

GUARDIANS OF LAKES  
MANAPOURI, MONOWAI & TE ANAU



Name of applicant – **Meridian Energy Limited**

Activity location address of consent you are submitting on - **Waiau River**

Application number – **APP 20233670**

**Submission details**

Our submission relates to the whole application.

The Guardians of Lakes Manapouri, Monowai and Te Anau are not a trade competitor of the applicant as described in section 308B of the Resource Management Act 1991)

**Outcome sought**

The Guardians are Neutral to the proposal subject to a number of concerns being carried into the consent decision.

**Hearing details**

I wish to be heard in support of my submission - Yes

I wish to be involved in any pre-hearing meeting that may be held for this application – Yes.

We will serve a copy of my submission on the applicant.

**Background to submission**

The Guardians of Lakes Manapouri, Monowai and Te Anau (The Guardians) are appointed under Section 6X of the Conservation Act (1987) and our functions include:

*"to make recommendations to the Minister on any matters arising from the environmental, ecological, and social effects of the operation of the Manapouri-Te Anau hydroelectric power scheme on the townships of Manapouri and Te Anau, Lakes Manapouri and Te Anau and their shorelines, and on the rivers flowing in and out of those lakes, having particular regard to the effects of the operation on social values, conservation, recreation, tourism, and related activities and amenities" (s.6X (2a)) and*

*"to make to the Minister, and to the Minister responsible for the administration of the Manapouri-Te Anau Development Act 1963, recommendations on the operating guidelines for the levels of Lakes Manapouri and Te Anau, for the purposes of section 4A of that Act" (s.6X(2c)).*

*The purpose of the lakes' operating guidelines is as detailed in s.4A (1) of the Manapouri-Te Anau Development Act 1963, being "to protect the existing patterns, ecological stability, and recreational values of their vulnerable lakeshores and to optimise the energy output of the Manapouri power station."*

The Guardians take our legislated responsibilities very seriously and have collectively become increasingly concerned about the ecological health of the shorelines of Lakes Manapouri and Te Anau over recent years, particularly in relation to their lakeshore vegetation sequences, and the ecological stability of their distinctive and characteristic vegetation zonation patterns. Our concerns also extend to the ecological health of the Waiau Arm and the Lower Waiau River.

In addition, the Guardians enjoy a strong social licence to speak on behalf of the Waiau catchment communities. Those communities expect us to advocate in consenting matters that have a direct impact on the water quality and quantity of the Waiau River. Councils and other organisations consider the Guardians have a clear role in the consenting process, and as a result are afforded affected party status over a number of activities in the catchment. The Guardians consider they are an affected party to this proposal.

### **Submission**

The Guardians understand that the reason for constructing a channel that will deliver only 70% of the flushing flows to the Lower Waiau River (LWR) is that, currently, the Waiau Arm channel is the factor limiting the delivery of flushing flows, such that only 30% can be delivered. With construction of the parallel channel, the channel will no longer be the limiting factor and the sill level of the MLC is what will limit the flushing flows - hence 70% flow delivery, not 100%.

Whilst the AEE and supporting documents are not clear on this matter, we seek clarification from the applicant on this point, and the implications of this shortfall should our understanding be correct.

### **Proposed Term of Consent**

The Guardians are uncomfortable with the 35 year term promoted by the applicant. This is even more pronounced given the introduction of FMU's to the catchment and the consent renewal process for the Manapouri Scheme in the coming years.

We consider a shorter term aligning with the existing consents in December 2031 would be appropriate. This will allow a full review of the scheme and its effects on the entire catchment, rather than a piecemeal approach to consenting.

### **Water Quality - Turbidity**

The proposed turbidity allowances are outlined in the AEE and in the NIWA Freshwater Ecology AEE (Appendix D, page 7, Executive Summary) where we read that the turbidity thresholds and durations will be nested.

For example, the turbidity threshold of 12.4 FNU will have a total exceedance allowance of 945 hours (+/- 39 days) with a maximum consecutive exceedance allowance of 315 hours (+/- 13 days), and for increasing thresholds of turbidity there are progressively shorter duration allowances for exceedance - both "total" and "consecutive" exceedance hours. The Guardians consider this is appropriate and is supported.

However, there is no minimum interval proposed between the consecutive exceedances. Only three exceedances of maximum consecutive duration will be allowed within the total exceedance allowance at each turbidity level. We consider there is benefit in applying a minimum permitted interval between exceedance events. To illustrate, for an exceedance of say 13 days at 12.4 FNU, followed by an interval of just one day, or two or three, before a further exceedance event, would not allow much respite for ecosystem recovery. We encourage an ecologically-referenced minimum interval should apply. Preferably, this minimum interval should be a ratio such as 3:2, such that it

could be scaled down to apply proportionately to a consecutive exceedance of a shorter period (eg a 12 day exceedance requires a 8-day interval).

### **Deposited Fine Sediment**

There is also a proposed Deposited Fine Sediment (DFS) threshold (p 7 of Appendix D), where the DFS exceedance allowance is "an increase of no more than 20% cover on the baseline value ... at the start of excavation, based on a rolling 4-week average of weekly observations [at the Waiau River monitoring site upstream of Excelsior Creek]."

Appendix D, p 24 then records that a turbidity of 30 FNU for 37 hours is sufficient to cause an increase in Deposited Fine Sediment (DFS) of 20% cover. However, the proposed turbidity threshold for 30 FNU is a total exceedance of 504 hours (21 days), with a maximum consecutive exceedance of 168 hours (7 days) (see p 7 of Appendix D).

The Guardians are uncertain with these calculations, and encourage the applicant to provide further context. The same report telling us on the one hand that the DFS threshold can be reached in as little as 37 hours at 30 FNU, whereas the maximum consecutive exceedance allowance for 30 FNU will be 168 hours (7 days) - ie 454% of the duration known to cause a DFS increase of 20% cover.

Regarding the DFS monitoring site, currently located just upstream of Excelsior Creek in the Waiau River, consideration needs to be given to shifting this site to downstream of Excelsior Creek for the duration of the project. The rationale for this is given on p 28 of Appendix D, where about 20% of DFS surveys have been missed due to elevated river levels, where high flows cause a lack of access due to channel geometry. "At the downstream site the river is much wider and a boulder /cobble bank slopes gradually into the water, so that some part of the river bed is accessible under a wide range of flows" (Appendix D, p 28).

The Guardians suggest the DFS monitoring site being shifted to downstream of Excelsior Creek for the duration of the project.

### **Phytoplankton Blooms**

The risk of phytoplankton blooms developing in the Waiau Arm is considered in terms of both the duration of the project (Appendix D p 55), as well as the longer term situation following excavation of the new parallel channel (Appendix D p 55, plus Appendix E).

Firstly, during the project the application notes "Directing all Mararoa water flow down the LWR during the excavation activities may increase the phytoplankton blooms farther upstream in the arm [due to reduced water velocity]," although we are advised that "the increased risk is likely to be small compared to the risk under typical summer conditions."

Appendix D goes on to say that "In any event, Meridian's usual summer monitoring in the Waiau Arm is designed to pick up warning signs of developing blooms. If blooms are detected, mitigation could be implemented (eg a flushing flow)".

We understand the applicants "usual summer monitoring" is currently under review, due to concerns raised by stakeholders (the Waiau Working Party and the Guardians) that there were instances during both the 2021/22 and 2022/23 monitoring seasons where warning signs of reduced water clarity and increasing chlorophyll a levels were detected and no mitigation action (ie flushing flows) was implemented. (To date the Waiau Arm water quality results of the 2023/24 monitoring season are not available to stakeholders, as the reporting does not occur in real time.)

A review of the Waiau Arm water quality monitoring plan has been requested, seeking increased integration of Waiau Arm flows (direction and magnitude / intensity) in anticipating poor water quality events, as well as more clarity over threshold trigger levels, including an appropriate

chlorophyll a trigger level, and development of a clearer decision-making matrix to ensure that where "mitigation could be implemented (eg a flushing flow)," such mitigation will be implemented, as appropriate.

The Guardians consider the current "usual" summer monitoring programme for Waiau Arm water quality is not satisfactory and it should be a condition of consent for the present application to update and enhance the water quality monitoring programme along the lines just outlined, to the satisfaction of all stakeholders involved.

### **Ongoing risks of phytoplankton blooms (ref Appendix D)**

Following the completion of the excavation project, the AEE states that "once the breakout excavations are completed, water velocities are expected to be lower in the Waiau Arm just upstream of MLC than those experienced in the current channels," such that "Decreased water velocity in the channels following the Project could increase the risk of development of high levels of phytoplankton in this part of the Waiau Arm."

This is a particular concern because it appears that the post-project plan is to rely on the current Waiau Arm water quality monitoring programme, which has already been identified by stakeholders as deficient in its provisions and unfit for present purposes, let alone the increased risk of phytoplankton blooms developing in this part of the Waiau Arm post-project.

In response to the increased risk, post-project, of elevated chlorophyll a levels leading to phytoplankton blooms, at least one additional water quality monitoring site should be added to the current suite of monitoring sites, and this should be set up in the vicinity of the existing channels, and closer to the MLC, than is the case for the current monitoring sites.

Additionally, the Waiau Arm flow data should be integrated into a predictive model for poor Waiau Arm water quality; there should be clearer water quality trigger levels, particularly the incorporation of a chlorophyll a trigger threshold; plus a more proactive decision-making matrix should be developed such that when mitigation measures are indicated (ie flushing flows) they will be delivered in a timely manner.

On page 55 of Appendix D the authors go on to say that the increased risk of phytoplankton blooms in the Waiau Arm in the vicinity of the MLC "is likely to be offset by the release of more effective flushing flows during summer than are possible at present".

There is nowhere in the AEE that confirms whether this assertion has been tested, and it needs to be tested. There will only be an additional 40% increase in flushing flow capability and it is unclear if this will be sufficient to offset the increased risk of phytoplankton blooms as no analysis is given. Whilst a step up from 30% capability to 70% presents a 133% increase (i.e  $40 \div 30 \times 100$ ) which initially appears significant, the Guardians would prefer the applicant to achieve a 100% flow, a 233% increase (being  $70 \div 30 \times 100$  ).

### **Appendix E**

Appendix E (NIWA's Assessment of risk of phytoplankton blooms in the Waiau Arm immediately upstream of the MLC following excavation of a new parallel channel) focuses mainly on velocity changes (reductions) in the existing (main and south) channels following the excavation of a new parallel channel, and finds that velocities will likely be reduced across a range of lake levels, leading to increasing risk of elevated chlorophyll a levels and associated phytoplankton blooms, with three to five times the number of days under high risk conditions expected (Appendix E, p 5).

Temperature effects, temperature stratification and expected shallower water in the three channels vs two channels are mentioned on p 18 of Appendix E, with reference also made to s3.3.1

on p 12 and Figure 3.1 on p 13 regarding temperature effects on chlorophyll a levels. Although not subjected to any detailed analysis in the report, these factors are expected to exacerbate the effects of reduced flow velocities and to increase even further the risk of elevated chlorophyll a levels and associated phytoplankton blooms. Further potential effects on chlorophyll a levels, due to increasing light penetration in shallower water, are not considered.

We note that Table 4.1 on p 18 indicates the increased risk of elevated chlorophyll a levels based on water velocities only - and it is on this basis that three to five times the number of days under high risk conditions are expected - without considering the possible exacerbating effects of increased water temperatures, increased light penetration and shallower depth of channels.

A summary of the effects assessment is given on p 19 of Appendix E, and this reiterates that "the chlorophyll a - velocity relationship suggests substantial increased risk of phytoplankton blooms over the risk in the existing channels. The predicted number of days per year under high risk of phytoplankton blooms in the post-excavation main and south channels was three to five times higher than that predicted for the existing main and south channels."

"Modelled water depth (averaged across the channels) is less than 2.5m in the parallel channel option. The shallow depths ... could increase the risk to more than that suggested by water velocity alone, because of the risk of warmer temperatures at times. While the existing channels are even shallower [than <2.5m], the effect of temperature would enhance phytoplankton growth only when velocities are low: if phytoplankton is continuously washed downstream it cannot accumulate to form blooms".

Whilst we agree with the author, regarding both the risks and the mitigating effects of continuous washing downstream to prevent the accumulation of phytoplankton, there is no indication that the applicant would agree to any such continuous washing downstream.

The author then goes on (on p 21) to assess the effect of the proposed enhanced flow releases as follows –

*"Following excavation of the proposed parallel channel the increased risk of phytoplankton blooms in all three channels will be reduced by managed flow releases that are part of current flow management in the LWR. Potentially useful flow releases are the larger flushing flows for periphyton management [a total of up to 70% of just 4 - 5 flows per year will be provided, vs 30% at the moment, ie an increase of just 40%], and the smaller [monthly] recreational flow releases."*

There appears to be no analysis of whether this actual number of flows - which are infrequent, of intermittent timing (periphyton flows), and for purposes other than removing phytoplankton - will be sufficient to ensure the frequency of "downstream washing" of phytoplankton necessary to avoid the build-up of blooms. Such "downstream washing" as does occur will certainly not be continuous.

We promote a separate condition of consent is required relating to specific chlorophyll a and phytoplankton thresholds for the Waiau Arm. We consider the current Waiau Arm water quality monitoring programme is not serving its current purpose to the satisfaction of stakeholders - and is under review - let alone serving the increased demands of an increased risk of elevated chlorophyll a levels and associated phytoplankton blooms. A fully revised, updated, upgraded and appropriately tailored Waiau Arm water quality monitoring and mitigation plan needs to be provided as a condition of consent.

### **Longfin eels**

There is a recommendation on p 9 (Executive Summary) and p 60 of Appendix D of "ensuring the instream excavation phase of the Project does not commence until after mid-March to avoid effects on upstream migrating juvenile eels (elvers)."

The current longfin eel trap and transfer programme is a credit to the applicant and it is important that all measures are taken to avoid any adverse effects on this "At Risk - Declining" species. The Guardians support this approach.

Also, the provision of a fish salvage programme for any site-attached longfin eels in the Waiau Arm should be endorsed (see p 8 (Executive Summary) and p60 / 61 of Appendix D).

### **Kaakahi**

Similarly, a salvage programme should be arranged for any kaakahi (At Risk - Declining) present in the project disturbance area (p 61, Appendix D).

### **Buchanan's sedge**

Several plants of Buchanan's sedge (At Risk - Declining) were identified in the artificially constructed, former eastern channel of the Mararoa delta (Appendix F, p23), also in Wetland 8 and some lake margin areas (Appendix F, p 24) where they are under threat from the excavation work. Pages 50 / 51 recommend that <10 of these plants will need to be removed and transplanted to "a suitable area of lacustrine habitat within the Project site, as well as follow-up monitoring of survival and replacement planting (if required)."

We consider the suggested mitigation seems a bit haphazard and risky. Given their threat status and limited number of plants identified for transplanting this may be insufficient intervention to secure this population. A more active approach to ensure survival of the population is encouraged. This would be to collect seed from these plants prior to disturbance and to germinate the seed and raise plants in an off-site nursery area for later rehabilitation of the site. This could be additional to the transplanting and follow-up of transplanted specimens: it offers a more proactive way of ensuring the species' survival at this site than the "wait and see" approach proposed.

### **Stonecrop (*Sedum acre*)**

The species list in Appendix A of Appendix F records the presence of the dicot. herb, stonecrop (*Sedum acre*). This exotic species can regenerate from very small fragments and has been the subject of an intensive eradication programme from the roadside gravels of the Te Anau basin (by people who have since retired - not sure of the DOC succession plan).

DOC and ES will likely be very interested to know of its presence in the proposed work site, and may prefer to initiate an eradication plan prior to works commencing - especially as there is an intention of setting some gravel material aside for use by local contractors (a potential source of further spread).

The Guardians welcome the opportunity to engage with the applicant in a pre-hearing meeting presuming the Council considers this would be beneficial.



Darryl Sycamore  
For the Guardians of Lakes Manapouri, Monowai & Te Anau