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5 November 2024

Selwyn District Council
2 Norman Kirk Drive
Rolleston 7614

Attention: Jane Anderson

RC245775 - DARFIELD SOLAR AND ENERGY STORAGE PROJECT NOISE ASSESSMENT PEER REVIEW

Dear Jane

We have been engaged to undertake a peer review of the assessment of noise effects prepared by Styles Group (SG) in relation to a new solar farm and energy storage facility at 1352 Homebush Road, Darfield (the site). Our review is based on the following documents:

1. Resource Consent Application and Assessment of Environmental Effects (AEE) – Mitchell Daysh – 6 November 2024
2. Appendix 08 Assessment of Noise Effects – Styles Group – 27 August 2024
3. Appendix 07 Proposed Conditions - District – Final – Mitchell Daysh

Rather than provide a line-by-line review of the Styles Group assessment, we have focussed on the key issues of the methodology and conclusions.

OPERATIONAL ACTIVITIES

Performance criteria

The appropriate noise limits of the Partially Operative Selwyn District Plan (POSDP) have been identified, namely:

- 50/40 dB $L_{Aeq\ 15min}$ (Day/Night) at or within the boundary of sites in Large Lot Residential Zone (RESZ)(NOISE- REQ1 & NOISE-TABLE5)
- 55/45 dB $L_{Aeq\ 15min}$ (Day/Night) at or within the notional boundary of buildings in the Rural Zone (GRUZ) (NOISE- REQ1 & NOISE-TABLE5)

We note that the POSDP does not provide noise limits for any sensitive location within the Dairy Processing Zone (DPZ) from activities in the Rural Zone (GRUZ)

Calculation methodology

Overall, we are satisfied that the SG report has used appropriate calculation methodologies to determine the sound levels on the surrounding sites. While they have not provided details of all the equipment sound power levels used in their calculations – only a sound power level for the HV transformer has been provided (93 dB L_{WA}) – their predicted noise levels are plausible based on data we have cross referenced from other projects.

We agree with SG's assessment of the sound levels associated with the tracking system's motors of the solar panels and that sound levels from these units will be low, with the overall sound emissions being dominated by other equipment.

SG has applied a 5 decibel penalty for special audible characteristics (SAC) for the HV transformer but not the other equipment; we agree this approach is appropriate. However, once operational, we recommend that commissioning noise monitoring in carried out to confirm if the SG predicted noise levels and SAC assumptions are correct.

Assessment of noise effects

As the activity status of the application is *discretionary* it is appropriate to consider adverse noise effects in the context of the receiving environment, and not just whether the activity will comply with the permitted activity noise standards.

SG has not conducted any ambient noise monitoring of the existing environment. However, we acknowledge that the proximity to a Dairy Factory, SH 73 and the rail corridor, indicates that sound levels surrounding the site will be relatively elevated compared to other rural areas that are more distant from these noise sources.

Given these factors and the calculated sound levels, we agree with SG's assessment that the operational noise emissions from the proposed activity will be reasonable for all receivers.

CONSTRUCTION ACTIVITIES

Performance criteria

SG is correct to highlight that whilst the POSDP provides construction noise limits, it does not indicate where these limits apply or what is meant by the various construction durations. However, we agree with SG's approach to reference the appropriate definitions from New Zealand Standard NZS 6803: 1999 *Acoustics - Construction Noise*. SG has adopted the long-term daytime (07:30 to 18:00) construction noise limits of 70 dB L_{Aeq} and 85 dB L_{AFmax}.

Vibration limits for commercial and residential buildings are provided in NOISE-R14 and TABLE4 of the POSDP. Whilst these limits do not apply exclusively to construction activities, the highest vibration levels are likely to occur during construction. We agree with SG that construction vibration will readily comply with these limits.

Calculated construction noise

With the exception of piling, which is discussed further below, the SG construction noise assessment is generally appropriate. With some minor clarifications, we ultimately agree with SG's recommendations that construction noise effects can be appropriately managed through conditions of consent, including the requirement for a construction noise management plan (CNMP) and appropriate references to NZS6803:1999. We note that SG's proposed wording has not been adopted in the draft consent conditions provided as Appendix 7 to the AEE.

NZS 6803:1999 also provides noise limits for commercial and industrial areas, and we consider that the office building within the Fonterra site should also have a noise limit applied for completeness.

We consider that piling noise has the potential to result in notable adverse effects at the nearest dwellings. Relatively little detail is provided in the AEE about the proposed duration of construction works, but given the size of the site, we expect that several thousand piles will be required and these could take several months to install, with several piling rigs potentially operating at the same time.

In their calculations, SG has used a piling rig sound power level of approximately 111 dB L_{WA} (83 dB L_{Aeq} at a distance of 10 metres). Based on measurements we have conducted at other locations, piling sound power levels in the range 120 to 130 dB L_{WA} are more typical, depending on the pile type and equipment used. Taking the median value of 125 dB L_{WA}, a separation distance of approximately 200 metres will be required to achieve the nominated noise limit of 70 dB L_{Aeq}.

Even with the relatively elevated ambient noise levels at the nearest dwellings to the site, we expect that piling noise will be received at relatively high noise levels at several adjacent dwellings for much of the piling phase. Based on our experience with other construction sites, we consider that the quantity, noise level and duration of percussive piling that is proposed will potentially result in adverse community reaction and requires further justification.

SG alludes to alternative piling technology in their statement:

> "*The CNMP will be used to outline the noise mitigation methods that must be adopted when piling works are in proximity (50m) to the closest receivers to enable compliance with the construction noise limits. Mitigation methods may include use of alternative piling methods (i.e. auger, screw or bored piling), use of screening or completing the works when the building is not occupied*"

We agree with the general tenet of this statement, specifically the requirement to prepare a CNMP and evaluate alternative piling methods to demonstrate that the best practical option has been considered.

However, in light of the low piling noise level used in the SG assessment, the 50 metre 'setback' distance is likely to be too small for establishing communication protocol with residents. Instead, we recommend that communication during construction should be established with Dwellings A, B, C, F & G, as identified in SG's Table 1 as follows:

Table 1 Separation distances to closest receivers

ID	Address	Operational noise: Approximate separation distance from notional boundary to closest noise sources	Construction Noise: Approximate separation distance from closest construction work to building façade
Dwellings inside the DPZ and DPZ Noise Control Overlay			
A	1/3792 West Coast Road	>170m to closest inverters >700m to BESS	≈19m to closest PV panel
B	2/3792 West Coast Road	>300m to closest inverters >600m to BESS	≈110m to closest PV panel
C	4/3792 West Coast Road	>400m to closest inverters >750m to BESS	≈200m to closest PV panel
Loes Road Dwellings			
F	68 Loes Road	>300m to closest inverters >800m to BESS	≈70m to closest PV panel
G	32 Loes Road	>200m to closest inverters >800m to BESS	≈ 50m to closest PV panel

Should consent be granted, we agree with SG that construction noise should be managed and assessed in accordance with NZS 6803: 1999 *Acoustics – Construction Noise*. Inherent in this Standard, is the requirement to adopt the best practicable option (BPO) to ensure noise from the site is minimised. We consider this is best demonstrated through the preparation of a Construction Noise Management Plan (CNMP) which should be submitted to Council for approval before construction commences.

With reference to NZS 6803, we would expect the CNMP to include a discussion of piling methodologies (driven, screw, etc) with respect to factors such as source noise level, efficiency (exposure duration) and practicality. If driven piles are the BPO, mitigation options should be evaluated, such as screening around the hammer and pile head and/or a pile dolly.

If this CNMP process is followed, we consider that construction noise effects will be reasonable.

RECOMMENDATIONS

We have reviewed the draft Conditions of Consent presented in Appendix 7 of the AEE and note these do not reflect all the noise-related conditions recommended by SG.

In Appendix A, we have updated these conditions to reflect the recommendations in the SG assessment, and have provided our additional commentary denoted as 'MDA'.

We trust this information is satisfactory. If you have any further questions please don't hesitate to contact us.

Yours faithfully

MARSHALL DAY ACOUSTICS LTD

Jon Farren
Principal

APPENDIX A AMENDMENTS TO CONDITIONS OF CONSENT

(new text shown in red)

Site Preparation and Construction

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New Condition as per SG condition 3 with suggested text amendments:

Xx Construction activities must be conducted in accordance with NZS 6803: 1999 "Acoustics – Construction Noise" and must comply with the "long-term duration" noise limits contained within Table 2 and Table 3 of that Standard.

10. The CNMP shall include, but not be limited to
    (a) The applicable permitted noise standards
    (b) The programme of works and hours of operation
    (c) Identification of surrounding noise sensitive receivers
    (d) Written communication with occupants of all occupied dwellings or minor dwellings that are within 200 metres of proposed piling works at least ten (10) days prior to the commencement of activities on site. The written advice shall set out:
        i. a brief overview of the construction works.
        ii. the working hours and expected duration,
        iii. an evaluation of piling methodology to demonstrate the Best Practicable Option has been adopted.
        iv. all mitigation measures to be implemented.
        v. the procedure for recording concerns/complaints regarding noise.
        vi. details of the management and mitigation measures required to comply with the relevant noise limits when piling works are undertaken within 200m of any occupied building that has not provided written approval.

~~11. Condition 10(d)vi does not apply if receivers (dwellings or minor dwellings) within 200m of the extent of works provide their written approval to authorise temporary exceedances of the construction noise limits.~~

12. (No changes proposed)

Operational Noise

…

20. (No changes proposed)

21. No later than six weeks prior to commencement of construction of the solar farm, the consent holder shall provide Council with a report setting out an acoustic assessment from a suitably qualified and experienced acoustic expert that demonstrates the selected plant and layout will achieve compliance with the noise limits in Condition 20. The report shall include an assessment of the cumulative sound power levels for all electro-mechanical plant and confirm any proposed mitigation measures that must be incorporated in the layout, design and operation of the activity.

22. New condition
    Within 6 weeks of the project becoming operational, a suitably qualified and experienced acoustic consultant shall perform measurements to confirm compliance with both the daytime and night-time

noise limits in Condition 20. The assessment shall include an objective analysis of any special audible characteristics during the day and at night, in accordance with Appendix B4 of NZS 6802:2008 Acoustics - Environmental Noise.

(a) Should the sound commissioning survey indicate that the noise limits are exceeded, then the mitigation options that will be implemented will be clearly outlined, including timeframes for the completion of these mitigation works.

(b) Following completion of any a mitigation measures, the sound commissioning survey will be repeated and an updated report provided to Council.