Mackenzie District Council
CONSENT APPLICATION 220048
A.W. & K.F. SIMPSON, BALMORAL SOLAR FARM
LANDSCAPE REVIEW

v.04

A. INTRODUCTION

1. This Landscape Review has been prepared by Graham Densem Landscape Architect, at the request of Mackenzie District Council.

2. It concerns an application to convert lightly-developed paddocks on Balmoral Station ('the Site') to a solar electric farm of ultimately 120ha, to be built in two stages. The Site is on Braemar Road, 6kms west of the junction with SH8 and 12kms east of Lake Pukaki. Under the Mackenzie District Plan it is within the Mackenzie Basin Outstanding Natural Landscape Area and area of High Visual Vulnerability.

3. This is a new issue for the Mackenzie Basin, arising from the global imperatives of climate change, and further such applications are likely in the future. From a landscape perspective, the impacts on the Outstanding Natural Landscapes and natural character of the Basin are potentially significant.

4. As stated in s.1.2 of the applicant's *Assessment of Landscape Effects ('Landscape Assessment'),* two other sites were considered and rejected before the current one, Site C, was selected. I was part of that initial consultation and acknowledge having indicated at the time that Site C appeared to have the greatest chance of approval in landscape terms, being contained within an area of already-developed paddocks, being enclosed by shelter plantings, and being in an unobtrusive location at the foot of the Old Man Range. It was made clear at the time however, that my opinions were without prejudice on the actual effects of any proposal that might be received in the future.

5. I visited the site in May and July 2021, and submitted a Draft Review labelled v.02, in June 2022. This revision, v.04, dated 14 November 2022, now answers issues raised by the applicant's landscape architect in an email of 22 November 2022[1]. The issue concerned my assessment of visual effects at Viewpoint VP8 in the applicants' Assessment of Landscape Effects document, dated 28 April 2022. My response is contained in in paragraphs 55 – 58 below specifically, and paragraphs 60 – 68 consequentially. Also now included in paragraphs 55 and 58 are two illustrations from Google Earth Street View, pertinent to this response.

6. The following documents have been considered in preparing this Review:
    - *The Application and Assessment of Environmental Effects document prepared by Boffa Miskell Ltd, dated 5 May 2022 (AEE);*
    - The *Assessment of Landscape Effects* document dated 28 April 2022 *(Landscape Assessment) and its Graphic Supplement dated April 2022, prepared by Boffa Miskell Ltd;*

[1] Email Emma Macrae – Graham Densem, 22 November 2022.

- The *Ecological Impact Assessment* by Boffa Miskell, dated 26 April 2022 *('Ecological Assessment'),* in particular Appendix *7 'Solar Panel Reflectivity Details'* from Canadian Solar.
- *The Operative Mackenzie District Plan, notably, provisions for the Mackenzie Basin Subzone and for its outstanding natural landscapes from Plan Change 13 and for biodiversity from Plan Change 18;*
- *The Canterbury Regional Policy Statement;*
- A second *Graphic Supplement* to the *Assessment of Landscape Effects,* dated 16 November 2022, with its accompanying email.

B. EXISTING ENVIRONMENT

7. I am familiar with the Balmoral environment, having assisted the Council through the Plan Change 13 process between 2007 – 2018, and as stated, having visited the site on two occasions. I have read section 2.0 'Existing Environment' in the *Landscape Assessment,* and accept that as a true statement of the site and its setting.

8. In my judgement, the salient features of the Site and surroundings, for this application, are:
    - *The exceptionally high and continuous levels of natural character throughout the Mackenzie Basin generally, which have led to the designation of an Outstanding Natural Landscape in the District Plan, and the need to adapt developments to fit in with and not diminish that sense of naturalness;*
    - *The high-country grassland ('tussock') nature of that character, and its visual openness, as opposed to the rural landscapes of lowland South Canterbury;*
    - *The extensive open, undeveloped outwash surfaces of the Army land north of the site, which have led to its designation as an area of 'High Visual Vulnerability' in the District Plan;*
    - *The bulk and north flanks of the Old Man Range immediately south of the site;*
    - *The already-existing compartment of pastoral development enclosed by conifer shelterbelts, comprising the site itself, which does not damage existing natural character and enables developments to be contained visually within;*
    - *An absence of buildings or structures in the vicinity, beyond fences, a road, bridge and power line;*
    - *The location of this compartment in a relatively unobtrusive location between the outwash surfaces and Old Man Range, where it does not disrupt the landscape grain of either;*
    - *Two wetland areas in the east of the site, parts of the headwater collector system of Irishman Creek, which drains southwards from this locality.*

9. The above features define the landscape issues against which the effects of this application will be assessed.

10. **Natural Character:** Photographs 1 & 2 of the *Graphic Supplement* demonstrate that the ground surface within the Site, while developed in ecological terms, maintains an open high-country grassland in terms of landscape character. However the coniferous enclosure breaks the openness that exists beyond the trees and north of Braemar Road. Thereby the natural character of the Site is already compromised in terms of bullet points 1 & 3 above.

That is not to say anything goes in its further development. In an Outstanding Natural Landscape, only developments that do not further compromise the identified landscape values are appropriate.

11. **Visibility:** Public visibility of the site is identified in s.2.5 of the *Landscape Assessment* as limited to Braemar Road, notably alongside the site and from where a raised section crosses the Pukaki Moraines, about 1km to the west. Views into the Site are largely obscured by the shelter trees, other than glimpses through openings at the two gates (Site Photographs 3 & 4 and Viewpoint 8, Graphic Supplement). All other locations are on seldom-frequented private land, mostly that of the applicants. This is accepted.

C. THE APPLICATION

12. The application proposes establishing a solar farm on the pastoral land within the existing shelter belts, ultimately occupying approximately 100 of the 120ha of that land[2]. It will be built in two stages, the first initially of 13.5ha at the western end, and ultimately, once capacity of the Transpower/Alpine Energy networks is upgraded, the remaining 86ha.

13. The farm will comprise ultimately 134,940 solar panels each approximately 2.4x1.4m, mounted on frames aligned east-west and angled to face the midday sun. The panel tops will be approximately 3.5m above ground although variable with ground undulations, and the lines approximately 4.9m apart, to allow access. While the arrays collectively will appear continuous in oblique (ground level) views, actual ground coverage will be approximately 40% by area. Largely, the existing pastures below will be maintained with continued grazing by sheep except for new roads and infrastructure.

14. Appendix 3 of the application, *Site Plan,* shows the arrays divided into four blocks by three north-south gravelled access roads each of 4m width. The modules will be setback 10m from the shelterbelts and surrounded by a 2.4m high chain link mesh fence within the existing shelterbelts.

15. Besides the solar arrays, there will be two permanent inverter structures in stage 1 and a further 15 approximately in stage 2. These convert DC current from the solar panels to AC current for the grid and will comprise weatherproof components on a 20- or 40-foot container base, up to 2-3m high, on a concrete pad.

16. There also will be an export switchgear building at each of the two connection points to the local network, which are (stage 1) at the west end facing Braemar Road and (stage 2) at the east end. These are likely to be prefabricated buildings the size of two 40-foot containers, side-by-side.

17. A temporary site office will exist during construction, typically a converted shipping container. Also, from 15 – 20 40-foot shipping containers in which the panels, framing cabling etc will be delivered to site. These will be in temporary works areas adjacent to (inside) the shelter trees along Braemar Road.

[2] *Landscape Assessment* s.2.4.1 and 4.1.1 refer.

18. Earthworks will comprise foundations for platforms, parking areas, internal roads and trenching for underground cables. The arrays themselves will not require earthworks in their construction, other than the point at which their metal pile is driven into the ground.

19. The two wetlands within the site (paragraph 8, last bullet point) have been identified as of ecological value. These will be excluded from the solar farm and fenced to maintain their values, with setbacks of at least 20m from their edges. These are shown on the Site Plan in Appendix 3.

20. The solar panels are stated to have a life of perhaps 20 years and it is reasonable to expect that, if the solar farm remains productive, they would be replaced at that time. The proposed farm therefore could be assumed to be a permanent feature of the landscape.

D. METHODOLOGY

21. The *Landscape Assessment* methodology is defined in **Appendix 1** of that document, noting in particular the distinction between effects on the visual environment, natural character and landscape (see 'Introduction' in Appendix 1). Also noted are the discussions on measuring each of these effects, and the seven-point scale used for the rating them. Where my re-assessments in this Review use this sevenfold assessment scale, the categories will be stated in quotation marks and with a capital letter, e.g. 'Low' or 'Very Low'.

22. **'Less Than Minor', 'More Than Minor':** The RMA requires an application to be notified unless the effects on a person will be 'less than minor' or the effects on the environment 'no more than minor'. In the *Landscape Assessment,* the final section of Appendix 1 contains a useful definition of these terms in relation to the seven-point scale:
    - **Less than Minor** *refers to 'Very Low' and the lower half of 'Low' effects;*
    - **Minor** *refers to the upper half of 'Low' effects and to 'Moderate-Low effects; and*
    - **More than Minor** refers to Moderate effects and all higher on the seven-point scale.

    This Review accepts, and will follow, that usage.

23. **Visual Catchment:** Having viewed the site and its locality, it is accepted that the 'visual catchment' described in *Landscape Assessment* s.2.5 and *Graphic Supplement* Figures 1, 3 and 5 (Site Photographs) suitably identifies the extent of potentially affected parties, visually. In terms of the public, these are the users of Braemar Road, and of private land, the neighbours on Army land to the north and Balmoral Station (the applicants) on the Old Man Range. The interior of the site is effectively screened from the outside, visually, by the surrounding trees, except where there are gaps for gates, and where a section of Braemar Road crosses higher land about 1km to the west.

24. **Conclusion:** The methodology followed by the *Landscape Assessment* is appropriate and the definitions particularly useful. The maps and site photographs of the *Graphic Supplement* give an effective basis for assessing effects on the site and neighbourhood.

E. ASSESSMENT

25. The *Landscape Assessment* s.5 contains the applicant's assessment of 'Natural Character Effects' in s.5.2, 'Landscape Effects' in s.5.3 and 'Visual Effects' in s.5.4.

EFFECTS: NATURAL CHARACTER

26. The *Landscape Assessment* as received defined the effects on natural character in Appendix 1. However following my phone conversation with Boffa Miskell, that definition is now amended to read *'Change in the characteristics or qualities including the level of naturalness*.' This reinserts words inadvertently omitted from the application copy but intended by the applicant.[3]

27. Section 5.2 of the *Landscape Assessment* assesses the natural character values of the existing site as **'Moderate'**, through having been grazed and fertilized, through including both indigenous and dominant exotic grasses, and through the wetlands having been accessed and pugged by cattle. This is accepted.

28. It defines the changes to this as resulting from firstly the perceived coverage of the existing pastures by the large number of manufactured solar panels, which will hide the grassed surfaces and its natural patterns of undulations. This will lessen the perception of naturalness within the shelterbelts. Secondly it describes the intended fencing of the wetlands and 20m setback, leading to increased ecological naturalness of the wetlands. Overall, the application conflates these perceptual and ecological effects into a **'Neutral to Low Beneficial'** effect on the natural characteristics and qualities of the site as a whole.

29. This is not accepted. In my view it gives undue weight to ecological benefits in the wetlands, although these are accepted as beneficial. It gives insufficient weight to the visible change of the land surface within the shelterbelts, from the existing natural-seeming grasslands to industrial-seeming manufactured panels. Perceptively, this change will far outweigh the extent of those to the wetlands, and my view will have a 'High' negative effect on the perceived natural character within the shelterbelts.

30. There is no simple logic to the combining of the two differing effects in a single assessment but in view the 'Low Beneficial' of the wetland and the 'High Negative' of the overall land surface, this proposal will have 'Moderate-High' effects on the site, referring to natural character within the four shelterbelts.

31. Little of this effect is experienced beyond the shelterbelts. Although away from the farm centre of Balmoral Station and containing no buildings, the enclosed, improved site is akin to the 'Homestead Nodes' accepted in Plan Change 13 as typical of the Mackenzie Basin cultural landscape. In this respect, and because it does not further disrupt natural character of the wider Basin, the proposed solar farm will fit the pattern recognised in the ONL.

32. In total therefore, the effects of this proposal on natural character in the Mackenzie Basin ONL generally are 'Very Low', due to its:
    - small size relative to surrounding landforms;

[3] *Landscape Assessment*, Appendix 1 + pers con G. Densem – E. McRae.

- lack of prominence at the junction between outwash plain and Old Man Range landforms;
- lack of prominence from peopled places of the Basin, behind the Old Man Range;
- containment within an already-modified enclosure;
- fitting within the 'Homestead node' pattern of the Basin.

33. **Conclusion, Natural Character:** Considering the characteristics of openness, vastness and natural landform which are the identified elements of the ONL still existing at this site, I am satisfied firstly that the solar farm would diminish those natural character values in this section of the Basin to a 'Very Low' extent, and secondly, that this measure is more important than the 'Moderate-High' effects within the site itself.

EFFECTS: LANDSCAPE

34. The *Landscape Assessment* defines Landscape Effects as *'Change in the physical landscape, which may affect its characteristics or values'*,[4] also re-inserting words omitted from the submitted copy. In this section, the application considers biophysical changes to landforms, soils, vegetation and the wetland, and changes to landscape character arising from the biophysical.

35. **Biophysical:** The landforms have a gentle fall to the south-west and within this exists small hummocks, undulations and the diagonal depression of the central wetland. The wetland will remain unaltered and the wider land surfaces generally so, with shallow, refilled trenching for cables, deeper (200mm) permanent excavations for the internal roads, and near the entrances, disturbance for parking areas, site buildings and construction storage. About 2% of the site will be altered in this manner. Soils will be affected in the same manner and extent.

36. The *Landscape Assessment* assesses these effects as 'Low' (neutral), which is accepted, with the small variation that in my view they are 'Low' (negative). Although the difference is of little consequence overall.

37. Vegetation effects will comprise creation of three further 4-metre gaps in the shelterbelts along Braemar Road, to create three site entrances above the two already existing. The grass sward will be maintained beneath the panels and grazed by sheep, except for small amounts taken up by roads and structures, effects of these assessed as 'negligible' in the application. The two wetlands will remain physically unchanged but likely improved by the planned fencing and pest eradication. These assessments are accepted.

38. **Character:** While seemingly repeating the previous section (paragraphs 26 – 33), this section considers changes to the modified character of the site, as opposed to its natural character. The *Landscape Assessment* considers temporary disruptions during construction and longer-term changes to the sense of amenity possessed by the site.

39. During construction, the exposure of bare soil during earthworks will be noticeable, and the 'clutter' of vehicles, equipment, materials, but most will be reinstated or removed on

[4] *Landscape Assessment,* Appendix 1, bottom of page, + pers comm G. Densem – E. McRae

completion. It is accepted the impacts of this will be 'Low-Moderate' in the short term but 'Very Low' on completion.

40. After completion, the transition from a 'rural pastoral' to an 'energy infrastructure' character will have occurred. The appearance of the ground surface will become dominated by coverage of manufactured panels despite the pastures beneath. The *Landscape Assessment* does not attempt an assessment of this but emphasises the isolating effects the shelter belts will have on this change, which is accepted. It also refers to the mitigating of structures by 'blending colours' (unspecified) and low reflectivity.

41. My conclusions were stated in paragraphs 27 – 33 above, which assessed effects on landscape character within the shelterbelts as 'High', but beyond the shelterbelts, as 'Very Low' for the Mackenzie Basin ONL overall.

42. The changes in site character therefore are in some cases 'Moderate-High' within the site but being confined within its shelterbelts and small in extent, do not affect the wider landscape. The 'Low' adverse effect of the *Landscape Assessment*[5] is therefore accepted.

EFFECTS: VISUAL

43. Visual Effects are defined in the Landscape Assessment as 'Change to views which may affect the visual amenity experienced by people'[6].

44. **Reflectivity:** A visual change which could result from this project relates to possible reflectivity ('glare and glint') that may catch people's eyes at certain directions and sun angles. The *Landscape Assessment* and *AEE* do not consider this but Appendix 7 of the *Ecological Impact Assessment* contains solar reflectivity details from the firm Canadian Solar, based on experience with panels near highways and airports. The following is based on that appendix.

45. Canadian Solar state that under most sun angles, reflectivity of their panels (which may or may not equate to those proposed here) is in the range of 4%.[7] In visual terms this is a very low value. However, they continue that where sun angles are low - in the range 10 – 20° above the horizon - reflectivity quickly rises to 30% or more. An aerial photo in Fig 1 of their paper shows significant glare from a solar array. The inference is that the panels may be significantly reflective from certain directions at times of low sun – for instance early morning or late afternoon. The Appendix describes processes to predict this, but which are most complex given the dynamics of sun movement, viewer directions and the continuous development of conditions on any given day.

46. The proposed panels on Braemar Road will be behind shelterbelts which largely screen normal views but may not preclude potential strong glare being visible to road users at times, through the trunks and gaps. For instance, Viewpoint 7 in the *Graphic Attachment* shows how the panels will be visible to traffic approaching from the west. With the panels angled to the north, low morning (easterly) sun reflecting off the panels is very likely to

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5 *Landscape Assessment*, 5.3.17.

6 *Landscape Assessment*, Appendix 1, bottom of page.

7 *Ecological Assessment*, Appendix 7, Canadian Solar Technical Bulletin, Fig 4.

affect locations to the west, such as drivers approaching on Braemar Road, through the gap seen in Photograph 7. Close to the site, this could potentially amount to serious dazzle at times. The effect seems to have been encountered overseas, the Canadian Solar paper including the photo of a road sign 'CAUTION. EXPECT SOLAR GLARE IN A.M.'[8]

47. In the absence of local experience, and in the interests of road users, this Review will bear in mind at least the potential for such effects, until proven otherwise.

48. **Views from private land:** The only residence nearby is the Balmoral Homestead, 2kms to the east. There are no views of the site from there, being screened by both trees and footslopes of the Old Man Range. The owners are the applicants in this case.

49. All farmlands surrounding the site south of Braemar Road are part of Balmoral Station, extending 5kms west of the site to the Mary Burn and also including slopes of the Old Man Range that overlook the site. There will be clear views into the site from these slopes but other than farm personnel, no others will have these views of the proposed solar farm.

50. North of Braemar Road and west to the Mary Burn is Ministry of Defence (Army) land, unfrequented except for military exercises and presumably, farm management. Signs on all gates warn the public to keep out. The land is visually open but as well as the low usage, would have no general views of the solar arrays due to the shelterbelts on the site. Existing and proposed openings in the shelterbelts would give glimpses of the site interior from MOD land near the road boundary but these are likely to be of 'Low' effect due to the very low usage of the MOD land. The assessment conclusion of 'none' (i.e. no views from private land, s.5.4.11) are therefore accepted in general, but with the proviso regarding reflectivity.

51. **Views from public locations:** These are taken by the *Landscape Assessment* to comprise solely the Braemar Road, which passes the site, and this is accepted. Nine representative Viewpoints are illustrated by photographs in the *Graphic Supplement* and description in the text. Eight are along Braemar Road, between State Highway 8 and elevated land about 2kms west of the site. The ninth is from Mt John.

52. **Viewpoint 1** shows that the site is not visible from SH8, obscured by the Old Man Range landform. **Viewpoints 2 – 4 and 6** illustrate more distant locations along Braemar Road where the site shelterbelts are visible but with no views into the site. **Viewpoint 9** demonstrates that the site is not visible from public areas at the summit of Mt John, it being obscured behind the Old Man Range. Views into the site from these six locations are accepted as functionally non-existent and they will not be considered further.

53. **Viewpoint 5** illustrates views of the site interior obtained from a 900m-long raised section of Braemar Road, at some distance 1km west of the site. The *Landscape Assessment* characterises this as 'a short section of the road'.[9] By my calculation however, it would at 80kph occupy a driver's attention directly ahead for 40 seconds, which seems a significant visible time. While distant, the interior is clearly seen above the shelterbelts and through

[8] *Ibid,* Fig 6.
[9] *Landscape Assessment* s.5.4.6

gaps, as would be the solar arrays and in particular, any potential glare. The *Landscape Assessment* (s.5.4.6), assesses this view as 'Low Adverse'.

54. In my view the effects could potentially be greater, given contrast with the highly-natural surroundings. While seen from a distance at Viewpoint 5, the solar arrays will be facing north (leftwards out of the site in this view), will therefore be visible, and due to their industrial character, will contrast visually with the otherwise vegetated surroundings. My view is that under normal conditions, the visual effects of the solar farm would be at least 'Low-Moderate' from this section of road. Should sun strike occur however, which must be possible from this direction during morning low sun, the arrays would draw attention to the site and become a focus of this view, if not dazzling. At such times the effects would in my view be 'Moderate-High', due to the reflections within the ONL setting.

55. **Viewpoints 7 & 8** illustrate public views from Braemar Road near and alongside the site. Gaps in the shelterbelts are seen to give strong views into the site at close range, the gap in Viewpoint 8 being 15metres wide. See also the applicants' Site Photographs 1, 2 & 5 from within the site, which illustrate the number of gaps as seen from the inside. Several existing gaps are planned to be planted in time, but three proposed further entrances will create new ones. Through whatever gaps may remain, the solar arrays will be visible, but in mitigation, mostly through relatively narrow openings and a 'tunnel' of flanking trees.

56. **Viewpoint 7**: The *Landscape Assessment* holds that effects at Viewpoint 7 will be 'Very Low'. Photo 1 below shows the west entrance to the site at a distance of about 40 metres, viewed from Google Earth. This is closer than the 300m distance assessed in Viewpoint 7 and more similar to Site Photograph 4 in the *Graphic Supplement*. In my view, the visual effects of the solar arrays at this closer range will be 'Moderate', looking obliquely onto a large area of the arrays, albeit through a relatively narrow gap, and considering the ONL context of the site. With increasing distance to the 300m range of VP7, effects would decrease to 'Low-Moderate' progressively. All effects would increase significantly should sun strike occur.

PHOTO 1: ***West entrance from Braemar Road at distance 40 metres, same direction as Viewpoint 7, which is at distance 300m. A significant expanse of arrays will be seen. (Google Earth)***

57. **Viewpoint 8:** The *Landscape Assessment* holds that effects at Viewpoint 8 will be 'Moderate-Low' and the additional explanation and simulation of November 2022 provides further details in support of this. Photo 2 below shows an oblique view of the same gap, looking east on Braemar Road, taken from Google Earth. The applicants' Visual Simulation (November 2022 Graphic Supplement) proposes that the left half of this gap be planted, but my Photo 2 also shows that even so, an oblique view would look over a wide length of solar arrays, as far as the distant trees. It is accepted that, as in the Viewpoint 8 additional simulations, the view at right angles to the road through the right half would remain unchanged, being onto the identified wetland area. The wetland would however remain unseen at the oblique angle of Photo 2, which would continue to look onto the solar arrays.

58. In my view, and taking into account the extra explanation provided as well as the ONL context of the site, the visual effects of the proposal on this oblique view would be 'Moderate'. This would increase dramatically if sun strike should occur. It is acknowledged the effects would not occur until Stage 2 of the development, by which time the new shelter trees would achieve the screening proposed, if planted at the start of development.

PHOTO 2: ***Oblique view into the site through the same gap illustrated in Viewpoint 8, looking east on Braemar Road. Proposed new planting, covering about the left half included in the box, will narrow this gap, but through the remaining right half, solar arrays will be seen extending to the far trees. (Google Earth)***

59. **Opacity?** Photographs 3, 4 & 8 of the Graphic Attachment indicate that alongside the shelterbelts, even where thick, a certain amount of view into the site will exist between the trunks. Visually, the shelterbelts are not fully opaque. To see such views from a passing vehicle, one would need to be looking sideways from the road which, while unlikely for drivers, would be normal for passengers. By my estimate the effects on these sideways views would be 'Low-Moderate' at normal times, but 'Moderate' should glare or sunstrike eventuate, which would through draw attention to the panels.

60. **Visual Effects, Summary:** Effects on private land, arising from the proposal, are accepted as 'Very Low'. Effects on users of Braemar Road, near the site, are accepted as 'Low' in general, 'Low-Moderate' through many gaps and sideways through trees where not opaque, but obliquely, facing the gaps at the north-west corner (Viewpoint 7) and middle entrance (Viewpoint 8), would be 'Moderate'. From the raised section of Braemar Road about 1km west of the site (Viewpoint 5), the visual effects would be 'Low-Moderate'. These assessments are weighted for the heightened sensitivity of the ONL status of the setting.

61. The assessments are provisional on there being no sun strike. Should sunstrike occur, the effects at such times would be 'Moderate-High' from the raised section of road to the west and oblique views near the site, and 'Moderate' from Braemar Road near and alongside the site. This would include, at times such as late afternoon, possible effects on Braemar Road east of the site, such as Viewpoint 4 and Site Photo 4 of the Graphic Attachment.

F. REVIEW, SUMMARY

62. **Effects on ONL:** Apart from the potential issue of sun strike, this Review accepts the findings of the *Landscape Assessment*, that the landscape effects of the solar farm on ONL values beyond the site will be generally minor. This is because they are screened within an existing modified area. This Review disagrees however that the effects on landscape character within the enclosing shelterbelts will be minor, holding they will be 'High' (paragraphs 28-9 above), but accepts, given the visual enclosure, unobtrusive location and already-modified nature of the site, that this is not experienced generally beyond the site. Accordingly, and despite its large size, the wider effects on the Mackenzie Basin ONL would be negligible.

63. **Reflectivity:** All the above findings on visual and landscape effects are dependent on no reflectivity or sun strike occurring. Should such effects occur, they would draw attention to the solar arrays in both close up and distant views, and would markedly impact on ONL values. It is beyond my expertise to predict such effects although overseas literature suggests they may occur (refer paragraph 44). Mitigation, if required, could not be realistically considered without further evidence but a large shiny area would contrast vividly with the naturalness of the Mackenzie Basin.

64. **Visual Catchment:** The visual effects of the proposed solar farm are accepted as largely being contained within the shelterbelts. The shelterbelts themselves are widely visible but not the activities within. This is a primary reason for the proposal being acceptable in an otherwise highly open and sensitive ONL environment. It also is the reason the original Site was likely to be unacceptable on landscape grounds.

65. **Number of Entrances:** Proposals to increase by three the number of openings in the Braemar Road shelterbelt will increase exposure of the solar farm to public view. These have been seen to have most effect from oblique views through any gaps. It is not clear what number may become too many in terms of openings but it would be preferable on visual grounds to minimise the number of access points and openings, both for reasons of maintaining visual screening and to minimise denaturalisation of the ONL from multiple formed turnoffs and gates in the lightly-developed roadside of Braemar Road.

66. **Viewing Audience:** It is accepted that the public will see the site only from a relatively short length of Braemar Road. This is a lightly-travelled road although increasingly used to access the expanding recreation facilities on the east side of Lake Pukaki, such as new farm accommodation and the Alps2Ocean cycle trail.

67. **Naturalness, Landscape Character and ONL:** In its essence, converting the highly-natural Mackenzie Basin landscape to the industrial character of massed solar arrays is strongly contrary to the aims of the ONL designation. This Review has disagreed with the assertion of the *Landscape Assessment*[10] that the effects on landscape character within the containment of the site will be 'Low, beneficial', based on benefits to the wetland. While that benefit is accepted, it does not outweigh effects on the greater area that will be covered by solar panels, and their consequent further de-naturalisation of the majority of the site. Such change must be held to be against the ONL values, unless mitigated.

68. The change in character brought about by solar panels is acceptable in this case, through being visually-contained and on modified land. However, it is important to establish the point that massed solar panels in general would cause fundamental change to the rural and high country landscape character of the Mackenzie Basin, and thereby to the ONL values.

69. **Visual Assessment:** The process of documenting likely visual effects by photographs of 'typical' locations is accepted. Also, the documenting of the site interior and public viewpoints on Braemar Road and Mt John, and the proposed measures for minimising visual effects by colours and reflectivity that blends into the setting, and by narrowing and minimising the number of openings in the shelter belts.

70. The following conclusions of the *Visual Assessment* are accepted**:**
    - 'No' or 'Low' visual effects for users of Braemar Road between SH8 and about 50 metres from the site eastern boundary, due to intervening topography and vegetation, and the rising road immediately east of the site. Also, 'No' or 'Low' effects along the road west of the site beyond 300m, barring the raised area described below (Viewpoints 1 – 4, & 6);
    - No visual effects from public areas on Mt John, the solar farm being hidden behind the Old Man Range from this direction;

71. The following conclusions are not accepted, or not in full:
    - The applicants' 'Low' visual effects from a raised section of Braemar Road 1km west of the site (Viewpoint 5). This Review holds them to be at least 'Low-Moderate' from the contrast of the solar panels with the surrounding natural character. It would however become significant at times of sun strike, should it occur. No particular mitigation seems possible for such long-distance views;
    - The applicants' 'Very Low' visual effects within 300m west of the site on Braemar Road (Viewpoint 7). This Review holds that within 300m of the site, effects would steadily increase approaching the site, from 'Low-Moderate' at 300m to 'Moderate' at 50 metres, given oblique views of the expanse of Solar arrays that would occur, albeit framed by the shelterbelts;

[10] *Landscape Assessment* s.5.2

- The applicants' 'Moderate-Low' visual effects from Braemar Road alongside the solar farm and through gaps (Viewpoint 8). In my view, and taking the further explanation and mitigation into account, this underestimates the visual effects. The solar arrays will be facing the road, will be seen at close range, and viewed obliquely through gaps, will be seen extending en mass into the distance. In my view effects on these views would be 'Moderate'.
- There could be a positive element to the close-up views, in allowing for inquisitiveness of the public to this new form of land use. However this does not outweigh the negative visual effects.

72. **Mitigation?** No mitigation of the overall effects of the solar arrays is possible or envisaged, beyond requiring the existing shelterbelts be maintained, and gaps minimised. It is emphasised that the existing trees are crucial in mitigating visual effects in the highly natural setting and should be replaced if lost to storm, fire, disease or etc. Recommended Condition 4 below is intended to ensure this. The *Landscape Assessment* proposes measures for the structures, earthworks and fencing[11], and these also are incorporated in the proposed recommendations below. As far as possible, disturbance to the simple, high country roadside character should be minimised.

73. **Cumulative Change:** The acceptability of this proposal results from its site-specific factors. The effects are contained, unobtrusively located, and affect an already-modified area. Applications to convert pastoral farmlands to solar farms are currently numerous up and down New Zealand and it is reasonable to expect more will be received within the Mackenzie Basin ONL over time. The visually-open and highly-natural and unique landscape character of the Basin has low capacity to absorb such change. As with the advent of irrigated dairying in the Basin, cumulative change from increasing numbers of solar farms would at some point reach a tipping point whereby they begin to overwhelm the natural character of the landscape, which is the basis of its ONL. This cumulative capacity is over and above the suitability of any particular site to absorb the effects.

G. RECOMMENDATIONS

74. Arising from the application, the following are recommended regarding landscape matters:

Recommendation 1:
That the application be accepted as regards landscape effects, with conditions included in Recommendations 2 – 10 below;

Recommendation 2:
That all existing boundary trees be retained except where new entrances are agreed, and existing gaps be planted or narrowed with like tress where redundant;

Recommendation 3:
That the number of new entrances be reconsidered and if possible, lessened;

[11] In *Landscape Assessment*, s.5.3.15

Recommendation 4:
That all screen trees be maintained during the life of the solar farm and if parts are lost, be replaced by like plantings as soon as reasonably possible;

Recommendation 5:
That onsite infrastructure and buildings be non-reflective, coloured to blend with the wider Mackenzie Basin landscape, and in keeping with Appendix K of the Mackenzie District Plan;

Recommendation 6:
That visible foundations of buildings and structures be avoided, and as far as practical, floors kept close to ground level;

Recommendation 7:
That proposed boundary fences be located to follow the inside of the shelterbelts and be in accordance with Appendix K of the Mackenzie District Plan;

Recommendation 8:
That all soils disturbed by the project be reinstated and regrassed immediately post-construction, and views of bare soil minimised;

Recommendation 9:
That in the event that reflectivity from the proposed panels causes nuisance or danger to neighbours or road users, the applicant will take measures to block or otherwise eliminate the nuisance.

75. Additional to the application, the following are recommended for Council attention

Recommendation 10:
That the Council monitor the potential for cumulative effects on the Mackenzie Basin ONL arising from further applications for solar or renewable energy schemes.

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Graham Densem
ANZILA
14 December 2022