

Response to Hydro Inundation Chapter and Overlay

Springwater Trust presentation in-absentia for the Hearings Panel on PC28, to be heard Thursday 29 May 2025.

Introduction

Springwater Trust submitted on PC 28 and was due to present in support of its submission at the Hearing Panel on Thursday. 29 May 2025. Regretfully, due to a late minute hospital appointment, Springwater Trust is unable to appear.

Springwater Trust respectfully submits the presentation it was to make in person at the Panel Hearing to the Panel for them to consider in absentia.

Overview

MDC claim that the risk of failure of the Pukai canal and dam infrastructure is very low.

- Springwater Trust (ST) asserts: MDC have no understanding what the term “very low means”

MDC state that under the Building Act 2004, the Building (Dam) Safety Regulations 2022 or the New Zealand Safety Guidelines 2024 there is no requirement to determine the likelihood of a dam failure occurring.

- ST asserts: Dams are built to a set of standards which encompass the likelihood for a failure event to occur, and the impact on people and structures of that failure in a region.

MDC claim that inundation risk was already being managed under the existing District Plan and is now improved under PC28.

- ST asserts: MDC cannot manage risk as they have no empirical assessment of what the risk is. MDC managed the hazard under the existing District Plan and are continuing the same one-sided approach with PC28.

MDC claim they are taking a risk-based approach to the hydro inundation hazard.

- ST asserts: Risk is a function of likelihood and consequence. MDC have a worst-case scenario consequence model with no understanding of likelihood.
- ST asserts: The RMA and proposed National Planning Standards for Natural hazards requires that MDC take a risk-based approach to managing natural hazards.

MDC refer to the national importance of the hydro infrastructure and the reverse sensitivity effect whereby a structures PIC classification could be increased due to downstream development.

- ST asserts: The Pukaki dam and canals have a PIC rating of high and would not change as a result of downstream developments in the HIHO zone.

Discussion:

A. The MDC approach is at odds with planning policy

The construction and management of dams and canals are based on an assessment of risk derived as a numeric value = probability X consequence. Dams are designed to withstand a range of natural hazard events. The risk of failure is inherently captured in NZ regulations and Guidelines as established rules and minimum standards for defining design parameters and loads, structural capacity and defensive design measures.

When designing a dam engineers must understand what is the standard that the dam is being constructed to. This generally is a statement that the dam must be able to withstand a certain size event that is likely to occur within a given timeframe. These are captured in a range of states such as

- Operating Basis Earthquake (OBE) = the earthquake that the structure must safely withstand with no damage.
- Safety Evaluation Earthquake (SEE) = is that level of shaking for which damage can be accepted but for which there should be no uncontrolled release of water from the reservoir.
- Maximum Credible Earthquake (MCE) = is the largest conceivable earthquake magnitude that is considered possible along a recognized fault or within a geographically defined tectonic province.

The most likely cause of failure of hydro infrastructure is a large earthquake. In very basic terms the Pukaki dam and canals are designed and managed to a minimum Safety Evaluation Earthquake (SEE) standard that requires there would be no release of water in a 1 in 10,000-year AEP earthquake event.

The Pukaki Inlet Dam and the Pukaki Canals are classified as “High” Performance Impact Classifications (PIC). This means they have been built and are managed to the highest standards available. A High PIC classification means that if the dam failed there would be a high risk of damage to infrastructure and potential loss of life.

The existing “High” PIC classification means that the Pukaki Inlet Dam and the Pukaki Canals PIC classification would remain unchanged with any developments in the hydro inundation area.

MDC have identified a hazard of the failure of the dam infrastructure that would result in a catastrophic release of water which is most likely caused by a large earthquake event. Damwatch have provided a worst-case scenario of four simultaneous catastrophic failure points occurring along the left bank of the Pukaki canal only and modelled this into a hydro inundation hazard overlay (HIHO). This HIHO scenario would result in significant volumes of water flowing across the mapped area with potential to cause damage to structures and potential risk to life.

Because the worst-case scenario requires multiple simultaneous failures the modelling Hydro Inundation Hazard Overlay (HIHO) represents a scenario that may or may not occur well in excess of a 1 in 10,000 year “safe” event.

The hazard report focuses on worse case – three separate and concurrent canal breaks. If this creates a 1 in 5000 probability, other scenarios (e.g. only two break, or there is a break on the north side), could reduce the probability to 1:10,000 or 1:20,000.

Natural flooding is mitigated by the culverts under the canal, so focus should only be on canal failure.

The break points in the report are at the points of the culverts – could risk be mitigated further by strengthening the culverts?

To put this in context, MDC utilises a definition of a “high flood risk as areas where the product of water depth (metres) multiplied by velocity (metres per second) equals or exceeds 1 in areas subject to inundation during an event of 0.2% Annual Exceedance Probability. This equates to a 1 in 500-year event.

The likelihood of an earthquake occurring that might possibly lead to the modelled worst-case scenario that forms the has not been assessed by MDC but has to be a multiple of a “safe” 1 in 10,000-year event.

MDC do not know if the worst-case hazard could occur or any indication of likelihood of its occurrence. MDC have no, evidence-based approach that assesses the risk of the HIHO inundation happening.

There is a requirement under National Planning Standards for territorial authorities to utilise a risk-based policy framework to underpin local planning. Section 6 of the Resource Management Act obliges territorial authorities to manage the risks from natural hazards not just focus on worst case scenario consequences.

MDC have not assessed the likelihood of the inundation event occurring. The canal infrastructure is built and operated to be safe in a 1 in 10,000-year earthquake event.

MDC have restricted property rights by taking a zero-development approach for a hazard that has in excess of a 1 in 10,000 year AEP. Policy 3B11 reads

*Avoid as far as practicable, changes to existing land use activities in the hydro Inundation Hazard Overlay that **may increase the likelihood or scale** of harm to people or property from hydro inundation or the potential for reverse sensitivity effects.*

The proposed policy effectively states that all new building is to be avoided because any new building will lead to the increase of a likelihood of harm to people or property. The addition of one more structure into an area automatically leads to an increase of likelihood of harm just because one more building exists. By focusing on avoiding an increase in likelihood it fails to contemplate that the likelihood of the hazard event could be so remote it is inconsequential.

Rule 3.1.2.g in Section 7 of the MDP proposes that there are no occupied buildings located in the hydro inundation hazard area unless certain conditions are met. One of these is that it cannot be located in an area greater than a low hazard. Again, by focusing on avoiding an increase in likelihood it fails to contemplate that the likelihood of the hazard event could be so remote it is inconsequential.

The implementation of the proposed policy rules have a significant negative effect on people's property rights with the following examples likely to occur:

- Insurance premium hikes and difficulty getting insurance
- Issues getting mortgages with banks on land with District Plan hazard overlays
- Loss of value of land and buildings if potential buyers of land/houses in the inundation zone, are discouraged by the seemingly catastrophic consequences of hydro inundation, and if banks become reluctant to lend to build on the land
- Restrictions on activity that would otherwise be allowed – e.g. residential visitor accommodation
- Building restrictions and activity restrictions that the council may impose under regulatory controls to mitigate the risk of loss of life and property in the unlikely event of hydro inundation event – for example
 - Not allowing buildings at all
 - Restrictions on where buildings are sited
 - Restrictions on foundation heights
 - Restrictions on use of buildings
 - Restrictions on the number of habitable buildings

MDC claim that a risk-based approach is being taken to the development of hydro inundation provisions. They make statements that the likelihood of a dam or canal failure associated with the Waitaki Power Scheme is very low. MDC have no evidence-based assessment of this likelihood to make these statements. They have no context for the term “very low”.

Without any empirical assessment of likelihood MDC cannot assess risk. The Building Act 2004, the Building (Dam Safety) Regulations 2022 and the NZ Dam Safety Guidelines 2024 do not require a numeric value to be assigned to the risk of dam or canal breach. The RMA S6(h) under matters of National Importance requires Territorial Authorities to exercise their functions and powers to the management of significant risks from natural hazards.

The proposed National Policy Statement for Natural Hazard Decision-making 2023 sets the key policy objectives as follows;

Policy 1: When making planning decisions, decision-makers are to determine the level of natural hazard risk as high, moderate, or low.

Policy 2: When determining natural hazard risk, decision-makers are to consider:

(a) first, the likelihood of a natural hazard event occurring (either individually or in combination) and the consequences of the natural hazard event occurring, including potential loss of life, serious injury, adverse effects on the environment, and potential serious damage to property and infrastructure; and

(b) second, tolerance to a natural hazard event, including the willingness and capability of those who are subject to the risk (such as a community, Māori, or the Crown) to bear the risk of that natural hazard (including its cost) and any indirect risks associated with it.

....

Policy 5: Planning decisions must ensure that:

(a) in areas of high natural hazard risk, new development is avoided unless the level of risk is reduced to at least a tolerable level or:

(i) the new development is not a new hazard-sensitive development; and

(ii) there is a functional or operational need for the new development to be located in the area of high natural hazard risk, and

(iii) there are no practicable alternative locations for the new development; and

(iv) risk is reduced to as low as reasonably practicable; and

(b) in areas of moderate natural hazard risk, mitigation measures are taken to reduce natural hazard risk to new development as low as reasonably practicable; and

(c) in areas of low natural hazard risk, new development is enabled.

The proposed approach to managing the risk of hydro inundation does not appear to have followed any of the above guidelines.

B. The adoption of MDC's approach district wide sets an unnecessary and dangerous precedent for how the risk should be assessed district wide, and creates unnecessary cost and burden on MDC and Rate Payers.

- By email to councillor Scott Aaronson MDC CEO (Angela) in response to our concerns states (Italics are Angela's extracts): *"There is on onus to advise community where there are highlight high hazard areas especially if there is a risk to life which in this instance there could be – even though the risk is low.*

*Under the Resource Management Act 1991 (RMA), **Section 31** outlines the responsibilities of councils, which include controlling the effects of land use to avoid or mitigate natural hazards*

This section mandates that councils must manage the use, development, and protection of land to prevent or reduce the risk of natural hazards.

31 Functions of territorial authorities under this Act

- (1) Every territorial authority shall have the following functions for the purpose of giving effect to this Act in its district:
 - (a) the establishment, implementation, and review of objectives, policies, and methods to achieve integrated management of the effects of the use, development, or protection of land and associated natural and physical resources of the district:
 - (aa) the establishment, implementation, and review of objectives, policies, and methods to ensure that there is sufficient development capacity in respect of housing and business land to meet the expected demands of the district:
 - (b) the control of any actual or potential effects of the use, development, or protection of land, including for the purpose of—
 - (i) the avoidance or mitigation of natural hazards; and
 - (ii) *[Repealed]*
 - (ia) the prevention or mitigation of any adverse effects of the development, subdivision, or use of contaminated land:
 - (iii) the maintenance of indigenous biological diversity:
 - (c) *[Repealed]*
 - (d) the control of the emission of noise and the mitigation of the effects of noise:
 - (e) the control of any actual or potential effects of activities in relation to the surface of water in rivers and lakes:
 - (f) any other functions specified in this Act.
- (2) The methods used to carry out any functions under subsection (1) may include the control of subdivision.

Rationale from the notification documents

- 6.6. For this reason, it is prudent that potential areas of inundation that could occur following infrastructure failure are mapped, and property owners are aware of the inundation risk in such areas. Meridian has advised that some potential inundation areas are not currently included in the District Plan's Hydro Inundation Hazard Area, meaning the maps and rules need updating.
- 6.7. Within potential inundation areas, people's safety needs to be provided for and the potential for increased reverse sensitivity towards the WPS needs to be minimised. An increase in occupied buildings or visitor accommodation in potential inundation areas can adversely impact the ongoing operation and maintenance of the WPS. To achieve this, development in potential areas of inundation is limited.
- 6.8. As part of the early community engagement undertaken on all Stage 4 topics, wider community consultation was undertaken. Six community meetings were held throughout the District, providing an opportunity for community members to meet with Council planners and discuss the District Plan review. As part of this phase of consultation, community members were surveyed on several matters, including how the natural hazards and risks impacting the District should be managed in the District Plan. The feedback received from this first phase was used to inform the Preferred Approach to be taken when drafting provisions. Feedback received included:

Further in the same document we noted some thoughts of community members:

Hydro Inundation Approach	Several respondents questioned the mapping of the hydro inundation areas prepared by Damwatch.
	The proposed controls associated with managing activities in the hydro inundation hazard areas were opposed by several respondents.
	Respondents questioned why Residential Visitor Accommodation is being restricted, whereas a residential unit is provided for.

	One respondent questioned how Council will monitor if houses are being used for residential visitor accommodation.
	Two respondents thought this matter should be dealt with via a Civil Defence Emergency Plan rather than via the District Plan, and that Mariean should undertake further mitigation such as maintaining bridges, stabilizing stream banks and removing willows.
	Some confusion was expressed between the flood hazard assessment overlay mapping and the hydro inundation hazard overlay mapping.

2. These comments have been taken into account in the drafting of provisions for PC28, noting that a some of the comments relate to operational matters which sit outside the District Plan provisions.

Essentially though

Even though the infrastructure is managed under best practice dam safety assurance programmes, there remains a risk that failure can occur, for example as a consequence of an extreme earthquake.

While the likelihood of a structural failure is very low, the consequences can be serious for people and property.

Potential areas of inundation that could occur following infrastructure failure are mapped in the District Plan in the Hydro Inundation Hazard Overlay.

The objective, policy and rules included in this chapter aim to provide for the safety of people and property and to minimise the potential for reverse sensitivity effects on the hydro electricity schemes.

The RMA is clear and we should

avoid, as far as practicable, changes to existing land use activities in the Hydro Inundation Hazard

Overlay that may increase the likelihood or scale of harm to people or property from hydro

inundation, or the potential for reverse sensitivity effects. Where it has been demonstrated that avoidance is not practicable, minimise the potential for harm.”

- Adopting Angela’s interpretation of the duty of care on MDC in drafting regulations would create undue and unrealistic obligations on any Council, in respect of Risk management:
 - Do they have to curtail the tourism and other commercial activities that would attract one more person into the district, e.g., the camp at Lake Pohaka?
 - Do they have to consider the risks of equally as low chance natural events happening – e.g., Solar storm or Meteorites?
 - If the MDC are so risk adverse, why are they investing in infrastructure that encourages more visitors into the catchment – e.g., public toilets at freedom camping sites. In fact, why are they allowing freedom camping below the dam infrastructure at all?
- You see the utterly ridiculous precedent that would be set by MDC adopting such provisions would either create inconsistency, because they simply can’t regulate to manage every risk, or would create a burden so great that the Mackenzie district would have to close.
- The notion of evacuation simply shouldn’t be considered - It would in fact be a dangerous precedent for MDC to do so. If MDC introduced the restrictions as proposed, they would be required to consider applying the same level of care through-out the district. For instance, they would need to consider similar restrictions in Fairlie to cope with School Stream.
- ST seriously questions the “one more building or visitor would break the Camel’s back” scenario in relation to reverse sensitivity. Surely with 21 lots and several residences already built down Lyford Lane, the horse has bolted?
- In respect of residential visitor accommodation, what is the discernible difference between a paying Airbnb visitor and a non-paying guest? The 11 April 2025 memo on flood inundation prepared by Meridian and MDC states at page 5 that a 1 -1.5hour time period is relatively short time period to allow for evacuation on Lyford Lane – really? Isn’t the most likely scenario a devastating earthquake – the minute this happens, Lyford Lane will know they have to adopt the relevant procedures in the emergency response plan. Whether they have paying guests or non-paying visitors in their dwellings, isn’t going to make a difference to the response.

- Instead of creating rules that require time-consuming and costly consents, in what is essentially bureaucratic over-reach, why don't MDC have a simple set of guidelines or requirements that address the issue, e.g., "where residential visitor accommodation is undertaken, ratepayers must clearly display evacuation procedures"?
- If councils and energy providers nationally are so worried about consequences, why is Clyde allowed to exist?

C What is the necessary differentiation between Meridian and MDC's obligations?

- Meridian is correct as dam owner to focus on Hazard (i.e consequence only), but MDC has to focus on Risk, which is a function of probability and consequences. Meridian is required to consider only the Building Code and Dam Regulations. The Dam regulations were designed to make owners of these structures consider the potential hazard and put in place appropriate management plans to ensure the hazard is mitigated. The intention behind the regulation was to put hazard management in the hands of the owners of the structures, who were generally large-scale corporate entities, rather than relying on smaller and diverse downstream entities (e.g. farmers and other landowners) to manage these hazards.
- The PIC system grades the hazards, Meridian holding the highest (and therefore most stringent) PIC grading of 3. This means that they will have a very high degree of measures to prevent adverse effects of the Hazard.
- a marginal increase in residents in the Lyford Lane area would place any further restrictions on Meridian. For instance, if there are 20 Residents, a doubling to say 40 isn't going to materially impact the response in the event of catastrophic failure.
- The Building code is designed for a 1:500 wind and earthquake event. Buildings are therefore designed to avoid risk of death at this level. While the building restrictions don't specifically address flood, placing flood related regulations based on events above 1:500 simply doesn't make sense.
- The notion of evacuation simply shouldn't be considered by MDC. The fact is if the buildings are safe (which they will be under the building code), then there is no need to evacuate them, and in fact, best practice is probably to stay put, get on the roof, and wait until you are rescued.
- Rather than requiring consents, simply establish a regulation that manages the risk – e.g. requiring providers of residential visitor accommodation to display procedures in the event of earthquake, fire, flood etc.