

THE CANTERBURY REGIONAL COUNCIL

IN THE MATTER OF The Resource Management Act 1991

A N D

IN THE MATTER OF resource consent applications by Simons Hill Station Limited,
Simons Pass Station Limited and Pukaki Irrigation Company
Limited to take and use water in the Upper Waitaki Catchment

**CLOSING SUBMISSIONS ON BEHALF OF SIMONS HILL STATION LIMITED,
SIMONS PASS STATION LIMITED AND PUKAKI IRRIGATION COMPANY LIMITED**

DATED THIS 28TH DAY OF APRIL 2010

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MAY IT PLEASE THE COMMISSIONERS:**Introduction**

- 1 The applicants I represent have been working on the proposals before you for the last seven years. The applications fall within the rubric of the MWRL case but are supplemented in important respects by site specific investigations supporting the MWRL case, insofar as it applies to Simons Hill/Simons Pass. The detailed additional scientific work that has been carried out by the applicants leads to a slightly different “*hybrid*” Adaptive Management Proposal being put forward (by comparison with MWRL).
- 2 The applicants’ case is that these applications can appropriately be granted without the need for the **groundwater** verification process. As has been explained by Mr McIndoe, this verification has already been carried out for Simons Hill/Simons Pass.¹ A full Adaptive Management Proposal is, however, put forward including ecological baseline monitoring and staging.
- 3 The proposal to stage irrigation development has been specifically designed for Simons Hill/Simons Pass, particularly having regard to the technical information now available concerning the speed that groundwater travels through the aquifer system. The proposal differs somewhat from the MWRL proposal for these site specific reasons.
- 4 The core issues that you must address in coming to a decision about the Simons Hill/Simons Pass applications are:
 - (a) The nature of the receiving environment – fundamentally, where will the nutrient losses from the farming systems proposed end up?
 - (b) Can the receiving environment assimilate these nutrients?
 - (c) What is the magnitude of the risk involved and how can it appropriately be managed (via Adaptive Management or otherwise)?
 - (d) Are there potential terrestrial and landscape effects that have not been identified and mitigated in the applicants’ proposal? If so, how can they be dealt with?
 - (e) How can Simons Hill and Simons Pass Stations be sustainably managed for the future given the enormous land management issues presently facing the properties?

¹ Ian McIndoe, reply evidence.

- (f) In the end, as a matter of overall evaluation, does the granting of the applications, with the conditions proposed achieve sustainable management in accordance with section 5 of the RMA?

5 The applicants' approach has been to:

- (a) Verify and provide further technical information augmenting the MWRL case in order to reduce uncertainty.
- (b) Consult with submitters and resolve, where possible, outstanding issues.
- (c) Adopt a conservative approach to thresholds in order to achieve a high level of comfort that thresholds will not be reached.
- (d) Address residual concerns as to uncertainty via Adaptive Management.

6 Overall, it is submitted that the very conservative approach adopted by the applicants, coupled with the Adaptive Management Proposal and the detailed evidence of the benefits of the grant of consent are such that the balance overwhelmingly favours the grant of consent.

MWRL thresholds

7 The applicable limiting thresholds for Simons Hill/Simons Pass are the Maryburn River node on the eastern side of the Mary Range and the Pukaki groundwater threshold on Pukaki Flats.²

8 The NDAs for those parts of the properties east of the Mary Range are set with reference to the Maryburn threshold.

9 For the Simons Hill and Simons Pass on Pukaki Flats the relevant NDAs derive from the aggregated groundwater threshold of 1.0mg/l of nitrate nitrogen.³

10 In Opening I indicated that this groundwater threshold was purely policy based and derived from policy WQL2 of the NRRP. The policy is significantly more restrictive than the drinking water standard (11.3mg/l of nitrate nitrogen).

11 The focus of the groundwater policy in the NRRP is preventing a decline in water quality and aquatic ecosystems of groundwater fed rivers and downstreams lakes.⁴ This is the appropriate focus, it is submitted because groundwater is not set at a level above which adverse effects on biological systems may occur, rather it is highly precautionary.

² Evidence of Ian McIndoe, pg 25, para 126.

³ Ian McIndoe, pg 127, para 150.

⁴ NRRP, Chapter 4, Issue WQL2, pg 53.

- 12 It is submitted that where there is specific groundwater and nutrient flow path information, this should be preferred as against the general policy threshold in the plan. The Panel now has available to it the detailed groundwater science undertaken in this case giving a high level of confidence that the vast bulk of nutrients in question will discharge directly to the lake. That is, it is submitted, the most relevant receiving environment for this case. As Dr Freeman, in relation to groundwater, has said:

*“There is general agreement that an appropriate general groundwater quality standard should be 1.0 mg/l of nitrate nitrogen. However, given the limited use of groundwater in the areas down gradient for drinking water supply and the New Zealand drinking water standard of 11.3 mg/l of nitrate nitrogen, as noted in my earlier section 42A report, **the key issue is the potential adverse effects of increased nutrient concentrations on surface water recharged from groundwater.**”*

The key application of groundwater monitoring and specific trigger responses would be most applicable in locations where there is significant distance and/or slow groundwater movement between irrigation areas and sensitive surface receiving waters – eg, the Pukaki Flats area.

It is essential that in the Pukaki Flats area that groundwater monitoring be carried out to assess any potential effects on groundwater quality and the potential effects on the Tekapo/Pukaki Rivers and/or Haldon Arm of Lake Benmore. Reliance on surface water monitoring alone would be ineffective given the significant time lags that could be involved, as detailed in the evidence of Peter Callander.⁵ [My emphasis.]

- 13 At the time Dr Freeman made these remarks, the Pukaki Flats groundwater investigations were not available to him. These investigations show clearly amongst other things that the speed of groundwater travel underneath Pukaki Flats is quite rapid. There is now a firm basis for the development of a monitoring programme focusing on Pukaki Flats’ groundwater, the Tekapo River and the Haldon Arm.
- 14 The Policy WQL2 of the NRRP is made relevant to these applications by Policy 13 of the Waitaki Catchment Water Allocation Regional Plan (“WCWARP”). This policy directs you to *“have regard to the extent to which the exercise of consent could result in water quality objectives in the Natural Resources Regional Plan not being achieved”*.

⁵ Dr Freeman, pg 12, paras 49-51.

- 15 On this matter, while it is a matter for you to consider, it is not intended that the policy based threshold should be rigidly applied. Mr Whata's MRWL submissions on this point at paragraphs 3.7 to 3.17 are adopted.
- 16 The proposed conditions have been drafted on this basis.

The Haldon Arm

- 17 The applicants rely on the evidence put forward by MWRL and others concerning the assimilative capacity of Lake Benmore and in particular the Haldon Arm. Relevantly for Simons Hill/Simons Pass, the following observations can be made:
- (a) The assimilative capacity of the Haldon Arm has been accepted by all concerned to be greater than that of the Ahuriri Arm.⁶ Estimates from the various experts range between a current trophic status of 1.95 to 2.50 with a number of experts adopting a range. There is some difference of view about the appropriate target trophic state against which the Arm should be managed but there appears to be wide acceptance that 2.75 is the appropriate number.⁷ The parties' relevant evidence is summarised in the following table.

Haldon Arm Trophic state current and proposed limit

	<i>Maximum Current</i>	<i>Proposed Maximum</i>	<i>Available Capacity</i>
NIWA	Summer epilimnetic 1.95. Annual epilimnetic 2.05	2.75-3.00	0.70-1.05
Meridian (Sullivan)	Summer epilimnetic 2.40	2.75	0.35
MWRL	2.10 (excluding chlorophyll a)	2.75	0.65
Dr Romero	Summer epilimnetic 2.40 (samples from December 2009 were 2.60-2.70 but were subject to considerable uncertainty) ⁸	2.75	0.35
Dr Freeman	-	2.50	

⁶ Mike Freeman, second addendum, pg 10.

⁷ Mike Freeman, second addendum, pg 10.

⁸ Dr Romero, para 3.7.

NRRP	-	3.00	
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- (b) It is noteworthy that none of the parties are suggesting that the policy based NRRP threshold of 3.00 should be adopted.
- (c) Dr Freeman's suggested target of 2.50 is well below the consensus and would, it is submitted, be an exceedingly and undue conservative approach, and certainly out of step with the approach suggested by Dr Romero.⁹
- (d) It should also be remembered the applicants have developed their farm use scenarios on a very conservative basis as against the NDAs. They have adopted the highly developed setting of OVERSEER and have not put forward farm use scenarios which bring them anywhere close to the NDA from the MWRL work.¹⁰ The total modelled loss at the end of the staging period is approximately 70% of the total NDA modelled on a highly developed basis for N and 20% for P.¹¹ Refer **Appendix "1"**
- (e) The mass balances for the Haldon Arm in the Lake generally proceed on the basis that Simons Hill/Simons Pass would be utilising 100% of its NDA allocation.
- (f) The NDA for Pukaki Flats is set against the groundwater threshold. As Ms Robson indicated in her evidence¹², on the basis of the MWRL the assimilative capacity of the Haldon Arm had been the limiting threshold for Pukaki Flats, the NDA would have been **approximately 50kg per year per hectare higher, an approximately 300% increase over the MWRL allocation.**

Risk assessment and scientific uncertainty

- 18 In this case, you are required to evaluate a large volume of scientific and expert opinion to reach an overall judgment as to the appropriateness of granting consents. Part of this exercise involves an evaluation of the risks associated with the grant of consents. The RMA does not expressly prescribe a "*precautionary principle*", however, you are required to evaluate effects which are of a low probability but high potential impact (section 3(f)).¹³

⁹ Dr Romero, pg 3, para 2.1.

¹⁰ Melissa Robson, para 31.

¹¹ Simons Hill, Simons Pass, Rosehip Orchards and High Country Rosehip Orchards are the only applicants to have used the "*highly developed*" OVERSEER setting.

¹² Melissa Robson's evidence, para 70.

¹³ *Shirley Primary School v Christchurch CC* [1999] NZRMA 66.

19 The standard of proof required in cases of scientific uncertainty has been discussed by the Environment Court in a number of cases.¹⁴ In *McIntyre*, the Court formulated the relevant test as follows:

“The evidence must satisfy us of the facts (ie, that there will or not be such an effect) on the balance of probabilities having regard to the gravity of the question.”

20 Numerous cases have confirmed that the Act does not require a “no risk” approach.¹⁵

21 The Environment Court has also observed that the assessment of what is an acceptable degree of risk is a question of fact in each particular case.¹⁶ The following are considered to be relevant steps in assessing the degree of risk:

- (a) Analyse the relevant principles, objectives and policies.
- (b) Identify the risks.
- (c) Identify the consequences.
- (d) Estimate the probability of harm.
- (e) Evaluate the significance of a risk.
- (f) Comparative risk assessment.

22 The approach of these applicants has been to seek to identify the areas of scientific uncertainty and address these by further investigation so as to provide you with a high level of certainty as to the grant of consent.

23 In relation to groundwater, it should be recognised that groundwater hydrology is notoriously difficult and uncertain. It is an area of science where detractors can no doubt always find uncertainty and assert information gaps. Applicants are not, however, required to eliminate all risk, rather they are required to put forward a proposal which deals with risk appropriately, having regard to the gravity of the questions involved.¹⁷

24 There will always be residual uncertainty, particularly where complex environmental systems are concerned. The appropriate response where these issues have the potential to impact significantly is to seek to manage the

¹⁴ *Clifford Bay Marine Farms Ltd v Marlborough DC*, C131/2002; *Shirley Primary School v Christchurch CC* [1999] NZRMA 66; and *McIntyre v Christchurch CC* [1997] NZRMA 289 at 303-307.

¹⁵ *Land Air Water Assoc v Waikato RC*, Environment Court A110/01.

¹⁶ *Clifford Bay Marine Farms Ltd v Marlborough DC*, C131/2002.

¹⁷ *McIntyre*, para 303-307.

uncertainties by allocating the risk involved to those benefiting from the proposed development. The Adaptive Management regime put forward by the applicants is expressly put forward for this purpose. It is intended to allocate the residual risk associated with the grant of these applications to the applicants rather than the environment.

- 25 Within this framework the position for Pukaki Flats groundwater is:
- (a) There is a high level of certainty regarding the hydrological connection between the groundwater resource and the Tekapo River.¹⁸
 - (b) Only a very small quantity of groundwater (less than 5% of through-flow) may discharge to the Tekapo River.¹⁹

Terrestrial Ecology

- 26 Peter Espie is a research scientist who has specialist expertise in terrestrial ecology in the management of the South Island High Country for 34 years. He has been an active researcher on the ecology of indigenous tussock grassland systems of the South Island and their management. He was the Field Team Leader for the Mackenzie Protected Natural Areas programme (PNA) in 1983/84.²⁰
- 27 This hearing Panel is well placed it is submitted, to make an assessment of the impact of these applications from a terrestrial ecology point of view. Rarely is the detailed site specific and long term evidence available of the kind presented in this case as to the relevant values. The long term changes evident from Dr Espie's work on Pukaki Flats show that the loss of tussock cover and the invasion by exotic weed species is advanced.²¹ Dr Espie's expert view is of course no news to those involved every day in the management of Simons Hill/Simons Pass Stations.
- 28 You have heard from Denis Fastier about the changes that have taken place on Simons Hill Station since he purchased the property in 1994.
- 29 He says:

*"When we arrived at Simons Hill in 1994 the Flats had been grazed and yet there was a strong, healthy, fescue tussock grassland as shown in the 1995 photograph **attached** (marked "C"). At that time, I employed*

¹⁸ Ian McIndoe, reply evidence, para 91.

¹⁹ Ibid, para 92.

²⁰ Peter Espie, evidence in chief, pgs 1 and 2, para 1.1-1.9.

²¹ Ibid, pg 17, para 4.10.

Dr Brian Molloy, a botanist with a lifetime of experience in the High Country, to advise me on how to manage this tussock grassland. His assessment concurred with mine, that this was one of the best remnants of a fescue tussock grassland in the Mackenzie, and possibly the South Island. In particular, we wanted to know if we ought to retire it from grazing.

His evaluation of the Flats was that there were no obvious factors or qualities that had predisposed this area to healthy tussock land. He concluded that the condition of the tussock grassland at that time was probably a coincidence of timing – good luck, effectively, that it had not yet suffered the same fate as other tussock in the area. He advised that there was nothing we could do to prevent the tussock dying. Notwithstanding his advice, we tried to preserve it by ceasing to graze it.²²

... (at paragraph 53):

*The Pukaki Flats are a prime example of this. The Pukaki Flats portion of Simons Hill has not been grazed for over 10 years now and tussock has continued to decline to the extent that there is now hardly any left. Tussock now only occurs on patches of better soils with higher water holding capacity. With the advent of weeds and especially Hieracium, competition for moisture is so severe that the tussock seedlings can not compete and grasslands are unable to recover. **Attached** and marked “D” is a photo of the Pukaki Flats in 2003, illustrating the devastating effect of Hieracium. The tussock cover can be starkly contrasted with that in the earlier 1995 photo. I emphasise that no stock has grazed this area over this period.”²³*

- 30 The Mackenzie Guardians, in particular Susan Walker, present general evidence concerning the ecological values of the Mackenzie Basin. Aspects of her generalised evidence impact on these applications.
- 31 Dr Espie has presented rebuttal evidence addressing the matters raised by Dr Walker.
- 32 Dr Walker’s recommendation at paragraphs 43 and 44 of her evidence was:

“In my opinion, to assess the onsite effects of the applications, a new survey of flora and fauna is needed on all proposed application sites, of a

²² Denis Fastier, pg 11, paras 48 and 49.

²³ Denis Fastier, pg 12, para 53.

standard similar to the example at Attachment 10. Such survey requires specialised expertise (because of the often cryptic and diminutive flora and fauna) and maybe time consuming (because threatened spring annual plants can be observed only briefly each Spring).²⁴

- 33 As indicated, in my submission, this is precisely the kind of work that has been carried out by Dr Espie. In addition, because of the long term data that is available for Pukaki Flat, the changes in botanical composition over time are able to be understood.²⁵ Such material would not be able to be obtained from a single onsite survey of the kind suggested by Dr Walker. It is understood, and Mr Peter Glasson and Mr Denis Fastier are able to confirm if required, that Dr Walker has not visited the site.
- 34 In coming to her recommendation of the need for site specific surveys, Dr Walker relies significantly on the Protected Natural Area programme survey from 1984, which identified the Tekapo/Pukaki Flats (Simons Hill) as containing significant areas.²⁶
- 35 Dr Espie, who led the survey work for the Mackenzie, concluded in his evidence in chief that the site no longer contains the values the survey recommended should be protected.^{27 28}
- 36 Dr Walker also relies on work carried out as part of a tenure review in raising concerns about the locations of threatened species habitat.²⁹
- 37 Simons Hill has been through tenure review. As part of the statutory process the Crown is directed towards ensuring the protection of significant inherent values, either by way of the Crown acquiring the land in question or by way of covenant or other statutory protection mechanism.³⁰
- 38 Significant parts of Simons Hill were identified and set aside for Crown ownership as part of the tenure review of that property. No part of the Pukaki Flats on Simons Hill Station was identified or included in any land to be retained by the Crown for ecological reserve purposes nor protected by way of covenant. Accordingly it is submitted that any areas of significance have been dealt with in this context. For Simons Pass this property is still in tenure review. The latest

²⁴ Dr Walker, pg 16, para 43.

²⁵ Peter Espie, pgs 15-22, para 4.1-4.17.

²⁶ Dr Walker, pg 16, para 42.

²⁷ Dr Walker's Attachment 15 relies on the protected natural areas work in categorising Simons Hill as the 'greatest' category for potential effects on biodiversity.

²⁸ Dr Espie, pg 22, para 4.17.

²⁹ Attachment 15.

³⁰ Crown Pastoral Land Act, s24(b).

identification of the areas containing significant values by the Department of Conservation is set out in Dr Espie's evidence in chief.³¹

- 39 The applicants' proposal has been developed in consultation with submitters, including the Department of Conservation. Those areas of concern identified by the Department were excluded from the irrigation command area.³²
- 40 The Department has not raised any site specific concerns as to terrestrial ecology for Simons Hill and Simons Pass Stations.
- 41 Elizabeth Steven for Mackenzie Guardians gives evidence as a registered landscape architect on landscape issues as well as terrestrial ecology (despite having no scientific qualifications).³³
- 42 Ms Steven appears to recognise the degraded state of Pukaki Flat, particularly the "*Pukaki outwash plain*", but says:

*"It must also be recognised inland outwash plains are naturally rare and threatened ecosystem, which has not been cultivated. In the absence of rabbits, wilding pines and possibly briar, and with no stock grazing, it is my understanding that there is a possibility that native species could return to the land, given enough time."*³⁴

- 43 Dr Espie addresses this issue; in his reply, for Pukaki Flat. The "*potential for natural recovery of fescue tussock grassland on Pukaki Flat is negligible*."³⁵
- 44 Dr Espie also addresses the evidence of Dr Walker that there is evidence of native re-colonization from the Tekapo field trials, rabbits and grazing are excluded. Dr Espie does not agree with this view.³⁶ Dr Espie has research involved in the Tekapo Scientific Reserve from 1992 to the present. Dr Espie's evidence is that while the stature of remnant individual fescue tussocks has increased (because of the exclusion of rabbits) there has been no appreciable recovery in the short tussock grassland community, and inter-tussock cover remains dominated by exotic grasses and Hawk-weed.³⁷
- 45 Even if it was true that with the *exclusion of rabbits, wilding pines, briar and with not stock grazing, native species would return*, the statement posits a scenario which simply does not exist at present nor is there any likelihood of that scenario

³¹ Dr Espie's evidence, pg 17, para 4.5.

³² Peter Glasson's evidence, pg 15, para 80.

³³ Elizabeth Steven, pgs 1 and 2, paras 2-8.

³⁴ Elizabeth Steven, pg 26, para 111.

³⁵ Dr Espie, pg 36, para 3.22.

³⁶ Dr Espie, reply evidence, pg 30, para 3.10.

³⁷ Dr Espie, reply evidence, pg 30, para 3.10.

ever coming into being. The future for Pukaki Flat does not involve *the “absence of rabbits, wilding pines and sweet briar”*.³⁸ That is not a possible future environment that is relevant for your consideration. The reality is, as Dr Espie says; the process of degradation and erosion of Pukaki Flat will continue.

Landscape and amenity values

46 Both Ms Elizabeth Steven and Ms Di Lucas have given evidence for the Mackenzie Guardians about the specific landscape effects of the Simons Hill and Simons Pass applications. Ms Steven in particular has focussed on the potential adverse effects of the proposed irrigation on the Pukaki Flats area of the properties. It is noted that neither Mr Steven nor Ms Lucas have visited Simons Hill and Simons Pass Stations themselves³⁹.

47 Ms Steven makes the assertion in her evidence that:

“Almost all areas proposed for application are relatively unmodified and retain an appearance and an ecology that is not dissimilar to that existing prior to European occupation”.⁴⁰

48 As was set out very clearly in the evidence of Dr Mike Steven, Mr Espie and Mr Fastier, this is far from the situation that exists on the outwash basin. Rather than the species of tussock that may have existed prior to European settlement,⁴¹ the area was described in Dr Mike Steven’s evidence as a *“barren, arid wasteland”*.⁴² The domination by the weed Hieracium, in conjunction with the infestation of rabbits, has ensured that there is little of the pre-settlement appearance and ecology that Ms Steven speaks of. In addition in her evidence she specifically states that she has not inspected the area since 2006 and does agree that the area *“appears very barren”*.⁴³

49 Ms Steven expresses concerns that the terminal moraine *“necklace”* is a *“distinctive”* and *“vivid”* element of the plains.⁴⁴ As the evidence of Mr Peter Glasson and Mr Kyle make clear, this moraine area in the middle of the application area will be excluded from irrigation.⁴⁵

³⁸ Elizabeth Steven, pg 26, para 111.

³⁹ Mr Peter Glasson and Mr Denis Fastier are available to confirm.

⁴⁰ Elizabeth Steven, pg 27, para 115.

⁴¹ Described in the evidence of Dr Walker, pg 9, para 24.

⁴² Dr Steven, pg 18, para 71.

⁴³ Elizabeth Steven, pg 26, para 115.

⁴⁴ Elizabeth Steven, pg 30, para 128.

⁴⁵ John Kyle, pg 10, para 3.24

- 50 The areas proposed for irrigation east of the Mary Range, and immediately west of the Mary Range south of State Highway 8, are already subject to irrigation and intensive farming practices.⁴⁶
- 51 As Dr Mike Steven points out in his evidence in chief the outwash gravel plains currently display a higher degree of naturalness than the more intensively farmed areas of both properties. However, this naturalness is characterised by a “*high degree of land degradation*”.⁴⁷
- 52 As can be seen from Figure 1 of Dr Steven’s evidence, the most visual areas of irrigation will be the areas east of the Mary Range that are already subject to irrigation and intensive farming.⁴⁸
- 53 Dr Steven does acknowledge that there will be a minor shift in naturalness with the commencement of irrigation on the Pukaki Flats,⁴⁹ however, he makes it clear that with regards to this area the altered state of naturalness can be viewed as an improvement given the current degraded state of the plains:

*“I consider this is an example of circumstances in which human intervention can bring about a more sustainable outcome in terms of natural resource management. The continued colonisation of the outwash gravels by wilding pines, Hieracium and other exotic weeds, rabbit infestation and ongoing loss of soil through wind erosion, is clearly unsustainable.”*⁵⁰

- 54 The applicants have proposed a number of steps by which perceived adverse effects will be mitigated. Buffers have been proposed so that no irrigation will take place in the vicinity of State Highway 8 and, perhaps with the exception of views from a much higher vantage point, very little of the development will be visible. The moraine area and hard rock outcrops will not be included in the irrigation area.⁵¹
- 55 In Mr Chris Glasson’s addendum section 42A report he recommends that both properties are appropriate for irrigation. He specifically states (pg 7–21):

“Where Ms Steven’s assessment, I believe, goes astray is her consideration of this site to be an ONL landscape. It is a degraded floor

⁴⁶ Mike Steven, pg 4, para 11.

⁴⁷ Mike Steven, pg 5, para 12.

⁴⁸ Mike Steven, pg 9, para 20.

⁴⁹ Mike Steven, pg 11, para 34.

⁵⁰ Mike Steven, pg 11, para 34.

⁵¹ Mike Steven pg 12, para 37.

*of the Basin therefore reducing its natural character to a less than high rating”.*⁵²

- 56 He goes on to reiterate that, the mitigation proposed by the applicants, and designed so that the landscape values of the sites will not be lost, is appropriate.⁵³
- 57 Through case law (the series of Wakatipu cases in particular) the Courts have set out the criteria for assessing landscape under the RMA. These criteria include:⁵⁴
- (a) The natural science factors - the geological, topographical, ecological and dynamic components of the landscape;
 - (b) Its aesthetic values including memorability and naturalness;
 - (c) Its expressiveness (legibility), how obviously the landscape demonstrates the formative processes leading to it;
 - (d) Transient values (occasional presence of wildlife; or its values at certain times of the day or of the year);
 - (e) Whether the values are shared and recognised;
 - (f) Its value to tangata whenua;
 - (g) Its historical associations.
- 58 The evidence of Mr Steven, Mr Espie and the farm owners Mr Valentine and Mr Fastier, it is clear that assessment of the irrigation areas according to these criteria shows a landscape that is already degraded and that will in fact benefit from the application of irrigation. We note that the Canterbury Regional Policy Statement acknowledges the degree of degradation that is present in some areas of the Mackenzie Basin and states:

*“Finding successful long-term solutions to land degradation will require that the social and economic factors which affect the way land is managed now and in the future, are addressed along with the natural resource problems. Such factors include the short-term and long-term economic viability of properties, institutional arrangements, the mix of land types within properties, and alternative sustainable land uses”.*⁵⁵

⁵² Chris Glasson, addendum report, pg 7, para 20.

⁵³ Ibid, pg 7, para 21.

⁵⁴ *Wakatipu Environmental Society v Queenstown Lakes District Council* [2003] 289 (EnvC).

⁵⁵ Canterbury Regional Policy statement, pg 74.

The position with submitters

- 59 I outlined in Opening the position that had been reached with the principal submitters on these applications. These applicants have endeavoured wherever possible to refine these applications and to deal with them in a way which accommodates submitters' and ECan's concerns. Mr Peter Glasson outlined the consultative process that had been undertaken by the applicants in his evidence.⁵⁶ He outlined the numerous alterations made to the applications following consultation with ECan, the Mackenzie District Council, New Zealand Transport Agency, Meridian, Royal Forest & Bird, Fish & Game Council, LINZ, Department of Conservation and Te Rūnanga o Ngāi Tahu.⁵⁷
- 60 As at Opening, the discussions had resulted in the submission from the New Zealand Transport Agency being withdrawn. It is noted that the Department of Conservation's submissions, while opposing all applications in the Upper Waitaki, do not directly raise concerns of a site specific nature concerning Simons Hill/Simons Pass.
- 61 There have been two further significant developments since Opening submissions were presented in November last year. These are:

Ngāi Tahu

- 62 Discussions with Te Rūnanga o Ngāi Tahu have continued. An updating memorandum from Mr Horgan representing Te Rūnanga o Ngāi Tahu has been filed. In summary, Ngāi Tahu's position now is that it maintains formal opposition to the applications on the basis of the uncertainty surrounding the grant of applications they identify, particularly having heard the evidence of Meridian Energy. However, despite that general opposition, Ngāi Tahu support a grant, if there is to be one, on the basis of the Adaptive Management Proposal put forward by the applicants, and the Mahinga Kai Enhancement Project developed with them.
- 63 I said in Opening that a Mahinga Kai Enhancement Proposal was under discussion with Ngāi Tahu and undertook to come back concerning this when discussions were complete. These discussions have only been concluded within the last few days. The Proposal effectively is to construct a series of small ponds adjacent to the Tekapo River and carry out riparian planting in consultation with specialist ecological advice. The project would specifically be designed to enhance Mahinga Kai gathering opportunities for Rūnanga, particularly around

⁵⁶ Peter Glasson, pgs 6-15, paras 30-84.

⁵⁷ Ibid, pgs 6-15, paras 30-84.

eel. Dr Ryder gave evidence on the proposal and said that the wetlands in the area contained habitat that was suitable for ecological management and enhancement.⁵⁸

64 As part of the arrangements with Ngāi Tahu, Rūnanga will be granted exclusive access to the Mahinga Kai gathering area. These applications are therefore put forward on the basis that the Mahinga Kai project is part of what is proposed by the applicants.

65 The applicants do not formally put forward this project as part of what is sometimes termed “*cultural compensation*”.⁵⁹ The applicants’ case is that there are no cultural values being compromised by the grant of consent such that a “*mitigation*” is required. Rather, the impetus for the project comes from the cultural impact assessment conducted by Tipa & Associates. The assessment identified the rehabilitation of land and waters as a priority for Ngāi Tahu in the Tekapo/Pukaki River area and Maryburn Stream Catchments. Ngāi Tahu sought to identify ways that Mahinga Kai gathering opportunities could be enhanced through irrigation. The applicants see the project as part of the more general enhancement of land and waters that is made possible by the grant of consent.⁶⁰

Fish & Game

66 Fish & Game support the grant of consent.⁶¹ Fish & Game view the surrender of consents to take water from the Maryburn Scheme as significant. Mr Mark Webb said:

“Fish & Game support surrendering of consents to take water from the Maryburn as a means of restoring flows to a level that more closely reflect natural conditions. It is accepted that the plan provides for reallocation of surrendered water, although obviously we would prefer not to see the water reallocated. I believe the benefit of returning up to 210 litres per second to the Maryburn over the Summer would be to see a return to pre-1990 spawning use – a three-fold increase on current levels.”⁶²

67 In fact, the total surrendered consents (both Maryburn Irrigation Scheme and Simons Hill Station Limited’s individual consent) is 333 litres per second.

⁵⁸ Dr Ryder’s evidence, para 16, point 14.

⁵⁹ Paul Horgan, pg 7, para 17.

⁶⁰ The cultural impact assessment, pg 39.

⁶¹ Mark Webb’s evidence, pgs 15 and 16, para 81.

⁶² Ibid, pgs 5 and 6, para 81.

- 68 Fish & Game support the Mahinga Kai Enhancement Proposal for approximately 109 hectares on Simons Hill Station near the Tekapo River.⁶³

Groundwater

- 69 In Opening I indicated that the MWRL case proceeded on the basis that irrigation water from the irrigation of Pukaki Flat would not enter the Tekapo River in the reach above the Tekapo River node.⁶⁴
- 70 In the latter part of 2009 and prior to the presentation of the applicants' case, the applicants had carried out significant additional onsite monitoring in order to verify the MWRL groundwater position. A series of onsite piezometers and river gauging was carried out. I indicated in Opening that there was significantly more data on the groundwater situation for Simons Hill and Simons Pass available than for any other property in the Basin. Ian McIndoe's conclusion at that time from the material compiled was that the quantity of surface water entering the Lower Tekapo, whether at the Tekapo node or the Tekapo/Benmore node was less than minor.⁶⁵ Two witnesses have subsequently addressed this issue, Mr Heller and Mr Callander. Mr Heller reviewed the MWRL groundwater evidence in his section 45A specialist report. He said:

"I consider that within groundwater sub-catchments, all groundwater is likely to discharge to surface waters before entering Lake Benmore, with only the lower Ahuriri and lower Tekapo areas having localised groundwater discharges to the lake."⁶⁶

- 71 In questioning before the Panel, particularly Commissioner Bowden, Mr Heller indicated that he did not agree with Mr Callander's assessment that there may be a significant contribution of groundwater to the Lower Tekapo River.⁶⁷
- 72 Mr Callander gave evidence that:

"The MWRL groundwater assessment provides a useful conceptual understanding of the overall hydrology of the Upper Waitaki Catchment, but it is not sufficiently robust to provide a reliable verification of the distribution of nutrient concentrations in groundwater throughout the Catchment and the pattern of emergence in surface waterways, other

⁶³ Mark Webb's evidence, para 82.

⁶⁴ Opening Submissions, pg 8, para 38(d).

⁶⁵ Ian McIndoe, pg 27, para 147.

⁶⁶ Tom Heller, pg 11, para 45.

⁶⁷ Questioning from the Panel, 26 January 2010.

*than a broad brush average assessment of nutrients entering the lower reaches of rivers and Lake Benmore.*⁶⁸

*“From the point of view of Meridian’s areas of interest in the Catchment, the increased irrigation areas in the lower reaches of the Tekapo and Pukaki River basins and the Ohau and Wairepo Creek areas are the areas where there is potential for greater effects than those estimated by MWRL.”*⁶⁹

- 73 It should be noted that at the time that Mr Callander presented his evidence he had not had the opportunity of reviewing the additional groundwater investigations undertaken by Aqualinc nor the evidence of Mr McIndoe. Opportunity for this was subsequently given and Meridian indicated that Mr Callander did not wish to comment. In any event, given Mr Callander’s view of the uncertainty of the groundwater evidence, the applicants have undertaken a detailed further programme of groundwater investigation. These investigations are principally aimed at providing a firm basis to estimate the likely level of groundwater contribution to the Lower Tekapo River. As a consequence of this work, investigations as to the speed of groundwater movement through Pukaki Flats have been undertaken and this work has been utilised to develop the applicants’ Adaptive Management Proposal.
- 74 The type of fieldwork undertaken and the investigation completed is the sort of groundwater verification process that is contemplated and proposed by MWRL as part of its lock-step Adaptive Management Proposal. As such, these applicants do not propose any further groundwater investigations as part of its Adaptive Management regime.
- 75 The main conclusions from the work are:
- “- *The aquifer beneath the Pukaki Flats is high yielding.*
 - *The aquifer beneath the Pukaki Flats are probably semi-confined.*
 - *The Tekapo River predominantly loses flow to groundwater between the Maryburn Stream confluence and Lake Benmore.*
 - *A small quantity of groundwater (less than 5% of flow-through) from the Pukaki Flats may discharge into the Tekapo River from the Pukaki River near the Pukaki River confluence.*

⁶⁸ Mr Callander’s evidence, para 79.

⁶⁹ Mr Callander (individual applications), pgs 21 and 22, paras 78 and 79.

- *The maximum travel time for contaminants to travel through Pukaki Flats is between 45 and 150 days depending on the distance assumed.*

With respect to the key concern related to groundwater flow paths, the field measurements have shown that it is extremely unlikely that more than very minor quantities of groundwater could enter the Tekapo River and that the majority of groundwater is entering Lake Benmore or beyond Lake Benmore.”⁷⁰

- 76 And finally, with respect to the key concern related to groundwater flow paths, the field measurements have shown that it is extremely unlikely that more than very minor quantities of groundwater could enter the Tekapo River and that the majority of groundwater is entering Lake Benmore or beyond Lake Benmore.⁷¹
- 77 The Commissioners have been understandably concerned about the implications of receiving new material late in the piece in the context of this hearing. Mr McIndoe’s reply evidence, however, does not raise new issues. It is material in reply to important issues of certainty raised by submitters. Mr Callander’s point was that (in his view) there was an insufficiently certain basis to reach the important conclusions necessary as part of these applications. The applicants have sought to address his concerns.
- 78 The only submitters who have put forward expert evidence on this issue is Meridian, and only Mr Callander and Mr Heller have given evidence concerning it.
- 79 In my submission the applicants have proceeded in a responsible and careful manner having regard to the importance to the issues under consideration in order to provide the Panel with maximum certainty as to crucial issues.

Adaptive Management

- 80 The MWRL Adaptive Management Proposal involves a programme of carrying out environmental baseline studies, groundwater investigations and a staging approach to irrigation development.
- 81 Simons Hill and Simons Pass put forward an alternative site specific Adaptive Management Proposal for Pukaki Flats which has the following components:
- (a) Baseline ecological assessment as proposed by Dr Coffey.⁷²

⁷⁰ Ian McIndoe, reply, paras 124 and 125.

⁷¹ Ian McIndoe, reply, *****

⁷² Dr Coffey, reply evidence, para 2.17.

- (b) The staging of the irrigation development on Pukaki Flats so that a small amount of additional nutrient load is added each year for seven years. The full proposed discharge for Pukaki Flats would not be reached until Year 7. In the first year irrigation development is carried out at the northern end of Simons Pass and 1608 hectares of new centre pivot irrigators are constructed and irrigated pasture planted. No stock is grazed.
- (c) Between Years 2 and 8 irrigation development continues in stages and farm management options with greater nutrient and phosphorus losses are introduced.
- (d) For the purposes of the staging model the Proposal involves the introduction of an intensive sheep and beef finishing (or similar) option and dairying off in stages. By Year 8 when the full NDA is reached, the applicants would be a dairy on a wintering off basis over the whole irrigated area. Alternatively, the NDA would allow flexibility to carry of a mixed sheep and beef operation in accordance with the farm use proposals put forward by the applications.
- (e) Monitoring at each stage is proposed such that the applicants will not be permitted to proceed to the next stage unless thresholds are met relevant to the previous year.

82 For the irrigated area east of the Mary Range the MWRL staging proposal is put forward.

83 The applicants proposal has been designed so that:

- (a) All but the discharge associated with the Year 1 (1608 hectares of irrigation without stock) is adaptively managed over a seven year period.
- (b) The speed of groundwater travel is such that elevated levels of nitrogen or phosphorus entering the receiving environment will be able to be picked up, for example in deep groundwater.

84 **Appendix "1"** is a conceptual representation of what is proposed.

Section 42A reports

Darren McNae re OVERSEER

85 Mr McNae's addendum report states:

“A majority of the issues identified have been satisfactorily revised or responded to by the applicants and it is noted in the above tables where applicants have provided responses that are still not deemed to be in line with “best practice use” of OVERSEER.”⁷³

86 In respect of these applications Mr McNae initially had a number of concerns for which explanations were provided to Mr McNae and he has identified (on Appendix 1 Summary Table pgs 15 and 17) that there are no outstanding issues in relation to the OVERSEER modelling for these properties. A detailed summary of the Simons Hill and Simons Pass explanations can be found in the attachments to Mr McNae’s addendum report (immediately after the Summary Table at page 29). He concludes the report by saying:”

“Overall there is a strong level of confidence that the completed modelling provides a reasonable representation of future nutrient loading.”⁷⁴

87 It is further noted that neither applicant is included in the list where further doubt remained with regards to the OVERSEER modelling.

Mike Freeman

88 The most recent addendum report of Dr Freeman has classified the water takes for both properties as “amber”.⁷⁵ Dr Freeman’s description of the amber category states that it includes:

*“Those that, on the basis of the currently available information, had significant uncertainties about potential adverse effects on cumulative water quality and depending on additional consideration relating to issues other than cumulative water quality effects **could be granted**, provided that either more information is obtained to reduce the uncertainties and/or subject to strict comprehensive monitoring and response conditions that would enable a rapid and effective control response that would adequately prevent the occurrence of significant adverse effects.”⁷⁶*

89 Dr Freeman has suggested a further audit be carried out of the Pukaki Flats groundwater work from ECan hydrogeological and water quality experts. A further audit is supported by the applicants.

⁷³ Mr McNae, addendum report, pg 8, para 14.

⁷⁴ Mr McNae, addendum report, pg 8, para 18.

⁷⁵ Mike Freeman, s42A report addendum, 11 January 2010 pg 16, para 47.

⁷⁶ Ibid, pg 16 para 47.

Reporting Officer – Maria Bartlett

90 Ms Bartlett's property specific section 42A reports for Simons Hill Station Limited and Simons Pass Station Limited recommend decline of all of the applications.⁷⁷

91 Although the applicants have offered on many occasions, Ms Bartlett has never visited the site.⁷⁸ This is extremely surprising given the importance of the issues for the applicant, and the purported evaluation of the site specific evidence Ms Bartlett has carried out on landscape and terrestrial ecology. Ms Bartlett's analysis is, at best, a "desk top" audit.

92 A number of technical issues are raised. The substantive issues appear to be a combination of ecology and landscape.

93 In relation to ecosystems Ms Bartlett places the evidence of Dr Espie alongside the evidence of Dr Walker and says:

"The arguments presented [by Dr Espie] contrast with those found in the evidence presented by Dr Walker, on behalf of the Mackenzie Guardians. These two pieces of evidence outline prevalent opposing viewpoints regarding the future of plains, habitats and landscape in the Mackenzie Basin. It is clear that there is likely to be some loss of habitat of threatened indigenous species as a result of the proposed development, despite proposed preservation of particularly sensitive sites. Dr Espie argues that much of the loss is eminent regardless of the development and his argument is countered by Ms Walker who asserts that certain values will be despite the Hieracium encroachment, and could be enhanced."⁷⁹

94 What is clear from these comments is that Ms Bartlett relies entirely on the evidence of Dr Walker.

95 Dr Walker has not carried out a site specific ecological survey in relation to the property and has not relied upon one for her evidence. Conclusions rely on outdated material (particularly the Natural Area Survey and the conservation resources report by DoC).⁸⁰ No account is taken of the significant reduction in irrigation command area, described by Mr Peter Glasson following consultation with DoC. Those areas identified by the Department as containing ecologically sensitive areas have been excluded from irrigation.

⁷⁷ S42A report, Maria Bartlett, paras 206-208 (Simons Hill) and paras 236-238 (Simons Pass).

⁷⁸ Mr Glasson and Mr Fester are available to confirm.

⁷⁹ S42A report, pg 42, para 189.

⁸⁰ Dr Espie, reply, pg 21, para 1.11.

96 I have already commented on the suggestion that the ecology of the Flats could be enhanced without irrigation, in my submission that is a completely unrealistic suggestion.

97 Ms Bartlett also says:

*"I accept that the tussocks are degraded and the Flats on Simons Hill appear barren, it is not clear to me, from the conflicting evidence presented, that the Flats are devoid of value for threatened, including endemic, indigenous species. Further investigation, as suggested by Ms Walker, would be useful."*⁸¹

98 These statements demonstrate, it is submitted, that in attempting to evaluate the evidence Ms Bartlett sets the threshold far too high. The applicants do not need to show with the certainty Ms Bartlett requiring that *"the Flats are devoid of value"*.⁸²

99 Of the three options proposed by the applicants the only outstanding issues (aside from general water quality) are in relation to effect on the ecosystem. Ms Bartlett refers to additional landscape concerns with the proposed take from Lake Pukaki and Pukaki Canal option. The basis for the concerns regarding landscape of the two alternative options is not outlined in the section 42A report and Mr Steven gave specific evidence in relation to the landscape effects of the canals and found them to be acceptable.⁸³ There has been no evidence to the contrary, and the issue was not of sufficient concern for it to feature in Mr Chris Glasson's analysis.

100 Ms Bartlett relies in part on landscape effects for her recommendation to decline. Ms Bartlett appears to prefer the evidence of Ms Steven to that of the Council appointed independent expert Mr Chris Glasson.⁸⁴ It is not clear how Ms Bartlett carries out this analysis. She has no landscape qualifications at all and as previously noted has not visited the site. In those circumstances the apparent preference for Ms Lucas' evidence is inexplicable. Equally inexplicable is the failure to reference or discuss any of the evidence put forward by the applicants on landscape issues. Dr Steven's detailed evidence is completely omitted from consideration in Ms Bartlett's evaluation.

⁸¹ S42A report, addendum Maria Bartlett, pg 42, para 190.

⁸² Ibid, pg 42, para 190.

⁸³ Mike Steven, general evidence, paras 89-91.

⁸⁴ S42A report, addendum Maria Bartlett, pgs 43 and 50, paras 193 and 223.

101 Overall, in coming to her recommendations, Ms Bartlett completely excludes from consideration any of the counter-veiling benefits of the applicants' proposals that have been placed in evidence. There is no consideration given to:

- (a) The positive effects on land management.
- (b) The positive effects on soil erosion (which are dramatic).
- (c) The positive social effects.

102 As such, Ms Bartlett's written material does not attempt to guide you as to how you should exercise your judgment under Part 2 of the Act in order to achieve sustainable management. Her recommendations for this reason alone should, in my submission, be put to one side.

Technical issues

Mackenzie District Plan – Rule 15.1.1(g)

103 When Ms Bartlett presented her substantive section 42A report, she made verbal reference to a telephone conversation that she had with a Mackenzie District Council planning officer. She said that the officer had advised her that the proposals for Simons Hill and Simons Pass may breach Rule 15.1.1(g) in the Mackenzie District Plan relating to the clearance of fescue tussock cover. She was critical of the applicants for not having made application to the Mackenzie District Council for consent to cover this issue. Even though this issue has never formally been raised with the applicants and it does not appear anywhere in the written material provided to the Commissioners by Ms Bartlett, Dr Espie has carried out an assessment under Rule 15.1.1(g) and determined that there is no breach of the Rule.

Water Allocation Plan policies 12 and 13

104 Ms Bartlett claims in relation to CRC062842 (the proposed take from Lake Pukaki) that there is a non-compliance with policy 12 and 13 of the WAP. These are the policies that deal with the allocation of water to activity.

105 Ms Bartlett's argument appears to be that a granting of a take greater than the allocated volume (8,000,000m³) consumes not only part of the allocation to hydro-electric generation but also all of the allocation to "*other activities*".⁸⁵

⁸⁵ S42A report, addendum Maria Bartlett, para 201.

106 It is submitted that it is not helpful to attempt to pick apart Table 5 as Ms Bartlett does. Hydro-electric generation receives the “*residual*” allocation according to the table. Any allocation above the maximum limit comes off the residual rather than any of the other numbers as a matter of hydrology. In any event, the volumetric limitation upstream of Lake Pukaki is a limit that is a part of the overall 275 limit upstream of the Waitaki Dam. This limit represents the total allocation to agricultural and horticultural activities within the Catchment. The sub-limits represented by a, b and c (8,000,000m³ upstream of Tekapo and Pukaki and 12,000,000m³ upstream of Ohau) are really internal limitations within the 275. It is submitted that there can be no effect on other activities until the total volumetric limitation is exceeded and that will not happen in this case.

Notification and effluent issues

107 In an oral exchange with the Panel Ms Bartlett appeared to suggest the applicants are effectively seeking consent for an activity which goes beyond the parameters of the original applications. Ms Bartlett expressed the view that if the word “*dairy*” had appeared in the applications and/or public notices, a larger number of submitters in opposition would have materialised.

108 With respect, Ms Bartlett proceeds down this misconceived path from an incorrect starting point. She advised the Panel that the public notices referred only to sheep and beef grazing. In fact, the applications were summarised as being “*for irrigation of up to 2400 hectares of pasture and crops for grazing stock, and for domestic and stock water purposes ...*”

109 Dairy cows are clearly “*stock*” and, accordingly, the grazing of dairy cows is within the ambit of the applications. Any party reviewing the public notice would reasonably have anticipated that dairying was a possible land use outcome. Numerous submissions were received and many of them raised concerns about the intensification of land use generally and consequent effects on water quality. There is nothing in the submissions to suggest submitters were under a misapprehension about the scope of the applications or that they were in any way limited to only sheep or beef grazing. In addition, the applications attracted around the same level of opposition as those described by Ms Bartlett as obvious dairy proposals (e.g. Five Rivers, Southdown and Killermont).

110 From the time the applications were first filed the applicants have deliberately not specified or limited themselves to any particular type of land use. They have been consistent in their quest for flexibility given the fickle nature of the primary produce market. Instead they have defined their development envelope by reference to a maximum N and P discharge amount. In this way they retain the

ability to respond efficiently to market pressures while still attaining the same, acceptable, environmental outcome.

Discharge of dairy effluent

- 111 Ms Bartlett, in oral comment, has expressed the view that resource consents should be obtained for either onsite or offsite disposal of effluent. Ms Bartlett has gone so far as to suggest that the present applications should be declined in the absence of such additional applications. This is a most extraordinary position to take at this late stage in the hearing after the applicants have spent millions of dollars pursuing their consents over several years and after time has well passed for further information requests under section 92 or a determination as to deferral under section 91.
- 112 In any event, it is considered that applications relating to the discharge of dairy effluent are not required.
- 113 Firstly, in the event dairy effluent is disposed of by way of tanker, Simons Pass/Simons Hill will not be discharging it and will not, therefore, require resource consent. The purchaser of such effluent will need to ensure they hold any necessary authorisations in the event it is discharged.
- 114 I understand Ms Bartlett has raised an issue as to vehicle movements if dairy effluent is sold and trucked off site. She suggests 24 vehicle movements per day and describes this as “*very significant*” and that consent under the District Plan would be required.
- 115 Mr Tacoma’s evidence is that effluent trucking would generate one tanker visit every two days per separate dairy unit. The Mackenzie District Plan provides for an average of 40 vehicle trips per day as a permitted activity (Rule 15.1.1(f)). Accordingly, the likely vehicle movements are not even close to triggering the need for resource consent under the District Plan and clearly fall within the permitted baseline of effects.
- 116 The Panel has expressed some concern with the reality of trucking effluent offsite. It has described such a scenario as “*fanciful*”. I note, however, that in the course of his most recent presentation Mr McNae clarified for the Panel that he did not consider such a possibility to be fanciful, but rather economically inefficient. Inefficiency arises because the farming operation would then have to buy fertiliser to replace the nutrients lost through offsite effluent disposal. Mr McNae quite properly conceded it was not his role to determine or comment on the financial viability of the proposals. He further observed that removing the

effluent by truck and applying a product such as urea, could equate to a better environmental outcome because the applicants would have absolute certainty as to the quantity of P and N being applied to the land.

117 The term *fanciful* has its genesis in case law concerning the permitted baseline. In those cases it has variously been described as meaning:

- (a) *“By fanciful we mean ... unrealistic or not based on reality.”*⁸⁶
- (b) *“Activities that are theoretically possible but lacking in reality – ie fanciful activities.”*⁸⁷
- (c) *“The term fanciful itself does not appear to have been defined in case law. Dictionary definitions include:*
 - *Existing only in the imagination or fancy;*
 - *Over-imaginative and unrealistic, existing only in the imagination;*
 - *Not based on fact.*

*When regard is had to the dictionary definitions and the Court of Appeal’s comments in Smith Chilcott, we consider that a reasonable interpretation of the word fanciful is unrealistic or not based on reality.”*⁸⁸

118 On the evidence before you from Mr Tacoma and Mr McNae, it is not at all problematic for the applicants to deal with the effluent without the need for additional consents. It is clear that effluent has a value and is an essential component of productive, intensive farming. I note that while Mr McNae questions the commercial sense behind implementing such a system, it is well established law that as decision-makers you should not concern yourselves with the financial viability of a proposal⁸⁹.

119 With respect to onsite storage of effluent, the NRRP provides for a certain quantity per property as a permitted activity.⁹⁰ In the event that development of the Pukaki Flats approaches this storage threshold, the frequency of effluent removal is such that the total volume is never exceeded and/or the property could be subdivided into separate dairy farm units. It is submitted that, on the

⁸⁶ *Luggate Holdings Ltd v Queenstown Lakes DC*, W081/09.

⁸⁷ *Kircher v Marlborough DC*, C090/09.

⁸⁸ *Te Whakaruru Ltd v Thames Coromandel DC*, W086/08.

⁸⁹ *NZ Rail Ltd v Marlborough DC* [2004] NZRMA 70 (HC).

⁹⁰ NRRP, Rule WQL29.

evidence, the latter is a highly likely scenario in which case, each unit will store much less than what is allowed to be stored on site as a permitted activity.

- 120 Finally, it is submitted that even if effluent were not removed from the site it is appropriate to address the need for any discharge applications at a later time. Unlike the situation this Panel has previously considered in respect of Southdown Holdings Limited, Five Rivers Limited and Killermont Station Limited, applications have not been made by Simons Hill and Simons Pass for the discharge of effluent and, accordingly, section 103 of the Act has not been triggered.
- 121 In addition, the Council does not have outstanding further information requests and has not exercised its discretion under section 91 to defer hearing of the applications. The applicants are most of the way through a process that has been arduous and expensive only to be faced with Ms Bartlett's oral submission that the applications ought to be declined in the absence of discharge applications. In my submission this is not a ground for declining the applications. It also raises issues of equivalence and fairness given that the ordinary accepted approach of Council is to deal with effluent discharge applications after take and use consents have been granted. Mr Whata provided you with evidence on this point⁹¹ and the reality of this practice was acknowledged by you in the 8th Minute of Commissioners.⁹²
- 122 The Panel might take the view that it finds itself in a somewhat similar situation to that in February when the Minister called in the effluent applications of Southdown, Five Rivers and Killermont. Albeit the wash-down water generated by a shed is a tiny fraction of the volume of the effluent generated by the previously proposed "housed dairy" option. Having previously determined that section 103 required a joint hearing for the effluent discharge consents and the take and use consents, the Panel was confronted with a situation whereby that joint hearing could not occur.
- 123 Dr Freeman's memorandum of 3 February expressed the view:

"It is important to appreciate that even though the three dairy effluent discharge permit applications have been separated out, the nutrient components of both proposed discharges are included in the overall cumulative water quality effects assessment."⁹³

⁹¹ Supplementary legal submissions in relation to Section 103 issue on behalf of Southdown Holdings Ltd, Five Rivers Ltd and Killermont Station Ltd (24 October 2009) at paragraph 24.

⁹² Paragraph 32.

⁹³ Memorandum from Environment Canterbury reporting officer Michael Conrad Freeman, 3 February 2010, para 8.

- 124 Dr Freeman's memorandum and conclusions apply equally to Simons Pass and Simons Hill. Albeit that the scale of the dairy-related discharge is a fraction of the effluent that was proposed to be generated by the housed dairy option originally pursued by Mr Whata's clients. In short, you have before you all of the information you require to make an assessment of actual and potential effects. In addition I concur with Ms Dysart's view that you are required under the Act to continue and advance matters on the information you have.
- 125 Regardless of whether effluent is disposed of on-site, the applicants will need to apply N and P to their land. This has been accounted for in the Overseer modelling undertaken for the properties and is included in the overall NDA proposed for Simons Hill and Simons Pass. Having effluent disposal applications before you would not offer any further elucidation in terms of effects or advance your understanding of the nature of the proposal. Accordingly, I submit you must proceed to determine the applications and, more importantly, you can grant them on the information and evidence provided.

Conclusion

- 126 The applicants have sought to provide a high level of certainty as to the critical issues associated with their applications. For groundwater and terrestrial ecology you are, in my submission, in an excellent position to judge the likelihood of potential adverse effects occurring and the scale of these potential effects.
- 127 As to landscape, in my submission there are really no remaining issues of significance. The independent counsel appointed reviewer has determined that the grant of these applications is appropriate from a landscape perspective. This position was reached with the ECan reviewer following extensive discussions and modifications of the proposal.
- 128 Much of the evidence in opposition, whether ecological or landscape, is based on a misapprehension of the values associated with Pukaki Flats. On this count, Dr Espie's evidence, it is submitted, is compelling. The Flats are in an advanced and continuing state of degradation. Windborne erosion of the Flats is extreme. Irrigation provides an appropriate and sustainable solution to these issues.
- 129 In terms of potential cumulative effect of the water quality, the applicants have adopted a very conservative approach to the thresholds relevant to them. The groundwater threshold is policy based and extremely conservative. The NDAs for Pukaki Flat are set on the basis of the groundwater thresholds. The applicants' farming proposals are proposed systems which will have discharges well inside the proposed NDAs (70% for nitrogen and 20% for phosphorus).

- 130 The applicants' Adaptive Management proposal is specifically designed, is conservative, and will appropriately allocate any residual risk associated with the granted applications to the applicants.
- 131 These applicants have been waiting many years for a consideration of these applications. In my submission, the evidence overwhelmingly favours the grant.

DATED at Christchurch this 28th day of April 2010.

K G Reid

Counsel for the following Applicants:

Simons Hill Station Limited, Simons Pass Station Limited
and Pukaki Irrigation Company Limited

APPENDIX "2"

Analysis of Adaptive Management Case Law Simons Hill/Simons Pass

Overview

- 1 Adaptive management has been described by the Court as:

“...An experimental approach to management, or “structured learning by doing”. It is based on developing dynamic models that attempt to make predictions or hypotheses about impacts of alternative management policies. Management learning then proceeds by systematic testing of these models, rather than by random trial and error. Adaptive management is most useful when large complex ecological systems are being managed and management decisions cannot wait for final research results.”

(see for example, *Golden Bay Marine Farmers and Others v Tasman District Council* (W19/2003), at para 405; *Oruawharo Marae Trust v Auckland Regional Council* (A083/2006) etc)
- 2 Adaptive management may be appropriate when there is a risk of future significant effects which can not be predicted or expected, and where there is uncertainty in, or an absence of information. (*Golden Bay*)
- 3 Total risk avoidance is not required; a practical balance is to be achieved between being cautious and providing for utilisation of the resource. The test is to determine what level of risk is considered reasonable (*Golden Bay; Oruawharo Marae*).
- 4 Not all effects need to be measured and monitored; but only reasonable/scientifically significant effects (*Biomarine Ltd v Auckland Regional Council*.(A14/2007))
- 5 An holistic approach to adaptive management is required (*Biomarine*).
- 6 An adaptive management may leader to better informed decisions in the future. (*Clifford Bay Marine Farms Ltd v Marlborough District Council* (C131/2003); *Rotokawa Joint Venture Ltd v Waikato Regional Council* (A41/2007))
- 7 Benchmarks of adaptive management include:
 - (a) Disclosure of information to Council/regulatory bodies including disclosure of monitoring results, both favourable and unfavourable, so that stpes can be taken before significant adverse effects eventuate (*Golden Bay*);
 - (b) A co-regulatory approach – between industry/the applicant and Council/the regulatory body(*Golden Bay*);
- 8 From the cases considered and adaptive management regime should/may include (at least) the following:
 - (a) A baseline line study/survey;
 - (b) Staging of development and flexibility of staging;
 - (c) Extensive and ongoing environmental monitoring programmes, incorporating recording and reporting systems;

- (d) Management plans, which may or may not form conditions of consent, depending on the level of flexibility in management required;
- (e) Flexibility – an opportunity for the consent holder to adapt methods of monitoring, management, and/or apply for a change in consent conditions;
- (f) Review conditions – which enable the limiting, down scaling or halting of development;
- (g) The ability to detect and remedy any adverse effects before they become irreversible;

9 It may also include:

- (a) An experimental component (in monitoring and management);
- (b) Modelling;
- (c) Bonds;
- (d) Environmental audits;
- (e) A shorter term of consent;

Case Law

10 In this section we will discuss the relevant case law. We will begin with a discussion of three older cases which are useful in terms of providing an overview as to the meaning and principles of adaptive management. We will then discuss more recent cases where an adaptive management regime has been adopted and endorsed by the Court.

***Golden Bay Marine Farmers and Others v Tasman District Council* (W19/2003)**

- 11 In Environment Court Decision *Golden Bay Marine Farmers and Others v Tasman District Council* (W19/2003), being a Second Interim Report and Findings to the Minister of Conservation, the Tasman District Council, and the Referrers on an Inquiry into the Aquaculture References to the Tasman District Council's Proposed Resource Management Plan, the Environment Court was required to consider an adaptive management regime proposed by one of the Referrers (the Mussel Industry Group or "MIG", being an association of parties including the Golden Bay Marine Farmers).
- 12 Stage II of the Environment Court's inquiry (being the subject of this decision) involved a consideration of the Proposed Tasman Resource Management Plan ("PTRMP") and the requirement that it provide efficient procedures to allow the Council to manage resource consent applications for activities associated with the use, development and protection of the natural and physical resources of the Coastal Marine Area ("CMA") in Golden and Tasman Bays.
- 13 The Mussel Industry Group ("MIG"), was formed as a response to the First Interim Report to further refine the industry group's case on planning issues. Its position was, according to the Court's summary, a further drive for efficiency and integrated management of aquaculture, seeking provision in the Proposed Plan for "whole block" resource consent applications for mussel farming instead of many small applications.

- 14 MIG's case promoted an adaptive management regime which involved the use of adaptive management techniques that addressed the risk of future significant adverse effects from whole block aquaculture which could not be predicted or expected, and which are applied because of uncertainty and absence of information at the time the plan is prepared and resource consents are sought.
- 15 In summary, the MIG proposal embodied the elements of adaptive management through management plans, monitoring, reviews, financial contributions, environmental audits, environmental standards and community participation. More particularly, the adaptive management regime it advocated for stressed a need for:
- baseline surveys;
 - staging and flexibility of staging;
 - a need for extensive monitoring and guidelines;
 - monitoring to be integrated with process bases;
 - monitoring over time which would allow trigger levels to be set and the management regime refined accordingly;
 - a series of checks and balances that would protect against significant adverse effects;
 - removal of marine farm structures should indicators show significant adverse effects;
 - identification of appropriate sites for the long term;
 - ecological controls incorporated into the draft rules based on other scientific work carried out;
 - acknowledgement that locations for monitoring are based on predictive modelling and within blocks there will need to be some modification;
 - benthic surveys within and along transects extending outside the blocks, along with a time series of water column monitoring at five sites area each block;
 - a good overall management plan covering all the AMA and a management plan for each block with details of staging, a description of reporting and review requirements, along with resource consent conditions;
 - reasons for considering density as another possible mechanism of staging because it would increase the flexibility to provide necessary feedback information about risk reduction;
 - each stage to be dependent on reviewed information so some flexibility has to be built in for it to be workable;
 - a look at development of the whole AMA rather than trying to isolate the 250 hectare blocks entirely;
 - continuity of monitoring, which will be more easily achieved with whole block management; and

- feedback of monitoring information so that risk may be reduced in succeeding stages. (Refer paragraph 406).
- 16 The opposition to the adaptive management techniques proposed came chiefly from Challenger (another Referrer), Forest and Bird and at a lesser level the Tasman District Council (“TDC”).
- 17 TDC expressed concerns with the process because it allegedly:
- (a) avoided the need to assess any actual and potential adverse effects to the environment for the whole area sought to be occupied over the life of a resource consent at the time the resource consent is applied for - referred to by Counsel for the Council as the “*end state situation*”; and
 - (b) because it meant the TDC would lose regulatory control over the AMAs if environmental process standards as suggested by MIG were incorporated into the Proposed Plan.
- 18 Forest and Bird identified that from its point of view, that the basic concept of adaptive management is “to learn about natural populations and sustainable harvesting through experience with management itself, rather than through basic research or the development of general ecological theory”. According to Forest and Bird the concept of adaptive management was developed to accommodate human exploitation of natural resources rather than to conserve or protect them against unanticipated effects. They argued it was a refinement of the traditional “*learning as you go*” approach, arguing that it is open to scientific uncertainty more explicitly but it is not an insurance against potential impacts of large scale marine farming.
- 19 Another referrer, Challenger Scallop Enhancement Company Ltd (“Challenger”), was also very critical of the adaptive management regime proposed by MIG, seeing it as a method to maximise opportunities as soon as possible for full scale marine farming. Challenger made several specific points, namely:
- marine farming development will continue in a manner which is unassailable until the science establishes that development or uptake cannot continue. This is not adaptive management; there are no sensors or sensitivity mechanisms in the MIG proposal; this does not represent precautionary adaptation to circumstances and consequently the likelihood of uncertainty is high;
 - a truly adaptive management technique is one which responds to *decreasing* uncertainty and the adaptation is linked to the results of monitoring which Drs Gillespie and Grange both have advocated; monitoring over time will allow the trigger levels to be set and the management regime to be adapted and refined accordingly;
 - the method of co-operation advocated generally is the requirement that everyone co-operate with the MIG parties to allow development to continue under the umbrella of an initial full block consent until there is a “red light”: this is not an adaptive management technique and it was rejected by the scientists;
 - it was in fact Challenger which introduced into the inquiry a specific example of adaptive management – and that management regime is now at the cutting edge of international fisheries management with investment in science necessarily significant in order that science may permit the development; Challenger implies its method in that case should be following in this. (Refer paragraph 404 of the decision).

- 20 The Court did not accept these arguments.
- 21 In evaluating them it defined the term “adaptive management” at paragraph 405 as:

“*Adaptive Management*: An experimental approach to management, or “structured learning by doing”. It is based on developing dynamic models that attempt to make predictions or hypotheses about impacts of alternative management policies. Management learning then proceeds by systematic testing of these models, rather than by random trial and error. Adaptive management is most useful when large complex ecological systems are being managed and management decisions cannot wait for final research results.”

- 22 It noted that a **benchmark** of adaptive management is the **need for disclosure in a transparent way**, - in this case that being the disclosure of any discoveries about the ecosystem or changing information so that the Tasman District Council (“TDC”/“the Council”) could ensure that steps were taken before significant adverse effects eventuated. (refer paragraph 407)

- 23 It noted that another **benchmark** of adaptive management is the **co-regulatory approach** between the industry and the Council (refer paragraph 408). Submissions of a party to the proceedings were cited by the Court with approval as follows:

“Traditionally, the developer has wished to control what happens with the utilisation of physical resources (managing the structures), and the regulatory authority has focused on managing the natural resources (water quality and the ecosystem in the coastal marine area). **However, adaptive management requires a co-regulatory approach, where the self-regulatory management procedures involving physical resources and their sustainability are integrated with the regulatory responses for managing the natural resources and their sustainability.**”

- 24 The Court noted that in this case, the TDC would be involved as co-regulator at every stage in the process as the management plans, condition review provisions, monitoring programmes and staged development, (which together comprised the adaptive management regime) would all be controlled by enforceable resource consent conditions.

- 25 The Court also noted the **importance of management plans**. At paragraph 411:

“In our view, management plans have a central place in large developments like this. The impact and the scrutiny they receive not only by a consent authority but by the Environment Court on appeal should not be underestimated. They may be included as conditions of consent, or to provide more flexibility as anticipated here, providing information about the way in which the consent holder intends to comply with the more specific controls or parameters laid down by conditions of consent: see *New Zealand Rail Ltd v Marlborough District Council* (1993) 2 NZRMA 449.”

- 26 The Court commented that, while all management practices are, in effect, experiments, **it is vital to incorporate an experimental component into monitoring and management, in order to determine causality of effects** (i.e. to determine why), noting that sometimes shifts in emphasis are required and a regime which focuses on one particular method of mussel farming (for example) may not permit an adequate adaptive management regime. (Refer paragraph 422).

- 27 The Court considered the **precautionary principle and risk avoidance**, citing with approval the following passage from one witness’ evidence:

“... **the statutory obligation to act in a precautionary manner does not require total risk avoidance**. In practice it is not possible to eliminate all risk with respect to fisheries management. **A practical balance is to be achieved between being cautious and providing for the purpose of the Act that includes where possible providing for utilisation. The test is to determine what level of risk is considered reasonable.** The best available information must support an assessment that the stock/fishery is likely to be able to sustain an increase to the TAC/TACC. The extent of the increase proposed by a

stakeholder may as a result be reduced following consideration of all the factors outlined above."

(refer paragraph 425)

28 After considering all the arguments, the Court noted that in relation to the concept of adaptive management, neither Challenger nor Forest & Bird provided sufficient evidence to allege that what was proposed by the MIG was not a legitimate form of adaptive management. It noted that the MIG proposals embodied the elements of adaptive management through management plans, monitoring, reviews, financial contributions, environmental audits, environmental standards and community participation, concluding that it was an appropriate technique for the management of marine farming. [Refer paragraph 429]

Kuku Mara (Forsyth Bay) v The Marlborough District Council (W25/2002)

29 This case was cited with approval in the *Golden Bay Marine Farmers* case (above), being another of the earlier cases where the Court was required to consider adaptive management in the scheme of the Act. It is now briefly discussed.

30 The *Kuku Mara (Forsyth Bay)* case concerned a section 120 resource consent appeal against the Council's decision to decline a resource consent for a Mid Bay Marine Farm of 42.25 hectares in the Marlborough Sounds.

31 In response to the call by submitters for a strong application of the precautionary approach to development, extensive environmental, technological, performance and process conditions had been developed by the Applicant Kuku Mara, underpinning its adaptive management techniques to meet unidentified risks in the coastal marine area. Kuku Mara explained that this was a response to the difficulties in predicting whether environmental controls would be effective in practice.

32 The Court summarised Kuku Mara's concept of "adaptive management" as encompassing (refer paragraph 21):

- a comprehensive management plan;
- baseline assessments;
- staged development (three stages);
- a comprehensive environmental monitoring regime was to be established which incorporated recording and reporting systems;
- opportunities would be created for the Council to review the conditions of consent to ensure that effects were appropriately avoided, remedied or mitigated and that monitoring was appropriate;
- opportunity would be provided for the consent holder to apply for a change in conditions;
- a 10 year term of consent;
- if adverse effects were found to be major through monitoring, those effects were not irreversible; and
- if adverse effects were found and the proposal was scaled back, it was anticipated the environment would recover.

- 33 In the *Kuku Mara* case the Court made clear that it considered that Kuku Mara had put before it the best scientific evidence available, and that the adaptive management techniques proposed were sufficient to address the (unknown) issues of water column and Benthic sustainability.
- 34 Although the adaptive management regime proposed by the applicant was considered sound and robust by the Court, the applications for consent were in fact declined (for non-ecological reasons).

***Clifford Bay Marine Farms Limited v Marlborough District Council* (C131/2003)**

- 35 Another earlier decision where an adaptive management regime is relatively comprehensively discussed is the Environment Court decision (Judge Jackson) of *Clifford Bay Marine Farms Limited v Marlborough District Council* (C131/2003).
- 36 In this case the Court was required to determine what would be the effects on Hector's dolphins of establishing a large marine farm in Clifford Bay on the eastern coast of Marlborough. The whole area of Cloudy Bay and Clifford Bay, the subject area of the resource consents, were shown on the planning maps of the Proposed Wairau-Awatere Resource Management Plan ("PWARM") as an area of significant conservation value. An appendix of that plan described the area as of national importance for Hector's dolphin.
- 37 There were two basic substantive issues to be resolved at the hearing:
- (a) The Director-General of Conservation argued that there would be potentially significant impacts from the establishment on the farm on Hector's dolphin, an indigenous species with a declining population and endangered status;
 - (b) The Marlborough Environment Centre supported that proposition, and also argued that there would be adverse impacts on the amenity of residents of the area and the users of the shore from the operation of the mussel farm.
- 38 On the issue of the Hector's dolphin, it was the Director-General's case that while definite effects of a marine farm on Hector's dolphin had not been established, there were potential effects which, if they were to materialise, would be of very high impact. It was argued that the probability of such effects could not be described as low, and although they were uncertain, the evidence showed the existence of a realistic risk which should be taken seriously and that the application should therefore be declined.
- 39 In contrast, the applicant submitted that there was no evidence to the effect that the proposed farm, especially in its initial form, would be capable of causing Hector's dolphin mortalities directly, and that there was no scientifically defensible evidence about potential indirect effects on Hector's dolphin. The applicant contended that the cases of those opposing the farm were based on an "absence of research" and that there was therefore insufficient evidence to support the precautionary approach to the extent of declining the application as advocated by them. The applicant further submitted that if any effects did arise from the proposed marine farm, the extensive monitoring proposed in the conditions of the consent, together with the review provisions, enabled these effects to be remedied by an adaptive management response. (Refer paragraph 12 of the decision). The adaptive regime proposed by the Applicant included a baseline study, staging, monitoring and review.
- 40 In considering the proposal the Court noted (at paragraph 118) that the staged development and monitoring proposed by the applicant as conditions of consent indicated that it acknowledged at least the possibility that effects may follow from

the development which require avoidance, remedying or mitigation. The Court said that the case must therefore turn on whether the conditions proposed, in particular the monitoring regime and adaptive management strategy, can first **detect** and secondly, **remedy** any adverse effects that might arise before they became irreversible.

- 41 It noted that the two options open to it were to decline consent, or to grant it in such a way that if any adverse effects on the use Hector's dolphin make of the habitat arise, they would be limited, and measures to reverse them could be speedily implemented. It said that the probability of undetected adverse effects of significance occurring unrelated to, and unaccompanied by, other existing adverse effects were of sufficiently low probability that they should not lead it to decline the application altogether. In the end, in deciding to grant the consent, the Court noted that it placed heavily reliance on condition 11- the review condition, to limit the expansion, and cut back the extent of development should the research required by the consent suggest that that was necessary. (Refer paragraph 157).

Biomarine Limited v Auckland Regional Council (A14/2007).

- 42 A relatively recent case where complex but uncertain scientific issues were involved in the grant of consent is *Biomarine Limited v Auckland Regional Council* (A14/2007). This case involved an appeal by the Applicant (Biomarine Ltd) against the Regional Council's decision to decline consent for an application to construct and operate an oyster farm in the Kaipara Harbour and to recommend to the Minister the occupation of the coastal marine area for up to 140 hectares for that purpose. (Minister approval was required because the activity would occupy the coastal marine area).
- 43 A number of issues arose out of the application, including relevantly (for present purposes) the impact of the proposal on the indigenous seagrass *Zostera*, on which the proposal could potentially have an adverse effect. One of the key issues for the Court, therefore, was determining what the adverse effect on *Zostera* was and how it was to be measured.
- 44 The possible effects of an oyster farm on *Zostera* were identified as including enrichment of sediments by organic matter, physical damage during construction and by farm management operations, smothering by material deposition, shading by structures, and the combination of these factors.
- 45 The applicant accepted that the adverse effects on *Zostera* and benthic communities within the marine farm should be avoided. The expert evidence for the applicant was that with comprehensive conditions (as proposed by the applicant) and staged development, the potential effects, (if any), could be identified at an early stage and avoided.
- 46 The monitoring conditions proposed were, according to the applicant, intended to detect a reasonable level of adverse effects, although not every effect, as any activity could produce effects. It considered that it was necessary to identify the level of effect to be monitored, with monitoring to be undertaken to detect whether there was disruption to the functioning of the marine system at that level. The applicant considered given the (then) current level of knowledge of *Zostera* and changes to its habitat, a 2 – 5% change in *Zostera* cover could be considered a 'reasonable' effect, and the monitoring programme should be alert to and able to detect this level of change. Further, that the *Zostera* habitat and any flow-on effects for the species relying on *Zostera* should be the focus of any monitoring. (Refer paragraphs 41-43 of the decision).
- 47 In considering the application and its effects the Court noted (at paragraph 127) that it recognised that an adaptive management approach, coupled with **careful**

monitoring and review, may, in due course, confirm that there was no impact of the farm on *Zostera*. Indeed, all the witnesses agreed that extensive monitoring, staged development, adaptive management and reviews were an appropriate approach to ascertain whether an oyster farm could be developed over *Zostera*, although the monitoring would need to be appropriately robust.

- 48 The Court noted that on the other hand however, the provisions of section 6(a) and 6(c) RMA use the strong words of “preservation” and “protection” and the various statutory documents (the New Zealand Coastal Policy Statement, the Regional Policy Statement and other relevant Plans) all suggest a cautious approach where the outcomes are not known. Nonetheless, in considering these from an integrated perspective, the Court’s conclusion was that the approach of the applicant (i.e. adaptive management) was sound, (although in the circumstances of the case, considered it appropriate to limit the scale of the application for which consent was to be granted, - i.e. three out of four blocks of oyster farm development were to be allowed).
- 49 The Court considered that consent could properly be granted because any risk could properly be managed by an adaptive management regime, coupled with **monitoring, review and staging of development**, (at paragraph 175). If each stage of development was monitored, and such monitoring showed no scientifically significant adverse effect, then the next stage could be developed. Two years monitoring after each stage was considered appropriate in the circumstances, showing no scientifically significant adverse effect before the next stage could be commenced.
- 50 The Court also considered that in the circumstances a cautious approach would suggest a **shorter term of consent** than the 30 years applied for, although it recognised that there was a need for economic return on the investments and therefore concluded that a consent of 20 years would more than adequately balance the interests of the applicant and wider environmental issues in the case. (Refer paragraphs 176 and 177).
- 51 In conclusion (at paragraph 179) the Court noted that overall its **approach under Part 2 is holistic**, stating that it did not see the consent term as being separated from the balance of consent. The Court said it was the complete package: – a lesser area; a 20 year term; appropriate conditions of consent; addressing adaptive management; staged development and review – that satisfied it overall that the objectives of the Act were met. The Court made clear that if any of those aspects were to be changed, its decision may very well be different.

Rotokawa Joint Venture Limited, Mighty River Power Limited & Others v Waikato Regional Council (A 41/2007).

- 52 Another relatively recent decision where an adaptive management approach has been accepted is the Environment Court decision of *Rotokawa Joint Venture Limited, Mighty River Power Limited & Others v Waikato Regional Council* (A41/2007). That decision concerned the wording of conditions of a resource consent granted to Contact Energy Limited in relation to the re consenting of the Wairakei Power Station which generates electricity using the Wairakei/Tauhara Geothermal System.
- 53 By way of background, the consent hearing followed an earlier hearing of comparable length (over 50 days sitting time) and complexity to determine the geothermal section of the Regional Policy Statement, and the geothermal provisions of the Proposed Regional Plan. The outcome of that hearing was a focus in the Geothermal Chapter of the Regional Plan on integrated and adaptive management. (Refer Decision A47/2006). The subsequent consent applications (the subject of decision A41/2007) were to be determined in that context. (For a

discussion of the relevant Plan provisions, see paragraphs 121-136 of decision A41/2007).

- 54 The resource consents sought by Contact were required to enable the full utilisation of both the Wairakei Power Station and the Poihipi Power Station. The consents had been granted in the first instance by the Council's Hearing Committee, and were subject to detailed and comprehensive conditions, which encompassed an "adaptive management" approach due to the considerable technical uncertainty as to the extent of future effects, particularly subsidence (the primary issue in the Environment Court) and the need for management of the resource.
- 55 According to the Environment Court (refer paragraph 50), the conditions imposed by the Hearing Committee were drafted in a way that contemplated monitoring and information gathering, so that informed decisions could be made. The conditions enabled flexibility to appropriately respond to a range of trends and effects.
- 56 Matters covered by the conditions included **modelling** (which required the maintenance and ongoing refinement of reservoir and subsidence models); **monitoring** (which required ongoing monitoring in relation to the consents); and a substantial **bond** of \$5 million (to be provided by Contact to the Regional Council within one year of consent commencement for the purposes of securing compliance against various conditions). (Refer paragraphs 52 - 66 of the decision where the Environment Court summarises the relevant essential ingredients of the Commissioners' decision).
- 57 At the Environment Court hearing there were two main appellants, Contact - the applicant, and the Taupo District Council ("the Council").
- 58 The main focus of the Council's concerns was the avoidance of any risk of subsidence from the Taupo urban area. (Subsidence is the sinking of the earth at the surface relative to a specified point). To achieve this, it sought the full reinjection (as opposed to discharge to rivers etc) of all the geothermal water (whether extracted as a fluid or steam) within the geothermal system. In general terms, the Council wished to see a much more stringent approach to the control of subsidence than was reflected in the Commissioners' decision.
- 59 Contact's position was that the full reinjection was not necessary when regard was had to the predicted subsidence and likelihood of damage arising from any subsidence, also arguing that full reinjection had the potential to adversely effect production.
- 60 In considering the issue of subsidence, there was general agreement among the expert witnesses as to the physics of subsidence. There was no lack of understanding or disagreement on that, and it was accepted that the basic mechanism that causes subsidence is compaction of the porous rock in response to a decline of fluid pressure caused by fluid extraction. However, it was the application of the theory of particular geothermal systems that gave room for divergence of opinion. As noted by the Court, each system is unique and at Wairakei/Tauhara there was a limited knowledge of the properties of geological formations, especially the spatial variability and distribution of those properties. Inferences and extrapolations needed to be made from the limited characterisation data available, and this is where the experts diverged.
- 61 The Court was presented with two different models both outlined to predict future subsidence. The models had been described by one witness as a simple rather empirical model on the one hand, which could be contrasted with a more fundamentally sound but far too complicated and ambitious model on the other.

His view was that neither model was capable of predicting the future subsidence because there were too many unknowns in the equation.

62 In considering the models, the Court said (at paragraph 236) that because of the nature of the limitations and uncertainties identified, and the strong disagreements between the experts, particularly as they related to modelling predictions, it was unable to make a firm finding as to which subsidence model provided more credible results. Further (at paragraph 238) that any model is only as good as its data, and in that case, geo-mechanical data, especially in the Tauhara area, was poor.

63 The end result was that there were considerable uncertainties built into the expert predictions on future subsidence, and although the Court had little difficulty in finding that subsidence was likely to occur as a result of future extraction, to what extent under different scenarios was uncertain. (Refer paragraph 242). As such, there was an onus on it (i.e. the Court) to ensure that the conditions of consent included adequate measures to address the issue.

64 The Court went on emphasis later (at paragraph 451) that the many uncertainties identified from the evidence highlighted the importance of monitoring, noting that its interim decision on policy and plan matters (A47/2006) had emphasised **the key role that monitoring must play in an integrated and adaptive management regime.**

65 Related to the issue of subsidence was that of reinjection. Various witnesses discussed the benefits and its advantages of reinjection, and emphasised the need for adaptive management for a successful reinjection strategy. One witness, Professor Home's evidence was cited by the Court in its decision (at paragraph 131) where he said:

"Reservoir management requires the **adjustment** of the reinjection strategy and reaction to observations and interpretations of the reservoir response to exploitation. This has been common practice in many of the world's geothermal developments."

66 Another witness, Dr Pruess, told the Court that the manner in which recharge would be affected by reinjection would depend on conditions specific to a particular reservoir, and upon reinjection design and management (placement and rates of reinjection wells). For reinjection to be successful, he said, reinjection schemes must be designed with proper attention to thermal, hydraulic, chemical, and geo-mechanical issues – reinjection operations must be monitored, and operators must be willing and able to **modify and adapt** their reinjection procedures in response to changing reservoir conditions. His conclusion was cited by the Court at paragraph 132 of the decision:

"International experience suggests that in order for injection to be successful, geothermal operators need to approach injection design and management **with a willingness to be flexible.**"

67 After considering that and other evidence, the Court concluded at paragraph 139 that it was satisfied on the evidence:

"... that the potential adverse effects of reinjection are manageable provided an adaptive management reinjection strategy is carried out. We recognise the uniqueness of each geothermal system, and the highly variable characteristics that field operators could be confronted with. However, we are satisfied, that provided field operators employ an **ongoing strategy of monitoring** their production and reinjection performance, **and adjust their utilisation approach and response to field observations, then the potential risks can be avoided.**"

68 In other words, the Court recognised that where a "one size fits all approach" may not be appropriate, particularly where there is some scientific uncertainty, then adaptive management may be an appropriate alternative. That is, where a

resource, such as a geothermal system, has unique characteristics, the response, be it through avoiding or remedying or mitigating effects, will vary depending on those characteristics. Where a variety of effects are possible, because the resource is highly individualistic, then it there needs to be flexibly in how it is managed.

- 69 In summarising its findings (at paragraph 507) the Court noted that the findings it had made on the substantive issues reflected its **balancing of the conflicting considerations** arising from its factual determinations and application of the relevant statutory directives. The problem of subsidence needed, said the Court, to be seen in the context of its findings. It noted that while there had been subsidence to date, that subsidence appeared to be generally decreasing in rate, save for a question mark over one particular area, and even then the rate of subsidence was such that an ill-informed reaction was not warranted. Rather, what was needed, said the Court, **was some positive and proactive research and monitoring, so that better informed decisions can be made.** [NB - Note that similar comments were made by the Court in the *Clifford Bay* decision, where the Court acknowledged that the dearth of information on Hector's dolphins and the effect of marine farms could to some extent be improved through monitoring etc as part of adaptive management.]

***Oruawharo Marae Trust v Auckland Regional Council* (A083/2006)**

- 70 *Oruawharo Marae Trust v Auckland Regional Council*, is another Environment Court decision where an adaptive management regime was proposed, although in this case by an Appellant (not the Applicant) as part of the consent. The case concerned replacement resource consents for increased sand extraction in the Kaipara Harbour. Consent had been granted by the Auckland Regional Council, and appeals subsequently lodged in the Environment Court by a number of parties.
- 71 The Oruawharo Marae opposed the applications on a number of grounds, primarily cultural (therefore no further discussion is required).
- 72 Forest & Bird also opposed the applications to some extent, although for different reasons. Its case did not involve complete opposition to the granting of the consents, but rather it sought a scientifically credible monitoring regime to ensure protection of the important conservation values within and adjacent to the extraction sites and within Kaipara Harbour. It sought the imposition, through conditions, of a monitoring regime that would collect reliable baseline data. According to the Court's summary at paragraph 12 of its decision, Forest & Bird sought to set a "high bar employing the precautionary principle: based on reliable and credible information, such that the important values of coastal ecosystems were properly provided for." Emphasis was placed on monitoring and protection of migratory and endemic birds, and ensuring that there would be no adverse effects on the rare Maui's dolphin; also that the "entire ecosystem including the benthic environment" was not adversely affected.
- 73 Forest & Bird, through expert witnesses, challenged the case for the applicants that extraction of sand at the rates proposed was sustainable, and this underscored its request for a robust monitoring regime. Forest & Bird also challenged the assertions of the applicants about demand for sand in the Auckland Region and beyond. In consequence it advocated an "adaptive management regime" to be included in the robust monitoring programme it was seeking, involving the undertaking of baseline studies, particularly in relation to Maui's dolphin, as a pre-condition of increases in extraction rates. Forest & Bird put forward draft amendments to certain aspects of the proposed conditions of consent.

74 The activities for which consent was sought were in the coastal marine area and as such, the relevant statutory documents (such as the New Zealand Coastal Policy Statement, the Regional Policy Statement etc) set out a wide range of matters for consideration before any activity within the coastal marine area could be improved, including:

- (1) Alternatives to the proposal must be considered;
- (2) A precautionary approach was to be adopted, recognising that effects from the physical coastal system are uncertain, and in the case of sand, accurate sediment budgets are difficult to determine;
- (3) The natural character of the coastal environment must be protected, including its physical processes, the integrity of resilience and functioning of its ecosystems, significant habitats of indigenous fauna and areas of importance to migratory species; and
- (4) The relationship of Maori to their ancestral lands, water sites, waahi tapu and other taonga are to be protected.

75 The applicants acknowledged, and it was also the Court's finding (refer paragraph 43), that general understanding of the geomorphological and ecological patterns of the Kaipara Harbour, was far from complete. For that reason, conditions were proposed embracing adaptive management. Hence, said the Court, if monitoring and review demonstrated that the sand extraction activity was causing undue adverse effects, staged increases may not come about, and there may even be a case for reduction in extraction.

76 After having considered the arguments from the parties the Court said at paragraph 91:

"The Court is mindful of its obligation to act in a precautionary manner having regard to the provisions of the relevant statutory instruments. Indeed, we have formed the view that that is an entirely appropriate approach in the circumstances. **The precautionary principle, however, does not require total risk avoidance. In this regard we respectfully adopt the statement of approach by another division of the Court different constituted:**

.... The statutory obligation to act in a precautionary manner does not require does not require total risk avoidance. In practice it is not possible to eliminate all risk with respect to fisheries management. A practical balance is to be achieved between being cautious and providing for the purposes of the Act ...

(*Golden Bay Marine Farmers and Others v Tasman District Council* W19/2003 paragraph 425).

We find that, from a sand sustainability perspective, the applicants have paid appropriate regard to the precautionary principle in framing their proposals and conditions of consent. And that, given the level of understanding of the harbour's natural processes, **the principle can be best secured on an ongoing basis through a mix of monitoring and review conditions within the context of an adaptive management regime.** The latter term has been defined as follows:

Adaptive Management: An experimental approach to management, or "structured learning by doing". It is based on developing dynamic models that attempt to make predictions or hypotheses about impacts of alternative management policies. Management learning then proceeds by systematic testing of these models, rather than by random trial and error. Adaptive management is most useful when large complex ecological systems are being managed and management decisions cannot await for final research results.

We adopt that definition for the purposes of the current case. Mr Fisher conceded that the (very largely) agreed conditions effectively set up an adaptive management regime, and that consistent with the concept **it would be lawful for a section 128 review acting on monitoring results to require that staged increases in extraction not occur, or that there be a decrease, and that this may happen on either a permanent or temporary basis provided however that the consent could not be entirely cancelled.** We also remind ourselves at this juncture that there can be no assumption that consent, if granted, would be "renewed" at the end of the proposed 20 year term. In light of these considerations, we find that it would be consistent with the purpose of the Act from a

sustainability perspective, for consent to be granted/recommended largely on the basis of the conditions proposed but subject to the following amendments: ...”

(Refer paragraphs 91 and 92 of the decision).