CHAPTER 18

General Environmental Assessment

18. General Environmental Assessment

This chapter, in addition to **Chapter 19** Socio-Economic Assessment, addresses aspects of the proposed Project beyond the key issues identified in the Director-General's Requirements (DGR's). In summary the following chapter contains sections on climate, air quality, soils and landforms, waste, responses to consultation and aspects relating to construction.

18.1 Climate

On the Monaro Plains, the climate is regarded as sub alpine, with long cold winters and temperatures regularly falling below freezing. Due to the Monaro's location (lee of the Snowy Mountains), a rain shadow effect is experienced throughout the region, creating low and irregular rainfall.

A summary of climate data from Nimmitabel Wastewater Treatment Facility (Station No 70067, elevation 1,075 m) from the Bureau of Meteorology (BoM) is presented in **Table 18.1**.

Table 18.1 Annual weather conditions

Weather Conditions	Measurements
Annual rainfall	687.7 mm
Highest monthly rainfall	68.2 mm (December)
Lowest monthly rainfall	46.0 mm (August)
Annual minimum/maximum temperature	3.4°C / 15.6°C
Highest mean monthly maximum temperature	22.8°C (January)
Lowest mean monthly minimum temperature	- 1.9°C (July)

Source: BoM 2009

The Nimmitabel Wastewater Treatment Facility also recorded the annual mean average of clear, cloudy and rainy days, which included 102 clear days, 118 cloudy days and 81 rainy days (BoM 2009).

18.2 Air Quality

18.2.1 *Existing Situation*

Air quality in the Cooma-Monaro shire is likely to fluctuate on a seasonal basis according to the Regional State of the Environment Report (SoE) 2008. This is predominantly due to the use of wood heaters during winter, where temperature inversions trap the pollution close to the ground. In Bombala, air quality is generally considered acceptable except for during bushfire or fuel reduction burns. The use of wood heaters during winter does not pose any pollution problems due to the topography. Both Councils also experience industrial type pollutants and emissions from the use of motor vehicles, however this is not significant compared to other major city centres.

The Project site would not be expected to experience air quality issues from industry and wood heaters, as it is placed in a rural setting. However, air quality could be affected by occasional bush fires and fuel reduction burns.

18.2.2 *Potential Impacts*

The majority of potential impacts to air quality will occur during the construction phase. Dust particles and emissions can be produced from a range of activities, including:

- Clearing;
- Excavation;
- Blasting (if required);
- Concrete batching;
- Rock crushing;
- Road works; and
- Transport of materials and infrastructure.

Heggies Pty Ltd conducted a qualitative air quantitative assessment for the construction of the Project to determine whether a PM10 study was required. As described in **Appendix 21** the predicted PM10 daily emissions would be 10 kg and the total dust would be 35 kg, which means that no dust mitigation methods need to be currently employed on-site. However a Construction Dust Management Plan (CDMP) will be implemented and dust deposition gauges will be installed near Mobile Resource sites to monitor dust emissions and ensure emissions do not exceed 4 grams per metre squared per month, in accordance with NSW Department of Environment and Climate Change (DECC) guidelines.

Cumulative Impacts: An assessment of cumulative environmental impacts considers the potential impact of a proposal in the context of existing developments and future developments to ensure that any potential environmental impacts are not considered in isolation. Other activities in the locality that have the potential to generate dust emissions include the upgrade (from gravel to sealed) of the Snowy River Way and the quarry located just to the north of Nimmitabel. However, given the amount of dust estimated to be generated from the proposed wind farm it is not anticipated to create a significant level of cumulative impact.

18.2.3 *Management and Mitigation*

The majority of work will not occur near residential areas, however to ensure appropriate mitigation measures are utilised for dust and other emissions a CDMP will be included in the Construction Environmental Management Plan and Operational Environmental Management Plan. Mitigation methods could include:

- During excavation topsoil will be stockpiled. After excavation topsoil will be replaced for seeding/fertilising and excess subsoil will be disposed of in an appropriate manner. If any excavation occurs on steep slopes the topsoil will need to be stabilised;
- Any stockpiled material will be covered with plastic, seeded or otherwise bound to reduce dust. Dust levels at stockpile sites would be visually monitored. Dust suppression (e.g. water sprays) would be implemented if required;

- During dry and windy conditions a water cart or alternative chemical dust suppression would be available and applied to work areas; and
- If blasting is required, Australian New Zealand Environment and Conservation Council guidelines for control of blasting impacts will be followed.

18.3 Soils and Landforms

18.3.1 *Existing Situation*

The dominant underlying geology is fine grained Tertiary basalt occurring on the crests/ridges and upper slopes within the Project site. Lower lying areas have transported clays from the surrounding basalts. The banks of the MacLaughlin River are made up of deposits of gravels, sands, silts and clays (Tulua 1994; Lewis & Glen 1995).

The soil landscapes of the Cooma 1:100,000 map sheet (Tulau 1994) and DECC unpublished data indicates five soil units - Brothers, Upper Cooma Creek, Maneroo, Maneroo variant and Quidong (**Figure 18.1**) below.

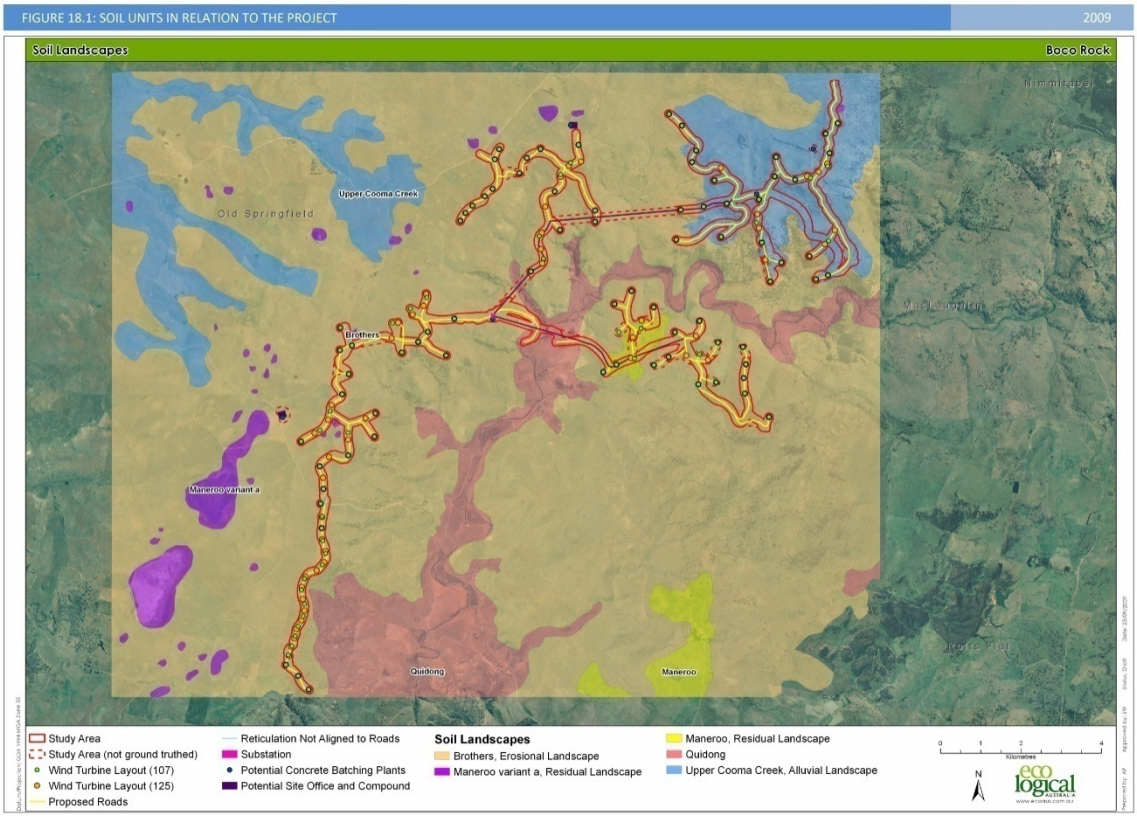

Figure 18.1 Soil units in relation to the Project
(An A3 size version of this Figure is displayed in Volume 2)

For this assessment the Maneroo variant will be classified with the Maneroo as it has similar properties and has limited distribution across the site.

Brothers occurs within all areas of the Project. The soil is a Dermosol and is formed on slopes of undulating to rolling hills and forms shallow to moderately deep profiles over basalt parent material.

It is generally stable as long as there is sufficient ground cover or non-concentrated surface flows (Tulau 1994).

Upper Cooma Creek occurs in the Springfield Cluster. The soil is a Vertosol and forms in valley flats with deep profiles. It is generally stable, except when the soil is disturbed and exposed. The soil can also have seasonal water logging and inundation (Tulau 1994).

Maneroo occurs in the Boco, Sherwins and Yandra Clusters. The soil is a Dermosol and forms on the crests and upper slopes of the undulating basalt hills. The profile is generally shallow profiles, however deep profiles can form in localised pockets. It is generally stable as long as there is sufficient ground cover or non-concentrated surface flows (Tulau 1994).

Quidong occurs along a limited section of proposed roads for the Project. The soil is a Rudosol and occupies the lower slopes and valley flats associated with the MacLaughlin River. It has a low-moderate erodibility (personal communication DECC 2009).

Associated landowners were also consulted to determine any contamination onsite. Many landowners indicated that whilst potentially contaminating activities (e.g. sheep dips, fuel storage, and herbicide spraying) have occurred on-site, these activities did not occur on ridge top locations that will be disturbed by the proposed development.

18.3.2 *Potential Impacts*

The majority of potential impacts will occur during construction and will therefore be limited to the timeframe of construction. These impacts could include compaction, erosion or contamination and the degree of impact will be determined by the characteristics of the soil (see **Appendix 22**).

Also as the area experiences low levels of rainfall, there will be minimal impacts from water erosion. However, any exposed soil will be at a higher susceptibility to water or wind erosion.

Cumulative Impacts: An assessment of cumulative environmental impacts considers the potential impact of a proposal in the context of existing developments and future developments to ensure that any potential environmental impacts are not considered in isolation. There are no other known major projects that would impact the soil and landforms in the locality. It is therefore anticipated that there will be no cumulative effect to soil and landforms from the introduction of the proposed development into the area.

18.3.3 *Management and Mitigation*

A number of management actions will be implemented to manage surface runoff, exposed soil surfaces and contamination to surrounding soil. These methods will be included in the Soil Water Management Plan (SWMP) and will include:

- Procedure for personnel to manage suspected contaminated soils during earthworks;
- All disturbed soil surfaces should be stabilised as soon as practicable after works have ceased in the area; and
- All stockpiles should be covered to prevent the loss of material during wind and rain events. Where practicable stockpiles should be placed in areas sheltered from the wind.

Also to minimise soil compaction at the Project site, the SWMP will have specific measures for stock management, including:

- Management of stock access during periods of vegetation and soil disturbances; and
- Removal of stock access from construction areas for entire construction periods to allow for regeneration, subject to landowner participation.

18.4 Waste

During the construction of a wind farm there are a variety of wastes produced, including:

- Cleared vegetation;
- Packaging material;
- Building materials;
- Domestic wastes;
- On-site toilets; and
- Chemicals.

Under the NSW DECC Waste Classification Guidelines there will be liquid wastes and general solid waste (non-putrescible) produced. All waste will be disposed of with regard to Council and NSW DECC guidelines.

To handle the waste on-site from packaging and building materials and domestic waste there will be both skip bins and recycling bins. Vegetation will be mulched and used on-site where feasible, otherwise the rest can be burnt on-site with permission from Council, provided as firewood to landowners or taken to the Cooma landfill. The on-site toilets will either be drained by a septic tank or be an enclosed unit. All chemicals and oils will be treated as contaminated waste at the Cooma landfill. Any disposal of unsuitable excavated material will require development consent from Bombala Council (personal communication Ingram 2009), unless it is virgin excavated natural material, then it can be disposed of at the Cooma landfill (personal communication Smith 2009). For full details on mitigation and management see **Appendix 23**.

Cumulative Impacts: An assessment of cumulative environmental impacts considers the potential impact of a proposal in the context of existing developments and future developments to ensure that any potential environmental impacts are not considered in isolation. Post construction the Project will produce minimal waste materials, and it is therefore anticipated that there will be no cumulative effect to waste from the introduction of the proposed development into the area.

18.5 Response to Consultation

18.5.1 *Trigonometrical Stations*

The Department of Lands (DoL) were asked to provide advice on the proximity of the proposed wind farm to two Trigonometrical Stations (TS) within the Project site. These TS's are located 57.5 m and 30.5 m respectively from proposed wind turbine locations. The DoL indicated (**Appendix 24**) that neither of the TS's are located on Trigonometrical Reserves and so the Surveyor General cannot insist on any additional conditions for construction. However it was requested that during the construction phase, care is taken not to disturb or damage these TS's or the adjacent witness marks

otherwise financial penalties would be incurred. The Proponent has therefore committed to avoid disturbing/damaging the TS's and adjacent witness marks.

18.5.2 *Crown Roads and Crown Land*

The DoL were also asked to provide input on aspects of the Project that may affect Crown Roads and Land (**Appendix 24**). As such a number of Crown Roads that are both held and not held under Enclosure Permits have been identified. Pending Development Approval, applications will be lodged with the DoL to close and transfer the affected Crown Roads to the adjoining landowners. To expedite the process the Proponent, in consultation with the adjoining landowners, intends to submit letters of intent to close the affected Crown Roads in readiness for the process to commence should Approval be granted.

With respect to Crown Land, there is within the Project site a reserve for future public requirements under the general parish reservation (Lot 7301 DP 1139914), within the Cooma-Monaro Shire Council area. This Lot is also subject of an Aboriginal Land Claim (ALC) 11049 for which processing is yet to commence. The DoL have advised that until a determination is made with respect to the ALC, they are unable to authorise any use or occupation of the land. At the time of consultation with the DoL the Proponent had proposed a route for an internal overhead power line that traversed this Lot. The Proponent has since relocated the overhead line so as not to involve this land.

18.5.3 *Council Roads*

It may be necessary to transfer a Crown Road to Council for discrete sections of land that are to be affected by the proposed development. To date the only area where this has been identified would be the Crown Road access to Lot 7301 DP 1139914 (as detailed above), should the ALC be determined. If the ALC is not determined, the Crown Road will be included in an application to close the road and transfer it to the adjoining landowner.

In addition, there is an instance of an existing council road located outside the legal road reserve within the Yandra Cluster. The Cooma-Monaro Shire Council have advised that if construction work was required to improve the road to service the Project, Council would require that the road boundaries be adjusted as necessary so that any part of the road on which upgrading work is carried out will be brought into the legal reserve. This would involve survey and registration of the plans for sections of road opening and closing.

18.5.4 *Native Title*

In consultations with the DoL advice was sought as to whether Native Title existed across any of the landholdings affected by the Project. The DoL have confirmed that Native Title is extinguished over all lands affected by the proposed Boco Rock Wind Farm (**Appendix 24**).

18.6 Construction

Eco Logical Australia Pty Ltd (ELA) conducted a risk analysing in general accordance with Australia Standard 4360: *2004 Risk management* and Handbook HB 203:2006 *Environmental risk management – principles and processes* to provide a framework to meet the requirements listed in the DGR's.

A list of activities, products and services relating to the pre-construction, construction and operational stages of the wind farm was developed in consultation with the Proponent. This list was reviewed in order to identify potential sources or pathways (aspects) for environmental risks (impacts) to occur, as tabulated in **Appendix 23**.

18.6.1 *Management and Mitigation*

To ensure all potential impacts during pre-construction, construction and operational stages are mitigated and managed a number of Management Plans will be created, based on the risk analysis done by ELA. **Appendix 23** lists each activity, the impact it will have and possible risk treatment. Below is an overview of each necessary Management Plan and the main high residual risks which should be addressed.

Construction Environmental Management Plan: The Construction Environmental Management Plan (CEMP) will be developed prior to pre-construction and used to address environmental impacts identified by the risk analysis process in both the pre-construction and construction stages. The CEMP will consist of and address the following:

- A Soil and Water Management Plan (SWMP) in accordance with Landcom (2004), Managing Urban Stormwater: Soils and Construction, 4th Edition:
    - Soil erosion and sediment management;
    - Contaminated soil disturbance;
    - Water quality monitoring procedure for earthworks occurring in or adjacent to riparian areas;
    - Water management strategy to minimise water quality impacts and to maximise capture and reuse of water within the site; and
    - Incorporate permit/approval requirements for work within creek and riparian zones in accordance with NSW Office of Water (NOW) and NSW DECC.
- A Construction Dust Management Plan (CDMP) as listed in **Appendix 23**;
- Manage site security and uncontrolled access via a lockable chain link fence around the temporary site facilities to minimise acts of vandalism and arson;
- Obtain necessary licenses and permits from NOW, Department of Primary Industries (DPI) and NSW DECC;
- Manage disturbance to 'no go' areas by flagging, fencing and including details on hard copy and electronic construction plans;
- Designate environmental management responsibility to key personnel;
- Transport of oil (80,000 L for collector substation transformer and 1,000 L per wind turbine generator transformer) will be via purpose built vehicles/tankers in accordance with the Australian Dangerous Goods Code and will be fitted with emergency spill equipment. Oil will be transferred to transformers by qualified personnel, who have training in emergency spill response. Spill control equipment will be available at the point of use;
- Incorporate licensing requirements for the concrete batching plants into the CEMP, including speed limits, portable spill kits, and management of concrete slurry;
- Use of fire mitigation and management strategies discussed in **Chapter 16** Fire and Bushfire;
- Use local water supplies, where possible, in written agreement with local landowner;

- Community consultation strategy for the duration of the construction period, to keep community informed of progress/delays and to maintain a method for receiving and addressing community feedback; and
- A number of other mitigation measures are outlined in **Appendix 23**.

Operational Environmental Management Plan: An Operational Environmental Management Plan (OEMP) will be developed prior to the completion of construction activities in order to address the broad range of the environmental impacts identified in this risk analysis. The OEMP may be combined with the CEMP for the development. The OEMP will also need to address additional mitigation measures outlined in **Appendix 23**.

18.7 Proposed Transmission Line

The proposed transmission line will be assessed apart from this EA under Part 5 of the *EP&A Act*. Impacts relating to climatic condition, air quality, soils and landforms, waste, responses to consultation and aspects relating to construction are considered to be similar to those associated with the Boco Rock Wind Farm development.

18.7.1 *Cumulative Impacts*

The proposed transmission line development will occur in parallel with the planned upgrade to the existing 66 kV network as described in **Chapter 3** Project Description and the Boco Rock Wind Farm. It is anticipated that there will be minimal cumulative impacts to air quality, soils and landforms, and waste from the introduction of the proposed transmission line into the area. However, if necessary, an assessment will be included in the Review of Environmental Factors for the transmission line.

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