BEFORE THE SELWYN DISTRICT COUNCIL

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of a resource consent application to establish a solar array at 150 and 115 Buckleys Road, Brookside, Selwyn District
RC235464

GLINT AND GLARE EVIDENCE OF RUDI VAN DER VELDEN

For Selwyn District Council

March 2024

1.0 INTRODUCTION

1 My full name is Rudolf Marinus Van der Velden

2 I hold the position of Director/Engineering Consultant of Velden Aviation Consulting Limited and been in this position since 2020.

3 I hold a Bachelors Degree in Electrical Engineering (University of Canterbury), obtained registration as a professional engineer in 1985 (Institute of Professional Engineers New Zealand) and registration as a Chartered Engineer in 1987 (U.K Institute of Electrical Engineers), and a Post Graduate Certificate in Strategic Leadership (University of Canterbury, 2014)

4 My experience includes at least 40 years in the aviation industry as design engineer, subject matter expert and team leader for all aspects of engineering relating to air traffic management and Air Traffic Control systems which included communications, navigation, surveillance and satellite navigation systems.

5 In the last few years, I have formed my own consulting company Velden Aviation Consulting Limited and are also contracted by the Pacific Aviation Safety Office to carry out audits and inspections at airports in the Pacific.

6 Of relevance to the above experience over the past five years this included glint and glare impact assessment for solar farm related projects for Rarotonga, Auckland and Christchurch International Airports Kowhai park solar farm related impacts, Meridian Energy Ltd Ruakaka solar farm at Marsden Point and other solar farm projects in the Selwyn District on behalf of the Selwyn District Council.

7 Glint and glare assessments related to the above work included review and analysis of impacts of solar farms and arrays to dwellings, road users, railways as well as airports.

8 I have been engaged by Selwyn District Council for a peer review of the glint and glare assessment carried out by PagerPower in August 2022 for a previous application for this resource consent.

9 I have been engaged by Selwyn District Council to provide glint and glare evidence for this application based on peer review of Boffa Miskell glint and glare impact assessments (September 2023).

10 I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023. I have complied with it in preparing this evidence and I agree to comply with it in presenting evidence at the hearing. The evidence that I give is within my area of expertise except where

I state that my evidence is given in reliance on another person's evidence. I have considered all material facts known to me that might alter or detract from the opinions I express in this evidence.

2.0 SCOPE OF EVIDENCE

11 My evidence is with regard to glint and glare impact assessment only and is based on peer review of the Boffa Miskell reports on this.

12 I have also considered the written submissions and focused on the concerns relating to glint and glare impacts.

13 In preparation of my evidence, I have read the following ;

a. Boffa Miskell report, Buckleys Road Solar Array, Application for Resource Consent and Assessment of Environmental Effects, Prepared for Keax Energy, 9 August 2023.
b. Velden Aviation Consulting : Review of Boffa Miskell Assessment of Glint and Glare at Buckleys Road Solar Farm. 21 September 2023.
c. Boffa Miskell Memorandum 24 October 2023, Project Number BM210727
d. Boffa Miskell Report : Appendix 4, Site layout and Battery plan
e. Boffa Miskell Report : Appendix 13 Landscape and Visual Amenity Assessment
f. Boffa Miskell Memorandum 24 October to Selwyn District Council
g. Selwyn District Council S95 and 95 A -E
h. The submissions

14 I have visited the site on 9 Sept 2022 with regard to the first AEE relating to the PagerPower Glint and Glare Impact Assessment in relation to my peer review of that report.

3.0 EXECUTIVE SUMMARY

15 I agree with the results and conclusions of the glint and glare impact AEE and S95 and 95 A-E reports from Boffa Miskell and Selwyn District Council.

16 This is based on the independent analysis on the same parameters associated with the Keax Buckleys Road Solar Farm proposed for Buckleys road and the results from this analysis corresponding well with that of the Boffa Miskell AEE.

17 Overall, the peer review assessed that the independent assessment largely agreed with the results of the assessment which concluded that impact from glint and glare from the solar farm would be less than minor once all mitigation considerations are taken into account.

18 This is discussed in further detail in my evidence below.

4.0 GLINT AND GLARE POTENTIAL IMPACT CONSTRAINTS

19 Constraints adopted for the assessment were based on Australian New South Wales Government Guidelines on Large Scale Solar Energy Development as shown in table 2 below. This was considered more conservative than most constraints adopted by other States.

Table 2: Impact rating and performance objectives for glare impacts to residential dwellings

High glare impact	Moderate glare impact	Low glare impact
> 30 minutes per day > 30 hours per year	< 30 minutes & > 10 minutes per day < 30 hours & > 10 hours per year	< 10 minutes per day < 10 hours per year
Significant amount of glare that should be avoided.	Implement mitigation measures to reduce impacts as far as practicable.	No mitigation required.

5.0 GLINT AND GLARE IMPACT ON DWELLINGS

20 Potential impact was assessed for both single and two storey dwellings. Heights assessed were for 1.8m for single storey and 3.6m for two storey dwellings.

21 Results indicated there was little difference to predicted glare impacts for both levels of dwellings considered. While there was some potential glare identified for a couple of properties this was for less than 10 hours per year with durations of less than 10 minutes per day and therefore low impact and unlikely to require any mitigation.

22 Overall, based on my peer review of analysis and assessment outcomes there was low potential impact to the dwellings which would be deemed less than minor. This is largely due to use of a single axis tracking system, in contrast to a fixed-tilt system. The assessment concluded that together with

the existing vegetation and planned vegetation to offer screening mitigation the overall impact to dwellings is less than minor.

6.0 GLINT AND GLARE IMPACT ON ROAD USERS

23 I considered that the initial AEE assessment that was reviewed did not consider road users of larger vehicles with driver eye level heights of 2.5m.

24 This would cover vehicles such as tractors, haulage vehicles, buses etc which I considered would be the majority of road users of the surrounding roads around the proposed solar farm and also present a worst case scenario for road users.

25 This was subsequently addressed by further analysis and found that four of the surrounding roads could potentially be impacted by solar glare.

26 The outcomes determined potential glare from Buckleys Road is not oriented in the direction of travel for road users and no mitigation was considered necessary. Potential glare from Brookside and Irwell Road will be screened by an intervening shelterbelt hedge that the applicant will maintain. Potential glare at Hanmer and Caldwells Roads will be mitigated by an area of extended backtracking to the south-eastern portion of the site until the planting establishes to a suitable height to prevent glare for a 2.5m eye level.

7.0 MITIGATION MEASURES

27 A consideration with regard to road users is that while any glare should ideally be eliminated, due to the dynamic nature traffic and speed at which they travel means that glare will be momentary if not fleeting as the vehicles pass the geometrical point of reflection. This in itself offers some measure of mitigation.

28 I consider however on top of this that the planned shelterbelts and plantings as well as other measures undertaken such as solar panel tracking together with back-tracking provide sufficient mitigation to reduce glare impacts.

29 This is based on further analysis results which indicate that these measures will reduce the impacts to less than minor.

8.0 SUBMISSIONS

30 Of the submissions reviewed, while many discussed impacts due to solar panels such as potential hazards related to fire hazard, leachates and other environmental impacts, two submitters raised direct concerns with regard to potential glint and glare impacts. I have considered the matters raised and remain of the view that potential solar glint and glare impacts will be less than minor.

9.0 CONCLUSIONS

31 The adverse impacts due to any glint and glare based on my peer review is in line with results from the Boffa Miskell AEE and associated glint and glare assessment. That is, that the overall impact due to glint and glare, once all mitigation measures have been taken into account, will be less than minor for both dwellings and road users.

Rudi Van der Velden : *Engineering Consultant*

March 2024