under: the Resource Management Act 1991

in the matter of: submissions and further submissions in relation to proposed Variation 1 to the proposed Canterbury Land and Water Regional Plan

and: Fonterra Co-operative Group Limited
Submitter

Statement of evidence of Ian Kevin Goldschmidt (Fonterra and Darfield overview)

Dated: 29 August 2014
STATEMENT OF EVIDENCE OF IAN KEVIN GOLDSCHMIDT

INTRODUCTION

1. My name is Ian Kevin Goldschmidt.

2. I am the National Environment Manager, for Fonterra Limited (Fonterra). As the National Environment Manager, my role is to:

   2.1 manage the environmental strategy and lead the resource consenting process for major capital developments (such as Darfield);

   2.2 manage systems and processes in the New Zealand manufacturing sites to ensure resource consent compliance; and

   2.3 lead initiatives to improve the sustainability of Fonterra’s New Zealand’s manufacturing operations.

3. I hold a Bachelor of Resource Studies Degree from Lincoln University.

4. I am familiar with proposed Variation 1 (Variation 1) to the proposed Canterbury Land and Water Plan (pCLWP).

SCOPE OF EVIDENCE

5. My evidence relates to Fonterra’s manufacturing operations at the Darfield site (Fonterra will provide evidence regarding dairy farming activities later in the hearing process).

6. In my evidence I will provide:

   7.1 a description of the Fonterra;

   7.2 a description of the Fonterra Darfield site;

   7.3 an overview Fonterra Darfield’s operations and discharges;

   7.4 a summary of the issues and concerns Fonterra manufacturing has with CLWP v1;

   7.5 comments on the Officers’ section 42A report; and
7.6 conclusions.

INTRODUCTION

8 Fonterra acknowledges the work that Canterbury Regional Council and the Selwyn Waihora Zone Committee have undertaken leading up to the notification of Variation 1. We appreciate the challenges faced in sustainably managing water quality and quantity in this part of the Canterbury Region.

9 We recognise that Te Waihora/Lake Ellesmere is a tribal taonga for Ngai Tahu and is highly valued by the wider community for a broad range of uses. We support the community in seeking improved cultural and environmental outcomes associated with Te Waihora/Lake Ellesmere and the freshwater bodies that make up its catchment.

10 Within this we also consider it is important to recognise that the catchment underpins a highly productive primary sector providing economic and social strength to the Canterbury region.

11 With this in mind, Fonterra supports the proposed vision for the catchment as noted on page 4-3 of Variation 1 i.e.:

“To restore the mauri of Te Waihora while maintaining the prosperous land-based economy and thriving communities.”

12 Fonterra has appreciated the opportunity to be involved in the Zone Committee discussions and also discussions with the Regional Council’s planning staff.

13 While most of our recommendations have been adopted in the either the Variation 1 (as notified) or the s42A report we hold some residual concerns relating to how some of the rules and policies are currently drafted and how they may be interpreted in the future. Ms Sharon Dines addresses these matters in detail in her evidence.

FONTERA

14 Fonterra was established in 2001 when, with passing of the Dairy Industry Restructuring Act (DIRA) and the voting by 84% of New Zealand Dairy farmers, support was confirmed for the merger of the
New Zealand Dairy Board, New Zealand Dairy Group and Kiwi Co-operative Dairies.

Fonterra is one of the top six dairy companies in the world by turnover, the leading exporter of dairy products, and is responsible for more than a third of international dairy trade. Fonterra is owned by over 11,000 New Zealand dairy farmers who supply more than 15 billion litres of milk each year. Our global supply chain stretches from farms all over New Zealand to customers and consumers in more than 140 countries.

Fonterra employs 6,253 people in New Zealand operations, processes 92% of New Zealand’s total milk production and provides $525m to the New Zealand economy through wages and salaries. Fonterra is New Zealand’s biggest company and is responsible for 25% of New Zealand’s total exports by value.

Last dairy season Fonterra exported 2.2 million metric tonnes of dairy products to international markets.

Fonterra has an annual turnover of approximately NZ$20 billion.

Fonterra is legally required (DIRA, section 73) to process milk supplied to it by its shareholders. The only ability Fonterra has to reject supply is under sections 94 and 95. These sections allow for rejection if the supply of milk is less than 10,000 kilogram of milksolids or if the cost of transporting the milk of the new entrant exceeds the highest cost of transporting another shareholder farmer’s milk. Accordingly we need to model potential growth in milk production and plan for the processing capacity that we are required to provide.

FONTERA DARFIELD

Milk production in the South Island continues to grow, especially in the Canterbury region, which now produces 19.4% of New Zealand’s milk from 17.3% of the national dairy cows, second only to the Waikato region.¹ Canterbury is the fastest growing dairying region in New Zealand with milk production in Canterbury growing at 5% per annum.

Following expansions of existing plant at Clandeboye, near Timaru and Edendale near Invercargill and after in depth economic and risk analysis in 2010, Fonterra decided to develop a “greenfield” site 3.5km west of Darfield.

The Darfield site was chosen as the appropriate location for development for several reasons. These include:

22.1 Darfield being central in Canterbury and near an existing and expanding milk pool, creating significant transport efficiencies (as discussed by Mr Mike Copeland);

22.2 Having additional manufacturing capacity at a new site reducing the risk to the wider business (in terms of having spread across a number of sites rather than a single site);

22.3 the land that was purchased having a resource consent for a sufficient volume of water that would allow for future development of the site, together with a reliable electricity supply;

22.4 the land area being physically large enough to allow for multiple developments and on-site wastewater disposal with limited potential impact on neighbouring properties;

22.5 the land being connected to a state highway and rail;

22.6 the proximity of the site to Lyttelton Port;

22.7 the site being close to Darfield and Christchurch City for skilled staff and support industries; and

22.8 there was a willing seller of the land purchased.

The Darfield plant commenced processing in August 2012, and was expanded in August 2013. The investment in Darfield cost more than $500m and the first two dryers were built over a three year period. The site has a physical foot print which provides for the addition of several more dryers should the forecasted milk supply show growth near the Darfield site.

The Darfield site now employs more than 200 people, processes 7.2 million litres a day which is approximately 8.6% of New Zealand’s peak milk on a daily basis. Mr Mike Copeland presents evidence on the impact of the Darfield site on the local, regional and national economy.

Key details of the site layout are shown in Figures 1 and 2.
Figure 1. Fonterra Darfield

Figure 2. Irrigation farms
The Darfield plant is located on 680 ha of land owned by Fonterra of which approximately 12 ha is used by the milk powder plant and its associated facilities. The remaining areas of Fonterra land (excluding buffer zones and non-irrigation areas) are used for the land irrigation of wastewater and clean process water. Fonterra holds a number of resource consents which are affected by Variation 1. These consents are required to operate the manufacturing plant on a day to day basis and provide for potential expansion. These are summarised in Table 1 below and are attached to my evidence in Annexure 1.

Table 1. Fonterra Darfield Resource Consents

<table>
<thead>
<tr>
<th>Consent</th>
<th>Description</th>
<th>Land Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRC103594</td>
<td>Wastewater irrigation</td>
<td>Fonterra</td>
</tr>
<tr>
<td>CRC140775</td>
<td>Clean process water irrigation</td>
<td>Gunn (third party)</td>
</tr>
<tr>
<td>CRC140777</td>
<td>Clean process water irrigation</td>
<td>Gray (third party)</td>
</tr>
<tr>
<td>CRC134753</td>
<td>Domestic sewage to Land</td>
<td>Fonterra</td>
</tr>
<tr>
<td>CRC103589.1</td>
<td>Stormwater to Land</td>
<td>Fonterra</td>
</tr>
<tr>
<td>CRC060458.3</td>
<td>Water take (Groundwater)</td>
<td>Fonterra</td>
</tr>
<tr>
<td>CRC133976</td>
<td>DAF sludge spreading</td>
<td>Various (3rd party)</td>
</tr>
</tbody>
</table>

Fonterra’s Darfield operation relies on groundwater to provide water for processing and also for cleaning the manufacturing plant and milk tankers in line with food safety standards.
Water is drawn from two bores on site which are approximately 245 and 251.6m deep with a standing water level of approximately 152 and 158m respectively.

Resource consent CRC060458.3 permits the abstraction of up to 12,960m³/day with an annual allocation of 2,599,000m³ per year (subject to conditions). As shown in Figure 3 and 4 there is currently surplus water in both the daily and annual allocation which is planned to be used for the addition of more milk processing facilities in the future should milk supply require it – with current abstraction being around 6,000m³/day.

![Daily Water Use - Darfield Site](image)

**Figure 3 Daily Water Use**
Figure 4 Annual Water Use

30 Fonterra Darfield requires a consistent supply of water each day. A milk powder dryer is designed to use a specific volume of water on a daily basis and also during specific cleaning processes. A milk dryer cannot operate on less water than its design requirements. Any restrictions or reductions which limit daily abstraction requirements means a dryer will not operate.

31 Minor reductions in water use can be made through clean in place (CIP) optimisation. Within Fonterra this is a continual process and advancements in CIP mean less time spent cleaning and more time producing product. However these advancements generally result in very minor water efficiency gains.

32 It is important to also emphasise that the volume of water taken each day is not fixed. Each time a dryer is shut down it is required to be cleaned. This uses approximately 30% more water than a normal day’s operation. Currently the Darfield dryers can run for up to 30 days without shutdown (and full clean). Water restrictions would mean the dryers would have to be taken off line more regularly and as a result would use more water.

33 As discussed by Mr Peter Callander, milk powder dryers are very efficient users of water and actually discharge significantly more
water than they use as a result of the milk evaporation process. When this clean process water is irrigated to land with factory wastewater a material portion of the water abstracted results in a neutral or positive water balance.

34 In regard to the resource consent held, it is further noted that Fonterra went through a comprehensive consent variation process to alter the adaptive management conditions of the site’s water take to recognise the neutral or positive water balance nature of the activity. The details of these conditions are discussed by Mr Callander. It is important that Fonterra can retain the same or similar adaptive management conditions to provide for certainty into the future.

35 Darfield’s water take consent will need to be replaced in May 2020. It is important that for the protection of the current site and also to allow for future development that the water available today is available post 2020. Restrictions to water will mean the economic and water use efficiencies spoken about by Mr Mike Copeland will be lost as future developments will need to be moved to areas where there is water available.

WASTEWATER AND CLEAN PROCESS WATER

36 Wastewater is generated during the cleaning of the plant used to manufacture dairy products. The wastewater contains mainly milk and dairy product residues (milk solids), and dilute concentrations of nitric acid, sodium hydroxide and dairy sanitisers used in the clean-in-place (CIP) system.

37 The plant also recovers the water evaporated from the milk. This stream is commonly referred to as clean process water (condensate water or COW water). The clean process water stream containing only traces of milk contaminants produced during the evaporation process. Mr Peter Callander discusses the efficiencies of the milk powder process and how the process discharges more water than it abstracts.

38 In some instances, clean process water is re-used within the manufacturing plant, for example during first rinses prior to clean-in-place washes. This minimises the amount of water consumed on site and the amount of wastewater/clean process water irrigated.

39 The clean process water and waste water is collected separately and stored in silos. The wastewater is pumped to a dissolved air flotation (DAF) unit for treatment. In the DAF unit the pH of the wastewater is adjusted to a pH of about 4.2, by the addition of acid, to precipitate proteins and destabilise fat emulsions. The
wastewater is mixed with water containing dissolved air at a pressure of 4 to 6 bar. The release of fine air bubbles occurs in the DAF unit and these attach to suspended material in the wastewater enabling the separation and collection of DAF sludge at the surface of the DAF unit.

Some of the DAF sludge is provided as pig food but supply currently outweighs demand. As a result the remainder is injected on to rural farm land as a nitrogen fertiliser replacement at a rate no greater than 150kg/N/ha per year (in accordance with resource consent CRC133976, (see Annexure 1). DAF sludge which exceeds stockfood capacity is currently provided as a fertiliser substitute to five farms in the Selwyn Waikora catchment in accordance with informal agreements between Fonterra and the farmers concerned. Sludge is applied by an injection unit up to twice per annum on these farms. The resource consent specifies the properties on which DAF sludge can be applied but allows for additional properties to be added as required, provided consent conditions are met including obtaining the agreement of neighbouring landowners, boundary setback requirements together with monitoring of the sludge being applied.

The treated waste water is irrigated to Fonterra owned land (effective area of 635ha) which is mainly run as a cut and carry operation (with limited grazing). The clean process water is irrigated to third party land owned by the Gunn and Gray families to support farming operations on those properties. Formal contracts and easements are in place between Fonterra and these landowners to enable the irrigation. As discussed by Mr Potts in more detail, irrigation of wastewater and clean process water accompanied by good farming practice is a very effective way of maximising the benefits of the nutrients.

As a result of these land treatment processes and the associated farming practise there is leaching of nitrogen to groundwater. As discussed by Mr Potts, the combined leaching from all of Fonterra's currently consented operations has been calculated at 61.4T/year, which was not reflected in the report used to develop Table 11(i) in the notified version of Variation 1. Mt Potts provides further details of the waste treatment and disposal activities at Fonterra Darfield in his evidence.

Fonterra needs security that the waste treatment system it has now is protected into the future. Nutrient losses from the irrigation of industrial wastewater and the farming system that operates under it need to be allowed for to enable the ongoing operation of the Darfield plant.
The nutrient losses from the farming activity which is able to function as a result of the application of the industrial waste cannot be separated in management terms and therefore should not be subjected to separate rules.

If the Darfield site expands it may need the ability to increase the land area that wastewater, clean process water and DAF sludge is irrigated on. Without the ability to expand its land treatment and assume neighbouring land areas nitrogen allocations the site will not be able to expand.

To provide for future expansions Fonterra proposes that land required for future waste treatment expansions should be able to ‘substitute’ the allowable nitrogen leaching allocation for that land parcel (as a farming activity) to that of an industrial allocation.

Allowing such a substitution between farming and industrial activities in the rules would allow for certainty whilst supporting the visions for Selwyn Waihora zone.

OFFICERS S42A REPORT

Fonterra is positive that many of its concerns in relation to the Darfield manufacturing site have been addressed in the Officers s42a report. Fonterra has some recommendations for further clarification in the rules and policies to ensure that all parties have clarity of the meaning. Fonterra also recommends some minor changes to come of the rules to allow more flexibility of operations whilst supporting the vision of the Selwyn Waihora zone.

SPECIFIC AMENDMENTS SOUGHT

Policy 11.4.10, 11.4.11, 11.4.14, table 11(i) and Rule 11.5.6

The section 42A report (pg 198-204) deletes reference to the N load allocated to Industrial or Trade Processes in Table 11(i) and amends the policy and rule regime so that Industrial Trade Premises can obtain a landuse consent as a discretionary activity if they comply with requirements of any discharge permit issued prior to notification of Variation 1.

New Industrial or Trade Process discharges are allowed as a discretionary activity but must have a nitrogen loss that does not exceed the lawfully allowed nitrogen loss from the farming activity that the waste disposal replaces on the new land.

Fonterra supports these recommendations as they provide simple and effective wording. Fonterra does request some further wording be added to ensure the plan is clear that nutrient loss from the
farming operation that supports an ITP wastewater discharge is considered as one activity.

Therefore in relation to Policy 11.4.14, the following amendment is required:

From 1 January 2022, to achieve the water quality limits in Section 11.7.3 require farming activities to:

(a) Implement a Farm Environment Plan prepared in accordance with Schedule 7 Part A, where a property is greater than 20 hectares; and

(b) Where a property’s nitrogen loss calculation is greater than 15 kg of nitrogen per hectare per annum, make the following further percentage reduction in nitrogen loss rates, beyond those set out in Policy 11.4.13(b), to achieve the catchment target for farming activities in Table 11(i), unless the farm forms part of an industrial trade process land treatment system for wastewater disposal (excluding sludge waste disposal) authorised by a discharge consent:

(i) 30% for dairy;
(ii) 22% for dairy support; or
(iii) 20% for pigs; or
(iv) 13% for irrigated sheep, beef or deer; or
(v) 10% for dryland sheep and beef; or
(vi) 7% for arable; or
(vii) 5% for fruit, viticulture or vegetables; or
(viii) 0% for any other land use.

In relation to Rule 11.5.6, the following amendment is proposed:

Despite any of Rules 11.5.7 to 11.5.13, the use of land for a farming activity in the Selwyn Waihora catchment is a permitted activity provided the following conditions are met:

1. The property is used for the disposal of wastewater or liquid waste from an industrial or trade process and a resource consent has been granted for that discharge that limits nitrogen loss from that property; or

2. The property is:
   a. Less than 5 hectares; and
   b. The nitrogen loss calculation for the property does not exceed 15 kg per hectare per annum.

Ms Dines outlines a further consequential amendment that is required as a result of this change.

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2 Variation 1 text is shown in black; amendments made in the Officers S42A report are shown in black text with additions underlined and deletions struck out; amendments proposed by the witness are shown in grey wash with additions underlined and deletions struck out.
Fonterra also proposes a new rule to allow for the use of DAF sludge as a fertiliser replacement as follows:

Within the Selwyn Waihora catchment the discharge of any industrial or trade process sludge waste, including sludge waste from livestock processing, excluding sewage, into or onto land, or into or onto land in circumstances where a contaminant may enter water is a restricted discretionary activity where the following conditions are met:

1. The discharge of the industrial or trade process sludge is undertaken in association with a farming activity being used as a substitute, or part substitute, for fertiliser.
2. The farming activity is a permitted activity under any of Rules 11.5.6-11.5.8 or has been granted a resource consent in accordance with any of Rules 11.5.9-11.5.11 or 11.5.14.
3. The discharge of industrial or trade process sludge waste occurs no more than twice per annum on the same area of land.

Matters of discretion:
1. The location, volume, rate and timing of the application of sludge waste to land.
2. Setbacks from water bodies and sensitive receptors.
3. Monitoring to characterise the sludge waste discharged.
4. Any adverse effects on mahinga kai, wahi tapu or wahi taonga within the Cultural Landscape /Values Management Area.

A definition of industrial or trade process sludge waste is also necessary as follows:

Industrial or trade process sludge waste means any semi liquid to semi solid waste produced by an industrial or trade wastewater treatment process (whether mechanical or biological) and includes the waste from a dissolved air flotation (DAF) process and waste activated sludge (WAS).

If the Commissioners do not support the recommendation in the Officers 42a report to delete Table 11(i), then Fonterra seeks that the figures in Table 11(i) for nitrogen load from ITPs are corrected.

The figures from Table 4 and 6 in Mr Potts evidence are the correct figures for the Fonterra Darfield operation.

Policy 11.4.22 and Rule 11.5.37

Fonterra supports the approach Environment Canterbury is taking to reduce water allocation through clawing some water back when it is transferred. However Fonterra considers there are limited circumstances where a transfer could generate a positive benefit, negating the need to surrender water. The relevant policy and rule require amendment to reflect this. As discussed previously in my evidence and also evidence by Mr Peter Callander, milk powder
plants are very efficient users of water and a large amount of the water used results in a neutral or positive water balance.

Fonterra requests some further wording to be added to Policy 11.4.22 and Rule 11.5.37 to ensure that if water is to be transferred and it can be shown that the water used will result in a neutral or positive water balance then it should be able to be transferred without a percentage of the take being surrendered. The proposed amendments are:

Restrict the transfer of water permits within the Rakaia-Selwyn and Selwyn-Waimakariri water allocation zones to minimise the cumulative effects on flows in hill-fed lowland and spring-fed plains rivers from the use of allocated but unused water, by requiring that:

(a) Irrigation scheme shareholders within the Irrigation Scheme Area shown on the Planning Maps do not transfer their permits to take and use groundwater; and

(b) No permit to take and use groundwater is transferred from down-plains to up-plains; and

(c) In all other cases, except in relation to a community water supply, 50% of any transferred water is surrendered.

(b) 50% of any transferred water is surrendered except where:

(i) the water is used for a community water supply, or

(ii) the water take is for an industrial activity and, when considered in conjunction with other activities on the site to which the water is transferred, results in a neutral or positive water balance.

Rule 11.5.37 give effect to the policy so Rule 11.5.37 (4) would require the following amendment:

If the transfer is within the Rakaia-Selwyn or Selwyn-Waimakariri Combined Surface and Groundwater Allocation Zones 50% of the volume of transferred water is to be surrendered—unless:

(a) the water take is for an industrial activity and, when considered in conjunction with other activities on the site to which the water is transferred, results in a neutral or positive water balance.

**POLICY 11.4.23**

In its original submission Fonterra recommended clarification in the wording of Variation 1 to the effect that water should only be reallocated to existing resource consent holders at a rate and volume that reflects demonstrated use, **unless** the resource consent holder is operating an existing industrial or trade process and demonstrates that the unused portion of the take is necessary
to allow for planned future development at the industrial or trade process site.

62 The Officers report (page 241-250) recommends reference be made in Policy 11.4.23 to reasonable use, rather than demonstrated use. Fonterra supports this change. The Officer goes on to say this policy does not apply to industrial or trade process as the policy is specific to "irrigation".

63 Fonterra supports this view as it would protect water allocations which have been retained to allow for expansion of industrial or trade process but recommends the following wording to ensure that future consenting officers don’t misinterpreted the policy.

Only reallocate water to existing resource consent holders at a rate and volume that reflects demonstrated reasonable use as calculated in accordance with Schedule 10 to provide a volume required to meet demand conditions in eight and a half out of ten years for a system with an application efficiency of 80%.

Note:

This policy and the reasonable use test in Schedule 10 do not apply to industrial and trade processes that take water and then discharge wastewater and clean process water by irrigation to land under an authorised discharge permit.

For the purpose of Policy 4.50(b)(i) of this Plan, Policy 11.4.23 and associated rules constitutes a method and defined timeframe to phase out over-allocation. For the avoidance of doubt, that means the requirement of Policy 4.50(b)(i) for replacement takes to be no more than 90% of the previously consented take does not apply in the Selwyn Waihora catchment and is replaced instead by Policy 11.4.23.

POLICY 11.4.27

64 Fonterra is supportive of the implementation and use of adaptive management conditions to manage the groundwater resource in the Selwyn Waihora catchment. As I have discussed earlier in my evidence, Fonterra worked through a consent variation to the adaptive management conditions of consent (CRC060458.3) to take groundwater to ensure the neutral or positive water balance component of Fonterra’s activity at Darfield was recognised.

65 It is important for Fonterra’s ongoing operation of the site and the company to meet its obligations to collect milk under DIRA that this water remains available into the future.

66 Fonterra is supportive of the Officers report to adopt Fonterra’s
CONCLUSION

67 Fonterra is supportive of what the Canterbury Regional Council and the Selwyn Waihora Zone Committee are trying to achieve with Variation 1.

68 We appreciate the challenges faced in sustainably managing water quality and quantity in this part of the Canterbury Region.

69 We also appreciate the Officers have addressed most – but not all - of Fonterra’s concerns relating to the Darfield Manufacturing plant.

70 The minor changes proposed in my evidence will ensure the current and future benefits of the Darfield site can be maintained.

Dated: 29 August 2014

Ian Kevin Goldschmidt
ANNEXURE 1 – FONTERRA RESOURCE CONSENTS
ANNEXURE 2 – SITE PLANS

Figure 1. Fonterra Darfield
Figure 2. Irrigation farms
Subject to the following conditions:

DEFINITIONS

1) For the purposes of this resource consent:
   (a) Clean process water means condensate water (cow water), obtained by evaporating the water content out of milk and cooling water.
   (b) Frozen means the temperature at five centimetres soil depth is less than zero degrees Celsius for a period of 12 hours or longer in the preceding 24 hours.
   (c) Overseer® Modeller means a person holding an Advanced Sustainable Nutrient Management Certificate issued by Massey University or an equivalent qualification.
   (d) Qualified Person means a person who holds a relevant tertiary qualification that required the equivalent of at least three years full-time study, and who has expertise in environmental investigation and environmental sampling, or a person who has such extensive experience and expertise to be equivalent to that qualification and expertise. The consent holder shall provide evidence of the person’s qualifications, experience and expertise on request from the Canterbury Regional Council.
   (e) Environmental Scientist means a person who holds a post-graduate science qualification related to groundwater quality or a person who has such extensive experience and publications to be equivalent to that qualification. The consent holder shall provide evidence of the person’s qualifications, experience and expertise on request from the Canterbury Regional Council.
   (f) Significant Ponding means when wastewater remains on the ground surface of an area greater than 50 square metres 24 hours after irrigation ceases.
   (g) Wastewater means treated factory wastewater from the washing down of trucks, equipment, tanks and pipes in process areas, consisting of water, milk, milk products, traces of nitric acid, caustic soda and dairy sanitisers, clean process water and stormwater runoff from coal and milk load in and out areas and from balance tank and silo areas.

LIMITS

2) The discharge shall be only:
   (a) wastewater;
   (b) clean process water; and
   (c) stormwater runoff from coal and milk load in and out areas and from balance tank and silo areas.

3) The wastewater shall be discharged onto land at or about map reference NZMS 260: L35: 3600-4995 as shown on SL2 attached to and forming part of this consent.

4) The discharge to land shall occur on:
   (a) at least 211 hectares of land when the Milk Powder Plant has one operational dryer; and
   (b) at least 422 hectares of land when the Milk Powder Plant has two operational dryers.

5) The total volume of wastewater discharged shall not exceed 8720 cubic metres per day for at least 95 percent of the time.

6) The volume of wastewater discharged shall not exceed 2,360,000 cubic metres per year.
(a) For the purposes of demonstrating compliance with conditions (5) and (6) the volume of wastewater discharged system shall be continuously measured by a flow meter.

(b) The flow meter specified in condition 7(a) shall be located at a point following exit from the treatment system and before discharge onto the land application system and calibrated annually to a margin of error of ± 5%.

DISCHARGE

Wastewater shall be discharged onto land by spray irrigation. The consent holder shall ensure that the discharge:

(a) shall be applied over the irrigation area in a uniform manner; and

(b) does not cause any Significant Ponding on the ground surface.

Wastewater shall be irrigated to pasture at an application rate of not more than 25 millimetres per irrigation cycle with a minimum average return period of 16 days, with an average rate of no more than two millimetres per day over the return cycle.

The soil moisture in the wastewater application area shall be monitored daily when wastewater is irrigated using a generally accepted method. The results of this monitoring shall be recorded and made available to the Canterbury Regional Council on request.

When soil moisture in the wastewater application area exceeds 85 percent of field capacity the consent holder shall:

(d) Defer irrigation of clean process water in order to reduce the loading on the irrigation area; and

(e) Reduce the application rate to 15 millimetres per irrigation cycle;

to avoid Significant Ponding.

There shall be no discharge:

(a) over or within 20 metres of any surface water body, well or bore, impermeable surfaces, roads or property boundaries or in any other place or at such a rate that the discharge is likely to enter surface water or flow onto any neighbouring property;

(b) within 100 metres of any dwelling not owned by the consent holder.

The annual nitrogen loading rates of the wastewater shall not exceed:

(a) an average of 250 kilograms per hectare per year over the area actually irrigated (during the period 1 August to 31 July); and

(b) a maximum of 300 kilograms per hectare per year on any area (during the period 1 August to 31 July).

An appropriately accurate record shall be kept of the areas actually irrigated during the period 1 August to 31 July each year.

(a) The depth of snow shall be measured daily during times when snow is on the ground surface.

(b) If the depth of snow over 80 percent of the irrigation area exceeds 25 millimetres for a period of 12 hours or longer in the preceding 24 hours, the depth of wastewater irrigation shall not exceed 15 millimetres and irrigation of clean process water shall cease for 24 hours.

(c) There shall be no discharge onto land in circumstances where the land is frozen.

The discharge to air from wastewater discharge shall not result in odour, which is noxious, offensive or objectionable beyond the property boundary.

The consent holder shall:

(a) take all practicable measures to prevent the drift of aerosols beyond the boundary of the property on which this consent is exercised;

(b) use wind direction control to automatically deactivate irrigation zones close to down-wind boundaries to minimise the risk of spray drift;

(c) clean all wastewater storage vessels monthly; and

(d) flush wastewater pipelines and centre pivots used for the irrigation of wastewater after every wastewater irrigation cycle.

RAINFALL MONITORING
16) The consent holder shall install a rain gauge at the site in order to measure the depth of rainfall. The depth of rainfall shall be measured and recorded daily.

WASTEWATER MONITORING

17) The consent holder shall, at seven day intervals, take a representative 24 hour sample of the wastewater at the point it enters the irrigation system. The sample shall be analysed for:
   (a) pH;
   (b) Electrical conductivity [microSiemens per centimetre];
   (c) Chemical oxygen demand [milligrams per litre];
   (d) Total Kjeldahl nitrogen [milligrams per litre];
   (e) Nitrate-nitrogen [milligrams per litre];
   (f) Total phosphorus [milligrams per litre]; and
   (g) Total suspended solids [milligrams per litre].

18) The consent holder shall, at monthly intervals, take a representative 24 hour sample of the wastewater at the point it enters the irrigation system. The sample shall be analysed for and calculated (as indicated):
   (a) Biological oxygen demand [milligrams per litre];
   (b) Sodium [milligrams per litre];
   (c) Potassium [milligrams per litre];
   (d) Calcium [milligrams per litre];
   (e) Magnesium [milligrams per litre]; and
   (f) Sodium adsorption ratio (SAR) [calculated].

19) The results of the analyses of the wastewater monitoring carried out in accordance with Conditions 17 and 18 shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, on a monthly basis.

20) The discharge shall have a sodium adsorption ratio of less than 15.

GROUNDWATER MONITORING

21) Subject to conditions 22 and 23, and prior to the exercise of this consent, the consent holder shall install up to six monitoring bores at the locations and in the order set out in Monitoring Bore Plan MBP1 attached to and forming part of this consent.

22) The objective of installing the monitoring bores installed in accordance with condition 21 shall be:
   (a) for bores 5 and 6, to provide access to unconfined or semi-confined, shallow groundwater up-gradient from the wastewater irrigation area; and
   (b) for bores 1, 2, 3 and 4, to provide access to unconfined or semi-confined, shallow groundwater down-gradient of the wastewater irrigation area and which is reasonably anticipated to intercept any contaminants that might be discharged to groundwater from the irrigation of the wastewater.

23) To ensure compliance with the objective set out in condition 22:
   (a) for the construction of each monitoring bore the consent holder shall, in consultation with a groundwater scientist nominated by the Canterbury Regional Council, and at the consent holder’s cost, use existing hydrogeological information and the field information collected from the construction of any previous monitoring bore(s) along with technical advice from the nominated groundwater scientist to determine where and how best to install any subsequent monitoring bores (including, but not limited to specific location, screening depths, length of screens and water table fluctuations);
   (b) notwithstanding condition 23(a), if the consent holder and the nominated groundwater scientist both determine that, for example, because of:
      (i) the variability in water table depths;
      (ii) the heterogeneous nature of the local geology;
      (iii) the presence of confining layers;
      (iv) expected wide seasonal fluctuations in water levels; or
      (v) considerable technical issues associated with drilling and sampling groundwater
   the construction of a monitoring bore would be unlikely to provide access to shallow groundwater as anticipated by condition 22, then the consent holder shall not be required to construct that monitoring bore.
(a) Groundwater samples shall be taken at three monthly intervals, starting within one month of installation, from all monitoring bores able to be used to access groundwater and analysed for the following determinands:

(i) Biochemical oxygen demand [milligrams per litre];
(ii) Nitrate-nitrogen [milligrams per litre];
(iii) Nitrite-nitrogen [milligrams per litre];
(iv) Ammonium-nitrogen [milligrams per litre];
(v) Dissolved reactive phosphorus [milligrams per litre];
(vi) Sodium [milligrams per litre];
(vii) Total dissolved solids [milligrams per litre]; and
(viii) E. coli [colony forming units per 100 millilitres]

(b) all bores able to be used to access groundwater shall be purged prior to sampling to remove standing water from the bore casing and ensure that the sample collected represents ambient groundwater outside the bore screen; and
(c) pH and electrical conductivity shall be analysed during bore purging to ensure these are stable prior to sampling.

(a) If the concentration of nitrate nitrogen in a groundwater sample from any down-gradient monitoring bore exceeds 8.5 g/m3 NO3-N, then the sampling frequency for that bore and the up-gradient monitoring bore(s) shall be increased to monthly; and
(b) the monitoring frequency shall only return to three monthly following a three month period where all nitrate nitrogen results from that down-gradient bore are less than 8.5 g/m3 NO3-N.

The results of any analyses of the groundwater monitoring carried out in accordance with Condition 24 shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, on a monthly basis.

LYSIMETER MONITORING

The consent holder shall install 10 ceramic cup suction lysimeters within and across the areas irrigated with wastewater and these shall be sampled monthly and analysed for nitrate-nitrogen concentration.

The location of the lysimeters installed in accordance with condition 27 shall ensure that a representative nitrate-nitrogen concentration can be assessed across the entire irrigation area.

(a) The design and installation of the lysimeters shall be certified within one month of installation, by a person with a post-graduate qualification in soil science or similar discipline and with expertise in the design and installation of lysimeters, as being an appropriate design and installed appropriately.
(b) The certificate specified in condition 29(a) shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager within one month of installation.

RESULTS OF MONITORING BORE AND LYSIMETER MONITORING

Subject to condition 31, if:
(a) the nitrate-nitrogen concentration in groundwater from any of the individual downstream monitoring bores increases by more than two milligrams per litre, averaged over any two consecutive samples, above the overall average concentration of nitrate nitrogen of groundwater from the two up-gradient monitoring bores (measured or estimated, if for some reason any data is missing) over the same time period; or
(b) the average mass load of nitrate-nitrogen as measured by the suction lysimeters installed in accordance with conditions 27 and 28 exceeds 18 kg N/ha/yr

then the consent holder shall within 20 working days report to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, on how it will modify its farming or wastewater operation to ensure that:
(c) the nitrate-nitrogen concentration in groundwater from all down-gradient bores is not greater than 2 milligrams per litre above the average concentration in up-gradient monitoring bores; and
(d) the mass load of nitrate-nitrogen as measured in the suction Lysimeters installed in accordance with conditions 27 and 28 does not exceed an average of 18 kg N/ha/yr.

Advisory note: the mechanisms that the consent holder uses to modify its farming or wastewater operation to ensure conditions 30(c) and (d) are met may include, but are not limited to, destocking and increasing the rate of ‘cut and carry’.
31) If the nitrate-nitrogen concentration or mass load of nitrogen as set out in conditions 30(a) and (b) are exceeded, and if an Environmental Scientist engaged by the consent holder and an Environmental Scientist nominated by the Canterbury Regional Council both agree that the cause of the exceedence of nitrate-nitrogen concentration or the mass load of nitrogen was not as a result of the discharge activities of the consent holder, then the consent holder shall not be required to comply with condition 30.

32) If the nitrate-nitrogen concentration or the mass load of nitrogen as set out in conditions 30(a) and (b) are exceeded, and condition 31 does not apply, then within 12 months of providing the report described in condition 30, the consent holder shall provide a further report to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, that:
   (a) Confirms that the response measures described and required under condition 30 have been implemented; and
   (b) Provides a revised Overseer® model report undertaken by an Overseer® Modeller and an outline of any further steps required to achieve compliance with the nitrogen load threshold specified in condition 30(b).

33) If subsequent to providing the further report as specified in condition 32, the nitrate-nitrogen concentration of down-gradient groundwater as set out in conditions 30(a) has continuously been exceeded, and condition 31 does not apply, then notwithstanding condition (11), the annual nitrogen loading rates of the wastewater shall not exceed:
   (a) an average of 225 kilograms per hectare per year over the area actually irrigated (during the period 1 August to 31 July); and
   (b) a maximum of 270 kilograms per hectare per year on any area (during the period 1 August to 31 July).
   These reduced nitrogen loads shall not apply if subsequent monitoring shows that the nitrate-nitrogen concentration of down-gradient groundwater as set out in conditions 30(a) is not exceeded.

34) If two years subsequent to a requirement to reduce the annual nitrogen loading rates as specified in condition (33), the nitrate-nitrogen concentration of down-gradient groundwater as set out in conditions 30(a) has continuously been exceeded, and condition 31 does not apply, then notwithstanding condition (11), the annual nitrogen loading rates of the wastewater shall not exceed:
   (a) an average of 200 kilograms per hectare per year over the area actually irrigated (during the period 1 August to 31 July); and
   (b) a maximum of 240 kilograms per hectare per year on any area (during the period 1 August to 31 July).
   These reduced nitrogen loads shall not apply if subsequent monitoring shows that the nitrate-nitrogen concentration of down-gradient groundwater as set out in conditions 30(a) is not exceeded.

35) If two years subsequent to a requirement to reduce the annual nitrogen loading rates as specified in condition (34), the nitrate-nitrogen concentration of down-gradient groundwater as set out in conditions 30(a) has continuously been exceeded, and condition 31 does not apply, then notwithstanding condition (11), the annual nitrogen loading rates of the wastewater shall not exceed:
   (a) an average of 175 kilograms per hectare per year over the area actually irrigated (during the period 1 August to 31 July); and
   (b) a maximum of 210 kilograms per hectare per year on any area (during the period 1 August to 31 July).
   These reduced nitrogen loads shall not apply if subsequent monitoring shows that the nitrate-nitrogen concentration of down-gradient groundwater as set out in conditions 30(a) is not exceeded.
36) (a) The consent holder shall, within six months of the commencement of this consent, start sampling the upper 200 millimetres of soil in the irrigation area to determine representative soil conditions. A qualified person shall prepare and document a sampling regime that shall ensure that sufficient samples are taken to provide information that is representative of soil conditions in the irrigation area. The sampling regime shall be provided to the Canterbury Regional Council on request.

(b) The samples shall be taken at least once annually by a qualified person.

(c) Each individual sample shall be identified as comprising each separate soil type, and shall be analysed as soon as possible, to ensure the integrity of the sample, for the following determinands:

(i) soil pH;

(ii) electrical conductivity [microSiemens per metre];

(iii) soil density [grams per cubic centimetre];

(iv) total phosphorus [milligrams per litre];

(v) Olsen phosphorus (available phosphorus) [milligrams per litre];

(vi) Total nitrogen [milligrams per litre];

(vii) Nitrate-nitrogen [milligrams per litre];

(viii) Anaerobically mineralisable nitrogen [milligrams per litre];

(ix) Exchangeable cations: calcium, magnesium, potassium and sodium exchangeable percentage (ESP);

(x) Base saturation; and

(xi) Sodium adsorption Ratio (SAR).

(d) The results of the analyses shall be recorded and shall include the following information:

(i) the date and time the samples were taken;

(ii) the location where the samples were taken;

(iii) the date the analyses were undertaken;

(iv) identification and contact details of the laboratory undertaking the analyses; and

(v) a summary of the methods used in the analyses.

(e) A Qualified Person shall undertake an interpretation of the results. The interpretative report shall include:

(i) the specific soil type;

(ii) the context of the conditions of the receiving environment at the time the sampling was undertaken;

(iii) spatial and temporal comparisons, including trends, of sample results, and where appropriate, explanations of inputs and formulae used, including explanations of the units used for each reported result.

(f) A copy of the results shall be retained and forwarded to the Canterbury Regional in accordance with condition 42 of this consent.

(g) Representative sampling of the total nitrogen concentration of any pasture or crop removed from the irrigation areas shall be undertaken.

37) If the exchangeable sodium percentage reaches five percent, lime or gypsum shall be added to the soil to reduce the exchangeable sodium percentage to below five percent. Records of any action taken to reduce the exchangeable sodium percentage shall be maintained and provided to the Canterbury Regional Council on request.

38) (a) All sampling required in this consent shall be undertaken by a Qualified Person using the most appropriate scientifically recognised and current methods.

(b) All samples taken shall be analysed using the most appropriate scientifically recognised and current method by a laboratory that is accredited for that method of analysis by International Accreditation New Zealand (IANZ) or an equivalent accreditation organisation that has a Mutual Recognition Arrangement with IANZ.

MAINTENANCE

39) The consent holder shall maintain and operate all structures and relevant equipment associated with the sites’ wastewater treatment and disposal system in accordance with the procedures and requirements of the Environment Management Plan prepared in accordance with condition 42 of this consent.

RECORDS AND REPORTING

40) The consent holder shall log any complaints received. The log will include the following:

(a) Date and time;

(b) Nature and location of the complaint;

(c) Complainant’s details;

(d) Weather information;

(e) Details of the key operating parameters at the time of the complaint; and

(f) Remedial action taken to prevent further incidents, if appropriate.

Complaints shall be reported to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within 24 hours and the log of complaints shall be made available to the Canterbury Regional Council on request.
Record No CRC103594

Consent Summary

41) During the periods when the wastewater and clean process water irrigation system is operating the consent holder shall record the:
   (a) instantaneous daily volume of any discharges into land by spray irrigation; and
   (b) the areas on which irrigation has occurred.

42) The consent holder shall supply to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, an annual report on the exercise of this consent over the prior dairy season. The report shall be provided by 30 September each year and shall include the following records:
   (a) daily rates and volumes of discharge;
   (b) location of wastewater application, rate and depth of application, and the nitrogen loading rate;
   (c) analysis and interpretation of wastewater quality, lysimeter sampling, soil monitoring and groundwater monitoring;
   (d) proposals for mitigating any adverse effects found to be occurring;
   (e) a record of any complaints that were received relating to the irrigation of wastewater;
   (f) any pasture or crop harvest and removal from the irrigated land and the nitrogen content of that material;
   (g) records of grazing including stock type and numbers; and
   (h) a general comment on any farming activities that could impact on the nitrogen status of the soil such as cultivation, aeration, planting, applications of lime and of nitrogen inhibitors.

ENVIRONMENT MANAGEMENT PLAN

43) At least 10 working days prior to the first exercise of this consent, the consent holder shall prepare and forward to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, and Environment Management Plan for the operation of the wastewater treatment and disposal system. The Environment Management Plan shall include details of procedures to:
   (a) manage and maintain the wastewater treatment and storage systems;
   (b) manage and report on soil moisture and wastewater irrigation application rates;
   (c) manage soil fertility on the wastewater irrigation area;
   (d) manage soil structure;
   (e) manage and report on a nutrient budget for the operation of the wastewater irrigation area;
   (f) monitor wastewater, groundwater and soil and report on the results;
   (g) manage the wastewater discharge when irrigation is not possible because of weather;
   (h) manage stock grazing;
   (i) minimise potential odour and spray drift from the system;
   (j) respond to emergencies and provide contingency plans in the event of equipment failure or adverse weather;
   (k) respond to complaints and/or carry out community liaison and
   (l) procedures and processes for updating the plan.

The Environment Management Plan shall include an Overseer® analysis undertaken by an Overseer® Modeller to ensure nitrogen leaching rates are less than 18 kg N/ha/yr. The Overseer® analysis shall be prepared using the ‘advanced monthly stock reconciliation method’.

44) The Environment Management Plan shall be reviewed by the consent holder at least annually for the purpose of addressing any issues relating to compliance with the conditions of this consent. The current plan shall be forwarded to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, annually and prior to 30 September in any year.

ADMINISTRATION

45) The Canterbury Regional Council may, once per year, on any of the last five working days of April or October, serve notice of its intention to review the conditions of the consent for the purposes of:
   (a) dealing with any adverse effect on the environment which may arise from the exercise of this consent and which is appropriate to deal with at a later stage; or
   (b) requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment; or
   (c) requiring compliance with any relevant rule of an operative Regional Plan; or
   (d) reviewing the frequency of monitoring and the determinands monitored.

46) This consent shall lapse ten years after the date of commencement, unless the consent is given effect to before that lapsing date, under section 125 of the Resource Management Act 1991.

DURATION

47) This consent shall expire 35 years after the date of commencement of this consent.
27 August 2013

Fonterra Co-operative Group Limited  
(Hamilton)  
Attn To: Fiona Mathis  
PO Box 333  
Waikato Mail Centre  
Hamilton 3240

Dear Sir/Madam

NOTICE OF RESOURCE CONSENT DECISION(S)

RECORD NO: CRC140775  
NAME: Fonterra Co-operative Group Limited (Hamilton)

The decision of Environment Canterbury is to grant your application(s) on the terms and conditions specified in the attached resource consent document(s). Your resource consent(s) commences from the date of this letter advising you of the decision. The reasons for the decision are:

1. There are no persons considered to be adversely affected by this proposal.
2. Any adverse effects on the environment as a result of the change in conditions will be minor.

For some activities a report is prepared, with officer recommendations, to provide information to the decision makers. If you require a copy of the report please contact our Customer Services section.

If you do not agree with the consent authority decision, you may object to the whole or any part. Notice of any objection must be in writing and lodged with Environment Canterbury within 15 working days of receipt of this decision.

Alternatively you may appeal to the Environment Court, PO Box 2069, Christchurch. The notice of appeal must be lodged with the Court within 15 working days of receipt of this decision, with a copy forwarded to Environment Canterbury within the same timeframe. If you appeal this decision, the commencement date will then be the date on which the decision on the appeal is determined. If you are in any doubt about the correct procedures, you should seek legal advice.

Environment Canterbury takes every measure to improve both applications and processes, and we appreciate your feedback as an important component in ensuring this occurs. You can complete a consents survey on-line at http://www.ecan.govt.nz/services/resource-consents/pages/surveys.aspx. Alternatively, you can call our Customer Services Section on 0800 EC INFO who will be happy to complete the survey with you.

Charges, set in accordance with section 36 of the Resource Management Act 1991, shall be paid to the Regional Council for the carrying out of its functions in relation to the administration, monitoring and supervision of resource consents and for the carrying out of its functions under section 35 of the Act.

Thank you for helping us make Canterbury a great place to live.

Our Ref: CRC140775  
Your Ref: EC108073,EC104565  
Contact: Customer Services
For all queries please contact our Customer Services Section by telephoning (03) 353 9007, 0800 ECINFO (0800 324 636), or email ecinfo@ecan.govt.nz quoting your CRC number above.

Yours sincerely

[Signature]

CONSENTS PLANNING SECTION

CC Address:

Planz Consultants Limited
Attn To: Jane Anderson
PO Box 1845
Christchurch 8140
RESOURCE CONSENT CRC140775
Pursuant to Section 104 of the Resource Management Act 1991

The Canterbury Regional Council (known as Environment Canterbury)

GRANTS TO: Fonterra Co-operative Group Limited (Hamilton)

A DISCHARGE PERMIT: To discharge contaminants into or onto land and air.

CHANGE TAKES EFFECT DATE: 27 Aug 2013

EXPIRY DATE: 02 Dec 2045

LOCATION: Racecourse Hill, DARFIELD

SUBJECT TO THE FOLLOWING CONDITIONS:

Definitions

1. For the purposes of this resource consent:
   a. **Clean Process Water** means condensate water (cow water), obtained by evaporating the water content out of milk and cooling water.
   b. **Overseer® Modeller** means a person holding an Advanced Sustainable Nutrient Management Certificate issued by Massey University or an equivalent qualification.
   c. **Qualified Person** means a person who holds a relevant tertiary qualification that required the equivalent of at least three years full-time study, and who has expertise in environmental investigation and environmental sampling, or a person who has such extensive experience and expertise to be equivalent to that qualification and expertise. The consent holder shall provide evidence of the person’s qualifications, experience and expertise on request from the Canterbury Regional Council.
   d. **Significant Ponding** means when wastewater remains on the ground surface of an area greater than 50 square metres 24 hours after irrigation has ceased.

Limits

2. The discharge shall be only clean process water sourced from a Milk Powder Plant located on State Highway 73, Racecourse Hill, Darfield.

3. The clean process water shall be discharged onto land at or about map reference NZMS 260: L35:3336-5068 or BX22:2338-8906 as shown on Plan CRC140775, which forms part of this consent.

4. The discharge to land shall occur on at least 106 hectares of land but not onto the lower terrace adjacent to the Hawkins River.
5 Clean process water shall be irrigated to pasture at an average application rate not exceeding five millimetres per day when the soil moisture is less that 85 percent of field capacity.

6 When the soil moisture on the Irrigation farm exceeds 85 percent of field capacity the consent holder shall;
   a. Subject to (b) below defer irrigation of clean process water in order to reduce the loading on the irrigation area; and
   b. Reduce the application rate to an average of 1.5 millimetres per day.

7 The volume of clean process waste discharged shall not exceed 500,000 cubic metres per year.

8 For the purpose of demonstrating compliance with conditions (5) to (7) and (12), the consent holder shall:
   a. Continuously measure the volume of clean process water discharged with a flow meter;
   b. Monitor soil moisture, as required, with a TDR Type Soil Moisture Meter.

9 The flow meter specified in condition (8)(a) shall be located at a point following the exit from the storage silos or pond(s) and before the discharge onto land by the irrigation system. The flow meter shall be calibrated annually to a margin of error of +/- 5 percent.

10 All irrigation infrastructure shall be designed, constructed and operated to comply with the New Zealand Electrical Code of Practice for Electrical Safe Distances 34:2001 (NZECP 34:2001).

Discharge

11 The clean process water shall be discharged onto land by spray irrigation. The consent holder shall ensure that the discharge:
   a. Is applied over the irrigation area in a uniform manner;
   b. Does not cause any significant ponding on the ground surface; and
   c. Does not occur within 24 hours of the application of any fertiliser.

12 The soil moisture in the irrigation area shall be monitored daily when clean process water is irrigated using a generally accepted method and in accordance with condition (8)(b). The results of this monitoring shall be recorded and made available to the Canterbury Regional Council on request.

13 There shall be no discharge:
   a. Over or within 20 metres of any surface water body, well or bore, impermeable surfaces or in any other place or at such a rate that the discharge is likely to enter surface water or flow onto any neighbouring property; or
   b. Within 100 metres of any dwelling unless written approval has been obtained from the landowner/occupier by the consent holder.
The consent holder shall annually update a nutrient balance to demonstrate nutrients are being managed effectively.

Overseer® shall be used to calculate the average annual concentrations of nitrate-nitrogen in the soil drainage water from the irrigation land. The consent holder shall ensure that:

a. If the predicted annual average concentration of nitrate-nitrogen, calculated in accordance with this condition exceeds 8 milligrams per litre, best management practices shall be implemented to minimise as far as practicable, the discharge of nitrate-nitrogen to soil drainage water;

b. The predicted average annual concentration of nitrate-nitrogen in the soil drainage water shall not exceed 16 milligrams per litre.

**Odour and Aerosols**

The discharge to air from the spray irrigation of clean process water shall not result in odour which is noxious, offensive or objectionable beyond the property boundary.

The consent holder shall:

a. Take all practicable measures to prevent the drift of aerosols beyond the boundary of the property on which this consent is exercised; and

b. Use wind direction controls to automatically deactivate irrigation zones close to down-wind boundaries to minimise the risk of spray drift.

**Maintenance**

The consent holder shall maintain and operate all structures and relevant equipment associated with the site’s disposal system in accordance with the procedures and requirements of the Environment Management Plan prepared in accordance with condition (24) of this consent.

**Clean Process Water Monitoring**

The consent holder shall for the first 12 months after commencement of the discharge authorised by this consent, take a representative 24 hour sample of the clean process water at the point it enters the irrigation system on one day per week that irrigation occurs. For the remaining term of the consent, three samples per year will be taken. The sample shall be analysed for:

a. COD in milligrams per litre;

b. Total nitrogen in milligrams per litre;

All samples shall be taken by a suitably qualified person.

Results of the analyses of clean process water monitoring carried out in accordance with condition (19) shall be provided to the Canterbury Regional Council, within ten working days of the samples being collected.

a. Prior to this consent being exercised the consent holder shall install two
monitoring bores at locations that enables the monitoring of nitrate-nitrogen in the up-gradient and down-gradient shallow groundwater (if present) that might be affected by irrigation/discharge activities.

b. The final location of the monitoring bores shall be determined in consultation with the Canterbury Regional Council. The consent holder shall not be required to install bores below a depth of 40 metres.

c. Sampling shall be completed by a qualified person at least once every three months for the term of this consent and the results shall be provided to the Canterbury Regional Council, Attention RMA Compliance and Enforcement Manager within 1 month of the consent holder receiving the results.

Records and Reporting

22 The consent holder shall log any complaints received. The log at a minimum shall contain the following information:

   a. Date and time the complaint was received;
   b. Nature and location of the complaint;
   c. Complainant's details;
   d. Weather information; and
   e. Details of the key operating parameters at the time of the complaint; and
   f. Remedial action taken to prevent further incidents.

Complaints shall be reported to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within 24 hours and the log of complaints will be made available to the Canterbury Regional Council on request.

23 The consent holder shall supply to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, an annual report on the exercise of this consent over the prior dairy season. The report shall be provided by 30 September each year and shall include the following records:

   a. Daily application rates and volumes of discharges onto land by spray irrigation;
   b. Location and timing of clean process water applications;
   c. A record of any complaints that are received relating to the irrigation of clean process water;
   d. A copy of the nutrient budget as required by condition (14);
   e. A copy of the Overseen® report as required by condition (15);
   f. Analysis and interpretation of clean process water quality; and
   g. Any proposals for mitigating any adverse effects found to be occurring.

Environment Management Plan

24 At least 10 working days prior to the first exercise of this consent, the consent holder shall prepare and forward to the Canterbury Regional Council, Attention:
RMA Compliance and Enforcement Manager, an Environment Management Plan (EMP) for the operation of the wastewater treatment and disposal system. The EMP shall include, but not be limited to, details of procedures to:

a. Manage and maintain the clean process water storage systems;
b. Manage and report on soil moisture and clean process water irrigation application rates, including in snow cover situations;
c. Manage and report on the nutrient budget;
d. Monitor clean process water quality;
e. Reduce application rates and manage the storage silos and pond(s) when weather and soil conditions are not suitable for irrigation;
f. Minimise potential odour and spray drift from the system; and
g. Respond to emergencies and provide contingency plans.

25 The Environment Management Plan shall be reviewed by the consent holder at least annually for the purpose of addressing any issues relating to compliance with the conditions of this consent. The current plan will be forwarded to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager by 31 August each year for the term of this consent.

Administration

26 The Canterbury Regional Council may, once per year, on any of the last five working days of April or October, serve notice of its intention to review the conditions of the consent for the purposes of:

a. Dealing with any adverse effect on the environment which may arise from the exercise of this consent and which is appropriate to deal with at a later stage; or
b. Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment; or
c. Requiring compliance with any relevant rule of an operative Regional Plan; or

d. Reviewing the frequency of monitoring and the determinants monitored.

27 This consent shall lapse ten years after the date of commencement, unless the consent is given effect to before the lapsing date, under section 125 of the Resource Management Act.

Issued at Christchurch on 27 August 2013

Canterbury Regional Council
Consent No: CRC140775

Exercising of resource consent

It is important that you notify Environment Canterbury when you first start using your consent.

GRANTED TO:  
Fonterra Co-operative Group Limited (Hamilton)

A DISCHARGE PERMIT:  
To discharge contaminants into or onto land and air.

LOCATION:  
Racecourse Hill, DARFIELD

Even if the consent is replacing a previous consent for the same activity, you need to complete and return this page.

Providing this information will:

- Validate your consent through to its expiry date
- Minimise compliance monitoring charges
- Help provide an accurate picture of the state of the environment.

If consent CRC140775 is not used before 27 Aug 2023 this consent will lapse and no longer be valid.

Declaration:

I have started using this resource consent.

Action taken: (e.g. pasture irrigated, discharge from septic tank/boiler/spray booth etc).

Approximate start date (Note: this may be different to the date the consent was granted)::

Signed: ___________________________ Date: ___________________________

Full name of person signing (please print): _______________________________________

Please return to:

Environmental Protection - Administration
Environment Canterbury
PO Box 345
Christchurch 8140
27 August 2013

Fonterra Co-operative Group Limited
(Hamilton)
Attn To: Fiona Mathis
PO Box 333
Waikato Mail Centre
Hamilton 3240

Dear Sir/Madam

NOTICE OF RESOURCE CONSENT DECISION(S)

RECORD NO: CRC140777
NAME: Fonterra Co-operative Group Limited (Hamilton)

The decision of Environment Canterbury is to grant your application(s) on the terms and conditions specified in the attached resource consent document(s). Your resource consent(s) commences from the date of this letter advising you of the decision. The reasons for the decision are:

1. Any adverse effects on the environment as a result of the change in conditions will be minor.
2. There are no persons considered to be adversely affected by this proposal.

For some activities a report is prepared, with officer recommendations, to provide information to the decision makers. If you require a copy of the report please contact our Customer Services section.

If you do not agree with the consent authority decision, you may object to the whole or any part. Notice of any objection must be in writing and lodged with Environment Canterbury within 15 working days of receipt of this decision.

Alternatively you may appeal to the Environment Court, PO Box 2069, Christchurch. The notice of appeal must be lodged with the Court within 15 working days of receipt of this decision, with a copy forwarded to Environment Canterbury within the same timeframe. If you appeal this decision, the commencement date will then be the date on which the decision on the appeal is determined. If you are in any doubt about the correct procedures, you should seek legal advice.

Environment Canterbury takes every measure to improve both applications and processes, and we appreciate your feedback as an important component in ensuring this occurs. You can complete a consents survey on-line at http://www.ecan.govt.nz/services/resource-consents/pages/surveys.aspx. Alternatively, you can call our Customer Services Section on 0800 EC INFO who will be happy to complete the survey with you.

Charges, set in accordance with section 36 of the Resource Management Act 1991, shall be paid to the Regional Council for the carrying out of its functions in relation to the administration, monitoring and supervision of resource consents and for the carrying out of its functions under section 35 of the Act.

Thank you for helping us make Canterbury a great place to live.

Our Ref: CRC140777
Your Ref: EC108073,EC104565
Contact: Customer Services
For all queries please contact our Customer Services Section by telephoning (03) 353 9007, 0800 ECINFO (0800 324 636), or email ecinfo@ecan.govt.nz quoting your CRC number above.

Yours sincerely

[Signature]

CONSENTS PLANNING SECTION

CC Address:

Planz Consultants Limited
Attn To: Jane Anderson
PO Box 1845
Christchurch 8140
RESOURCE CONSENT CRC140777
Pursuant to Section 104 of the Resource Management Act 1991

The Canterbury Regional Council (known as Environment Canterbury)

GRANTS TO: Fonterra Co-operative Group Limited (Hamilton)

A DISCHARGE PERMIT: To discharge contaminants into or onto land and to air.

CHANGE TAKES EFFECT DATE: 27 Aug 2013

EXPIRY DATE: 02 Dec 2045

LOCATION: Racecourse Hill, DARFIELD

SUBJECT TO THE FOLLOWING CONDITIONS:

Definitions

1 For the purposes of this resource consent:
   a. Clean Process Water means condensate water (cow water), obtained by evaporating the water content out of milk and cooling water.
   b. Overseer® Modeller means a person holding an Advanced Sustainable Nutrient Management Certificate issued by Massey University or an equivalent qualification.
   c. Qualified Person means a person who holds a relevant tertiary qualification that required the equivalent of at least three years full-time study, and who has expertise in environmental investigation and environmental sampling, or a person who has such extensive experience and expertise to be equivalent to that qualification and expertise. The consent holder shall provide evidence of the person’s qualifications, experience and expertise on request from the Canterbury Regional Council.
   d. Significant Ponding means when wastewater remains on the ground surface of an area greater than 50 square metres 24 hours after irrigation has ceased.

Limits

2 The discharge shall be only Clean Process Water sourced from a Milk Powder Plant located on State Highway 73, Racecourse Hill, Darfield.

3 The clean process water shall be discharged onto land at or about map reference NZMS 260: L35:3740-4979 or BX22:2741-8818 as shown on Plan CRC140777, which forms part of this consent.

4 The discharge to land shall occur on at least 106 hectares of land.
Clean process water shall be irrigated to pasture at an average application rate not exceeding five millimetres per day when the soil moisture is less than 85 percent of field capacity.

When the soil moisture on the irrigation farm exceeds 85 percent of field capacity the consent holder shall:
   a. Subject to (b) below defer irrigation of clean process water in order to reduce the loading on the irrigation area; and
   b. Reduce the application rate to an average of 1.5 millimetres per day.

The volume of clean process waste discharged shall not exceed 500,000 cubic metres per year.

For the purpose of demonstrating compliance with conditions (5) to (7) and (12), the consent holder shall:
   a. Continuously measure the volume of clean process water discharged with a flow meter;
   b. Monitor soil moisture, as required, with a TDR Type Soil Moisture Meter.

The flow meter specified in condition (8)(a) shall be located at a point following the exit from the storage silos or pond(s) and before the discharge onto land by the irrigation system. The flow meter shall be calibrated annually to a margin of error of +/- 5 percent.

All irrigation infrastructure shall be designed, constructed and operated to comply with the New Zealand Electrical Code of Practice for Electrical Safe Distances 34:2001 (NZECP 34:2001).

Discharge

The clean process water shall be discharged onto land by spray irrigation. The consent holder shall ensure that the discharge:
   a. Is applied over the irrigation area in a uniform manner;
   b. Does not cause any significant ponding on the ground surface; and
   c. Does not occur within 24 hours of the application of any fertiliser.

The soil moisture in the irrigation area shall be monitored daily when clean process water is irrigated using a generally accepted method and in accordance with condition (8)(b). The results of this monitoring shall be recorded and made available to the Canterbury Regional Council on request.

There shall be no discharge:
   a. Over or within 20 metres of any surface water body, well or bore, impermeable surfaces or in any other place or at such a rate that the discharge is likely to enter surface water or flow onto any neighbouring property; or
   b. Within 100 metres of any dwelling unless written approval has been obtained from the landowner/occupier by the consent holder.

The consent holder shall annually update a nutrient balance to demonstrate nutrients are being managed effectively.

Overseer® shall be used to calculate the average annual concentrations of nitrate-
nitrogen in the soil drainage water from the irrigation land. The consent holder shall ensure that:
   a. If the predicted annual average concentration of nitrate-nitrogen, calculated in accordance with this condition exceeds 8 milligrams per litre, best management practices shall be implemented to minimise as far as practicable, the discharge of nitrate-nitrogen to soil drainage water;
   b. The predicted average annual concentration of nitrate-nitrogen in the soil drainage water shall not exceed 16 milligrams per litre.

**Odour and Aerosols**

The discharge to air from the spray irrigation of Clean Process Water shall not result in odour which is noxious, offensive or objectionable beyond the property boundary.

The consent holder shall:
   a. Take all practicable measures to prevent the drift of aerosols beyond the boundary of the property on which this consent is exercised; and
   b. Use wind direction controls to automatically deactivate irrigation zones close to down-wind boundaries to minimise the risk of spray drift

**Maintenance**

The consent holder shall maintain and operate all structures and relevant equipment associated with the site’s disposal system in accordance with the procedures and requirements of the Environment Management Plan prepared in accordance with condition (23) of this consent.

**Clean Process Water Monitoring**

The consent holder shall for the first 12 months after commencement of the discharge authorised by this consent, take a representative 24 hour sample of the clean process water at the point it enters the irrigation system on one day per week that irrigation occurs. For the remaining term of the consent, three samples per year will be taken. The sample shall be analysed for:
   a. COD in milligrams per litre;
   b. Total nitrogen in milligrams per litre;

All samples shall be taken by a suitably qualified person.

Results of the analyses of Clean Process Water monitoring carried out in accordance with condition (19) shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager within 10 working days of the samples being collected.

**Records and Reporting**

The consent holder shall log any complaints received. The log at a minimum shall contain the following information:
a. Date and time the complaint was received;
b. (Nature and location of the complaint;
c. Complainant's details;
d. Weather information; and
e. Details of the key operating parameters at the time of the complaint; and
f. Remedial action taken to prevent further incidents.

Complaints shall be reported to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within 24 hours and the log of complaints will be made available to the Canterbury Regional Council on request.

22
The consent holder shall supply to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, an annual report on the exercise of this consent over the prior dairy season. The report shall be provided by 30 September each year and shall include the following records:
   a. Daily application rates and volumes of discharges onto land by spray irrigation;
   b. Location and timing of clean process water applications;
   c. A record of any complaints that are received relating to the irrigation of clean process water;
   d. A copy of the nutrient budget as required by condition (13);
   e. A copy of the Overseer® report as required by condition (14);
   f. Analysis and interpretation of clean process water quality; and
   g. Any proposals for mitigating any adverse effects found to be occurring.

Environment Management Plan

23
At least 10 working days prior to the first exercise of this consent, the consent holder shall prepare and forward to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, an Environment Management Plan (EMP) for the operation of the wastewater treatment and disposal system. The EMP shall include, but not be limited to, details of procedures to:
   a. Manage and maintain the clean process water storage systems;
   b. Manage and report on soil moisture and clean process water irrigation application rates, including in snow cover situations;
   c. Manage and report on the nutrient budget;
   d. Monitor clean process water quality;
   e. Reduce application rates and manage the storage silos and pond(s) when weather and soil conditions are not suitable for irrigation;
   f. Minimise potential odour and spray drift from the system; and
   g. Respond to emergencies and provide contingency plans.

24
The Environment Management Plan shall be reviewed by the consent holder at least annually for the purpose of addressing any issues relating to compliance with the conditions of this consent. The current plan will be forwarded to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager by 31
August each year for the term of this consent.

Administration

25 The Canterbury Regional Council may, once per year, on any of the last five working days of April or October, serve notice of its intention to review the conditions of the consent for the purposes of:
   a. Dealing with any adverse effect on the environment which may arise from the exercise of this consent and which is appropriate to deal with at a later stage; or
   b. Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment; or
   c. Requiring compliance with any relevant rule of an operative Regional Plan; or
   d. Reviewing the frequency of monitoring and the determinants monitored.

26 This consent shall lapse ten years after the date of commencement, unless the consent is given effect to before the lapsing date, under Section 125 of the Resource Management Act.

Issued at Christchurch on 27 August 2013

Canterbury Regional Council
Exercising of resource consent

It is important that you notify Environment Canterbury when you first start using your consent.

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**GRANTED TO:** Fonterra Co-operative Group Limited (Hamilton)
**A DISCHARGE PERMIT:** To discharge contaminants into or onto land and to air.
**LOCATION:** Racecourse Hill, DARFIELD

Even if the consent is replacing a previous consent for the same activity, you need to complete and return this page.

Providing this information will:

- Validate your consent through to its expiry date
- Minimise compliance monitoring charges
- Help provide an accurate picture of the state of the environment.

If consent CRC140777 is not used before 27 Aug 2023 this consent will lapse and no longer be valid.

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**Declaration:**

I have started using this resource consent.

**Action taken:** (e.g. pasture irrigated, discharge from septic tank/boiler/spray booth etc).

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**Approximate start date (Note: this may be different to the date the consent was granted):**

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**Signed:** ___________________________ **Date:** ___________________________

**Full name of person signing (please print):**

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Please return to:

Environmental Protection - Administration
Environment Canterbury
PO Box 345
Christchurch 8140
21 March 2013

Fonterra Co-operative Group Limited
Attn: Ian Goldschmidt
30 Factory Road
Brightwater 7022

Dear Sir/Madam

RESOURCE CONSENT AMENDMENT
NUMBER: CRC134753
NAME: Fonterra Co-operative Group Limited

Errors have been identified in the above mentioned resource consents (incorrect condition numbers referred to in condition 6). The decision maker, who made the original decision, has assessed the error and is satisfied that the error can be corrected under the powers of section 133a of the Resource Management Act 1991. Therefore the errors have been corrected.

Please destroy the documents currently in your possession and replace them with those enclosed. All the original attachments (i.e. any maps, pamphlets etc) are still valid.

For all queries please contact our Customer Services Section by telephoning 03) 353 9007, 0800 ECINFO (0800 324 635), or email ecinfo@ecan.govt.nz quoting your CRC number above.

Yours Sincerely

CONSENTS PLANNING SECTION
RESOURCE CONSENT CRC134753
Pursuant to Section 104 of the Resource Management Act 1991

The Canterbury Regional Council (known as Environment Canterbury)

GRANTS TO: Fonterra Co-operative Group Limited

A DISCHARGE PERMIT: To discharge human and domestic wastewater into land.

CHANGE TAKES EFFECT DATE: 20 Mar 2013

EXPIRY DATE: 02 Dec 2045

LOCATION: State Highway 73, Darfield

SUBJECT TO THE FOLLOWING CONDITIONS:

Definitions

1 For the purposes of this consent:

(a) Qualified Person means a person who holds a relevant tertiary qualification that required the equivalent of at least three years full-time study, and who has expertise in environmental investigation and environmental sampling, or a person who has such extensive experience and expertise to be equivalent to that qualification and expertise. The consent holder shall provide evidence of the person's qualifications, experience and expertise on request from the Canterbury Regional Council.

(b) Wastewater means only:
   (i) wastewater from ablution blocks including toilets, showers and hand basins; and
   (ii) wastewater from kitchen facilities.

2 (a) The volume of wastewater discharged shall not exceed 16 cubic metres per day averaged over any 30 consecutive days.

(b) For the purposes of demonstrating compliance with Condition 2(a) the volume of wastewater entering the land application system shall be continuously measured by a flow meter.

(c) The flow meter specified in condition 2(b) shall be located at a point following exit from the treatment system and before discharge into the land application system and calibrated annually to a margin of error of ± five percent.
Scope

3 The discharge shall be only into land as shown on the attached "Opus – General Overall Site Layout Plan 6/3119/6/7604 Sheet 01 Revision R1" which forms part of this consent.

4 (a) The wastewater shall be treated in a membrane bioreactor treatment system (MBR) or an alternative wastewater treatment system that provides the same or better quality of treatment.
(b) The wastewater treatment system shall be fitted with an alarm to alert the consent holder to power failure, membrane rupture or high water levels.

5 After exiting the wastewater treatment system, the wastewater shall be discharged via a land application system as follows:
(a) The land application system shall include an area of at least 4,200 square metres for sewage disposal through sub-surface drip irrigation.
(b) Lines of drip irrigation tubing shall be at least one metre apart.
(c) The drippers on the drip irrigation tubing shall be spaced at intervals not more than 600 millimetres apart.
(d) The wastewater shall be evenly dosed in fixed quantities over the land application system.
(e) The wastewater shall be discharged at a loading rate not exceeding eight millimetres per day, with an average loading rate not exceeding four millimetres per day calculated as a monthly rolling average.
(f) The drip irrigation tubing shall be covered with between 100 and 200 millimetres of soil.
(g) The soil above the drip irrigation tubing shall be planted with grass. The grass shall be kept in a healthy state. Replanting shall occur when erosion or die-off has resulted in bare or patchy soil cover.

6 A certificate shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within one month of completion of the wastewater treatment and land application system signed by a Chartered Professional Engineer (CPEng) who has experience of designing and installing wastewater treatment systems, certifying that the system has been designed and installed in accordance with Conditions 4, 5 and 6.

7 The discharge shall not result in any wastewater being visible at the land surface.

8 The land application system shall be fenced to exclude stock, unauthorised vehicles and unauthorised access.

9 The discharge shall not result in odour that is offensive or objectionable beyond the boundary of the property on which the consent is exercised.
10  (a) There shall be no discharge within 20 metres of any surface water body; and
(b) There shall be no discharge to a surface water body as a consequence of the exercise of this consent.

11  (a) The wastewater treatment system and land application system shall be serviced at least once every six months or sooner determined by conditions on site, by a person who is a currently Registered Drainlayer under the Plumbers, Gasfitters and Drainlayers Act 2006 or who holds an equivalent qualification or who is an accredited agent of the manufacturer (of the wastewater treatment system) for the service and operation of the relevant wastewater treatment system or land application system.

(b) The servicing shall include, but shall not be limited to:
   (i) flushing the membrane and cleaning if necessary;
   (ii) inspecting the filters and cleaning if necessary;
   (iii) checking that the pump is working and replacing the pump as required;
   (iv) checking the electrical equipment is working and replacing as necessary; and
   (v) checking the alarm system is working and replacing as necessary.

(c) Grass from the site of the land application system shall be harvested and removed from the site.

(d) Following every service a written report shall be prepared and kept by the consent holder. In addition, the consent holder shall keep written records of all repairs made to any part of the wastewater treatment and land application system.

(e) The consent holder shall forward a copy of the written reports and records of repairs to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, on request.

12  Prior to installation of the wastewater treatment and land application system, the consent holder shall prepare an Operation and Maintenance Manual. This Manual shall include, but not be limited to:

(a) Procedures to ensure the efficient operation of the treatment and land application system;

(b) Methods of pasture management, including the harvesting and removal of grass from the land application system;

(c) Contingency plans in the event of a breakdown or malfunction, or when discharge is not possible;

(d) A list of the records that will be kept and how they will be maintained; and

(e) A list of the sampling required and how the records will be maintained.
13  (a) A copy of the Operation and Maintenance Manual shall be supplied to the Canterbury Regional Council Attention: RMA Compliance and Enforcement Manager within five working days of its completion.
(b) Any subsequent changes to the Operations and Maintenance Manual shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager within five working days of those changes being made.

14  (a) Daily records shall be kept of the following, and supplied to the Canterbury Regional Council on request:
   (i) The volume of wastewater applied to land.
   (ii) The depth of rainfall.
(b) Records shall be kept of the following and supplied to the Canterbury Regional Council Attention on request:
   (i) The wastewater nitrogen loading rate expressed as kilograms per hectare per year; and
   (ii) The quantity of pasture (kilograms dry weight) removed from the site, recorded on a monthly basis.

15  (a) Representative samples of treated wastewater shall be taken from a point following exit from the wastewater treatment system and before discharge into the land application system.
(b) The samples shall be taken by a qualified person at the following frequencies;
   (i) At least once every 30 days for the first 12 months following commencement of the discharge authorised by this consent.
   (ii) At least once every three months for the following 24 months.
   (iii) At least once per year thereafter.
   (iv) At least once every 30 days for the six months following any exceedence of the trigger values in Condition 17.

16  (a) All samples taken in accordance with Condition 15 shall be analysed for:
   (i) BOD5;
   (ii) Faecal coliforms;
   (iii) Total suspended solids; and
   (iv) Total nitrogen.
(b) The samples shall be maintained prior to analysis by the most appropriate generally accepted method that ensures that the analysis result is representative of the wastewater at the time of sampling
(c) The samples shall be analysed using the most appropriate scientifically recognised and current method by a laboratory that is certified for that method of analysis by an accreditation authority such as International Accreditation New Zealand (IANZ).
The results of the analyses carried out in accordance with condition 16 shall be compared to the following trigger values:

(a) A median of 20mg/L BOD5 in any 10 consecutive samples and a maximum of 35mg/L BOD5 in any one sample.

(b) A median for faecal coliforms of 100cfu per 100ml sample in any five consecutive samples and a maximum of 1000cfu per 100ml in any one sample.

(c) A median of 30mg/L total suspended solids in any 10 consecutive samples and a maximum of 45mg/L TSS in any one sample.

(d) No more than one sample over 25mg/L total nitrogen in any 10 consecutive samples.

If any of the results of the sampling carried out in accordance with conditions 15 and 16 exceed the trigger values in condition 17 the consent holder shall, within three working days, take another sample of the treated wastewater in accordance with condition 15 and have it analysed in accordance with condition 17.

If the results of the sampling and analysis carried out in accordance with condition 18(a) exceed the trigger values in condition 17, the consent holder shall immediately inspect, service, repair and/or modify the treatment system, as required, to reduce the concentration of water quality parameters in the discharge to less than the trigger values set out in condition 17.

A further sample shall be collected and analysed within seven days of receiving the results of the sample taken in accordance with condition 18(a).

In the event that the results of analyses of the sample taken in accordance with condition 18(c) exceed the trigger values shown in condition 17, the consent holder shall immediately cease the discharge of wastewater from the treatment system to land.

In the event of a cessation of discharge under condition 18(d), the discharge of wastewater from the treatment system to land shall not recommence until the results of analyses of a further sample do not exceed any of the trigger values specified in condition 17.

Advisory Note: If a discharge cessation is required, wastewater will need to be tankerred off site until there is full compliance with the trigger values specified in condition 17.
19(a) The consent holder shall provide an annual report to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager by 30 September each year.

(b) The report shall include, but not be limited to:

(i) A summary and interpretation of the data collected under conditions 15, 16 and 18;

(ii) Identification and discussion of any trends in the results;

(iii) A comparison of the results with results from previous years;

(iv) An explanation of any operational difficulties, changes or improvements made to the processes which could result in changes in the effects on water quality or the quality of the wastewater discharged; and

(v) If applicable, an outline of any measures undertaken to mitigate any adverse environmental effects to prevent a recurrence and a comment on the effectiveness of these measures.

20 The Canterbury Regional Council may, once per year, on any of the last five working days of April or October, serve notice of its intention to review the conditions of this consent for the purposes of:

(a) Dealing with any adverse effect on the environment which may arise from the exercise of this consent and which it is appropriate to deal with at a later stage; or

(b) Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment; or

(c) Requiring the consent holder to carry out monitoring and reporting instead of, or in addition to, that required by the consent;

(d) Requiring the consent holder to undertake remediation action, instead of, or in addition to, that required by the consent.

Review

21 This consent shall lapse ten years after the date of commencement, unless the consent is either given effect to before that lapsing date, pursuant to section 125 of the Resource Management Act 1991.

Issued at Christchurch on 21 March 2013

Canterbury Regional Council
RESOURCES CONSENT CRC103589.1
Pursuant to Section 104 of the Resource Management Act 1991
The Canterbury Regional Council (known as Environment Canterbury)

GRANTS TO: Fonterra Co-operative Group Limited (Hamilton)
A DISCHARGE PERMIT: To discharge contaminants in stormwater into land.
DATE DECISION: 31 January 2012
EXPIRY DATE: 2 December 2045
LOCATION: Racecourse Hill, DARFIELD

SUBJECT TO THE FOLLOWING CONDITIONS:

DEFINITIONS
1) For the purposes of this resource consent:
    (a) **Qualified Person** means a person who holds a relevant tertiary qualification that required the equivalent of at least three years full-time study, and who has expertise in environmental investigation and environmental sampling, or a person who has such extensive experience and expertise to be equivalent to that qualification and expertise. The consent holder shall provide evidence of the person's qualifications, experience and expertise on request from the Canterbury Regional Council.
    (b) **HSNO** means Hazardous Substances and New Organisms Act 1996 and associated regulations.
    (c) **Hazardous substances** means a substance that is subject to HSNO.

HAZARDOUS SUBSTANCES

2) The consent holder shall ensure that:
    (a) All practicable measures shall be undertaken to prevent oil and fuel leaks from vehicles, storage vessels and machinery; and
    (b) Storage of hazardous substances or refuelling of vehicles and machinery shall not occur within 50 metres on any ephemeral flowing surface water body.

3) The consent holder shall maintain on site at all times, measures to prevent spills entering land or water including:
    (a) Spill kits to contain or absorb any spilled hazardous substance;
    (b) Signs to identify the location of spill kits; and
    (c) Written procedures in a clearly visible location that are to be undertaken to contain, remove and dispose of any spilled hazardous substance.

4) Copies of HSNO Test Certificates for each storage system where required shall be retained on site at all times and made available for inspection by officers or agents of the Consent Authority.

5) The consent holder shall maintain a current inventory of all hazardous substances stored on the site, and a copy of the inventory shall be made available to the Consent Authority on request.

6) In the event of a spill of a hazardous substance within the site, the consent holder shall:
    (a) Take all practicable measures to prevent the hazardous substance being further discharged into land or water; and

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(b) Collect and remove the hazardous substance and any contaminated material as soon as practicable.

7) In the event of a spill of more than 50 litres or 50 kilograms of a hazardous substance on site, the consent holder shall record and provide to the Canterbury Regional Council Attention: RMA Compliance and Enforcement Manager, and to the Selwyn District Council, Attention: Environmental Policy and Approvals Manager, within 24 hours of the spill:
   (a) The date, time, location and amount of the spill;
   (b) The substance spilled;
   (c) A description of the remediation measures taken in response to the spill;
   (d) A description of the measures taken to prevent the spill substance being discharged into land or water;
   (e) The cause of the spill and measures that will be taken to prevent a recurrence; and
   (f) The timeframes for such measures.

8) Any contaminated material, resulting from a spill as specified in condition (7) and removed from the site, shall be disposed of at a facility authorised to receive such material. The consent holder shall provide the Canterbury Regional Council and the Selwyn District Council with written confirmation of such disposal within 10 working days of the disposal.

LIMITS

9) The discharge shall be only stormwater generated from:
   (a) roofs, including the dryer roof;
   (b) impermeable sealed surfaces, including roads and other hardstand areas; and
   (c) refuelling areas;
associated with the proposed Milk Powder Plant located on State Highway 73, Racecourse Hill, Darfield, shown on attached URS Plan “Stage 2 Stormwater and Wastewater Layout – Fig 1 –Rev B which forms part of this consent.

10) Stormwater shall be generated from no more than 83,000 square metres of roof and no more than 67,000 square metres of hardstand and roading.

11) The discharge of roof stormwater shall not be from galvanised sheet building materials.

12) There shall be no discharge from coal and milk loading and unloading areas, from truck wash areas or hardstand around the silos and balance tanks into the stormwater system.

13) Any on-site chemical storage areas shall be bunded to prevent the release of the hazardous substance from the bunded area. Each bund shall be:
   (a) Sized to contain at least 110 percent of the largest single container within the bund; and
   (b) Constructed of robust material and made effectively impermeable to leakage through the bund material.

14) Material collected in bunds shall be removed off-site for disposal at a facility authorised for the disposal of such material.

STORMWATER SYSTEM PERFORMANCE

15) Stormwater shall be discharged as follows:
   (a) Except for storm events that occur less frequently than 10 percent annual exceedance probability storm events, all stormwater from roofs, except that from the dryer roof, shall be discharged into land via a sealed system that excludes all other stormwater.
(b) Stormwater from the dryer roof shall be discharged to road and parking areas for collection and treatment in the infiltration basins.
(c) Stormwater from impermeable sealed surfaces shall be discharged into land:
   (i) via collection sumps, pipes and swales to the vegetated infiltration basins; or
   (ii) by overland sheet flow to vegetated infiltration basins or to treatment swales.
(d) Stormwater from the refuelling area shall be discharged via an oil/water separator prior to discharge to an infiltration basin.

16) When the capacity of the infiltration basins or swales is exceeded, stormwater shall:
   (a) be directed to soakage trenches; or
   (b) flow overland to landscaped or grassed areas.

STORMWATER SYSTEM DESIGN

17) All sumps shall be fitted with submerged or trapped outlets as per the Christchurch City Council standard sump details labelled SSD1 SSD2 SSD3 and SSD4, which form part of this consent.

18) (a) The stormwater system shall be designed and constructed to collect, treat and dispose of stormwater up to and including all 10 percent annual exceedance probability storm events; and
   (b) National Institute of Water and Atmospheric Research High Intensity Rainfall Design System (HIRDS) V3 rainfall data or Selwyn District Council 2010 data, plus an increase of 15 percent of the rainfall depth to take account of climate change, shall be used in the design of the stormwater system.

19) The stormwater swales shall:
   (a) Be at least 70 metres in length;
   (b) Have a maximum base width of 1.5 metres;
   (c) Have side batter that do not exceed one vertical to four horizontal; and
   (d) Be uniformly vegetated with grass.

20) The two stormwater infiltration basins shall:
   (a) Be designed to treat and dispose of the first 25 millimetres of any rainfall event generated from each specific catchment area;
   (b) Be lined with a layer of topsoil at least 150 millimetres thick; and
   (c) Be uniformly vegetated with grass.

21) Stormwater shall not cause ponding in the infiltration basins for longer than 72 hours after cessation of any storm event.

22) Bypass systems shall be installed to divert all stormwater generated in excess of the first 25 millimetres of any storm event from the infiltration basins into soakage trenches or to overland flow.

23) The soakage trenches shall be constructed:
   (a) In accordance with a design consistent with the New Zealand Building Code (E1/VN1) 2004;
   (b) To reach down to gravel allowing infiltration at a minimum rate of 600 millimetres per hour; and
   (c) With sufficient capacity to dispose of stormwater generated during rainfall events up to and including all 10 percent annual exceedance probability storm events.

24) The oil/water separator referred to in Condition 15 (d) shall:
   (a) Have a minimum capacity of 1000 litres;
   (b) Have the capacity to treat stormwater flows of at least one litre per second; and

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(c) Be designed and constructed to capture oil globules greater than or equal to 150 micrometres in diameter.

25) The infiltration basins shall have an infiltration rate:
   (a) Not exceeding 112 millimetres per hour and not less than 18 millimetres per hour as determined using a double ring infiltrometer test; or
   (b) Not exceeding 75 millimetres per hour and not less than 12 millimetres per hour as determined using a flooded basin test.

DESIGN PLANS

26) At least one month prior to the construction of the stormwater system, the consent holder shall submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, design plans of the stormwater system, including the oil/grit separator design details, to be installed that comply with Conditions (9) to (25) of this consent.

27) Within one month after the installation of the stormwater system, a certificate signed by a Chartered Professional Engineer (CPEng) with stormwater treatment system design/construction experience, shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, to certify that the stormwater system complies with Conditions (9) to (25) of this consent. The CPEng shall at the same time provide a signed statement confirming that they are competent to certify the engineering work.

INSPECTIONS AND MAINTENANCE

28) The entire treatment system shall be inspected at least once every month.
   (a) Any visible hydrocarbons and debris or litter shall be removed within five working days of inspection.
   (b) Any accumulated sediment in the infiltration basins and swales shall be removed within five working days of inspection.
   (c) Any accumulated sediment in the sumps shall be removed when the sediment occupies more than one quarter of the depth below the invert of the outlet pipe.
   (d) Any erosion or scour shall be remediated within five working days of inspection to the extent that future rain events will not cause erosion or scour.

29) The infiltration basins shall be:
   (a) Maintained so that grass or vegetation is in a healthy and uniform state; and
   (b) Re-planted where erosion or die-off has resulted in bare or patchy soil cover.

30) The swales shall be:
   (a) Maintained so that vegetation is in a healthy and uniform state;
   (b) Re-planted where erosion or die-off has resulted in bare or patchy soil cover; and
   (c) Mowed regularly or maintained so that vegetation has a minimum length of 50 millimetres.

31) The oil/water separator shall be maintained in accordance with the manufacturer's specifications/operating instructions. A copy of these specifications/operating instructions shall be made available to the Canterbury Regional Council on request.

DISPOSAL OF MATERIAL

32) Any material removed in accordance with Condition (28) shall be disposed of at a facility authorised to receive such material.

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MONITORING

33) Representative soil samples shall be taken from each of the infiltration basins:
(a) At least once every ten years;
(b) From a depth of between zero and 50 millimetres below the ground surface at the point of lowest elevation;
(c) By a Qualified Person; and
(d) In general accordance with the Ministry for the Environment (2004) ‘Contaminated Land Management Guidelines—Site Investigation and Analysis of Soils.’

34) Soil samples taken in accordance with Condition (33) shall be analysed for the following contaminants:

- Copper
- Lead
- Zinc
- Benzo(a)pyrene
- Total Petroleum Hydrocarbons:
  - C_7 to C_8
  - C_10 to C_14
  - C_16 to C_36

in milligrams per litre (mg/L) using the United States Environmental Protection Agency method 1312, Synthetic Precipitation Leaching Procedure (SPLP), using reagent water, by a laboratory accredited by IANZ for the appropriate methods, compared against the Leachate Trigger Concentrations as listed in Condition (36).

35) The analyses undertaken in accordance with Condition (34) shall be carried out with detection limits of a maximum of 10 percent of the trigger concentrations set out in Condition (36), with the exception of Total Petroleum Hydrocarbons detection limits which shall be as follows:

<table>
<thead>
<tr>
<th>Method detection limit</th>
<th>Total Petroleum Hydrocarbons</th>
<th>SPLP (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C_7 – C_8</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>C_10 – C_14</td>
<td>0.20</td>
</tr>
<tr>
<td></td>
<td>C_16 – C_36</td>
<td>0.40</td>
</tr>
</tbody>
</table>

36) The results of analyses undertaken in accordance with Condition (34) shall be compared against the following trigger concentrations:

- Leachate Trigger Concentration
  - Copper: 40 mg/L
  - Lead: 0.2 mg/L
  - Zinc: 30 mg/L
  - Benzo(a)pyrene: 0.014 mg/L
  - Total Petroleum Hydrocarbons:
    - C_7 to C_8: 360 mg/L
    - C_10 to C_14: 7 mg/L
    - C_16 – C_36: 14 mg/L

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37) If any of the trigger concentrations listed in Condition (36) are exceeded, the soils shall be considered to be contaminated and:
   (a) Additional sampling to determine the lateral and vertical extent of the contamination, with respect only to the contaminant(s) that exceeded a trigger concentration, shall be carried out in accordance with Conditions (33)(b) to (d), and (34) to (36);
   (b) All contaminated soils identified in accordance with Conditions (33) to (36) shall be removed; and
   (c) The infiltration basin shall be reconstructed in accordance with Conditions (18), (20) and (25).

38) Any soils imported on site to backfill any excavation as a result of Condition (37) shall not be sourced from:
   (a) A site where activities included in Schedule WQ13 of the Natural Resources Regional Plan or the Ministry for the Environment’s Hazardous Industries and Activities list have been, or are being, undertaken; or
   (b) Any site on the Canterbury Regional Council’s Listed Land Use Register, unless the soil has been analysed for the appropriate contaminants and has been shown to be not contaminated, defined as at or below background concentrations and residual use guideline values.

RECORDING AND REPORTING

39) Records of the inspection and maintenance of the stormwater system shall be kept. The records shall include, but not be limited to, information that demonstrates compliance with Conditions (28) to (31) of this consent. Copies of these records shall be provided to the Canterbury Regional Council on request.

40) A report on soil monitoring undertaken in accordance with Conditions (33) to (37) shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within 30 working days of the taking of samples. This report shall include:
   (a) All monitoring results required by the conditions of this consent;
   (b) An analysis of all monitoring results against relevant guidelines and the determination of any trends in the results;
   (c) Comments on any adverse effects from the discharge and the actions taken to remedy or mitigate these effects; and
   (d) Recommended changes to the monitoring programme, if applicable.

TANKER PARKING AREA

41) The tanker parking area shall have an isolation valve or sluice to fully isolate this area in the event of a spill.

REVIEW

42) The Canterbury Regional Council may, once per year, on any of the last five working days of April or October, serve notice of its intention to review the conditions for this consent for the purposes of:
   (e) Dealing with any adverse effect on the environment which may arise from the exercise of this consent and which it is appropriate to deal with at a later stage; or
   (b) Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment; or
   (c) Requiring the consent holder to carry out monitoring and reporting instead of, or in addition to, that required by the consent;
   (d) Complying with the requirements of the relevant rule in an operative regional plan; or
   (e) Reviewing the trigger values established specified in the conditions of this consent.

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LAPSING

43) This consent shall lapse ten years after the date of commencement, unless the consent is either given effect to before that lapsing date, under section 125 of the Resource Management Act 1991.

DURATION

44) This consent will expire on the 2nd December 2045.

Issued at Christchurch on 19 March 2012

Canterbury Regional Council

Environment Canterbury is the promotional name of the Canterbury Regional Council
9 November 2011

Fonterra Co-operative Group Limited
Attn: Mr Ian Goldschmidt
30 Factory Road
Brightwater 7022

Dear Mr Goldschmidt

NOTICE OF RESOURCE CONSENT DECISION(S)
NUMBER(S): CRC060458.3
NAME: Fonterra Co-operative Group Limited

The decision of Environment Canterbury is to grant your application(s) on the terms and conditions specified in the attached resource consent document(s). Your resource consent(s) commences from the date of this letter advising you of the decision. The reasons for the decision are:

1) Any adverse effects on the environment as a result of the change in conditions (1), (2), (4), (7), (14), (16), (23), (25), (26), and (27), and the inclusion of condition (21) will be minor.
2) Any adverse effects on the environment as a result of the proposed activity will be minor.

For some activities a report is prepared, with officer recommendations, to provide information to the decision makers. If you require a copy of the report please contact our Customer Services section.

If you do not agree with the consent authority decision, you may object to the whole or any part. Notice of any objection must be in writing and lodged with Environment Canterbury within 15 working days of receipt of this decision.

Alternatively you may appeal to the Environment Court, PO Box 2069, Christchurch. The notice of appeal must be lodged with the Court within 15 working days of receipt of this decision, with a copy forwarded to Environment Canterbury within the same timeframe. If you appeal this decision, the commencement date will then be the date on which the decision on the appeal is determined. If you are in any doubt about the correct procedures, you should seek legal advice.

Environment Canterbury takes every measure to improve both applications and processes, and we appreciate your feedback as an important component in ensuring this occurs. You can complete a consents survey on-line at http://www.ecan.govt.nz/services/resource-consents/pages/surveys.aspx. Alternatively, you can call our Customer Services Section on 0800 EC INFO who will be happy to complete the survey with you.

Charges, set in accordance with section 36 of the Resource Management Act 1991, shall be paid to the Regional Council for the carrying out of its functions in relation to the administration, monitoring and supervision of resource consents and for the carrying out of its functions under section 35 of the Act.

Thank you for helping us make Canterbury a great place to live.

For all queries please contact our Customer Services Section by telephoning (03) 353 9007, 0800 ECINFO (0800 324 636), or email ecinfo@ecan.govt.nz quoting your CRC number above.

Our Ref: CO6C/31478
Your Ref: 
Contact: Customer Services

RMOG
Rev May 2008
Yours Sincerely

Tania Harris
SECTION MANAGER CONSENTS
on behalf of the Canterbury Regional Council

Enc
Mr B Williams
PO Box 2510
Christchurch 8140
RESOURCE CONSENT CRC060458.3
Pursuant to Section 104 of the Resource Management Act 1991
The Canterbury Regional Council (known as Environment Canterbury)

GRANTS TO: Fonterra Co-operative Group Limited
A WATER PERMIT: to take and use water
DATE DECISION: 8 November 2011
EXPIRY DATE: 1 May 2020
LOCATION: West Coast Road, RACECOURSE HILL

SUBJECT TO THE FOLLOWING CONDITIONS:

1) A3 condition set

These conditions shall apply to bores that are cased and screened in a manner that abstracts water from the following depths only.

<table>
<thead>
<tr>
<th>In the coastal confined aquifer area as shown on annexure 3</th>
<th>Below 80 m below natural ground surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the mid-plains area outside of the area overlain by A1 as shown on Annexure 3</td>
<td>Below 40 m below natural ground surface</td>
</tr>
<tr>
<td>In the upper plains area as shown on Annexure 3</td>
<td>Below 45 m below natural ground surface</td>
</tr>
</tbody>
</table>

The Consent Holder shall, before the commencement of taking water under this consent advise in writing the Council, Attention: RMA Compliance and Enforcement Manager, of the aquifer zone the consent holder is abstracting from. This shall be determined by comparing casing and screen depths with Table 1 attached.
Within 20 working days of receipt of the notice, the Council shall notify the Consent Holder in writing whether or not it agrees with the Consent Holders assessment of the aquifer zone being drawn upon. If the Council does not agree to the aquifer zone advised by the consent holder it shall include in the written notice the reasons for disagreement and shall advise which zone it considers appropriate on the basis of the casing and screen depths provided. The Council may only reject an advised aquifer zone on reasonable grounds having regards to the aquifer depths identified in Table 1 attached.

2) Location of take

(a) The take shall be located generally as described in the application and except where provided otherwise in the application, or by subsequent variation of this consent, shall only be used to supply water to the property on which the take is located and any other properties described in the application.

(b) Provided that prior notification is given to the Canterbury Regional Council (Council) the consent holder may increase the depth of the production bore from that set out in the application. If the production bore is screened below the depth of Aquifer 2 (being the deemed lower bound of Aquifer 2 set out in the table attached as Annexure 2) then condition set A3 shall apply.

(c) Prior to any bore being deepened, the consent holder shall advise the Council, Attention: RMA Compliance and Enforcement Manager, of that intention and shall obtain any necessary consents or variation of consent for such works.

(d) Prior to the taking of any water for the purposes of use in the dairy plant for milk processing, the

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interference assessments required by the applicable set of conditions shall be carried out and provided to the Council, Attention: RMA Compliance and Enforcement Manager. No water may be taken for use in the dairy plant for milk processing until the relevant interference requirements have been complied with.

Note: Generally, this consent to take and use water will not need to be varied if the take is deeper than that applied for, provided all relevant conditions can be met including, in particular, any conditions relating to interference effects on nearby takes. However, a new consent to drill the bore may be required or the existing bore consent may need to be varied.

3) **Bore, diameter, depth, map reference**

Water may be taken only from L35/0883, 400 millimetres diameter, at map reference NZMS 260 L35:3455-5133, and bore L350884, 400 millimetres diameter, at map reference NZMS 260 L35:3558-4871.

Except as provided for in Condition (2), the depth at which water is drawn into the production bore(s) shall be no less than 200 metres below ground level.

The bore number, diameter and map reference and top of Aquifer depth are set out in the table attached as Annexure 1 to the decision and the deemed upper level of Aquifer 3 is as shown in the table attached as Appendix 2.

4) **Area, use**

Water shall only be used in the dairy plant for milk processing and water may also be used for dust suppression during the construction of the dairy factory, as described in the application as amended on 23 March 2011. Provided however, that this consent authorises the taking and use of water for the purpose of testing as required by this consent.

5) **Transfer**

This consent is granted on the basis that water is to taken from the location specified and used on the property specified. The allocation, the subject of this consent, shall not be transferred to any other property, other well or other depth.

Note: This consent has been granted on the basis of the water needed to serve a particular property. If there is a proposal to use water taken pursuant to this consent on another property (whether or not in conjunction with a transfer) there would need to be an application to vary this condition. This consent is not intended to encourage or authorise the trading of surplus water, since that may lead to situations where the volumes taken pursuant to consents are much greater than would be the case if use was limited to the property where the water is needed. The Council will have the ability via the consent process to consider whether the transfer and/or variation of condition is desirable and necessary.

6) **Rate and volume**

Subject to all other conditions, water may only be taken from bore L35/0883 at a rate of not exceeding 75 litres per second and from bore L35/0884 at a rate not exceeding 75 litres per second. The combined rate at which may be taken from both bores (L35/0883 and L35/0884) shall not exceed 150 litres per second, with a volume not exceeding 12,960 cubic metres per day and 2,599,000 cubic metres between 1 July and the following 30 June.

Note: The rates, volumes of bores are set out in the table attached as Annexure 1 to this decision. Taking and use of water is authorised outside of the period referred to above, so far as is required for Aquifer testing.

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7) **Adaptive Management Conditions**

(a) In any irrigation season (being 1 September to 30 April following) groundwater may not be taken until the Council has given written notice to the Consent Holder that it agrees to the Annual Volume.

(i) The Annual Volume for this consent shall be calculated for each forthcoming season by the consent holder and is subject to an assessment of water availability ("the Assessment"); as specified in Appendix A; and

(ii) The assessment methodology ("the Methodology") is set out in Appendices A and B attached to this consent and includes any amendments to those Appendices that have been agreed in writing by the Consent Holder and the Council; and

(iii) The calculation of the Annual Volume resulting from the Methodology for the forthcoming season, together with supporting data, shall be documented in a report ("the Report"); and

(iv) The Report shall be sent annually to the Council, Attention: RMA Compliance and Enforcement Manager.

(b) If the calculation of the Annual Volume as determined under condition 7(a) is likely to limit full consented milk production for that dairy season, the Consent Holder may include "Additional Volume" to be added to the Annual Volume calculated under 7(a) to give a revised Annual Volume for the dairy factory, on the basis of the following:

(i) The formula used to calculate Additional Volume shall be: Annual predicted milk volume to be processed into milk powder x 0.84.

(ii) The Additional Volume to be incorporated into the revised Annual Volume shall equal the Annual Condensate Volume, which represent the water imports to the site.

(iii) The calculation of the Additional Volume resulting in the calculation in 7(b)(i), together with supporting data, shall be documented in "the Report" as required in Condition 7(a).

(c) Within 20 working days of receipt of the Report, the Council shall notify the Consent Holder in writing whether or not it agrees to the Annual Volume calculation for the forthcoming irrigation season. If the Council does not agree to the Annual Volume it shall include in the written notice any concerns and those concerns shall be referenced back to the methodology in Appendix A. If the Council does not accept the Annual Volume calculation it shall provide its own assessment of the Annual volume carried out in accordance with the methodology in Appendix A.

(d) Where the Council provides a revised calculation that shall be the Annual Volume unless the Applicant provides a further revised calculation which is approved by the Council.

(e) The consent holder may in any year, provide the Council with a revised Report before 1 December and the Annual Volume for the balance of the season may be changed as a result. In the event that the consent holder submits a revised Report paragraphs (a), (b), (c) and (e) shall apply.

(f) Notwithstanding the provisions of sub-clause (a) and (b), the consent holder shall be entitled to take the groundwater subject to the restrictions (if any) set out in the Report if the Council does not provide written notice in accordance with this Condition within 20 working days of receipt of the Report.

8) **Revising the Environmental Flow Safeguard (EFS)**

The EFS and/or the Annual Recession as calculated in accordance with Appendix A and B shall be reviewed if in the opinion of Council officers, or the consent holder's consultants, measured water levels indicate a significant variation from that predicted using the contouring method outlined in Appendix B:

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Where such a review is required the following shall apply:

(a) The consent holder or group of consent holders shall commission a report (the EFS Revision Report) to be prepared by a suitably qualified person or persons which provides data and analysis to support a new EFS and recession interpolated from the measured water level for that production bore and water levels, EFS and recessions from other adjacent bores in the same aquifer (the EFS Revision Report).

(b) The report(s) shall be sent to the Council, Attention: RMA Compliance and Enforcement Manager.

(c) Within 20 working days of the receipt of the report, the Council shall advise the consent holder in writing stating whether or not it is satisfied with the information and analysis provided in the report and whether it accepts the proposed EFS. If the Council is not satisfied with the report contents or proposed EFS the written notice shall outline any concerns with the information provided. The Council may only reject a revised proposed EFS on reasonable grounds consistent with the methodologies set out in Appendix A and Appendix B.

(d) If further information is required, that will be provided to the Council as soon as is practicable. Within 20 working days of the receipt of the further information the Council shall advise the consent holder in writing stating whether or not it accepts any further revised proposed EFS or proposes an alternative EFS. (The Council may only reject a revised proposed EFS on reasonable grounds).

(e) If no agreement can be reached on a revised EFS, then either the Council may review the conditions of this consent (including Appendix A and Appendix B) or the consent holder may seek a variation of conditions (including Appendix A and Appendix B) for the purpose of revising the EFS and (if appropriate) adjusting the methodology for calculation of the EFS and recession.

(f) “Significant” means + or − 1 percent change in the EFS where that change is greater than 100 millimetres.

9) **Future revision of methodology**

The methodology for determining groundwater contours may be revised by agreement between the Council and the consent holder(s) if a model (such as an Eigen value or some other analytical or numerical model) is developed that can more accurately and reliably predict groundwater levels at specific locations in each aquifer than the current contour methodology.

Where such a revision is proposed, a report shall be prepared by a suitably qualified person or persons who will provide data and analysis to support the revised methodology and revised EFS and groundwater recessions interpolated from the measured water levels.

**Explanatory Note:**

In the absence of long-term data the contour method may not be reliable for inland and coastal areas. Water level measurements following bore installation by the consent holders, increased monitoring by Canterbury Regional Council and increased water level measurement by all consent holders may be used to:

- verify the contour methodology as reliable and appropriate; or
- develop or improve existing or alternative models that can predict groundwater levels.

Either of the above or a combination of the two approaches could be used to better define the potentiometric surface for each aquifer. Adopting these improvements the EFS and recession can be more reliably estimated for the bore location. If agreement can not be reached on a revised methodology the Regional Council may utilise the special review condition where appropriate.

10) **Bore installation**

In the case of each production bore (where not already drilled) and in the case of any bore which is replaced or re-drilled during the term of this consent; the following shall apply:

(a) The casing shall be installed through the soil zone to the top of the screen. The annular space between the outside of the casing and the drill hole wall shall be sealed with cement grout to
whatever depth is necessary to prevent the contamination or pollution of groundwater by surface or shallow subsurface sources, to control subsurface pressures, and to prevent movement of the casing at all times until the bore is decommissioned. Care shall be taken to avoid grout moving into an aquifer.

(b) Except where a resource consent has been granted which allows access to more than one water bearing layer, or where a drilling permit specifies a seal as not necessary, the annular space between the outside of the casing and the drill hole wall in the aquitards between overlying aquifers shall be constructed in a manner that seals the annular space in order to prevent the interconnection or movement of groundwater along the annulus outside the casing between the overlying aquifers i.e. minimising casing shoe sizes or drilling with mud systems.

(c) All casing material (including temporary casing material) shall be suitable, in terms of its composition, cleanliness, strength and corrosion resistance for the site and installation conditions and the use of the bore. The screen slot size shall be appropriate for the aquifer and the gravel pack grain size and grading. The screen shall be securely sealed to the casing to prevent entry of rock or soil or gravel pack material into the bore.

(d) Within one month of the installation of each new production bore, the consent holder shall provide the geological log of the drill hole and the construction details of the bore (including the depth of the screen) to the Council, Attention: RMA Compliance and Enforcement Manager, together with a certificate signed by a suitably qualified person, certifying that the geological log and construction details as provided are correct.

11) **Straight pipe for flow meter checking**

(a) The consent holder shall, before the first exercise of this consent, install an easily accessible straight pipe, with no fittings or obstructions on it, of a length at least 15 times the diameter of the pipe, as part of the pump outlet plumbing or within the mainline distribution system for the purposes of enabling the Council to attach a water meter to check compliance with Condition (6).

(b) Clause (a) shall not apply where an electromagnetic water meter is installed pursuant to Condition (12) (Water metering and rate and volume recording) and certification of this is provided pursuant to Condition (15) (Certification of Installation of Rate, Volume and Level Measuring Devices).

12) **Water metering and rate and volume recording**

(a) The consent holder shall, before the first exercise of this consent:

(i) install a water meter(s) that has an international accreditation or equivalent New Zealand calibration endorsement suitable for use with an electronic recording device, from which the rate and the volume of water taken can be determined to within an accuracy of plus or minus five percent at a location(s) that will ensure the total take of water from bores(s) L35/0883 & L35/0884 is measured; and

(ii) install a tamper-proof electronic recording device such as a data logger that shall record (or log) the flow totals every 15 minutes and have the capacity to hold at least one season's data of water taken as specified in clauses (b)(i), or which is telemetered, as specified in clause (b)(ii);

(b) The water meter and recording device(s) shall be set to wrap the data from the measuring device(s) such that the oldest data will be automatically overwritten by the newest data (i.e. cyclic recording); and shall:

(i) store the entire season's data in each 12 month period from 1 July to 30 June in the following year, which shall be downloaded and stored in a commonly used format and provide to the Council in a form and to a standard specified in writing by the Council; or

(ii) be connected to a telemetry system which collects and stores all of the data continuously with an independent network provider who will make that data available in a commonly used format at all times to the Council and the consent holder. No data in the recording device(s) shall be deliberately changed or deleted.

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(c) The water meter and recording device(s) shall be accessible to the Council at all times for inspection and/or data retrieval.

(d) 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.

(e) All practicable measures shall be taken to ensure that the water meter and recording device(s) are at all times fully functional and have an accuracy standard of + or − five percent.

13) **Water level measuring in the Production Bore**

(a) The water level, relative to ground level, in bores L35/0883 & L350884, shall be measured (where practicable to a precision of better than 0.01 metres). The consent holder shall measure the working water level in the well immediately before switch off. Pumping shall cease for at least 48 hours or until water level recovery is at least 90 percent complete prior to the standing water level measurement taking place. The time that each measurement is made shall be recorded together with the water level measurement.

(b) All manual measurements of the standing water level and the date and time of measurement shall be recorded in a log book kept for that purpose, and supplied to the Council, Attention: RMA Compliance and Enforcement Manager, each year during the month of June, or upon request.

(c) Water level measurements can be undertaken using in situ instrumentation. Where these are used, the depth of placement shall be recorded. Data shall be downloaded from these instruments at least once per year and supplied to the Council, Attention: RMA Compliance and Enforcement Manager, each year during the month of June, or upon request.

14) **Review of Monitoring Data**

At the completion of the first full year of water use (1 August to the following 31 July) the consent holder shall engage, or at any other time during the five years after the end of the first year of water use following the implementation of this consent, the council may direct the consent holder to engage a suitably qualified and experienced person to review the water level and water use monitoring data collected under Conditions (12) and (13) to determine whether leakage has developed with longer term pumping. If leakage is identified and if the quantum of that leakage exceeds 5L/s over the duration of the year then the source and the effects of that leakage shall be assessed and where effects are more than minor, a mitigation plan shall be developed and implemented to reduce the effect of the leakage before the commencement of the next year. This mitigation plan shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, at least one month prior to the beginning of the next irrigation season for the purposes of reviewing the mitigation plan as to its adequacy and ensuring the mitigation plan is given effect to before the consent is further exercised in the forthcoming year.

15) **Certification of installation of rate/volume and level measuring devices**

(a) Within one month of the installation of the measuring or recording device(s) or any subsequent replacement measuring or recording device(s), and at five-yearly intervals thereafter, and at any time when requested by the Council, the consent holder shall provide a certificate to the Council, Attention: RMA Compliance and Enforcement Manager, signed by a suitably qualified person certifying, and demonstrating by means of a clear diagram, that:

(i) each measuring and recording device(s) is installed in accordance with the manufacturer's specifications; and

(ii) data from the recording device can be readily accessed and/or retrieved in accordance with the conditions above.

16) **Aquifer Tests**

Prior to the implementation of this consent:

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(a) The consent holder shall arrange for a suitably qualified person to undertake a constant rate discharge aquifer test ("aquifer test") in the production bore(s). The aquifer test shall continue until such time as there is no significant change in water level recorded in the pumped bore or any other bore monitored during the test. The maximum duration of the aquifer test shall be seven days. "No significant change" justifying the cessation of the aquifer test includes:
   - the existence of steady state leakage for a period of 24 hours.

(b) Prior to the commencement of the aquifer test the Council and the consent holder may agree; the number of wells to be tested (in the case of multiple production wells) the duration of the aquifer test and the methodology for the test.

Note: A different duration test may be necessary in circumstances where the water from a seven day test can not practically be disposed of. In those circumstances a shorter duration test or a longer duration with a lower rate test may be appropriate.

(c) This condition shall authorize the undertaking of the aquifer test in terms of Rule WON16 of the Canterbury Regional Council's proposed natural Resources Regional Plan as notified on 3 July 2004.

(d) The aquifer test shall be undertaken in accordance with Council technical report No. R98(10), 1998 or any subsequent replacement pumping test guidelines published by the Council available at the time of testing, and in accordance with Appendix C attached.

(e) Where there are production bores within 2,000 metres of the bore the subject of this consent then, prior to the first exercise of this consent for use in the dairy plant for milk processing the aquifer test shall:
   (i) monitor water level in the pumped bore;
   (ii) monitor water level in at least one other production bore screened at the same depth as the pumped bore and located within 2,000 metres of the pumped bore where available; and
   (iii) monitor water level in selected shallower production bores at different depths within 2,000 m of the pumped bore, where available.

Note: This consent has been granted on advice from the consent holder (through the Consent Holder's consultant) that effects of pumping from a well at this depth and at this location on the shallow aquifer (A1) and consequently on spring flow and stream flow will be minor. The aquifer testing which is required by these conditions is the minimum considered necessary and has, as one purpose, to show whether leakage is occurring when the well is pumped over a 7 day period. The testing undertaken is to be sufficient to determine whether leakage is happening and to enable the source of that leakage to be investigated and may require more than the minimum as set out above. The most appropriate means to do so would be to monitor wells shallower than the test well. Where no shallow wells exist but leakage is considered to be a distinct possibility, it would be prudent to consider whether a shallow monitoring well should be installed prior to the test being undertaken otherwise there is a risk that the test outcome may be ruled unsatisfactory by the Ecan officers given their review role in Condition (17).

(f) The aquifer test specifications shall be sufficient to determine:
   - the magnitude of well interference effects on all bores located within 2,000 metres of the production bore.
   - whether leakage has developed and is contributing to the production bore yield.

(g) Prior to commencement of the test, the aquifer test specifications shall be certified by a suitably qualified person acceptable to the Council, as being consistent with the requirements of this condition.

(h) Data, results and analysis of the test data shall be forwarded to the Council, Attention: RMA Compliance and Enforcement Manager, within three months of completion of the test and at least one month prior to exercising the consent.

(i) If the Council does not accept the aquifer test results as being adequate for the intended purpose it may require that a repeat analysis or repeat of the test be carried out. (Such a requirement must be on reasonable grounds).
17) **Analysis of Aquifer Tests**

(a) The results of the aquifer test shall be analysed by a suitably qualified person experienced in the analysis of pump tests and shall be used to determine:

(i) the direct cumulative interference effects resulting from the abstraction of water permitted by this consent on authorised water takes existing prior to the notifiable date of this consent which are within 2,000 metres of the production bores. The methodology to assess well interference effects for the purpose of this condition is set out in Condition (18); and

(ii) whether leakage is evident in the data collected from the pumped well and any other well monitored during the test and the magnitude of that leakage.

18) **Result of analysis of aquifer test (well interference)**

(a) Analysis as described in Schedule WQN10 of the Council's Proposed natural Resources Regional Plan as notified 3 July 2004 shall be undertaken and subject to (b) below, applied.

(b) If the analysis shows that the "protected available drawdown" (as described in Schedule WQN10 of the Council's Proposed natural Resources Regional Plan as notified 3 July 2004) for bores within 2,000 metres of the production bores, will be exceeded, the consent holder shall provide to the Council, Attention: RMA Compliance and Enforcement Manager:

(i) details of any changes proposed by the Consent Holder to avoid, remedy or mitigate any significant adverse effect; and

(ii) a well interference assessment undertaken and provided by a suitably qualified and experienced person that demonstrates that the proposed mitigation measures are adequate to ensure that interference effects on water takes authorised prior to the notifiable date of this consent and within 2,000 metres of production bores are within the thresholds set out in Policy WQN20 of the Council's Proposed Natural Resources Regional Plan as notified on 3 July 2004; or

(iii) an assessment undertaken and provided by a suitably qualified and experienced person in accordance with Appendix D to ensure that the yield of any potentially affected neighboring bores will be protected; or

(iv) the written agreement(s) of any potentially affected bore owners within 2,000 metres of the production bore, to the proposed interference.

19) **Leakage Assessment**

(a) Where leakage is identified in the measured drawdown in the production well, an assessment of the effects of that leakage shall be undertaken on the groundwater availability in shallower strata including Aquifer 1; on groundwater discharge to springs and streams; and on wells within 2,000 metres of the pumped well:

- At the same depth as the pumped well.
- At shallower depth than the pumped well.

(b) At no time shall leakage from A1 exceed 5L/s. Where leakage from A1 is assessed as greater than 5L/s then mitigation measures shall be developed and implemented to ensure effects are less than 5L/s.

(c) Where mitigation is not able to reduce this leakage from A1 to less than 5L/s then any take would be out of compliance and pumping will have to cease.

(d) This assessment shall be documented in a Report and the Report shall be sent to the Council, Attention: RMA Compliance and Enforcement Manager.

(e) Where effects are identified and mitigation measures are considered necessary, the mitigation measures proposed shall be included in the report.

(f) If mitigation is not able to minimise the leakage from A1 then the take will be considered to be out of compliance and the consent will not be able to be exercised.

**Note:** Where leakage is identified during the pumping test it is important that the consent holder, through their consultant, investigate where this leakage may be sourced from and what effect that
leakage may have on other users and the resource. This may require a test to be undertaken after shallow monitoring wells have been identified or constructed. The expectation in most instances where deep wells are pumped is that there will be no effects or no measurable effects on A1 or on spring or stream discharge. However this condition requires this possibility to be examined. Where leakage is assessed as affecting shallower wells or the shallow aquifer (not expected) then mitigation measured are to be proposed and to be implemented to ensure effects are within limits set.

20) **CRC Certification**

(a) Within 20 working days of receipt of information provided under Conditions (15) to (18), the Council shall give written notice (“compliance advice notice”) to the consent holder stating whether or not it is satisfied with the information and if not satisfied, the written notice shall outline any concerns and the reasons for those with reference to the methodologies set out in the relevant condition. (Provided that any compliance advice notice which states that the Council is not satisfied shall be based on reasonable grounds).

(b) If a compliance advice notice is not received within 20 working days, the consent holder shall be deemed to have complied with Conditions (15) to (18).

(c) The consent shall not be exercised until the compliance advice notice states that the consent holder is in compliance and that mitigation measures proposed, if any, are acceptable.

21) **Milk Processing Plant Water Efficiency Audit**

(a) Within two years of each stage of the milk processing plant development beginning to process dairy products, the consent holder shall arrange for a suitably qualified and experienced person to carry out an audit of the use of water in the new plant during October and November, in accordance with Dairy Industry best practice or such as that detailed in Auckland Regional Council technical publication number 82 “Industrial Water Audit Guidelines”, or any subsequent replacement or equivalent publication.

(b) The audit carried out in accordance with this condition shall;

(i) monitor total water use;

(ii) identify areas or processes where water could be used more efficiently; and

(iii) recommend any practicable measures that could be implemented to reduce water use as identified in condition (21)(ii) above.

(c) A copy of the audit, and a timeline for implementing any practicable measures identified in condition (21)(b)(iii), shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within 20 working days of completion of the audit.

(d) The audit carried out in accordance with this condition shall be repeated after each stage of the development or every five years which ever is less for the duration of this consent.

22) **Backflow prevention**

(a) The system used to take water in terms of this permit shall have a backflow preventer manufactured in accordance with AS 2845.1 (1998) or the American Society of Sanitary Engineers standards installed within the pump outlet plumbing or within the mainline and at a location that prohibits any other connection to the mainline, to prevent the backflow of water into the bore; and

(b) 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 person; and

(c) A test report shall be provided to the Council, Attention: RMA Compliance and Enforcement Manager.

23) **Measurement of natural groundwater levels**

(a) The taking of water in terms of this permit shall cease for a period of up to 48 hours on notice from the Council, to allow measurement of natural groundwater levels; and

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**Environment Canterbury** is the promotional name of the Canterbury Regional Council
(b) The Council will provide not less than seven working days notice of its requirement to measure groundwater levels in accordance with this condition. A consent holder may refuse to allow measurement under this condition if the required notice has not been given.

24) **Standard Review of conditions**

The Council may, at any time during the five years after the end of the first full irrigation season following the implementation of this consent, serve notice of its intention to review the conditions of this resource consent for the purpose of dealing with any adverse effect on the environment arising from the exercise of this consent (either on its own or in conjunction with any other consents) and where because of the nature or degree of effect, it is desirable that the effects be addressed prior to the expiry of this consent.

25) **Review of conditions for the purpose of revising the Environmental Flow Safeguard and/or the methodology for predicting groundwater levels.**

The Council may, at any time during the five years after the end of the first full irrigation season following the implementation of this consent, serve notice of its intention to review the conditions of this resource consent for the purpose of:

(a) Revising the Environmental Flow Safeguard that was established in terms of Appendix A if groundwater levels measured by the consent holder indicate a significant variation in the groundwater recession and the EFS calculated using the contouring method outlined in Appendix B (for the purpose of defining significant, a variation of 10 percent between measured and assessed groundwater recession or a one percent change measured and assessed EFS values where that change is greater than 100 millimetre, shall be considered to be significant) and/or

(b) Revising the methodology set out in Appendix B, if a model (such as an Eigen value or some other analytical or numerical model) is developed that can more accurately and reliably predict groundwater levels at specific locations in each aquifer than the current contour methodology and where the Council considers that it is more appropriate to use that method.

(c) This review may be in conjunction with, or alternative to a review pursuant to Condition (8) or (9).

26) **Review of conditions to address unforeseen leakage from Aquifer 1 to Aquifers 3 to 6**

(a) The Council may in the circumstances described below, at any time during the 5 years after the end of the first full irrigation season following the implementation of this consent serve notice of its intention to review the conditions of this resource consent for the purpose of limiting leakage from the overlying strata to Aquifers 3 to 6 by:

- applying A2 adaptive management to this consent; and/or
- requiring measures to limit leakage (including requiring the bore to be deepened); and/or
- limiting the take at times when levels in aquifer 1 or shallow groundwater levels or stream flows are low; and/or
- otherwise restricting the rates or volumes of take pursuant to this consent

so as to ensure that the exercise of this consent does not on its own or in conjunction with the exercise of any other consents, cause significant lowering of levels in Aquifer 1 such that the availability of water to those taking from Aquifer 1 is compromised, or such that the frequency or duration of unsustainable low flows in lowland streams is increased.

(b) Such review may be notified only if the Council determines via monitoring and modelling, that replicates the monitoring results, that a significant proportion of the water taken pursuant to this consent is likely to be derived from the shallow groundwater.

(c) For the purpose of this condition “a significant proportion” shall include, but not be limited to:

(i) where the pumped rate is less than 50 L/s and where 5 L/s or more of the take is estimated to be derived or induced to flow from Aquifer 1; or
(ii) where the pumped rate is greater than 50 L/s and 10 percent of the annual pumped volume is estimated as being derived from or induced to flow from Aquifer 1 during the irrigation season.

27) **Term of Consent**

This consent shall expire 10 years after the implementation date or on 1 May 2020, whichever occurs earlier.

28) **Implementation Date**

The implementation date for the purpose of this consent is the date on which water is first taken for the purpose pursuant to the consent.

Issued at Christchurch on 9 November 2011

Canterbury Regional Council

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**Environment Canterbury** is the promotional name of the Canterbury Regional Council
Exercising of resource consent

It is important that you notify Environment Canterbury when you first start using your consent.

GRANTED TO:           Fonterra Co-operative Group Limited
A WATER PERMIT:       to take and use water
LOCATION:             West Coast Road, RACECOURSE HILL

Even if the consent is replacing a previous consent for the same activity, you need to complete and return this page.

Providing this information will:

- Validate your consent through to its expiry date
- Minimise compliance monitoring charges
- Help provide an accurate picture of the state of the environment.

If consent CRC060458.3 is not used before 14/10/2013 this consent will lapse and no longer be valid.

Declaration:

I have started using this resource consent.

Action taken: (e.g. pasture irrigated, discharge from septic tank/boiler/spray booth etc).

Approximate start date (Note: this may be different to the date the consent was granted):

Signed: ___________________________ Date: ___________________________

Full name of person signing (please print): _______________________________________

Please return to:

Environmental Protection - Administration
Environment Canterbury
PO Box 345
Christchurch
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<td>Korostichuk, Mr J E</td>
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<td>M567624</td>
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<table>
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<th>Wills at different depths on property, could possibly be monitored</th>
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<tr>
<td>No drilled Yes</td>
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<tr>
<td>M56 7233 2074</td>
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<td>No Small take</td>
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<td>Love, Mr D</td>
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<td>Backward, Marcia &amp; J R</td>
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<td>Otte, Mr K T</td>
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<tr>
<td>Scarlet, Mr W A &amp; Mrs J T</td>
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</table>
ANNEXURE 2

TABLE OF AQUIFER DEPTHS
SOURCE - MCINDOE EVIDENCE

Table 1: General description of aquifer depths (from Davey, 2006(2) and Aqualinc, 2005)

<table>
<thead>
<tr>
<th>Aquifer number</th>
<th>Depth ranges assigned (m bgl)</th>
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<tbody>
<tr>
<td></td>
<td>Coastal confined</td>
</tr>
<tr>
<td>1a</td>
<td>&lt; 20'</td>
</tr>
<tr>
<td>1</td>
<td>20 – 35</td>
</tr>
<tr>
<td>2</td>
<td>35 – 80</td>
</tr>
<tr>
<td>3</td>
<td>80 – 130</td>
</tr>
<tr>
<td>4</td>
<td>130+</td>
</tr>
<tr>
<td>5</td>
<td>190+</td>
</tr>
</tbody>
</table>

Note 1: From Bowden et al (1983), top confined aquifer - not evident further inland except near surface water ways.
APPENDIX A

ADAPTIVE MANAGEMENT METHODOLOGY

1. DEFINITION OF TERMS

a. The Environmental Flow Safeguard (EFS, Red Zone in Figure A1)

The Environmental Flow Safeguard (EFS) is the water level below which no water can be abstracted by the consent holder.

The Environmental Flow Safeguard in each aquifer is defined as follows:

- Aquifer 1: 30 April 2004 water level (A1 consents)
- Aquifer 2: 30 April 2006 water level (A2 consents)
- Aquifer 3: 50% of the 2005-06 recession below 30 April 2006 water level (A3 consents)
- Aquifer 4: 50% of the 2005-06 recession below 30 April 2006 water level (A3 consents)
- Aquifer 5: 50% of the 2005-06 recession below 30 April 2006 water level (A3 consents)

The EFS applying to a particular consent depends upon whether that consent is subject to the A2 or A3 conditions. The A2 set of conditions applies to takes within Aquifer 2 where Aquifer 1 is overhead. The master table Annexure 1 to the decision specifies which consents are subject to which conditions.

b. Groundwater Recession (the green and blue zones in Figure A1)

The groundwater recession is the sum of the Seasonal Environmental Discharge and the Seasonal Abtractive Discharge. It is difference in water level between the spring high water level (nominally 1 September) and the autumn low water level (nominally 30 April).

The groundwater recession is determined by either:

1. Using the water level record from a production bore or an appropriate and/or relevant observation bore\(^1\) to calculate the difference in water level between the spring high water level (nominally 1 September) and the autumn low water level (nominally 30 April); or

2. Where there is no water level record, it will be interpolated using the contoured model of groundwater level(s) and recessions methodology set out in Appendix B

---

\(^1\) An appropriate and/or relevant observation bore is one screened in the same aquifer as the consent holder's bore, has a water level that is +/- 5% of that measured on the same day as the consent holder's bore, and is no further than 1000m from the applicant bore.
(iii) The Groundwater Recession is a fixed value. The groundwater recession is set for the same irrigation season as the EFS; i.e.

Aquifer 1 – 2003-4 (A1 consents)
Aquifer 2 – 2005-6 (A2 consents)
Aquifers 3-5 – 2005-6 (A3 consents)

The Groundwater Recession applying to a particular consent depends upon whether that consent is subject to the A2 or A3 conditions. The A2 set of conditions applies to takes within Aquifer 2 where Aquifer 1 is overhead. The master table Annexure 7 to the decision specifies which consents are subject to which conditions.

c. New Activity Water (grey zone in Figure A1)

The New Activity Water (NAW) is the available volume (as represented by the depth) of groundwater from which the consent holder may abstract their annual volume in the forthcoming irrigation season.

It is the depth of water measured between the top of the reserved water column and the 1 September groundwater level.

In the case of replacement consents the cumulative effect of these takes is already included in the EFS and the Groundwater Recession. Therefore, no assessment needs to be undertaken to determine if the New Activity Water depth is affected. Where an increase in take is sought, the additional volume sought (the top up portion) will be included in the NAW.

Explanatory Note:

The difference between new and replacement takes is that for replacement takes the cumulative effect of the take is already included in the groundwater recession. Because these takes were being exercised in the 2005-6 season the effects (cumulative interference) are “recorded” in the groundwater signature. As a consequence there is no requirement to assess the cumulative effect on the NAW.

d. September 1 Water Level (the top of the grey zone in Figure A1).

The September 1 Water Level is the median groundwater level which shall be measured annually by the consent holder during the last week of August in the locality of the consent holder’s bore.

The consent holder shall obtain the September 1 Water Level using:

(i) An approved measurement device to take water level measurements from:
the production bore; and

subject to access and availability, all bores located within 750m of the production bore that are screened within the same strata as the production bore; and

any Regional Council observation bore(s) located within 1000m of the production bore and that are screened within the same strata as the production bore, or

(ii) Any other method acceptable to the Canterbury Regional Council and notified in writing to the consent holder by the Canterbury Regional Council.

e. The Assessment Bore

The assessment bore is a virtual bore, used to calculate the well interference effects of the production bore.

The interference from the consent holder's new take in the assessment bore located 750m distance of the production bore shall be determined from a well interference assessment using the method of Hunt and Scott (2007)2 or standard well hydraulics methods.

The average rate of take required to deliver the seasonal allocation over 150 days shall be used in the calculation.

The assessment bore shall have the following specifications:

- The same depth, diameter and screen profile as the production bore;
- The same aquifer hydraulic characteristics (T, S and leakage) as the production bore;
- The same discharge, self-induced drawdown and specific capacity as the production bore.

For replacement takes no assessment bore is required unless the 1 September water level is lower (mbgl) than the Reserved Water Level (described below in "Carrying Out the Assessment for Aquifers 2-6, Replacement Takes ").

---

Figure A1. Schematic of values (in violet) required for the assessment procedure.
2. **Assessment of Water**

This adaptive management methodology shall be used prior to the commencement of each irrigation season (typically September – May) to determine whether or not the consent can be exercised (including partially exercised) in the forthcoming irrigation season ("the season").

(a) **In the case of a new consent (or that portion of a replacement consent which is an increase over existing volumes):**

(i) If the interference from the production bore in the assessment bore is less than (or equal) to the new activity water the consent holder can fully exercise the take of water, or

(ii) If the interference from the production bore in the assessment bore exceeds the new activity water the consent holder must reduce the rate of take until the interference effect is less than or equal to the new activity water, or

(iii) If the 1 September water level is below the reserved water level, no water can be taken in that irrigation season.

(b) **In the case of a replacement consent:**

(i) If the 1 September water level is the same as or above the Reserved Water Level (the "EFS plus the groundwater recession") the consent holder can fully exercise the take of water.

(ii) If the 1 September water level is below the Reserved Water Level, the consent holder must reduce the rate of take until the interference in the assessment bore is reduced by the difference between the 1 September water level and the Reserved Water Level.

(iii) If the difference between the 1 September water level and the Reserved Water Level is greater than the interference in the assessment bore no water can be taken in that irrigation season.

3. **Pumping from multiple bores.**

If the consent is to take water from more than one production bore for the irrigated area, each production bore shall be assessed with its own individual assessment bore.

4. **Carrying Out the Assessment for Aquifers 2-6, New Takes**

The assessment requires determination of all the water depths shown in Figure A1. The procedure is as follows:
(a) Determine values for Environmental Flow Safeguard and Groundwater Recession for the locality of the production bore.

(b) Enter these values in the correct cell of the Excel spreadsheet (Figure A3). The determination and data entry will be required once because EFS and Groundwater Recession are fixed values.

(c) Determine and enter the interference from the consent holder’s new take in the correct cell of the Excel spreadsheet. This will also be required to be done once.

(d) Determine and enter the measured 1 September water level from the production bore in the correct cell of Excel spreadsheet. This figure will be derived each year.

(e) The result will automatically be calculated; i.e.

- The consent can be exercised in full (the interference effect is less than the depth of NAW), or
- The consent will need to be partially restricted (so the interference effect can be reduced to less than the depth of NAW), or
- The consent cannot be exercised (the interference effect can not be reduced to less than the depth of NAW).

5. **Carrying Out the Assessment for Aquifers 2-6, Replacement Takes.**

The assessment requires determination of all the water depths shown in Figure A4. The procedure is as follows:

(a) Determine values for Environmental Flow Safeguard and Groundwater Recession for the locality of the production bore.

(b) Enter these values in the correct cell of the Excel spreadsheet (Figure A4). The determination and data entry will be required once because EFS and Groundwater Recession are fixed values.

(c) Determine and enter the measured 1 September water level from the production bore in the correct cell of Excel spreadsheet. This figure will be derived each year.

(d) Determine and enter the interference from the consent holder’s replacement take in the correct cell of the Excel spreadsheet. This will be required once because it is a fixed value.

(e) The result will automatically be calculated; i.e.

- The consent can be exercised in full (when the 1 September water level is the same as or greater than the Reserved Water Level), or
The consent will need to be partially restricted (when the difference between the 1 September water level and the Reserved Water Level is negative and the interference effect is greater than this difference), or

The consent cannot be exercised. (when the interference effect cannot be reduced to be less than the difference between the 1 September water level and the Reserved Water Level).

6. **Carrying out the Assessment for Aquifer 1**
   The method of assessment for Aquifer 1 shall be as set out for A2 to A6

7. **Carrying Out an Aquifer Test.**
   Where this Appendix requires Aquifer testing it shall be carried out in accordance with the specific conditions of the relevant consent.
<table>
<thead>
<tr>
<th>Bore Number</th>
<th>Actual Depth (m bgl)</th>
<th>Aquifer</th>
<th>EFS (m bgl)</th>
<th>Groundwater recession (m)</th>
<th>Reserved Water Level (m)</th>
<th>1 September 2005 Water Level (m bgl)</th>
<th>New Activity Water (NAW) (m)</th>
<th>Consent Exercise Allowed</th>
<th>Interference from new take (m)</th>
<th>Does interference exceed NAW?</th>
<th>Reduction of allocation required to mitigate effect</th>
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<tbody>
<tr>
<td>Lxx/yyy</td>
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<td>A2</td>
<td>50.5</td>
<td>4.92</td>
<td>45.62</td>
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<td>yes</td>
<td>0.05</td>
<td>yes</td>
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Reduction in take required to mitigate effects in 2005/2006 44.0%

Figure A3. Excel spreadsheet used to carry out the assessment. Aquifers A2-6, New takes. Light grey cell require data values to be entered, dark grey are calculated automatically. **Note:** the values, while representative of A2, are nominal and used for explanatory purposes only.
<table>
<thead>
<tr>
<th>Bore Number</th>
<th>Actual depth (m bgl)</th>
<th>Aquifer</th>
<th>EPS (m bgl)</th>
<th>Groundwater recession (m)</th>
<th>Reserved Water Level (m)</th>
<th>1 September 2005 water level (m bgl)</th>
<th>Consent Exercise Water (CEW), m</th>
<th>Consent Exercise Allowed</th>
<th>Interference from replacement take (m)</th>
<th>Does interference exceed CEW?</th>
<th>Reduction of allocation required to mitigate effect</th>
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<tr>
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<td>A2</td>
<td>50.5</td>
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<td>0.05</td>
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</table>

Reduction in take required to mitigate affects in 2005/2006 44.0%

Figure A4. Excel spreadsheet used to carry out the assessment Aquifers 2-6, Replacement Takes. Light grey cell require data values to be entered, dark grey are calculated automatically. (Note: the values, while representative of A2, are nominal and used for explanatory purposes only).
APPENDIX B

CONTOURING GROUNDWATER LEVELS AND RECESSIONS

Groundwater Levels and Recessions

The adaptive management assessment requires determination of the EFS and the calculation of the groundwater recession. The groundwater recession that is applicable is that recession which occurred in the same year as the EFS. Where a consent holder's bore is adjacent (within 1000m) to an observation bore that is screened in the same aquifer the water level and groundwater levels and recession values can be obtained and used for the assessment. However, for most applicants there is no adjacent and/or relevant observation bore and an alternative approach was required. Instead, the groundwater level and recession has been calculated using a contour map (iso-line maps).

Development of the Groundwater Level and Recession Contours

1. The determination of the groundwater level and groundwater recessions has been carried out by Andrew Dark (Aqualinc) as follows:

   (a) The groundwater levels database was queried for all readings from the Rakaia-Selwyn groundwater allocation zone in the appropriate depth range, within 2 weeks either side of a selected date (for example; 1 September, 2005).

   (b) Where multiple readings were returned in the 4-week time range, the reading closest to the desired date was used. If there were two readings an equal spacing either side of the selected date (e.g. 2 weeks before and 2 weeks after) the reading least likely to be affected by localised interference was selected.

   (c) The depth range for each aquifer was determined using the hydrological layer depth ranges from the Canterbury Groundwater Model. This depth range varied depending on whether the inland or coastal part of the aquifer was being considered. Further filtering of the water level data based on this spatial distribution was carried out.

   (d) The observed water level data set was merged with the coastal boundary nodes from the Canterbury Groundwater Model. It was assumed that the piezometric surface would rotate around the coastal boundary during recharge and recession.

   (e) A surface was fitted through the combined data (observation bores and coastal boundary nodes) in ArcGIS using kriging. The contours were plotted for the surface.

   (f) Additional water level points were then added along the contour lines in the areas where the contours were smooth and consistent with Aqualinc's understanding of the behaviour of the aquifers. These additional points combined with the original data set to create the piezometric surface. The re-calculation gave a smoothed surface that passed through each of the observed water levels.

   (g) The Interpolation process was carried out for Aquifer 1 for September 2003 and April 2004, and Aquifers 2-5 for September 2005 and April 2006. The two surfaces were then subtracted from each other to give a surface of water level recession for the 2003-04 or 2005-06 irrigation season. From the surfaces at the location of each applicant production bore in the Rakaia-Selwyn zone the EFS water levels and recessions were obtained.
(h) The water level contours (September 2003 and April 2004, and September 2005 and April 2006) and the 2003-04 and 2005-6 recessions for Aquifer 1 and Aquifers 2-5 are shown in Figures B1-4. These data were used to carry out the adaptive management assessment for applicants in A1-5.

(i) The deeper aquifers could not be contoured in the same way as A1, A2 and A3 because of the limited amount of available observation data. Rather, the contours have been based on results from the Aqualinc steady-state groundwater model. The 1 September 05 observed water levels were a good match to the modelled contours, and for 30 April 06 the contours were shifted up-gradient to match the observed water levels on this date. Most aquifer 5 bores with water level data available have their top screens in aquifer 4; hence, the deeper aquifers have been grouped together as aquifer “A4+” (Figure B4).

(j) There was insufficient data to reliably determine the groundwater contours for A3 and deeper in 2000-01; i.e. 2000-01 contours have been developed for A2. Therefore, the assessment based on 2000-01 water levels that define the EFS and Groundwater Recession shown in Figure B5 has been carried out for A2 applicants only.
Figure B1. Groundwater contours (m above mean sea level) for A1 (September 2003 and April 2004), 2003-4 recession values and observation bores in A1.
Figure B2. Groundwater contours (m above mean sea level) for A2 (September 2005 and April 2006), 2005-6 recession values and observation bores in A2.
Figure B3. Groundwater contours (m above mean sea level) for A3 (September 2005 and April 2006), 2005-6 recession values and observation bores in A3.
Figure B5. Groundwater contours (m above mean sea level) for A2 (September 2000 and April 2001), 2000-1 recession values and observation bores in A2.
APPENDIX C

Pumping test requirements

1. A 4-step drawdown test shall be conducted on the production bore for a period of no less than two hours, with recovery period, to determine the optimal pumping rate for the constant rate discharge test. It is good practice for this to be carried out at the time of initial bore construction.

2. The constant rate discharge test shall be carried out during a period of limited pumping to minimise interference impacts on bores being monitored.

3. Water levels shall be monitored in each production and monitoring bore being used in the constant rate discharge test for a period of at least 24 hours prior to and after the recovery period of the test to determine the water level trends and fluctuations in these bores.

4. Water levels shall be monitored in each production and monitoring bore being used in the constant rate discharge test for a period of at least 48 hours prior to the test in any bores where tidal effects are expected to be observed, to determine the water level trends and fluctuations in these bores.

5. Where practical a bore in the same strata as the production bore in which effects would not be expected to be seen during the constant rate discharge test shall be monitored throughout the test so as to observe background effects.

6. Barometric pressure shall be recorded before the commencement of, during and after the constant rate discharge test where confined aquifers are being monitored.

7. Any relevant rainfall events or river flow fluctuations that occur during the constant rate discharge test shall be recorded and taken into account when interpreting the test data.

8. Water level and time shall be measured simultaneously and accurately for each bore involved in the test throughout the duration of the test. This clause does not require synchronous measurements from multiple bores.

9. Flow from the production bore shall be measured and recorded, and as far as practically possible, shall be kept constant within a precision of 5% from the start to the finish of the constant rate discharge test. Achieving constant flow control will simplify the analysis of the test and is particularly important where water level observations are limited to the production bore.

10. The duration of the constant rate discharge test shall be no less than 10,000 minutes or seven days unless it can be demonstrated to the satisfaction of the Council that the necessary data has been obtained in a shorter time period or agreement between the consent holder and the Council to a shorter duration is reached prior to the test commencing.
11. The production bore being tested shall have a non-return valve fitted to the pump or riser.

12. Where possible the discharged water from the pumping test shall be diverted to a drain, water race or surface water body not hydraulically connected to the pumped aquifer. Approval shall be sought from the owner or maintainer of any drains or water race prior to use.

Comment:

a) Amendments are sought because a local drain, water race or surface water body may not be present. Approval may not be forthcoming from the owner or maintainer, particularly where the discharge exceeds the capacity or design of the scheme. See letters attached from URS and Aqualinc Research Ltd regarding difficulties encountered in this groundwater zone in conducting aquifer tests.

13. If the discharged water is not able to be diverted to a drain, water race or surface water body that is not hydraulically connected to the pumped aquifer, the constant discharge test may be undertaken at a rate of take lower than the maximum rate of take authorised under the consent. In such circumstances the duration of the test may need to be extended to ensure the total volume pumped is equivalent to that of a 7 day test.

Comment

b) The consent should not be frustrated because water pumped at the maximum rate of take creates an environmental hazard (surface flooding roads and property) due to the absence of local drains, water races or surface water bodies. Conducting a constant discharge test using a rate of take that is lower than the maximum rate of take does not invalidate the test results. The results can be adjusted to bring into account the maximum authorised rate of take. The conditions require the CRC to approve of the aquifer test specification, prior to the test commencing.

14. For the A2 consents, the production bore; the monitoring well constructed In Aquifer 1; and one or more suitable observation bores within the same aquifer as the production bore and located within 2000 meters of the production bore shall be monitored during the constant discharge test.

15. For the A3 consents, the production bore and one or more suitable observation bores within the same aquifer as the production bore and located within 2000 meters of the production bore shall be monitored during the constant discharge test. Monitoring additional wells at shallower depth would provide additional data where leakage is likely.

16. Following the constant rate discharge test, water level recovery shall be monitored in the pumped bore and any monitoring wells until recovery is at least 90% complete.
APPENDIX D

Alternative assessment of well interference effects

1) This applies in the following circumstances:

A neighbouring bore is used solely for stock water, or domestic potable supply,

or

A self induced drawdown has been measured at a yield exceeding half the consented yield of the potentially affected bore.

2) If a neighbouring bore fails to meet the above criteria, then the 80% "protected available drawdown" (as outlined in policy WQN20 of Canterbury Regional Council's Proposed Natural Resources Regional Plan as notified on 3 July 2004) shall apply unless further information is obtained.

Explanatory Note: If insufficient information exists, then the assessment shall default to 80% of the available drawdown in neighbouring bores being protected at times of lowest water level, as outlined in policy WQN20.

3) If sufficient information exists, then the self induced drawdown (SID) shall be predicted for neighbouring bores. This will be established using one of the following methods:

(i) For a single yield drawdown data pair, extrapolating a known yield drawdown relationship by applying the following formula -

$$\text{SID} = \text{known drawdown} \times \left(\frac{\text{consented rate}}{\text{known yield}}\right)^2$$

(ii) Measuring the drawdown and the potentially affected bore directly at the consented yield.

(iii) Conducting a step drawdown aquifer test on the potentially affected bore and predicting the SID using the test results.

(iv) If the potentially affected bore is solely used for stock water or domestic potable supply then the SID can be assumed to be 3 m.

4) Once the SID has been determined the projected available drawdown can be recalculated by the following formula -

$$\text{Protected available drawdown (\%) = } \frac{100 \times \text{SID}}{\text{(Total available drawdown at times of the water level exceeded 80\% of the time)}}$$

5) Where the "total available drawdown" at times of low water level is defined in figure WQN13 of Canterbury Regional Council's Proposed Natural Resources Regional Plan as notified on 3 July 2004.
6) The well interference effects shall then be as repossessed using Policy WQN20 of Canterbury Regional Council's Proposed Natural Resources Regional Plan as notified on 3 July 2004 substituting the recalculated "protected available drawdown" where it is a lesser value than that contained in Policy WQN20.
Condition Set

Small Takes

The consents to which these conditions apply are specified in Annexure 1 (Master table) being

<table>
<thead>
<tr>
<th>Consenting Body</th>
<th>Consent Number</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anderson and Hurst PJ and DJ</td>
<td>CRC050407</td>
<td>2.4 L/S</td>
</tr>
<tr>
<td>Jowett Ms RK</td>
<td>CRC050474</td>
<td>3.8 L/S</td>
</tr>
<tr>
<td>Cropmark Seeds Ltd</td>
<td>CRC030614</td>
<td>3 L/S</td>
</tr>
<tr>
<td>Lee BWA</td>
<td>CRC050653</td>
<td>5 L/S</td>
</tr>
<tr>
<td>Chalmers RT &amp; LL</td>
<td>CRC051156</td>
<td>2.7 L/s</td>
</tr>
<tr>
<td>Ellis LG &amp; EJ</td>
<td>CRC051341</td>
<td>5 L/s</td>
</tr>
<tr>
<td>Fitzallen Park Ltd</td>
<td>CRC051631</td>
<td>6 L/s</td>
</tr>
<tr>
<td>Brinks South Island Ltd</td>
<td>CRC052320</td>
<td>3.6 L/s</td>
</tr>
<tr>
<td>White GJH &amp; K</td>
<td>CRC054069</td>
<td>3.5 L/s</td>
</tr>
<tr>
<td>Grimwood KB</td>
<td>CRC060051</td>
<td>6 L/s</td>
</tr>
<tr>
<td>John Arbuckle Standards Breeds Ltd</td>
<td>CRC060250</td>
<td>5 L/s</td>
</tr>
<tr>
<td>Love D</td>
<td>CRC061004</td>
<td>2 L/s</td>
</tr>
<tr>
<td>Tavistock Estate Ltd</td>
<td>CRC062220</td>
<td>2.5 L/s</td>
</tr>
</tbody>
</table>

1. **Location of take**

(a) The take shall be as located generally as described in the application and except where provided otherwise in the application, or by subsequent variation of this consent, shall only be used to supply water to the property on which the take is located and any other properties described in the application.

(b) Provided that prior notification is given to Canterbury Regional Council (Council), the consent holder may increase the depth of the production bore. If the production bore is screened below the depth of Aquifer 1 (being the lower bound of Aquifer 1 estimated in the table attached as Annexure 2) then the Small Take condition set shall still apply.

(c) Prior to any bore being deepened, the consent holder shall advise the Council (Attention: RMA Compliance and Enforcement Manager) of that intention and shall obtain any necessary consents or variation of consent for such works.*

(d) Prior to the taking of any water for the purposes of irrigation, the interference assessments required by Schedule WON10 of the Council’s Proposed Natural Resources Regional Plan as notified 3 July 2004 or as modified by Appendix D shall be carried out and provided to the Council (Attention: RMA Compliance...
and Enforcement Manager). No water may be taken for irrigation purposes until the relevant interference conditions have been complied with.

*Note: Generally, this consent to take and use water will not need to be varied if the take is deeper than that applied for, provided all relevant conditions from the A2 or A3 conditions can be met, including in particular, any conditions relating to interference effects on nearby takes. However, a new consent to drill the bore may be required or the existing bore consent may need to be varied.

2. **Bore, diameter, depth, map reference**

Water may be taken only from [bore number], [formerly bore number?], at [diameter in millimetres], at [map reference].

Except as provided for in condition 2, the depth at which water is drawn into the production bore(s) shall be [as set out in the application] or as advised to the Council (Attention: RMA Compliance and Enforcement Manager) after construction of the well.

3. **Aquifer confirmation**

The applicant shall advise the Council in writing of the aquifer(s) that water is to be abstracted from. This shall be determined by comparing screened zone(s) and cesigning depth(s) with the table of aquifer depths attached as Annexure 2.

4. **Area, use**

Water shall only be used for irrigation of up to [area] hectares of [crops and pasture for grazing dairy cows], as described in the application, on the area of land shown in the attached plan CRCxxxxx.

5. **Transfer**

This consent is granted on the basis that water is to taken from the location specified and used in the property specified. The allocation, the subject of this consent, shall not be transferred to any other property, other well or other depth.

*Note:* This consent has been granted on the basis of the water needed to serve a particular property. If there is a proposal to use water taken pursuant to this consent on another property (whether or not in conjunction with a transfer) there would need to be an application to vary this condition. This consent is not intended to encourage the trading of surplus water, since that may lead to situations where the volumes taken pursuant to consents are much greater than would be the case if use was limited to the property where the water is needed. The Council will have the ability via the consent process to consider whether the transfer and/or variation of condition is desirable and necessary.

6. **Rate and volume**

Subject to all other conditions water may be taken at a rate not exceeding [maximum rate] litres per second, with a volume not exceeding [design return period volume] cubic metres in any period of [design return period] consecutive days and [seasonal] volume cubic metres between 1st July and the following 30th June.

*Note:* The rates, volumes and the minimum depth of bores are set out in the table attached as Annexure 1 to this decision.
7. **Bore installation**

In the case of each production bore (where not already drilled) and in the case of any bore which is replaced or re-drilled during the term of this consent the following shall apply:

(a) The casing shall be installed through the soil zone to the top of the screen. The annular space between the outside of the casing and the drill hole wall shall be sealed with cement grout to whatever depth is necessary to prevent the contamination or pollution of groundwater by surface or shallow subsurface sources, to control subsurface pressures, and to prevent movement of the casing at all times until the bore is decommissioned. Care shall be taken to avoid grout moving into an aquifer.

(b) In wells deeper than A1, except where a resource consent has been granted which allows access to more than one water bearing layer, or where a drilling permit specifies a seal as not necessary, the annular space between the outside of the casing and the drill hole wall in the equitard between Aquifers shall be constructed in a manner that seals the annular space in order to prevent the interconnection or movement of groundwater along the annulus outside the casing between Aquifers.

(c) All casing material (including temporary casing material) shall be suitable, in terms of its composition, cleanliness, strength and corrosion resistance for the site and installation conditions and the use of the bore. The screen slot size shall be appropriate for the aquifer and the gravel pack grain size and grading. The screen shall be securely sealed to the casing to prevent entry of rock or soil or gravel pack material into the bore.

(d) Within one month of the installation of each new production bore the consent holder shall provide the geological log of the drill hole and the construction details of the bore (including the depth of the screen) to the Council (Attention: RMA Compliance and Enforcement Manager) together with a certificate signed by a suitably qualified person, certifying that the geological log and construction details as provided are correct.

8. **Straight pipe for flow meter checking**

(a) The consent holder shall, before the commencement of the 2008 - 2009 irrigation season install an easily accessible straight pipe(s), with no fittings or obstructions on it, of a length at least 15 times the diameter of the pipe, as part of the pump outlet plumbing or within the mainline distribution system for the purposes of enabling the Council to attach a water meter to check compliance with Condition 2.

(b) Clause (a) shall not apply where an electromagnetic water meter is installed pursuant to Condition 7 [water metering and rate and volume recording] and certification of this is provided pursuant to Condition 8 [Certification of installation of Rate, Volume and Level Measuring Devices]

9. **Water metering and rate and volume recording**

(a) The consent holder shall, before the commencement of the first irrigation season to apply under this consent:

(i) install a water meter(s) that has an international accreditation or equivalent New Zealand calibration endorsement suitable for use with an electronic recording device, from which the rate and the volume of water...
taken can be determined to within an accuracy of plus or minus five percent at a location(s) that will ensure the total take of water from bores(s) [specify] is measured; and

(ii) install a tamper-proof electronic recording device such as a data logger that shall record (or log) the flow totals every 15 minutes and have the capacity to hold at least one season’s data of water taken as specified in clauses (b) (i) and (b) (ii), or which is telemetered, as specified in clause (b).

(b) The water meter and recording device(s) shall be set to wrap the data from the measuring device(s) such that the oldest data will be automatically overwritten by the newest data (i.e. cyclic recording); and shall:

(i) store the entire season’s data in each 12 month period from 1 July to 30 June in the following year, which shall be downloaded and stored in a commonly used format and provide to the Council in a form and to a standard specified in writing by the Council; or

(ii) When directed in writing by the Council, shall within 3 months be connected to a telemetry system which collects and stores all of the data continuously with an independent network provider who will make that data available in a commonly used format at all times to the Council and the consent holder. No data in the recording device(s) shall be deliberately changed or deleted.

(c) The water meter and recording device(s) shall be accessible to the Council at all times for inspection and/or data retrieval.

(d) 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.

(e) All practicable measures shall be taken to ensure that the water meter and recording device(s) are at all times fully functional and have an accuracy standard of ±5%.

Water level measuring in the Production Bore

(a) The standing water level, relative to ground level, in bore [bore number] shall be measured (where practicable to a precision better than 0.01 metres) as follows:

(i) once at the start of the irrigation season before pumping has commenced;

(ii) once two days after the cessation of pumping at the end of the irrigation season;

(iii) once within the first seven days of each calendar month. The consent holder shall measure the working water level in the well immediately before switch off. Pumping shall then cease for at least 48 hours or until water level recovery is at least 90% complete prior to the standing water level measurement taking place. The time that each measurement is made shall be recorded together with the water level measurement.

(b) All manual measurements of the standing water level and the date and time of measurement shall be recorded in a log book kept for that purpose, and
supplied to the Council (Attention: RMA Compliance and Enforcement Manager), each year during the month of June, or upon request.

(c) Water level measurements can be undertaken using in situ instrumentation. Where these are used, the depth of placement shall be recorded. Data shall be downloaded from these instruments at least once per year and supplied to the Council (Attention: RMA Compliance and Enforcement Manager) each year during the month of June, or upon request.

10. Certification of installation of rate/volume and level measuring devices

(a) Within one month of the installation of the measuring or recording device(s) or any subsequent replacement measuring or recording device(s), and at five-yearly intervals thereafter, and at any time when requested by the Council, the consent holder shall provide a certificate to the Council (Attention: RMA Compliance and Enforcement Manager), signed by a suitably qualified person certifying, and demonstrating by means of a clear diagram, that:

(i) each measuring and recording device(s) is installed in accordance with the manufacturers specifications; and

(ii) data from the recording device can be readily accessed and/or retrieved in accordance with the conditions above.

11. Irrigation efficiency

(a) The consent holder shall take all practicable steps to:

(i) Ensure that the volume of water used for irrigation does not exceed that required for the soil to reach field capacity. In this condition field capacity means the soil moisture content in the crop root zone after drainage (1-3 days) after thorough wetting (such as a large rainfall event that exceeds the root zone water holding capacity when the macro pores contain air and micro pores water); and

(ii) Avoid leakage from pipes and structures; and

(iii) Avoid the application of water onto non-productive land such as impermeable surfaces and river or stream riparian strips.

12. Nitrate management

(a) Where the water is used for irrigation, with the exception of the first period ending 30 June during which this consent is exercised, for each preceding 12 month period ending 30 June, a Council approved method shall be used to model the nitrate-nitrogen concentration in the soil drainage water below the plant root zone and a nutrient budget for the subject land;

(i) Where the modelled nitrate-nitrogen concentration in the soil drainage water exceeds eight grams per cubic metre, a Nitrate Management Plan shall be prepared describing management practices that shall be implemented to minimise the loss of nitrate-nitrogen by leaching below the plant root zone.

(ii) A copy of the Nitrate Management Plan shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, by 30 September each year.
(iii) The modelled nitrate-nitrogen concentration in the soil drainage water shall not exceed 15 grams per cubic metre for more than three consecutive years, the existing management practices will be reviewed within 3 months by a person who can demonstrate competency in agriculture and nitrate-nitrogen management and they shall prepare a comprehensive report (at the expense of the consent holder) detailing the investigation of the existing management practices and making recommendations for reducing the soil drainage water to less than 16 grams per cubic metre at a rate of at least 5% per year and a copy of the report will be provided to Canterbury Regional Council within 3 months of completion and that the recommendations contained within the report will be given effect to prior to the commencement of the next irrigation season.

(b) A record of all measured input data and the calculations undertaken in accordance with clause (a) shall be:

(i) prepared by 31 August each year;

(ii) maintained for the property for the duration of the consent; and

(iii) 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 an "approved method" is

(i) "Overseer" (AgResearch)

(ii) The Soil Plant Atmosphere Model (SPASMO- HortResearch)

(iii) Any other method approved by the Canterbury Regional Council.

(d) For the purposes of this condition, the "subject land" means the area that is irrigated between 1 July and 30 June of each year.

13. Backflow prevention

(a) 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 preventor 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 and at a location that prohibits any other connection to the mainline, to prevent the backflow of water into the bore; and

(b) 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 person; and

(c) A test report shall be provided to the Council (Attention: RMA Compliance and Enforcement Manager).
14. **Measurement of groundwater levels**

(a) Where reasonably required, the taking of water in terms of this permit shall cease for a period of up to 48 hours on notice from the Council, to allow measurement of groundwater levels; and

(b) The Council will provide not less than seven working days notice of its requirement to measure groundwater levels in accordance with this condition. A consent holder may refuse to allow measurement under this condition if the required notice has not been given.

15. **Standard Review of conditions**

The Council may, at any time during the 5 years after the end of the first full irrigation season following the implementation of this consent, serve notice of its intention to review the conditions of this resource consent for the purpose of dealing with any adverse effect on the environment arising from the exercise of this consent (either on its own or in conjunction with any other consents) and where because of the nature or degree of effect, it is desirable that the effects be addressed prior to the expiry of this consent.

16. **Term of Consent**

This consent shall expire 10 years after the implementation date or on 1 May 2020, whichever occurs earlier.

17. **Implementation Date**

The implementation date for the purpose of this consent is the date on which water is first taken for the purpose pursuant to the consent.
Conditions Set

A1

The consent to which these conditions apply is specified in Annexure 1 (Master table) being

Scarlett Mr W.A. and Mrs J.T. CRC071440 (21 L/S);

1. Aquifer Confirmation A1

These conditions shall apply to bores that are cased and screened in a manner that abstracts water from the following depths only.

| In the coastal confined aquifer area as shown on annexure 3 | 0 to 35 m below natural ground surface |

2. Location of take

(a) The take shall be located generally as described in the application and except where provided otherwise in the application, or by subsequent variation of this consent, shall only be used to supply water to the property on which the take is located and any other properties described in the application.

(b) Provided that prior notification is given to the Canterbury Regional Council (Council), the consent holder may increase the depth of the production bore from that set out in the application. If the production bore is screened below the depth of Aquifer 1 (being the lower bound of Aquifer 1 estimated in the table attached as Annexure 2) then condition set A2 or A3, whichever is relevant shall apply in place of the A1 condition set.

(c) Prior to any bore being deepened, the consent holder shall advise the Council (Attention: RMA Compliance and Enforcement Manager) of that intention and shall obtain any necessary consents or variation of consent for such works.

(d) Prior to the taking of any water (other than for the purposes of testing as required by this consent), the interference assessments required by the applicable set of conditions shall be carried out and provided to the Council (Attention: RMA Compliance and Enforcement Manager). No water may be taken for the purpose stated until the relevant interference conditions have been complied with.

Note: Generally, this consent to take and use water will not need to be varied if the take is deeper than that applied for, provided all relevant conditions can be met including, in particular, any conditions relating to interference effects on nearby takes. However, a new consent to drill the bore may be required or the existing bore consent may need to be varied.
3. **Bore, diameter, depth, map reference**

Water may be taken only from [bore number], [formerly bore number] of [diameter in millimetres], at [map reference].

Except as provided for in condition 2, the depth at which water is drawn into the production bore(s) shall be no more than 35 metres below ground level.

The bore number, diameter and map reference are set out in the table attached as Annexure 1 to the decision and the deemed depth of aquifers in Zone A2 as shown in the table attached as Annexure 2 and in the area east of the line shown on the plan in Annexure 3.

4. **Area, use**

Water shall only be used for irrigation of up to [area] hectares of [crops and pasture for grazing dairy cows], as described in the application, on the area of land shown in the attached plan CRCxxxxx. Provided however, that this consent authorises the taking and use of water for the purpose of testing as required by this consent.

5. **Transfer**

This consent is granted on the basis that water is to taken from the location specified and used on the property specified. The allocation, the subject of this consent, shall not be transferred to any other property, other well or other depth.

**Note:** This consent has been granted on the basis of the water needed to serve a particular property. If there is a proposal to use water taken pursuant to this consent on another property (whether or not in conjunction with a transfer) there would need to be an application to vary this condition. This consent is not intended to encourage the trading of surplus water, since that may lead to situations where the volumes taken pursuant to consents are much greater than would be the case if use was limited to the property where the water is needed. The Council will have the ability via the consent process to consider whether the transfer and/or variation of condition is desirable and necessary.

6. **Rate and volume**

Subject to all other conditions water may be taken at a rate not exceeding [maximum rate] litres per second, with a volume not exceeding [design return period volume] cubic metres in any period of [design return period] consecutive days and [seasonal] volume cubic metres between 1st July and the following 30th June.

**Note:** The rates, volumes and the minimum depth of bores are set out in the table attached as Annexure 1 to the decision. Taking and use of water is authorised outside of the period referred to above, as required for Aquifer testing.

7. **Adaptive Management Conditions**

(a) In any irrigation season (being 1 September to 30 April following) groundwater may not be taken until the Council has given written notice to the Consent Holder that it agrees to the Annual Volume.

(i) The Annual Volume for this consent shall be calculated for each forthcoming season by the consent holder and is subject to an assessment of water availability ("the Assessment"); as specified in Appendix A; and
(i) The assessment methodology ("the Methodology") is set out in Appendices A and B attached to this consent and includes any amendments to those Appendices that have been agreed in writing by the Consent Holder and the Council; and

(ii) The calculation of the Annual Volume resulting from the Methodology for the forthcoming season, together with supporting data, shall be documented in a report ("the Report"); and

(iv) The Report shall be sent annually to the Council (Attention: RMA Compliance and Enforcement Manager).

(b) Within 20 working days of receipt of the Report, the Council shall notify the Consent Holder in writing whether or not it agrees to the Annual Volume calculation for the forthcoming irrigation season. If the Council does not agree to the Annual Volume it shall include in the written notice any concerns and those concerns shall be referenced back to the methodology in Appendix A. If the Council does not accept the Annual Volume calculation it shall provide its own assessment of the Annual volume carried out in accordance with the methodology in Appendix A.

(c) Where the Council provides a revised calculation that shall be the Annual Volume unless the Applicant provides a further revised calculation which is approved by the Council.

(d) The consent holder may in any year, provide the Council with a revised Report before 1 December and the Annual Volume for the balance of the seasons may be changed as a result. In the event that the consent holder submits a revised Report paragraphs (a), (b), (c) and (e) shall apply.

(e) Notwithstanding the provisions of sub-clause (a), the consent holder shall be entitled to take the groundwater subject to the restrictions (if any) set out in the Report, if the Council does not provide written notice in accordance with this Condition within 20 working days of receipt of the Report.

8. Revising the Environmental Flow Safeguard (EFS)

The EFS and/or the Annual Recession as calculated in accordance with Appendix A and B shall be reviewed if in the opinion of Council officers, or the consent holder's consultants, measured water levels indicate a significant variation from that predicted using the contouring method outlined in Appendix B:

Where such a review is required the following shall apply:

(a) The consent holder or group of consent holders shall commission a report (the EFS Revision Report) to be prepared by a suitably qualified person or persons which provides data and analysis to support a new EFS and recession interpolated from the measured water level for that production bore and water levels, EFS and recessions from other adjacent bores in the same aquifer (the EFS Revision Report).

(b) The report(s) shall be sent to the Council (Attention: RMA Compliance and Enforcement Manager).

(c) Within 20 working days of the receipt of the report, the Council shall advise the consent holder in writing stating whether or not it is satisfied with the information and analysis provided in the report and whether it accepts the proposed EFS. If the Council is not satisfied with the report contents or
proposed EFS the written notice shall outline any concerns with the information
provided. The Council may only reject a revised proposed EFS on reasonable
grounds consistent with the methodologies set out in Appendix A and Appendix
B.

(d) If further information is required, that will be provided to the Council as soon as
is practicable. Within 20 working days of the receipt of the further information
the Council shall advise the consent holder in writing stating whether or not it
accepts any further revised proposed EFS or proposes an alternative EFS.
(The Council may only reject a revised proposed EFS on reasonable grounds).

(e) If no agreement can be reached on a revised EFS, then either the Council may
review the conditions of this consent (including Appendix A and Appendix B) or
the consent holder may seek a variation of conditions (including Appendix A
and Appendix B) for the purpose of revising the EFS and (if appropriate)
adjusting the methodology for calculation of the EFS and recession.

(f) "Significant" means + or - 1% change in the EFS where that change is greater
than 100mm.

9. Future revision of methodology

The methodology for determining groundwater contours may be revised by agreement
between the Council and the consent holder(s) if a model (such as an Eigen value or
some other analytical or numerical model) is developed that can more accurately and
reliably predict groundwater levels at specific locations in each aquifer than the current
contour methodology.

Where such a revision is proposed, a report shall be prepared by a suitably qualified
person or persons who will provide data and analysis to support the revised
methodology and revised EFS and groundwater recessions interpolated from the
measured water levels.

Explanatory Note:

In the absence of long-term data the contour method may not be reliable for inland and
coastal areas. Water level measurements following bore installation by the consent
holders, increased monitoring by Council and increased water level measurement by all
consent holders may be used to:

- verify the contour methodology as reliable and appropriate; or
- develop or improve existing or alternative models that can predict groundwater
  levels.

Either of the above or a combination of the two approaches could be used to better
define the potentiometric surface for each aquifer. Adopting these improvements the
EFS and recession can be more reliably estimated for the new bore location. If
agreement can not be reached on a revised methodology the Council may utilise the
special review condition where appropriate.

10. Monitoring bore condition

(a) The consent holder shall, before the first exercise of this consent, identify or
install a monitoring bore that meets the following criteria:

(i) the monitoring bore shall have a minimum diameter of 50 millimetres;
(ii) the monitoring bore shall be located no less than 10 metres and no greater than 50 metres from the pumping bore;

(iii) the monitoring bore shall be located between the pumping bore and the closest adjacent surface water body;

(iv) Where a production bore is sited on a property boundary or is adjacent to a surface water body, the monitoring well shall be sited at the closest practical location.

(v) the monitoring bore shall be screened only in the uppermost water bearing strata.

(vi) Where the consent holder has two or more production bores in the same aquifer, within or at 1000 m separation distance from a proposed monitoring well site, the installation of a single monitoring well shall be sufficient for compliance with this condition.

(b) Water levels in the monitoring bore shall be measured as per condition 14.

(c) The monitoring bore shall not be used for any purpose other than water level measurement or sampling for water quality analysis, (particularly nitrate analysis).

(d) Monitoring bores shall be drilled to sufficiently intercept groundwater so that water level measurements can still be made during periods of peak or minimum groundwater levels, to ensure monitoring is able to take place.

(e) If, in accordance with part (e) of this condition, a monitoring bore is to be installed, a bore permit must be obtained prior to construction and the monitoring bore must be installed to the conditions on the bore permit in addition to the criteria in part (a) of this condition.

11. **Bore installation**

In the case of each production bore (where not already drilled); and in the case of any bore which is replaced or re-drilled during the term of this consent; and all monitoring bores (where applicable) the following shall apply:

(a) The casing shall be installed through the soil zone to the top of the screen. The annular space between the outside of the casing and the drill hole wall, shall be sealed with cement grout to whatever depth is necessary to prevent the contamination or pollution of groundwater by surface or shallow subsurface sources, to control subsurface pressures, and to prevent movement of the casing at all times until the bore is decommissioned. Care shall be taken to avoid grout moving into an aquifer.

(b) Except where a resource consent has been granted which allows access to more than one water bearing layer, or where a drilling permit specifies a seal as not necessary, the annular space between the outside of the casing and the drill hole wall in the aquitard between Aquifers 1 and 2 shall be sealed with grout to prevent the interconnection or movement of groundwater along the annulus outside the casing between Aquifers 1 and 2.

(c) All casing material (including temporary casing material) shall be suitable, in terms of its composition, cleanliness, strength and corrosion resistance for the site and installation conditions and the use of the bore. The screen slot size shall be appropriate for the aquifer and the gravel pack grain size and grading.
The screen shall be securely sealed to the casing to prevent entry of rock or soil or gravel pack material into the bore.

(d) Within one month of the installation of each new production bore and all monitoring bores, the consent holder shall provide the geological log of the drill hole and the construction details of the bore (including the depth of the screen) to the Council (Attention: RMA Compliance and Enforcement Manager) together with a certificate signed by a suitably qualified person, certifying that the geological log and construction details provided are correct.

12. **Straight pipe for flow meter checking**

(a) The consent holder shall, before the first exercise of this consent, install an easily accessible straight pipe, with no fittings or obstructions on it, of a length at least 15 times the diameter of the pipe, as part of the pump outlet plumbing or within the mainline distribution system for the purposes of enabling the Council to attach a water meter to check compliance with condition 2.

(b) Clause (a) shall not apply where an electromagnetic water meter is installed pursuant to Condition I [water metering and rate and volume recording] and certification of this is provided pursuant to Condition I [Certification of Installation of Rate, Volume and Level Measuring Devices]

13. **Water metering and rate and volume recording**

(a) The consent holder shall, before the first exercise of this consent:

(i) install a water meter(s) that has an international accreditation or equivalent New Zealand calibration endorsement suitable for use with an electronic recording device, from which the rate and the volume of water taken can be determined to within an accuracy of plus or minus five percent at a location(s) that will ensure the total take of water from bores(s) [specify] is measured; and

(ii) install a tamper-proof electronic recording device such as a data logger that shall record (or log) the flow totals every 15 minutes and have the capacity to hold at least one season's data of water taken as specified in clauses (b) (i) or which is telemetered, as specified in clause (b) (ii);

(b) The water meter and recording device(s) shall be set to wrap the data from the measuring device(s) such that the oldest data will be automatically overwritten by the newest data (i.e. cyclic recording); and shall:

(i) store the entire season's data in each 12 month period from 1 July to 30 June in the following year, which shall be downloaded and stored in a commonly used format and provide to the Council in a form and to a standard specified in writing by the Council, or

(ii) be connected to a telemetry system which collects and stores all of the data continuously with an independent network provider who will make that data available in a commonly used format at all times to the Council and the consent holder. No data in the recording device(s) shall be deliberately changed or deleted.

(c) The water meter and recording device(s) shall be accessible to the Council at all times for inspection and/or data retrieval.
(d) 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.

(e) All practicable measures shall be taken to ensure that the water meter and recording device(s) are at all times fully functional and have an accuracy standard of ±5%.

14. **Water level measuring in the Production Bore**

(a) The standing water level, relative to ground level, in bore [bore number] shall be measured (where practicable to a precision of better than 0.01 metres) as follows:

(i) once at the start of the irrigation season before pumping has commenced;

(ii) once two days after the cessation of pumping at the end of the irrigation season;

(iii) once within the first seven days of each calendar month. The consent holder shall measure the working water level in the well immediately before switch off. Pumping shall then cease for at least 48 hours or until water level recovery is at least 90% complete prior to the standing water level measurement taking place. The time that each measurement is made shall be recorded together with the water level measurement.

(b) All manual measurements of the standing water level and the date and time of measurement shall be recorded in a log book kept for that purpose, and supplied to the Council (Attention: RMA Compliance and Enforcement Manager), each year during the month of June, or upon request.

(c) Water level measurements can be undertaken using in situ instrumentation. Where these are used, the depth of placement shall be recorded. Data shall be downloaded from these instruments at least once per year and supplied to the Council (Attention: RMA Compliance and Enforcement Manager), each year during the month of June, or upon request.

15. **Water level measuring in the Monitoring Bore**

(a) The consent holder shall, before the first exercise of this consent:

(i) install in the monitoring bore a water level measuring and recording device, to enable water levels to be measured, that has an international accreditation or equivalent New Zealand calibration endorsement, suitable for use with an electronic recording device, which will measure the static and operating water levels in the monitoring bore to within an accuracy of plus or minus one percent; and

(ii) install a tamper-proof electronic recording device such as a data logger(s) that shall time stamp a reading from the water level measuring and recording device at least once every [specify time period - default = 15 minutes] for takes with a "high" degree of hydraulic connection to a surface water body, 50 minutes for all others], and have the capacity to hold at least one season's data of water taken as
specified in clauses (b) (i) and (b) (ii), or which is telemetered, as specified in clause (b).

(b) The water level measuring and recording device(s) shall be set to wrap the data from the measuring device(s) such that the oldest data will be automatically overwritten by the newest data (i.e. cyclic recording); and shall:

(i) store the entire season's data in each 12 month period from 1 July to 30 June in the following year, which the consent holder shall then download and store in a commonly used format and provide to the Council in a form and to a standard specified in writing by the Council; or

(ii) be connected to a telemetry system which collects and stores all of the data continuously with an independent network provider who will make that data available in a commonly used format at all times to the Council and the consent holder. No data in the recording device(s) shall be deliberately changed or deleted.

(c) Other types of water level monitoring devices which achieve the same outcomes may be installed with the approval of the Council.

(d) The water level measuring and recording device(s) shall be accessible to the Council at all times for inspection and/or data retrieval.

(e) The water level measuring and recording device(s) shall be installed and maintained throughout the duration of the consent in accordance with the manufacturer's Instructions.

(f) All practicable measures shall be taken to ensure that the water level measuring and recording devices are fully functional at all times.

16. Certification of installation of rate/volume and level measuring devices

(a) Within one month of the installation of the measuring or recording device(s) or any subsequent replacement measuring or recording device(s), and at five-yearly intervals thereafter, and at any time when requested by the Council, the consent holder shall provide a certificate to the Council (Attention: RMA Compliance and Enforcement Manager) signed by a suitably qualified person certifying, and demonstrating by means of a clear diagram, that:

(i) each measuring and recording device(s) is installed in accordance with the manufacturer's specifications; and

(ii) data from the recording device can be readily accessed and/or retrieved in accordance with the conditions above.

17. Review of Monitoring Data

At the completion of the first full irrigation season and prior to the commencement of the next irrigation season the consent holder shall engage, or at any other time during the 5 years after the end of the first full irrigation season following the implementation of this consent, the council may direct the consent holder to engage a suitably qualified and experienced person to review the water level and water use monitoring data collected under conditions 13, 14 and 15 to determine whether stream depletion has developed with longer term pumping. If stream depletion is identified and if the quantum of that stream depletion exceeds 5L/s over the duration of the irrigation season (taken to be 150 days) then a mitigation plan shall be developed and implemented to reduce the
stream depletion to below 5L/s before the commencement of the next irrigation season. This mitigation plan shall be provided to the Canterbury Regional Council, Attention RMA Compliance and Enforcement Manager, at least one month prior to the beginning of the next irrigation season for the purposes of reviewing the mitigation plan as to its adequacy and ensuring the mitigation plan is given effect to before the consent is further exercised in the forthcoming irrigation season.

18. Aquifer Tests

Prior to the implementation of this consent:

(a) The consent holder shall arrange for a suitably qualified person to undertake a constant rate discharge aquifer test ("aquifer test") in the production bore(s). Subject to (b) below, the minimum duration of the aquifer test shall be 7 days unless hydrogeological conditions allow the test to be terminated earlier. Hydrogeological conditions in this instance include:

(i) the existence of steady state conditions as a result of stream depletion for a period of 24 hours; or

(ii) no further evidence of delayed yield, if it occurs.

(b) Prior to the commencement of the aquifer test the Council and the consent holder may agree the number of wells to be tested (in the case of multiple production wells); the duration of the aquifer test; and the methodology for the test.

Note: A different duration test may be necessary in circumstances where the water from a 7 day test can not practically be disposed of. In those circumstances a shorter duration test or a longer duration, but lower rate test may be appropriate.

(c) This condition shall authorize the undertaking of the aquifer test in terms of Rule WQN16 of the Canterbury Regional Council's proposed natural Resources Regional Plan as notified on 3 July 2004.

(d) The aquifer test shall be undertaken in accordance with Council technical report No. R98(10), 1998 or any subsequent replacement pumping test guidelines published by Council available at the time of testing, and in accordance with Appendix C attached.

(e) The aquifer test shall:

- Monitor water level in the monitoring bore screened in the uppermost water bearing strata;

- Monitor water level in the production bore; and

- subject to access and availability, monitor water level in at least one observation bore screened in the same aquifer as the production bore and located within 2000 metres of the production bore.

- Where practical a bore in the same strata as the production bore in which effects would not expected to be seen during the constant rate discharge test shall be monitored throughout the test so as to observe background effects.
Note: it is the consent holders responsibility to demonstrate that his/her take results in effects that are less than minor, particularly on Aquifer 1. What has been stated in this condition is the minimum requirement for undertaking an aquifer test. Monitoring of additional wells during the aquifer test would be expected to provide a scientifically more rigorous outcome.

(f) The aquifer test specifications shall be sufficient to determine:

- The magnitude of well interference effects on all bores located within 2000 metres of the production bore where such bores exist; and
- the magnitude of stream depletion in any waterway potentially affected by the exercising of this consent

(g) Prior to commencement of the test, the aquifer test specifications shall be certified by a suitably qualified person acceptable to the Council, as being consistent with the requirements of this condition.

(h) Data, results and analysis of the test data shall be forwarded to the Council (Attention: RMA Compliance and Enforcement Manager), within three months of completion of the test and at least one month prior to exercising the consent.

(i) If the Council does not accept the aquifer test results as being adequate for the intended purpose it may require that a repeat analysis or repeat of the test be carried out. (Such a requirement must be on reasonable grounds).

19. Analysis of Aquifer Tests

(a) The results of the aquifer test shall be analysed by a suitably qualified person experienced in the analysis of pump tests and shall be used to determine:

(i) The direct cumulative interference effects resulting from the abstraction of water permitted by this consent on authorised water takes existing prior to the notifiable date of this consent which are within 2000 metres of the production bore(s). The methodology to assess well interference effects for the purpose of this condition is set out in Condition 20; and

(ii) the magnitude of stream depletion in any waterway or spring potentially affected as a result of the abstraction of water permitted by this consent. The effects shall be classified using the categories set out in Appendix WQN7 of the Canterbury Regional Council’s Proposed Natural Resources Natural Plan as notified on 3 July 2004.

20. Result of analysis of aquifer test (well interference)

(a) Analysis as described in Schedule WQN10 of the Council’s Proposed Natural Resources Regional Plan as notified 3 July 2004 shall be undertaken and subject to (b) below, applied.

(b) If the analysis shows that the “protected available drawdown” (as described in Schedule WQN10 of the Council’s Proposed natural Resources Regional Plan as notified 3 July 2004) for bores within 2,000 metres of the production bores, will be exceeded, prior to taking water for abstraction, the consent holder shall
provide to the Council (Attention: RMA Compliance and Enforcement Manager):

(i) details of any changes proposed by the Consent Holder to avoid, remedy or mitigate any significant adverse effect; and

(ii) a well interference assessment undertaken and provided by a suitably qualified and experienced person that demonstrates that the proposed mitigation measures are adequate to ensure that interference effects on water takes authorised prior to the notifiable date of this consent and within 2,000 metres of production bores are within the thresholds set out in Policy WQN20 of the Council’s Proposed Natural Resources Regional Plan as notified on 3 July 2004; or

(iii) an assessment undertaken and provided by a suitably qualified and experienced person in accordance with Appendix D to ensure that the yield of any potentially affected neighbouring bores will be protected; or

(iv) the written agreement(s) from any potentially affected bore owner(s) within 2000 metres of the production bore, to the proposed interference.

21. Results of analysis of aquifer tests (stream/spring depletion)

(a) If the analysis of the aquifer test results shows that, in accordance with the classification outlined in Appendix WQN7 of the Canterbury Regional Council’s Proposed Natural Resources Regional Plan as notified on 3 July 2004, the bore is classified as having a high degree of hydraulic connection, or a moderate or low degree of hydraulic connection with a depletion rate of greater than five litres per second with a surface water body (“the Surface Water Body”), no taking of water may be permitted under this consent until the consent holder has satisfied the Canterbury Regional Council that its application has been amended sufficiently to ensure that adverse effects on surface water flows will be no more than minor.

This may include:

(i) providing to the Canterbury Regional Council (Attention: RMA Compliance and Enforcement Manager) proposed measures to reduce the hydraulic connection of the production bore(s) to the surface water body to a low classification;

(ii) for takes classified as having a moderate or low connection, providing to the Canterbury Regional Council (Attention: RMA Compliance and Enforcement Manager) details of a reduced pump rate that results in a stream depletion effect of less than five litres per second.; or

(iii) details of a proposed minimum flow condition for any adversely affected Surface Water Body in accordance with Policy WQN4 shall be provided to the Canterbury Regional Council (Attention: RMA Compliance and Enforcement Manager).

(b) The consent holder shall not recommence taking water under this consent until they are in receipt of written notice from the Canterbury Regional Council that the
proposed amendment is adequate to mitigate against more than minor adverse effects on surface water flows.

22. CRC Certification

(a) Within 20 working days of receipt of information provided under conditions 17 to 21 inclusive the Council shall give written notice ("compliance advice notice") to the consent holder stating whether or not it is satisfied with the information and if not satisfied, the written notice shall outline any concerns and the reasons for those with reference to the methodologies set out in the relevant condition. (Provided that any compliance advice notice which states that the Council is not satisfied shall be based on reasonable grounds).

(b) If a compliance advice notice is not received within 20 working days, the consent holder shall be deemed to have complied with conditions 18 to 21.

(c) The consent shall not be exercised until the compliance advice notice states that the consent holder is in compliance and that mitigation measures proposed, if any, are acceptable.

23. Irrigation efficiency

(a) The consent holder shall take all practicable steps to:

(i) Ensure that the volume of water used for irrigation does not exceed that required for the soil to reach field capacity. In this condition field capacity means the soil moisture content in the crop root zone after drainage (1-3 days) after thorough wetting (such as a large rainfall event that exceeds the root zone water holding capacity when the macro pores contain air and micro pores water); and

(ii) Avoid leakage from pipes and structures; and

(iii) Avoid the application of water onto non-productive land such as impermeable surfaces and river or stream riparian strips.

24. Nitrate management

(a) With the exception of the first period ending 30 June during which this consent is exercised, for each preceding 12 month period ending 30 June, an approved method shall be used to model the nitrate-nitrogen concentration in the soil drainage water below the plant root zone and a nutrient budget for the subject land;

(i) Where the modelled nitrate-nitrogen concentration in the soil drainage water exceeds eight grams per cubic metre, a Nitrate Management Plan shall be prepared describing management practices that shall be implemented to minimise the loss of nitrate-nitrogen by leaching below the plant root zone.

(ii) A copy of the Nitrate Management Plan shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, by 30 September each year.
(iii) The modelled nitrate-nitrogen concentration in the soil drainage water shall not exceed 16 grams per cubic metre for more than three consecutive years, the existing management practices will be reviewed within 3 months by a person who can demonstrate competency in agriculture and nitrate-nitrogen management and they shall prepare a comprehensive report (at the expense of the consent holder) detailing the investigation of the existing management practices and making recommendations for reducing the soil drainage water to less than 16 grams per cubic metre at a rate of at least 5% per year and a copy of the report will be provided to Canterbury Regional Council within 3 months of completion and that the recommendations contained within the report will be given effect to prior to the commencement of the next irrigation season.

(b) A record of all measured input data and the calculations undertaken in accordance with clause (a) shall be:

(i) prepared by 31 August each year;

(ii) certified as an accurate record by a person who can demonstrate competency in agricultural management;

(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) Prior to or at the conclusion of each irrigation season a groundwater sample ("the Sample") will be taken from shallowest bore on the property to which this consent applies; and

(d) The Sample shall be analysed by a laboratory that is certified for that method of analysis for nitrate-nitrogen; and

(e) The results of this analysis shall be provided to the Canterbury Regional Council, Attention RMA Compliance and Enforcement Manager, within one month of the sample collection.

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

(i) 'Overseer' (AgResearch)

(ii) The Soil Plant Atmosphere Model (SPASMO- HortResearch)

(iii) Any other method approved by the Canterbury Regional Council.

(g) For the purposes of this condition, the "subject land" means the area that is irrigated between 1 July and 30 June of each year.

25. Backflow Prevention

(a) 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 and at a location that prohibits any other connection to the mainline, to prevent the backflow of water into the bore; and

(b) 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 person; and

(c) A test report shall be provided to the Council (Attention RMA Compliance and Enforcement Manager) within two weeks of each inspection.

26. Measurement of groundwater levels

(a) Where reasonably required, the taking of water in terms of this permit shall cease for a period of up to 48 hours on notice from the Council, to allow measurement of groundwater levels; and

(b) The Council will provide not less than seven working days notice of its requirement to measure groundwater levels in accordance with this condition. A consent holder may refuse to allow measurement under this condition if the required notice has not been given.

27. Standard Review of conditions

The Council may, at any time during the 5 years after the end of the first full irrigation season following the implementation of this consent, serve notice of its intention to review the conditions of this resource consent for the purpose of dealing with any adverse effect on the environment arising from the exercise of this consent (either on its own or in conjunction with any other consents) and where because of the nature or degree of effect, it is desirable that the effects be addressed prior to the expiry of this consent.

28. Review of conditions for the purpose of revising the Environmental Flow Safeguard and/or the methodology for predicting groundwater levels

The Council may, at any time during the 5 years after the end of the first full irrigation season following the implementation of this consent, serve notice of its intention to review the conditions of this resource consent for the purpose of:

(a) Revising the Environmental Flow Safeguard that was established in terms of Appendix A if groundwater levels measured by the consent holder indicate a significant variation in the groundwater recession and the EFS calculated using the contouring method outlined in Appendix B (for the purpose of defining significant, a variation of 10% between measured and assessed groundwater recession or a 1% change measured and assessed EFS values where that change is greater than 100 mm, shall be considered to be significant).

and/or

(b) Revising the methodology set out in Appendix B, if a model (such as an Eigen value or some other analytical or numerical model) is developed that can more accurately and reliably predict groundwater levels at specific locations in each aquifer than the current contour methodology and where the Council considers that it is more appropriate to use that method.

(c) This review may be in conjunction with, or alternative to a review pursuant to condition 8, or 9.
29. Review of conditions to address unforeseen stream depletion

(a) The Council may in the circumstances described below, at any time during the 5 years after the end of the first full irrigation season following the implementation of this consent, serve notice of its intention to review the conditions of this resource consent for the purpose of limiting stream depletion of adjacent surface water bodies:

- requiring measures to limit stream depletion (including requiring the bore to be deepened); and/or
- limiting the take at times when A1 levels or stream flows are low; and/or
- otherwise restricting the rates or volumes of take pursuant to this consent

so as to ensure that the exercise of this consent does not on its own or in conjunction with the exercise of any other consents, cause significant lowering of levels in Aquifer 1 such that the availability of water to those taking from Aquifer 1 is compromised, or such that the frequency or duration of unsustainable low flows in lowland streams is increased.

(b) Such review may be notified only if the Council determines via monitoring and modelling, that a significant proportion of the water taken pursuant to this consent is likely to be derived from stream depletion.

(c) For the purpose of this condition "a significant proportion" shall include, but not be limited to, where 5 L/s or more of the take is estimated to be derived or induced to flow from a surface water body, during the irrigation season.

30. Term of Consent

This consent shall expire 10 years after the implementation date or on 1 May 2020, whichever occurs earlier.

31. The Implementation Date

The implementation date for the purpose of this consent is the date on which water is first taken for the purpose pursuant to the consent.
Conditions Set

A2

Subject to condition 2(b) below, the consents to which these conditions apply are specified in Annexure 1 (Master Table). This set of conditions applies to takes considered to be within Aquifer 2 where Aquifer 1 is considered to be overhead. This area is shown on the figure in Annexure 3. Takes from Aquifer 2 where Aquifer 1 is not considered to be overhead are covered by condition set A3 except for small takes which are covered by the small take condition set.

1. Aquifer Confirmation A2

These conditions shall apply to bores that are cased and screened in a manner that abstracts water from the following depths only.

<table>
<thead>
<tr>
<th>In the coastal confined aquifer area as shown on annexure 3</th>
<th>35 to 80 m below natural ground surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the mid-plains area where overlain by A1 as shown on annexure 3</td>
<td>40 to 80 m below natural ground surface</td>
</tr>
</tbody>
</table>

2. Location of take

(a) The take shall be located generally as described in the application and except where provided otherwise in the application, or by subsequent variation of this consent, shall only be used to supply water to the property on which the take is located and any other properties described in the application.

(b) Provided that prior notification is given to the Canterbury Regional Council (Council), the consent holder may increase the depth of the production bore from that set out in the application. If the production bore is screened below the depth of Aquifer 2 (being the lower bound of Aquifer 2 estimated in the table attached as Annexure 2) then condition set A3 shall apply in place of the A2 condition set.

(c) Prior to any bore being deepened, the consent holder shall advise the Council (Attention: RMA Compliance and Enforcement Manager) of that intention and shall obtain any necessary consents or variation of consent for such works.

(d) Prior to the taking of any water (other than for the purposes of testing as required by this consent), the interference assessments required by the applicable set of conditions shall be carried out and provided to the Council (Attention: RMA Compliance and Enforcement Manager). No water may be taken for the purpose stated until the relevant interference conditions have been complied with.

Note: Generally, this consent to take and use water will not need to be varied if the take is deeper than that applied for, provided all relevant conditions can be met including, in particular, any conditions relating to interference effects on nearby takes. However, a
new consent to drill the bore may be required or the existing bore consent may need to be varied.

3. **Bore, diameter, depth, map reference**

Water may be taken only from [bore number], [formerly bore number] of [diameter in millimetres], at [map reference].

Except as provided for in condition 2, the depth at which water is drawn into the production bore(s) shall be no less than [top of aquifer depth] metres below ground level.

The bore number, diameter and map reference are set out in the table attached as *Annexure 1* to the decision and the deemed depth of aquifers in Zone A2 as shown in the table attached as *Annexure 2* and in the area east of the line shown on the plan in *Annexure 3*.

4. **Area, use**

Water shall only be used for irrigation of up to [area] hectares of [crops and pasture for grazing dairy cows], as described in the application, on the area of land shown in the attached plan CRCxxxxx. Provided however, that this consent authorises the taking and use of water for the purpose of testing as required by this consent.

5. **Transfer**

This consent is granted on the basis that water is to taken from the location specified and used on the property specified. The allocation, the subject of this consent, shall not be transferred to any other property, other well or other depth.

**Note:** This consent has been granted on the basis of the water needed to serve a particular property. If there is a proposal to use water taken pursuant to this consent on another property (whether or not in conjunction with a transfer) there would need to be an application to vary this condition. This consent is not intended to encourage the trading of surplus water, since that may lead to situations where the volumes taken pursuant to consents are much greater than would be the case if use was limited to the property where the water is needed. The Council will have the ability via the consent process to consider whether the transfer and/or variation of condition is desirable and necessary.

6. **Rate and volume**

Subject to all other conditions water may be taken at a rate not exceeding [maximum rate] litres per second, with a volume not exceeding [design return period volume] cubic metres in any period of [design return period] consecutive days and [seasonal] volume cubic metres between 1st July and the following 30th June.

**Note:** The rates, volumes and the minimum depth of bores are set out in the table attached as *Annexure 1* to the decision. Taking and use of water is authorised outside of the period referred to above, as required for Aquifer testing.
7. **Adaptive Management Conditions**

(a) In any irrigation season (being 1 September to 30 April following) groundwater may not be taken until the Council has given written notice to the Consent Holder that it agrees to the Annual Volume.

(i) The Annual Volume for this consent shall be calculated for each forthcoming season by the consent holder and is subject to an assessment of water availability ("the Assessment"); as specified in Appendix A; and

(ii) The assessment methodology ("the Methodology") is set out in Appendices A and B attached to this consent and includes any amendments to those Appendices that have been agreed in writing by the Consent Holder and the Council; and

(iii) The calculation of the Annual Volume resulting from the Methodology for the forthcoming season, together with supporting data, shall be documented in a report ("the Report"); and

(iv) The Report shall be sent annually to the Council (Attention: RMA Compliance and Enforcement Manager).

(b) Within 20 working days of receipt of the Report, the Council shall notify the Consent Holder in writing whether or not it agrees to the Annual Volume calculation for the forthcoming irrigation season. If the Council does not agree to the Annual Volume it shall include in the written notice any concerns and those concerns shall be referenced back to the methodology in Appendix A. If the Council does not accept the Annual Volume calculation it shall provide its own assessment of the Annual volume carried out in accordance with the methodology in Appendix A.

(c) Where the Council provides a revised calculation that shall be the Annual Volume unless the Applicant provides a further revised calculation which is approved by the Council.

(d) The consent holder may in any year, provide the Council with a revised Report before 1 December and the Annual Volume for the balance of the seasons may be changed as a result. In the event that the consent holder submits a revised Report paragraphs (a), (b), (c) and (e) shall apply.

(e) Notwithstanding the provisions of sub-clause (a), the consent holder shall be entitled to take the groundwater subject to the restrictions (if any) set out in the Report, if the Council does not provide written notice in accordance with this Condition within 20 working days of receipt of the Report.

8. **Revising the Environmental Flow Safeguard (EFS)**

The EFS and/or the Annual Recession as calculated in accordance with Appendix A and B shall be reviewed if in the opinion of Council officers, or the consent holder's consultants, measured water levels indicate a significant variation from that predicted using the contouring method outlined in Appendix B:

Where such a review is required the following shall apply:

(a) The consent holder or group of consent holders shall commission a report (the EFS Revision Report) to be prepared by a suitably qualified person or persons which provides data and analysis to support a new EFS and recession
interpolated from the measured water level for that production bore and water levels, EFS and recessions from other adjacent bores in the same aquifer (the EFS Revision Report).

(b) The report(s) shall be sent to the Council (Attention: RMA Compliance and Enforcement Manager).

(c) Within 20 working days of the receipt of the report, the Council shall advise the consent holder in writing stating whether or not it is satisfied with the information and analysis provided in the report and whether it accepts the proposed EFS. If the Council is not satisfied with the report contents or proposed EFS the written notice shall outline any concerns with the information provided. The Council may only reject a revised proposed EFS on reasonable grounds consistent with the methodologies set out in Appendix A and Appendix B.

(d) If further information is required, that will be provided to the Council as soon as is practicable. Within 20 working days of the receipt of the further information the Council shall advise the consent holder in writing stating whether or not it accepts any further revised proposed EFS or proposes an alternative EFS. (The Council may only reject a revised proposed EFS on reasonable grounds).

(e) If no agreement can be reached on a revised EFS, then either the Council may review the conditions of this consent (including Appendix A and Appendix B) or the consent holder may seek a variation of conditions (including Appendix A and Appendix B) for the purpose of revising the EFS and (if appropriate) adjusting the methodology for calculation of the EFS and recession.

(f) "Significant" means + or − 1% change in the EFS where that change is greater than 100mm.

9. **Future revision of methodology**

The methodology for determining groundwater contours may be revised by agreement between the Council and the consent holder(s) if a model (such as an Eigen value or some other analytical or numerical model) is developed that can more accurately and reliably predict groundwater levels at specific locations in each aquifer than the current contour methodology.

Where such a revision is proposed, a report shall be prepared by a suitably qualified person or persons who will provide data and analysis to support the revised methodology and revised EFS and groundwater recessions interpolated from the measured water levels.

**Explanatory Note:**

In the absence of long-term data the contour method may not be reliable for inland and coastal areas. Water level measurements following bore installation by the consent holders, increased monitoring by Council and increased water level measurement by all consent holders may be used to:

- verify the contour methodology as reliable and appropriate; or
- develop or improve existing or alternative models that can predict groundwater levels.

Either of the above or a combination of the two approaches could be used to better define the potentiometric surface for each aquifer. Adopting these improvements the
EFS and recession can be more reliably estimated for the new bore location. If agreement cannot be reached on a revised methodology the Council may utilise the special review condition where appropriate.

10. Monitoring bore condition

(a) The consent holder shall, before the first exercise of this consent, identify or install a monitoring bore that meets the following criteria:

(i) the monitoring bore shall have a minimum diameter of 50 millimetres;

(ii) the monitoring bore shall be located no less than 10 metres and no greater than 50 metres from the pumping bore;

(iii) the monitoring bore shall be located between the pumping bore and the closest adjacent surface water body;

(iv) Where a production bore is sited on a property boundary or is adjacent to a surface water body, the monitoring well shall be sited at the closest practical location.

(v) the monitoring bore shall be screened only in the uppermost water bearing strata.

(vi) Where the consent holder has two or more production bores in the same aquifer, within or at 1000 m separation distance from a proposed monitoring well site, the installation of a single monitoring well shall be sufficient for compliance with this condition.

(b) Water levels in the monitoring bore shall be measured as per condition 14.

(c) The monitoring bore shall not be used for any purpose other than water level measurement or sampling for water quality analysis, (particularly nitrate analysis).

(d) Monitoring bores shall be drilled to sufficiently intercept groundwater so that water level measurements can still be made during periods of peak or minimum groundwater levels, to ensure monitoring is able to take place.

(e) If, in accordance with part (a) of this condition, a monitoring bore is to be installed, a bore permit must be obtained prior to construction and the monitoring bore must be installed to the conditions on the bore permit in addition to the criteria in part (a) of this condition.

11. Bore installation

In the case of each production bore (where not already drilled); and in the case of any bore which is replaced or re-drilled during the term of this consent; and all monitoring bores (where applicable) the following shall apply:

(a) The casing shall be installed through the soil zone to the top of the screen. The annular space between the outside of the casing and the drill hole wall, shall be sealed with cement grout to whatever depth is necessary to prevent the contamination or pollution of groundwater by surface or shallow subsurface sources, to control subsurface pressures, and to prevent movement of the casing at all times until the bore is decommissioned. Care shall be taken to avoid grout moving into an aquifer.
(b) Except where a resource consent has been granted which allows access to more than one water bearing layer, or where a drilling permit specifies a seal as not necessary, the annular space between the outside of the casing and the drill hole wall in the aquitard between Aquifers 1 and 2 shall be sealed with grout to prevent the interconnection or movement of groundwater along the annulus outside the casing between Aquifers 1 and 2.

(c) All casing material (including temporary casing material) shall be suitable, in terms of its composition, cleanliness, strength and corrosion resistance for the site and installation conditions and the use of the bore. The screen slot size shall be appropriate for the aquifer and the gravel pack grain size and grading. The screen shall be securely sealed to the casing to prevent entry of rock or soil or gravel pack material into the bore.

(d) Within one month of the installation of each new production bore and all monitoring bores, the consent holder shall provide the geological log of the drill hole and the construction details of the bore (including the depth of the screen) to the Council (Attention: RMA Compliance and Enforcement Manager) together with a certificate signed by a suitably qualified person, certifying that the geological log and construction details provided are correct.

12. **Straight pipe for flow meter checking**

(a) The consent holder shall, before the first exercise of this consent, install an easily accessible straight pipe, with no fittings or obstructions on it, of a length at least 15 times the diameter of the pipe, as part of the pump outlet plumbing or within the mainline distribution system for the purposes of enabling the Council to attach a water meter to check compliance with condition 2.

(b) Clause (a) shall not apply where an electromagnetic water meter is installed pursuant to Condition [ ] [water metering and rate and volume recording] and certification of this is provided pursuant to Condition [ ] [Certification of Installation of Rate, Volume and Level Measuring Devices]

13. **Water metering and rate and volume recording**

(a) The consent holder shall, before the first exercise of this consent:

(i) install a water meter(s) that has an international accreditation or equivalent New Zealand calibration endorsement suitable for use with an electronic recording device, from which the rate and the volume of water taken can be determined to within an accuracy of plus or minus five percent at a location(s) that will ensure the total take of water from bores(s) [specify] is measured; and

(ii) install a tamper-proof electronic recording device such as a data logger that shall record (or log) the flow totals every 15 minutes and have the capacity to hold at least one season's data of water taken as specified in clauses (b) (i) or which is telemetered, as specified in clause (b) (ii);

(b) The water meter and recording device(s) shall be set to wrap the data from the measuring device(s) such that the oldest data will be automatically overwritten by the newest data (i.e. cyclic recording); and shall:

(i) store the entire season's data in each 12 month period from 1 July to 30 June in the following year, which shall be downloaded and stored in a
commonly used format and provide to the Council in a form and to a
standard specified in writing by the Council; or

(ii) be connected to a telemetry system which collects and stores all of the
data continuously with an independent network provider who will make
that data available in a commonly used format at all times to the
Council and the consent holder. No data in the recording device(s) shall
be deliberately changed or deleted.

(c) The water meter and recording device(s) shall be accessible to the Council at
all times for inspection and/or data retrieval.

(d) 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.

(e) All practicable measures shall be taken to ensure that the water meter and
recording device(s) are at all times fully functional and have an accuracy
standard of ±5%.

14. Water level measuring in the Production Bore

(a) The standing water level, relative to ground level, in bore [bore number] shall
be measured (where practicable to a precision of better than 0.01 metres) as
follows:

(i) once at the start of the irrigation season before pumping has
commenced;

(ii) once two days after the cessation of pumping at the end of the irrigation
season;

(iii) once within the first seven days of each calendar month. The consent
holder shall measure the working water level in the well immediately
before switch off. Pumping shall then cease for at least 48 hours or
until water level recovery is at least 90% complete prior to the standing
water level measurement taking place. The time that each
measurement is made shall be recorded together with the water level
measurement.

(b) All manual measurements of the standing water level and the date and time of
measurement shall be recorded in a log book kept for that purpose, and
supplied to the Council (Attention: RMA Compliance and Enforcement
Manager), each year during the month of June, or upon request.

(c) Water level measurements can be undertaken using in situ instrumentation.
Where these are used, the depth of placement shall be recorded. Data shall
be downloaded from these instruments at least once per year and supplied to
the Council (Attention: RMA Compliance and Enforcement Manager), each
year during the month of June, or upon request.

15. Water level measuring in the Monitoring Bore

(a) The consent holder shall, before the first exercise of this consent:
(i) install in the monitoring bore a water level measuring and recording device, to enable water levels to be measured, that has an international accreditation or equivalent New Zealand calibration endorsement, suitable for use with an electronic recording device, which will measure the static and operating water levels in the monitoring bore to within an accuracy of plus or minus one percent; and

(ii) install a tamper-proof electronic recording device such as a data logger(s) that shall time stamp a reading from the water level measuring and recording device at least once every [specify time period - default = 15 minutes for takes with a "high" degree of hydraulic connection to a surface water body, 60 minutes for all others], and have the capacity to hold at least one season's data of water taken as specified in clauses (b) (i) and (b) (ii), or which is telemetered, as specified in clause (b).

(b) The water level measuring and recording device(s) shall be set to wrap the data from the measuring device(s) such that the oldest data will be automatically overwritten by the newest data (i.e. cyclic recording); and shall:

(i) store the entire season's data in each 12 month period from 1 July to 30 June in the following year, which the consent holder shall then download and store in a commonly used format and provide to the Council in a form and to a standard specified in writing by the Council; or

(ii) be connected to a telemetry system which collects and stores all of the data continuously with an independent network provider who will make that data available in a commonly used format at all times to the Council and the consent holder. No data in the recording device(s) shall be deliberately changed or deleted.

(c) Other types of water level monitoring devices which achieve the same outcomes may be installed with the approval of the Council.

(d) The water level measuring and recording device(s) shall be accessible to the Council at all times for inspection and/or data retrieval.

(e) The water level measuring and recording device(s) shall be installed and maintained throughout the duration of the consent in accordance with the manufacturer's instructions.

(f) All practicable measures shall be taken to ensure that the water level measuring and recording devices are fully functional at all times.

16. Certification of installation of rate/volume and level measuring devices

(a) within one month of the installation of the measuring or recording device(s) or any subsequent replacement measuring or recording device(s), and at five-yearly intervals thereafter, and at any time when requested by the Council, the consent holder shall provide a certificate to the Council (Attention: RMA Compliance and Enforcement Manager) signed by a suitably qualified person certifying, and demonstrating by means of a clear diagram, that:

(i) each measuring and recording device is installed in accordance with the manufacturer's specifications; and
(ii) data from the recording device can be readily accessed and/or retrieved in accordance with the conditions above.

17. Review of Monitoring Data

At the completion of the first full irrigation season and prior to the commencement of the next irrigation season the consent holder shall engage, or at any other time during the 5 years after the end of the first full irrigation season following the implementation of this consent, the council may direct the consent holder to engage a suitably qualified and experienced person to review the water level and water use monitoring data collected under conditions 13, 14 and 15 to determine whether leakage has developed with longer term pumping. If leakage is identified from A1 and if the quantum of that leakage exceeds 5L/s over the duration of the irrigation season (taken to be 150 days) then a mitigation plan shall be developed and implemented to reduce the leakage to below 5L/s before the commencement of the next irrigation season. This mitigation plan shall be provided to the Canterbury Regional Council, Attention RMA Compliance and Enforcement Manager, at least one month prior to the beginning of the next irrigation season for the purposes of reviewing the mitigation plan as to its adequacy and ensuring the mitigation plan is given effect to before the consent is further exercised in the forthcoming irrigation season.

18. Aquifer Tests

Prior to the implementation of this consent:

(a) The consent holder shall arrange for a suitably qualified person to undertake a constant rate discharge aquifer test ("aquifer test") in the production bore(s). Subject to (b) below, the minimum duration of the aquifer test shall be 7 days unless hydrogeological conditions allow the test to be terminated earlier. Hydrogeological conditions in this instance include:

(i) the existence of steady state leakage for a period of 24 hours; or
(ii) no further evidence of delayed yield, if it occurs.

(b) Prior to the commencement of the aquifer test the Council and the consent holder may agree the number of wells to be tested (in the case of multiple production wells); the duration of the aquifer test; and the methodology for the test.

Note: A different duration test may be necessary in circumstances where the water from a 7 day test can not practically be disposed of. In those circumstances a shorter duration test or a longer duration, but lower rate test may be appropriate.

(c) This condition shall authorize the undertaking of the aquifer test in terms of Rule WQN-16 of the Canterbury Regional Council’s proposed natural Resources Regional Plan as notified on 3 July 2004.

(d) The aquifer test shall be undertaken in accordance with Council technical report No. R98(10), 1998 or any subsequent replacement pumping test guidelines published by Council available at the time of testing, and in accordance with Appendix C attached.

(e) The aquifer test shall:

* Monitor water level in the monitoring bore screened in the uppermost water bearing strata;
- Monitor water level in the production bore; and

- subject to access and availability, monitor water level in at least one observation bore screened in the same aquifer as the production bore and located within 2000 metres of the production bore.

- Where practical a bore in the same strata as the production bore in which effects would not expected to be seen during the constant rate discharge test shall be monitored throughout the test so as to observe background effects.

Note: it is the consent holder's responsibility to demonstrate that his/her test results in effects that are less than minor, particularly on Aquifer 1. What has been stated in this condition is the minimum requirement for undertaking an aquifer test. Monitoring of additional wells during the aquifer test would be expected to provide a scientifically more rigorous outcome.

(f) The aquifer test specifications shall be sufficient to determine:

- The magnitude of well interference effects on all bores located within 2000 metres of the production bores where such bores exist; and

- Any direct interference effect of the production bore on the uppermost water bearing strata over the duration of the aquifer test; and

- Whether leakage is occurring and the magnitude of that leakage.

(g) Prior to commencement of the test, the aquifer test specifications shall be certified by a suitably qualified person acceptable to the Council, as being consistent with the requirements of this condition.

(h) Data, results and analysis of the test data shall be forwarded to the Council (Attention: RMA Compliance and Enforcement Manager), within three months of completion of the test and at least one month prior to exercising the consent.

(i) If the Council does not accept the aquifer test results as being adequate for the intended purpose it may require that a repeat analysis or repeat of the test be carried out. (Such a requirement must be on reasonable grounds).

19. **Analysis of Aquifer Tests**

(a) The results of the aquifer test shall be analysed by a suitably qualified person experienced in the analysis of pump tests and shall be used to determine:

(i) The direct cumulative interference effects resulting from the abstraction of water permitted by this consent on authorised water takes existing prior to the notifiable date of this consent which are within 2000 metres of the production bore(s). The methodology to assess well interference effects for the purpose of this condition is set out in Condition 21; and

(ii) Whether the measured drawdown in the monitoring bore in Aquifer 1 exceeds 100 mm as a result of pumping the production bore; and

(iii) Whether leakage is evident in the data collected from the pumped well or any other well monitored during the test and if so the magnitude of that leakage.
20. **Leakage Assessment – A2 Wells more than 2000m from a Spring or Stream**

(a) If, as a result of pumping the production bore the change in water level in the monitoring bore is **less than or equal to 100 mm** and no leakage is observed in the measured drawdown in the production bore, the consent will be subject to Aquifer 2 adaptive management conditions as set out in Appendix A without any further restriction on the consent.

(b) If the change in water level in the monitoring bore is **less than or equal to 100 mm and leakage is observed** in the measured drawdown of the production bore and/or observation bore(s) then the rate of leakage will be estimated using the relative magnitude of the early and late slopes revealed when drawdown is plotted against time on a log axis using the following relationship:

\[
\text{Leakage as proportion of pumping rate} = 1 - \frac{\Delta s_{\text{late}}}{\Delta s_{\text{early}}}
\]

where

\[
\Delta s_{\text{early}} = \text{drawdown per log cycle of the early-time drawdown curve}
\]

\[
\Delta s_{\text{late}} = \text{drawdown per log cycle of the late-time drawdown curve.}
\]

If the calculated leakage as proportioned from the pumping rate exceeds 10% of the annual allocated volume, the pumping rate shall be reduced until the leakage rate is 10% or less than the annual allocated volume.

(c) If the change in water level in the monitoring bore is **more than 100 mm and leakage is identified** in the measured drawdown in the production bore data then the pumping rate shall be reduced so that the direct interference effect in the monitoring bore is less than or equal to 100 mm. The effect of leakage shall then be reassessed in accordance with condition (b) above.

(d) If the change in water level in the monitoring bore is **more than 100 mm but no leakage is identified** in measured drawdown in the the production bore data then the consent will be subject to Aquifer 2 adaptive management conditions as set out in Appendix A and a report shall be prepared and forwarded to the Council setting out the assessed cause of the observed water level change in the monitoring bore.

(e) Notwithstanding the provisions of clauses (b) and (c) the consent holder may, after obtaining any necessary consents or variations install and/or deepen the bore and take groundwater from a depth that ensures leakage from Aquifer 1 is below the thresholds set out in those clauses.

(i) The consent holder will then be subject to Aquifer 3 Adaptive Management conditions as set out in Appendix A and any other relevant A3 conditions, including testing for interference.

(ii) If, after the bore is deepened, analysis of aquifer tests demonstrates that leakage from an overlying layer exceeds the thresholds in (b) or (c) above, then A1 Adaptive Management shall apply.

21. **Where the production bore is located within 2000 m of a lowland stream or river**

Condition 20 above shall apply and in addition:
(a) If leakage is observed in the measured drawdown of the production bore the stream depletion effect shall be assessed using Environment Canterbury Technical Report “Guidelines for the Assessment of Groundwater Abstraction effects on Stream flow” or other methods acceptable to the Council.

(b) If the assessed stream depletion effect is greater than 5 L/s, the consent will be subject to minimum flow conditions unless the stream depletion effect can be reduced to less than 5 L/s. (This is in addition to the requirements of condition 19 above.)

or

The consent holder may, after obtaining any necessary consents or variations, install and/or deepen the bore and take groundwater from Aquifer 3 or deeper layers. The consent holder will then be subject to Aquifer 3 Adaptive Management conditions as set out in Appendix A and any other relevant A3 conditions, including testing for interference.

(c) The results of all stream depletion and leakage assessments shall be supplied to the Council prior to the taking of any water for irrigation purposes and Clause 17(i) shall apply.

22. Result of analysis of aquifer test (well interference)

(a) Analysis as described in Schedule WQN10 of the Council’s Proposed Natural Resources Regional Plan as notified 3 July 2004 shall be undertaken and subject to (b) below, applied.

(b) If the analysis shows that the “protected available drawdown” (as described in Schedule WQN10 of the Council’s Proposed Natural Resources Regional Plan as notified 3 July 2004) for bores within 2,000 metres of the production bores, will be exceeded, prior to taking water for abstraction, the consent holder shall provide to the Council (Attention: RMA Compliance and Enforcement Manager):

(i) details of any changes proposed by the Consent Holder to avoid, remedy or mitigate any significant adverse effect; and

(ii) a well interference assessment undertaken and provided by a suitably qualified and experienced person that demonstrates that the proposed mitigation measures are adequate to ensure that interference effects on water takes authorised prior to the notifiable date of this consent and within 2,000 metres of production bores are within the thresholds set out in Policy WQN20 of the Council’s Proposed Natural Resources Regional Plan as notified on 3 July 2004; or

(iii) an assessment undertaken and provided by a suitably qualified and experienced person in accordance with Appendix D to ensure that the yield of any potentially affected neighbouring bores will be protected; or

(iv) the written agreement(s) from any potentially affected bore owner(s) within 2000 metres of the production bore, to the proposed interference.
23. **CRC Certification**

(a) Within 20 working days of receipt of information provided under conditions 17 to 21 inclusive the Council shall give written notice ("compliance advice notice") to the consent holder stating whether or not it is satisfied with the information and if not satisfied, the written notice shall outline any concerns and the reasons for those with reference to the methodologies set out in the relevant condition. (Provided that any compliance advice notice which states that the Council is not satisfied shall be based on reasonable grounds).

(b) If a compliance advice notice is not received within 20 working days, the consent holder shall be deemed to have complied with conditions 17 to 21.

(c) The consent shall not be exercised until the compliance advice notice states that the consent holder is in compliance and that mitigation measures proposed, if any, are acceptable.

24. **Irrigation efficiency**

(a) The consent holder shall take all practicable steps to:

(i) Ensure that the volume of water used for irrigation does not exceed that required for the soil to reach field capacity. In this condition field capacity means the soil moisture content in the crop root zone after drainage (1-3 days) after thorough wetting (such as a large rainfall event that exceeds the root zone water holding capacity when the macro pores contain air and micro pores water); and

(ii) Avoid leakage from pipes and structures; and

(ii) Avoid the application of water onto non-productive land such as impermeable surfaces and river or stream riparian strips.

25. **Nitrate management**

(a) With the exception of the first period ending 30 June during which this consent is exercised, for each preceding 12 month period ending 30 June, an approved method shall be used to model the nitrate-nitrogen concentration in the soil drainage water below the plant root zone and a nutrient budget for the subject land;

(i) Where the modelled nitrate-nitrogen concentration in the soil drainage water exceeds eight grams per cubic metre, a Nitrate Management Plan shall be prepared describing management practices that shall be implemented to minimise the loss of nitrate-nitrogen by leaching below the plant root zone.

(ii) A copy of the Nitrate Management Plan shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, by 30 September each year.

(iii) The modelled nitrate-nitrogen concentration in the soil drainage water shall not exceed 16 grams per cubic metre for more than three consecutive years, the existing management practices will be reviewed within 3 months by a person who can demonstrate competency in agriculture and nitrate-nitrogen management and they shall prepare a comprehensive report (at the expense of the consent holder) detailing
the investigation of the existing management practices and making
recommendations for reducing the soil drainage water to less than 15
grams per cubic metre at a rate of at least 5% per year and a copy of
the report will be provided to Canterbury Regional Council within 3
months of completion and that the recommendations contained within
the report will be given effect to prior to the commencement of the next
irrigation season.

(b) A record of all measured input data and the calculations undertaken in
accordance with clause (a) shall be:

(i) prepared by 31 August each year;

(ii) certified as an accurate record by a person who can demonstrate
    competency in agricultural management;

(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) Prior to or at the conclusion of each irrigation season a groundwater sample
("the Sample") will be taken from shallowest bore on the property to which this
consent applies; and

(d) The Sample shall be analysed by a laboratory that is certified for that method
of analysis for nitrate-nitrogen; and

(e) The results of this analysis shall be provided to the Canterbury Regional
Council, Attention RMA Compliance and Enforcement Manager, within one
month of the sample collection.

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

(i) 'Overseer' (AgResearch)

(ii) The Soil Plant Atmosphere Model (SPASMO- HortResearch)

(iii) Any other method approved by the Canterbury Regional Council.

(g) For the purposes of this condition, the "subject land" means the area that is
irrigated between 1 July and 30 June of each year.

26. **Backflow Prevention**

(a) 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 and at a location that prohibits any other
connection to the mainline, to prevent the backflow of water into the bore; and

(b) 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 person; and
(c) A test report shall be provided to the Council (Attention RMA Compliance and Enforcement Manager) within two weeks of each inspection.

27. Measurement of groundwater levels

(a) Where reasonably required, the taking of water in terms of this permit shall cease for a period of up to 48 hours on notice from the Council, to allow measurement of groundwater levels; and

(b) The Council will provide not less than seven working days notice of its requirement to measure groundwater levels in accordance with this condition. A consent holder may refuse to allow measurement under this condition if the required notice has not been given.

28. Standard Review of conditions

The Council may, at any time during the 5 years after the end of the first full irrigation season following the implementation of this consent, serve notice of its intention to review the conditions of this resource consent for the purpose of dealing with any adverse effect on the environment arising from the exercise of this consent (either on its own or in conjunction with any other consents) and where because of the nature or degree of effect, it is desirable that the effects be addressed prior to the expiry of this consent.

29. Review of conditions for the purpose of revising the Environmental Flow Safeguard and/or the methodology for predicting groundwater levels

The Council may, at any time during the 5 years after the end of the first full irrigation season following the implementation of this consent, serve notice of its intention to review the conditions of this resource consent for the purpose of:

(a) Revising the Environmental Flow Safeguard that was established in terms of Appendix A if groundwater levels measured by the consent holder indicate a significant variation in the groundwater recession and the EFS calculated using the contouring method outlined in Appendix B (for the purpose of defining significant, a variation of 10% between measured and assessed groundwater recession or a 1% change measured and assessed EFS values where that change is greater than 100 mm, shall be considered to be significant)

and/or

(b) Revising the methodology set out in Appendix B, if a model (such as an Eigen value or some other analytical or numerical model) is developed that can more accurately and reliably predict groundwater levels at specific locations in each aquifer than the current contour methodology and where the Council considers that it is more appropriate to use that method.

(c) This review may be in conjunction with, or alternative to a review pursuant to condition 8, or 9.

30. Review of conditions to address unforeseen leakage from Aquifer 1 to Aquifer 2

(a) The Council may in the circumstances described below, at any time during the 5 years after the end of the first full irrigation season following the implementation of this consent, serve notice of its intention to review the
conditions of this resource consent for the purpose of limiting leakage from the
overlying strata to Aquifer 2 by:

- requiring measures to limit leakage (including requiring the bore to be
deepened); and/or
- limiting the take at times when A1 levels or stream flows are low;
  and/or
- otherwise restricting the rates or volumes of take pursuant to this
  consent

so as to ensure that the exercise of this consent does not on its own or in
conjunction with the exercise of any other consents, cause significant lowering
of levels in Aquifer 1 such that the availability of water to those taking from
Aquifer 1 is compromised, or such that the frequency or duration of
unsustainable low flows in lowland streams is increased.

(b) Such review may be notified only if the Council determines via monitoring and
modelling, that a significant proportion of the water taken pursuant to this
consent is likely to be derived from the shallow groundwater.

(c) (For the purpose of this condition "a significant proportion" shall include, but
not be limited to, where the pumped rate is less than 50 L/s and where 5 L/s or
more of the take is estimated to be derived or induced to flow from Aquifer 1,
or where the pumped rate is greater than 50 L/s and 10% of the annual
pumped volume is estimated as deriving from or induced to flow from Aquifer 1
during the irrigation season.)

31. Term of Consent

This consent shall expire 10 years after the implementation date or on 1 May 2020,
whichever occurs earlier.

32. The Implementation Date

The implementation date for the purpose of this consent is the date on which water is
first taken for the purpose pursuant to the consent.
Conditions Set

A3

The consents to which these conditions apply are specified in Annexure 1 (Master table). This set of conditions applies to takes deemed to be from Aquifers 3-6 and from takes within what is deemed to be Aquifer 2 where Aquifer 1 is not considered to be overhead.

1. A3 condition set

These conditions shall apply to bores that are cased and screened in a manner that abstracts water from the following depths only.

<table>
<thead>
<tr>
<th>In the coastal confined aquifer area as shown on annexure 3</th>
<th>Below 80 m below natural ground surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the mid-plains area outside of the area overlain by A1 as shown on Annexure 3</td>
<td>Below 40 m below natural ground surface</td>
</tr>
<tr>
<td>In the upper plains area as shown on Annexure 3</td>
<td>Below 45 m below natural ground surface</td>
</tr>
</tbody>
</table>

The Consent Holder shall, before the commencement of the first irrigation season to apply under this consent advise in writing the Council (Attention: RMA Compliance and Enforcement Manager) of the aquifer zone the consent holder is abstracting from. This shall be determined by comparing casing and screen depths with Table 1 attached.

Within 20 working days of receipt of the notice, the Council shall notify the Consent Holder in writing whether or not it agrees with the Consent Holders assessment of the aquifer zone being drawn upon. If the Council does not agree to the aquifer zone advised by the consent holder it shall include in the written notice the reasons for disagreement and shall advise which zone it considers appropriate on the basis of the casing and screen depths provided. The Council may only reject an advised aquifer zone on reasonable grounds having regards to the aquifer depths identified in Table 1 attached.

2. Location of take

(a) The take shall be located generally as described in the application and except where provided otherwise in the application, or by subsequent
variation of this consent, shall only be used to supply water to the property on which the take is located and any other properties described in the application.

(b) Provided that prior notification is given to the Canterbury Regional Council (Council) the consent holder may increase the depth of the production bore from that set out in the application. If the production bore is screened below the depth of Aquifer 2 (being the deemed lower bound of Aquifer 2 set out in the table attached as Annexure 2) then condition set A3 shall apply.

(c) Prior to any bore being deepened, the consent holder shall advise the Council, (Attention: RMA Compliance and Enforcement Manager) of that intention and shall obtain any necessary consents or variation of consent for such works.

(d) Prior to the taking of any water for the purposes of irrigation, the interference assessments required by the applicable set of conditions shall be carried out and provided to the Council, (Attention: RMA Compliance and Enforcement Manager). No water may be taken for irrigation purposes until the relevant interference requirements have been complied with.

Note: Generally, this consent to take and use water will not need to be varied if the take is deeper than that applied for, provided all relevant conditions can be met including, in particular, any conditions relating to interference effects on nearby takes. However, a new consent to drill the bore may be required or the existing bore consent may need to be varied.

3. Bore, diameter, depth, map reference

Water may be taken only from [bore number], [formerly bore number] of [diameter in millimetres], at [map reference].

Except as provided for in condition 2, the depth at which water is drawn into the production bore(s) shall be no less than [top of aquifer depth] metres below ground level.

The bore number, diameter and map reference and top of Aquifer depth are set out in the table attached as Annexure 1 to the decision and the deemed upper level of Aquifer 3 is as shown in the table attached as Appendix 2.

4. Area, use

Water shall only be used for irrigation of up to [area] hectares of [crops and pasture for grazing dairy cows], as described in the application, on the area of land shown in the attached plan CRCxxxx. Provided however, that this consent authorises the taking and use of water for the purpose of testing as required by this consent.
5. **Transfer**

This consent is granted on the basis that water is to taken from the location specified and used in the property specified. The allocation, the subject of this consent, shall not be transferred to any other property, other well or other depth.

**Note**: This consent has been granted on the basis of the water needed to serve a particular property. If there is a proposal to use water taken pursuant to this consent on another property (whether or not in conjunction with a transfer) there would need to be an application to vary this condition. This consent is not intended to encourage or authorise the trading of surplus water, since that may lead to situations where the volumes taken pursuant to consents are much greater than would be the case if use was limited to the property where the water is needed. The Council will have the ability via the consent process to consider whether the transfer and/or variation of condition is desirable and necessary.

6. **Rate and Volume**

Subject to all other conditions, water may be taken at a rate not exceeding [maximum rate] litres per second, with a volume not exceeding [design return period volume] cubic metres in any period of [design return period] consecutive days and [seasonal] volume cubic metres between 1st July and the following 30th June.

**Note**: The rates, volumes of bores are set out in the table attached as **Annexure 1** to this decision. Taking and use of water is authorised outside of the period referred to above, so far as is required for Aquifer testing.

7. **Adaptive Management Conditions**

(a) In any irrigation season (being 1 September to 30 April following) groundwater may not be taken until the Council has given written notice to the Consent Holder that it agrees to the Annual Volume.

(i) The Annual Volume for this consent shall be calculated for each forthcoming season by the consent holder and is subject to an assessment of water availability ("the Assessment"); as specified in Appendix A; and

(ii) The assessment methodology ("the Methodology") is set out in Appendices A and B attached to this consent and includes any amendments to those Appendices that have been agreed in writing by the Consent Holder and the Council; and

(iii) The calculation of the Annual Volume resulting from the Methodology for the forthcoming season, together with supporting data, shall be documented in a report ("the Report"); and

(iv) The Report shall be sent annually to the Council: (Attention: RMA Compliance and Enforcement Manager).
Within 20 working days of receipt of the Report, the Council shall notify the Consent Holder in writing whether or not it agrees to the Annual Volume calculation for the forthcoming irrigation season. If the Council does not agree to the Annual Volume it shall include in the written notice any concerns and those concerns shall be referenced back to the methodology in Appendix A. If the Council does not accept the Annual Volume calculation it shall provide its own assessment of the Annual volume carried out in accordance with the methodology in Appendix A.

Where the Council provides a revised calculation that shall be the Annual Volume unless the Applicant provides a further revised calculation which is approved by the Council.

The consent holder may in any year, provide the Council with a revised Report before 1 December and the Annual Volume for the balance of the season may be changed as a result. In the event that the consent holder submits a revised Report paragraphs (a), (b), (c) and (e) shall apply.

Notwithstanding the provisions of sub-clause (a), the consent holder shall be entitled to take the groundwater subject to the restrictions (if any) set out in the Report if the Council does not provide written notice in accordance with this Condition within 20 working days of receipt of the Report.

8. **Revising the Environmental Flow Safeguard (EFS)**

The EFS and/or the Annual Recession as calculated in accordance with Appendix A and B shall be reviewed if in the opinion of Council officers, or the consent holder's consultants, measured water levels indicate a significant variation from that predicted using the contouring method outlined in Appendix B:

Where such a review is required the following shall apply:

(a) The consent holder or group of consent holders shall commission a report (the EFS Revision Report) to be prepared by a suitably qualified person or persons which provides data and analysis to support a new EFS and recession interpolated from the measured water level for that production bore and water levels, EFS and recessions from other adjacent bores in the same aquifer (the EFS Revision Report).

(b) The report(s) shall be sent to the Council (Attention: RMA Compliance and Enforcement Manager).

(c) Within 20 working days of the receipt of the report, the Council shall advise the consent holder in writing stating whether or not it is satisfied with the information and analysis provided in the report and whether it accepts the proposed EFS. If the Council is not satisfied with the report contents or proposed EFS the written notice shall outline any concerns with the information provided. The Council may only reject a revised proposed EFS on reasonable grounds consistent with the methodologies set out in Appendix A and Appendix B.
(d) If further information is required, that will be provided to the Council as soon as practicable. Within 20 working days of the receipt of the further information the Council shall advise the consent holder in writing stating whether or not it accepts any further revised proposed EFS or proposes an alternative EFS. (The Council may only reject a revised proposed EFS on reasonable grounds).

(e) If no agreement can be reached on a revised EFS, then either the Council may review the conditions of this consent (including Appendix A and Appendix B) or the consent holder may seek a variation of conditions (including Appendix A and Appendix B) for the purpose of revising the EFS and (if appropriate) adjusting the methodology for calculation of the EFS and recession.

(f) "Significant" means + or – 1% change in the EFS where that change is greater than 100mm.

9. Future revision of methodology

The methodology for determining groundwater contours may be revised by agreement between the Council and the consent holder(s) if a model (such as an Eigen value or some other analytical or numerical model) is developed that can more accurately and reliably predict groundwater levels at specific locations in each aquifer than the current contour methodology.

Where such a revision is proposed, a report shall be prepared by a suitably qualified person or persons who will provide data and analysis to support the revised methodology and revised EFS and groundwater recessions interpolated from the measured water levels.

Explanatory Note:

In the absence of long-term data the contour method may not be reliable for inland and coastal areas. Water level measurements following bore installation by the consent holders, increased monitoring by Canterbury Regional Council and increased water level measurement by all consent holders may be used to:

- verify the contour methodology as reliable and appropriate; or
- develop or improve existing or alternative models that can predict groundwater levels.

Either of the above or a combination of the two approaches could be used to better define the potentiometric surface for each aquifer. Adopting these improvements the EFS and recession can be more reliably estimated for the bore location. If agreement cannot be reached on a revised methodology the Regional Council may utilise the special review condition where appropriate.

10. Bore installation

In the case of each production bore (where not already drilled) and in the case of any bore which is replaced or re-drilled during the term of this consent, the following shall apply:
(a) The casing shall be installed through the soil zone to the top of the screen. The annular space between the outside of the casing and the drill hole wall shall be sealed with cement grout to whatever depth is necessary to prevent the contamination or pollution of groundwater by surface or shallow subsurface sources, to control subsurface pressures, and to prevent movement of the casing at all times until the bore is decommissioned. Care shall be taken to avoid grout moving into an aquifer.

(b) Except where a resource consent has been granted which allows access to more than one water bearing layer, or where a drilling permit specifies a seal as not necessary, the annular space between the outside of the casing and the drill hole wall in the aquitards between overlying aquifers shall be constructed in a manner that seals the annular space in order to prevent the interconnection or movement of groundwater along the annulus outside the casing between the overlying aquifers i.e. minimising casing shoe sizes or drilling with mud systems.

(c) All casing material (including temporary casing material) shall be suitable, in terms of its composition, cleanliness, strength and corrosion resistance for the site and installation conditions and the use of the bore. The screen slot size shall be appropriate for the aquifer and the gravel pack grain size and grading. The screen shall be securely sealed to the casing to prevent entry of rock or soil or gravel pack material into the bore.

(d) Within one month of the installation of each new production bore, the consent holder shall provide the geological log of the drill hole and the construction details of the bore (including the depth of the screen) to the Council (Attention: RMA Compliance and Enforcement Manager) together with a certificate signed by a suitably qualified person, certifying that the geological log and construction details as provided are correct.

11. Straight pipe for flow meter checking

(a) The consent holder shall, before the first exercise of this consent, install an easily accessible straight pipe, with no fittings or obstructions on it, of a length at least 15 times the diameter of the pipe, as part of the pump outlet plumbing or within the mainline distribution system for the purposes of enabling the Council to attach a water meter to check compliance with condition 4.

(b) Clause (a) shall not apply where an electromagnetic water meter is installed pursuant to Condition 10 [Water metering and rate and volume recording] and certification of this is provided pursuant to Condition 12 [Certification of Installation of Rate, Volume and Level Measuring Devices]

12. Water metering and rate and volume recording

(a) The consent holder shall, before the first exercise of this consent:

(i) install a water meter(s) that has an international accreditation or equivalent New Zealand calibration endorsement suitable for use with an electronic recording device, from which the rate and the
volume of water taken can be determined to within an accuracy of plus or minus five percent at a location(s) that will ensure the total take of water from bores(s) [specify] is measured; and

(ii) install a tamper-proof electronic recording device such as a data logger that shall record or log the flow totals every 15 minutes and have the capacity to hold at least one season's data of water taken as specified in clauses (b) (i), or which is telemetered, as specified in clause (b)(ii);

(b) The water meter and recording device(s) shall be set to wrap the data from the measuring device(s) such that the oldest data will be automatically overwritten by the newest data (i.e. cyclic recording); and shall:

(i) store the entire season's data in each 12 month period from 1 July to 30 June in the following year, which shall be downloaded and stored in a commonly used format and provide to the Council in a form and to a standard specified in writing by the Council; or

(ii) be connected to a telemetry system which collects and stores all of the data continuously with an independent network provider who will make that data available in a commonly used format at all times to the Council and the consent holder. No data in the recording device(s) shall be deliberately changed or deleted.

(c) The water meter and recording device(s) shall be accessible to the Council at all times for inspection and/or data retrieval.

(d) 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.

(e) All practicable measures shall be taken to ensure that the water meter and recording device(s) are at all times fully functional and have an accuracy standard of ±5%.

13. Water level measuring in the Production Bore

(a) The standing water level, relative to ground level, in bore [bore number] shall be measured (where practicable to a precision of better than 0.01 metres) as follows:

(i) once at the start of the irrigation season before pumping has commenced;

(ii) once two days after the cessation of pumping at the end of the irrigation season;

(iii) once within the first seven days of each calendar month. The consent holder shall measure the working water level in the well immediately before switch off. Pumping shall cease for at least 48 hours or until water level recovery is at least 90% complete prior to
the standing water level measurement taking place. The time that each measurement is made shall be recorded together with the water level measurement.

(b) All manual measurements of the standing water level and the date and time of measurement shall be recorded in a log book kept for that purpose, and supplied to the Council (Attention: RMA Compliance and Enforcement Manager) each year during the month of June, or upon request.

(c) Water level measurements can be undertaken using in situ instrumentation. Where these are used, the depth of placement shall be recorded. Data shall be downloaded from these instruments at least once per year and supplied to the Council (Attention: RMA Compliance and Enforcement Manager), each year during the month of June, or upon request.

14. Review of Monitoring Data

At the completion of the first full irrigation season and prior to the commencement of the next irrigation season the consent holder shall engage, or at any other time during the 5 years after the end of the first full irrigation season following the implementation of this consent, the council may direct the consent holder to engage a suitably qualified and experienced person to review the water level and water use monitoring data collected under conditions 12 and 13 to determine whether leakage has developed with longer term pumping. If leakage is identified and if the quantum of that leakage exceeds 5L/s over the duration of the irrigation season (taken to be 150 days) than the source and the effects of that leakage shall be assessed and where effects are more than minor, a mitigation plan shall be developed and implemented to reduce the effect of the leakage before the commencement of the next irrigation season. This mitigation plan shall be provided to the Canterbury Regional Council, Attention RMA Compliance and Enforcement Manager, at least one month prior to the beginning of the next irrigation season for the purposes of reviewing the mitigation plan as to its adequacy and ensuring the mitigation plan is given effect to before the consent is further exercised in the forthcoming irrigation season.

15. Certification of installation of rate/volume and level measuring devices

(a) Within one month of the installation of the measuring or recording device(s) or any subsequent replacement measuring or recording device(s), and at five-yearly intervals thereafter, and at any time when requested by the Council, the consent holder shall provide a certificate to the Council (Attention: RMA Compliance and Enforcement Manager) signed by a suitably qualified person certifying, and demonstrating by means of a clear diagram, that:

(i) each measuring and recording device(s) is installed in accordance with the manufacturers specifications; and
(ii) data from the recording device can be readily accessed and/or retrieved in accordance with the conditions above.

16. **Aquifer Tests**

Prior to the implementation of this consent:

(a) The consent holder shall arrange for a suitably qualified person to undertake a constant rate discharge aquifer test ("aquifer test") in the production bore(s). The aquifer test shall continue until such time as there is no significant change in water level recorded in the pumped bore or any other bore monitored during the test. The maximum duration of the aquifer test shall be seven days. "No significant change" justifying the cessation of the aquifer test includes:

- the existence of steady state leakage for a period of 24 hours.

(b) Prior to the commencement of the aquifer test the Council and the consent holder may agree; the number of wells to be tested (in the case of multiple production wells) the duration of the aquifer test and the methodology for the test.

**Note:** A different duration test may be necessary in circumstances where the water from a 7 day test can not practically be disposed of. In those circumstances a shorter duration test or a longer duration with a lower rate test may be appropriate.

(c) This condition shall authorize the undertaking of the aquifer test in terms of Rule WQN16 of the Canterbury Regional Council's proposed natural Resources Regional Plan as notified on 3 July 2004.

(d) The aquifer test shall be undertaken in accordance with Council technical report No. R88(10), 1998 or any subsequent replacement pumping test guidelines published by the Council available at the time of testing, and in accordance with Appendix C attached.

(e) Where there are production bores within 2000 m of the bore the subject of this consent then, prior to the first exercise of this consent for irrigation purposes the aquifer test shall:

(i) Monitor water level in the pumped bore;

(ii) Monitor water level in at least one other production bore screened at the same depth as the pumped bore and located within 2000 m of the pumped bore where available; and

(iii) Monitor water level in selected shallower production bores at different depths within 2000 m of the pumped bore, where available.

**Note:** This consent has been granted on advice from the consent holder (through the Consent Holder's consultant) that effects of pumping from a well at this depth and at this location on the shallow aquifer (A1) and consequently on spring flow and stream flow will be minor. The aquifer testing which is required by these conditions is the minimum
considered necessary and has, as one purpose, to show whether leakage is occurring when the well is pumped over a 7 day period. The testing undertaken is to be sufficient to determine whether leakage is happening and to enable the source of that leakage to be investigated and may require more than the minimum as set out above. The most appropriate means to do so would be to monitor wells shallower than the test well. Where no shallow wells exist but leakage is considered to be a distinct possibility, it would be prudent to consider whether a shallow monitoring well should be installed prior to the test being undertaken otherwise there is a risk that the test outcome may be ruled unsatisfactory by the Ecan officers given their review role in Condition 17.

(f) The aquifer test specifications shall be sufficient to determine:

- the magnitude of well interference effects on all bores located within 2000 metres of the production bore.

- whether leakage has developed and is contributing to the production bore yield.

(g) Prior to commencement of the test, the aquifer test specifications shall be certified by a suitably qualified person acceptable to the Council, as being consistent with the requirements of this condition.

(h) Data, results and analysis of the test data shall be forwarded to the Council (Attention: RMA Compliance and Enforcement Manager), within three months of completion of the test and at least one month prior to exercising the consent.

(i) If the Council does not accept the aquifer test results as being adequate for the intended purpose it may require that a repeat analysis or repeat of the test be carried out. (Such a requirement must be on reasonable grounds).

17. Analysis of Aquifer Tests

(e) The results of the aquifer test shall be analysed by a suitably qualified person experienced in the analysis of pump tests and shall be used to determine:

(i) The direct cumulative interference effects resulting from the abstraction of water permitted by this consent on authorised water takes existing prior to the notifiable date of this consent which are within 2000 metres of the production bores. The methodology to assess well interference effects for the purpose of this condition is set out in Condition 18; and

(ii) Whether leakage is evident in the data collected from the pumped well and any other well monitored during the test and the magnitude of that leakage.
18. **Result of analysis of aquifer test (well interference)**

(a) Analysis as described in Schedule WQN10 of the Council’s Proposed natural Resources Regional Plan as notified 3 July 2004 shall be undertaken and subject to (b) below, applied.

(b) If the analysis shows that the "protected available drawdown" (as described in Schedule WQN10 of the Council’s Proposed natural Resources Regional Plan as notified 3 July 2004) for bores within 2000 metres of the production bores, will be exceeded, the consent holder shall provide to the Council (Attention: RMA Compliance and Enforcement Manager):

(i) details of any changes proposed by the Consent Holder to avoid, remedy or mitigate any significant adverse effect; and

(ii) a well interference assessment undertaken and provided by a suitably qualified and experienced person that demonstrates that the proposed mitigation measures are adequate to ensure that interference effects on water takes authorised prior to the notifiable date of this consent and within 2000 metres of production bores are within the thresholds set out in Policy WQN20 of the Council’s Proposed Natural Resources Regional Plan as notified on 3 July 2004; or

(iii) an assessment undertaken and provided by a suitably qualified and experienced person in accordance with Appendix D to ensure that the yield of any potentially affected neighboring bores will be protected; or

(iv) the written agreement(s) of any potentially affected bore owners within 2000 metres of the production bore, to the proposed interference.

19. **Leakage Assessment**

(a) Where leakage is identified in the measured drawdown in the production well, an assessment of the effects of that leakage shall be undertaken on the groundwater availability in shallower strata including Aquifer 1; on groundwater discharge to springs and streams; and on wells within 2000m of the pumped well.

- At the same depth as the pumped well.
- At shallower depth than the pumped well

(b) At no time shall leakage from A1 exceed 5L/s. Where leakage from A1 is assessed as greater than 5L/s then mitigation measures shall be developed and implemented to ensure effects are less than 5L/s.
(c) Where mitigation is not able to reduce this leakage from A1 to less than 5L/s then any take would be out of compliance and pumping will have to cease.

(d) This assessment shall be documented in a Report and the Report shall be sent to the Council (Attention: RMA Compliance and Enforcement Manager).

(e) Where effects are identified and mitigation measures are considered necessary, the mitigation measures proposed shall be included in the report.

(f) If mitigation is not able to minimise the leakage from A1 then the take will be considered to be out of compliance and the consent will not be able to be exercised.

Note: Where leakage is identified during the pumping test it is important that the consent holder, through their consultant, investigate where this leakage may be sourced from and what effect that leakage may have on other users and the resource. This may require a test to be undertaken after shallow monitoring wells have been identified or constructed. The expectation in most instances where deep wells are pumped is that there will be no effects or no measurable effects on A1 or on spring or stream discharge. However this condition requires this possibility to be examined. Where leakage is assessed as affecting shallower wells or the shallow aquifer (not expected) then mitigation measured are to be proposed and to be implemented to ensure effects are within limits set.

20. **CRC Certification**

(a) Within 20 working days of receipt of information provided under conditions 15 to 18, the Council shall give written notice ("compliance advice notice") to the consent holder stating whether or not it is satisfied with the information and if not satisfied, the written notice shall outline any concerns and the reasons for those with reference to the methodologies set out in the relevant condition. (Provided that any compliance advice notice which states that the Council is not satisfied shall be based on reasonable grounds).

(b) If a compliance advice notice is not received within 20 working days, the consent holder shall be deemed to have complied with conditions 15 to 15.

(c) The consent shall not be exercised until the compliance advice notice states that the consent holder is in compliance and that mitigation measures proposed, if any, are acceptable.
21. **Irrigation efficiency**

(a) The consent holder shall take all practicable steps to:

(i) Ensure that the volume of water used for irrigation does not exceed that required for the soil to reach field capacity. In this condition field capacity means the soil moisture content in the crop root zone after drainage (1-3 days) following a thorough wetting (such as a large rainfall event that exceeds the root zone water holding capacity when the macro pores contain air and micro pores water); and

(ii) Avoid leakage from pipes and structures; and

(iii) Avoid the application of water onto non-productive land such as impermeable surfaces and river or stream riparian strips.

22. **Nitrate management**

(a) With the exception of the first period ending 30 June during which this consent is exercised, for each preceding 12 month period ending 30 June, an approved method shall be used to model the nitrate-nitrogen concentration in the soil drainage water below the plant root zone and a nutrient budget for the subject land;

(i) Where the modelled nitrate-nitrogen concentration in the soil drainage water exceeds eight grams per cubic metre, a Nitrate Management Plan shall be prepared describing management practices that shall be implemented to minimise the loss of nitrate-nitrogen by leaching below the plant root zone.

(ii) A copy of the Nitrate Management Plan shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, by 30 September each year.

(iii) The modelled nitrate-nitrogen concentration in the soil drainage water shall not exceed 16 grams per cubic metre for more than three consecutive years, the existing management practices will be reviewed within 3 months by a person who can demonstrate competency in agriculture and nitrate-nitrogen management and they shall prepare a comprehensive report (at the expense of the consent holder) detailing the investigation of the existing management practices and making recommendations for reducing the soil drainage water to less than 16 grams per cubic metre at a rate of at least 5% per year and a copy of the report will be provided to Canterbury Regional Council within 3 months of completion and that the recommendations contained within the report will be given effect to prior to the commencement of the next irrigation season.

(b) A record of all measured input data and the calculations undertaken in accordance with clause (a) shall be:
(i) prepared by 31 August each year;

(ii) certified as an accurate record by a person who can demonstrate competency in agricultural management;

(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) Prior to or at the conclusion of each irrigation season a groundwater sample ("the Sample") will be taken from shallowest bore on the property to which this consent applies; and

(d) The Sample shall be analysed by a laboratory that is certified for that method of analysis for nitrate-nitrogen; and

(e) The results of this analysis shall be provided to the Canterbury Regional Council, Attention RMA Compliance and Enforcement Manager, within one month of the sample collection.

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

(i) "Overseer" (AgResearch)

(ii) The Soil Plant Atmosphere Model (SPASMO- HortResearch)

(iii) Any other method approved by the Canterbury Regional Council.

(g) For the purposes of this condition, the "subject land" means the area that is irrigated between 1 July and 30 June of each year.

23. **Backflow prevention**

(a) 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 and at a location that prohibits any other connection to the mainline, to prevent the backflow of water into the bore; and

(b) 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 person; and

(c) A test report shall be provided to the Council (Attention: RMA Compliance and Enforcement Manager).
24. **Measurement of natural groundwater levels**

(a) The taking of water in terms of this permit shall cease for a period of up to 48 hours on notice from the Council, to allow measurement of natural groundwater levels; and

(b) The Council will provide not less than seven working days notice of its requirement to measure groundwater levels in accordance with this condition. A consent holder may refuse to allow measurement under this condition if the required notice has not been given.

25. **Standard Review of conditions**

The Council may, at any time during the 5 years after the end of the first full irrigation season following the implementation of this consent, serve notice of its intention to review the conditions of this resource consent for the purpose of dealing with any adverse effect on the environment arising from the exercise of this consent (either on its own or in conjunction with any other consents) and where because of the nature or degree of effect, it is desirable that the effects be addressed prior to the expiry of this consent.

25. **Review of conditions for the purpose of revising the Environmental Flow Safeguard and/or the methodology for predicting groundwater levels.**

The Council may, at any time during the 5 years after the end of the first full irrigation season following the implementation of this consent, serve notice of its intention to review the conditions of this resource consent for the purpose of:

(a) Revising the Environmental Flow Safeguard that was established in terms of Appendix A if groundwater levels measured by the consent holder indicate a significant variation in the groundwater recession and the EFS calculated using the contouring method outlined in Appendix B (for the purpose of defining significant, a variation of 10% between measured and assessed groundwater recession or a 1% change measured and assessed EFS values where that change is greater than 100 mm, shall be considered to be significant)

and/or

(b) Revising the methodology set out in Appendix B, if a model (such as an Eigen value or some other analytical or numerical model) is developed that can more accurately and reliably predict groundwater levels at specific locations in each aquifer than the current contour methodology and where the Council considers that it is more appropriate to use that method.

(c) This review may be in conjunction with, or alternative to a review pursuant to condition 8 or 9.
27. **Review of conditions to address unforeseen leakage from Aquifer 1 to Aquifers 3 to 6**

(a) The Council may in the circumstances described below, at any time during the 5 years after the end of the first full irrigation season following the implementation of this consent serve notice of its intention to review the conditions of this resource consent for the purpose of limiting leakage from the overlying strata to Aquifers 3 to 6 by:

- applying A2 adaptive management to this consent; and/or
- requiring measures to limit leakage (including requiring the bore to be deepened); and/or
- limiting the take at times when levels in aquifer 1 or shallow groundwater levels or stream flows are low; and/or
- otherwise restricting the rates or volumes of take pursuant to this consent

so as to ensure that the exercise of this consent does not on its own or in conjunction with the exercise of any other consents, cause significant lowering of levels in Aquifer 1 such that the availability of water to those taking from Aquifer 1 is compromised, or such that the frequency or duration of unsustainable low flows in lowland streams is increased.

(b) Such review may be notified only if the Council determines via monitoring and modelling, that replicates the monitoring results, that a significant proportion of the water taken pursuant to this consent is likely to be derived from the shallow groundwater.

(c) For the purpose of this condition "a significant proportion" shall include, but not be limited to,

(i) where the pumped rate is less than 50 L/s and where 5 L/s or more of the take is estimated to be derived or induced to flow from Aquifer 1; or

(ii) where the pumped rate is greater than 50 L/s and 10% of the annual pumped volume is estimated as being derived from or induced to flow from Aquifer 1 during the irrigation season.

28. **Term of Consent**

This consent shall expire 10 years after the implementation date or on 1 May 2020, whichever occurs earlier.

29. **Implementation Date**

The implementation date for the purpose of this consent is the date on which water is first taken for the purpose pursuant to the consent.
5 April 2013

Fonterra Co-operative Group Limited
(Darfield)
Attn To: Ian Goldschmidt
30 Factory Road
Brightwater 7022

Dear Ian

NOTICE OF RESOURCE CONSENT DECISION(S)

RECORD NO: CRC133976
NAME: Fonterra Co-operative Group Limited (Darfield)

The decision of Environment Canterbury is to grant your application(s) on the terms and conditions specified in the attached resource consent document(s). Your resource consent(s) commences from the date of this letter advising you of the decision. The reasons for the decision are:

1) Any adverse effects on the environment as a result of the proposed activity will be minor.
2) There are no persons considered to be adversely affected by this proposal.

For some activities a report is prepared, with officer recommendations, to provide information to the decision makers. If you require a copy of the report please contact our Customer Services section.

If you do not agree with the consent authority decision, you may object to the whole or any part. Notice of any objection must be in writing and lodged with Environment Canterbury within 15 working days of receipt of this decision.

Alternatively you may appeal to the Environment Court, PO Box 2069, Christchurch. The notice of appeal must be lodged with the Court within 15 working days of receipt of this decision, with a copy forwarded to Environment Canterbury within the same timeframe. If you appeal this decision, the commencement date will then be the date on which the decision on the appeal is determined. If you are in any doubt about the correct procedures, you should seek legal advice.

You can find online information about your consent document at http://ecan.govt.nz/publications/General/YourConsentDocumentBooklet09.pdf and also information regarding the monitoring of your consent at http://ecan.govt.nz/publications/General/monitoring-your-consent-booklet.pdf. These booklets contain important information about your consent and answers some commonly asked questions about what will happen next in the life of your resource consent. There is an Annual Compliance Monitoring Charge associated with every consent. For details of this, please refer to page 10 of the "Monitoring Your Consent" booklet.

Environment Canterbury takes every measure to improve both applications and processes, and we appreciate your feedback as an important component in ensuring this occurs. You can complete a
consents survey on-line at http://www.ecan.govt.nz/services/resource-consents/pages/surveys.aspx. Alternatively, you can call our Customer Services Section on 0800 EC INFO who will be happy to complete the survey with you.

Charges, set in accordance with section 36 of the Resource Management Act 1991, shall be paid to the Regional Council for the carrying out of its functions in relation to the administration, monitoring and supervision of resource consents and for the carrying out of its functions under section 35 of the Act.

Thank you for helping us make Canterbury a great place to live.

For all queries please contact our Customer Services Section by telephoning (03) 353 9007, 0800 ECINFO (0800 324 636), or email ecinfo@ecan.govt.nz quoting your CRC number above.

Yours sincerely

[Signature]

CONSENTS PLANNING SECTION

CC Address:

Golder Associates (NZ) Limited, Christchurch
Attn To: Anna Wilkes
PO Box 2281
Christchurch 8140
RESOURCE CONSENT CRC133976
Pursuant to Section 104 of the Resource Management Act 1991

The Canterbury Regional Council (known as Environment Canterbury)

GRANTS TO: Fonterra Co-operative Group Limited (Darfield)
A DISCHARGE PERMIT: To discharge contaminants onto or into land and to air.
COMMENCEMENT DATE: 05 Apr 2013
EXPIRY DATE: 05 Apr 2028
LOCATION: Darfield Area

SUBJECT TO THE FOLLOWING CONDITIONS:

Definitions

1. For the purposes of this resource consent:

1. Dairy wastewater treatment sludge means dissolved air flotation sludge (DAF). DAF sludge is fine suspended materials that are removed during the treatment of wastewater from the milk powder processing plants. The DAF sludge shall have an average solids content of not less than 12%.

2. Qualified Person means a person who holds a relevant tertiary qualification that required the equivalent of at least three years full-time study, and who has expertise in environmental investigation and environmental sampling, or a person who has such extensive experience and expertise to be equivalent to that qualification and expertise. The consent holder shall provide evidence of the person’s qualifications, experience and expertise on request from the Canterbury Regional Council.

3. Effluent includes dairy effluent and human effluent.

4. Buffer area means areas where there has been no application of dairy wastewater treatment sludge.

Limits

2. The discharge shall be only dairy wastewater treatment sludge.

3. Dairy wastewater treatment sludge shall be discharged into or onto land only in accordance with the Soil Suitability Maps, Plan CRC133976A and Plan CRC133976B, which form part of this consent:
a. Any amendments to the Soil Suitability Maps (SSM) shall be reviewed by a suitably qualified person with at least five years experience in the relevant field. The revised SSM and the name of the person preparing or reviewing any part of the SSM and their qualifications shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within one month of the amendments being made.

4

This consent authorises the discharge of dairy wastewater treatment sludge on the properties listed in Appendix 1 of this consent and shown on the plans in Appendix 2.

5

Other properties for the discharge of dairy wastewater treatment sludge may be added to the list in Appendix 1, provided:

a. The adjoining neighbours have given written approval;

b. A plan of the property is added to Appendix 2 that notes:
   i. Any exclusion areas;
   ii. The site of the dairy wastewater treatment sludge application; and
   iii. Water races;

c. Prior approval of the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager has been obtained. If notification from the RMA Compliance and Enforcement Manager is not received within 20 working days and the requirements of condition (5)(a),(b) and (d) have been met, the property is to be considered approved;

d. The soils on the property are suitable for dairy wastewater treatment sludge disposal as covered in the Soil Suitability Maps in condition (2); and

e. The applicant has supplied the property with the concentration of nutrient inputs from the DAF sludge application.

6

The application of dairy wastewater treatment sludge is limited to a maximum of 20 cubic metres per hectare in any dairy processing season (1 August-31 July).

7

There shall be no dairy wastewater treatment sludge spread on land that has had other effluent applied in the preceding 12 months.

8

**Discharge**

Dairy wastewater treatment sludge shall be discharged into or onto land as follows:

a. Using a slot applicator with a depth of not less than 50 millimetres, except where it is to be applied directly to land to be cultivated. Where the dairy wastewater treatment sludge is applied directly to land it shall be ploughed within six hours of completing the application; and

b. The consent holder shall ensure that the discharge:
   i. Shall be applied over or into land in a uniform manner;
   ii. Does not cause any significant ponding on the ground surface; and
   iii. Does not discharge directly to surface water.

9

The consent holder shall inform the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, at least twelve hours prior to the contingency discharge of dairy wastewater treatment sludge.
The notification shall include:

a. Approximate start day and time;
b. Property location; and
c. Expected end date.

There shall be no discharge of dairy wastewater treatment sludge onto land, within:

a. 50 metres of any surface water;
b. 100 metres of any potable water abstraction point;
c. 20 metres of any property boundary, unless the adjoining neighbour’s approval has been obtained to do otherwise;
d. 100 metres of any school, marae or residential dwelling other than residential dwellings on the property, and any community drinking water supply protection zone; or
e. Over or onto impermeable surfaces, roads or property boundaries or in any other place or at such a rate that the discharge is likely to enter surface water or flow onto any neighbouring property.

The annual nitrogen loading rates of the dairy wastewater treatment sludge shall not exceed an average of 150 kilograms per hectare per year over the area actually irrigated (during the period 1 August to 31 July).

There shall not be any discharge of dairy wastewater treatment sludge onto land with an average slope of greater than 15 degrees.

Advice note:
The slope may be determined by the use of topographical maps or based on a survey completed by a registered surveyor.

There shall be no discharge of dairy wastewater treatment sludge (DAF sludge) onto land that has been significantly compacted prior to an application of DAF sludge, unless it is to be cultivated within six hours of completing the application:

a. Where there is evidence of significant compaction the consent holder shall:
   i. Complete and record a visual inspection of the proposed discharge site noting areas of compaction;
   ii. Record the method used to apply the DAF sludge; and
   iii. Record the time the DAF sludge application was completed;
b. The records collected in accordance with condition 13(a) shall be included in the records kept under condition (17) of this consent

Advice note
For the purposes of this consent significant compaction is indicated by the presence of pugging and/or treading and a poorly aerated band in the topsoil. Significant compaction may also be indicated by using soil indicators such as bulk density, penetration resistance, and marco-porosity.

There shall be no discharge of dairy wastewater treatment sludge on land that has
been recently aerated, sub-soiled or mole ploughed, unless at the time of application:
   a. Conditions are dry; and
   b. The area will be cultivated within six hours of completing the dairy wastewater treatment sludge application.

15 The discharge to air from the application of dairy wastewater treatment sludge shall not result in odour which is noxious, offensive or objectionable beyond the boundary of the property.

16 The consent holder shall use wind direction controls to determine application areas away from down-wind boundaries to minimise associated odour effects.

**Dairy wastewater treatment sludge monitoring**

For each application of dairy wastewater treatment sludge (DAF sludge), the consent holder shall record the following information:

   a. A detailed map showing the application area;
   b. The contractor who applied the DAF sludge;
   c. Identification of significant soil compaction where it has been identified in accordance with condition (13) and other matters identified in condition (13)(a);
   d. The method of application;
   e. The volume of dairy wastewater treatment sludge applied each day;
   f. The date of the application;
   g. The time of the application, which includes the time application of DAF sludge was completed.
   h. A weather description including:
      i. Estimated wind speed, and wind direction; and
      ii. Daily rainfall.
   i. The return period in accordance with conditions (6) and (7);
   j. Environmental complaints, such as odour, as described in condition (21);
   k. Uncontrolled spills and mitigation measures taken; and
   l. Whether the paddock was cultivated since the last sludge application.

The records collected in accordance with this condition shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, on request.

18 The consent holder shall, at monthly intervals, take a representative 24 hour sample of the dairy wastewater treatment sludge by composite sample. The sample shall be:

   a. Collected from the back of the DAF discharge hopper; and
   b. Be analysed for:
      i. pH
      ii. Sodium adsorption ratio (SAR)
      iii. Ammonia Cal –N
iv. Total Sulphur  
v. Calcium (Ca), Magnesium (Mg), Sodium (Na) and Potassium (K)  
vi. Total Kjeldahl nitrogen [milligrams per litre]  
vii. Nitrate-nitrogen [milligrams per litre]  
viii. Total phosphorus [milligrams per litre]  
ix. Total suspended solids [milligrams per litre]  
x. Oil and grease

The results of the analyses of the information and monitoring carried out in accordance with conditions (17) and (18) shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, annually or on request.

Soil sampling

To determine representative soil conditions, each year the consent holder shall analyse soil samples from the properties, up to a maximum of three properties, that have had dairy wastewater treatment sludge applied during that year. The sampling results shall be provided to the Canterbury Regional Council annually or on request.

1. The soil samples shall be taken by a qualified person.  
2. At each discharge site, soil sampling shall:  
   1. Occur in the same manufacturing season as the application of dairy wastewater treatment sludge  
   2. Consist of at least five replicate samples collected from both the discharge area and the buffer areas;  
   3. Be taken at a depth of 150 millimetres; and  
   4. Replicates may be pooled for analysis.

3. Soil samples from the discharge and buffer areas shall be analysed as soon as possible, to ensure the integrity of the sample, for the following determinands:  
   1. Soil pH  
   2. Electrical conductivity [micro Siemens per centimetre]  
   3. Organic carbon [milligrams per litre]  
   4. Olsen phosphorus (available phosphorus) [milligrams per litre]  
   5. Total nitrogen [milligrams per litre]  
   6. Anaerobically mineral sable nitrogen [milligrams per litre]  
   7. Cation exchangeable capacity [meq/100g]  
   8.  
   9. Exchangeable cations: calcium, magnesium, potassium and sodium  
   10. Base saturation  
   11. Sodium Adsorption Ratio (SAR)  

4. The results of the analyses shall be recorded and shall include but not be limited to the following information:  
   1. The date and time the samples were taken;  
   2. The location where the samples were taken;  
   3. The date the analyses were undertaken; and
4. An interpretation of the results obtained.

Records and reporting

The consent holder shall log any odour complaints received. The log will include the following:
   a. Date and time;
   b. Nature and location of the complaint;
   c. Complainant’s details;
   d. Weather information;
   e. Details of the key operating parameters at the time of the complaint; and
   f. Remedial action taken to prevent further incidents, if appropriate.

Complaints shall be reported to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within 24 hours and the log of complaints shall be made available to the Canterbury Regional Council on request.

By September 30 each year the consent holder shall prepare and submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, a report which includes the following, based on dairy wastewater treatment sludge disposal for the preceding season:

1. A summary of compliance with the conditions of this consent;
2. A copy of the application records relating to condition (17); and
3. A summary and analysis of the monitoring results collected in accordance with conditions (18) and (20) of this consent.

The Canterbury Regional Council may, once per year, on any of the last five working days of April or October, serve notice of its intention to review the conditions of the consent for the purposes of:
(a) Dealing with any adverse effect on the environment which may arise from the exercise of this consent and which is appropriate to deal with at a later stage; or
(b) Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment; or
(c) Requiring compliance with any relevant rule of an operative Regional Plan; or
(d) Reviewing the frequency of monitoring and the determinants monitored.

The lapsing date for the purposes of Section 125 of the Resource Management Act shall be 30 June 2018.
Attachments

Location Plan CRC133976A
Soil Suitability Plan - CRC133976B
Soil Suitability Plan - CRC133976C
Appendix 1 Properties Authorised for the discharge of dairy wastewater treatment sludge
Appendix 2 Plans of Property Authorised for the discharge of dairy wastewater treatment sludge

Issued at Christchurch on 5 April 2013

Canterbury Regional Council
## Appendix 1 Properties Authorised for the discharge of dairy wastewater treatment sludge

<table>
<thead>
<tr>
<th>Farm Owner</th>
<th>Title Reference</th>
<th>Description</th>
<th>Total area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA &amp; RM Baxter</td>
<td>10559 Lot 1 302757 BLK II Hawkins SD</td>
<td>20.8</td>
<td></td>
</tr>
<tr>
<td>S Baxter</td>
<td>10600 Lot 2 302757</td>
<td>119.8</td>
<td></td>
</tr>
<tr>
<td>R Bull</td>
<td>CB 27A/618 PT RS 2667770 39856 3864</td>
<td>103.2</td>
<td></td>
</tr>
<tr>
<td>R Bull</td>
<td>CB 23K/714 PT Rural Sec 3636 BLK II SD BLK XIV Oxford SD</td>
<td>41.3</td>
<td></td>
</tr>
<tr>
<td>Westwood</td>
<td>CB 77D/33 PT Lot 1 DP 1299 PT Rural Sec 21993 BLK XIV Oxford SD</td>
<td>213.7</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 2 Plans of Property Authorised for the discharge of dairy wastewater treatment sludge
**Category 1** Suitable for use in dry to wet conditions

**Category 1** Suitable for use in dry to wet conditions, low pressure tyres required in wet conditions

**Category 1 + Category 5** Suitable for use in dry to wet conditions, low pressure tyres required in wet conditions, unsuitable for use when the soil is dry and rain is likely during or soon after application

**Category 2** Suitable for use in dry to moist conditions

**Category 3** Suitable for use in dry conditions only

**Category 3 + Category 5** Suitable for use in dry conditions only, unsuitable for use when the soil is dry and rain is likely during or soon after application
Exercising of resource consent

It is important that you notify Environment Canterbury when you first start using your consent.

GRANTED TO: Fonterra Co-operative Group Limited (Darfield)
A DISCHARGE PERMIT: To discharge contaminants onto or into land and to air.
LOCATION: Darfield Area

Even if the consent is replacing a previous consent for the same activity, you need to complete and return this page.

Providing this information will:

- Validate your consent through to its expiry date
- Minimise compliance monitoring charges
- Help provide an accurate picture of the state of the environment.

If consent CRC133976 is not used before 30 Jun 2018 this consent will lapse and no longer be valid.

Declaration:
I have started using this resource consent.

Action taken: (e.g. pasture irrigated, discharge from septic tank/boiler/spray booth etc).

Approximate start date (Note: this may be different to the date the consent was granted): ________________

Signed: ____________________________ Date: ________________

Full name of person signing (please print): ____________________________

Please return to:
Environmental Protection - Administration
Environment Canterbury
PO Box 345
Christchurch 8140