

Before the commissioners appointed by the Canterbury Regional Council

In the matter of The Resource Management Act 1991
and
In the matter of 60 water permit applications to take and use water, 29 land use consent applications and 21 discharge permit applications, for agricultural and horticultural activities

Section 42A Report

Date of hearing: September 2009 – February 2010

Second Addendum Report of Michael Conrad Freeman, with input from Maria Bartlett on non-water quality related proposed resource consent conditions for Lone Star Farms Limited.

Introduction

1. This report deals with a number of matters that have arisen during the course of the hearing that I have been asked to comment on by the hearing commissioners. These comments are in addition to the material contained in my original and first addendum section 42A reports.
2. This report has benefitted from caucusing discussions between Environment Canterbury (ECan) reporting officers and representatives acting for Mackenzie Water Research Limited (MWRL), the applicant groups and Meridian.
3. This report is composed of four sections, outlined as follows:
 - (a) Maximum nutrient loading in the Lake Benmore Ahuriri Arm catchment
 - (b) Response to modified farm environmental management plans (FEMPs) and Overseer modelling
 - (c) Recommendations for water quality trigger response condition framework
 - (d) Comments on specific proposed updated conditions

Maximum nutrient loading in the Lake Benmore Ahuriri Arm catchment

4. As outlined in my first addendum report, the sum of the individual property nitrogen loads sought in association with the water permit applications appears to significantly exceed the maximum load proposed in the GHD/MWRL report. Clarification was sought at the hearing about the basis for establishing priority and as a consequence I have updated the table presented in my first addendum report. The additional material together with a brief explanation is outlined below:

Consent application numbers added	The original table was prepared without referring to the actual consent numbers.
Receipt and notifiable dates added	Added to show the notifiable dates used by Peter Skelton to determine priority. Also the receipt date is included.
Corrections to minor errors in original table	As detailed verbally at the hearing.
Inclusion of applicant proposed property nitrogen loading	Provides a clearer basis of the potential nutrient loading sought rather than just the Overseer estimate. The original table only included the Overseer load estimate and not the applicant proposed limit.

Table 7 A summary of the estimated total property loads associated with proposed irrigation development proposals (Priority is that determined by Commissioner Skelton, and was determined on the basis of the date the application was deemed to be notifiable. Consent applications for locations outside of the Ahuriri Arm catchment have not been included.)

Applicant	Station name	Consent number(s)	Receipt date	Notifiable date (used to determine priority by Peter Skelton)	Priority (numbers added)	Replacement or new	Irrigation area (ha)	Nitrogen loading from Overseer modelling (kg N/yr)	Applicant proposed nitrogen loading threshold (kg N/yr)
Dunstan Peaks	Clifton Downs/Dunstan Peaks/Twin Burn	CRC011361	15 Jan 2001	19 Jul 2002	1	Replacement	344	15,032	28,109
Otamatapaio Station	Otamatapaio including Glenburn	CRC012047	7 May 2001	4 Mar 2003	2	Replacement	200	16,747	22,466
Anderson	Bog Roy	CRC012017 & CRC012019	28 Mar 2001	20 Jun 2003	3	Replacement	165	8,511	8,834
Anderson	Rostreiver	CRC012017	28 Mar 2001	20 Jun 2003	3	New (Replacement)	60	5,243	5,226
Otematata [#] Station	Otematata	CRC041033 & CRC012017	28 Mar 2001	20 Jun 2003	3	New (Replacement)	90	23,286	28,251
Killermont Station	Killermont (Ahuriri River)	CRC041331	28 Jul 2003	3 Dec 2003	4	New	216	4,902	4,902
Killermont Station	Killermont (Ahuriri River)	CRC041777	22 Dec 2003	22 Dec 2003	4	New	300	6,812	6,812
Killermont Station	Killermont (Frosty Gully)	CRC040180	27 Feb 2004	27 Feb 2004	4	Replacement	28	632	632
Southdown Holdings	SHL Killermont	CRC041788	27 Feb 2004	27 Feb 2004	5	New	1049	20,576	28,611
McAughtrie et al (Greenfield Rural)	Riverside (300 Sold to Quailburn Downs)	CRC991473	23 Dec 1998	29 Oct 2004	6	New (Replacement)	85	5,841	5,930
McAughtrie et al (Ellis-Lea Farms)	The Glens	CRC991473	23 Dec 1998	29 Oct 2004	6	Replacement	85	11,170	11,858
McAughtrie +	Willowburn	CRC991473 & CRC011940	28 Mar 2001	10 Nov 2004	7	New (replacement)	170	6,452	6,584

Applicant	Station name	Consent number(s)	Receipt date	Notifiable date (used to determine priority by Peter Skelton)	Priority (numbers added)	Replacement or new	Irrigation area (ha)	Nitrogen loading from Overseer modelling (kg N/yr)	Applicant proposed nitrogen loading threshold (kg N/yr)
McAughtrie et al						(CRC991473) replacement (CRC011940)			
Bellfield Land Co ^φ	Quailburn Downs (load apportioned)	CRC011987	29 Mar 2001	15 Nov 2004	8	Replacement	190	5,771	5,774
Killermont Station	Killermont	CRC041798	1 Mar 2004	3 Mar 2005	9	New	75	1,699	1,699
Southdown Holdings	Glen Eyrie	CRC040835	31 Oct 2003	21 Mar 2005	10	New	1096 [‡]	17,347	20,214
Otematata [#] Station	Otematata	CRC041033 & CRC012017	14 Nov 2003	21 Mar 2005	11	New	30	7,762	9,417
Horo [@]	Ribbonwood	CRC042020, CRC042011, CRC042015, CRC042017, & CRC042018	23 Mar 2004	24 Mar 2005	12	New	500	12,457	12,717
Twin Peaks	Twin Peaks	CRC063564	7 Apr 2006	7 Apr 2006	13	New	72	9,462	10,937
Bellfield Land Co ^φ	Quailburn Downs (load apportioned)	CRC071649	1 Dec 2006	1 Dec 2006	14	New	52	1,581	1,581
Applications total N load								181,283	220,554
Southdown Holdings [*]	SHL Killermont Alternate	CRC073115	23 Mar 2007	1 May 2007	15	New	1049	20,576	28,611

[#] Load split on basis of catchment and irrigation area only.

[‡] Area split from total of 2068 ha to take account of two catchments for Glen Eyrie irrigation area. 53% of revised overseer cubicle option (e.g., 0.53 x 32,721=17,347)

^{*} Note SHL Killermont total nitrogen load only included once.

[@] Splits on a simple irrigation area proportional basis.

^φ Splits on a simple irrigation area proportional basis.

Note: New(replacement) means that the application(s) is for replacing an expired consent for irrigation but that development has not occurred.

5. As noted in my first addendum section 42A report the maximum nitrogen load proposed by the GHD/MWRL report and in evidence, 154,185 kg N/yr, is somewhat less than the total of the individual proposed property loads, 220,554 kg N/yr. This is before loadings from other sources are included, e.g., properties not included in this hearing, various point nutrient sources, etc.
6. Legal issues relating to the priority of consent applications will be addressed in legal advice from ECan solicitor Marie Dysart.

Response to modified farm environmental management plans and Overseer modelling

7. A key issue that is common to all the current FEMPs is the lack of specific complementary updated proposed resource consent conditions. There are significant limitations in interpreting the effectiveness of the FEMPs in the absence of the complementary resource consent conditions. A common issue with the FEMPs is that while they include a comprehensive range of appropriate measures, it is not clear how many of these measures are proposed to be mandatory. The current proposed resource consent conditions do not include adequate provisions that would require all key measures to be mandatory. The measures included in the FEMPs are written as non-mandatory good practice measures. While the term “mandatory good agricultural practices” is frequently used in the FEMPs, mechanisms that would make all those practices mandatory are absent. Before any of these measures could be mandatory under a resource consent, appropriate conditions would need to be included in any resource consent granted.
8. The status of modified FEMPs and Overseer modelling is summarised in the following table.

Applicant group	Status of Overseer modelling and FEMPs	Comments
DuncanCotterill clients (Ewan Chapman)	Modified FEMPs and Overseer modelling provided.	No specific updated resource consent conditions provided to review. Reliance on non-mandatory codes of practice and guidelines. A comprehensive range of non-mandatory measures included.
Goodmantavendalereid clients (Kelvin Reid)	Comments provided in response to Darren McNae’s section 42A report on Overseer modelling. An outline of a staging proposal provided for proposed Pukaki Flats developments.	No specific updated resource consent conditions provided to review. Refer to Darren McNae’s report.
Russell McVeagh clients (Christian Whata)	Modified FEMPs and Overseer modelling provided. Agreement on many Overseer modelling issues.	No specific updated resource consent conditions provided to review. Reliance on non-mandatory codes of practice and guidelines. A comprehensive range of non-mandatory measures included.

9. An assessment of the modified Overseer modelling and feedback from applicants on earlier Overseer modelling has been undertaken by Darren McNae (see Darren McNae addendum section 42A report).
10. The modified FEMPs include frequent references to codes of practice and guidelines that are generally written without any explicit mandatory requirements. Therefore there is no guarantee that such non-mandatory codes of practice/guidelines will be implemented. Specific components of those documents should be 'extracted' and 'translated' into mandatory consent conditions.
11. There is also a need to have specific conditions relating to Overseer auditing processes and the related response mechanisms if auditing identifies a need for changes to specific input variables in order to comply with generally accepted best practice for Overseer modelling. Refer to the addendum section 42A report of Darren McNae for a technical outline of the reasons for the need for such conditions. I have not seen any proposed enforceable mandatory conditions that would require a consent holder to modify an Overseer input in response to an audit finding, and therefore potentially modify farm management to ensure NDA compliance. Darren McNae's report makes it clear that such provisions are essential.

Recommendations for water quality trigger response condition framework

Introduction

12. This outline has been prepared in response to the applicants' proposed conditions and has been developed to assist with establishing appropriate suites of conditions for those consent applications that the commissioners consider should be granted subject to appropriate conditions. My views on the applications that should or could be granted are outlined in my first addendum evidence. The only change to those classifications, as outlined verbally at the hearing, is that I consider that those applications for existing irrigation classed as red because of the degradation of local river water quality could be granted if a condition was included that provided for the exercise of the consent if the river water quality complied with the appropriate water quality standards (see paragraph 19).
13. A meeting was held between representatives of the applicants, Meridian and ECan reporting officers on 25 March 2010 to discuss conditions. It was agreed at that meeting that a suite of conditions would be provided to the reporting officers on Wednesday 7 April 2010 to enable comments to be added. However, I understand that it was not possible for the applicants to get updated conditions finalised in time. Therefore these comments have been prepared on the basis of the earlier proposed conditions and subsequent discussions between the parties.
14. A key focus of discussions has been to endeavour to identify an appropriate framework for water quality related conditions that recognises the uncertainties associated with a significant number of consent applications and provides a satisfactory level of assurance that if receiving water quality deteriorates, then feedback or trigger responses would apply to ensure water quality does not breach specific water quality standards.
15. I understand that some applicants are going to propose staging of proposed developments that would involve monitoring and a limitation on development until monitoring demonstrated that specified water quality was being maintained. That approach is not

inconsistent with a suite of trigger response conditions, but should not replace a robust suite of trigger/response conditions.

16. I do not recommend sole reliance on a 'stage and lock' approach. That approach would require long-term (i.e., decades) environmental and hydrological monitoring. The key reason for that view is because of the potentially significant time delays between nutrients leaving a paddock and their arrival in a surface water body. In addition, significant time periods are needed before confidence could be had that an appropriate range of hydrological and other background processes have been incorporated into the assessment of the potential adverse effects on water quality.
17. It is likely that additional environmental and hydrological monitoring incorporated into an agreed modelling system could be used to determine a robust mechanism to provide greater certainty for all parties about the potential adverse effects on water quality.

River receiving environments

Requirement for monitoring at upstream and downstream node monitoring sites.

18. In river catchments with multiple consents potentially being granted, e.g., Omarama Stream, additional node monitoring sites to those proposed by MWRL would be required to provide discrimination between possible cause and effect, unless all possible consent holders would be held jointly and severally responsible for trigger response conditions.
19. Additional node monitoring sites are needed for the Ahuriri River delta, Wairepo Arm/Kelland Pond and the Tekapo River delta – to assess the potential impacts of resurfacing groundwater on the quality of those delta/shallow lake environments. Exact locations would need to be established.

Early warning and environmental standard water quality triggers

20. Recommended early warning and environmental standard triggers are outlined below.

	Periphyton biomass (mg chl a /m ²)	DRP (mg/l)	DIN (mg/l)
Early warning trigger	90	0.006 [#]	0.14 [#]
Environmental standard trigger	120*	0.007*	0.18*

[#] Rounded up

* Based on MFE periphyton guidelines and ECan technical report

21. The above proposed environmental standards are based on the MfE guidelines and the ECan scientists' technical review of PNRRP WQ objectives and standards (Hayward, Meredith & Stevenson, 2009, Review of Proposed NRRP water quality objectives and standards for rivers and lakes in the Canterbury region). The proposed early warning triggers are based on 75% of the environmental standards rounded up where needed in the light of existing background water quality and the need to round calculated values.
22. There is apparently general agreement by the applicants' representatives on the concept of a trigger response system based on 75% and 100% triggers. However, the parties may differ significantly on the detail of what the actual triggers and responses should be.

Sampling periods

23. The sampling period and the definition of when a trigger response condition is activated should be a function of the timescales that are important, e.g., one DRP or DIN sample result that exceeds the trigger would not warrant a nutrient discharge allowance (NDA) reduction response. Conversely, a five week period with a continuous breach of the 'bottom line' environmental standard for DRP or DIN would indicate a significant potential for periphyton proliferation and other adverse effects.
24. It is also important to recognise the importance of periphyton biomass as a fundamental critical water quality indicator, while at the same time recognising that there could be circumstances where factors other than water quality can prevent, at least for a period of time, periphyton biomass from developing, e.g., frequent floods. Likewise it is also important to recognise that periphyton biomass may exceed the trigger conditions without accompanying water quality indicators consistently exceeding trigger conditions. This is because of the ability of periphyton to rapidly uptake nutrients from the water column.
25. Therefore a combination of chemical and biological trigger responses are essential and an exceedence of any of those triggers needs to initiate actions that will ensure an effective response that results in appropriate water quality standards being met.
26. It is recommended that the compliance definition should apply the triggers to the mean of any three consecutive weekly sampling, during the critical weekly sampling period.
27. Sampling should be undertaken weekly at all the monitoring sites (applicant proposed nodes plus the recommended additional sites) during the period 1 December until 30 April and monthly for the rest of the year. Each water quality sample should be taken in accordance with the appropriately specified methods. Each periphyton biomass sample should be taken in accordance with the methods specified in the NZ Periphyton Monitoring manual (MfE 2000, New Zealand Periphyton Guideline: Detecting, monitoring and managing enrichment of streams).

Response conditions

28. The appropriate response to breaches of triggers should consider the level of adverse effect a breach may cause.
29. In establishing a proposed response to the two triggers it is important to take account of the confidence limits of the Overseer modelling which are estimated (by AgResearch scientists) to be approximately 20% (see evidence of Matt Ryan), the relative proportion of the area of consented irrigation to the balance of a property and the need to have a response that would result in a substantial reduction in the nutrient load from the property.
30. For example, the properties in this group of applicants range from those where nearly 90% of the property is proposed to be irrigated, while there are others where the proportion is less than 5%. In the latter situations it is clear that a consent holder may have much more limited options to reduce a property NDA. One way to potentially address this latter issue would be to establish an acceptable base areal nutrient loading and in the event of a trigger exceedence the response reduction would require to any loading above that acceptable base load. No specific proposal has yet been provided by the applicants to address this matter.
31. It is also important to appreciate that there will be significant time-lags involved between a change to a nutrient management practice and the results of that change on receiving water quality. Depending on the specifics of the location of the property and the receiving water

these time lags could range from weeks to many years. In addition there will be some farm management systems that are not readily amenable to rapid controls. Therefore, it is not proposed that trigger responses should apply immediately. It is considered appropriate that an implementation period of a month would be appropriate if a non-compliance occurred early in the season. A relatively rapid response would be appropriate to a breach of an environmental standard trigger while a delayed response could apply to a breach of an early warning trigger. Similarly if a non-compliance occurred late in the season the response may not effectively or fully apply until the following season.

32. In properties distant from a surface water receiving water body there would need to be appropriate groundwater quality monitoring undertaken as part of a monitoring and trigger response programme.
33. The response requirement should be subject to a default provision as outlined in my first addendum evidence, i.e., a control would apply to a specific property unless a two person expert panel considered that the cause of a breach was highly likely to have been caused by an activity beyond the control of the consent holder. Therefore this emphasises the need for multiple water quality monitoring sites in catchments with multiple potential nutrient sources.
34. There needs to be an NDA control response for both triggers. A 10% and 50% NDA reduction are considered appropriate responses respectively, taking account of the risks and the actual or potential adverse effects. The logic for these proposed reductions are that a breach of the early warning trigger indicates that water quality is deteriorating and if no action is taken there would likely be a breach of the environmental standard. Similarly if the environmental standard is breached it is reasonably certain that there would be significant adverse effects. Therefore a significant reduction in nutrient loading would be required to restore water quality.
35. While this approach is relatively straightforward for properties that would have a large proportion of the land area in irrigation, as noted above there are potentially additional issues for large properties that would have a relatively small proportion of the property under irrigation. The concern that has been raised in caucusing by applicant representatives is that property owners with a large percentage of the property in irrigation would have more ability to control the total nutrient load from the property while large properties with relatively small irrigation areas would have less scope to reduce nutrient loads. As noted above this issue could in part be addressed by applying an acceptable base-load approach. In addition, this issue also needs to be considered in the context of appropriate upstream and downstream monitoring sites included into a sampling programme.
36. If the water quality monitoring evidence clearly implicates one property then there should be a clear responsibility on that property to reduce their nutrient load. If the consent holder considers that there has been an error in the original applicant modelling then they would have the option to apply for a change to the relevant conditions to address that matter. It is possible that some one-off event on the relevant property could have caused the water quality breach. However, this would highlight the need for property owners to ensure that all aspects of nutrient management were undertaken on the property in the context of the potential repercussions of a breach of a receiving water standard.

Requirement to submit new Overseer modelling in response to a trigger breach

37. Revised Overseer modelling would need to be submitted to demonstrate that appropriate action has been taken to reduce nitrogen loading in line with a reduced NDA.

Alleviation of response controls

38. There would also need to be a condition that allows a control restriction to be lifted once the receiving water triggers are not exceeded.

Lake receiving environments

39. Many of the issues outline above are common to lake water quality monitoring. However, a key difference is the need to include a provision that requires all relevant consents in the catchment to be subject to the trigger response conditions.
40. There are five basic lake monitoring locations:
- (i) Ahuriri Arm of Lake Benmore
 - (ii) Haldon Arm of Lake Benmore
 - (iii) Ahuriri River and Tekapo River deltas
 - (iv) Wairepo Arm/Kelland Pond
 - (v) Localised locations in Lake Tekapo and Lake Aviemore
41. The environmental trigger standard for Lake Benmore has generally been accepted as a requirement that the lake must remain oligotrophic. This requires the TLI to remain below 3. However, there are a significant number of related technical issues that would need to be resolved before that relatively simple concept could be implemented. The key issues relating to establishing TLI trigger response conditions for Lake Benmore and other lake situations are as follows:

Issue	Comment	Recommendation
Annual or Summer mean	Issue addressed in detail in the NIWA Lake Benmore modelling report	The most meaningful resource management timescale would be a defined summer period, December – April inclusive. An annual average would mask potentially significant summer effects.
Sampling protocols	Needs to follow generally accepted NZ practice – depth integrated	Generally accepted sampling methodologies. Depth integrated sampling.
Monitoring required to calculate TLI	Need to ensure clarity about including chlorophyll <i>a</i> , TP & TN but excluding Secchi disc depth	Generally accepted by applicant representatives but conditions would be needed to detail all monitoring requirements, detection limits

Issue	Comment	Recommendation
		laboratory accreditation, etc.
TLI environmental standard	Accepted as 3 - but need to define the related details	Maximum of 3.0 as the mean of monthly samples taken during December – April (inclusive) at any of the sites, sites as used in NIWA study
TLI early warning trigger	<p>Ahuriri Arm</p> <p>A 75% figure would not be appropriate because WQ already significantly exceeds 2.25. 2.75 proposed by applicant as an annual mean. NIWA data indicates summer TLI could currently be 2.9, and therefore some reduction appears needed to provide a buffer. Setting 2.9 as the trigger would not provide a sufficient safety buffer.</p> <p>Haldon Arm</p> <p>A 75% figure would not be appropriate because WQ already exceeds 2.25. 2.75 proposed by applicant as an annual mean. NIWA data indicates could currently be 2.4. Would be inappropriate to allow for a significant deterioration.</p>	<p>Ahuriri Arm 2.8 as a summer max</p> <p>Haldon Arm 2.5 as a summer max</p>
Ahuriri River and Tekapo River delta standards	These should be set at the same standards as for the parent lake	See directly above
Wairepo Arm	<p>Need to have triggers and ones that recognise the existing degraded water quality but set a limit of the eutrophic boundary.</p> <p>Existing summer mean TLI appears to be 3.7 based on TN and TP (GHD data).</p>	<p>Early warning trigger = 3.8</p> <p>Environmental standard trigger = 4.0</p>

Response conditions

42. Because of the generally significant time lags involved between nutrient loss on a property and receipt of those nutrients in Lake Benmore the breach of a trigger would most probably be the result of much earlier land management practices. This highlights the need to ensure that there is a timely response as feasible.
43. A critical issue would be the extent to which nutrient loading reductions would be applied throughout the catchment. It is proposed that any trigger breach would require an assessment of all the Overseer audit information to endeavour to determine whether the breach is a result of activities on a specific property or a more widespread issue. If that assessment determines that there is overall significant compliance with NDAs and that the breach was not likely caused by activities beyond the control of the property owners then a wider investigation would be recommended to the Canterbury Regional Council. If the assessment conclusion is that the most likely cause of a breach of an early warning trigger is as a result of nutrients from the consent holding properties then the conditions would need to provide for the following:
- A review of the Overseer audit results for all consent holders in the specific catchment.
 - An assessment of the extent to which there may be any additional sources of nutrients in the catchment over and above those included in the original MWRL assessment.
 - An across catchment property nutrient loading reduction of 10%.
44. If the assessment conclusion is that the most likely cause of the breach of the environmental standard is as a result of nutrients from the consent holding properties then the conditions would need to provide for the following:
- A review of the Overseer audit results for all consent holders in the specific catchment.
 - An assessment of the extent to which there may be any additional sources of nutrients in the catchment over and above those included in the original MWRL assessment.
 - A requirement for a comprehensive re-modelling of the nutrient balances for the catchment.
 - An across catchment property nutrient loading reductions of 50%.

Alleviation of response controls

45. There would also need to be a condition that allows a control restriction to be lifted once the receiving water triggers are not exceeded.

Requirement to submit new Overseer modelling in response to trigger control

46. Revised Overseer modelling would need to be submitted to demonstrate that appropriate action has been taken to reduce nitrogen loading in line with the reduced NDA.

Local lake water quality triggers

47. Local lake water quality triggers need to be established, particularly for the properties on the shores of Lake Tekapo. The applicants have suggested that a programme should be established but detailed proposed conditions have not yet been received.
48. Trigger response conditions should be established based on the wider water quality management goals for the relevant lake. The annual TLI data for Lake Tekapo indicate that an appropriate standard for an annual TLI should be 2.0 (Hayward, Meredith & Stevenson, 2009, Review of Proposed NRRP water quality objectives and standards for rivers and

lakes in the Canterbury region.). Insufficient information is currently available to identify an appropriate summer TLI standard. Therefore until there is more detailed information for Lake Tekapo the following annual TLI trigger response standards are recommended:

Early warning – Annual mean TLI = 1.5

Environmental standard – Annual mean TLI = 2.0

Groundwater receiving environments

49. There is general agreement that an appropriate general groundwater quality standard should be 1.0 mg/l 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 nitrate nitrogen, as noted in my earlier section 42A report the key issue is the potential adverse effects of increased nutrient concentrations on surface waters recharged from groundwater.
50. The key application of groundwater monitoring and specific trigger responses would be most applicable in locations where there is a significant distance and or slow groundwater movement between irrigation areas and sensitive surface receiving waters, e.g., the Pukaki Flats area.
51. 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 the Haldon Arm of Lake Benmore. Reliance on surface water quality monitoring alone would be ineffective given the significant lag times that could be involved, as detailed in the evidence of Mr Peter Callander.

Comments on specific proposed updated conditions

52. Extended discussions have been held with representatives of all consent applicants and it is understood that further common and individual consent conditions will be proposed. In addition, advice has been received that further hydrogeological and water quality investigations have been undertaken in the Pukaki Flats area and a comprehensive report will be provided. At the time of preparing this report these were not available.
53. At the time of preparing this report one specific new suite of proposed resource consent conditions has been received, Lone Star Farms Limited. Specific comments have been made on those proposed conditions as detailed below.

Conclusions

FEMPs and Overseer modelling

54. There is a reasonable level of agreement between the applicant representatives and ECan's reporting officer, Mr Darren McNae, about the majority of significant Overseer modelling issues. However, some key outstanding issues relate to the measures that should be undertaken to take account of the underlying uncertainties associated with some inputs, and how responses should be incorporated into conditions that provide for changes to input variables if auditing identifies a need for changes to an input. This underlines the need to have conditions that would ensure appropriate monitoring and response mechanisms are included to address Overseer modelling uncertainty.

Proposed resource consent conditions

55. As detailed in my first addendum section 42A report, I consider that there are two groups of consent applications that could be granted (green and amber), provided that appropriate robust and certain conditions could be formulated that would ensure that specific water quality standards are maintained. I have tried to identify and explain some key issues that need to be developed and resolved before that situation can be achieved.
56. In the absence of suites of comprehensive proposed conditions that fully address the identified issues, I cannot recommend that any resource consent applications be granted.

Maximum nutrient loading in the Lake Benmore Ahuriri Arm catchment

57. The proposed property nutrient loadings (220 tonnes N/yr) significantly exceed the MWRL/GHD proposed maximum nutrient loading for the Ahuriri Arm of Lake Benmore (154 tonnes N/yr) even before other nutrient load sources are taken into account. No further formal information from the applicants has been provided to resolve this issue. Therefore, as detailed in my first addendum section 42A report I cannot recommend that any new applications in this catchment be granted. Given the apparent proximity of the summer Ahuriri Arm TLI (2.9) to the oligotrophic boundary (3.0), my opinion is that replacement applications in this catchment should only be granted if local river water quality concerns are addressed (such as in the Omarama Stream and the Willow Burn) and if appropriately robust and comprehensive lake water quality trigger control conditions are developed and applied.

**Lone Star proposed consent conditions, provided 8 April 2010, and reporting officer comments
Schedule "A"**

Proposed Condition	Reporting officer comments and recommended changes (Italics = comments, blue wording = recommended changes/additions)
Consent Application CRC073236	
<p><i>Scope</i></p> <p>1 Works in the bed and banks of the Mistake River shall be limited to the installation, use and maintenance of a water supply pipeline including:</p> <p style="padding-left: 40px;">Excavation of a trench of up to 1m in width, 64m in length and 2m in depth;</p> <p style="padding-left: 40px;">Installation of a pipeline 200mm in diameter.</p>	<i>Agree</i>
<p>The pipeline described in 1(b) shall be buried to a minimum depth of 1m and a maximum depth of 2m below lowest bed level.</p>	<i>Agree</i>
<p><i>Location</i></p> <p>The works carried out in accordance with Condition 1 shall be located in the bed and banks of the Mistake River between map references NZMS 260 I37:070-038 and NZMS 260 I37:071-039 or thereabouts to ensure the buried pipeline extends the full width of the river bed.</p>	<p>The works carried out in accordance with Condition 1 shall be located in the bed and banks of the Mistake River between approximately map references NZMS 260 I37:070-038 and NZMS 260 I37:071-039, such that the buried pipeline extends the full width of the river bed.</p>
<p><i>Prior to works</i></p>	<i>Agree</i>

<p>Prior to <i>commencing</i> works, a copy of this resource consent shall be given to all persons undertaking activities authorised by this consent.</p>	
<p>The Canterbury Regional <i>Council</i>, Attention: RMA Compliance and Enforcement Manager shall be notified not less than 48 hours prior to the commencement of works.</p>	<p>The Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager shall be notified in writing not less than 48 hours prior to the commencement of works.</p>
<p><i>Works/Construction</i></p> <p>Works to install the pipeline described in Condition 1 are to be undertaken only during the months of January February or March of any year and shall take no longer than 15 days to complete.</p>	<p><i>Agree</i></p>
<p>During the installation period the consent holder may divert the existing flow of the Mistake River from one half of the river channel.</p>	<p><i>Condition not applicable as diversion will be subject to a water permit (yet to be given a consent number)</i></p>
<p>There shall be no stockpiling of materials within the bed or banks of the Mistake River.</p>	<p><i>Agree</i></p>
<p>All practicable measures shall be undertaken to prevent oil and fuel leaks from vehicles and machinery, including:</p> <p>There shall be no storage of fuel or refuelling of vehicles and machinery within 20 metres of the bed of a river.</p> <p>Fuel shall be stored securely or removed from site overnight.</p>	<p><i>Agree</i></p>
<p>All practicable measures shall be undertaken to minimise adverse effects on property,</p>	<p><i>CRC preference is for use of separate conditions as recommended in the original S42a Report wording, however, if this melding of conditions is to</i></p>

<p>amenity values, wildlife, vegetation, and ecological values, including:</p> <p>Machinery shall be free of plants and plant seeds prior to arrival at the work site, and prior to use within the river bed.</p> <p>To prevent the spread of dydimo or any other aquatic pests, the consent holder shall ensure that the activities authorised by this consent are undertaken in accordance with the Biosecurity New Zealand's Hygiene's procedures.</p> <p>Implementation of best management practices to ensure as far as practicable, the works do not cause erosion of the banks or bed of the Mistake River.</p> <p>Minimise the number of vehicles and machinery entering river channels containing flowing water within the Mistake River.</p>	<p><i>be used, then wording is recommended to be changed as follows:</i></p> <p>All practicable measures shall be undertaken to minimise adverse effects on property, amenity values, wildlife, vegetation, and ecological values, including:</p> <p>(a) keeping machinery free of plants and plant seeds prior to arrival at the work site, and prior to use within the river bed;</p> <p>(b) preventing the spread of didymo, or any other aquatic pests, by ensuring that the activities authorised by this consent are undertaken in accordance with Biosecurity New Zealand's hygiene procedures [would be preferable to specify exactly what measures must be taken];</p> <p>(c) implementing best management practices to ensure, as far as practicable, the works do not cause erosion of the banks or bed of Mistake River; and</p> <p>(d) minimising entry of vehicles and machinery to river channels containing flowing water.</p>
<p>Vehicles and/or machinery shall not operate within 100 metres of birds which are nesting or rearing their young in the bed of the river.</p>	<p><i>Agree</i></p>
<p><i>Accidental Discovery Protocol</i></p> <p>In the event of any disturbance of Koiwi Tangata (human bones) or Taonga (treasured artefacts), the consent holder will immediately:</p> <p>Advise the Canterbury Regional Council of the disturbance;</p>	<p><i>(b) should refer to: ... Te Runanga o Arowhenua, Te Runanga o Waihao</i></p>

<p>Advise the Upoko Runanga of Te Taumutu Runanga, or their representative, of the disturbance; and</p> <p>Cease earthmoving operations in the affected area until an area containing the Koiwi Tangata or Taonga has been clearly demarcated and Kaumatua and archaeologists have certified that there it is appropriate for earthmoving to recommence.</p>	<p>and Te Runanga o Moeraki, or their representatives ...</p> <p><i>Wording needs changing to address need for greater certainty about certification process, e.g., certification to what standard? What happens if that certification is not provided?</i></p>
<p><i>Upon Completion</i></p> <p>Following completion of the works the trench will be back-filled, levelled and compacted to resemble the original river bed as far as is practicable. All fill used for the installation and reinstatement shall be comprised of sand, silt and gravel, and shall be free of vegetation.</p>	<p>Following completion of the works the trench shall be back-filled, levelled and compacted to resemble the original river bed as far as is practicable. All fill used for the installation and reinstatement shall be comprised of sand, silt and gravel, sourced from excavation of the trench, and shall be free of vegetation.</p>
<p>All spoil and any other waste material from the installation works shall be removed from the site on completion of the works.</p>	<p><i>Agree</i></p>
<p><i>Administration</i></p> <p>The Canterbury Regional Council may, once per year, on any of the last five working days of June each year, serve notice of its intention to review the conditions of this consent for the purposes of dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage.</p>	<p><i>Need to use Condition AD04 from Attachment 6 of original S42a Report 1 for consistency of review provisions and to enable two opportunities annually</i></p>

<p>Consent Application CRC031175 – To divert, take and use surface water</p>	<p><i>Condition numbering is incorrect for the suite of water permit conditions, which should reset and run from Condition 1 to Condition 16.</i></p>
<p>Water shall only be taken from the Mistake River via a gallery intake installation at extraction point I37/0041 at or about map reference NZMS 260 I37:063-036, at a maximum rate of 261 l/s, with a daily volume not exceeding 22,550m³ per day and a total volume not exceeding 2,682,000m³ per year for a period of 212 days between 1 October and the following 30 April.</p>	<p>Water shall only be taken from the Mistake River via a gallery intake installation at surface water abstraction point I37/0041 at or about map reference NZMS 260 I37:063-036, at a maximum rate of 261 l/s, with a daily volume not exceeding 22,550m³ per day and a total volume not exceeding 2,413,800m³ per year for a period of 212 days between 1 October and the following 30 April.</p>
<p>Water shall be used only for spray irrigation of 447 hectares of crops and pasture for grazing sheep, beef cattle or non-milking dairy cows, as described in the application, on the area of land shown in attached plan CRC031175.</p>	<p>Water shall be used only for spray irrigation of 447 hectares of crops and pasture for grazing sheep, beef cattle or non-milking dairy cows, as described in the application, on the area of land shown in attached plan CRC031175, which forms part of this consent.</p> <p><i>Need copy of attached plan CRC031175, as per revision of the plan in Attachment One of original S42a Report 25A</i></p>
<p>The irrigation system shall be designed according to the INZ Design Code of Practice.</p>	<p><i>The purpose of this condition is unclear.</i></p>
<p><i>Management</i></p> <p>The consent holder shall take all practicable steps to:</p> <ul style="list-style-type: none"> Ensure that the volume of water used for irrigation is less than half the water holding capacity of the soil in each irrigation return period; and Avoid leakage from pipes and structures; and Avoid the use of water onto non-productive land such as impermeable surfaces and river or stream riparian strips. 	<p><i>Agree</i></p>

<p>The consent holder shall undertake the following activities in respect of Rapuwai Lagoon:</p> <p>Erect (in so far as there is not already a fence in place) a stock-proof fence to protect the riparian boundary from stock damage.</p> <p>Carry out a progressive riparian regime over two years in accordance with the details set out in the Farm Environment Management Plan.</p>	<p><i>There are other High Natural Character water bodies within, or adjacent to the irrigation area, that would benefit from stock exclusion and riparian management (i.e., Mick's Lagoon, Cass River and Mistake River) – applicant evidence indicates no currently planned increase in stock numbers but FEMP process would allow it, which could increase potential stock damage to riparian margins</i></p>														
<p>Whenever the flow (expressed in litres per second) in the Mistake River reaches the levels set out in column A of Table 1 (below) the maximum rate at which water may be taken shall be the same as that set out in column B of Table 1.</p> <table border="1" data-bbox="165 699 824 1214"> <thead> <tr> <th data-bbox="165 699 479 826">Column A River Flow (ℓ/s)</th> <th data-bbox="479 699 824 826">Column B Abstraction (ℓ/s)</th> </tr> </thead> <tbody> <tr> <td data-bbox="165 826 479 890">0-520</td> <td data-bbox="479 826 824 890">0</td> </tr> <tr> <td data-bbox="165 890 479 954">520-585</td> <td data-bbox="479 890 824 954">0 (or managed minor take)</td> </tr> <tr> <td data-bbox="165 954 479 1018">586-650</td> <td data-bbox="479 954 824 1018">65</td> </tr> <tr> <td data-bbox="165 1018 479 1082">651-715</td> <td data-bbox="479 1018 824 1082">130</td> </tr> <tr> <td data-bbox="165 1082 479 1145">716-780</td> <td data-bbox="479 1082 824 1145">195</td> </tr> <tr> <td data-bbox="165 1145 479 1214">>780</td> <td data-bbox="479 1145 824 1214">261</td> </tr> </tbody> </table>	Column A River Flow (ℓ/s)	Column B Abstraction (ℓ/s)	0-520	0	520-585	0 (or managed minor take)	586-650	65	651-715	130	716-780	195	>780	261	<p><i>This condition would be better expressed as other minimum flow conditions, with wording describing specific conditions and actions to be taken, as per S42a Report 25A and addendum.</i></p> <p><i>I note that the addendum version of this condition is very conservative, based on F&G and DOC evidence, allowing a further 330L/s in river prior to first stepdown, and 1:1 steps, which is likely to provide low reliability for the applicant, although it is in line with Policy 32 and WCWARP HNC policies – submitter feedback on this condition will be important</i></p>
Column A River Flow (ℓ/s)	Column B Abstraction (ℓ/s)														
0-520	0														
520-585	0 (or managed minor take)														
586-650	65														
651-715	130														
716-780	195														
>780	261														
<p><i>Farm Environmental Management</i></p>	<p><i>It is essential that FERA and FEMP are completed and provided to decision makers prior to making a decision on the consent application,</i></p>														

The consent holder shall before the first exercise of this consent, prepare and submit to the Canterbury Regional Council a Farm Environmental Risk Assessment (FERA) and Farm Environmental Management Plan (FEMP) which sets out the practices and procedures to be put into place to operate the water take and delivery of water to the command area and to monitor the environmental effects arising from the exercise of the consent, so as to ensure compliance with the conditions of consent and to minimise the potential for adverse effects on the environment arising from the exercise of the consent. The FEMP shall, as a minimum, address:

Any issues raised by the FERA; and

On farm procedures to:

achieve efficient use of water; and

minimise adverse effects on groundwater and surface water quality;
and

minimise adverse effects on groundwater levels; and

minimise adverse effects on water bodies and riparian areas; and

safeguard significant indigenous biodiversity; and

ensure compliance with Mandatory Good Agricultural Practices.

Monitoring requirements to measure compliance with condition 22(b) (i) to (vi) above.

specifically to determine whether the FEMP and the complementary conditions fully address critical water quality issues. Currently the proposal would not require any of the general draft FEMP measures to actually be undertaken.

Specific critical FEMP measures would need to be clearly mandatory either as specific conditions or by reference to a specific mandatory clause in the FEMP.

No specific water quality trigger response conditions or water quality monitoring conditions have been proposed. Appropriate conditions are essential.

A five year review will only provide for three iterations or monitoring/review periods to assess the effectiveness of measures.

<p>Procedures to implement review and update the FEMP every 5 years, or following a significant change in farming practice (for example a change from beef production to dairy) in order to ensure ongoing compliance with condition 22(b) above.</p>	
<p>The consent holder shall give due consideration to any feedback from ECan on the contents of the FERA and FEMP prior to finalising the initial FEMP, each review of and any amendments to the FEMP.</p>	<p><i>Consideration of CRC feedback does not necessarily mean that any changes would be made - this condition is does not provide any certainty about ensuring that water quality standards would be met. See above comments about the need for mandatory FEMP measures.</i></p>
<p><i>Metering</i></p> <p>An automatic water level recorder (telemetry capable) shall be installed at the Mistake River bridge downstream of the gallery take (at approximately map reference 260 I37:080-040) or as close as practicable to the gallery intake as possible, and used to check the minimum residual flow condition has been met.</p>	<p><i>This needs to be condition WP08 from Attachment 6 of S42a Report 1 as this version of the condition provides no certainty regarding installation and would not be consistent in approach</i></p>
<p>The consent holder shall before the first exercise of this consent:</p> <p>install a water meter(s) that has an international accreditation or an equivalent New Zealand calibration endorsement suitable for use with an electronic recording device (telemetry capable), from which the rate and the volume of water taken can be determined within an accuracy of plus or minus five percent at a location that will ensure the total take of water from the gallery is measured</p> <p>Take a reading from the water meter at least once per month; record the date</p>	<p><i>This needs to be condition ME02 from Attachment 6 of S42a Report 1 as this version of the condition would not provide sufficient data collection parameters and would not be consistent in approach</i></p>

<p>and the meter reading either electronically or in a log book kept for that purpose; and supply these data to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, each year during the month of June, or when requested in writing.</p> <p>Ensure that the water meter is accessible to the Canterbury Regional Council at all times for inspection.</p> <p>Ensure that the water meter is installed, maintained and operated throughout the duration of the consent in accordance with the manufacturer's instructions.</p> <p>Take all practicable measures to ensure that the water meter is fully functional at all times.</p>	
<p>Within one month of the installation of any measuring device required in accordance with condition 25, or any subsequent replacement measuring device, and at five-yearly intervals thereafter, and at any time when requested by the Canterbury Regional Council, the consent holder shall provide a certificate to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, signed by a suitably qualified person certifying, and demonstrating by means of a clear diagram, that the measuring device has been installed in accordance with the manufacturers specifications.</p>	<p><i>Need ME05 and ME06 of Attachment 6 of S42a Report 1 to provide sufficient certainty regarding installation standard and consistency</i></p>
<p>The consent holder shall, on request, provide ECan with any results of the monitoring procedures implemented in accordance with condition 22(c).</p>	<p><i>See above comments.</i></p>

<p><i>Existing installation</i></p> <p>The consent holder shall decommission and cease to use the existing take point, holding pond and water races within 6 months of first abstraction from the gallery intake point.</p>	<p><i>Agree</i></p>
<p>The consent holder shall allow the Department of Conservation to use any irrigation pipelines installed on Godley Peaks Station to convey water to Mick's Lagoon up to a maximum rate of 30l/s.</p>	<p><i>This condition appears to be ultra vires. DOC will need to apply for additional abstraction and can apply to use the same gallery intake, which will simply require written approval from Lone Star at the time of application, so this condition is not required.</i></p>
<p><i>Review</i></p> <p>The Canterbury Regional Council may, once per year, on any of the last five working days of June, serve notice of its intention to review the conditions of this consent for the purposes of dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage.</p>	<p><i>Need to use Condition AD04 from Attachment 6 of S42a Report 1 for consistency of review provisions and to enable two opportunities annually</i></p>
<p><i>Lapse</i></p> <p>The lapsing date for the purposes of section 125 shall be 15 years from the date of first abstraction.</p>	<p><i>The lapse date should not equate to the entire term of consent. A reference to 5 years, or an end date equivalent to 5yrs, is recommended, as per Condition AD04 of Attachment 6, S42a Report 1. Locking up an allocation of water without use for a 15 year period would not be efficient use of water.</i></p>