

Before the Hearings Commissioners
at Christchurch

in the matter of: a submission on proposed Plan Change 3 to the Land &
Water Regional Plan – South Canterbury Coastal
Streams

to: **Canterbury Regional Council**

submitter **Hunter Downs Development Company Limited**

Statement of evidence of Brian Neil Ellwood

Dated: 25 September 2015

STATEMENT OF EVIDENCE OF BRIAN NEIL ELLWOOD

- 1 My full name is Brian Neil Ellwood.
- 2 I am a Project Manager for Hunter Downs Development Company Limited (*HDDCL*) and have held the role of Project Manager for Hunter Downs Irrigation Scheme (*HDI Scheme*) since 2006. I have worked in the area of irrigation and water infrastructure since 1998 in both consultancy and regional council roles. I have been employed by Meridian from 2003 to 2013 and now contract to HDDCL via Ellwood Consulting Limited.
- 3 I have the following qualifications: a MAppISC (Hons) (1997) in agricultural engineering and a BTech (Hons) (1996) in environmental engineering both from Massey University, and a post graduate certificate in Irrigation from Charles Sturt University of New South Wales (2007). I also hold an intermediate level certificate in Sustainable Nutrient management (the 'OVERSEER® qualification') from Massey University.
- 4 My wider roles and experience relating to irrigation include:
 - 4.1 the project management of all aspects of the *HDI Scheme* since 2006, which has included:
 - (a) an application for resource consent to take and use water for irrigation;
 - (b) overseeing engineering design – concept to feasibility;
 - (c) trial investigations (and concept designs) for the *HDI Scheme*;
 - (d) leading the commercial and funding agreements to date; and
 - (e) overseeing the prospectus development and issue.
 - 4.2 the development of the Project Aqua irrigation infrastructure mitigation plans and mitigation agreement negotiations with Lower Waitaki Irrigation companies;
 - 4.3 various matters concerning the North Otago Irrigation Company Limited (where I was involved through my then employee Meridian Energy Limited). This included:
 - (a) the technical studies;
 - (b) design build tender preparation;

- (c) interactive tendering;
 - (d) contractor selection; and
 - (e) Meridian's underwriting agreement negotiations,
- and
- 4.4 various other matters (especially while employed by Meridian Energy Limited) concerning the consideration of irrigation options across Canterbury.
- 5 I am authorised to give this evidence in relation to the HDI Scheme on behalf of HDDCL.
- 6 In preparing my evidence I have reviewed:
- 6.1 the HDDCL submission on the proposed plan change 3 (PC3) to the Land and Water Regional Plan (LWRP);
 - 6.2 the *South Canterbury Coastal Streams (SCCS) limit setting process Predicting consequences of future scenarios: Overview Report* (Norton & Robson, February 2015);
 - 6.3 the Officers' section 42 A Report;
 - 6.4 the submissions from the Department Of Conservation and Central South Island Fish & Game; and
 - 6.5 the evidence of **Ms Sarah Dawson, Dr Donna Sutherland, Mr Richard Timpany.**
- 7 In addition to the above, I am generally familiar with the Zone Committee Process and the Nitrogen Allocation Reference Group having attended many Zone Committee meetings since the Zone Committee was established. I have given presentations to the Zone Committee on the HDI Scheme and participated in the technical discussions of the Nutrient Allocation Reference Group helping agree the maximum caps for different soil types.

SCOPE OF EVIDENCE

- 8 In my evidence I provide an outline of the following:
- 8.1 the HDI scheme consents held;
 - 8.2 nutrient management as proposed under HDIS;
 - 8.3 the need for OVERSEER® nutrient budget updating;

- 8.4 an outline of Wainono Lagoon augmentation flow regime (noting that is discussed in much more detail by **Dr Sutherland**);
- 8.5 comment on HDDCL's concern with the prohibited activity status proposed in Rule 15.5.26;
- 8.6 comment on a common expiry consent duration and HDDCL's need for greater than 10 years for significant infrastructure related consents; and
- 8.7 comment on advisory note to Table 15(p)

GENERAL DESCRIPTION OF HUNTER DOWNS IRRIGATION SCHEME CONSENTS

- 9 The resources consenting for the development and operation of HDI Scheme has been staged with the water related consents progressed ahead of the construction related consents.
- 10 The 'water only' resource consents for HDI Scheme were lodged in October 2006. By 'water only' I mean the application for resource consent for the taking and use of water from the Waitaki River for irrigation. The other consents needed for the scheme construction and operation are being prepared but are still to be applied for.
- 11 The application to take and use water (what is now CRC142804) then advanced to hearing in October 2007. A decision on the HDI Scheme was provided on 27 April 2010 and following an appeal that was settled through discussions the Environment Court issued a consent order on 17 November 2011.
- 12 CRC142804 authorised the taking of up to 20.5 cumecs of water and an annual vole of 252 Mm³ of water for irrigation across the area from Waihao Downs to Otipua, just south of Timaru.
- 13 As set out in Figure 1 of **Mr Timpany's** evidence, the HDI Scheme has consent with the capacity to irrigate the equivalent of 40,000 hectares from within a total command area of 60,000 hectares. The command area includes land such as those parts of properties, roads, river bed land and steep land not suitable for irrigation – along with a limited amount of existing irrigation.

HDIS NUTRIENT RESOURCE CONSENT CONDITIONS

- 14 The HDI Scheme has applied for a consent to discharge to land relating to nutrient management. At the time of preparing this evidence that application was still being progressed.
- 15 It is however noted that there are existing conditions on the take and use consent (CRC142804) that relate to the management of both nitrogen and phosphorus. These conditions extend to the requirements for all properties receiving water to produce a nutrient budget. Phosphorus is managed with the use of physical measures to limit sediment transport, maintaining soil structure, avoiding pugging and overwater soils. Nitrogen and the leaching of nitrates is specifically managed by condition 20(f). This provides that for each property, for each 12 month period ending 30 June:
- (i) either, it is demonstrated, via the nutrient budget required in (c) above, that the average total nitrogen (fertiliser and effluent) application has been less than 200 kgN/ha/yr; or
 - (ii) approved methods are used to undertake calculations or measurements of the average annual concentration of nitrate nitrogen in the soil drainage below the plant root zone and the actions in (iii), (iv) or (v) below are implemented depending on the calculated or measured nitrate concentration. For the purposes of this rule, approved methods shall be:
 - Calculations using either the most recent version of the OVERSEER® model or the most recent version of the Soil Plant Atmosphere Model (SPASMO); or
 - Any other method of calculation or measurement approved by the Canterbury Regional Council.
 - (iii) where the average annual concentration of nitrate nitrogen in the soil drainage water below the plant root zone as calculated in accordance with clause (ii) or measured, for the property exceeds 8 grams per cubic metre, management practices are implemented to reduce the loss of nitrate nitrogen to soil drainage water. These may include but not be limited to:
 - Split applications of nitrogen fertiliser
 - Timing of nitrogen fertiliser application to plant growth
 - Avoiding application of nitrogen fertiliser to saturated soil
 - Avoiding applying nitrogen fertiliser when the soil temperature at 10 cm depth is less than 10°C

- (iv) where the average annual concentration of nitrate nitrogen in the soil drainage water below the plant root zone calculated in accordance with clause (ii), exceeds 12 grams per cubic metre of nitrate nitrogen:
 - Nitrification inhibitors, winter cover crops, or appropriate technology or management practice, implemented to reduce the loss of nitrate nitrogen to soil drainage water.
 - (v) where the average annual concentration of nitrate nitrogen in the soil drainage water below the plant root zone calculated in accordance with clause (ii) or measured, exceeds 16 grams per cubic metre of nitrate nitrogen:
 - The average total nitrogen (fertiliser and effluent) application to that property is limited to 200 kgN/ha/yr.
- 16 This condition implements progressive nutrient mitigation strategies as the nitrate concentration in the soil drainage increases. If soil nitrate drainage exceeds 16 g/m³ a nitrogen input cap is required to limit the nitrogen use and therefore leaching.
- 17 Evidence presented at the hearing showed that for all landuse types if nitrogen was limited to 200 kg/ha/yr then leaching would not exceed 16g/m³ which was the standard applied in the then Natural Resource Regional Plan under Rule WQL20.
- 18 The selection of nutrient strategies will vary over time and the adoption of the latest best practice is managed via the scheme and farm management plans. This ensures that as science develops there is a ready mechanism for this to be applied on farm.
- 19 The now operative LWRP and PC3 now require separate consent to be held for the discharge of nutrients from land due to the use of land for farming. As noted above, the HDI Scheme has applied under the LWRP for a discharge consent to authorise scheme members land use and nutrient discharge.
- 20 As a part of the application process a significant effort has been put into ensuring the conditions of consent are consistent with the notified version of PC3. This is discussed later in my evidence.

INVOLVEMENT WITH ZONE COMMITTEE

- 21 HDDCL has been involved at the community level with participation in the Zone Committee organised meeting to discuss:
- 21.1 future development scenario's;

21.2 nutrient allocation regimes; and

21.3 nutrient limits and maximum caps.

- 20 In this regard, HDDCL has provided considerable time and technical information to the Council to help inform the development of the ZIP addendum and the Nutrient Allocation Reference Group (NARG) agreement. The ZIP addendum outcomes and NARG agreement have been written on the basis of Scenario 2b, HDIS scheme being developed with the provision augmentation to Wainono lagoon and water quality in the receiving environment achieving water quality concentrations for nitrogen of 90% toxicity.
- 21 The community discussions in relation to future development scenarios included the HDI Scheme in Scenarios 2 (a and b) and 3 (a and b). Assessments were made of the benefits to the community from the development of the HDI Scheme balanced with the predicted change in environmental effects from further landuse intensification.
- 22 Scenario 2b gained wide support from the community as a package of outcomes which provided for the community's needs for growth (economic, social and cultural) and met desired environmental outcomes (Wainono TLI 6 and instream nitrogen toxicity of 90%). This support was on the basis of both the technical assessments of the effects and benefits and detailed community discussion of the outcomes that the community wanted to see from development.
- 23 Much of the information used in the assessment was derived from the tested evidence used in the HDI Scheme consent hearing along with earlier technical reports combined with updated research commissioned by the HDI Scheme and the Council especially in relation to the potential augmentation of Wainono Lagoon.

DISCHARGE CONSENT APPLICATION DETAILS

- 24 I have already discussed the discharge consent application earlier in my evidence.
- 25 In simple terms, the application is intended to provide the same amount of nitrogen loss allowance as was assessed in conjunction with the use component of CRC142804 in the original take and use of water application process.
- 26 The discharge application incorporates conditions relating to the scheme load authorised in each catchment, the maximum caps

relating to soil types, and the requirement to operate at GMP. The proposed conditions of consent are attached in **Appendix 1**.

- 27 The discharge consent includes a mechanism for updating OVERSEER® parameters relating to scheme load, and maximum caps based on reference farming systems. The same reference farming systems as reported in the S42A report's appendix 2 by Ned Norton have been used.

IRRIGATION SCHEME RULE 15.5.11

- 28 Rule 15.5.11 condition 2 requires an irrigation scheme to not apply for consent to discharge nutrients over any land which is part of a Nutrient User Group or Farming Enterprise. Failure to meet this condition is a prohibited activity. I consider this is overly restrictive and impractical for the HDI Scheme to manage –especially during the time before full uptake is achieved.
- 29 The HDI Scheme already needs a nutrient discharge consent for its users to intensify in place before scheme construction can commence. However, it is expected that it will take several years to reach full uptake as property's join the scheme. Prior to a property joining HDIS it may be practical – and sensible - for that property to be in a Nutrient User Group or Farming Enterprise.
- 30 Against that approach the proposed rules and conditions would require the HDI Scheme to not apply for any land within a Nutrient User Group or Farming Enterprise and then to vary the nutrient discharge consent whenever a property which was in Nutrient User Group or Farming Enterprise joined the scheme.
- 31 I do not agree with the S42A report that restricting nutrients being shared across two groups will effects the environmental outcomes anticipated by the plan because both require consent (rule 15.5.6 to 12) and to show that the catchment load limits in Table 15 (p) are not exceeded. The conditions of any consent would inevitably require that such an outcome was met and I consider such a requirement would be easy to implement.
- 32 In this regard, the proposed conditions of the HDI Scheme nutrient discharge consent includes a schedule of properties which have joined the scheme to provide the Council with information for monitoring and compliance.

OVERSEER® BUDGET UPDATING

- 33 HDDCL submitted that PC3 should not specify fixed maximum nitrogen loss loads at both the paddock and at the catchment level. To this extent, the loads in PC3 have been created using

OVERSEER® based on a range of assumptions around current and future landuse mix, soil types and rainfall/drainage - HDDCL supports the assumptions used to generate the nutrient loads but is concerned that version changes to the OVERSEER® models predicted nitrogen leaching rates may change the land user's ability to comply with a fixed nutrient loss rate, while the observed effects on the environment remain unchanged.

- 34 The Council is seeking to manage instream and groundwater quality by controlling nitrogen leaching via OVERSEER® predicted nitrogen leaching rates. This approach relies on predictions of losses of nitrogen at the root zone across the catchment being calibrated with current water quality measurement in both groundwater and surface water to establish the catchment factor. The catchment factor accounts for the loss of nitrogen between the root zone and that measured in the receiving environment due to biological and chemical processes using the nitrogen and transforming its form.
- 35 Changing the prediction of the loss of nitrogen at the root zone for the same assumed landuse does not change the water quality observed in the receiving environment. What has changed is our understanding of the catchment factor.
- 36 HDDCL is accordingly seeking that the plan include a mechanism which maintains a land user's ability to comply with the catchment load and max caps when there has been no change to the farming system but there has been a change in the way the farming system has been modelled.
- 37 HDDCL has suggested two mechanism for the plan to incorporate OVERSEER® version changes:
- a. a rule within PC3 that provides that:

[x] When considering compliance with any nitrogen loss limit included in rules 15.5.1 to 15.5.40 (along with supporting tables), version [X] of OVERSEER® shall be used. If OVERSEER® is updated:

(a) the most recent version of OVERSEER® shall be used to calculate an equivalent nitrogen loss limit (the Equivalent Limit) using the same input parameters as were used to calculate the nitrogen limit calculated using version [X] of OVERSEER®; and

(b) the Equivalent limit shall be used for the purposes of determining compliance.

or

- b. alternatively, each individual table (m, n and p) could include a footnote (which would form part of the table and therefore the relevant rule) to the effect that:

[x] If OVERSEER is updated, the most recent version shall be used to recalculate the nitrogen loss limit in [Table X] using the same input data (at which point the new loss limit will apply).

- 38 The S42A report at paragraph 10.151 to 10.155 discussion is made recommendation adoption the approach of a new policy and foot note to table 15 (p) but not Tables (m) or (n).
- 39 I believe that it is important that Table 15(n) in particular is also updateable as compliance with the maximum caps is a matter of discretion for rules 15.5.2, 15.5.3, 15.5.6, and not meeting the maximum caps level causes the activity status to be prohibited.
- 40 HDDCL supports the recommendations in appendix 2 of the section 42A report for the inclusion of a narrative for providing a reference farming system to update the maximum caps, catchment loads and flexibility caps. This will provide certainty for land users and a known way to update the OVERSEER® derived leaching rates.
- 41 HDDCL notes the section 42A report para 10.31 has recommended that the table 15 (m) and (n) be updated to use version 6.2 of OVERSEER® and in para 10.400 has adopted the updated maximum cap number for Table 15(n) and provided a reference to the use of version of OVERSEER® 6.2. While this is a step in the right direction, the updated numbers using OVERSEER® version 6.2 will only be relevant while version 6.2 is the current version. There will be future changes to OVERSEER® during the life of the plan and the inclusion of the narratives that reference the land use system being assessed is needed.

AUGMENTATION OF WAINONO LAGOON

- 42 The evidence of **Dr Sutherland** provides an outline of the predicted benefits of providing augmentation to Wainono Lagoon. Rules 15.5.24 and 15.5.25 provide for the development of a wetland and for the discharge of water for augmentation. To this extent, the technical work supporting the Zip Addendum and Plan change for augmentation development is based on a proposed flow regime of 4

cumecs flushing flows followed by a maintenance flow of up to 1 cumecs¹.

- 43 Condition 5 of Rule 15.5.24 limits the discharge of augmentation water to 1% of the 1 in 5yr annual flood. For the Hook River (one of the likely sites for the discharge of augmentation) the 1 in 5yr annual flood flow is 44 cumecs².
- 44 Condition 5 has the impact of restricting the maximum discharge of augmentation water to 440 L/s which is less than the proposed flow regime the effects assessment and benefits predicted from PC3 have been based on. The inclusion of condition 5 may affect the ability to gain consent for the augmentation in the form proposed especially the ability to provide flushing flows of up to 4 cumecs.
- 45 HDDCL submitted that condition 5 be deleted. An alternative to deleting the condition is to increase the percentage to 10% of the 1 in 5 yr annual flood.
- 46 I have not been able to find any analysis in the section 32 report or technical support information to support condition 5 of the rule. I believe that the effects which condition 5 relate to is included in matters of discretion. Making the proposed augmentation flow regime which the plan is based on, a full discretionary activity is considered unnecessarily restrictive.

TAKE AND USE OF WATER RULE 15.5.26

- 47 HDDCL submitted that the Rule 15.5.26 should be changed from prohibited to non-complying status. The basis for this requested amendment is the abstraction of groundwater or surface water in the tributaries near Wainono lagoon for environmental enhancement.
- 48 The prohibited nature of the rule would, for example, exclude the abstraction of water for nitrogen removal treatment and the return of that water to the lagoon. The NIWA technical report³ lists a range of advance nutrient management practices which could be

¹ Appendix 18 Overview Report - Sutherland, D., Norton, N. (2011) Assessment of augmentation of water flows in Wainono Lagoon. Prepared for Meridian Energy Limited May 2011. NIWA Client Report CHC2011-043

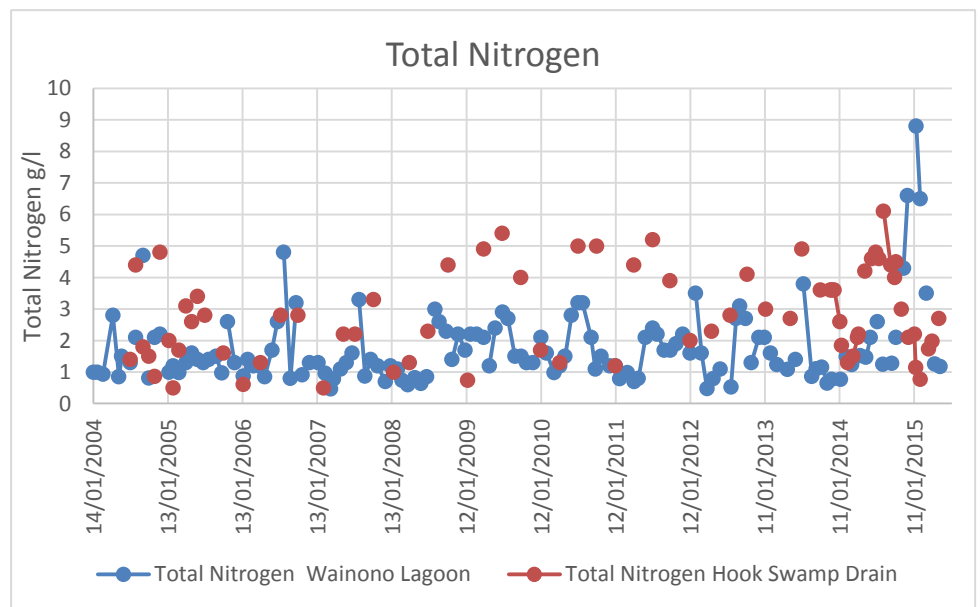
² The combined data from 2001 – 2006 and 2012 – 2014, the value for the 5 year flood has been estimated to be 44 m³/s. For the site at Hook Beach Road (site number 70703 at map reference J40:62944-13060).

³ Appendix 18 Overview Report - Sutherland, D., Norton, N. (2011) Assessment of augmentation of water flows in Wainono Lagoon. Prepared for Meridian Energy Limited May 2011. NIWA Client Report CHC2011-043

used to reduce the nitrogen load to the Lagoon. Other innovative practices would also be restricted.

- 49 Water quality in the Hook Swamp Drain is often poorer than that of Wainono lagoon with high concentrations of Nitrate nitrogen **Figure 1**. The Hook Swamp Drain is not included in the water bodies in table 15 (f) to 15(j) and any taking of water from this water body would be a prohibited activity.

Figure 1 Total Nitrogen concentration in Wainono lagoon and the Hook Swamp Drain.



- 50 A non-complying status is appropriate for abstraction activities which have environmental enhancement opportunities and show alignment with the objectives and policies of the plan. Consent application with a full assessment of effects would still be required.

CONSENT DURATION

- 51 Policy 15.4.35 (and associated rules) relate to the imposition of common catchment expiry dates on “any permit” within the Waihao-Wainono Area, the Northern Stream Area and the Morven-Sinclairs Area. The policy anticipates that consents will not be granted for any period longer than 10 years.
- 52 This is of particular concern to the HDI Scheme. The take and use consent CRC142804 was granted for a period 35 years and HDDCL

considers that is the minimum period that will be required to have sufficient certainty to finance and under take the development of the HDI Scheme.

- 53 I acknowledge that the Officers have recommended that Policy 15.4.35 be narrowed to just the take and use of water but I am not sure that assists the HDI Scheme (where its primary activity is the take and use of water). I do however note that its actual take (but not its use) technically falls under the Waitaki Catchment Water Allocation Regional Plan (which does not include an equivalent policy), but it is unclear as to whether the Council would still require a 10 year duration in relation to the 'use'.
- 54 Although as the Officer suggests it may be possible for the HDI Scheme to make an application seeking a longer consent duration without any supporting policy HDDCL is considers there is no certainty or clarity as to how such an application might be determined (especially in the face of a policy framework that expects something contrary).

TABLE 15(P) MANAGEMNT OF SCHEME ALLOCATED LOAD

- 55 The catchment loads in Table 15(p) have been developed on the basis of the HDI Scheme being development with leaching rates for a land use mix of 70% Dairy, 10% Dairy support, 10% Sheep and Beef and 10% Intensive Cropping.
- 56 Table 15 (p) footnote "*" provides advice relating to the top-up load that allows for irrigation schemes members to increase above the nitrogen baseline. The note specifies that the scheme load must be used before any increase up to the flexibility cap.
- 57 HDDCL has requested that the note be deleted as it is an unnecessary complication to the scheme's ability to manage members' load.
- 58 To me it is not clear what total flexibility load available is, as it is not specified in the table - even if the note does say it allows use of any flexibility load provided it is used after scheme load.
- 59 It also appears that a requirement for an irrigation scheme in policy 15.4.14 is to manage all property loads and not just the addition due to irrigation, to ensure that catchment limits can be managed. HDDCL is able to make this work by ensuring that scheme members have the necessary farm management plans, are operating at GMP for their farming system and are meeting the maximum caps in Table 15(n).

- 60 I believe what is important is that the irrigation scheme member nutrient load in conjunction with other nutrient load does not exceed the catchment limits. Requiring separation of a property's increase in load to either show that it is not using flexibility cap load or requiring the scheme to report what amount of flexibility cap load is being used in addition to scheme load is unnecessary extra complexity.
- 61 This restriction could also be a disadvantage to property's joining a irrigation scheme

SUMMARY

- 62 The HDIS Scheme is consented to take 20.5 m³/second which is sufficient to irrigate an area of 40,000 ha within a command area of 60,000ha.
- 63 The HDIS Scheme is a large scale irrigation scheme in the development phase. The scheme has detailed consent conditions and requirements on the future members which are designed to create a robust management of environmental effects arising from the use of water and change in land use to irrigated agriculture.
- 64 HDDCL supports nutrient management via a system which provides certainty:
- 21.4 to future members that they will be able to intensify land use; and
- 21.5 that changes in OVERSEER® predications of nutrient loss from their properties (brought about by a change in the version of OVERSEER®) will not change compliance with the nutrient load limits of PC3.
- 65 The use of farm system narratives to represent nutrient load maximum caps in PC3 is a sensible and workable solution to manage changes in the modelling of nutrient leaching over time.
- 66 Water quality standards of a TLI of 6 for Wainono Lagoon and 90% toxicity for nitrogen in receiving environments is important to enabling the package of outcomes anticipated by the plan.

Dated: 25 September 2015

Brian Ellwood

Appendix 1

Proposed Nutrient Discharge Consent Conditions

**DRAFT CONDITIONS
USE OF LAND AND THE DISCHARGE OF NUTRIENTS UNDER THE
HUNTER DOWNS IRRIGATION SCHEME
CRC156580**

It is proposed that a set of conditions apply to this consent as follows:

General

1. *This consent authorises:*
 - a) *the use of land for farming; and*
 - b) *the discharge of nutrients to water arising from the use of farming authorised in clause 1a).*
2. *The use of land and discharge of nutrient authorised by this consent is from land that is subject to a Nutrient Supply Agreement with the Hunter Downs Irrigation scheme and are within the Scheme Area generally identified in the attached plan entitled "Hunter Downs Irrigation – Scheme Area" [see **Appendix 4**], to a maximum of 43,400 hectares.*
3. *The use of land and the discharge of nutrients within the Waihao-Wainono Plains catchment permitted by this consent shall not be exercised until resource consents have been obtained and physical construction of facilities for the water quality improvement or augmentation of Wainono Lagoon are completed.*

Schedule of properties

4. *Upon the first exercise of this consent, the consent holder shall notify the Canterbury Regional Council, Attention: RMA Monitoring and Compliance Manager, and provide written confirmation of:*
 - a. *the properties that are subject to a Nutrient Supply Agreement as set out in Condition 2 of this consent; and*
 - b. *that at least part of each property is located within the Scheme Area as identified on "Hunter Downs Irrigation – Scheme Area" [see **Appendix 4**].*
5. *For any property that is partially included within the Scheme Area shown on Hunter Downs Irrigation – Scheme Area" [see **Appendix 4**], the entire property shall be included in CRC156580 Schedule One and accounted for under this consent.*

6. *Properties may be added to or removed from CRC156580 Schedule One provided that:*
- a. *Any part of the property is within the area shown on Hunter Downs Irrigation – Scheme Area” [see **Appendix 4**];*
 - b. *Prior to the addition or removal of a property from Schedule One, the consent holder shall provide an updated schedule including plans showing the area of each new property to be included or existing property being removed, to the Canterbury Regional Council, Attention: RMA Monitoring and Compliance Manager;*
 - d. *Any property added to Schedule One shall comply with the terms and conditions of the consent holder's Scheme Management Plan set out in Condition 7; and*
 - e. *The owner of any property added to Schedule One is subject to the conditions of this consent.*

Scheme Management Plan

7. *Prior to exercise of this consent, the consent holder shall prepare and submit to the Canterbury Regional Council a Scheme Management Plan.*
8. *. The Scheme Management Plan shall, as a minimum, include the following matters:*
- a. *A Template to be used as the basis for individual Farm Management Plans. The Farm Management Plan Template shall have the following objectives:*
 - i. *To achieve technically efficient use of water, minimising runoff and drainage;*
 - ii. *To minimise contamination of groundwater and surface water, particularly in terms of faecal contamination, Nitrogen and Phosphorus;*
 - iii. *To minimise nutrient losses to water while managing soil fertility to optimise pasture and crop productivity;*
 - iv. *To minimise adverse effects on groundwater and surface water levels;*
 - v. *To maintain soil in good physical condition;*
 - vi. *To minimise adverse effects on water bodies and riparian areas through healthy riparian margins;*
 - vii. *To safeguard significant indigenous biodiversity and ecosystem values within the Scheme area;*
 - viii. *To respect Ngai Tahu values in relation to freshwater;*

ix. To provide information to the consent holder including land use, area irrigated, stock numbers, and fertiliser use.

The Template shall also include the requirements specified in Condition 16

- b. *Procedures to prepare, regularly review and update the Farm Management Plan Template, including provision for associated consultation with the Community and Ngai Tahu Liaison Groups and water users, and opportunity to receive, and give due consideration to, feedback from the these groups prior to finalising the initial Template, each review of, and any amendments to, the Template.*
- c. *Procedures to ensure the preparation, implementation, regular review, updating and obtaining consent holder approval for individual Farm Management Plans for all properties receiving water from the HDI Scheme. Individual Farm Management Plans, at the time of consent holder approval, shall be based on the current version of that Farm Management Plan Template and include the requirements of the Farm Management Plan Template specified in Condition 8a.*
- d. *Provision for an annual internal audit of compliance with the provisions of the Farm Management Plans, including provision for consultation regarding the results of the audit with Community and Ngai Tahu Liaison Groups and water users. The annual audit is to be undertaken by a person who is independent of the consent holder. Such provision shall ensure that each individual Farm Management Plan is audited annually for each of the first 3 years following the initial delivery of water to that property or any increase in the quantity of water delivered to that property. After that time, every property which has received water for more than 3 years shall be audited at least once every 5 years, with at least 20% of Farm Management Plans being audited each year. The Scheme Management Plan shall ensure that a report of each audit is provided to the water users on each property audited and to the consent holder, and that an overall audit report is also prepared covering compliance generally on all properties audited.*
- e. *Compliance monitoring and enforcement procedures, including the circumstances under which the provision of nutrient allocation to a Property described in Schedule One is restricted or ceased, as a result of any individual non-compliance with the implementation requirements of the individual Farm Management Plan for that property. The enforcement procedures shall specify how the following:*
 - i. *That a property's inclusion in Schedule One only occur where a Farm Management Plan has been prepared, in accordance with the Farm Management Plan Template;*
 - ii. *That for minor non-compliance with no or minor short term actual adverse environmental effect, routine personal contact*

with the property owner or occupier (as might apply) with follow-up written notification from the consent holder requiring compliance with the relevant provisions of the Farm Management Plan;

iii. That for significant non-compliance, or repeated minor non-compliance, with moderate actual or potential adverse environmental effect, immediate action from the consent holder requiring immediate compliance by the property owner or occupier (as might apply) with relevant provisions of Farm Management Plan including notification of removal from Schedule One within 30 days if non-compliance is not remedied;

iv. That for major and/or persistent non-compliance with serious or persistent actual or potential adverse environmental effects, immediate action from the consent holder requiring immediate compliance by the property owner or occupier (as might apply) with relevant provisions of Farm Management Plan including notification of cancellation of any Nutrient Supply Agreement and removal from Schedule One within 10 days if non-compliance is not remedied.

f. Provision for ongoing education, training and information to assist property owners or occupiers (as might apply) in preparation and implementation of individual Farm Management Plans, including efficient use of nutrients, best practice farming and environmental management. Provision to extend this education, training and information to other properties within the overall Scheme Area that are not taking and using water under this consent, and make this available to properties within the Lower Waitaki River catchment downstream from the location of the water take for this consent;

g. Procedures to receive, record and respond to public complaints;

h. The consent holder shall at all times comply with and implement the current provisions of the Scheme Management Plan, except to the extent that the Scheme Management Plan or any of its provisions are inconsistent with the conditions of this consent.

9. Following the first exercise of this consent, the consent holder shall review the Scheme Management Plan annually by 31 July each year for the first five years, and then by 31 July every three years thereafter, in consultation with the Canterbury Regional Council. Each review will take into account the information gained from the monitoring required by the conditions of this consent. The review shall:

a. assess whether management practices are resulting in compliance with the conditions of this consent, and whether the requirements of the Scheme Management Plan in Condition 7

above are being met through the actions and methods undertaken to implement the Scheme Management Plan; and

- b. propose any amendments that the consent holder considers necessary to better achieve the requirements of the Scheme Management Plan in Condition 8 above.

Note: The Scheme Management Plan required under conditions 7 to 9 may be combined with any requirement for a Scheme Management Plan under any separate resource consent held by the consent holder.

Rate of Nutrient Discharge

10. The maximum rate at which nitrate nitrogen may be leached from a property with a Nutrient Supply Agreement shall comply with:

- i. a whole of scheme load of 1,120T/yr for the Scheme Area as identified on "Hunter Downs Irrigation – Scheme Area" [see **Appendix 4**], (using OVERSEER® version 6.0.3 and revisable for equivalents with future versions of OVERSEER ®)
- ii. the relevant individual catchment load for the catchments shown in Table 1; and
- iii. the relevant soil type leaching rate for the individual property type(s) shown in Table 2.

between 1st July and the following 30th June, as calculated from the individual Farm Environment Plans prepared in accordance with condition 7.

Table 1 Catchment irrigable hectares and total nutrient load (using OVERSEER® version 6.0.3 and revisable for equivalents with future versions of OVERSEER ®)

Catchment	Total Irrigation area Ha	Total load Nitrate Nitrogen (T/yr)
Otipua	8,300	220
Pareora	5,100	130
Otaio	5,200	130
Kohika	4,600	120
Horseshoe Bend	2,100	50

<i>Makikihi</i>	5,100	130
<i>Wainono</i>	13,000	340
<i>Total</i>	43,400	1,120

Table 2 Landuse mix for baseline nutrient load (using OVERSEER® version 6.0.3 and revisable for equivalents with future versions of OVERSEER ®)

<i>Landuse</i>	<i>Percentage of area</i>	<i>Soil Type Leaching rate Nitrate Nitrogen (kg/ha/yr)</i>		
		<i>VL</i>	<i>M</i>	<i>Pd*</i>
<i>Drainage mm/yr</i>		216	204	204
<i>Dairy 4 cows/ha wintered off</i>	70	50	30	17
<i>Arable mixed</i>	10	23	23	12
<i>Sheep, 20% Beef and Deer</i>	10	30	18	10
<i>Dairy support</i>	10	48	26	15

**The Pd soil leaching rates are after an allowance of 50% denitrification reduction. Direct Overseer predicted output is double.*

Note: The land use mix in Table 2 has been used to calculate the baseline nutrient load. At a property level, this land use mix will change but the maximum rate or Good Practice Management leaching rate for each specific property will always be met, as detailed in Condition 11 below.

11. *The maximum rate at which nitrate nitrogen maybe leached from a property with a Nutrient Supply Agreement shall comply with the maximum rates specified in Table 3 below for that property's soils or the Good Management Practice (GMP) leaching rate specific in the Property's Farm Management Plan whichever is the lessor..*

Table 3: Maximum cap on nutrient loss per farm (using OVERSEER® version 6.2)

Maximum Cap Nitrate Nitrogen leaching (kg/ha/yr)	Soil Type
33 ¹	XL, VL, L
23 ²	M, H, D
37 ³	Pd, Pdl

For determination of equivalent leaching rates to future Overseer versions the following specific farm systems apply

¹ L soil with a Dairy 4 cows/wintered off farm system

² H soil with a Dairy 4 cows/wintered on farm system

³ PDL soil with a Dairy 5 cows/wintered off farm system

12. For the purposes of determining compliance with Conditions 10 and 11 above:

- a. A combined rolling average of the current year and the preceding three years nitrate nitrogen leaching shall be used for assessing compliance.
- b. The farm management plan for the property where nutrient discharge is authorised by this permit shall specify the soil types and maximum average leaching rate for the property operating at Good Management Practice levels.
- c. That sufficient records are kept for each property to ensure that the nutrient budget, and the calculations using the OVERSEER® model, the Soil Plant Atmosphere Model (SPASMO) or any other method of calculation or measurement, are able to be independently audited. That these records are made available to the consent holder, in a form that is suitable to be made available to Canterbury Regional Council on request. That these records include:
 - i. Timing and rate of inorganic fertiliser applications;
 - ii. Timing and rate of effluent disposal;
 - iii. Stocking rates (number and type of animals) on an annual basis; and
 - iv. Land uses, including timing and type of cultivation activities.
 - v. Soil types which make up the farmed land of the property

13. Where the calculated average annual amount of nitrate nitrogen leached below the plant root zone, exceeds the relevant limit(s) specified in Conditions 10 and 11, then action shall be taken to ensure the average total nitrogen (fertiliser and effluent) application to that property is limited to 200 kgN/ha/yr, until such time as the property no longer exceeds the relevant limits(s).

Nutrient Supply Agreement between Consent Holder and Properties where authorisation to discharge Nitrate Nitrogen is to be Used

14. No authorisation to discharge nitrate nitrogen from the Hunter Downs Irrigation Scheme allocation shall be provided by the consent holder to any property unless, over that property, there is a written Nutrient Supply Agreement on standard terms between the consent holder and that property. This Nutrient Supply Agreement shall include:

- a. A requirement for each property to prepare and maintain a Farm Management Plan (FMP) prior to the delivery of nutrients to that property. The FMP shall be prepared in accordance with Schedule One, which forms part of this consent. The FMP shall be updated as necessary and on farm practice shall be in accordance with the FMP.
- b. A requirement for an audit of the implementation of the individual Farm Management Plan for that property in accordance with the requirements of the Scheme Management Plan set out in Condition 7 and provision for access on to the property by the Scheme Manager or their nominated representative, in order to undertake such an audit and/or to undertake spot checks of compliance with the implementation requirements of the Farm Management Plan and/or to undertake environmental monitoring in accordance with the requirements of the resource consent for the Hunter Downs Irrigation Scheme;
- c. Provision for access on to the property by the Scheme Manager or their nominated representative, in order to undertake environmental management projects along the margins of rivers, lakes and wetlands on or adjoining the property.

15. Note: Only one FMP is required per property holding a Nutrient Supply Agreement or Water Supply Agreement under consent CRC142804 (such that it may be notified to the Canterbury Regional Council).

Farm Management Plan

16. The Farm Management Plan Template included in the Scheme Management Plan combined and prepared, reviewed and updated in accordance with Conditions 8(d) and (e) above shall include the following requirements:

- a. That a nutrient budget is prepared and implemented for all properties recorded in Schedule One;
- b. That mechanisms are implemented to ensure that cattle, pigs, and deer are excluded from Rivers and Wetlands (as defined in the Resource Management Act 1991) adjoining land being irrigated;
- c. That any potential mudfish sites, from which cattle, pigs, and deer are not otherwise excluded in terms of (b) above, are surveyed by an appropriately qualified person and, if found to be actual mudfish habitat, then mechanisms are implemented to ensure that cattle, pigs, and deer are excluded from such sites in accordance with (d) above, or an equivalent habitat is provided and the mudfish relocated to the alternative habitat;
- d. That, for each property, for each 12 month period ending 30 June:
- i. approved methods are used to undertake calculations or measurements of the average annual concentration of nitrate nitrogen in the soil drainage below the plant root zone and the actions in (iii), (iv) or (v) below are implemented depending on the calculated or measured nitrate concentration. For the purposes of this rule, approved methods shall be:
- Calculations using either the most recent version of the OVERSEER® model or the most recent version of the Soil Plant Atmosphere Model (SPASMO); or
 - Any other method of calculation or measurement approved by the Canterbury Regional Council..
- e. That the following records are kept for each property and made available to the consent holder, in a form that is suitable to be made available to Canterbury Regional Council on request:
- i. Timing and rate of inorganic fertiliser applications
- ii. Timing and rate of nitrification inhibitor applications;
- iii. Stocking rates (number and type of animals) on an annual basis; and
- iv. Land uses, including timing and type of cultivation activities.

Note: The Farm Management Plan required under condition 14 (and referred to elsewhere in this resource consent) for each property may be combined with any requirement for a Farm Management Plan under any separate resource consent held by the consent holder or the property owner or occupier (as might apply)...

Record Keeping and Provision of Information to Canterbury Regional Council

17. The consent holder shall ensure that each property that is supplied by the Hunter Downs Irrigation Scheme shall maintain detailed

records for all data required to be recorded, measured and calculated in accordance with the conditions of this consent, and this data shall be provided to the Canterbury Regional Council on request.

18. The consent holder shall ensure CRC156580 Schedule One details each property whose Land Use and Discharge of Nutrients is authorised by this consent and shall make the Schedule One available to Canterbury Regional Council on request.

19. The consent holder shall prepare an annual report which describes the following matters:

- i. the number of properties and the total area of irrigated land and non-irrigated land of those properties (including the person(s) with who a Nutrient Supply Agreement has been entered) identified on CRC156580 Schedule One;*
- ii. The results of the FMP audits that have been conducted in accordance with condition (8) of this consent each year;*
- iii. A record of the estimated annual loss of nitrogen and phosphorus for the preceding 12-month period (being from the 1st of July until the following 30th of June) for all properties identified on CRC156580 Schedule One;*
- iv. Any incidence of significant non-compliance with the conditions of this resource consent, and/or with the requirements set out within the individual Farm Environment Plans;*
- vi. The actions taken by both the consent holder and (as necessary) the land owner(s) in the Schedule to remedy or mitigate a significant non-compliance that is identified in accordance with condition (8) of this consent, and*
- vii. The consent holder shall provide a copy of the annual report to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager by the 30th of September every year.*

Version of OVERSEER®

20. If OVERSEER® is updated, the most recent version shall be used to recalculate the nitrogen loss limit for the purposes of complying with the conditions of this consent (Scheme load, catchment loads, maximum cap rates and Individual property loads), using the same input data and land-use mix based on 43,400 hectares (at which point the revised nitrogen loss rates, maximum cap leaching rates, and catchment loads will apply).

Review of Conditions

21. Canterbury Regional Council may on the last working day of June each year, serve notice of its intention to review conditions of this consent for the purposes of dealing with any adverse effects on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage. However, this condition shall not be exercised for the first 3 years from the time at which this consent is first exercised, and shall not be exercised to review the same condition more than once in any 3 year period.