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Waitaki Proposal

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RE: ADVERSE EFFECTS ASSESSMENT FOR FAST TRACK APPLICATION

Section 5: Adverse Effects

- *Describe the anticipated and known adverse effects of the project on the environment.*

Potential adverse effects could include.

- Visual and landscape effects
- Glint and Glare / Reflectivity
- Earthworks and land disturbance
- Highly productive land
- Other effects as discussed below.

Landscape and Visual

A landscape assessment will address potential effects in terms of amenity where the site is located, as the wider area supports abundant vegetation patterns.

The development is such that the number of panels required to generate the necessary power output requires a large land area. This land area for development is circa 240ha. The coverage is not contiguous cover in the sense there is spacing between the rows of panels however it is not actual coverage of the ground space as the panels are on support poles and site above the ground. It is the pole supports and the storage pad for the transformer(s) and ancillary equipment, that have contact with the ground.

There are circa 5m spacings between the rows as shown on the concept plan and this therefore enables pasture for sheep or small animal grazing or some form of low height crop to be planted between the rows. For this proposal sheep grazing can be undertaken to control pasture growth and continue a farming system.

The permitted building height within this zone will not be exceeded by the panels nor ancillary equipment therefore reducing potential effects of bulk when viewed from outside the area.

There are six adjoining properties either directly or over roads from the sites. Within these boundaries up to ten residential units which includes farm workers accommodation range between 40 metres and 760 metres from the application site at various points around the entire perimeter. Some of these houses will have limited views of the property due to existing vegetation or screened due to topography of the land.

The proposal's siting, setback from roads and internal boundaries, the retention of existing screen planting including on the wider application site, presence of abundant off-site vegetation patterns within the contextual setting and low heights of the solar panels, reduces any adverse landscape effects to acceptable levels.

The mitigation method to help obscure the solar arrays if required is planting of suitable vegetation along the boundaries to reach minimum heights of 3-4m metres at maturity. The site is not entirely flat but for those residential units closer to the property the effect of the vegetative screening does provide a level of amenity.

Therefore, the visibility of the facility will be low from many vantage points which will be detailed as part of a landscape and visual assessment report.

Glint and Glare / Reflectivity

Solar panels are manufactured with an anti-reflective coating and are built to absorb light. Solar panels have a low reflectance value which can be less than 12%. The table below compares the reflective properties of various features:

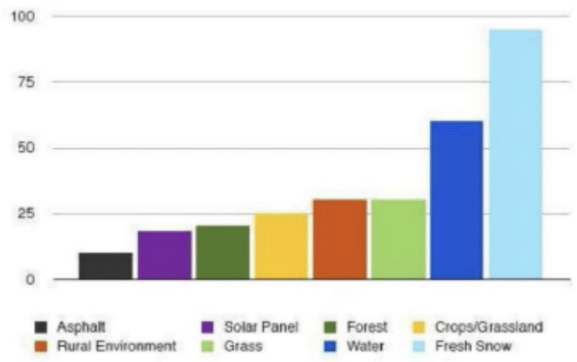

Figure 1: Analysis of typical material reflectivity. (Source: Spaven Consulting, 2011).

The table demonstrates that the reflectivity or glint/glare is less than what would be generated from forest crops/grassland properties.

Land Disturbance and Earthworks

The site clearance will include the removal of any farm buildings and internal farm fencing and gates, vegetation removal (including weeds) except for existing shelter on boundaries.

There will be formation of a new internal access tracking with varying widths of between 4m and 5m.

Earthworks are proposed to drive piles to support the solar panel frames, trench to lay cables connecting the frames of the solar panels together, disturb topsoil to prepare areas for the relocatable buildings and tree planting, including inverters and future battery sites, and spread gravel for forming internal tracks.

A shallow trench of 0.6m to bury electric cables between the rows of cells will keep any disruption to plants and animals to a minimum. A 22KV underground cable that will connect from the inverters to the high voltage cables forming a radial circuit between the transformer(s) and substation(s) will be undertaken.

There is no requirement for large stockpiles and that if any stockpiles are proposed they would be located away from adjoining property boundaries. The internal tracks/accessways would be informal and limited soil scraping is proposed to establish these.

Earthworks can have adverse effects on the quality of water in aquifers and surface waterbodies where contaminants may enter water. This proposal will manage any effects of limited earthworks where it may enter any surface waterway.

Highly Productive Land

The site contains some LUC2-4 classified land which indicates (on a desktop basis) productive potential of the soil.

It is proposed for farming activities to continue through, for example, sheep grazing under and around the panels. It will be possible to design the layout of the solar farm to maximise the ongoing productive potential of the soil resource. Effects on the highly productive land will therefore be able to be managed to the greatest extent practicable.

Other Matters

Electromagnetic fields

There are no radiofrequency, electrical field or magnetic effects associated with solar farms that would exceed NZ guidelines for the public or workers.

The National Policy Statement on Electricity Transmission is an instrument to manage the environmental effects associated with electricity transmission. These apply the 1998 Electromagnetic

Field (EMF) health protection guidelines of the International Commission on Non-Ionizing Radiation Protection (ICNIRP) to manage EMF. The ICNIRP re-issued their guidelines in 2010, revising the public exposure limit for magnetic field from 100 to 200 μT (micro tesla) and NZ Ministry of Health recommend the revised limit.

Based on experience from similar installations, it is expected that the solar farm equipment will have a minimal/negligible effect on EMF readings at the boundary and that the actual EMF readings will be significantly below the 200 μT public limit. Additionally, equipment with potential to generate EMF's will be positioned away from the property boundaries.

Fire Risk

As there are no combustible materials on site the risk of fire is minimal. The equipment will be installed by a qualified solar installer in accordance with applicable AS/NZS standards for safe electrical installations and solar installations:

- AS/NZS 5033:2021 Installation and safety requirements for photovoltaic (PV) arrays
- AS/NZS 3000:2018 Electrical installations - Known as the Australian/New Zealand Wiring Rules

Programmed maintenance will include vegetation control to reduce risk of vegetation fire.

Consultation with Fire and Emergency New Zealand (FENZ) will be undertaken. FENZ have a document itemising "at risk" native and exotic plants where fire risk is concerned. The proposed plants for the screening at this site will not be at risk plants.

Stormwater

The proposal will not affect nor change rainwater runoff patterns. If specific areas are compacted during construction, they will be cultivated to reinstate drainage patterns.

There is a possibility of a discharge to land consent required from Canterbury Regional Council for water falling off the panels and discharging to land. This aspect is therefore proposed to be covered by this application.

Staffing

In terms of staff and employment, construction of the site will require several contracting operators and staff (up to 200) many of whom will ideally be from the local area. Specialist electrical teams will complete the connection of the site to New Zealand and the highest international standards.

Once commissioned the solar farm will create full time equivalent roles (potentially up to 20) for monitoring and maintenance activities. These include site visits for communications, inverter faults,

maintenance on the actuators that tilt the arrays and mechanical cleaning of the panels (which is likely to be undertaken under contract). Otherwise for most if not all other times the site can be monitored and operated remotely. The effects of the hours in relation to the activity is considered insignificant.

Traffic

The proposal is also not expected to impact upon the existing or wider traffic movements over and above those experienced at present. The installation for the facility will generate a level of heavy vehicle and service vehicle movements over the period it will take to establish and commission this facility. This is estimated to be up to 60 movements/day during construction. Construction works for the development will be undertaken potentially in stages, and total construction time may take up to eighteen-month-two years before fully completed following consent approvals.

After establishment, vehicle movements will be intermittent and include only maintenance and service vehicle and management and staff as required for the operation of the facility. In terms of vehicle movements and associated noise that will occur with the proposal, in general, on-site activity is limited to the movement of those vehicles associated with establishing, maintaining, and monitoring the facility the intensity of movement is often sporadic.

As such, there is no formal on-site car parking required for office administration and management requirements.

Noise

The Waitaki District Plan seeks to control noise where an activity will impact upon either residential dwellings or at property boundaries.

Other than vehicle movements on and around the site, the balance of any noise related activities would be construction and predominantly the installation of the piling supports for the PV panels on the site and support buildings and infrastructure installation.

The other possible noise source would be the transformer(s). The standard sound level of a 2500kVA transformer is typically 71dB. It is considered this sound level is between conversation level and the sound of a car driving along a road as a comparable sound. The noise from the transformer is best described as a humming sound (maximum 71dB at 1m distance); this is positioned within the site, and it is unlikely it will be heard from the outside, particularly for the closest residential units.

Based on central positioning of transformer(s) and inverter stations, that noise level and distance to boundaries and residential units both daytime and nighttime noise will be compliant with District Plan noise standards therefore, noise emanating from the application site is considered to be a minimal effect.

As to construction, the main construction-related noise is piling. This noise would be like that of installing fence posts or strainers or likened to that of a vineyard establishment where multiple support posts are driven into the ground to support establishment of vines. It is temporary noise during normal working daylight hours and an accepted part of work in a rural environment.

Other than that noise would be intermittent and limited to vehicle movements on a day-to-day basis.

Construction will occur during daylight hours during the usual working week.

Once commissioned the hours of operation are not considered as needing to be restricted by any means and the applicant requires access on any given days including a Sunday or Public Holiday if required.

The effects of ambient noise from the surrounding road network and the general environment from farming activities would all contribute to lessening any impact of any noise from the site itself.

Dust

Potential dust effects will be limited to no effects from dust nuisance generated from this site. However, the effect of dust onto the PV units over time, could be considered a type of reverse sensitivity effect however the dust generator in this instance would be road dust and/or potential effects of windblown soils from adjoining farmlands. The existing and proposed screening will assist in minimising the impact of dust on the site.

Shading of solar panels due to soiling is divided in two categories, namely, soft shading such as air pollution, and hard shading which occurs when a solid such as accumulated dust or bird droppings block the sunlight. This can be overcome with regular maintenance and cleaning of the solar panels as required using online monitoring.

Overtime the land uses have heavily increased to utilise water to irrigate pasture. This in turn due to the high level of dairy farming in the area has resulted in a lot more arable land area turned to pastoral farming which reduces dust from wind-blown erosion.

Reverse Sensitivity

It is not anticipated or likely that there will be any adverse effects from this activity operating on-site and then the operator having issues about effects from other activities in the vicinity. The existing farming activities in the vicinity pose limited or less than minor effects for the applicant's development and nor would the applicant take issue with any existing activities.

The applicant would not be seeking to undertake this operation or proposal if they had already experienced effects from existing activities in the vicinity of the site that are likely to cause an unpleasant working environment.

Overall, there are little to no adverse effects that are anticipated to arise because of the proposed development.

Natural Hazards

There is no flooding nor hazard notation on the District Plan maps to indicate significant issues.

Under the Draft Waitaki District Plan there is some reference on the Planning Maps to show liquefaction susceptibility on the lower land close to the road. There are no specific details around this for the site.

The lower area of the site is also part of the wider Waitaki Floodplain however considering the location of the site some 900m from the Waitaki riverbed at its closest point it is hard to anticipate significant water depth from any large event from the river affecting the solar arrays.

The facilities are located above the ground level with the supporting poles. The ancillary equipment such as inverters and transformer(s) are raised above ground level so anticipated to be above any localised flood level.

The Draft Waitaki District Plan does not have any legal effect currently.

Cultural Effects

The application site does not contain any site of significance to Tangata Whenua based on District Plan information to the applicant's knowledge.

There is an archaeological feature being a "rock shelter" held within Section 51 Block III Awamoko Survey District. This is a small feature on the land and will be avoided by the applicant during development.

It is anticipated that an accidental discovery protocol condition or advice note may be imposed should this application be approved.