



# Balmoral Solar Array

Resource Consent Application and Assessment of Environmental Effects

Prepared for Andrew William Simpson and Karen  
Frances Simpson




5 May 2022



## Document Quality Assurance

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# 1.0 Introduction

The purpose of this document is to provide a comprehensive planning application and assessment of actual and potential effects in relation to the construction and operation of a solar array on Braemar Road, Balmoral Station, Tekapo.

This AEE sets out:

- the full name and address of the owner/occupier of the site:
- a description of the site at which the activity is to occur:
- a description of the activity:
- an assessment of the activity:
  - against relevant objectives, policies, or rules in planning documents;
  - in terms of its effects on the environment; and
  - against any relevant provisions of a document referred to in section 104(1)(b).

An AEE is required to accompany any application for resource consent under Section 88 of the Resource Management Act 1991 (RMA). This AEE has been prepared in accordance with the Fourth Schedule of the RMA, covering those matters of relevance identified in the Canterbury Regional Policy Statement, the Mackenzie District Plan and other relevant statutory documents.

## 2.0 Applicant and Property Details

Completed application forms are enclosed as **Appendix 1**.

The summary details relating to the applicant and subject site are as follows:

To:	Mackenzie District Council.
Applicant Names:	Andrew William Simpson and Karen Frances Simpson Balmoral Station Tekapo.
Address for Service:	Boffa Miskell Ltd PO Box 110, Christchurch 8140 Attn: Claire Kelly Phone: 03 353 7561 Email: <a href="mailto:clairek@boffamiskell.co.nz">clairek@boffamiskell.co.nz</a>
Address for Fees:	Andrew William Simpson and Karen Frances Simpson PO Box 3 Lake Tekapo 7945 New Zealand.
Site Address:	397 Braemar Road Balmoral Station Lake Tekapo.
Legal Description:	Part Run 344 (refer to <b>Appendix 2</b> ) Situated in Block V11, V111, X1, X11, X11, XV, XV1 and XV11 Jollie, 11 and 1V Pukaki, 1 Burke and X111 Tekapo Survey Districts CB529/21.  Leased under s83 Land Act 1948.
Owner/Occupier Name and Address:	<u>Owner</u> Land Information New Zealand Crown Property Christchurch Crown Property Christchurch (Pastoral) Private Bag 4721 Christchurch 8140.  <u>Occupier</u> Andrew William Simpson and Karen Frances Simpson Balmoral Station Tekapo.
Site Area:	Approximately 113ha.
District Plan Zoning:	Rural.
Designations / Limitations:	None.



### 3.0 Site Selection

Andrew William Simpson and Karen Frances Simpson (the Applicant) have proposed for several years to establish a solar array on Balmoral Station and had identified a site, which would not reduce the area available for primary production, in particular stock finishing.

This site (hereafter referred to as Site A) is identified on *Figure 1* below.



*Figure 1: Approximate location of Site A*

However, Site A forms part of an important glacial outwash plain. It also supports significant ecological values, meeting the criteria in the Canterbury Regional Policy Statement (CRPS) as a priority for protection as 'Indigenous vegetation in land environments where less than 20% of the original Indigenous vegetation cover remains' and 'Areas of indigenous vegetation located in "originally rare" terrestrial ecosystem types'.

The Applicant faced very strong guidance from Mike Harding (Mackenzie District Council's (MDC) ecologist at that time) to look at alternative sites as he considered that it was not possible to achieve 'no net loss', and definitely not a 'net gain' in indigenous biodiversity values. Put simply, it is not possible to 'recreate' this land environment (glacial outwash plain) and the indigenous vegetation that grows upon it.

Graham Densem (MDC's landscape planner) also expressed concerns about potential adverse effects on the values of the outstanding natural landscape given that the site is highly visible including from Mt John and the solar array would dissect a geological feature.

As such, the Applicant concluded that it would be preferable from an ecological and landscape perspective to consider alternative sites. However, the number of suitable sites on Balmoral Station is limited due to several factors including, but not limited to:

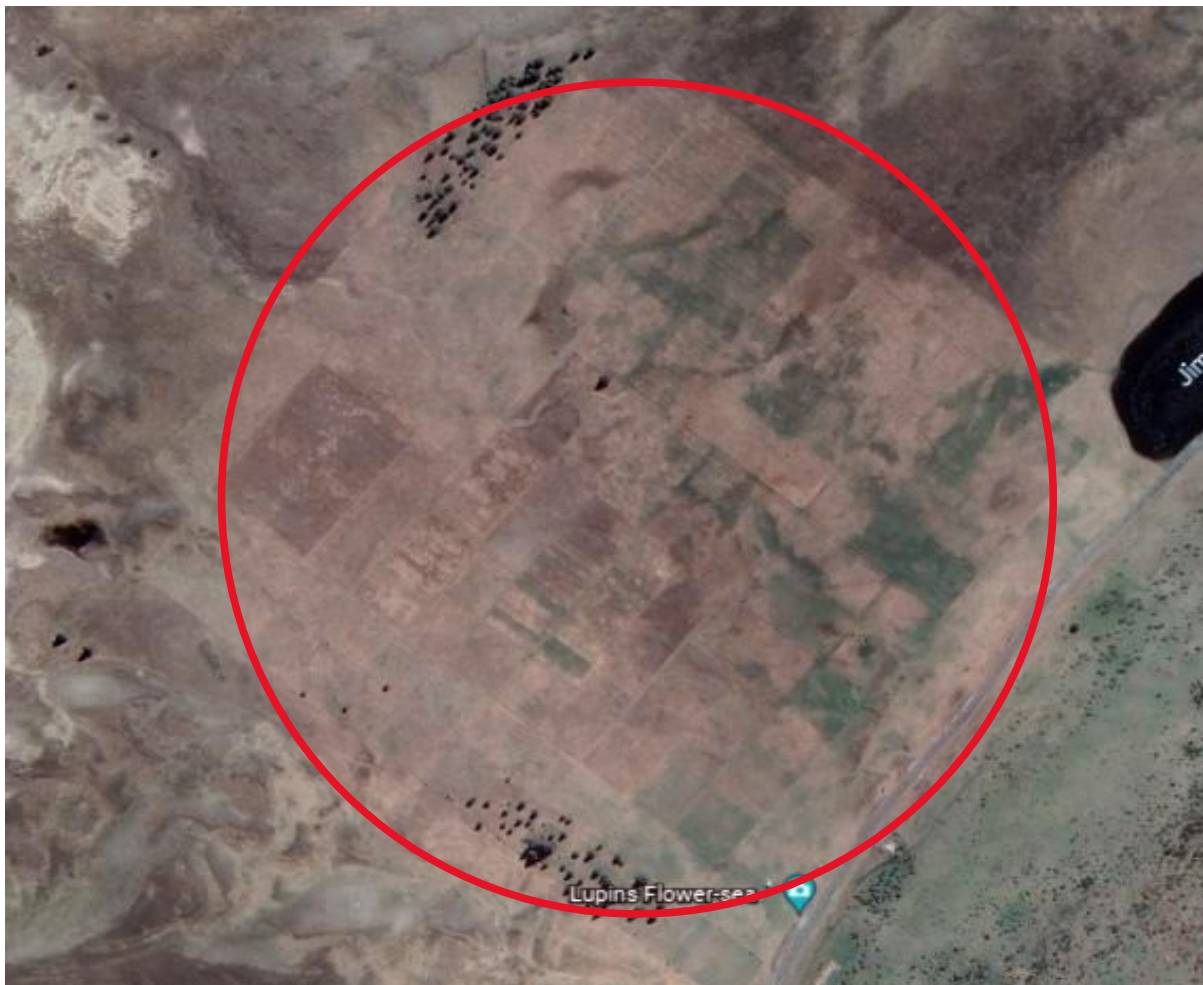
- Many areas support significant indigenous vegetation (as defined in accordance with the criteria in the CRPS).



- There are extensive areas where less than 20% of the original Indigenous vegetation cover remains.
- The high visibility of many areas from public viewing points including Mt John.
- The high likelihood of significant adverse effects on the values of the outstanding natural landscape of Te Manahuna (Mackenzie Basin).
- The need to connect, with relative ease, to existing electricity transmission infrastructure.
- The retention of land that is suitable for primary production including irrigation and stock finishing.

Therefore, careful thought and consideration was given to choosing another site for the proposed solar array, having regard to the factors identified above. Consequently, only two sites were identified: Sites B and C.

Site B (*Figure 2*) is a freehold site owned by the Applicants. It is located at the foot of Mt John and was used as an AgResearch site, being fenced into blocks that have been planted with different crops. It is smaller than either Site A or Site C and is visible from Mt John and Godleys Peak Road. It has no natural screening and two small areas of established trees.



*Figure 2: Approximate location of Site B*

Site C (*Figure 3*) is located on Braemar Road and is crown pastoral land leased under s83 Land Act 1948. It is screened by a well-established shelterbelt and is also used for farming, being mainly pastoral activities.



*Figure 3: Approximate location of Site C*

Site C (the Site) was selected as the preferred site because it was initially perceived to have the following qualities:

- good access for construction and maintenance vehicles: the Site adjoins Braemar Road along its northern boundary.
- excellent proximity to a grid connection point: a 33kV line (part of the local line network) runs down the opposite side of Braemar Road.
- a relatively flat topography, meaning that earthworks are likely to be limited in scale and extent.
- a mature shelterbelt (15-20m in height) along all its boundaries, which may limit views of the Site from Braemar Road, and its position behind Old Man Range means that it is unlikely to be visible from public viewing points.
- a presumed dominance of exotic/pasture species, due to the historic use of the Site for primary production (cultivation, application of fertiliser, sowing of seed and planting of a shelter belt).

However, the Site is Crown Pastoral Lease and the proposed solar array will not meet the conditions of the current pastoral lease that gives the Applicant the right to cultivate, sow seed, top-dress, apply fertiliser and plant a shelterbelt i.e. pastoral/agricultural activity. Therefore, the Applicant has prepared and lodged an application with LINZ/ Crown Property to obtain an easement over the Site to establish the solar array, which is currently in the latter stages of being considered.

## 4.0 The Reasons for the Proposal

### 4.1 The Simpson Family

The Simpson family are fourth generation Tekapo farmers, with a passion for Te Manahuna (the Mackenzie Basin). They view themselves as custodians of the land and have been involved in conservation type projects such as fencing off 180 hectares, followed by a further 220 hectares of significant ecological areas. These have proved a useful comparison between 'conserved' land and land that is farmed in terms of understanding the ecological impacts of farming activities.

The family business today, encompasses farming (mainly beef and sheep), visitor accommodation, horse trekking and residential development, and is carbon positive because of forestry blocks established on more than 500ha of land between Tekapo and Pukaki. As such, solar generation is seen as a fitting extension of this sustainable investment commitment.

The family's vision is to "create an environmentally and economically diverse business for the benefit of future generations and our community". In pursuit of that vision, the Simpson family has engaged with Infratec New Zealand Limited (Infratec) to investigate and develop plans for a major solar array on land leased by the Applicant.

### 4.2 Infratec

Infratec is a leading renewable energy EPC (engineer, procure, construct) and project developer in the New Zealand market, with extensive experience on similar projects in New Zealand, the Pacific and ASEAN regions. The core business of Infratec is the design, procurement and installation of solar photovoltaic, battery storage, microgrids and high voltage networks, ground-mount systems, and utility scale plants.

### 4.3 Relationship with Government Direction and Policy

A new domestic emissions reduction target by 2050 was set into law with the Climate Change Response (Zero Carbon) Amendment Act in November 2019. This Act provides a framework by which New Zealand can develop and implement clear and stable climate change policies that:

- contribute to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5° Celsius above pre-industrial levels.
- allow New Zealand to prepare for, and adapt to, the effects of climate change.

The changes do four key things:

- set a new domestic greenhouse gas emissions reduction target for New Zealand to:
  - reduce net emissions of all greenhouse gases (except biogenic methane) to zero by 2050.
  - reduce emissions of biogenic methane to 24–47 per cent below 2017 levels by 2050, including to 10 per cent below 2017 levels by 2030.
- establish a system of emissions budgets to act as stepping-stones towards the long-term target.

- require the Government to develop and implement policies for climate change adaptation and mitigation.
- establish a new, independent Climate Change Commission to provide expert advice and monitoring to help keep successive governments on track to meeting long-term goals.

This proposal aligns with the move towards decarbonisation, and a decrease in the generation of greenhouse gases and improved sustainability. This coupled with cost efficiencies in renewable generation and an increase in the consumption of energy, is driving rapid growth in renewable and alternative generation. Solar power is on the rise across New Zealand, with decreasing cost and steadily improving performance leading to increasing interest in grid and network connected solar arrays.

Furthermore, the Mackenzie District has been identified as one of the most promising areas in New Zealand for solar generation, with long sunshine hours, limited shading and a high clear sky index, along with good proximity to the national electricity transmission network (National Grid).

## 5.0 Description of the Site and Surrounding Area

### 5.1 The Site

The Site is located on Braemar Road, Tekapo at approximately 850m above sea level and lies approximately 9km to the northwest of the Tekapo township. The Site is comprised of two areas known as Cattle Yard and Tom's Paddock and is approximately 113ha in area. It has an established shelterbelt of pine trees along all its boundaries, with small gaps for vehicle access and where a perennial wetland flows through and out of the Site. There is also a wetland in the southwest corner of the Site.

The topography is gently undulating with hummocks and low-lying areas where water is retained after heavy rainfall events.

The Site is Crown Pastoral Lease and the Applicant has the right to cultivate, sow seed, top-dress, apply fertiliser and plant a shelterbelt. To date, the Site has been used for grazing sheep and beef cattle during the winter months.

### 5.2 The Surrounding Area

The Site is in the heart of Te Manahuna (the Mackenzie Basin), an outstanding natural landscape that is valued by its residents, New Zealanders and visitors alike. The land surrounding the Site is typical of that found in Te Manahuna (the Mackenzie Basin), being dry, tussock grassland that is used for grazing with a very low density of built development (outside of the main settlements) and some scattered blocks of forestry. The Braemar Road rock glacier (a Geopreservation Site) lies to the northeast.

To the immediate north of Braemar Road, the land is used by the New Zealand Defence Force (NZDF) and is designated for this purpose. Land to the south of the Site falls away to become lower lying with the Old Man wetland to the south, before the land rises steeply to the Old Man Range, a distinctive rounded feature in the immediate area. Approximately 1.85km to the east is Balmoral Homestead and 4.5km to the southeast is a NZDF facility that is accessed off SH8.

An Alpine Energy transmission line (33kV) runs to the north of the Site that terminates at Mt Cook. SH8, which connects Tekapo to Twizel is the main road in the area, lying approximately 4.8km to the southeast of the Site at its nearest point.

## 6.0 Description of the Proposal

It is proposed to construct a solar array with a maximum generation capacity of approximately 88MW at Braemar Road, Tekapo. The proposed solar array will be developed in two phases:

Phase	Megawatt-peak capacity	Area (approx.)	Length of construction period	Date when construction commences
1	12MWp	13.5ha	9 months	2023.
2	76MW	86ha	18 months	Subject to the cost, time and planning considerations of network upgrades to both Transpower and Alpine Energy infrastructure.

Phase 1 will cover that part of the Site shown in pink on the Site Plan in **Appendix 3**. In real terms, over the course of a year this will produce enough electricity to power 2,800 households, equivalent to around 70% of the Tekapo township.

Phase 2 will cover the balance of the Site as shown on the Site Plan in **Appendix 3** but will be constructed in 3 blocks, hereafter referred to as Block 1, Block 2 and Block 3.

This application seeks consent for the entirety of Phase 1 and Phase 2.

### 6.1 Overview

The Solar Array will comprise:

- PV array modules – Phase 1 will contain approximately 20,000 bifacial PV modules and Phase 2 will contain approximately 114,940 bifacial PV modules. In total, there will be 134,940 modules. These modules generate electricity on both sides, allowing for direct and reflected light to be captured and harnessed.
- Perimeter security fencing.
- 2 new underground lines connecting the Site to the transmission network.
- 17 Central Inverter Skid Units.
- Two MV Export Switchgear and storage areas.
- Internal tracks, parking and laydown area.

### 6.2 PV Modules

Each bifacial PV module will be approximately 2.4m by 1.3m and will be mounted on framing that will be typically supported by a single line of C-section galvanised steel piles. The piles will be driven approximately 1.6m into the ground (depending on geotechnical conditions). The modules will be

angled to achieve maximum efficiency, whilst also recognising the need to manage effects on landscape values and will generally be at least 1m above ground level. However, irregular changes in ground levels may mean this is slightly encroached in certain spots however this will be the exception to the rule. A concept elevation depicting typical mounted PV modules can be found in **Appendix 4a**, which also shows the layout of the modules. The modules will be erected in rows to form arrays: each array contains two rows of modules and will be approximately 4.6m in width.

Whilst the modules may appear to form a continuous area, actual ground coverage will be approximately 40% (48ha) by area. The proposed layout will provide approximately 4.9m between each array to provide access for maintenance and replacement (if required) and 4 access tracks of approximately 4m in width that will enable vehicle access as shown on the Site Plan in **Appendix 3**. The modules will be setback approximately 10m from the shelterbelts and at least 24m from the edge of the wetlands, which includes a 4m strip for light vehicles i.e. quad bikes to access the modules.

The PV modules will likely have a 20-year life and then need to be replaced at that time or earlier if there are significant advancements in technology. However, it is intended that the solar array will operate on the Site in perpetuity.

## 6.3 Operation of the Array

The electricity will be collected from each module, passing through cables. The voltage at this point is typically around 1500V. The power will then be routed to MV inverters which convert the direct current generated by the solar modules into alternating current which can be fed into the electricity grid. The inverters will also manage the amount of electricity entering the grid to ensure the system does not get overloaded. A further series of high voltage AC cables will then carry the electricity to the MV export switchgear unit comprised of electrical disconnect switches, fuses or circuit breakers used to control, protect and isolate electrical equipment. The switchgear is used to both de-energize equipment to allow maintenance or replacement work, and to disconnect the solar array from the electrical network if there is a fault.

To connect the part of Phase 2 west of the central wetland to the switchgear unit in the northeast corner of the Site, it is proposed to run an underground cable out of the Site and along Braemar Road to avoid the central wetland. It is acknowledged that this will require approval from MDC'S Roadway Department.

## 6.4 Buildings

### 6.4.1 Permanent

It is proposed to install inverters in weather resistant housings on a single ISO 20' or 40' container skid (2.5m wide x 2-3m in height x 7-8m in length) sitting on a reinforced concrete slab.

The inverter's main job will be to convert DC power produced by the solar array into usable AC power. However, they will also enable monitoring from afar, so Infratec can see how the system is performing and can provide diagnostic information to help operation and maintenance crews identify and fix system issues. These important components are also increasingly taking on decision-making and control functions to help improve grid stability and efficiency as well as responsibility for battery management.



It is expected that in Phase 1 there will be approximately 2 of these, with a further 15 (approximately) being required for Phase 2.



Figure 4: Photograph of HEMK MV skid gen 3

The MV Export switchgear and storage facility is typically a prefabricated building the size of a two 40' containers side-by-side, so approx. 5m in width x 12m in length, which sit on a reinforced concrete slab. This will be located near the connection points to the local network, as shown on the Site Plan attached in **Appendix 3**.



Figure 5: Photograph of MV Export switchgear and storage facility

A permanent site storage facility comprising a 20ft or 40ft container or kit set building may also be installed on-site to provide simple office facilities, storage and welfare facilities.

Overall, permanent site coverage will be approximately 41% (48.5ha).

#### 6.4.2 Temporary structures

During the construction of Phase 1, a temporary site office will be established in a converted shipping container or similar, as well as temporary amenities for staff such as self-contained toilets and a break area. These will be located in a temporary laydown area that will be located close to the entrance to the Site as identified in light blue on the Site Plan in **Appendix 3**.

During construction there will 15-20 40' shipping containers in the site temporary laydown area, for receiving stock of piles, framing, PV modules and cable.

These buildings/containers will be removed after the completion of Phase 1 and solar modules erected within the laydown area.

This process will be repeated for Phase 2, with laydown area being identified on the Site Plan in **Appendix 3**.

#### 6.4.3 Fencing

Phase 1 will be surrounded by a 2.4m tall chain-link, fence with gates at each access point, throughout its construction and operation. This will be extended around the entire Site when Phase 2 is constructed. The fence will be located within the Site and screened by the existing shelterbelts.

All the wetland areas will be fenced as shown on the Site Plan in **Appendix 3** as part of Phase 1 with a stock and rabbit-proof fence, which will be setback at least 20m from the edge of the wetlands. An initial rabbit and hare knock-down (and follow-up surveillance / control) will be employed following site establishment, to eliminate and exclude rabbits and hares from the wetland and setback areas.

### 6.5 Water

It is intended to truck potable water to the Site to meet drinking water demands for construction workers and staff as required. An above ground water tank, with a capacity of up to 5,000L will be situated on the site adjacent to the Site Office, to be constructed during Phase 1, to provide drinking water and service the ablutions. The water tank will be filled with potable water offsite and trucked to the Site as required.

The temporary site office and staffroom will be self-contained having a surface effluent tank (2,700L capacity) that will be emptied as required, via a truck that will take sewerage offsite to be disposed of appropriately at an authorised facility.

### 6.6 Earthworks

The proposal (Phase 1 and 2) will require a total volume of 13,074m<sup>3</sup> over a total area of 27,372m<sup>2</sup> (2.74ha or 2.4% of the Site) of earthworks to:

- provide a flat platform for structures, parking for 9 cars and the laydown areas of approximately 25m x 50m, and
- create internal roads; and
- minor levelling works within the array area; and
- create trenches or reticulation of DC and AC cables between modules, inverters, transformers and to the grid connection. These will be backfilled once work is complete and allowed to revegetate.

Draft trenching and access track cross sections can be found in **Appendix 4b**.

The piles for the modules will be driven and therefore there are no 'earthworks' required as there will be no cutting, filling or displacement of earth.

The volumes and area per phase are set out below:

Phase	Volume	Area
1	3,096m <sup>3</sup>	6,298m <sup>2</sup>
2	Block 1: 3,903.96m <sup>3</sup> Block 2: 2,777.28m <sup>3</sup> Block 3: 3,296.76m <sup>3</sup> Total = 9,978m <sup>3</sup>	Block 1: 7,961.65m <sup>2</sup> Block 2: 6,046.05m <sup>2</sup> Block 3: 7,066.30m <sup>2</sup> Total: 21,074m <sup>2</sup>
<b>Total</b>	<b>13,074m<sup>3</sup></b>	<b>27,372m<sup>2</sup></b>

The minimum depth of cut will be 0.2m and the maximum depth of cut will be 1m, associated with the digging of trenches.

Earthworks will be setback at least 20m from the wetlands on the Site. A swale drain will also be created along each of the access tracks to channel surface water run-off and keep it away from the works/array area and wetlands. These measures will form part of an Erosion and Sediment Control Plan (ESCP) that will be prepared and implemented to ensure potential adverse effects are avoided or mitigated as much as practicable. The general principles that will be adopted during the earthworks activities and incorporated in the ESCP reflect the scale of the works and are as follows:

- Minimise the disturbance area due to earthwork activities as far as practicable, noting that Phase 1 and Phase 2 will be undertaken years apart, while satisfying all requirements for construction of the Site.
- Progressively stabilise exposed areas following completion.
- Divert all clean water runoff away from exposed earthworks areas, to minimise the risk of sediment entering the wetlands.
- Intercept sediment-laden runoff (as required) from exposed areas with sediment retention ponds to provide filtration and retention of sediment prior to discharging to land.
- Regularly inspect the erosion and sediment control measures and undertake any maintenance necessary to maximise the potential retention of sediment on the Site.

- If necessary, earthwork activities may be limited in specific areas during periods of high wind and rainfall.
- Ongoing assessment of the erosion and sediment control measures and, if required, adjustments as the work progresses.
- Ensure site staff are aware of the requirements of the ESCP and the relevant resource consent conditions prior to the works commencing.
- Ensure that after hours contact details are available.
- Dust will be controlled through the use of water trucks, if required, to ensure no offensive or objectionable effects beyond the site boundary.

These principles are generally in accordance with the Environment Canterbury (ECan) Erosion and Sediment Control Online Toolbox for erosion and sediment control.

Furthermore, the earthworks contract developed for the Site will place specific responsibilities on the contractor for the environmental management of the Site. As part of this management, the contractor will be responsible for providing and maintaining adequate erosion and sediment control measures to protect the wetlands.

## 6.7 Vegetation clearance

It is understood that the area of vegetation that will need to be cleared is 2.7ha given that the modules will sit above the ground.

In summary, the proposal will result in the following loss of vegetation clearance:

Phase	Permanent Loss	Temporary Loss
1	3,746m <sup>2</sup>	2,553m <sup>2</sup>
2	9,671m <sup>2</sup>	11,404m <sup>2</sup>
<b>Total</b>	<b>13,416m<sup>2</sup></b>	<b>13,956m<sup>2</sup></b>

However, adopting the precautionary principle, it has been assumed that the shading of vegetation, especially indigenous vegetation, may lead to a loss of species and diversity. Conversely, there is evidence that exotic/pasture species will benefit from shading, which will enable the Site to be used for pastoral activities. It is therefore difficult to quantify the exact extent of vegetation loss, but permanent vegetation clearance associated with construction activities such as earthworks (not shading) will be approximately 13,416m<sup>2</sup> (1.2% of the Site). However, all vegetation clearance, loss and potential changes to species and diversity have been assessed.

It is not proposed to undertake vegetation clearance, earthworks or construct modules within 20m of the wetlands on the Site. However, it is proposed to remove several existing crack willow trees and surveillance for (and elimination of) several key weed species will occur within wetland / setback areas (Russell lupin, scotch broom, gorse, lotus, sweet briar, and all exotic trees e.g., willow, conifer, poplar and birch species).

## 6.8 Vehicle Crossings, tracks and hardstanding

There are two vehicle crossings to the Site that will be retained as shown on the Site Plan in **Appendix 3**. It is proposed to establish a further 4 vehicle crossings that will provide direct access from Braemar Road to four internal tracks thus minimising the need for tracks and associated vegetation clearance and earthworks within the Site. The vehicle accesses will be formed to MDC standards.

Four permanent gravel tracks will be constructed in a north/south direction across the Site to provide for the construction of the array and access by staff for on-going maintenance. Aggregate will also be needed to create hardstanding in the laydown areas, and concrete may be required to create foundations for the inverters and fencing.

## 6.9 Traffic Generation

During construction of each stage, approximately twenty light vehicle trips will be required to and from the Site each day with staff entering and leaving the Site.

Delivery of materials (including aggregate for tracks, inverters and containers, and the construction materials for the solar arrays) will be made using heavy goods vehicles. Other equipment will be required at times e.g. pile driving machinery. The numbers and scale of vehicles will range depending on the deliveries and will require up to 8 heavy vehicle movements per day at times during the construction period.

The majority of vehicle movements will be associated with the construction of the solar array as the Site is generally passive and operates without permanent staff. However, there will be the occasional need for maintenance or repair engineers to visit the Site to undertake routine or emergency works. It is anticipated that only 1 - 2 staff will need to visit the Site approximately once a month. This will equate to around four vehicle trips per month when staff visit the site to check the solar array is operating as it should and carry out any maintenance.

## 6.10 Storage and Use of Hazardous Substances

Some fuel storage for machinery will be required during construction but will comply with all HSNO requirements including bunding storage areas and having spillage kits on Site. No fuel or chemicals will be stored on the Site once construction is complete.

Oil-filled Transformers remaining on the Site will be fully bunded as per AS NZS standards and good industry practice.

## 6.11 33kV underground power lines

The project will require two new connections to the existing 33kV electricity network. Two underground lines, cumulatively 350m in length, are proposed to connect the Site to the existing Alpine Energy 33kV network at Braemar Road. One will be associated with Phase 1 and located at the northwest corner of the Site and the other with Phase 2 and located at the northeast corner of the Site.

## 6.12 Primary Production

The Site will continue to be used for pastoral activities, likely grazing sheep, as they can walk under and amongst the modules without damaging them, but all cattle grazing will cease. All grazing will be fully excluded from a 10.5 ha 'central wetland' area (which includes a  $\geq 20$  m setback of existing dry pasture / short tussockland and from two other 'southwest wetlands' (4.0 ha in total) in the southwest corner of the Site (including dryland setback as above), by means of an internal stock and rabbit-proof fence. This means 14.5 ha of the c.113 ha site that is currently grazed by cattle will no longer be grazed at all. Aerial over sowing and top-dressing will also cease in the wetlands and setback areas but may continue in other areas of the Site. This will occur as part of Phase 1.

Once Phase 2 construction commences, the Site may be fertilised, with machinery being able to access between the rows of modules, although a hand or more manual approach may be required to fertiliser under the modules. However, fertiliser may not be required at all, depending on the rate of growth achieved when the land is sheltered from the worst of the Mackenzie weather.

## 7.0 Reasons for the Application

The following section discusses the applicable definitions and activity status applicable to each aspect of the application. A full statutory assessment can be found in **Appendix 5**.

Resource consent for the following activities have been sought from the Canterbury Regional Council: Earthworks.

### 7.1 National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health

The National Environment Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) states that the NES applies when a person wants to sample the soil on a piece of land, disturb the soil of the piece of land, or change the use of the piece of land, which means changing it to a use that is reasonably likely to harm human health, if the piece of land (subclause 7):

- *has an activity or industry described in the Hazardous Activities and Industries List (HAIL) being undertaken on it, or*
- *an activity or industry described in the HAIL has been undertaken on it, or*
- *it is more likely than not that an activity or industry described in the HAIL is being or has been undertaken on it.*

The following activities, of relevance, are listed in HAIL:

#### A Chemical manufacture, application and bulk storage

1. *Agrichemicals including commercial premises used by spray contractors for filling, storing or washing out tanks for agrichemical application.*
6. *Fertiliser manufacture or bulk storage.*
8. *Livestock dip or spray race operations.*
10. *Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds*
17. *Storage tanks or drums for fuel, chemicals or liquid waste.*

Firstly, it needs to be determined if a HAIL activity is occurring, has or is likely to have, occurred within the Site. An analysis of aerial photographs and the knowledge of the Applicant provides no evidence of the manufacture, bulk storage of agrichemicals, fertiliser manufacture or bulk storage, livestock dip or spray race operations or persistent pesticide bulk storage or use. However, given that the Site was, and will continue to be used, as production land for grazing, it is likely that agrichemicals (fertilisers) were/will continue to be applied to the land. It can therefore be concluded that a HAIL activity has and will continue to occur on the Site.

Clause 8 states that if a piece of land described in subclause (7) is production land, these regulations apply if the person wants to—

Activity	Comment
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(a)remove a fuel storage system from the piece of land or replace a fuel storage system in or on the piece of land:	It is not proposed to remove a fuel storage system.
(b)sample or disturb—  (i)soil under existing residential buildings on the piece of land:  (ii)soil used for the farmhouse garden or other residential purposes in the immediate vicinity of existing residential buildings:  (iii)soil that would be under proposed residential buildings on the piece of land:  (iv)soil that would be used for the farmhouse garden or other residential purposes in the immediate vicinity of proposed residential buildings:	There is not and never has been residential buildings on the Site.
(c)subdivide land in a way that causes the piece of land to stop being production land:	It is not proposed to subdivide the Site.
(d)change the use of the piece of land in a way that causes the piece of land to stop being production land.	It is noted that the land will not stop being production land as it will be used for sheep grazing.

Consequently, it is considered that Site is not subject to the provisions of the NES and therefore no consent is required.

## 7.2 Mackenzie District Plan

The Mackenzie District Plan (MDP) seeks to achieve the sustainable management of natural and physical resources but with a focus on land uses such activities as: the development of utilities, earthworks, and the clearance of vegetation.

### 7.2.1 Utilities

Section 16 of the MDP contains the utility rules, which ‘take precedence over any other rules that may apply to utilities in the District Plan unless specifically stated to the contrary’. Therefore, these rules take precedence over the Rural Zone rules, except Rule 15.2.1.j which stipulates that the construction, commissioning and operation of power generation facilities outputting more than 25 kilowatts is a Discretionary Activity.

#### 7.2.1.1 Definitions

Facilities, structures and works necessary for, incidental to, and associated with providing the following:

- The generation and transmission of energy:

- *Transportation networks and navigational aids;*
- *The storage, treatment and conveyance of water and sewage;*
- *The disposal of waste;*
- *Radiocommunications and telecommunications;*
- *The protection of the community from natural hazards; and*
- *Monitoring and observations of weather.*

*The PV Array Modules are also classified as a Building in the District Plan which is defined as:*

*Any structure or part of a structure whether temporary or permanent, movable or immovable but does not include:*

- *Any scaffolding or falsework erected temporarily for maintenance or construction purposes;*
- *Fences, walls or retaining walls of 2m in height or less not used for advertising or for any purposes other than as a fence, retaining wall or wall;*
- *Structures less than 5m<sup>2</sup> and in addition less than 2m in height; (The PV Array Modules will be greater than 5m<sup>2</sup> and will exceed 2m in height);*
- *Masts, poles, radio and television aerials less than 7m in height;*
- *Any vehicle, trailer, tent, caravan or boat whether fixed or movable.*

Mackenzie District Council has confirmed that:

- the solar array is defined as a Utility. The proposed solar modules, roading, earthworks, permanent office, permanent switchgear containers and temporary shipping containers are included in the definition as ‘*facilities, structures and works necessary for the generation and transmission of energy.*’; and
- the new transmission lines required to connect to the existing 33kV line that runs to Mt Cook are also defined as Utilities.

#### 7.2.1.2 Rules

In summary, consent is required for the following activities:

Rule	Activity	Status
Section 15		
15.1.1.j Power Generation Facilities.	Construction, commissioning and operation of power generation facilities outputting up to 25 kilowatts outside the areas scheduled under Rule 13 above.	Discretionary.
Section 16		
1.5 a	Utility buildings (including the PV array modules) and buildings that are ancillary to utilities that exceed 50m <sup>2</sup> Gross Floor Area and are located within 50m of a wetland.	Discretionary.
1.5 e	The solar array as a generation facility is not specifically provided for in the Utility section.	Discretionary.

### 7.2.2 Earthworks

In summary, consent is required for the following activities:

Rule	Activity	Status
Chapter 7		
4.3.1	The volume of earthworks will exceed 300m <sup>3</sup> and result in more than 1000m <sup>2</sup> of exposed soil.  Earthworks will occur on land within 50m of a wetland and will exceed 20m <sup>3</sup> (volume) per hectare in any continuous 5-year period, and 50m <sup>2</sup> (area) per hectare in any continuous 5-year period.	Discretionary.

### 7.2.3 Vegetation clearance

Mackenzie District Council has confirmed that the rules in Plan Change 18 (PC18) that control vegetation clearance of areas of indigenous vegetation or habitats of indigenous fauna apply to this proposal.

#### 7.2.3.1 Definitions

*Improved Pasture: means an area of land where exotic pasture species have been deliberately sown or maintained for the purpose of pasture production, and species composition and growth has been modified and is being managed for livestock grazing.*

*Indigenous Vegetation: means a community of vascular plants, mosses and/or lichens that includes species native to the ecological district. The community may include exotic species, but does not include vegetation that has been planted as part of a domestic garden, for amenity purposes or as a shelterbelt, or exotic woody pest plant.*

*Significant indigenous vegetation and significant habitats of indigenous fauna: means areas of indigenous vegetation or habitats of indigenous fauna which:*

- a) meet the criteria listed in the Canterbury Regional Policy Statement's Policy 9.3.1 and Appendix 3; or*
- b) are listed in Appendix I as a Site of Natural Significance; and*
- c) includes any areas that do not comprise improved pasture within the glacial derived or alluvial (depositional) outwash and moraine gravel ecosystems of the Mackenzie Basin as shown on Figure 1.*

*Vegetation Clearance: means the felling, clearing or modification of trees or any vegetation by cutting, crushing, cultivation, spraying, burning, irrigation, artificial drainage, and mob stocking. It includes over-sowing, topdressing or overplanting on land that is not improved pasture. Clearance of vegetation shall have the same meaning.*

The Site (i.e., the main paddock area where the solar farm will be constructed) contains deliberately sown exotic pasture species and the Site is managed for livestock grazing, but also includes vascular plants and non-vascular species (mosses and / or lichens) native to the ecological district (that have not been planted), therefore it is considered to meet the definitions of both 'improved pasture' and 'indigenous vegetation.' This is discussed further in the Ecological Impact Assessment in **Appendix 7**.

#### 7.2.3.2 Rules

In summary, consent is required for the following activities:

Rule	Activity	Status
1.3.2.1	Clearance of vegetation within an area of significant indigenous vegetation or significant habitat of indigenous fauna	Non-Complying.

### 7.3 Summary

The table below identifies the consents required under the MDP:

Activity	Activity Status
Establishing and operating a solar array.	Discretionary.
Establishing utility buildings that are ancillary to utilities.	Discretionary.
Earthworks	Discretionary.
Clearance of indigenous vegetation.	Non-Complying.

Consequently, the overall activity status of the application is Non-Complying as the activities for which consents are being sought overlap to such an extent that they cannot be realistically or properly separated.

### 7.4 Other legislation

Under the Health and Safety at Work Act and Fire and Emergency Act, the Applicant will need to provide a Health and Safety Management Plan and a Fire Emergency Plan. The Fire Emergency Plan will be required to be approved by the local fire service.

The Electrical Codes of Practice are a requirement under the Electricity Act which also has standards that the Applicant will need to comply with. The relevant standards are listed below, but not limited to:

- ASNZS1768: Lightning protection.
- ASNZS2067: Substations and high voltage installations exceeding 1 kV a.c.
- ASNZS5033: General installation and safety requirements for electrical installations of PV array.
- ASNZS4777: Grid connection of energy systems via inverters, Part 2: Inverter requirements.
- ASNZS3000: Electrical installations - Known as the Australian/New Zealand Wiring Rules.

- ASNZS5139: Electrical installations - Safety of battery systems for use with power conversion equipment.
- Electricity Industry Act 2010.
- Electricity Industry Participation Code 2010.
- Electricity Safety Regulations 2010.

## 8.0 Section 104(2) Permitted Baseline

### 8.1 Mackenzie District Plan

The Mackenzie District Plan provides for the following relevant permitted activities:

- The construction, commissioning and operation of power generation facilities outputting up to 25 kilowatts outside the areas scheduled under Rule 13 above.
- Utility buildings and buildings ancillary to utilities in all zones up to 50m<sup>2</sup> Gross Floor Area.
- Lines for conveying electricity at a voltage up to and including 110KV with a capacity up to and including 100MVA per circuit.
- Irrigation and stock water races, open drains and channels and any incidental equipment.

It is appropriate to apply the permitted baseline as the activities set out above are relevant to the proposal and could be carried out as of right. They are not fanciful and clearly illustrate the nature and extent of activities and associated adverse effects that are considered appropriate at the Site. This is especially relevant in relation to lines for conveying electricity at a voltage up to and including 110KV.

## 9.0 Assessment of Environmental Effects

A comprehensive assessment of the effects of the proposal has been undertaken, with key elements of this assessment focussing on the matters of non-compliance and the assessment matters as specified in the Mackenzie District Council.

### 9.1 Landscape Effects

Boffa Miskell was engaged by LTE to prepare a Landscape Effects Assessment (LEA) (**Appendix 6**). This assesses the landscape effects of the proposed solar array and ancillary development on the immediate and surrounding environment character.

#### 9.1.1 Existing Environment

The Site lies within the Mackenzie Basin Subzone and Outstanding Natural Landscape, as defined in the Mackenzie District Plan. This is a glacial landscape, and the Site is part of an outwash plain, formed by glacial deposits deposited by meltwater outwash at the terminus of a former glacier. Old Man Range lies to the south of the Site, beyond the wetland of the same name, see Figure 1 in the Graphic Supplement in **Appendix 6**.

Lake Alexandrina with the hut settlement located at its southern tip lies to the northeast of the Site. Further to the east lies the distinctive feature of Mt John with its internationally renowned observatory, and Lake Tekapo beyond.

Landcover in this area is generally herbfield and grassland with areas of bare soil and rocks. Some areas of pine plantation and shelterbelts form features in the landscape, including at the Tekapo Military Camp, around Balmoral Station and surrounding the Site itself, with their darker colour and verticality being noticeably incongruent with the low profile and expansive nature of the basin landscape.

There are few residential dwellings in proximity to the Site and publicly accessible views from the north and east are extremely limited due to the Ministry of Defence land in this direction. Balmoral Station is the nearest residential dwelling, lying approximately 1.85km to the east, and views from here towards the Site are screened by the landform of the Old Man Range. There are no other private residences with views towards the Site.

#### 9.1.2 Landscape Effects

##### 9.1.2.1 Direct Landscape Effects (or Biophysical effects)

The landform of the Site will remain unchanged as large areas of bulk earthworks are not required to construct the solar farm. There will only be minor disturbance to the soil associated with the construction of the solar modules, ancillary structures, piles for the modules, cable trenching, laydown and access and the fencing around the Site. This means that there will be less than minor (low/neutral) effects on the topography or landform of the Site.

No trees or significant vegetation will be removed, and the Site will be accessed by the existing entrances and four new entrances along Braemar Road that will minimise the need for internal



roading. The Site will remain productive as the ground will remain grassed and utilised for grazing. The physical effects on vegetation associated with the proposed Solar Farm will be limited to the removal of small areas of tussock and pasture to allow for trenching, pile driven foundations and the installation of the ancillary equipment for the solar modules. Therefore, effects on vegetation, as a contributor to the landscape, will be less than minor (negligible).

The proposed solar arrays will not be located in the vicinity of the ephemeral wetlands that run through the centre, and lie to the southeast of the Site and no earthworks will be carried out adjacent to or within a 20m setback from these wetlands. It is also proposed to fence these areas to prevent sheep accessing the wetlands and allow natural rehabilitation of these areas. There will be no adverse effects on the natural character of the wetlands resulting from this proposal.

#### 9.1.2.2 Landscape Character Effects

Potential adverse effects on landscape character include:

- The temporary disruption to existing landscape characteristics and values during construction; and
- The modification of the existing landscape values and wider long-term impacts on the landscape character and amenity of the area.

The Canterbury Regional Landscape Study recognises that the landscape contains areas of exceptional legibility, aesthetic, transient, shared and recognised, very high natural science and high tangata whenua and historic landscape values. However, it also acknowledges that landscape qualities vary across an area of this size, which contains areas of human modification. The Site has been subject to human influence, in the form of the planting of a pine shelterbelt, and fertilising of the land to obtain improved pasture (albeit that is also ecologically significant), which has modified the character of the basin landscape.

As a result of constructing the solar farm, the Site will transition from a rural productive landscape to one dominated by energy infrastructure. The large expanse of open space within the pine shelterbelt boundaries will be reduced to areas between solar modules. However, the presence of grazing animals will maintain a sense of the existing rural character of the Site.

The pine shelterbelt is recognised as forming part of the existing modified character of this part of the Basin and it is proposed to maintain this for the life of the solar farm. It will screen views of the ground surface of the Site from all but a few small areas, and as the proposed solar modules will have a low profile in the context of the existing landform and the surrounding shelterbelt, any adverse effects on landscape character will be very localised.

However, to further reduce any adverse effects on landscape character, the landscape planner has recommended that a number of mitigation measures are undertaken. These are set out below.

#### 9.1.3 Visual Effects

The ZTV (Zone of Theoretical Visibility) illustrates that the visual catchment of the Site is extremely limited, with views towards the Site contained by the undulating moraine and outwash landform of the surrounding area, in particular by the Old Man Range to the south of the site. Further, the pine shelterbelt surrounding the site boundary generally prevents views into the Site. Publicly accessible views are limited to those from small sections of Braemar Road near the site boundary, where gaps in

the shelterbelt vegetation allow glimpsed views into the Site. One area of higher land to the west also provides an elevated view into the Site.

Balmoral Station is the nearest residential dwelling to the Site, lying approximately 1.85km to the east, and views from here towards the Site are screened by the landform of the Old Man Range. There are no other private residences with views towards the Site.

The following tables summarise the potential visual effects from the viewpoints and private residences identified in the LEA.

#### 9.1.3.1 Effects from public vantage points

Viewpoint		Comment
1	From SH8	The Site is screened from view beyond Old Man Range. There will be no adverse visual effects from this viewpoint.
2	Braemar Road, near Balmoral Station	There will be no adverse visual effects from this viewpoint due to the pine shelterbelt.
3	Braemar Road East	There will be no adverse visual effects from this viewpoint due to the shelterbelt and by the outwash landform.
4	Braemar Road, approaching site boundary from the East	The export switchgear and storage facility, together with the export line to the grid will be partially visible through a gap in the shelterbelt from this viewpoint, resulting in a less than minor (very low) adverse visual effect.
5	Braemar Road West	This view is representative of the view from a short section of road (approximately 900m in length) where due to the elevation of the landform, it will be possible to gain a view into the Site. Visual effects from this viewpoint will therefore be less than minor (low adverse) and will gradually reduce as road users move closer to the Site.
6	Braemar Road West	Approximately 1.2km from the site boundary, the elevation of the road has lowered, therefore most of the ground surface of the Site will be screened by the surrounding shelterbelt. Therefore, adverse visual effects will be less than minor (very low adverse).
7	Braemar Road West near site boundary	Two gaps in the shelterbelt will provide narrowly framed views into the Site. From this location, a transient framed view of the Site's fencing and solar modules will be visible, resulting in less than minor (very low adverse) visual effects.
8	View South from Site Boundary	This view will be experienced as an oblique glimpsed view by users of Braemar Road, and solar modules, inverter

		units and surrounding security fencing will be visible. No modules will occupy the immediate foreground of this view, as the gap in the shelterbelt coincides with the path of the wetland in this location. As such, adverse visual effects for road users at this particular point will be minor (moderate-low) adverse.
9	Mt John	There will be no adverse visual effects from this viewpoint.

#### 9.1.3.2 Effects from private vantage points

There are few residential dwellings in proximity to the Site, with Balmoral Station being the nearest, and views towards the Site are screened by the landform of the Old Man Range. There are no other private residences with views towards the Site, therefore there will be no adverse visual effects for local residents.

#### 9.1.3.3 Summary of Potential Adverse Effects

Overall, adverse effects on the landscape character values of Te Manahuna (the Mackenzie Basin) will be less than minor (low) if the recommended mitigation measures set out below are adopted.

Adverse visual effects resulting from the proposal are limited (ranging from none to minor adverse effects) due to the Site's secluded location at the foot of the Old Man Range landform. The Site is also contained by a mature shelterbelt (15-20m in height) which limits views to the Site from Braemar Road, and the Site is also not visible from main viewpoints in the district (such as Mt St John and SH8).

#### 9.1.4 Mitigation measures

The following mitigation measures are recommended to ensure effects on landscape character values are effectively managed and remain less than minor:

- The materials and colour of onsite infrastructure will, where practical, be non-reflective and in keeping with the materials and colouring of existing infrastructure or of a colour that will blend with the landscape, as outlined in Appendix K of the Mackenzie District Plan;
- Where practical, proposed new buildings will be non-reflective and constructed of materials, or painted in, a natural range of browns, greens and greys to complement the tones found in the rural surroundings, as outlined in Appendix K of the Mackenzie District Plan;
- Visible foundations shall be avoided where possible, keeping the floor of buildings/structures close to ground level;
- Fencing shall follow the inside of the shelterbelt boundary and be in accordance with the recommendations outlined for fencing in Appendix K of the Mackenzie District Plan; and
- Areas of soil disturbance will be rehabilitated progressively or immediately post-construction, reducing views of bare soil.

## 9.2 Ecology

Boffa Miskell was engaged by the Applicant to undertake a survey of the ecological values at the proposed solar farm site, and to provide an Ecological Impact Assessment (EclA). The full EclA can be found in **Appendix 7** and a summary of the key findings and recommendations is provided below.

### 9.2.1 Existing Environment

The Site lies within the Tekapō Ecological District (ED) in the Mackenzie Ecological Region, in the inter-montane Mackenzie Basin. The existing (present day) vegetation reflects modification following human settlement, particularly European pastoralism. The extent of scrub / low forest and tall tussock communities has been reduced, and the extent of short tussockland has increased as a result of an increased frequency of fire. However, existing short tussock grasslands have been degraded by years of grazing by sheep and rabbits, and the introduction and spread of exotic plants (particularly grasses and mouse-ear hawkweed). Relatively extensive areas of copper tussock are still present in the Tekapō ED, although much of it has been modified. Sparsely vegetated cushionfield, herbfield, and short tussock grassland communities are present on shallow soils on outwash plains, and specialised turfland communities occur in the numerous kettlehole wetlands that occupy moraine hollows.

In terms of the Threatened Environment Classification<sup>1</sup>, the Site is divided roughly in half: the eastern end of the Site is within a land environment where 10-20% indigenous vegetation remains nationally; and the western end of the Site is within land environments, where 20-30% indigenous vegetation remains nationally.

The site is located at 820-840 m elevation with a semi-continental climate, meaning hot and dry summers and cold frosty winters and snow on the ground at times. The Site is also very windy.

### 9.2.1 Ecological Values.

Desktop information on terrestrial ecology values were gathered from a number of sources. Information on the general ecological effects of solar farms, such as those induced by light reflection and micro-climatic changes were obtained from international peer-reviewed studies and 'grey literature' reports. In addition, preliminary site observations were made by Dr Jaz Morris (Ecologist) during very brief visits to the Site on 5 May 2021 and again on 28 July 2021.

#### 9.2.1.1 Vegetation

Jaz Morris re-visited the Site on 18-19 November to undertake a detailed survey of terrestrial and wetland vegetation / habitats, including plot measurements as described below. Michael McMillan (AECL) also attended as an iwi observer. Jaz Morris also made a brief follow up visit to the 'southwest wetlands' area on 9 December 2021. On this visit, a southern grass skink was observed near a slash pile at the west of the Site.

All vegetation types within the Site are listed in **Error! Reference source not found.** table below and a full description of the vegetation types can be found in the EclA:

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<sup>1</sup> The Threatened Environment Classification is a combination of three national databases: Land Environments of New Zealand, Land Cover Database (Version 2) and the Protected Areas Network. The Threatened Environment Classification shows how much indigenous vegetation remains within land environments, how much is legally protected, and how the past vegetation loss and legal protection are distributed across New Zealand's landscape.

Vegetation types within the solar farm site and their locations, described using the classification system of Atkinson (1985). A '\*\*' denotes exotic species.

Vegetation type	Locations at site
Fescue tussock / browntop / mouse-ear hawkweed* grassland.	Main paddock: majority of site
(Copper tussock) / sweet vernal grassland.	Main paddock: northeast of site near Braemar Road
Mouse-ear hawkweed herbfield.	Main paddock: elevated moraine hummocks, terrace riser near central wetland
(Soft rush – bog rush) / exotic grass – jointed rush* grassland.	Central wetland area
[Oval sedge – soft rush] / (kneel foxtail*) – browntop* grassland / mudfield	Southwest wetland areas

### 9.2.1.2 Lizards

Lizard surveys were carried out on two separate visits in November 2021 and February 2022. During the first lizard survey (November 2021) by Matt Turner and Alex Gault a walk-through survey was carried out over the Site, with visual searches undertaken in possible lizard habitat, such as dense tussocks and near slash piles of felled trees, and passive detection methods (baited tracking tunnels) were used across the Site in different habitat types, including within fescue tussock and copper tussock areas, and in the adjacent pine shelter belts.

During the second lizard survey (February 2022) by Matt Turner and Dr Mandy Tocher undertook manual and visual searches. They also set pitfall traps (baited) across the Site where tracking tunnel detections of lizards had occurred, as well as in suitable lizard habitat including near slash piles, on the edges of the central wetland area, and within fescue tussock and copper tussock areas.

A review of the DOC Bioweb database found lizard records for five species within 10 km of the solar farm site as set out in the table below.

Lizard species recorded at, or within 10 km of, the solar farm footprint.

Common Name	Scientific Name	Conservation Status	Site Survey	DOC Herpetofauna Database*
Canterbury spotted skink	<i>Oligosoma lineoocellatum</i>	Threatened – Nationally Vulnerable		x
Mackenzie skink	<i>Oligosoma prasinum</i>	Threatened – Nationally Vulnerable		x
Southern Alps gecko**	<i>Woodworthia</i> "Southern Alps"	At Risk - Declining		x
Southern grass skink	<i>Oligosoma aff. polychroma clade 5</i>	At Risk - Declining	x	x
McCann's skink	<i>Oligosoma maccanni</i>	Not Threatened	x	x

\* Accessed 11/2020). \*\* Southern Alps gecko were only found outside the solar farm site.

### 9.2.1.3 Incidentally observed species

It is also noted that a number of species were incidentally observed during ecological surveys as follows: New Zealand blue (Zizania sp.) boulder copper butterfly (*Lycaena boldernum*), common tussock butterfly (*Argyrophenga antipodum*), mānuka beetle (*Pyronota* sp.), various unidentified

moths (likely including *Scoparia* sp., *Tingena* sp., and *Eudonia* sp.) and spiders, a harvestman, and grasshoppers (likely *Sigaia australis* and possibly one other species).

#### 9.2.1.4 Weeds

Other than mouse-ear hawkweed, there are few problem weeds within the Site. Of note is that Russell lupin is largely absent (one or two plants were recorded in the main paddock area and within the central wetland) despite this species being abundant along Braemar Road), and lotus, sweet briar, and wilding pines are extremely infrequent. Other typical weeds of the area such as thistles, St John's wort, and woolly mullein (poor man's tobacco) are absent entirely. Several crack willows (previously planted) are present in the central wetland.

The following table summarises the assessment of ecological values at the Site following the EIANZ guidelines (Roper-Lindsay et al. 2018):

*Summary of ecological values assigned to vegetation, habitats and communities and indigenous fauna within the Site.*

Ecosystem Component	Representativeness	Rarity / Distinctiveness	Diversity and Pattern	Ecological Context	Overall Ecological Value
Terrestrial and Wetland Vegetation and Habitats					
Main paddock area	Low-Moderate	Moderate	Low-Moderate	Low	Moderate
Central wetland	Moderate	High	Low-Moderate	Moderate	Moderate
Southwest wetlands	Very Low	Moderate	Very Low	Low	Low
Threatened and At-Risk Plant Species					
Dryland sow thistle	Threatened – Nationally Vulnerable				Very High
Other At Risk – Declining species	At Risk – Declining				High
Birds					
Tarapirohe / Black-fronted tern	Threatened – Nationally Endangered				Very High
Pihoihoi / NZ pipit, Tōrea / South Island pied oystercatcher, Tūturiwhatu / Banded dotterel	At Risk – Declining				High
All other indigenous birds	Not Threatened				Low
Lizards					
Southern grass skink	At Risk – Declining				High
McCann’s skink	Not Threatened				Low
Southern Alps gecko	At Risk - Declining				High
Terrestrial Invertebrates					
All species incidentally observed	Not Threatened				Low

## 9.2.2 Effects Assessment

### 9.2.2.1 Vegetation Clearance

The main paddock area includes all areas of the Site aside from wetlands, and the vast majority of this area is a fescue tussock grassland (along with other minor vegetation types characterised either by herbfield or the presence of copper tussock). Approximately 2.7 ha of this vegetation type will be removed or disturbed during construction of the solar farm, with the permanent loss of 1.3 ha and temporary loss of 1.4 ha (areas disturbed by minor trenching will be remediated and expected to eventually recover to a similar state).

The ecological effect of the direct loss or disturbance of up to 2.7 ha of this plant community in relation to its extent in the immediate area, within the Tekapō ED and at the regional level is considered to be less than minor (very low) (a negligible magnitude impact on a moderate ecological value).

### 9.2.2.2 Shelterbelts and Roadside

Four vehicle crossings will be constructed from Braemar Rd into the Site, with a total vegetation clearance of c.100 m<sup>2</sup> (four 4x6 m areas). The pine shelterbelt itself is essentially completely bare of vegetation beneath the trees and the roadsides (depending on where the vehicle crossings are located) comprise fescue tussock and copper tussock areas, but also areas of weeds including Russel lupin and silver birch. Therefore, the spread of weeds rather than a loss of ecological values is the key concern, and the clearance of this vegetation will have a less than minor (very low) level of effect.

### 9.2.2.3 Changes in Vegetation Composition

Aside from direct vegetation clearance, effects to vegetation composition (changes in plant species richness and abundance) could arise across a large proportion of the main paddock area due to solar panel effects, specifically:

- Shading of vegetation immediately beneath solar panel arrays; and
- Alteration of microclimate (temperature / humidity) beneath and between solar panel arrays (for example, the 'solar photovoltaic heat island effect'; see Barron-Gafford et al. 2016); and
- Retirement of the main paddock area from cattle grazing, as part of a change to site management that would be necessitated by the solar farm installation, and also exclusion of rabbits and hares from the Site.

In summary, the competing influences of the proposal on indigenous species, while not being able to be predicted with certainty (due to the lack of precedent), seem likely to tend towards discernible and somewhat adverse effects beneath panels, with neutral effects elsewhere. In brief:

- areas beneath modules may appear lusher and grassier but there would be little obvious difference between modules and in other areas of development on the Site (e.g., around inverter stations).
- there is no evidence to suggest that the proposal will result in a total loss of habitat suitability for indigenous species in general nor for any particular indigenous species. As such, the proposal is not considered to be akin to vegetation clearance. In fact, if the predictions regarding a 'moderated' climate beneath the modules is incorrect or other effects (such as a



'photovoltaic heat island' effect) are overall more influential on plant growth conditions, indigenous species may maintain or even increase their competitive niche at the Site.

Overall, the level of ecological effect is therefore considered to be less than minor (a low magnitude impact on a moderate ecological value).

#### 9.2.2.4 Implications for Wetlands

Potential effects of the proposal on the wetlands, especially wetland vegetation, are likely to be positive, i.e., a net gain. No adverse effects in terms of wetland hydrology or extent are likely to arise as a result of solar farm construction or operation, due to the very limited degree of earthworks proposed, which would be located at some distance from and upslope of wetland areas.

#### 9.2.2.5 Effects on Threatened and At-Risk Plant Species.

Two dryland sow thistle (Threatened – Nationally Vulnerable) plants were recorded at the Site (in an area of fescue tussock grassland in the east of the Site), and although it is likely that more individuals are present, the Site is not considered good habitat for this cryptic species owing to the level of prior pasture improvement and existing relatively dense exotic grasses (compared to typical habitat for the species). On this basis, even in the worst case, effects on that species will be less than minor (low) level of effect (a negligible magnitude of effect on very high ecological value).

#### 9.2.2.6 At Risk Species

Other At Risk species at the Site are considered likely to generally persist, especially between panels, owing to the low level changes in vegetation discussed above, and may well benefit from improved habitat quality in dryland setback areas. On this basis, even in the worst case i.e. total loss, adverse effects on their populations at the local, ED, and national level will result in a less than minor (very low) level of effect (a negligible magnitude of effect on high ecological values).

#### 9.2.2.7 Weed Spread and Establishment

The establishment of weeds as a result of, or following, construction works is a potential risk given the current low level of many exotic weed species across the Site, and the moderate ecological values of the plant communities and habitats within the Site. Conservatively, the impact of weed establishment and spread in the main paddock area due to construction will be less than minor (low) (a very low or low level of effect depending on the plant community / habitat type which range from low to moderate ecological value). It is therefore recommended that measures to prevent weed introduction, establishment and spread, and for weed surveillance and control in setback areas are implemented.

#### 9.2.2.8 Birds

There are four potential effects on avifauna that are considered: permanent habitat modification / loss; displacement resulting from construction disturbance; impacts on breeding birds; and impact trauma (bird strike) with panel arrays.

In summary, whether the possible effect of bird strike will occur at this Site is not known, nor whether indigenous species will be more or less susceptible than exotic species, but it appears likely (based on all the above information) that it will affect only a small number of indigenous birds, if any at all. If it occurs, there will likely be a negligible effect on bird species with ecological values ranging from negligible to high (or very high, if in a remote occurrence a nationally Threatened species were to

overfly the Site and suffer collision). This constitutes a less than minor (very low to low) level of effect. Nevertheless, monitoring for this possible effect is proposed.

### 9.2.3 Lizards

Lizard habitat will be affected by construction works and this could lead to a permanent or temporary loss of habitat as well as sub-lethal effects of habitat alteration including the displacement of lizards to less suitable habitat, or increased stress to lizards from the loss of refugia and increased exposure to predators. However, surveys undertaken indicate that the lizard populations within the construction footprint (i.e. roads, cable trenches and laydown area) are likely to be low in density and the area of direct vegetation clearance (2.7 ha) will be small in relation to the extent of the Site. However, there will also be a risk to lizards from vehicles and machinery moving across the Site, the burning of slash piles and the loss of suitable refugia, which may result in an increase in the likelihood of skink predation.

Overall, the proposal will result in adverse effects that will be less than minor (very low to low). However, a number of mitigation measures are proposed below.

#### 9.2.3.1 Terrestrial Invertebrates

A wholesale change to the quality or availability of terrestrial invertebrate habitat is not anticipated. Conservatively, the magnitude of change may reflect that of the vegetation itself, being a low magnitude of effect, and hence a very low level of overall effect.

In summary, the potential level of effect (assuming no mitigation) of the proposed activities on each of the ecological components is set out in the table below.

*Assessment of level of effect without mitigation*

Ecosystem Component	Ecological Value	Magnitude of Effect	Level of Effect
<b>Terrestrial Ecosystems and Habitats</b>			
Main grassland area – direct vegetation clearance in solar array area	Moderate	Negligible	Less than minor (Very Low)
Main grassland area – change in vegetation composition in solar array area	Moderate	Low	Less than minor (Low)
Wetland areas – retirement from grazing	Low- Moderate	Positive	Positive (Net Gain)
Effects to Threatened plant species	Very High	Negligible	Less than minor (Low)
Effects to At Risk plant species	High	Negligible	Less than minor (Very Low)
Weed spread and establishment – all areas	Moderate	Low	Less than minor (Low)
<b>Birds</b>			
Permanent habitat modification / loss	Low – Very High	Negligible	Less than minor (Very Low – Low)
Disturbance and temporary displacement	Low – High	Negligible	Less than minor (Very Low)
Nesting birds	Low – High	Negligible	Less than minor (Very Low)

Bird strike with panels	Low – Very High	Negligible	Less than minor (Very Low-Low)
<b>Lizards</b>			
Habitat alteration	Low – High	Low	Less than minor (Very Low-Low)
Mortality during site preparation	High	Low	Less than minor (Low)
Construction mortality	Low – High	Negligible	Less than minor (Very Low)
Increased predation	Low – High	Low	Less than minor (Very Low-Low)
<b>Terrestrial Invertebrates</b>			
Habitat alteration	Low	Low	Less than minor (Very Low)

## 9.2.4 Impact Management Measures

The following impact management measures will be implemented to ensure effects on ecological values are effectively managed and remain less than minor (low to very low). However, it is noted that these are not strictly required given the lack of significant or even minor adverse effects.

### 9.2.4.1 Avoid and Minimise

#### Terrestrial Vegetation

- Minimise direct vegetation clearance via press-in piling of solar panel array supports using the lightest possible machinery (to minimise soil compaction and damage to vegetation).
- Manage the change from cattle to sheep grazing to minimise change to vegetation composition across the main paddock area by overstocking (rather than understocking and allow rampant growth of exotic grasses) may be the preferred initial approach.

#### Weeds

- To prevent the introduction, establishment and spread of weeds:
  - Ensure all construction machinery is cleaned before it enters the solar farm site, including if machinery leaves the solar farm site temporarily (due to the presence of Russell lupin and other weeds along Braemar Rd).
  - Seed bare soil with grass (exotic browntop is already prevalent and most likely to establish rapid soil cover) following completion of trench installation and back-filling of topsoil.
  - Control weed species that establish along trenching works and vehicle tracks using appropriate control methods.
- Remove crack willow, Russell lupin, lotus, wilding conifers, and woody weeds (gorse, broom, sweet briar) from wetland and setback areas, and control incursions of these species across the entire site throughout the lifetime of the solar farm.

#### Birds

- Carry out a pre-construction survey of the Site (within the week prior to the commencement of construction of each phase of the solar farm, if works commence during the breeding season)

by a suitably qualified ecologist (SQE) with over five years' experience conducting bird surveys, in order to:

- Determine whether the above species (or any other indigenous bird species observed during the survey deemed of conservation concern by an SQE) are breeding within the solar farm footprint. Subsequently;
  - If breeding pihoihoi / NZ pipit and tōrea / South Island pied oystercatcher (or other species of conservation concern) are absent, works could proceed within the breeding season; or
  - If breeding pihoihoi / NZ pipit and tōrea / South Island pied oystercatcher (or other species of conservation concern) are present within the solar farm footprint, works could proceed subject to setbacks from nests or other similar measures to avoid or otherwise manage impacts to breeding birds, as advised by an SQE.

#### Lizards

- Prepare and implement a Lizard Management Plan (LMP) that will identify key lizard mortality / injury risks (e.g., slash pile removal) and outline appropriate measures that, when effectively implemented, will avoid those risks.

#### 9.2.4.2 Remediation

- Seed bare soil with appropriate grass species (browntop) following completion of any trenching or other earthworks and back-filling of topsoil. Sow grass seed at a time when revegetation is most likely to be successful (e.g., during autumn or spring when grass seed is most likely to strike and provide the best coverage) (the timing of remediation work will be important to minimise exposing bare ground to invasion by exotic weed species).

#### 9.2.4.3 Mitigation

- Undertake limited supplementary planting of small numbers of copper tussock and appropriate local sedge species (e.g. *Carex kaloides*) along the edge of the central wetland is proposed to improve habitat for lizards. Fruiting species including porcupine shrub (*Melicytus alpinus* agg.) should be planted on terrace risers to provide addition cover and food for lizards. No initial planting is recommended in the southwest wetland areas.
- Install natural refugia along the edge of the central wetland area or in dry areas, including logs or rock piles to provide additional cover and suitable basking areas for lizards. Appropriately sized logs from the slash piles could be installed in wetland or dry areas to provide refugia. Suitably sized rocks (boulders with a variety of sizes to allow for the creation of crevices) collected into piles should also be placed around the wetland.

#### Compensation

- Implement predator control along the central wetland, likely in the form of a network of DOC200 traps (or similar, with mouse traps) with monthly bait checks and monitoring for the lifetime of the solar farm. This will ideally reduce predator pressure on lizards in the key habitat areas.

#### Monitoring required for effects management

- Undertake regular (6 monthly) weed (particularly Russell lupin, broom and wilding conifer) surveillance and control across the solar farm site. It is recommended that surveillance commences 6 months after construction works and finishes 24 months following the completion for each stage of solar farm construction works. Regular weed surveillance and control should remain ongoing in wetland and setback areas for the life of the solar farm.
- Monitor for bird strike with panel arrays. This monitoring would require recording information about any bird species found dead at the Site that appears to have suffered trauma injuries, including species, number, and suspected cause of death. 3 years and 10 years following the construction of Phase 1, and 3 years and 10 years following the construction of Phase 2, the solar farm operator shall engage an SQE to undertake a review of all available bird strike records and prepare a Bird Strike Report. The Bird Strike Report and any recommendations should be prepared in consultation with Te Rūnanga o Arowhenua and Te Rūnanga o Waihao (or their agreed representatives) and provided to both Mackenzie District Council and to the Department of Conservation.

#### Monitoring not required for effects management

- Establish a number of vegetation monitoring plots within the solar array areas (under and between panels) and in setback areas (and potentially another nearby control site), with monitoring ideally every 5-10 years.
- 5 years following establishment of the southwest wetlands fencing, that input is sought from an SQE with over 5 years' experience conducting botanical surveys on whether a non-interference approach remains appropriate, or whether targeted wetland plantings and / or additional weed control would be of benefit.

In summary, the following table provides an assessment of the residual impact after the recommended management measures have been implemented.

*Summary of predicted impacts, proposed mitigation and residual effects after the implementation of avoidance, minimisation and mitigation measures.*

Subject or Location of Impact	Predicted Impact Without Impact Management Measures	Summary of Impact Management Measures Recommended	Residual Effects After Implementation of Impact Management Measures
<i>Terrestrial Vegetation</i>			
Main paddock area	Less than minor.	Allow vegetation recovery in setback areas, modify stock grazing rates to ensure exotic grasses are regularly suppressed.	Less than minor.
Effects to Threatened Plant species	Less than minor.	No specific actions recommended; habitat for the species in setback areas likely to improve in quality.	Less than minor.
Weed spread and establishment during construction	Less than minor.	Clean machinery before bringing it on site, immediately re-sow backfilled trenches in browntop, monitor 6-monthly for 24 months post construction.	Effects avoided by implementation of recommendations.

Subject or Location of Impact	Predicted Impact Without Impact Management Measures	Summary of Impact Management Measures Recommended	Residual Effects After Implementation of Impact Management Measures
Weeds – central and southwest wetlands	Less than minor.	Weed control in wetland and setback areas has already been adopted as part of the proposal (see Section 2.2.2).	Effects avoided by implementation of project shaping recommendations.
<i>Avifauna</i>			
Nesting birds	Less than minor.	Avoid construction during September-January nesting period, or conduct pre-construction nesting bird survey and avoid construction in nesting areas until breeding has naturally ceased.	Effects avoided if either recommendation is adopted.
Bird strike	Less than minor.	Monitoring for actual occurrence of bird strike during stage 1, potential for introduction of bird deterrent measures if required for stage 2.	Effects may at worst remain at low levels.
<i>Lizards</i>			
Habitat alteration	Less than minor.	Addition of natural refugia in areas of lizard habitat where construction has occurred and around laydown area to supplement temporary loss in refugia. Habitat enhancement, including planting and provision of refugia around retained wetland areas.	Less than minor.
Slash pile burning mortality	Less than minor.	Dismantle and move slash piles before burning. Capture and relocate lizards within the piles during dismantling (potential methods, to be described in a LMP. Prevent lizards from re-entering piles by moving piles away from lizard habitat or fencing the pile to exclude lizards.	Less than minor.
Construction mortality	Less than minor.	Avoid construction during colder months (May-September).	Less than minor.
Increased predation	Minor	Long term predator control for duration of solar farm in key lizard habitat areas (i.e. wetland areas).	Less than minor.

Overall, the level of effect of the construction and operation of the proposed solar farm on ecological values, with implementation of project shaping, site management, and other recommendations, is generally expected to be less than minor, with a net gain in wetland areas. The assessment of at-worst less than minor level effects considers the already modified nature of the Site but also the relatively insignificant direct impacts of earthworks and site clearance required to construct the solar panel arrays, noting that indirect effects to vegetation will likely be the main adverse effect. Furthermore, the setting aside of a portion of the Site for habitat enhancement will mitigate (to a degree) the likely changes induced by the prolonged presence of solar panel arrays across a relatively large area.

## 9.3 Construction Effects

It is proposed to manage effects of construction using management plans. The existing shelter belts will also provide effective visual screening of construction activities and some wind protection, which will minimise the risk of discharging dust onto adjoining public roads. Whilst there are no sensitive neighbours, hours of construction will likely be 7am to 6pm weekdays and Saturdays (not public holidays) and construction noise will be managed under NZS6803:1999 Acoustics - Construction Noise.

### 9.3.1 Earthworks

The proposed earthworks, which will be setback 20m from the edge of the wetlands, will be controlled through the use of an Erosion and Sediment Control Plan (ESCP), which will include a Dust Management Plan. The ESCP approach and principles are set out in the proposal description, and its implementation will ensure that any adverse effects on amenity values and the wetlands will be avoided or mitigated appropriately.

Heavy vehicles coming to the Site to deliver materials or machinery will use either of the existing vehicle access points located in the north-western and south-eastern corners of the Site or the new access points along Braemar Road. These vehicle crossings will minimise the number of internal tracks, which will be gravelled as required to manage potential dust and sediment issues.

Overall, it is considered that the effects of the proposed earthworks on the amenity of the surrounding area and the wetlands will be effectively managed.

### 9.3.2 Vehicle Crossings and Traffic Generation

The vehicle accesses will be formed, sealed and maintained to an all-weather standard with the first 5.5 metres of the accesses being comprised of compacted level metal surfacing as Braemar Road is unsealed.

The low numbers of vehicles using this road means that there is limited potential for conflicts with construction traffic and the existing and proposed vehicle accesses will be more than 1km from an intersection and sight distances in both directions exceed 250m. The activity will also be unlikely to generate more than 40 vehicle trips per day, and therefore it is considered that the proposal will not result in adverse effects on the safe and efficient operation of Braemar Road.

### 9.3.3 Storage and Use of Hazardous Substances

The temporary storage and use of hazardous substances on the Site will be undertaken in accordance with the requirements of the MDP and HSNO including a plan to manage any spills given the ecological values on the Site. The storage of petrol and diesel and the refuelling of vehicles will occur and be contained within the laydown areas, some distance from the wetlands.

As such, no adverse effects are anticipated to arise from the temporary storage and use of hazardous substances on the Site.

## 9.4 Operational Effects

Once the solar array is operational, the traffic generated by the proposal will likely be approximately four vehicle trips per month when staff visit the Site to check the solar array is operating efficiently and carry out any maintenance. Noise generated by the solar array will be minimal as there are no moving parts or mechanical elements such as turbines, that generate noise. Traffic noise may be noticeable, with vehicles travelling to and from the Site, however such noise is commensurate with other activities in the area such as the NZDF facility.

The solar array will operate 24 hours a day, 7 days a week once it is switched on. However, as outlined earlier, the generation of solar energy is largely a passive activity that requires minimal activity and occasional maintenance. Sheep grazing is also proposed across the Site, with the solar panels being set at least 1m above the ground providing space for the sheep to graze underneath. This will maintain an element of rural character and amenity on the Site.

Overall, it is concluded that operational effects on both immediately adjoining public and private property and the wider environment will be less than minor.

## 9.5 Mana Whenua Values

Ngāi Tahu exercises kaitiakitanga for the purposes of the Resource Management Act 1991 over the area based on the Area of Interest agreed between Ngāi Tahu and the Crown in the Deed of Settlement.

The Canterbury Regional Landscape Study Review (Boffa Miskell Ltd, 2010), identifies the following Tangata Whenua Values in relation to Te Manahuna (the Mackenzie Basin):

- Lakes Tekapo, Pukaki, Benmore and Ohau are acknowledged in the Ngai Tahu Claims Settlement Act (1998).
- The Mackenzie Basin lakes (Tekapo, Pukaki and Ohau) are all referred to in the legend of “Nga Puna Wai Karikari o Rakaihautu” which describes how the principal lakes of Te Wai Pounamu were dug by the rangatira (chief) Rakaihautu.
- Maori used the lakes in this area for mahinga kai (waterfowl).
- These lakes are part of a wider mahinga kai trail that ran from Lake Pukaki down the original path of Waitaki River to the coast.

Based on this, proposed activities that occur within Te Manahuna (the Mackenzie Basin) are relevant and will potentially affect iwi cultural values and other associative values.

Therefore, engagement with iwi has been a key part of the process and this is discussed further in section 11.2.

## 9.6 Positive Effects / Benefits

### 9.6.1 Relationship with pastoral farming

Solar generation is highly complementary to the existing farming activities and operations on Balmoral Station. Importantly the expected income stream from solar generation will provide a consistent and



alternate source of revenue to the leaseholder – further diversifying the income sources for Balmoral Station. Farming the Mackenzie is tough - high altitude, long winters and dry summers are always a challenge, as have been certain economic events along the way such as the disbanding of supplementary meat payments in the early 1980's, the share market crash in 1987 and subsequent 20% plus interest rates late 80's and early 90's certainly tested the resolve and economic fortitude of leaseholders. The Applicants believe solar farming will provide further diversification of revenue from the farm estate and protect against the extremes of fluctuations in traditional pastoral farming revenue, thereby enabling revenues to continue to flow and continuous improvement and effective management of the pastoral farm through times where expenditure would otherwise be constrained.

It also enables the Site to be used in a highly efficient manner with solar energy generation and primary production operating together. The land can be deemed to be highly productive with minimal impact on the environment, especially in terms of discharges to land that could affect the wetlands within the Site.

#### 9.6.2 Relationship with Government Direction and Policy

This proposal aligns with the domestic emissions reduction target by 2050 was set into law with the Climate Change Response (Zero Carbon) Amendment Act in November 2019. It will assist in reducing greenhouse gas emissions by reducing reliance on fossil fuels, and build resilience into the electricity generation network by reducing reliance on hydro electricity generation, which is under pressure due to changing weather patterns, which may be related to climate change. Furthermore, it will provide a locally generated, resilient electricity supply; reducing the need for long transmission distances and the costs associated with that. It may also assist with lowering the risk of unreliable supply due to events such as earthquakes that can disrupt supply.

### 9.7 Proposed conditions

The following conditions of consent are offered by the Applicant to ensure that any adverse effects of the proposal are effectively managed:

1. That the proposed activities shall proceed in general accordance with the information and plans submitted with the application, except where otherwise stated in the conditions of this consent, including the following documents and plans:
  - Resource Consent Application and Assessment of Environmental Effect Assessment of Environmental Effects', prepared for Infratec New Zealand Ltd, dated 4 May 2022, by Boffa Miskell Limited.
  - Ecological Impact Assessment, prepared for Infratec New Zealand Ltd, dated 26 April 2022, by Boffa Miskell Limited.
  - Landscape Effects Assessment, prepared for Infratec New Zealand Ltd, dated 28 April 2022, by Boffa Miskell Limited.
2. A Construction Management Plan (CMP) shall be prepared and provided to the Council for certification prior to commencing works on the Site. The CMP shall address:
  - measures to minimise direct vegetation clearance and soil compression such as press-in piling of solar panel array supports using the lightest possible machinery.

- measures to prevent the introduction, establishment and spread of weeds, including, but not limited to:
    - ensuring all construction machinery is cleaned before it enters the Site, including if machinery leaves the site temporarily (due to the presence of Russell lupin and other weeds along Braemar Rd).
    - seeding bare soil with grass (exotic browntop is already prevalent and most likely to establish rapid soil cover) following completion of trench installation and back-filling of topsoil.
    - controlling weed species that establish along trenching works and vehicle tracks using appropriate control methods.
    - removing crack willow, Russell lupin, lotus, wilding conifers, and woody weeds (gorse, broom, sweet briar) from wetland and setback areas, and control incursions of these species across the entire site throughout the lifetime of the solar farm.
  - management of construction noise.
  - management of construction traffic.
  - measures to manage the impact of visible foundations, including keeping the floor of buildings/structures close to ground level.
3. A Sediment and Erosion Control Plan including a dust management plan shall be prepared and provided to Mackenzie District Council for certification prior to any works commencing on the Site.
  4. The materials and colour of on-site infrastructure shall, where practical, be non-reflective and in keeping with the materials and colouring of existing infrastructure or of a colour that will blend with the landscape.
  5. All buildings, where practicable, shall be non-reflective and constructed of materials, or painted in, a natural range of browns, greens and greys to complement the tones found in the rural surroundings.
  6. The security fencing shall follow the inside of the shelterbelt boundary.
  7. Farming on the site shall be undertaken in general accordance with the Balmoral Station Farm Management Plan.
  8. If construction works for each stage of the solar farm commence during the main bird breeding season (September 1 – 31 January), a pre-construction survey of the Site shall be conducted within the week prior to the commencement of construction by a suitably qualified ecologist (SQE) with over five years' experience conducting bird surveys, in order to:
    - Determine whether pihoihoi / NZ pipit and/or tōrea / South Island pied oystercatcher (or any other indigenous bird species observed during the survey deemed of conservation concern by an SQE) are breeding within the solar array footprint. Subsequently:
      - If breeding pihoihoi / NZ pipit and/or tōrea / South Island pied oystercatcher (or other species of conservation concern) are absent, works shall proceed within the breeding season; or

- If breeding pihoihoi / NZ pipit and/or tōrea / South Island pied oystercatcher (or other species of conservation concern) are present within the solar array footprint, works shall proceed subject to setbacks from nests or other similar measures to avoid or otherwise manage impacts to breeding birds, as advised by an SQE.
- 9. A Lizard Management Plan (LMP) shall be prepared that will identify key lizard mortality / injury risks (e.g., slash pile removal) and outline appropriate measures that, when effectively implemented, will avoid those risks. The Consent Holder shall obtain authorisations under the Wildlife Act 1953 (WAA) or under subsequent legislation as required by the Department of Conservation. The LMP shall be provided to Council for certification at least 30 working days prior to commencing works on the Site, and any WAA shall be provided to Council for reference.  
  
The LMP shall be prepared in consultation with Te Rūnanga o Arowhenua (or its agreed representatives).
- 10. The LMP prepared in accordance with condition 9 shall include habitat enhancement and predator control measures to be undertaken in wetland and lizard habitat areas, which shall at a minimum include:
  - a. Supplementary planting of small numbers of copper tussock and local sedge species (e.g., *Carex kaloides*) along the edge of the central wetland and fruiting species including porcupine shrub (*Melicytus alpinus* agg.) on terrace risers. Plantings shall be of appropriately eco-sourced from the Tekapō Ecological District and be free from weeds.
  - b. Installing natural refugia along the edge of the central wetland area or in dry areas, including logs or rock piles to provide additional cover and suitable basking areas for lizards.
  - c. Regular predator control along the central wetland, such as via the use of a network of no more than 100m spacings of DOC150, DOC200, or similar traps checked monthly.
- 11. The Consent Holder shall undertake regular (6 monthly) weed surveillance and control (particularly for Russell lupin, broom and wilding conifer) across the Site, commencing 6 months after construction works start and finishing 24 months following the completion of each stage of construction works.
- 12. The Consent Holder shall undertake annual weed surveillance and control in the wetlands and setback areas during the operational life of the solar array.
- 13. To manage the adverse effects of bird strike to species of conservation concern, the Consent Holder shall:
  - a. Record information about dead or injured indigenous bird(s) of any species that is classified as locally uncommon, nationally At Risk, or nationally Threatened found at the Site, including species, number, date, time of day, photographs in situ, GPS location, and the suspected cause of death.
  - b. If an injured uncommon, At Risk, or Threatened indigenous bird is discovered at the Site, the Department of Conservation shall be immediately contacted to obtain advice on what

further actions to undertake. It is noted that due to Wildlife Act 1953 requirements, the handling of any injured indigenous birds or the storage of any dead indigenous birds may require approval from the Department of Conservation.

- c. If a dead uncommon, At Risk, or Threatened indigenous bird is discovered at the Site, the Department of Conservation shall be contacted within 5 working days to arrange collection of the carcass, and conduct postmortem analysis, if required.
  - d. Records of all dead and injured uncommon, At Risk, or Threatened indigenous birds found at the Site shall be provided on an annual basis to Mackenzie District Council and to the Department of Conservation, and records kept by the solar array operator for the lifetime of the solar array.
14. The Consent Holder shall 3 years and 10 years following the construction of Phase 1, and 3 years and 10 years following the construction of Phase 2 engage an SQE to undertake a review of all available bird strike records and prepare a Bird Strike Report summarising, at a minimum, methods, findings, recommendations, and any further monitoring or mitigation requirements. If there are no bird strike records available in the reporting period (i.e., 0-3 years or 3-10 years), the SQE shall conduct (and base their findings on) their own surveys at the Site conducted at least 3-monthly for a minimum continuous period of 12 months.
- The Bird Strike Report and any recommendations shall be prepared in consultation with Te Rūnanga o Arowhenua (or its agreed representatives) and provided to both Mackenzie District Council and to the Department of Conservation.
15. The Consent Holder shall engage an SQE to establish XXX vegetation monitoring plots within the solar array areas (under and between panels) and in setback areas (and potentially within another nearby control site). These shall be monitored every 5 years during the operational life of the solar array and the results recorded.
16. Within 5 years of constructing the central wetlands and southwest wetlands fencing, the Consent Holder shall engage an SQE with over 5 years' experience to conduct botanical surveys in order to provide advice on whether a non-interference approach remains appropriate, or whether targeted wetland plantings and / or additional enhancement steps including weed control are required or would be of benefit to achieve the assumed benefit in wetland condition. A report containing the findings of the survey and any required changes to the management of the wetland area shall be provided to Mackenzie District Council and Te Rūnanga o Arowhenua.
17. The Consent Holder shall, within 12 months of the solar array reaching the end of its economic or operational life (not including periods when the solar array may not operate because of technical issues or maintenance/improvement works), clear the site of all panels, buildings/structures and cabling, and the land shall be returned to pastoral uses. However, the wetlands shall remain fenced and monitoring and weed control shall be undertaken as required by Conditions 11 and 16.
18. The Mackenzie District Council may, once per year, on any of the last five working days of May or November, serve notice of its intention to review the conditions of this consent for the purposes of:

- a. dealing with an adverse effect on the environment occurring as a result of the exercise of this resource consent; or
  - b. providing for legislative or regulatory amendments; or
  - c. requiring the consent holder to carry out monitoring and reporting instead of, or in addition to, that required by the resource consent.
19. If this consent is not exercised within five years of the date of grant of consent, it shall lapse in accordance with Section 125 of the Resource Management Act 1991.

Advice Note: 'Exercised' is defined as implementing any requirements to operate this consent and undertaking the activity as described in these conditions and/or application documents.

## 9.8 Conclusion of Assessment of Environmental Effects

It is concluded that the adverse effects of the solar array on the environment will be no more than minor because the proposal will:

- provide new electricity generation from solar (a renewable resource) in a location where energy supply is a constraint to growth and the solar array can connect into the local distribution network.
- avoid areas designated as a Land of National/Natural Significance.
- adopt an ESCP that will manage the adverse effects of earthworks especially on the wetlands.
- result in adverse effects on landscape character and the values of the ONL that will be less than minor, and views of the solar array from public areas will be limited in extent.
- protect the natural character of the wetlands by ensuring that works are setback from the edges of the wetlands thus maintaining existing vegetation cover.
- not impact on the soils within the Site as it is only proposed to dig post holes and trenches, and not remove any soils as it is intended to undertake primary production i.e. sheep grazing on the Site.
- result in additional vehicle crossings to the Site that will be constructed as per Council requirements, that with the low vehicle numbers using Braemar Road and the good sight distances will minimise any adverse effects on the safe and efficient operation of this road.
- result in less than minor adverse effects on ecological values including those resulting from vegetation clearance, given the already modified nature of the Site.
- provide for some benefits arising from weed control and the removal of grazing activities within the wetland setbacks.

## 10.0 Statutory Assessment

In accordance with Section 104(1) of the Resource Management Act 1991 ('RMA'), this part of the report addresses the following statutory documents which are relevant to this proposal:

- National Policy Statement for Renewable Electricity Generation 2011 (NPS-REG).
- Canterbury Regional Policy Statement 2013 (CRPS).
- Mackenzie District Plan 2011 (MDP) (amended by PC13 in 2017 and PC18 in 2021).
- Waitaki Iwi Management Plan (WIMP).
- Part II of the RMA.

The focus for the assessment of these documents is on the areas that are particularly relevant and within the scope of the consents that have been applied for.

These planning documents are in a hierarchy whereby the lowest-order documents are required to give effect to the mid and higher-level documents (e.g. district plan provisions are to give effect to the regional policy statement provisions which in turn give effect to the national planning documents).

Due to the different timescales at which these documents have been prepared and made operative, some higher-order documents have not been given effect to by the lower order documents in the hierarchy. In this case:

- the National Policy Statement for Renewable Electricity Generation (NPS-REG) was gazetted in April 2011. However, whilst the Utility chapter of the MDP is dated October 2011, it does not appear to give effect to the NPS-REG.

A full list of the relevant objectives and policies contained within the above documents is set out in **Appendix 8**. To facilitate the identification and analysis of the documents, the following assessment groups and assesses the relevant provisions according to the various policy themes rather than looking at each document individually.

### 10.1 Energy

Document	Objectives and Policies
NPS-REG	<p>Of particular relevance to this proposal, the policies seek that decision-makers recognise the benefits of renewable electricity generation including increasing electricity generation capacity while avoiding, reducing or displacing greenhouse gas emissions, and increasing local supplies through diversification of type and location of generation.</p> <p>The policies also seek that regard is had to meeting or exceeding the New Zealand Government's national target for the generation of electricity from renewable resources.</p> <p>There is also clear direction to have 'particular regard' to the need to locate renewable electricity generation facilities where the renewable energy resource is</p>

	available, and the location of the existing distribution network with regard to connecting to the national grid.
CRPS	<p>The proposal is clearly defined as renewable electricity generation and regionally significant infrastructure in the CRPS.</p> <p>Policy 16.3.3 recognises the benefits of renewable energy generation facilities including maintaining or increasing electricity generation capacity while, amongst other matters, avoiding, reducing or displacing greenhouse gas emissions; maintaining or increasing the security of supply at local and regional levels, and also wider contributions beyond Canterbury; by diversifying the type and/or location of electricity generation; using renewable natural resources and assist in meeting international climate obligations.</p> <p>Policy 16.3.5 seeks to provide efficient, reliable and resilient electricity generation within Canterbury by enabling the development of new electricity generation infrastructure, with a particular emphasis on encouraging the operation, maintenance and upgrade of renewable electricity generation activities and associated infrastructure.</p>
MDP	<p>The Plan seeks to recognise and provide for the use and development of renewable energy generation and transmission infrastructure and operations within the footprint of current operations or on land owned by infrastructure operators as at 1 October 2011. Existing power generation facilities are specifically provided for in the Rural Zone as Scheduled Activities, subject to conditions controlling their environmental impact.</p> <p>The Plan seeks to recognise the economic and social importance of transportation, electricity generation and transmission, and rural servicing infrastructure and, consistent with other objectives and policies of this Plan, provide for its upgrading, maintenance and enhancement. Power generation and transmission facilities within the District are an important part of the national electricity generation and supply network. Power generation facilities within the Mackenzie District form part of the Waitaki Hydro Scheme, which produces approximately 28% of New Zealand's electricity.</p> <p>To avoid, remedy or mitigate adverse reverse sensitivity effects of non-farm development and residential activity on rural activities and activities such as power generation, transmission, infrastructure, state highways and the Tekapo Military Training Area.</p>

## Discussion

The proposal will provide new electricity generation from solar (a renewable resource) in a location where energy supply is a constraint to growth and the solar array can connect into the local distribution network. It will also assist in diversifying the type and location of local supplies and meeting the Government's national target for the generation of electricity from renewable resources.

The potential adverse effects resulting from the proposed solar array will be avoided, remedied or mitigated to the extent that is practicable. The proposal will result in improved sustainability with regard to increasing energy generated from renewable resources close to where it can be used, and efficiency as it will only result in an initial need to provide a new distribution line, that will be short in length, to the Alpine Energy distribution network. The full-scale solar array may require upgrading to existing Alpine Energy and Transpower infrastructure.

It is considered that the proposal will not be contrary to the energy objectives and policies of the NPS-REG, the CRPS and the MDP, and in fact will accord with those seeking to achieve greater reliance on renewable energy generation.

## 10.2 Utilities

Document	Objectives and Policies
CRPS	<p>Chapter 5 of the CRPS addresses development in the wider region (outside of Greater Christchurch). The objectives seek to ensure the integration of land-use and regionally significant infrastructure including where it promotes sustainable management, which this proposal would by creating an energy generation facility that would serve the local community.</p> <p>Policy 5.3.2 seeks to enable development including regionally significant infrastructure which does not compromise or foreclose options for accommodating the consolidated growth and development of existing urban areas; and the productivity of the region's soil resources, without regard to the need to make appropriate use of soil which is valued for existing or foreseeable future primary production, or through further fragmentation of rural land. It also seeks to avoid or mitigate natural and other hazards and reverse sensitivity effects and conflicts between incompatible activities whilst integrating with the efficient and effective provision, maintenance or upgrade of infrastructure.</p> <p>Policy 5.3.9 specifically seeks to provide for the development of new infrastructure, while:</p> <ul style="list-style-type: none"> <li>(a) recognising the logistical, technical or operational constraints of this infrastructure and any need to locate activities where a natural or physical resource base exists;</li> <li>(b) avoiding any adverse effects on significant natural and physical resources and cultural values and where this is not practicable, remedying or mitigating them, and appropriately controlling other adverse effects on the environment; and</li> <li>(c) when determining any proposal within a sensitive environment (including any environment the subject of section 6 of the RMA), requiring that alternative sites, routes, methods and design of all components and associated structures are considered so that the proposal satisfies sections 5(2)(a) – (c) as fully as is practicable.</li> </ul>
MDP	Objective 1 and associated policies seek to ensure that utilities manage potential adverse effects on the surrounding environment by applying performance standards



	<p>to separate incompatible activities, maintain visual amenities, safety, and the quality of the environment. The policies also seek that areas identified as possessing important natural features, significant indigenous vegetation or significant habitats of indigenous fauna are protected from utilities which are visually and environmentally incompatible. However, decisions should also take into account the economic and operational needs of utilities when assessing the location, design and appearance of utilities, whilst encouraging the joint use of existing facilities and sites where possible. Utility operators are also encouraged to adopt their own monitoring systems to ensure that the effects of utilities and their operation is regularly evaluated to avoid, remedy or mitigate adverse effects on the environment.</p> <p>Objective 2 and its related policies seek to specifically enable the establishment, use and maintenance of utilities that are necessary for the well-being of the community. The policies imply that applications should consider alternative sites or locations, with decisions needing to consider the economic costs and strategic needs of the utility. Consideration also needs to be given to the importance of the utility.</p>
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## Discussion

The proposed solar array will not affect any urban areas and in fact, the provision of a local energy source may support MDC's ability to consolidate Tekapo rather than development spreading across the rural land. As to the use of rural land, the land does not have versatile soils nor is it highly productive compared to other areas of the District. The Site is not affected by natural hazards and no adjoining land uses will be affected, being land used for primary production and the Defence Force Training area.

The objectives and policies of the Utility chapter in the MDP are relatively enabling of developing new renewable energy facilities provided that *areas identified as possessing important natural features, significant indigenous vegetation or significant habitats of indigenous fauna are protected from utilities which are visually and environmentally incompatible*.

As determined in Section 9 above, the array specifically avoids areas designated as Land of National/Natural Significance and effects on landscape values have been assessed as less than minor. The Applicant did consider alternative sites as discussed in Section 3 and deemed this Site to be the most appropriate given the screening provided by the shelterbelt and its proximity to a 33kv transmission line. It is also noted that Te Manahuna (the Mackenzie Basin) has been identified as one of the most promising areas in New Zealand for solar generation, with long sunshine hours, limited shading and a high clear sky index, along with good proximity to the National Grid.

With regard to effects on significant indigenous vegetation, this has been addressed in Section 9.2 above and overall adverse effects on ecological values have been found to be less than minor. It is noted that the Applicant intends to undertake the monitoring of weeds, bird strike as well as establish a number of vegetation monitoring plots amongst the panels and in setback areas to improve understanding of the impact of solar arrays on vegetation type and composition.

Phase 1 will produce enough electricity to power 2,800 households, equivalent to around 70% of the Tekapo township, whose growth is potentially constrained by the current electricity supply. This proposal represents a viable, economic and local source of electricity that will support the economic and social welling of the district.

It is therefore considered that the proposal accords with the utility objectives and policies of the MDP.

### 10.3 Landscapes and Natural Character

Document	Objectives and Policies
CRPS	Chapter 12 sets out the approach to identifying and protecting outstanding natural features and landscapes from inappropriate subdivision, use and development. It seeks to apply a consistent approach to the identification and management of outstanding natural features and outstanding natural landscapes setting out assessment matters which address biophysical, sensory and associative values.
MDP	The objectives and policies in the Rural Chapter address a wide range of matters including preserving the natural character and functioning of the District's lakes, rivers, and wetlands and their margins, and managing the adverse effects of activities such as earthworks, vegetation clearance, tree plantings and buildings that have the potential to threaten the survival of riparian vegetation and habitat.
	<p>The Plan seeks to protect and enhance the outstanding natural landscape of the Mackenzie Basin subzone in particular the following characteristics and/or values, of relevance to this proposal:</p> <ul style="list-style-type: none"> <li>(a) the openness and vastness of the landscape;</li> <li>(b) the tussock grasslands;</li> <li>(c) the lack of houses and other structures;</li> <li>(e) the form of the mountains, hills and moraines, encircling and/or located in, the Mackenzie Basin;</li> <li>(2) .....</li> <li>(3) Subject to objective 3B(1) above and to rural objectives 1, 2 and 4: <ul style="list-style-type: none"> <li>(a) to enable pastoral farming;</li> </ul> </li> </ul> <p>The policies also recognise that there are areas where development beyond pastoral activities is either generally inappropriate or should be avoided; some areas have greater capacity to absorb different or more intensive use and development and that applications should be accompanied by an assessment of landscape character sensitivity and ensuring that adverse effects, including cumulative effects, on the environment of sporadic development are avoided or mitigated. This can be achieved by strongly discouraging non-farm buildings elsewhere in the Mackenzie Basin outside of Farm Base areas.</p>

## Discussion

Te Manahuna (the Mackenzie Basin) has been identified as an Outstanding Natural Landscape and the Site lies in an area of high visual vulnerability. However, the Site is screened by a mature shelterbelt that will provide visual screening of the solar array. Whilst, it is recognised that the shelterbelt itself creates an artificial feature that is not in-keeping with the character of the Basin, it does reduce the impact of the solar array and associated modules, which are also not generally anticipated in the Basin.

Furthermore, the LEA has relied upon the shelterbelt as a mitigation measure in determining that effects on landscape character and the values of the ONL will be less than minor, and views of the solar array from public areas will be limited in extent.

Ideally, the Applicant would like to replace the shelterbelt with indigenous planting and has engaged with Mike McMillian of AECL regarding replanting the boundaries of the Site with native species. However, it is unknown at this time, which, if any native species would survive in this harsh environment and at this elevation. Furthermore, the species would need to grow to a reasonable height, and this would likely take some time, if indeed it is possible. It is also unlikely that indigenous species would establish in proximity to a pine tree shelterbelt. Consequently, there could be a significant period of time when the solar farm would be highly visible, if the pine trees are replaced with native species.

Therefore, whilst it is not proposed to proceed with this as part of this application, the Applicant is keen to continue engaging with iwi on this matter. It may be that some trial planting occurs on Balmoral Station and that the pine trees can be replaced at a later date, recognising that this may require an amendment to the consent, if it is granted.

The natural character of the wetlands will be maintained by the proposed setbacks within which works will not occur thus maintaining existing vegetation cover and ensuring the stability of the riparian margins.

Overall, the proposal accords with the direction of the objectives and policies that address landscape values and natural character.

## 10.4 Ecology

Document	Objectives and Policies
CRPS	Chapter 9 contains the objectives and policies in relation to ecosystems and indigenous biodiversity. A clear objective is to halt the decline of Canterbury's ecosystems and indigenous biodiversity, and protect their life-supporting capacity and mauri, whilst identifying and protecting areas of significant indigenous vegetation and significant habitats of indigenous fauna and restoring or enhancing ecosystem functioning and indigenous biodiversity, in appropriate locations, particularly where it can contribute to Canterbury's distinctive natural character and identity and to the social, cultural, environmental and economic well-being of its people and communities.

	<p>Of relevance to this proposal, Policy 9.3.2 sets out priorities for protection which includes:</p> <ul style="list-style-type: none"> <li>• Indigenous vegetation in land environments where less than 20% of the original Indigenous vegetation cover remains.</li> <li>• Areas of indigenous vegetation located in “originally rare” terrestrial ecosystem types not covered above.</li> <li>• Habitats of threatened and at-risk indigenous species.</li> </ul> <p>This is to be achieved through an integrated management approach, promoting the enhancement and restoration of Canterbury’s ecosystems and indigenous biodiversity, where this will improve the functioning and long-term sustainability of these ecosystems and sets out limitations on the use of biodiversity offsets in Policy 9.3.6.</p> <p>The following criteria apply to the use of biodiversity offsets:</p> <ul style="list-style-type: none"> <li>• the offset will only compensate for residual adverse effects that cannot otherwise be avoided, remedied or mitigated;</li> <li>• the residual adverse effects on biodiversity are capable of being offset and will be fully compensated by the offset to ensure no net loss of biodiversity;</li> <li>• where the area to be offset is identified as a national priority for protection under Policy 3.2, the offset must deliver a net gain for biodiversity</li> <li>• there is a strong likelihood that the offsets will be achieved in perpetuity; an</li> <li>• where the offset involves the ongoing protection of a separate site, it will deliver no net loss, and preferably a net gain for indigenous biodiversity conservation.</li> <li>• Offsets should re-establish or protect the same type of ecosystem or habitat that is adversely affected, unless an alternative ecosystem or habitat will provide a net gain for indigenous biodiversity.</li> </ul>
MDP	<p>The objectives protect and enhance significant indigenous vegetation and habitats, riparian margins and the maintain natural biological and physical processes. Land development activities are managed to ensure the maintenance of indigenous biodiversity, including the protection and/or enhancement of significant indigenous vegetation and habitats; the maintenance of natural biological and physical processes; and the retention of indigenous vegetation. The intent is to support/encourage the integration of land development proposals with comprehensive identification, and protection and/or enhancement of values associated with significant indigenous biodiversity. This is proposed to be achieved through comprehensive Array Biodiversity Plans and enabling development that is in accordance with those plans.</p> <p>The policies are focussed on the protection of significant indigenous vegetation or habitats, seeking that such sites are identified in accordance with the criteria listed in the Canterbury Regional Policy Statement and development which reduces the values of these sites is prevented. The policies refer to ‘rural development’ and seek</p>

	<p>to ensure this provides for no net loss of indigenous biodiversity values in areas identified as significant. In this regard, the policies provide for the offsetting of adverse effects, if it complies with criteria listed in the Plan Change. Policy 5 is of specific interest:</p> <p>To recognise the economic and social importance of renewable energy generation and transmission consistent with objectives and policies of this Plan, to provide for its upgrading, maintenance and enhancement.</p>
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The Site is not currently identified as a Site of Natural Significance in the Mackenzie District Plan but through ecological assessment, it has been found to support significant indigenous vegetation. As such, it meets both the definitions for significant indigenous vegetation and improved pasture.

Policy 2 of the Mackenzie District Plan seeks to protect areas of significant indigenous vegetation and significant habitats of indigenous fauna by, amongst other matters, ensuring that land use 'avoids' the clearance of indigenous vegetation or any reduction in its extent (including through edge effects). Avoid is a strong direction as shown by the Supreme Court in the land mark case *Environmental Defence Society Inc v The New Zealand King Salmon Co Ltd* [2014] NZSC 38 which stated that 'avoid' means 'not allow' and restricted the 'overall broad judgement' approach. However, Policy 5 states that despite Policy 2, the effects on indigenous biodiversity should be managed in a way that recognises the national significance of renewable energy generation activities and the electricity transmission network and provide for their development, operation, upgrading, and maintenance by:

*Providing for the upgrading and development of renewable energy generation and the electricity transmission network, while managing any adverse effects on indigenous biodiversity, having particular regard to:*

- i. the location of existing structures and infrastructure and the need to locate the generation activity where the renewable energy resource is available; and*
- ii. the logistical, technical and operational constraints associated with the activity; and*
- iii. the importance of maintaining and increasing the output from existing renewable electricity generation activities; and*
- iv. environmental compensation which benefits the local environment affected, as an alternate, or in addition to offsetting, to address any significant residual environmental effects.*

There is a clear direction to 'provide' for the development of renewable energy generation and the policies do not appear to specifically refer to existing generation facilities only, given the reference to: *the need to locate the generation activity where the renewable energy resource is available; and the logistical, technical and operational constraints* associated with the activity. As such, it is considered that the proposal is more appropriately provided for under Policy 5.

Potential adverse effects on ecological values including vegetation clearance have been assessed as being less than minor, given the already modified nature of the Site, with some benefits from weed control and removal of grazing activities within the wetland setbacks. This is a low level of effect on indigenous biodiversity and does not result in the significant residual adverse effects that need to be offset. Although the fencing of the wetlands, the management of weeds and on-going monitoring of birds and changes to vegetation could all be considered a form of environmental compensation.

Overall, the proposal accords with the direction of the objectives and policies that address indigenous biodiversity.

## 10.5 Land Use

Document	Objectives and Policies
CRPS	Chapter 15 seeks to, amongst other matters, maintain and improve the quality of Canterbury's soil to safeguard their mauri, their life supporting capacity, their health and their productive capacity by ensuring that land-uses and land management practices avoid significant long-term adverse effects on soil quality, and to remedy or mitigate significant soil degradation where it has occurred, or is occurring; and to promote land-use practices that maintain and improve soil quality.
MDP	Traditional pastoral farming is encouraged so as to maintain tussock grasslands, subject to achievement of the other Rural objectives and the policy below.  Avoid, remedy or mitigate adverse effects of livestock farming to protect the amenity of rural areas and the quality of the physical environment.
	A level of rural amenity which is consistent with the range of activities anticipated in rural areas, but which does not create unacceptably unpleasant living or working conditions for the District's residents or visitors, nor a significant deterioration of the quality of the general rural and physical environment.  To encourage and/or control activities to be undertaken in a way which avoids, remedies or mitigates adverse effects on the amenities and physical environment of rural areas.
	The objectives and policies seek that vehicle access does not detract from the efficiency, safety and amenity of the various activity areas, particularly the state highway network. This is to be achieved by ensuring adequate access provisions exist. Furthermore, there should be equitable sharing of road maintenance costs to ensure that compensation is paid for repair of damaged roads.

This proposal will not impact on the soils within the Site as it is only proposed to dig post holes and trenches, and not remove any soils as it is intended to undertake primary production i.e. sheep grazing on the Site.

All earthworks will be well set back from the wetlands within the Site and will be appropriately managed via an Erosion and Sediment Control Plan to further ensure the protection of the wetlands and the amenity values in the surrounding area.

The proposal will result in additional vehicle crossings to the Site but this does not equate to additional vehicle numbers: just that the trucks and staff cars will enter the Site at various points to minimise the number of gravel tracks required within the Site. This will limit impacts on landscape values and loss of vegetation. The vehicle crossings will be constructed as per Council requirements and the low vehicle numbers using Braemar Road and the good sight distances will minimise any

effects on the safe and efficient operation of the road. Furthermore, once operational, the solar array will generate very low levels of vehicle movements.

A level of rural amenity will be retained by also using the Site for the grazing of sheep and all adverse effects of undertaking the works will be internalised within the Site, being visually contained by the pine shelterbelt.

Overall, the proposal accords with the direction of the objectives and policies that address land uses.

## 10.6 Hazardous Substances

Document	Objectives and Policies
MDP	The objectives and policies in the Hazardous Substances section seeks to avoid or mitigate adverse environmental effects arising from the use, storage, transportation, manufacture, and disposal of hazardous substances, including from accidental spillage or poor management practices.

It is proposed to temporarily store and use petrol and diesel on the Site during the construction of the solar array. The volume to be stored will meet the permitted standards in the Plan and the storage and use will be undertaken in accordance with all HSNO requirements to avoid any adverse effects on the environment, especially given the ecological values on the Site.

Overall, the proposal accords with the direction of the objectives and policies that address hazardous substances.

## 10.7 Waitaki Iwi Management Plan

The Waitaki Iwi Management Plan (WIMP) was developed by Te Rūnanga o Arowhenua, Te Rūnanga o Waihao and Te Rūnanga o Moeraki as an expression of rakatirataka and in fulfilment of their kaikiaki responsibilities.

The WIMP addresses cultural landscapes and that they, and their respective components are restored, enhanced and protected. The policies seek to protect significant areas of remaining indigenous vegetation, enable enhancement and planting of indigenous species especially mahika kai. There is also a focus on improving water quality.

### Discussion

As discussed above, there is a low level of effect on indigenous biodiversity and the proposal does not result in significant residual adverse effects that need to be offset. Although the fencing of the wetlands, the management of weeds and on-going monitoring of birds could all be considered a form of environmental compensation that will benefit indigenous biodiversity and improve knowledge of the effects of solar arrays on vegetation in Te Manahuna (the Mackenzie Basin). Planting within the wetlands is not deemed appropriate by the ecological expert, but the removal of weeds and grazing activities will benefit the existing indigenous vegetation.

The proposal will also not adversely affect water quality given that earthworks will not penetrate groundwater and an ESCP will be implemented to manage any adverse effects arising from the proposed earthworks.

## 10.8 Part II of the RMA

The Mackenzie District Plan was prepared some time ago but has been subject to several plan changes, of particular relevance PC13 (final decision in 2017) and PC18 (under appeal). The CRPS was made operative in 2013. All of these documents were competently prepared through a hearing and decision-making process in a manner that appropriately reflects the provisions of sections 5-8 of the Act, as were PC13 and PC18.

Accordingly, it is concluded that no further assessment against Part 2 is considered necessary.

## 10.9 Conclusion on Statutory Considerations

It is concluded that the proposal accords with the intent of the objectives and policies across the relevant statutory documents and will not be contrary to the outcomes sought by the Waitaki Iwi Management Plan.



## 11.0 Consultation and Iwi Engagement

### 11.1 Mackenzie District Council

The Applicant has actively engaged with MDC and its experts on this proposal to ensure that it is a feasible proposition and the potential and adverse effects are being addressed in an appropriate manner. The following table sets out the meetings held and the outcomes of these:

Date	Purpose	Outcome
4 <sup>th</sup> May 2021	To undertake a site visit and hold a meeting with MDC to discuss Site A.  We also visited Site C.	Stop work on Site A.  Proceed with Site C.
28 <sup>th</sup> July 2021	Site visit and meeting with MDC and Mike McMillian from AECL to discuss initial design and potential adverse effects of establishing a solar array on Site C.	Agreed that Site C was appropriate (at this stage).  Emma McRae to discuss landscape matters with Graham Densom i.e. how the proposal will sit in the outstanding natural landscape.  Jaz to discuss and agree ecological survey methods with MDC expert.  No major concerns raised.
26 <sup>th</sup> January 2022	Teams meeting with the MDC, technical experts and Mike McMillian from AECL – mainly to discuss the pine trees around the Site.  There were two matters to discuss:  1. What would be the adverse effects if the trees were removed.  2. What planting (or otherwise) could replace them.	That the pine trees are to remain because:  1. There is too much uncertainty about what will grow to a sufficient height in this location, and  2. In the interim, there would be significant adverse effects on the values of the ONL and apart from reshaping the solar array, it was unclear how these could be addressed.  MDC stated that it will withdraw from conversations at this point and allow the Applicant to proceed with preparing the application.

Until 26<sup>th</sup> January, there have also been other numerous conversations with MDC's technical experts regarding assessment methodologies, potential adverse effects and effective mitigation measures.

## 11.2 Iwi Engagement

Te Rūnanga o Arowhenua and Te Rūnanga o Waihao both hold mana whenua over the Site.

Initially the Applicant engaged with both Te Rūnanga o Arowhenua and Te Rūnanga o Waihao but was advised by Aukaha<sup>2</sup> that Aoraki Environmental Consultancy Limited (AECL)<sup>3</sup> would essentially take the lead on this project and that no reply would be provided on behalf of Te Rūnanga o Waihao (please refer to the email in **Appendix 10**).

Consequently, AECL has been part of the journey in progressing the proposal. Mike McMillian was also on-site when the initial lizard surveys were undertaken, but unfortunately, no-one from AECL attend the trapping survey due to availability and vaccine requirements.

However, a copy of the draft application and technical reports were provided to AECL on 22<sup>nd</sup> March, so they could digest these prior to a hui on 30<sup>th</sup> March 2022. Engagement with iwi has been a key part of the process and the hui provided an opportunity to discuss the proposal and for iwi to provide comments and/or recommendations on the application.

A record of the hui with AECL is provided in **Appendix 11** which documents the key issues raised and how these have been addressed by the Applicant. It is also noted that a Memorandum of Agreement is proposed with Te Rūnanga o Arowhenua to establish, for example, a programme of cultural health and ecological monitoring, explore opportunities to engage with local schools and explore opportunities to replace the pine shelterbelt with indigenous planting.

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<sup>2</sup> The Rūnaka based consultancy service with Governance that has five Rūnaka owners: Te Rūnanga o Waihao, Te Rūnanga o Moeraki, Kāti Huirapa Rūnaka ki Puketeraki, Te Rūnanga o Ōtākou and Hokonui Rūnanga

<sup>3</sup> AECL provide advice for Rūnanga south of the Rakaia to the Waitaki River.

## 12.0 Notification

### 12.1 Public Notification

The application has been assessed against each of the steps under section 95A to determine whether public notification is required.

Section 95A provides a step-by-step guide in determining whether public notification is required:

Step 1	<p>Mandatory public notification in certain circumstances.</p> <p>An application must be publicly notified if:</p> <ul style="list-style-type: none"><li>• the applicant requests public notification</li><li>• public notification is required under section 95C</li><li>• the application is made jointly with an application to exchange recreation reserve land.</li></ul>
Step 2	<p>If not required by step 1, public notification is precluded in certain circumstances.</p> <p>An application cannot be publicly notified if:</p> <ul style="list-style-type: none"><li>• a rule or national environmental standard (NES) precludes notification.</li><li>• the application is for one or more of the following, but no other, activities:<ul style="list-style-type: none"><li>– a controlled activity;</li><li>– a restricted discretionary, discretionary or non-complying activity, but only if the activity is a boundary activity.</li></ul></li></ul>
Step 3	<p>If not precluded by step 2, public notification is required in certain circumstances.</p> <p>Other than for those activities in step 2, public notification is required if:</p> <ul style="list-style-type: none"><li>• a rule or NES requires public notification.</li><li>• the assessment under section 95D determines that the activity will have, or is likely to have, adverse effects on the environment that are more than minor.</li></ul>
Step 4	<p>Public notification in special circumstances</p> <p>If notification is precluded under step 2, or isn't required under step 3, consideration must be given to whether special circumstances exist that warrant public notification of the application.</p>

In assessing the proposal under section 95A it is noted that:

- None of the circumstances of Step 1 (section 95A(3)) apply because the Applicant has not requested public notification and the application is not made jointly with an application to exchange recreation reserve land.

- Public notification is not precluded under Step 2 as a rule or national environmental standard (NES) does not preclude notification, and the application is not for a controlled activity, or a boundary activity.
- The circumstances in Step 3 are particularly relevant. There is no NES requiring public notification. The assessment under section 95D determines that the activity will not have, or is not likely to have, adverse effects on the environment that are more than minor.
- Step 4 does not apply as there are no special circumstances which could warrant public notification under s95A(9).

Accordingly, the consent authority is requested not to publicly notify this application.

## 12.2 Limited Notification

Where the consent authority accepts that public notification is not required (see Part 11.1 above), the consent authority must then determine if limited notification is required under section 95B:

Step 1	<p>Certain affected groups and affected persons must be notified.</p> <p>If the consent authority determines that certain people or groups are affected, these persons/groups must be given limited notification:</p> <ul style="list-style-type: none"> <li>• affected protected customary rights groups</li> <li>• affected customary marine title groups (in the case of an application for a resource consent for an accommodated activity)</li> <li>• an affected person under section 95E to whom a statutory acknowledgement is made (if the proposed activity is on or adjacent to, or may affect, land that is the subject of a statutory acknowledgement)</li> </ul>
Step 2	<p>If not required by step 1, limited notification is precluded in certain circumstances. An application cannot be limited notified if:</p> <ul style="list-style-type: none"> <li>• a rule or NES precludes limited notification of the application</li> <li>• it is for either or both of the following, but no other, activities: <ul style="list-style-type: none"> <li>– a controlled land use activity under a district plan</li> <li>– an activity prescribed through regulations.</li> </ul> </li> </ul>
Step 3	<p>If not precluded by step 2, certain other affected persons must be notified.</p> <p>Determine whether, in accordance with section 95E, the following persons are affected persons:</p> <ul style="list-style-type: none"> <li>• in the case of a boundary activity, an owner of an allotment with an infringed boundary; and</li> <li>• in the case of any activity prescribed under section 360H(1)(b), a prescribed person in respect of the proposed activity.</li> </ul>

	In the case of any other activity, determine whether a person is an affected person in accordance with section 95E.
Step 4	<p>Further notification in special circumstances.</p> <p>If the consent authority determines special circumstances exist that warrant limited notification of the application to any other persons not already determined to be eligible for limited notification (excluding persons assessed under section 95E as not being affected persons), the council must give limited notification to those persons.</p>

Limited Notification under section 95B is precluded because:

- None of the circumstances of Step 1 (section 95B(2) or (3)) apply as there are no affected protected customary rights groups, customary marine title groups or an affected person under section 95E to whom a statutory acknowledgement is made.
- None of the circumstances of Step 2 apply as a rule or NES does not preclude limited notification of the application, and the application is not for a controlled land use activity under a district plan or an activity prescribed through regulations.
- Step 3 does not apply, as there are no adversely affected persons in accordance with section 95E (as assessed below).
- Step 4 does not apply as there are no special circumstances which would warrant limited notification under Section 95B(10) to persons other than those considered as affected persons under section 95E.

With regard to affected persons, Section 95E states:

*95E Consent authority decides if person is affected person*

- (1) *For the purpose of giving limited notification of an application for a resource consent for an activity to a person under section 95B(4) and (9) (as applicable), a person is an affected person if the consent authority decides that the activity's adverse effects on the person are minor or more than minor (but are not less than minor).*
- (2) *The consent authority, in assessing an activity's adverse effects on a person for the purpose of this section—*
  - (a) *may disregard an adverse effect of the activity on the person if a rule or a national environmental standard permits an activity with that effect; and*
  - (b) *must, if the activity is a controlled activity or a restricted discretionary activity, disregard an adverse effect of the activity on the person if the effect does not relate to a matter for which a rule or a national environmental standard reserves control or restricts discretion; and*
  - (c) *must have regard to every relevant statutory acknowledgement made in accordance with an Act specified in Schedule 11.*
- (3) *A person is not an affected person in relation to an application for a resource consent for an activity if—*

- (a) the person has given, and not withdrawn, approval for the proposed activity in a written notice received by the consent authority before the authority has decided whether there are any affected persons; or*
- (b) the consent authority is satisfied that it is unreasonable in the circumstances for the applicant to seek the person's written approval.*

*(4) Subsection (3) prevails over subsection (1).*

With regard to the above, no persons are considered to be adversely affected by the proposal because:

- the screening provided by the shelterbelt restricts views from public viewing places; and
- the Site is remote from private residences; and
- the adverse effects of the proposal have been assessed as generally less than minor, the exception being effects on visual amenity when looking south from Site boundary, which are considered to be minor. However, that is an effect on the public rather than an identifiable person; and
- adverse effects will generally be internalised to the Site.

Further Te Rūnanga o Arowhenua and AECL have provided a letter of support (**Appendix 12**) to the proposal expressing their appreciation in being involved in the project from conception and being able to review the draft conditions of consent,

Accordingly, it is considered that the consent authority need not give notice of this proposal to any person.

## 12.3 Special circumstances

Special circumstances in the context of public notification of resource consents have been defined by the Court of Appeal as circumstances that are “outside the common run of things which is exceptional, abnormal or unusual but may be less than extraordinary or unique”. The purpose of considering special circumstances requires looking at matters that are beyond the plan itself. The fact that a proposal might be contrary to the objectives and policies of a plan is probably not sufficient to constitute special circumstances.

Special circumstances must also be more than:

- where a council has had an indication that people want to make submissions.
- the fact that a large development is proposed.
- the fact that some persons have concerns about a proposal.

Whilst it is recognised that Te Manahuna (the Mackenzie Basin) is an iconic landscape and supports significant ecological values, the potential adverse effects of the proposal have been assessed as being generally less than minor. Furthermore, the proposal generally accords with the objectives and policies in the relevant statutory documents. The uniqueness of the Basin or the fact that there may be parties interested in the proposal are not considered to be special circumstances. Therefore, the Council is requested not to publicly or limited notify this application on the basis of special circumstances.

## 12.4 Conclusion of Notification Assessment

Pursuant to Sections 95 to 95G of the RMA, this application must be processed without public notification and without limited notification to any person because:

- None of the steps under section 95A require the consent authority to publicly notify the application; and
- None of the steps under section 95B require the consent authority to limited notify the application; and
- There are no persons identified as being adversely affected under s95E; and
- There are no special circumstances that require this application to be notified.

## 13.0 Conclusion

It is proposed to construct a solar array with a maximum generation capacity of approximately 88MW at Braemar Road, Tekapo. The proposed solar array will be developed in two phases.

The Solar Array will comprise:

- PV array modules – Phase 1 will contain approximately 20,000 bifacial PV modules and Phase 2 will contain approximately 114,940 bifacial PV modules. In total, there will be 134,940 modules. These modules generate electricity on both sides, allowing for direct and reflected light to be captured and harnessed.
- Perimeter security fencing.
- 2 new underground lines connecting the Site to the transmission network.
- 17 Central Inverter Skid Units.
- Two MV Export Switchgear and storage areas.
- Internal tracks, parking and laydown area.

The proposal will require:

- earthworks totalling 13,074m<sup>3</sup> over a total area of 27,372m<sup>2</sup> (2.74ha or 2.4% of the Site) with a minimum depth of cut of 0.2m and a maximum depth of cut of 1m.
- the clearance of 2.7ha of vegetation resulting in the permanent loss of 13,416m<sup>2</sup> and temporary loss of 13,956m<sup>2</sup>.

It is also proposed to:

- fence all wetland areas as part of Phase 1 with a stock and rabbit-proof fence, which will be setback at least 20m from the edge of the wetlands.
- truck potable water to the Site to meet drinking water demands for construction workers and staff as required.
- have a temporary site office and staffroom with a surface effluent tank (2,700L capacity) that will be emptied as required, via a truck that will take sewerage offsite to be disposed of appropriately at an authorised facility.
- establish a further 4 vehicle crossings that will provide direct access from Braemar Road that will be constructed to MDC standards.
- store some fuel for machinery during construction that will comply with all HSNO requirements including bunding storage areas and having spillage kits on site.
- lay two underground lines, cumulatively 350m in length, to connect the Site to the existing Alpine Energy 33kV network at Braemar Road.
- use the Site for pastoral activities, likely grazing sheep Site.

Consent is required under the Mackenzie District Plan for a Non-Complying activity.



A comprehensive assessment of the effects of the proposal has been undertaken, with key elements of this assessment focussing on the matters of non-compliance and the assessment matters as specified in the Mackenzie District Council:

- Landscape Effects: adverse effects on the landscape character values of Te Manahuna (the Mackenzie Basin) will be less than minor (low) if mitigation measures are adopted.

Adverse visual effects resulting from the proposal are limited (ranging from none to minor adverse effects) due to the Site's secluded location at the foot of the Old Man Range landform. The Site is also contained by a mature shelterbelt (15-20m in height) which limits views to the Site from Braemar Road, and the Site is also not visible from main viewpoints in the district (such as Mt St John and SH8).

- Effects on ecological values: the level of effect of the construction and operation of the proposed solar farm on ecological values, with implementation of project shaping, site management, and other recommendations, is generally expected to be less than minor, with a net gain in wetland areas.
- Construction Effects: it is considered that the effects of the proposed earthworks on the amenity of the surrounding area and surface and groundwater quality will be effectively managed. Traffic generated during construction will not create adverse effects on the safe and efficient operation of Braemar Road given the good sight distances and low volume of traffic that uses this road.
- Operational Effects: the traffic generated by the proposal will likely be approximately four vehicle trips per month when staff visit the Site to check the solar array is operating efficiently and carry out any maintenance. Noise generated by the solar array will be minimal as there are no moving parts or mechanical elements such as turbines, that generate noise. Sheep grazing is also proposed across the Site to maintain an element of rural character and amenity on the Site.
- Mana Whenua Values: the proposed activities occur within Te Manahuna (the Mackenzie Basin) and will potentially affect iwi cultural values and other associative values. Therefore, engagement with iwi has been a key part of the process and a hui with AECL provided an opportunity to discuss the proposal and for iwi to provide comments and/or recommendations on the application. Their support of the proposal strongly suggests that it aligns with their values and the direction set out in the WIMP.
- Positive Effects / Benefits: solar generation is highly complementary to the existing farming activities and operations on Balmoral Station.

This proposal aligns with the domestic emissions reduction target by 2050 was set into law with the Climate Change Response (Zero Carbon) Amendment Act in November 2019.

The proposal has been assessed against the relevant objectives and policies of the:

- National Policy Statement for Renewable Electricity Generation 2011 (NPS-REG).
- National Policy Statement for Freshwater Management 2020 (NPS-FM).
- Canterbury Regional Policy Statement 2013 (CRPS).
- Mackenzie District Plan 2011 (MDP) (amended by PC13 in 2017 and PC18 in 2021).

- Waitaki Iwi Management Plan (WIMP).
- Part II of the RMA.

and found to not be contrary to these.

The application can be processed on a non-notified basis without notice to any person pursuant to Section 95 of the RMA because effects on the environment will be no more than minor and no persons have been identified as being adversely affected. It is also considered that no special circumstances exist.

In conclusion, it is considered that the Mackenzie District Council has the authority to grant consent to the proposed development on a non-notified basis in terms of Sections 104 and 104B and D of the RMA for the reasons stated above.