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 **RE Future**

Brewster Wind Farm

Appendix K

Geotechnical Assessment

December 2021



**Melbourne
Geotechnics**
CONSULTING GEOTECHNICAL ENGINEERS

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Geotechnical Desktop Study

Re: Proposed wind turbine development at

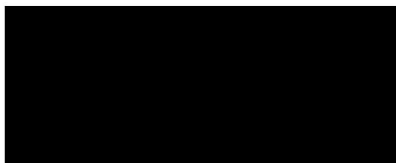


Western Highway, Brewster

File: 200384/1

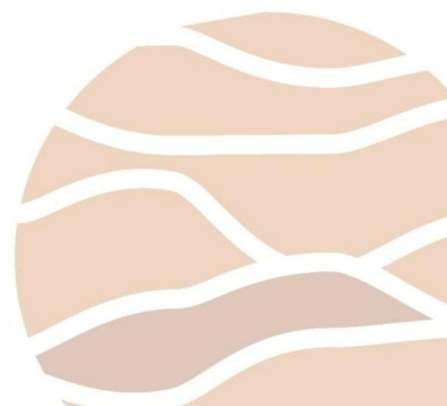
Date: 26th of October 2021

Client:



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Introduction

A desktop study was undertaken to provide an initial geotechnical assessment of the proposed Brewster wind farm. It is understood that 7 wind turbines are proposed. Relevant geological maps were examined with the purpose of providing feasibility foundation and pavement advice for the proposed construction.

Scope of the Study

The study is limited to a desk top review only.

The scope of this report is to provide comments on the anticipated footing systems and pavement options, based on experience in the region and its geology, as interpreted from appropriate maps.

Site investigation work will be required to confirm the assumptions made in this report for any design purpose.

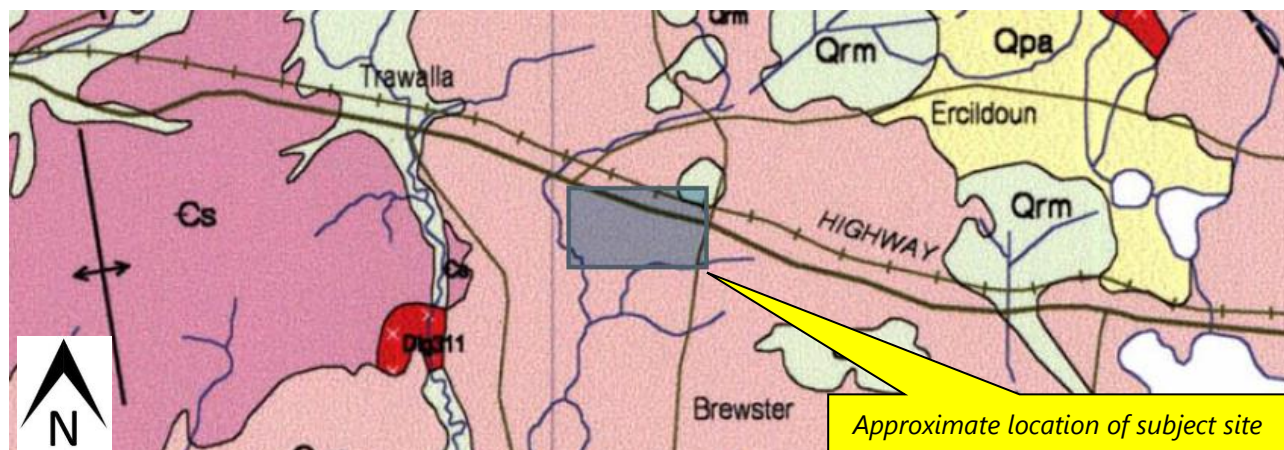
Site Description

The site is located along the southern side of Western Highway, approximately 4 km east of Trawalla, and 35km west of Ballarat. The site is currently being used as farmland. Aerial imagery suggests that the site has a ground cover of grass with some gravel roads.

Subsurface Conditions

Regional geology

The site is identified on the 'Geological Survey of Victoria' Ballarat Sheet (1:250,000). The geology of the turbine site is identified on the geological map as lying within the Quaternary "Newer Volcanic" formation and associated residual soil profiles. Weathering of these olivine basalt flows typically result in shallow surface residual silts, underlain by highly reactive silty clays which grade to variably weathered basalt at depth.



Extract from 'Geological Survey of Victoria' Ballarat Sheet (1:250,000) showing site in the Quaternary "Newer Volcanics" formation

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Discussion

Anticipated subsurface conditions

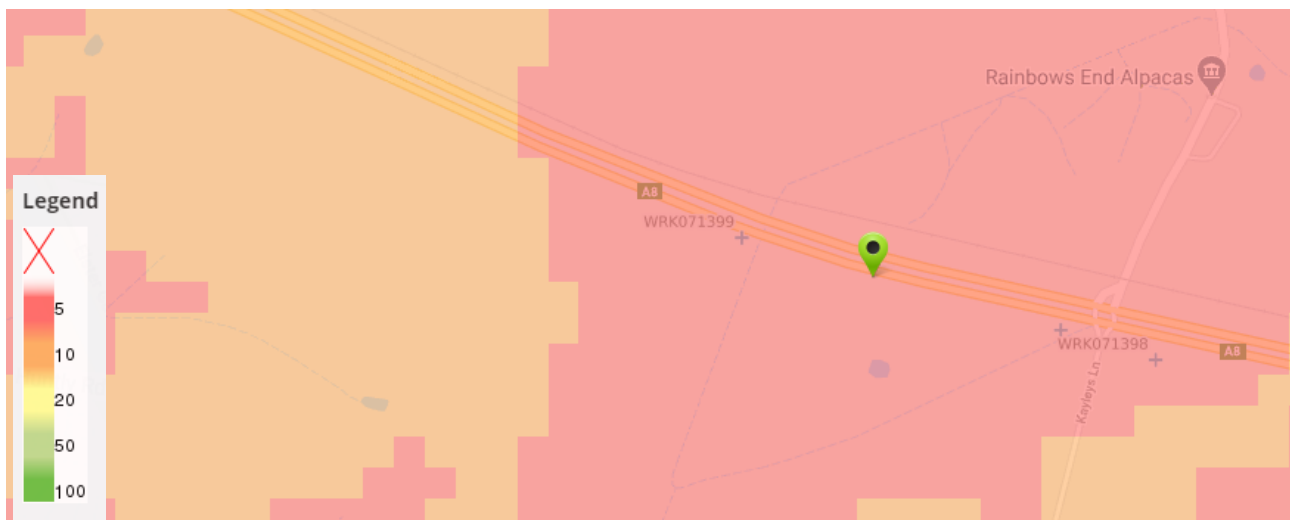
The Quaternary "Newer Volcanics" formation is expected to be characterised by:

- Topsoils comprised of clayey SILT of medium plasticity, underlain by,
- Silty CLAY of a high plasticity, underlain by,
- Variably weathered basalt ROCK.

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The subsurface geology will need to be confirmed through direct sampling methods.

Checks of Visualising Victoria's Groundwater database (<http://www.vvg.org.au/>) indicates that the local groundwater table lies at a depth between <5m to 10m, noting this data is approximate.



Extract from 'Visualising Victoria's Groundwater' database showing the approximate depth to groundwater being between <5m to 10m

The local groundwater regime would be investigated during a detailed geotechnical investigation, as necessary.

Transient perched groundwater may form within the upper topsoils at shallow depths during the wetter months.

The geological setting is favourable in terms of interaction between the soil mass and groundwater regime.

Foundation options

It is understood that loading conditions are relatively light for wind turbine structures, with overturning movements usually the critical loading condition in the order of 200kPa (peak edge pressures). The natural CLAY soils found within this geological setting are generally highly reactive, and it is recommended that mass pads are founded on a base of continuous weathered basalt ROCK.

It is expected that a mass pad footing will provide the most practicable foundation type for the structure.

Piled foundations would provide further alternatives to a conventional pad type footing, however the final foundation design will be based on economics with all alternatives providing a stable foundation.



At this stage, it is expected that no unusual difficulties will be associated with the construction of the wind turbine footings.

Pavements

It is anticipated that access roads will be required for the construction of the wind farm facility and future maintenance.

Heavy construction vehicles and large cranes may be required during the construction period. Traffic frequency and loading conditions on access roads during construction may be high. However, postconstruction traffic is likely to be low and comprise light vehicles for maintenance purposes only.

Subgrade properties within the region may range from poor to good. Some form of subgrade improvement or geo-reinforcement may be required. This could include in situ lime/cement stabilisation upon which the pavement is constructed or placement of a geo-fabric on the stripped surface upon which the pavement is constructed.

Conventional construction practices should be able to accommodate the ground conditions on site (evidenced by existing roads and pavements).

Report notes

This report contains information for the feasibility stage of the proposed development. Detailed geotechnical site investigation and reporting will be required for design purposes.

During the construction period, land may be disturbed and exposed to erosion. Erosion and sediment runoff can be minimised/controlled by adopting good construction practices referenced below (2), (3) and (4).

Further information regarding geotechnical site investigation reports is referenced below (6).

Please contact us if you have further queries.

Yours faithfully,

Melbourne Geotechnics Pty Ltd

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References

1. Centre for eResearch and Digital Innovation, Federation University Australia, 2016. Visualising Victoria's Groundwater, <http://www.vvg.org.au/>, viewed 31 August 2016.
2. Environment Protection Authority. 1996 *Environmental Guidelines for Major Construction Sites*. Best Practice Environmental Management.
3. Environment Protection Authority. 1991 *Construction Techniques for Sediment Control*. Publication 275.
4. Ransom, M.J., 1987: *Control of erosion on construction sites*. Department of Conservation Forests and Lands, Victoria
5. Institution of Engineers, Australia. 1987. *Guidelines for the Provision of Geotechnical Information in Construction Contracts*, Institution of Engineers, Australia, 1987.

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