Lake Pūkaki Hydro storage and dam resilience works

Substantive Application under the Fast-Track Approvals Act 2024

Meridian Energy Limited

05 November 2025

→ The Power of Commitment

Project name	Meridian - WPS Pūkaki FTC
Document title	Lake Pūkaki Hydro storage and dam resilience works | Substantive Application under the Fast-Track Approvals Act 2024
Project number	12656630
File name	Substantive Application.docx

Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
					Nick Eldred	[redacted]	05/11/2025

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1. Where applicable the relevant clauses of Schedule 5 of the Fast-Track Approvals Act 2024 are noted in Red beside each heading.

1. Applicant Details

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2. Introduction

This application by Meridian Energy Limited (Meridian) seeks to enable the operation of Lake Pūkaki below the current normal minimum level of 518.0 m above mean sea level (m RL), for a three-year period through 2028, and for civil works at Pūkaki Dam to improve the structure's resilience to wave action during lower lake operational levels (**Proposal**).

To understand what is being sought by Meridian, it is necessary to understand the wider Waitaki Power Scheme (WPS) and the role of Lake Pūkaki within the scheme. Section 2.1 below provides an overview of the WPS, Section 2.2 describes the current operating framework for Lake Pūkaki, Section 2.3 sets out the constraints with the current framework and Section 2.4 what is sought by this application.

2.1 Waitaki Power Scheme

Lake Pūkaki forms part of the WPS which is a nationally and regionally significant component of New Zealand's electricity supply infrastructure. It is New Zealand's largest and most flexible hydroelectricity power scheme and therefore has a critical role to play in the electricity system and economy. It consists of eight power stations (two owned by Genesis Energy and six owned by Meridian Energy), commissioned between 1935 and 1985, together having an installed capacity of 1,761 MW, being ~32% of New Zealand's installed hydro capacity.

The Meridian owned components of the WPS have a current asset value of $9.468 billion (June 2025). Annually, on average, Meridian invests an estimated $30 million in the management, upkeep, and improvement of the WPS.

Lake Pūkaki itself is a modified natural lake and is managed as part of the WPS. It is New Zealand's largest hydro storage lake and provides an average of 4,485 GWh of stored water, being 44 % of New Zealand's total hydro storage capacity. Most of the water that powers Meridian's six downs stream power stations comes from Lake Pūkaki, meaning that the ability to access and efficiently use water stored in the lake is critical to the overall operation of the WPS.

As an electricity system with a large proportion of renewable generation, and hydro generation in particular, New Zealand has a long-standing reliance on hydro storage to provide flexible generation and security of energy supply. However, in comparison to other hydro dominant energy systems world-wide, New Zealand has relatively low amounts of hydro storage. This has resulted in energy security issues in dry years (particularly in winter/spring seasons). This issue is discussed further in Section 2.3.

2.2 Lake Pūkaki Current Operating Framework

The take, use, damming and diversion of water within the Waitaki Catchment, including management of the levels of Lake Pūkaki, is governed by the Waitaki Catchment Water Allocation Regional Plan (WCWARP). The WCWARP was made operative in 2005 and in its original form included a requirement for the level of Lake Pūkaki to be maintained above 518.0 m RL, with no consent pathway available to authorise the utilisation of stored water below this level.

Under resource consent CRC905321.7[1], Meridian is authorised to dam the Pūkaki River to control and operate Lake Pūkaki between the levels of 518.0 m RL (normal consented minimum lake level) and 532.5 m RL (maximum consented storage level).

In 2012, Meridian initiated Plan Change 1 (PC 1) to the WCWARP which sought to introduce a new minimum lake level for Lake Pūkaki during electricity supply emergencies when the System Operator ((SO) Transpower) had commenced an Official Conservation Campaign (OCC (**described below**)). PC1 allowed additional water from Lake Pūkaki to be used for generating electricity as a permitted activity when an OCC is declared by the SO. For the purposes of evaluating the costs and benefits of PC1, the duration of an entire event (time below 518.0 m RL) was considered likely to be between 4-7 months (this includes the time spent operating below 518.0 m RL, as well as the time required to restore the lake level to above 518.0 m RL once an OCC has ended). Supporting technical effects assessments were submitted as part of this plan change process. It was ultimately concluded that

[1] CRC905321.7 and other consents related to the WPS expired in April 2025; however, these activities are continuing pursuant to section 124 of the RMA while the application is before the Environment Court for determination via direct referral.

allowing access for electricity generation purposes to water stored between 513.0 m RL and 518.0 m RL, as a permitted activity once an OCC has been declared, was appropriate and promoted the sustainable management purpose of the RMA.

PC3 of the WCWARP included a new rule regarding the use of Lake Pūkaki between 518.0 m RL and 515.0 m RL. In addition to the PC1 Permitted Activity rule, at times of a Security of Supply Alert (SSA (**described below**)) initiated by the SO, the lake may be operated between 515.0 m RL and 518.0 m RL. The rule is not a permitted activity and to enable this use, Meridian applied for and was a granted resource consent in 2018 (CRC185833). This consent expired on 30 April 2025 but has been granted a section 124 continuance while a new replacement consent application (CRC240441) is being processed.

The SSA and OCC triggers are defined as follows:

– **Security of Supply Alert:** If reported storage falls below the New Zealand or South Island Alert Contingent Storage Release Boundary, a SSA is issued by the SO. At this point, there is an estimated 4% risk of running out of hydro storage within the next 12 months.
– **Official conservation campaigns:** An OCC is a period during which the system operator calls on New Zealanders to voluntarily reduce their electricity usage. An OCC is declared (by the SO) when the risk of electricity supply shortage (as assessed under the Security of Supply Forecasting and Information Policy (SOSFIP), exceeds 10% and is forecast to continue to do so for at least one week. It can also be called by mutual agreement between the SO and the EA (Electricity Authority)[2].

In Summary the lake may be operated below 518.0 m RL in the following circumstances:

– At times of a SSA, the lake may be operated between the alert minimum control level of 515.0 m RL and 518.0 m RL (provided for under existing consent CRC185833 which expired in April 2025 and which a replacement consent application, CRC240441, has been lodged and is due to be heard via Direct Referral to the Environment Court commencing on 3 November 2025).
– During a time when an OCC is commenced, the lake can be operated between the minimum control level of 513.0 m RL and 518.0 m RL (provided for as a permitted activity under Rule 17 of the Waitaki Catchment Allocation Plan).
– Above 532.5 mRL in accordance with established flood rules (existing consent CRC905321.7, Condition 6)

As detailed above, the ability to utilise the hydro storage in Lake Pūkaki below 518.0 m RL is currently only available to Meridian when electricity system supply triggers are initiated by the SO and/or by the EA.

2.3 Implications of the Current System

Meridian considers the current security of supply regime has been shown to be unworkable and does not give electricity market participants (both generators and customers) confidence that the storage in Lake Pūkaki below 518.0 m RL will be available when it is needed.

In Winter 2024, New Zealand experienced an energy shortage caused by naturally low hydro inflows, naturally low wind generation, and an unexpected shortage of gas. Through this period there was a real possibility that Meridian would need to manage Lake Pūkaki below 518.0 m RL.

During this period, the ability to utilise contingent hydro storage was highly uncertain. This uncertainty impeded Meridian's ability to plan for the use of hydro storage and impacted on the use of stored water below and, importantly, above the consented minimum (518.0 m RL). In short, Meridian was required to assume that hydro storage would not necessarily become available and therefore plan on the basis that the lake level would potentially have to remain at or above 518.0 m RL. This inevitably drives a prudent operator to be more cautious regarding use of Lake Pūkaki storage to avoid a situation where lake levels reach 518.0 m RL but cannot be drawn down below this. In that scenario, Meridian would have to significantly reduce generation levels from the WPS,

[2] This scenario could arise in circumstances that the SOSFIP framework hadn't accounted for. For example, the risk of shortage is 10% even though the SOSFIP says it is less. In this instance, the EA would act consistent with their statutory objective to promote competition, efficiency, and reliability for the long-term benefit of consumers. It could also occur for practical reasons such as 'the 10% curve is forecast to be crossed at 3am on Saturday but the SO and EA make an announcement on Friday during normal working hours.

resulting in potentially avoidable wholesale market volatility and pricing reflecting a scarcity which is created by regulation.

This prudent and necessarily cautious use of available hydro storage results in higher electricity costs and increased carbon emissions due to greater reliance on thermal generation. It also undermines confidence in the security of the electricity system. In 2024, this resulted in significantly increased wholesale spot prices, exposing large industrial plants to very high prices with some reducing or ceasing operations (refer to **Appendix A** Economics Benefits and Costs Report). From 2018 to 2023, average winter prices were around $180/MWh but in early August 2024, the average was over $800/MWh. The implication of reduced energy supply contributes to the increase of forward and future contract prices on consumers (industrial, residential and commercial users), to reflect the shortages and change of fuel supplies.

In August 2024, the SO had to make an urgent, ad hoc adjustment to the way storage release boundaries were modelled, and storage accessed. Transpower's decision to make an adjustment on a temporary basis (between 1 September and 31 October 2024), means that there remains significant uncertainty regarding access to storage in 2026, 2027 and 2028. This timing responds to a period of potential electricity shortages, while committed new renewable generation (solar, wind and hydro) and battery capacity, along with demand response, closes the supply-demand gap.

It is noted that Transpower, in its role as SO, is undertaking a review of the SOSFIP. While it is encouraging that the SO recognises the need to review current security settings, the review's outcomes and completion date are not assured, and the duration of any change is unclear.

2.4 Proposed Temporary Operating Framework

Meridian's application seeks to enable the operation of Lake Pūkaki below the current normal minimum level of 518.0 m RL, for a three-year period through 2028, without the currently applicable SO triggers.

Operating Lake Pūkaki between 518.0 m RL and 513.0 m RL, and making readily available the additional stored water, provides approximately 545 GWh of realisable energy. This is equal to the entire annual output of Meridian's new 176 MW Harapaki wind farm which cost approximately $450 million NZD to construct, or the annual electricity consumption of 75,000 average New Zealand households. It is equivalent to running one Huntly Rankine turbine unit (a New Zealand thermal power station) for 91 days (refer to **Appendix A** Economics Benefits and Costs report).

Of the options available, contingent hydro storage represents fuel that is currently available to the electricity system at a lower cost, and with lower carbon emissions, than the alternatives. Removing blocks to accessing that storage is the most efficient, straightforward and cost-effective way to boost New Zealand's energy reserves. It does not rely on external supply chains (as is the case for coal), or on upstream production performance (as is the case for gas). It simply requires the removal of restrictions which currently prevent its use, even in situations of shortage.

The project's key benefits are detailed below. Further benefits are described in the Economic Benefits and Costs report included in **Appendix A**:

Key Benefits:

- Making stored water available, providing approximately 545 GWh of realisable energy.
- Reduced need for demand response to reduce energy consumption (157 GWh or 59% lower per year).
- Lower wholesale prices (an average reduction of $10/MWh or 7%) and lower price volatility in the wholesale market.
- Lower overall costs for electricity consumers (a reduction of $437 million per annum or 7% lower per year).
- Reduced carbon emissions (196 kT CO2 equivalent per annum or 9% lower) as hydroelectric power is utilised over thermal generation.
- Lower hydro spill (on average it would be 346 GWh or 23% lower per year).

As part of utilising storage below 518.0 m RL, it is necessary to protect the Pūkaki dam from wave erosion. This is achieved by the placement of additional rock or rip-rap on the upstream face of the dam and the left and right abutments. The rock armouring will improve the resilience of the Pūkaki dam which is a nationally significant

component of New Zealand's electricity infrastructure. The rock armouring works form part of this application under the Fast-track Approvals Act 2024 (FTAA)

2.5 Referral Application

In April 2025, Meridian applied for the Proposal to be referred under the FTAA. This application was assessed as being complete and in August 2025, the Ministry for the Environment (MFE) advised that the Minister had decided to refer the Proposal under the FTAA. Accordingly, Meridian is entitled to make this substantive application for the approvals needed to authorise the Project.

2.6 Report Structure

This application has been prepared in support of the substantive application made by Meridian to the Environmental Protection Authority (EPA) for all necessary approvals required to authorise the operation of Lake Pūkaki below 518.0 m RL, and for the civil works at Pūkaki Dam to improve the structures resilience to wave action during lower lake operational levels. It provides all information required by section 43, Schedule 5 and Schedule 7 of the FTAA.

Table 1 Report Structure

Section of Report	Clause/Schedule	Reference
Section 2 – Introduction/Project Background		
Section 3 Proposed Activity	Schedule 5 – Resource Consent Clause 5(1)(a), - Description of the proposed activity. Clause 5(1)(e) – Description of any other activities that are part of the proposal Clause 5(1)(f) – Description of any other resource consents, notices of requirement for designations, or alterations to designations required. Schedule 7 – Wildlife Act Approval Clause 2(1)(b) – Actions to be carried out involving protected wildlife	Section 3 Appendix C Appendix E Appendix M
Section 4 Site Description	Schedule 5 – Resource Consent Clause 5(1)(b) – Description and map of the site Clause 5(1)(d), and 5(6) – Name and address of the owner and occupier of the site and land adjacent to the site. Schedule 7 – Wildlife Act Approval Clause 2(1)(d) – List of protected wildlife species	Section 4 Appendix F-O
Section 5	Compliance with Section 46(2)(a), (b) and (d) Schedule 5 – Resource Consent Clause 5(1)(c) – Confirmation of compliance with Section 46	Section 5
Section 6 – National Benefit	Schedule 5 – Resource Consent Clause 5(1)(c) and s43 of the Fast Track Approvals Act	Section 6 Appendix A
Section 7 – Statutory Rule Analysis	Schedule 5 – Resource Consent Clause 5(1)(h), Clause 5(2). and Clause 5(3) – Assessment of activity against relevant provisions in a national environmental standard, other regulations made under the RMA, national policy statement, national coastal policy statement, regional policy statement or proposed regional policy statement, plan or proposed plan, and planning document recognised by a relevant iwi authority and lodged with a local authority. Schedule 7 – Wildlife Act Approval	Section 7 Appendix M

Section of Report	Clause/Schedule	Reference
	Clause 2(1)(i) – A statement of whether authorisation is sought to temporarily hold or relocate wildlife.	
Section 8 Assessment of Environmental Impacts	Schedule 5 – Resource Consent Clause 5(4)(a), Clause 5(4)(b), Clause 6, and Clause 7 – Assessment of Effects on the Environment Schedule 7 – Wildlife Act Approval Clause 2(1)(e) – An outline of impacts on threatened, data deficient and at-risk wildlife species Clause 2(1)(j) – A list of all actual and potential wildlife effects of the proposed activity. Clause 2(1)(k) – Methods to avoid or minimise effects and any offsetting or compensation proposed. Clause 2(1)(o) – Expert views or advice regarding the proposal.	Section 8 Appendix D-O
Section 9 Part 2 of the RMA	Schedule 5 – Resource Consent Clause 5(1)(g) – Assessment of the activity against sections 5, 6 and 7 of the RMA	Section 9
Section 10 Statutory Considerations	Schedule 5 – Resource Consent Clause 5(1)(h) Clause 5(2) and Clause 5(3) Assessment of activity against relevant provisions in a national environmental standard, other regulations made under the RMA, national policy statement, national coastal policy statement, regional policy statement or proposed regional policy statement, plan or proposed plan, and planning document recognised by a relevant iwi authority and lodged with a local authority. Schedule 7 – Wildlife Act Approval Clause 2(1)(c) – An assessment of the activity and its impacts against the purpose of the Wildlife Act.	Section 10 Appendix D-P
Section 11 – Environmental Management Measures	Schedule 5 – Resource Consent Clause 6(d) – Description of proposed mitigation measures to prevent or reduce the actual or potential effects of the activity. Schedule 7 – Wildlife Act Approval Clause 2(1)(f) – A statement of how the methods proposed will ensure best practice standards are met. Clause 2(1)(g) – A description of methods to safely, efficiently and humanely catch, hold, or kill animals and relevant animal ethics processes.	Section 11 Appendix M
Section 12 Affected Parties and Consultation	Schedule 5 – Resource Consent Clause 6(e) – Identification of any persons who may be affected by the activity and any response to the views of any persons consulted. Schedule 7 – Wildlife Act Approval Clause 2(1)(n) – Proof and details of all consultation on the application specific to wildlife impacts.	Section 12 Appendix Q-S
Section 13 Conditions	Schedule 5 – Resource Consent Clause 5(1)(k) – The conditions that the applicant proposes for resource consent.	

3. Proposed Activity Clause 5(1)(a), Clause (1)(e), Clause 2(1)(a) and Clause 2(1)(b)

Meridian is seeking approval to temporarily ease access restrictions on Lake Pūkaki hydro storage by removing the current SSA or OCC triggers, allowing it to operate between 518.0 m RL and 513.0 m RL over the next three years to 31 December 2028, a period of potential electricity shortages.

Additionally, Meridian is seeking approval to permanently install rock armouring at Pūkaki Dam to ensure the structure's resilience to wave erosion when operating the lake at lower levels (below 518.0 m RL). This approval is necessary to ensure the safe operation of the Pūkaki Dam at these lower lake levels. Undertaking this work is dependent upon suitably low lake levels and the rock, once placed, will be permanent. The consent for this aspect is therefore intended to be enduring, allowing the work to be carried out over multiple years when conditions allow. Meridian has had material stockpiled ready for rock armouring since 2014, but the work has not been undertaken due to lake levels not falling low enough.

During initial site investigations, it was noted that there is a low (but not zero) possibility of lizard habitat being present within the work areas. A lizard survey was undertaken at the end of October, and while lizards were located, their specific location and species have yet to be confirmed by Meridian's herpetologist. A written report is expected imminently. In order to enable the application to progress, Meridian has taken a conservative approach and seeks a Wildlife Authority for the disturbance of lizards across the site as part of this application. A duration of 35 years is sought for the Wildlife Authority.

In terms of Schedule 7, Clause 2(1)(a) and Clause 2(1)(b) of the FTAA, the purpose of the proposed activity is to facilitate the construction of rock armouring on the dam face and abutments at Lake Pūkaki. The actions to be carried out include catching, holding, relocating and incidentally killing lizards during the rock armouring works.

Further, details of the proposed activities are set out below.

It is noted that in terms of Schedule 5, Clause (1)(e) there are no other activities beyond those set out below that are part of the proposal to which the consent application relates.

It is noted that in terms of Schedule 5, Clause (1)(f) there are no other resource consents, notices of requirement for designations or alterations to designations required for the project to which this application relates.

3.1 Eased Access

Meridian is seeking approval to lower Lake Pūkaki below 518.0 m RL (to a minimum of 513.0 m RL) without SSA or OCC triggers being initiated by the SO in the calendar years 2026 - 2028. As set out in the report prepared by Meridian titled 'Lake Pūkaki hydro storage management: 2026-2029 and included in **Appendix B,** there is an estimated 3-4% probability that lake levels might fall below 518.0 m RL in any given week over this period.

Meridian has undertaken modelling to inform operational decisions regarding the management of water stored in Lake Pūkaki, comparing the current restricted operating regime (which is controlled by the SO), to the proposed eased access regime which allows Meridian access to the water stored without the SSA and OCC triggers. **Appendix B** sets out this modelling.

The modelling draws on 91 years of hydrological and meteorological data for the lake, and the current understanding of the NZ energy system (supply and demand analysis), resulting in forecasts of stored water (energy), which can be used to understand potential future changes to lake levels.

Figure 1 shows the modelled weekly stored energy in Lake Pūkaki based on restricted access conditions with a statistical distribution based on the 91 hydrological years, and Figure 2 shows the same for eased access conditions. Under the restricted access conditions, Meridian identifies few instances of the discretionary storage being used, reflecting a risk adverse approach to operations. Under the eased access conditions, a wider operating range of storage is used, and the lake level is anticipated to drop below 518.0 m RL following prolonged

low inflows. This is estimated to occur 3% of the time, with a 5% probability of the duration below 518.0 m RL exceeding 12 weeks in any one year.

A duration of three years is sought for this aspect of the application.

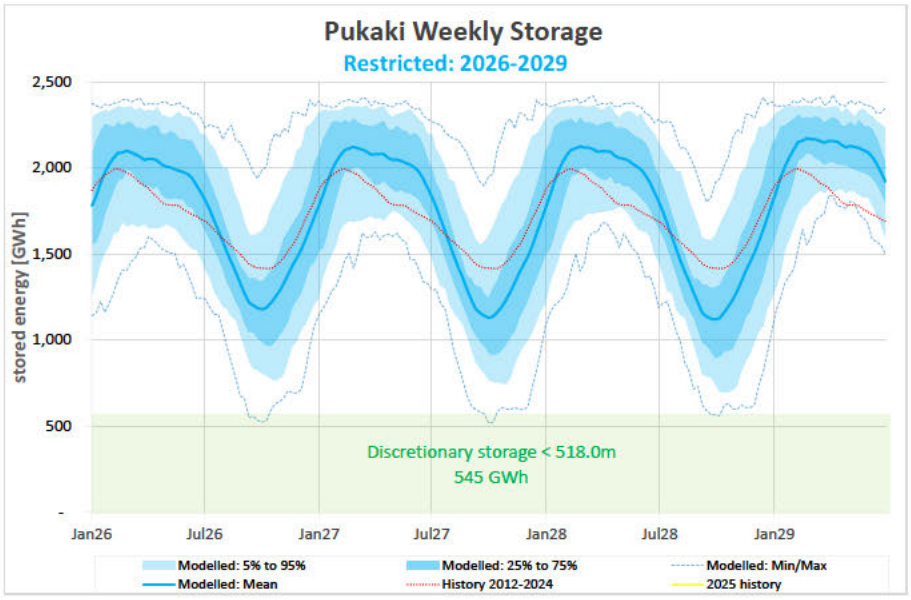

Figure 1 ***Modelled status quo weekly storage 2026 – 2029, assuming current lake level restrictions (supplied: Meridian, Sept 2025)***

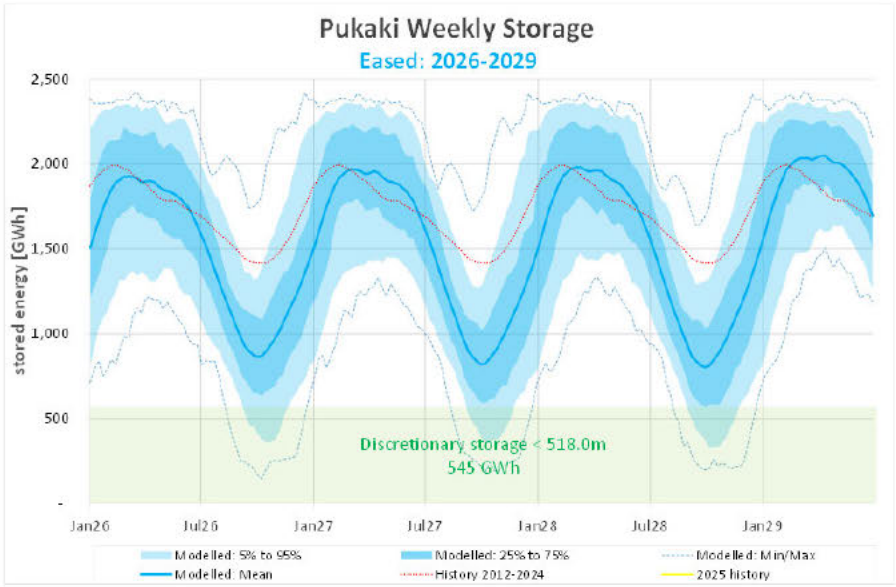

Figure 2 ***Modelled weekly storage 2026 – 2029 with restrictions eased in accordance with PC1 (supplied: Meridian, Sept 2025)***

The Meridian modelling indicates the following over the period between January 2026 and January 2029 (the period of interest for the fast-track application):

Modelled First Year of Eased Operation (2026)

- Under eased conditions of operation, typically lake levels are held lower, but still in the normal operating range above 518.0 m RL most of the time, only falling below 518.0 m RL on occasion.
- There is approximately a 3% probability that lake levels in any given week will be below 518.0 m RL. Therefore, on average (and based on the modelled 91 years of data) the lake level will be below 518.0 m RL for only 1.5 weeks in the first year of operation.

– 23% of the modelled hydrological sequences dip below 518.0 m RL in the first year. However, most instances are short duration and not deep. Of the 91 hydrological sequences modelled, 21 sequences fall below 518.0 m and of these 21 sequences:
    - 9 fall between 518.0 – 517.0 m RL
    - 6 fall between 517.0 m – 516.5 m RL
    - 3 fall between 516.5 m – 516.0 m RL
    - 2 fall between 516.0 m – 515.0 m RL
    - 1 falls below 515.0 m RL
– In terms of duration, in the worst-case scenario, the lake level falls below 518.0 m RL in September and does not return above 518 m RL until December (a duration of no more than approximately 4 months). However, the likelihood of this scenario is extremely low – approximately 1% (1 of the 91 hydrological sequences modelled).

Modelled Subsequent Years of Eased Operation (2027 and 2028)

– The pattern is broadly the same in subsequent years although the probability of falling below 518.0 m RL in any given week increases very slightly to 3.5% in 2027 and 4% in 2028.

The modelling was peer reviewed by an external consultant and their report is provided in **Appendix B.**

Enabling access to hydro storage is expected to result in a wider lake operating range i.e. Lake Pūkaki being able to be operated more flexibly providing support to New Zealand's electricity system. In Meridian's view, this is in line with what would be expected for a resource termed 'contingent storage' i.e. occasional usage during extreme periods to support system security. It is noted that since 2012 when the new minimum lake level was introduced, contingent storage has never been used. In addition, with access to contingent storage enabled, Meridian's analysis shows that in no cases – even the most extreme of historical dry sequences – would Lake Pūkaki storage levels reach the bottom of the currently permitted range (513.0 m RL). This is consistent with the strong incentives on hydro operators to prudently manage storage.

The modelling confirms that while eased access to stored water below 518.0 m RL may result in the lake being taken below that level, it is more likely that over the 3 years of eased access, this storage will not be used. The major benefit of eased access is likely to be the ability for Meridian to use stored water above 518.0 m RL less conservatively, knowing that it does not risk breaching a consent limit if continuing low inflow conditions meant the lake level needed to be reduced below 518.0 m RL to allow generation patterns from the WPS to be maintained to meet system requirements.

3.1.1 Prudent Operation

Meridian would only need to use storage in Lake Pūkaki below 518.0 m RL in the event of very low inflows to the catchment. Under most hydrological conditions the additional storage would not be used at all. As an integrated generator and retailer of electricity, Meridian has strong commercial incentives to manage hydro storage prudently and avoid operating at low lake levels. At low lake levels, Meridian is less able to generate electricity but still has to buy electricity from the spot market to supply its customers. This could result in Meridian becoming a net purchaser of electricity on the spot market at a time of fuel scarcity when spot prices are likely to be high. In that scenario, Meridian could be severely exposed to financial losses due to the need to continue to supply customers on lower fixed price contracts.

To avoid that catastrophic outcome, Meridian prudently manages storage and purchases various insurance products to reduce risk and arrest the decline of lake levels in a dry year. Those options include:

– contracts with large industrial customers like the New Zealand Aluminum Smelter to reduce their consumption (which in turn means Meridian can generate less and conserve water); and
– contracts with other electricity generators that can be called on to reduce Meridian's exposure to spot prices (which in turn means Meridian can generate less and conserve water).

Such insurance products come at a cost and significantly reduce Meridian's revenues in a dry year. Meridian's 2025 financial result is an example of this playing out in practice. However, these insurance products enable Meridian to use less water and reduce the risk of even more catastrophic financial outcomes if Meridian cannot

generate enough to cover its supply contracts. Even with such insurance products in place, Meridian still faces a residual risk which creates a strong incentive to avoid low lake levels.

As an added incentive to avoid low lake levels, the Electricity Authority requires retailers to compensate customers during any OCC by paying them each $12 per week. Given Meridian has over 400,000 customer connections, these weekly costs would be significant. While Meridian is seeking to allow access to contingent storage without an OCC trigger being met, an OCC is still likely to be called when national or South Island storage falls to a certain level, meaning Meridian would continue to face the financial incentive created from this customer compensation requirement.

As set out in the Economic Report and included in **Appendix A**, there are also significant reputational and regulatory implications for Meridian if it does not use hydro storage prudently.

3.2 Pūkaki Dam rock armouring

Protective rip-rap will be installed on the upstream face of the Pūkaki dam and its left and right abutments to provide protection from wave erosion during periods when the lake level is below 518.0 m RL.

If the rip-rap placement was to be completed in a single stage, the estimated duration of construction works is approximately 12 to 18 weeks. However, it is unlikely that the lake level will be below 518.0 m RL for such an extended period of time to allow all work to be completed in one continuous phase. It is therefore expected that the works will take place in multiple stages over a number of years, and accordingly a consent duration of 35 years is sought for this aspect of the application.

Full details of the construction methodology and staging are provided in the report titled Pūkaki Dam Rip-Rap Design and Construction Methodology and included as **Appendix C**. A summary of the proposed works is provided below noting that the final methodology is dependent on the timing and duration of low lake levels. These parameters will be assessed by the contractor and Meridian prior to work commencing.

The proposed construction methodology as outlined below involves placing the rip-rap in two sequential tranches defined by elevation ranges being:

– Tranche 1 – From 518.6 m RL to 514.5 m RL (Main Dam); from 517.3 m RL to 513.0 m RL (abutments)
– Tranche 2 – From 514.5 m RL to 509.6 m RL (Main Dam); from 513.0 m RL to 510.5 m RL (abutments)

Figure 3 shows the location of the proposed rip rap including the main dam and left and right abutments.

Tranche 2 will only commence once Tranche 1 is fully completed. Each tranche will be implemented concurrently across all three work zones.

Figure 3 Work Zones

3.2.1 Programme of works

The construction methodology has been developed based on the following assumptions:

- Construction activities may be short in duration (a few weeks) and occur over multiple stages.
- It may take multiple years to complete all the required works. This is expected to extend beyond the three-year period applicable to the eased access to Lake Pūkaki below 518.0 m RL.
- Forecasting lake levels within a period of a few weeks is generally achievable based on predicted generation flows from the lake, predicted inflows, and predicted rainfall events in a 1-to-2-week window. Based on this data, guidance can be provided to a contractor as to when lake levels are likely to reach levels required for construction to commence and how long they are likely to stay low in the short to medium term.
- Given the time required to mobilise and demobilise from the site, contractor guidance indicates that the minimum duration for any construction stage is 3 weeks.
- Inflow events, whether predicted or not, can result in a relatively rapid rise in lake level. Historical data indicates that the lake can rise up to 1 m in one day and 3 m in one week. Therefore, the construction sequence must include plans for rapid site demobilisation, ensuring the site is left in a safe and environmentally appropriate condition prior to water returning to cover the works area.

3.2.2 Construction Methodology

3.2.2.1 Overview

The rip-rap placement is expected to be undertaken using a multi-staged approach with works being sequenced as follows:

1. Monitor lake level trends.
2. Review and if required, update and finalise Environmental Management Plans I.e. Erosion and Sediment Control Plan (**ESCP; Appendix D),** Lizard Management Plan (**Appendix E**), Dust Management Plan (Appended to **Appendix G and Appendix G)** and Emergency Spills Response Plan.

3. Update traffic management and safety plans This will include the safe re-routing of the Alps to Ocean (A2O) cycle trail and the Te Araroa (TA) walking trail which run through the site.
4. Establish the site as the lake level lowers below 520.0 m RL and there is an expectation of the lake level continuing to drop to below 518.0 m RL.
5. Construct access tracks and ramps.
6. Begin rip-rap work on the dam and its abutments when lightly or unarmoured areas requiring protection become accessible (accurate rip-rap placement is possible to a depth of approximately 1 m below water level).
7. Extend rip-rap protection by placing rock to levels as low as possible before lake level rises.
8. Once lake levels begin to rise and assuming all works have not been completed, decommission certain aspects of the site and leave others such as access ramps protected for when work commences in the future.
9. Once all works are complete, fully decommission including the removal of access ramps.

3.2.2.2 Work Hours

Construction activities will be restricted to the following schedule:

– Daily: 6:00 a.m to 7:30 p.m.
– No work during the following periods:
  - Good Friday to Easter Monday (inclusive)
  - 24, 25, 26 and 31 December and 1 January
  - New Zealand Public Holidays

3.2.2.3 Construction Access

– Access to the right abutment and Main Dam will be via the main carpark entrance (Figure 4 and Figure 5) and the left abutment via the existing unsealed track (Figure 6). Temporary ramps will be created to provide access to construction sites by relocating existing rip-rap materials and/or infilling with granular material to create a stable truck surface.
– Between construction activities, the temporary ramps are likely to partially inundated. They will be protected by placing rip-rap over them. Minor reinstatement may be required before each construction event. Ramp construction is expected to take 10 days.
– Additional access tracks to both ends of the Intake Dam may be required for inspection and maintenance, using the same methods as for the Main Dam.

Figure 4 Intake Dam access tracks

3.2.2.4 Site establishment

Temporary offices, workrooms, and ablutions will be established for each construction event. The Lake Pūkaki carpark, located on Meridian's land, will serve as the main site compound, requiring closure of the carpark, toilets, the Punatahu Visitor Centre and the Mt Cook Alpine Salmon (MCAS) shop.

Each construction event will be secured with temporary fencing and controlled access, including lockable gates. Fencing will prevent public entry and maintain site safety, with installation expected to take about two days. The carpark will remain closed for the duration of works.

Figure 5 *Dam and right abutment - security fencing, closed access, access ramps and temporary buildings*

Figure 6 *Left abutment - security fencing, closed access and access ramp*

3.2.2.5 Rock Supply and Stockpile Management

Rock material has been previously harvested and stockpiled near the site. The locations of the existing stockpiles are shown on Figure 7. At present, approximately 23,000 tonnes of rock is available, which is sufficient to complete the proposed works across all three work zones down to 514.0 m RL.

Figure 7 Stockpile locations

As the existing stockpiles are depleted, additional rock will be brought to site from existing quarries within the region. An additional 50,000 tonnes of rock will be required to support lake operation to 513.0 m RL, which includes rip-rap placement to 510.5 m RL plus rip-rap bedding (as required).

Prior to the commencement of active construction, rock will be transported by road trucks to two designated project stockpile areas as shown in Figure 7:

– Pūkaki Dam stockpile area at the existing carpark.
– Upstream stockpile area on the left abutments.

Both stockpile areas will be managed by a 20-tonne excavator, operated by personnel responsible for directing the stockpiling of different sizes of rock within the stockpile zones. This excavator will also be used to load the rip-rap onto road trucks for delivery to active work areas for final placement.

3.2.2.6 Dive Survey

Pre-construction dive surveys will be undertaken to verify the extent and condition of rip-rap protective rock below 517.0 m RL at both abutments. As noted in the construction methodology included in **Appendix C**, the primary purpose of the survey is to confirm the extent of rip-rap below 517.0 m RL on each abutment. Based on the available information, it has been assumed that rip-rap is absent below 517.0 m RL. However, the survey may show rip-rap extends below this level. Divers will survey approved transects at 4 m horizontal intervals, recording rip-rap and rip-rap bedding presence, size distribution, angularity/interlock characteristics, any voids or displacement, and any erosion. A photo/video record will be collected. The survey will be used to refine the construction methodology.

The Pūkaki Canal inlet (Gate 18) rip-rap will also be inspected by qualified divers (subject to health and safety constraints and requiring an outage), to verify suitability under reduced lake levels. Based on as-built records, only minor remedial works, if any, are anticipated compared with the main dam interventions. It is noted that while the construction methodology refers to works that might be undertaken around Gate 18, Meridian considers this very unlikely, and as such have not included these works as part of the application.

3.2.2.7 Key Equipment

The following equipment, or equivalent alternatives, is expected to be required to complete the proposed works. This assessment assumes that construction activities will be undertaken concurrently across all three work areas (Main Dam, Left Abutment, and Right Abutment).

Table 2 Proposed equipment list

Task	Resource	Quantity
Transferring rock to project designated stockpile areas	27-tonne road truck	3
Sorting and loading rock from stockpile area	20-tonne excavator	2
Enabling and construction of Tranche 1 works on Main Dam, left abutment and right abutment	45-tonne excavator Long-reach excavator	3 1
Enabling and construction of Tranche 2 works on Main Dam, left abutment and right abutment	45-tonne excavator Long-reach excavator	3 1
Carting gravel and rock to/from Main Dam and right Abutment	11-tonne road truck	3

4. Site description Clause 5(1)(b), Clause 2(1)(d), Clause 5(1)(d) and Clause 5(6)

This section provides a description of the existing physical, social, environmental and cultural characteristics of Lake Pūkaki, Pūkaki Dam and the surrounding environment.

4.1 Overview

4.1.1 Lake Pūkaki

Lake Pūkaki, located approximately 10 kilometres (km) north of Twizel in the Mackenzie Basin, is a modified natural lake and is the largest hydroelectricity storage lake in New Zealand.

It provides an average of 4,485 GWh of stored water, being 44% of New Zealand's total hydro storage capacity. Lake Pūkaki water levels have been controlled since the early 1950's, when it was raised by 9 m via a low dam. In the late 1970s, water from Lake Tekapo was directed into Lake Pūkaki via the Tekapo Canal and during this time Lake Pūkaki was raised by a further 37 m with the construction of the Pūkaki high dam (referred to as the Pūkaki Dam).

Lake Pūkaki is fed by natural inflows and diverted inflows, which include snow melt, in particular from the Tasman and Hooker Rivers, as well as from Lake Tekapo via the Tekapo Canal and Tekapo B Power Station. It covers an area of approximately 179 square kilometres and reaches a depth of 107 m.

The outflow of water from Lake Pūkaki is generally into the Pūkaki Canal via the Pūkaki Canal inlet (Gate 18). As necessary to pass flood flows when the lake level is high, for recreational flows in accordance with consent requirements, and for gate testing, flows can also be released into the Pūkaki River via the spillway situated within the Pūkaki Dam (Gate 19).

Water is taken from Lake Pūkaki for irrigation purposes by Glentanner Station Limited (Catherine Fields), adjacent to Gate 19 and within Meridian's land. These facilities and operations, being the responsibility of Glentanner Station Limited, are not the subject of this application. Meridian has a legal agreement with Glentanner Station Limited regarding the security of its water supply. A plan showing the key WPS infrastructure is included in Figure 8 below.

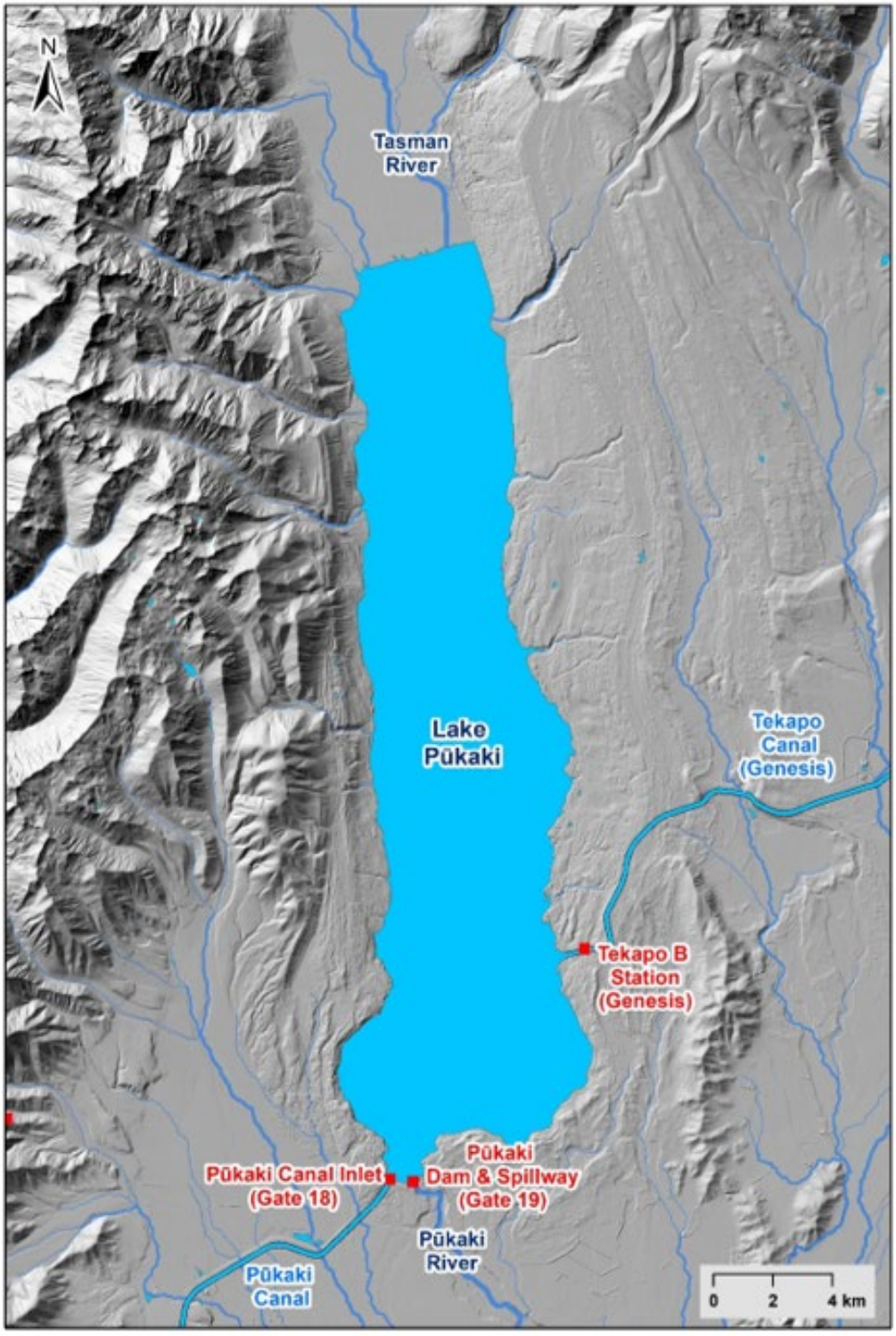

Figure 8 *Lake Pūkaki and key infrastructure associated with the WPS*

Lake Pūkaki is a Statutory Acknowledgement Area. Furthermore, the Mackenzie Basin is recognised as an Outstanding Natural Landscape in the Canterbury Regional Policy Statement and in Plan Change 13 to the Mackenzie District Plan. The extent of the Statutory Acknowledgement Area is shown on the plan included as Figure 9 below.

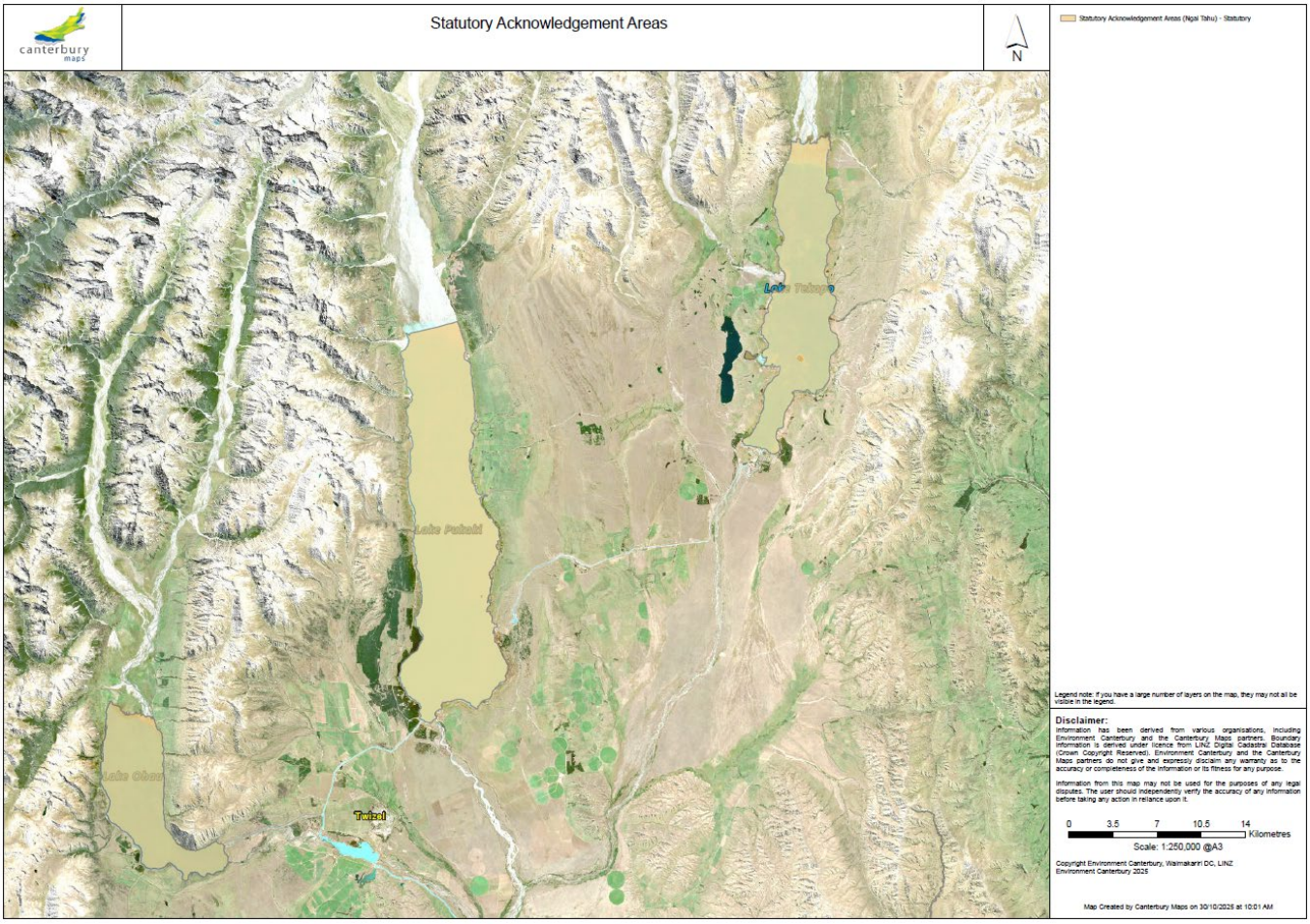

Figure 9 Statutory Acknowledgement Area Extent

4.1.2 Pūkaki Dam

The Pūkaki Dam is located at the southern end of the lake where the Pūkaki Canal begins. Constructed in 1977, the Pūkaki Dam is made up of two structures separated by a rock ridge in the centre. Both dams are earth-fill structures with a maximum height of approximately 61 m and a total crest length of 1.7 km. The upstream face of the dam is protected from wave damage by a layer of rip-rap sitting on bedding material. The downstream face is protected from erosion by a layer of coarse gravel. The rip-rap protection extends along the lake edge for approximately 1.8 km.

4.1.3 Pūkaki Canal and Associated Infrastructure

Water from Lake Pūkaki flows through the Pūkaki Canal inlet (Gate 18) into the Pūkaki Canal. The Pūkaki Canal conveys water from Lake Pūkaki to the confluence of the Ōhau Canal, and then via the Ōhau A Canal to Ōhau A Power Station to Lake Benmore.

The Pūkaki Canal is situated on land owned by Meridian. Water is taken from the Pūkaki Canal for irrigation purposes by Bendrose Station Limited. This water take, being the responsibility of Bendrose Station Limited, is not the subject of this application. Meridian has a legal agreement with Bendrose Station Limited regarding the security of its water supply.

4.2 Land Ownership

Meridian owns land and part of the bed of Lake Pūkaki in the vicinity of and including the Pūkaki Dam (Figure 10). The legal description for Meridian Owned land is Lot 1-2 Deposited Plan 368484.

Meridian holds an easement in gross over the balance of the bed and margin of the lake - Deed of Grant of Easement for Lake Pūkaki YEC 7611810.1 granted by the Commissioner of Crown Lands (the Operating Easement).

The Operating Easement does include Lot 2 in Deposited Plan 407182, owned by Genesis Energy Limited.

Titles and the Operating Easement are included in **Appendix H.**

4.3 Adjacent Land Ownership

Figure 10 below shows Meridian owned land and adjoining land ownership. The full names and addresses of each adjacent landowner and land occupiers is provided in **Appendix I.**

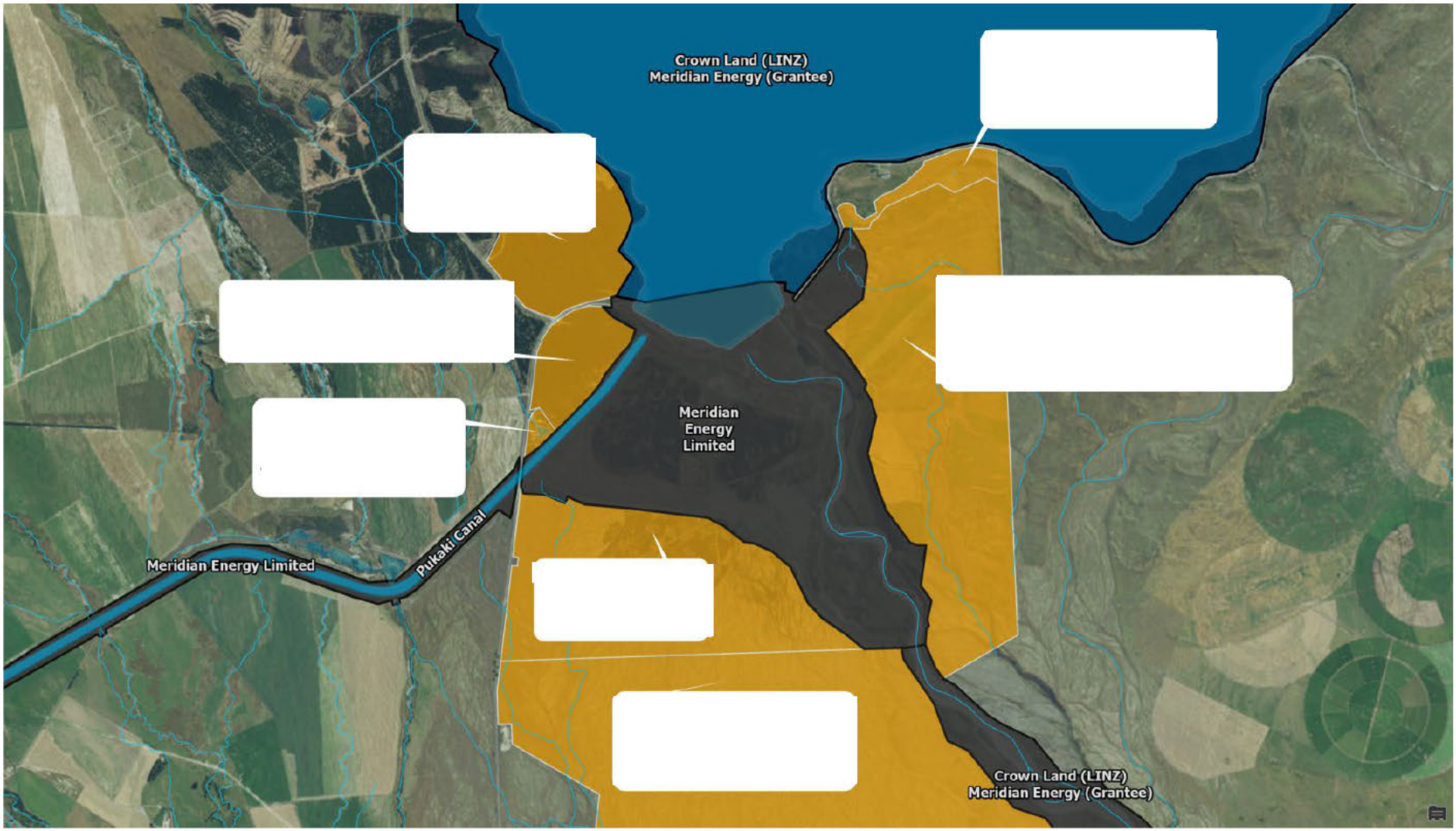

Figure 10 *Land Ownership Map*

4.4 Topography

As set out in the Groundwater Assessment prepared by GHD and included in **Appendix J**, the topography around Lake Pūkaki ranges from Aoraki/Mt Cook to the north at an elevation of approximately 3,700 m, to the Tasman Delta at an elevation of approximately 533.0 m. The lake is flanked on its west by the Ben Ohau Ranges with peaks around 2500 m, and on its east by more gentle slopes. The area in proximity to the dam is at approximately 553 m.

4.5 Geology

The area is underlain by Torlesse Supergroup basement rocks (greywacke and schist), overlain by Tertiary conglomerates (Kowai Formation) and Quaternary glacial deposits (Wolds, Balmoral, Mt John, Tekapo) (Cox & Barrell, 2007; Forsyth, 2001). These deposits vary in permeability, with post-glacial gravels near rivers being most permeable. Fault zones such as the Ostler Fault uplift low-permeability formations, creating barriers to groundwater flow (Jack, 2023). The southern lake margins contain complex sediment layers, including Contorted Sediments Silt, further limiting groundwater exchange (Barrell & Read, 2014).

Further details on groundwater and geological characteristics of the area are detailed in **Appendix K**.

4.6 Hydrology

4.6.1 Surface Water

The Waitaki River catchment lies in the central South Island of New Zealand, covering the southern Canterbury region. The catchment headwaters reach the main divide of the Southern Alps (Kā Tiritiri o te Moana) and flow southeast to the Pacific Ocean between Timaru and Oamaru.

The headwaters are feed by three major glacial lakes - Tekapo, Pūkaki, and Ōhau. These drain under controlled conditions through the Mackenzie Basin and a sequence of hydropower lakes; Lake Ruataniwha, Lake Benmore, Lake Aviemore and Lake Waitaki. The lowest hydropower lake, Lake Waitaki, discharges to the braided Waitaki River just upstream of Kurow.

The upper catchments experience an alpine to sub-alpine climate, with strong west–east precipitation gradients. Precipitation is high in the headwaters (snow-dominated in winter), while the Mackenzie Basin is semi-arid.

The Waitaki catchment covers approximately 12,000 km², with about 9,750 km² upstream of the Waitaki Dam. The river's median flow at Kurow is around 376 m³/s, though flows are heavily modified by the hydropower operations. Natural inflows are strongly seasonal with low winter flows due to snow storage in the Southern Alps, and high spring and summer flows due to snow, rainfall and glacial melt.

The Lake Pūkaki catchment is approximately 1,420 km², covering alpine and sub-alpine terrain with significant glaciated areas. It borders the main divide and receives westerly and easterly climate influences. The lake sits within the upper Waitaki River catchment and recieves an average inflow of 134 m³/s, making up approximately 35% of the Waitaki River catchments annual flow.

4.6.2 Groundwater

The site and surrounding groundwater setting are described in detail in the Groundwater Assessment contained in **Appendix J.** This report concludes that groundwater flow generally follows topographic gradients (Figure 11), with limited connectivity to Lake Pūkaki due to the presence of low-permeability lakebed sediments (Barrell & Read, 2014; URS, 2010).

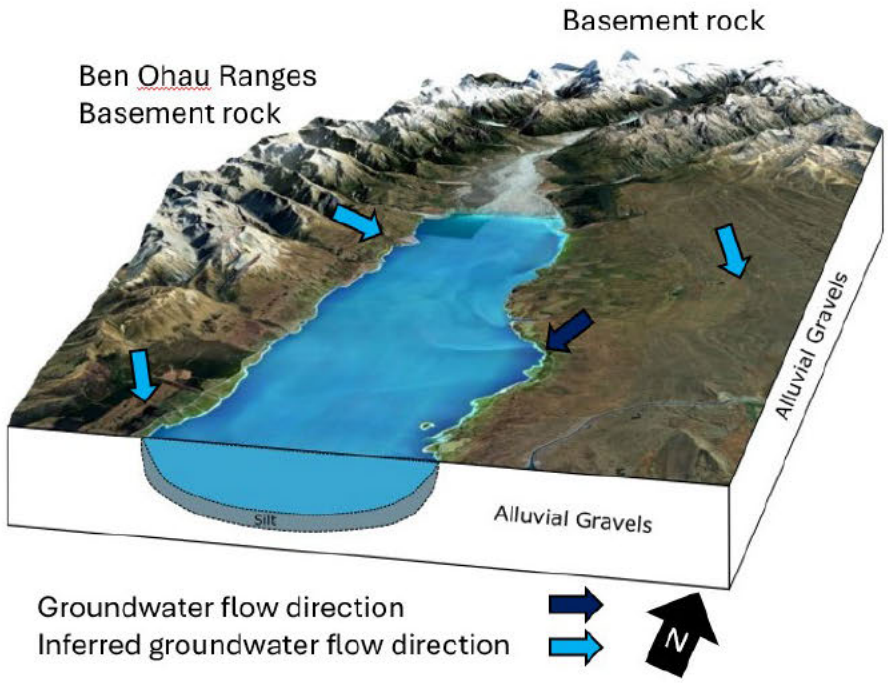

Figure 11 *Stylised groundwater conceptual model. Groundwater flow directions from Cooksey (2008) and inferred groundwater flow directions assumed from topography and drainage patterns. Note the thickness of the silt layer at the base of the lake is unknown, depicted in the image to indicate its presence (Irwin, 1972)*

Regional aquifers are hosted in post-glacial outwash gravels, particularly the Mt John Formation, which is considered semi-confined and regionally significant (Cooksey, 2008). There are 34 existing bores located close to the margins of the lake (Figure 12 and Table 3). Of these bores, 19 are owned by Meridian or a previous entity (Ministry of Works) that is assumed to now be Meridian. Of the remaining 13, one is listed as not used and therefore excluded from further analysis (H37/0001), with the remainder being active and used for domestic (6 bores), domestic and stockwater (4 bores) or irrigation (BZ15/5196) purposes. BZ15/5196 is authorised by CRC250571 at a maximum rate of take of 5 L/s. There are two active bores without a stated purpose (BY15/5001 and BY15/5002).

Table 3 *Summary of bores near Lake Pūkaki*

Well number	Status	Owner	Use	Depth (m)	Estimated distance between the bore and a lower lake level (m)[1]
H38/0273	Active	Mt Cook Lakeside Retreat	Domestic Supply	96.0	270
H38/0206	Active	Lakeshore Estates Limited	Domestic and Stockwater	108.5	230
H38/0063	Active	Mr A E Tibby	Domestic Supply	48.0	810
H38/0038	Active	Mr R J Houston	Domestic Supply	36.2	500
H38/0006	Active	Meridian Energy Ltd	Water Level Observation	20.3	270
H38/0005	Active	Meridian Energy Ltd	Water Level Observation	20.5	220
H37/0021	Not Used	Meridian Energy Ltd	None listed	61.0	580
H37/0018	Not Used	Meridian Energy Ltd	None listed	51.8	700

Well number	Status	Owner	Use	Depth (m)	Estimated distance between the bore and a lower lake level (m)[1]
H37/0014	Active	Meridian Energy Ltd	Water Level Observation and Stock Supply	68.0	430
H37/0013	Active	Meridian Energy Ltd	Water Level Observation and Stock Supply	83.5	280
H37/0012	Not Used	Meridian Energy Ltd	None listed	70.1	530
H37/0011	Not Used	Meridian Energy Ltd	Water Level Observation	32.9	120
H37/0010	Not Used	Meridian Energy Ltd	Water Level Observation	34.7	160
H37/0009	Not Used	Meridian Energy Ltd	Water Level Observation	51.8	310
H37/0008	Not Used	Meridian Energy Ltd	None listed	3.4	-
H37/0007	Not Used	Meridian Energy Ltd	Water Level Observation	25.0	160
H37/0006	Not Used	Meridian Energy Ltd	None listed	38.4	130
H37/0005	Not Used	Meridian Energy Ltd	None listed	46.9	120
H37/0004	Not Used	Meridian Energy Ltd	None listed	13.1	200
H37/0002	Active	The Helicopter Line	Domestic Supply	37.0	2,340
H37/0001	Not Used	Glentanner Park	Domestic and Stockwater	21.0	1,260
BZ15/5196	Active	NZ Alpine Lavender	Irrigation (authorised by CRC250571)	49.7	1,880
BZ15/5091	Active	Matt Hurst	Domestic and Stockwater	47.1	810
BZ15/5085	Active	Matt Hurst	Domestic and Stockwater	53.0	810
BZ15/5084	Active	Matt Hurst	Domestic and Stockwater	53.0	720
BZ15/5073	Active	Charlie Hobbs	Domestic Supply	35.5	870
BZ15/5046	Active	Meridian Energy Ltd	Geotechnical / Geological Investigation	30.5	60
BZ15/5045	Active	Meridian Energy Ltd	Geotechnical / Geological Investigation	35.0	130
BZ15/5044	Active	Meridian Energy Ltd	Geotechnical / Geological Investigation	35.2	140
BZ15/5043	Active	Meridian Energy Ltd	Geotechnical / Geological Investigation	30.2	210
BZ15/5016	Active	Nomadic Yurts Limited	Domestic Supply	96.1	200

Well number	Status	Owner	Use	Depth (m)	Estimated distance between the bore and a lower lake level (m)[1]
BY15/5002	Active	Glentanner Station Limited	None listed	15.6	580
BY15/5001	Active	Glentanner Station Limited	None listed	20.5	1,040

[1] Low lake level was the level shown in the "latest imagery" shown in Canterbury Maps, accessed 17 July 2025

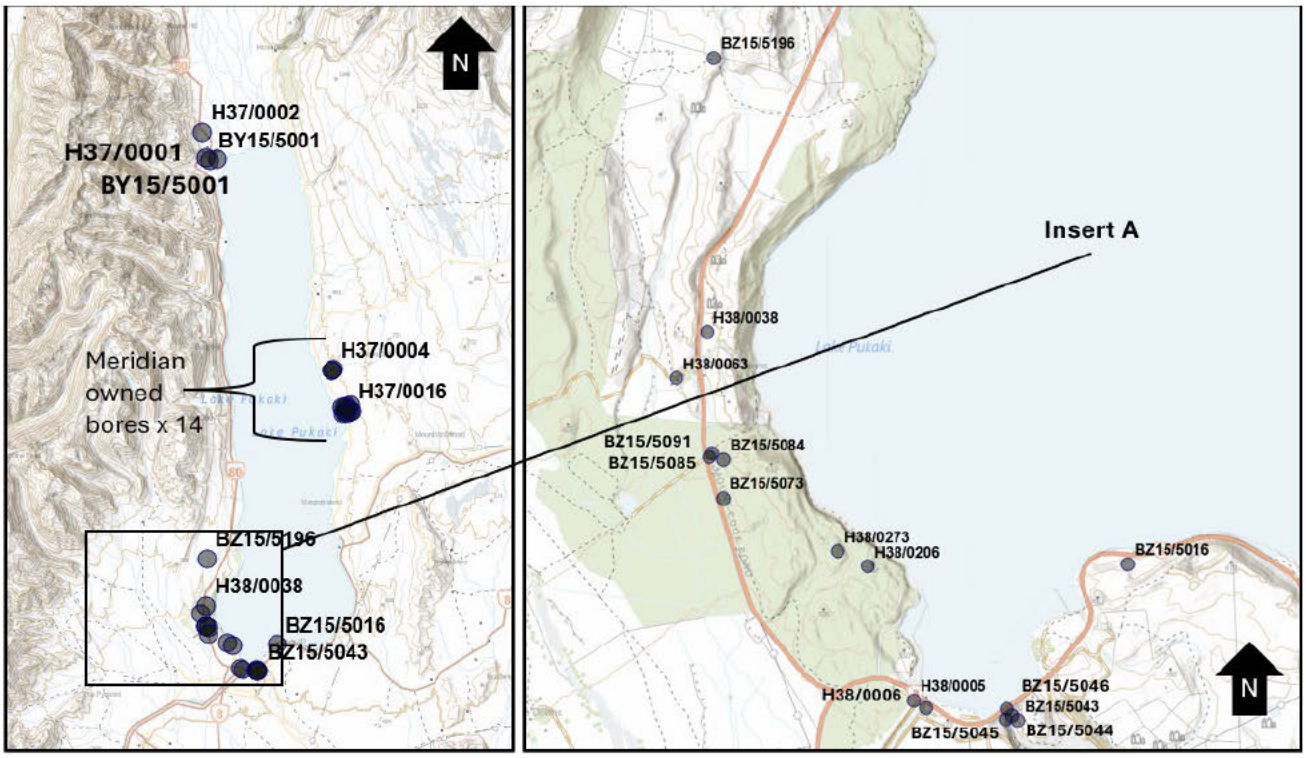

Figure 12 *Existing bores near the lake margin, with Insert A showing bores close to the dam. Source: Canterbury Maps*

4.7 Lake Processes and Geomorphology

An assessment of lake processes and geomorphology has been undertaken by GHD and is included in **Appendix K**. This report demonstrates that Lake Pūkaki has an erodible lake shore and dynamic associated landforms.

The natural Lake Pūkaki was formed behind terminal moraine as glaciers retreated at the end of the last ice age, approx. 18,000 to 14,000 years BP (before present).

Lake levels determine the wave impact zone along the lake shore. As noted above, Lake Pūkaki levels have been raised twice due to dam construction. Prior to artificial control, lake levels were about 484.0 m RL (Sutherland *et al.*, 2019[3]). Lake level fluctuation has been dependent on different operational regimes. Since 1999, levels have been higher on average, than during the 1979 – 1999 period, with lake levels typically over 527.0 m RL. Typically, the full extent of the operating range is not experienced every year, with minimum and maximum levels associated with extreme climatic conditions.

Lake Pūkaki experiences seasonal fluctuations in lake levels, with low levels during the spring and high levels during the autumn following snow melt. The lake morphology is, therefore, adapted to the variable regime. Broad-scale response to changing conditions is slow, with a lag of decades to a century.

[3] Sutherland, J.L.; Carrivick, J.L.; Shulmeister, J.; Quincey, D.J.; James, W.H.M. 2019. Ice-contact proglacial lakes associated with the Last Glacial Maximum across the Southern Alps, New Zealand, *Quaternary Science Reviews* 213

Climate change projections indicate increasing lake level variability over time.

The high energy wave climate within Lake Pūkaki, combined with erodible hillside material, has resulted in a dynamic landform. Eroded hillside material is rapidly transported long-shore. Localised erosion rates are controlled by the geology and sediment characteristics of the backshore material.

Shoreline erosion inspections of protected sections of the lake shore have been ongoing since at least 1987. Repeat inspections at selected monitoring locations indicate that erosion is typically caused by:

– Undermining of the existing rock or gabion protection, causing damage to roads and other assets on occasion.
– Uncontrolled overland flow causing either rilling or erosion around overwhelmed culverts. A geotechnical appraisal of road instability associated with Jack's Stream notes that heave due to ice formation is also a destabilising process in the moraine material (Downer NZ, 2024[4]). The destabilising effect of subaerial processes was also noted by Single (2022).
– Single (2022) observed that erosion can be exacerbated within unprotected ground adjacent to artificial structures.

In contrast, longshore transport has created depositional features at the upper lake / wave run-up levels. Linear barrier beaches have formed across shallow sloping ground and shallow embayments, blocking minor tributaries. Spits have formed on the lee of protruding promontories.

Larger tributary streams (i.e., which are sufficiently large or high energy to prevent blockage by longshore transport), deposit their transported sediment load on reaching the lake. This sediment forms arcuate alluvial fans, referred to as deltas, protruding into the lake. Tributary streams entering from the steep western hillside / mountain slopes carry high sediment loads fed by debris flows and landslides in their steep catchments.

The head of Lake Pūkaki is dominated by the Tasman River delta formed due to the high sediment load of the Tasman River. High energy, competent (i.e. with a high sediment transport capacity), flood flows can cause hyperpycnal flows, where dense, sediment-laden flow can extend some distance into the lake. However, the shallow lake depth adjacent to the delta front encourages rapid deposition of coarse bed sediments, with fine suspended sediment moving further into the lake.

4.8 Engineering Structures

There are seven structures around the lake that have the potential to be affected by the proposed activity. These have been assessed by GHD in the report titled 'Lake Pūkaki Engineering Structures Assessment' included in **Appendix L.** Figure 13 below shows the location of each of these structures (excluding the A2O Cycleway and TA Trail).

[4] Downer NZ. 2024. Preliminary Geotechnical Appraisal, SH80-RP8.600 -8.700 Jacks Stream Slip, April 2024.

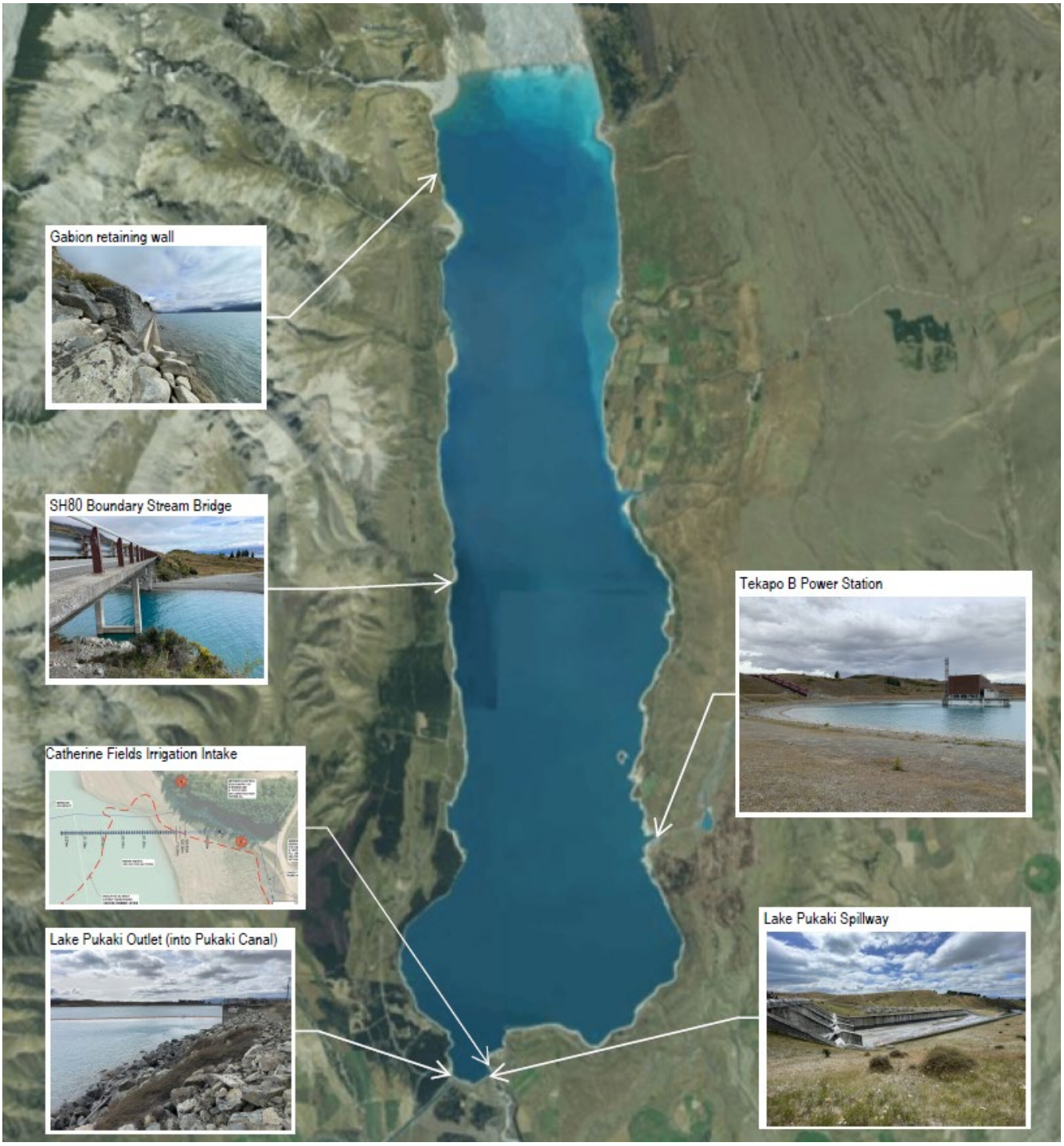

Figure 13 Map of Lake Pūkaki, showing the structures assessed on the site visit

In summary these structures are:

– The Lake Pūkaki Outlet (Gate 18)
– The Lake Pūkaki Spillway
– Tekapo B Power Station – a 46m high structure located within a tailrace pond and within the lake's current operating water levels. The power station houses two 80 MW generators which are supplied with water via two large penstocks which are fed from Lake Tekapo via the upper Tekapo A Power Station.
– Gabion retaining wall – a gabion retaining wall approximately 60 m long is situated on the western shoreline of Lake Pūkaki adjacent to SH80 Mount Cook Road.

– Boundary Stream Bridge – The Boundary Stream Bridge 10 is located on the western shoreline of Lake Pūkaki adjacent to SH80 Mount Cook Road, where Boundary Stream crosses under SH80.
– Catherine Fields Irrigation Intake – a 150 L/s irrigation intake is located adjacent to SH8 immediately north of the Lake Pūkaki Spillway.
– A2O Cycle Trail – This is the longest of the 23 Nga Haeranga Great Rides of New Zealand, extending over 300km. The ride commences at either Aoraki Mount Cook or alternatively Tekapo. Both routes meet at Lake Pūkaki where the trail continues to the Pacific Ocean ending at Oamaru.
– Te Araroa walking trail - The Te Araroa Trail spans the length of New Zealand, extending from Te Rerenga Wairua to Motupōhue. It is one of the world's most diverse long distance walking trails covering 3,000 km. It is estimated that 2,000 walkers a year complete the trail in one continuous journey with many more walking the various local sections. Lake Pūkaki is in the Tekapo to Lake Oahu section of the Te Araroa Trail.

4.9 Air Quality

There is limited available information regarding background dust concentrations in the region around Lake Pūkaki. It is accepted as being low, except during dust storm events. Consequently, there has been no requirement for monitoring of ambient dust levels by either local operators or the Regional Council.

Dust storms are a natural and historical feature of the region, particularly during spring, driven by strong north westerly winds and exposed glacial sediments (Bluett, 2012). The sources of the dust storms near Lake Pūkaki are the dry braided channels of the Tasman River, the exposed lacustrine delta of the Tasman River at the northern end of the lake and numerous smaller river deltas that enter Lake Pūkaki at points along the eastern and western lake shores.

Fine sediments are deposited onto these areas by "fluvio-glacial processes", which vary diurnally and seasonally with rainfall and snowmelt.

Minor sources of dust, particularly for locations in close proximity to the source are "degraded tussock grasslands, gravel roads, scree slope and lakeshore cliffs."

In terms of risk periods for dust storms, as noted in the Air Quality – Lake Dust Assessment included in **Appendix F**, Spring and Summer are the highest risk periods for dust storms due to the higher wind speed and lower rainfall.

The area is sensitive to dust due to its natural landscape, tourism value, and conservation significance. There are up to 70 potential receptors identified within the vicinity of Lake Pūkaki, including residential dwellings, tourist and recreational sites and conservation areas.

The area at the southern end of the lake where the rip-rap placement activities will occur is geographically separated from the areas most affected by dust storms and consequently its meteorology is complex. Modelling has been undertaken to understand the meteorology and consequently the potential impacts on nearby sensitive receptors from the proposed construction works. Details of this modelling are included in the Air Quality Assessment – Construction Dust included in **Appendix G.**

The closest sensitive receptor to the construction works area identified in the Air Quality Assessment is The Pines freedom camping site, located approximately 105 m from the northeast corner of the Left abutment construction site.

No significant odour sources have been identified in proximity to the site as confirmed in the Air Quality Assessments.

4.10 Ecology

4.10.1 Ecological values

An Ecological Impact Assessment has been carried out by Tonkin & Taylor and is included in **Appendix M**. This report notes that Lake Pūkaki and its connected environments support a range of ecological values, including:

– The environment is highly modified by human activity and the WPS, while also being compatible with a range of ecological values that have adapted to the modifications and variability of scheme operation.

- The Tasman River, the alpine and hill fed tributary rivers, and the hydrologically linked wetlands are ecologically significant per the Canterbury Regional Policy Statement (CRPS) Policy 9.3.1.
- The Tasman River and the alpine and hill fed tributary river habitats are of very high freshwater habitat value. This is primarily due to their upland natural state, rarity within the landscape and provision of habitat for species with some level of conservation concern.
- The littoral zone within Lake Pūkaki is considered to provide some beneficial biological function, which includes a low abundance and diversity of biofilm and macrophyte habitat that provides a food resource for macroinvertebrates and fish. The littoral zone of Lake Pūkaki is considered to have moderate – high ecological value, with value spatially variable and dependent on the bathymetric features of the lake. A higher value is attributed to areas where a larger and more stable littoral zone can develop.
- Lake Pūkaki and its tributary rivers supports a low diversity of fish species, however several species present are of ecological, conservation or recreational value. The overall value of this fish community in Lake Pūkaki is moderate.
- Wetland ecological values associated with Lake Pūkaki range from moderate to very high. Most wetlands have limited hydrological connectivity to the lake, however the Tasman River Delta has a 'high' hydrological connectivity to the lake.
- Avifauna ecological values associated with Lake Pūkaki range from low to very high. Highest value species include kakī (Himantopus novaezelandiae) and Australasian bittern (Botaurus poiciloptilus), which are classified as Threatened – Nationally Critical.
- Lizard and invertebrate ecological values range from low to very high. Highest value species include Lakes skink (Oligosoma aff. chloronton; Threatened – Nationally Vulnerable), Mackenzie skink (O. prasinum; Threatened – Nationally Vulnerable), and scree skink (O. waimatense; Threatened – Nationally Vulnerable).

4.10.2 Wetlands

High level wetland studies have been conducted by the Department of Conservation (DOC), Boffa Miskell (2020) and Tonkin & Taylor (2025). These studies are discussed in detail in the appended groundwater assessment (**Appendix J**) and in the Ecological Impact Assessment included in **Appendix M.**

A total of 17 wetlands connected to Lake Pūkaki and comprising 645 ha were assessed and delineated by Boffa Miskell (2023). A plan showing the location of these wetlands is included in Figure 14 below.

All wetlands were considered 'Significant' in accordance with the Canterbury Regional Policy Statement (CRPS) definitions. Wetlands vary in their typology, and include floodplain, shore, lacustrine, palustrine, riverine, marsh, delta, terrace, depression, shallow water and seepages. Wetlands support some indigenous species, but many have been degraded by introduced plant species invasions and have low ecological values present, with their 'significance' coming exclusively as a result of the overall reduction in New Zealand's natural wetlands which makes all remaining wetlands 'significant' as a matter of definition, regardless of their actual ecological value. Only Wetland 1 (Glentanner Wetland), Wetland 2 (Tasman River Delta), Wetland 5 (Boltons Gully 1) and Wetland 17 (Lower Pūkaki 2) support large tracts of indigenous vegetation. In addition, only Wetland 1 (Glentanner Wetland) and Wetland 2 (Tasman River Delta), currently receive targeted ecological management as part of Project River Recovery (PRR)15 (Boffa Miskell, 2023).

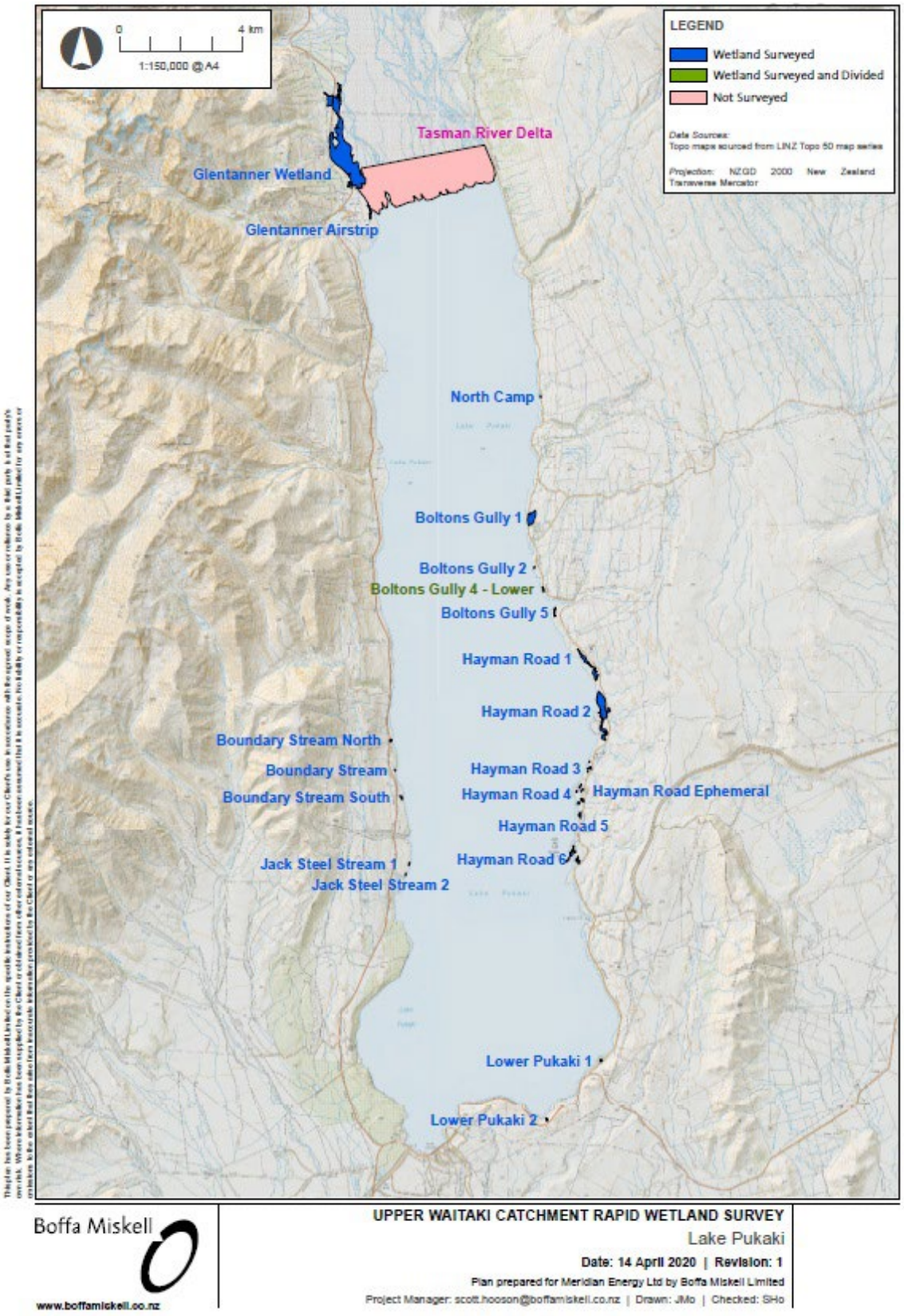

Figure 14 *Wetlands identified as part of Boffa Miskell (2020) Rapid Assessment of Accessible Wetlands*

Boffa Miskell (2023) assessed wetland values in accordance with EIANZ criteria (Roper-Lindsay et al. 2017). However, the subsequent report by Tonkin and Taylor (2025) considers the site wetlands assessed and classified as 'low' value by Boffa Miskell (2023) to be of moderate ecological value. The justification for this difference in value is based on the 'rarity/distinctiveness' matter, as outlined in detail in Appendix G of the Tonkin & Taylor report. Specifically Tonkin & Taylor have advised that 'Rarity/distinctiveness' is based on matters such as 'naturally uncommon or induced scarcity', 'amount of habitat remaining', 'national priority for protection' and 'habitat supporting Threatened or At risk species or locally uncommon species' As less than 10% of the historical extent of wetlands remain and as 'wetlands' have been identified as a priority for protection through the NPS-FM, all wetlands at the site have a 'high' value for rarity and distinctiveness with their actual values only rationalising their value to 'moderate' rather than 'low' as previously reported by Boffa Miskell.

As such, the wetland values are summarised as follows:

– One wetland is considered of very high ecological value (Tasman River Delta).
– Four wetlands of high value.
– Twelve wetlands of moderate value.

The 17 wetlands were assessed by Boffa Miskell (2023) as being hydrologically connected to Lake Pūkaki. Of the 17 wetlands, 16 were assessed as having a 'low' level of hydrological connectivity to the lake. Wetland 2 (Tasman River Delta) was assessed as having a 'high' level of connectivity to the lake.

Further assessment was undertaken by GHD (2025) on wetland hydrology and groundwater effects. This analysis concluded that the 17 wetlands are occasionally inundated by the lake. Except for the Tasman Delta, these wetlands interact with lake at approximately 525.0 m RL and above. Therefore, for the purposes of assessing wetland effects associated with this proposal, the only relevant wetland is the Tasman Delta.

There are an additional four wetlands located downstream of Lake Pūkaki and hydrologically connected to the Pūkaki and Lower Tekapō Rivers. These wetlands receive input only during infrequent spill releases from Gate 19 to the Pūkaki River. The importance of the rivers and Lake Pūkaki spill events to the wetlands is considered to be low due to the frequency of spill events (which are rare) (Boffa Miskell, 2023; Hooson, 2025). These wetlands include one moderate (Wetland 19) and three high (Wetlands 20-22) value wetlands.

4.11 Landscape and Visual

A description of the Landscape and visual values relevant to the proposal is contained in the Landscape Visual Assessment, undertaken by The Goodfellow Group Limited (**Appendix N**). This assessment identifies that Lake Pūkaki is an important gateway to Aoraki Mt Cook National Park. The mountain ranges surrounding the basin include Aoraki/Mount Cook, the Ben Ohau Range and the Two Thumb Range. The Mackenzie Basin includes Lake Pūkaki and Lake Tekapo (among other smaller high-country lakes), all of which accentuate the openness and vastness of this landscape. The braided Tasman River flows into Lake Pūkaki at its northern end.

Lake Pūkaki itself is a 15km long glacial lake that is acknowledged as being significantly modified, largely through the raising of the lake level by the introduction of the WPS. As noted in the Landscape Assessment, the WPS which includes Lake Pūkaki, does not detract from the scale or quality of the Mackenzie Basin. The Mackenzie Landscape Study[5] states under paragraph 3.5:

'It thus has to be concluded that an element of the Mackenzies landscape value is at its distinctive forms of cultural modification and the different-ness from lowland New Zealand, and not solely its naturally-derived values'.

A similar observation is made by landscape assessor Stephen Brown[6] in regard to the Outstanding Natural Landscape (ONL) status and landscape modifications of the HEP:'*…major components of the Waitaki Power Scheme permeate the rest of the ONL, and such (ONL) status has been attributed regardless of their presence'.*

Thus, the WPS forms part of the outstanding landscape value associated with the Mackenzie Basin, rather than detracting from it.

People largely experience the lake as an iconic setting for Aoraki/Mount Cook, with key views from SH8 at the Visitor Centre/Salmon Shop and large carpark area where there are fixed viewing locations, and from SH80 as it

[5] 'The Mackenzie Basin Landscape Study' by Graham Densem Landscape Architects (2007).
[6] 'Memo Waitaki Hydo-Electric Power Scheme Reconsenting', by Brown NZ, 29th March 2024.

passes along the western edge of the lake. Recreational opportunities include the A2O cycle trail, and the Te Araroa Trail, freedom camping on the east side of the lake, and restricted boating activity. Swimming and fishing are activities that occur on the lake, although they are usually undertaken some distance from the WPS infrastructure.

4.12 Socio-Economic

A Socio-economic Impact Assessment has been undertaken by GHD and is included **Appendix O**. This report sets out the social and economic characteristics of the area within which the site is located.

The report notes that Lake Pūkaki is bordered by significant conservation areas and tourism sites: the Ruataniwha Conservation Area to the west, Aoraki/Mount Cook National Park to the north, and the Mount Cook Conservation Area to the northeast. While the wider region supports extensive recreation and tourism, active use of the lake itself is relatively limited.

The nearest residential dwellings are located to the northeast of the dam wall, approximately 1.3 km away. The MCAS shop, Punatahu Visitor Centre and toilets, are located between the dam and State Highway 8.. These facilities are situated on land owned by Meridian and will need to be closed for the duration of the construction works. The car park adjacent to this building is also on Meridian owned land and is used as a viewing area across Lake Pūkaki and on a clear day, offers views of Aoraki/Mount Cook.

4.12.1 Community and Demographics

Twizel, 10 km south of Lake Pūkaki, was founded in 1968 as a hydro construction town and after construction ended was retained after community lobbying in 1983. Today it is the Mackenzie District's largest town and a key tourist hub, with its population tripling during peak summer. The study area falls mainly within the Mackenzie Lakes SA2 (5,129 km², including extensive conservation land) and Twizel SA2 (15.4 km²) as shown on Figure 15 below. Both areas have small permanent populations (1,131 and 1,674 respectively in 2023), but high seasonal variation. More than 50% of dwellings are unoccupied on Census night, reflecting their use as visitor accommodation.

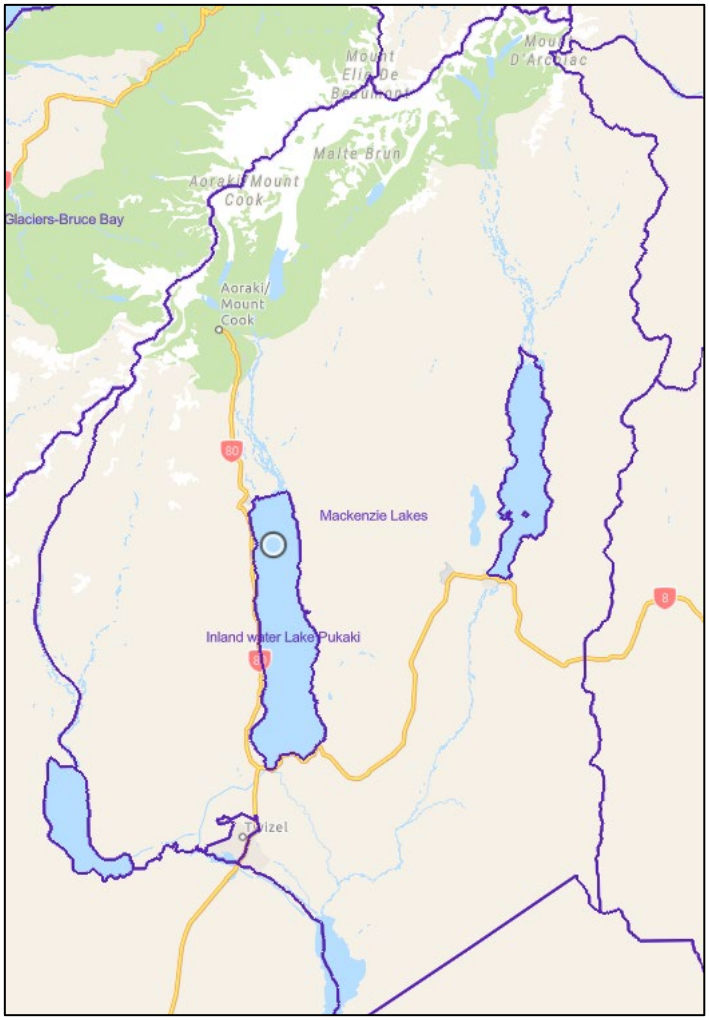

Figure 15 SA2s included in the Study Area (base map from Stats NZ 2023 SA2 Boundary)

4.12.2 Economy and Employment

The local economy is heavily reliant on tourism, hospitality and agriculture, with:

– Approximately 39% of employment in the Mackenzie Lakes statistical area in accommodation and food services.
– Approximately 17-22% of employment in agriculture, forestry and fishing.

Tourism is a major economic driver, with visitor numbers peaking at over 200,000 in January and dropping to around 70,000 in winter months.

4.12.3 Recreation and Tourism

Lake Pūkaki is a key node in both the A2O Cycle Trail (New Zealand's longest Great Ride, over 300 km), and the Te Araroa Trail (spanning the length of the country). The lake is surrounded by walking tracks, scenic lookouts, and conservation areas.

Key infrastructure includes the Lake Pūkaki car park (with toilets, the MCAS Shop, and the Punatahu Visitor Centre), nearby lodges, motels and freedom camping sites such as The Pines, and the New Zealand Alpine Lavender Farm on SH80.

Key recreational activities within the area include:

– Fishing: The lake is open year-round for trout and salmon, with Glentanner Station a popular spot. Fishing in the Tasman River is permitted from 1 November to 30 April.

– Driving: Mount Cook Road (SH80), a 55 km route along the western lake edge, is renowned as one of the world's best scenic drives.
– Hunting: Permitted in the Ben Ohau Range within Ruataniwha Conservation Park, accessible from SH80, known for tahr and chamois.
– Birdwatching: Lake Pūkaki is a bird spotting area on the eBird website.
– Skiing: There are four ski fields in the Mackenzie Region.

4.12.4 Cultural Values

The Te Runanga o Ngai Tahu Act 1996 recognises Te Rūnanga o Ngāi Tahu as the representative of Kāi Tahu whānui. Kāi Tahu whānui is defined as meaning the collective of the individuals who descend from the primary hapu of Waitaha, Kāti Mamoe, and Kāi Tahu, namely Kāti Kuri, Kāti Irakehu, Kāti Huirapa, Ngāi Tuahuriri, and Kāi Te Ruahikihiki.

The Te Runanga o Ngai Tahu (Declaration of Membership) Order 2001 defines the Papatipu Rūnanga o Ngāi Tahu whānui and their respective takiwa. Te Rūnanga o Arowhenua, Te Rūnanga o Waihao and Te Rūnanga o Moeraki are the relevant Papatipu Rūnanga in relation to the Waitaki Catchment.

Meridian's understanding of and appreciation for the cultural values associated with Lake Pūkaki has been developed over years of korero and an ongoing commitment by Meridian to recognise and provide for the relationship of Rūnanga with the lake and surrounding area. A useful overview of these values is provided in the Waitaki Iwi Management Plan 2019.

This plan describes the Waitaki River catchment as having an important historical role in the creation history of Kai Tahu. The catchment is an extensive mahinka kai area and is part of a network of travel routes leading from the South Islands west to east coasts. The rivers provided access for people from the coast to access food and other resources from inland, with the river itself providing many forms of mahika kai. Figure 16 below sourced from the Waitaki Iwi Management Plan 2019 provides a helpful overview of the eco-cultural attributes of the Waitaki Catchment.

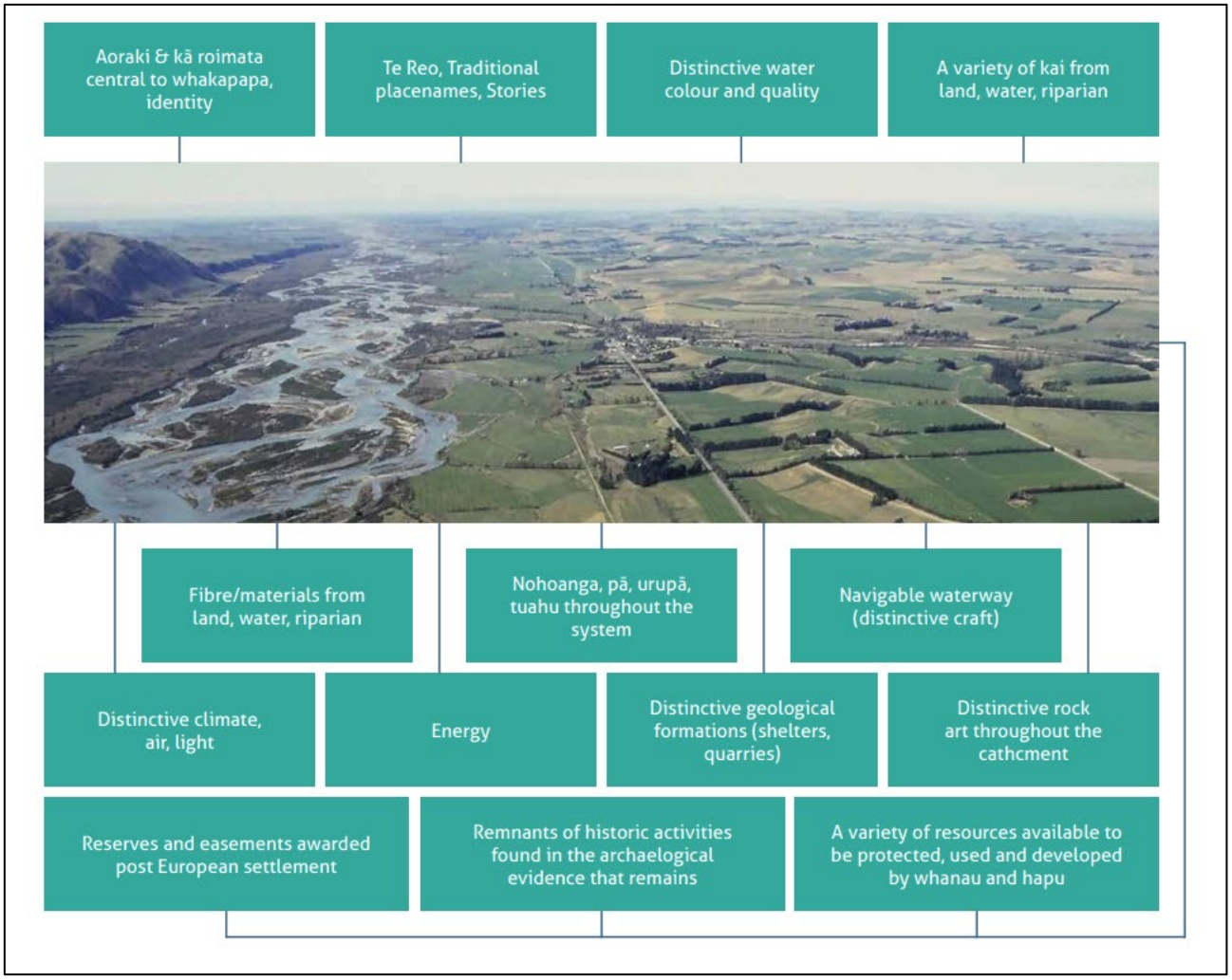

Figure 16 Eco-cultural attributes of the Waitaki Catchment (source Waitaki Iwi Management Plan 2019

According to the *Te Manahuna Pou Whenua Roadmap* (Mackenzie District Council, 2025), Lake Pūkaki is the largest of the lakes formed by Rakāihautū in Te Manahuna. The lake and its connecting rivers – Te Awa Whakamau (Tasman River) and Te Awaure (Jollie River), supported multiple kāika mahika kai sites, where species such as weka, pūtakitaki (Paradise Duck), āruhe, tuna, and tīkumu (mountain daisy) were traditionally gathered. The surrounding alpine ranges and waterways also carry a rich whakapapa of names and narratives, including those linked to the waka Araiteuru and its passengers.

Nearby, the Twizel area is also associated with several kāika mahika kai of significance. Weka were gathered at Te Waiotūtahi, while Wakapōha on the Ōhau awa and Kutu Tuia near the outlet of Lake Ōhau were important places for harvesting both weka and tuna.

A Nohoanga site is located near the Pines freedom camping area. This provides Ngai Tahu with an opportunity to experience the landscape as their tipuna did and rekindle the tractional practices foo gathering food and other resources. The Nohoanga designation provides Ngāi Tahu Whānui with temporary and exclusive rights to occupy the site for up to 30 days between 16 August and 30 April each year.

4.12.4.1 Treaty Settlements - Redress

The relevant treaty settlement is the Ngāi Tahu Claims Settlement Act 1998. This Act provides the legislative framework that furthers the agreements expressed in the Deed of Settlement between the Crown and Ngāi Tahu. This legislation recognises the special relationship of Ngāi Tahu with the land and resources, including those used and affected by the proposal.

Within the legislation, the Crown acknowledges the cultural, spiritual, historic, and traditional association of Ngāi Tahu with the Waitaki catchment, and statutory acknowledgement areas which include Lake Pūkaki[7]. The legislation also sets out the nohoanga entitlements and matters related to mahika kai addressed in the deed of settlement.

The statutory acknowledgement records that Pūkaki is one of the lakes mentioned in the tradition of "Ngā Puna Wai Karikari o Rakaihautu," which tells how the principal lakes of Te Wai Pounamu were dug by the rangatira (chief) Rakaihautu. In Ngāi Tahu tradition, Pūkaki is referred to as the basin that captures the tears of Aoraki, a reference to the meltwaters that flow from Aoraki into the lake in the springtime.

The purpose of the statutory acknowledgement area is to:

– Require that consent authorities forward summaries of resource consent applications affecting Lake Pūkaki to Te Rūnanga o Ngāi Tahu.
– Require that consent authorities, Heritage New Zealand Pouhere Taonga or the Environment Court, as the case may be, have regard to this statutory acknowledgement in relation to Lake Pūkaki.
– Enable Te Rūnanga o Ngāi Tahu and any member of Ngāi Tahu Whānui to cite this statutory
– acknowledgement as evidence of the association of Ngāi Tahu to Lake Pūkaki.
– Consent authorities must have regard to the statutory acknowledgement when considering whether Te Rūnanga o Ngāi Tahu is an affected entity for a resource consent application within, adjacent to, or directly impacting the statutory acknowledgement area.

4.12.4.2 Archaeology and Heritage Values

There are no archaeological sites or heritage items in the vicinity of the site, furthermore it is noted that the site was extensively disturbed during the construction of the dam, therefore the environment is highly modified, and the likelihood of any accidental discoveries is considered low. Notwithstanding this, Meridian's standard accidental discovery protocols will be followed.

[7] Ngai Tahu Claims Settlement Act 1998, Schedule 34

5. Confirmation of Compliance with s46(2)(a), (b) and (d) Clause 5(1)(c)

Section 46 of the Fast-track Approvals Act 2024 requires that the EPA decides whether a substantive application is complete and within scope. Subsections (2)(a), (b) and (d) state the following:

"(2) A substantive application complies with this subsection if –

(a) The application complies with –

i. section 42; and

ii. sections 43 and 44; and

(b) the application relates solely to a listed project or referred project; and

(c) the EPA considers that on the face of the application the project does not appear to involve an ineligible activity; and

(d) any fee, charge, or levy payable under regulations in respect of the application is paid."

With respect to this substantive application by Meridian the following is noted:

– The application complies with section 42 as:
  - a substantive is being lodged by every authorised person who is the proposed holder of an approval;
  - the substantive application complies with section 43 as demonstrated below;
  - the applicant is eligible to apply for all corresponding approvals under the specified acts; and
  - the substantive application seeks resource consent that would otherwise be applied for under the Resource Management Act 1991, and a wildlife approval as defined in clause 1 of Schedule 7.
– The application complies with section 43 as:
  - The substantive application is lodged in the form and manner approved by the EPA;
  - The substantive application explains how the project is consistent with the purpose of this Act – See Section 6 below.
  - Demonstrates that the project does not involve any ineligible activities.
  - States the approval to be held by each person
  - The substantive application is lodged within the deadline stated in the referral decision (2 years from 18 August 2025).
  - Complies with information requirements specified by the Minister under section 27(3)(b)(ii)
    – A summary of consultation with Te Runanga o Ngai Tahu, relevant Papatipu runanga and their representatives since referral, outlining concerns raised regarding Ngai Tahu settlement principles, statutory acknowledgements, and nohoanga entitlement, and explaining how this has informed the substantive application. – See Section 12 below.
  - States whether the application relates to a priority project. The project is not a priority project under s43 of the FTAA.
  - All fees, charges and levys are paid on lodgement.
  - The requirements set out in clause 5 to 9 of Schedule 5 are included in this application.
  - The requirements set out in clause 2 of Schedule 7 are included in this application.
– The application complies with section 44 as:
  - The information provided in compliance with section 43 is in sufficient detail as to satisfy the purpose for which it is required.
– The application relates solely to a referred Project.
– The application does not involve any ineligible activities.
– All fees, charges or levys payable under regulation in respect of the application have been paid.

6. National Benefit Clause 5(1)(c), and Section 43 Fast-Track Approvals Act

An application under the Fast Track Approvals Act 2024 must ensure "*The activity facilities the delivery of infrastructure and development projects with significant regional or national benefits."* It is considered that the proposal of eased access to lower Lake Pūkaki levels, and armouring of Pūkaki Dam and abutments will have national benefits in terms of security of energy supply and longevity of critical infrastructure.

The national economic benefits of the proposal are discussed in detail in the Economic Benefits and Cost Report included in **Appendix A**. The benefits were assessed by comparing the proposal against the existing scenario of lowering the lake with SSA and OCC triggers. These benefits include (but are not limited to) the following:

- Making stored water available, providing approximately 545 GWh of realisable energy and a 13.9% increase in controlled storage (noting that Lake Pūkaki represents 45.5% of the country's total controlled hydro storage). This is equivalent to the annual output of Meridian's new 176 MW Harapaki wind farm or the annual electricity consumption of 75,000 average New Zealand residential households. This also equates to running one Huntly Rankine unit (a New Zealand thermal power station) for 91 days.
- Uncertainty impedes Meridian's ability to plan for the use of hydro storage and impacts the use of stored water below and, importantly, above the consented minimum (518.0 m RL). In short, under the current system, Meridian is required to assume that hydro storage will not necessarily become available and therefore must plan on the basis that the lake level will potentially have to remain at or above 518.0 m RL. This necessarily requires Meridian to be cautious regarding use of Lake Pūkaki storage in order to avoid a situation where lake levels reach 518.0 m RL but cannot be drawn down below this. Taking this decision-making away from the SO is therefore beneficial in that it will enable Meridian to manage the lake during the next 3 years with more certainty.
- Reduced need for demand response to reduce energy consumption (157 GWh or 59% lower per year).
- Lower wholesale prices (an average reduction of $10/MWh or 7%) and lower price volatility in the market.
- Lower overall costs to electricity consumers (a reduction of $437 million per annum or 7% lower per year).
- A nationally significant reduction in contracted forward prices for electricity through resource cost saving due to less need to constrain industrial uses and divert resources to supplying others and less reliance on high valued thermal resources to keep the lights on. It reflects a gain to the economy from avoiding stoppages and using more high valued resources to keep generating electricity in a dry year.
- Reduced carbon emissions (196 kT CO2 equivalent per annum or 9% lower) as hydroelectric power is utilised over thermal generation.
- Lower hydro spill (on average it would be 346 GWh or 23% lower per year).
- A nationally significant increase in retail competition through removing the high contract prices as a constraint on retailers seeking new clients.
- The rock armouring will improve the resilience of Lake Pūkaki's dam which is a nationally significant component of New Zealand's electricity infrastructure. The asset has a value of $9.468 billon. Providing flexibility on construction completion timing allows the applicant to be more efficient with resources which provides a long-term benefit for consumers.
- Other alternatives to resolving the security of energy supply include government intervention which would be a high cost for taxpayers (if funded from tax, or electricity users or funded by a levy). The proposal does not require this action to be taken.

The purpose of the Fast-track Approvals Act is to facilitate the delivery of infrastructure and development projects with significant national benefits. The Economic Benefits and Cost Report (**Appendix A**) demonstrates that the proposed activity will have significant national benefits. Given the activity's 'Prohibited' status under the WAP, the FTA is the only mechanism by which this activity can be facilitated.

7. Statutory Rule Analysis **Clause 5(1)(h), 5(2) and 5(3), Clause 2(1)(i) Rule Analysis only. For Policy Framework Assessment see Section 9 below.**

The proposed activity as set out in Section 3 above, has been assessed against the rule provisions of the following relevant planning instruments:

– National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES-CS)
– National Environmental Standards for Freshwater (NES-F)
– Waitaki Catchment Water Allocation Regional Plan (WCWARP)
– Canterbury Land and Water Regional Plan (LWRP)
– Canterbury Air Regional Plan (CARP)
– Wildlife Act

Other relevant statutory planning instruments and further assessment on the above planning instruments, are detailed in Section 9 below, and **Appendix P.** It is noted that the proposed activity is permitted under both the Operative and Proposed Mackenzie District Plans, therefore in terms of rule analysis no further consideration of these plans is necessary.

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

Th NES-CS sets out planning controls for activities occurring on contaminated or potentially contaminated land. This standard is designed to ensure that land affected by contaminants in soil is appropriately identified and assessed before being developed.

The Pūkaki dam is located within a property area that has been identified on Environment Canterbury's (ECan) Listed Land Use Register (LLUR) as having three HAIL activities occurring on it. These HAIL activities include:

– HAIL activity A17: Storage tanks for fuel, chemicals or liquid waste
– HAIL activity B4: Power stations, substations or switchyards
– HAIL activity G5: Waste disposal to land (excluding where biosolids have been used as soil conditioners)

A HAIL assessment (see **Appendix B** of the Erosion and Sediment Control Plan) completed by GHD contaminated land specialists determined that while several HAIL activities have been identified as present within the wider property within which the site is located, due to the nature of contaminants and the distance to the proposed works area, it is considered unlikely that contamination in soils is present at the site. It is there considered that the proposed activity does not require consent under the NES-CS. Notwithstanding this, Meridian have included a proposed accidental discovery condition in relation to contaminated land.

7.2 Resource Management (National Environmental Standards for Freshwater) Regulations 2020 (NES-F)

The NES-F sets requirements for carrying out certain activities that pose risks to freshwater and freshwater ecosystems. Anyone carrying out these activities will need to comply with the standards.

The NES-F is designed to:

– Protect natural inland wetlands
– Protect urban and rural streams from in-filling
– Ensure connectivity of fish habitat (fish passage)

The NES-F sets out regulations regarding the construction of specified infrastructure within or adjacent to natural inland wetlands. The regulations are designed to protect natural inland wetlands from activities such as vegetation clearance, earthworks, complete or partial drainage and discharge of contaminants.

The proposal will involve land disturbance, as well as the taking, use, and discharge of water. Rock armouring on the dam's high face will not occur within 100 m of a natural inland wetland. Regarding the taking, use, and discharge of water, it is noted that the water will be taken and discharged from Gate 18 at the Pūkaki dam, which is also not within 100 m of a natural inland wetland.

As no land disturbance, and the taking, use, and discharge of water will not occur within 100 m of a natural inland wetland, the regulations contained in the NES-F are not applicable.

7.3 Waitaki Catchment Water Allocation Regional Plan

The WCWARP outlines rules for water allocation in the Waitaki catchment, aligning with the Resource Management Act 1991. This plan manages water levels in Lake Pūkaki to support hydroelectric power generation, irrigation, and other uses.

Rule 3 of WCWARP states that no person can take, use, dam, or divert water from Lake Pūkaki if the lake level is below the minimum lake level of 518.0 m except in the follow circumstances:

– A minimum lake level of 513.0 m RL during an OCC (Part 9 of the Electricity Industry Participation Code 2010).
– A minimum lake level of 515.0 m RL during an SSA.

Rule 17 of WCWARP states that taking, using, damming, or diverting water for hydroelectric generation that complies with Rule 3 is a discretionary activity, except during an OCC, when it is a permitted activity.

Meridian seeks consent to lower the lake below 518 m RL without either an OCC or SSA and as such is unable to comply with Rule 3 of the WCWARP.

Rule 12 of the WCWARP states that any activity not complying with Rule 3 is a **prohibited activity**.

With respect to the prohibited activity status, it is noted that the adverse impacts of what is proposed are essentially the same as those that would be experienced in a lake lowering under an OCC - at which point the activity is permitted, and in the case of a SSA, authorised by a discretionary resource consent. This is not an activity of a type (or with a scale of effects) that the WAP makes no provision for or one that is contrary to everything the plans objectives and policies seek. The FTAA expressly makes provision for the granting of consents for activities that are prohibited by rules in RMA plans (Sch 5, clause 17(3) and (4)).

7.4 Canterbury Land and Water Regional Plan (LWRP)

The LWRP sets out Canterbury's resource management goals and outcomes for managing land and water resources in the region to achieve the purpose of the Resource Management Act. It includes rules relating to discharges to surface water and earthworks in the bed of a lake or river that are relevant to this application. Table 4 below provides an assessment against those rules.

It is noted that most of the works are to be carried out on the dam rather than in the bed of the lake as illustrated in Figure 17 below. Both the dam (orange shaded area) and low permeability blanket (area within the white dotted line) form the 'dam structure', therefore only the sections of blue rip rap beyond the white dotted line, potentially extend onto the bed of the lake. Consequently, the bulk of the earthworks associated with the rock armouring works are permitted under Rule 5.158 with only a small portion of incidental earthworks requiring assessment under the provisions relating to works in the bed of the lake.

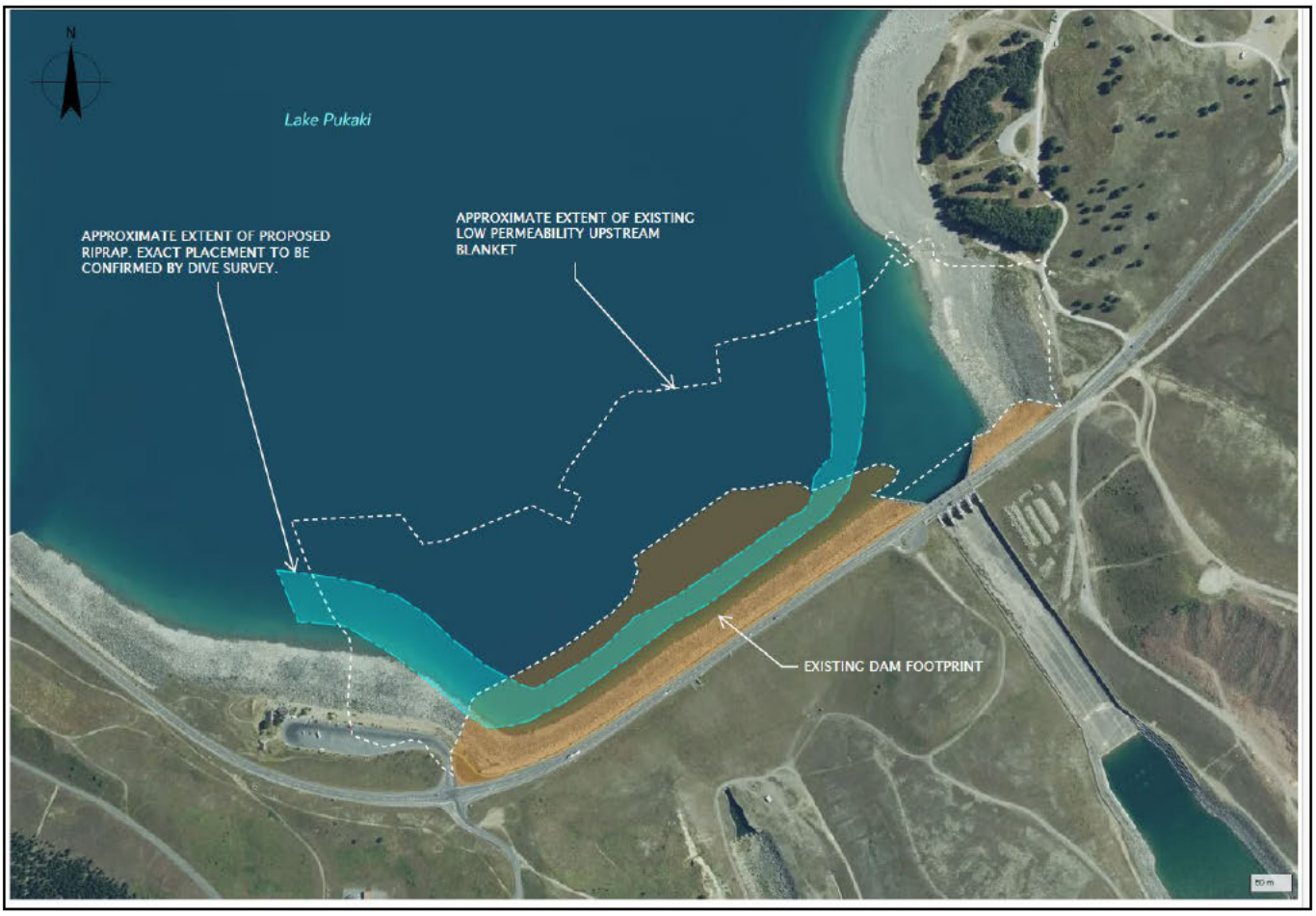

Figure 17 *Extent of existing dam footprint and existing low permeability blanket.*

Table 4 *LWRP Rule Analysis*

Rule	Activity
Rule 5.158: The use and maintenance of a lawfully established dam that existed on 1 November 2013 is a permitted activity.	The existing dam was lawfully established prior to 2013, therefore the rock armouring works associated with the maintenance of the dam are considered to be a **permitted activity.**
Rule 5.98: Any discharge of water or contaminants onto or into land in circumstances where a contaminant may enter groundwater that is not classified by any of the above rules, is a permitted activity provided the following conditions are met: 1. The volume of discharge does not exceed 10 m^3 per day and the application rate does not exceed 10 mm per day; and 2. The discharge is not directly into groundwater; and 3. The discharge does not result in any overflow or runoff into any surface water body or onto neighbouring site; and 4. The discharge does not, in groundwater, render fresh water unsuitable or unpalatable for consumption by animals or humans; and	The proposed activity may result in construction phase discharges of stormwater to land associated with the construction of the rock armouring. This includes site preparation work, such as the construction of access tracks and laydown areas and discharges associated with the operation of machinery in water. 1. **Does not comply.** The discharge volume may exceed 10m^3 per day. 2. **Complies**. The discharge is not directly into groundwater. 3. **Does not comply.** The discharge may result in an overflow to a surface water body (the lake) but will not overflow onto a neighbouring site.

Rule	Activity
5. The discharge does not contain any hazardous substance, hazardous waste or added radioactive isotope; and 6. The discharge does not occur when the soil moisture exceeds field capacity; and 7. The discharge is not from or into contaminated or potentially contaminated land; and 8. The discharge is not within a. 50 m of a bore used for water abstraction; or b. Within a Community Drinking water Protection Zone as set out in Schedule 1; and **9.** Where the discharge is from the use of live ammunition associated with military training under the Defence Act 1990, conditions 1 to 8 do not apply.	4. **Complies.** The discharge will not render freshwater unsuitable or unpalatable for consumption by animals or humans. 5. **Complies.** The discharge does not contain any hazardous substance, hazardous waste or radioactive isotope. **6. N/A** 7. **Complies.** the discharge is not from or into contaminated land. 8. **Complies**. The discharge is not within 50 m of a bore used for abstraction or within a Community Drinking Water Protection zone. **9. N/A** **Rule Not Met**
Rule 5.99: Any discharge of water or contaminants into surface water or onto or into land in circumstances where it may enter surface water that is not classified by any of the above rules is a permitted activity, provided that the following conditions are met: 1. The discharge is not from or into contaminated or potentially contaminated land; and 2. The discharge is not into a Natural State waterbody; and 3. The discharge meets the water quality standards in Schedule 5 after reasonable mixing with the receiving waters, in accordance with Schedule 5; and 4. The concentration of total suspended solids in the discharge shall not exceed: a. 50 g/m^3 where the discharge is to any spring fed river, Banks Peninsula river, or to a lake; or b. 100 g/m^3 where the discharge is to any other river or to an artificial watercourse; and 5. The discharge does not result in more than a 20% change in the rate of flow of the receiving surface water body; and 6. The discharge does not contain any hazardous substance, hazardous waste or added radioactive isotope.	The proposed activity involves potential construction phase discharges to surface water associated with the rock armouring. This includes site preparation work, such as the construction of access tracks and laydown areas and discharges associated with the operation of machinery in water. 1. **Complies**. the discharge is not from or into contaminated land. 2. **Complies**. The discharge is not into a Natural State Waterbody. 3. **Complies.** The discharge will be managed to meet the water quality standards in Schedule 5 after reasonable mixing with the receiving waters. 4. **Does not comply.** The discharge may exceed a total suspended solids concentration of greater than 50g/m3 during construction of the rock armouring. 5. **Complies.** The discharge will not alter the rate of flow of the receiving waterbody. 6. **Does not comply.** There is some potential for the discharge to contain hazardous substances as the activity involves the operation of machinery in water. **Rule Not Met**
Rule 5.100: Any discharge that is not permitted by either Rule 5.98 or 5.99 and is not classified by any other rule in this Plan is a discretionary activity.	The proposed activity involves potential construction phase discharges to land and surface water associated with the construction of the rock armouring. This includes site preparation work, such as the construction of access tracks and laydown areas and discharges associated with the operation of machinery in water.
Rule 5.148: The extraction of gravel from the bed of a lake or river including the deposition of substances on the bed and excavation or other disturbance of the bed of a lake or river, but excluding the diversion of water within the bed of a river, is a permitted activity, provided the following conditions are met:	The proposed activity primarily involves the excavation of bed material on the dam face associated with the proposed rock armouring and the deposition of material in the lake. However, it is possible that a small portion of the work will extend onto the bed of the lake. 1. **Complies.** The activity will not occur within a high naturalness waterbody;

Rule	Activity
1. The activity is not undertaken in, on, or under the bed of any river or lake listed as a high naturalness waterbody in Sections 6 to 15; and 2. No part of the activity occurs within flowing water; and 3. The activity does not include the deposition of any substance other than bed material on the bed; and 4. The volume excavated by any person or on behalf of any person, organisation or corporation: a. In the bed of any river or lake does not exceed 5 m^3 in any consecutive 12 months; or b. Between 1 February and 31 August, in the beds listed in Schedule 14, does not exceed 5 m^3 per month and not more than 10 m^3 in any 12 consecutive month period; or c. Between 1 February and 31 August, in the beds listed in Schedule 15, does not exceed 10m^3 per month and not more than 20 m^3 in any 12 consecutive month period; and 5. Any excavated material (other than surplus or reject material) is removed from the bed within 10 days of the material being excavated; and 6. Unless undertaken by owner of the structure, or written permission from the owner of the structure has been obtained, the activity is undertaken more than 50 m from any lawfully established dam, weir, culvert crossing, bridge, surface water intake plant or network utility pole or pylon, more than 150 m from any lawfully established water level recorder and more than 7.5 m from any existing defences against water; and 7. The activity and any associated equipment, materials or debris does not obstruct or alter access to or the navigation of the lake or river; and 8. The activity does not include screening or any other processing of the gravel within the bed of the lake or river; and 9. The activity is not undertaken in a salmon spawning site listed in Schedule 17, or in in any inanga spawning habitat during the period of 1 January to 1 June inclusive or in any Critical Habitat; and 10. Excavation shall not occur within 100 metres of birds which are nesting or rearing their young in the bed of the river.	2. **Complies.** The lake is not classified as flowing water; 3. **Does not comply.** The activity may involve the deposition of material other than bed material on the bed; 4. a. **Does not comply.** The volume of excavation may exceed 5m^3 in a consecutive 12-month period. b. **N/A.** The lake is not listed in Schedule 14 c. **N/A.** The lake is not listed in Schedule 15 5. **Complies.** Any excavated material will be removed from the bed within 10 days of being excavated. 6. **Complies.** The work will be undertaken by the owner of the dam. 7. **Does not comply.** The activity and associated equipment, material or debris will temporarily obstruct or alter access to the lake. 8. **N/A.** The activity does not include screening or processing of gravel within the bed of the lake. 9. **N/A.** The lake is not listed in Schedule 17 or identified as an inanga spawning habitat. 10. **N/A** **Rule Not Met**
Rule 5.149: The extraction of gravel from the bed of a lake or river, including the ancillary deposition of substances on the bed and excavation or other disturbance of the bed that does not meet condition 4, 5, or 8 of Rule 5.148 but excluding the diversion of water within the bed of a river, is a permitted activity provided the following condition is met: 1. The extraction of gravel is undertaken by or on behalf of CRC in conformance with the current version of the Canterbury Regional Gravel Management Strategy	While the excavation may not meet condition 4 of Rule 5.148, it will not be undertaken by or on behalf of Canterbury Regional Council.

Rule	Activity
prepared to give effect to Policy 10.3.4 of the Canterbury Regional Policy Statement.	
Rule 5.150: The extraction of gravel from the bed or a lake or river including the ancillary deposition of substances on the bed and excavation or other disturbance of the bed that does not meet condition 1, 2, 3, 6, 7, 9 or 10 of Rule 5.148 or condition 1 of Rule 5.149 but excluding the diversion of water within the bed of a river, is a discretionary activity.	The proposed activity cannot comply with conditions 2, 3, 4 and 7 of Rule 5.148 or condition 1 of Rule 5.149 and must therefore be assessed as a **discretionary activity.**

7.5 Canterbury Air Regional Plan

The CARP seeks to manage discharges to air in the best practicable manner, to maintain air quality where it provides for people's health and cultural wellbeing, or to improve it if it does not while recognising the investment in, and significant contribution to the economy and social wellbeing of Canterbury of industrial and trade activities that discharge to air.

Table 5 below provides an assessment of the activity against the relevant rules of the CARP.

Table 5 CARP Rule Analysis

Rule	Activity
Rule 7.3: the discharge of odour, dust or smoke into air that is not managed by any other rule in this Plan is a permitted activity provided the following conditions are met: 1. The discharge does not cause or is not likely to cause an adverse effect beyond the boundary of the property of origin; and 2. The discharge does not cause an offensive or objectionable effect beyond the boundary of the property of origin when assessed in accordance with Schedule 2.	1. The proposed rock armouring may cause an effect beyond the boundary of the property of origin. 2. The proposed rock armouring may cause an offensive or objectionable effect beyond the boundary of the property of origin when assessed in accordance with Schedule 2.
Rule 7.5: The discharge of odour, dust or smoke into air that does not meet condition 2 of Rule 7.3 is a non-complying activity.	The proposed activities do not meet condition 2 of rule 7.3 and must therefore be assessed as **non-complying activities.**

7.6 Wildlife Act 1953

The Wildlife Act 1953 was drafted to protect native and introduced wildlife, including threatened species. It controls human activities that could harm wildlife and sets a framework for managing the effects of activities on wildlife.

Section 53A states that the Director-General may authorize the taking or killing of wildlife that is incidental to carrying out an otherwise lawful activity and notes that killing of wildlife is incidental if it is not directly intended but is unavoidable and foreseeable as a consequence of carrying out the lawful activity.

Based on a lizard survey carried out at the end of October, the site contains areas of lizard habitat.. While the final reporting has not yet been finalised, Meridian proposes to take a conservative approach and seek an Authorisation that would otherwise be sought under S53A of the Wildlife Act to handle, relocate or kill wildlife incidentally, noting that because of the proposed scheduling of the work, if any lizards are present their salvage and relocation may not be a viable option.

8. Assessment of environmental impacts

Clause 5(4)(a), 5(4)(b), 6 and 7, and Clause2(1)(e), 2(1)(j), 2(1)(k), 2(1)(o)

8.1 Introduction

This section of the application describes the effects of the proposed activities including both eased access and rock armouring on the existing environment. The topic-by-topic assessments address:

– the physical and chemical characteristics, i.e., hydrology, air quality, groundwater, structures and lake shoreline geomorphology.
– the ecological components including the benthic ecology of rivers, lake macrophytes, fish, wetland habitats, birds and terrestrial invertebrates associated with riverbeds, and
– the social characteristics associated with landscape, recreation and tourism values, and characteristics of other water users.

At the end of each section the effects attributable to the proposed activity that justify a management response are identified.

8.2 Basis for Assessment

8.2.1 Plan Change 1 (PC1)

As noted previously, the WCWARP in its original form included a minimum lake level of 518.0 m RL, with no pathway for utilising stored water below this level.

In 2012, Meridian initiated Plan Change 1 (PC 1) to the WCWARP which sought to introduce a new minimum lake level for Lake Pūkaki during electricity supply emergencies when the SO had commenced an OCC. PC1 allowed additional water from Lake Pūkaki to be used for generating electricity as a permitted activity when an OCC is declared by the SO. Within For the purposes of evaluating the costs and benefits of PC1, the duration of an entire event (time below 518.0 m RL) was considered likely to be between 4-7 months (this includes the time spent operating below 518.0 m RL, as well as the time required to restore the lake level to above 518.0 m RL once an OCC has ended). Supporting technical effects assessments were submitted as part of this plan change process. It was ultimately concluded that allowing access for electricity generation purposes to water stored between 513.0 and 518.0 m RL, as a permitted activity once an electricity supply emergency OCC has been declared, was appropriate and promoted the sustainable management purpose of the RMA.

The following sections rely on the 2012 effects assessments as appropriate and focuses on both the changes that have occurred since 2012, and the differences between the activities permitted by PC1 and the proposed activities. The applicant discussed this matter with ECan during the consultation stage. ECan confirmed that the approach taken in regards to PC1 is appropriate.

8.2.2 Plan Change 3 (PC3)

In addition to PC1, PC3 of the WCWARP included a new rule regarding the use of Lake Pūkaki between 518.0 m RL and 515.0 m RL. In addition to the PC1 Permitted Activity rule, at times of a SSA initiated by the SO, the lake may be operated between the alert minimum control level of 515.0 m RL and 518.0 m RL. The rule is not a permitted activity and to implement enable this use, Meridian applied for and was a granted resource consent in 2018 (CRC185833). This consent expired on 30 April 2025 but has been granted a section 124 continuance while the new replacement consent application (CRC240441) is being processed.

The technical assessments introduced through the PC3 process also provide a useful baseline for assessment and are considered in the following sections.

8.2.3 Approach to dam safety

Meridian understands that all matters related to dam safety are to be addressed through the Building Act 2004 and not through resource consents under the Resource Management Act 1991 (RMA). This is because on 12 May 2022, the Government introduced the Building (Dam Safety) Regulations 2022. These regulations are established and implemented under the Building Act 2004.

All of the dams that form part of the WPS, including Pūkaki Dam, are covered by the regulations.

The applicant discussed this matter with Environment Canterbury during the reconsenting of the WPS. ECan confirmed that the approach taken to dam safety is appropriate.

8.3 Wetland Hydrology – Eased Access

The Groundwater Assessment included in **Appendix J**, considers the impact of the proposed eased access on wetlands near the lake margins. This assessment identified that:

– 14 wetlands are inundated at high lake levels but not at lower lake levels, suggesting they are hydraulically connected to the lake at times, but that they continue to function over a large range of water levels (for instance the current operating range of 532.5 to 518.0 m RL).
– 5 wetlands that are considered to be not hydrologically connected to the lake.
– 2 wetlands may be inundated by waves at high lake levels but not at lower lake levels, suggesting they are connected to the lake at times, but that they continue to function over a large range of water levels (for instance the current operating range of 532.5 to 518.0 m RL).
– The Tasman Delta is directly connected to the lake and how much land is exposed depends on lake levels. The wetland hydrology to the Tasman Delta is not expected to change due to the proposed activity, as the delta already experiences changes in lake level, albeit the lower lake levels will result in a larger extent being exposed.

From this analysis, the assessment concluded that 17 wetlands are occasionally inundated by the lake. Except for the Tasman Delta, these wetlands interact with lake at approximately 525.0 m RL and above and as such, are not impacted by the proposed activity. With respect to the Tasman Delta, given the large range of lake levels that occur now (518.0 to 532.5 m RL), it is considered unlikely that there will be a change to wetland hydrology if the lake operates between 518.0 and 513.0 m RL for limited periods of time over the three year term of consent and that any adverse impacts will be insignificant.

Ecological impacts associated with wetlands have been considered separately in section 8.9 below.

8.4 Groundwater Users – Eased Access

The assessment of groundwater users has concentrated on four privately owned active bores within 500m of the lake margin, being H38/0273, H38/0206, H38/0038 and BZ15/5016 as shown in Figure 12 (Section 4).

As noted in the Groundwater Assessment included in **Appendix J**, H38/0273 and H38/0206 screens are located well below the proposed low operating level. As such they are unlikely to be directly hydraulic connected to the lake. H38/0038 bottom screen is at approximately 558.4 m RL, being 26 m above the maximum lake level of 532.5 m RL, and 45 m above the proposed lower operating level of 513.0 m RL. Again, these values suggest this bore is unlikely to be directly hydraulic connected to the lake.

BZ15/5016 is located on the southern edge of the lake and piezometric contours suggest groundwater flow in this area is southwards from the lake towards the bore. However, BZ15/5016 bore log shows 9 m thick sandy silt layers between 519.0 to 510.0 m RL, with its screen installed below the silt from 510.0 to 500.0 m RL. The BZ15/5016 bore log is evidence that there is a clear sedimentary barrier between the lake and BZ15/5016 restricting any significant hydraulic connection.

The yield test undertaken on BZ15/5016 (available via ECan's well search tool[8]) was reviewed as part of the assessment. The yield test results show large drawdowns for small yields (54.3 m of drawdown for less than 0.51

[8] **Well search | Environment Canterbury https://www.ecan.govt.nz/data/well-search/welldetails/QloxNS81MDE2/QloxNS81MDE2IA%3D%3D**

L/s), consistent with it being installed into a low permeable material. If the lake acted as a recharge boundary to the bore, we would expect much higher yields and smaller drawdowns. Given the evidence presented above, it is unlikely that BZ15/5016 is hydraulic connected to the lake.

As part of the PC1 process, effects on groundwater users were concluded to be unlikely. The Groundwater Assessment prepared in support of this substantive application came to a similar conclusion that groundwater users are unlikely to be impacted by the eased access proposal.

8.5 Structures – Eased Access

There are seven structures located on the lake shoreline with the potential to be affected by the proposed eased access. These were all visually assessed and photographed as part of the Engineering Structures Assessment included in **Appendix L.** Two of the seven structures are the Lake Pūkaki Outlet and Spillway located on the southern end of the lake. The assessment assumed that the proposed rock armouring works will provide erosion protection of these structures and therefore they were not assessed further. It is also noted that the rock armouring work is proposed to be undertaken away from the remaining structures, and as such it is not anticipated that there will be any adverse impacts on them from that aspect of the proposal. Impacts on the remaining structures arising as a result of the eased access are assessed as follows:

8.5.1 Tekapo B Power Station

The Tekapo B Power Station is a 46 m-high structure situated within a tailrace pond and within the lake's current operating water levels. Commissioned in August 1977, it houses two 80 MW generators which are supplied with water via two large penstocks which are fed from Lake Tekapo via the Tekapo Canal. The peak discharge flowrate through the power station is limited to 130 m^3/s (typically occurring at high tailwater conditions). Tekapo B Power Station and the associated infrastructure is owned by Genesis Energy Limited.

The station is surrounded by water when the discharge is operational (refer to Figure 18) and has been designed for a Lake Pūkaki operational water level range of 14.3 m, with the lowest operational tailwater level at around 518.0 m RL.

Figure 18 Site visit photo of Tekapo B Power Station showing the two penstocks.

The usually submerged portion of the station structure is shown in a 1977 photo taken during construction (Figure 19).

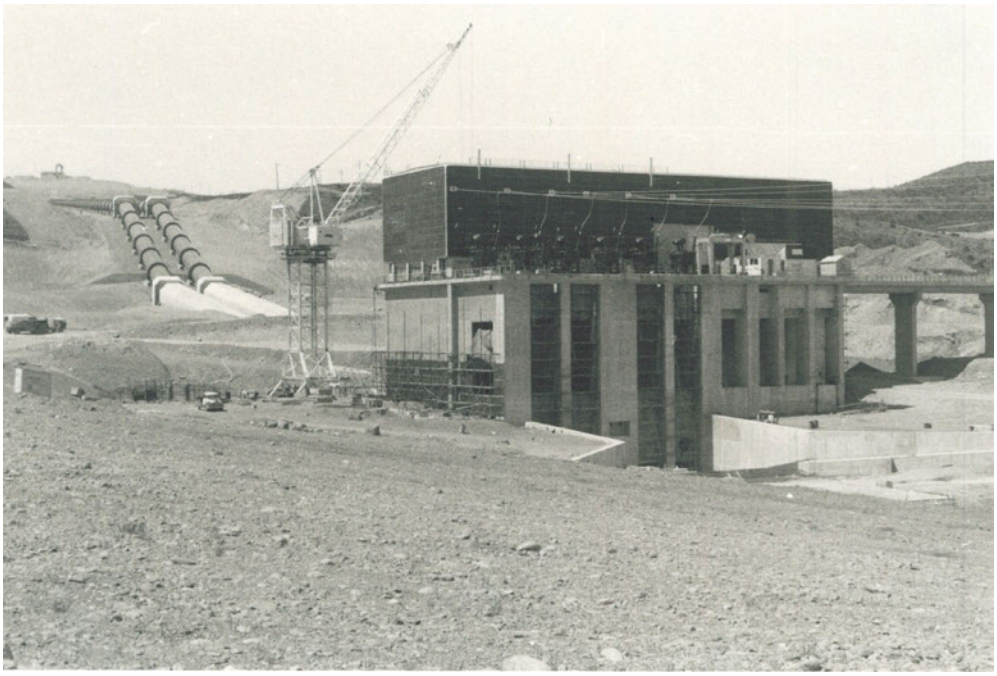

Figure 19 1977 image of Tekapo B Power Station under construction (Source: information board near the power station).

8.5.2 Tailrace Discharge Channel and Weirs

Tekapo B Power Station was constructed prior to raising of Lake Pūkaki. To allow the station to generate power before the lake was raised, a tailrace weir with a crest of 517.85 m RL and rock chute, were constructed to maintain the tailrace pond at around 518.0 m RL.

The weir and chute are comprised of three linked components:

– A trapezoidal shaped earth lined channel from Tekapo B outlet to the weir.
– The weir at the head of the chute is formed by a concrete sill approximately 45.7m in length.
– The chute downstream of the weir comprises a further ten concrete sills (beams) spaced every 30.5m over the length of the structure. The overall length of the chute is 364 m, and it has an average slope of 19.3:1 (horizontal to vertical) except over the last 61 m where it increases to 8:1. The level of the last sill at the base of the chute is 502.23 m RL. The spaces between the sills are lined with rock boulders overlying gravel and sand filters.

Figure 20 shows an aerial view of the weir and chute in operation in the 1970's with Lake Pūkaki water level at around 504.3 m RL.

Figure 20 Lake Pūkaki at 504.3 m RL showing the full extent of the tailrace and weir.

Figure 21 shows a plan view of the Tekapo B Power Station, tailwater pond and discharge channel with the 11 sills (crest weir and ten sills) and key reduced levels.

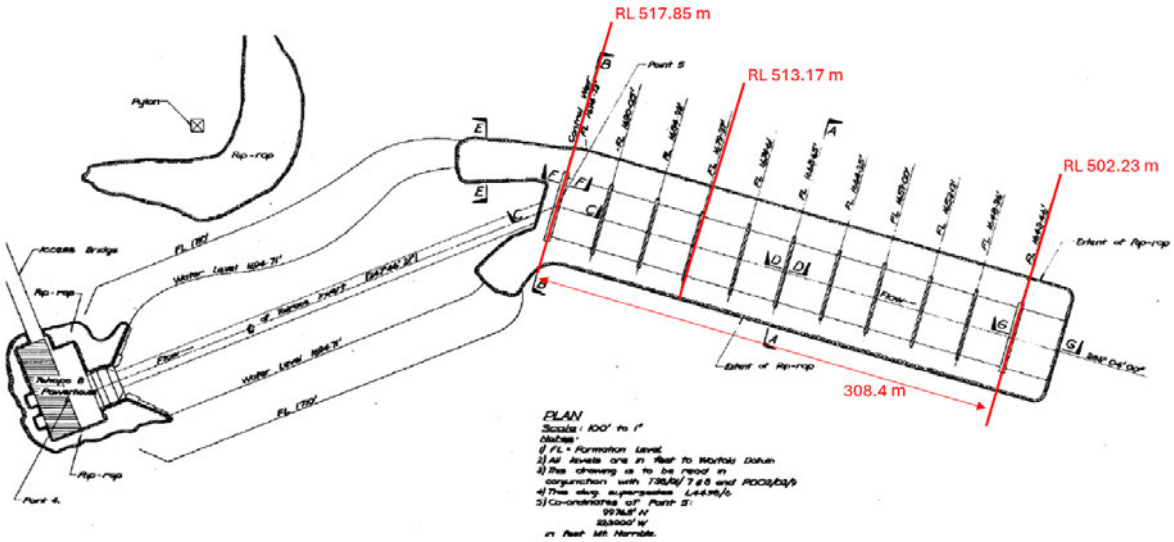

Figure 21 Plan view showing the Tekapo B Power Station (left) and the tailrace weir (right) with reduced levels.

Lake level records show the last time the lake level was below 518.0 m RL was immediately following the commissioning of the Tekapo B Power Station in August 1977. Figure 22 indicates that the power station operated below 518.0 m RL for approximately 609 days (or 20 months). Since that time, the weir and chute have been submerged, although at low lake levels the structure remains visible below the surface (See **Appendix L**)

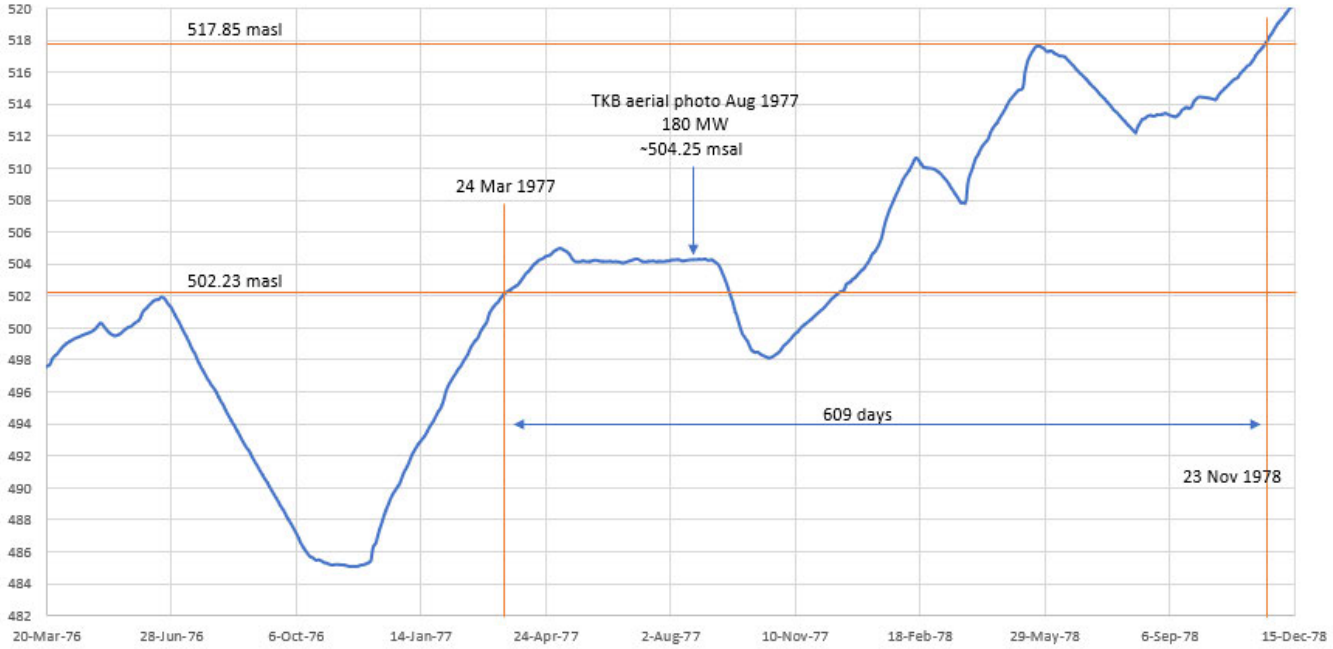

Figure 22 ***Lake level records from 1976 – 1978 showing 15 months following the August 1977 commissioning of Tekapo B power station where the lake was operated below 518.0 m RL, i.e. up until 23 Nov 1978.***

8.5.3 Damwatch Study and Summary of Findings

Drawing the lake level below 518.0 m RL and down to 513.0 m RL will expose the weir and the upper sills with discharge water from Tekapo B power station flowing over the weir and down the chute. Damwatch were commissioned by Meridian in August 2025 to complete a study of the weir and chute (Damwatch 2025 – see Appendix B to **Appendix L**): The study provides:

– A review of historical documentation for the design and construction of Tekapo B Power Station and other associated studies

– A hydraulic assessment of the weir and chute structure under the proposed operational conditions for accessing Lake Pūkaki below 518.0 m RL. This included:

- Use of a 1D HEC-RAS hydraulic model to assist in the interpretation of hydraulic behaviour.
- An assessment of the likely performance and structural stability of the weir and chute structures based on historical performance.
- An assessment of the structural stability of the weir and chute structures from exposure to wind-generated waves during lowered lake levels.

The full report is included in Appendix B to **Appendix L**. In summary, the key findings are:

– The chute structure comprises 11 concrete sills with sill 1 being the crest weir. Drawing the lake down to 513.0 m RL will expose the first four concrete sills in still-water conditions, with sill 4 located at approximately 513.17 m RL (i.e. no flow from Tekapo B).

– The first two bays (sill 1-2 and 2-3) have large rock material with a medium diameter d_{50} of 0.6 to 0.85m. From sill 3 to 5, the rock material has a d_{50} of 0.3m to 0.45m. Below sill 5, the median diameter d_{50} = 0.27m.

– Some scouring occurred during operation of the spillway in the 1970s downstream of sill 5. Rock was stockpiled on site at the time and repairs were made during station shutdowns.

– Field measurement of the hydraulic performance of the chute were made in the 1970s. Overall, it was concluded that the control weir and chute *"successfully maintained a well-defined waterway in spite of some movement of rock downstream"* (Malan and Hancock, 1979 – see **Appendix L**).

– Modelling completed by Damwatch indicates as the lake drops to 514.0 m RL and with Tekapo B operating, "ramp-type" (or chute) flow conditions (turbulent flow (USBR, 2007 – see Attachment 1)) extended further down the chute than the "still-water" condition described above, with the rock filled bays between sills 1-2, 2-3, 3-4 and 4-5 being exposed to this flow.

– Irrespective of the lake level, tailwater levels at Tekapo B Power Station will be unchanged due to the control by the crest weir (sill 1) and remain at around 518.0 m RL.
– Damwatch assessed the weir and chute against the following issues regarding the draw down of the lake below 518.0 m RL:
    - the stability of the rock chute under conditions of ramp-type flow.
    - the effects of sediment deposition on flow behaviour down the rock chute.
    - the effects of wind-generated waves on the lining of the rock chute.
– Damwatch concluded that:
    - The rock material in the bays between sills 1 and 5 is very likely to remain stable if the level of Lake Pūkaki is drawn down to 513.0 m RL with ramp-type flow of 130 m^3/s down the chute.
    - It is possible that fine sediment may have deposited on the chute since the 1970s. This could change the characteristics of the chute flow. However, the highly turbulent nature of ramp-type flow will rapidly remove any fine sediment.
    - For a mean annual windstorm, the significant wave height will be in the order of 1.5 m. Waves of this height would not break before reaching the rock chute and would impact on the structure as plunging type breaking waves. Damwatch concluded that the rock in the bays as low as sills 5-6 is likely to remain stable under the impact of these waves if the lake level is drawn down to 513.0 m RL. They also note there is no evidence of the rock chute being damaged by wind generated waves during operation in the 1970s.

In summary, the Damwatch report has identified and assessed the potential areas of risk associated with operation of the weir and chute at lake levels between 518.0 and 513.0 m RL. The study has not identified any areas of specific concern. It also notes that the crest weir maintains a water level of 518.0 m RL at Tekapo Power Station. Therefore, the power station is not directly impacted by the lower lake levels.

In addition:

– As describe in Section 3.1, the application is limited to a three-year period (until 2028) and modelling completed by Meridian indicates any draw down events are most likely to be short in duration and associated with lake levels between 518.0 and 515.0 m RL.
– As part of PC1, the proposed lake level draw down is already permissible with SO approval. There has been no change in structures or conditions at Tekapo B Power Station since PC1 that would materially alter the effects considered for PC1.
– Meridian will visually monitor the weir, chute, and nearby lake edges whenever the lake is lowered below 518.0 m RL. The monitoring schedule and approach will be set in agreement with Genesis Energy Limited.
– The existing weir maintains the water levels at the Tekapo B Power Station at around 518.0 m RL. This means that the power station can continue to operate when the lake is drawn down below 518.0 m RL.

8.5.4 Gabion Retaining Wall

A gabion retaining wall approximately 60 m long is situated on the western shoreline of Lake Pūkaki adjacent to SH80 Mount Cook Road (SH 80 RS 17 RP 12.64 – 12.7). Figure 23 shows an aerial view of the site and the shoreline profile.

Figure 23 *Left: Photo taken of the gabion retaining wall facing north. Right: Aerial image of the Gabion retaining wall between SH 80 RS 17 RP 12.64 – 12.7 (Source: Google Maps).*

The concrete base of the gabion retaining wall is located at approximately 532.0 m RL. The gabion wall is therefore unlikely to be directly impacted by a reduced lake level as it is well above the existing operating range. While there is some potential for localised bed erosion if the lake level drops below the extent of rip rap below the concrete base of the gabion wall for an extended period, the expected short duration at levels below 518.0 m RL (months, not years), and the distance between the retaining wall and the lake shoreline will be such that it will not impact the retaining wall's integrity. Inspection of the rip-rap at the SH 80 Mount Cook Road gabion wall is recommended whenever water levels fall below the extent of the rip rap.

8.5.5 Boundary Stream Bridge

The Boundary Stream Bridge 170 is located on the western shoreline of Lake Pūkaki adjacent to SH80 Mount Cook Road, where Boundary Stream crosses under SH80. The elevation of the base of the bridge piers is within the operating range of Lake Pūkaki, meaning the piers are partially submerged at higher lake levels (Figure 24), and at lower lake levels there is no inundation of the stream channel or bridge piers (Figure 25).

Figure 24 *Left: Aerial view of Boundary Stream Bridge (SH 80 RS 17 RP 12.64 – 12.7, Source: Google Maps). Right: Site visit photo showing the partially submerged bridge abutments.*

Figure 25 View from the bridge at a lower lake level in July 2017 – Lake Level approximately 523 m RL (Source: Google Maps).

The bridge piers are therefore exposed to a range of conditions, from typical stream flows and associated potential scour, to lake inundation as part of the normal lake operating envelope above 518.0 m RL. Therefore, no additional risk of stream scour is anticipated from a lake level operated below 518.0 m RL.

8.5.6 Catherine Fields Irrigation Intake

The 150 L/s Catherine Fields Irrigation Intake is located adjacent to SH8, immediately north of the Lake Pūkaki Spillway. This intake structure was constructed circa 2017 and is, therefore, the only structure assessed in this report that was designed and installed after 2012 (i.e. since Plan Change 1).

Figure 26 indicates a plan view of the intake and Figure 27 a long section indicating the anchor blocks and inlet screen within the normal operating range of the intake.

A high-level intake options assessment was completed by GHD in September 2024 for this intake, which highlighted that the existing system is inoperable at lake levels below 518.42 m RL. Several temporary design options were developed for consideration, with the aim of addressing the issue of water abstraction at lower lake levels. Meridian has an agreement with the owners of the intake structure regarding the supply of water, or remuneration for a lack of water supply, for lake levels below 518.42 m RL. It is noted, however, that the resource consent to take water via this intake has a condition which references the level at which the abstraction must cease (518.0 m RL). Therefore, even if Meridian provided access to water below 518.0 m RL, the resource consent does not enable water to be taken at that level.

Design drawings indicate that lowering the lake below 518.0 m RL will expose the intake screen foundation to wave action that may not have been anticipated during the original intake design. However, the screen concrete anchoring system appears to be the same as for the pipeline anchor blocks that are currently exposed to wave erosion. It is therefore unlikely that any further erosion damage will occur than would normally occur on the anchor blocks which are subjected to wave action above 518.42 m RL.

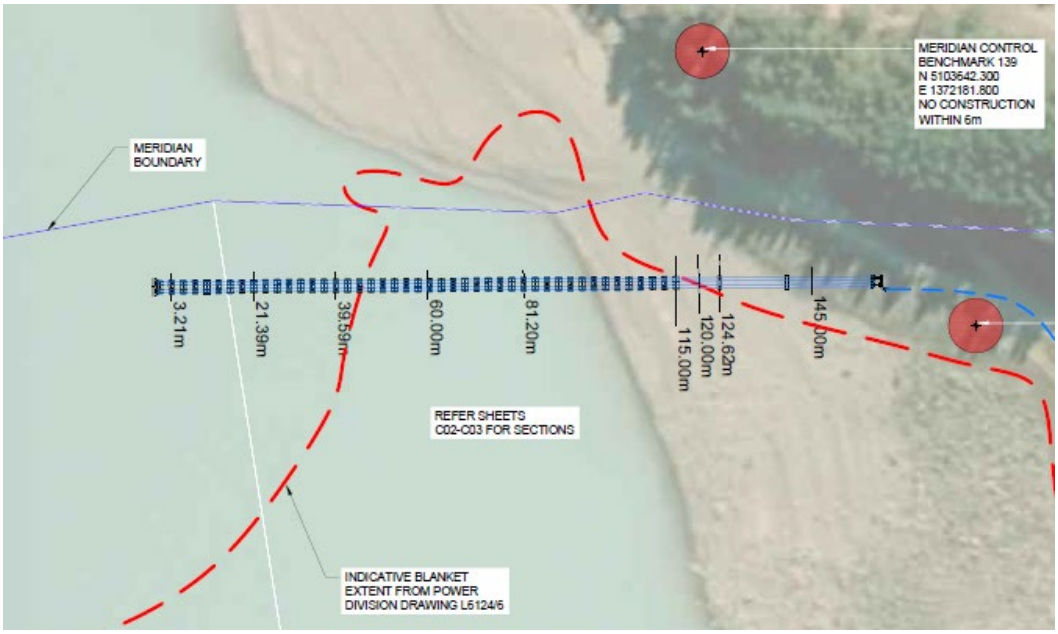

Figure 26 Catherine Fields Intake Plan

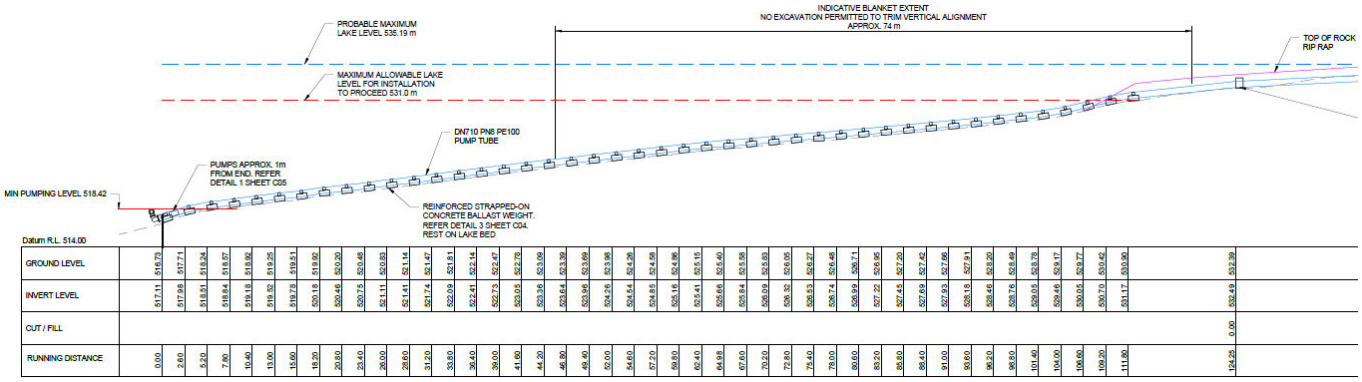

Figure 27 Catherine Fields Intake Long Section

Notwithstanding the above, it is considered unlikely that that there will be any detrimental impacts of wave erosion on the Catherine Fields intake.

8.6 Air Quality

The proposed activities have the potential to cause adverse impacts on air quality in the surrounding environment. Given the discrete nature of the discharges, individual assessments have been undertaken for the effect of eased access on lake levels and lake shoreline exposure, and rock armouring activities. The full assessments are included in **Appendix F and G** and are discussed below.

Both assessments took a conservative approach. The assessment process for both reports was based on the assessment criteria and methodology for assessing dust impacts in New Zealand (MfE, 2016) for health and amenity.

The assessments included a detailed analysis of the processes for dust generation and suppression, the meteorological data that is relevant to the site, and identification of potential receptors and their likely sensitivity to dust.

The review of meteorological data using a multi-criteria analysis process was undertaken to identify a representative worst-case year to use for the modelling. The year 2015 was selected as it was assessed as the most appropriate for a high number and severity of dust storm and wind erosion events. A total of 15 modelling

points were created around the eastern and southern lake perimeter and on the Tasman River delta to understand the change in potential for dust events to be generated between the current and eased restriction scenarios.

For the rock armouring assessment, the construction methodology and sequencing were used to inform the model input assumptions. This included assumptions associated with the time of year that the works will operate and the duration of construction events.

8.6.1 Eased Access

Lowering the lake from 518.0 m RL to 513.0 m RL is expected to expose an additional 9.5 km² of lakebed, primarily at the Tasman River delta. This area may contain fine glacial till that has not previously been subject to drying and wind erosion.

The qualitative modelling showed that current dust storm origin and intensity is estimated to be greatest from the Tasman River delta. The assessment indicated that the dust impacts are more pronounced to the northern end of the lake and adjacent to the shoreline, reducing with distance along the lake towards the south. Those sensitive receptors that have been identified as most likely to be affected are Braemar Station and Tasman Downs Station. (It is noted, as set out in Section 12 below that Meridan have an existing agreement in place with Braemar Station.) The public accessing and using the eastern shoreline of the lake for recreational activities may also be exposed to more intense dust events. The impacts are expected to be localised and consistent with those assessed and accepted under the 2012 PC1 application.

Meridian's modelling indicates that the lowering of the lake below 518.0 m RL is likely to be infrequent and for short duration, therefore limiting the potential for an increase in effects. Given the short duration of the eased restrictions (i.e., lower lake levels for limited periods over no more than three years), the assessment that was undertaken is deemed to be conservative and precautionary in its approach. Specifically, it included a duration greater than that modelled by Meridian (**Appendix C**) and uses a year where wind events were higher than average.

The assessment included a FIDOL assessment with respect to dust generation from the eased access. This concluded that the likelihood of dust storm conditions coinciding with the lake being lowered below 518.0 m RL, and the shores being sufficiently dry enough to create a more intense dust storm than a landowner may currently experience, to be low.

In terms of mitigation, the air quality assessment concluded that there are no practicable measures to actively manage newly exposed areas of the lakebed to reduce dust generation. This is due to the short duration of increased risk – measured in weeks to months – and the potentially large areas over which dust suppression would have to be applied. The Dust Management Plan included in **Appendix D** focuses on communication with local communities and investigation of dust issues via a complaints register.

On the basis of the above, noting in particular the short duration and low frequency of the increased risk, it is considered that any air quality impacts associated with the eased access scenario will be less than minor, and acceptable.

8.6.2 Rock Armouring

Construction activities, including excavation, truck movements, and temporary stockpiling, have the potential to generate dust emissions that may result in short-term amenity impacts (e.g., visual and dust), especially during dry, windy conditions. No long-term air quality impacts are expected, given the temporary nature of the construction works. These have been assessed in the Air Quality Assessment included in **Appendix G**.

The impacts on air quality associated with the rock armouring works have been assessed using a quantitative model and applying reasonably conservative input assumptions. The modelling indicated that without mitigation measures adopted, the impacts on air quality from a health perspective are likely to be limited in lateral extent to less than 500 m downwind from the site and be of short duration. The report also identified the potential for the adjacent freedom camping areas on the left abutment, immediately adjacent to the works area, to be exposed to poor air quality if meteorological conditions are conducive to dust generation.

The assessment included a FIDOL assessment with respect to dust generation from the rock armouring activity. This concluded that there is a potential risk for uncontrolled construction activities to lead to adverse outcomes,

particularly for the receptors located immediately adjacent to the north side of the left abutment work zone. The short term irregular frequency of the proposed works are likely to be a positive mitigating factor, and the staged works approach provides opportunity for construction methods to be adapted.

The assessment concludes that the impacts can be mitigated and managed, either through exclusion, i.e., limiting public access close to the construction areas, and via dust suppression measures. There may be a small residual impact on farm workers at the Catherine Fields property, which can be reduced further with the implementation of identified mitigation measures. There is a possibility for active monitoring of dust concentrations and communication with this landowner to mitigate this risk. However, active monitoring is only recommended as a last resort measure given that it will not eliminate the dust but only provide information with regards to quantification of dust mitigation measures such as water trucks and/or sprays.

The amenity value impacts, namely deposited dust, were not modelled in the assessment. However, the modelled impacts of dust on air quality are considered to provide a good indication that the nuisance effects of dust from the works are likely to be largely contained to within the site area and in close proximity to the actual works. Hence, the amenity impacts are considered to be addressed implicitly when overall dust is minimised.

A Dust Management Plan included in Appendix D sets out mitigation measures, should adverse impacts arise. These measures include:

– Perform daily inspections for visible emissions along the site boundary of the Project site.
– Use dust suppression techniques (such as watering via watering trucks or sprinkler systems) as needed to maintain moist conditions on cleared or exposed areas, unsealed roads, temporary stockpiles, and high dust generating activities.
– Retain as much vegetative screening between the Project site and the nearest sensitive receptors as possible.
– Instigate progressive rehabilitation as soon as practicable to encourage the establishment of vegetation as soon as possible after the works.
– Consider covering loads in trucks, or spray loads as an alternative.
– Install wind breaks surrounding primary temporary stockpile locations. Given the often-extreme wind conditions experienced at the site, porous wind breaks should be considered in favour of solid wind breaks. Whilst this is a less effective mitigation measure, it will ensure that the wind break does not become a safety hazard under excessive load.

Given the temporary and short-term nature of the construction activity, the mitigation measures proposed, and the results of the modelling, it is considered that any adverse air quality impacts associated with the construction of the rock armouring will be both less than minor and acceptable.

8.7 Shoreline Geomorphology – Eased Access

The Lake Processes and Geomorphology report included in **Appendix K** provides an overview of the geomorphological processes and morphological response of Lake Pūkaki to fluctuating lake levels.

The assessment used historic morphological change and contemporary geomorphological processes to assess the likely effects of the proposed reduction in lake levels below 518.0 m RL. In summary the report concludes the following:

– Lake Pūkaki experiences seasonal fluctuations in lake levels, with low levels during the spring and high levels during the autumn following snow melt. Climate change projections indicate an increase in lake level variability. The lake morphology is, therefore, adapted to the variable regime. Broad-scale response to changing conditions is slow, with a lag of decades to a century. Therefore, short periods of lake levels below 518.0 m RL are not expected to trigger large-scale morphological adaptation.
– Short-term, localised event-driven morphological change is feasible during storm events. Although the external lake processes will not change, impacts could affect the shoreline and beine (submerged terrace of the lake shore) at elevations below 518.0 m RL. However, storm events typically occur in summer and winter, whereas low lake levels are modelled to typically occur late winter and spring. Therefore, the likelihood of adverse impact is anticipated to be low. Should minor morphological change occur, it would be anticipated that storm events during subsequent months would result in a reversion to pre-change conditions.

– Minor, localised effects are anticipated during construction associated with the rip-rap placement at the Pūkaki dam, minimised by timing construction to avoid storm events. Long-term impacts are anticipated to be low, with improved resilience to erosion along the protected shoreline.
– Vulnerable sections of the shoreline have been monitored for 37 years, with identification of baseline conditions and site-specific change. Where required, erosion protection has been installed, monitored and maintained. It is recommended that the ongoing lake monitoring programme is continued to identify and quantify the anticipated minor localised, site-specific effects.

Overall, based on the assessment provided in **Appendix K**, it is concluded that any adverse impacts associated with geomorphological processes and morphological response arising from the lowering of the lake below 518 m RL will be insignificant.

8.8 Water Quality – Rock Armouring

Water quality impacts associated with this application are considered to be limited to the rock armouring work aspect of the project only. The eased access and general operation of the lake below 518.0 m RL does not involve any physical works in the water nor any discharges to it. Therefore, the assessment of water quality is limited to the impacts associated with establishing the rock armouring, including impacts associated with the following:

– Machinery operating in water (including both machinery sitting in water, and the arm of the digger extending into water).
– Discharge of construction phase stormwater to water and to land in circumstances where it may enter water.
– Disturbance of lake bed material during construction.

An Erosion and Sediment Control Plan (ESCP) has been developed and is included in Appendix D. This plan acknowledges that construction activities in and around the lake pose risks to both the lake and the Pūkaki River. The works will be carried out near and below the lake waterline while the existing rock armouring stockpile areas drain toward the riverbed. If runoff from either the stockpile areas or construction works carries elevated levels of sediment or construction-related contaminants, it may adversely affect water quality. Additionally, in-lake operations are expected to disturb and mobilise sediment from the dam and abutment rip-rap armouring, as well as existing sediment that has accumulated along the dam margin, further contributing to potential sediment effects in Lake Pūkaki.

The proposed erosion and sediment control measures are shown on Figure 28 below.

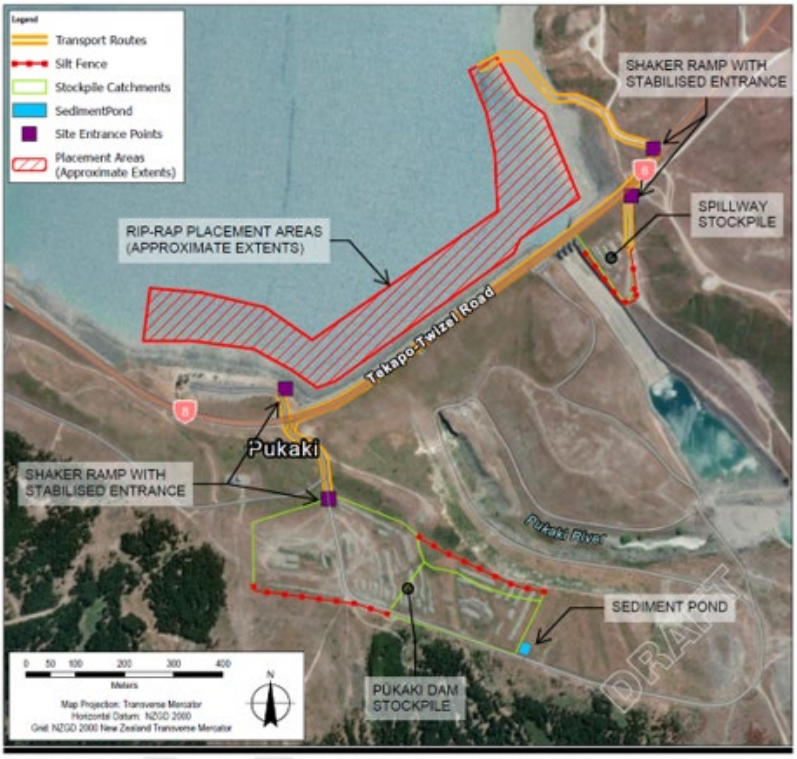

Figure 28 Erosion and sediment control layout plan

The key sediment discharge minimisation principles are set out in the ESCP and include:

– Where possible, all works will be completed with excavators located in dry conditions and above lake water levels. Nonetheless, works will require excavators to be removing and replacing rock from below the water level and at times sit in water at the edge of the lake. Given the likely short periods of time (a few weeks) that will be available to undertake the works the proposed construction methodology maximises the construction window by commencing works once the depth of water over the construction benches is 0.6m or less. Excavators can operate in this depth of water.
– Wherever possible, works will be kept to the minimum required to meet the needs of the project while also minimising soil disturbance and reducing reinstatement requirements.
– If runoff flows from the rock stockpiles in sheet flows, silt fences or shallow cut off drain will be used to minimise sediment runoff. Additionally, long overland flow paths with vegetation cover will offer fine sediment capture before reaching waterways. Significant runoff is only likely to occur during significant or very significant rain events.
– For areas of concentrated runoff, a sediment retention pond or soakaway pit will be constructed to treat runoff prior to discharge.
– If required, wheel wash stations and/or shaker ramps will be implemented for trucks leaving site. However, the ground conditions at the site are generally either established gravel tracks or gravel substrate and excessive mud generation is not expected.
– Regular (multiple times a day, as required) sweeping of the State Highway to remove any tracked material.
– Monitoring of the sediment plume development within Lake Pūkaki will be implemented and if required, sediment curtains will be installed to reduce sediment migration from the works area.

The ESCP includes specific control measures for the various areas that follow the principles set out above. These include specific measures for work near and within the lake. For work within the lake the following specific controls are proposed:

– Works within water will be minimised. This will be undertaken by constructing working platforms where practical to do so and implementing long reach excavator equipment.
– A single entry and exit point will be used to minimise the area of disturbance.

– All vehicles entering water will be thoroughly cleaned (washdown station) and checked for fuel and oil leaks prior to entry.

Section 5.7 of the ESCP sets out contingency measures that will be followed if sediment management near Lake Pūkaki is inadequate and is causing excessive or unsightly sediment plumes. These additional measures include the introduction of sediment curtains.

Based on the sediment discharge minimisation principles and the area specific controls, it is considered that any adverse impacts on water quality will be appropriately managed. The short duration of the work and the proposed reinstatement of the work sites will further mitigate water quality impacts such that they are considered to be less than minor.

8.9 Ecology

Potential impacts of the proposed eased access and rock armouring are assessed in detail in the Ecological Impact Assessment included in Appendix M. This assessment considers impacts on freshwater, wetland and terrestrial values.

8.9.1 Eased Access

With respect to eased access, the assessment notes that existing wetland and fauna communities are well adapted to the dynamic fluctuating levels of the lake with the impacts confounded by factors such as the normal operation of the WPS, upstream inputs such as rainfall and snow melt, surrounding land use change and pest plant and animal levels in the surrounding catchment. For this reason, it is difficult to attribute specific adverse impacts directly to the proposed activity, particularly given the short duration of the lower lake levels. Notwithstanding this the following assessment is made.

8.9.1.1 Freshwater

Lake Pūkaki littoral zone values range from moderate to high and are spatially variable. These areas provide important habitat and ecological function for macroinvertebrate and fish species that may be present or rely on those areas. The value of the fish community in the Pūkaki zone is considered high by Tonkin & Taylor due to the presence of several species of high ecological, conservation or recreational value. Notwithstanding this, given that the hydrological model predicts the lake levels would drop below 518.0 m RL for a maximum of 39 days, this would result in a low overall effect on the existing littoral zones and fish communities.

Lake level changes could result in inflowing tributaries becoming disconnected from the lake and impacting fish access to these habitats. As Lake Pūkaki is an artificially raised lake, it has effectively inundated former river/stream channels and their associated fans. Surface water connections appear to remain available at low levels, and it is therefore concluded that the surface water connection will remain.

8.9.1.2 Wetlands

The analysis undertaken in both the Groundwater Assessment and in the Ecological Impact Assessment concludes that the eased access is only likely to impact wetlands hydrologically connected to Lake Pūkaki, with only the Tasman River Delta assessed as having a high hydrological connectivity to Lake Pūkaki. All other wetlands only interact with the lake above 525.0 m RL.

For the Tasman River Delta, the eased access could result in increased bed exposure. The wetland extent of the Tasman Delta could respond with a temporary shift downslope; however, the extent of this shift is uncertain. The Tonkin & Taylor report shows that under the normal operating range of the lake, the Tasman River Delta wetland naturally fluctuates in extent by 100’s of metres. Given that the eased access would be temporary and of short duration, the wetland would return to its normal extent quickly, thus minimising potential impacts.

The eased access could impact wetland plants in the Tasman River Delta. Specifically, less frequent inundation could increase dryland plant/weed invasions and later plant distributions. However, the Ecological Impact Assessment considers any effects to be unlikely given the short duration of the eased access, the sporadic nature of the lowering and the fact that the change would not alter habitat options for wetland plants.

8.9.1.3 Terrestrial

Riparian vegetation is located outside Lake Pūkaki boundaries, therefore the impact of eased access on riparian vegetation is likely to be negligible, furthermore spills from Gate 19 are likely to be of a similar frequency and therefore effects on riparian vegetation along the Pūkaki river are also expected to be negligible.

The Tonkin & Taylor report notes that the eased access has the potential to temporarily impact on wetland/riverine bird foraging and breeding habitat through the modification of wetland habitats, however the bird community has adapted to wetland fluctuations and given the duration of eased access, it is not likely to affect wetland habitat quantity or quality for avifauna.

Kakī are a Threatened – Nationally Critical species with a population of approximately 141 adult birds. Under the existing PC1 agreement between Meridian and DOC, kakī monitoring will continue to be undertaken, focused on the Tasman Delta (or elsewhere if the birds shift in response to changing lake levels) when the lake level drops below 518 m RL. It is considered unlikely that additional lowering will impact this threatened bird species however, this monitoring will detect any change, and management may be undertaken under the existing agreement.

8.9.1.4 Lizards

The eased access is considered unlikely to impact native lizards as any habitat is located outside the lake margins. While there is some habitat along the Pūkaki river, native lizards are likely well adapted to the current spill regime which will remain similar during the proposed eased access. Overall, the impact of eased access on native lizards is considered to be negligible.

8.9.2 Rock Armouring

The proposed rock armouring and sourcing of rock from the nearby stockpile has the potential to have a range of ecological impacts without proper mitigation measures. These impacts include the temporary loss of shrubland and exotic grassland, temporary loss of exposed bounder revetment, disturbance of existing boulder stockpiles, temporary sedimentation effects and construction phase disturbance. These impacts are assessed in detail in the Tonkin & Taylor Ecological Impact Assessment and are discussed below.

8.9.2.1 Sedimentation Impacts

Based on the proposed construction methodology, the rock armouring work is not expected to have any long-term impacts on the littoral zone of the lake. Further any change in littoral habitat as a result of the construction work is expected to be negligible as a result of there only being a small change in the existing sediment conditions and no change once construction is completed.

8.9.2.2 Wetlands

The rock armouring work will take place away from any of the identified wetlands. Any potential effects on wetlands are likely to be limited to sediment discharges. However, as the only wetland with high hydrological connectivity is located more than 30km from the work area, any potential effect is considered to be negligible and again non-existent once the works are completed.

8.9.2.3 Terrestrial

The access tracks and temporary building area proposed as part of the rock armouring are located on the periphery of the Lake Pūkaki carpark. The works result in the temporary loss of approximately 915 m^2 of exotic grassland with occasional native shrubs.

Vegetation is sparse at the top of the existing dam wall and purposely maintained that way to allow access to the dam face. Without any remediation planting, Tonkin & Taylor assess the magnitude of effects as being moderate, however remediation planting to a similar condition to its current state would reduce the magnitude of effects to low or negligible. Meridian have proposed a condition of consent requiring the vegetation to be reinstated following the completion of the works.

With respect to avifauna, the area of the proposed rock armouring is normally inundated and thus not likely to provide bird habitat. Furthermore, the carparking area and surrounds are highly disturbed and as such would

provide low quality nesting habitat. On this basis any effects on avifauna as a result of the rock armouring works are considered to be negligible.

8.9.2.4 Lizards

The areas proposed to be disturbed by the rock armouring works including the grassland adjacent to the lake, the revetment and the existing stockpiles have previously been assessed as having a low likelihood of being lizard habitat. Notwithstanding this, a lizard survey was undertaken in late October 2025 which identified the presence of lizards in the vicinity of the proposed works. The associated written report has not yet been completed, therefore Meridian has taken a conservative approach of assessing the potential effects on the basis that lizards are present within the work areas.

The dam armouring works are located in an area usually inundated and unsuitable as lizard habitat. An access track across the existing dam revetment will need to be constructed to access the works area. The access track area comprises marginal lizard habitat. However, materials for the armouring will be taken from both a 6.3 ha and 0.8 ha area of stockpiled boulders which may comprise lizard habitat.

Tonkin & Taylor have developed a Lizard Management Plan to outline lizard survey methods and effects management options depending on survey findings.

Lizard salvage may not be possible for a number of reasons including impracticalities associated with the duration of disturbance, likely season of the works (i.e. salvage not possible during cooler months), and potential for continued re-invasion from nearby habitats. Notwithstanding this, the LMP includes a range of measures to avoid, remedy, minimise, offset and compensate impacts. If required, the protocols set out in the LMP will ensure any adverse impacts are appropriately managed.

8.10 Landscape and Visual

Appendix O contains a Landscape Impact Assessment that has been prepared by Goodfellow Group. This assessment has considered the landscape and visual impacts associated with both the eased access and rock armouring aspects of the activity.

8.10.1 Eased Access

Goodfellow Group concluded that the effect of lowering the lake from 518.0 m RL to 513.0 m RL will be minor in terms of landscape and visual amenity values, with changes to the shoreline forming an incremental adjustment within a highly modified, working lake environment. The report noted that Lake Pūkaki's character is marked by regular, substantial fluctuations in water level arising from its active and essential operation as part of the national hydro-electric power system. These fluctuations—and resulting shoreline changes—are both widely anticipated and largely accepted by visitors and residents as a norm, reflecting the utilitarian landscape character.

The Landscape Visual Assessment recognises that an operating lake level, below 518.0 m RL, could increase marginal erosion for short periods and that the application seeks authorisation for a 3-year period only. The lake processes and geomorphology assessment for this project (GHD, 2025) concluded that the likelihood of adverse impacts on geomorphology associated with a lower lake level are low. The report also noted that should any minor changes in morphology occur because of a lower lake level, subsequent storm events would likely result in a change back to pre-lowering conditions. Based on that assessment, during this 3-year period, the degree of morphological change and its corresponding impact on landscape values is considered to be negligible.

The proposed drawdown below 518.0 m RL is expected to occur infrequently, typically during winter periods of high electricity demand and low inflow, and will be temporary, until lake levels are restored by subsequent hydrological conditions. The aesthetic coherence, memorability, and outstanding status of the Mackenzie Basin and Lake Pūkaki environment will persist, with no material effect on visual amenity values or the region's landscape significance.

On this basis, the assessment concludes that any adverse landscape effects associated with the temporary lowering of Lake Pūkaki's level below 518.0 m RL will be negligible. The anticipated changes to the lakeshore will

be minimal given the size of the lake and will be consistent with both the ordinary pattern of lake level fluctuation and the established character of Lake Pūkaki as a functional, dynamic component of the national hydro system.

8.10.2 Rock armouring

With respect to the proposed rock armouring, the report concludes based on site inspections, comparative photo studies, and updated landscape modelling, that the temporary construction works will result in 'Moderate-high' adverse landscape effects. This is primarily due to the highly visible nature of the activity and temporary structures contrasting with the landscape setting. However, the report notes that these effects are not permanent, and the removal of all temporary elements will ensure the site is not left with any lasting adverse landscape effects. The report also concludes that any long-term change introduced by rock armouring will be visually indiscernible from the existing rip-rap and will be wholly consistent with the artificial and infrastructural character of the lake's edge.

Further to this conclusion, it is noted that the likely short term, sporadic nature of the construction process will further mitigate any adverse landscape visual impacts associated with the rock armouring work to an extent that they are considered acceptable.

8.11 Socio-Economic

The proposed eased access and rock armouring each have the potential to have different socio-economic impact. They have been assessed in detail in the Socio-Economic Impact Assessment (SEIA) included in **Appendix O.** The key themes for the potential impacts include access and connectivity, amenity and character, recreation impact, the environment and livelihood.

8.11.1 Eased access

The SEIA concludes that the lowering of the lake levels has a neutral socio-economic impact with the only potential adverse impact relating to the environment. Notwithstanding this, these impacts are largely concentrated at the northern end of the lake away from sensitive receptors.

8.11.2 Rock armouring

Adverse socio-economic impacts associated with the rock armouring relate to the establishment of the site compounds. The impacts include the following:

– Business disruption particularly for the MCAS shop which will be relocated sporadically for a number of weeks over a number of years, during construction periods for the rock armouring.
– Vehicles restricted from accessing the Lake Pūkaki Car Park (which will be closed) during rock armouring construction periods.
– Loss of public amenities associated with closure of Lake Pūkaki Car Park during rock armouring construction periods, resulting in inconvenience and potential litter and waste and cleanliness issues at other facilities.
– Safety of cyclists and pedestrians travelling near the Lake Pūkaki Car Park construction site during rock armouring work due to possible conflicts with construction vehicles. A minor and temporary diversion of the A2O and Te Araroa Trail is proposed during rock armouring construction periods.
– Dust impacts may require monitoring. If they exceed health requirements then a potential temporary closure of The Pines freedom camping area may be required during the construction periods.

The report recommends a suite of mitigation measures including:

– Consultation with MCAS to help identify a suitable temporary location.
– Signage provided at road closure points to direct vehicles to the northern entrance of the Lake Pūkaki Reserve which is the nearest carpark.
– Information about the temporary car park closures, relocation of MCAS and location of public amenities should be placed on websites including Mackenzie District Council and Department of Conservation.
– Usage of public amenities such as toilets and waste facilities should be monitored to enable an appropriate level of cleaning. Consideration may need to be given for additional amenities such as a temporary toilet

facility or additional waste bins if significant demand results in poor maintenance of amenities or visitors begin to soil or leave waste in the surrounding environment

– Consultation with A2O and Te Araroa Trail Trust to understand when route diversions will be required. Notifications of the change in route should be made on the various trail websites including A2O, Te Araroa Trail and Department of Conservation. Notifications should also be placed on the Mackenzie District Council website. An email should also be sent to cycle and hiking tourism operators.

Overall, based on the short-term nature of the works, the fact that they will occur during the off season and the mitigation proposed, the SEIA concludes that the rock armouring will result in a slight negative socio-economic impact.

8.12 Impacts on the Alps to Ocean Cycle Trail and the Te Araroa Trail

The A2O route is shown on Figure 29 along with the existing rock stockpiles and proposed work zones associated with the Pūkaki dam rip rap placement work. Details of the construction methodology are provided in Section 3 and **Appendix C**. The Te Araroa Trail shares the same route as the A2O in the vicinity of the proposed works.

Rip-rap rock will be transported via truck from the existing stockpiles to the project designated stockpiles for temporary storage prior to placement. This potentially impacts the A2O / TA route in several locations. In addition, creating a safe construction work zone will require the closure of the existing carpark to the west of the dam and the western most access route to the Pines freedom camping area. These closures will also potentially impact the A2O / TA route (see Figure 29).

The key areas where the A2O route interact with the proposed works are circled on Figure 29. The proposed approach to mitigation is as follows:

– To the extent possible, the approach is to maintain the existing route with appropriate traffic management controls (as described below). The exception is Area 1 and 2.

  For Area 1, the A2O / TA route currently traverses through the middle of the western stockpile site. In discussion with the trail Managers, the recommended approach is to re-route the A2O / TA for the duration of any works, approximately as shown on Figure 30.

  For Area 2, the route currently goes through the middle of the eastern work zone and the temporary stockpile area. The recommended approach is to re-route the A2O / TA trail as shown on Figure 30 and 31. This re-route will partly follow the existing access road and will interface with construction traffic. This re-route will therefore be subject to a specific traffic management approach outlined in the construction methodology. The second part of the re-route will cross Meridian land on a temporary section of trail running parallel to SH8 before re-joining the existing trail immediately before crossing the Pūkaki dam. This route will be closed to all traffic other than A2O and Te Araroa users and construction traffic (see Figure 32).

– For Areas 2 and 3, given the relatively low traffic movements during active construction periods (likely 3 to 4 heavy trucks per hour plus light vehicle movements), the proposed approach is through a Traffic Management Plan (TMP).

Figure 29 Rip-Rap Existing Stockpiles, proposed work areas and A2O Route

Figure 30 Left abutment - security fencing, closed access and access ramp and proposed re-route

Figure 31 Construction Traffic Routes and Proposed Diversions for the A2O/TA Trail

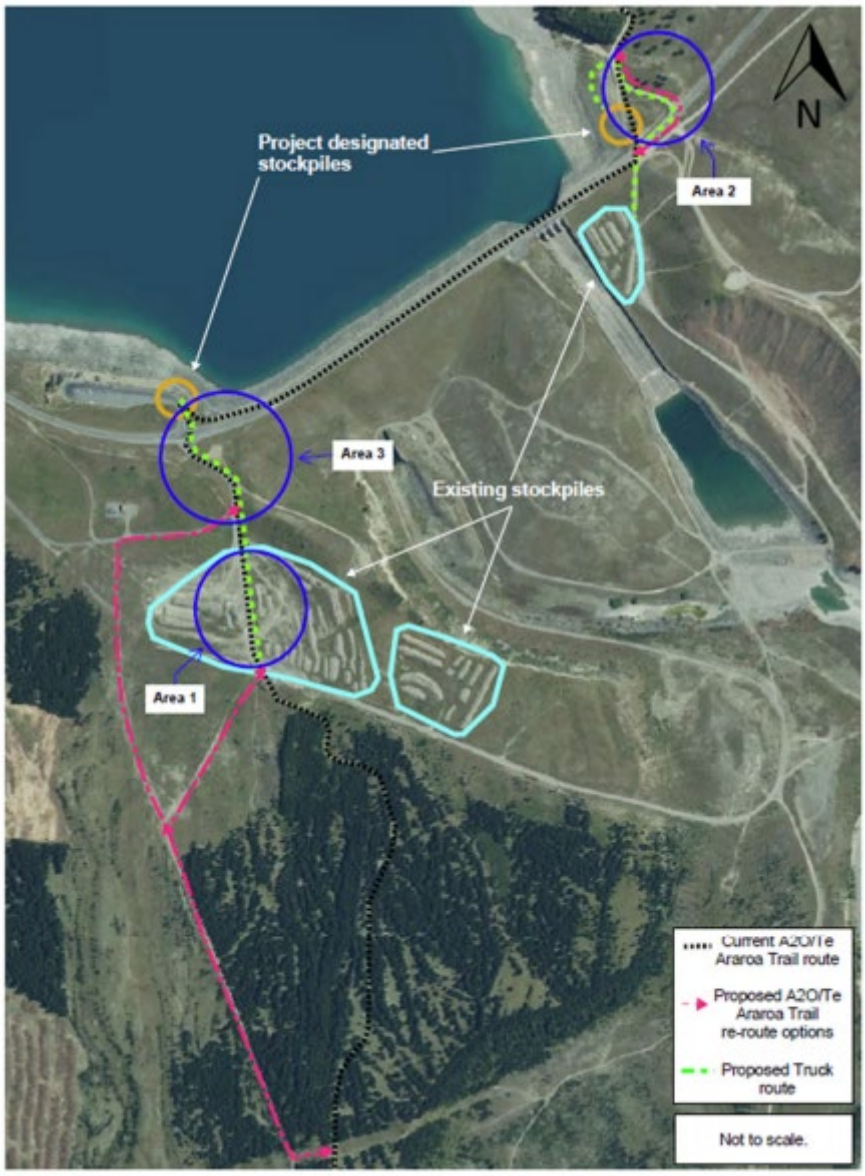

Figure 32 Construction Traffic Routes and Proposed Diversions for the A2O/TA Trail

Overall, any impacts on the A2O and Te Araroa trail are considered to be negligible particularly given that the peak cycle and walking period is November to February and the most likely construction period is winter and early spring. Furthermore, it is noted that Meridian has consulted with the A2O and TA trail managers. A summary of these discussions are contained in Section 12 and in **Appendix Q.**

8.13 Cultural Impacts

The Lake Pūkaki catchment is identified as a Rūnanga Sensitive Area in the Mackenzie District Plan, and the lake itself is a Statutory Acknowledgement Area due to its significant cultural, spiritual, historic, and traditional association with the Ngāi Tahu iwi.

The careful design of the proposed works to cause as little disturbance as practicable combined with the construction methods that will be used to minimise effects will ensure that the cultural values associated with the area are respected and protected to the greatest practicable extent.

As detailed in Section 12, Meridian has consulted with the Rūnaka chairs of Waitaki Rūnaka - Te Rūnanga o Moeraki, Te Rūnanga o Arowhenua and Te Rūnanga o Waihao. Meridian provided the Rūnaka with a Project background, an overview of proposal, key dates and mitigation measures. As a result of feedback received, the eastern construction area has been amended to avoid intruding onto a nohoanga area.

Rūnaka asked Meridian to consider implementing a hydrological trigger for when lake lowering below 518 m RL should occur. Meridian carefully considered this request and evaluated various options for establishing such a trigger. However, given the complexity and dynamic nature of the electricity system, along with the unpredictability of dry periods, it was determined that implementing a hydrological trigger was not feasible. Instead, to provide Rūnaka with the certainty that any lake lowering below 518 m RL is carried out prudently, Meridian has amended proposed conditions 1-4 of the lake lowering consent (Section 11) to include detailed reporting to Rūnaka of any lake lowering event. This includes strategies to restore the lake to the normal consented minimum, and details of the circumstances leading up to the lowering event. At the date of lodgement, this approach is being considered by Rūnaka.

During consultation, Meridian discussed the impacts of the proposed activities on wildlife. No concerns were raised. As such, it is concluded that any adverse impacts associated with cultural values as they relate to the site and its associated values will be appropriately mitigated.

8.14 Natural Hazards

8.14.1 Lake Level Changes

The potential lake shore stability and geomorphological effects associated with the operation of the lake at levels below 518.0 m RL are addressed in the Lake Processes and Geomorphology included in **Appendix K**. In terms of shoreline stability and erosion, the report concluded that:

– The lake shore morphology is continuing to adapt to the construction of the WPS and raising of the lake. Broad scale response is slow with a lag of decades or a century. Therefore, short periods of lake levels below 518.0 m RL are not expected to trigger large-scale morphology adaption.
– Short-term, localised event-driven morphological change is feasible during storm events. Although the external lake processes will not change, impacts could affect the shoreline at elevations below 518.0 m RL. However, storm events typically occur in summer and winter, whereas low lake levels are modelled to occur during the spring. Therefore, the likelihood of adverse impact is anticipated to be low. Should minor morphological change occur, it would be anticipated that storm events during subsequent months would result in a reversion to pre-change conditions.

In summary, ongoing erosion and adaptation of the shoreline to the construction of the WPS has been recognised and regularly monitored for many years by Meridian. From a natural hazard perspective, no areas of concern have been identified such as large-scale land instability. The proposed short-term changes in lake level operations are not to increase the risk in relation to potential natural hazards.

It is noted that the site is located in a Flood Hazard Assessment overlay in the Mackenzie District Plan. However as the activity is not ‘New Critical Infrastructure’ no additional assessment is required.

Other natural hazards risks are related to the dam safety and are addressed in the following section.

8.14.2 Approach to dam safety

As set out in Section 7 above, Meridian understands that all matters related to dam safety are to be addressed through the Building Act 2004 and not through resource consents under the Resource Management Act 1991 (RMA). This is because on 12 May 2022, the Government introduced the Building (Dam Safety) Regulations 2022. These regulations are established and implemented under the Building Act 2004.

All of the dams that form part of the WPS, including Pūkaki Dam, are covered by the regulations.

The applicant discussed this matter with ECan during the reconsenting of the WPS. ECan confirmed that the approach taken to dam safety is appropriate.

8.15 Alternatives Assessment

As required by Schedule 5, Clause 6(c) of the FTAA, Meridian has considered possible alternative methods of discharge including discharge into any other receiving environment.

The discharges associated with the activity include discharges to air associated with both eased access and the rock armouring, and construction phase discharges to land and water associated with the placement of rock armouring on the dam face and abutments.

By the very nature of the activity and the environment, there are no possible alternative methods of air discharge for either eased access or rock armouring. The implications of not proceeding with this activity have been discussed in detail throughout this application. If the rock armouring does not proceed, there is the potential for the integrity of the dam structure to be compromised during future lowering events.

With respect to the construction phase discharges to land and water, alternative discharge locations and methods were considered by the design team. Overall, the locations and methods were selected as the appropriate and with the least impact on environmental receptors. Due to the absence of a reticulated network, there are no other viable alternatives to the discharges.

8.16 Conclusion

As demonstrated in sections 8.1-8.15 above, any adverse impacts associated with the proposed activity are able to be appropriately mitigated such that they are not sufficiently significant as to be out of proportion to the projects' regional and national economic benefits. Specifically, any adverse impacts on ecological values are mitigated by the short term nature of the proposal, and lizard management protocols. Likewise, any adverse impacts associated with air discharges are short term and can be mitigated through on-site dust management techniques.

9. Part 2 of the RMA – Purpose and Principles Clause 5(1)(g)

Part 2 of the RMA sets out the overall purpose of the Act and defines the RMA's purpose and principles. The purpose of the RMA as set out in **Section 5** is to promote the sustainable management of natural and physical resources. The proposal to enable eased access to water between 518 m RL and 513 m RL for a period of 3 years, and to undertake rock armouring work has been assessed against the purpose and principles of the RMA and it has been determined that the proposed activities will achieve the purpose of the RMA as set out in section 5 of that Act by enabling people and communities throughout New Zealand to provide for their social, economic, and cultural well-being and for their health and safety through the provision of the various benefits identified in the Economic Benefits and Cost Report (**Appendix A**). At the same time as providing these benefits all adverse impacts of the proposal are to be managed to their lowest practicable level and are not significant. This is consistent with the conclusions reached as part of PC1 where the use of water between 518.0 m RL and 513.0 m RL was considered to be both appropriate and to promote the sustainable management purpose of the RMA.

Section 6 of the RMA sets out the matters of national importance, which must be recognised and provided for in relation to managing the use, development, and protection of natural and physical resource. The site is located within an Outstanding Natural Landscape in an area that is used by locals and visitors as a key viewpoint of the wider area.

The proposed eased access will have no material impacts on public access to the lake or associated viewing areas. While the construction periods associated with the rock armouring will involve temporary restrictions to public access, these restrictions are primarily limited to the carparking area and A2O / TA trail. The trail will remain open for the duration of the works with diversions in place, and directions to alternative nearby public facilities will be provided. Given the short-term duration of the works and the likelihood that they will be undertaken during winter periods when public use of the area is more limited, maintenance and enhancement of public access to the lake will be appropriately recognised and provided for.

As noted in Section 4 above, the Lake Pūkaki catchment is identified as a Rūnanga Sensitive Area, and the lake itself is a Statutory Acknowledgement Area due to its significant cultural, spiritual, historic, and traditional association with the Ngāi Tahu iwi.

Cultural values associated with the site have been recognised and provided for through the design process and all works will be limited to only that which is required. As a result of feedback received, the eastern construction area has been amended to avoid intruding onto a nohoanga area and erosion and sediment protocols will be in place to manage any discharges to the lake.

Overall, it is considered that matters of national importance relevant to the proposed activity have been recognised and provided for, including in particularly those relating to public access and cultural values.

Section 7 of the RMA provides a list of further matters to which particular regard must be given in relation to managing the use, development, and protection of natural and physical resources. Of relevance to the proposal, particular regard has been given to kaitiakitanga, amenity values, intrinsic values of ecosystems, maintenance and enhancement of the quality of the environment and climate change. Kaitiakitanga is a way of managing the environment, based on the Māori world view and enables a process to protect Māori rights through honourable conduct, fair processes, robust consultation, and good decision-making. Consultation is ongoing with the Waitaki Runanga in relation to Statutory Acknowledgment Areas, with specific changes to the proposal having been made in response to that consultation.

The amenity values associated with the site, while affected in the short term, will overall, be maintained. While the stockpiles to the south of SH8 will be retained, the remainder of the site will be remediated, recontoured and revegetated at the end of each construction period. Once completed, the rock armouring works will sit below the level of the lake, and the site will be visually indistinguishable from the existing.

The rock armouring works will enable Meridian to provide for future effects of climate change, by improving the resilience of existing infrastructure. At present, as demonstrated in the technical assessments, the dam structure is at risk of erosion from wave action at lower levels. The works will therefore provide protection from future climate scenarios.

10. Statutory Considerations, Objectives, Policies and Relevant Provisions Clause 5(1)(h), 5(2), 5(3), 2(1)(c)

10.1 Introduction

The proposed activity as set out in Section 3 above, has been assessed against the provisions of the following relevant planning instruments:

- National Policy Statement for Renewable Electricity Generation (NPS-REG)
- National Policy Statement for Freshwater Management (NPS-FM)
- National Policy Statement for Indigenous Biodiversity (NPS-IB)
- Canterbury Regional Policy Statement (CRPS)
- Waitaki Catchment Water Allocation Regional Plan (WCWARP)
- Waitaki Iwi Management Plan
- Canterbury Land and Water Regional Plan (LWRP)
- Canterbury Air Regional Plan (CARP)
- Wildlife Act
- Canterbury Conservation Management Strategy

It is noted that this section provides an overview of the matters in the statutory objectives and policies that are relevant to the proposed activities. An analysis of the proposal against the relevant RMA rules is provided in Section 7 above.

It is recognised that since both the WCWARP and the LWRP were prepared, changes have been made to some higher order documents. This means that the provisions within the Plans cannot be assumed to give effect to higher order documents that have been developed later (unless those higher order documents have directed changes to the regional plans). In these circumstances it is appropriate for any statutory considerations to address the higher order documents themselves in relation to relevant matters.

The WCWARP was prepared in accordance with the Resource Management (Waitaki Catchment) Amendment Act 2004. Section 28 of this Act in certain circumstances provides a different statutory relationship between the WCWARP and the Canterbury Regional Policy Statement and other regional plans. Section 28 states the following:

'If the provisions of a regional policy statement or regional plan that applies to any part of the Waitaki catchment are inconsistent with the regional plan developed and approved under this Part, the provisions of the regional plan developed and approved under this Part prevail.'

Table 6 below identifies the relative timing in the preparation of the statutory documents relevant to consideration of the proposed activities. The National Policy Statement for Indigenous Biodiversity 2023 (NPS-IB) does not apply to the operation and maintenance of renewable electricity generation assets and is therefore not addressed in this table (see Section 10.8.).

Table 6 Statutory Document Timing

Timing	WAP	CLWRP	RPS	NPS-REG	NPS-FM
June 1998			Original operative		
July 2006[9]	Plan operative[10]				
April 2011				Operative	
July 2011					2011 operative
October 2012	PC1 operative				
January 2013			Current operative and 1998 inoperative		
July 2014					2014 operative and 2011 inoperative
February 2016		Operative			
September 2016	PC3 operative Policies 1A and 1B inserted from NPS-FM				
September 2017					2017 operative and 2014 inoperative
June 2018	Policy A4 inserted from NPSFM	Policy A4 inserted from NPS-FM			Amendment to 2017 NPS-FM
August 2018		PC5 appeals resolved			
August 2020					2020 operative and 2017 inoperative
September 2020	Policies 3.22, 3.24 inserted from NPS-FM Clause 3.26 as a freshwater objective inserted from NPS-FM	Policies 3.22, 3.24 inserted from NPS-FM Clause 3.26 as a freshwater objective inserted from NPS-FM			
November 2021		PC7 decision – appeals outstanding			
January 2023					Amendment to 2020 NPS-FM
February 2023					Amendment to 2020 NPS-FM
March 2023	Policies 3.22 and 3.24 inserted from NPS-FM	Policies 3.22 and 3.24 inserted from NPS-FM			

[9] There is a consideration that the WAP was operative in part in 2005 as the nature of matters before the High Court were limited.
[10] The Operative Plan included by reference some objectives and policies from the then notified Natural Resources Regional Plan addressing water quality.

The information in the table above shows that, in relation to the WCWARP, consideration should also be given to:

– subject to Section 28 of the Resource Management (Waitaki Catchment) Amendment Act 2004, the operative CRPS, other than in relation to matters that were addressed in PC3 of the WCWARP, and
– the National Policy Statement for Freshwater Management 2020 (NPS-FM).

In relation to the CLWRP, consideration should also be given to the NPS-FM, and if there are inconsistencies with the WCWARP, the WCWARP prevails.

In considering the provisions of the CRPS, as this was prepared prior to the NPS-FM, its provisions need to be considered in this light, and if there are inconsistencies with the WCWARP, the WCWARP prevails.

While the WCWARP, CLWRP and CRPS were all prepared after the National Policy Statement for Renewable Electricity Generation (NPS-REG) became operative, it is recognised that the NPS-REG and the NPS-FM have not both been considered together in the development of the CRPS or either of the regional plans.

10.2 National Policy Statement for Renewable Electricity Generation

The NPS-REG set out an objective and policies to enable the sustainable management of renewable electricity under the RMA. It outlines standards councils must use in their plans to manage renewable generation projects consistently across jurisdictions.

The NPS-REG is designed to:

– Give effect to national-level priorities and objectives in local/regional planning.
– Provide direction to councils and decision-makers so renewable generation is enabled while balancing environmental, social, and cultural effects.
– Ensure consistency across the country so developers are not navigating a patchwork of different local rules.
– Increase certainty for investors and accelerate the transition to low-emissions energy.

The proposed eased access provides Meridian with the ability to sustainably manage their generation portfolio during periods of electricity shortages. In the current regulatory and energy environment, without this consent and in the absence of the system operator calling a SSA or OCC, the energy system becomes reliant on non-renewable, high emission energy sources which in themselves have more significant environmental, social and cultural effects. The proposed rock armouring will improve the resilience of the existing WPS infrastructure, enabling the energy resource to be sustainably managed into the future without the risk of dam erosion.

Both the eased access and the rock armouring works will allow Meridian to sustainably manage their renewable energy resources. The assessment of environmental impacts set out in Section 8 above demonstrates that this can be done while balancing environmental, social and cultural impacts. Therefore, both activities are considered to be consistent with the objective and policies of the NPS-REG.

Appendix P provides a full assessment of the objectives and policies of the NPS-REG and how the project aligns with these.

10.3 National Policy Statement for Freshwater Management

The NPS-FM sets requirements for how regional councils must manage freshwater bodies (rivers, lakes, wetlands and aquifers), including requirements for monitoring and reporting on freshwater outcomes. It establishes freshwater management units and sets limits/targets for water quality and quantity. The NPS-FM involves tangata whenua (Māori) in decision-making through Te Mana o te Wai – the hierarchy of obligations (first to the health of water, then to human needs, then to other uses). It also includes standards for maintaining or improving ecological health, water quality and availability. Notwithstanding this, it is noted that pursuant to section 104(2F) RMA clauses 1.3(5) and 2.1 of the NPSFM cannot be considered on a resource consent application.

The NPS-FM is designed to:

– Protect and restore freshwater ecosystems so that they are healthy and resilient

– Direct councils to set enforceable limits on water use and discharges, rather than leaving it open-ended.
– Prioritise the mauri (life force) of water above commercial and recreational uses
– Create a nationally consistent framework so freshwater is managed sustainably across Aotearoa, not just region by region.

The impact assessment included in Section 8 above has demonstrated that both the eased access and rock armouring work can be undertaken in a manner that minimises adverse impacts on freshwater ecosystems and takes into account cultural values associated with the lake. This is achieved through the preparation and implementation of an erosion and sediment control plan. The plan sets out measures to minimise impacts on freshwater resources including setback areas from the lake, limitations on work occurring within the wetted area of the lake and the rehabilitation of the lake margin following the completion of the work. The objectives and policies of the NPS-FM are further achieved by the consultation that Meridian has undertaken with tangata whenua and the mitigation proposed to mitigate adverse effects on the cultural values of the lake. Overall, it is considered that these measures will protect the mauri of the freshwater resource while enabling Meridian to undertake these activities.

Appendix P outlines the objective and policies of the NPS-FM and how the project aligns with these.

10.4 National Policy Statement for Indigenous Biodiversity (NPS-IB)

The NPS-IB sets requirements for how councils must identify, protect, manage and restore indigenous biodiversity across New Zealand. Under the NPS-IB, Significant Natural Areas (SNAs) are mapped and classified in district and regional plans. It establishes rules to avoid adverse effects on highly significant biodiversity areas, and to manage or remedy effects elsewhere. The NPS-IB requires councils to work with tangata whenua and landowners in biodiversity planning as well as setting requirements for monitoring and reporting on biodiversity health and trends.

Clause 1.3 (3) states:

"Nothing in this National Policy Statement applies to the development, operation, maintenance or upgrade of renewable electricity generation assets and activities and electricity transmission network assets and activities. For the avoidance of doubt, renewable electricity generation assets and activities, and electricity transmission network assets and activities, are not "specified infrastructure" for the purposes of this National Policy Statement."

Therefore, no further consideration of the NPS-IB is necessary.

10.5 Canterbury Regional Policy Statement

The CRPS sets requirements under the RMA Act for Canterbury. It sets the strategic direction for how land, water, biodiversity, infrastructure, hazards, and growth are to be managed in the region.

The CRPS is designed among other things to:

– Provide a regional framework for balancing development and environmental protection.
– Strategic integration of land use and regionally significant infrastructure in the wider region.
– Ensure national directions (like NPS-FM, NPS-IB, NPS-REG) are translated into a Canterbury-specific context.
– Sustainably manage freshwater resources.
– Protect the intrinsic value of waterbodies and their riparian zones.
– Recognise and provide for the continuation of existing hydro electricity generation and irrigation schemes and other activities that involve substantial investment in infrastructure.
– Avoid duplication and conflicts between district plans, and resolve cross-boundary issues (e.g., river catchments, biodiversity corridors, transport networks).

Appendix P outlines the objectives of the CRPS and how the project aligns with these objectives. The proposed activities are consistent with the overarching objectives and policies of the CRPS, particularly those relating to the sustainable management of freshwater resources, the protection of intrinsic values associated with waterbodies and the continuation of existing hydro electricity generation. The proposed eased access and rock armouring will

facilitate the continuation of hydro electricity generation in a sustainable manner, while improving the infrastructure's resilience.

10.6 Canterbury Land and Water Regional Plan

The purpose of the CLWRP is to identify resource management outcomes or goals for managing Canterbury's land and water resources to achieve the purpose of the Resource Management Act. As noted in Section 10.1 the framework associated with the management of water resources sits within the WCWARP which is assessed below. The focus for consideration of the CLWRP is therefore on those activities requiring consent under the CLWRP, namely, the discharge of contaminants to land and water associated with the construction of rock armouring.

The CLWRP contains objectives and policies to the following effect:

– Nationally and regionally significant infrastructure is enabled and is resilient and positively contributes to economic, cultural and social wellbeing through its efficient and effective operation and ongoing maintenance, repair development and upgrading.
– The quality and quantity of water in fresh waterbodies is managed to safeguard the life supporting capacity of ecosystems and ecosystem processes.
– Water is recognized as an enabler of economic and social wellbeing for the region.

As set out in the Construction Methodology (**Appendix C)** and the Erosion and Sediment Control (**Appendix D**), the construction methodology has been designed to facilitate the required maintenance and upgrade works at the dam, while protecting the quality of the freshwater in the lake. The staged approach seeks to minimise the amount of time that machinery is required to operate in water, and to contain sediment and avoid its direct discharge to water. Furthermore, reinstatement activities following each of the construction phases will avoid incidental discharge of sediment from the site. Overall, it is considered that the proposed activities are required for the efficient and effective ongoing operation of nationally significant infrastructure and that the work can be undertaken in a manner that safeguards the quality of Lake Pūkaki.

In addition, the eased access to stored water enables the WPS to operate more efficiently, reduces the reliance on non-renewable energy during periods of restricted supply and overall produces nationally significant benefits.

10.7 Canterbury Air Regional Plan

The CARP sets out the framework to manage discharges to air in the best practicable manner. Its principal purpose is to maintain air quality where it provides for people's health and cultural wellbeing, or to improve it if it does not.

The CARP includes objectives and policies that seek to maintain amenity values of the receiving environment, manage air quality in a way that provides for the cultural values and traditions of Ngai Tahu and that discharges are managed to take account of adjacent land uses and sensitive activities.

The air quality assessments have concluded that any air discharges associated with the eased access will be consistent with those already arising as a result of fluctuating lake levels.

Discharges associated with the construction of the rock armouring have the potential to adversely impact cultural values, and nearby sensitive receptors. Notwithstanding this, the assessments have demonstrated that with the implementation of appropriate mitigation measures and taking into account the short duration of the construction periods, any adverse impacts from air discharges will be contained to the extent that they are less than minor.

It is further noted that the proposed works are required to improve the resilience of nationally and regionally significant infrastructure which contributes to peoples social and economic wellbeing.

Appendix Q contains a full assessment of the activity against the objectives and policies of the CARP.

10.8 Waitaki Catchment Water Allocation Regional Plan

The WCWARP provides for the allocation of water in the Waitaki catchment and addresses issues relating to water allocation in the catchment. It acknowledges that water allocation has relationships with other aspects of resource

management including landscape, water quality, soil and bank erosion, wetlands, operational management of beds and rivers and the management of floods.

The plan includes objectives associated with sustaining the qualities of the environment of the Waitaki River and associated beds, banks, margins, lakes and wetlands by recognizing the importance of the cultural needs of tangata whenua and the interconnected nature of the river, safeguarding the life supporting capacity of the river and its ecosystems, managing water bodies in a way that maintains the natural landscape and amenity characteristics.

The plan also seeks to enable people and communities to provide for their social, economic and cultural wellbeing and their health and safety by providing water for among other things hydro-electricity generation.

Of particular note is Policy 37 which provides for the temporary lowering of Lake Pūkaki where necessary for the purposes of maintenance or rehabilitation of electricity generation infrastructure.

The proposed eased access and rock armouring activities will be undertaken in a manner that sustains the qualities of the lake and its associated ecosystems, natural landscape and amenity characteristics. Eased access is required to provide certainty and stability to New Zealand electricity consumers over the next 3 years during periods of expected electricity shortages. As demonstrated, this eased access is able to be undertaken without giving rise to any unacceptable adverse impacts, in particular impacts on cultural values, ecosystems, sensitive receptors and natural landscape amenity. Any impacts that do occur will be no different to those that are expected when lake lowering occurs under a OCC or SSA. Furthermore, it is noted that Policy 37 specifically anticipates the temporary lowering of Lake Pūkaki for the purpose of maintenance or rehabilitation of electricity generation. Therefore, while not provided by for by the current rule framework, the eased access activity is anticipated by the policy framework.

The rock armouring works are required to ensure ongoing resilience of the existing WPS infrastructure and in particular, reduce the risks associated with erosion. While there may be some potential impacts associated with landscape and visual amenity, and with potential dust discharges, these impacts will be sufficiently short in duration that they are not considered inconsistent with the Plan. Furthermore, Policy 37 specifically anticipates maintenance and rehabilitation of electricity generation infrastructure.

Appendix Q includes a full assessment of all relevant objectives and policies of the WCWARP.

10.9 Waitaki Iwi Management Plan

The Waitaki Iwi Management Plan has been 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 kaitiaki responsibilities within the Waitaki Catchment

The Waitaki Iwi Management Plan sets out Waitaki Rūnaka values, objectives, and policies for how land, water, biodiversity, and cultural resources in the Waitaki catchment should be managed. It provides direction on freshwater management (flows, allocations, mahinga kai and water quality), protection of wāhi tapu and cultural landscapes, sustainable land use, biodiversity and habitat restoration, and climate resilience and future generations' well-being.

The Waitaki Iwi Management Plan is designed to

– Express Waitaki Rūnaka rangatiratanga (self-determination) in resource management decision-making.
– Embed Mātauranga Māori and tikanga into planning frameworks.
– Provide a cultural lens on environmental issues that complement and sometimes challenge national/regional policies.
– Ensure iwi aspirations and rights (Treaty-based and cultural) are visible and actionable in local and regional planning.
– Act as a reference point for consent applicants, councils, and agencies to understand iwi expectations before engaging.

Appendix Q outlines the objectives of the Waitaki Iwi Management Plan and how the project aligns with these objectives. Overall that assessment demonstrates that through the implementation of the erosion and sediment

control plan, the discharge of any contaminants to the lake will be avoided or mitigated. This will assist with protecting the mauri of the lake and assist in safeguarding its life supporting capacity now and into the future. Protection of the adjacent nohoanga area during the construction process will further ensure that iwi access to the resource is not impeded.

The proposed eased access is also aligned with these objectives. The eased access will be managed in a manner that maintains the mauri of the lake, protects the cultural landscape and will facilitate climate resilience and future generations wellbeing by enabling the rock armouring to occur, and by avoiding the need for non-renewable electricity generation during times of supply constraints.

10.10 Heritage New Zealand Pouhere Taonga Act 2014

The HNZPTA sets requirements for:

– Protection and management of historic heritage places, including archaeological sites (defined as places associated with human activity pre-1900, whether recorded or not).
– Requirement to obtain an archaeological authority from Heritage New Zealand Pouhere Taonga before undertaking any work that may modify or destroy an archaeological site.
– Processes for recognising and protecting wāhi tapu (sacred places) and wāhi tūpuna (ancestral places).
– Maintenance of the New Zealand Heritage List/Rārangi Kōrero of significant historic and cultural heritage places.

The HNZPTA is designed to:

– Promote the identification, protection, preservation, and conservation of New Zealand's historic and cultural heritage.
– Provide legal protection for archaeological sites, regardless of whether they are recorded or known at the time.
– Ensure heritage values are considered in planning, development, and land use decisions.
– Strengthen partnership with Māori in protecting sites of cultural significance.

There are no known archaeological sites within the vicinity of the proposed works. No further consideration of this Act is considered necessary.

10.11 Wildlife Act 1953

The purpose of the Wildlife Act 1953 is to protect animals classified as wildlife including some of New Zealand's most endangered species. It does this by controlling how people interact with wildlife and classifying species with different levels of protection. The Act aims to conserve both native and introduced species of mammals, birds, reptiles and amphibians.

A Lizard Survey was completed in late October 2025, this identified lizards at the site, however the written report has not yet been completed. Given the time sensitive nature of undertaking the construction work, it is not feasible to proceed with an accidental discovery approach, as the identification of a protected lizard would mean that the works would have to cease while a Wildlife Authority was sought, and the window for undertaking the armouring in that expected low lake level event would be lost. Accordingly, Meridian has applied for a proactive Wildlife Authority, to enable the company to relocate or incidentally kill lizards. The Lizard Management Plan included in Appendix E sets out protocols for relocation and compensation if relocation is not possible.

Based on the protocols set out in the Lizard Management Plan, it is considered that the proposed activities have had appropriate consideration of the purpose of the Wildlife Act 1953, and that, relocation will be the first option for management.

10.12 Canterbury (Waihata) Conservation Management Strategy

The Canterbury (Waihata) Conservation Management Strategy (CMS) sets out the conservation values in Canterbury and provides guidance for DOC's work and strategic outcomes for the region. Its overarching purpose

is to implement policy and establish objectives for the integrated management of natural and historic resources, including species managed by DOC and for recreation, tourism and other conservation purposes. Its consideration is important particularly with respect to the Wildlife Authority that is sought.

There are no specific policies that apply to the Pūkaki area however some key themes warrant consideration. These include, protection of the outstanding natural features and landscapes of the Mackenzie Basin including indigenous biodiversity values an, conserving threatened and at-risk species. The proposed rock armouring and eased access activities have been shown throughout this report and the supporting technical reports, to be able to be undertaken in a manner that maintains the natural features and landscapes of the Mackenzie Basin. While some disturbance of lizard habitat may occur, the Lizard Management Plan sets out protocols to mitigate any adverse effects on them. Overall, it is considered that the proposed activities align with the purpose, objectives and policies of the CMS.

11. Environmental Management Measures

Clause 6(d), Clause 2(1)(f), 2(1)(g)

11.1 General

An ESCP has been prepared which sets out the overarching approach to site management practices and procedures that will be implemented to manage sediment control, and spill prevention at the site. A copy of the ESCP is attached as **Appendix D**. A LMP has also been prepared which sets out the protocols that will be followed for identifying and managing any lizards present on site. The LMP is contained in **Appendix E.** Finally, DMP's have been prepared setting out the proposed dust management protocols. These are contained in **Appendix F and G.**

11.2 Hydrology

11.2.1 Proposed Erosion and Sediment Controls

The sediment and erosion control measures outlined in this section will be implemented prior to the start of construction works and will be decommissioned once the works have been completed.

The following key principles are applied in developing this ESCP and are to be implemented during construction:

- Minimise works and soil disturbance to reduce reinstatement needs.
- Limit construction below Lake Pūkaki's waterline.
- Schedule works during periods of low wind and wave activity.
- Use silt fences, vegetation, and tree buffers to treat sheet runoff. Sediment retention ponds will capture concentrated flows.
- Implement washdown stations for machinery before entering the lake.
- Monitor sediment daily; install sediment curtains if required.

11.2.2 Specific Control Measures for the Rock Armouring Stockpile Area

The rock armouring stockpile area has been split into three catchment areas, with erosion and sediment control measures designed per ECan's Erosion and Sediment Control Toolbox (refer to Figure 33):

- Catchment 1 (South): Runoff travels 1.5 km through vegetation, with silt fencing along the southern boundary.
- Catchment 2 (Northeast): Small area with sheet flow, with silt fencing along the northeastern boundary.
- Catchment 3 (South to roadside channel): Runoff directed to a 906 m³ sediment pond before discharging via culvert and 1.5 km of vegetation.

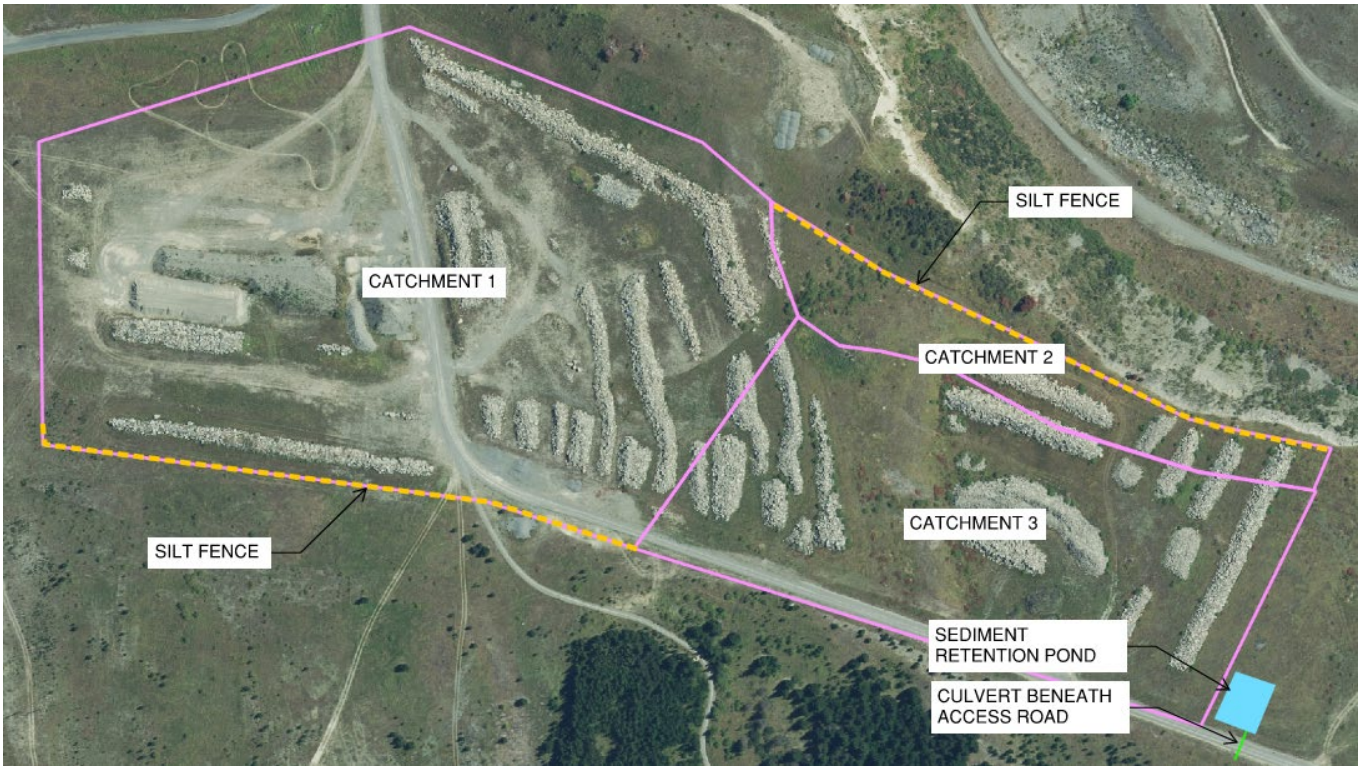

Figure 33 Rock armouring area catchment and sediment and erosion control measures.

11.2.3 Construction Measures

Construction involves infilling rock armouring above and below the waterline. To minimise sediment:

- Reduce excavator work below the water line of Lake Pūkaki.
- Use careful excavation practices when laying down the rock armouring.
- Install a washdown station for trucks carrying the rock armouring to Lake Pūkaki, if required.
- Sediment curtains may be added to minimise the sediment stirred up from the lake floor and the sediment which is dropped into Lake Pūkaki.

11.2.4 Maintenance, monitoring and reporting

- Inspect erosion, sediment and control features daily and maintain as required.
- Visually monitor water quality every 3 hours while the site is active, comparing samples with references, including upstream and downstream of the canal intake.
- Monitor sediment plume extent and weather forecasts and adjust works to reduce exposed surfaces and direct flows to sediment ponds when heavy rain is expected.

Refer to Appendix D for further detail on erosion and sediment control mitigation measures.

11.3 Air Quality

Mitigation measures for managing dust discharges are set out in the DMP's included in **Appendix F and G**. They include the following:

11.3.1 Eased Access

- Meridian must contact residents via phone call, text or email when the lake will be lowered below 518 m RL and when it is expected to be back above 518 m RL.
- Meridian must maintain a complaints register which identifies any cause and impact of an alleged dust nuisance, and corrective and/or mitigation action taken where reasonable and practical.

– Residents within the affected area should also be encouraged to record details of dust nuisance events in a dust diary. Details would include date and time of event, weather conditions at the time of the event, a description of the type and amount of dust detected, and the duration of the event. Meridian should provide clear instructions to residents on how to document information and what to include, to ensure consistency.

11.3.2 Rock Armouring - General Procedures

– Prepare dust management education material for inclusion in site inductions, training, and daily toolbox meetings.
– Prepare and undertake a regular audit to ensure compliance with conditions of the permit. Audit records should be stored in the Site Office.
– Plan construction activities to keep exposed areas to a minimum and, where possible, avoid scheduling major emissions-generating activities to occur at the same time.
– All plant and equipment should be fitted with the appropriate emissions controls and maintained according to the manufacturer's specifications.
– Implement on-site traffic and operational controls to prevent unnecessary dust generation from vehicle movements, including regularly watering access roads if rainfall is insufficient to suppress dust, inspecting incoming trucks to ensure trucks transporting material are covered and tailgates are firmly fixed, and enforcing speed limits.
– Do not undertake dust-generating activities during adverse weather conditions when visible plumes of dust are observed to leave the Project boundary.
– Bins, rubbish, and storage areas will be monitored during regular audits and emptied at regular intervals.
– Perform daily inspections for visible emissions along the site boundary of the Project site.

11.3.3 Specific Mitigation Measures

– Use dust suppression techniques (such as watering via watering trucks or sprinkler systems) as needed to maintain moist conditions on cleared or exposed areas, unsealed roads, temporary stockpiles, and high dust generating activities.
– Retain as much vegetative screening between the Project site and the nearest sensitive receptors as possible.
– Instigate progressive rehabilitation as soon as practicable to encourage the establishment of vegetation as soon as possible after the works.
– Consider covering loads in trucks, or spray loads as an alternative.
– Install wind breaks surrounding primary temporary stockpile locations. Given the often-extreme wind conditions experienced at the site, porous wind breaks should be considered in favour of solid wind breaks. Whilst this is a less effective mitigation measure, it will ensure that the wind break does not become a safety hazard under excessive load.

Temporary closure of the campsite and campervan parking area immediately to the north of the left abutment construction zone may be warranted when construction activities are taking place and weather forecasts are very adverse for dust generation. GHD understands that this land is under the management of Meridian and is within their control to manage access, however any potential closer would be undertaken in consultation with MDC.

11.4 Ecology

11.4.1 Lizard Management

The LMP addresses potential impacts and management of lizards. The proposed lizard-related measures include:

– Updating the LMP as required following the survey to outline the findings and proposed management effects measures depending on species present.

– Avoidance, minimisation and remedying measures are recommended where nationally At Risk or Threatened lizards are recorded. These include prioritisation of stockpile material use to avoid lizards to the extent practicable. In addition, dam works areas will be remediated following works completion.
– If native lizards are recorded during the survey, and salvage and translocation is deemed impractical, compensation is proposed.
– Boulders across the dam armouring works area will be re-established following armouring works.

11.5 Socio-Economic

To manage and minimise socio-economic impacts, the following measures outlined in the Socio-Economic Impact Assessment (refer to **Appendix O**) include:

– Consultation with MCAS to help identify a suitable temporary location.
– Signage provided at road closure points to direct vehicles to the northern entrance of the Lake Pūkaki Reserve which is the nearest carpark.
– Information about the temporary car park closures, relocation of MCAS and location of public amenities should be placed on websites including Mackenzie District Council, Department of Conservation. An email should also be sent to tourism operators so that they can amend their itinerary accordingly.
– Usage of public amenities such as toilets and waste facilities should be monitored to enable an appropriate level of cleaning. Consideration may need to be given for additional amenities such as a temporary toilet facility or additional waste bins if significant demand results in poor maintenance of amenities or visitors begin to soil or leave waste in the surrounding environment
– Consultation with A2O and Te Araroa trail managers to understand when route diversions will be required. Notifications of the change in route should be made on the various trail websites including A2O, Te Araroa and Department of Conservation. Notifications should also be placed on the Mackenzie District Council. An email should also be sent to cycle and hiking tourism operators.

12. Affected Parties and Consultation

Clause 6(1)(e), 2(1)(n)

This section provides details of the consultation and engagement undertaken by Meridian with relevant administering agencies and iwi in accordance with Schedule 5, Clause 6(1)(e), and Schedule 7, Clause 2(1)(n).

12.1 Consultation

Meridian has undertaken consultation with the following applicable local authorities, iwi authorisation and administering agencies.

- Canterbury Regional Council (Environment Canterbury (ECan))
- Mackenzie District Council (MDC)
- Waitaki Rūnaka (Te Rūnanga o Moeraki, Te Rūnanga o Arowhenua and Te Rūnanga o Waihao) / Te Rūnanga o Ngāi Tahu: Meridian has an established relationship with Ngāi Tahu in the Waitaki Catchment through Waitaki Rūnaka. Waitaki Rūnaka speak for mana whenua for this Catchment and involve Te Rūnanga o Ngāi Tahu as they deem appropriate.
- Department of Conservation (DOC)
- New Zealand Transport Agency (NZTA)

Appendix Q contains a full summary of the consultation undertaken to date with the above local authorities, iwi authorities and administering agencies. The key points arising from consultation are as follows:

- Technical reports, management plans and the draft suite of conditions were sent to ECan for feedback prior to lodgment. A project overview meeting was also held with technical experts prior to reviews commencing. ECan's feedback and Meridian's responses are provided in **Appendix R**.
- A meeting involving GHD's air quality experts and ECan's air quality reviewers was held to address review comments. The ECan feedback table (**Appendix R**) contains responses to the feedback, reflecting points discussed in the meeting.
- Discussions with Mackenzie District Council have occurred. At time of lodgment, no concerns had been raised by MDC. It is noted that resource consents are not required from MDC for this Project.
- Consultation with the Waitaki Rūnaka have been underway since February 2025. In September, a comprehensive presentation was provided to the Waitaki Rūnaka, outlining the project and detailing the authorisations required under the FTAA and the proposed strategy for Lizard management (Wildlife Act permit). Discussions related to water management below 518.0 m RL remain ongoing.
- MFE were consulted in relation to the referral application. MFE requested that Meridian provide an assessment of the project against any relevant National Policy Statement and National Environment Standards.
- Following an initial project overview meeting, DOC were provided with the draft Ecological Impact Assessment and the Draft Lizard Management Plan to review. DOC has provided formal feedback, and this is included in **Appendix S.**
- NZTA have indicated two permissions/requests will be required as follows:
  - Approval to use Temporary Traffic Management (TTM) for trucks crossing the highway and A2O/Te Araroa Track diversions.
  - A Corridor Access Request (CAR) to allow NZTA to mitigate any damage to the highway assets (in the case the kerb and sealed carriageway).

In addition to the above consultation, the following parties have also been consulted as they were identified as potentially being affected by the proposal:

- Land Information New Zealand (LINZ)
- Genesis Energy Limited (Genesis)
- Mt Cook Alpine Salmon (MCAS)

– Alps2Ocean Trail Manager
– Te Araroa Trail Manager
– Catherine Fields (landowner) near the dam site
– Fish and Game New Zealand (F&G)

Appendix Q contains details of the consultation undertaken to date with these stakeholders. In summary, as a result of consultation, concerns have been mitigated with all stakeholders expect for Genesis Energy Limited. Engagement with Genesis is on-going.

12.2 Affected parties

The list of parties that may be affected for the purpose of clause 6(1)(e) of Schedule 5 is:

– Genesis Energy Limited
– Mt Cook Alpine Salmon
– Alps2Ocean Trail manager
– Te Araroa Trail Manager
– Catherine Fields (landowner) near the dam site
– Fish and Game New Zealand
– Mackenzie District Council
– Waitaki Rūnaka – (Te Rūnanga o Moeraki, Te Rūnanga o Arowhenua and Te Rūnanga o Waihao)
– New Zealand Transport Agency
– Department of Conservation
– Braemar Station (Dust impacts)
– Tasman Downs Station (Dust Impacts)

12.3 Section 30 of the FTAA

Section 30 of the Act requires an applicant to notify in writing each consent authority that has jurisdiction over an area where the approval would apply. In accordance with Section 30(3) the consent authorities are required to:

…advise the authorised person—

a) of any existing resource consent to which section 124C(1)(c) or 165ZI of the Resource Management Act 1991 would apply if the approval were to be applied for as a resource consent under that Act; or

b) that there are no existing resource consents of that kind.

The section 30 authorities in this instance are Canterbury Regional Council and Mackenzie District Council. The Section 30 responses from the authorities have been attached to the Application form.

12.4 Stakeholder Agreements

Meridian has a number of agreements and letters of support in place from PC1 and the 2018 resource consent application. Meridian will continue to honour these agreements if lake levels drop below 518.0 m RL over the duration of this temporary consent. The parties to these agreements are listed below.

PC1 Agreements:

– Department of Conservation
– Fish and Game New Zealand
– Te Rūnanga o Moeraki
– Te Rūnanga o Arowhenua
– Te Rūnanga o Waihao
– Genesis Energy

– New Zealand Transport Agency
– Six Landowners

PC1 letters of support:

– Mackenzie District Council

2018 SSA Consent application letters of support:

– Te Rūnanga o Moeraki
– Te Rūnanga o Arowhenua
– Genesis Energy Limited

13. Conditions Clause 5(1)(k)

The following conditions are proposed for each of the respective activities.

13.1 Consent – Operation of Lake Pūkaki below 518 mRL

It is noted that these conditions have been amended to address concerns raised by Waitaki Rūnaka during the consultation process. Rūnaka asked Meridian to consider implementing a hydrological trigger for when lake lowering below 518 m RL should occur. Meridian carefully considered this request and evaluated various options for establishing such a trigger. However, given the complexity and dynamic nature of the electricity system, along with the unpredictability of dry periods, it was determined that implementing a hydrological trigger was not feasible. Instead, to provide Rūnaka with the certainty that any lake lowering below 518 m RL is carried out prudently, Meridian has amended conditions 1-4 below to include detailed reporting to Rūnaka of any lake lowering event. This includes strategies to restore the lake to the normal consented minimum, and details of the circumstances leading up to the lowering event. At the date of lodgement, this approach is being considered by Rūnaka.

Conditions:

1. The consent holder must advise Canterbury Regional Council attention: Manager Compliance, Te Rūnanga o Moeraki, Te Rūnanga o Arowhenua, and Te Rūnanga o Waihao when reducing lake levels reach 519.0 metres AMSL, i.e. before Lake Pūkaki is reduced below the Normal Consented Minimum Lake Level of 518.0 metres AMSL.
2. During any period within which the level of Lake Pūkaki is below 518 metres AMSL, the consent holder must advise Canterbury Regional Council attention: Manager Compliance, Te Rūnanga o Moeraki, Te Rūnanga o Arowhenua, and Te Rūnanga o Waihao weekly of:
    a. the strategies adopted to restore Lake Pūkaki to the Normal Consented Minimum Lake Level of 518 metres AMSL; and
    b. the lake level at the end of each reporting week.
3. During periods when Lake Pūkaki is operated below 518 metres AMSL the consent holder shall measure and record the lake water levels, relative to mean sea level (Lyttelton datum), at a frequency not less than every 60 minutes, to the satisfaction of the Canterbury Regional Council, and shall supply the records to Canterbury Regional Council attention: Manager Compliance , Te Rūnanga o Moeraki, Te Rūnanga o Arowhenua, and Te Rūnanga o Waihao annually.
4. On each occasion that the consent holder implements this consent to manage Lake Pūkaki below 518 metres AMSL, the consent holder must, no later than eight weeks following the completion of each lowering event, provide Canterbury Regional Council attention: Manager Compliance, Te Rūnanga o Moeraki, Te Rūnanga o Arowhenua, and Te Rūnanga o Waihao with the following information:
    a. the date and time at which the lake was lowered below 518 metres AMSL;
    b. the levels at which the Lake Pūkaki was managed over the duration of the lowering event;
    c. the duration of the lowering event; and
    d. A written description of the circumstances leading to and applying during the lowering event.
5. If the information provided in condition 4 indicates that the timing, duration, frequency and extent of any lowering event is different to what was predicted in the resource consent application, then the consent holder shall provide a detailed explanation of the differences and the circumstances of their occurrence to the Canterbury Regional Council, attention: Manager Compliance.
6. The Canterbury Regional 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. Requiring best practicable options to be adopted by the consent holder to remove or reduce any adverse effect on the environment as a result of the exercise of this resource consent; or

c. Requiring the consent holder to carry out monitoring and reporting instead of, or in addition to, that required by the resource consent; or

d. Requiring the consent holder to comply with a relevant rule in an operative regional plan.

13.2 Consent – Discharge of Contaminants to Land or Water

Conditions:

Scope:

This consent authorises the discharge of contaminants (including sediment-laden water, dust deposition, and incidental hydrocarbon discharges) to land and water arising from civil works and associated with dam protection works at Lake Pūkaki, between 510.5 and 518.0 m RL.

T*his consent also authorises the disturbance of the dam located within Lake Pūkaki, including, excavation, deposition, and stockpiling of materials, subject to compliance with these conditions.*

This consent also authorises the disturbance of the bed of Lake Pūkaki, subject to compliance with these conditions.

Compliance

1. Works shall be limited to ……..(update standard condition 1 based on final scope).
2. Construction sequencing and staging shall occur in general accordance with Section 9.6 of the Rip-rap design and construction methodology report.

   Note: Some of the sequencing may run concurrently of each other where appropriate and/or each tranche will be constructed in multiple stages (depending on lake level conditions and site accessibility).
3. All practicable measures shall be undertaken to prevent oil and fuel leaks from vehicles and machinery including but not limited to:
   a. There shall be no storage of fuel or refuelling of vehicles and machinery within 20 metres of flowing water.
   b. Fuel shall be stored securely or removed from the site overnight.
   c. The pump shall be attended at all times during refuelling.
   d. Drip trays shall be used at all times during refuelling.
   e. A spill response kit shall be kept on site at all times.
4. To prevent the spread of pest species, including but not limited to didymo, the consent holder shall ensure that activities authorised by this consent are undertaken in accordance with Biosecurity New Zealand's hygiene procedures and that machinery shall be free from plants and plant species before use in water.

Construction Environmental Management Plan

5. Environment Canterbury shall be notified at least five working days:
   a. prior to commencement of works, and
   b. prior to the re-commencement of works, where works have been discontinued for more than 14 days.
   c. Notification shall include:
      i. Consent number
      ii. Proposed start and end dates
      iii. Name, address and contact telephone number of the person supervising the works
6. Before starting works, the Consent Holder shall provide a copy of this consent to staff and contractors undertaking the activities authorised by this consent and explain to them how to comply with the conditions.
7. When undertaking works in and adjacent to water, the consent holder shall, in accordance with the Erosion and Sediment Control Plan (ESCP), ensure that sediment losses to natural water are minimised where practicable and that silt control measures are in place.

8. During the period of the works, erosion and sediment controls shall be implemented to mitigate sedimentation effects associated with the construction of the rock armouring in accordance with the ESCP approved as the part of the grant of this consent.
9. The objective of the ESCP is to set out the measures to be implemented during construction to minimise as far as reasonably practicable the erosion and the discharge of sediment and other contaminants into Lake Pūkaki and the Pūkaki Riverbed.

   The ESCP shall include but not be limited to the following information as appropriate to the scale, location and type of earthworks:

   a. contour information

   b. erosion and sediment controls including specific design location, dimensions and capacity

   c. details of measures to control sediment runoff, dust and the removal of soil, debris and other materials from public roads or places.

   d. catchment boundaries for the sediment controls

   e. discharge locations for each catchment/sediment control device

   f. details of measures for managing any contaminated land

   g. details of construction methods to be employed including timing and duration

   h. identification of the suitably qualified persons to manage the erosion and sediment controls

   I. maintenance requirements

   j. reinstatement provisions

   k. All practicable measures to be undertaken to prevent the spill of fuel, hydraulic fluid, or other potential liquid contaminants, including but not limited to requirements that:

      i. No fuel may be stored, or vehicles or machinery refuelled within 20 metres of the lake.
      ii. Where refuelling cannot be undertaken more than 20 metres from the lake, appropriate controls shall be put in place to avoid potential spills while refuelling.
      iii. Fuel, hydraulic fluid and other potential liquid contaminants shall be stored securely or removed from site overnight.

10. The ESCP may be amended and changed by the consent holder provided such amendments are consistent with the objective of minimising any effects of sediment or construction on the lake environment. An amended ESCP shall be submitted to Canterbury Regional Council attention: Manager Compliance for confirmation that it complies with the conditions of this consent.
11. The consent holder may implement any amended ESCP after 20 working days of it being submitted for certification if Canterbury Regional council has not notified the consent holder of its decision. If Canterbury Regional Council notify the consent holder that the amended ESCP does not comply with the conditions of this consent the consent holder shall immediately revert to implementing the Approved ESCP.

Temporary reinstatement of the site

12. In the event of imminent significant rainfall and associated rising lake level above 518 m, and where works remain incomplete, the protective measures outlined in Section 9.6 and 9.7 of The Rip-Rap Design and Construction Methodology Report shall be implemented prior to site demobilisation. These shall include but are not limited to:

    a. Removal of any temporary stockpiles created during works, as required.
    c. Temporary protection of created access ramps with zone 10 materials (rip-rap) to minimise erosion.

Final reinstatement of the site

13. Within 14 days of the final completion of rock armouring activities at the site:

    a. All temporary deposits of gravel, sand and other natural material (including reject material) shall be levelled to the natural ground level or removed from site.
    b. All created access ramps will be removed, and the area shall be reshaped and formed to a state consistent with the surrounding dam.
    c. Any temporary structures and construction materials shall be removed.

d. Re-grassing of any remaining areas of bare ground to match the surrounding existing land.

e. Rock stockpile areas may be retained for other necessary maintenance works associated with other aspects of the Lake Pūkaki and related engineering structures.

14. Any construction work shall be in accordance with the approved Lizard Management Plan included as Appendix E of the consent documentation.

15. In the event of any discovery of land contamination found during works, the following steps shall be taken:

    a. Advise site management and cease works immediately in the vicinity of the contamination and/or isolate the area until the protocols set out in (b) below are followed.

    b. If confirmation of contamination is needed, the consent holder shall engage, or instruct engagement, of a contaminated lands Suitably Qualified and Experienced Practitioner (SQEP). The SQEP can provide options for next steps including soil reuse and/or disposal

    c. For interim management of the unexpected discovery, the following steps shall be undertaken:

        i. Where possible, contamination should remain in the ground or removed from the ground and securely isolated until a suitable course of action has been decided

        ii. In the event that any soil contamination found has been excavated into trucks or stockpiles, or contaminated groundwater has been stored in a settlement tank, the contamination shall be contained to control migration or leachate formation

    d. If any contaminated soil is discovered during the works and requires off-Site disposal, soil shall be tested before any material is sent off-Site and disposed of at an approved off-site disposal facility (where required).

    e. The consent holder will maintain a register of any contaminated material discovered, including location, type, quantity and any associated disposal records. The information will be provided to the SQEP writing the soil validation report.

    f. Notification of any discovery shall be submitted to Canterbury Regional Council attention: Manager Compliance within 2 working days.

13.3 Consent – Discharge of Contaminants to Air

Conditions

1. The discharge of contaminants to air shall be limited to matter arising from the following activities:

Rock Armouring

a. Constructing access tracks and ramps.

b. Transporting rock from the existing stockpile sites to the temporary construction stockpile areas.

c. Constructing work benches.

d. Constructing toe/key along High Dam.

e. Rock placement on High Dam.

f. Rock placement on abutments.

g. Temporary building.

h. Decommission of site.

i. Maintenance/management of temporary stockpiles within the construction area.

At and about XXXXXXXXXXX (add site details) and plan reference attached to and forming part of this resource consent.

2. The Site Manager, or another nominated person, must be available at all times during rock armouring activities to respond to dust emissions complaints and issues. The contact details shall be displayed on signage at the entrance to the main carpark.

Dust Management Plan

3. The Consent Holder must prepare a Dust Management Plan.
4. The purpose of the Dust Management Plan is to provide a framework for managing dust emissions from the activities authorised under Condition (1a-1i)) of this resource consent and to mitigate and minimise effects.

    The Dust Management Plan shall:

    a. Be prepared in accordance with Schedule 2 of the Canterbury Air Regional Plan; and
    b. Be retained on site at all times; and
    c. Be provided to all persons operating or carrying out the activities authorised by this resource consent; and
    d. Be prepared by a suitably qualified experienced practitioner in air quality; and
    e. Include details on how the conditions of this resource consent will be complied with.

5. The Dust Management Plan shall include, but not be limited to:

    a. A description of the site location and the receiving environment; and
    b. A system for training employees and contractors to make them aware of the requirements relating to dust mitigation and the conditions of this resource consent; and
    c. Identifying staff responsibilities for implementing and reviewing the Dust Management Plan; and
    d. A description of all on-site activities as described in Condition (1a-1i) and dust sources on site; and
    e. A description of the weather conditions that trigger the requirement for dust suppression activities; and
    f. The methods to be used for controlling dust at each source during on-site activities, and
    g. A description of the methods for the use of water for dust suppression on all exposed areas on dry and/or windy days (in accordance with the weather criteria identified in condition 6(e), including how and when water will be applied to maintain damp surfaces; and
    h. The frequency and triggers of when water will be used to maintain damp surfaces, and when these measures are to commence on dry and/or windy days in accordance with the weather criteria identified in condition 6(e); and
    i. A description of the contingency measures to be used on-site; and
    j. Procedures, processes and methods for managing dust when staff are not on site.

Dust Mitigation

6. The Consent Holder must utilise all reasonably practicable measures to minimise the discharge of dust from rock armouring activities on-site:

    a. On dry days and/or windy days in accordance with the weather criteria identified in condition 6(e) above; and
    b. When there is any visible emission of dust from the site.

Complaints

7. A record of all complaints relating to dust discharged to air from the site and associated activities must be maintained and shall include:

    a. The location where the dust was detected by the complainant; and
    b. The date and time when the dust was detected; and
    c. A description of the wind speed and wind direction when the dust was detected by the complainant; and
    d. The most likely cause of the dust detected; and

e. Any corrective actions undertaken by the Consent Holder to avoid, remedy, or mitigate the effects of the dust detected by the complainant.

8. The Consent Holder must maintain a record of any complaints and any responses or investigative actions taken as a result. This record shall be provided to the CRC Regional Leader – Compliance Monitoring, upon request.

Annual Report

9. The Consent Holder shall prepare an annual monitoring report for the period of 1 July to 30 June to the CRC, Attention: Regional Leader Compliance Monitoring, by 30 September each year that the consent is exercised (i.e. if there have been no rock armouring activities over the 12-month period no report is required).

10. The annual monitoring report shall include but not be limited to:

    a. A record of any periods when the lake was lowered below 518 m RL, including the dates and duration of the event.

    b. The complaints record required in accordance with Condition (9).

Administration

11. The Canterbury Regional 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. Requiring best practicable options to be adopted by the consent holder to remove or reduce any adverse effect on the environment as a result of the exercise of this resource consent; or

    c. Requiring the consent holder to carry out monitoring and reporting instead of, or in addition to, that required by the resource consent; or

    d. Requiring the consent holder to comply with a relevant rule in an operative regional plan.

12. If this consent is not exercised within XX (align with duration) years of the date of grant of consent, it shall lapse in accordance with Section 125 of the Resource Management Act 1991.

Advice Note: *'Exercise of this resource consent' is defined as undertaking the activity as described in these conditions.*

13.4 Wildlife Permit

These conditions have been updated to reflect the changes sought by DOC during the consultation process, and agreed by Meridian. Any changes sought by DOC but not agreed by Meridian are set out in Appendix R

<u>Conditions</u>

1. This Authority applies to lizards that meet the threshold for protection under the Wildlife Act 1953 (including any subsequent amendments).

2. If, in the course of a lizard survey, planned construction activity or lizard salvage activity, all reasonable effort has been made to meet all of the conditions expressed and implied in this authority; and wildlife is killed by the Authority Holder, then that will be permitted under this authority.

    Advice Note: Planned Construction Activity includes the following activities in relation to the establishment of rock armouring at the Pūkaki Dam:
    - *Site establishment*
    - *Construction of Access Tracks and Ramps*
    - *Rip Rap work on the dam and its abutments*
    - *Decommissioning and reinstatement*

3. DOC Operations Manager(s) are to be contacted immediately for further advice if species of protected wildlife other than those listed in Schedule 1 (1) - (not just lizards) are located within the footprint of a planned activity. A separate application to catch alive, liberate or kill non-authorised species will be required.
4. This Authorisation gives the Authority Holder the right to hold wildlife listed in Schedule 1 in accordance with the terms and conditions of the Authorisation, but the wildlife remains the property of the Crown. This includes any dead wildlife, live wildlife, any parts thereof, any eggs or progeny of the wildlife, genetic material and any replicated genetic material.
5. Unless expressly authorised by the Director-General in writing, the Authority Holder must not donate, sell or otherwise transfer to any third party any wildlife, material, including any genetic material, or any material propagated or cloned from such material, collected under this Authority.

    Note: The exception to this is the collection of eDNA which will be sent to a third party for genetic analysis to assess species presence.
6. Any lizard relocation activity must be undertaken in accordance with the approved Lizard Management Plan *titled "insert [Lizard Management Plan title] and dated [insert date]* for the project that adheres to relevant best practice Lizard Salvage and Transfer principles.
7. Lizards must only be handled by herpetologists Authorised to Undertake this Activity or herpetologists under the direct supervision of the Authorised Personnel and approved by DOC.
8. Lizard capture, handling and relocation should be undertaken at a suitable time of year when lizards are active. October to April inclusive is the usual duration, but this will vary by location and altitude. No salvage activity will be carries out between May-September inclusive.
9. Capture and handling of lizards must involve only techniques that minimise the risk of infection or injury to the animal.
10. The Authority Holder is only permitted to release wildlife that are listed in Schedule 1(1) using methods described in the Lizard Management Plan written for the particular lizard salvage operation.
11. Capture and handling methods shall follow those described in the Herpetofauna inventory and monitoring toolbox http://www.doc.govt.nz/our-work/biodiversity-inventoryandmonitoring/herpetofauna/.
12. The Authority Holder must ensure all live capture traps are covered to protect lizards from exposure and minimise stress. Damp leaf litter or other material must be provided to reduce desiccation risk and the bottom of the pit-fall trap must be perforated to allow drainage of water. The Authority Holder must ensure that all live capture traps contain retreats to minimise risk of predation events within the trap.
13. If any mortality is detected, due consideration shall be made, and documented, that show measures have been taken to reduce mortality. Measures may include, but are not limited to, providing additional protection from weather, undertaking rodent suppression by trapping and/or poisoning at the site; not conducting live-trapping where mouse numbers have irrupted following grass seeding (where predation has been the cause of mortality); twice-daily trap checks, switching catching devices, or some combination of these measures.
14. The Authority Holder must ensure all live capture traps, (e.g. pitfall traps), are checked at least every 24 hours.
15. The Authority Holder must sterilise any instruments that come in contact with the lizards and/or are used to collect or measure lizards between each location. A separate holding bag must be used for each animal. All gear should be thoroughly cleaned and dried between sites.
16. The Authority Holder must ensure lizards are temporarily held individually in a suitable container (e.g. breathable cloth bag) and held out of direct sunlight to minimise the risk of overheating, stress and death.

17. If any lizards should die during planned construction activity and/or the authorised activities of catch, transfer or liberate, the Authority Holder must:

    a. inform the Director-General within 48 hours;

    b. If requested by the Director-General, chill the body if it can be delivered within 72 hours, or freeze the body if delivery will take longer than 72 hours;

    c. send the body to Massey University Wildlife Post-mortem Service for necropsy, along with details of the animal's history;

    d. pay for any costs incurred in investigation of the death of any lizard, if required to do so by the Director-General; and

    e. If required by the Director-General, cease the planned construction activity and/or Authorised Activity for a period determined by the Director-General.

18. If any lizards are found injured as part of the planned construction activity and/or Authorised Activity, the Authority Holder shall seek advice from the Authorised Personnel listed under Schedule 1 on management of the lizard(s).

19. The Authority Holder must not euthanise any wildlife unless:

    a. The Authority Holder obtains authority from the Director-General; or

    b. A veterinarian recommends euthanasia on animal welfare grounds; or

    c. The Authority Holder euthanises the wildlife under direction from the Director-General.

20. The Authority Holder must provide an annual report or reports to the Director-General on any lizard surveys undertaken. These must be electronically forwarded to the Director-General at XXXXXXXX@doc.govt.nz citing the Authority Number XXXXXXX. These reports must be submitted by 30 June each year.

21. For all salvage operations, A report on each salvage operation is to be submitted in writing to XXXXXXXXX@doc.govt.nz and to the DOC Operations Manager, at XXXXXXXXXX@doc.govt.nz by 30 June each year for the life of this Authorisation, summarising outcomes in accordance with any specific Lizard Management Plan. Each report must include:

    a. The permission number; and

    b. the species and number of any animals collected and released;

    c. the GPS location (or a detailed map) of the collection point(s) and release point(s);

    d. results of all surveys, monitoring or research; and

    e. description of how the Lizard Management Plan was implemented including any difficulties encountered with capture and handling, how release sites were assessed, post release monitoring and what contingency actions were required.

22. For all survey and salvage operations undertaken, completed Amphibian and Reptile Distribution System (ARDS) cards for all herpetofauna sightings and captures (http://www.doc.govt.nz/conservation/native-animals/reptiles-and frogs/speciesinformation/herpetofauna-data-collection/ards-card/,) must be sent to Herpetofauna, Department of Conservation, National Office, PO Box 10420 Wellington 6143 or herpetofauna@doc.govt.nz. For more information refer to: http://www.doc.govt.nz/conservation/nativeanimals/reptiles-and-frogs/reptiles-and-frogsdistribution-information/species-sightings-and-datamanagement/).

23. All reports submitted under Conditions 20 and 21 above must contain any implication s of the results for conservation management.

24. The Authority Holder acknowledges that the Director-General may provide copies of the reports referred-to in Conditions 20 and 21 above, to tangata whenua and the general public if requested.

25. Didymo biosecurity - The Authority Holder must comply with the Ministry for Primary Industries' (MPI)'s "Check, Clean, Dry" cleaning methods to prevent the spread of didymo (Didymosphenia geminata) and other freshwater pests when moving between waterways. "Check, Clean, Dry" cleaning methods can be found at - **http://www.biosecurity.govt.nz/cleaning**.

26. The Director-General may revoke this Approval at any time in respect of the whole or any part (pursuant to clause 7(4) of Schedule 7 of the Fast-track Approvals Act 2024) if:

    (a) the Approval Holder breaches any of the conditions of this Approval; or
    (b) in the Director-General's opinion, the carrying out of the Approval has caused or is likely to cause any unforeseen or unacceptable effects on lizards.

    If the Director-General intends to revoke this Approval in whole or in part, the Director-General must give the Approval Holder such prior notice as is reasonable and necessary in the circumstances.

27. The Approval Holder may apply to the Director-General for variations to this Approval in accordance with clause 7(2) of Schedule 7 of the Fast-track Approvals Act 2024.

28. The Approval Holder must comply with all statutes, bylaws, and regulations, and all notices, directions, and requisitions of the Director-General and any competent authority relating to the exercise of the Approval.

29. If required in writing by the Director-General, the Approval Holder must make such improvements to techniques (including catching, handling, releasing, preserving and storing), and take such other steps as directed by the Director-General.

14. Conclusion

Lake Pūkaki forms part of the WPS which is a nationally and regionally significant component of New Zealand's electricity supply infrastructure. Lake Pūkaki is also New Zealand's largest hydro storage lake. Because of the storage in Lake Pūkaki (and the other lakes in the system), the chain of six power stations that sits below Lake Pūkaki (meaning that water can be used to generate electricity multiple times), and the flexibility with which it can operate, the WPS is New Zealand's largest and most flexible hydroelectricity power scheme and therefore has a critical role to play in the electricity system and economy.

The WPS assets have a current value of $9.468 billion (30 June 2025). Annually, on average, Meridian invests an estimated $30 million in management, upkeep, and improvement of the WPS, providing significant benefits at a regional and national level.

The current operating framework prevents the utilisation of water stored below 518.0 m RL, except during an SSA or OCC declared by the SO. Meridian considers that the current regime is unworkable and does not give market participants confidence that the storage below this level will be available for generation when needed. This leads to a reduction in secured energy supply and requires reliance on non-renewable energy sources to fulfil demand and results in increased electricity prices.

Modelling undertaken by Meridian has shown that the market will be vulnerable to electricity shortages over the next three years (being 2026, 2027 and 2028), while new renewable energy sources are brought online. In order to provide more certainty to the market, reduce the need for non-renewable energy sources, and manage the risk of avoidable increases in power prices, Meridian seeks to enable the operation of Lake Pūkaki below the current normal minimum level of 518.0 m RL, for a three-year period through 2028, without the currently applicable SO triggers. Meridian also seeks authorisation to undertake civil works on the upstream face of Pūkaki Dam to improve the structure's resilience to wave action when lake levels are low.

Consents are sought for the following:

– Water Permit to take, use, dam or divert water for hydroelectricity generation. – Prohibited Activity
– Discharge Permit to discharge water or contaminants to water or onto land in circumstances where the contaminant may enter groundwater. – Discretionary Activity
– Discharge Permit for the extraction of bed material and the deposition of material in the lake. – Discretionary Activity
– Discharge Permit for the discharge of dust associated with the construction of the rock armouring. – Discretionary Activity
– Wildlife Authority to handle, relocate or kill wildlife incidentally.

The water permit is classified as a prohibited activity (Rule 12 of the WCWARP) however the adverse effects are essentially the same as a lake lowering under the following scenarios:

– Under an OCC which is classified as a permitted activity
– Under an SSA, authorised by an operative discretionary resource consent

The proposal's effects are not materially different from those associated with activities anticipated under the WCWARP, nor are they contrary to the outcomes that the WCWARP's objectives and policies seek. In particular, the adverse impacts of what is proposed are essentially the same as those that would be experienced in a lake lowering under an OCC - at which point the activity is permitted, and in the case of a SSA, authorised by a discretionary resource consent. This is not an activity of a type (or with a scale of effects) that the WCWARP makes no provision for nor one that is contrary to the outcomes the plan's objectives and policies seek. The FTAA expressly makes provision for the granting of consents for activities that are prohibited by rules in RMA plans (Sch 5, clause 17(3) and (4)).

An Assessment of Environmental Impacts is provided in Section 8 of this report. The assessment concludes:

– That both the eased access and rock armouring can (subject to implementation of appropriate mitigation) be undertaken in a manner that maintains the values of existing ecological habitats and communities, minimises adverse impacts associated with the discharge of sediment to surface water and groundwater and the impacts associated with the discharge of dust.

– The WPS is an established, deeply embedded, and important part of the Mackenzie Basin (including being associated with an Outstanding Natural Landscape).
– While the proposal may have some adverse impacts on the visual amenity of the area, these will be of a short duration and following the completion of the rock armouring and/or eased access period, the environment will be visually indistinguishable from the existing environment.
– Appropriate consideration has been given to the cultural values associated with the lake and mitigation (including relocating one of the construction areas) will be implemented to address any cultural impacts.

The application has demonstrated that the activity has regard to sections 5, 6 and 7 of the RMA and that there is no fundamental tension between the proposed activity and the overall outcomes sought in the applicable objectives and policies of the various national and local statutory documents.

Consultation has been undertaken (and continues) with the key stakeholder groups. To reflect these discussions, relevant changes have been made to the application.

Based on the information provided above, and the significant national and regional benefits of the proposed activity, it is considered that the proposal can be approved under the FTAA subject to the conditions proposed in Section 13 of this report.

The qualifications and experience of the report author is set out in Appendix T. The author confirms that they have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note (2023) and agree to comply with it. In that regard the lead author confirms that this SEIA report is written within their expertise, except where stated that the author is relying on the assessment of another person. The author confirms that they have not omitted to consider material facts known to them that might alter or detract from the opinions expressed.

15. References.

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Statutory considerations

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Appendices

Appendix A

Economic Benefits and Costs Report

Appendix B

Lake Pūkaki hydro storage management: 2026-2029

Appendix C

Pūkaki Dam Rip-Rap Design and Construction Methodology

Appendix D

Erosion and Sediment Control Plan

Appendix E

Lizard Management Plan

Appendix F

Air Quality – Lake Dust Assessment

Appendix G

Air Quality – Construction Dust

Appendix H

Titles and Operating Easement

Appendix I

Adjacent Landowner and Occupiers List

Appendix J

Groundwater Assessment

Appendix K

Lake Processes and Geomorphology Assessment

Appendix L

Lake Pukaki Engineering Structures Assessment

Appendix M

Ecological Impact Assessment

Appendix N

Landscape Visual Assessment

Appendix O

Socio-economic Impact Assessment

Appendix P

Statutory Analysis

Appendix Q

Consultation Summary

Appendix R

Environment Canterbury Feedback Table

Appendix S

DOC Feedback Table

Appendix T

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