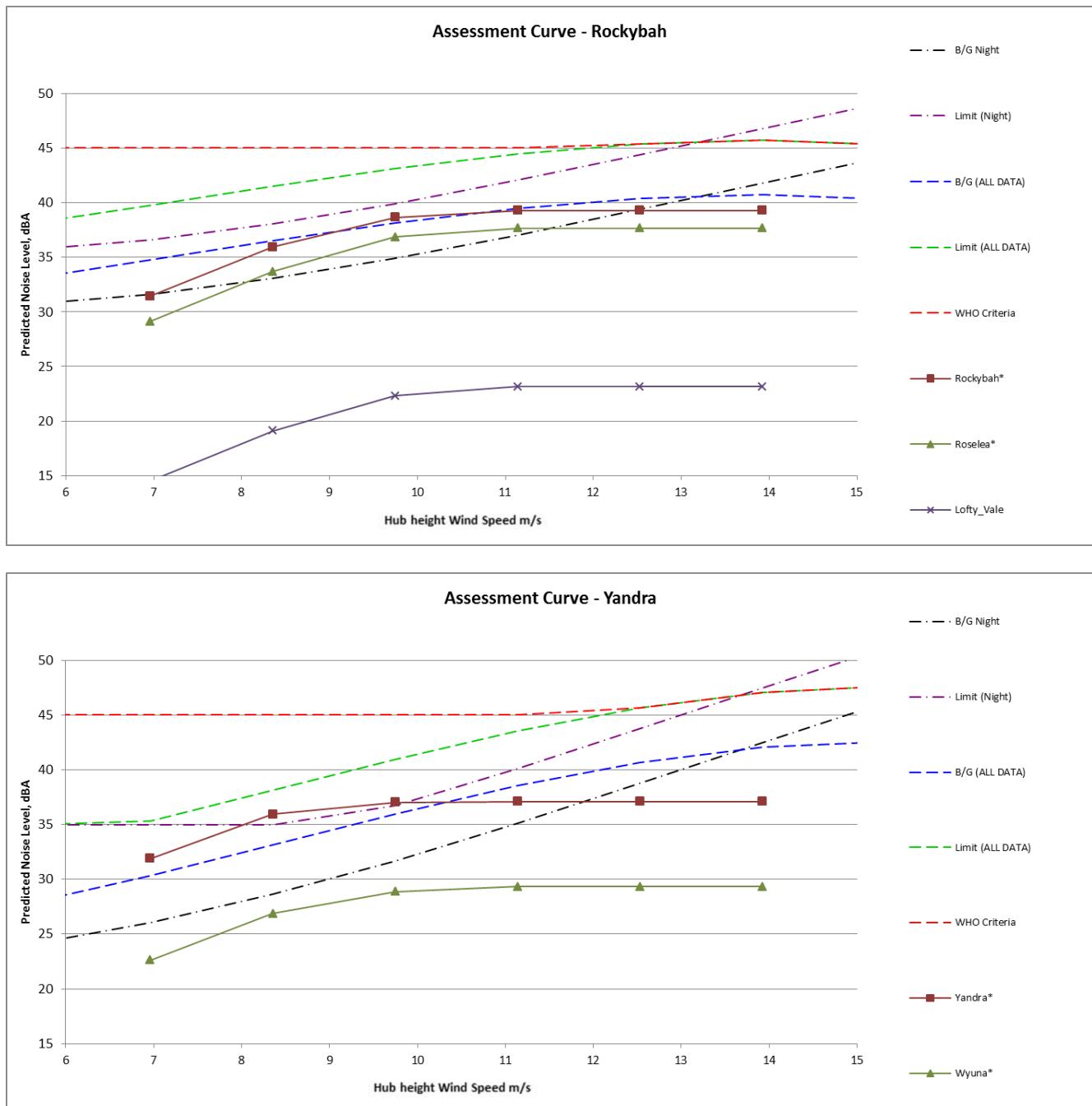
Assessment Curves: Stage Two Mod = Vestas V150 – 4.2 MW



## Assessment Curves: Stage Two Mod = Vestas V150 – 4.2 MW



## Assessment Curves: Stage Two Mod = Vestas V150 – 4.2 MW

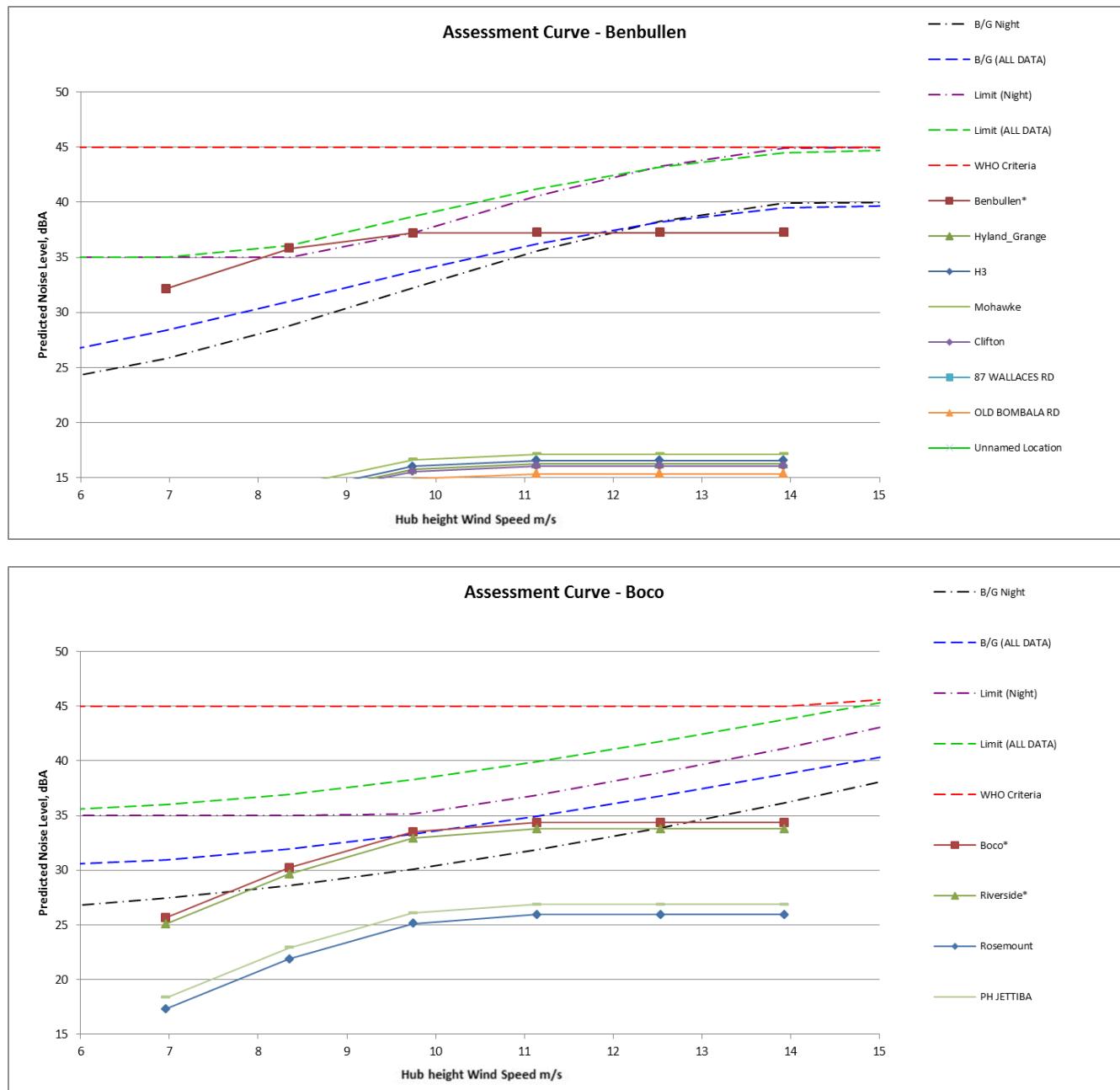


# **APPENDIX B**

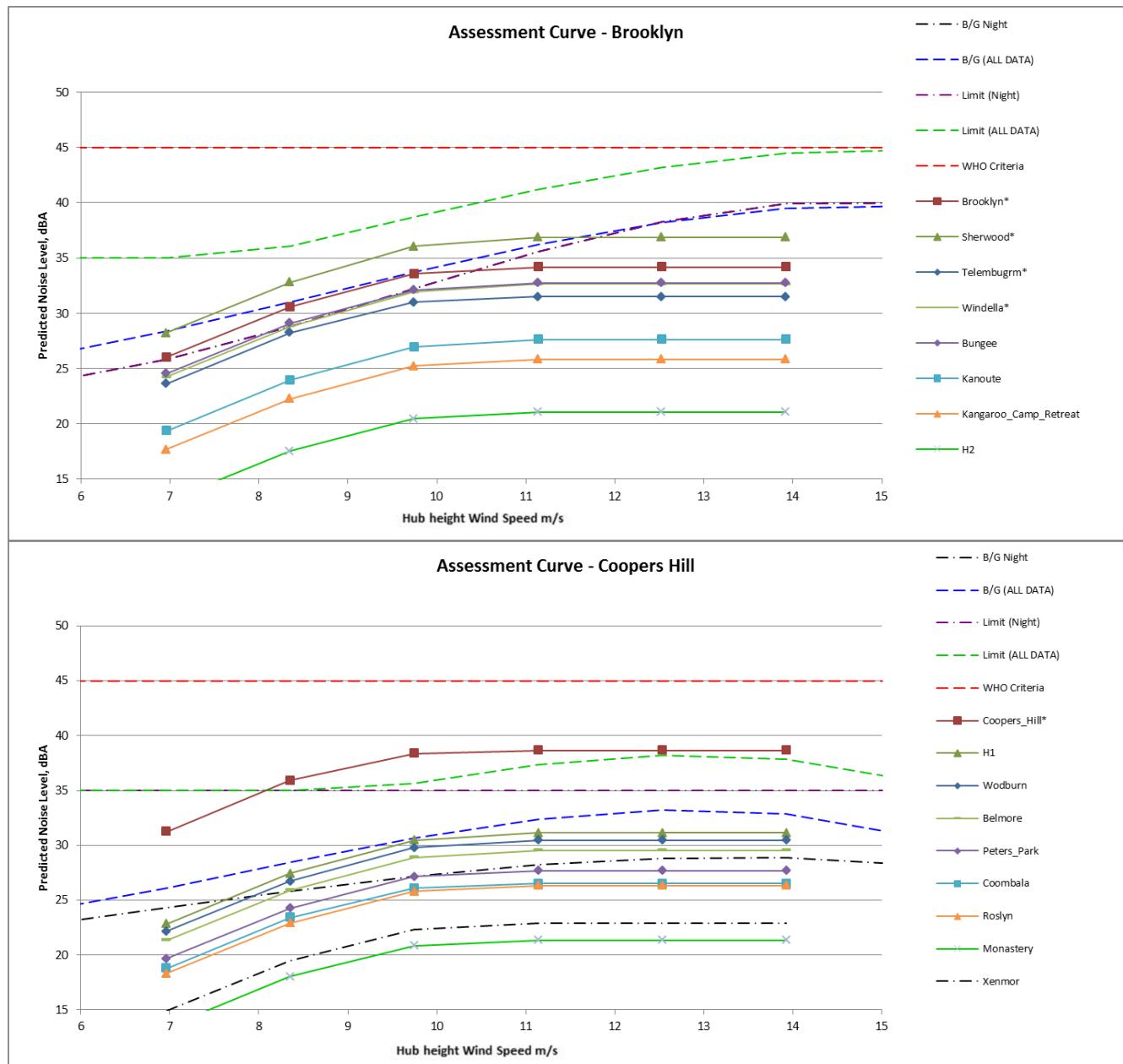
Noise Assessment Curves

General Electric GE 5.3 MW - 158

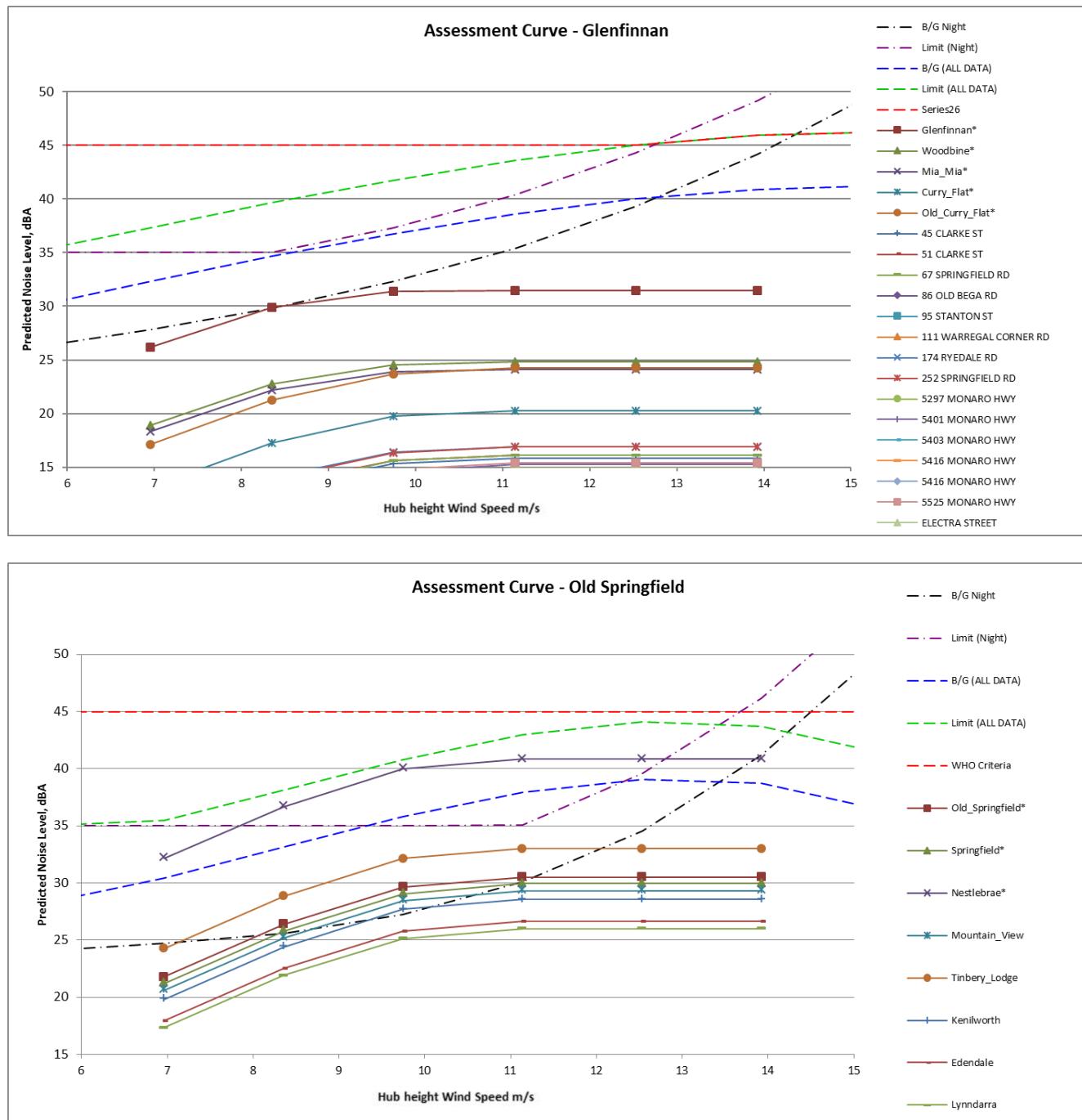
## Assessment Curves: Stage Two Mod = General Electric 5.3 MW-158



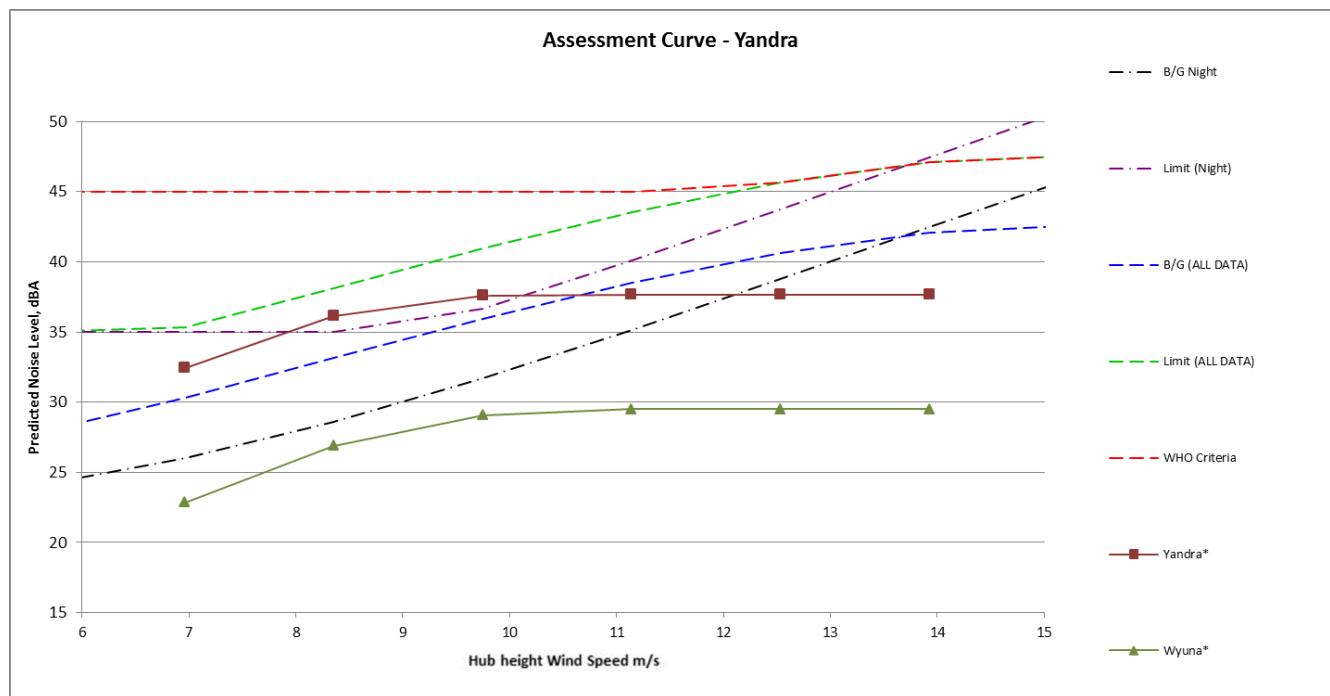
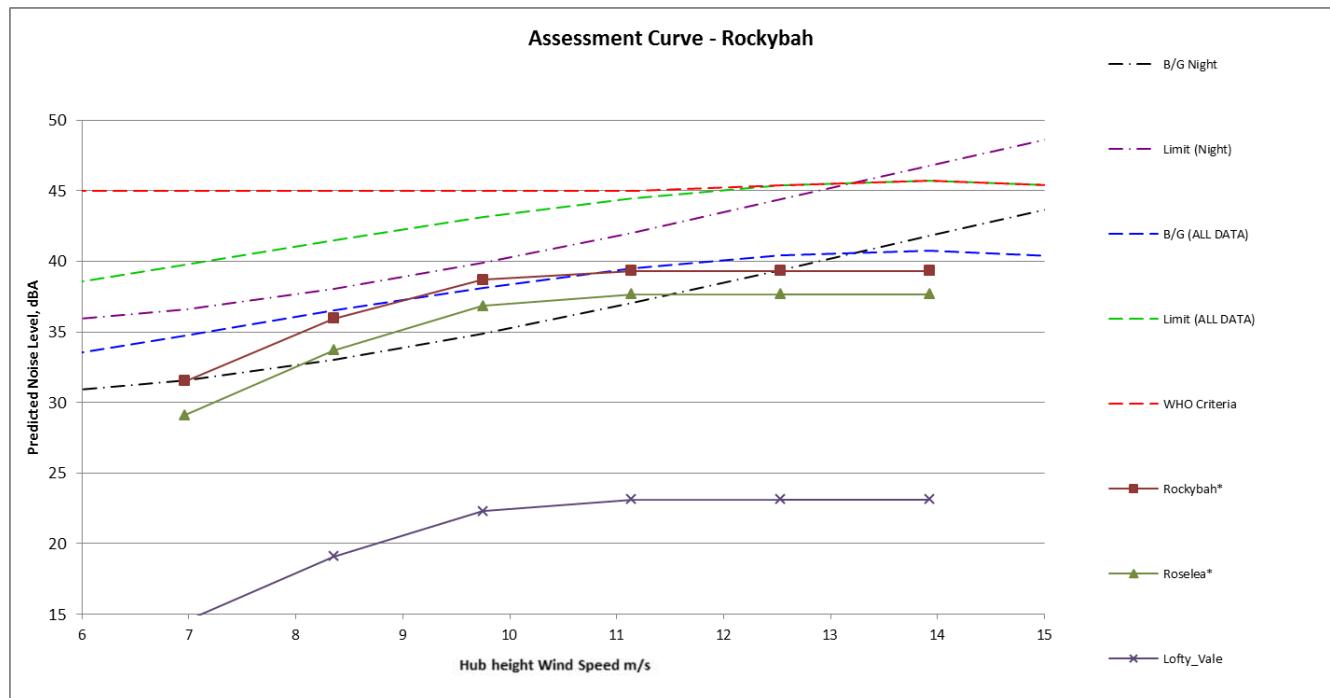
## Assessment Curves: Stage Two Mod = General Electric 5.3 MW-158



## Assessment Curves: Stage Two Mod = General Electric 5.3 MW-158

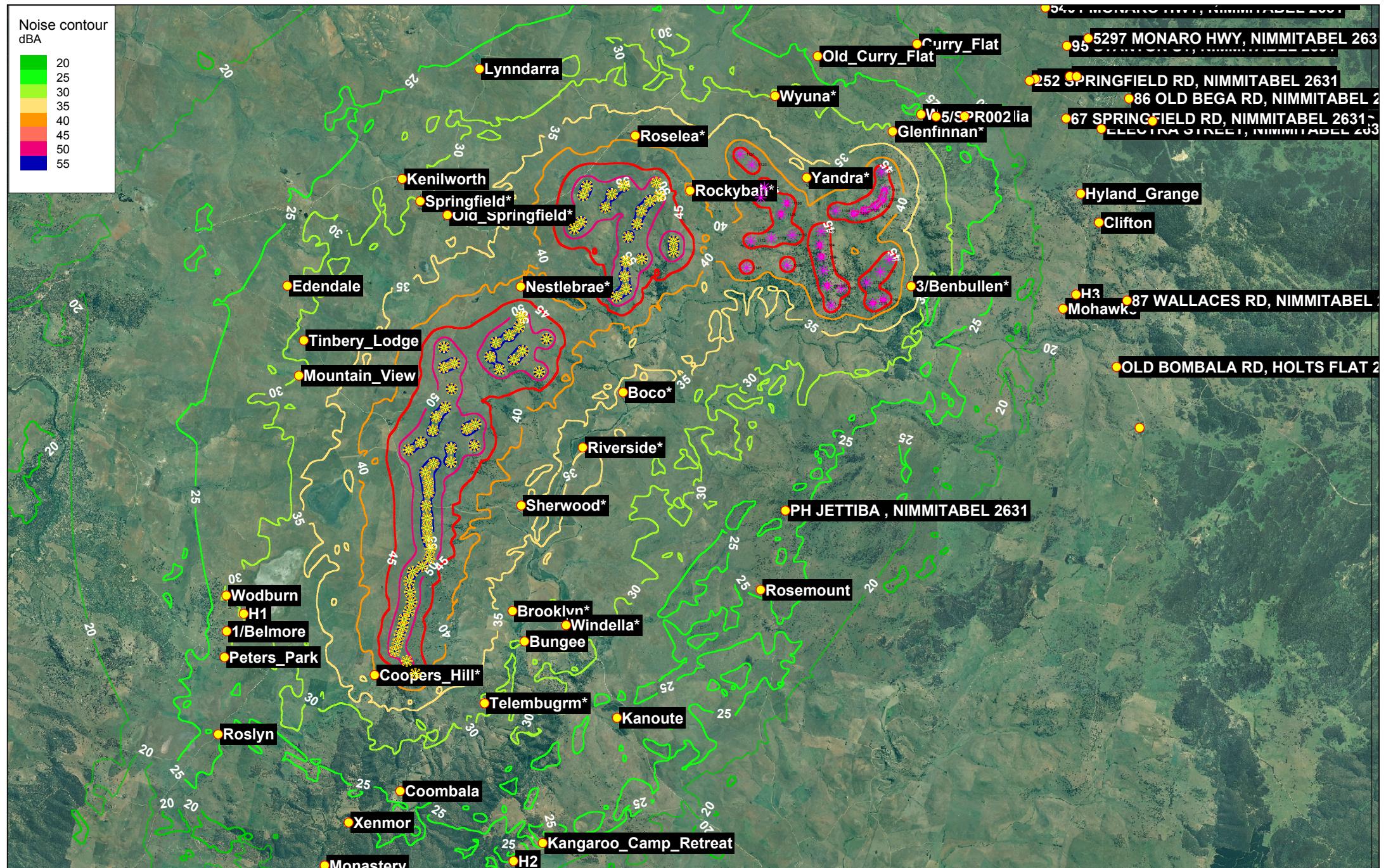


Assessment Curves: Stage Two Mod = General Electric 5.3 MW-158



# APPENDIX C

## Noise Contours



2/2 Domville Avenue  
HAWTHORN  
VIC 3122  
AUSTRALIA  
T: 61 3 9249 9400  
F: 61 3 9249 9499  
[www.slcconsulting.com](http://www.slcconsulting.com)

A scale bar with markings at 0, 0.5, 1, 2, 3, and 4. The first two segments are black, the third is white, and the last two are black. Below the bar, the label "km" is written.

**LEGEND**

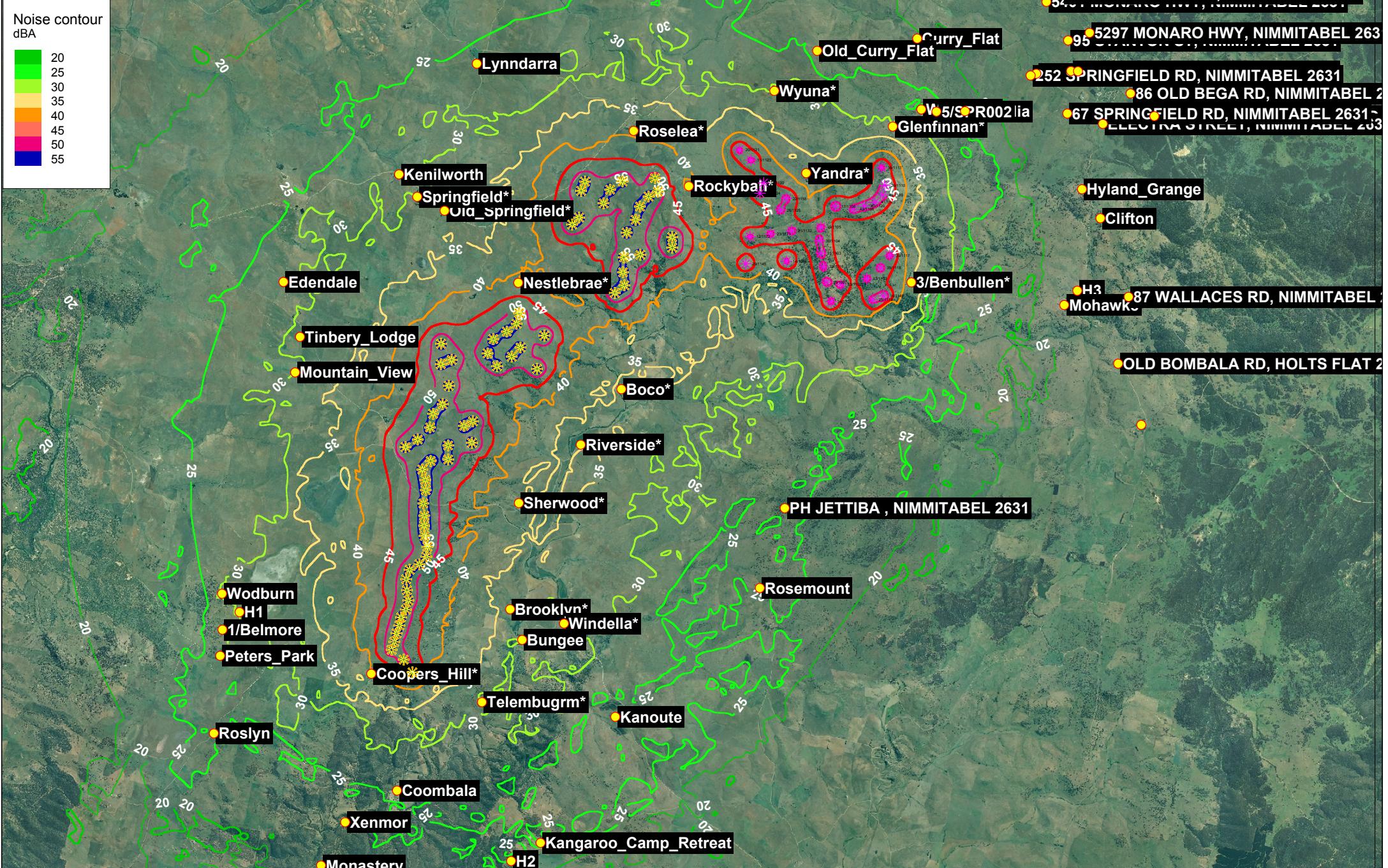
- WTG Stage 1
- WTG Stage 2
- Receptor
- Limit 45dBA

<b>PROJECT</b>	Boco Rock Wind farm
<b>CLIENT</b>	Boco Rock Wind Farm Pty Ltd
<b>DESCRIPTION</b>	Stage 1 WTG (67 X GE 1.6MW & 1.7MW) Stage 2 WTG (30 x V150 4.2MW)

Date: 22-Aug-2018  
Project No.: 640.11757  
Report No.: 640.11757-R1  
Prediction Method: ISO 9613-2:1996  
Prepared By: BF  
Prediction Height: 1.5 m

**APPENDIX  
C**

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### BRISBANE

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Australia  
T: +61 7 3858 4800  
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### GOLD COAST

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### MACKAY

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### MELBOURNE

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### SYDNEY

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Lane Cove NSW 2066  
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### TOWNSVILLE

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### NELSON

6/A Cambridge Street  
Richmond, Nelson 7020  
New Zealand  
T: +64 274 898 628

## Appendix E Traffic and dilapidation correspondence with Council

**From:** [Arthur Wilkinson](#)  
**To:** [Mark Branson](#)  
**Cc:** [Peter Bascomb](#)  
**Subject:** RE: BRST / Traffic and dilapidation  
**Date:** Friday, 5 April 2019 9:26:35 AM  
**Attachments:** [SnowyMonaroLogo\\_withtagline\\_250x54\\_000f550e-091b-42d5-b1e8-c825388785cc.png](#)

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Mark

I apologise for the delay.

This appears to have addressed the issues I raised regarding the ongoing maintenance of the network.

Regards

Arthur Wilkinson

Snowy Monaro Regional Council

**Arthur Wilkinson**

Works Manager



PO Box 714 Direct 02 6455 1830  
COOMA NSW 2630 Mobile 0439 061 354  
Phone 1300 345 345  
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[snowymonaro.nsw.gov.au](mailto:snowymonaro.nsw.gov.au)

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**From:** Mark Branson [mailto:[Mark.Branson@cwprenewables.com](mailto:Mark.Branson@cwprenewables.com)]  
**Sent:** Thursday, 4 April 2019 4:37 PM  
**To:** Arthur Wilkinson  
**Cc:** Peter Bascomb  
**Subject:** RE: BRST / Traffic and dilapidation

Hi Arthur,

Do you have any further comments in relation to the approach below for roads at Boco Rock Stage Two?

Thankyou

**Mark Branson**

M: 0402 259 580

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**From:** Mark Branson  
**Sent:** Tuesday, 12 March 2019 5:00 PM  
**To:** 'Arthur Wilkinson' <[Arthur.Wilkinson@snowymonaro.nsw.gov.au](mailto:Arthur.Wilkinson@snowymonaro.nsw.gov.au)>  
**Subject:** BRST / Traffic and dilapidation

Hi Arthur,  
Thanks for your time last week in Cooma to discuss the SMRC submission on the Boco Rock Stage Two Modification.

Following our discussion and further review of your submission, I have prepared the following with the aim of addressing your concerns specifically related to Stage Two:

1. A pre-construction dilapidation assessment of Springfield Road (between Monaro Highway and Yandra Road) be undertaken by the Proponent in consultation with SMRC to determine the pre-existing road condition.
2. Visual inspection of Springfield Road to be undertaken throughout Project construction by SMRC at regular intervals (i.e. monthly) to monitor road condition and identify areas for repair.
3. The Proponent will be responsible for maintenance and repair of Springfield Road in response to issues identified in the visual inspections during construction of Yandra cluster.
4. Following construction the Proponent will undertake a pre-operational dilapidation assessment and return Springfield Road to the pre-existing condition identified in the pre-construction dilapidation assessment.
5. The Traffic Management Plan will identify any other Council roads to be used for heavy vehicle or over-dimensional vehicle traffic during construction of Stage Two, once the source of supply materials is known, and the above dilapidation requirements will similarly apply to those roads.

Let me know if you have any further concerns.

Thankyou

**Mark Branson**

Senior Development Manager

**CWP Renewables**

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