

24 November 2022

Attention: Ewan Chandler
Newton Family Trust
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BY EMAIL

Dear Ewan

Re: Independent review of the Agricultural Impact Assessment for the proposed Glanmire Solar Energy Project

1. I refer to the written instruction from yourself to undertake an independent review of the Agricultural Impact Assessment conducted by SLR Consulting Australia Pty Ltd (Report Ref: 630.30108.001, September 2022) for the proposed Glanmire Solar Energy Project. The objective of this review is to provide you and the planning authority with an assessment of the adequacy and accuracy of the Agricultural Impact Assessment compared to industry resources and recognised guidelines, namely the:

- a) Soil Landscapes of the Bathurst 1:250,000 Sheet, Kovac M, Murphy BW, and Lawrie JA (2010).
- b) Land and Soil Capability Mapping for NSW, Department of Planning Industry and Environment (2021).
- c) Large-Scale Solar Energy Guideline, Department of Planning and Environment (2022)
- d) Guidelines for Surveying Soil and Land Resources, McKenzie NJ, Grundy MJ, Webster R and Ringroase-Voase AJ (2008).
- e) The Australian Soil Classification, Isbell RF and National Committee on Soil and Terrain (2021).
- f) Soil physical measurements and interpretation for land management, McKenzie N, Coughlan K and Cresswell H (2002).
- g) Soil chemical methods, Rayment GE and Lyons DJ (2011).
- h) What surface soil is that? 2nd edition Extension Brochure, Lawrie J, Murphy BW and Packer IJ (2002).
- i) Soils and sustainable farming systems in soils: Their properties and management, 3rd edition, PEV Charman and BW Murphy, Lawrie J, Murphy B, Packer IJ and Harte AJ (2007).

2. The scope of work is to provide an independent review of the Agricultural Impact Assessment which in part contains an assessment of the:

- a) Agricultural and land resources.
- b) Land and soil capability.

- c) Local and regional agricultural land enterprises.
- d) Potential impacts.
- e) Mitigation measures.

3. I am suitably competent to undertake this independent review being a Certified Environmental Practitioner with expertise in soils and geomorphological assessment with over 25 years' experience. I am well qualified, holding an undergraduate degree in Applied Science (Agriculture) specialising in soils and land management, a graduate diploma (Water Management) specialising in geomorphology and hydrology, and a master's degree (Environmental Management) specialising in hydrogeology. I am an active member of the Environmental Institute of Australia and New Zealand, the Australasian Land and Groundwater Association, and Soil Science Australia.

3. Background

The proposed Glanmire Solar Energy Project is located at 4823 Great Western Highway Glanmire NSW with a real property address of Lot 141 DP 1144786, referred to as the site throughout this review. The site is around 186ha in area with an elevation range of around 760 to 800 mAHD, with a general south west aspect. The landscape is gently undulating rises with slope gradients generally < 10%. Soils are mapped as deep Brown Soils and Red and Yellow Earths (Chromosols) and deep Solodic Soils (Sodosols) overlying granite parent material (Kovac et al 2010). From a review of the available historical aerial photography and satellite imagery (1954-2022) and discussions with yourself the site has been rotationally farmed since at least the 1950s with a mix of pasture, fodder, and grain crops. The site is mapped as being Class 3 and 5 Land and Soil Capability (DPIE, 2021).

4. Results

a) Agricultural and water resources

- i. The long term climate data is inaccurate for the site as it is taken from Bathurst Airport with data records only from 1988 to 2022. The patched point dataset with interpolated records dating to 1889 for Glanmire would be preferable to use. The result is around a 100mm difference in annual rainfall. (Page 13 – section 2.1).
- ii. The hydrology is misconceptualised with the Fish River flowing to the west not the east as suggested. (Page 14 – section 2.3.1).
- iii. The hydrology does not adequately characterise the stream order, channel occurrence, spacing, development depth relative to width, migration, pattern, directionality, nor integration. The drainage is also not adequately characterised to assess if the drainages are ephemeral, intermittent, or perennial. As the site hydrology is not adequately characterised the above can have significant impacts not only for planning purposes but also for the agricultural, ecological, and construction function on-site and downstream. (Page 14 – section 2.3.1).
- iv. No conceptual model has been offered for groundwater. There is no mention of the nearby and down gradient registered stock/domestic and water supply water bores (GW031913 and GW802908). This is inadequate to assess the potential interflow that is likely to occur on site, deep drainage, or potential high water tables from a change in land use to a solar energy project. The groundwater section is inadequate to base a risk assessment framework on. (Page 14 – section 2.3.2).

- v. Kovac et al (2010) offers the most recent Soil Landscape mapping compared to the 1990 work referenced. (Page 15 – section 2.5).
- vi. The sampling density is inadequate for the soil type assessment and has potentially misconceptualised the soils on site. Only six sites were investigated by SLR while the DPIE (2022) Guideline requires 1 site per 5ha to 25ha. This is a major deficiency of the SLR report. (Page 15 – section 2.6).
- vii. The soil survey type and methodology has not been established nor justified (e.g. grid, traverse, free survey). Of the eight check points by SLR (C1 to C8) six of them were dam banks in low lying areas which is biased to low lying areas and potentially misconceptualises the soil types on site. It is well established that Sodosols are more prevalent in low lying areas, hence SLRs conclusions. (Page 15 – section 2.6).
- viii. Due to the narrowly defined objectives in the SLR report the soil survey was selective in data collection and presentation and therefore cannot serve well for risk assessment. Because of the sparse and irregular sampling over a relatively large area, only general conclusions are able to be drawn by SLR, for they are based on a very limited amount of data. This is a major deficiency of the SLR report. (Page 15 – section 2.6).

b) Land and soil capability

- i. Owing to the inadequacy and potential inaccuracy of the assessment of agricultural and land resources presented by SLR as outlined above, the Land and Capability Assessment and Biophysical Strategic Agricultural Land Assessment cannot be relied upon for a risk assessment framework. (Pages 21-22 – Section 3).
- ii. It is important to note that the Land and Soil Capability Scheme around soil structure decline hazard is based on work by Lawrie et al (2002, 2007) on surface characteristics (surface sodicity, surface hardsetting & organic matter) while the SLR report appears to focus on subsoil sodicity hence a potential misconceptualisation of the Land and Soil Capability. Therefore, it can be argued that the SLR report does not follow the Scheme for soil structural decline hazard assessment. (Pages 21-22 – Section 3).
- iii. A critical component of soil profile description is soil structure and the method SLR used for intrusive sampling does not allow adequate assessment of such (soil pits are the industry standard). (Pages 21-22 – Section 3).

c) Local and regional agricultural land enterprises

- i. The gross margin returns for Land and Soil Capability 4 od 5 land has been presented while it is likely large parts of the site are as mapped (DPIE, 2021), Class 3. (Page 26 – section 4.4).

d) Potential impacts

- i. The soil erosive potential is limited to a comment about tunnel erosion which is failure of the subsoil. There is no assessment of water erosion, splash erosion, sheet erosion, rill erosion, gully erosion, wind erosion nor mass movement. This is considered to be a major limitation of the SLR report as all of these types of erosion are likely during the construction and operational phase of a solar energy project. (Page 28 – section 5.1).
- ii. The impact on soil assessment is theoretical with no practical plan on how groundcover will be managed, nor pasture established and maintained. With limited access for machinery within a solar array the above could be difficult to achieve. Again, the Land

and Soil Capacity Class assigned by SLR which is relied upon for the impact on soil assessment could be inaccurate leading to inadequate management. (Page 28 – section 5.1).

- iii. As the site hydrology has not been adequately characterised a risk assessment on the surface waters and farm dams and potential downstream impacts cannot be made. (Page 29 – section 5.5).
- iv. As the site hydrogeology has not been adequately characterised a risk assessment on the groundwater and potential downstream impacts cannot be made. (Page 29 – section 5.5).
- v. As the site hydrology has not been adequately characterised a risk assessment on the four removed dams and potential downstream impacts cannot be made. (Page 31 – section 5.7).
- vi. Weed management is inadequate and there is no mention of the practicality of weed control under a solar array with limited access for machinery. There is no plan around this. (Page 31 – section 5.12).

e) Mitigation measures

- i. The mitigation measures for soil resources are limited to the addition of gypsum. This is assessed to be inadequate to protect soil resources on site as no consideration has been given to the design of earthworks to control runoff, all types of erodibility, soil permeability, bank and earthworks stability, earthworks spacing, and types of excavation or ripping for foundation for the solar array and installation of cabling. No geotechnical data has been provided to assess suitability of in situ material for earthworks. This is assessed to be a major limitation of the SLR report. (Page 34 – section 6.1).
- ii. Regarding the re-establishment of agricultural lands a comment around returning the land to its pre-solar capability cannot be made when it can be argued that the soil type assessment is inadequate to establish the soil resource on site.

If you have any queries about the contents of this independent review, please contact the undersigned.

Yours sincerely



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