in the matter of: the Resource Management Act 1991

and

in the matter of: a number of applications to take and use water from the Upper Waitaki catchment

Brief of evidence of Kenneth George Gimblett on individual applications

Dated: 30 November 2009

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BRIEF OF EVIDENCE OF KENNETH GEORGE GIMBLETT ON INDIVIDUAL APPLICATIONS

INTRODUCTION

1 My full name is Kenneth (Ken) George Gimblett.

2 My qualifications and experience are set out in the brief of evidence dated the 16th September 2009.

3 I have been engaged by Meridian Energy Limited (Meridian) to provide evidence in relation to planning matters relevant to the current resource consent applications to take and use water for irrigation in the Upper Waitaki Catchment.

4 I confirm that I have read the Environment Court's Code of Conduct for expert witnesses and this evidence has been prepared in accordance with that code. I agree to comply with the code's terms. In that regard, I confirm that the statements made in this evidence are within my area of expertise (unless I state otherwise) and I also confirm that I have not omitted to consider material facts which might alter the opinions stated in this evidence.

5 In preparing this evidence I have reviewed:

5.1 the evidence provided on behalf of the Upper Waitaki Applicant Group (UWAG); specifically that from **Mr Batty** (dated 25 September 2009) and the associated legal submissions (dated 5 October 2009); and

5.2 the planning evidence and conditions of consent put forward by **Mr Kyle** in supplementary evidence dated 15 October 2009 for Southdown Holdings Limited, Five Rivers Limited and Killermont Station Limited; and

5.3 all addendum and individual applicant evidence prepared on behalf of Meridian.

SCOPE OF EVIDENCE

6 In this evidence I outline my:

6.1 concerns relating to the position presented by UWAG; and

6.2 commentary on potential conditions of consent, should consents be granted.

7 It is emphasised that the issues and concerns set out in my original evidence on cumulative effects remain. I still consider that it will be

necessary for the Panel to resolve a number of fundamental issues prior to considering consent conditions.

UWAG ISSUES

Bundling / Status / Activities applied for

8 In reviewing the evidence provided by **Mr Batty**, I note that he considers that all of the applications should not be bundled together (his paragraph 3.1). This view is reinforced by the UWAG legal submissions (paragraph 71). I agree that it is appropriate that not all applications before this hearing should be bundled together. However, I consider that in situations where there are multiple applications for an individual proposal or applicant, for interrelated activities, these should be bundled in terms of their status and assessment. In that respect I maintain the view expressed in my evidence of 16 September 2009 (paragraphs 66 and 69-71).

9 **Mr Batty** comments in paragraph 4.2 on the issue of PNRRP Rule WQL62 and the status of activities making reference to my earlier evidence. Although still relevant, my original point was not so much one of questioning the status or the relevance of the threshold tests of section 104D(1), but rather whether all necessary consents had been sought by the applicants, including any that may be required under PNRRP Rule WQL62.

10 I now note that the Commissioners Minute 8 (6 November 2009) has directed specific "effluent applications" for Southdown Holdings Ltd, Five Rivers Ltd and Killermont Station Ltd be joined with these proceedings to enable a full understanding of the effects on the environment. I remain unclear as to whether other applicants ought to be seeking consent for the same or similar activities in association with their proposals (as I do not know the full extent of all applicant's aspirations), but if that were the case then presumably a consistent approach would be required, and obviously consent cannot be granted (or conditions applied) for an activity that has not been applied for.

"**Whole of catchment" approach to cumulative effects**

11 The legal submissions provided for UWAG confirm that the UWAG applicants support the "whole of property" approach (paragraphs 13 and 14) and I agree that this is important. However, the UWAG applicants do not appear to fully support the "whole of catchment" approach in quite the way proposed by MWRL in managing cumulative effects on water quality.

12 In his paragraph 4.9 **Mr Batty** comments on the water quality monitoring at nodes as proposed by MWRL. He considers this to have practical and equitable difficulties and considers that non-point

discharges cannot be enforced for areas outside the current consenting process. I understand this position to be at odds with the approach undertaken by MWRL in their modelling and underlying their volunteered conditions of consent. In this respect there appears to be a discrepancy on this issue between experts representing the various applicants (**Mr Kyle** and **Mr Batty**).

13 I understand that the assessment by MWRL of cumulative water quality was undertaken on the basis of accounting for all nutrients in the affected catchments and that in setting nodal thresholds and determining assimilative capacity the degree of conservatism allows for existing uses and for some changes in activities and environmental conditions. That is, the determination of assimilative capacity at various nodes has factored in both the current or baseline environmental conditions (obviously affected by current activity), and where it exists, potential for increased levels of nutrient loading at environmentally acceptable levels. In this way the MWRL evidence has approached the nodal thresholds as a whole and assigned responsibility to the current consent applicants for nodal compliance. While I accept it is not without its challenges, I question whether there is any realistic alternative way that the cumulative effects on the receiving environment could ever be determined or controlled with any certainty without consideration of the whole catchment.

14 In so far as current practices have been factored into setting baseline conditions, I consider it would be appropriate to include both those occurring and any unimplemented consents, where there is a realistic probability of them being implemented. The GHD Summary Report (August 2009) prepared for MWRL confirms that the baseline established for the purposes of that study was the current land use activity (as at 2008), including any existing operative irrigation. In determining assimilative capacity, future land use was predicted to include the additional 25,000ha of new irrigation, unimplemented irrigation consents and tranching irrigation (as per the MIC agreement). More discussion on this issue is provided in the legal submissions for Meridian.

15 **Mr Batty** also raises inherent concerns regarding equity, particularly for smaller irrigators, and **Mr Kyle** has sought to address that by introducing to the draft conditions the concept of proportionality. In other words, in situations of an exceedance, first determine likely cause and then assign or apportion responsibility for any necessary remediation response. I have no issue with that in principle, however I do have significant reservations with its practical implementation. I foresee the real potential for there to be dispute amongst consent holders as to where those mitigation responsibilities might fall, and arguably in the meantime no individual consent holder is held to be in breach of their own conditions, or in fact responding positively for the environment. My

preference is certainly to require some determinative investigation/report as to likely cause(s) but beyond that simply assign mitigation responsibility through conditions to all and every consent holder in the sub-catchment. How they then might collectively/individually achieve the necessary mitigation is more meaningfully incentivised.

Renewals

16 The UWAG legal submissions draw a distinction between consent applications for renewals and those for new takes (paragraphs 53-61). It is noted that renewal consents relate to activities presently occurring and thus having been considered in the existing baseline conditions. I accept that the current effects of the renewal consents have already been taken into account in the modelling and that they should therefore be seen as forming part of the assimilative capacity where modelling shows that there is the ability to increase nutrient loading without adversely affecting the environment. I also accept that some renewal applicants will very likely implement improved efficiencies in farm operations and irrigation practices, with the certainty of renewed entitlements.

CONDITIONS

17 Firstly, and as I noted above, there has been no change to the conclusions reached in my original evidence. That is, there are a number of outstanding issues and matters that will need to be resolved prior to determining these consent applications, and that there may not be sufficient technical understanding to be satisfied of the likely outcomes or to be confident that the proposed management and implementation approach will be adequate and effective in achieving those outcomes. I also note the concerns raised by the experts engaged by Meridian over the actual threshold limits proposed. However, I have turned my mind to potential conditions of consent should the Panel be minded to grant consent to any of the applications. I agree with the sentiment expressed in the UWAG legal submissions (paragraphs 148-149) that it is essential that any conditions achieve a resource management purpose and as a general principle leave as little as possible to any future discretion or uncertainty. I however also accept the legitimacy of adaptive management techniques in achieving sustainable resource management, particularly when dealing with the degree of environmental complexity evident in the case of the applications being considered.

18 My review and consideration of potential conditions in relation to the use of water for irrigation[1] has been informed by the original template conditions provided in the evidence of **Mr Kyle** for MWRL

[1] For the avoidance of doubt, these are in addition to those conditions agreed between Meridian and MIC in relation to derogation approvals.

(2 September 2009) , the conditions provided in the ECan section 42A reports, and the more advanced conditions suggested in the supplementary evidence of **Mr Kyle**[2]. This evidence primarily relies on the advanced conditions **Mr Kyle** has provided for Killermont Station Limited as an example on which to base my consideration.

19 Attached to this evidence is a set of amended conditions outlining suggested track changes that I consider would be necessary (**Annexure One**). In some areas it is possible to suggest changes to address some of the concerns raised below. However, for some issues I am not in a position to suggest a solution. I would qualify my comments in that I have not had the time to complete as comprehensive a review as I would have liked and I am yet to receive sets of proffered conditions from all applicants. I therefore accept that there may very well be further refinement and additions necessary to produce a complete and implementable set of conditions, and beyond that more specific consideration or additions in the context of individual applications.

20 I acknowledge that **Mr Kyle** appears to have spent time refining and progressing possible conditions of consent. These changes appear to have addressed some of the initial concerns that Meridian had with the original template style conditions. However, I continue to have some concerns over the surety and enforceability of the proposed conditions and the ability of the conditions to adequately avoid or mitigate adverse effects.

21 In putting forward my suggestions, I have accordingly tried to focus on encompassing 'broad principles' rather than dwelling on details. In some areas I have nevertheless been able to provide quite specific comment on the conditions provided, drawing on my own opinions and the advice of other advisors to Meridian.

"Whole of farm" and "whole of sub catchment" issues

22 MWRL representatives have suggested that although most of the applications sought relate only to parts of farms, the whole of each farm seeking consent should be subject to the conditions controlling nutrient losses and management practices. UWAG appear to be accepting of this concept. This concept has been the basis of the modelling undertaken and appears to have been volunteered through the advanced conditions of consent. The Farm Environmental Management Plans (FEMP), integral to the exercise of these consents, would also be prepared and applied on the basis of this whole of farm approach.

23 MWRL representatives have also suggested in evidence that where issues may arise in the future over nutrients at sub catchment nodes, the current applicants assume responsibility for managing

[2] Dated 15 October 2009 and relating to Southdown Holdings Limited, Five Rivers Limited and Killermont Station Limited.

nutrients in the whole of that sub catchment (**Mr Kyle**). This would require the applicants to be responsible in some cases for effects arising as a consequence of the actions of other parties who are not subject to these current consents and may be undertaking permitted activities or operating under existing use rights or other approvals. MWRL suggests that responsibility would also be assumed for 'natural' influences of relevance to nutrient levels in water and again this approach forms the basis of the MWRL modelling undertaken and relied upon in evidence (**Mr Kyle**, evidence of 2 September 2009, paragraph 7.2).

24 However, I am also conscious of the fact that this approach does not appear to be accepted by the applicants represented by UWAG (**Mr Batty** and UWAG legal submissions) and this may pose some serious problems in relying on the modelling and associated assessments of effects. I also note that in the amended conditions provided by **Mr Kyle** in his supplementary evidence (15 October 2009) this approach appears to have been qualified with the ability built into suggested condition 37 to disregard the effects of natural occurrences (i.e. not attributable to land use practices).

25 I agree with an approach in which whole of farms and whole of sub catchments are captured under these current applications. Without this approach it would be extremely difficult to ensure that cumulative adverse effects on the environment are adequately managed or avoided. The equity issues raised in the legal submissions for UWAG are of relevance, however, I am not convinced that compliance should only be determined on an individual farm basis (even if based on both modelling and monitoring) when the cumulative effects analysis is predicated on not exceeding nodal threshold limits and ultimately a specified trophic state for Lake Benmore. **Mr Turner** has restated in his evidence (30 November 2009) the importance of avoiding operational issues associated with water quality for the Waitaki Hydro-electricity power scheme, in areas such as the Wairepo Arm and Tekapo River in particular. Furthermore, and I agree, **Mr Turner** has also noted the imperative of ensuring accountability for remediation in a situation of a sub-catchment node exceedance, without which avoidance of adverse cumulative effects on water quality might never be realised.

26 To not link the approval of the current applications to compliance at relevant nodes would mean that there was sole reliance on modelled / monitored farm based performance to address the cumulative effects issue. In my opinion the short coming of that approach is that there can be no response / mitigation requirement in the event of nodal monitoring revealing a NDA exceedance except by way of a consent condition review, assuming all farms are delivering on their FEMP's and apportioned discharge allowances at farm level. In effect, this would mean that the potential for an adverse cumulative

effect of nutrient losses on receiving waters would not be adequately addressed.

27 Evidence from various technical experts for Meridian (and others) raises questions over the ability to rely on the underlying water quality effects assessment prepared for MWRL and ultimately the appropriateness of the nodal threshold limits derived from that assessment. That of itself, but coupled with the modelled / adaptive management approach on farm, the dynamics of the natural environment, potential for lag effects, etc suggest to me a combination of nodal and farm based compliance is preferable, and seemingly in the opinion of applicants relying on the modelling carried out for MWRL, desirable if the environmental bottom lines for the relevant receiving environment (waters) are to be maintained.

28 I do however note that the MWRL modelling undertaken has considered the existing environment including those applicants presently seeking renewals (but not unimplemented consents). In this way current practices (as at 2008) are already considered within the nutrient calculations. I accept that the conditions of consent as currently developed may be better suited to the new consents rather than the renewal consents and there may need to be further refinement of appropriate conditions of consent for renewals acknowledging that distinction.

Monitoring

29 As the majority of the understanding of potential impacts on the environment from increased nutrients is based on modelling, there is invariably a level of uncertainty over how this will actually relate to outcomes in the environment. For this reason (and in addition to any further monitoring that might need to be undertaken prior to the grant/exercise of consent) I consider that accurate and timely monitoring is essential in understanding effects that may arise and confirming that whatever critical nutrient thresholds are determined, are not being breached.

30 Whilst I acknowledge that nutrient monitoring on both each farm as well as at each sub catchment node has a financial implication for applicants, it is the most transparent method of understanding what nutrient levels are occurring and where. This would best enable tracking of nutrients should trigger levels be reached and enables the validation of modelling and FEMP implementation (see evidence from **Mr Potts**). I note that the combined monitoring and modelling approach has now been volunteered by MWRL experts (in the conditions attached to the supplementary evidence of **Mr Kyle** 15 October 2009).

31 Sub catchment nodal monitoring is essential to understanding what effects are occurring in each area and thus where nutrients may be coming from prior to them entering the groundwater, waterways,

lakes and canals. This monitoring would give actual levels rather than just modelled predictions. The monitoring obligation needs to be clearly expressed in conditions, sufficiently targeted and frequent, etc to be effective in the management of water quality effects. While I again recognise the advances made in this regard in the updated conditions presented by **Mr Kyle**, I believe further refinement and improvement is necessary and can still be made. To that end, I have offered suggested modifications in **Annexure One**.

32 I also note in relation to nutrients entering lakes, that **Mr Kyle's** advanced conditions include monitoring within the lakes (his condition 35 and Table 3) and this would also assist in understanding the nutrient levels occurring in the receiving environment. However, no conditions are proposed to provide a compliance trigger on nutrient levels in the lakes, or indeed ultimate compliance with the desired trophic state.

Sub Catchment monitoring triggers and breaches

33 Given the significance of the nodal thresholds in the overall management of cumulative water quality outcomes, a key component of the conditions are those that relate to the sub catchment monitoring and responses.

34 In this regard, one key area of concern initially was the lack of a trigger mechanism within the conditions to deal with a situation where the sub catchment nutrient levels were being approached and management practices may need to change to avoid breaching such levels. This issue has been addressed in part in **Mr Kyle's** revised conditions and I have advanced this concept further in my amended conditions attached. In essence the conditions now suggest:

- An initial trigger set at 75% of the nutrient thresholds;
- If reached, the sampling frequency increases to weekly;
- If 5 consecutive weeks show the 75% trigger continues to be exceeded on average, preparation of a report identifying cause and remedial/management measures;
- Implementation of remedial/management measures and continued monitoring;
- If the nutrient thresholds are exceeded (100%), increased sampling and a report on the source of nutrients;
- Reduction in weekly allocation of water to the consent holder by 5% and development and implementation of a remedial action plan; and

- Continued monitoring and further weekly water reductions if a return to below the thresholds is not achieved.

A process diagram outlining these steps in more detail is included as **Annexure Two** to this evidence.

35 Whilst this approach has progressed the conditions at a conceptual level, there continues to be a range of concerns with some of the details of the conditions, including:

- Timeliness in response – there appear in places to be quite long or undefined timeframes in identification of an issue and understanding of cause, and it may be desirable to specify/shorten timeframes for identification, reporting and remedial action (accepting and acknowledging the practicalities associated with sampling, analysis, reporting, etc).

- A potential lack of an adequate deterrent with just a small (5%) initial / compounding reduction if an actual exceedance of the nutrient thresholds occurs. If the deterrent is insignificant there is no real incentive to avoid breaches and a higher potential for adverse effects to occur. Altering the wording of the condition to relate to a reduction in weekly water allocations rather than annual allocations would partially address this concern and aligns with the derogation agreements.

- Insufficient consideration of lag in the timing of monitoring (e.g. different timeframes for nutrients in groundwater relative to surface water). I understand from the evidence of **Mr Callander** that he has concerns over the conditions in relation to lag and monitoring frequencies/parameters.

- Insufficient consideration of how to deal with issues arising from parties who are not consent holders (e.g. those carrying out permitted or existing activities, and the possible future subdivision of land). This is in part a legal issue and has been addressed in the legal submissions presented on behalf of Meridian.

- The uncertainties around the ability to take a successful enforcement action (or even review) against continued breach of conditions when those conditions embody an adaptive management and cyclical remedial action approach.

- The challenges inherent in attempting to encourage collaboration between consent holders within a sub catchment, but ultimately holding all consent holders individually responsible for remediation should it prove necessary.

- These conditions contemplate application of fertiliser which in some situations may be an activity for which consent is required under PNRRP provisions (possibly non-complying) but has not yet been sought.

- Uncertainties around whether the river and lake sampling programmes will be sensitive enough to monitor long term changes in water quality and accurately determine compliance.

36 It is also noted that while these advanced conditions contain more certainty regarding sub catchment compliance, they only apply to the sub catchment monitoring and not to the same extent to on farm activity. The Panel may therefore see merit in including further conditions relating to on farm activities (e.g. maximum nitrogen application) to reflect critical modelling assumptions and to avoid adverse effects.

Specific comments on conditions

37 Beyond those conditions relating to sub catchment monitoring and nodal threshold compliance, the following comments relate to the wider suite of conditions. Again, my suggestions in respect of these issues are intended to identify improvements where possible, on the basis of those conditions that have already been put forward by **Mr Kyle**.

38 In a number of places throughout the conditions, reference is made to "other consent holders" in relation to where collaborative efforts may be required/encouraged to prepare plans or multiple parties may be responsible for remedial action. It is important that these parties be clearly defined as being those holding water take and use consents relevant to this process. Without specificity this reference could relate to persons historically holding a resource consent for totally unrelated activities. This approach will also need to be able to be applied to (capture) future water take consents that may be granted in these catchments within the allocation / MIC agreement parameters.

39 Throughout the suggested conditions reference is made to the use of experts to assist in processes such as verification of reports or auditing. I agree that this is an important part of the process but consider that it should be explicit in the conditions that this person or organisation should be an independent professional. I have added this aspect to the amended conditions in **Annexure One**, and I am aware that ECan officers may well have standardised reference conditions for this type of situation. Although I have not put them forward, there may need to be similar certainty provided in conditions relating to industry standards and modelling methods.

40 Similarly, the suggested conditions rely throughout on the certification (also called approval) of the Canterbury Regional Council of a range of documents/reports. This includes the planting plans, FEMP's, monitoring plans and remedial action plans. Whilst I agree that it is necessary that such documents be submitted to the Council it would be desirable for such conditions to have an explicit certification process, including timeframes, to give certainty to all parties. It could also be seen as being more appropriate that such a process be undertaken by an independent body rather than the consent authority which has an ongoing role in monitoring, and potentially ultimately reviewing, the consents. ECan officers may again be able to provide standardised conditions to this effect.

41 I consider that a much higher level of certainty is needed within many of the conditions that relate to processes e.g. monitoring or auditing. To this extent, I have endeavoured to provide a greater level of direction within the amended conditions in **Annexure One**.

42 **Mr Potts** has noted in his evidence that there is a need for the compliance thresholds to be measured in both mass (kg/yr) and concentration (mg/l) as there needs to be a more immediate way of determining whether the threshold has been triggered/breached than as is achievable under an annual mass loading method. This aspect has been incorporated into the amended conditions attached, although as noted by **Mr Potts** the specifics of how the numbers might be defined for both surface water and groundwater may not be easily achieved. Conceptually though without the requirement to apply a concentration based threshold, compliance with only an annual mass loading would take a year of sampling to determine.

43 **Ms Sutherland** has identified issues in relation to the monitoring of conditions in Lake Benmore, and achieving, or maintaining at least, the desired trophic state of Lake Benmore, and the shortcoming of relying simply on nutrient quantities measured at sub-catchment nodes. I consider both monitoring and compliance conditions are warranted in respect of the desired TLI of 2.75 summer average for Lake Benmore. Beyond some suggestions in respect of preparing a lake monitoring plan, I have not suggested other modifications of the conditions in **Annexure One** to deal with thresholds or remedial action. It however seems apparent that such conditions would need to address:

- Compliance thresholds;
- Necessary monitoring and sampling methodology, including the possibility of intermediary trigger levels for a response;
- Process for reporting;
- Process for remedial action should a breach of thresholds occur.

44 I note that **Mr Kyle's** suggested condition 35 (and associated table) relating to lake monitoring and associated levying of costs from consent holders does not address these specific matters.

DURATION OF CONSENT

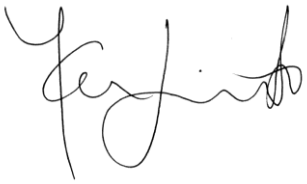
45 I am aware that the issue of consent duration has been raised in Section 42A officers reports, in questioning by the Commissioners during the hearing, and by **Mr Kyle** in his rebuttal evidence (5 November 2009). Where water availability is subject to the derogation approvals and the terms of the MIC agreement, irrespective of the issue of managing unforeseen adverse effects through a limited term of consent, it seems sensible to me that any consents issued reliant on those approval/agreements align with Meridian's entitlement to the water. In other words, granting consents to run beyond Meridian's present entitlements (to April 2025) potentially sets expectations for security of access that may not eventuate.

46 Whilst there remains some uncertainty and divided opinions amongst the various experts, concerning the fundamental basis on which the environment's assimilative capacity has been determined, I would err towards a position of conservatism in respect of the matter of consent duration. Furthermore the extent of the applicants' apparent reliance on both predictive modelling and adaptive management in response to monitoring also suggests to me some caution is necessary in the determination of any appropriate duration of consent.

CONCLUSIONS

47 I am mindful that there are a range of issues that need to be resolved prior to the Panel making any decisions on whether or not to grant consent, not least of which being the high degree of uncertainty in some aspects of the science / technical evidence and in some cases the apparent lack of information available. However, should the Panel be minded to grant consent to any of the applications, I have outlined the principles which I consider should be carefully considered in creating generic conditions of consent, building on the basis provided to date on behalf of specific applicants. I accept further work is still required in this regard.

Dated: 30 November 2009



Kenneth George Gimblett

ANNEXURE ONE: SUGGESTED CHANGES / ADDITIONS TO MWRL CONDITIONS

For the purposes of this consent **[farm]** or "subject land" includes the following land parcels **[insert legal descriptions]**.

3. The consent holder shall take all practicable steps to:

(a) ~~Ensure that the volume of water used for irrigation does not exceed that required for the soil to reach field capacity; and~~ Ensure that all irrigated soils are classified into the profile available water (PAW) classes in Table 1 below and for each PAW class:

i The corresponding maximum application depth in Table 1 below shall be adhered to;

ii The minimum return intervals in Table 1 below shall be maintained; and,

iii The Trigger Soil Moisture Levels in Table 1 below shall be adhered to.

Table 1: Assumed irrigation parameters as a function of soil depth and system type

PAW (mm)	Application depth (mm)	Return interval (day)	TSML (% of PAW)	UCC
Centre pivot				
30	10	2	50%	0.80
60	20	4	55-60%	0.75
90	20	4	60%	0.75
130	20	4	60%	0.75

(Source: Irrigation and Drainage Modelling of Upper Waitaki Basin – Aqualinc Groundwater Report – GHD)

(b) Avoid leakage from pipes and structures; and

(c) Avoid the use of water onto non-productive land such as impermeable surfaces and river or stream riparian strips; and

(d) If the irrigation system used to distribute water taken in terms of this permit is used to distribute effluent, fertiliser or any other added contaminant, a backflow preventer manufactured in accordance with AS 2845.1 (1998) or the

American Society of Sanitary Engineers standards shall be installed within the pump outlet plumbing or within the mainline, to prevent the backflow ~~backfiow~~ of water containing contaminants into the fresh water source ~~bore~~; and

(e) The backflow preventer shall be tested to the standard set out in AS 2845.3 (1993) or an equivalent method within one month of its installation and annually thereafter by a suitably qualified independent person. A test report shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within two weeks of each inspection.

Farm Management Standards

4. The Nutrient Discharge Allowances from ~~for~~ **[farm]** ~~Killermont Station~~ and the combined nutrient discharge from all the other properties in the **[X Node]** shall be:

Table 2: Nutrient Discharge Allowances

Node	Reference location	Total Discharge from this Farm (kg/year)		Combined Total Discharge from All Farms in the Node (kg/year and mg/L concentration)	
		N	P	N	P
Modelled farm leachate					
Node A ~~Ahuriri Groundwater~~					
Node B ~~Ahuriri River at Ahuriri Arm of Lake Benmore (periphyton)~~					
~~Ahuriri River at Ahuriri Arm of Lake Benmore (ANZECC)~~					
~~Ahuriri Arm of Lake Benmore~~					

~~Nutrient losses from the farm shall be monitored at each node point by the consent holder in accordance with condition 5, to verify that nutrient losses remain below the specified allowance.~~

(a) Nutrient losses from **[farm]** shall be less than or equal to the total discharges allocated to this farm in Table 2 above, and nutrient losses from **[farm]** in combination with all farms contributing to the **[X Node]** are less than or equal to the combined total discharges for all farms in the node in Table 2.

(b) Nutrient losses from **[farm]** and all the other farms in the **[X Node]** shall be monitored at each node point set out in Table 2 by the consent holder and by the group of consent holders **[water take consent holders subsequent to x date]** respectively in accordance with Condition 5, to verify that nutrient losses remain below the specified allowances.

5. Monitoring of compliance with the Nutrient Discharge Allowance ("Total Discharge from this farm") ~~at each node~~ for **[farm]** as identified in condition 4 shall be undertaken by the consent holder by:

~~a) annual use of OVERSEER, or an approved equivalent, with relevant details from the farm management diary, to estimate annual nutrient losses; and~~
~~b) continuous monitoring of nutrient losses using approved monitoring methods and annual analysis of the data to calculate the annual nutrient loss at farm scale.~~

(a) An "approved method" shall be used to model the nutrient leaching on the farm and to prepare a nutrient budget for the "subject land" for that prior 12 month period, including;

i Records shall be maintained throughout the year of the farm management practices and associated data, for **[farm]** that will be used as input to the "approved method"; and

ii Predictions shall be made of the farm management practices that will be used for the following 12 month period to provide input data to the "approved method" having regard to the need not to exceed the total Nutrient Discharge Allowance on the farm and at each node.

(b) A record of the predicted and measured input data, including continuous monitoring of nutrient losses, the calculations undertaken and the calculated nitrate-nitrogen concentration for **[farm]** shall be:

i prepared by 31 August each year; and

ii certified as an accurate record by a suitably qualified independent person; and

iii maintained for the property for the duration of the consent; and

iv. provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, by 30 September each year, or upon request.

(c) For the purposes of this condition the minimum number of gravity lysimeters (or equivalent) is three replicates of three (nine in total) per soil type or management regime and these shall be located in both irrigated and dryland areas, using methodology outlined in [XXXX]. They shall be sampled on a frequency not less than monthly for total N and total P; except that should modelling (using OVERSEER) be undertaken using soils that are "Highly Developed" and the predicted Nutrient Discharge Allowance is less than the on-farm limit in Table 2, Condition 4, then the continuous monitoring is not required.

(d) For the purposes of this condition an "approved method" is:

i The most recently published version of 'Overseer' (AgResearch); or

ii Any other method approved by the Canterbury Regional Council.

~~6. The consent holder shall prepare a nutrient budget annually for Killermont Station. A nutrient budgeting tool will be used to determine fertilizer requirements and inputs from non-fertiliser sources of nutrients. Records shall be maintained throughout the year (including farm management practices and associated data) that will be used as input to the approved method of nutrient budgeting.~~

~~7~~6. The consent holder shall ensure that fertiliser is applied in accordance with 'The Code of Practice for Nutrient Management (With Emphasis on Fertiliser Use) NZFMRA O7. Fertiliser spreaders shall be tested and calibrated by the consent holder at least annually, and every 5 years by an appropriately qualified independent auditor and the results of testing provided to the Canterbury Regional Council.

~~8~~7. The consent holder shall ensure that all new irrigation infrastructure shall be designed and accredited by a qualified independent professional, and installed in accordance with the accredited design. The design shall take into account the specific requirements of **[farm]** ~~Killermont Station~~ soil types. Copies of accredited design documents shall be provided to the Canterbury Regional Council.

~~9~~8. If existing irrigation infrastructure is being used, the consent holder shall obtain an evaluation report prepared by a certified irrigation evaluator. The evaluation shall

determine the system's current performance in accordance with the Code of Practice for Irrigation Evaluation 2005. This report shall be obtained within three months of the first exercise of the consent. Any recommendations identified in the report shall be implemented within 12 months from the date of receipt of the report. A copy of the report shall be given to the Canterbury Regional Council: attention the Compliance and Enforcement Manager.

~~10~~9. The consent holder shall ensure that all irrigation infrastructure shall be tested and calibrated by the consent holder once within 12 months of the first exercise of this consent ~~during the first year~~ and then thereafter every 5 years in accordance with the Code of Practice for Irrigation Evaluation 2005 by a certified irrigation auditor. The certified irrigation auditor shall prepare a report outlining its findings and recommendations. Any recommendations identified shall be implemented within 12 months from the date of receipt of the report. A copy of the report shall be given to the Canterbury Regional Council: attention the Compliance and Enforcement Manager.

~~11~~10. The consent holder shall maintain ongoing and complete records for **[farm]** ~~Killermont Station~~ in relation to the type of crop, cultivation methods, nutrient inputs and yields. Such records are to be used as inputs to the "approved method" as described in Condition 5(d) ~~OVERSEER model~~, and shall be made available to the Canterbury Regional Council on request.

~~12~~11. The consent holder shall ensure that nitrogen fertiliser is not applied to land between 31st May and 1st September in any year.

~~13~~12. The consent holder shall ensure that ~~once every three years~~ from the first exercise of this consent soil testing is undertaken annually between September and November to account for all sources of nutrients, including applied effluents and soil reservoirs and shall achieve the following standards:

(a) Representative average soil concentrations of Olsen P shall not exceed 25 mg phosphorous per kilogram of soil (dry weight).

(b) The sample shall be analysed by a laboratory that is certified for the analysis being undertaken. As a minimum, the parameters outlined in Table 3 be included.

(c) All sampling shall be undertaken by a suitably qualified independent person.

(d) Results and interpretation shall be submitted in a report by the independent testing person to the Canterbury Regional Council within 2 months of the sample collection.

~~14~~13. The consent holder shall ensure that all fertiliser brought onto the property which is not immediately applied to the land ~~and~~ is stored in a covered area that incorporates all practicable measures to avoid accidental spillages of fertiliser entering waterways.

~~15~~14. The consent holder shall identify within the property a fertiliser filling area, the identified fertiliser area shall be at least 50m from a watercourse, spring or bore and will have no drains that discharge to clean water or that can discharge directly ~~straight~~ to ground.

~~16~~15. If liquid fertilisers are used, the consent holder shall ensure that the fertiliser is stored in a bunded tank (minimum capacity of 110% of the stored liquid) to avoid any discharge to surface or groundwater and such that it is also protected from vehicle movements.

~~17~~16. The consent holder shall ensure that a no grazing riparian margin of at least 3 metres width ~~shall be~~ is maintained adjacent to ~~the~~ any irrigation race or surface water body on the subject property.

~~18~~17. The consent holder shall ensure that stock ~~is~~ are excluded from entering all surface water bodies on the property by fencing and/or other effective means, irrespective of whether the water bodies are perennial or ephemeral. ~~For water bodies that only flow on a temporary basis, only temporary electric fencing shall be required to exclude stock when water is flowing.~~

~~19~~18. The consent holder shall ensure that all riparian margins to surface water bodies identified in condition ~~17~~ 16 (excluding ephemeral areas and irrigation races) are planted with appropriate plant species to achieve nutrient stripping requirements. The planting shall consist of, but not be limited to:

(a) Trees and shrubs along the outer ~~zone~~ portion of the riparian planted area; and

(b) Sedges, flaxes, indigenous grasses along the stream margin.

19~~(a)~~. To achieve the obligations set out in condition 18 ~~19~~ a planting plan shall be prepared by the consent holder, having taken advice from an appropriately qualified independent ecologist in order to assist in the preparation of this Plan. This plan shall be submitted to the Canterbury Regional Council for certification prior to giving effect to this consent.

20. The planting plan required and certified under condition 19 shall be implemented prior to the exercise of this consent.

~~20~~21. The consent holder shall implement a monitoring and maintenance programme to ensure the planting undertaken in condition ~~19~~ 20 is successful. The monitoring and maintenance programme shall consist of:

(a) Three monthly monitoring for mortality of any plants during the first year post ~~implementation of the farm system~~ following the exercise of consent, and ~~then~~ thereafter six monthly for a period of two years. ~~Any gaps in the vegetation cover will be replaced.~~

(b) Any dead, diseased, or removed plants shall be replaced within 6 months.

(~~b~~c) Six monthly monitoring for visible woody weeds (eg gorse, broom, pines). Any woody weeds detected within the riparian buffer zone shall be removed immediately. Once full vegetation cover ~~required by condition 20~~ has been achieved, monitoring for woody weeds can be reduced to annually.

~~(c) Monitoring specified in (a) and (b) shall continue until 90% vegetation cover has been achieved.~~

Farm Environmental Management Plan (FEMP)

~~21~~22. The consent holder shall prepare for the approval of the Canterbury Regional Council a FEMP ~~as is required~~ to give effect to this consent. The FEMP shall be approved prior to the exercise of this consent and shall apply to the entirety of **[farm]** (including all land beyond the irrigated areas).

The objectives of the FEMP are to:

(a) ensure the proposed farm systems for **[farm]** ~~Killermont Station~~ ~~can~~ meet its nutrient ~~requirements~~ discharge allowances, and contribute to the

achievement of the total nutrient discharge allowances for all farms in the node, set out in condition 4 above, and

(b) identify and mitigate other farm specific environmental risks that are unique to **[farm]** ~~Killermont Station~~ and the farm management system that is proposed for this property.

~~22~~23. The FEMP shall set out the approach to farm management, monitoring and mitigation that will be implemented by the consent holder to address the actual and potential effects on water quality arising from nutrient runoff.

~~23~~24. The FEMP shall include use of ~~OVERSEER or an alternative industry standard~~ an "approved method" as described in Condition 5(d) to model current and proposed ~~(without additional mitigation)~~ farming systems on **[farm]** ~~Killermont Station~~ to determine the nutrient reductions required and changes to farm management practices or farm systems, in order to comply with the farm and node Nutrient Discharge Allowances specified in Condition 4.

~~24~~25. The FEMP shall include a Farm Environmental Risk Assessment (FERA) for the identification and mitigation of site specific environmental risks and triggers unique to **[farm]** ~~Killermont Station~~.

~~25~~26. The FEMP for **[farm]** ~~Killermont Station~~ shall include an on-farm monitoring plan describing the location, frequency and parameters to be monitored and the 'triggers' if applicable to require a specific mitigation task to be adopted. On farm monitoring and mitigation by the consent holder shall be in general accordance with Table ~~1~~ 3 below.

Table ~~1~~ 3 -On Farm Monitoring

On-farm	Parameter	Location	Frequency	Measured parameters to be included	Triggers	Management and Mitigation
Soil	Soil nutrient testing	All blocks in rotation	~~1 in 3 years~~ Annually within September to November	Standard suite of soil nutrients, pH, C, N and organic matter	Olsen P of 25	Reduce or stop addition of P fertiliser to area and monitor.
Soil	Soil compaction survey	Hydrologically connected areas of Manuka Creek, Frosty Gully, and Ahuriri River.	Annually	Surface and subsoil compaction	Compaction, surface capping	Remove compaction with appropriate tool
Effluent	Irrigated effluent nutrient testing	All blocks receiving effluent	Regularly throughout spreading season	Total N, nitrate, ammonia, dissolved reactive phosphorous, BOD		
Effluent	Cumulative effluent application	All blocks receiving effluent	Record each time effluent is applied	Application depth based on PNRRP Rule 26 Table WQL26 Maximum effluent application depths for discharge on to land	200kg/ha effluent N including solid fraction	Import no more effluent
Water	Groundwater quality	On farm bore *H39/0045*	Annually at mid depth of aquifer	Total Nitrogen, nitrate, ammonia, total Kjeldahl nitrogen, total phosphorous, dissolved reactive phosphorous	>1 mg/l nitrate/N	If comparative groundwater analysis from upstream and downstream indicates an exceedance of 1mg/l due to on farm activities, the N application to land should be reduced or stock held withheld for longer until a root cause analysis can be conducted.
Water	Surface water quality	Entry and exit (share with Killermont (WHL)) of Tara Hills race on property boundaries. Exit of Manuka Creek on property boundary (share with Tara Hills)	Monthly for first two years to establish patterns.	Total Nitrogen, nitrate, ammonia, total Kjeldahl nitrogen, total phosphorous, dissolved reactive phosphorus, suspended solids.	No significant decrease in water quality between up gradient and down gradient of the property.	If comparative surface water analysis indicates a decrease in surface water quality, the degraded determinands should be identified as these will

						Contamination, while a full root cause analysis is undertaken. If the determinands suggest effluent, then effluent irrigation should cease on the implicated pivots. If the analyses indicate stock encroachment, the stock should be withheld from the connected paddocks.
Water	Irrigation application		Annually by the consent holder and 1 in 5 years by an independent	Application uniformity	>80%	Optimisation of the irrigator performance will be performed at the time of testing
Fertiliser	Fertiliser application		Annually by the consent holder and 1 in 5 years by an independent	Application uniformity		Optimisation of the spreader performance will be performed at the time of testing.
Soil	Application depths	All soil types	Record each time irrigation water is applied	Application depth: Maximum depth to be based on PAWs in Condition 3(a); Minimum irrigation frequency to be based on the values in Condition 3(a) for different PAWs	Trigger soil moisture levels in table 1 (Condition 3(a))	Reduce application depths, increase irrigation frequency and maintain the irrigation trigger levels on which drainage modelling was based.
Soil	Soil Moisture	Representative of All soil types and irrigation management regime	Record each time irrigation water is applied	Soil moisture deficit prior to irrigation – either measured or calculated	Trigger soil moisture levels in table in Condition 3a	Reduce application depths, increase irrigation frequency and maintain the irrigation trigger levels on which drainage modelling was based.
Soil	Drainage	Representative of All soil types – both irrigated and dryland	Record monthly, or more frequent	Drainage water volume, TN and TP concentration	As per Condition 4	Change farm management practices

~~26~~27. The consent holder shall engage an independent expert Environmental Scientist to review the FEMP for **[farm]** ~~Killermont Station~~ prior to its approval by the Canterbury Regional Council. The expert peer reviewer shall be nominated and appointed by agreement between the consent holder and the Canterbury Regional Council. The expert peer reviewer shall prepare a report detailing their findings, and this report shall be part of the documentation submitted to the Canterbury Regional Council in seeking approval of the FEMP.

~~27~~28. The FEMP for **[farm]** ~~Killermont Station~~ shall be prepared and submitted for approval to the Canterbury Regional Council six months prior to giving effect to this consent. The FEMP shall be approved prior to the exercise of this consent.

~~28~~29. The consent holder may without changing the objectives of a FEMP seek the approval of the Canterbury Regional Council for any necessary amendment to such a plan on the following terms:

(a) The review shall be undertaken in consultation with and be approved by the Canterbury Regional Council.

(b) Such review is necessary to give effect to the purpose of the FEMP for **[farm]** ~~Killermont Station~~.

~~29~~30. The consent holder shall pay all actual and reasonable costs of the Canterbury Regional Council in connection with the review of the FEMP for **[farm]** ~~Killermont Station~~ prior to its approval.

Advice Note:

Council approval will be forthcoming to be within 90 *working days of receipt of the Farm Environmental Management plan or plans.*

~~30~~31. The FEMP and nutrient discharge allowances set out in condition 4 shall apply to **[farm]** ~~Killermont Station~~ and to any subsequent landholdings resulting from the subdivision of that property (including the removal or addition of land to that property holding) so long as that landholding relies on this consent. Should any changes to the land holding occur, the FEMP shall be reviewed and updated in consultation with and be approved by the Canterbury Regional Council to recognise the changed land area.

~~31~~32. The consent holder shall implement the FEMP from the date on which water is abstracted, or prior if necessary, to give effect to this consent and henceforth, adhere to the requirements of the FEMP required by condition ~~21~~ 22 for the duration of this consent.

~~32~~33. The FEMP for **[farm]** ~~Killermont Station~~ shall include an annual independent auditing process ~~with inputs from the farm operator and other interested parties, such as: the Department of Conservation, Ngai Tahu and New Zealand Fish and Game,~~ to demonstrate that the management practices and mitigation measures planned for the farm are being implemented.

The annual auditing process shall incorporate inputs from the farm operator and any ongoing consultation with interested parties.

The annual auditing process shall include (where appropriate) the following ~~measures~~:

(a) Checks of the storage of silage for visible signs of discharge and destination of silage liquor

(b) Checks of the fertiliser storage and filling area/s for visible signs of discharge

(c) Auditing of the farm OVERSEER nutrient budget and ~~submission of~~ compliance with thresholds

(d) Records of Fertiliser spreader and irrigation testing and of calibration at least once every ~~1 in~~ 5 years

(e) Reconciliation of fertiliser, effluent and soil records with nutrient budget and fertiliser recommendations

(f) Monthly records of stock numbers and movements on and off the property

(g~~f~~) ~~Submission and brief i~~Interpretation of soil, water quality, supplement and machinery calibration tests, including trigger exceedances.

(h~~g~~) ~~Submission~~ Review of example irrigation schedules.

(i~~h~~) Annual ~~quadrat~~ quadrant testing for % ground cover, ~~submission~~ and reporting of broad findings.

(j~~i~~) An ~~A~~annual soil compaction survey, ~~submission~~ and reporting of broad findings and any remedial~~s.~~ actions

(k~~j~~) An ~~A~~annual wet weather survey, ~~submission~~ and reporting of broad findings and any remedial~~s.~~ actions

~~(k) Annual fertiliser spreader and irrigation testing and calibration.~~

(l) Self certification for application of fertiliser according to code of practice

(m) ~~Submission of p~~Proof of "approved handler" status.

~~33~~34. The annual auditing process required in Condition 32 shall include the preparation of a report to be submitted to the Canterbury Regional Council annually. The consent holder shall engage an independent expert Environmental Scientist to review the report prior to its submission to the Canterbury Regional Council. The peer review documentation shall be submitted to the Canterbury Regional Council as part of the annual audit report.

Sub-catchment Monitoring and Mitigation

~~34~~35. Prior to the exercise of this consent the consent holder shall prepare a sub catchment monitoring plan with respect to the necessary off farm monitoring as outlined in the Table ~~2~~ 4 below.

(a) This sub catchment monitoring plan may be prepared in collaboration with other consent holders **[water take consent holders subsequent to x date]** who are required to prepare a sub catchment monitoring plan for this ~~in the~~ sub catchment in order to better achieve integrated management.

(b) The sub catchment monitoring plan shall demonstrate how the consent holder will undertake monitoring to achieve the Nutrient Discharge Allowances set out in Table 6.

(c) The sub catchment monitoring plan shall specify any pre-implementation monitoring required to confirm baseline conditions~~, and the required frequency of post implementation monitoring~~.

(d) The sub catchment monitoring plan shall specify an appropriate methodology for conducting all off farm monitoring.

(e) This sub catchment monitoring plan shall be reviewed and confirmed as being appropriate to meet its purpose by an appropriately qualified independent Environmental Scientist, prior to being submitted to Canterbury Regional Council for approval ~~certification~~. ~~Once certified,~~ Approval must be obtained prior to the exercise of this consent and the consent holder shall implement this plan and shall continue the monitoring for the duration of the consent.

(f) The sub catchment monitoring plan will set out the methods by which the data will be collected and analysed by a qualified independent person/group.

Table ~~2~~ 4 – Sub Catchment Monitoring

	Monitoring Type	**Parameter to be measured**	**Sites to be monitored**	**Frequency of monitoring post implementation**
Groundwater	Quality	Total nitrogen, nitrate, ammonia, total Kjeldahl nitrogen, total phosphorous, dissolved reactive phosphorous	All groundwater monitoring bores at mid aquifer depth	Quarterly. ~~If after 2 years there is consistency between the quarterly samples this can be reduced to twice a year.~~
Surface water	Quality	Total nitrogen, nitrate, ammonia, total Kjedahl nitrogen, total phosphorous, suspended solids, pH and temperature.	All sub catchment nodes	Monthly
	Quantity	Flow assessed when water quality sampling occurs	All sub catchment nodes	Monthly with water quality sampling.
	Clarify FRE3	Flow	Stony River, Wairepo Creek, Tekapo River, Greys River	Continuous until FRE3 has been clarified
	Establish that FRE3 is sufficient to remove nuisance algal growths	Periphyton biomass before and after a FRE3 flow event	All sub catchment nodes	One off
	Ecology	Benthic invertebrates, periphyton,	All major watercourses on	Annually for macroinvertebrates,

		macrophytes, and fish. Canada geese (if deemed required in consultation with Fish and Game) and mammalian predators (if deemed required consultation with Department of Conservation)	farms	macrophytes and fish. Monthly ~~from November – April~~ for periphyton Birds in consultation with Fish and Game Mammalian predators in consultation with Department of Conservation

~~35~~36. Prior to the exercise of this consent the consent holder shall prepare a lake monitoring plan with respect to the necessary monitoring as outlined in the Table 5 below:

(a) This lake monitoring plan may be prepared in collaboration with other consent holders **[water take consent holders subsequent to x date]** who are required to prepare a lake monitoring plan in order to better achieve integrated management.

(b) The lake monitoring plan shall specify any pre-implementation monitoring required to confirm baseline conditions.

(c) The lake monitoring plan shall specify an appropriate methodology for conducting all lake monitoring.

(d) The lake monitoring plan will set out the methods by which the data will be collected and analysed by a qualified independent person/group.

(e) The consent holder shall be levied on an annual basis in order to meet the costs inherent in conducting the ~~Upper Waitaki Catchment~~ lake monitoring outlined in Table ~~3~~ 5 below. This lake monitoring may be carried out (i) on a collective basis by a suitable independent body appointed by all relevant water take consent holders in the Upper Waitaki Catchment and approved by the Canterbury Regional Council or (ii) by the Canterbury Regional Council. All necessary costs associated with this monitoring shall be met by the consent holders on a proportional basis.

Advice Note:

Where costs are to be met on a proportional basis, this means that an individual consent holder shall meet costs according to a ratio which accounts for the proportion of land irrigated by that consent holder as a percentage of all land irrigated in the Upper Waitaki Catchment.

Table ~~3~~ 5 – Upper Waitaki Monitoring

	Monitoring Type	Parameter to be measured	Sites to be monitored	Frequency of monitoring
Lakes Tekapo, Pukaki and Ohau	Quality	Vertical profile of temperature, dissolved oxygen, pH, total nitrogen, total phosphorous, ammonia, nitrate, nitrite, total Kjedahl nitrogen, dissolved reactive phosphorous, Secchi depth, Chlorophyll-a	Lake Tekapo, Pukaki, and Ohau	Quarterly
	Lake sediment	Total nitrogen, total phosphorous		Annually
	Ecology	Benthic invertebrates, macrophytes, and phytoplankton		Annually Phytoplankton quarterly
Lake Benmore, Lake Ruataniwha and Wairepo Arm	Quality	Vertical profile of temperature, dissolved oxygen, pH, total nitrogen, total phosphorous, ammonia, nitrate, nitrite, total Kjeldahl nitrogen, dissolved reactive phosphorous, Secchi depth, Chlorophyll-a	Lake Benmore, Ahurir Arm, Northern Arm, and near Benmore Dam, Lake Ruataniwha and Wairepo Arm of Lake Ruataniwha	Monthly

	Lake sediment	Total nitrogen, total phosphorous		Every 3 years
	Ecology	Benthic invertebrates, macrophytes and phytoplankton		Annually Phytoplankton quarterly
Lake Aviemore and Lake Waitaki	Quality	Vertical profile of temperature, dissolved oxygen, pH, total nitrogen, total phosphorous, ammonia, nitrate, nitrite, total Kjeldahl nitrogen, dissolved reactive phosphorous, Secchi depth, Chlorophyll-a	Lake Aviemore near dam and Lake Waitaki near dam	
	Lake sediment	Total nitrogen, total phosphorous		Every 3 years
	Ecology	Benthic invertebrates, macrophytes and phytoplankton		Annually Phytoplankton quarterly

~~36~~37. If the monitoring undertaken in accordance with the sub catchment monitoring plan in condition 34 indicates that the nodal readings of Nitrogen and Phosphorous have reached 75% of the ~~value~~ threshold limit specified in table ~~4~~ 6, then the sampling frequency at that ~~site~~ node shall be increased to weekly and notification of the exceedence shall be provided to the Canterbury Regional Council with [2?] days of it being recorded.

~~37~~38. If the increased monitoring undertaken in accordance with condition 36 determines that the average of ~~any~~ five ~~of those~~ consecutive weekly results exceeds 75% of the ~~value~~ threshold limit specified in table ~~4~~ 6 then a report shall be prepared by an appropriately qualified independent Environmental Scientist and provided to the Canterbury Regional Council within one month of the receipt of such results. These results shall all be completed and available to the Canterbury Regional Council within one month of the 5th weekly sample being taken. ~~The purpose of the report shall be determine whether or not the cause of the exceedance is likely to be because of natural influences, or land use practices.~~

The report shall include an assessment of:

(a) the likely reasons for the observed increase in nutrient levels, including likely source and contributors (natural sources, or land use influences); and

(b) the likelihood that the threshold limit/s in Table ~~4~~ 6 will in fact be exceeded. ~~by land use practices; and~~

~~(c)~~ The report shall also identify the best practicable remedial or management measures considered necessary to ensure the threshold limit/s is not exceeded and the timeframes within which those measures shall be implemented ~~by land use practices~~.

Table ~~4~~ 6 – Thresholds

~~THRESHOLD TABLE~~		

Node	**Reference location**	**Node Thresholds (kg/year)**		**Node Thresholds (mg/L concentration)**	
		N	**P**	**N**	**P**
Node A					

Node B					
etc					

~~38~~39. If the monitoring and reporting undertaken in accordance with condition 37 determines ~~that the consent holder is either solely or partly responsible for the~~ an increase above 75% of the threshold limit/s in observed nutrient levels measured in the sub catchment, the consent holder shall be responsible for implementing ~~(either wholly or partly, depending on the degree of culpability)~~ the remedial measures outlined in the report prepared in accordance with condition 37~~(c)~~ and for providing notification to the Canterbury Regional Council of the implementation of those measures. Monitoring shall continue on a weekly basis in accordance with condition 36 until such time as the results of that monitoring show that the nodal readings of Nitrogen and Phosphorus have returned to a level/s below 75% of the ~~value~~ threshold limit/s specified in table ~~4~~ 6.

~~39~~40. If the monitoring undertaken in accordance with the sub catchment monitoring plan prepared under ~~in~~ condition 34 indicates that the nutrient ~~value~~ threshold limit/s outlined in table ~~4~~ 6 have been exceeded then:

(a) The sampling frequency at that ~~site~~ node shall be increased to weekly and;

(b) If the average of ~~any~~ five ~~of those~~ consecutive weekly results exceeds the threshold~~s~~ limit/s in table ~~4~~ 6 above then notification shall be provided to the Canterbury Regional Council within [2?] days of it being recorded and a report shall be prepared by an appropriately qualified independent Environmental Scientist and provided to the Canterbury Regional Council within one month of the receipt of such results. The report shall include an assessment of the likely reasons for the observed increase in nutrient levels, including likely source and contributors.

~~40~~41. If the monitoring and reporting undertaken in accordance with condition 39(b) shows ~~determines that the consent holder is either solely or partly responsible for the~~ a threshold limit exceedance then:

(a) the ~~annual~~ weekly allocation of water to the consent holder shall reduce by 5% for the irrigation season that is current or

which commences subsequent to the identification of the exceedance; and

(b) the consent holder shall prepare on either a collective or individual basis a Remedial Action Plan, for the certification of Canterbury Regional ~~c~~Council within 3 months of the notification required under condition 39(b).

~~41~~42. The Remedial Action Plan shall prescribe the methods and timeframes for altering and/or adapting farm practices on one or more of the farms within the affected sub catchment to ensure that the exceedance in ~~water quality standards~~ nutrient threshold limit/s under Table 6 at the affected ~~site~~ node are returned to and maintained at a level that is below the threshold~~s~~ limit/s identified in table ~~4~~ 6 for the current and subsequent irrigation seasons. The Remedial Action Plan shall be verified by an appropriately qualified independent Environmental Scientist prior to being submitted to Canterbury Regional Council for certification.

~~42~~43. Once the Remedial Action Plan prepared in accordance with conditions 40 and 41 has been certified by the Canterbury Regional Council, the consent holder shall implement immediately any necessary changes to on farm management practices required by the Remedial Action Plan. The consent holder shall update their FEMP (if necessary and in accordance with the processes set out in condition 29 of this consent) to include the changes in farm management to be adopted in accordance with condition 41.

~~43~~44. The consent holder shall continue to monitor water quality at the affected ~~site~~ node on a weekly basis, and if this monitoring indicates that the thresholds in table 6 continue to be exceeded the weekly allocation of water to the consent holder shall reduce by an additional 5% for every week that the thresholds are exceeded until monitoring shows that these thresholds are not being exceeded. If the monitoring shows that the threshold limits in table ~~4~~ 6 are not exceeded for a period of 2 consecutive months following implementation of Remedial Action Plan, then the ~~5%~~ weekly allocation reduction can be lifted, and weekly monitoring can cease once below 75% of the threshold limit/s. ~~If this monitoring indicates that the thresholds in table 4 6 continue to be exceeded the annual allocation of water to the consent holder shall reduce by an additional 5% for every week that the thresholds are exceeded until monitoring shows that these thresholds are achieved.~~ All weekly

monitoring results shall be provided to the Canterbury Regional Council as soon as they are available.

~~44~~45. Should the measures undertaken in accordance with condition ~~43~~ 42 fail to achieve compliance with the thresholds in table ~~4~~ 6 on two separate occasions, the Canterbury Regional Council shall review the consent in terms of section 128 of the Resource Management Act 1991.

ATTACHMENT TWO: PROCESS DIAGRAM FOR SUBCATCHMENT MONITORING PROCESS (CONDITIONS 36-44)