Meeting with Meridian Energy Mackenzie District Council and Pukaki Airport Board held in Fairlie on the 18.4.17 to discuss the issues surrounding the proposed Hydro Inundation Mapping that will include Pukaki Airport.
This is a transcript of this meeting which was recorded.

Present: Graham Smith, Mayor Mackenzie District Council (MDC)
Nathan Hole Senior regulation manager
Keri-Anne Little committee Administrator
Wayne Barnett Chief Executive

Anne Munro MDC councillor
Paul Hannigan MDC Councillor
Stuart Barrow MDC Councillor
Chris Clark, MDC councilor.
Russell Armstrong, councilor
David ?? MDC counsel

James Leslie MDC Councillor and Pukaki Airport board member
Derek Kirke Pukaki Airport Board Chair
Rick Ramsay Pukaki Airport Board member
Grant Bissett Pukaki Airport Board member

Andrew Ferriband (Meridian Planning, compliance and strategy manager
Humphrey Tacon In-House Counsel for Meridian Energy
Jim ~~???~~ WALKER.

Graham - Mayor
Okay gentlemen, first of all I'd like to welcome you all along. It's great that you've come along here today, we've got quite a number of questions to answer, we'd like you to answer, and we've got some real concerns, it's been out there for a while but it's finally sort of taken us by probably a wee bit of surprise that we've had the airport zone as such red-lined. So I think the best way is probably to hand it over to you Andrew to take us through your position.
Oh sorry about that, no sorry I do, well starting from Andrew, we'll go right around the table and do introductions

Andrew Feriiband: Meridian
So my name's Andrew Ferriband, I'm employed by Meridian as a Planning Compliance Strategy

Manager, and I've been involved with the Plan Change 13, process since I came to the company in 2010, and I've been going for many years before that, but we'll talk about that once we get into the discussion.

Hi, my name's Humphrey Tacon, in-house councilor for Meridian Energy.

Jim Walker Dam safety engineer for Meridian Energy based in Christchurch

Hi, I'm Anne Munro, a new councilor as of last October.

Paul Hannigan, new councilor as of last October.

Stuart Barrow, councilor. Chris Clark, councilor. Russell Armstrong, councilor.

James Leslie, Councilor, and co-operative member of the airport board.

Derek Kirk, chairman of the Pukaki Airport Board, along with Rick, we've been involved in this organization for about 10 years now.

Grant Bisset Pukaki Airport board

Rick 😉 I don't know what I have to say to you. T ...??

Nathan Hole, senior planning and regulations manager.
Keri Anne Little committee administrator.

Graeme Smith, mayor.

Wayne Barnett Chief Executive
DAVE? Counsel for MDC.
Thank you for that. So Andrew, you

Andrew
I guess we're here at your invitation. Yes. Thinking back 18 months, two years ago, Clare Barlow, former mayor, wrote to me and I guess raised the question about the airport zone and the district plan process and wanting to understand, I guess, the hazard issue in greater depth and I think kind of raised the spectrum of what work might need to be done to mitigate that hazard. And then some time passed and we had the local government elections and I think Graeme wrote to me to say, Clare wrote to you some time ago. Could you provide us some information, particularly in the context of what is this hazard and why does it need to be addressed with the district plan?

[~~Speaker 5~~] HERMAN

I'll just jump in. In this instance as well, we wish to have a full, frank conversation. That's why I've got Jim here.

Jim is the expert in that field. And cognisant of the fact that there is an ongoing process there.

So I'm presuming, David, that you're happy that all the conversations today are on a without prejudice basis.

David ???? MCO COUNSEL

I'm happy if it's on that basis. If that means that what's said in this meeting is going to be found to be used in having light on the cause.

Graham

I think we'd be quite accepting, my council would be quite accepting of that, that we can be full and frank today. I think that would be a good start. Thank you.

Andrew

So I think it was at that point we said, hey, it might be useful to have a roundtable discussion about the issue so that everyone more clearly understands it. I guess kind of understands what each party's expectation is with respect to what's needed to be done. And I thought that was a good way of dealing with it.
And then I think shortly after that, I think Derek contacted me and said, hey, we're also an effective party here. It's core business for us. And, again, hey, we'd like to understand what the issue is.

And asked me, it was almost like a local government information request, which is fair enough, saying what's some of the background information. And I thought, well, I could reply to this, or, again, got on the telephone and had a reasonable conversation with Derek about trying to say, look, it's probably better for me to fish out some information which kind of gives some background in terms of where we've come from to where we've got to. Because this process, as I alluded to when I opened up here, is not a process that's happened overnight.

It goes back to sort of 2007, 2008 when a plan change was kicked off. And there is, like, truckloads. David, Nathan, are you aware of this?

Literally truckloads of information round about on that plan change. So what I tried to do is pull out the, I guess, starting from the decision that came out of the court in 2011 and the key correspondence that flowed on from that in the context of defining what this hazard was and what it is to try and give you a little bit of background without overloading you with information on the base of the page if there's any gaps or anything additional needed. And again, if it's the outcome of today, there's still some gaps, let's get that information backed out so that everyone's kind of in the same position.

Derek

I have read it from cover to cover.

Andrew;

So I guess we're in your hands a little bit. But I guess to me what is, what's the essence here is that Meridian and the Council and the Federated Farmers and others have been working, I

guess, I guess a decision came out in 2011, a plan change 13 decision came out and said the hazard in relation to the, you know, the hazard in relation to a canal failure really needs to be mapped more specifically and clearly. Meridian and the Council were, I guess, tasked, and Genesis was able to sort of come into the game as well, tasked to go and do that work. And through that, so from that point of 2011 to the present, we've been doing that work, And I guess through the plan change 13 process, there were a couple of islands, effectively, that became, you know, once we'd done the mapping exercise, there were a couple of islands that came apparent through the planning process that were kind of sitting in isolation to this hazard that had been identified around them. Where in reality, I guess, Meridian's position has always been you can't really have this artificial island in the context of a hazard.

Graham

And you were talking about the Pukaki Airport zone.

Andrew

Zone, yes, and there was another piece of land called Hocken rural residential zone land as well that, in terms of the mapping that I circulated, you know, stand out as separate entities. So through the Plan Change 13 process, I guess there was a bit of to-ing and fro-ing between council and NBC. And we agreed that the best way to deal with those in the end, and there was a court memo around that sets that out, was to effectively deal with those two parts rather than trying to deal with them through the Plan Change 13 process.

Our view was that was more appropriate than that we dealt with through the district plan review process. So where the Plan Change 13 process has got to, we've just been through a recent court hearing which hopefully will bring that process to an end. Hopefully. But this book always seems to have another chapter. It's almost getting into a trilogy. If that process is brought to an end, there's a consent order that's basically with the court that will then hopefully be signed off, and that will basically put in place that mapping, that was agreed to by all those parties.

??????? From Meridian

I mean, the only thing I would add to what Andrew's saying is that, I mean, it's been a big journey. You know, it kicked off back in 2007, and I think there have been, is it nine, one interim decision, nine procedural decisions, two high court appeals, abandoned court of appeal proceedings. There has also been the 293 process which was kicked off at the start of this year. And what really wasn't, I don't think any party involved in the proceedings had any idea that this matter was going to go on for the length of time that it has. We have only been interested in the matters which affect Meridian, and we have more or less, all we've been doing is providing information, and that information has been more in relation to water, where does it go? And that information has been provided by ourselves and also Genesis. And so we've had the likes of Damwatch, who are specialists in that field, together with Opus. And they've carried out that mapping and applied a minor to it to ensure that there was a good, solid, robust understanding as to where the water goes. There was, I think originally, the special purpose zone, i.e. the airport zone was captured within that, and it was agreed in relation to the

memos, because Plan Change 13 really only dealt with the rural zone, it wasn't appropriate for it to be captured at that point in time. Nonetheless, at some stage, we're going to have to sit down and work out how to ensure that it is captured in an appropriate manner. And that may be guided by what pops out from the Environment Court when we get that final decision. When we do get that decision from the Environment Court, as Andrew has alluded to, there could be another appeal from that in relation to Federated farmers and what Judge Jackson espouses in relation to the best use of resources, etc. There could be another layer, and we're hoping that that's not going to be the case. But unfortunately, sometimes, from time to time, you can't decide and you get caught on this ride with other parties. So I think today, as Andrew's outlined, we're happy to have a chat to you.

We've got Jim here who can actually go through and explain the thinking behind it, the rationale behind it, *outline what you see on those pink sheets is actually the worst-case scenario in the sense of simultaneous breaks occurring all at the same time. It wouldn't actually look like that in a real case.*

Derek

In terms of what your thoughts are, in terms of what you must have given some thought as to what you would want to see in the new district plan, can you outline, just without prejudice, your broad views as to what you think is appropriate to put in the new district plan? Because that's crucial for a lot of people.

Sold sections without notifying owners

Graham

Probably just before you get there, we're particularly concerned now, Pukaki Airport Board and Council have a development on the Pukaki airfield, and it has potential to probably grow into quite a big airfield. We're now sort of in a position, and Pukaki Airport Board are really feeling uncomfortable having sold a number of sections without notifying the sale properties of the potential flood and the effect that this will now possibly have on land values and development within that area. And so that is where we're possibly coming from, Derek.

Andrew

So Graham, I think this might be, before we jump into what the solution would be...

Graham

Right. No, no, I wasn't asking for a solution. I was just putting our case of concern.

Andrew

Yep, yep. Because what I would say, I think it would be useful to get... Because I think, you know, Claire asked me, and I think you asked me, and Derek asked me, well, you know, what is the worst-case scenario here? And, you know, can you commission Dam Watch to do some extra work, which we said ultimately, well, actually, there's not much point getting Dam Watch to do some extra additional work, because we've already done some. And I think it might be useful to get Jim just to talk about that for a short period of time, because I think it'll be helpful to understand what is the nature of the hazard we're talking about. And then probably that

leads into a natural discussion about what the expectations might be around what planned solution you might have for it.

Meridian ?????

Because you also have to factor in that the risk has always been there. It's been there from day one. The only thing that's changed now is that there's more information, a better understanding as to if something did happen, where would it happen, and where would the water go? So all that one is doing is ensuring that people are fully aware of it, and then it's up to those individuals as to what risks that they are prepared to accept.

Graham

Well, I look at this map and think, well, if there was a breach further around in this canal, why wouldn't you have a red line around Twizel?

[Speaker 18]

Oh, Twizel.

Andrew

I think that's where it's kind of useful to get Jim to talk to that.

Graham

Oh, sorry.

Andrew

Because we actually have done some additional work since there, and we did actually look at the effect it might have on Twizel, but when you actually look at the breach scenarios, the water that actually reaches Twizel is not very deep, so it's not something that...

Rick

Can I just ask a clarification there? And Jim will probably have the answer to that. The first time we've seen an inundation map was one done by Opus, I think, by Grant Webby, which basically has a three-break scenario, which are effectively told that it's under canal, plus just before the emergency stop, And in that hazard planning map, the flows don't come anywhere near the airport. Now, that was done using LiDAR. The subsequent one, which is really the one that is one of impact, is the canal and that dam burst, which is Pukaki Dam. And that hasn't had a LiDAR Opus Dam Watch report done. It's just a broad brush. Right. And that's actually the point that I think we should start at, is that we all understand that the original LiDAR Opus map didn't show the airport affected by any of the breaches that were in those scenarios, which were basically only three scenarios anyway. But they did affect the one that we all felt was most likely to impact, which was somewhere between the State Highway overbridge and the emergency spillway. And we knew that that, on your maps, doesn't get us,

right? What's come out of this is a broad brush of the dam bursts. This is a different scenario, and we'll paint this all pink. But we actually haven't done a LiDAR study to show where those flows go.

Jim Meridian

Yeah. So there's... Yeah, so subsequent to that work, there's actually maps dating back to the 1990s, so that's the original sort of dam break mapping of Pukaki Dam up there. We've subsequently had that updated using LiDAR information to map things out. And that sort of includes more work on that. And, yeah, that sort of clearly goes through the airport zone area.

Derek

And we... Oh, sorry. The two report reports that you sent me, Andrew, one from Beelon Webby, the expert witness, and another one from Gimba, they refer to much more update maps and much more update data than we've got to date. And even the report that Nathan dugout, the dugout, that full report, at the weekend. That's the 2013 report, and these two documents, both by Beel and by Gimba, they refer to mapping done in 2014, So there must be more update information that we haven't got.

Nathan

Yeah, so I think I sent these ones to you, Derek.

Derek

Yes, we've got that. We've got the map, but we don't have any of the data that shows us the flows, or we have none of that. Yeah, that's fine.

Jim

I suppose, like, to put sort of some perspective around the dam safety programme is, I'm sure that you may be aware, and I remember you've been on some of the talks we've done to explain about the Meridian to the Dam Safety Assurance Programme, but the whole objective is to keep the water in the reservoir. So that's what we're all focused on. And so we've got a huge amount of work that we do to sort of understand the structure and the loads that might affect them and to understand the behaviour under these loads. For civil defence planning purposes we have to give guidelines as a sort of set of dam safety guidelines by the NZ Society of Dam Safety for Large Dams And sort of following those, what our requirement for us is to look after the dams and make sure, in the case of... ..to understand what the consequences of the breach would be and to make sure that the structures would be safe for those conditions. But also understand that if there was a failure, what would the consequences be? *And that information is normally provided to the councils for civil defence and emergency planning purposes*. So that's why we normally, we'd produce the mapping, but the mapping's been produced for the canals, the intake dam and the main dam. So that's the purpose of it. It's not just sort of, hey, there's an immediate hazard, you're at risk. It's more about risk. It's more a case of sort of the residual risk after all the things we do to ensure the structures are safe. If the water was to get out, where would it go? And then sort of where would people be at risk, where would they

dams be evacuated to.

Rick

So, Jim, does that lead to the question of what's the probability? Because given all of your safety guidelines and procedures, if you came anywhere near a flood zone or whatever, you actually have other procedures in place.

Jim

Yeah

Rick

The dam bursting at the inlet end of it is the result of everything else going wrong and not

working.

Jim - Meridian
It's an extremely low probability. So the guidelines, this sort of dam industry in New Zealand doesn't really work around probabilities because there aren't any more Pukaki dams to compare it with. It's just one. So what we do is work by standards. So we have to be able to demonstrate that the structure will meet certain load criteria. So it's generally the flood and earthquake are the big ones.We also consider the cost that the structures are made of soils, different types of soils. We consider the internal erosion. So we manage those two sort of particular standards and generally very high standards.

Rick

So the problem that we're actually faced with is something that you class from an engineering point of view as an *extremely low probability*, converting it into a high hazard zone across a development.

Jim

Yeah.

Rick

Which has two different purposes. One is *extremely low hazard* in terms of engineering, in terms of the failure. And then the other one becomes, well, we're going to stick all this in the district plan because the map would show that in the *extremely low event* of this happening, this water would go here. Now that actually, I think, is the nub of the issue that we face and how did we arrive at that. And what does it mean for people who own sections at the airport? One last question, can't help but ask. Is this a sunny day scenario, right, because we understood the sunny and rainy days. Yeah. And is it at Lake Pukaki being held at its maximum operating level or its flood range?

Jim

So we've got mapping for the dam. We've got mapping for both the sort of sunny day failure and the rainy day failure. So the sunny day failure is the lakes at its maximum control level and for some reason fails, where does the water go.

We've also got the mapping that says in the middle of a very large flood event, the dam fails. That's what it is.

Meridian speaker

For the canal, because the canal, we control the inflows and the outflows, if you only have a sunny day failure, it doesn't experience flooding.

Rick

So maximum control level for a sunny day failure, right? 532.5. 532.5. Yeah, and the rainy day could be?

Jim

If you've got anything on that, it's 2 to 2.7 metres,

higher than the max control. But it doesn't really

break the reference, that's the way the reference.

RICK

And so in the failure mode, basically you have a

gradual breakdown in some process, same as for

the canal, which the canal is effectively a dam,

right?

That's correct, yeah.

RICK

So the failure mechanism is the same. In the original flow out, does it not breach through the emergency spillway and go down there?

And at some point it overwhelms, that can go somewhere else.

JIM

Is that? Yeah, there's a process like that. *So, yeah, these dam rate flood mappings are based on*

sort of very extreme scenarios. So they, because it was an embankment dam, so an embankment dam could fail by piping. So they basically model a breach through an embankment dam and sort of say, well, what would happen? So it's more focused on, you know what you're thinking about, is this a realistic failure mechanism for this dam?

You're more thinking about, well, water's got to get out somehow. So we want to know kind of where would the water get out, where could water get out, how much water could get out, how quickly does it get out, and where does it go? So it doesn't really sort of, it's not really based on this is the most likely way this dam is going to fail . With an embankment dam, it could fail, you would get a big sort of notch carved out of the dam, this much water would get out and this is where it would go.

RICK

And just on those maps you've provided, presumably the water just doesn't flow to the east, it goes both directions over Lake Wardell and heads off over Rhoboro downs and everywhere.

Jim

It depends on which, the models that you've got there for the canal sort of are all based on breaking through the left-hand side sort of looking downstream to the left-hand side. But the canal Inlet failure in that area would go both ways.

RICK

So this hazard map that we've got here which shows us in the high hazard zone does that include the water going both sides?

JIM

Probably best that we've got those updated maps, I've brought a set along but I can't leave them here because they haven't been issued to the council. I'll let you have a look at that, you can sort of see.

RICK

I guess it's just a question, but in the end, that is what it is, isn't it?

Andrew Meridian

Yeah, so I think what Jim's saying is there's a whole spectrum of tools available to Meridian to deal with a particular hazard, right from how the canal structure was built at the outset, ongoing maintenance, the dam assurance programme, and then as you go along, it's also the question of if something goes wrong, where does the water go, how does one respond to it? And so we're at the other end of the moment and we're trying to ensure that the question that

one needs to answer is what is the appropriate regulatory response with that information being made available.

Meridian

So this is the spectacular mapping. So as you can see, this is Pukaki Inlet down here, and as you can see, you get sort of flow out over the top of the canal on both sides, down past the airport area, and then sort of heading off towards Benmore, so covering quite a large extent, and sort of kind of collateral on the spilling of the canal in the area between the Twizel River and the Fraser Strea

RICK

So we would expect that the district plan review, by the time it's got to that, it's going to be dealing with that map and not some earlier version.

Andrew

You'd have the most up-to-date information available for you.

Jim Meridian

So I guess what it's important to understand about these maps is they're a compilation, effectively. And if you look at this map here, I mean, this is just four breach scenarios. So when this work was commissioned in 2013, it's just four breach scenarios in particular locations.

If you were to do this to its nth degree, what you'd actually be doing is going along and copying and saying, well, what would be the outcome of this breach here and the outcome of this breach here, you know, to get the full picture. And so this map here is another piece of information that's probably more important in the context of the airport zones because what it says, in essence, is that if there was a breach at the Pukaki inlet, and correct me if I'm wrong, Jim, the worst-case outcome could be a wall of water that traverses down, gets across the airport zone, and what then?

Can you see the gap in the greater than 2-metre depth?

Meridian

Greater than 2-metre depth.

Derek or a counciller

So this is surprising that that map is so broad-brushed because if you just drive out as an amateur and have a look at the airport, just the other side of the gravel pit there's about a 2.5-metre terrace there. Now, that map doesn't show any less than a flow from that terrace.

Now, I'm just an ordinary old farmer, but I would have thought that that terrace would do a pretty good job of at least deflecting a good chunk of water away from us.

JIM

It is worst-case mapping, so basically what they've assumed is a large breach through the intake dam and sort of a, I don't know what the numbers are in terms of the release, but sort of, you know, you've got a situation where you've lost about a third of the dam and the entire leak and gap is one as well as all that. Is it based on LiDAR?

It is based on LiDAR.

[Speaker 8]

That is on LiDAR. Yes.

RICK PAB

Andrew y, can I just clarify? The 2013 report, you've got that doesn't factor in an intake dam, but it doesn't. It's just a canal. But the maps that were prepared for PC13 do take into account the intake dam breach.

[Speaker 2]

So, Jim, this is the work that led to these maps here.

[Jim

Yes.

Andrew

Yeah, so we did this report in 2013.

Jim

Yeah.

Andrew

Then a number of iterations were undertaken to accommodate...

Jim

Yeah, so it was Plan Change 13 but it included the intake dam.

Jim

It did. Yes.

Andrew

And is that work subsequent to that?

Jim This is subsequent to that, yeah.
Andrew
So it's actually just playing another piece of it, an information gap in the sense of saying what's the worst-case outcome of the pre-gap?

JIM

So these ones were done, I mentioned that sort of 1990 mapping that was done by OPUS. This is an update of the 1990 work by OPUS, really to bring it into the... In 2015, the dam safety guidelines were updated.

So in order to bring the mapping into line with the current guidelines and provide sort of information about why they're provided, what they're to be used for.

Rick

I'm sorry, Jim. So in the paper's 1990 maps, they have shown something like this, but just coarser,

Jiim

much coarser than that,

Rick

and it would have included the Airport zone.

Andrew

But it would have had the benefit... What that piece of work's had the benefit of is more modelling, presumably, and also the benefit of LIDAR

[Jim

Yep. And it changed the way that the sort of breach model is done is a bit

different.

[Speaker 8]

Because the reason I ask that question is because when you look at the PC13 maps, I mean, as Rick and Derek say, it goes right across the airport zone, but when you read the 2013 report, Dam Watch report, a lot of the airport zone's not affected. So what's the difference between those maps and the 2013 report? Obviously, assuming it must be an intake dam breach.

Jim

I think you might be Right

Andrew

So those first maps didn't... This study, though, didn't include Pukaki Inlet

dam

Jim

No.

Andrew

So they were just... So those first maps that we put together were based on that map, that atmospheric area. Yeah, yeah.

Derek

Which is a map we much prefer, by the way. Laughter

Yeah, I can see that.

Andrew

That's what we should talk about, because we just put a horrible number out there saying two metres of water.

So now let's put that into context, because I think that's important in terms of how the council might want to decide how it deals with this hazard. So, Jim, if you could explain that from the point of view of, if we've had a breach, how long is it before that water gets to the airport zone?

[Speaker 16]

Could possibly just... I mean, there must be a huge amount of factors that would cause a breach like that.

Jim

Mm, yeah.

Spekaer 16

Can you possibly just elude some of that? Well, the...

Jim

I mentioned that sort of the Dam Safety Assurance Programme, and so it's in the Meridians interest to keep the water in the reservoir. So the expectation is that the dam, and now the majority of that first 8km of the canal, are regarded as what we call high-potential impact classification, so high consequence of failure. So because the...

The onus is on the owner and the developer of the dam to assure the safety of the people living downstream from the dam. So, where there is a risk of loss of life, sort of significant damage to property, the environment, or sort of third-party infrastructure, the expectation on the dam owner is that it would meet what we call the high-potential impact classification criteria. So in this case, it means for Pukaki Dam, and now we're having to re-evaluate the canal for these same standards, is that we have to be able to withstand maximum critical earthquake.

So we've sort of done work with Geological Nuclear Sciences and consultants at URS to identify right through the Waitaki Valley where are the major fault zones, how large an earthquake could they develop, how much shaking would we see at the site, and we're sort of working through the process to evaluate the dam for that level of shaking, and we believe that the dam will withstand that level of shaking without failure. So the safety criteria is it must withstand these extreme loads without failure.

So we expect it to withstand maximum critical earthquake. We've just finished a study to review and revise the problem of maximum flood. So it's what's the largest possible flood or flood inflow that could occur in the Catchment of the Pukaki Dam flow into the Pukaki Reservoir, fill up the reservoir, and have to be released, either retained by the dam or released.

So using the spillways that we have, we can withstand the maximum critical inflow, and it is a massive, massive amount of water. We can withstand that. And we also look at risks such as internal erosion or piping.

So of course the dams are made of soil, and we're basically taking natural soils and engineering them to form a wall a barrier to retain water. We look at the risk that over time the water pressure could find its way through and start to erode material. So we've done studies to re-evaluate those materials against modern standards and sort of check it out extremely well.

So a very, very extensive process that we're doing our work. We need to understand what are the potential failure modes for the dam and what things do we know, what things can we check, which give us confidence that it will meet those standards. So it's all about meeting

standards.

But then at the end of the day, it's a dam. It's not without risks, so we need to recognize that if it did go wrong, we need to have emergency response, emergency planning in place, to see what the risks are.

Derek

I'm assuming that concrete structure, I forget what you call it, just this side of the canal, the cement structure, that allows the canal to, I presume they just collapse out, do they, under a wall of water?

Jim

Oh, the toppling blocks.

Derek

So that's all calculated by LIDAR as well?

Jim

The toppling block is basically a protection for the canal, so that if the canal were to be overfilled, there'd have to be a mal-operation basically of the canal. If it were overfilled, those toppling blocks tip over and it releases surplus water, and that would flow, there's that sort of flood path that goes from the canal across the sort of terrace downstream of Pukaki and into the Pukaki River. So that's there to effectively, as a fused protection for the canal to make sure the canal doesn't over-top anywhere, which would be a hazard to the community

Derek

So presumably the collapse of that structure is built into the cement structure?

Jim

Yes, it's not a big contribution. It basically allows you to flow about 560 cumes of water out of the canal, which is the maximum inflow from that control structure. So it doesn't greatly, it would be the first, you can see indicated on the map, yes, there would be water would go across that terrace and would drop into the Pukaki River and head off down the Bemmore that way.

Derek

But it's not a huge help?

Jim

No. But again, the likelihood is extremely remote, so we're really seeing this kind of stuff. It's not, it's far from unique to have a population have development downstream of high potential impact classification dams. Like last week I was in in Alexandra, which is downstream of the

CLYDE dam. And people are aware of the risk and presumably it's sort of there that the response is that you have an emergency response and the ability to evacuate if there was a problem

Rick

Yes, the real issue though is that nobody, the Central Otago District Council, doesn't have in there any rules that say your floor plan for your house in Alexandra must be six metres above ground level in the case of a catastrophic failure of Pukaki Dam and that actually gets to the nub of the issue at the airport. In the wording of the letter from you, Andrew, the implication is that there's going to be some controls, if you like, over structures because the words say that there will be damage to structures and so on and you'll be looking for the appropriate response from Council.

I mean, from what I hear is the dam will stay in place. It's going to meet all the dam safety guidelines. Extremely unlikely that this maximum event will ever occur.

And therefore, what is necessary in any residential area below the dam within that zone can be dealt with in ways other than building controls.

??

So what are you going to seek from the district plan, which is get back to what we're asking, because the thing is that you can't build hangers three meters off the ground or whatever it is.

Andrew

So my understanding of this scenario here is that if everything turns to custard, there would be, there's a reasonable amount of time before it would reach the airport site. So an evacuation scenario is possible.

Derek

What is that time?

Andrew

Between 35 minutes to an hour and a half.

JIM

Yeah. So this, again, is sort of extreme scenario. So it is the, what's modelled in the dam break study information is that kind of once the breach has become substantial, what's the amount of time for water to reach certain locations?

And then kind of what's the amount of time for the maximum depth of water to arrive there? So that would assume that somehow or other we haven't seen this breach forming, which is very unlikely. So the times you've got here are the times, kind of once it's all, it's well into failing, the dam's collapsing, it doesn't take account of the fact that in order to reach a point where failure

is occurring, there would have been lots and lots of warning it's unlikely to be related to an earthquake, if anything sort of that The risk that is highest in our mind would be the piping and internal erosions so we have guys who do surveillance on the dam and we have cameras on the dam so we are monitoring for that kind of failure so we wouldn't expect that kind of bang, the dam's failing, we didn't see it coming. It's going to, you know, there'll be lots and lots of time prior to this. But once it happens, then you're sort of down to about, well, the mapping at the bottom of the airport zone is just over 50, 55 minutes to an hour, and north of the airport zone is about 35 minutes. So between 35 minutes and an hour for the first arrival of water.

RICK ??

And when you say first arrival,

You mean getting your feet wet

Jim

Yes getting your feet wet
And then...

Graham

So it's not going to come in a wall?

Jim

It's kind of walking speed. It's going to, no, I don't know. LAUGHTER We've never had it anywhere.

No, I'm sort of flipping about. No, I mean, there'll be lots of indications that things are going wrong. The...

I suppose a thing we see as a positive is that from the airport zone to get to an area where you would be safe from flooding inundation, it's not far, it's basically from the airport to the Twizel Bridge. So, you know, for people to evacuate kind of from the airport site to a place of safety is a relatively quick operation. So in terms of time, if you had 35 minutes warning, you'd be able to get... Some of you might not be able to take all your stuff with you, but you'd still be OK.
ANDREW
So when you go to the question of what's kind of our expectation, I think we've got to be careful because we're not a regulatory decision-maker here as a council, but I think we can give some indications about kind of what our minimum expectations are. So the first expectation is that the hazard's actually recognised.

Graham

Well, I kind of flip the other way and say, well, whose is the hazard? ITS YOURS so do you recognise some responsibility?

ANDREW

Oh, we recognise some responsibility in the sense that the airport zone means that we have an obligation in terms of the PIC classification that Jim was talking about before that is definitely now a high PIC classification. So if that structure is found to be wanting in any way, Meridian has to put that or make sure that structure is designed to that standard, which can be millions and millions of dollars.

Graham

Can I wind that wee bit back again? Because if the airport develops into, say, an internationalairport and there's hundreds of people living out in that area, does that PIC rating have to go up?

ANDREW

No, it's at its highest.

Graham

So it's at its highest now, so it wouldn't matter if you were protecting a town or anything, you wouldn't do anything different.

ANDREW

So it imposes a whole series of obligations on us in terms of monitoring and checking and making sure things are actually to a certain standard.

You asked what would our minimum expectations be. So this is kind of our minimum expectation, recognise it's not our function to tell you as a council how you manage a hazard scale.

But you can guarantee that if the plan is notified without this being recognised, we will be having a debate about it. I mean, I'm not threatening in any way, but it's just a...

[Speaker 15]

Well, it's not a threat.

What it's saying is we are forced into a position there. We have to advocate to the council in terms of its regulatory function that it has a hazard. And whether council chooses to recognise that hazard or not is up to the council.

But we will take every step to ensure that we have exhausted to you as elected representatives that you understand what you're managing. So just hear me through.

Graham

Yeah, I was just going to say...

ANDREW

I'm trying to give you what our minimum expectation is. And it's up to the council. At the end of the day, it will make its own decisions.

It's not for Meridian to tell the council how it operates its own functions. The second requirement is that the hazard scale, and you're already doing that anyway, is recognised in terms of yourLIMS . So...

And that would just be a function of if it's mapped, it's going to be shown on the LIM anyway. And then the council's choice, it's got a range of options in terms of how it manages the hazard. It can just acknowledge the hazard in the plan, or it can have some regulatory intervention in terms of saying there are rules and regulations that come into play.
You have to build your house, you know, six feet off the ground or two metres off the ground to avoid the hip, blah, blah, you know. Taking it to its extreme.

ANDREW

The only thing I'd add to that is that I don't think it's going to be a surprise to anyone. This risk has always been there. People are aware of it.

RICK

I think that is not true. The people who bought these sections before any of this process started, and right up until today, until we were made aware of it, know nothing about this.

ANDREW
Well, no, they know since we... You would have seen the court memorandum that says the council...

RICK

Hang on, we're talking about private property owners out there.

ANDREW

Yeah, I'm sorry. If people purchased it prior to 2016, that's probably the case.

RICK

Yeah, well, that's what I'm saying. There are a whole group of people out there who said this will come as a complete surprise. There's another group that won't because it's not on the LIM

DEREK

And furthermore, Meridian told the court that they had consulted with all landowners.

Graham

Well, can we just hear Andrew out on what he's saying?

Andrew

So then the third expectation, you've got a range of methods. From our point of view, if we're candid about it, our expectation is you'd have some kind of method that recognises civil defence response. Because we say the hazard, as you've heard from Jim, the likelihood of this happening is low.

But if it does happen, there are high consequences associated with that. I used to work for local government. I reflect on being a civil defence controller and going off to Christchurch city civil defence controller meetings and talking about liquefaction.

And everyone said, what the hell is that? No understanding of it all. But there were places mapped showing Christchurch covered with this stuff. And it came about. So we can't ignore these things because hazards have gained a greater status, I guess, in terms of resource management functions. So what I'm saying to you, we're not coming along with a big stick and saying you need to treat this hazard in terms of the airport zone in the same way as the hazard is actually dealt with outside the zone.

And part of that is *because we accept the airport zone has arisen historically here before this hazard was actually understood.* I mean, if council was coming along with an airport zone proposition today, then, you know, given where the courts got to, you know, the court has, through the plan change 3 process, accepted the issue about the hazard. So it's not as though there's any contest about that.

I think if you go to the Canterbury Regional Policy Statement, they have policies in terms of, you know, what constitutes a hazard. And this does constitute a hazard. And it does meet those bills in terms of, you know, that this hazard should be recognised.

You've got changes that have just happened to resource management where hazards have been given a higher profile than they have been. And the expectations on local government in terms of managing those are higher than they have been in the past. So all of this is adding up to, I think it's probably difficult for council to say, just leave the airport zone as it is, because we know that this hazard exists.

Graham

Oh, we have some responsibility too.

ANDReW

Yeah, yeah. And the work that Jim's done over here has quantified what the outcome of that failure might be. So, as I said, it's not for Meridian.

I mean, Meridian will provide you the information it has, but ultimately it's going to be a council decision through its district plan review process how it chooses to manage that.

Graham

Unless Meridian wanted to do some funding to protect our airport.

Andrew

I don't think that that would help. That funding, I mean, if you've got a 2-metre wall of water, it's just going to go over the top anyway. Unless you've got a 10-metre wall of water.

RICK

Can I ask Jim, though? These things don't start out as 2-metre walls of water. They start out with a piping failure, which is a certain leakage. I would suggest that your canal level monitoring for your normal operations would show there's an abnormal level at one end of the canal and there'll be an alarm raised in the control room, et cetera, et cetera. And this thing starts out as a leak and then a stream and then a so on and so on. The question is, it's not really a wall of water. It's something, from an engineering point of view, why is it not divertible?

JIM
No, sorry, the 2 metres is the, that's got to be greater than 2 metres. What it's actually indicating on the map here is we've got time of arrival . It's indicating to a reduced level how much depth of water. So you're talking about a very large volume of water, a very large depth of water.

And the 2 metres is the connect. And it's more than this. This is when you get into the zone where, in this classification, it becomes high hazard for people down there.

So it's not saying the depth of water all the way down here is 2 metres. It would be considerably larger. Also, I mean, you know, from the other perspective, you know, we think the likelihood of a dam breach is very very low bend if you look at the, I think you've got the NZSOLD guidelines, but for you guys to have a look at the NZSOLD guidelines to see kind of what the expectations would be for the council might be quite helpful as well. Because when we look at the guidelines as the downlow, you know, so we say, well, our job is to keep the water in the reservoir. And our job is also to sort of provide information to the councillors and the sort of downstream public to say, well, if it did all turn to custard where does the water go?

And the reason we provide that is so that civil defence planning can be put in place to evacuate, to sort of respond if that event were to happen.

[Speaker 10]

So your modelling is done on that basis, civil defence and emergency management rather than district planning? Yes.

Derek

So if we take those four key issues that you just outlined and we're recognising the hazard

well, this is the map that the courts are likely to approve, which actually is saying that the issue, the airport zone is taken out of the hazard map, but it's to be dealt with through the district planning route. So this map will go into the LIM and Nathan will have some notes that go with that map. Correct, Nathan? Is that sort of what you're thinking at this point?

Nathan

Yes.

RICK

You'll put that on the LIM

NATHAN

Yes. I mean, that's a bit of a solution. [RICK

]That's on at the moment. [Speaker 6]

That's on at the moment. ??

Graham
Well, we'll just have one at a time, thanks.
Sorry, Derek, you've got a question?

Derek

So, well, I'm just going through these four key issues because they're pretty important.

GRAHAM

Well, we'll just go through one at a time.

Andrew

If we accept the map, so if we're looking at the map post-district plan review process, we'd expect the white to be pink, and that's what would go on the LIM.

Derek

Which is the one that's in there now.

ANDREW

No, no, well, sorry, this one here at the moment shows the airport. *It doesn't show the airport zone is still shaded white. So it's saying there's no hazard there,* but we all know there's a hazard there.

Derek

So, yeah, well, it's not this one that's on the LIM, it's the other one, the one that you say.

RICK

It's the older one, the X, the damn one.

Okay.

In reality, now that you're aware of that, is that what's going to have to go on to the LIM?

Derek

So even though Judge Jackson might say this is to be dealt with outside Plan Change 13 it doesn't make any difference in the LIM, correct?

Humphyrey

Ah, yeah, I think that is correct. I mean, but the water doesn't stop and do a U-Turmmuch

as we like it

Derek

From the party's legal obligations, I'm looking at. So...

Nathan

When we do a LIM on a property, what we have to do, we're required to provide information that we're told in relation to the land over which the LIM is sort And so, you know, this is all information that does affect those properties and that's what we need to provide. 're provided.

RIKC

So one of the things I believe, with the information that I'm hearing, particularly from Jim about the engineering and the standards that have to be achieved and the whole AIM, I actually believe that's the background that also should be attached to the LIM. I mean, this whole thing about it *being an extremely unlikely event, those words that Meridian uses*, those are the words we should use. But we should also use the processes that Meridian do to contain the water within the dam and the standards and guidelines that they have to comply with.

Otherwise, there's a hellish an scare factor there that's going to have an impact on the airport.

Grant Bisset

I totally agree with that. And the thing that's been in my mind up until here, and what you've had to say, Jim, is that the most likely cause of this is going to be a seismic rupture of a fault line, either the Alpine fault or the Osler fault, because logically, in an aviator's mind, that's what's going to break some terrain. So I think it's, you know, understanding the risk.

And, you know, for me, I'm kind of confused as to why we are talking about an extremely low probability, but when I look at a LIM, I'm seen to be in a high-hazard zone. And I understand

the hazard is having a couple of metres of water flow across my land. It is, you know, the consequences of that are high. But I do think that in the LIM that it needs to be understood. And I'll be interested as to what the legal counsel would advise a purchaser of one of our lots if they look at that and see high- hazard zone without any context around it. Or a banker.

ANDREW

Yeah, so, like, my ears prick up when you say high-hazard area. And it's never been conveyed that way. It's been conveyed as a hydroelectricity inundation hazard area.

[Speaker 6]

So there's a...

Derek

That is very good

Yeah, Wayne.

WAYNE

Yeah, and on this map here, on the red thing, it says high.

JIM

High hazard. It's within it. So what that is is showing a flow path of waterline.

And if you're in the red, that's where you're saying the height of the water... Is that the height of the water is higher than 2 metres? Yeah.

ANDREW

So there are two maps. These are the ones that have gone to the court. So that's the pink.

The pink's been referred to the court, and there's a general note attached to that, and that's identified as a hydroelectricity inundation hazard area. Then with these maps, these are finely grained ones. So these ones have the detail And the different colours... I probably won't be able to speak to this, but the different colours indicate different depth and also velocity.

JIM

These other maps indicate a combination of depth and velocity.

ANDREW

So, like, for example, the blue area on the fringes, you're looking at 0 to 0.25. The green as you go in, you're looking at 0.25, half a metre, and it keeps on rising. So the red here is where you're

over 2 metres. But that's all captioned.
It's just one colour on those ones.

Grant

But isn't the airport in the red? That is.

Rick

Andrew, in your letter to the mayor, you referred to the airport zone fall within a high-hazard zone. A high-hazard zone means inundation resulting in a downfall, etc. These are the words that we're fully aware of.

So we have a extreme low probability, and then we have a high hazard. But what you've outlined in the district, what you would expect to see in the district plan, and when I hear you say the words you expect to see, I would expect nothing less than Meridian would have a submission to the district plan and could say these things to it. This is what's going to happen if the plan doesn't reflect what you're saying.

ANDREW

Well, I think our reference point would be, you know, from a mapping point in terms of the district plan, it would be the pink. I agree that from a LIM perspective, you may have that map over there, or a map similar to it, that Jim has gone, and there might be some explanation around that. Because I think you're quite right, it can become quite confusing.

Because it's not saying... Well, what I understand what the red actually means is that that flow, if there was a breach, and if that flow went through, there would be catastrophic outcomes in terms of people potentially dying, buildings fall over. That's what we're talking about.

But it's not saying there's a high likelihood that that will happen. Because the risk is very low

DEREK

And on top of that, you're saying you have quite a lot of mechanisms in place that can give people a pretty damn good warning that they can go somewhere else, and that's probably the one area we can work together on.

GRANT

Because the understanding, like I say, from people that just look at that and look at what we're putting on the LIM at the moment is that this is a catastrophic, instantaneous failure with a more or less instant result. You know, seconds afterwards, there's this wall of water. But you've given us an assurance that under either the Alpine or Osler fault ruptures, these things are going to maintain their integrity.

JIM

That's our expectation.

GRANT

You said to me that is a key point of understanding in terms of risk management for us. But until right now, I haven't understood this issue.

JIM

We're involved in a process here in Kurow that has set up sort of a community of civil defence. We're kind of working through the same process as sort of downstream of Waitakie Dam. We think, oh, geez, the event of an earthquake in Waitaki Dam will fall over.

So we're involved in a series of meetings that are sort of trying to explain the risk side of this as well as the hazard side. And when the civil defence claim came out, I think it was much more the higher risk for the community were more of the dairy tankers going ripping through the town. Now, the likelihood of dam stuff, it was relatively easy for them to manage.

It was like, yes, there's a very, very big earthquake. Any concerns? Can we hide around and wait? I imagine that would be the similar kind of things in every one of the places.

RICK
Yeah, my memory of that is that we're both seeking a separate siren that could be activated for that specific thing.

JIM

Yeah, but when we're able to explain sort of the understanding of engineering and understanding of Waitaki Dam, there's no sort of direct correlation between there's a big earthquake and Waitaki Dam falls over. Yeah, because it meets that high PIC criteria. So, oh, but if you were worried, you'd go there and wait.

GRANT

So if Meridian was to invest in the Pukaki Airport, how would its legal counsel bear this risk from investment?

[Speaker 11]

LAUGHTER Have we got a deal for you. We've tried to persuade them coming down from Christchurch to ~~Poison~~ Pukaki, and they won't let us fly.

Graham

Too risky? Too risky of the airport?

No, it's the risk of landing.

[Speaker 7]

Flying's safer than driving.

[Speaker 11]

That's my understanding too, but they won't let us.

Derek

So... So we've got to the LIM that's happened too, and it sounds as though we can work through that, working with your explanations and working with Nathan as to what's sensible and not going to put the fear of God at any potential buyers but be a reasonable representation.

Graham

I think it's important. Nathan, I'd like you to just say how you feel our ~~limbs~~ LIMS should represent.

Nathan

What we put on the LIM is based on advice that David has provided. So it's not... Once the court made that decision in relation to accepting the hazard, so that's when we started providing the information on LIMS

But I think it's important to note that what we do in LIMS is we just provide information. We don't interpret information. That does create risk for the council if we start interpreting information.

Our job is just to present the relevant information that we hold in relation to the property and then they can seek advice if they need to.

[Speaker 6]

Can I ask a question?

WAYNE

Can I just jump in? Just one on that, because a couple of things... One area that seems really bizarre on all of us to make, and that is around the probability, because when you're talking about high consequence evenand having a discussion in the absence of probability just seems absolutely amazing to me.

I mean, you could be talking about a meteor that comes in and lands, and if a meteor lands, it will do a lot of damage. But it's kind of unlikely. So really, you've got to have both.

Now, my understanding is that the court has accepted evidence without looking at probability,

which seems really strange to me. It would seem that with any deliberations at all, I would have thought that someone who's sensibly looking at it would have to look at probability. And then, if that comes through, you end up with a balanced piece of information being provided to people, and they can say, look, this is a high consequence, very low probability event.

You can get insurance for the property damage and you need a civil defence response to it. There'd be some thinking going through there. But if you don't have the probability in it, it doesn't take you down that logic path.

And it just seems amazing to me that the court didn't...

Harry

They did look did look at the probability.

ANDREW
And I think, Wayne, also, if you... I mean, since this decision's come out, the Canterbury Regional Policy Statement's been through a review, and it has some policy in it which, effectively, this hazard meets, from a point of view of managing it.

[Speaker 10]

That doesn't address it quite very specifically, does it? It's the natural hazards, which are defined as the AEP.

[Speaker 4]

Can you read that out, Wayne?

WAYNE

It says, risk is usefully defined as the product of a probability of an event and the cost of the consequences. The probability of a canal failure is very low. As we understand, Mr Connell's evidence, Meridian designs its canals for such low-probability events as earthquake-caused failures with a 1 in 10,000 annual exceedance probability for different potential impact classifications depending on the population at risk and showing the dam...

and building dam safety regulations. In this case, it appears that the principal cost of the canal failure might well be the loss of a life, and so Meridian's concern was to minimise the number of persons whose lives might be at risk. An obvious way to achieve that is to avoid further residential development and the potential flood path from canal failure.

As we accept Mr Connell's evidence, the plans attached to his evidence show that farm-based areas proposed by the Council... by the Council 6... 6R are potentially affected by Class 1 inundation.

These are Irishment Creek, blah, blah, blah. So, yeah, so you're talking about an earthquake-caused failure with an exceedance of 1 in 10,000 annual exceedance. So that's a failure, not the earthquake, Jim.

I'm taking that.

[Speaker 17]

If that's the earthquake, it means you've got the failure on top of that.

[Speaker 7]

And then you've got the position of the failure anywhere on the canal. So the expectation is that...

[Speaker 1]

It's pretty low.

[Speaker 7]

I'd take a chance with a canal rather than a meteor.

[Speaker 6]

That's right. That's good.

RICK

One of the questions I want to ask you, I'll be a good guy. What stops a statement from Meridian in terms of how they manage the assets, the levels they manage it to, as produced by Meridian in relation to this hazard being included in the LIM So it's not a council assessment.

It's actually a statement-of-fact priority, which says, here's the probability, here's the standards that this applies to, and the Meridian assessment of this is that a catastrophic failure producing this hazard is of whatever. And then you attach that to the LIM as a statement.

[Speaker 10]

Well, if that's information that's being provided to council, then it would be disclosed as part of the LIM

RICK

Well, I believe that's...

[Speaker 9]

I think it would be very helpful, because if you could crystallise what you said before into a one- or two-paragraph thing to go on the limb, if I was a potential purchaser, I would take a high level of comfort in that, whereas at the moment, I think I've got a high level of exposure because I just see high hazard and I go, eek!

Graham

So you would be prepared to do this, Andrew?

[Speaker 9]

Yeah.

[Speaker 6]

You would do?

ANDREW

I don't see a problem with that.

[Speaker 6]

Oh, I'm just kidding!

MERIDIAN COUNSEL

I think we can go a

little bit further than

that. I think we can go

a little bit further than

that, in the sense that

we... If you think back

to what we did for

Omahau, Downs and...

Bednrose. We did a series of mappings and statements to that, and in the context of the development of this map, we also have a clause that effectively recognises that it's a chance, but it's an unlikely event. So I think...

I think we can endeavour to put something together, whether it ultimately meets your needs or not. You'll need to think about that. But we can have some exchange about developing, seeing whether we can develop something that puts it into context.

Because I understand completely what you're saying. Someone sees a big piece of red, and someone hears about a two-metre wall of water, that's going to have a completely different perception outcome, if you say, that there's plenty of time for forewarning, that this is an extremely unlikely event.

DEREK

Improbable.

And if we can come up with some sensible, civil defence arrangements, where we use Meridian's skills at the dam, to give people plenty of warning, that's obviously got to bepart of it as well, doesn't it?

JIM

So we have, of course, a generation emergency response manual, and this sort of details, I'm sure there's 21 different categories of hazard that Dam Safety follow ,and it sort of details the processes we would go through and which point we phone up the council But there's the expectation that there's something on the council to implement the evacuation.

Derek

Probably the most tricky one of Andy's four points that he outlined is the rules and regulations. Because we've got an awful lot of planning into this airport in the way that taxiways and boarding platforms are designed, it's really not going to be possible for the airport to tell owners they've got to look at their foundations and need to avoid this flood. We just simply can't do that.

[ANDREW

So, Derek, can I help there? I hope I haven't misled you. No, no, I was saying our expectation wasn't that you would have to regulate.

Derek

Right.

ANDREW

But a method that you could use in the district plan was a civil defence response. Sure. So it's slightly different.

Good.

[Speaker 10]

So, Andrew, just to... I guess there's a perception that what you are looking for is the transference of the rural provisions and the places they're meant to this land. And from what you're saying, that's not what you're...

ADNREW

I mean, what we've been careful to say is we're not telling the council what it should be doing. No, I understand. OK.

So, I mean, we've thought long and hard about this. We've thought about, you know, when the flow can get there and this mapping, you know, in its previous time use as a kind of a dam assurance project, blah, blah, blah, that... that there is some reasons why you wouldn't expect the same level of control as outside the airport zone.

RICK

Can I just read you a little sentence that, of course, put the wind up as it says in your letter to GRAHAM "Meridian considers the regulatory framework agreed through Plan Change 13 to manage future development of the Wider Mackenzie subregion to be appropriate for the reasons identified through that process. You can understand why when we read that and we know roughly what's going on with Plan Change 13, we know a lot more at the moment than we did before, that we saw that as being building heights, all these things.

If we're talking about civil defence responses, appropriate evacuation procedures, things like that, we can make that work and appropriate wording on LIMS to make people completely aware,plus the hazard map I mean, from an airport board member, I wouldn't have a problem with that. I think that's appropriate.

[Speaker 6]

I hope you've fixed it.

Graham

I'd just like, Nathan, do you see any need for Council to sort of be putting further regulation on this?

Nathan

No, all I've ever said is that we need to work through how the hazard is addressed over the airport zone and the Hocken Lane rules that we're using, and that's what we've been working towards getting to.

Grant Bisset

I think described and addressed. I think the hazard needs to be accurately described because, to me, it's had a broad-brush, red-marked, high-hazard label stuck on it, but actually that's not how I'm interpreting what Jim's saying. So I think you've got to describe the hazard correctly and then talk about the addressing or the mitigation of the hazard,

Speaker

If a worse scenario happens if it was.

[Speaker 10]

The simple reality is that, from Council's perspective, it has to go through a Section 32 analysis, basically. Do we? Yes.

[Speaker 15]

Unfortunately.

[Speaker 10]

Councils legal

person

If you look at disciplinary review and notifying, and that will involve a consideration of alternatives, take into account the information that Council's received now. So that could be the outcome of the Section 32 analysis, that that is the appropriate approach to take. And that's all subject to a lot more discussions and investigation following from this meeting, obviously, and all the information that we've been provided with.

What I'm suggesting is that Council needs to do that Section 32 analysis which will involve the risk and probability assessment as well. From the information that we now have, that would seem that an appropriate outcome from that could be that it's not dealt with in both the regulation but dealt with in the way it's been addressed. My concern, from the Council's perspective, is, of course, to ensure that the Council isn't in the gun.

They are liable. And I have come, after having read that letter too research, I've come to the impression that you were looking at PC-13 type controls. And it's obviously, as you recognise, it's a very, very different zone than the rural zone in the PC-13

Derek

You can understand

our panic when we saw

that. [Speaker 5]

Can I just ask one question? With the airport zone, do you need to get a resource consent if you build a land-use resource consent for a hangar?

[Speaker 8]

No.

Andrew, can I just ask a question in relation to Omahau and Bendrose. So the information that you've provided, that'll be outdated now, won't it?

Because it's just based on Canal Bridge, not an intake dam. Because their mapping is based on the two theatres in ~~Benbrook.~~ Bendrose

Rick

Just while we're talking about that, doesn't this actually make the case for having a site-specific section in the plan to impact the airport, putting these inundation issues and everything else?

Graham

As a separate zone?

Rick

Yeah, or a separate section within the zone.

Graham

Do you agree with that, David?

David No, no, I don't agree with that at all.

[Nathan

I mean, you can have a piece of this eco-

multiple zone, would it say, I understand what

Rick's saying, but it doesn't affect it at all.

[Rick

No, no.

Graham

Because some of this description that we're going to describe within this particular area isn't going to apply to any other flood area, it's more applying to Pukaki.

[Speaker 13]

Yes it is . I think we are forgetting Hocken Lane. For two zones that are in the flood area, are you going to have the something in the district plan for two zones that are in the the defined area are you going have the same rules for both or are you going to have...

[Speaker 10]

I think the outcome of the plan change 13 and the resolution of the issue here dealt with Hocken lane by notification on the LIM, and that was about it because it was already identified as a flood hazard are and the floor areas were already...

Derek

Was plan change 15, was that just white?

[Nathan

No, no, no. We had this very same discussion in relation to Hocken Lane not plan change 15. Plan Change 15 is operative

[Speaker 13]

So plan change 15...

So we can treat the

Airport zone

separately to

Hocken Lane

Nathan

But, I mean, where it got to in terms of plan change 15 was Meridian submitted that the submission wasn't accepted by the commissioners, Meridian chose not to appeal that decision. It then sort of came up again through the hazard issue on PC13 and then it was recognised that we were going to have to address that issue through the review, and so I'm suspecting that that will come up again with Hocken Lane. The difference with Hocken Lane is that you can't do anything there as a permitted activity, it's already a flood hazard area, so there's a whole lot of other restrictions in there, and through plan change 15 it was identified as an area that wasn't suitable for further development other than flood what people were doing that before.

Grahm

Right. Well...

[Speaker 7]

Sorry. Can I have this one? That's probably going to be the dumbest question of the day.

So, if Meridian has this canal and dam designed to have the highest PIC rating, why are you interested in this stuff downstream? So you operate... You're not going to change how you operate.

Your liability is, you know, you're doing what you would expect a prudent dam operator to do. I don't see where your liability or interest in this...

Jim

The earlier interest was around the canal, and the focus on the canal. Yeah. Because the canal

was...

Before pre-development, the area was rated as a low PIC classification, so for us, the issues with the canal are that it's changed the standard that we have to engineer to. So it's having a reverse effect on us, so we've had to invest a lot of money. Right.

Several hundred thousand dollars in reassessing the canal to work on that to understand it. And there was a real concern that we would have to physically upgrade the canal, which would have gone into the hundreds of millions..

[Speaker 7]

But you haven't done that.

JIM

No. Our engineering has indicated to us that it should meet the high PIC criteria for the canal. Right.

For us, it's this reverse sensitivity that when the structure is built, if there's nobody at risk, the structure's local PIC requirements are very much lower. When they change, that can be a real challenge if we find that the structure won't, as it's currently built, won't meet those higher criteria. So you've probably experienced with the Tekapo Canal, where the Maryburn fill section, they're unable to upgrade that beyond the median PIC criteria.

It was a concern for us with the Pukaki and Ohau Canals.

[Speaker 7]

Right. But this is a much bigger issue for Genesis

Graham

Yeah, but... But, Jim, you said before that canal up there is built to the highest tech rating.

[Speaker 11]

Well, no, no, it wasn't.

Graham

Oh, that's what I heard you say.

Jim

Oh, well, it was. LAUGHTER When they designed and built it, they weren't thinking of those criteria. Since the plan change 13 was kicked off, we've done a lot of work to try and standardise that, and we believe that it will meet those high criteria.

So, particularly in that top end of it, sort of up near to the... It's that highway, we're lucky because the embankments are relatively low.

Graham

Right.

Jim

So, it's OK when you're in the higher sections. That's... Yeah, there's more work for us to do there to be absolutely confident.

Graham

But you're actually not going to do anything to the canal other than understand what the canal...

Jim

If we find a deficiency, we'll have to fix it. And we will. We wont be

happy.

Grant Bissett

So, Jim, a question. If you were, say, domiciled in a hangar site on that airport and, say, you slept through the first alarm and realised that you don't have 35 minutes to get to the Twizel Bridge, do you think standing on that three-metre berm that's between the road and the buildings would be the safe place to be

Graham

In Your pyjamas.

I don't want to wind it up now.

Jim

It would be... The gravel road's away pretty normally. I'd get out of there

Derek

Yeah. Get a

hearing aid

Graham

The other thing, Jim, you dismissed quite quickly the fact that a bund would have any effect at all.

JIM

Yeah, and I've been able to engineer something to divert this potential flow because, from Meridians s point of view, the probability of this thing failing is extremely low, so it won't... If we're going to spend money on it, we'll spend money on the dam.

Rick

So that's the conundrum we see.

Chris Clarke
That just sounds like an inconsistency in your position when you say that. You're saying you absolutely must take action in the district plan, but we're not going to because it's not needed and pointless. No, but, yeah.

Andrew

Unfortunately, it catches, like... In effect, there's one very low problem that still has high impact. So, you know, we've got the information, we're aware of it, and what we're doing is...sharing it

[Speaker 12]

Why not mitigate the high impact as a good, responsible...

[Speaker 17]

Well, they are.

[Speaker 11]

Well, they are.

JIM

But the next stage, or the last stage, is emergency response.

[Speaker 11]

Absolutely.

JIM

And we've got a lot of emergency response processes in place, but we... Yeah, so we believe the next piece is when we pick up the phone, we've got an MDC, that area needs to be evacuated. We must have a response plan.

Rick

It is cheaper to have an emergency response plan than it is to build a bunk.

Well, I was just in... That's basically it.

Jim

It wouldn't be very good use of anybody's money to... No.

Graham

To build a bund. And it'd have limited effect.

[Speaker 12]

So, what you're considering, is that up to the latest report that came out yesterday on the effects of Canterbury and they have done a re-analysis of earthquake damage?

Jim
No, we actually... We kicked off... even ahead of the Kaikoura earthquakes

Speaker 12

No, no, this is the one that came out yesterday in the press that they...

...have really upgraded what's going to happen from Haast right

through.

JIM

Well, we sort of kicked off... We did a whole study in order to understand the seismic hazard in the Waitaki Valley.
And that's concluded in about 2008. And at that stage, GNS said, this is the part of the country we know the most about. And we'vee sort of kicked off a refresh of that.

So, based on the post-Earthquake, and now the Kaikoura earthquakes, and all this research that GNS and Victoria University can give us an update on how things have changed in terms of seismic modes. So, kind of, based on the information we've got at the moment, which is sort of 2014, was the last piece of work we had done for the Pukaki Dam We've got information for that.

If this new study tells us something... to

do something different then we will

update

Rick

Jim, can I ask you an engineering question? You've got two parts to the dam. So, you've got the canal inlet dam, and you've got the main dam.

Is there an assessment done that in this sort of catastrophic failure mode that may occur, and that would be the earthquake one, which one is actually more likely to go out of the two?

JIM

No, actually, the more likely case isn't seismic. We're actually in a quite fortunate position with the Pukaki Dam. It's not close to a fault.

So, you know, you might think sort of Alpine fault, so, you know, it's only maybe a magnitude 8 event and kind of, you know, that would be really devastating. And for the South Island, it would. But because it's kind of, it's at least sort of 90, 90 to 130 kilometres away from Pukaki Dam, you get this sort of attenuation effect.

So, the further you are away from the fault line, the less the shaking is at the site. So, Pukaki Dam, Alpine fault's not the worst case. The Osler fault, which is about a magnitude 7, 7.2 event, is the higher one for Pukaki Dam that's well able to withstand shaking from the Ostler. So, from a seismic point of view, I think it's a really good piece of work.

RICK

Sorry, you're kind of missing what I'm saying.

[Speaker 11]

Which one's going to go? Which one?

NEITHER

RICK

No, they are. Have you presented a scenario which we're responding to? One of them is a sunny day seismic and the other one's a piping, and obviously...

JIM

Oh, no, so they're all mapped out. So, basically, that scenario is not saying this is as a result of an earthquake. This is saying...

[Speaker 4]

Could be either.

JIM

It fails. It doesn't sort of, you know, we're not sort of saying...

[Speaker 17]

Yeah.

JIM

One of the things we put on the maps is to say, look, this doesn't, this isn't telling you anything about the safety of the dam, kind of this. We're saying the safety of the dam meets as far as we're able to see, the ascertain, it meets the earthquake, it meets the flood, and we're managing any piping loss. So, we think we meet all of the criteria, but if...

OK, let's try and rephrase the question.

RICK

The inlet dam is a very small dam. The main dam is a very large dam. The risk of a piping failure in the small dam compared to the risk of a piping failure in the large dam, is there more risk associated with a bigger structure with more formation that is nestled between, you know, two points, whereas the inlet dam was sandwiched between...

JIM

I can't... There isn't a number I can

put on it.

Rick

I mean, from a layman's point of view, I would have thought the main risk is the main dam.

Jim

And if you're living in a Pukaki Airstrip you hope it's the main dam. That's what I'm hoping. Yeah, but I honestly, you know, we...

RICK

You haven't assessed it.

JIM

You know, in New Zealand, there's no... We're sort of very... In the dams industry, people are very reluctant to try and put sort of probability actual numbers on these things because you can't sort of say the probability of this by the Pukaki Dam is a particular value because, you know, to do that kind of statistical stuff, you need a whole bunch of examples, and there's no other Pukaki Dam.

So, you know, how was it built? What materials? It's built from unique materials.

It's not the same as any other dam around the place. Yeah. So it really exists pretty much down to engineering against standards.

So if we know what the materials are, we know how they perform, then we can say, well, if we apply these kind of loads, it's got more than enough capacity to meet those loads. Therefore, it's safe enough. We don't sort of go, yeah, the probability of that is a value of X.

So, yeah, I would say that, you know, in a couple hundred years' time, there'll be a bunch of people sitting around this table, but the dam will still be there. And... Nothing's happened.

Graham

Nothings

happened

Chris

Or not.

JIM

Only an international example will be there.

[Speaker 14]

Other than I'll say it didn't perform as expected.

Graham

That's right. Right, well, we've had a fair sort of a session. Derek, have you got more concerns you want addressed?

Derek

No, no, no, I'm hugely comforted by what I've heard, and thank you, the three of you, for giving us that assurance that, of course, I think we've got a reasonable pathway to get through this and have a very successful airport and not hurt Meridian or Council or ourselves. Just one, probably it's a reference to David's, in the 22nd of February memorandum to the court, which hasn't been signed off by the judge yet, but you, David, and Meridian's counsel agreed that the updated hazard map for the planned train setting would be deleted, the airport would be deleted, and the hazard issue within the zone would be considered as part of the response district plan review, and Meridian will address the hazards issue as part of that review process.

This gives a pretty good steer that Meridian and council are going to work together to come up with a good plan for this, so I just hope that will happen, David. Make sense?

Yeah.

Graham

I'm just having a quick run round. David, if you want to make any comments, do you think a described assessment of the situation on the LIMS provided by Meridian would be a good start?

David

Yeah, yes, sir. That would be helpful.

Graham

And does that mitigate some of council's risk?

David

Well, I've never seen that. The more women you put on a limb, the more risk there is of getting something wrong.

Graham

That's right, and I'm aware whose risk is this? Is this Meridian's risk? Are they trying to pass it on to us?

David

No, I mean, there are two issues there. In terms of the limb, the LIM is council's responsibility.

Graham

That's our responsibility.

David

Right. Derek

David, can you not have a statement within a LIM that is... I mean, Meridian are their experts on this particular risk. Couldn't a statement within a LIM be signed off by Meridian rather than council?

David

No, that's always going to be council. There's a representation by council.

RICK

Sorry, I think what he's saying is what I said before, is if Meridian would produce a set of words that actually outline the risk standards they operate their structures to likelihood...

DAVID

And what I said earlier was if that was prepared, if that was provided to council, that would be part of the information that council would have available in relation to that.

Derek

That's all I

am

suggesting

Graham

And Meridian were reasonably, Andrew, reasonably comfortable with that.

Andrew

All two of them.

Graham

There were two out of three.

Andrew

I'm probably happy if it's legally sound.

Graham

Nathan?

I just wasn't sure if I got an answer to that. Bendrose

question

Andrew

And I'll... Yeah, I think we need...

Nathan

Because the reason I asked that is we need to move in terms of the extents of PC13 relatively quickly in terms of re-identifying the farm-based use of those properties.

Yeah, so Jim and I haven't got an absolute answer for you, so I'm going to have to go back to what I think you said.

Nathan

No, that's all right.

Graham

Wayne?

Wayne]

No, look, I'm pretty comfortable I think the key thing here is context and making sure that information does come with context.

Graham

Anyway, councillors, are you all comfortable?

Well, I'd just like to thank Meridian for coming down here, Andrew, Humphrey and Jim. I think it's been a very forthcoming workshop as such.

You've certainly given us some understanding. We were fair-sweating it out a wee bit over the fact that here we were developing an airport which was a high-hazard zone, but you've dispelled it as it's so low in probability that I'm more likely to be hit by a star out of the sky than anything else, so...

Chris Clarke

An aeroplane.

Graham

Or an aeroplane. So I thank you all and I thank your Pukaki Airport Board too for the way you fronted up here and thank you, Derek, for the work you put in and Rick and all of you and thank you, David, too, for putting to give us legal advice.

Andrew

So, Graham, I understand you're on a fast track for your district plan.

Graham

We are quite fast-tracked.

Andrew

So, do you just want us to work with Nathan , but also Copy and Derek and myself too, please.

[Andrew

That'd be good.

Graham, thank

everyone and it's

great. Thank

you, everyone.