Applicant: Hurunui Water Project Limited

Recommended Conditions for Consent Application: CRC172780

Proposed Activity: To Use Land for Farming

Site Location: Hurunui Catchment, Hurunui

Proposed Consent Expiry: 10 August 2050

PLEASE NOTE: THIS IS NOT AUTHORISATION TO COMMENCE THE ACTIVITY

Prior to including proposed conditions in the officer report, I seek your endorsement of the following draft conditions.

Proposed Conditions:

1. The use of land for farming shall occur only within a maximum area of 43,762 hectares within the Hurunui River Catchment as shown on Plan CRC172780, which forms part of this consent.

2. The maximum annual amount of nitrate-nitrogen that is leached below the root zone from farming activities in the command area within the Hurunui catchment above State Highway 1 for this irrigation scheme shall not exceed a modelled dissolved inorganic nitrogen load of 1270 tonnes per year.

   **Advice Note:** The soil nitrogen leaching loss of 1270 tonnes per year has been calculated based on the estimated total soil leaching loss below the root zone and a 16% increase in the 2005 – 2011 average annual nitrogen load in the Hurunui River at State Highway 1 in accordance with the Technical Note attached as Annexure 2 of CRC172780 which forms part of this consent. This figure was derived by defining the soil leaching loss from the HWP command area within the Hurunui catchment as at 20 December 2013 and then increasing that number by 16% of the total modelled root zone loss to reflect the same percentage increase in the Hurunui River at State Highway 1. In order to track the change in leaching as land use change occurs the land use and irrigation database will be updated to reflect the changes. Updated nitrate nitrogen leaching numbers will be assigned to properties where land use change has occurred and the leaching numbers from all properties in the area defined in condition 2 will be summed to check compliance with the limit of 1270 tonnes.

3. Land-use activities within the catchment of each of the contributing waterways shall not cause an increase in Dissolved Reactive Phosphorus reaching the Hurunui River at State Highway 1 as a six yearly average annual in-stream load. Land-use activities occurring as a result of this consent shall be evaluated based on their phosphorus contribution to the Hurunui River mainstem at State Highway One and its tributaries at their confluence with the mainstem above State Highway One.
Advice Note: The six yearly average is calculated as an accumulated mean based on the previous six years data including data prior to the commencement of the consent holder’s activities.

4. For each property first receiving water, the consent holder shall quantify the aggregate nitrate-nitrogen leaching and phosphorus loss for all properties within the irrigation scheme command area, and:

   a. appoint a suitably qualified and experienced person, in consultation with the Canterbury Regional Council, to:
      i. audit and verify that the newly supplied property’s Farm Environmental Management Plan (prepared in accordance with conditions 10 to 19) achieves best practice management; and
      ii. audit the maximum annual amount of nitrate-nitrogen that may be leached below the root zone and phosphorus loss for each property; and
      iii. audit the aggregate amount of nitrate-nitrogen leached and phosphorus loss for all properties irrigated by the consent holder using the numbers derived from condition 4(a)(ii).

   b. submit a Land Use Compliance Report inclusive of the above auditor’s report demonstrating compliance with conditions 2 and 3 above to the Canterbury Regional Council Attention: RMA Monitoring and Compliance Manager by 31 July each year. The Land Use Compliance Report, shall include:
      i. a cross check against the look-up tables in Environment Canterbury report R14/19; and
      ii. the annual report required by condition 18.

Unless addressed by conditions 24 and 25.

5. Prior to the exercise of this consent, the consent holder shall form a water user group or catchment management group after full consultation with the Canterbury Regional Council to achieve the whole catchment limits for water use and limits on nutrient loss in these consents and of those in the Hurunui and Waiau Rivers Regional Plan. The consent holder, in consultation with this group, shall develop improved methods for monitoring or otherwise determining the contributions from the different landholders in each catchment within the scheme area, particularly for ensuring compliance with catchment nutrient limits including conditions 2 and 3 of this consent. If the water user group or catchment management group pools their individual nutrient limits, then compliance with the load limits specified in the individual resource consents authorising the farming activities, will be assessed by aggregating together all farming activities undertaken on all properties belonging to any water user group or catchment management group formed for the purposes of pooling nutrient limits in compliance with the combined total load limit for the water user group or catchment management group.
6. The consent holder shall, prior to the commencement first exercise of this consent:
   
a. Install weather monitoring stations at representative locations within the command area that will enable the determination of daily rainfall, evapotranspiration and soil moisture.
   
b. The rainfall, evapotranspiration, and soil moisture data from the weather stations shall be made available for all scheme users for the purpose of irrigation scheduling to ensure efficient water use.

   *Advice Note: The information collected from the weather stations will be used to assist individual water users with irrigation management and the efficient on-farm water use as detailed in the Farm Environmental Management Plans (FEMPs).*

7. **Scheme Environmental Management Plan (SEMP)**

   Prepare a Scheme Environmental Management Plan (SEMP) in accordance with Conditions 9-11 of CRC120675.

8. **Surface water monitoring**

   Undertake surface and groundwater quality monitoring in accordance with conditions 12-20 of CRC120675.

9. **Nutrient Management Issues**

   The consent holder shall engage a suitably qualified and experienced person to implement a catchment nutrient load model and budgeting tool to track changes in nutrient discharges arising from the commencement and implementation of the scheme for all the command area that drains into the Hurunui River upstream of the State Highway One flow recorder and the summary output from the model shall be provided to the Canterbury Regional Council Attention: RMA Monitoring and Compliance Manager prior to the commencement of irrigation under this consent and on an annual basis once irrigation commences. All the model input data shall also be provided to the Canterbury Regional Council on request for auditing purposes.

10. **Farm Environment Management Plans**

    Prior to and during the use of water from the scheme for irrigation on individual properties, there shall be a Farm Environmental Management Plan (FEMP) prepared, produced, maintained and implemented for each property which shall cover the total farm property (including areas not using water authorised by this consent). The FEMP shall be developed in general accordance with the Irrigation New Zealand Farm Environment Plan Template or the latest revision. The FEMP shall be developed with input from the land owner or manager to ensure it is tailored to their land area and is practical to implement.

11. Each FEMP shall take into account all sources of nutrients used for the farming activity and identify all relevant nutrient management practices and mitigation measures. Industry articulated good management practices shall be implemented.
on all properties receiving water from the scheme to minimise the loss of nitrate-nitrogen to soil drainage water, and to minimise any loss of sediment, phosphorus or nitrogen to surface waters. Industry articulated good management practices shall be specified in each FEMP.

12 The consent holder shall:

   a. Keep a copy of each FEMP, and supply any such FEMP to the Canterbury Regional Council, on request; and
   b. Ensure the implementation and auditing of the FEMPs.

13 Each FEMP shall include the following objectives:

   a. Ensure that all irrigation systems on the property area are capable of operating to meet industry and scheme standards for industry articulated good practice irrigation. Water application rates shall be determined for the particular soil types and climate of the property;
   b. Maximise water application effectiveness while minimising excess drainage and runoff utilising climate information, including that provided by the scheme;
   c. Minimise the incidence of wind and/or water erosion caused as a result of farming practices;
   d. Minimise nutrient losses to surface and ground water through the use of nutrient budgeting and implementing nutrient management;
   e. Minimise nitrate leaching and/or run-off losses to surface and ground water through measures such as careful fertiliser management, management of drains, and planting of strategic buffer zones around surface water bodies (including drains);
   f. Minimise phosphorus run-off losses to surface water through minimising surface runoff of sediment and effluent through properly designed and operated effluent systems, riparian planting, control of runoff from stock tracks and bridges and ensuring that crops are not grazed close to waterways.
   g. Apply nutrients only where needed to maximise effectiveness and minimise losses to non target areas;
   h. Minimise the risk of groundwater and surface water contamination by nutrients and microbial pathogens by managing and collecting animal effluent to meet industry articulated good management practice standards.
   i. Limit stock access to waterways and wetlands (including drains, races and stockwater races) to maintain water quality and to encourage native vegetation growth;
   j. Minimise soil loss and contamination of waterways;
   k. Avoid, remedy or mitigate effects on native plants and native animals and their habitats on individual farm properties and where possible enhance native plants and native animals and their habitats; and
   l. Ensure that if a property holds any existing consents for the irrigation of land on the property and wishes to use water under this consent on the same area of land, the use of water for these areas shall comply with the water use requirements specified in this consent related to the efficient use of water. The combined application rate for water taken from
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<tr>
<td>14</td>
<td>Each FEMP shall:</td>
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<tr>
<td></td>
<td>a. include for each objective:</td>
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<td></td>
<td>i. Measureable targets that clearly set a pathway and timeframe for achievement of the objective;</td>
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<td></td>
<td>ii. A description of the industry articulated best management practices together with actions required to achieve the objective and targets;</td>
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<td></td>
<td>iii. The records of measuring performance and achievement of the targets.</td>
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<td>b. Specify (in kg/ha/yr) a maximum annual amount of nitrate-nitrogen that may be leached below the root zone and phosphorus loss estimated for the property using OVERSEER;</td>
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<td>c. To the extent that OVERSEER is updated, then the original input file shall be adopted in the replaced version of OVERSEER to determine the change in the nutrient loss rate specified in sub-clause (b) above.</td>
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<td>15</td>
<td>A suitably qualified and experienced person in conjunction with each water user within the scheme shall write the part of the FEMP that provides the site specific farm environmental risk assessment.</td>
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<td>16</td>
<td>The consent holder will audit the FEMPs on an annual basis:</td>
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<td></td>
<td>a. Each FEMP shall be audited by a suitably qualified independent assessor appointed by the consent holder. The purpose of the audit shall be to ensure that the FEMP demonstrates achievement of the objectives as set out in Condition 14 and demonstrates compliance with conditions of this consent.</td>
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<td>b. For the first three years of receiving and using scheme water for irrigation, each farm plan will be independently audited annually. Audits undertaken by an independent assessor will continue annually if there is any non-compliance with the FEMP.</td>
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<td>c. When all the conditions have been complied with for three consecutive years each plan will be independently audited, including a site visit, at least once every three years. If there is a change in the farm ownership or a change in key management staff or if the three yearly audit indicates a failure to fully implement the FEMP or any noncompliance with any of the conditions of this consent then annual independent audits will again be required until full compliance has been achieved for three consecutive years of independent audits.</td>
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<td>d. In the event that the areas of non-compliance are identified, the consent holder shall take all practicable steps including, if necessary, suspending the irrigation water supply to ensure that the water users are fully compliant as soon as practicable and in any case prior to next 30 July.</td>
</tr>
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<td>17</td>
<td>The consent holder shall obtain from water users who use any other land (other than a property within the HWP Scheme) for the wintering of stock within the Hurunui catchment, an undertaking that the water user will only use such land where the property has a FEMP or other requirement that incorporates industry...</td>
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articulated good management practices for the management of stock and nutrients.

18 As at 31st July each year, the consent holder shall compile the FEMPs and collate the individual property assessments and supply this information, in a schedule and a map, to the Canterbury Regional Council Attention RMA Monitoring and Compliance Manager in the annual report. The schedule and map shall show the area irrigated on each property and the estimated nitrogen and phosphorus losses from each property from the FEMP budgets and the total water used during that season.

19 The consent holder shall not use water to supply any farm or group of farms, where the farm or group of farms is causing significant adverse localised effects resulting in:
   a. Breaches of the Drinking Water Standards for New Zealand 2005 (revised 2008); or
   b. Land drainage problems;

   unless each of the effects listed above are adequately mitigated to an extent that is considered acceptable by the consent holder and the Monitoring and Compliance Manager of the Canterbury Regional Council.

20 The consent holder shall not authorise or permit any person to use water under this resource consent unless that authorised person provides a written undertaking to comply with Conditions 10 to 19 of this resource consent, to the same extent as if the resource consent had been granted to that person as well as the consent holder.

**Reporting and Review of Scheme Environmental Management Plan (SEMP)**

21 The consent holder shall prepare a report describing the results of the environmental monitoring outlined in the SEMP, for the period 1 July to the following 30 June for each year compared to monitoring from previous years, together with details of any mitigation implemented. This report will identify any recommended changes to the SEMP, which may only be implemented following the Canterbury Regional Council’s approval.

22 The consent holder shall submit the annual report to the Canterbury Regional Council, Attention: RMA Monitoring and Compliance Manager by 31 July each year.

23 A review of the SEMP will be carried out by the consent holder each year, and as part of consent reviews at Stage 1, mid-Stage 2 and late Stage 2 (as described in condition 28 of this consent) and as part of the final planning of Stage 2 of the scheme. The review of the SEMP and any revisions to it shall be submitted and approved by the RMA Monitoring and Compliance Manager of the Canterbury Regional Council and prior to the take and use of water for Stage 2.

24 If the consent holder supplies water for use for irrigation on land within the Hurunui Catchment (as shown on Plan HWP 1) on which irrigation is authorised by
a separate land use consent, the separate land use consent provides that:

a. The separate consent includes one or more conditions which:
   i. specify a numerical limit for the annual load of nitrogen that may be leached from the soil (and an annual reporting requirement using Overseer or such other method approved by the Chief Executive of the Canterbury Regional Council);
   ii. include restrictions (no more lenient than those contained in condition 3 of this consent) on the amount of Phosphorus that may be lost from the property (and an annual reporting requirement using Overseer or such other method approved by the Chief Executive of the Canterbury Regional Council);
   iii. requires the efficient use of water and places a numerical limit on the amount of water that can be applied to the land;
   iv. requires the preparation of and compliance with a Farm Environment Plan.

b. Prior to the supply of water the consent holder of this consent has:
   i. undertaken the requirements outlined in conditions 7 and 8 of this consent (unless the requirements or those of conditions intended to achieve equivalent outcomes have already been carried out by the separate consent holder to an equivalent or better standard);
   ii. informed the Canterbury Regional Council (Attention: RMA Monitoring and Compliance Manager) of the consent holder the water is being supplied to under this condition, and the consent(s) authorising irrigation on those properties.

25 If the consent holder supplies water and the water is used in a manner that complies with the relevant conditions of that separate consent then the holder of that separate consent shall not be required to comply with the conditions of this consent. Similarly, the holder of this consent shall not be required to comply with the conditions of the separate consent. For the avoidance of doubt, the holder of this consent is required to account the aggregate nitrate-nitrogen leaching and phosphorus loss for all properties within the irrigation scheme command area in accordance with conditions 4 and condition 5.

Advice Note: the numerical limit for nutrient control in this instance needs to be in such a form in the separate consent so that there is one point of control and monitoring back to the Canterbury Regional Council on nutrient controls. For the avoidance of doubt, where the separate consents meet the requirements of this rule, HWP would not be required to also supply individual farm nutrient information to the consent authority.

26 Reference to best management practices shall be defined as the industry accepted best management practice for irrigated land use applying at the time farm development commences on an individual property when utilising the consent holder’s water for irrigation purposes, and subsequent modifications to best management that are practical to implement on that individual property.
<table>
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<th><strong>Review</strong></th>
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| **27** The Canterbury Regional Council may, once per year, on any of the last five working days of May or November, serve notice of its intention to review the conditions of this consent, including reviewing the load of 1270 tonnes set in condition 2 above, for any of the following purposes:
| a. dealing with any adverse effects on the environment which may arise from the exercise of this consent; or |
| b. dealing with any matter arising out of a review or survey required under condition 28. |
| **28** The consent holder shall carry out the following assessments of their performance against the conditions of these consents within the time periods specified below:
| a. At the time the design details for the reservoirs are lodged with the Canterbury Regional Council, the consent holder shall report whether the actual storage volume (either live or total storage) of any of the reservoirs differs by more than five percent from those volumes described in the AEE; and |
| b. Upon completion of the further ecological surveys and studies required under the conditions of CRC120692, the consent holder shall report whether this work reveals taxon or taxa within any proposed dam or reservoir footprint of such conservation value that:
| i. the population or their habitat is deemed by an appropriately qualified expert to be of national significance; and/or |
| ii. additional mitigation or offset measures are required to address the adverse ecological effects of the proposed inundation. |
| c. Within the earlier of:
| i. six months of irrigation water first being used to irrigate 15500 hectares of land (Stage 1); or |
| ii. seven years after water is first being used for irrigation |
| the consent holder shall assess the following matters:
| i. the appropriateness of the annual volume limit on water taken; |
| ii. compliance with nitrogen and phosphorus limits (including any limits specified in the Hurunui and Waiau River Regional Plan or subsequent regional plan); |
| iii. review of mitigation and offsets provided for in the Ecological Plan; and |
| iv. assessment of measures necessary to ensure compliance with limits applying to the remainder of Stage 2 of the scheme (including any limits specified in the Hurunui and Waiau River Regional Plan or subsequent regional plan). |
| d. Unless otherwise agreed by a catchment nutrient management agreement approved by the Canterbury Regional Council, Stage 2 of the proposed irrigation scheme, as described in the application, cannot commence unless the review process under condition 28(c) has been completed. |
| e. Within the earlier of: |
The consent holder shall assess the following matters:

i. the appropriateness of the annual volume limit on water taken;

ii. compliance with nitrogen and phosphorus limits (including any limits specified in the Hurunui and Waiau River Regional Plan or subsequent regional plan);

iii. review of mitigation and offsets provided for in the Ecological Plan; and

iv. assessment of measures necessary to ensure compliance with limits applying to the remainder of Stage 2 of the scheme (including any limits specified in the Hurunui and Waiau River Regional Plan or subsequent regional plan).

f. Within the earlier of:

i. six months of irrigation water first being used to irrigate more than 45000 hectares of land; or

ii. eighteen years after water is first used for irrigation;

the consent holder shall assess the following matters:

i. the appropriateness of the annual volume limit on water taken;

ii. compliance with nitrogen and phosphorus limits (including any limits specified in the Hurunui and Waiau River Regional Plan or subsequent regional plan);

iii. review of mitigation and offsets provided for in the Ecological Plan; and

iv. assessment of measures necessary to ensure compliance with limits applying to the remainder of Stage 2 of the scheme (including any limits specified in the Hurunui and Waiau River Regional Plan or subsequent regional plan).

The assessments described in conditions 28(c) to 28(f) are temporal assessments (conditions 28(c)(ii), 28(e)(ii) and 28(f)(ii)) and hectare assessments (conditions 28(c)(i), 28(e)(i) and 28(f)(i)). The hectare assessment requirements are fixed but in order to avoid duplication of the assessment process, a temporal assessment does not need to be conducted if a hectare assessment has been completed within 18 months of the temporal assessment date. In addition, the consent holder, on reaching a temporal assessment date, may elect to complete a hectare assessment at the same time to determine the next stage of development where the hectares irrigated are within 1,500 hectares of a hectare review.

Within six months of completing the assessments described in Condition 28, the consent holder shall report to the Canterbury Regional Council RMA Monitoring and Compliance Manager on the findings of those assessments and the measures proposed to be implemented to ensure effects on the environment are no more significant than under the original proposal.
Upon receipt of any of the review reports described in Condition 30, the Canterbury Regional Council shall review the conditions of the consents pursuant to Section 128(1) of the Resource Management Act 1991 for the purpose of avoiding, remediying, or mitigating any adverse effect on the environment arising from the review or any increased risk of future non-compliance with conditions of the consents.

Reviews under Condition 28 (c), (e) or (f) shall include consideration of whether the area to be irrigated under the proposal should be reduced in order to reasonably ensure compliance with the nutrient load limits of this consent.

In accordance with Section 127 of the Resource Management Act 1991 the consent holder may, no earlier than twelve months after the approval of the Management Plans required by Condition 2 in WHIS General Conditions, apply to change or cancel any of the conditions of this consent.

Advice Note: These conditions apply where specific review conditions have not otherwise been imposed.

In addition to the above, Conditions 1 – 43 contained in General Conditions applying to all consents issued for the WHIS apply (referred to as schedule 1 in those consents).

Full Name(s)

I ________________________________________ have read and understood the conditions and confirm that I will be able to comply fully with these conditions. I also acknowledge that endorsing the above conditions is in no way written authorisation to commence the activity that is the subject of this application.

Signed: _____________________________________________________________________________

Date: _______________________________________________________________________________

Attachments:

Plan CRC172780
Annexure 2: CRC172780
Schedule One 1: General Conditions
**Annexure 2 of CRC172780**

This note summarises the procedure used to estimate the allowable soil leaching loss for the HWP consent. That was achieved by defining the current soil leaching loss from the HWP command area and increasing that number by 16% of the total modelled root zone loss at SH1.

This same methodology should be used to provide an annual calculation of leaching loss from the area defined in condition 2, to check compliance with the limit in that consent condition. The information in this technical note describes the information sources and how those information sources are used to generate the estimate of soil leaching loss across the Hurunui catchment between Mandamus and State Highway 1.

Overall, the estimates of soil leaching losses are based on the ECan Lookup tables (Lilburne, et. al, 2013) with adjustment factors applied to allow for additional drainage (and therefore leaching rates). Details of the derivation of those adjustment factors are presented in Aqualinc (2014) and a copy of the adjustment factors are appended in the Table at the end of this memo. The adjustments are broadly based around corrected estimates of drainage from soil moisture balances.

The ECan ‘Lookup tables’ are relatively simplistic estimates of nitrogen loss from the soil root zone, but are applicable to large, catchment scale estimates. The ‘Lookup tables’ require four main inputs to determine a leaching rate for a particular area of land including:

a) Landuse type;

b) Irrigation type (spray or border dyke)

c) Climate zone (Lincoln, Darfield or Hororata); and

d) Soil type.

The sources of information for each of these inputs are described in the following sections. Plots of the spatial location of each of the area are presented in Figures attached to this memo.

A. Landuse

Landuse data for the number in the consent condition was sourced from four main datasets (Figure 1):

1. **Data from Amuri Irrigation Company Limited.** AICL have developed their own estimate of root zone leaching from the area of land supplied under their scheme. The landuse across this area in the estimate of soil leaching for HWP is the same as in the AICL model.

2. **Shareholder surveys.** The results of HWP shareholder surveys in 2012, where HWP shareholders were asked to detail the landuse across their properties were the source of information for much of the area to the south of the Hurunui River. The surveys included questions regarding the proportions of sheep and beef across land areas, stocking rates for dairy platform areas, whether cows were wintered on or off a property, and details of the areas irrigated across a property. Updated information from Ngai Tahu Property Ltd was provided for the Balmoral area to reflect the December 2013 land use, together with minor
modifications to that data made agreement with Environment Canterbury.

3. **Agribase data.** Data from a previous landuse survey across the area were also used where no shareholder information was available. These data are based on information from 2010 and are therefore less up to date than data from either of the AICL data or shareholder surveys.

4. **CLUES.** The final data source was taken from CLUES. These data are relatively older than the other three sources and represent the dominant landuse across an area. These data were only used where none of the other three data sources were available and cover a small fraction of the total area modelled.

B. Irrigation Types

Areas that were defined as ‘irrigated’ across the model area were identified based on four main sources:

1. **Data from Amuri Irrigation Company Limited.** In a similar way to the landuse data, areas defined as irrigated across the AICL area were derived from data provided by AICL. These included areas defined as pivot irrigated, border dyke, rotorainer and K line irrigated, as well as some areas of dry land.

2. **Remote sensing and aerial photos.** Aerial photos from various times were used, based on imagery from Google Earth and Microsoft Bing mapping. Where imagery was recorded during summer, irrigated areas were typically easy to define, together with areas irrigated under centre pivots or border dykes. A second source of data was from satellite imagery showing the Normalised Difference Vegetation Index (NDVI). This data is based on the theory that dryland vegetation absorbs less solar radiation than irrigated areas, where the plant density is typically greater. These data are available from NASA and the data used for this exercise was derived from aerial imagery taken in March 2014.

3. **Shareholder Surveys.** The results of shareholder surveys in 2012, where irrigated areas were identified were incorporated in the maps of areas defined as irrigated. Where the type of irrigation was identified, that data was incorporated. Where no information was provided, further checks were carried out based on remote sensing.

4. **Agribase data.** In a similar way to the landuse data source, Agribase indicates which areas are irrigated, either via spray irrigation or border dyke irrigation. These data were used in areas where no shareholder data was available and outside the AICL area.

Figure 2 presents the spatial distribution of data sources described above that was used to define the leaching number in the consent. Figure 3 presents the types of irrigation that were classified across the area.

C. Climate Zones

Climate zones data is based on information from NIWA’s mean annual rainfall estimates (MAR) across the area. Figure 4 presents the spatial distribution of climate zones across the area.

D. Soil Types
Soil type data is based on three data sources:

- Data already used across the Amuri basin area (AICL land)
- Data provided to PDP by Landcare Research
- Data from the Fundamental Soils Layer

Figure 5 presents the spatial location of sources of data for soil types across the area. In general, data from the fundamental soils layer was used across a small proportion of the area, along the Hurunui riparian areas and a small part of the edge of the Waikari Valley. The resulting patterns of soil distribution are shown in Figure 6.

Current Leaching Rates

The Table attached to this note presents a summary of leaching across the area at the time the consent was granted.

Future Changes

The land use and irrigation type databases will need to be updated in the future as land use changes occur, so as to track the change in the N leaching values for different categories of land use within the catchment. Updated look-up table numbers that reflect that land use and/or irrigation type change will be assigned to the properties where land use change has occurred and the list of leaching values from all properties in the area defined in condition 2 will be summed to check compliance with the limit in condition 2. It is noted that the look-up table numbers themselves will not be updated as the limit of 1,270 tonnes of nitrate nitrogen per year has been calculated based on Lilburne, et. al, 2013.

References


**ASSESSMENT OF SOIL LEACHING LOSS FOR HWP**

1. Updated assumptions for soil leaching between Mandamus and SH1, based on amended land areas, new look-up tables and some extra leaching under spray irrigation

<table>
<thead>
<tr>
<th>Land Area Categories</th>
<th>HWP Stage 2</th>
<th>AIC shareholders outside HWP</th>
<th>Total HWP</th>
<th>NTP (Balmoral)</th>
<th>Other Irrigable Land</th>
<th>Non-Irrigable Land</th>
<th>Total Soil Leaching Contribution to SH1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modelled Area (ha) contributing to load</td>
<td>7,622</td>
<td>27,591</td>
<td>35,214</td>
<td>9,714</td>
<td>8,545</td>
<td>2,292</td>
<td>92,500</td>
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<tr>
<td>Average leaching (kg/ha/yr)</td>
<td>48.5</td>
<td>21.3</td>
<td>27.2</td>
<td>50.4</td>
<td>8.5</td>
<td>31.0</td>
<td>3.0</td>
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<tr>
<td>Total load (t/yr)</td>
<td>370</td>
<td>589</td>
<td>959</td>
<td>490</td>
<td>73</td>
<td>71</td>
<td>278</td>
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</tbody>
</table>

*Note 1*: The areas listed above exclude areas identified as ‘water’ and ‘roads’. Leaching from these landuses is set to 0.

*Note 2*: Average leaching rates derived from updated Ecan look-up Tables (Ecan report R14/19) with the exception of Non-irrigable land where a rate of 3.0 kg/ha/yr was used.

*Note 3*: AIC Command Area overlaps with 'Other HWP' and 'Other Irrigable Land'.

2. **Total soil leaching contributing to SH1**

| Soil leaching from Mandamus to SH1 (t/yr) | 1,870 |
| Soil leaching above Mandamus (based on in river load of 39 t/yr at Mandamus) | 78 |
| **Total leaching load above SH1 (t/yr)** | **1,948** |
| 18.5% of total leaching load (t/yr) | **360** |

3. **Allocation to HWP**

| Current HWP loss (t/yr) | 959 |
| 16% of total leaching contribution to SH1 (t/yr) | 311 |
| **Total Allocation to HWP (t/yr)** | **1,270** |
| Portion of 25% allowable increase | 16% |
## N load adjustment to correct for Overseer drainage estimates

<table>
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<tr>
<th>Soil</th>
<th>Pivot MAR=640mm</th>
<th>Pivot MAR=750mm</th>
<th>Pivot MAR=895mm</th>
<th>Rotoramer MAR=640mm</th>
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Schedule 1: General Conditions

General Conditions Applying to All Resource Consents - CRC120687, CRC120695, CRC120691, CRC120696, CRC120692, CRC120694, CRC122547, CRC120675, CRC130467

The following are General Conditions applying to all resource consents granted for the Waitohi Irrigation and Hydroelectricity Project (also known as the HWP scheme):

General

1 No water takes or uses shall commence until all obligations relating to that stage of scheme development and contained in other conditions of these consents have been met to the satisfaction of the Canterbury Regional Council RMA Monitoring and Compliance Manager.

Management Plans

2 The consent holder shall prepare for the approval of the Canterbury Regional Council RMA Monitoring and Compliance Manager such Management Plans as are required to give effect to the purposes and objectives specified in this consent, including, but not limited to the following:

(a) Scheme Environmental Management Plan (SEMP);
(b) Ecological Management Plan (EP);
(c) Waitohi Restoration Plan for the lower Waitohi and Washpen Stream;
(d) Braided River Birds Monitoring and Management Plan (BRBMMP);
(e) Reservoir Management Plan; and
(f) Recreation Management Plan;
(g) Excavation Management Plan.

3 The likely timing of the delivery of these Management Plans shall be identified by the consent holder within three months of the issue of this consent. The consent holder shall work collaboratively with the Canterbury Regional Council to ensure that ample notice of the delivery date for each plan is provided to assist the Canterbury Regional Council with planning the allocation of resources to assess each of the plans.

4 The consent holder may, without changing the purpose or objectives of a Management Plan referred to in Condition 2 above, seek the approval of the Canterbury Regional Council RMA Monitoring and Compliance Manager for any necessary amendment to such plan.

5 The consent holder may review and revise any Management Plan at any time on the following terms:

(a) The review shall be undertaken in consultation with and be approved by the Canterbury Regional Council RMA Monitoring and Compliance Manager;
(b) The consent holder shall, in relation to any change to any Management Plan, consult with the same parties it is required to consult in relation to the preparation of the original Management Plan under these conditions of consent;
(c) Such review shall be necessary to give effect to the purpose or objectives of the Management Plan.

6 All Management Plans shall state the objective or objectives sought to be achieved by such plans.

7 The consent holder shall pay all actual and reasonable costs of the Canterbury Regional Council in connection with the review of all Management Plans, design statements and design specifications prior to their approval.

Advice Note: Approval from the Canterbury Regional Council to be within 30 working days of receipt of each plan or plans.
Community liaison group

8 Within twelve months of the date of issue of these consents, the consent holder shall undertake an open public process to offer local residents and interested people, including representatives from the consent holder, the Canterbury Regional Council, and the contractors for the scheme the opportunity to be involved in a Community Liaison Group. The Community Liaison Group shall be chaired by an independent facilitator appointed by the consent holder in consultation with the Canterbury Regional Council.

9 In the event that it is not possible to establish such a group through no fault of the consent holder then such failure to do so shall not be a breach of these conditions.

10 The objectives of the Community Liaison Group shall be to:

(a) Build effective working relationships and mutual trust between the local community and the consent holder (including its contractors), especially during construction;

(b) Promote the free flow of information in all directions between the local community, the consent holder, the contractors, and the Canterbury Regional Council, in order to try to anticipate and resolve any potential issues before they arise;

(c) Participate in subsequent design and consent processes, including being consulted on detailed design of Stage 1 and Stage 2 water distribution and on Phase 2 consents;

(d) Evaluate the results of monitoring activities on a periodic basis;

(e) Oversee a Community Complaints Procedure, ensuring appropriate responses from the consent holder are forthcoming; and

(f) Recommend any changes to proposed mitigation measures that might be appropriate in light of the monitoring.

Complaints procedure

11 Within twelve months of the date of issue of these consents, the consent holder shall establish and operate a Community Complaints Procedure as follows:

(a) The consent holder shall have a clearly nominated and publicly communicated contact person within its own organisation or within one of its local agents for receipt of, and attendance to, complaints during construction;

(b) The consent holder shall establish a 24-hour free phone number for the local community to call if they have any concerns or complaints regarding construction. The free phone number shall be advised to all residents within the area affected by scheme construction via post and shall be advertised in the local newspaper prior to the commencement of construction of the scheme and at regular periods during construction;

(c) The consent holder shall maintain a log of any complaint received, including the following: the date, time, complainant name and contact details, nature of the complaint including the cause and effect if known, and record action taken to address or mitigate the complaint;

(d) The consent holder shall respond to complaints as soon as is practicable but not later than 24 hours and shall log the action that it intends to take in response to the complaint;

(e) The consent holder shall communicate with the complainant about actions taken;

(f) The consent holder shall document any other longer term actions to be taken;

(g) The consent holder shall present an incident summary (i.e. (c) to (e) above) to the meetings of the Community Liaison Group (in the event it is established) for review; and

(h) The consent holder shall make the complaints and response log available to the Canterbury Regional Council RMA Monitoring and Compliance Manager on request.

Monitoring of Hurunui and Waitohi River Channel Geomorphology
The consent holder will undertake a topographic survey of river cross sections at the below locations on a 5 yearly cycle and report the findings to the Canterbury Regional Council;

a) 250 m downstream of Powers Rd Bridge (Waitohi River) N5255673 E1564159;

b) 250 m downstream of Waitohi Rd Bridge - Horsley Downs (Waitohi River) N5252660 E1571473;

c) 250 m downstream of Medbury Rd Bridge - SH7 (Waitohi River) N5252300 E1578899;

d) 500 m downstream of Intake 4 (Hurunui River) N5257407 E1553286;

e) 500 m downstream of Intake 3 (Hurunui River) N5261307 E1564486;

f) 500 m upstream Camp Road (Hurunui River) N5258320 E1571226 Adjacent to Duns Road (Hurunui River) N5254307 E1576439; and

g) 1.5 km downstream of SH7 (Hurunui River) N5254107 E1582453.

- Advice Note: Particular regard shall be taken to record accumulation of fine sediments, sand and silts at river cross sections. Surveys shall be to standards consistent with those used by Canterbury Regional Council, and where practical, these surveys shall coincide with any being carried out by the Canterbury Regional Council.

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**Braided River Birds**

13 The Consent Holder shall establish an Environmental Management Trust (the Trust). The purpose of the Trust shall be to collect and administer funding for ecological management of the Waitohi and Hurunui Rivers, as set out in Conditions 14 to 17. The funding and work of the Trust is not to be applied to implementation of other ecological conditions and mitigations specifically required under these consents.

14 The Consent Holder shall contribute a sum of $20,000 to settle the Trust within 12 months of the commencement of these consents. Thereafter the consent holder shall contribute $15,000 per annum to the Trust until water is made available to 15500ha being Stage 1 of the scheme. Thereafter the consent holder shall contribute $30,000 per annum, with at least $20,000 being paid in cash and the remainder either paid in cash or through water users’ in-kind contributions to achieving the Trust’s objectives on the ground (examples of in-kind contributions being assistance with predator control, riverbed weed control, bird monitoring and riparian re-vegetation in locations not otherwise required under these consents).

15 The Trust shall prepare and submit to the Canterbury Regional Council for approval a Braided River Birds Monitoring and Management Plan (BRBMMP). The BRBMMP shall be submitted prior to the abstraction of water authorised under these consents and prior to commencing the surveys set out in Condition 17(b). The BRBMMP shall provide for the following objectives;

- To maximise opportunities to protect and enhance braided river bird populations.

- To monitor populations of braided river birds in order to detect long-term changes in distribution and abundance.

16 To achieve the objectives set out in Condition 15, the BRBMMP shall include:

- Timeframes and reporting requirements;

- Methods to monitor the abundance and distribution of black-fronted terns, pied oystercatchers, and black-billed gulls on the Hurunui River between the Mandamus River confluence and the Hurunui River mouth, and on the Waiothe River from and including the reservoirs to the confluence with the Hurunui River. Monitoring shall occur at least once within two years before exercising these consents, and once within two years after exercising these consents and thereafter at least once every five years. Bird monitoring shall include replicated counts within each year during which monitoring is undertaken;

- Methods to characterise and measure the suitability of habitat for braided river birds. These may include but not be limited to measurement of major habitat types and vegetative cover using aerial photography and measurement of river braiding (numbers and widths);
(d) Methods to control introduced weeds species that invade bird habitat, including but not limited to European broom, gorse, tree lupin, willows, poplars, pines, and alders;

(e) A long-term weed control strategy that aims to maximise conservation benefits in relation to resources invested, including identification of opportunities for water users to contribute in-kind;

(f) Methods to collaborate with councils or gravel extractors, if opportunities arise, to use heavy machinery to ensure that important nesting islands remain surrounded by water during the breeding season;

(g) Methods to control southern black-backed gulls to reduce their numbers on the Hurunui River to less than 10% than present immediately prior to exercise of the these consents, and maintain numbers at or below this level; and

(h) Methods to record, and electronically store, audit and backup data gathered under these consents.

17 The BRBMMP shall be implemented by the Trust.

18 The Trust shall prepare and submit to the Canterbury Regional Council an annual report, reporting on the work undertaken and effectiveness of achieving the objectives of the BRBMMP, and make recommendations as necessary for an adaptive management approach to achieve the objectives set out in Condition 15. The Trust shall submit this annual report to the Canterbury Regional Council Attention RMA Monitoring and Compliance Manager by the 31 July each year.

Advice Note: The consent holder is not expected to achieve total weed or southern black-backed gull control on the Hurunui River.

Archaeology

19 The consent holder shall erect display panels identifying the known historic heritage features of the area; the Upper Wagon Cut which is a road belonging to the 1860s, Leith’s Black Hotel built circa 1865 and the Rabbit Fence constructed in the 1880s. These display panels are to feature these sites and describe the gold rush, the Waitohi Gorge settlement as well as the early pastoral history. These interpretative signs are to be erected alongside the road to the Lower Gorge that overlooks these features.

20 A survey of the Hurricane Gully inundation area shall be undertaken by a qualified archaeologist in consultation with the local Rununga prior to the filling of the reservoirs. The results of this survey shall be provided to the Historic Places Trust and the Canterbury Regional Council.

21 An exploratory excavation shall be undertaken of the area known as the Waitohi Gorge Settlement Area. An Excavation Management Plan shall be prepared in consultation with the Historic Places Trust.

  * Advice Note: An Archaeological Authority under the Historic Places Act 1993 will be required in respect of the exploration of the Waitohi Gorge Settlement Area, and the removal of the section of historic rabbit fence. If any evidence of heritage features is discovered within the inundation area as a result of the survey required at Conditions 20 and 21, a further Archaeological Authority will be required.

Accidental Discovery for areas not covered by an Archaeological Authority

22 This protocol shall cover archaeological sites, historic sites and historic buildings classified under the Historic Places Act 1993. Where appropriate, all contractors, project managers and stakeholders shall be inducted into the protocol and made aware of their individual responsibilities under the protocol.

23 In the event of any disturbance of kōiwi tangata (human bones) or taonga (treasured artefacts), the consent holder shall immediately:

  a) Advise the Te Rūnanga o Ngāi Tahu, Te Rūnanga o Kaikōura and Te Rūnanga o Ngāi Tūāhuriri, or their representative, and the Canterbury Regional Council of the disturbance; and

  b) Cease earthmoving operations in the affected area until the area containing the kōiwi tangata or taonga has been clearly demarcated, and kaumatua and archaeologists have certified that it is appropriate for earthmoving to recommence.
In the event of accidental discovery of archaeological remains, the following steps shall be taken:

a) All activity affecting the immediate area shall cease and the Regional Archaeologist of the New Zealand Historic Places Trust shall be contacted;

b) The site shall be secured to ensure that the remains are not further disturbed;

c) Further works affecting the remains will not commence until either:

   (i) The Regional Archaeologist of the New Zealand Historic Places Trust has confirmed in writing that the archaeological provisions of the Historic Places Act 1993 do not apply or that the requirements of the archaeological provisions of the Historic Places Act 1993 have been met;

   (ii) and, if required, an archaeological authority has been granted by the New Zealand Historic Places Trust.

If human remains (koiwi tangata) are located, in addition to the above steps, the runanga representative for the area and the New Zealand Police must be contacted.

The above protocol shall only be amended in consultation with the New Zealand Historic Places Trust (NZHPT), Te Rūnanga o Ngāi Tahu, Te Rūnanga o Kaikōura, and Te Rūnanga o Ngāi Tūāhuriri. Once finalised, copies shall be lodged with those parties and the Canterbury Regional Council prior to any construction commencing.

Recreation

A Recreation Management Committee shall be established by the consent holder. A representative of Whitewater NZ and/or Jet Boating New Zealand shall be on the Recreation Management Committee. The Recreation Management Committee shall be consulted in the development of the Recreation Management Plan under Condition 28.

A Recreation Management Plan shall be prepared and implemented to address the following issues:

(a) The use of the reservoirs, and particularly the lower two, for recreational purposes;

(b) The development of cycle tracks.

(c) The cessation of takes for river boating provided for in consents CRC120687 and CRC120695.

(d) provision for replacement of reserves lost and mitigation of effects of the scheme on other reserves, and specifically replacement of the camping ground at the reserve located at Lake Sumner Bridge on the Waitohi River with one of a similar type and scale;

(e) mitigation for loss of angling amenity, including potential creation of fish spawning habitat, especially within the lower Waitohi;

(f) provision of river access points for recreational water users, especially access at Intakes 1A and 4.

Advice Note: The extent to which river access can be provided pursuant to a Recreation Management Plan will depend to an extent on the ability of the consent holder to negotiate access with landowners.

Flow monitoring

The consent holder may at its discretion install a water level recorder between the confluence of the North and South Branches of the Hurunui River and Intake 4. The exact location must be determined in consultation with the Canterbury Regional Council.

Water level recorder

The water level recorder will enable the determination of the continuous rate of flow and volume of water in the Hurunui River.
31 The water level recorder shall, as far as is practicable, be installed at a site likely to retain a stable relationship between flow and water level. The water level recorder shall be installed in accordance with the manufacturer’s instructions.

32 The flow at the shall be gauged at least every three months, and at any other time when required as determined by a site inspection, to be carried out at least once every month.

33 Gaugings and site inspections shall be carried out in accordance with the following manuals: Hydrologists Field Manual (NIWA 1991) and Procedure for Rating a Flow Station (NIWA 1993) or any equivalent publication.

34 The level of water in the Hurunui River shall be recorded by electronic means, at not greater than fifteen minute intervals in a tamper-proof recording device such as a data-logger, kept for that purpose and which is telemetered. The recorded data shall not be changed or deleted by any person. All data older than 12 months shall be archived in original format and provided to the Canterbury Regional Council upon request.

35 The measuring and recording devices described in Conditions 30 and 34 shall be available for inspection at all times by the Canterbury Regional Council.

36 All data from the recording device described in Condition 34 and the corresponding relationship between the water level and flow, shall be provided to the Canterbury Regional Council on request, and shall be accessible and available for downloading at all times by the Canterbury Regional Council.

Advice Note: This flow recorder could assist with the timing and magnitude of flushing flows and life cycle flows and the take from Intake 4 as detailed in consents CRC120687, CRC120695 and CRC120691.

37 The water meter and recording device(s) shall be installed and maintained throughout the duration of the consent in accordance with the manufacturer’s instructions.

38 All practicable measures shall be taken to ensure that the water meter and recording device(s) are fully functional at all times.

39 Within six months of the installation of a water level recorder under condition 31, and at five-yearly intervals thereafter, and at any one time when requested by Canterbury Regional Council, the consent holder shall provide a certificate to the Canterbury Regional Council signed by a suitably qualified and experienced person certifying the accuracy of the measuring and recording devices installed in accordance with Conditions 30 and 35, and also certifying that data can be readily accessed.

Reporting

40 An annual report shall be prepared and provided to the Canterbury Regional Council Attention RMA Monitoring and Compliance Manager by 31 July each year. This report shall include all reporting referred to in the conditions of consents CRC 120687, CRC120695, CRC120691, CRC120696, CRC120675, CRC120694, CRC122547 and CRC130467.

Costs

41 Any costs arising from any Management Plans, restoration programmes, or condition under these resource consents shall be met by the consent holder.

Lapse Date

42 Pursuant to section 125 of the Resource Management Act 1991, if not given effect to these consents shall lapse on the following dates:

(a) The consents associated with Stage 1 of this consent shall lapse 5 years after the commencement of the consents, where Stage 1 means the irrigation of up to 15500ha. and “give effect to” means for Stage 1 the taking of water for the purpose of irrigation through any part of the Stage 1 infrastructure being Intakes 1A or 1B and reservoirs at Seven Hills, Inches Road, the Lower Gorge and on-plain storage; and
(b) The consents (or parts thereof) associated with Stage 2 of this consent shall lapse 10 years after the commencement of the consents, where Stage 2 means the irrigation of up to 58,500 hectares as shown on attached Plan HWP1, and “give effect to” means for Stage 2 that construction of the Hurricane Gully dam has commenced. If Stage 2 has lapsed pursuant to this condition then the consents thereafter may only be exercised to the extent of conditions applying to Stage 1 of the proposal.

43 The Canterbury Regional Council (Attention: RMA Monitoring and Compliance Manager) shall be informed immediately on first exercise of this consent by the consent holder.

Review

44 The Canterbury Regional Council may, once per year, on any of the last five working days of May or November, serve notice of its intention to review the conditions of this consent for the purposes of dealing with any adverse effects on the environment which may arise from the exercise of this consent and which it is appropriate to deal with at a later stage.

45 The consent holder shall carry out the following assessments of their performance against the conditions of these consents within the time periods specified below:

(a) At the time the design details for the reservoirs are lodged with the Canterbury Regional Council, the consent holder shall report whether the actual storage volume (either live or total storage) of any of the reservoirs differs by more than five percent from those volumes described in the AEE; and

(b) Upon completion of the further ecological surveys and studies required under the conditions of CRC120692, the consent holder shall report whether this work reveals taxon or taxa within any proposed dam or reservoir footprint of such conservation value that:

(i) the population or their habitat is deemed by an appropriately qualified expert to be of national significance; and/or

(ii) additional mitigation or offset measures are required to address the adverse ecological effects of the proposed inundation.

(c) Within six months of irrigation water first being made available to 15500 hectares of land (Stage 1), or within seven years after commencement of the consents, whichever is earlier, the consent holder shall assess the following matters:

(i) the appropriateness of the annual volume limit on water taken;

(ii) compliance with nitrogen and phosphorus limits;

(iii) review of mitigation and offsets provided for in the Ecological Plan; and

(iv) assessment of measures necessary to ensure compliance with limits applying to the remainder of Stage 2.

(d) Within six months of irrigation water first being made available to the next 18000 hectares of land after completion of Stage 1, or within twelve years after commencement of the consents, whichever is earlier, consent holder shall assess the following matters:

(i) the appropriateness of the annual volume limit on water taken;

(ii) compliance with nitrogen and phosphorus limits;

(iii) review of mitigation and offsets provided for in the updated Ecological Plan; and

(iv) assessment of measures necessary to ensure compliance with limits applying to the remainder of Stage 2.
(e) Within six months of irrigation water first being made available to 45000 hectares of land, or within eighteen years after commencement of the consents, whichever is earlier, the consent holder shall assess the following matters:

(i) the appropriateness of the annual volume limit on water taken;

(ii) compliance with nitrogen and phosphorus limits;

(iii) review of mitigation and offsets provided for in the updated Ecological Plan; and

(iv) assessment of measures necessary to ensure compliance with limits applying to the remainder of Stage 2.

46 Within six months of completing the assessments described in Condition 45, the consent holder shall report to the Canterbury Regional Council RMA Monitoring and Compliance Manager on the findings of those assessments and the measures proposed to be implemented to ensure effects on the environment are no more significant than under the original proposal:

47 Upon receipt of any of the review reports described in Condition 46, the Canterbury Regional Council shall review the conditions of the consents pursuant to Section 128(1) of the Resource Management Act 1991 for the purpose of avoiding, remedying, or mitigating any adverse effect on the environment arising from the review or any increased risk of future non-compliance with conditions of the consents.

48 Reviews under Condition 45 (c), (d) or (e) shall include consideration of whether the limit on the annual volume of water taken should be reduced, and whether the area to be irrigated under the proposal should be reduced in order to reasonably ensure compliance with the nutrient load limits of the consents.

51 In accordance with Section 127 of the Resource Management Act 1991 the consent holder may, no earlier than twelve months after the approval of the Management Plans required by Condition 2 above, apply to change or cancel any of the conditions of this consent.

Advice Note: These conditions apply where specific review conditions have not otherwise been imposed.
Restrictions on taking C permit water

1. Whenever the unmodified flow in the Hurunui River falls below the following flows (Y L/s), the taking of C permit water in terms of this consent shall cease:

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Restrictions on taking B permit water

2. Whenever the unmodified flow in the Hurunui River falls below the following flows (Y L/s), the taking of B permit water in terms of this consent shall cease:

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Restrictions on taking A permit water

3. Whenever the unmodified flow in the Hurunui River falls below the following flows (Y L/s), the taking of A permit water in terms of this consent shall cease:

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<tbody>
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<td>Jan</td>
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</tr>
<tr>
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<td>Mar</td>
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<tr>
<td>Apr</td>
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<tr>
<td>May</td>
<td>12,000</td>
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<tr>
<td>Jun</td>
<td>12,000</td>
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<td>Jul</td>
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<tr>
<td>Dec</td>
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