

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of applications for water permits to abstract water, and associated activities for 17 applicants in the Lower Waitaki

TO ENVIRONMENT CANTERBURY

BRIEF OF EVIDENCE OF KERI JOY JOHNSTON AND MELISSA KEIR ANTHONY

INTRODUCTION

1. This report is a joint report prepared by Keri Johnston of Irricon Resource Solutions and Melissa Anthony of GHD Limited for 17 applicants, with a total of 35 applications, downstream of Waitaki Dam.
2. Ms Johnston holds a Bachelor of Engineering (honours) in Natural Resources Engineering from the University of Canterbury. She is a Professional Member of the Institute of Professional Engineers New Zealand (MIPENZ) and a Chartered Professional Engineer (CPEng).
3. Upon completion of her degree, Ms. Johnston worked for Meridian Energy Limited as a graduate civil engineer, based in Manapouri and Twizel. After twelve months, she accepted a position with Environment Canterbury (ECan) as a Consents Investigating Officer before taking on the role of Environmental Management Systems Engineer with the River Engineering Section of ECan. During her three and a half years with ECan, she was the Consents Investigating Officer for the applications associated with the Canterbury Regional Landfill at Kate Valley, and developed environmental management systems in accordance with ISO 14001 for several units within ECan.
4. Ms. Johnston left ECan to join RJ Hall Civil and Environmental Consulting Limited (RJH) as an Environmental Engineering Consultant. She was employed in this position for the previous three and a half years. Work mainly involved the preparation of resource consent applications for all land and water activities, and engineering related works.
5. Ms. Johnston is currently a director of Irricon Resource Solutions, a resource management and environmental engineering consultancy. She is also currently the contract Consents Investigating Officer for applications associated with the Central Plains Water Trust and the Ashburton Community Water Trust.
6. Ms. Johnston is currently working as a sub-consultant for GHD Limited for the applications downstream of Waitaki Dam.
7. Ms Anthony holds a Master of Science (honours) in Zoology (Aquatic Ecology) and a Bachelor of Science (Zoology and Plant & Microbial Sciences) from the University of Canterbury and a Post Graduate Diploma in Resource Studies from Lincoln University.
8. Ms Anthony worked for ECan for seven years, two years as an Ecosystem Health Officer (Aquatic Ecology) before moving to the role of Consents Investigating Officer and then Senior Consent Investigating Officer for a further five years. Aside from management aspects of the role, work largely involved auditing and assessing the effects on the environment of applications to take and use water, discharge contaminants and carry out works related to such activities.
9. During the five years she spent a year on secondment back in the role of Ecosystem Health Officer (Aquatic Ecology) developing, implementing and reporting on aquatic ecosystem and habitat health investigations and monitoring programmes for South Island streams and rivers.
10. Upon leaving ECan, Ms Anthony spent a year working in the United Kingdom as an Environmental Planner before returning to NZ and accepting a position with RJ Hall Civil and Environmental Consulting Limited (RJH) as a Resource Management &

Environmental Consultant. Work mainly involved the preparation of resource consent applications for all land and water activities.

11. Ms Anthony is currently employed with GHD Limited as a Senior Environmental Scientist. This move being the result of a merger between RJH and GHD Limited.
12. We acknowledge that we have read the code of conduct for expert witnesses contained in the Environment Court's Practice Note dated 31 March 2005. We have complied with it when preparing the following evidence, and agree to comply with it when giving evidence before the hearing commissioners.
13. The applications this brief of evidence relates to are as follows:

ABOVE BLACKS POINT – AGRICULTURAL & HORTICULTURAL ACTIVITIES

Waitaki River Main stem

A. Clarkesfield Holdings (1996) Ltd:	CRC061919 CRC061931
B. Haka Valley Irrigation Limited :	CRC032177 CRC032178
C. Maerewhenua District Water Resources Company Ltd:	CRC041004
D. Waitaki Orchards:	CRC061399
E. ER Rutherford:	CRC063815
F. Torach Farm Limited:	CRC073237

Hakataramea River & tributaries

G. RG & ZL Pringle:	CRC050940 CRC050957 CRC050960
H. RPNZ Properties Ltd:	CRC051767 CRC051768 CRC051769
I. Hakataramea Station (1990) Ltd:	CRC040999 CRC95046.2 CRC981376 CRC042653 CRC981377
J. Star Holdings Ltd:	CRC021585 CRC072756 CRC021258 CRC084260 CRC951776.5

K. RW & ME Sutton:	CRC071114
L. NJ Small:	CRC040988 CRC040989 CRC051766 CRC071825

Maerewhenua River & tributaries

M. R Meikle:	CRC040446
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Kurow River

N. Westmere Estate Ltd	CRC012051
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Otekaieke River & tributaries

O. Sunny Downs Ltd:	CRC073249
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ABOVE BLACKS POINT – TOWN & COMMUNITY WATER SUPPLIES

Otekaieke River & tributaries

P. Warnbro Enterprises:	CRC062308
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BELOW BLACKS POINT – AGRICULTURAL & HORTICULTURAL ACTIVITIES

Waitaki River Main stem

Q. DD & VJ Chalmers:	CRC042124
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14. Evidence for each applicant is presented in the order shown above. The preceding letter before each applicant's name corresponds to the Appendix letter where supporting documentation for each applicant is contained, if required.

SCOPE OF EVIDENCE

15. Evidence is being presented on the following:
- Summary of submissions relating to the applications:
 - Individual Application details, including:
 - Description of the Environment
 - Resource consent being sought
 - Previous resource consents
 - Background Information
 - Application Timeline and Summary of Amendments Made to the Applications

- Comments on Submissions
- Assessments of Environmental Effects
- Master table of all applicant details
- Proposed Consent Conditions and Associated Plans

16. The following abbreviations have been used:

MEL = Meridian Energy Limited
 WAP = Waitaki Catchment Water Allocation Regional Plan
 Cumecs = flow rate expressed in cubic metres per second (m³/s)
 L/s = litres per second
 ha = hectare
 g/m³ = grams per cubic metre
 ECan = Environment Canterbury
 Fish and Game = Fish and Game New Zealand, Central South Island
 DoC = Department of Conservation
 ORC = Otago Regional Council
 AEE = Assessment of Environmental Effects
 MfE = Ministry for the Environment
 UWCIS = Upper Waitaki Company Irrigation Scheme
 ET = evapotranspiration
 NRRP = Proposed Natural Resources Regional Plan
 Forest and Bird = Royal Forest and Bird Protection Society of New Zealand Incorporated
 HDIS = Hunter Downs Irrigation Scheme
 IO = Investigating Officer
 NBTC = North Bank Tunnel Concept
 RMA = Resource Management Act (1991)
 MRNAG = Mid Rivers New Applicant's Group
 m³/year = cubic metres per year
 m³/day = cubic metres per day
 mm = millimetres

SUMMARY OF SUBMISSIONS

17. A total of 56 submissions (from 54 submitters) were received on some or all of the applications made. 25 were in support, 29 in opposition and 2 neither of which 30 want to be heard in relation to their submission.
18. Of these 56 submissions made, 17 are generic to all applicants in the Waitaki Dam to Blacks Point area and have been summarised below. The remaining submissions relating to individuals or several individuals have been dealt with specifically by the relevant applications.
19. It is noted that in December 2003, 13 of the applications at this hearing were notified by MfE after the ministerial call-in.
20. CRC have commented on the submissions received in Appendix 5 of Report 1 of the S42a Report.
21. CRC note that *“many of the issues raised in these general submissions (referring to those received in 2003) were addressed by the Waitaki Water Allocation Board during the drafting of the Waitaki Catchment Water Allocation Regional Plan...”*.

22. This section of the report addresses submissions received in 2007.

SUBMISSIONS IN SUPPORT

Meridian Energy Limited

23. Meridian Energy indicated “*conditional support*” for the applications. However, Meridian Energy wish to ensure the system and the conditions of any consent granted to address the following:
- Addressed land use intensification effects, including adopting land use best management practices to protect water quality in the Lower Waitaki River
 - Included the installation and maintenance of water metres and reporting/telemetry
 - Promoted sustainable management of natural and physical resources
 - With regard to storage dams in the Hakataramea Valley, provision of individual and cumulative effects of sediment transport in the lower Waitaki catchment
 - Accord with any future consented flow regime
24. Overall, Meridian sought if consents are granted, that they are only granted with appropriate conditions to address the matters raised in their submission and wish to be heard in support of their submission.

Waitaki Valley Irrigators

25. The Waitaki Valley Irrigators support the granting of all the consent applications (replacement and new) made on the Waitaki River between the Waitaki Dam and Blacks Point
26. The submission identifies that the current allocation (150million m³/year) is sufficient for the Waitaki River main stem. However, when tributaries are included in the allocation, the total allocation should increase to 250million m³/year.
27. They fully support applications in process in this reach since they are efficient water users. However, this support is conditional on annual volumes being applied to ensure there are no adverse environmental affects.

GF Keeling

28. GF Keeling has submitted on consent applications between the Waitaki Dam and Black Point.
29. This submission identifies that the total allocation is sufficient for the Waitaki River main stem in this reach but not when tributaries are included whereby the total allocation should have been 250million m³/year.
30. They fully support applications in process in this since they are efficient water users. However, this support is conditional on annual volumes being applied to ensure there are no adverse environmental affects.

SUBMISSIONS IN OPPOSITION

Department of Conservation

31. DoC opposed these applications in their entirety as currently presented.
32. Some of the main reasoning for opposing the applications is that the activities do not promote sustainable management of natural and physical resources and as such are contrary to Part II of the RMA. Furthermore, the assessments of effects are deficient for several reasons as they fail to address:
 - Water quantity and its various effects, including cumulative adverse effects;
 - Effect of water quality change, including cumulative and flow-on effects;
 - Fish passage, migration and survival from the effects of the development of the associated infrastructure (construction/maintenance, intake design, fish screens);
 - Impact of developments on natural characters of rivers, wetlands, lakes and margins, vegetation, habitats etc; and
 - Freshwater habitats.
33. DoC identified that there are uncertainties with the applications as to whether they propose to adopt the minimum flows as set out within the WAP. Further, no significant mitigation measures have been offered by the applicants even though that in DoCs opinion, these adverse effects associated with the applications are significant.
34. DoC is concerned with the proposed consent duration of 35 years. A term of 10-15 years is considered by DoC to be more appropriate.
35. Several planning documents such as the Freshwater Fisheries Regulations 1983, Regional Policy Statement, Transitional Regional Plan and WAP, are identified as being documents providing guidance for assessing the applications. Therefore, should be applications granted, they should be consistent these planning documents.
36. DoC in summary stated they wished these applications to be declined and they wish to be heard in support of their submission.

Fish and Game New Zealand, Central South Island

37. Fish and Game opposed the applications given their statutory role and functions under the Conservation Act (1987).
38. Fish and Game consider that WAP provides “certainty” for all users, with minimum flows and flow sharing regimes to sustain instream and fisheries values, provision for flow variability and natural character. Efficiency of use standards and annual volumetric limits for irrigators were also identified.
39. Priority and status of applications under the WAP was raised – Fish and Game want the applications to be clear how much water is available to be allocated and the priority in which applications should be determined. Fish and Game identified that there are many figures on this but they are reliant on that of the Sullivan Report, March 2007.
40. Fish and Game considered all applications to be non-complying as there is no way to ascertain otherwise. Fish and Game questioned whether this was the intention of the

WAP Board. The WAP Board identifies in their “Decisions and Principle Reasons” for adopting the Plan that the environmental level and flow regimes, and the allocation to activities, are two key components of the allocation framework.

41. Fish and Game submit that ECan ought to review existing consents to clearly establish whether any water is available for new applications. Once the amount of water available for allocation has been established, discussion over the allocation limits can then occur. MEL/HDIS applications are to be considered first.
42. Fish and Game identifies values in relation to the Lower Waitaki River (main stem) riverbed as a nationally outstanding game bird habitat and recreation area, in addition to numerous other values, in relation to fisheries.
43. The Hakataramea River values are discussed and Fish and Game are very concerned that it is a mere remnant of the important river it once was. Fish and Game consider the Hakataramea River environmental flow-sharing regime to be an improvement but it is not certain that this new regime will enable recovery of the river and given further demand.
44. The present applications are therefore opposed because they will cumulatively adversely affect the fisheries habitat, angling amenity, national character, amenity values, water quality and the instream values associated with the River.
45. Major dam structures in the Hakataramea Valley are also of a particular concern and are opposed due to inadequate AEE 's.
46. Fish and Game do not consider that tributary allocations should be considered under Table 3 xxii (all other streams).
47. Maerewhenua River values are identified, and granting of consents is opposed to the extent that they adversely affect the River and its tributaries and the values associated with these rivers.
48. The allocation limit within Table 3 of the WAP is already exceeded by existing consents. Therefore additional abstraction would need to be issued as B permits.
49. Fish and Game identify that Otekaieke River, Malcolm's and Kurow Creek fit within Table 3 Row xxii of the WAP.
50. Fish and Game then go onto discuss all other rivers and streams as defined in Table 3 of the WAP. They believe that this regime is to apply to the mean flow as measured at the downstream end of the catchment. Within the catchment, flows are identified as they have a number of impacts on fisheries. The severity of the impacts on fisheries is highly dependent on the extent and duration of the low flows. Fish and Game remain opposed to these applications until flow statistics are available for these waterways to ascertain whether it is appropriate to grant further consents and under what conditions.
51. Fish and Game identified several general issues and concerns that the applicants had not; addresses which are:
 - There has been a significant investment in developing the environmental flow regimes of the WAP. Therefore the objectives, principles and rules of the WAP need to be implemented;
 - Consideration of cumulative effects and impacts on the environment;
 - Technical and allocative efficiency must be considered in accordance with Policy 14-20 of the WAP;
 - To fully consider the effects of water allocation in the Waitaki catchment, existing water use, water quality and changing land use. Fish and Game encourage the implementation of Environmental Farm Plans;

- Metering of the rate of take, volume and periods of irrigation for each applicant;
- Fish screen provisions are necessary for surface water intakes. Any fish screens should be consistent with the new guidelines identified;
- The importance of an adequate AEE to enable potentially affected parties to determine what environmental impact will occur as a result of the activity;
- Fish and Game opposed terms of 35 years for consents as difficult to predict the impact of an activity over this duration and therefore 10-15 years is advocated;
- The review clauses should not be used as a back up to address effects that occur as a result of undertaking the activity;
- Timing of instream works is important to avoid spawning and this needs to be consistently provided for.

52. The relief sought is to decline all consents unless the concerns outlined in this submission can be adequately avoided, remedied or mitigated by way of conditions on consent; or consents can be issued on appropriate conditions a part of an appropriate flow sharing regime.

Te Runanga o Ngai Tahu

53. Te Runanga o Ngai Tahu (Ngai Tahu) oppose all application in their entirety
54. Ngai Tahu identifies the Waitaki River for its cultural importance and their responsibilities to manage the natural resource and maintain the mana of Aoraki and the waters of the catchment. Ngai Tahu must consider the effects that the applications will or may have on the entire catchment.
55. Because of the depth and strength of relationships between Ngai Tahu and the Waitaki catchment, it is imperative that numerous adverse effects identified are avoided not mitigated or remedied.
56. Serious concerns are identified about the impacts, both individually and collectively, of the applications on the cultural beliefs, values and practices of Ngai Tahu. Ngai Tahu considers that insufficient information has been provided by applicants on either actual or potential cultural impacts of the applications or the cumulative effects that may result from the proposed activities.
57. Ngai Tahu considers the applications to be at odds with the cultural objectives of the RMA. The applications are considered to be inconsistent with the objective and policies of the WAP.
58. Ngai Tahu believes the only way to avoid the actual and potential adverse effects are to decline the applications.

Waitaki First Incorporated

59. Waitaki First oppose applications to take and use water for stock water and/or irrigation purposes unless any consents granted meet provisions of the WAP and includes several conditions summarised below:
- Water is applied by spray or drippers;
 - Soil moisture levels are reported monthly to regional authority;
 - Aquaflex data logger system to record soil moisture levels in place; and

- Approved farm management plan or a range of soil moisture levels when irrigations will be applied and cease along with the use of nitrogen inhibitors.
60. The Provision within the WAP needs to be complied with by all applicants. Waitaki First supports environmentally sustainable irrigation, which is locally controlled and managed. Proactive steps need to be taken to decrease potential risk of irrigation on water quality and monitoring of cumulative effects of new irrigation on water quality particularly west of the Waitaki Dam.
61. Waitaki First opposes the applications unless these conditions list are attached to the consent.

Lower Waitaki River Management Society Inc (LWRMS)

62. The LWRMS oppose all applications. The reason being that notwithstanding previous correspondence dated 21st September 2007; concerns are raised that the applicants may impact on the sustainability of the Lower Waitaki River system.
63. LWRMS wish the applications be declined based on the information available at the time of the submission.

Ngai Tahu-Mamoe Fisher People Incorporated

64. Ngai Tahu-Mamoe Fisher opposes the applications in their entirety and has identified several reasons for this.
65. The Confederation (Ngai Tahu-Mamoe Fisher People name under its constitution) represents collective tangata whenua of Ngai Tahu-Mamoe descent that hold interest in fresh water and sea fisheries (customary or commercial) who seek to protect those interests.
66. The Confederation is challenging ECan as the Confederation do not believe that ECan have the right to issue a property, priority use or management right, via resource consent when rights have been ceded to the people our Maori Nation in the Treaty Contract 1840.
67. The Confederation wish applications to be refused to be issued while claims to water, river, streams etc as contained within the boundaries of the Canterbury Purchase Block 1848 and the jurisdiction of the Canterbury Regional Council are following due process.
68. The Confederation wish to be heard in support of their submissions.

S Mahon and A Erickson

69. This submission opposes applications that impinge on the natural beauty of the Mackenzie Basin and specifically the quality of river water and any migration above or alongside Lake Pukaki and Tekapo.
70. It opposes all consents which threaten to compromise that intent of Part II of the RMA

Stephen Carswell

71. Mr. Carswell opposes the applications, as he is concerned that the land use change will lead to degradation of water quality. He explains his connection with the area and rivers.

72. Mr. Carswell wishes these applications to be declined and these applications should only be considered after an in-depth district regional water plan.

L Shand

73. Ms. Shand opposes all applications, as they do not meet Part II of the RMA. These consents would have actual and potential adverse effects on the environment and do not meet the criteria of the RMA for sustainable management or matters of national importance.
74. Ms. Shand has identified concerns regarding adverse effects on:
- Preservation of natural character of wetlands, lakes, river and margins;
 - Takes and discharges into lakes and rivers;
 - Protection of outstanding natural features and iconic landscapes;
 - Protection of significant indigenous vegetation and habitats;
 - Inefficient use of natural and physical resources;
 - Amenity values, ecosystems and heritage values;
 - Finite characteristics of natural and physical resources; and
 - Maintenance and enhancement of the McKenzie country's landscape, natural character and indigenous biota
 - Water quality.
75. Applications for non-complying activities under the WAP must honor the decision to make the activities non-complying. Ms. Shand also objects to the length of consent periods proposed.
76. Ms. Shand's objection will be satisfied if only the consents granted have very minor effects on the environment and absolutely pure water from a consent is discharged

C Marshall

77. Mr. Marshall opposes the applications as water has been taken without any responsibility for the health of the catchment and without any cost to the user.
78. Mr. Marshall seeks that the following conditions are required to grant consents:
- Include levy to improve natural health of Waitaki catchment;
 - Protecting/fencing indigenous forest and vegetation areas;
 - Purchasing area to bring about catchment renewal;
 - Joint action by landowners e.g. fencing;
 - Scientific research for catchment with holistic approach;
 - Increase catchments natural water storage for dry periods;
 - Provision of advisory group to represent users;
 - Permit no activity that radically alters rivers flows or water quality;
 - Annual levy in excess of any existing council rate;
 - Existing water rights should contribute financially;

- Water rights/quotas attached to specific land areas that are not transferable/tradable; and
- Water rights for specific purposes need approval to change use.

A and G Braun-Elwert

79. A and G Braun-Elwert oppose the consent applications. They appreciate economic benefit that irrigation bring to the local area and have no objection to the principle of using water for agricultural purposes. They are concerned regarding the sheer volume of water rights applied for as it raises questions to ecological and economic sustainability.
80. The submission identifies several areas of concern as summarised below:
- Water abstracted in the upper catchment is not available for electricity generation through the Waitaki power system. ECan needs to weigh up public benefit of electricity generation versus private benefits of irrigation;
 - Consideration to the implications of climate warming and commitments under the Kyoto Protocol. Need to consider climate-warming effects on water flow;
 - Request abstractions cease when cease once Lake Tekapo water levels reach 704.1 metres, and requests a sound base line study be undertaken to ascertain water availability. This should be carried out prior to granting any of the applications, particularly groundwater availability.
 - On-going monitoring of effects on groundwater levels, water temperatures and water quality where water is discharged after flood irrigation. Further, all discharges should be filtered, and no discharge of glacial origin into fresh water or discharge of didymo infected water into didymo free water bodies should occur;
 - Request all irrigation water be piped;
 - Request all water takes be metered and independently verified;
 - Request all costs relating to research, monitoring and enforcement be borne by the consent holders. All water takes be charged on a per unit basis and trading water rights or water be illegal; and
 - Request all applications for 35 years be reduced to a maximum of 15 years and the Crown is under no obligation to honor water rights if parameters change.

R Blackmore

81. Mr. Blackmore opposes all consent applications, as he is concerned that if the applications are granted and individual small streams and aquifers could become over allocated within the Waitaki catchment.
82. Mr. Blackmore proposes that abstraction from any stream does not exceed 1/3 of the 5-year mean low flow and that the integrity of the RMA Amendment Act 2004 and WAP is upheld.
83. Previously in 2004 Mr. Blackmore submitted in addition to the above issues, that irrigation methods be specified to ensure maximum efficiency of use, off stream storage be compulsory and the Hakataramea salmon spawning be reinstated.

SUBMISSIONS NEITHER IN SUPPORT OR OPPOSITION

Royal Forest and Bird Protection Society of NZ Inc (Forrest and Bird)

84. Forrest and Bird outlined their interest in these matters and the constitutional purpose of Forrest and Bird. They identify support for public notification of these consents and constraints on the applications. Forrest and Bird identified concerns regarding non-complying activities with the WAP if minimum flows are not complied with. Forrest and Bird propose that the WAP must be honored and upheld. Forrest and Bird note that the Council is constrained if Meridian Energy does not give up the water as it is essentially allocated to them.
85. Minimum environmental flows and ecological values are identified. Forrest and Bird believe minimum flows lower than that provided by the WAP will result in changes to river systems flow regimes and levels that in turn will cause various adverse effects to the environment. The Wainono Lagoon is identified as particular significance. All the applications activities considered together are likely to have major effects as defined by the RMA.
86. The WAP in Forrest and Bird opinions have been devised after years of extensive public consultation and a High Court appeal. Fish and Game submit that allocations of water on a basis that is not provided for by the WAP would be directly inconsistent with the purposes and principles of the RMA.
87. In conclusion, Forrest and Bird propose that applications for non-complying activities under the WAP be viewed in light of preserving public trust in the integrity of the WAP. Recognition must be given to existing uncertainties regarding water allocation, changing weather patterns, impacts on indigenous wildlife and habitats due to reducing instream flows. A precautionary approach must be followed and support sustainable management as required by the RMA. Furthermore the integrity of the WAP is upheld.

Land Information NZ Ltd (LINZ)

88. LINZ submitted to ensure that landowner consent is obtained for all proposals, which affect land, administered by LINZ.

Comments on submissions

89. The submissions in opposition were of a general nature and were made on all applications in the Waitaki Catchment.
90. Issues identified included, but are not limited to:
 - Cumulative effects of abstraction;
 - Environmental flow and level regimes, and effects on instream values;
 - Water quality;
 - Efficient use of water; and
 - Duration.

91. The reduction in length of duration and adoption of adaptive management conditions provides mitigation for these general submissions.
92. These matters have been taken into consideration for each individual application, and where applicable, conditions proposed to address the issues.

COMMENT ON PROPOSED MITIGATION MEASURES

93. A master table of all applicants in this report has been prepared. The table identifies all applications, details of each including type of consent, location, rate of take, proposed land use, annual allocation, area to be irrigated, and duration sought.
94. The table also identifies the types of mitigation measures proposed for each application. A template of proposed wording for each mitigation measures has been developed.
95. The template has then been used to create a conditions document for each applicant.
96. The master table and the supporting mitigation documents for each applicant are in Appendix R to this report.
97. ECan has also prepared a report (Appendix 6 of the Introductory S42a report) of examples of the types of conditions that could be used.
98. On review of this report, most of the conditions proposed by the applicants are in line with those suggested in the ECan report.
99. Differences include, but are not limited to: measurement of standing water level in bores, installing a straight length of pipe for groundwater takes, and efficient use of water have been proposed by the applicant, using the wording for these conditions that resulted from the Rakaia Selwyn Groundwater Allocation Zone hearing.

OVERVIEW OF APPLICATIONS

ABOVE BLACKS POINT – AGRICULTURAL & HORTICULTURAL ACTIVITIES

WAITAKI RIVER MAIN STEM

Description of Environment

100. The Waitaki River has a mean flow of 350 cubic metres per second at ECarls water level recorder at Kurow, and a total catchment area of approximately 11,800km². Three large lakes in the headwaters dominate the catchment by evening out flow extremes and trapping sediment. Pukaki, Tekapo and Ohau, are natural glacial lakes that have been raised at various times since the 1950's to provide storage for power generation.
101. The Waitaki River can be considered as three separate regions – the hydroelectric dams, the upper Waitaki River (that which is located above Black Point) and the lower Waitaki River. The Lower Waitaki River extends downstream of the lake Waitaki Dam and includes the Hakataramea Valley as a tributary. The Waitaki River is a single channel from this dam until Kurow, where upon it becomes a braided river. Here the river bed is active and has an approximate width of one km. The lower plains around the river have had both drainage and irrigation, so that a network of drains is found.

102. Groundwater recharge to the Post-Glacial Gravels is dominated by seepage from the Waitaki River. Below Kurow a continuous interaction occurs between the river and the Post-Glacial gravels. As the gravels broaden or deepen, river water is lost into the gravel system. Where the gravels become narrower or thinner, water is returned to the river via springs. There are numerous springs near the banks of the lower Waitaki.
103. The original landscape was probably largely treeless with flax and matagouri. Now the landscape is heavily modified by farming practices and the hydroelectric system, which has changed natural flows, but provides a large percentage of New Zealand's electricity needs.
104. Over 58 species of wetland birds are found in the main Waitaki river valley, possibly including the highly endangered black stilt. Salmon, eels and lamprey have had a limited distribution in this catchment since the hydroelectric development.
105. Ngai Tahu is associated with this catchment and has an association with the valley as far back as the 10th century AD.

APPLICANT: CLARKESFIELD HOLDINGS (1996) LIMITED

Resource consents being sought:

Consent ID	Description	Table 3 Location
CRC061931	To take and use water from bore I40/0624, at a rate not exceeding 5.5 L/s for the irrigation of 11.8 ha of existing dairy farm.	All other streams– Penticoco Stream
CRC061919	To take and use water from bore I40/0625 at a rate not exceeding 39.5 L/s for the irrigation of 188.2 ha of existing dairy farm.	Waitaki River

Other resource consents:

Consent ID	Description	Explanation
WTK878031.2	To take and use water from a channel and bores I40/0624 and I40/0625 at a rate not exceeding 45 L/s and an annual volume not exceeding 700, 000 m ³ /year for the irrigation of 200 ha of existing dairy farm.	CRC061931 and CRC061919 are replacement applications for WTK878031.2, but with an increase in annual volume from 700, 000 m ³ /year to 1, 120, 000 m ³ /year (an additional 420, 000 cubic metres). WTK878031.2 expired on 30 June 2007.
CRC962259	To take and use water from bore I40/0013 at a rate of 130 L/s for the irrigation of 214 ha of dairy farm.	The consent is active and expires on 24 July 2031. This area is completely separate from the area irrigated under WTK878031.2

Background Information

106. Clarkesfield Holdings (1996) Limited (hereon in referred to as “the applicant”) applied for CRC061931 and CRC061919 on 2 December 2005, 6 months prior to the expiry of WTK878031.2.
107. The applicant operates a 539 ha dairy farm located on SH82 on the north bank of the Waitaki River.
108. This application is for the irrigation of the dairy farm using spray irrigation, predominantly a k-line system.
109. Bore I40/0624 is located approximately 50 metres from a springfed tributary of the Waitaki River, 80 metres from the Penticoco Stream and 280 metres from the Waitaki River.
110. Bore I40/0625 is at the base of the hill, approximately 500 metres downstream of Clarkesfield Road. The bore is approximately 700 metres from the Waitaki River. Please note that on ECan’s GIS system, there is a streamline approximately 180 metres east of the bore. This is not a permanently flowing stream and only flows after prolonged rain carrying run-off from the hillside.

Application Timeline and Summary of Amendments Made to the Applications

Timeline	CRC061931	CRC061919
Date of Lodging	2 Dec 2005	2 Dec 2005
First Notifiable Date	2 Dec 2005	8 Dec 2005
WAP Notifiable Date	18 Oct 2006	18 Oct 2006
Public Notification	4 Aug 2007	4 Aug 2007

111. The application for resource consent lodged in December 2005 states that the “the taking of water shall be subject to minimum flow provisions as set out in the Waitaki Allocation Plan.”
112. In a letter dated 27 March 2007 to ECan, the applicant advised “considerable pressure is being felt by this applicant over being ‘left out in the cold’ given agreement by all irrigation groups, as of this week, to support the application and technical information provided by Meridian Energy Ltd as part of the Hunter Downs Irrigation proposal to change the minimum flow to 100 m³/s. Clarkesfield Holdings (1996) Ltd wishes to state that they too, support the technical information provided by Meridian Energy Limited for a minimum flow of 100m³/s.”
113. CRC061919 was notified to include the taking of water from a channel as well as bore I40/0625. The taking of water from a channel is not being perused.
114. The annual volume proposed for CRC061919 was 1, 120, 000 m³/year. This is being amended to 562, 500 m³/year. At a rate of take of 39.5L/s, an annual allocation of 1, 120, 000m³/year equates to 309 days per year, and this is not considered to be reasonable use.
115. No other changes have been made to the applications.

Comments on Submissions

116. 26 submissions were received on each of these applications. Of these, 12 were in opposition, 12 were in support and 2 neither in support nor opposition.
117. Of the 26 submissions received, there are none that relate specifically to this application.

Assessment of Environmental Effects – to take and use water

Effects on other water users

Effects on other water users	Assessment criteria (based on)	Policy 14, 23 and 26 (WAP)
	Comments	<p>Bore I40/0624, has a maximum rate of abstraction of 5.5 L/s. The amount of water coming from the stream is less than 90% of the continuous steady state abstraction rate over 7 days and the amount of water coming from the stream is less than 5 L/s after pumping the average continuous rate for 150 days, and therefore is classified as “unconnected groundwater”.</p> <p>Bore I40/0625, has a maximum rate of abstraction of 39.5 L/s. The amount of water coming from the stream is approximately 30.2 L/s. This is greater than 5 L/s after pumping the average continuous rate for 150 days, and therefore is classified as “connected groundwater”.</p>

118. There are no other surface water abstractors in the direct vicinity of the applicants bores.
119. There are 58 other bores and galleries within a 2km radius of the bore I40/0624 and 43 other bores and galleries within a 2km radius of bore I40/0625.
120. Transmissivity is in the order of 10, 000 m²/day, based on the limited specific capacity information available within a 2km radius of the gallery, although this is reasonable for its proximity to the Waitaki River, and its associated river gravels.
121. The Theis Equation has been used to model the direct drawdown on neighbouring wells at the full rate of abstraction (as opposed to just the portion of the take that is considered to be directly from groundwater). At a distance of 2, 000 metres from the bores, the drawdown is approximately 0.006 metres for bore I40/0624 and 0.038 metres for bore I40/0625 after 150 days. Schedule WQN10 of the NRRP states that drawdown in a neighbouring bore, resulting from the subject abstraction of less than 0.1 metres, is considered to be de minimis.
122. There are also many small surface waterways that act as hydraulic barriers between these bores and surrounding bores and galleries, therefore, Theis is a conservative method of assessment as it assumes a perfect hydraulic connection between the subject bore and the neighboring bore. Given this, the estimation of effect is on neighboring bores and galleries, is likely to be much less.
123. MRNAG is proposing an alternative flow regime for the Waitaki River based on a minimum flow for the river of 100m³/s. Further evidence will be presented on this by Mr. Nick Ward of Pattle Delamore and Partners and Mr. David Stewart of Raineffects Limited.
124. This low regime is aimed to ensure that existing water users are protected. The applicant fully supports this flow regime.

125. Given the small reduction in water level of the Waitaki River and very small drawdown in neighbouring wells as a result of this take, and the proposed environmental flow regime, effects on other water users from taking water will be less than minor.

Cumulative effects

126. The Waitaki River has an allocation limit of 90m³/s under Table 3 of the WAP. If all resource consents are granted, including CRC063815, the total allocation for the river will be 77.6m³/s, which is less than the allocation limit.
127. The take also sits within the area defined as “Downstream of Waitaki Dam, but Upstream of Black Point” in Table 5 of the WAP.
128. ECan considers that the allocation limit of 150million m³/year for this area will be exceeded if all resource consents are granted.
129. A combined annual allocation of 633, 300m³/year is proposed for these applications.
130. Further evidence on the subject of annual allocation will be presented by Mr. Ian McIndoe of Aqualinc and Ms Keri Johnston of Irricon Resource Solutions.

Effects of inefficient water use

Reasonable and Efficient Use Seasonal Volumes and Land use	Assessment criteria (based on)	Policy 15-21 (WAP)
	Land use	Dairy Pasture
	Area to be irrigated (hectares)	200 (100ha at any given time)
	Method of application	Spray
	Efficiency of application	80%
	Daily application depth	1.81mm and 4.03mm
	Return period	10 days
	Return period application depth	18.1mm and 40.3mm
	Soil profile available water	82mm
	Mean annual rainfall	540mm
	Assessment criteria (based on)	Policy 10 – 14 (WAP)
	Seasonal volume required (m³/year)	628, 580 m ³ /year
	Volume to be included in Table 5 (WAP) allocation	628, 580 m ³ /year
Comments	The proposed annual volume has been determined using the methodology of Brown and McIndoe (2003) for CRC061919 and WQNv2 for CRC061931.	

131. The taking of water in excess of that required for the intended use may contribute to water levels being unnecessarily reduced. This lowering may have adverse effects on other groundwater users; particularly where water availability is an issue. In addition, it may result in elevated water levels down gradient of the area being irrigated, which may in turn cause a reduction in productivity and possibly surface flooding.

132. The applicant is proposing to spray irrigate 200 ha of dairy pasture in total with 100 ha at any one time, on a ten day rotation. The property is covered with medium soils with an average water holding capacity of 82mm taken from the NZ Fundamental_s soils layer (Landcare Research). On a ten-day return period, between 18.1mm and 40.3mm will be applied. This is less than 50% of the average water holding capacity of the soil and is considered to be an efficient use of water.
133. Evidence on the methodology's used to determine annual allocation is being presented by Mr. Ian McIndoe of Aqualinc.
134. The take will be metered as required by Policy 21 of the WAP.
135. Given this, effects of inefficient use of water will be less than minor.

Effects on in stream values

Minimum flow requirements	Assessment criteria (based on)	Policy 3-5, 23 and 26 (WAP)
	Proposed Environmental Flow Regime	CRC061919 - MRNAG alternative flow regime
	Comments	<p>Bore I40/0624, has a maximum rate of abstraction of 5.5 L/s. The amount of water coming from the stream is less than 90% of the continuous steady state abstraction rate over 7 days and the amount of water coming from the stream is less than 5 L/s after pumping the average continuous rate for 150 days, and therefore is classified as "unconnected groundwater".</p> <p>Bore I40/0625, has a maximum rate of abstraction of 39.5 L/s. The amount of water coming from the stream is approximately 30.2 L/s. This is greater than 5 L/s after pumping the average continuous rate for 150 days, and therefore is classified as "connected groundwater".</p>

136. The next nearest stream is the Waitaki River at 280 metres from the bore I40/0624. At this distance, the degree of hydraulic connection is less than 5 L/s, and therefore, the abstraction from this bore does not require a minimum flow.
137. Bore I40/0625 is classified as "connected groundwater" and therefore, will be subject to a minimum flow for the Waitaki River.
138. The MRNAG alternative flow regime is based upon a minimum flow of 100m³/s for the Waitaki River, from the Waitaki Dam to the sea. MEL, for the HDIS applications, produced and presented evidence on effects on instream values from an alternative flow regime based on such a minimum flow. The applicant supports this evidence, and further evidence on this is being presented by Mr. Nick Boyes of RMG.
139. As the take is from two bores, fish screens are not required.
140. Given this, effects on instream values will be less than minor.

Effects of the use of water on water quality

Water Quality	Assessment criteria (based on)	Policy 13 (WAP), Objective WQL2 (NRRP)
	Existing NO₃-N concentration (mg/L)	0.1
	Increase in NO₃-N (mg/L)	0

Comments	Total NO₃-N (mg/L)	0
	This is an existing activity, with a small decrease in annual volume from 700,000m ³ /year to 628,580m ³ /year.	

- 141. Cumulative effects on water quality are being addressed by Ms Lynn Torgeson of Pattle Delamore and Partners. Her evidence concludes that, if all applications are granted, water quality effects will remain minor.
- 142. This land is already irrigated under WTK838031.2. There is no increase in the land area being sought, and no change in land use.
- 143. There is an increase in annual volume being sought, however, the mass mixing model works on area irrigated and land use, as opposed to how much water is being applied. Given that area and land use are not changing, the model would not indicate any change in nitrate nitrogen concentrations as a result of these applications, and has not been carried out for these applications.
- 144. Nitrate management conditions have been proposed to ensure that the applicant manages nitrate nitrogen effects from their property.

Effects on other users from seawater intrusion

- 145. The proposed bores are approximately 40km from the coast, making saltwater intrusion unlikely.

Effect on aquifer stability

- 146. The bores are situated in gravels of the Waitaki River. As the strata from which water is to be abstracted is gravel based, aquifer subsidence is unlikely.

Effect from cross-connection on groundwater quality

- 147. The bores are both 10 metres in depth, and are therefore considered to be abstracting from an unconfined aquifer. This means that cross connection between aquifers is unlikely.

APPLICANT: HAKA VALLEY IRRIGATION LIMITED

Resource consents being sought:

Consent ID	Description	Table 3 Location
CRC032177.1	To take and use surface water at a maximum rate not exceeding 1,000 L/s, from the Waitaki River for spray irrigation of 1,875 ha of crops and pasture in the Hakataramea Valley	Waitaki River
CRC032178	To place a pump shed, suction line and fish screen on the north bank of the Waitaki River at or about map reference NZMS 260 I40: 0827-0865 near Normanvale Estates intake, Kurow	Not Applicable

Background Information

148. The Haka Valley Irrigation Limited (here in referred to as the “applicant”) applied for resource consents CRC032177.1 and CRC032178 on the 13 June 2003.
149. This original application sought water to take up to 4 cubic metres per second continuously from the Waitaki River for irrigation up to 6,000 ha on land in the Hakataramea Valley which has since been reduced significantly after notification to 1,000 L/s for the irrigation of 1,857 ha.
150. A land use consent is required for works proposed to construct a pump station, pump suction lines and fish screens on the true left bank of the Waitaki River, several kilometres upstream of the Hakataramea Bridge at map reference I40:2951-9192.
151. The pump station is situated on land owned by Eric and Sue Ross. The scheme has an Agreement to Easement with Mr. and Mrs. Ross. This is attached to this report in Appendix B.
152. The scheme intends to pump water from the Waitaki River over the hill from the Waitaki River into the Hakataramea Valley where a reliable supply of water is often a problem during summer periods. The scheme will supply 6 farmers. Of these properties, only that owned by RW & ME Sutton is proposing to convert to dairying.
153. The scheme will be pipe water. There will be no open water races at all.
154. The majority of the land proposed to be irrigated by the scheme is currently not irrigated. However, there is some overlap between land that will be irrigated from water supplied by the scheme and that irrigated by other sources (such as individual surface water takes). The reason for this is that water bodies in the Hakataramea Catchment are subject to long and frequent periods of restrictions, and the land irrigated by individual surface water takes could be irrigated with water from the scheme during these times.

155. There have been numerous changes made to the applications from when they were first lodged. The main changes have been to decrease the rate of take, the annual volume being sought, and the area to be irrigated.
156. The application makes reference to the need to discharge water from the pipeline during emergency situations or for operational purposes such as draining the pipeline for winter and maintenance, into streams within the Hakataramea Valley. The applicant does not propose to discharge water into any water body at all. This will be managed by utilizing the water through irrigation.

Application Timeline and Summary of Amendments Made to the Applications

Timeline	CRC032177*	CRC032178
Date of Lodging	13 June 2003	13 June 2003
First Notifiable Date	24 March 2005	24 March 2005
WAP Notifiable Date	15 December 2006	Not applicable
Public Notification	04 August 2007	04 August 2007

157. The original scheme resource consents were applied for on the 13 June 2003. The main points of this applications are summarised as:
- Total abstraction required 3-4 m³/s (varying rates mentioned)
 - Total area to be irrigated was up to 6, 000 ha
 - Two pump station locations (PS A and PS B)
 - Water to be transported by pipeline or race
 - Pipeline peak demand of 0.45l/s/ha or race at 0.53l/s/ha
 - Land use of sheep, deer, cattle and cropping
158. During October 2003 the Waitaki call-in occurred.
159. On the 27th November 2003 a more comprehensive AEE was provided to ECan. This AEE provided more specific details and assessments than contained in the original application. The following changes were made:
- Total abstraction required is 4 m³/s
 - Total area to be irrigated between 6,000 ha and 9,000 ha
 - A land use consent was lodged to enable the construction of the pump suction lines, fish screens and pump house that with disturb the beds and banks of the waterway and result in a structure within 8 metres of the Waitaki River.
160. ECan requested further information on the 17th February 2005 in relation to the intake structure design and a further assessment on effects of water use. This information which was provided on the 21st March 2005. The main points are outlined below:
- Confirmation of one pump station – PS A.
 - Confirmation of two types of pump station installation possible at the intake – centrifugal pump delivering into pipeline or two stage pumping system using submersible pump in the river, pumping to centrifugal pumps above river flood levels.

- The final pump station design will not be specifically known until the tendering phase of the project.
 - Details of further consultation with affected parties.
 - Details of further information on land use and irrigation obtained from a questionnaire sent to Hakataramea Valley landholders. This anticipated that the use of water could result in intensification of existing land use.
161. On the 12th October 2006, ECan again requested further information in respect of the now operable WAP.
162. In the first instance a letter was sent to ECan advising that the annual volume would be in accordance with the WAP, indicating 6,000 cubic metres per ha, or a total of 48 million m³/year for the irrigation of 8000 ha. Some water supply for stock water may also be required along with changes to land use.
163. On the 14th December 2006 a more detailed response to the further information request was provided by the applicant. This outlined the following:
- Total abstraction required now of 3 m³/s.
 - Total area to be irrigated of 6,000 ha.
 - Total volume of 36 million m³/year equating to 6,000 cubic metres per ha.
 - Agreement to comply with WAP minimum flow and level regimes. This was on the basis that *"it is understood that these flows and levels may be reviewed from time to time. The applicant advises that they may seek to have lower minimum flows established at some stage in the future"*.
 - Furthermore that *"As the Hakataramea Valley Irrigation Inc understand the environmental flow regime would limit their take from time to time, they have indicated that should an opportunity to review the Regional Plan arise, they may submit to reduce the minimum flow from the Waitaki Dam to closer to 100 m³/s."*
 - Efficiency of use identified an average watering efficiency of 80 %.
 - The use of water now also included viticulture and horticultural activities.
 - The distribution system was confirmed to be piped.
 - Confirmed electricity to run the pumps rather than the option of diesel or generators.
 - With regard to water quality, it was identified that the applicant was waiting for the results of the ECan study "Water Quality Impacts from Irrigation Development in the Hakataramea Valley". Further details were also provided with a Crop and Food Research report.
 - A map locating the area to be irrigated was supplied.
 - Deed of Title/Ownership provided as requested relating to land owners.
 - Affected parties were identified and consultation advised.

- A further AEE was provided to fully address the effects of the activity. Additional details were provided in relation to the: pump station and peak rate of take; area to be irrigated; consideration of alternatives; economics and general environmental effects, consultation; environment description; assessment of effect of take and use; proposed mitigation measures.

164. Both consents were publically notified on the 4th August 2007
165. Since the public notification a further and final amendment has been made to the application CRC032177 for the take and use of water. The amendment was a reduction in flow rate and volume and consequently ECan considered this to be within the scope of what had been notified and therefore re-notification was not required. The changes are as follows:
- Total abstraction reduced to 1,000L/s.
 - Total annual volume of 11,142,000m³/year.
 - The total area to be irrigated of 1,857 ha.
166. The applicant has always indicated that they would comply with the WAP minimum flow of 150m³/s for the Waitaki River, and that they “*may seek to have lower minimum flows established at some stage in the future.*”
167. The applicant has been involved in proposing the MRNAG alternative flow regime for the Waitaki River, and is seeking this for themselves.

Comments on Submissions

168. With relation to CRC032177 19 submissions were received in total. Of these, 11 were in opposition, 6 in support and 2 neither support nor oppose.
169. With relation to CRC032178, 18 submissions were received in total relating. Of these, 12 were in opposition, 4 in support and 2 neither support nor oppose.
170. Three of the submissions received in support are relating directly to CRC032177.
171. Mayor J Coles submitted supporting the application mainly due to the economic benefits.
172. Mr. SW Taylor supports bringing more water into the Valley from the Waitaki River since no more water is available in the Hakataramea.
173. N, A & H Hayes (Normanvale Estate) believes that erosion from wind blow on un-irrigated land creates more issues than run-off from 2, 000 ha of irrigation.

Assessment of Environmental Effects – to divert, take and use water (CRC032177*)

Effects on other water users

Effects on other water users	Assessment criteria (based on)	Policy 14, 23 and 26 (WAP)
	Comments	The take is from the Waitaki River, between the Waitaki Dam and Kurow.

- 174. In the vicinity of the proposed pump station (PS A) Normanvale Estate currently have a pump station to take and use water from the Waitaki River (Normanvale Limited – CRC021158). This consent is to take and use 50 L/s for irrigation purposes.
- 175. Normanvale Estate is a shareholder of this scheme, for an additional area of land to be irrigated. CRC021158 will remain in place.
- 176. It is also noted that Normanvale Estate has advised in writing that they have no concern with the proximity of the scheme pump station to their own, and fully support the application by the scheme to take and use water. This letter is attached in Appendix B.
- 177. MRNAG is proposing an alternative flow regime for the Waitaki River based on a minimum flow for the river of 100m³/s. Further evidence will be presented on this by Mr. Nick Ward of Pattle Delamore and Partners and Mr. David Stewart of Raineffects Limited.
- 178. This low regime is aimed to ensure that existing water users are protected. The applicant fully supports this flow regime.
- 179. Given that the support of Normanvale Estates has been given to these applications, and the proposed environmental flow regime, effects on other water users from taking water will be less than minor.
- 180. Given this, effects on other water users are considered to be less than minor.

Cumulative effects

- 181. The Waitaki River has an allocation limit of 90m³/s. If all resource consents are granted, including CRC032177, the total allocation for the river will be 77.6m³/s, which is less than the allocation limit.
- 182. The take also sits within the area defined as “Downstream of Waitaki Dam, but Upstream of Black Point” in Table 5 of the WAP.
- 183. ECan considers that the allocation limit of 150million m³/year for this area will be exceeded if all resource consents are granted.
- 184. Further evidence on the subject of annual allocation will be presented by Mr. Ian McIndoe of Aqualinc and Ms Keri Johnston of Irricon Resource Solutions.

Effects of inefficient water use

Reasonable and Efficient Use Seasonal Volumes and Land use	Assessment criteria (based on)		Policy 15-21 (WAP)
	Land use		Crops, pasture and small areas of viticulture and horticultural activities and intensive pasture.
	Area to be irrigated (hectares)		1857
	Method of application		Spray
	Efficiency of application		80%
	Target application depth¹		4.7mm
	Return period		3-7 days on lighter soils Up to 15 days on the heavier soils
	Return period application depth		14.1mm – 70.5 mm
	Soil profile available water		50mm to 150mm (average 107mm)
	Mean Annual Rainfall		578mm
	Assessment criteria (based on)		Policy 10 – 14 (WAP)
	Seasonal volume required (m³/year)		11, 142, 000m ³ /year
	Volume to be included in Table 5 (WAP) allocation		11, 142, 000m ³ /year
	Comments	The proposed annual volume has been determined using schedule WQN9v2.	

185. The applicant is proposing a completely piped system to convey water to all shareholders, which is highly efficient. Originally some of the system had been proposed to convey water via races, but this is no longer proposed.
186. The applicant is proposing to spray irrigate 1, 857 ha of crops and pasture. The return period will vary amongst the individuals on the scheme so will be anywhere from three to seven day rotation on most farms with spray irrigation. The irrigation area is covered with a variety of soils ranging from light soils to good, heavy soils. Therefore, the return period for each individual property will vary, and could be up to 15 days on the heavier soils.
187. Evidence on the methodology's used to determine annual allocation is being presented by Mr. Ian McIndoe of Aqualinc.
188. The diversion and the take will be metered as required by Policy 21 of the WAP.
189. It is also noted that there is overlap between the area to be irrigated by the scheme and consents held by individuals.

190. Water from the scheme will (hopefully) be more reliable than consents held by individuals. The Hakataramea River and its tributaries experience long and frequent periods of restrictions, and water from the scheme will be able to be used instead during these times.
191. There are also instances where the system capacity (L/s/ha) for individuals is low. Water from the scheme could also be used to “top up” to a reasonable system capacity.
192. Therefore, mitigation needs to be proposed to ensure that water is used efficiently. In this instance, it is proposed to limit the specific capacity per property to 0.65 L/s/ha in combination with any other water source.
193. Given this, effects of inefficient water use will be less than minor.

Effects on in stream values

Minimum flow requirements	Assessment criteria (based on)	Policy 3-5, 23 and 26 (WAP)
	Proposed Environmental Flow Regime	Waitaki River - MRNAG Alternative Flow Regime
	Comments	

194. The MRNAG alternative flow regime is based upon a minimum flow of 100m³/s for the Waitaki River, from the Waitaki Dam to the sea. MEL, for the HDIS applications, produced and presented evidence on effects on instream values from an alternative flow regime based on such a minimum flow. The applicant supports this evidence, and further evidence on this is being presented by Mr. Nick Boyes of RMG.
195. The applicant is proposing to install a fish screen designed in accordance with the report *“Fish Screening: good practice guidelines for Canterbury, NIWA Client Report: CHC2007.092, October 2007”*.
196. Given this, effects on instream values will be less than minor.

Effects of the use of water on water quality

Water Quality	Assessment criteria (based on)	Policy 13 (WAP), Objective WQL2 (NRRP)
	Existing NO₃-N concentration (mg/L)	
	Increase in NO₃-N (mg/L)	
	Total NO₃-N (mg/L)	
Comments	Water quality effects resulting from the use of water for this applicant have been addressed separately.	

197. As the use of water from these applications occurs in the Hakataramea Valley, evidence prepared and presented by Ms Lynn Torgeson of Pattle Delamore and Partners is relevant to this application, and addresses this effect.

Assessment of Environmental Effects – to construct a pump shed, suction line and fish screen on the north bank of the Waitaki River (CRC032178)

Effects of the works on flood-carrying capacity and flooding patterns of the river

198. The pump station building will include all control panels and will be set above the maximum flood level between the river and the track.
199. Information from NIWA/Meridian Energy water level recorder site just upstream on the opposite side of the river will be used to ensure the pumping station can either be above or accommodate design flood levels for at least 1:100 annual exceedance probability flood event.
200. The preliminary pump station design is based on submersible pump/s mounted within 1.2 metres diameter protective pipe with the fish screening on the pipe. This is the only part of the structure that will be submerged in the river. The protective pipe structures will be mounted on a gantry fixed to the rock.
201. There are not expected to be any effects on flood patterns and only the applicant would be affected if flood events damaged the structure.

Effects of the works on other man-made structures

202. There are no other man-made structures in the vicinity except for the pump station of Normanvale Estate, who has provided written support for the application.

Effects of the works on water quality

203. There are no in stream works at all. Work is entirely on the bank of the Waitaki River.
204. Mitigation is proposed to ensure that fuel and other contaminants are not stored on the banks of the river and that no refueling of vehicles and machinery takes place within 20 metres of the edge of the river.

Effects of the works on bank erosion and bank stability

205. The AEE on the 14 December 2006 identified that *“the proposed site is on rock adjacent to deep water. That the rock is competent rock being schistose to non-schistose quartzfeldpathic sandstone (greywacke) and mudstone (argillite). The site is stable with no bank erosion observed at the specific site”*.
206. Mitigation is proposed ensuring that the effects of the works on bank erosion and stability are minor, which states that works shall not cause the erosion of the banks or the bed of the water body in which works are occurring.

Effects on in stream values

207. The fish screen and pipes are the only part proposed to be located in the water, which will be attached to the rock face. Therefore, there is no disturbance to the bed of the river at all.
208. Given this, effects on in stream values are minor.

APPLICANT: MAEREWHENUA DISTRICT WATER RESOURCES COMPANY LIMITED

Resource consents being sought:

Consent ID	Description	Table 3 Location
CRC041004	To take and use water at a rate not exceeding 468 L/s, from a proposed gallery I40/0536, for the irrigation of 936 ha of crops and pasture.	Waitaki River

Other resource consents:

Consent ID	Description	Explanation
CRC952210	To divert 1, 500 L/s from the Waitaki River into a diversion channel.	This consent is active and expires on 2 March 2030.
CRC952215	To take and use water from a diversion channel at a rate not exceeding 900 L/s for the border dyke irrigation of 650 ha.	This consent is active and expires on 2 March 2030.
CRC952216 - CRC952220	To discharge surplus water from the scheme into the Waitaki River.	This consent is active and expires on 2 March 2030.
CRC001203	To take and use up to 250 L/s from Duntroon Springs.	This consent is active and expires on 2 March 2030.
CRC062369	To install gallery I40/0536.	This consent is yet to be exercised and expires on 3 May 2012.

Background Information

209. Maerewhenua District Water Resources Company Limited (hereon in referred to as "the applicant") applied for CRC041004 on 13 November 2003. As it was lodged immediately post the ministerial call-in, MfE publically notified the application on 6 December 2003.
210. The applicant currently has resource consents for, and operates a border dyke irrigation scheme, which services an area of 650 ha. It was designed and built by the former Ministry of Works.
211. Its design only allowed for sufficient water to service gravity flow requirements of land within its gazetted boundaries. Development of irrigation schemes since the building of the border dyke scheme now means that land above the gravity flow areas can be economically irrigated.
212. Given this, the shareholders of the scheme voted to extend the irrigation area to include these areas. This application is for that additional area and will be operated as a spray irrigation scheme fed from a gallery.

213. The applicant has designated an area for its spray scheme of 5, 900 ha, within which 936 ha will be serviced at any one time.
214. The gallery is located right on the edge of the Waitaki River within metres of a side channel.
215. Water will be distributed using an open race network and a series of pump stations.

Application Timeline and Summary of Amendments Made to the Applications

Timeline	CRC041004
Date of Lodging	13 Nov 2003
First Notifiable Date	29 Nov 2005
WAP Notifiable Date	6 Mar 2007
Public Notification	4 Aug 2007

216. In a letter to ECan dated 7 March 2007, it was proposed to make a number of amendments. These are outlined in the following paragraphs.
217. The first was to allow dairying as a land use as since the applications being lodged, at least four of the properties had converted.
218. The second was to include a second point of take at the Duntroon Springs. This was subsequently removed from the application on 16 April 2008.
219. In this letter, reference was made to the minimum flow being sought. It was advised that:
- “The applicant wishes to seek a minimum flow of 100 m³/s as per the Hunter Downs Irrigation Scheme as this gives a better reliability of supply.*
- However, abstractors between the Waitaki Dam and Black Point have concerns about the proposed tunnel scheme and its effect on the ability of water to be abstracted in this reach, regardless of the minimum flow. Given this, the scheme supports the minimum flow change, but reserves its rights to change its status on this in light of further information coming to hand.”*
220. No other changes have been made to this application.

Comments on Submissions

221. 21 submissions were received in total relating to this application. Of these, 11 were in opposition, 8 in support and 2 neither support nor oppose.
222. Three of the submissions received are relating directly to this application. These were from JG Mackenzie, EJ Wills and Downland Farms Limited, as shareholders of the scheme, are all in support.

Assessment of Environmental Effects – to take and use water

Effects on other water users

Effects on other water users	Assessment criteria (based on)	Policy 14, 23 and 26 (WAP)
	Comments	Gallery I40/0536 has a maximum rate of abstraction of 468 L/s. The amount of water coming from the stream is approximately 450.9 L/s (of an average take over 150 days of 453 L/s). This is greater than 5 L/s after pumping the average continuous rate for 150 days, and therefore is classified as “connected groundwater”.

223. There are no other surface water abstractors in the direct vicinity of the applicants take.
224. There are 37 other bores and galleries within a 2km radius of the applicant’s gallery. Given the size of the take (468L/s), in spite of high degree of hydraulic connection, there is concern that neighbouring wells could still be adversely affected.
225. The bores within a 2km radius of the applicant’s gallery are listed in the following table. This is included because of a comment made in paragraph 47 of the ECan Section 42A Officers hearing report and the size of the take and the potential effects on surrounding groundwater users.

WELL #	STATUS	DEPTH	DISTANCE (m) FROM I40/0536	USE 1	USE 2	USE 3	OWNER	COMMENT
I40/0536	PW	10	0	IR			Gordon Bowie Scott and Nanne Otto Dogterom	Subject bore
I40/0494	AE	5	37	OB			Sutherland, I S	Observation bore
I40/0265	AE	15.45	531	CO	GE		AQUA - N O DOGTEROM	commercial/geology well
I40/0053	NO	33.4	820				WILLS, R S	Not used
I40/0054	NO	2.43	825				SUTHERLAND, J S	Not used
I40/0099	AE	20.5	827	ST			Wills, E J	MDWRC Scheme Shareholder
I40/0086	AE	5.76	832	DO	DA		Otto Dogterom	MDWRC Scheme Shareholder
I40/0656	AE		973	IR			Errol and Ngaire Wills	MDWRC Scheme Shareholder
I40/0692	AE	2.77	1080	OB			MERIDIAN ENERGY LIMITED	Observation bore
I40/0355	AE	1.87	1134	GE	OB	CO	Meridian Energy Limited	Observation bore; commercial/geology well
J40/0860	AE	40.64	1164	CO	GE		AQUA - N O DOGTEROM	commercial/geology well
I40/0356	AE	1.4	1253	GE	OB	CO	Meridian Energy Limited	commercial/geology well
J40/0863	AE	59.43	1288	CO	GE		AQUA - N O DOGTEROM	commercial/geology well
J40/0864	AE	10.5	1315	CO	GE		AQUA - N O DOGTEROM	commercial/geology well
J40/0861	AE	39.9	1323	CO	GE		AQUA - N O DOGTEROM	commercial/geology well
J40/0868	PR	5	1365	GE	OB	CO	Meridian Energy Limited	commercial/geology well
I40/0539	NO		1369					Not used
J40/0862	AE	40.04	1388	CO	GE		AQUA - N O DOGTEROM	commercial/geology well
I40/0253	AE	19.6	1440	CO	GE		AQUA - DOC/LINZ	commercial/geology well
J40/0884	AE		1450	OB			Blair, S	Observation bore
I40/0585	AE	12	1491	AT	IR		MR DOGTEROM	MDWRC Scheme Shareholder
J40/0865	AE	39.95	1548	CO	GE		AQUA - N O DOGTEROM	commercial/geology well

J40/0977	AE	4.1	1573	DO			Otto Dogterom	MDWRC Scheme Shareholder
I40/0252	AE	19.8	1594	CO	GE		AQUA - DOC/LINZ	commercial/geology well
J40/0446	BU	4.26	1650	OB				buried
J40/0888	AE		1666	OB			Project Aqua	Observation bore
I40/0658	AE		1713	DO			M Francis	On other side of permanently flowing spring fed stream along terrace base
I40/0411	ND	5	1755	GE	OB	CO	Meridian Energy Limited	Not drilled
I40/0061	AE	2.43	1795	OB			FRANCIS	Observation bore
J40/0889	AE		1802	OB			Project Aqua	Observation bore
J40/0450	FD	12.1	1837	OB			OAMARU BOROUGH COUNCIL	Filled in
J40/0451	AE	11.8	1837	OB			OAMARU BOROUGH COUNCIL	Observation bore
J40/0452	EX	12.1	1837				OAMARU BOROUGH COUNCIL	casing retrieved
J40/0453	EX	15.8	1837				OAMARU BOROUGH COUNCIL	casing retrieved
J40/0827	AE	6.3	1847	CO	GE		AQUA - G W DANIEL	commercial/geology well
J40/0444	BU	3.65	1849	OB				buried
J40/0719	AE	4	1881	IR			ME Kingsbury & D Chalmers	MDWRC Scheme Shareholder (Matt Ross)

226. Of the bores that could be affected by the applicant's take, each can be "eliminated" from the assessment for one of the following reasons:

- The bore owner is a scheme shareholder;
- The bore is not drilled, not used, buried, filled in, or the casing has been retrieved;
- The bore is only used as an observation bore, or was drilled for commercial/geology investigation;
- The bore is on the other side of a hydraulic barrier, such as the Waitaki River, or another permanently flowing water body between the subject bore and the bore concerned.

227. The reason for "elimination" for the corresponding bore is provided in the *COMMENT* column of the table. Therefore, there are no wells that could be adversely affected by the proposed take.

228. MRNAG is proposing an alternative flow regime for the Waitaki River based on a minimum flow for the river of 100m³/s. Further evidence will be presented on this by Mr. Nick Ward of Pattle Delamore and Partners and Mr. David Stewart of Raineffects Limited.

229. This low regime is aimed to ensure that existing water users are protected. The applicant fully supports this flow regime.

230. Given this, effects on other water users will be less than minor.

Cumulative effects of the take on other water users

231. The Waitaki River has an allocation limit of 90m³/s as set out within Table 3 of the WAP. If all resource consents are granted, including CRC063815, the total allocation for the river will be 77.6m³/s, which is less than the allocation limit.
232. The take also sits within the area defined as “Downstream of Waitaki Dam, but Upstream of Black Point” in Table 5 of the WAP.
233. ECan considers that the allocation limit of 150million m³/year for this area will be exceeded if all resource consents are granted.
234. Further evidence on the subject of annual allocation will be presented by Mr. Ian McIndoe of Aqualinc and Ms Keri Johnston of Irricon Resource Solutions.

Effects of inefficient water use

Reasonable and Efficient Use Seasonal Volumes and Land Use	Assessment criteria (based on)		Policy 15-21 (WAP)
	Land use		Mixed
	Area to be irrigated (hectares)		936
	Method of application		Spray
	Efficiency of application		80%
	Daily application depth		4.32 mm
	Return period		5 days
	Return period application depth		21.6 mm
	Soil profile available water		63mm
	Mean Annual Rainfall		555mm
Assessment criteria (based on)		Policy 10 – 14 (WAP)	
Seasonal volume required (m³/year)		5, 868, 270m ³ /year	
Volume to be included in Table 5 (WAP) allocation		5, 868, 270m ³ /year	
Comments	The proposed annual volume has been determined using Schedule WQN9v2.		

235. The taking of water in excess of that required for the intended use may contribute to water levels being unnecessarily reduced. This lowering may have adverse effects on other groundwater users; particularly where water availability is an issue. In addition, it may result in elevated water levels down gradient of the area being irrigated, which may in turn cause a reduction in productivity and possibly surface flooding.
236. The applicant is proposing to spray irrigate 936 ha of mixed land use on a ten day rotation. The property is covered with medium soils (Taiko silt loams, Paparua sandy loams, Ngapara fine sandy loams and Ngapara hill soils) with an average water holding capacity of 63mm. On a ten-day return period, 21.6mm will be applied. This is less than 50% of the average water holding capacity of the soil and is considered to be an efficient use of water.

237. Evidence on the methodology's used to determine annual allocation is being presented by Mr. Ian McIndoe of Aqualinc.
238. The take will be metered as required by Policy 21 of the WAP.
239. It is noted that the applicant also holds CRC001203, for the irrigation of 640 ha, and also individuals within the scheme area hold resource consents to take and use water for irrigation purposes also.
240. Therefore, mitigation measures are proposed to ensure that water is used efficiently. In this instance, it is proposed to limit the system capacity per property to 0.65 L/s/ha in combination with any other water source.
241. Given this, effects of inefficient water use will be less than minor.

Effects on in stream values

Minimum flow requirements	Assessment criteria (based on)	Policy 3-5, 23 and 26 (WAP)
	Proposed Environmental Flow Regime	Waitaki River– MRNAG alternative flow regime
	Comments	

242. The MRNAG alternative flow regime is based upon a minimum flow of 100m³/s for the Waitaki River, from the Waitaki Dam to the sea. MEL, for the HDIS applications, produced and presented evidence on effects on instream values from an alternative flow regime based on such a minimum flow. The applicant supports this evidence, and further evidence on this is being presented by Mr. Nick Boyes of RMG.
243. As this take is from a gallery, a fish screen is not required.
244. Given this, effects on instream values will be less than minor.

Effects of the use of water on water quality

Water Quality	Assessment criteria (based on)	Policy 13 (WAP), Objective WQL2 (NRRP)
	Existing NO₃-N concentration (mg/L)	0.1 – 2.9
	Increase in NO₃-N (mg/L)	0.042
	Total NO₃-N (mg/L)	0.142 – 2.942
Comments		

245. Cumulative effects on water quality are being addressed by Ms Lynn Torgeson of Pattle Delamore and Partners. Her evidence concludes that, if all applications are granted, water quality effects will remain minor.

246. A nitrates assessment has been carried out for this scheme. The assessment assumes the following:
- Nitrate Nitrogen value of 0.1 mg/L was used. This value was the lowest recorded concentration within a 10 km radius of the centre of the scheme area. This is conservative as a low background nitrate nitrogen concentration will result in a much larger increase overall. The highest nitrate nitrogen reading was 2.9 mg/L.
 - Scheme length in direction of groundwater flow = 4, 500 metres.
 - Scheme length perpendicular to groundwater flow = 8, 000 metres.
 - Groundwater flows parallel to the Waitaki River.
 - Transmissivity =8,000 m²/day based on the specific capacity of bores within the scheme area (where the water will be used as opposed to where it is being taken.)
 - A hydraulic gradient of 0.13 m/m calculated from piezometric surveys.
 - Concentration in drainage for dairy pasture is 12 g/m³.
 - Vertical drainage on non-irrigated land is 200 mm.
 - Vertical drainage on irrigated land is 350 mm.
247. The model assumes that the current situation is dry land beef and cattle (whereas in reality, it is a combination of land used including dairy farming) changing to fully irrigated dairy farming. This is the “extremes” of the scale and the most conservative approach.
248. The model indicates that as a result of irrigating an additional 936 ha of dairy pasture, the potential increase in nitrate-nitrogen concentration will be 0.042 mg/L.
249. The total nitrate-nitrogen concentration would be in the range of 0.142 mg/L to 2.942 mg/L, and this is less than the NZ drinking water standard value of 11.3 mg/L.
250. Nitrate management conditions have been proposed to ensure that the applicant manages nitrate nitrogen effects from their property.

MDWRC Nitrates Assessment

		Land area (ha)	NO ₃ -N (g/m ³)	Vertical drainage (mm)	NO ₃ -N (kg/ha/y)	NO ₃ -N (kg/y)	Total NO ₃ -N (kg/y)
Previous	Non irrigated beef cattle and sheep	936	12	200	24	22464	22464
Proposed	Irrigated Dairy	936	12	350	42	39312	39312
						change	16848
L-travel distance		536	m				
Property length in direction of GW flow		4500					
T		1000	m ² /day				
dispersivity		0.1	m				
gradient wrt sl		0.13					
width of property perpend to flow		8000	m				
initial NN levels measured		0.1	g/m ³				

B aquifer thickness	10	m
Drainage	0.15	m/year
sigma	0.1	
U-pore velocity	130.0	m/day
Q aquifer partial mixing	14235	
Q aquifer	47450	m ³ /y/m
Q drainage	675	m ³ /year/m
M N added	2106	
N after partial mix	0.237	g/m ³
N after total mix	0.142	g/m ³
N Increase (after total mixing)	0.042	g/m³

Effects on other users from seawater intrusion

251. The gallery is located approximately 35 km from the coast, making saltwater intrusion unlikely.

Effect on aquifer stability

252. The gallery is situated in gravels of the Waitaki River. As the strata from which water is to be abstracted is gravel based, aquifer subsidence is unlikely.

Effect from cross-connection on groundwater quality

253. The gallery is 10 metres in depth, and is therefore considered to be abstracting from an unconfined aquifer. This means that cross connection between aquifers is unlikely.

APPLICANT: WAITAKI ORCHARDS LIMITED

Resource consent being sought:

Consent ID	Description	Table 3 Location
CRC061399	To take and use water from a spring fed pond at a rate of 98 L/s, 2,117m ³ /week for irrigation of 7.6ha of horticulture and 98 L/s, 4,233.6 m ³ /week for frost fighting of this area.	Waitaki River

Previous resource consents:

Consent ID	Description	Explanation
WTK860151.1	To take up to 1 megalitre of water per July-June year from a spring at a maximum rate of 25 L/s for trickle	This consent expired on 30 June 1997.

Background Information

254. Waitaki Orchards Limited applied for resource consent CRC061399 on 27 October 2005. The orchard is primarily focused on apricot production, with a secondary focus on late season plum production. Small plantings of peaches and nectarines also exist.
255. The previous owner of the orchard let resource consent WTK860151.1 expire and for unknown reasons did not renew it at the time of expiry. The applicant, upon purchase of the Orchard, continued to irrigate as they understood that resource consent for the entire orchard was held by another party who had purchased part of the orchard. However, this isn't the situation and they now seek to have the take re-consented.
256. WTK860151.1 was granted in 1987 and was for a small volume of water (25 L/s). The volume of water applied for under this consent (using overhead sprinklers) reflects the change in irrigation technology and implementation over the last 30 years.
257. The applicant holds no other resource consents however they do have 30 shares in the UWICS. This entitles the applicant to rostered water on a 14-day basis for the irrigation of 35 ha. Historically the UWICS water has been reliable however the UWICS is also seeking renewal of consent applications as part of this hearing and therefore there is uncertainty surrounding this. In addition, it is uncertain whether water will be available from the UWICS for frost fighting purposes. It is noted that UWICS water is not and will not be applied in conjunction with water taken under this application if granted and supplies another part of the orchard.
258. Water is taken from a spring fed pond at a rate of 98 L/s, however this is not taken all day or in fact everyday. Irrigation water is taken for six hours; one day out of seven and water for frost fighting is taken a maximum of 12 hours per day and up to 15 days per year. Frost fighting figures are based on maximum historic requirements and there has been a year where frost fighting was required 10 days in a row and another where it was not required at all. However these types of event are quite rare.
259. Water flows from a spring about 100 metres upstream of the pond, along an existing waterway and into the pond where further springs emerge. It then seeps out from the pond into the existing man-made water race system which is used for border dyke irrigation by the downstream neighbour, and eventually into the Waitaki River about 500 metres downstream. The water race flows adjacent to the Waitaki River at a distance of about 400 metres.
260. Historically the spring fed pond was dug as a storage dam for water obtained from the UWICS. Upon digging the dam, springs were uncovered which now fed the pond. The applicant advised that the downstream neighbour constructed the water race system a few years ago and prior to its construction, any water seeping from the pond flowed directly across the adjacent paddock and into the Waitaki River. Aside from existing irrigation run-off from the surrounding border-dykes into the race, the UWICS also discharges water into the race. Therefore, water to the race is supplied by various sources and does not rely solely on seepage from the spring fed pond.
261. Water levels in the water race and adjacent spring fed waterway are higher during the irrigation season as presumably they are supplemented by irrigation by wash and higher water tables due to irrigation. The applicant has noted that levels in the pond tend to stay constant even when pumping at the full rate over 12hours for frost fighting purposes.

262. This application by Waitaki Orchards Limited, being for irrigation of horticulture crops and frost fighting purposes, is predominantly different than the majority of applications forming part of this hearing being for pasture and crops. The importance of water for frost fighting purposes cannot be over emphasized. The applicant, as part of MRNAG, submitted in opposition at the NBTC hearing and spoke to a Brief of Evidence at this hearing.
263. The content of this Brief is extremely relevant for the applicants own application and is therefore attached in Appendix D to this report.

Application Timeline and Summary of Amendments Made to the Applications

Timeline	CRC061399
Date of Lodging	27 Oct 2005
First Notifiable Date	2 Dec 2005
WAP Notifiable Date	15 Dec 2006
Public Notification	4 Aug 2007

264. The application for resource consents lodged in October 2005 stated that the take and use of water would be subject to the Waitaki River minimum flow as per WAP.
265. The applicant fully supports the MRNAG alternative flow regime for the Waitaki River, and while the application has not been amended to seek a lower minimum flow, it is noted that a minimum flow in line with other applicants, if acceptable to the panel, is preferred by this applicant.
266. ECan requested further information on this application on 7 November 2005 and this was provided on 1 December 2005. The information provided related to the annual volumes, clarification of the rate of take and further comment on the effects of the take on the environment. The consent was considered notifiable on 2 December 2005 following receipt of the requested information.
267. ECan requested further information on this application in October 2006, after the WAP became operative. At which point the applicant amended the annual allocation considerably, as there was a “typo” with the figure supplied in December 2005. Comment was also provided on consultation undertaken and water quality effects.
268. Following discussions with ECan on 3 July 2008, the annual allocation proposed for irrigation was amended to 41,800m³/year based on ScheduleWQN9v2.
269. No other amendments have been made to the applications.

Comments on Submissions

270. 16 submissions were received in total relating to this application. Of these, 11 were in opposition, 3 are in support and 2 neither support nor oppose.
271. None of the submissions received are relating directly to this application. They are all from submitters who made submissions on all applications in process, as detailed earlier in this report.

Assessment of Environmental Effects - to take and use water

Effects on other water users

Effects on other water users	Assessment criteria (based on)	Policy 14, 23 and 26 (WAP)
	Comments	A Waitaki River minimum flow is being proposed for this activity (irrigation and frost fighting).

272. A Waitaki River minimum flow is being proposed for this activity, both irrigation and frost fighting, given the close proximity to the Waitaki River, with the springs emerging about 400 metres parallel to the Waitaki River. The race is known (applicants observation over the years) to be ephemeral for times over winter months. Therefore, it is considered to be of more benefit to the catchment overall for the proposed activity to be subject to a minimum flow on the Waitaki River. A Waitaki River minimum flow site has been discussed with Ecan and is considered acceptable for this application as per paragraphs 26 and 29 of Ecan's Section 42A Officer's report for this application.
273. There is one consented take (CRC962093.1) on the spring-fed waterway upstream of the applicant's take. We are unaware of any other water permits taking from this waterway. CRC962093.1 authorises abstraction from a spring that feeds the waterway and a pond about 100 metres upstream of the applicants take. Given that the other abstractor takes water upstream of the applicant they are not considered affected by the proposed take.
274. Any water that seeps or flows from the spring fed pond is captured in the water race that runs through the downstream neighbour's property before reaching the Waitaki River. We are unaware of any consented takes for this property. It is noted that the downstream neighbour could abstract water for domestic and stock purposes. However, as the man-made water race is not solely fed by the spring fed pond but also by irrigation run-off from the surrounding border dyke systems and also discharge from the UWCIS, it is not considered that the proposed take will affect any abstraction for stock or domestic use downstream
275. The abstraction point is below the Waitaki River bridge, therefore will not cause the minimum flow to be reached any earlier, therefore other users on the main stem of the Waitaki River are not considered to be adversely affected by the proposed take.
276. The WAP minimum flow for the Waitaki River was set with the aim of protecting other users, as well as leaving sufficient water in the river to protect instream values.
277. MRNAG is proposing an alternative flow regime for the Waitaki River based on a minimum flow for the river of 100m³/s. Further evidence will be presented on this by Mr. Nick Ward of Pattle Delamore and Partners and Mr. David Stewart of Raineffects Limited.
278. This low regime is aimed to ensure that existing water users are protected. The applicant fully supports this flow regime.
279. In either case, effects on other users will be acceptable.

Cumulative effects

280. The Waitaki River has an allocation limit of 90m³/s. If all resource consents are granted, including CRC061399, the total allocation for the river will be less than the allocation limit.
281. The take also sits within the area defined as “*Downstream of Waitaki Dam, but Upstream of Black Point*” in Table 5 of the WAP.
282. ECan considers that the allocation limit of 150million m³/year for this area will be exceeded if all resource consents are granted.
283. Further evidence on the subject of annual allocation will be presented by Mr. Ian McIndoe of Aqualinc and Ms Keri Johnston of Irricon Resource Solutions.

Effects of inefficient water use

Reasonable and Efficient Use Seasonal Volumes and Land use	Assessment criteria (based on)		Policy 15-21 (WAP)	
	Land use		Horticulture and frost fighting	
	Area to be irrigated (hectares)		7.6	
	Method of application		Overhead spray irrigation	
	Efficiency of application		80%	
	Application rate (per hour)		4.5 mm	
	Return period (irrigation)		7 days	
	Return period application depth (irrigation)		27 mm	
	Soil profile available water		75-110 mm	
	Effective Irrigation Season Rainfall		200 mm	
	Assessment criteria (based on)		Policy 10 – 14 (WAP)	
			Irrigation	Frost fighting
	Seasonal volume required (m³/year)		41,800 m ³ /year	63,504 m ³ /year
	Volume to be included in Table 5 (WAP) allocation		41,800 m ³ /year	63,504 m ³ /year
Comments	The proposed annual volume has been determined using policy 16 of WAP and Schedule WQN9 v2 of NRRP and the proposed annual volume for frost fighting has been determined based on maximum 15 frost events per year requiring protection over a 12-hour period.			

284. The taking of water in excess of that required for the intended use may contribute to water levels being unnecessarily reduced. This lowering may have adverse effects on other groundwater users; particularly where water availability is an issue. In addition, it may result in elevated water levels down gradient of the area being irrigated, which may in turn cause a reduction in productivity and possibly surface flooding.
285. The applicant is proposing to use overhead spray system to irrigate 7.6 ha of fruit trees on a seven-day rotation. The property is covered with medium soils (based on local knowledge, ECan external GIS “Land Resources Inventory” layer and Soil Bureau data)

with an average water holding capacity of 75-110 mm. On a seven-day return period, 27 mm will be applied. This is less than 50% of the average water holding capacity of the soil and is considered to be an efficient use of water.

286. Evidence on the methodology's used to determine annual allocation is being presented by Mr. Ian McIndoe of Aqualinc.
287. Frost protection water is applied on an "as required basis". The length of time that water is required can vary from a few hours to up to 12 hours, depending on the nature of the weather conditions. An average time would be up to 6 hours per day but up to 12 hours may be required in severe frost events, and therefore has been applied for.
288. Water for frost protection is used as sparingly as possible as it is not in the best interest of the Orchardist and health of the fruit trees to apply any more water than is absolutely necessary.
289. The take for both uses will be metered as required by Policy 21 of the WAP.
290. ECan Section 42a Officer's report for this application, states in paragraph 53 that:
- "I am satisfied that the proposed seasonal allocation is reasonable for the proposed irrigation area and frost-fighting requirements."*
291. Given this the effects of inefficient water use are considered to be minor.

Effects on in stream values

Minimum flow requirements	Assessment criteria (based on)	Policy 3-5, 23 and 26 (WAP)
	Proposed Environmental Flow Regime	Waitaki River– MRNAG Environmental Flow Regime
Comments	A Waitaki River minimum flow has been proposed for this activity.	

292. As discussed above, a Waitaki River minimum flow has been proposed for this activity.
293. The MRNAG alternative flow regime is based upon a minimum flow of 100m³/s for the Waitaki River, from the Waitaki Dam to the sea. MEL, for the HDIS applications, produced and presented evidence on effects on instream values from an alternative flow regime based on such a minimum flow. The applicant supports this evidence, and further evidence on this is being presented by Mr. Nick Boyes of RMG.
294. Water from the spring fed pond seeps into the adjacent man-made water race and then flows into the Waitaki River about 500 metres downstream. The waterway in its entire natural course is only about 100 metres before seepage and channelization via the water race. It has been noted that during the winter months when irrigation is not occurring, less water, and sometimes no water, flows down the water race so the system is for part ephemeral.
295. The applicant is proposing to install a fish screen on the pump intake suction pipe designed in accordance with the report *"Fish Screening: good practice guidelines for Canterbury, NIWA Client Report: CHC2007.092, October 2007"*.

296. However, as the fish screen will be installed on a suction pipe, as opposed to being in-situ, the condition relating to design parameters has been modified to reflect this.
297. For either minimum flow regime, instream values will be protected and the effects on instream values are considered to be acceptable

Effects of the use of water on water quality

Water Quality	Assessment criteria (based on)		Policy 13 (WAP), Objective WQL2 (NRRP)
	Existing NO₃-N concentration (mg/L)		
	Increase in NO₃-N (mg/L)		
	Total NO₃-N (mg/L)		
Comments	Water quality effects are not considered to be a significant issue for this application given that it is an existing use over a small area.		

298. Cumulative effects on water quality are being addressed by Ms Lynn Torgeson of Pattle Delamore and Partners. Her evidence concludes that, if all applications are granted, water quality effects will remain minor.
299. A nitrates assessment for this property has not been undertaken given the small size of the area to be irrigated and the fact that the activity is existing. Thus any effects of the activity on water quality are already occurring.
300. The proposed irrigation system is designed to provide efficient delivery and not exceed half the water holding capacity of the soil. In addition, there are grassed rows between the fruit trees which help retain soil moisture and riparian buffer surrounding the spring fed waterway and pond which also captures any surface run-off.
301. It is our opinion that the effects of the use of water for the proposed activity will be less than minor. In paragraph 57 – 58 of ECan’s Section 42a Officer’s report for this application ECan reach the same conclusion.

APPLICANT: ER RUTHERFORD

Resource consents being sought:

Consent ID	Description	Table 3 Location
CRC063815	To take and use 81 L/s from gallery I40/0649, 10m in length, 300 mm diameter, and 6 metres deep, at a rate of 81 L/s for the irrigation of 125 ha of dairy pasture.	Waitaki River

Other resource consents:

Consent ID	Description	Explanation
CRC020869	To take and use water from bore I40/0093, 4.1 metres deep, at a rate of 3.3 L/s for the irrigation of 6 ha of dairy pasture.	This consent is active and expires on 31 January 2036.
CRC070487	To dam water in a 30, 000 cubic metre water storage pond.	This consent is active and expires on 11 December 2041.

Background Information

- 302. Mr. Rutherford (hereon in referred to as “the applicant”) applied for CRC063815 on 3 May 2006.
- 303. The applicant owns a 436 ha dairy farm located on SH83, just out of Duntroon, heading towards Kurow.
- 304. As well as CRC020869, the applicant holds 275 shares in the Upper Waitaki Community Irrigation Scheme (UWCIS) for the border dyke irrigation of 245 ha. In addition, the applicant currently irrigates 60 ha of previously dry land with water from the UWCIS using k-line irrigation. Water for this is held in the storage pond. However, this is effectively “robbing Peter to pay Paul” as the share holding is really only sufficient to irrigate the 245 ha. Irrigating the additional 60 ha extends the return period on the border dyke land to 20 days, which is too long. This application will allow the border dyke return period to be reduced, and thus water will be used more effectively. This gives a total of 305 ha of the 436 ha property under irrigation.
- 305. This application is for the irrigation of 125 hectares, of which 60 ha is that mentioned above, bringing the total irrigated land up to 370 ha. The 125 ha will be irrigated using the existing k-line system and centre pivot irrigation.
- 306. It is also noted that the resource consent for the UWCIS is currently going through the renewal process as well, and there is a degree of uncertainty as to how reliable with water will be in the future, with conditions of resource consent currently under “negotiation”.
- 307. The gallery is located approximately 300 metres from the Waitaki River.
- 308. Water from the gallery is pumped using a low-pressure system into the water storage pond.

Application Timeline and Summary of Amendments Made to the Applications

Timeline	CRC050940
Date of Lodging	3 May 2006
First Notifiable Date	3 May 2006
WAP Notifiable Date	13 Dec 2006
Public Notification	4 Aug 2007

309. The application for resource consent lodged in May 2006 refers to the WAP minimum flow for the Waitaki River of 150m³/s, however, was not offered as a condition of consent.
310. On 13 December 2006, in response to the request for further information sought as a result of the WAP becoming operative, it was advised that the applicant “will be supporting Meridian’s push for a lowered minimum flow of 100m³/s”.
311. No other changes have been made to this application.

Comments on Submissions

312. 19 submissions were received in total relating to this application. Of these, 12 were in opposition, 5 in support and 2 neither support nor oppose.
313. None of the submissions received are relating directly to this application.

Assessment of Environmental Effects – to take and use water

Effects on other water users

Effects on other water users	Assessment criteria (based on)	Policy 14, 23 and 26 (WAP)
	Comments	Gallery I40/0649 has a maximum rate of abstraction of 81 L/s. The amount of water coming from the Waitaki River is greater than 90% of the continuous steady state abstraction rate over 7 days (80.3 L/s of a possible 81 L/s) and therefore is classified as “connected groundwater”.

314. There are no other surface water abstractors in the direct vicinity of the applicants take.
315. There are 56 other bores and galleries within a 2 km radius of the applicant’s gallery.
316. Transmissivity is in the order of 5, 000 m²/day, based on the limited specific capacity information available within a 2 km radius of the gallery, although this is reasonable for its proximity to the Waitaki River, and its associated river gravels.
317. Information on direct interference from taking water from the gallery was provided to ECan in the application for resource consent provided to CRC by Glasson Potts Fowler (now Duffill Watts Group), and in response to requests for further information. Effects on other users were considered to be minor as drawdown in wells within a 2km radius was of acceptable levels (in the order of 0.1 metres to 0.2 metres).
318. In paragraph 41 of the ECan Section 42a Officer’s report for this application, it has been concluded that “there is little likelihood that other groundwater users in the area will be adversely affected due to well interference.”
319. MRNAG is proposing an alternative flow regime for the Waitaki River based on a minimum flow for the river of 100m³/s. Further evidence will be presented on this by Mr. Nick Ward of Pattle Delamore and Partners and Mr. David Stewart of Raineffects Limited.
320. This low regime is aimed to ensure that existing water users are protected. The applicant fully supports this flow regime.

321. Given this, effects on other water users will be less than minor.

Cumulative effects of the take on other water users

- 322. The Waitaki River has an allocation limit of 90m³/s. If all resource consents are granted, including CRC063815, the total allocation for the river will be 77.6m³/s, which is less than the allocation limit.
- 323. The take also sits within the area defined as “Downstream of Waitaki Dam, but Upstream of Black Point” in Table 5 of the WAP.
- 324. ECan considers that the allocation limit of 150million m³/year for this area will be exceeded if all resource consents are granted.
- 325. Further evidence on the subject of annual allocation will be presented by Mr. Ian McIndoe of Aqualinc and Ms Keri Johnston of Irricon Resource Solutions.

Effects of inefficient water use

Reasonable and Efficient Use Seasonal Volumes and Land Use	Assessment criteria (based on)	Policy 15-21 (WAP)
	Land use	Dairy Pasture
	Area to be irrigated (hectares)	125
	Method of application	Spray
	Efficiency of application	80%
	Daily application depth	5.6 mm
	Return period	3 days
	Return period application depth	16.8 mm
	Soil profile available water	209mm
	Mean Annual Rainfall	525mm
	<hr/>	
	Assessment criteria (based on)	Policy 10 – 14 (WAP)
	Seasonal volume required (m³/year)	706, 250m ³ /year
	Volume to be included in Table 5 (WAP) allocation	706, 250m ³ /year
Comments	The proposed annual volume has been determined using Schedule WQN9v2.	

- 326. The taking of water in excess of that required for the intended use may contribute to water levels being unnecessarily reduced. This lowering may have adverse effects on other groundwater users; particularly where water availability is an issue. In addition, it may result in elevated water levels down gradient of the area being irrigated, which may in turn cause a reduction in productivity and possibly surface flooding.
- 327. The applicant is proposing to spray irrigate 125 ha of dairy pasture on a three day rotation. The property is covered with heavy soils, taken from the NZ Fundamentals Soil’s Layer (Landcare Research), with an average water holding capacity of 209mm to 110mm. On a three-day return period, 16.8 mm will be applied. This is less than 50% of the average water holding capacity of the soil and is considered to be an efficient use of water.

328. Evidence on the methodology's used to determine annual allocation is being presented by Mr. Ian McIndoe of Aqualinc.
329. The take will be metered as required by Policy 21 of the WAP.
330. Therefore, effects of inefficient water use will be less than minor.

Effects on in stream values

Minimum flow requirements	Assessment criteria (based on)	Policy 3-5, 23 and 26 (WAP)
	Proposed Environmental Flow Regime	Waitaki River – MRNAG Alternative Flow Regime
	Comments	

331. The MRNAG alternative flow regime is based upon a minimum flow of 100m³/s for the Waitaki River, from the Waitaki Dam to the sea. MEL, for the HDIS applications, produced and presented evidence on effects on instream values from an alternative flow regime based on such a minimum flow. The applicant supports this evidence, and further evidence on this is being presented by Mr. Nick Boyes of RMG.
332. This take is from a gallery and as such a fish screen is not required.
333. Given this, effects on instream values will be less than minor.

Effects of the use of water on water quality

Water Quality	Assessment criteria (based on)	Policy 13 (WAP), Objective WQL2 (NRRP)
	Existing NO₃-N concentration (mg/L)	3.5
	Increase in NO₃-N (mg/L)	0.596
	Total NO₃-N (mg/L)	0.696 – 3.496
Comments		

334. Cumulative effects on water quality are being addressed by Ms Lynn Torgeson of Pattle Delamore and Partners. Her evidence concludes that, if all applications are granted, water quality effects will remain minor.
335. The applicant has undertaken a nitrates assessment for this property. The assessment assumes the following:
- Nitrate Nitrogen of 0.1 mg/L was used. This value was the lowest recorded within a 10 km radius of the centre of the scheme area. This is conservative as

a low background nitrate nitrogen concentration will result in a much larger increase overall. The highest nitrate nitrogen reading was 2.9 mg/L.

- Property length in direction of groundwater flow = 3000 metres.
- Property length perpendicular to groundwater flow = 300 metres.
- Groundwater flows parallel to the Waitaki River.
- Transmissivity =5, 000 m²/day from Meridian Energy's Kurow Dairy Farm.
- A hydraulic gradient of 0.0033 m/m calculated from piezometric surveys.
- Concentration in drainage for dairy pasture is 12 g/m³.
- Vertical drainage on non-irrigated land is 200 mm.
- Vertical drainage on irrigated land is 350 mm.

336. The model indicates that as a result of irrigating an additional 125 ha of dairy pasture, the potential increase in nitrate-nitrogen concentration will be 0.596 mg/L.

337. The total nitrate-nitrogen concentration would be in the range of 0.696 mg/L – 3.496 mg/L, and this is less than the NZ drinking water standard value of 11.3 mg/L.

338. Nitrate management conditions have been proposed to ensure that the applicant manages nitrate nitrogen effects from their property.

ER Rutherford Nitrates Assessment

	Activity	Land area (ha)	NO ₃ -N (g/m ³)	Vertical drainage (mm)	NO ₃ -N (kg/ha/y)	NO ₃ -N (kg/y)	Total NO ₃ -N (kg/y)
Previous	Irrigated Dairy	305	12	350	42	12810	15954
	Non-Irrigated Dairy	131	12	200	24	3144	
Proposed							17124
	Irrigated Dairy	370	12	350	42	15540	
	Non-Irrigated Dairy	66	12	200	24	1584	
						change	1170
L-travel distance		536	metres				
Property length in direction of GW flow		3000					
T		5000	m ² /day				
dispersivity		0.1	metres				
gradient wrt sl		0.0033					
width of property perpend to flow		300	metres				
initial NN levels measured		0.1	g/m ³				
B aquifer thickness		10	metres				
Drainage		0.15	m/yr				
sigma		0.1					
U-pore velocity		16.5	m/day				
Q aquifer partial mixing		1807					
Q aquifer		6023	m ³ /y/m				
Q drainage		450	m ³ /y/m				
M N added		3900					
N after partial mix		1.808	g/m ³				
N after total mix		0.696	g/m ³				

N Increase (after total mixing)

0.596 g/m³

Effects on other users from seawater intrusion

339. The proposed gallery is approximately 40km from the coast, making saltwater intrusion unlikely.

Effect on aquifer stability

340. The bores are situated in gravels of the Waitaki River. As the strata from which water is to be abstracted is gravel based, aquifer subsidence is unlikely.

Effect from cross-connection on groundwater quality

341. The proposed gallery is 10 metres in depth, and therefore considered to be abstracting from an unconfined aquifer. This means that cross connection between aquifers is unlikely.

APPLICANT: TORACH FARM LIMITED

Resource consents being sought:

Consent ID	Description	Table 3 Location
CRC073237	To take and use water from a gallery, I40/0708, at a rate of 100 L/s for the irrigation of 250 ha of crops and pasture.	Waitaki River

Other resource consents:

Consent ID	Description	Explanation
CRC084766	To install gallery I40/0708	

Background Information

342. Torach Farm Limited (hereon in referred to as “the applicant”) applied for CRC073237 on 29 March 2007.
343. The applicant owns a 274 ha farm located Priests Road, just out of Duntroon, heading towards Kurow. It is currently a sheep and beef property, but the possibility of a conversion to dairy has not been ruled out at this stage.
344. This application is for the irrigation of the farm using k-line and centre pivot irrigation.
345. The gallery is located approximately 300 metres from the Waitaki River.
346. Water will be pumped to the property via a proposed pipeline.

Application Timeline and Summary of Amendments Made to the Applications

Timeline	CRC073237
Date of Lodging	29 Mar 2007
First Notifiable Date	29 Mar 2007
WAP Notifiable Date	29 Mar 2007
Public Notification	4 Aug 2007

347. The application for resource consent lodged in March 2007 states that the “*water will be taken in compliance with Rules 2(1) (a) and (b) of the WAP.*” Rule 2(1) (a) refers to the minimum flow or level specified in Table 3. In this case, the application is for a take that was considered to be hydraulically connected to the Waitaki River and therefore, the application proposed a minimum flow of 150m³/s.
348. The application was originally sought to take water from a pond located on land owned by MEL, and which MEL also held resource consent to take and use water from.
349. The applicant sought to change the location of this take from the pond to a gallery located 100 metres from the pond on 30 May 2008. The gallery is closer to the Waitaki River on the same parcel of land.
350. The applicant fully supports the MRNAG alternative flow regime for the Waitaki River, and while the application has not been amended to seek a lower minimum flow, it is noted that a minimum flow in line with other applicants, if acceptable to the panel, is preferred by this applicant.

Comments on Submissions

351. 18 submissions were received in total relating to this application. Of these, 13 were in opposition, 3 in support and 2 neither support nor oppose.
352. Of the submissions, one is relating directly to this application, from MEL.
353. MEL opposed the application on the basis that the location of take was on land that required access from MEL, and that it would add to the cumulative effects and operation of resource consent CRC030183.1 (held by MEL from the same pond).
354. MEL’s submission suggested that the applicant move its take point directly to the Lower Waitaki River.
355. The applicant, subsequently, consulted with MEL, and it was concluded that a gallery could be installed on the land, as opposed to moving the take directly to the Lower Waitaki River. MEL has been approached for written confirmation of this, but at the time of writing this report, it had not been received.

Assessment of Environmental Effects – to take and use water

Effects on other water users

Effects on other water users	Assessment criteria (based on)	Policy 14, 23 and 26 (WAP)
	Comments	Gallery I40/0708 has a maximum rate of abstraction of 100 L/s. The amount of water coming from the Waitaki River is greater than 90% of the continuous steady state abstraction rate over 7 days (94.4 L/s of a possible 100 L/s) and therefore is classified as “connected groundwater”.

356. There are no other surface water abstractors in the direct vicinity of the applicants take.
357. There are 53 other bores and galleries within a 2 km radius of the applicant’s gallery.
358. Transmissivity is in the order of 6, 000 m²/day, based on the limited specific capacity information available within a 2 km radius of the gallery, although this is reasonable for its proximity to the Waitaki River, and its associated river gravels.
359. The Theis Equation has been used to model the direct drawdown on neighbouring wells at the full rate of abstraction (as opposed to just the portion of the take that is considered to be directly from groundwater) At a distance of 2, 000 metres from the bores, the drawdown is approximately 0.2 metres after 150 days.
360. There are also many small surface waterways that act as hydraulic barriers between the subject gallery and surrounding bores, therefore, Theis is a conservative method of assessment as it assumes a perfect hydraulic connection between the subject bore and the neighboring bore. Given this, the estimation of effect is on neighboring bores and galleries, is likely to be much less.
361. MRNAG is proposing an alternative flow regime for the Waitaki River based on a minimum flow for the river of 100m³/s. Further evidence will be presented on this by Mr. Nick Ward of Pattle Delamore and Partners and Mr. David Stewart of Raineffects Limited.
362. This low regime is aimed to ensure that existing water users are protected. The applicant fully supports this flow regime.
363. Given this, effects on other water users will be less than minor.

Cumulative effects

364. The Waitaki River has an allocation limit of 90m³/s. If all resource consents are granted, including CRC063815, the total allocation for the river will be 77.6m³/s, which is less than the allocation limit.
365. The take also sits within the area defined as “*Downstream of Waitaki Dam, but Upstream of Black Point*” in Table 5 of the WAP.
366. ECan considers that the allocation limit of 150million m³/year for this area will be exceeded if all resource consents are granted.
367. Further evidence on the subject of annual allocation will be presented by Mr. Ian McIndoe of Aqualinc and Ms Keri Johnston of Irricon Resource Solutions.

Effects of inefficient water use

Reasonable and Efficient Use Seasonal Volumes and Land Use	Assessment criteria (based on)		Policy 15-21 (WAP)
	Land use	Dairy Pasture (proposed)	
	Area to be irrigated (hectares)	250	
	Method of application	Spray	
	Efficiency of application	80%	
	Daily application depth	3.5 mm	
	Return period	10 days	
	Return period application depth	34.5 mm	
	Soil profile available water	82 mm	
	Mean Annual Rainfall	540mm	
	Assessment criteria (based on)		Policy 10 – 14 (WAP)
	Seasonal volume required (m³/year)	1, 225, 000m ³ /year	
	Volume to be included in Table 5 (WAP) allocation	1, 225, 000m ³ /year	
Comments	The proposed annual volume has been determined using Schedule WQN9v2.		

368. The taking of water in excess of that required for the intended use may contribute to water levels being unnecessarily reduced. This lowering may have adverse effects on other groundwater users; particularly where water availability is an issue. In addition, it may result in elevated water levels down gradient of the area being irrigated, which may in turn cause a reduction in productivity and possibly surface flooding.
369. The applicant is proposing to spray irrigate 250 ha of dairy pasture on a ten day rotation. The property is covered with medium soils, taken from the NZ Fundamentals Soil's Layer (Landcare Research) with an average water holding capacity of 82mm. On a ten-day return period, 34.5 mm will be applied. This is less than 50% of the average water holding capacity of the soil and is considered to be an efficient use of water.
370. Evidence on the methodology's used to determine annual allocation is being presented by Mr. Ian McIndoe of Aqualinc.
371. The take will be metered as required by Policy 21 of the WAP.
372. Given this, effects of inefficient water use are considered to be less than minor.

Effects on in stream values

flow req	Assessment criteria (based on)	Policy 3-5, 23 and 26 (WAP)
	Proposed Environmental Flow Regime	Waitaki River - MRNAG Alternative Flow Regime

Comments	
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373. The WAP minimum flow for the Waitaki River was set with the aim of protecting other users, as well as leaving sufficient water in the river to protect instream values.
374. The MRNAG alternative flow regime is based upon a minimum flow of 100m³/s for the Waitaki River, from the Waitaki Dam to the sea. MEL, for the HDIS applications, produced and presented evidence on effects on instream values from an alternative flow regime based on such a minimum flow. The applicant supports this evidence, and further evidence on this is being presented by Mr. Nick Boyes of RMG.
375. For either minimum flow regime, instream values will be protected.
376. This take is from a gallery and as such a fish screen is not required.
377. Given this, effects on instream values are considered to be less than minor.

Effects of the use of water on water quality

Water Quality	Assessment criteria (based on)	Policy 13 (WAP), Objective WQL2 (NRRP)
	Existing NO₃-N concentration (mg/L)	0.1
	Increase in NO₃-N (mg/L)	1.931
	Total NO₃-N (mg/L)	2.031
Comments		

378. Cumulative effects on water quality are being addressed by Ms Lynn Torgeson of Pattle Delamore and Partners. Her evidence concludes that, if all applications are granted, water quality effects will remain minor.
379. The applicant has undertaken a nitrates assessment for this property. The assessment assumes the following:
- Nitrate Nitrogen of 0.1 mg/L was used. This value was taken from the only groundwater quality site within a 10 km radius of the applicants property (SCY006917). This is conservative as a low background nitrate nitrogen concentration will result in a much larger increase overall.
 - Property length in direction of groundwater flow = 1, 600 metres.
 - Property length perpendicular to groundwater flow = 2, 000 metres.
 - Groundwater flows parallel to the Waitaki River.
 - Transmissivity =500 m²/day based on the specific capacity of one bore within a 2km radius of the applicant’s property (where the water will be used as opposed to where it is being taken.)
 - A hydraulic gradient of 0.005 m/m calculated from piezometric surveys.
 - Concentration in drainage for dairy pasture is 12 g/m³.

- Vertical drainage on non-irrigated land is 200 mm.
- Vertical drainage on irrigated land is 350 mm.

380. The model indicates that as a result of irrigating 250 ha of dairy pasture, the potential increase in nitrate-nitrogen concentration will be 1.931 mg/L.
381. The total nitrate-nitrogen concentration would be 2.031 mg/L, and this is less than the NZ drinking water standard value of 11.3 mg/L.
382. Nitrate management conditions have been proposed to ensure that the applicant manages nitrate nitrogen effects from their property.

Torach Farm Nitrates Assessment

	Activity	Land area (ha)	NO ₃ -N (g/m ³)	Vertical drainage (mm)	NO ₃ -N (kg/ha/y)	NO ₃ -N (kg/y)	Total NO ₃ -N (kg/y)
Previous	Non-Irrigated sheep and beef cattle	250	12	200	24	6000	6000
Proposed	Irrigated Dairy	250	12	350	42	10500	10500
					0	0	change 4500
L-travel distance		536	metres				
Property length in direction of GW flow		1600					
T		500	m ² /day				
dispersivity		0.1	metres				
gradient wrt sl		0.005					
width of property perpend to flow		2000	metres				
initial NN levels measured		0.1	g/m ³				
B aquifer thickness		10	metres				
Drainage		0.15	m/year				
sigma		0.1					
U-pore velocity		2.5	m/day				
Q aquifer partial mixing		274					
Q aquifer		913	m ³ /y/m				
Q drainage		240	m ³ /y/m				
M N added		2250					
N after partial mix		4.433	g/m ³				
N after total mix		2.031	g/m ³				
N Increase (after total mixing)		1.931	g/m³				

Effects on other users from seawater intrusion

383. The proposed gallery is approximately 40 km from the coast, making saltwater intrusion unlikely.

Effect on aquifer stability

384. The gallery is situated in gravels of the Waitaki River. As the strata from which water is to be abstracted is gravel based, aquifer subsidence is unlikely.

Effect from cross-connection on groundwater quality

385. The proposed gallery is 10 metres in depth, and therefore considered to be abstracting from an unconfined aquifer. This means that cross connection between aquifers is unlikely.

HAKATARAMEA RIVER & TRIBUTARIES

Description of Environment

386. The Hakataramea River is a 56 km long north-to-south flowing rain-fed river that joins the Waitaki River at Kurow. The catchment area approximates 89, 876 ha.
387. The Hakataramea Valley is bounded on the east by the Campbell Range and the Hunters Hills, on the north by the Dalgety Range and the Grampian Mountains, and on the west by the Kirkliston Range (WCC 1976).
388. Rainfall in the valley is generally low (450 mm in the lower reaches), but increases rapidly with altitude to 750-800 mm (ibid.). The mean flow of the river is approximately 5.83 m³/s, with an estimated mean annual low flow of 0.92m³/s. During the 1997/98 droughts, the lowest (7-day) flow recorded in the Hakataramea River was 339 L/s, with an estimated return period of 60 years (Horrell et al 1998).
389. As a result of the low rainfall, and limited groundwater storage, the Hakataramea River and its tributaries are heavily utilised for irrigation and stock water, which, during dry summers, exacerbates impacts on instream values.
390. Native fish found in the catchment include long-finned and short-finned eels, lamprey, Koaro, Common River Galaxias, Common Bully and Upland Bully (Wing 1981).

APPLICANT: RG & ZL PRINGLE

Resource consents being sought:

Consent ID	Description	Table 3 Location
CRC050940	To take and use water from three ponds adjacent to the Hakataramea River at a rate of 14 L/s for the irrigation of 120 ha of crops and pasture.	Hakataramea River
CRC050957	To divert water from Peters Stream at a rate of 40 L/s, and to take 35 L/s for the irrigation of 120 ha of crops and pasture.	All Other Streams
CRC050960	To place a culvert in the bed of Peters Stream for the diversion of water.	Not applicable

Previous resource consents:

Consent ID	Description	Explanation
CRC930285.1	To take and use water from three ponds adjacent to the Hakataramea River at a rate of 14 L/s for the irrigation of 120 ha of crops and pasture.	This consent expired on 1 June 2005. CRC050940 was lodged on 5 October 2004 to renew CRC930285.1.
WTK856651A	To divert water from Peters Stream for stock and domestic supply.	The previous owners of the property surrendered this consent in 1994; however, the diversion continued and still does to date, as it is the only stock water supply to that part of the property. CRC050957 was lodged in order to remedy this, but an irrigation component was also included.

Background Information

- 391. Mr. and Mrs. Pringle (heron in referred to as “the applicant”) applied for resource consents CRC050940, CRC050957, and CRC050960 on the 5th of October 2004.
- 392. The applicant holds no other resource consents.
- 393. Water is diverted from Peters Stream at a rate of 40 L/s and the diversion flows into the most up-gradient pond (pond three).
- 394. Water then flows from pond three into the Hakataramea River. This is a permanent diversion. Peters Stream ceases to have surface flow approximately 100 metres downstream of the diversion.
- 395. Ponds one and two exist naturally with base flow from the Hakataramea River.
- 396. During the irrigation season, it is proposed to abstract water at a rate of 35 L/s from the diversion channel, and 14 L/s in total from the waterholes to irrigate 120 hectares of crops and pasture for grazing sheep, beef cattle, and non-milking dairy cows.
- 397. Water is abstracted using a diesel pump and suction pipe. There is not a permanent surface water intake site on the diversion channel or any of the three waterholes.

Application Timeline and Summary of Amendments Made to the Applications

Timeline	CRC050940	CRC050957	CRC050960
Date of Lodging	5 Oct 2004	6 Oct 2004	6 Oct 2004
First Notifiable Date	3 Mar 2005	7 Mar 2005	6 Oct 2004
WAP Notifiable Date	15 Dec 2006	15 Dec 2006	15 Dec 2006
Public Notification	4 Aug 2007	4 Aug 2007`	4 Aug 2007

398. The applications for resource consents lodged in October 2004 stated that the take and use of water would be subject to the Hakataramea River minimum flow, which at the time was to reduce the rate of take by 50% when flows at SH82 were at or below 1, 500 L/s and to cease abstraction when flows at SH82 were at or below 500 L/s.
399. A review condition was also offered so that a new Hakataramea River minimum flow could be implemented once the WAP became operative.
400. ECan requested further information on these applications in October 2006, after the WAP became operative, at which point the applicant advised that the minimum flow as described in Table 3 of the WAP (being the Hakataramea River minimum flow) would be accepted.
401. The annual volume proposed for these applications was 612, 000 m³/year. This is being amended to 528, 000m³/year combined for both consents as the soil type used to determine the initial annual allocation was incorrect.

Comments on Submissions

402. 19 submissions were received in total relating to these applications. Of these, 13 were in opposition, 4 in support and 2 neither support nor oppose.
403. Two of the submissions received are relating directly to these applications.
404. Mr. SW Taylor is an irrigator in the Hakataramea Valley, and he is concerned that any new takes from the Hakataramea River will impact on his reliability of supply.
405. It is noted that Table 3 of the WAP specifies an allocation limit of 500 L/s for the Hakataramea River. At present, there is 291 L/s allocated, with a total of 116 L/s in process, including these applications. This brings the total allocation if all resource consents in process are granted to 407 L/s, within the allocation limit set by Table 3 of the WAP.
406. Only resource consent application CRC050940 is related directly to the Hakataramea River and this is a renewal application, not a new take.
407. Both CRC050940 and CRC050957, if granted, would be subject to the Hakataramea River minimum flow.
408. Given this, Mr. Taylor's reliability of supply will not be impacted any further by this take and it exists at present. Further explanation is given to this in the following section of this report entitled "Effects on other water users".
409. Mr. G Hay supported this application for the fact that it is a renewal application.

Assessments of Environmental Effects – to divert, take and use water

Effects on other water users

Effects on other water users	Assessment criteria (based on)	Policy 14, 23 and 26 (WAP)
	Comments	CRC050940 is a renewal application.

410. There are no other abstractors in the direct vicinity of the applicants property; the nearest abstractor is over 10km downstream.
411. CRC050940 is within the allocation limit set in Table 3 of the WAP for the Hakataramea River, and is a renewal of an existing consent.
412. CRC050957 is in the “all other streams” category of Table 3 of the WAP. The minimum flow specified for water bodies in this category is the one in five year, seven day low flow.
413. In paragraph 36 of the ECan Section 42a Officer’s report for these applications, ECan advises that the one in five year seven-day low flow for Peters Stream is 9 L/s.
414. The one in five year, seven day low flow in the Hakataramea River at SH82 is 780 L/s². Assuming that the one in five year, seven day low flow occurs in Peters Stream at the same time as that in the Hakataramea River at SH82, then Peters Stream will contribute 1.2% to the calculated one in five year, seven day low flow for the Hakataramea River.
415. Such a flow is inside the margin or error for flow measurement^(+/- 8%) and will be largely undetectable.
416. It is also notes that there are no other users on Peters Stream, which flows entirely within the applicant’s property, and therefore, no other person physically be affected by the take.
417. Given this, a minimum flow on Peters Stream is not appropriate.
418. The applicant recognises that there is discord between existing takes and applications in process for either renewal or new water, and for both these applications, it is proposed to maintain the current Hakataramea River minimum flow, (50% abstraction at 1.5m³/s and cease abstraction at 0.5m³/s) until such time as all consents to take and use water from the Hakataramea River are reviewed in line with the WAP.
419. The current Hakataramea River minimum flow requires abstractors to reduce to 50% of the maximum allowable take when flows in the Hakataramea River as measured at SH82 are at or below 1, 500L/s and to cease when flows are at or below 500L/s.
420. In the S24a report for these applications, the officer considers in paragraph 48 that whilst the applicant has proposed to comply with the and could impact on the reliability of supply of existing users also subject to the Hakataramea River minimum flow.

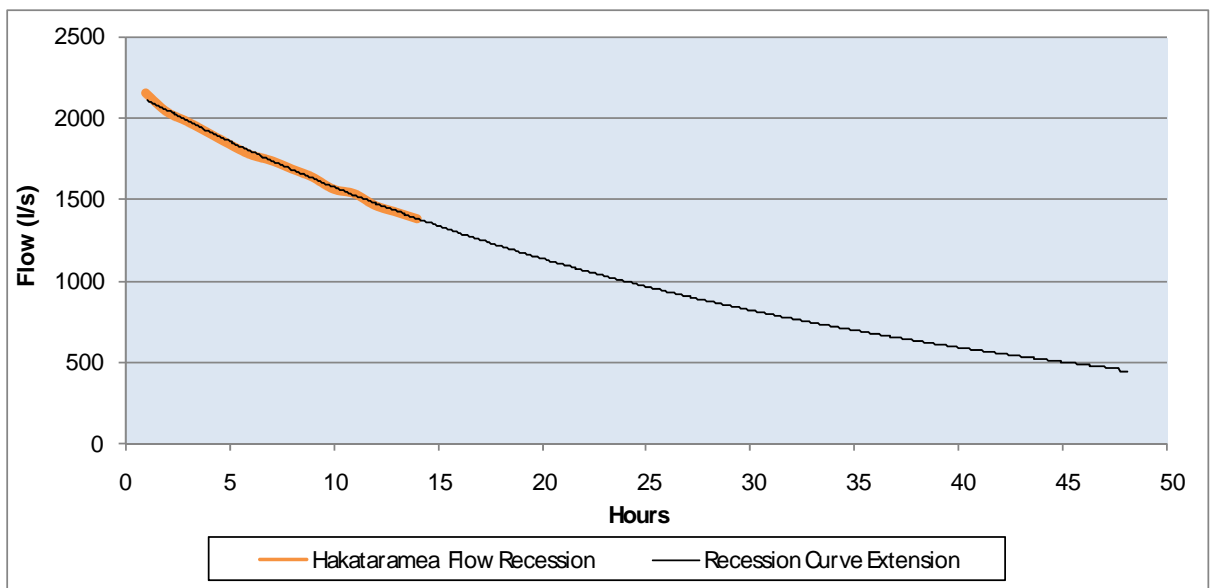
² Derived by NIWA.

421. In *“Report 3: Flow and Level Regime for the Tributary Water bodies”* of the ECan Section 42a Reports, it is shown that there is conflict between the existing minimum flow conditions on consents and those that could be adopted for new applications in accordance with Rule 2, Table 3.

422. In paragraph 61 of *“Report 3: Flow and Level Regime for the Tributary Water bodies”*, it is stated:

“To achieve equal priority with no effects on existing users, existing consents would have to be changed. In my view this could only occur if those consents were reviewed (under s128 of the RMA), existing consent holders requested a change to their minimum flows to be in line with the WCWARP (under s127 of the RMA), or new consents granted with a flow regime in line with flow regimes for existing consents and with the potential to change that flow regime at the same time as reviews of existing consents are being undertaken”

423. Mr. David Stewart of Raineffects Limited produced a recession curve for the Hakataramea River. The recession curve can show how much sooner the existing irrigators would be required to reduce or cease their abstraction as a result of the new application being granted.



Recession Curve for the Hakataramea River

424. Mr. Stewart, in evidence prepared for applications for Mr. RH Robertson, advises the following:

“In the case of the Hakataramea River, the low flow recessions at the restriction and cut-off flows occur only in summertime and these recessions are significantly modified by abstractions. Some natural winter recessions were found that fell as low as 1350 l/s and these were averaged, a trend line fitted and this trend line was extended until flows reached 500 l/s. The net result was that at flows between 1200 l/s and 1000 l/s, flows naturally recede at about 35 l/s/day.”

425. Therefore, if all applications in process are granted (a total of 116L/s³ of which 90L/s is for replacement water, for the Hakataramea River, and 125L/s⁴ of new water from

³ 14L/s CRC050940, 26L/s CRC031952, 30L/s CRC050767, 26L/s CRC050768, 20L/s CRC050769.

tributaries), restrictions would be reached between two and four days sooner than if these abstractions did not occur. This assumes that all water from tributaries actually makes it to the Hakataramea River (Peters Stream goes underground before it meets the Hakataramea River), and that a take, actually results in that equivalent amount being subtracted from the minimum flow site.

426. Given the proposed minimum flow conditions, effects on other water users are less than minor.

Cumulative effects of the take on other water users

427. With respect to Rule 2, Table 3, the diversion of 40 L/s from Peters Stream is in the “all other stream” category of Table 3 of the WAP. Currently there is no allocation limit is specified for such streams, and there are no other users (consented or otherwise on Peters Stream).

428. The Hakataramea River has an allocation limit of 500 L/s. If all resource consents are granted, including CRC050940, the total allocation for the river will be 407 L/s, which is less than the allocation limit.

429. With respect to Rule 6, Table 5, the take also sits within the area defined as “Downstream of Waitaki Dam, but Upstream of Black Point” in Table 5 of the WAP.

430. ECan considers that the allocation limit of 150million m³/year for this area will be exceeded if all resource consents are granted.

431. Further evidence on the subject of annual allocation will be presented by Mr. Ian McIndoe of Aqualinc and Ms Keri Johnston of Irricon Resource Solutions.

Effects of inefficient water use

Reasonable and Efficient Use Seasonal Volumes and Land Use	Assessment criteria (based on)	Policy 15-21 (WAP)
	Land use	Crops and pasture for grazing sheep, beef cattle and non-milking dairy cows.
	Area to be irrigated (hectares)	120
	Method of application	Spray
	Efficiency of application	80%
	Daily application depth⁵	3.9 mm
	Return period	7 days
	Return period application depth	27.3 mm
	Soil profile available water	75mm
	Mean Annual Rainfall	667mm
	Assessment criteria (based on)	Policy 10 – 14 (WAP)
	Seasonal volume required (m³/year)	528, 000m ³ /year
	Volume to be included in Table 5 (WAP) allocation	528, 000m ³ /year

⁴ 60L/s CRC981376, 30L/s CRC040989, 35L/s CRC050957

Comments	The proposed annual volume has been determined using the methodology of Brown and McIndoe (2003).
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- 432. The taking of water in excess of that required for the intended use may contribute to water levels being unnecessarily reduced. This lowering may have adverse effects on other groundwater users; particularly where water availability is an issue. In addition, it may result in elevated water levels down gradient of the area being irrigated, which may in turn cause a reduction in productivity and possibly surface flooding.
- 433. The applicant is proposing to spray irrigate 120 ha of crops and pasture on a seven day rotation. The property is covered with light soils, taken from the NZ Fundamental Soils Layer (Landcare Research) with an average water holding capacity of 75mm. On a seven-day return period, 27.3mm will be applied. This is less than 50% of the average water holding capacity of the soil and is considered to be an efficient use of water.
- 434. Evidence on the methodology's used to determine annual allocation is being presented by Mr. Ian McIndoe of Aqualinc.
- 435. The diversion and the take will be metered as required by Policy 21 of the WAP.
- 436. Given this, effects of inefficient water use will be less than minor.

Effects on in stream values

Minimum flow requirements	Assessment criteria (based on)	Policy 3-5, 23 and 26 (WAP)
	Proposed Environmental Flow Regime	Hakataramea River modified
Comments		

- 437. The applicant is proposing modified minimum flows based on flows in the Hakataramea River at SH82.
- 438. The reason for adopting the Hakataramea River minimum flow for CRC050957 (as opposed to the 5 year, 7 day low flow) is that Peters Stream contributes very little to the flow in the Hakataramea River. Therefore, it is of more benefit to the catchment overall to be subject to a minimum flow on the Hakataramea River.
- 439. The take for irrigation also occurs after the diversion from Peters Stream. The diversion is a permanent diversion as it also supplies stock water to the property. It is also noted that Peters Stream ceases to have surface flow approximately 100 metres downstream of the diversion. There is therefore no benefit to having the minimum flow set on Peters Stream.
- 440. Water from the diversion enters the ponds and then flows into the Hakataramea River. The irrigation take can only occur when flows in the Hakataramea River allow.

441. The modified minimum flows (as described in paragraphs 408 – 412 of this report), are higher than those specified in the WAP for the Hakataramea River.
442. The WAP set minimum flows that would be adequate to protect instream values, and therefore, higher minimum flows will further benefit these.
443. The applicant is proposing to install a fish screen designed in accordance with the report *“Fish Screening: good practice guidelines for Canterbury, NIWA Client Report: CHC2007.092, October 2007”*.
444. However, for the three ponds, the fish screens will be installed on suction pipes, as opposed to being in-situ, and therefore, the condition relating to design parameters has been modified to reflect this.
445. As the diversion channel ceases to have surface flow downstream of the diversion itself, and water that is not abstracted for irrigation is able to flow into the waterholes, and then the Hakataramea River, a fish screen is not necessary at the point of diversion.
446. Given this, effects on instream values are considered to be less than minor.

Effects of the use of water on water quality

Water Quality	Assessment criteria (based on)	Policy 13 (WAP), Objective WQL2 (NRRP)
	Existing NO₃-N concentration (mg/L)	
	Increase in NO₃-N (mg/L)	
	Total NO₃-N (mg/L)	
Comments	Water quality effects resulting from the use of water for this applicant have been addressed separately.	

447. Cumulative effects on water quality are being addressed by Ms Lynn Torgeson of Pattle Delamore and Partners.

Assessment of Environmental Effects – to install and maintain a culvert

Effects of the works on flood-carrying capacity and flooding patterns of the river

448. The culvert has is approximately 500 mm in diameter and 7 – 8 metres long. This has recently been up graded due to a history of blockages.
449. Any overland flows as a result of the culvert being in place, or from the diversion channel all occur in the applicant’s property.
450. Therefore, effects on flood carrying capacity and flooding patterns will be less than minor.

Effects of the works on other man-made structures

451. There are no other made structures in the application area.

Effects of the works on water quality

452. Works in the channel may cause a temporary discoloration of the water.
453. Mitigation is proposed requiring all practicable measures to be undertaken to minimise the discharge of sediment to the watercourse, arising from the works.
454. It is also noted that the works are of short duration of works (approximately 1-2 days), and the proposed mitigation measures will ensure that water quality is not affected.
455. Given this, effects on water quality are considered to be less than minor.

Effects of the works on bank erosion and bank stability

456. The diversion occurs at a relatively flat, stable part of the stream, which greatly reduces the potential for scour.
457. Mitigation is proposed that will ensure that the effects of the works on bank erosion and stability are minor.

Effects on in stream values and riparian margins

458. The diversion is from Peters Stream, which flows underground approximately 100 metres downstream of the diversion. Given the ephemeral nature of the stream and the fact that it does not have a direct connection to the Hakataramea River, the ecological value of the stream is considered to be limited.
459. The riparian vegetation consists of exotic pasture grass and is unfenced. Therefore, the riparian vegetation also has little ecological value.
460. Given that effects on water quality are considered to be minor, the effects on instream values and riparian margins are also considered to be minor.

APPLICANT: RPNZ PROPERTIES LIMITED

Resource consents being sought:

Consent ID	Description	Table 3 Location
CRC051767	To take and use water at a maximum rate not exceeding 30 L/s, with an annual volume not exceeding 252,000 cubic metres, from a pond adjacent to the Hakataramea River at or about map reference NZMS 260 I40:218-164, for spray irrigation of 48 ha of crops and pasture, adjoining McHendrys Road, in the Hakataramea Valley. This is an existing activity. A 35 year duration is sought	Hakataramea River
CRC051768	To take and use water at a maximum rate not exceeding 26 L/s, with an annual volume not exceeding 212,000 cubic metres, from bores I40/0003 and I40/0159,	Hakataramea River

	(1000 mm diameter and three metres deep), at or about map references NZMS 260 I40:207-156 and I40:210-159, for the spray irrigation of 40 ha of crops and pasture, adjoining McHendrys Road, in the Hakataramea Valley. This is an existing activity. A 35 year duration is sought.	
CRC051769	To take and use water at a combined maximum rate not exceeding 20 L/s, with an annual volume not exceeding 216,000 cubic metres, from bore I40/0528 (500 mm diameter and 10 metres deep), at or about map reference I40:147-102, bore I40/0440 (500 mm diameter and 10 metres deep), at or about map reference NZMS 260 I40: 144-106, and from bore I40/0441 (500 mm diameter and 10 metres deep), at or about map reference I40: 150-106, for the spray irrigation of 40 ha of crops and pasture, opposite Milne Road, Hakataramea Valley. This is an existing activity with the inclusion of an additional bore. A 35 year duration is sought.	Hakataramea River

Previous resource consents:

Consent ID	Description	Explanation
CRC930942.2	To take water from a pond adjacent to the Hakataramea River at a rate of 30L/s with a maximum volume not exceeding 12, 000 cubic metres per week (map reference I40: 218-164)	Expired 1 June 2005. Being exercised under S124 continuation.
CRC930653.3	To take water at a combined rate of 26L/s, with a volume not exceeding 10, 000 cubic metres in any period of 7 consecutive days from bore I40/0003 and I40/0159 (map reference I40: 2077-1569 and I40: 2103-1594).	Expired 1 June 2005. Being exercised under S124 continuation.
CRC042849.1	The rate at which water is taken from bore I40/0440, 500 mm diameter and 10 metres deep, at or about map reference NZMS 260 I40: 1446-1035, and bore I40/0441, 500 mm diameter and 10 metres deep, at or about map reference NZMS 260 I40: 1507-1063, and proposed bore, 500 mm in diameter and 10 metres deep, at or about map reference NZMS 260 I40: 1471-1029, shall not exceed a combined rate of 20 L/s, with a volume not exceeding 12, 096 cubic metres in any period of seven consecutive days.	Expired 1 June 2005. Being exercised under S124 continuation.

Background Information

461. RPNZ Properties Limited (hereon in referred to as “the applicant”) applied for CRC051767, CRC051768 and CRC051769 on 23 December 2004.
462. These applications are a complete renewal in terms of flowrate and volume.

463. A change to CRC051769 was required to allow water to be taken from an additional bore. This was granted by way of change of consent condition on the 24 January 2005.
464. The total area being spray irrigated by these three consents is 128 hectares of crops, horticultural crops, pasture, and grazing of dry stock.

Application Timeline and Summary of Amendments Made to the Applications

Timeline	CRC051767	CRC051768	CRC051769
Date of Lodging	23 Dec 2004	23 Dec 2004	23 Dec 2004
First Notifiable Date	7 Mar 2005	7 Mar 2005	7 Mar 2005
WAP Notifiable Date	14 Mar 2007	14 Mar 2007	14 Mar 2007
Public Notification	4 Aug 2007	4 Aug 2007	4 Aug 2007

465. The application for resource consent lodged in December 2004 offered several conditions including a minimum flow for the Hakataramea River. The following was advised:

“It is noted that the Hakataramea River minimum flow is/will be revised. Given this, the applicant requests that all three water rights be subject to the revised minimum flow”.

466. On the 4 March 2005 ECan made a request for information, in particular, an annual volume for each of the applications was requested. This was submitted to ECan on the 7 March 2005.
467. No further information was required under the WAP.

Comments on Submissions

468. 19 submissions were received in total relating to this application. Of these, 13 were in opposition, 4 are in support and 2 neither support nor oppose.
469. Two of the submissions received are relating directly to these applications.
470. Mr. SW Taylor is an irrigator in the Hakataramea Valley, and he is concerned that any new takes from the Hakataramea River will impact on his reliability of supply.
471. It is noted that Table 3 of the WAP specifies an allocation limit of 500 L/s for the Hakataramea River. At present, there is 291 L/s allocated, with a total of 116 L/s in process, including these applications. This brings the total allocation if all resource consents in process are granted to 407 L/s, within the allocation limit set by Table 3 of the WAP.
472. These three resource consent applications are related directly to the Hakataramea River, and are for renewal application, not a new take.
473. Mr. G Hay supported this application for the fact that it is a renewal application.

Assessment of Environmental Effects – to take and use water (CRC051767, CRC051768, CRC051769)

Effects on other water users

Effects on other water users	Assessment criteria (based on)	Policy 14, 23 and 26 (WAP)
	Comments	<p>CRC051767 is to take and use water from a pond sourced directly from the Hakataramea River.</p> <p>CRC051768 and CRC051769 are to take and water from shallow bores, which have been considered as completely hydraulically, connected to the Hakataramea River and has therefore been considered as surface water takes.</p>

474. These applications are to renew existing consents, with no changes being sought.
475. The current Hakataramea River minimum flow requires abstractors to reduce to 50% of the maximum allowable take when flows in the Hakataramea River as measured at SH82 are at or below 1, 500 L/s and to cease when flows are at or below 500 L/s.
476. In *“Report 3: Flow and Level Regime for the Tributary Water bodies”* of the S42a Reports, it is shown that there is conflict between the existing minimum flow conditions on consents and those that could be adopted for new applications in accordance with Rule 2, Table 3.
477. In essence, when flow in the river is 1.5m³/s, new abstractors can continue taking water at full rates of abstraction whilst existing users have reduced their takes by half.
478. Until such time as existing consents are reviewed, renewed, or changes of condition sought to change the minimum flow condition of a consent to that specified in the WAP, there will be this discord between existing users and new users.
479. The applicant recognises this, and therefore, for these applications, it is proposed to maintain the current Hakataramea River minimum flow, (50% abstraction at 1.5m³/s and cease abstraction at 0.5m³/s).
480. Given this, effects on other users will be less than minor.

Cumulative effects

481. With respect to Rule 2, Table 3, the Hakataramea River has an allocation limit of 500 L/s. If all resource consents are granted, including these applications, the total allocation for the river will be 407 L/s, less than the allocation limit.
482. With respect to Rule 6, Table 5, the take also sits within the area defined as “Downstream of Waitaki Dam, but Upstream of Black Point” in Table 5 of the WAP.
483. ECan considers that the allocation limit of 150million m³/year for this area will be exceeded if all resource consents are granted.
484. Further evidence on the subject of annual allocation will be presented by Mr. Ian McIndoe of Aqualinc and Ms Keri Johnston of Irricon Resource Solutions.

Effects of inefficient water use

CRC051767

Reasonable and Efficient Use Seasonal Volumes and Land use	Assessment criteria (based on)		Policy 15-21 (WAP)
	Land use		Crops, pasture and dry stock grazing
	Area to be irrigated (hectares)		48
	Method of application		Spray
	Efficiency of application		80%
	Daily application depth		5.4 mm
	Return period		5 day
	Return period application depth		27 mm
	Soil profile available water		82mm
	Mean Annual Rainfall		210 mm
	Assessment criteria (based on)		Policy 10 – 14 (WAP)
	Seasonal volume required (m ³ /year)		252, 000 m ³ /year
	Volume to be included in Table 5 (WAP) allocation		252, 000 m ³ /year
	Comments	The proposed annual volume has been determined using Schedule WQN9v2.	

CRC051768

Reasonable and Efficient Use Seasonal Volumes and Land use	Assessment criteria (based on)		Policy 15-21 (WAP)
	Land use		Crops, pasture and dry stock grazing
	Area to be irrigated (hectares)		40
	Method of application		Spray
	Efficiency of application		80%
	Daily application depth		5.6 mm
	Return period		5 day
	Return period application depth		28 mm
	Soil profile available water		60mm
	Mean Annual Rainfall		590mm
	Assessment criteria (based on)		Policy 10 – 14 (WAP)
	Seasonal volume required (m ³ /year)		212, 000 m ³ /year
	Volume to be included in Table 5 (WAP) allocation		212, 000 m ³ /year
	Comments	The proposed annual volume has been determined using Schedule WQN9v2.	

Reasonable and Efficient Use Seasonal Volumes and Land use	Assessment criteria (based on)	Policy 15-21 (WAP)
	Land use	Crops, pasture and dry stock grazing
	Area to be irrigated (hectares)	40
	Method of application	Spray
	Efficiency of application	80%
	Daily application depth	4.3 mm
	Return period	7 day
	Return period application depth	30 mm
	Soil profile available water	60mm
	Mean Annual Rainfall	556 mm
	Assessment criteria (based on)	Policy 10 – 14 (WAP)
	Seasonal volume required (m³/year)	216, 000 m ³ /year
	Volume to be included in Table 5 (WAP) allocation	216, 000 m ³ /year
Comments	The proposed annual volume has been determined using Schedule WQN9v2.	

485. The taking of water in excess of that required for the intended use may contribute to water levels being unnecessarily reduced. This lowering may have adverse effects on other groundwater users; particularly where water availability is an issue. In addition, it may result in elevated water levels down gradient of the area being irrigated, which may in turn cause a reduction in productivity and possibly surface flooding.
486. The applicant is proposing to spray irrigate a total of 128 ha of crops and pasture for grazing dry stock on a five to seven day rotation. The properties are both covered with light soils, taken from the NZ Fundamental Soils Layer (Landcare Research) with an average water holding capacities ranging from 60mm to 82mm. On a five to seven day return period, between 27mm to 30mm will be applied at each location. This is less than 50% of the average water holding capacity of the soil and is considered to be an efficient use of water.
487. Evidence on the methodology's used to determine annual allocation is being presented by Mr. Ian McIndoe of Aqualinc.
488. The take will be metered as required by Policy 21 of the WAP.
489. Given this, effects of inefficient water use will be less than minor.

Effects on in stream values

Minimum flow requirements	Assessment criteria (based on)	Policy 3-5, 23 and 26 (WAP)
	Proposed Environmental Flow Regime	Modified Hakataramea River minimum flow
	Comments	

- 490. The applicant is proposing modified minimum flows based on flows in the Hakataramea River at SH82.
- 491. The modified minimum flows (as described in paragraphs 464 - 468 of this report), are higher than those specified in the WAP for the Hakataramea River.
- 492. The WAP set minimum flows that would be adequate to protect instream values, and therefore, higher minimum flows will further benefit these.
- 493. The applicant is proposing to install a fish screen designed in accordance with the report *"Fish Screening: good practice guidelines for Canterbury, NIWA Client Report: CHC2007.092, October 2007"* for CRC051767 (to take and use water from the pond).
- 494. CRC051768 and CRC051769 are to take and use water from bores, which do not require fish screens.
- 495. Given this, effects on instream values are considered to be less than minor.

Effects of the use of water on water quality

Water Quality	Assessment criteria (based on)	Policy 13 (WAP), Objective WQL2 (NRRP)
	Existing NO₃-N concentration (mg/L)	
	Increase in NO₃-N (mg/L)	
	Total NO₃-N (mg/L)	
Comments	Water quality effects resulting from the use of water for this applicant have been addressed separately.	

- 496. Cumulative effects on water quality are being addressed by Ms Lynn Torgeson of Pattle Delamore and Partners.
- 497. The following effects are only relevant to CRC051768 and CRC051769.

Effects on other users from seawater intrusion

- 498. The proposed bores are approximately 60km from the coast, making saltwater intrusion unlikely.

Effect on aquifer stability

499. The bores are situated in gravels of the Hakataramea River. As the strata from which water is to be abstracted is gravel based, aquifer subsidence is unlikely.

Effect from cross-connection on groundwater quality

500. The bores are all between 10 metres and 20 metres in depth, and are therefore considered to be abstracting from an unconfined aquifer. This means that cross connection between aquifers is unlikely.

APPLICANT: HAKATARAMEA STATION (1990) LIMITED

Resource consents being sought:

Consent ID	Description	Table 3 Location
CRC950464.2	To change conditions of consent to include water storage as a use of water.	All other streams– McKays Stream
CRC981376	To divert water a rate of 60 L/s from McKays Stream to water races flowing into dams	All Other Streams– McKays Stream
CRC040999	To dam 413, 000 cubic metres in four storage dams and to use water from the dams at a rate of 75 L/s for the irrigation of 105 ha.	Not applicable
CRC981377	To disturb and excavate the bed of McKays Stream to install a water intake structure.	Not applicable
CRC042653	To disturb the bed of unnamed ephemeral streams to construct four water storage ponds.	Not applicable

Other resource consents held:

Consent ID	Description	Comment
CRC950464.1	To take and use water at a rate of 15 L/s from McKays Stream for irrigation and stock purposes.	This consent was transferred to the applicant from Hakataramea Landholding Company in 1998.

Background Information

501. Hakataramea Station (1990) Limited (heron in referred to as “the applicant”) applied for resource consents CRC981377 and CRC981376 on 17 February 1998. The applicant had previously held resource consents CRC895056A, B and C, for the same activities. These expired on 30 June 1993.
502. Resource consent CRC040999 was lodged on 13 November 2003.
503. Resource consents CRC042653 and CRC950464.2 were lodged on 10 June 2004.
504. The applications refer to the diversion of water from McKays Stream into four water storage ponds.
505. Water will be used for the irrigation of 105 ha of crops and pasture within a total area of 675 ha, allowing for crop rotation.

Application Timeline and Summary of Amendments Made to the Applications

Timeline	CRC981377	CRC981376	CRC04099	CRC950464.2	CRC042653
Date of Lodging	17 Feb 1998	17 Feb 1998	13 Nov 2003	10 June 2004	2 June 2004
First Notifiable Date	10 Nov 2004	10 Nov 2004	10 Nov 2004	27 Oct 2004	9 Oct 2004
WAP Notifiable Date	5 Feb 2007	5 Feb 2007	5 Feb 2007	5 Feb 2007	5 Feb 2007
Public Notification	4 Aug 2007	4 Aug 2007	4 Aug 2007	4 Aug 2007	4 Aug 2007

506. Resource consents CRC981377 and CRC981376 were lodged, as mentioned earlier in this report, to replace resource consents CRC895056A, B and C, for the same activities, but which had expired. These consents authorised the diversion of 60 L/s for wild flood irrigation.
507. In 1998, applications to renew CRC895056A, B and C were lodged.
508. Mr. Warwick Pascoe assessed the applications, a consents investigating officer at the time. Further information was requested on 23 March 1998 and supplied by the applicant on 24 March 1998.
509. A meeting was held between the applicant and the ECan on 29 May 1998, and on 5 June 1998, a record of the meeting was sent to the applicant requesting confirmation of the record. This included a set of draft conditions. There was no mention of written approvals being required.
510. The minimum flow’s proposed, as conditions by Mr. Pascoe were to retain 30 L/s in McKays Stream at Hakataramea Valley Road, and at least 90 L/s immediately downstream of the intake. A minimum flow of 500 L/s at the SH82 on the Hakataramea River was also included.
511. On 6 October 1999, confirmation of the record of the meeting had not been received, and the applicant was sent a fax advising this. On the fax, the first mention that written approvals were needed is made. The approvals were needed from Mr. AK Taylor (a downstream user), Fish and Game and the Department of Conservation.

512. A file note written by Mr. Pascoe on 11 October 1999 states that he had spoken to Fish and Game and the Department of Conservation (DoC). DoC had no concerns, but Fish and Game expressed concern. It is noted that Mr. Hayman (the applicant) would speak to Mr. Taylor once Fish and Game and DoC had been sorted out.
513. On 12 July 2000, Mr. Pascoe wrote to the applicant asking that the application be progressed.
514. A file note written by Mr. Pascoe on 7 August 2000 recording a telephone conversation with the applicant states that the applicant had offered for DoC to come onto the property and have a look, but he had heard nothing. A copy of the application had also been dropped in the Twizel Area Office, which hadn't been returned. Mr. Frank Scarf of Fish and Game had also been contacted, but was a "quick negative" about the application. Mr. Taylor had been spoken too, but the application and written approval form were still with DoC in Twizel, so the applicant was unable to get Mr. Taylor to sign. Mr. Pascoe offered to contact both Fish and Game and DoC.
515. On 8 August 2000, Mr. Pascoe spoke to Mr. Scarf of Fish and Game who advised that in general, he didn't want to see any more water taken from Hakataramea River and that also the resource consents issued following the break-up of the original Hakataramea Station were "messed up" and so he would want to look closely at the applications.
516. On 10 August 2000, Mr. Pascoe spoke with Mr. Dave Masson of DoC in Twizel, who wished to see what Fish and Game thought about the application before commenting further.
517. On 28 August 2000, Fish and Game wrote a letter to ECan advising that a more efficient system of irrigation application needs to be implemented if the interests of Fish and Game and others are to be protected. With conversion to spray or K line irrigation, together with a requirement to record the rate and volume of take, Fish and Game would be prepared to withdraw its objection to the application. All other conditions would be as detailed in Mr. Pascoe's letter of 5 June 1998.
518. The applicant was advised of this letter on 6 September 2000.
519. On 20 September 2000, the applicant spoke to Mr. Pascoe advising that he was going to employ a consultant to assist with the applications, and was going to look into storage dams, and using K line irrigation. Mr. Pascoe supported this and advised that this was a better option than attempting to get the wild flood consent replaced.
520. In August 2001, the applicant, in order to progress the application engaged Mr. RJ Hall.
521. On 13 November 2003, CRC040999 was lodged to dam water and use the water from the dams for spray irrigation.
522. Thirteen days later, the minister's call-in occurred.
523. In June 2004, two further consents were identified as being needed – a consent to construct the dams (CRC042653) and a change of conditions to CRC950464.1 to allow the water to be diverted into storage.

Comments on Submissions in relation to CRC021585, CRC021258, CRC021221.2 and CRC072756

- 524. 18 submissions were received in total relating to these applications. Of these, 12 were in opposition, 4 in support and 2 neither support nor oppose.
- 525. Two of the submissions received are relating directly to these applications. The remainder was from submitters who made submissions on all applications in process.
- 526. Mr. S Taylor is opposed to all new takes in the Hakataramea Valley on the basis the catchment is already over allocated.
- 527. Mr. G Hay is in support of the applications stating, “harvesting should be encouraged”.

Assessment of Environmental Effects – to take water (CRC981376)

Effects on other water users

Effects on other water users	Assessment criteria (based on)	Policy 14, 23 and 26 (WAP)
	Comments	

- 528. McKays Stream has a catchment area, at the point of abstraction, of approximately 10 square kilometres, coming off the Kirkliston Hills. The catchment, in general can be described as a steep, mountain catchment. The mean flow is estimated to be 203 L/s, and the mean annual low flow is estimated to be 77 L/s.
- 529. In 2003, Mr. Hall was also doing work for CRC021585 for Star Holdings Ltd on Station Stream. Mr. Hall created a correlation between flows in Station Stream and the Hakataramea River, and at the same time, created a correlation between flows in Station Stream and McKays Stream.
- 530. Mr. Hall made the following correlations:

Station Stream Fan Head (L/s)	McKays Stream @ diversion (L/s)
Mean flow = 151	Mean flow = 203
Mean annual low flow = 57	Mean annual low flow = 77

- 531. The corresponding flows on the Hakataramea River at SH82 are a mean flow of 6m³/s and a mean annual low flow of 1, 060 L/s. This means that McKay’s Stream contributes 3% of the daily mean flow of the Hakataramea River, and 7% of the mean annual low flow.
- 532. There is one other downstream abstractor on McKays Stream (now GK & JL Taylor Partnership). Mr. Taylor holds resource consent to divert 60 L/s from McKay’s stream.
- 533. The rationale behind ensuring that 90L/s was retained immediately downstream of the applicant’s intake was to ensure that there was 60L/s for Mr. Taylor and 30L/s left as the minimum flow for McKays Stream.

534. Including the applicant's existing consent of 15 L/s, there is 75L/s allocated from McKays Stream. This application will see the total abstracted from McKays Stream increased to 135 L/s.
535. McKays Stream is in the "all other streams" category of Table 3 of the WAP, which does not set an allocation limit, but states that the minimum flow should be the one in five year, seven day low flow.
536. However, in this instance, there is a consented downstream user, whose take needs to be protected.
537. As stated in paragraph 532 of this report, McKays Stream contributes a very small flow to the Hakataramea River. In paragraph 39 of the S42A report, ECan advises that "*the stream contributes very little flow to the Hakataramea River during summer periods.*" ECan estimates the one in five year, seven day low flow for McKays Stream to be 7 L/s.
538. If the applicant were to divert 60 L/s, whilst abiding by a minimum flow of 7 L/s, Mr. Taylor would be unable to abstract his consented rate of 60 L/s.
539. To ensure that effects on Mr. Taylor are minor, a minimum flow of the mean annual low flow has been proposed (77 L/s) to be retained at Hakataramea Valley Road. Also, a flow of 137 L/s must be retained immediately downstream of the applicant's intake (77 L/s minimum flow + 60 L/s Taylor diversion).
540. The minimum flow proposed for McKays Stream is high, however, in order to ensure that effects on other users are mitigated, a minimum flow for the Hakataramea River is also proposed. This is to halve abstraction when flows in the Hakataramea River at SH82 are at 1, 500 L/s and to cease abstraction at 500 L/s.
541. The diversion will be metered as per Policy 21 of the WAP.
542. Given this, effects on other users will be minor.

Cumulative effects of the take on other water users

543. With respect to Rule 2, Table 3 of the WAP, the diversion from McKays Stream is in the "all other stream" category of Table 3 of the WAP, and no allocation limit is specified for these streams.
544. With respect to Rule 6, Table 5 of the WAO, the take sits within the area defined as "*Downstream of Waitaki Dam, but Upstream of Black Point*" in Table 5 of the WAP.
545. ECan considers that the allocation limit of 150million m³/year for this area will be exceeded if all resource consents are granted.
546. Further evidence on the subject of annual allocation will be presented by Mr. Ian McIndoe of Aqualinc and Ms Keri Johnston of Irricon Resource Solutions.

Effects on in stream values

Minimum flow requirements	Assessment criteria (based on)		Policy 3-5, 23 and 26 (WAP)
	Proposed Environmental Flow Regime		MALF for McKays Stream at Hakataramea Valley Road and 137 L/s immediately downstream of the intake and Hakataramea River modified minimum flow.
	Comments		

- 547. Minimum flows are normally set to protect in stream values. The applicant is proposing to cease abstraction at higher than “normal” minimum flows.
- 548. Mr. Scarf from Fish and Game had stated, in earlier correspondence regarding this application, that the minimum flows suggested by Mr. Pascoe were sufficient. These were 30 L/s on McKays Stream at Hakataramea Valley Road, 90 L/s immediately downstream of the intake and 500L/s on the Hakataramea River at SH82.
- 549. In this instance, a minimum flow of the mean annual low flow on McKays Stream is proposed (77L/s). This is higher than originally proposed, and should, therefore, protect in stream values.
- 550. However, in order to ensure that effects on other users are mitigated, a minimum flow for the Hakataramea River is also proposed. This is to halve abstraction when flows in the Hakataramea River at SH82 are at 1, 500 L/s and to cease abstraction at 500 L/s.
- 551. Given this, effects on instream values will be minor.

Assessment of Environmental Effects – to add the storing of water as a use (CRC950464.2)

Effects on other water users

Effects on other water users	Assessment criteria (based on)		Policy 14, 23 and 26 (WAP)
	Comments	CRC950464.2 is a resource consent that authorises a take of 15 L/s from McKays Stream for stock water and irrigation purposes.	

- 552. No additional water is being taken from Mckays Stream, and the effects of this activity are being assessed under CRC040999 (to dam water).

Effects on in stream values

Minimum flow requirements	Assessment criteria (based on)	Policy 3-5, 23 and 26 (WAP)
	Proposed Environmental Flow Regime	To retain current consented minimum flows.
	Comments	CRC950464.1 currently has a minimum flow condition for the Hakataramea River at SH82 that requires the take to be reduced to 50% when flows are at or below 1500 L/s and to cease when flows are at or below 500 L/s.

553. The applicant proposes to retain the current minimum flow, and therefore, the take will not alter the current situation in respect to when water can be abstracted, and therefore, the effect on in stream values is also unchanged.

Assessment of Environmental Effects – to dam and use water (CRC040999)

554. CRC040999 will enable water to be stored in four water storage ponds, located in grassed depressions within the applicant's property.
555. The depressions carry flow only during major rainstorm events, or snowmelt, which typically occurs once to twice a year. The maximum catchment area for each dam is 0.5 square kilometres. This is very small.
556. Three of the ponds are of a small volume (21, 000 cubic metres each) and the fourth pond will hold 350, 000 cubic metres.
557. As the storage ponds will be located out of stream, the primary effect to address is dam failure.
558. The three storage ponds of 21, 000 cubic metres are a maximum height of 4.5 metres above ground level with a maximum water depth of 4 metres.
559. The largest pond has a maximum height of 10 metres.
560. When a dam fails, a large wave of water flows downstream. This sudden rise in water levels can mean that people downstream of the failed dam can experience a loss of property, stock, and even life. Also, the ecosystem downstream of the dam can be significantly damaged.
561. The property is bounded by McKays Stream and Rocky Point Stream. The nearest dwellings to the storage sites (excluding the applicant) is over 3 km away, on the other side of the McKays Stream. Hakataramea Valley Road is 2.3 km downstream of pond 4 (the largest pond).
562. Under NZSOLD guidelines, the storage ponds are considered to be in the **low** risk category. This means that the risk to life is low, with minimal damage (environmental and economic) possible as a consequence of failure. The likelihood of loss of life is considered exceedingly small given the rural nature of the site, and the size of the dam.
563. Robin Fell at the ANCOLD conference entitled Dams: the implications of ownership did a survey of 14, 700 dam failures on large dams (>15m high) and found that only 0.83% of all embankment dams failed. The probability of failure is extremely small, and the storage on this applicant's property is only a fraction of the height of dams surveyed.

564. The most likely causes of a dam failure for storage of this nature are overtopping causing a breach.
565. Any failure flows would be routed into the Hakataramea River via McKays and Rock Point Streams.
566. Calculations have been carried out to assess the effect of a breach failure. These calculations are based on work by Macdonald and Langridge-Monopolis in 1984 in which the pair assessed 42 examples of previous dam failures. The calculations determine a breach formation factor, defined as the volume of the breach outflow multiplied by the depth of water above the breach invert. Macdonald and Langridge-Monopolis also concluded from the analysis of the 42 case studies cited in their paper that the breach side slopes could be assumed to be 1:2 H:V, and the breach shape was either trapezoidal or triangular.
567. For these calculations, a trapezoidal breach shape has been used, with a 5-metre breach width. The gradient within the property to the downstream boundary is 0.03 m/m, and a Manning's number of 0.07 is used to represent permanent pasture and crops as the dominant land surface downstream of the storage site.
568. For the 350, 000 cubic metre water storage pond, time to affect the breach is 3 minutes, with the breach lasting between 15 minutes to 20 minutes. Peak outflow will be $318.6\text{m}^3/\text{s}$, but will reduce to $143\text{m}^3/\text{s}$ within a matter of minutes. The peak flow resulted in velocity of 0.84 m/s, and a water depth of 198mm at a distance of 2, 300 metres from the dam (this is the distance to the road), and would last for a matter of minutes at this rate.
569. For a pond storing 21, 000 cubic metres, time to affect the breach are 3 minutes, with the breach, lasting between 15 minutes to 20 minutes. Peak outflow was $47\text{m}^3/\text{s}$. This peak outflow resulted in velocity of 0.39 m/s, and a water depth of 63mm at a distance of 2, 300 metres from the dam (this is the distance to the road), and would last for a matter of minutes at this rate.
570. For overtopping to affect a breach, there would need to be a "dent" in the downstream slope and water would need to be concentrated at this point for a long period of time to erode enough material for the embankment to fail. For out of stream water storage ponds, this is highly unlikely to occur as the storage is filled "manually".
571. Conditions are proposed to ensure a Chartered Professional Engineers involvement throughout the process.
572. A building consent is also required for the ponds as the water depth in each pond exceeds 3 metres. Therefore, the structural aspect of each pond will also be dealt with in detail during the building consent process.

Effects of inefficient water use

Reasonable and Efficient Use Seasonal Volumes and Land Use	Assessment criteria (based on)		Policy 15-21 (WAP)
	Land use		Crops and pasture for grazing sheep, beef cattle and non-milking dairy cows.
	Area to be irrigated (hectares)		105
	Method of application		Spray
	Efficiency of application		80%
	Daily application depth		6.2 mm
	Return period		3 days
	Return period application depth		18.6 mm
	Soil profile available water		63mm
	Mean Annual Rainfall		564mm
	Assessment criteria (based on)		Policy 10 – 14 (WAP)
	Seasonal volume required (m³/year)		577, 500m ³ /year
	Volume to be included in Table 5 (WAP) allocation		0 m ³ /year
	Comments	<p>The proposed annual volume for irrigation has been calculated using Schedule WQN9v2.</p> <p>The volume to be included in Table 5 for this consent is 0. This is because, the diversion of water into storage under CRC981367 and CRC950464.2 has already been included, and this is that same water being used.</p>	

573. The taking of water in excess of that required for the intended use may contribute to water levels being unnecessarily reduced. This lowering may have adverse effects on other groundwater users; particularly where water availability is an issue. In addition, it may result in elevated water levels down gradient of the area being irrigated, which may in turn cause a reduction in productivity and possibly surface flooding.
574. The applicant is proposing to spray irrigate 600 ha of crops and pasture on a three day rotation. The property is covered with light soils with an average water holding capacity of 63mm. On a three-day return period, 18.6 mm will be applied. This is less than 50% of the average water holding capacity of the soil and is considered to be an efficient use of water.
575. Evidence on the methodology's used to determine annual allocation is being presented by Mr. Ian McIndoe of Aqualinc.
576. The diversion and the take will be metered as required by Policy 21 of the WAP.
577. Given this, effects of inefficient water use will be less than minor.

Effects of the use of water on water quality

Water Quality	Assessment criteria (based on)	Policy 13 (WAP), Objective WQL2 (NRRP)
	Existing NO₃-N concentration (mg/L)	
	Increase in NO₃-N (mg/L)	
	Total NO₃-N (mg/L)	

Comments

Water quality effects resulting from the use of water for this applicant have been addressed separately.

578. Cumulative effects on water quality are being addressed by Ms Lynn Torgeson of Pattle Delamore and Partners.

Assessment of Environmental Effects – to excavate, disturb and place a structure, for the diversion of water, McKays Stream (CRC981377)

579. The works involve the construction of a low-level diversion bund in the bed of McKays Stream to facilitate the diversion of water into races that feed the water storage ponds.
580. The bund comprises un-consolidated river gravels and boulders pushed up from the bed may be constructed in order to effect the diversion of water.
581. The batters will be 1:1 H: V, with a crest width of 800 mm to 1000 mm, and not stand more than 800mm to 1000mm above the general bed level. It will be located adjacent to the natural banks of the stream and project upstream at an angle of typically 30 to 40 degrees to the centre line of the stream at the bund site. It will be approximately 30 metres in length.
582. No other structures are required for the diversion of water as the intake already exists for CRC050464.1.

Effects of the works on flood-carrying capacity and flooding patterns of the river

583. The bund is designed to fail in a flood event and therefore no change in flooding patterns is expected.
584. The dimensions of the bund are such that it is not intrusive in the stream, and will therefore not interfere with normal flows (water will be able to continue to flow over the bund and around it).
585. Given this, effects on flood carrying capacity and flooding patterns of the river will be minor.

Effects of the works on other man-made structures

586. There are no other man made structures upstream or downstream of the application area.
587. Therefore, effects on other man-made structures will be minor.

Effects of the works on water quality

588. Works in the channel may cause a temporary discoloration of the water.
589. Mitigation is proposed stating that all practicable measures will be undertaken to minimise the discharge of sediment to the watercourse, arising from the works.

590. It is also noted that the works are of short duration of works (approximately 1 -2 days), and the proposed mitigation measures will ensure that water quality is not affected.

591. Given this, effects on water quality will be minor.

Effects of the works on bank erosion and bank stability

592. Mitigation is proposed to ensure that the effects of the works on bank erosion and stability are minor.

593. It is also noted that effects on flood carrying capacity and flooding patterns are considered to be minor, and with the proposed mitigation, effects on bank erosion and stability will be minor.

Effects on in stream values

594. The bund is not a dam (i.e. it does not extend across the entire width of McKays Stream). There will always be flow either flowing over the bund and/or around the bund downstream and fish passage will not be impeded in any way.

595. Given this, effects on in stream values will be minor.

Assessment of Environmental Effects – to construct four water storage ponds in the bed of unnamed ephemeral streams (CRC042653)

596. The works involve the construction of four water storage ponds in grassed depressions. The depressions normally carry water approximately two times a year following an extreme rainfall event, or snow melt. The maximum catchment area for each pond is 0.5 square kilometres.

597. Construction equipment consists of diggers, trucks and compaction equipment.

Effects of the works on flood-carrying capacity and flooding patterns of the river

598. The works occur in grassed depressions.

599. The ponds will capture any water flowing in the depressions, but for the catchment area, this is estimated to be in the order of 2 L/s to 5 L/s.

600. If the ponds are full, spillways incorporated in the dams will allow water to overflow the ponds and continue on down the depressions.

601. Given this, there will be no effect on flood carrying capacity and flooding patterns of the river.

Effects of the works on other man-made structures

602. There are no other mad made structures in the application area.

603. Therefore, effects on other man-made structures will be minor.

Effects of the works on water quality

604. The works occur in grassed depressions that flow typically two times a year. Therefore, there is no effect of the works on water quality.

605. Given this, effects on water quality will be minor.

Effects of the works on bank erosion and bank stability

606. The works occur in grassed depressions, which only flow typically two times a year.

607. Given this, effects on bank erosion and bank stability will be minor.

Effects on in stream values

608. The works occur in grassed depressions, which have no in stream values.

609. Therefore, effects on instream values will be minor.

APPLICANT: STAR HOLDINGS LIMITED

Resource consents being sought:

Consent ID	Description	Table 3 Location
CRC951776.5	To take water at a rate of 103 L/s from Station Stream for irrigation purposes. This application is to transfer 60 L/s from a downstream location on Station Stream (currently authorised under resource consents CRC951698.1 and CRC951804.2) to an upstream location on Station Stream, where resource consent to take and use 43 L/s is held (CRC951776.4).	All other streams– Station Stream.
CRC021585	To divert surface water from Station Stream during times of high flow (harvesting) into a storage dam.	All Other Streams– Station Stream
CRC021221.1	To increase the total volume stored from 300, 000 cubic metres to 500, 000 cubic metres.	Not applicable
CRC072756	To take and use 434 L/s from a water storage pond for the irrigation of 600 ha of crops and pasture for grazing sheep, beef cattle, deer and non-milking dairy cows.	Not applicable
CRC021258	To excavate, disturb and place a structure in the bed of Station Stream for the diversion of water.	Not applicable
CRC084260	To change the location of the discharge authorised by resource consent CRC021223.1 from Potatoe Stream to Station	Not applicable

	Stream.	
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Other resource consents held:

Consent ID	Description	Explanation
CRC951776.4	To take and use water from Station Stream at a rate of 43 L/s.	This is being changed to include resource consents CRC951698.1 and CRC951804.2, increasing the rate of take to 103 L/s.
CRC951698.1	To take and use water from Station Stream at a rate of 30 L/s.	This will be surrendered upon the granting of CRC951776.5.
CRC951804.2	To take and use water from Station Stream at a rate of 30 L/s.	This will be surrendered upon the granting of CRC951776.5.
CRC021221.1	To dam 300, 000 cubic metres in an out of stream water storage pond.	The volume stored is being increased under CRC021221.2 to 500, 000 cubic metres.
CRC021223.1	To discharge 2, 500 L/s (being water diverted but not taken) into Potatoe Creek.	It is proposed to return this water to Station Stream under CRC084260.

Background Information

- 610. Star Holdings Limited (heron in referred to as “the applicant”) applied for resource consents CRC021585 and CRC021258 on 24 December 2001.
- 611. Resource consents CRC084260, CRC951776.5, CRC021221.1 and CRC072756 were lodged on 12 December 2006.
- 612. The applications relate to two properties in the Hakataramea Valley known as Caberfeidh Station and Broadacres.
- 613. The resource consent applications in paragraph 611 relate to harvesting water from Station Stream during times of high flow and filling storage consented under CRC021221, and carrying out in stream works to facilitate the diversion of water. This occurs on Caberfeidh Station.
- 614. Applications CRC084260, CRC951776.5, CRC021221.1 and CRC072756 were lodged after the applicant purchased Broadacres, the property immediately downstream of Caberfeidh Station. Broadacres has resource consents that allowed a total of 60 L/s to be taken from Station Stream. The applicant requested that this allocation be transferred 2.7 km upstream to Caberfeidh Station, which has a resource consent for 43 L/s, to allow a total of 103 L/s to be abstracted at this point. The volume of storage would be increased from 300, 000 cubic metres to 500, 000 cubic metres, and both Caberfeidh Station and Broadacres could be irrigated from the water stored. Water diverted, but not taken, would be returned to Station Stream.
- 615. In the application, it was concluded that the effects of the proposed changes would be minor as no more water was being taken than that already consented, and the water was being used on land currently irrigated. With respect to the discharge, it was far

more beneficial to discharge water back into Station Stream, where there is one downstream user, rather than into Potatoe Creek, which has no users on it at all.

616. ECan were satisfied that the effects of transferring the Broadacres takes upstream to Caberfeidh Station, and changing the location of the discharge were minor, and a memo to Bianca Sullivan of ECan was written by the investigating officer at the time (Mr. Simon Johnson) on 29 March 2007 recommending that the applications proceed non-notified. This is appended to this report in Appendix J.
617. ECan decided to notify the remaining applications (the increase in storage and the use of water) on the basis the water quality could be adversely affected as a larger area than previously irrigated would being sought.
618. Some time passed, and there was no progress on the applications that had been recommended for non-notification.
619. In April 2007, Mr. Johnson was requested to “re-visit” his recommendation. At this point, he put a case forward for recommending that the applications be notified, primarily on the basis that it was unclear where the transfer “fitted” within the relevant rules in the WAP relating to the transfer of water (Rules 8 and 21 to 24), and that to achieve an appropriate standard of decision-making, the applications be notified and heard and decided with the other water and land use-related applications lodged by the applicant in respect of the same farm. The memo he prepared is attached in Appendix J.

Application Timeline and Summary of Amendments Made to the Applications

Timeline	CRC021585	CRC021258	CRC021221.2	CRC072756	CRC951776.5	CRC084260
Date of Lodging	24 Dec 2001	24 Dec 2001	12 Dec 2006	12 Dec 2006	12 Dec 2006	12 Dec 2006
First Notifiable Date	23 Feb 2003	23 May 2003	12 Dec 2006	12 Dec 2006	12 Dec 2006	12 Dec 2006
WAP Notifiable Date	15 Dec 2006	15 Dec 2006	12 Dec 2006	12 Dec 2006	12 Dec 2006	12 Dec 2006
Public Notification	4 Aug 2007	4 Aug 2007	4 Aug 2007	4 Aug 2007	14 May 2008	14 May 2008

620. No amendments have been made to the applications.

Comments on Submissions in relation to CRC021585, CRC021258, CRC021221.2 and CRC072756

621. 20 submissions were received in total relating to these applications. Of these, 14 were in opposition, 4 in support and 2 neither support nor oppose.
622. Three of the submissions received are relating directly to these applications.
623. Mr. and Mrs. Cleave have asked that the applications be declined on the basis that the applicant owns a number of farms in the Hakataramea Valley, which boundary each other, and have consents which can and are being used for irrigation.
624. Mr. and Mrs. Cleave do not currently hold any resource consent to take and use water for irrigation purposes. Therefore, the applicant’s proposal will have no effect on this submitter at all.

625. Mr. S Taylor is opposed to all new takes in the Hakataramea Valley on the basis the catchment is already over allocated. These applications relate to combining existing takes, and harvesting water during periods of high flows, which will have no effect on existing users, such as Mr. Taylor.
626. Mr. G Hay is in support of the applications stating, “harvesting should be encouraged”.

Comments on Submissions in relation to CRC991776.5 and CRC084260

627. One submission was received in relation to these applications.
628. Mr. S Taylor submitted in support of application CRC082460 (discharge permit) advising that with the discharge being returned to Station Stream, it gives other consent holders the use of the water.

Assessment of Environmental Effects – to harvest water (CRC021585)

Effects on other water users

Effects on other water users	Assessment criteria (based on)	Policy 14, 23 and 26 (WAP)
	Comments	CRC021585 is to take water at times of high flow. This is a water harvesting consent. The point of diversion is on Caberfeidh Station.

629. Station Stream is a steep mountain torrent coming off the eastern face of the Kirkliston Range, and discharging into the Hakataramea River. It is ephemeral in the lower reaches during most summers, and when with respect to flows, is either “feast” or “famine”.
630. Information relating to the correlation between flows in Station Stream and the Hakataramea River was provided by Mr. RJ Hall in the resource consent application for CRC021585, and further information provided in 2003. Mr. Hall created a synthetic flow record for Station Stream by using the mean daily flows of the Hakataramea River at SH82 and the instantaneous records including a couple of days either side of the days that gaugings had been undertaken in Station Stream. Using this data, he was able to establish a correlation between the two. This enabled the SH82 record to be retained for minimum flow purposes. It also ascertains what flows were occurring in Station Stream, as these flows are more of a limiting factor than the flows in the Hakataramea River. The synthetic flow record for Station Stream developed in 1984 (a rainfall-runoff model in which long term rainfall records and stream gaugings) was used to configure our numbers and verify against known flows.
631. Mr. Hall made the following correlations:

Hakataramea River at SH82 (m³/s)	Station Stream fan head (L/s)
104	4200
93	3750
61	2500
30	1250
25	1041

20	841
16	680
12	520
10	440
8	360
6	280
4	200
2	119
1.5	99
1	79
0.5	59

632. There are two other abstractors on Station Stream. One is located upstream of Caberfeidh Station, and the other is located downstream of Broadacres, in the vicinity of where Station Stream ceases to have surface flow, and this users reliability of supply can be very poor.
633. Including the applicant's existing consents, there is 193 L/s allocated from Station Stream. The applicant is 103 L/s of this allocation, with 45 L/s from each of the upstream and downstream abstractors.
634. There are no other resource consents (in process or granted) for taking or diverting water for irrigation purposes from Station Stream.
635. Water harvesting is the concept of taking water at times of high flow, and storing the water for use when it is needed.
636. The applicant recognised the reliability of supply issues with Station Stream. From the above table showing the correlation between flows in Station Stream and the Hakataramea River, flows in the Hakataramea River have to be in excess of 4m³/s for the consented rate to be abstracted from Station Stream.
637. Therefore, in 2001, the applicant submitted resource consent applications to allow them to harvest and store water.
638. The applicant proposed a "staged" harvesting regime. This is as follows:

<i>Flow in the Hakataramea River at SH82 (m³/s)</i>	<i>Abstraction Rate (L/s)</i>
4.5 – 10	103
10-16	250
16-25	400
25-30	500
>30	600

639. Implementing this regime means that the full rate of take of 103 L/s will be taken until flows in the Hakataramea River are above 10 m³/s, when the rate of take can be increased.

- 640. It is also proposed to limit the volume of water taken for harvesting to 50% of the available flows in Station Stream. This is to protect flow variability and to ensure that sufficient water is still available for downstream users.
- 641. Because the take occurs only when flows are sufficiently high in both the Hakataramea River and Station Stream, and with the staged approach, other users on Station Stream are not affected by the harvesting regime.
- 642. The diversion will be metered as per Policy 21 of the WAP.
- 643. Given this, effects on other users will be minor.

Cumulative effects of the take on other water users

- 644. The diversion from Station Stream is in the “all other stream” category of Table 3 of the WAP, and no allocation limit is specified for these streams, and this is an application to take high flow water.
- 645. There are currently no active resource consents in the Hakataramea Catchment to harvest water, however, including this application, there are three applications in process to take water at high flows.⁶ The total amount of water being abstracted when flows are in excess of 4.5m³/s is a maximum of 653 L/s⁷.
- 646. Table 3 of the WAP for the Hakataramea River made harvesting in addition to any allocation limits and flow sharing. In “*Report 3: Flow and Level Regime for the Tributary Water bodies*” of the ECan Section 42a Officer’s reports for this application, paragraph 67 refers to a potential need to accord priority on a “first on, last off” approach. However, this only relates to three applicants, all of whom I represent, and have agreed that while there is only the three of them, that priority amongst the three is not an issue.
- 647. It is also noted that the applicant can only take the current consented rate of take of 103L/s until such time as the flow in the Hakataramea River exceeds 10m³/s.
- 648. Mr. David Stewart of Raineffects Ltd has prepared a flow duration table for the Hakataramea River at SH82. This is as follows:

%	0	1	2	3	4	5	6	7	8	9
0	800002	32441	21987	17816	15446	13901	12664	11651	10896	10220
10	9669	9136	8694	8305	7962	7616	7328	7052	6817	6587
20	6364	6141	5955	5776	5612	5459	5304	5161	5026	4899
30	4778	4663	4547	4433	4332	4230	4131	4031	3940	3838
40	3741	3647	3550	3460	3372	3286	3208	3125	3045	2964
50	2888	2807	2745	2679	2615	2555	2501	2444	2386	2336
60	2286	2232	2185	2138	2089	2048	1998	1952	1902	1846
70	1796	1751	1710	1671	1638	1602	1566	1535	1500	1465
80	1420	1376	1336	1293	1248	1194	1140	1089	1042	1001
90	949	898	851	812	783	752	716	689	660	618
100	447									

⁶ Star Holdings, Sutton and Small.

⁷ 103 L/s Star Holdings + 50L/s Sutton + 500L/s Small

- 649. From the table, flows are in excess of 10m³/s for only 9% of the time, and therefore, for the frequency and duration that water is able to be harvested, there will be no effect on any other water user in the catchment.
- 650. The take also sits within the area defined as “Downstream of Waitaki Dam, but Upstream of Black Point” in Table 5 of the WAP.
- 651. ECan considers that the allocation limit of 150million m³/year for this area will be exceeded if all resource consents are granted.
- 652. CRC072765 seeks to use 3, 240, 000 m³/year from the dam for irrigation purposes.
- 653. Further evidence on the subject of annual allocation will be presented by Mr. Ian McIndoe of Aqualinc and Ms Keri Johnston of Irricon Resource Solutions.

Effects on in stream values

Minimum flow requirements	Assessment criteria (based on)	Policy 3-5, 23 and 26 (WAP)
	Proposed Environmental Flow Regime	Hakataramea River Table 3 WAP (flows in excess of 4.5 m ³ /s)
Comments		

- 654. The applicant is proposing the environmental flow regime for the Hakataramea River as described in Table 3 of the WAP for flows in excess of 4.5m³/s.
- 655. Minimum flows are normally set to protect in stream values. In this instance, a high flow is proposed.
- 656. The equivalent flow in Station Stream when flows are in excess of 4.5m³/s on the Hakataramea River is approximately 200 L/s.
- 657. NIWA prepared a report for the previous owner of the property’s entitled *Assessment of Proposed Changes to Irrigation Consents on the Fish and Fauna of Station Stream and Potato Creek in the Hakataramea Catchment* in February 2002. This report concluded that Station Stream contained average densities of two widespread and common native fish species (Canterbury galaxies and Upland bully). No uncommon or endangered species were found.
- 658. No trout were present in Station stream at all.
- 659. The report concluded that both native species described in Paragraph 658 are able to complete their life cycles in streams, so do not require access downstream to large rivers or the ocean.
- 660. It is also noted that Policy 8 of the WAP states that *“By promoting water harvesting, outside of the water bodies identified in Policy 2, as a means of capturing water for use when flows are low by allowing the taking, damming or diversion of water at flows in the water body that are above the mean and in a manner that avoids or mitigates the loss of physical and ecological benefits of high flow events”*.

661. The applicant is proposing to install a fish screen designed in accordance with the report *“Fish Screening: good practice guidelines for Canterbury, NIWA Client Report: CHC2007.092, October 2007”*.
662. The application is consistent with this policy, and taking water at higher levels will not affect in stream values.

Assessment of Environmental Effects – to transfer water (CRC951776.5)

Effects on other water users

Effects on other water users	Assessment criteria (based on)	Policy 14, 23 and 26 (WAP)
	Comments	CRC951776.5 is an application to transfer 60 L/s from two existing resource consents upstream on Station Stream.

663. There are only 2 other parties with consents to take water from Station Stream. Mr. B Gray (formerly New Zealand Deer Farms) holds CRC950458.1 to take 45 L/s approximately 250 metres upstream of the take point of CRC951766.4. Maungatiro Partnership holds CRC931005 to take 45 L/s approximately 6.4 kilometres downstream of the take point of CRC951766.4.
664. No additional allocation is being taken from Station Stream. The only change in effects is to move the location of the existing consented takes upstream, and this does not adversely affect the other users on Station Stream.
665. An annual volume combined with CRC021585 is proposed to ensure that no more water than is needed is diverted from Station Stream.
666. Given that no more water is being taken from Station Stream than is currently authorised, and there are no other water users between the points of take being “merged”, effects on other users will be minor.

Effects on in stream values

Minimum flow requirements	Assessment criteria (based on)	Policy 3-5, 23 and 26 (WAP)
	Proposed Environmental Flow Regime	67 L/s as measured in Station Stream at Kirkliston Foothills.
	Comments	CRC951776.5 will be subject to a low flow of a 1 in 5 year, 7 day low flow.

667. As referred to in the previous section, NIWA reported in 2002 that the native fish species galaxids and bullies are present in Station Stream and are able to complete their life cycles notwithstanding the fact that there was no permanent summer flow to the main stem of the Hakataramea River.

668. In paragraph 50 of the S42a report for this application, ECan have recommended a minimum flow for this consent of 67L/s measured in Station Stream at the Kirkliston Foothills.
669. CRC951776.4 is currently subject to the Hakataramea River minimum flow.
670. The applicant accepts the minimum flow as per the recommendation of ECan for Station Stream, and retaining the current Hakataramea River minimum flow.
671. Given this, effects on instream values will be minor.

Assessment of Environmental Effects – to increase the volume dammed from 300, 000 cubic metres to 500, 000 cubic metres (CRC021221.2)

672. CRC021221.1 enables 300, 000 cubic metres of water. The storage is located wholly within Caberfeidh Station, and it is an out of stream storage system.
673. In December 2006, an application to change conditions was lodged with ECan to increase the volume of water stored from 300, 000 cubic metres to 500, 000 cubic metres.
674. It was originally proposed to store this water behind a 12 metre high earth dam, but the applicant is in the process of building the first 300, 000 cubic metres of storage in a series of smaller ponds (all one structure), with a maximum embankment height of 1.4 metres above natural ground level and a maximum water depth of 2.9 metres, but with a total area of approximately 20 ha (as opposed to 4.5 ha).
675. The volume of water dammed and embankment height is two key components in a dam permit – it is these two variables that affect a dam failure scenario. The reduction in height means that the probability of a dam failure is significantly reduced. And, whilst it is a series of ponds, it is all one structure. The area is entirely within the applicants property and therefore the fact that the applicant has chosen to construct storage over 20 ha only impacts on the applicant. Therefore, the reduction in height, but an increase in area is within the scope of the application as the effects of the change are reduced from that which was originally applied for.
676. Storage is currently being filled using CRC951776.4, but it is intended to use both CRC021585 and CRC951776.5 if granted.
677. As the storage facility is located out of stream, the primary effect to address is dam failure.
678. When a dam fails, a large wave of water flows downstream. This sudden rise in water levels can mean that people downstream of the failed dam can experience a loss of property, stock, and even life. Also, the ecosystem downstream of the dam can be significantly damaged.
679. The nearest dwellings to the storage site (excluding the applicant) are over 3 km away. The nearest road is 2.5 km downstream.
680. Under NZSOLD guidelines, the proposed storage facility is considered to be in the **low** risk category. This means that the risk to life is low, with minimal damage (environmental and economic) possible as a consequence of failure. The likelihood of loss of life is considered exceedingly small given the rural nature of the site, and the size of the dam.

681. Robin Fell at the ANCOLD conference entitled Dams: the implications of ownership in 2002 did a survey of 14, 700 dam failures on large dams (>15m high) and found that only 0.83% of all embankment dams failed. The probability of failure is extremely small, and the storage on Caberfeidh Station is only a fraction of the height of the dams surveyed.
682. The most likely cause of a dam failure for storage of this nature is overtopping causing a breach.
683. Calculations have been undertaken to assess the effect of a breach failure. The calculations are based on work by Macdonald and Langridge-Monopolis in 1984 in which the pair assessed 42 examples of previous dam failures. The calculations determine a breach formation factor, defined as the volume of the breach outflow multiplied by the depth of water above the breach invert. Macdonald and Langridge-Monopolis also concluded from the analysis of the 42 case studies cited in their paper that the breach side slopes could be assumed to be 1:2 H:V, and the breach shape was either trapezoidal or triangular.
684. A trapezoidal breach shape has been used, with a 5-metre breach width. The gradient within the property to the downstream boundary is 0.112 m/m, and I have used a Manning 's number of 0.07 has been used to represent permanent pasture and crops as the dominant land surface downstream of the storage site.
685. For a 500, 000 m³ water storage pond, time to affect the breach is 5 minutes, with the breach lasting between 15 minutes to 20 minutes. Peak outflow from the breach is 11.66m³/s. This results in a velocity of 0.32 m/s, and a water depth of 17 mm at a distance of 2, 500 metres from the dam (this is the distance to the road), and would last for a matter of minutes at this rate.
686. If a 12-metre embankment was to be constructed, the peak outflow from the breach would be 443 m³/s, which is 36 times greater than the storing the same volume of water in a 1.4 metre embankment dam.
687. For overtopping to affect a breach, there would need to be a “dent” in the downstream slope and water would need to be concentrated at this point for a long period of time to erode enough material for it to fail. For out of stream water storage ponds, this is highly unlikely to occur as the storage is filled “manually”.
688. Conditions on the resource consent already ensure that the applicant has Chartered Professional Engineers involvement and certification in the process right through from design to filling, and as this application for a change of conditions to increase the volume stored, these conditions will be unchanged.

Assessment of Environmental Effects – to use water (CRC072756)

Effects of inefficient water use

Use Seasonal	Assessment criteria (based on)	Policy 15-21 (WAP)
	Land use	Crops and pasture for grazing sheep, beef cattle and non-milking dairy cows.
	Area to be irrigated (hectares)	600
	Method of application	Spray
	Efficiency of application	80%

Water Quality	Daily application depth	6.3 mm	
	Return period	3 days	
	Return period application depth	18.9 mm	
	Soil profile available water	63mm	
	Mean Annual Rainfall	245 mm	
	Assessment criteria (based on)	Policy 10 – 14 (WAP)	
	Seasonal volume required (m³/year)	3, 240, 000 m ³ /year	
	Volume to be included in Table 5 (WAP) allocation	0 m ³ /year	
	Comments	The proposed annual volume has been determined using Schedule WQNv2.	
		However, this annual allocation should not be included in Table 5 as the water than is being used is that diverted to storage under CRC021585. This diversion annual volume is to be included of 3, 740, 000m ³ / year.	

689. The taking of water in excess of that required for the intended use may contribute to water levels being unnecessarily reduced. This lowering may have adverse effects on other groundwater users; particularly where water availability is an issue. In addition, it may result in elevated water levels down gradient of the area being irrigated, which may in turn cause a reduction in productivity and possibly surface flooding.
690. The applicant is proposing to spray irrigate 600 ha of crops and pasture on a three day rotation. The property is covered with light soils, taken from NZ Fundamental Soils Layer (Landcare Research) with an average water holding capacity of 63mm. On a three-day return period, 18.9 mm will be applied. This is less than 50% of the average water holding capacity of the soil and is considered to be an efficient use of water.
691. Evidence on the methodology's used to determine annual allocation is being presented by Mr. Ian McIndoe of Aqualinc.
692. The diversion and the take will be metered as required by Policy 21 of the WAP.

Effects of the use of water on water quality

Water Quality	Assessment criteria (based on)	Policy 13 (WAP), Objective WQL2 (NRRP)
	Existing NO₃-N concentration (mg/L)	
	Increase in NO₃-N (mg/L)	
	Total NO₃-N (mg/L)	
Comments	Water quality effects resulting from the use of water for this applicant have been addressed separately.	

693. Cumulative effects on water quality are being addressed by Ms Lynn Torgeson of Pattle Delamore and Partners.

Assessment of Environmental Effects – to change the location of the discharge from Potatoes Creek to Station Stream (CRC084260)

Effects on other water users

694. The water being discharged is that that is diverted in excess of the consented rate, and is returned immediately back to Station Stream, rather than Potatoe Creek.
695. There are no users of water on Potato Creek, thus no water users will be disadvantaged by the discharging of water to Station Stream.
696. There is one water user with consent to take water from Station Stream, who is located downstream of the dam site. Maungatiro Partnership (Mr. S Taylor) holds resource consent CRC931005 to take 45 L/s approximately 6.4 kilometres downstream. The reliability of flow at their point of take would be increased by the relocation of the spill water in Station Stream as the take occurs very close to where Station Stream becomes ephemeral.
697. Mr. Taylor submitted in support of this application for that very reason, stating that the discharge back into Station Stream would give other consent holders (such as himself) access to the water.
698. Therefore, no other water users will be adversely affected by the change of the discharge location.

Effects on in stream values

699. The water that would have been spilled to Potatoe Creek would have resulted in higher flows in this creek than would naturally occur.
700. To date, with storage only under construction now, the discharge into Potatoe Creek has not occurred to date.
701. In relation to the discharge of water to Station Stream, the fish species that are present (being galaxids and bullies) are able to complete their life cycles notwithstanding the fact that there was no permanent summer flow to the main stem of the Hakataramea River.
702. The water discharged into Station Stream will be in addition to the naturally occurring flow, and therefore, effects on in stream values will be less than minor.

Assessment of Environmental Effects – to excavate, disturb and place a structure, for the diversion of water, in Station Stream (CRC021258)

703. The works involve the construction of a low-level diversion bund in the bed of Station Stream to facilitate the diversion of water under “normal” flows (as opposed to the harvesting of water).
704. The bund comprises un-consolidated river gravels and boulders pushed up from the bed may be constructed in order to effect the diversion of water.
705. The batters will be 1:1 H:V with a crest width of 800mm to 1000mm, and not stand more than 800mm to 1000mm above the general bed level. It will be located adjacent to the natural banks of the stream and project upstream at an angle of typically 30 to 40 degrees to the centre line of the stream at the bund site. It will be approximately 10 metres in length and up to 3 metres wide.
706. The bund is intended to fail by erosion and washout in flows in the order of 4m³/s.

707. A control structure is situated immediately after the diversion of water. This consists of a manually operated underflow gate in order to regulate flow entering the supply race downstream of that structure, and in order to ensure that excess water is diverted back to Station Stream.
708. Excess flow will be directed back to Station Stream over a side spill weir constructed of concrete or timber, with a rock rip rap apron.

Effects of the works on flood-carrying capacity and flooding patterns of the river

709. The bund is designed to fail in a flood event and will therefore not obstruct flood flows.
710. Given this, effects on flood carrying capacity and flooding patterns of the river will be minor.

Effects of the works on other man-made structures

711. There are no other mad made structures upstream or downstream of the proposed bund.
712. Given this, effects on other man-made structures will be minor.

Effects of the works on water quality

713. Works in the channel may cause a temporary discoloration of the water.
714. Mitigation is proposed requiring that all practicable measures be undertaken to minimise the discharge of sediment to the watercourse, arising from the works.
715. It is also noted that the works are of short duration of works (approximately 1 -2 days); this in combination with the proposed mitigation measures will ensure that water quality is not affected.
716. Given this, effects on water quality will be less than minor.

Effects of the works on bank erosion and bank stability

717. Mitigation is proposed to ensure that the effects of the works on bank erosion and stability are minor.
718. The rock rip rap apron on the on the side spill weir will ensure that there is no erosion from the discharge back into Station Stream from the water race.
719. Given this, effects on bank erosion and bank stability will be minor.

Effects on in stream values

720. The bund is not a dam (i.e. it does not extend across the entire width of Station Stream). There will always be flow either flowing over the bund and/or around the bund downstream.
721. The NIWA 2002 report advises that it would be unlikely that adult trout would be able to migrate very far up into these tributaries given that they have no more ephemeral flow in the lower reaches.

722. NIWA also confirmed that the native species present didn't need access downstream into larger rivers or oceans. However, access will not be prevented as a result of the bund as water will be able to flow over and around the bund.

723. Given this, effects on in stream values will be minor.

APPLICANT: RW and ME SUTTON

Resource consents being sought:

Consent ID	Description	Table 3 Location
CRC071114	To divert water at a rate of 50 L/s and with a volume not exceeding 500,000 m ³ /year, to a storage dam for irrigation purposes, from Avonlea Stream at or about map reference I40:0961-1262, approximately 4.5 km north west of Hakataramea Valley between Hayes Rd and Farm Rd	All Other Streams – tributary of Avonlea Stream

Previous resource consent:

Consent ID	Description	Explanation
CRC980512.1	To divert water from an unnamed tributary of Avonlea Stream, at or about map reference I40:107-127, for water storage purposes.	This consent expires on 20 May 2033. CRC071114 was lodged on 9 October 2006 originally as a change of condition to CRC980512.1 in order to better reflect the activity occurring. ECan considered the significance of the change to require a new consent. CRC980512.1 will be surrendered upon granting of CRC071114.

Related resource consents:

Consent ID	Description	Explanation
CRC980511.1	To dam water, at or about map reference I40:101-132.	This consent expires on 20 May 2033 and remains unchanged.
CRC980513.1	To take water from Tirouni Dam, at or about map reference I40:101-132 for irrigation of up to 140 ha	This consent expires on 20 May 2033 and remains unchanged.

Background Information

724. Mr. and Mrs. Sutton (here on in referred to as the “applicant”) applied for a change of condition to CRC980512.1 on the 9th of October 2006.
725. The change to CRC980512.1 sought to increase the rate of take/diversion from 5L/s to 50L/s at times of high flows. In order to better reflect the activity occurring ECan allocated a new number (CRC071114) to the application and it has since been treated as a new application.
726. A correction to the map reference specified in the original consent for the diversion was also applied for. This is due to fact that the consented map reference on the Avonlea Stream below the dam, which makes it physically impossible to fill the dam via race.
727. The applicant holds two other related resource consents to the diversion. These are CRC980511 to dam water at a volume of 123,500 cubic metres and CRC980513 to take water from the Tirounui Dam for irrigation, at a rate not exceeding 44 L/s, with a volume not exceeding 38,016 cubic metres in any period of fourteen consecutive days.
728. These two consents remain unchanged.
729. Water is to be diverted from Avonlea Stream at a rate not exceeding 50 L/s at times of high flows into the Tirouni Dam.
730. Water is stored and subsequently abstracted for irrigation purposes by the two existing consents.
731. Avonlea Stream ceases to have surface flow approximately 20 to 30 metres downstream of the diversion, unless during flood/fresh events.

Consultation and Discussion Details

732. When the application was lodged consultation had already commenced with the DoC and the Fish and Game. Verbally both parties had indicated written approval would be made.
733. On the 13th October 2006 written approval was received from Fish and Game on the basis that the minimum flows and volumetric allocations would be in accordance with those specified in the WAP. This written approval is appended to the report as Appendix K.
734. On the 22nd January 2007 written approval was also received by DoC. This written approval is appended to the report as Appendix K.
735. More details of this follows in the section “Comments on Submissions and written approvals received”.

Application Timeline and Summary of Amendments Made to the Applications

Timeline	CRC071114
Date of Lodging	9 Oct 2006
First Notifiable Date	26 Feb 2007
WAP Notifiable Date	26 Feb 2007

736. The new application sought to increase the diversion rate from 5 L/s to 50 L/s at times of high flows in accordance with the Hakataramea River flow sharing regime in the WAP, Table 3 (xix).
737. This means that 5 L/s could be taken as part of the existing allocation, and then water will be taken at rates between 6 L/s to 50 L/s whenever the Hakataramea River exceeds 4.5 m³/s.
738. Mitigation is also proposed to regulate the diversion by installing an intake slide gate on the existing pipe intake, to control the diversion rate between 5L/s and 50L/s to meet the Hakataramea River flow sharing regime.
739. ECan requested further information on these applications in 1st December 2006. The following was requested:
- An annual volume for the diversion;
 - Duration of diversion;
 - Residual flow in unnamed tributary;
 - Details of diversion gate; and
 - A 4-digit map reference.
740. On the 19th December 2006, further information was supplied which identified that an annual volume should not be necessary given the consent to take from the dam (CRC980513) had a volume limiting the subsequent take from the dam and consequently the amount of water diverted into the dam. Given there are only ever outflows from the dam during emergency situations via an emergency spillway, water in the dam can only be taken out via the take consent.
741. The duration of the diversion was clarified to be all year around to enable the dam to be filled during the winter months. Further clarification was also provided in relation to the other points requested.
742. There was further liaison with Bianca Sullivan and Simon Johnson over the annual volume and non-notification, with a letter dated 7th February 2007. This letter is attached to this report in Appendix K.
743. This letter highlights that the existing 5 L/s take was part of the existing allocation in terms of Table 3 of the WAP, and that any water taken over this rate would only occur when the Hakataramea River flow exceeded 4.5m³/s, which is in addition to the allocation limit and flow sharing regime. The aim of this change was to ensure that water was only taken during periods of high flows.
744. Table 5 was also addressed, that it was questionable whether this additional water is actually within Table 5 limits since this water is exempt from the Table 3 allocation limits.
745. Further, Rule 6 (2) was also pointed out which refers to water diverted and returned to the same water body in the vicinity of the diversion, for fisheries and wildlife, does not need to be accounted for in the annual allocation to activities in Table 5.

746. The merits of this activity in relation to this Rule 6 2) was discussed since the diversion was to another tributary on the same stream system and the fisheries and wildlife values of Tirounui Dam were detailed, which is sustained by this diversion.
747. ECan still required an annual volume and therefore, an annual volume of 500,000m³/year was provided on the 26th February 2007.
748. A Section 42a Officers Report, prepared by Mr. Simon Johnson for ECan, dated 5th April 2007, recommended that this consent application be non-notified. This report is attached to this report as Appendix K. However, Commission Skelton determined that the application be notified due to it being unable to comply with Rule 6 - Table 5.

Comments on Submissions and Written Approvals

749. 19 submissions were received in total relating to these applications. Of these, 13 were in opposition, 4 in support and 2 neither in support or opposition.
750. Two of the submissions received in opposition were generic submissions from DoC and Fish and Game whom had previously provided written approval for this application as discussed earlier.
751. Subsequent discussions were had with both parties in relation to their submissions. It was identified that since their earlier written approval had been received, issues over water quality and allocation had arisen hence the submissions.
752. A further letter dated 25th February 2008 was provided to DoC and Fish and Game outlining the minimum flows already proposed as part of the original application were consistent with the WAP. That water quality was not an issue in relation to this activity given it is for a non-consumptive diversion of water, not a take and use. And also that it was debatable whether this non-consumptive use should be part of the allocation issue.
753. On the 2nd April 2008 a letter was received from Fish and Game saying they were not opposed to the application based on a number of matters. This letter is attached to this report in Appendix K. The matters identified are mainly the WAP minimum flows and flow regimes. An additional matter was raised requesting an expiry of 20 May 2033 which is consistent with the two related consents and which now has been proposed as part of these consent conditions.
754. DoC is still considering whether they will provide written approval again.
755. Two further submissions received are relating directly to the application.
756. Mr. SW Taylor is an irrigator in the Hakataramea Valley. He is concerned that any new takes from the Hakataramea River will impact on his reliability of supply.
757. The consented 5L/s take is included in the existing allocation to date. The additional rate of take between 5L/s and up to 50L/s is proposed to be taken only at high flows, when the Hakataramea River exceeds 4.5m³/s which will therefore not affect existing users.
758. CRC071114, if granted, would be subject to the Hakataramea River Environmental Flow Regime as detailed in Table 3 of the WAP.
759. Given this, Mr. Taylor's reliability of supply will not be impacted any further by this change to the existing consent.

760. Mr. G Hay supported this application for the fact that it is a renewal application.

Assessment of Environmental Effects – to divert, take and use water

Effects on other water users

Effects on other water users	Assessment criteria (based on)	Policy 14, 23 and 26 (WAP)
Comments	CRC071114 is a renewal for the diversion of 5 L/s and additional flows up to 50 L/s during high flows in the Hakataramea River. This change provides for water harvesting and the diversion is located on the applicant's property.	

- 761. There are no other abstractors in the direct vicinity of the applicant's property; therefore, direct interference from diverting water is not an issue.
- 762. Avonlea Stream, from which water is diverted, is a steep mountain stream draining off the eastern face of the Kirkliston Range, which discharges into the Hakataramea River. It is ephemeral 20-30 metres downstream of the diversion and only ever flows into the Avonlea Stream branch below the dam during flood or fresh events.
- 763. Hydrology data on the Avonlea Stream is very limited with no known hydrology investigations. For that reason, restricting the diversion in accordance with the Hakataramea River was considered more appropriate.
- 764. The existing 5 L/s take is currently consented under CRC980512.1, but this consent is not subject to a minimum flow.
- 765. The current Hakataramea River minimum flow requires abstractors to reduce to 50% of the maximum allowable take when flows in the Hakataramea River as measured at SH82 are at or below 1, 500 L/s and to cease when flows are at or below 500 L/s.
- 766. In "Report 3: Flow and Level Regime for the Tributary Water bodies" of the S42a Reports, it is shown that there is conflict between the existing minimum flow conditions on consents and those that could be adopted for new applications in accordance with Rule 2, Table 3.
- 767. In essence, when flow in the river is 1.5m³/s, new abstractors can continue taking water at full rates of abstraction whilst existing users have reduced their takes by half.
- 768. Until such time as existing consents are reviewed, renewed, or changes of condition sought to change the minimum flow condition of a consent to that specified in the WAP, there will be this discord between existing users and new users.
- 769. For the part of this take for 5 L/s, which is an existing take, it is proposed to maintain the current Hakataramea River minimum flow, (50% abstraction at 1.5 m³/s and cease abstraction at 0.5m³/s) in line with existing consents.
- 770. Additional water is only to be taken when the river exceeds 4.5m³/s (water harvesting). The diversion of water at time of high flows therefore does not affect other users.
- 771. Given this, effects on other users will be minor.

Cumulative effects of the take on other water users

772. The diversion of 50 L/s from Avonlea Stream is in the “all other stream” category of Table 3 of the WAP, and no allocation limit is specified for these streams. This water is only to be taken during high flows.
773. There are currently no active resource consents in the Hakataramea Catchment to harvest water, however, including this application, there are three applications in process, including the applicant’s, to take water at high flows.⁸ The total amount of water being abstracted when flows are in excess of 4.5m³/s is a maximum of 653 L/s⁹.
774. Table 3 of the WAP for the Hakataramea River made harvesting in addition to any allocation limits and flow sharing. In “*Report 3: Flow and Level Regime for the Tributary Water bodies*” of the ECan Section 42a Officer’s Hearing reports, paragraph 67 refers to a potential need to accord priority on a “first on, last off” approach. However, this only relates to three applicants, and they have agreed that while there is only the three of them, that priority amongst the three is not an issue.
775. From the flow duration table prepared for the Hakataramea River by Mr. David Stewart, it can be seen that flows in excess of 4.5m³/s occur for approximately 32% of the time.

%	0	1	2	3	4	5	6	7	8	9
0	800002	32441	21987	17816	15446	13901	12664	11651	10896	10220
10	9669	9136	8694	8305	7962	7616	7328	7052	6817	6587
20	6364	6141	5955	5776	5612	5459	5304	5161	5026	4899
30	4778	4663	4547	4433	4332	4230	4131	4031	3940	3838
40	3741	3647	3550	3460	3372	3286	3208	3125	3045	2964
50	2888	2807	2745	2679	2615	2555	2501	2444	2386	2336
60	2286	2232	2185	2138	2089	2048	1998	1952	1902	1846
70	1796	1751	1710	1671	1638	1602	1566	1535	1500	1465
80	1420	1376	1336	1293	1248	1194	1140	1089	1042	1001
90	949	898	851	812	783	752	716	689	660	618
100	447									

776. At 4.5m³/s (including the applicant’s take) only 653 L/s can be harvested. The difference, in percentage terms, that the three applicants would be able to take water for is between 5% (the full rate of 653L/s can be taken 27 % of the time (4, 500 L/s + 653 L/s = 5, 153 L/s = exceeded 27 % of the time), and below this, there is insufficient water available for all to be abstracting at full rates.
777. And, as mentioned in paragraph 781, the three applicants applying to harvest water have agreed that priority between them is not an issue, therefore, cumulative effects on other water harvesters are less than minor.
778. The diversion is within the area defined as “*Downstream of Waitaki Dam, but Upstream of Black Point*” in Table 5 of the WAP.

⁸ Star Holdings, Sutton and Small.

⁹ 103 L/s Star Holdings + 50L/s Sutton + 500L/s Small

779. ECan considers that the allocation limit of 150million m³/year for this area will be exceeded if all resource consents are granted.

780. Further evidence on the subject of annual allocation will be presented by Mr. Ian McIndoe of Aqualinc and Ms Keri Johnston of Irricon Resource Solutions.

Effects of inefficient water use

Reasonable and Efficient Use Seasonal Volumes and Land use	Assessment criteria (based on)		Policy 15, 18-21 (WAP)
	Activity		Diversion of water to storage dam
	Multiple Use		Diverted water is stored in the Tironui dam which has fisheries and wildlife values before subsequent irrigation abstraction
	Assessment criteria (based on)		Policy 10 – 14 (WAP)
	Annual volume required (m³/year)		500, 000 m ³ /year
	Volume to be included in Table 5 (WAP) allocation		0 m ³ /year
	Comments	<p>The annual volume should not be included as the subsequent irrigation abstraction seasonal volume is the controlling consumptive allocation.</p> <p>The proposed annual volume has been based on the ability to abstract water over the 4.5 m³/s for the Hakataramea River, storage dam size and the subsequent irrigation abstraction requirements.</p>	

781. The diversion of water in excess of that required for the intended use may contribute to water levels being unnecessarily reduced in this particular tributary of the Avonlea Stream. Given the diversion is a non-consumptive use this lowering should not have adverse affects on other groundwater users.

782. An annual volume has been proposed on the diversion considering water availability in relation to the percentage of time the Hakataramea River exceeds 4.5m³/s and also to sustain the subsequent irrigation abstraction.

783. Based on work carried out by hydrologist Mr. Dave Boraman of Boraman Consultants Ltd, 4.5m³/s can be exceeded during October to April for approximately 65 days during this period. We have therefore assumed 50 L/s can be taken for 65 days, which equates to 280,000 cubic metres. Furthermore, 5 L/s can be diverted during the remainder of this time, from October to April, which equates to 66,000 cubic metres. There is also a provision for the storage volume of 123,500 cubic metres to be filled during the winter ready for the irrigation season. This totals a volume of approximately 470,000 cubic metres and 30,000 cubic metres.

784. The diversion will be metered as required by Policy 21 of the WAP.

785. Given this, effects of inefficient water use will be less than minor.

Effects on in stream values

Assessment criteria (based on)		Policy 3-5, 23 and 26 (WAP)
Proposed Environmental Flow Regime		5 L/s – modified Hakataramea River minimum flow. 6 L/s – 50 L/s – Hakataramea River Table 3 harvesting.

Comments	This has been proposed for the diversion CRC071114
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- 786. The reason for adopting the Hakataramea River minimum flow for CRC071114 (as opposed to the 5 year, 7 day low flow) is that there is a recorder site at SH82. This supplies a high level of certainty as to when the diversion can occur. Further, there is very limited flow data for Avonlea Stream itself.
- 787. No instream fisheries values have been identified for this tributary of the Avonlea Stream. The minimum flow restriction proposed on the diversion has been agreed with Fish and Game and discussed with and previously agreed to by DoC.
- 788. It is also noted that the Avonlea Stream ceases to have surface flow approximately 20 to 30 metres downstream of the diversion. Approximately 1km downstream of the diversion the streambed merges with the farmland and is now just a developed depression that only flow during flood events. There is therefore no benefit to having the minimum flow set on the Avonlea Stream, and the Hakataramea River minimum flow will provide adequate restriction in relation to the Avonlea Stream flows.
- 789. A fish screen is located on the take from the dam but has not been considered necessary on the diversion due to the minimal fisheries values in the Avonlea Stream. During consultation and approval with Fish and Game, a fish screen has not been considered necessary. DoC has not considered this necessary during previous consultation.
- 790. It is also noted that the diversion not only supports the irrigation abstraction from the dam but also the fisheries and wildlife values associated with the dam. In communications with Graeme Hughes of Fish and Game an article on the Tironui Dam was written regarding paradise shelduck, noting that the dam is an important molting habitat.
- 791. In 1996 there was a banding programme at the dam to provide information on hunter harvest, molt dispersion and shelduck species. Graeme Hughes noted it is important that the dam sustains good water levels to provide for the ducks and fisheries. This letter is appended to the report as Appendix K.
- 792. Given this, effects on instream values will be minor.

Effects of the use of water on water quality

Water Quality	Assessment criteria (based on)	Policy 13 (WAP)
Comments	There are no water quality effects resulting from the diversion of water into the storage dam.	

- 793. The diversion of water does not create any water quality effects, as it is not for a use of water, which relates to the unchanged CRC980513 to take and use water.

794. This applicant is also part of the Haka Valley Irrigation Scheme and is proposing to convert to dairy. The use of water for this purpose on this property has been assessed as part of the Hakataramea Water Quality study being presented by Ms Lynn Torgeson of Pattle Delamore and Partners.

APPLICANT: NJ SMALL

Resource consents being sought:

Consent ID	Description	Table 3 Location
CRC040989	To divert water at a rate of 30 L/s from Grampians Stream either into storage or used directly for irrigation. To divert water at a rate of 1, 000 L/s, from Grampians Stream into a water storage dam (water harvesting).	All other streams– Grampians Stream.
CRC040988	To dam water behind a 23 metre high dam in Mortens Creek, storing 2, 600, 000 cubic metres.	All Other Streams – Mortens Stream
CRC051766	To take and use 200 L/s from a water storage pond for the irrigation of 275 ha of crops and pasture for grazing sheep, beef cattle, deer and non-milking dairy cows.	Not applicable
CRC071825	To excavate and disturb the bed of Mortons Stream to place a water storage dam.	Not applicable

Other resource consents held:

795. The applicant holds no other resource consents.

Background Information

796. Mr. Small (heron in referred to as “the applicant”) applied for resource consents CRC040989 and CRC040988 on 18 November 2003. Resource consent CRC051766 was lodged on 23 December 2004 and CRC071825 on 19 December 2006.

797. The applicant’s property is currently not irrigated and the granting of these consents will enable the irrigation of 275 ha of the property at any one time. This will enable the applicant to make the best use of the available water for the particular crop type.

798. The proposal is to take 30 L/s from Grampians Stream while flows allow (this is a B permit consent) and irrigate under gravity.

799. However, the applicant also proposes to take water from a storage dam. To access this water, the applicant will have to use a pump. Further, it is also anticipated that the

30L/s take will be used to fill the storage dam when flows allow, as there will be an interim period where the 30 L/s can be diverted for irrigation, but flows are still not high enough for water harvesting to occur.

800. It is also proposed to take up to 1, 000 L/s during times of high flow (water harvesting) and put into storage. Harvesting will commence with a take of 500 L/s when flow in the Hakataramea River as measured at SH82 is at 4.5 m³/s, increasing to a take up to 1000 L/s as flow in the Hakataramea River as measured at SH82 is at or above 30 m³/s.
801. All water will be diverted into a 23 metre high dam in Mortens Stream, storing 2, 600, 000 cubic metres of water.
802. Two alternative dam designs options have been developed for consideration at the site by Riley Consulting Ltd. The final dam design will be confirmed following detailed site investigation.
803. The two dam types are a roller compacted concrete dam and a concrete faced rock fill dam. A roller compacted concrete dam is constructed of roller compacted concrete placed in 300 mm layers. The dam's upstream face and crest is sealed with a 500mm capping layer of conventional concrete. The concrete faced rock fill dam is constructed of majority filled compacted rock with two 800m thick transition layers consisting of compacted selected rock fill and silty gravel respectively overlain on the upstream batter, and a 200 mm thick concrete slab placed on the upstream dam face to provide a leakage barrier.
804. Water will be taken from the dam and used for irrigation purposes when minimum flow restrictions are in place.

Application Timeline and Summary of Amendments Made to the Applications

Timeline	CRC041989	CRC041988	CRC051766	CRC071825
Date of Lodging	18 Nov 2003	18 Nov 2003	23 Dec 2004	19 Dec 2006
First Notifiable Date	6 Apr 2005	6 Apr 2005	23 Dec 2004	19 Dec 2006
WAP Notifiable Date	7 Nov 2006	7 Nov 2006	7 Nov 2006	19 Dec 2006
Public Notification	4 Aug 2007	4 Aug 2007	4 Aug 2007	4 Aug 2007

Comments on Submissions

805. For CRC040988 (to dam water) 17 submissions were received in total relating to these applications. Of these, 11 were in opposition, 4 in support and 2 neither support nor oppose. For CRC071825 (to construct a dam), 18 submissions were received. Of these, 12 were in opposition, 4 in support and 2 neither support nor oppose.
806. None of the submissions received are relating directly to these applications.
807. For CRC040989 (to divert water) and CRC051766 (to use water) 19 submissions were received in total relating to these applications. Of these, 13 were in opposition, 4 in support and 2 neither support nor oppose.
808. Two of the submissions received are relating directly to these applications.
809. Mr. S Taylor is opposed to all new takes in the Hakataramea Valley on the basis the catchment is already over allocated. These applications relate to taking water at times of higher flow than existing users, with the intention of protecting existing users.

810. Mr. G Hay is in support of the applications stating that “harvesting should be encouraged”.

Assessment of Environmental Effects – to divert water (CRC004989)

Effects on other water users

Effects on other water users	Assessment criteria (based on)	Policy 14, 23 and 26 (WAP)
Comments	This application relates to taking up to 1, 000 L/s under a harvesting situation and 30 L/s at other times.	

811. Grampians Stream is a tributary of the Hakataramea River, with a catchment area upstream of the diversion of 12 square kilometres. It has a cobbled bed, with a steep gradient and is incised into the alluvial fan.

812. A minimum flow of 33.5 L/s had been proposed for Grampians Stream. This was derived using a catchment area ratio (McKercher Pearson).

813. In paragraph 37 of the S42a report for this application, ECan advises that they are not satisfied with a minimum flow on Grampians Stream of 33.5 L/s. ECan estimates the one in five year, seven day low flow for Grampians Stream to be 57 L/s.

814. Grampians Stream is in the “all other streams” category of Table 3 of the WAP, which does not set an allocation limit, and states that the minimum flow should be the one in five year, seven-day low flow. The applicant is agreeable to the minimum flow proposed by ECan.

815. There are no other users on Grampians Stream.

816. In “*Report 3: Flow and Level Regime for the Tributary Water bodies*” of the S42a Reports, it is shown that there is conflict between the existing minimum flow conditions on consents and those that could be adopted for new applications in accordance with Rule 2, Table 3.

817. In essence, when flow in the river is 1.5m³/s, new abstractors can continue taking water at full rates of abstraction whilst existing users have reduced their takes by half.

818. Until such time as existing consents are reviewed, renewed, or changes of condition sought to change the minimum flow condition of a consent to that specified in the WAP, there will be this discord between existing users and new users.

819. Given this, as well as the minimum flow on Grampians Stream, it is proposed to cease abstraction when flows in the Hakataramea River are at or below 0.5m³/s and to reduce the take by 50% at 1.5 m³/s.

820. Harvesting will commence at a maximum rate of 500 L/s when flow in the Hakataramea River, as measured at SH82 is at or above 4.5 m³/s, and increase linearly as flows increase, peaking at a take of 1, 000 L/s when flow in the Hakataramea River at SH82 is at 30 m³/s.

821. The diversion will be metered as per Policy 21 of the WAP.

822. It is noted in the evidence for applicant RG & ZL Pringle that if all consents in the Hakataramea River catchment are granted, minimum flow restrictions for those subject to the Hakataramea River minimum flow at SH82, will be restricted two to four days sooner than if the abstractions did not occur, and in this instance, further restriction on Grampians Stream is also proposed.
823. Therefore, any effects on other water users are less than minor.

Cumulative effects

824. The diversion is from Grampians Stream is in the “*all other stream*” category of Table 3 of the WAP, and no allocation limit is specified for these streams, and this is an application to take high flow water.
825. There are currently no active resource consents in the Hakataramea Catchment to harvest water, however, including this application, there are three applications in process, including the applicant’s, to take water at high flows.¹⁰ The total amount of water being abstracted when flows are in excess of 4.5m³/s is a maximum of 653 L/s¹¹.
826. Table 3 of the WAP for the Hakataramea River made harvesting in addition to any allocation limits and flow sharing. In “*Report 3: Flow and Level Regime for the Tributary Water bodies*” of the S42a Reports, paragraph 67 refers to a potential need to accord priority on a “first on, last off” approach. However, this only relates to three applicants, all of whom I represent, and have agreed that while there is only the three of them, that priority amongst the three is not an issue.
827. From the flow duration table prepared for the Hakataramea River by Mr. David Stewart, it can be seen that flows in excess of 4.5m³/s occur for approximately 32 % of the time.

%	0	1	2	3	4	5	6	7	8	9
0	800002	32441	21987	17816	15446	13901	12664	11651	10896	10220
10	9669	9136	8694	8305	7962	7616	7328	7052	6817	6587
20	6364	6141	5955	5776	5612	5459	5304	5161	5026	4899
30	4778	4663	4547	4433	4332	4230	4131	4031	3940	3838
40	3741	3647	3550	3460	3372	3286	3208	3125	3045	2964
50	2888	2807	2745	2679	2615	2555	2501	2444	2386	2336
60	2286	2232	2185	2138	2089	2048	1998	1952	1902	1846
70	1796	1751	1710	1671	1638	1602	1566	1535	1500	1465
80	1420	1376	1336	1293	1248	1194	1140	1089	1042	1001
90	949	898	851	812	783	752	716	689	660	618
100	447									

828. At 4.5 m³/s (including the applicant’s take), only 653 L/s can be harvested. The difference, in percentage terms, that the three applicants would be able to take water for is between 5% (the full rate of 653L/s can be taken 27 % of the time (4, 500 L/s + 653 L/s = 5, 153 L/s = exceeded 27 % of the time), and below this, there is insufficient water available for all to be abstracting at full rates.

¹⁰ Star Holdings, Sutton and Small.

¹¹ 103 L/s Star Holdings + 50L/s Sutton + 500L/s Small

829. And, as mentioned in paragraph 796, the three applicants applying to harvest water have agreed that priority between them is not an issue, therefore, cumulative effects on other water harvesters are less than minor.
830. The take also sits within the area defined as “Downstream of Waitaki Dam, but Upstream of Black Point” in Table 5 of the WAP.
831. ECan considers that the allocation limit of 150million m³/year for this area will be exceeded if all resource consents are granted.
832. Further evidence on the subject of annual allocation will be presented by Mr. Ian McIndoe of Aqualinc and Ms Keri Johnston of Irricon Resource Solutions.

Effects on in stream values

Minimum flow requirements	Assessment criteria (based on)	Policy 3-5, 23 and 26 (WAP)
	Proposed Environmental Flow Regime	30 L/s – modified Hakataramea River minimum flow + 57L/s Grampians Stream. 1000 L/s – Table 3 WAP Hakataramea River, harvesting.
	Comments	

833. For the harvesting regime, the applicant is proposing the environmental flow regime for the Hakataramea River as described in Table 3 of the WAP. This requires that harvesting only occurs whenever the flow in the Hakataramea River is in excess of 4.5m³/s.
834. Minimum flows are normally set to protect in stream values. In this instance, a high flow is proposed.
835. The diversion of 30 L/s is also proposed to be subject to higher minimum flows than the “normal”. In January 2005, the applicant engaged Ross Dungey Consulting to undertake a fisheries investigation of Grampians Stream and Mortons Stream.
836. Four species of brown trout, rainbow trout, upland bully and the Canterbury galaxiid were recorded in Grampians Stream.
837. Mr. Dungey concluded that the stream supports a significant fish fauna and clearly is important for spawning habitat for rainbow trout.
838. He also advised that the proposed scheme of capturing a proportion of high flows is unlikely to adversely affect aquatic biota on Grampians Stream.
839. The application is consistent with this policy, and taking water at higher levels will not affect in stream values.
840. The applicant is also proposing to install a fish screen on the diversion from Grampians Stream designed in accordance with the report “Fish Screening: good practice guidelines for Canterbury, NIWA Client Report: CHC2007.092, October 2007”.

841. Therefore, effects on instream values will be less than minor.

Assessment of Environmental Effects – to dam water (CRC040988)

Effects of a dam failure

842. When a dam fails, a large wave of water flows downstream. This sudden rise in water levels can mean that people downstream of the failed dam can experience a loss of property, stock, and even life. Also, the ecosystem downstream of the dam can be significantly damaged.
843. There are two dwellings within 6 km of the dam site (Bomar and Zanker (formerly Wallace). However, both dwellings are located on the other side of a 300 feet (91 metres) ridge and could not possibly be affected by a dam failure.
844. As the proposed dam has a height of greater than 15 metres, and a reservoir volume of greater than 1 million cubic metres, the potential impact category of the dam has been determined using the screening criteria set out in the NZSOLD guidelines, in which the preliminary potential impact category (PIC) would be high. However, the NZSOLD guidelines make it clear that the preliminary screening criteria should not be adopted where the expected consequences of failure are low, or very low.
845. In this particular situation, the dam, given the restricted natural gorge flow capacity, isolation of the location, and the lack of dwellings and buildings on the floodplain between the gorge and the Hakataramea River, the adoption of a low to medium PIC is more appropriate.
846. Robin Fell at the ANCOLD conference entitled Dams: the implications of ownership in 2002 did a survey of 14, 700 dam failures on large dams (>15m high) and found that only 0.83% of all embankment dams failed. The probability of failure is extremely small.
847. The most likely causes of a dam failure for storage of this nature are overtopping causing a breach or a piping (internal erosion) failure.
848. Calculations have been carried out to assess the effect of a breach failure. The calculations are based on work by Macdonald and Langridge-Monopolis in 1984 in which the pair assessed 42 examples of previous dam failures. The calculations determine a breach formation factor, defined as the volume of the breach outflow multiplied by the depth of water above the breach invert. Macdonald and Langridge-Monopolis also concluded from the analysis of the 42 case studies cited in their paper that the breach side slopes could be assumed to be 1:2 H:V, and the breach shape was either trapezoidal or triangular.
849. A trapezoidal breach shape has been used, with a 5-metre breach width. The gradient within the property to the downstream boundary is 0.05 m/m, and a Manning's number of 0.07 has been used to represent permanent pasture and crops as the dominant land surface downstream of the storage site.
850. For a 2.6 million cubic metre water storage pond in a 23m high dam, with a 1 m freeboard, the time to affect the breach is 13 minutes. The peak outflow from the breach is 1879 m³/s. This results in a peak velocity is 3.8 m/s.
851. The model used assumes that the water has a clear path to the dwelling. The topography is also such that the applicant's property sits within its own valley, and the dam is situated in the narrow gorge before Mortons Stream joins Grampians Stream.

Natural ground level is approximately 4 metres higher than the dam height. Therefore, floodwaters from the dam site flow directly into Grampians Stream and the Hakataramea River, all within confined flood paths to the Hakataramea River.

852. There are two dam options. The concrete faced rock fill dam requires a spillway separate from the dam. This will be constructed to safely pass a 1 in 200 year flood for the stream, assumed to be $65\text{m}^3/\text{s}$. This will be constructed separate from the dam, on the true right abutment of the dam, and will be 30 metres wide and 80 metres long.
853. The roller compacted concrete dam allows floodwaters to pass over the dam directly (i.e. the dam itself acts as the spillway). The design width of the spillway is 50 metres, although the dam is wider. This structure can pass the attenuated 1 in 200 year flood flow with a water depth over the crest of 0.8 metres and the probable maximum flood of $135\text{m}^3/\text{s}$ with a water depth of 1.4 metres.
854. By the time this water gets to the Hakataramea River at a distance of approximately 7 kilometres, the depth of the water is only 253 mm and has a velocity of 1.3 m/s. This will have no effect on the Hakataramea River.
855. Conditions are proposed to ensure a Chartered Professional Engineers involvement throughout the process.
856. A building consent is also required for this structure and this aspect will be dealt with in detail during the building consent process.

Effects of damming water on instream values

857. Mortons Stream has a catchment area upstream of the dam site of approximately 31 square kilometres. The catchment is sourced in the Kirkliston Range, and flows across pastoral farmland before cutting through a very narrow gorge, and then joining Grampians Stream. The proposed dam site is in the narrow gorge.
858. In April 2003, simultaneous gaugings were undertaken on Grampians Stream at the diversion site and Mortons Stream at the dam site by Environmental Consultancy Services. The measured flow in Grampians Stream was 67 L/s, whilst the corresponding flow in Mortons Stream was 6 L/s. Results of the gauging are attached in Appendix L.
859. Given this, the contribution of Mortons Stream to Grampians Stream is very small.
860. During the fisheries investigation on the applicant's property, only three long fin eel were found in Mortons Stream. Mr. Dungey noted that Mortons Stream was high and discolored at the time of sampling but even in such conditions, if there were any significant number of fish, some would at least be seen even if they did escape capture.
861. It is not proposed to maintain a residual flow downstream of the dam. Flows in the catchment are not significant in the context of what is entering Grampians Stream, and it was not a significant spawning ground.
862. It is also considered that the reservoir would provide additional habitat, and will be a positive effect of the proposal.

Assessment of Environmental Effects – to use water (CRC051766)

Effects of inefficient water use

Reasonable and Efficient Use Seasonal Volumes and Land Use	Assessment criteria (based on)		Policy 15-21 (WAP)
	Land use		Crops and pasture for grazing sheep, beef cattle and non-milking dairy cows.
	Area to be irrigated (hectares)		275
	Method of application		spray
	Efficiency of application		80 %
	Daily application depth		6.3 mm
	Return period		3 days
	Return period application depth		18.9 mm
	Soil profile available water		82mm
	Mean Annual Rainfall		516mm
	Assessment criteria (based on)		Policy 10 – 14 (WAP)
	Seasonal volume required (m³/year)		1, 540, 000 m ³ /year
	Volume to be included in Table 5 (WAP) allocation		0 m ³ /year
	Comments	The proposed annual volume has been determined using WQN9 v2. This water is water that is diverted to storage under CRC040989.	

863. The taking of water in excess of that required for the intended use may contribute to water levels being unnecessarily reduced. This lowering may have adverse effects on other groundwater users; particularly where water availability is an issue. In addition, it may result in elevated water levels down gradient of the area being irrigated, which may in turn cause a reduction in productivity and possibly surface flooding.
864. The applicant is proposing to spray irrigate 275 ha of crops and pasture at any one time on a three day rotation. The area specified on the plan showing the area to be irrigated is much larger as throughout the year, water requirements will vary around the property, but only 275 ha will be irrigated at any one time. Providing this flexibility will enable the applicant to use the water efficiently. The property is covered with medium soils taken from the NZ Fundamental Soils Layer (Landcare Research) with an average water holding capacity of 82mm. On a three-day return period, 18.9 mm will be applied. This is less than 50 % of the average water holding capacity of the soil and is considered to be an efficient use of water.
865. Evidence on the methodology's used to determine annual allocation is being presented by Mr. Ian McIndoe of Aqualinc.
866. The diversion and the take will be metered as required by Policy 21 of the WAP.
867. In paragraph 77 of the ECan Section 42a Officer's hearing report for this application, ECan advises that upon comparison of the proposed irrigation area and the dam inundation area, that a portion of the irrigation area will be under water once the dam is constructed.

868. The plans provided by RJ Hall at the time the application was lodged, were hand drawn schematics. The plans provided for this applicant in this report show that there is no overlap between the irrigation area and dam inundation area.
869. Given this, effects of inefficient water use will be minor.

Effects of the use of water on water quality

Water Quality	Assessment criteria (based on)	Policy 13 (WAP), Objective WQL2 (NRRP)
	Existing NO ₃ -N concentration (mg/L)	
	Increase in NO ₃ -N (mg/L)	
	Total NO ₃ -N (mg/L)	
Comments	Water quality effects resulting from the use of water for this applicant have been addressed separately.	

870. Cumulative effects on water quality are being addressed by Ms Lynn Torgeson of Pattle Delamore and Partners.

Assessment of Environmental Effects – to construct a concrete faced rock fill dam and diversion bund in the bed of Mortons Stream (CRC071825)

871. The works involve the construction of a 23 metre high, either roller compacted concrete or concrete faced rock fill dam in the bed of Mortons Stream and a bund which comprises un-consolidated river gravels and boulders pushed up from the bed may be constructed in order to effect the diversion of water in Grampians Stream.
872. For the construction of the dam (either type), a small earth fill cofferdam will be constructed upstream of the dam to intercept stream flow and divert it into a pipe passing through the dam site. When the dam construction reaches the height of the outlet pipe, the diversion pipe will be connected.
873. Construction equipment consists of a concrete batch plant, diggers, trucks and compaction equipment.

Effects of the works on flood-carrying capacity and flooding patterns of the river

874. There are no flood protection works in this region.
875. The low-level diversion bund is designed to “blowout” during times of high flow, and will need to be re-instated after each high flow event.
876. The dam will reduce any flood flows downstream by buffering the peak flood flows and capturing these in storage.
877. Given this, effects on flood carrying capacity and flooding patterns will be minor.

Effects of the works on other man-made structures

878. There are no other mad made structures upstream or downstream of the application area.

879. Given this, effects on other man-made structures will be less than minor.

Effects of the works on water quality

880. Works in the channel may cause a temporary discoloration of the water.

881. Mitigation is proposed requiring that all practicable measures be undertaken to minimise the discharge of sediment to the watercourse, arising from the works.

882. Construction of the dam will take approximately three months; however, the proposed mitigation measures, and the means by which the dam is to be constructed, described in paragraphs 872 – 874 of this report, will ensure that water quality is not affected.

883. Given this, effects on water quality will be less than minor.

Effects of the works on bank erosion and bank stability

884. The bund is located in a relatively flat and stable part of Grampians Stream, which greatly limits the potential for scour, and is designed to “blow out” during times of high flows.

885. The dam is located in a rock lined gorge, and given the proposed construction methods, will not induce any erosion at the site.

886. Given this, effects on bank erosion and stability will be minor.

Effects on in stream values

887. The Dungey report advises that Grampians Stream was a significant spawning habitat and therefore, mitigation is proposed limiting the timing of works in the stream to avoid this sensitive time.

888. Mortens Stream contains long fin eels, and therefore, is not as significant, however, this is a direct tributary of Grampians Stream and any change in water quality would have “flow on” effects, therefore timing of works will be limited on this stream also.

889. Given this, effects on in stream values will be less than minor.

MAEREWHENUA RIVER & TRIBUTARIES

Description of Environment

890. The Maerewhenua River arises in the Danseys Pass area of North Otago and has a catchment area of 298 square kilometres. It flows initially through a narrow gorge (Kelly's Gully) and then spreads out to a braided bed as it crosses rolling lands before flowing into the Waitaki River at Duntroon. Same-day multiple site flow gaugings of the Maerewhenua River below the confluence towards Duntroon established that there is steady loss of river water into its bed near Livingstone and a partial return of flow downstream at Duntroon.

891. The Maerewhenua River is important as a recreational resource for fishing and swimming, and supplies irrigation water for over 470 ha of adjacent terraces and rolling

farmlands. The entire Maerewhenua River valley is of regional significance as a low altitude plains landscape.

892. The Maerewhenua River has a cobbled bed with good riparian vegetation cover (appears to be mostly crack willow). It is likely to be good habitat for aquatic macro-invertebrates, native and introduced fish (including eels, trout and salmon), aquatic plants and algae and some bird species.
893. Groundwater in the area forms part of the Taratu Formation. The Taratu formation contains a heterogeneous mixture of silts, clays, sands and quartz gravels. In places the gravels are clean of silt sufficiently to form usable aquifers. This aquifer is often referred to as the Papakaio Aquifer. However, there are large parts of the Taratu Formation, both vertically and laterally that are very poor aquifers.
894. The predominant groundwater flow pattern within the Maerewhenua Basin is northwest – southeast. Thus groundwater flow passes under the Maerewhenua River at right angle across the regional boundary into Otago Region. Profiles across the basin suggest that the Maerewhenua River water level is important in constraining the groundwater level within the Papakaio Aquifer.

APPLICANT: RJ & JM MEIKLE

Resource consents being sought:

Consent ID	Description	Table 3 Location
CRC040446	To take and use water from bore I41/0030, 100 mm diameter, 15 metres deep, at a rate of 12 L/s for the spray irrigation of 26 ha of crops and pasture.	Maerewhenua River

Background Information

895. Mr. RJ & Mrs. JM Meikle (hereon in referred to as “the applicant”) applied for CRC040446 on 3 September 2003.
896. The applicant owns a 504 ha cropping and beef and sheep farm located on West Maerewhenua Road, Maerewhenua.
897. This application is for the irrigation of 26 ha of the property, to be irrigated using a k-line system.
898. The bore is located on a terrace approximately 20 metres above and 915 metres away from the Maerewhenua River.

Application Timeline and Summary of Amendments Made to the Applications

Timeline	CRC040446
Date of Lodging	3 September 2003
First Notifiable Date	3 September 2003
WAP Notifiable Date	15 December 2006
Public Notification	4 August 2007

899. The application for resource consent lodged in September 2003 advised that 26 ha of a 101 ha area is to be irrigated. However the applicant now just wishes to include a particular 26 ha area of the property.
900. On 13 December 2006, in response to the request for further information sought as a result of the WAP becoming operative, the applicant proposed an annual volume in line with WQN9v2.
901. At this time the applicant also confirmed that the map of the area to be irrigated provided as part of the AEE submitted in September 2003, being a 101 ha is correct. They also confirmed that 12 L/s can reasonably service 26 ha but at the time the applicant wished to have the flexibility to use the water within the larger area if so required. As mentioned above, the applicant now proposes to irrigate a specific 26 ha area.
902. Also at this time, it was advised that no minimum flow was proposed, as the bore was not considered hydraulically connected to the Maerewhenua River as confirmed in a memo by ECan Hydro-geologist, Mrs. Philippa Aitchison-Earl. Therefore the bore does not meet the definition of 'connected groundwater' or 'shallow groundwater' as defined in the WAP and as such no minimum flow is proposed.
903. No other amendments have been made to the application.

Comments on Submissions

904. 20 submissions were received in total relating to this application. Of these, 15 were in opposition, 3 in support and 2 neither support nor oppose. Four of the submissions relate directly to this application.
905. Mr. MF Moynihan consider that the Maerewhenua River is already fully allocated and as such existing users have to come in line with WAP. Should any further water be taken then it should only be for harvesting when river in high flows
906. Mr. & Mrs. SR & ME Fenwick consider that the Maerewhenua River is fully allocated and no more water should be granted except possibly in high flows for harvesting water into a dam.
907. Maerewhenua Community Scheme state that the application is located above the Maerewhenua Community Scheme intake which is already under sever pressure and consider the river cannot survive if more water is taken during peak times. Further, present consent holders need to be protected. However they have no objection to taking water during times of high flows.
908. In response to the above objections, it is noted that the proposed abstraction is not hydraulically connected to the Maerewhenua River and therefore existing users of the river are not affected.
909. Springside Farms Limited & WA Simpson & G Simpson considers that the Maerewhenua basin section of the Papakaio aquifer is already fully allocated. To support this they make reference to an ORC decision 15-09-04 on the submitter's consent 97451. This decision states that with the granting of the Simpson consent, based on the information available, no further groundwater is available for abstraction from the Maerewhenua Basin. The submitter is concerned that further abstractions could affect their existing reliability of supply and recharge into the aquifer. This could

then affect submitter's ability to meet the conditions of their consent relating to static water levels. The submitter also opposes the proposed duration given that ORC consents are granted for 15 years. If there is spare water, the submitter states they would have applied for it themselves at the time they were granted their consent from ORC.

- 910. This matter is addressed in the “Cumulative effects” section below, paragraphs 922-933.
- 911. Prior to notification, written approval had been received from Fish and Game in a letter dated 8 September 2003, attached in Appendix M. This letter advised that Fish and Game were not opposed to the application provided the proposed mitigation measures were adhered to and they advocated for a duration of 15 years.
- 912. Following public notification in 2007, Fish and Game, in their submission commented that the Maerewhenua River provides spawning and juvenile rearing habitat for rainbow and brown trout and salmon and has considerable populations of these species. The granting of consents are opposed to the extent they adversely affect the tributaries and values of the rivers. The allocation limit is also exceeded by existing consents and therefore any additional abstraction from the river would need to be issued as B permits.
- 913. In response to this submission, it should be noted that the abstraction has been assessed as not hydraulically connected to the Maerewhenua River therefore is not affecting instream values or the allocation limit for the river.
- 914. The remainder of the submissions were from submitters who made submissions on all applications in process, as detailed earlier in this report.

Assessment of Environmental Effects – to take and use water

Effects on other water users

Effects on other water users	Assessment criteria (based on)	Policy 14, 23 and 26 (WAP)
Comments	The take is from a bore, which is not considered hydraulically connected to the Maerewhenua River.	

- 915. There are several consented surface water abstractions downstream of the applicants bore and three current consented takes within 2km of the applicants take. However the abstraction is not considered connected to the river therefore these users are not considered adversely affected by the proposal.
- 916. This has been confirmed by Ms Philippa Aitchison-Earl (ECan Hydro-geologist) via a memo to Leo Fietje dated 9 December 2003, refer Appendix M. In this memo Mrs. Aitchison-Earl states that the bore is not considered hydraulically connected to the Maerewhenua River and does not meet the definition of ‘connected groundwater’ or ‘shallow groundwater’ and therefore does not require a minimum flow.
- 917. This conclusion is further supported in a Memorandum (refer Appendix M) dated 3 July 2008 from Jens Rekker (ORC Resource Scientist-Groundwater) to David Just (ECan

Consents IO). Mr. Rekker advises that the bore is unlikely to cause a stream depletion effects on the river since the aquifer is significantly “perched” above the river.

918. There are 17 other bores now recorded within a 2 km radius of the applicant’s bore. However it is noted that at the time the application was lodged, there were only 14 bores. Of these, 13 were proposed with no consents attached to them and as such they were excluded from the assessment. Only one bore, I41/0015 had been drilled within 2 km of the applicants bore. Information on direct interference from taking water from the applicants bore was provided to ECan in the application. No adverse effects on this bore (I40/0015) is expected as a result of the proposed activity due to the small rate of take (12 L/s), the large distance to the bore (over 1400 metres) and the fact that the bore is located on the other side of the river.
919. Mr. Rekker has commented in his memo (refer Appendix M) to ECan that the closest neighbouring groundwater take within the Taratu Formation/Papakaio Aquifer is the Simpson/Springside Farms Ltd bore at a distance of 3.62 km. This bore is located on the opposite of the Maerewhenua River to the applicants bore. Mr. Rekker has further advised that: *“In my opinion there is little likelihood of drawdown induced by pumping of the Meikle bore extending beyond the mid line of the Maerewhenua River.”*
920. ECan Section 42a Officer’s report for this application discusses this effect in paragraphs 26-37. In paragraph 37 the IO states:
- “ ... I agree with the applicant that there are no surrounding groundwater users that are likely to be affected by the proposed abstraction.”*
921. Given this, effects on other water users (surface and groundwater) are considered to be less than minor.

Cumulative effects

922. The take sits within the area defined as *“Downstream of Waitaki Dam, but Upstream of Black Point”* in Table 5 of the WAP.
923. ECan considers that the allocation limit of 150million m³/year for this area will be exceeded if all resource consents are granted. This consent falls under that threshold and therefore complies with Rule 6 of the WAP and Table 5
924. Further evidence on the subject of annual allocation will be presented by Mr. Ian McIndoe of Aqualinc and Ms Keri Johnston of Irricon Resource Solutions.
925. As noted in paragraph 910 above a submission has been received in relation to the allocation of the Papakaio Aquifer. ECan have received advice on this matter from Mr. Rekker of ORC (refer attached memo from Mr. Rekker in Appendix M)
926. Mr. Rekker has provided the following: *“There have been a variety of estimates of groundwater recharge of the Papakaio Aquifer within the Maerewhenua Basin. The allocation limit finally adopted by Otago Regional Council for the basin is 2.2million m³/year. Of the total 2.10million m³/year has been allocated to the Simpson, Elliot and Hamilton takes. The addition of the Meikle take would bring the consented total up to 2.24million m³/year. This total is just outside the limitation on allocation set by Otago Regional Council. However, it is my opinion that the Meikle groundwater take would have only self-limited access to the groundwater storage of the wider Maerewhenua Basin due to the hydrogeology and topography around the bore site. This factor provides some comfort in allocating groundwater resource to it.”*

927. Mr. Rekker concluded by stating that: *“Were an application for a take of similar scale and geometric setting received by Otago Regional Council, it is likely that the Council would be inclined to grant it”.*
928. Mr. Rekker has recommended that the applicant should be required to demonstrate the ability to extract groundwater at the proposed rate from bore and that the discretion or ability to revise the maximum instantaneous and monthly maximum rates downwards should be retained if the pumping test fails to demonstrate the ability to pump the proposed volume.
929. As per Mr. Rucker’s advice, the applicant proposes a mitigation measure requiring standing water level to be measured regularly and a step drawdown test to be undertaken to determine the pump rate.
930. Further, if this consent is granted and the ORC allocation limit is accepted by ECan, the aquifer will be 44,300 cubic metres over the 2.2 million cubic metre limit. However attention is drawn to Mr. Rekkers comment that if such consent were received by ORC, it is likely that it would grant.
931. It is also noted that in the Commissioner’s decision (section 4.1.3) for Mr. Simpson’s ORC application ORC97451, Mr. Simpson’s groundwater expert commented that 2.2 million cubic metres was a conservative figure and in their opinion the aquifer has more than sufficient capacity to allow the Mr. Simpson application to be granted and for the take to be sustainable.
932. Given the comments received from ORC and from Mr. Simpson’s expert regarding the conservative nature of the allocation figure, in combination with the mitigation proposed which provides for the ability of ECan to review and reduce the consented rate or volume of water taken, should a step drawdown test indicate that the bore is unable to yield the proposed consented rate and volume, the cumulative effects of this application will be minor.
933. It is noted in paragraph 53 of the ECan Section 42A Officer’s hearing report for this application that:

“With the advice provided and the mitigation proposed, despite the submissions received highlighting these concerns, I consider the adverse effects of the proposal are likely to be minor.”

Effects of inefficient water use

Reasonable and Efficient Use Seasonal Volumes and Land Use	Assessment criteria (based on)	Policy 15-21 (WAP)
	Land use	Crops and Pasture
	Area to be irrigated (hectares)	26
	Method of application	Spray
	Efficiency of application	80 %
	Daily application depth	4 mm
	Return period	10 days
	Return period application depth	40 mm
	Soil profile available water	75 - 110 mm
	Effective Irrigation Season Rainfall	195 mm

Assessment criteria	Assessment criteria (based on)	Policy 10 – 14 (WAP)
	Seasonal volume required (m³/year)	144,300 m ³ /year
	Volume to be included in Table 5 (WAP) allocation	144,300 m ³ /year
Comments	The proposed annual volume has been determined using Policy 16 of WAP and Schedule WQN9 of NRRP.	

934. The taking of water in excess of that required for the intended use may contribute to water levels being unnecessarily reduced. This lowering may have adverse effects on other groundwater users; particularly where water availability is an issue. In addition, it may result in elevated water levels down gradient of the area being irrigated, which may in turn cause a reduction in productivity and possibly surface flooding.
935. The applicant is proposing to spray irrigate 26 ha of pasture on a ten day rotation. The property is covered with medium soils (Kaura soils – silt loams, 90-100 mm and Otiake soils - silt and sandy loams, 75 mm) with an average water holding capacity of 75mm to 110 mm. On a ten-day return period, 40 mm will be applied. This is less than 50 % of the average water holding capacity of the soil and is considered to be an efficient use of water.
936. Evidence on the methodology's used to determine annual allocation is being presented by Mr. Ian McIndoe of Aqualinc.
937. The take will be metered as required by Policy 21 of the WAP.
938. ECan Section 42A Officer's hearing report for this application states in paragraphs 72 and 73 that:

"I agree that the daily and annual volumes proposed are appropriate for the area over which irrigation is sought to occur.

I therefore agree that the proposed use of water is consistent with policies 15 and 16 of the WCWARP, and that the adverse effect of an inefficient take will be minor."

Effects on in stream values

Minimum flow requirements	Assessment criteria (based on)	Policy 3-6, 23 and 26 (WAP)
	Proposed Environmental Flow Regime	Maerewhenua River Table 3 WAP
	Comments	The activity does not meet the definition of 'connected groundwater' or 'shallow groundwater' and therefore Rule 2 is not applicable

939. The applicant is not proposing an environmental flow regime for the Maerewhenua River as described in Table 3 of the WAP. Comment has been received from Ms Philippa Aitchison-Earl (ECan Hydro-geologist) via a memo to Leo Fietje dated 9 December 2003 that the bore is not considered hydraulically connected to the

Maerewhenua River and does not meet the definition of 'connected groundwater' or 'shallow groundwater' and therefore does not require a minimum flow.

940. This observation is supported by ORC, Mr. Rekker advised that the bore is unlikely to cause a stream depletion effects on the river since the aquifer is significantly “perched” above the river.
941. Therefore it is assumed, given lack of connection to the river that there will be no adverse effects on in-stream values as a result of the proposed activity.
942. As this take is from a bore and as such a fish screen is not required.
943. Paragraphs 63-64 of ECan Section 42A Officer’s hearing report for this application addresses this effect and it is concluded that the adverse effects will likely be minor.

Effects of the use of water on water quality

Water Quality	Assessment criteria (based on)	Policy 13 (WAP), Objective WQL2 (NRRP)
	Existing NO₃-N concentration (mg/L)	0.1
	Increase in NO₃-N (mg/L)	0.024
	Total NO₃-N (mg/L)	0.124
Comments	The nitrates assessment has been based on the existing 26 ha area being entirely uses for grazing sheep and with irrigation being entirely used for beef cattle, as this gives the most conservative assessment. In reality the 26 ha area, existing and proposed, is a mixture of sheep and beef but predominately sheep.	

944. Cumulative effects on water quality are being addressed by Ms Lynn Torgeson of Pattle Delamore and Partners. Her evidence concludes that, if all applications are granted, water quality effects will remain minor.
945. A nitrates assessment for this property has been undertaken. The assessment assumes the following:
- Nitrate Nitrogen of 0.1 mg/L from one reading taken from the applicants bore on 20 February 2007. This is the only reading within 10 km of the applicants proposed irrigation area.
 - Property length in direction of groundwater flow = 385 metres.
 - Property length perpendicular to groundwater flow = 850 metres.
 - Groundwater flows parallel to the Maerewhenua River.
 - Transmissivity =1000 m²/day used as a default figure. Using the specific capacity values within a 2 km radius of the bore to determine transmissivity gives a value of 8716 m²/day, as does using figures from a 4.5 km radius. A value of 1000 m²/day is therefore considered conservative.
 - A hydraulic gradient of 0.090 m/m calculated from contours taken from ECan GIS.
 - Concentration in drainage for pasture for sheep is 8 g/m³ and for beef is 12 g/m³.
 - Vertical drainage on non-irrigated land is 200 mm.
 - Vertical drainage on irrigated land is 350 mm.

946. The model indicates that as a result of irrigating 26 ha of currently non-irrigated pasture for sheep and beef, the potential increase in nitrate-nitrogen concentration will be 0.024 mg/L. This is less than the allowable 2 mg/L as specified in Objective WQL2 of the NRRP.
947. The total nitrate-nitrogen concentration would be 0.125 mg/L, and this is less than the NZ drinking water standard value of 11.3 mg/L. This is consistent with Policy 13 of the WAP and Objective WQL2 of the NRRP
948. Paragraph 75 of the ECan Section 42A Officer's hearing report for this application confirms the above and states that the adverse effects of the proposed activity will likely be minor.
949. Given the small area of land proposed to be irrigated and the use for grazing of pasture for sheep and beef (not dairy cows), the effects on water quality are considered to be minor.

Nitrates Assessment							
		Land area	NO ₃ -N	Vertical drainage	NO ₃ -N	NO ₃ -N	Total NO ₃ -N
	Activity	(ha)	(g/m ³)	(mm)	(kg/ha/yr)	(kg/yr)	(kg/yr)
Previous	Non-irrigated sheep	26	8	200	16	416	416
	Non irrigated crops		23	200	46	0	
	Non-irrigated cattle		12	200	24	0	
Proposed	Irrigated sheep		8	350	28	0	1092
	Irrigate crops		23	350	80.5	0	
	Irrigated Dairy	26	12	350	42	1092	
						change	676
L-travel distance		536	m				
Property length in direction of GW flow		385					
T		1000	m ² /day				
dispersivity		0.1	m				
gradient wrt sl		0.09					
width of property perpend to flow		850	m				
initial NN levels measured		0.1	g/m ³				
B aquifer thickness		10	m				
Drainage		0.15	m/yr				
sigma		0.1					
U-pore velocity		90.0	m/day				
Q aquifer partial mixing		9855					
Q aquifer		32850	m ³ /yr				
Q drainage		57.75	m ³ /yr				
M N added		795					
N after partial mix		0.180	g/m ³				
N after total mix		0.124	g/m ³				
N Increase (after total mix)		0.024	g/m³				

Effects on other users from seawater intrusion

950. The proposed bore is located a considerable distance from the coast, making saltwater intrusion unlikely.

Effect on aquifer stability

951. As the strata from which water is to be abstracted is gravel based, aquifer subsidence is unlikely. This is confirmed by Mr. Rekker in his memo to ECan, attached in Appendix M.
952. Paragraph 62 of ECan's Section 42A Officer's hearing report for this application states that the adverse effects on the take on aquifer stability would be minor.

Effect from cross-connection on groundwater quality

953. The bore is only screened in one aquifer and the applicant proposes to install a backflow preventer valve to ensure that no fertilizer that is distributed using the irrigation system can contaminate groundwater. Given this, cross connection between aquifers is unlikely.
954. Paragraph 59 of the ECan's Section 42A Officer's hearing report for this application states that the adverse effects of cross connection on groundwater quality would be minor.

KUROW RIVER

Description of Environment

955. ECan report R05/16 advises that 7DMALFs were calculated for the Kurow River at the 'Gorge' and 'Curries' of 199 and 201L/s with the river being dry in its lower reaches for periods over summer.
956. The report further states that Mr. Jim Chapman who has lived and farmed next to the Kurow River for most of his life stated "that the river often only flows about 500m past his irrigation intake and that the summer flows never reach the main road; bar the very exceptional wet summer (Pers. Comms. Nov 2004).
957. A fish survey undertaken in 2002 by NIWA identified three species of fish present in the River, brown trout, Canterbury galaxiid, and upland bully, and the applicant states that there are trout present in the water race and ponds associated with the current diversions from Kurow River.
958. The applicant also states that the River is snow and spring fed and that the flow is lost beneath gravels in the lower reaches.

APPLICANT: WESTMERE ESTATE LIMITED

Resource consent being sought:

Consent ID	Description	Table 3 Location
CRC012051	To divert, take and use water from Kurow River at a rate of 48L/s for the irrigation of 76 ha of crops, pasture and for stock water and domestic purposes.	Kurow River

Previous resource consents:

Consent ID	Description	Explanation
WTK865431A	To divert, take and use water from Kurow River at a rate of 57 L/s for the irrigation of 120 ha.	This consent is under section 124 (RMA) continuation pending the granting of CRC012051
WTK865431A	To take up to 1200 megalitres of water per year from Kurow River at a rate of 140 L/s for border dyke the irrigation of 116 ha.	This consent is under section 124 (RMA) continuation pending the granting of CRC012051
CRC062352	To divert, take and use water from Kurow River at a rate of 51 L/s for the irrigation and stock water, 1,608,336 m ³ /year	Mining right - deemed permit, expires 01 Oct 2021
CRC062343	To divert, take and use water from Kurow River at a rate of 16 L/s for the irrigation and stock water, 504,576 m ³ /year	Mining right - deemed permit, expires 01 Oct 2021
CRC062341	To divert, take and use water from Kurow River at a rate of 28 L/s for the irrigation and stock water, 883,008 m ³ /year	Mining right - deemed permit, expires 01 Oct 2021
CRC062339	To divert, take and use water from Kurow River at a rate of 56 L/s for the irrigation and stock water, 1,766,016 m ³ /year	Mining right - deemed permit, expires 01 Oct 2021

Background Information

959. Westmere Estate Limited (heron in referred to as “the applicant”) applied for resource consent CRC012051 on the 29th of March 2001. The applicant has a 1,107 ha property of which it is proposed to irrigate 400 ha. 324 ha are currently irrigated under the existing deemed permits. This application will allow for the spray irrigation of the remaining 76 ha.
960. The applicant holds four existing resource consents (deemed permits – mining rights), totaling 151 L/s and 4,761,936 m³/year.
961. This application is replacement consent for WTK865431A and B (refer attached documents in Appendix N) As this application was lodged on 29 March 2001, the applicant has the ability to continue to use WTK865631 pursuant to section 124 of the RMA until a decision on the replacement consent is made. The current application is for a lesser rate of take than previously authorised. Further this application does not seek the ability to take more water than what is already authorised under the existing mining privileges of 4,761,936m³/year. This amendment is a result of a conversion to spray irrigation and more efficient farming practices to ensure an efficient use of water.
962. Water for all permits is currently diverted from Kurow River at a rate of 208 L/s. The diversion flows down a water race system to either the lower or upper races. Water in

the lower race is taken and abstracted via a k-line irrigation system or if not abstracted it flows into two storage ponds from where it is abstracted. Water diverted into the upper water race is then pumped to the upper terrace for irrigation. Water not used for irrigation from the upper race system does not flow into the storage ponds. A letter from ECan, dated 16 Nov 2004 makes reference to the water race system being in place since 1903.

963. During the irrigation season, it is proposed to abstract water at a rate of 46.6 L/s from the diversion channel water race system, to irrigate 76 ha of pasture for grazing milking dairy cows. A maximum of 137.7m³/day (1.4 L/s) is required 365 days per year for stock drinking water and domestic purposes, this figure is slightly less when the dairy cows are not milking (88.5 m³/day) as they typically require less drinking water.
964. Water is abstracted from the upper water race using a portable pump and suction pipe. There is not a permanent surface water intake site on the diversion channel for this abstraction.

Application Timeline and Summary of Amendments Made to the Applications

Timeline	CRC012501
Date of Lodging	29 March 2001
First Notifiable Date	2 Sept 2002
WAP Notifiable Date	23 Feb 2007
Public Notification	6 Dec 2003 (MfE call in) and 4 Aug 2007

965. The application for resource consents lodged in March 2001 was for the divert, take, dam and use of 170 L/s from Kurow River for the irrigation of 215 ha and for stock and domestic water requirements. Of this, 145 L/s were to be for border dyke irrigation and 22 L/s for stock/domestic purposes.
966. In April 2001 the applicant advised ECan that the return period for the system was 21 days. The applicant discussed the application with the ECan Consents Investigating Officer on 2 Sept 2002 and it was determined that a 14-day return period for the system was achievable. The application was considered notifiable as of this date.
967. In Jan 2004, the applicant received a letter from ECan advising that the application that they had submitted on 29 March 2001, included replacement of notified rights WTK690291(A-C), WTK690301(A-C) and WTK690491(A-C) which were mining privileges and allowed up to 112L/s to be taken. It was also advised that these existing notified mining privileges were considered deemed permits until 1 Oct 2021 and as such resource consent is not required for the diversion and abstraction of water covered by those privileges. The deemed permits are now CRC062352, CRC062343, CRC062341 and CRC062339 listed above.
968. The letter further advised that only WTK865431(A-B) which was not a notified right, could be altered and reduced to cover the proportion of water required over and above the amount permitted under the existing privileges.
969. A letter dated 16 Nov 2004 was sent from ECan to the applicant requesting further information. This letter confirmed that a Water Users Group had been set up for the users of the Kurow River in Sept 2003 with the help of ECan staff. This was considered necessary as a number of properties used the same intake point as the applicant during the irrigation season.

970. This letter also made reference to an earlier further information request, dated 23 June 2003, to which no response had been received. We are unaware of the contents of that letter however we do note that the 16 Nov 2004 letter refers to a request for a minimum flow being asked for in 2003 letter. It also states that details of consultation with DoC and Fish and Game which were requested in 2003 were no longer required.
971. The 16 Nov 2004 letter from ECan also asked for clarification on abstraction rates and volumes, area to be irrigated, method of irrigation and pumping schedule roster of users. It appears that this clarification relates to the fact that some of the existing permits this consent was trying to replace were in fact considered deemed permits and therefore did not need to be included with this application. This in turn was likely to alter the irrigation area.
972. This letter also requested information on details of any storage dams, an appropriate minimum flow for Kurow River, details on the diversion, discharge details, further details on fish passage, ways of preventing fish from entering the water race system and further details on domestic water requirements.
973. ECan and the applicant addressed the issues outlined in the 16 Nov 2004 letter in a meeting on 22 Nov 2004. At this meeting the applicant noted that ECan had advised him that given the size of his ponds, being less than 3 m deep and less than 1 ha in area, consent was not required. The applicant was to provide some outstanding information however this was not provided. It is not known why the applicant (who was not using the services of a consultant at this time) did not provide this information.
974. A letter from ECan to the applicant, dated 18 Jan 2005, clarified which of the notified rights were considered mining privileges and which were notified rights. The letter advised that the applicant would need to amend the application, CRC012051, to only cover the amount of water required above that permitted by way of the mining privileges. It does not appear that any amendment to the rate was made by the applicant at this time.
975. A letter from ECan, dated 23 Jan 2006, confirmed the issue of deemed permit documents CRC062352, CRC062343, CRC062341 and CRC062339. This letter also advised that two other applications the applicant had applied for, CRC020329 and CRC020331 were no longer required due to the re-issue of the mining rights as deemed permits.
976. A letter from ECan, dated 23 March 2006, in response from a letter from the applicant, advised that existing consents WTK865431A & B which were due to expire on 30 June 2006, could continue to operate under section 124(b) of the RMA 1991 as the replacement application, CRC012051 (this application), was received on 29 March 2001.
977. On 23 Feb 2007 the applicant met with Gillian Ensor (nee Marks) at ECan and requested to amend application CRC012051 to reduce the rate of take from 170 L/s to 115 L/s, being 93 L/s for irrigation (border dyke and k-line) of 157 ha and 22 L/s for stock water, a total of 2,660,515 m³/year. The applicant also advised that they requested no minimum flow as the stream seeps to ground within 1km of the take point.
978. At this time, discussion focused on the fact that the applicant was adamant that the information requested in the letter dated 22 Nov 2004 had already been provided to ECan back in 2005. Ms Ensor advised that ECan had not received the information or that there was no record of it on file. As a result the applicant provided copies of the information.

979. On 11 June 2007, the applicant again met with Ms Ensor at ECan to discuss a request for further information letter dated 16 May 2007. This letter had requested further information relating to a reasonable and efficient use of water and a detailed map of the irrigation area. At this meeting it came to light that the irrigation area was 197 ha not 157 ha as noted at the 23 Feb 2007 meeting. The application was amended as such. Although it should be noted that the original application AEE was for irrigation of 215 ha, greater than both amendments.
980. On 1 July 2008, the application was amended and was reduced to 48 L/s, 459,892m³/year for irrigation of 76ha of crop and pasture and water for stock and domestic purposes. It was also advised that the allocation take under resource consent CRC012051 and the applicants existing deemed permits CRC062352, CRC062343, CRC062341 and CRC062339 would not exceed 4,761,936 m³/year. In June 2008 a minimum flow was also proposed based on the WAP Table 3 requirements. It is noted that any water taken for essential drinking is exempt from a minimum flow under Rule 2(2).
981. No other amendments have been made to the application.
982. There have been numerous changes made to the application from when the application was first lodged, to now. The main changes have been to decrease the rate of take, annual volume being sought, and area to be irrigated

Comments on Submissions

983. From the August 2007 notification, 16 submissions were received in total relating to this application. Of these, 11 were in opposition, 3 in support and 2 neither support nor oppose.
984. None of the submissions received are relating directly to the application.
985. However, it is noted that Fish and Game in their generic submission for all applicants involved in this hearing make specific reference to Kurow River and its value in contributing to the Waitaki River. It is identified as fitting within Table 3 xxii.
986. In respect to Fish and Game submission, it is noted that a minimum flow condition has been proposed for abstraction from Kurow River and this is based on Table 3 xxii.
987. In the letter mentioned in paragraph 969-971 above, ECan advised that on 4 March 2002 copies of the application were sent to the local runanga, DoC and Fish and Game. According to ECan, on 7 March 2002, Graeme Hughes of Fish and Game advised that he had no concerns with the replacement of the water permits. DoC also responded at this time advising that the fish species identified in the river were of no particular concern to DoC. The minimum flow restriction was also discussed.
988. A summary of the December 2003 notification details is found in paragraph 20 of the ECan section 42A Officer's hearing report for this application

Assessments of Environmental Effects – to divert, take and use water

Effects on other water users

	Assessment criteria (based on)	Policy 14, 23 and 26 (WAP)
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Comments

CRC012501 is a replacement application for WTK865631, which allowed the abstraction of 57 L/s. This application is for 48 L/s so effects are considered to be less than existing given this reduction.

989. There are nine other abstractors that take and use water from Kurow River, these have all been issued as mining privileges (deemed permits). Several of these are in the direct vicinity of the applicant's property and in fact divert and take water from the same existing water race as the applicant. A Water Users Group for this river has been established to share water during times of low water availability and the users have agreed to a roster system to share water. No submissions were received from any of the existing water permit holders on the Kurow River when this application was notified in August 2007.
990. This application is not a deemed permit and will have the lowest priority of all existing applications for diverting and taking water as part of the water users group.
991. Kurow River is in the "all other streams" category of Table 3 of the WAP, which does not set an allocation limit. A minimum flow of 165L/s has been established and accepted by ECan for this river based on WAP (refer attached Memorandum from Adam Martin, ECan, Appendix N). None of the existing nine permits have minimum flow restrictions and therefore can keep taking until the river runs dry however the applicant must cease abstracting at 165L/s.
992. As this is a replacement consent the effect of the take are considered to be part of the existing environment. Given that this application seeks a reduction in the rate and volume from that which was previously authorised, WTK865631 (57 L/s to 48 L/s), no other persons are considered to be affected by the take. It is also noted that Policy 28(c) of the WAP provides for maintaining an existing consent in the same allocation limit and priority band when it is replaced. However there is no existing banding structure in place for this river so a minimum flow based on the 5-year, 7 day low has been proposed for this application as discussed in paragraph 993 above.
993. Given that this is a replacement consent so effects are existing and given that it is proposed to cease abstraction when flows in the Kurow River are at or below the proposed minimum flow of 165 L/s it is considered that any effects on other users resulting from this take are minor.
994. It is noted that the use of essential drinking water is exempt from the minimum flow restriction under Rule 2(2) of the WAP
995. ECan's section 42A Officer's report for this application states in paragraphs 57 and 58 that:

"Given the minimum flow proposed, and the mitigation to ensure that this can be complied with, I consider that the reliability of supply for other water users will be adequately protected.

I am therefore satisfied that the adverse effects on other water users on Kurow River will be minor."

Cumulative effects

996. The diversion and take of 48 L/s from Kurow River is in the “all other stream” category of Table 3 of the WAP, and no allocation limit is specified for such streams. There are several other existing deemed permit consents taking from Kurow River.
997. The take also sits within the area defined as “*Downstream of Waitaki Dam, but Upstream of Black Point*” in Table 5 of the WAP.
998. ECan considers that the allocation limit of 150million m³/year for this area will be exceeded if all resource consents are granted. The volume of water taken under this application does not exceed the Table 5 allocation as identified in ECan Section 42A Report 1, Appendix 3 “*Instantaneous and Annual Allocations, and Application Priority*”. The applicant is not proposing to take any more water annually than is already authorized under his four existing deemed permit s.
999. This application seeks an annual volume of 459,892m³/year and a combined annual volume in combination with resource consents CRC062352, CRC062343, CRC062341 and CRC062339 of 4,761,936m³/year.
1000. Further evidence on the subject of annual allocation will be presented by Mr. Ian McIndoe of Aqualinc and Ms Keri Johnston of Irricon Resource Solutions.

Effects of inefficient water use

Reasonable and Efficient Use Seasonal Volumes and Land Use	Assessment criteria (based on)	Policy 15 - 21 (WAP)
	<u>IRRIGATION</u>	
	Land use	Pasture for grazing milking dairy cows.
	Area to be irrigated (hectares)	76
	Method of application	Spray
	Efficiency of application	80 %
	Daily application depth¹²	5.3 mm
	Return period	7 days
	Return period application depth	37 mm
	Soil profile available water	75 mm - 110 mm
	Effective Irrigation Season Rainfall	210 mm
	Assessment criteria (based on)	Policy 10 – 14 (WAP)
	Seasonal volume required (m³/year)	410,400 m ³ /year
	Volume to be included in Table 5 (WAP) allocation	0 m ³ /year
<u>DOMESTIC DRINKING WATER</u>		
Essential use: 300 L/person/day x 13	4 m ³ /day	
Assessment criteria (based on)	Policy 10 – 14 (WAP)	
Seasonal volume required (m³/year)	1,423.5 m ³ /year	
Volume to be included in Table 5 (WAP) allocation	0 m ³ /year	

STOCK DRINKING WATER	
320 day (milking) x 1640 cows x 70L/cow/day x 1.2L/day (peak demand & loses)	137.7 m ³ /day
45 day (dry) x 1640 cows x 45L/cow/day x 1.2L/day (peak demand & loses)	88.5 m ³ /day
Assessment criteria (based on)	Policy 10 - 14 (WAP)
Seasonal volume required (m³/year)	48,068 m ³ /year
Volume to be included in Table 5 (WAP) allocation	0 m ³ /year
Comments	The annual volume does not need to be included in the Table 5 allocation as the applicant is proposing a combined annual allocation with the existing mining privileges.

1001. The taking of water in excess of that required for the intended use may contribute to water levels being unnecessarily reduced. This lowering may have adverse effects on other groundwater users; particularly where water availability is an issue. In addition, it may result in elevated water levels down gradient of the area being irrigated, which may in turn cause a reduction in productivity and possibly surface flooding.
1002. The applicant is proposing to spray irrigate 76 ha of crops and pasture on a seven day rotation. The property is covered with light-medium soils (based on local knowledge and ECan online GIS) with an average water holding capacity of 75 mm– 110 mm. On a seven-day return period, 37 mm will be applied. This is less than 50 % of the average water holding capacity of the soil and is considered to be an efficient use of water. An annual volume has been proposed based on Policy 16 of WAP and Schedule WQN9 of NRRP.
1003. The applicant is also using the water for stock and domestic drinking water purposes. Daily volumes for both activities have been calculated based on the figures specified in Policy 17 of the WAP (and Tables WQN26 and 27 of NRRP).
1004. The total annual volume proposed as detailed in paragraph 1001 above is 459,892m³/year. An annual volume has also been proposed based on Schedule WQN9 v2 and Policy 17. Evidence on the methodology used is being presented by Mr. Ian McIndoe of Aqualinc.
1005. The diversion and the take will be metered as required by Policy 21 of the WAP. In addition, the applicant has proposed to maintain the water race in good order and repair so as to minimise water losses from the race.
1006. It is also acknowledged that the applicant holds four existing deemed permits. Although these deemed permits specify rate of take and land use they do not specify an irrigation area. The applicant notes that the proposed area to be irrigated under this consent is not currently irrigated with the deemed permits and it is not intended to be.
1007. The applicant proposes to measure the rates and volumes of water diverted and taken under this consent to ensure that the activity operates efficiently.

1008. In ECan's Section 42A Officer's hearing report for this application, paragraph 92 concludes that proposed use of water for irrigation, domestic and stock drinking water meets the reasonable use tests set out in Policies 16 and 17 of WAP.
1009. Given all of the above, it is considered that the proposed activity will constitute and efficient use of water.

Effects on in stream values

Minimum flow requirements	Assessment criteria (based on)	Policy 3-5, 23, 24, 26 and 44 (WAP)
	Proposed Environmental Flow Regime	Kurow River Table 3 WAP
	Comments	A minimum flow is proposed for this application based on WAP. It is noted that any water taken for essential drinking is exempt from a minimum flow under Rule 2(2).

1010. The applicant is proposing the environmental flow regime for the Kurow River as described in Table 3 of the WAP. This minimum flow has been assessed by and considered appropriate by ECan; refer Memorandum from Adam Martin in Appendix N.
1011. The environmental flow regime was set through the plan process and is considered to protect in stream values. ECan Section 42A Officer's hearing report for this applicant notes in paragraph 40 that the flow proposed is appropriate for protecting the values of Kurow Creek.
1012. The take for irrigation occurs after the diversion from Kurow River. The diversion is a permanent diversion into the race system that has existed since 1903. It supplies existing consented irrigation water and stock water to the property.
1013. The applicant proposes to install a fish screen on the suction pipes used to abstract water from the water race and the diversion channel.
1014. It is also noted that the amount of water to be diverted and taken annually under this consent will not exceed the annual volume that is already authorised under the deemed mining privileges. In addition, this application is for replacement consent so any effects already exist.
1015. It is also noted in the ECan Section 42A Officer's hearing report for this applicant, paragraph 41 and 42 that DoC and Fish and Game have no concerns with the proposed take.
1016. Paragraph 47 of the ECan's section42A Officer's hearing report for this application states that:

"I am satisfied that the minimum flow determined will adequately protect the limited fish values within Kurow River and subject to the minimum flow requirement and a fish screen on the pump intake being imposed as conditions of consent, if granted, I consider that the adverse effect on ecosystems will be minor."

Effects of the use of water on water quality

Water Quality	Assessment criteria (based on)	Policy 13 (WAP), Objective WQL2 (NRRP)
	Existing NO ₃ -N concentration (mg/L)	0.1
	Increase in NO ₃ -N (mg/L)	0.222
	Total NO ₃ -N (mg/L)	0.322
Comments	The nitrates assessment has been based on the existing 76 ha area being entirely used for grazing sheep and with irrigation being entirely used for milking dairy cows, as this gives the most conservative assessment. In reality the 76 ha area, is currently used for grazing dairy cows.	

1017. Cumulative effects on water quality are being addressed by Ms Lynn Torgeson of Pattle Delamore and Partners. Her evidence concludes that, if all applications are granted, water quality effects will remain minor.

1018. The Applicant has undertaken a nitrates assessment for this property. The assessment assumes the following:

- Nitrate Nitrogen of 0.1 mg/L from one reading taken from the only bore in the area with a reading bore I30/0030, over 10 km of the applicants proposed irrigation area. This is considered a conservative figure.
- Property length in direction of groundwater flow = 400 metres.
- Property length perpendicular to groundwater flow = 1600 metres.
- Groundwater flows parallel to the Kurow River.
- Transmissivity = 500 m²/day used as a conservative default figure given the lack of data in the area.
- A hydraulic gradient of 0.030 m/m calculated from contours taken from ECan online GIS, conservative figure.
- Concentration in drainage for pasture for sheep is 8 g/m³ and for dairy cows is 12 g/m³.
- Vertical drainage on non-irrigated land is 200 mm.
- Vertical drainage on irrigated land is 350 mm.
- The model has assumed that the current land-use is all sheep and with irrigation the land is to be used for grazing dairy cows, this allows for a conservative assessment.

1019. The model indicates that as a result of irrigating 76 ha of currently non-irrigated pasture for sheep, the potential increase in nitrate-nitrogen concentration for irrigated dairy pasture will be 0.222 mg/L. This is less than the allowable 2 mg/L increase specified in Objective WQL2 of the NRRP.

1020. The total nitrate-nitrogen concentration would be 0.322 mg/L, and this is less than the NZ drinking water standard value of 11.3 mg/L as also specified in Objective WQL2 of the NRRP.

1021. It should be noted that dairy cows currently graze the land and this land-use is not changing under irrigation.

1022. Nitrate management conditions have been proposed to ensure that the applicant manages nitrate nitrogen effects from their property.

1023. Paragraph 101 of the ECan section 42A Officer's report for this application states that:

"Given the recommended mitigation, the comparatively small area to be irrigated, I consider that the adverse effects of the proposed use will likely be minor."

Nitrates Assessment							
		Land area	NO ₃ -N	Vertical drainage	NO ₃ -N	NO ₃ -N	Total NO ₃ -N
	Activity	(ha)	(g/m ²)	(mm)	(kg/ha/yr)	(kg/yr)	(kg/yr)
Previous	Non-Irrigated sheep	76	8	200	16	1216	1216
	Non irrigated crops		23	200	46	0	
	Non-Irrigated cattle		12	200	24	0	
Proposed	Irrigated sheep		8	350	28	0	3192
	Irrigate crops		23	350	80.5	0	
	Irrigated Dairy	76	12	350	42	3192	
						change	1976
L-travel distance		536	m				
Propety length in direction of GW flow		400					
T		500	m ² /day				
dispersivity		0.1	m				
gradient wrt sl		0.03					
width of property perpend to flow		1600	m				
initial NN levels measured		0.1	g/m ³				
B aquifer thickness		10	m				
Drainage		0.15	m/yr				
sigma		0.1					
U-pore velocity		15.0	m/day				
Q aquifer partial mixing		1643					
Q aquifer		5475	m ³ /yr/m				
Q drainage		60	m ³ /yr/m				
M N added		1235					
N after partial mix		0.822	g/m ³				
N after total mix		0.322	g/m ³				
N Increase (after total mixing)		0.222	g/m ³				

OTEKAIKE RIVER & TRIBUTARIES

Description of Environment

1024. The Otekaieke River is a tributary of the Waitaki River the confluence with which is approximately 1 km beyond the township of Otekaieke on State Highway 83.

1025. It is a braided riverbed where some of the channels have clear shingle and some are covered in weeds. Riverbanks tend to be covered in gorse, willow and broom with the bordering land in pasture. The river is known to contain rainbow and brown trout and some salmon.

1026. The applicant has provided comment obtained from the MfE summary of submissions on the Waitaki Plan:

The Otekaieke River is a tributary of the Waitaki River similar in character to the Otiake Stream. The Otiake Stream has some flow in the upper reaches, but only flow in the lower reaches after heavy rain. Both contain rainbow and brown

trout and some salmon and are important in that they provide invertebrates and a mix of genes in the sports fish populations.

1027. Fish and Game in their submission stated that while the Otekaieke has reasonable flows in the upper reaches, and is connected to the Waitaki River, it suffers low flows in summer. Electric fishing shows populations of adult brown and rainbow trout, and salmon, however the river does not offer much angling opportunity as there is little holding water.
1028. The Otekaieke River is not noted as a waterway of significant recreational or instream values in ECan Inventory reports of these values within the Canterbury Region (U04/13 and U04/14).

APPLICANT: SUNNY DOWNS LIMITED

Resource consent being sought:

Consent ID	Description	Table 3 Location
CRC073249	To take water at a rate not exceeding 45 L/s and 1944 m ³ /day from a waterhole for irrigation purposes of 115 ha	Otekaieke River

Previous resource consents:

Consent ID	Description	Explanation
CRC951084.3	To take and use water at a rate of 45L/s, 12 hour/day, 1944 m ³ /day from a spring for irrigation of up to 115 ha	This consent expires on 28 June 2030.
CRC00472.1	To dam water and divert water from an unnamed drain for irrigation purposes.	This consent expires on 28 June 2030.
CRC00473	To discharge water into water for irrigation purposes, discharge shall not exceed 45L/s	This consent expires on 28 June 2030.

Background Information

1029. New Zealand Deer Farms, NZDF, applied for a change of consent conditions to resource consent CRC951084.3 on 12 December 2005. The consent was transferred to Sunny Downs Limited (hereon in referred to as “the applicant”) as of 5 April 2007.
1030. This application was to abstract water at a rate of 45 L/s for 12 hour/day taking the total volume to 3,888m³/day for irrigation purposes.
1031. ECan determined that this application should be treated as a new application and subsequently it became, CRC073249.

1032. The applicant owns a 600 ha farm located on Eastern Road, Otekaieke. The land is currently in a mixed usage for growing crops, pasture for grazing sheep, beef cattle, deer and viticulture. The land use is not proposed to change as a result of this application.
1033. It is proposed to irrigate an 115ha area within a larger 220 ha area of the property using spray methods.
1034. The waterhole (I40/0155) from which water is to be abstracted, originates from a spring, it then flows down a man-made watercourse that presently flows through the applicant's property via an existing dam, and on to the Otekaieke River where it confluences at or about map reference NZMS 260 I40:164-934.
1035. The water source for the spring appears to be from a pond adjacent to the Otekaieke River at map reference NZMS 260 I40:155-917. The pond is understood to be fed from the Otekaieke River (local observation over the years) and lose water through a limestone fissure where it re-emerges as spring I40/0155. The adjacent property, Warnbro Enterprises Limited, holds an authorization (CRC950552) to take water from the pond. To protect the flow in the spring and waterhole and the associated existing consent, CRC951084.3, Warnbro Enterprises Limited are required to cease abstraction when the water level drops below 95.74 metres above sea level.
1036. It is noted that the flow from the waterhole has been recorded by ECan Compliance Monitoring Officers as flowing at about 50 L/s, refer attached CMO report in Appendix O. The abstraction from the waterhole and associated man-made water race has been occurring for over 20 years. The previous owner, NZDF, has been diverting the entire flow into the dam since the construction of the dam in 1999. Therefore inadvertently taking water at a rate of up to 50 L/s, all day, every day. Following a Compliance Monitoring visit, NZDF sought to obtain consent to take water for the remaining 12 hour/day not currently authorised under CRC951084.2.
1037. A change of conditions to the existing discharge permit, CRC000473 was also applied for. This was to enable the activity to comply with the existing situation whereby the applicant diverts the entire flow from the water race into the dam and thus at times, when the dam is full, discharges water at rates greater than 45 L/s back into the race from the dam. The original consents to discharge, dam/divert and take water (CRC000473, CRC000472.1 and CRC951084.2) proposed that water from the water hole would flow down the existing water race alongside the dam. The applicant would install an intake to take water into the dam from the race and an outlet to discharge water as required back into the race.
1038. However as mentioned above, the entire water flow has been diverted into the dam since about 1999. The applicant now intends to install structures to enable the water to be taken, diverted, dammed and discharged as authorised. Therefore, the change in condition to the discharge permit is no longer necessary as water will only be taken and discharged at the rates authorised. At times when the dam is full, water can continue down the water race by-passing the dam.
1039. This matter has been discussed with ECan Compliance Monitoring Officer, Mike Hide, on 15 July 2008 and it was agreed that the application to change the conditions of the discharge permit is not required if the water race and diversion works as authorised. This was also noted in a CMO report and associated notes to the NZDF from Mr. Hide, attached as Appendix O.

1040. As the application was initially applied for as a change of conditions, no minimum flow was proposed.
1041. It is assumed that duration was not initially proposed as the application was applied for as a change of conditions and hence duration to remain unchanged. However, the application is now treated as a new application and was notified with duration of 35 years.
1042. It is also noted that at the time of applying for the increase in volume, the neighbouring property, Warnbro Enterprises Limited, also put in an application to enable them to take up to 45 L/s, 12 hour/day at a rate of 45 L/s from the water hole. This meant that both the applicant and Warnbro were applying for the same water. The applicant and Warnbro have since come to an understanding and as a result the Warnbro applications have been withdrawn.
1043. It should also be re-iterated that non-compliance issues as mentioned above were occurring while the property was owned by the previous owner (NZDF). The applicant via this application seeks the ability to rectify the non-compliance issues.

Application Timeline and Summary of Amendments Made to the Applications

Timeline	CRC073249
Date of Lodging	12 Dec 2005
First Notifiable Date	12 Dec 2005
WAP Notifiable Date	15 Dec 2006
Public Notification	4 Aug 2007

1044. The application for resource consent lodged in December 2005 as mentioned in paragraph 1039 above was for a change of conditions to increase the abstraction rate from 45 L/s 12 hour/day to 45L/s, 24 hour/day, to reflect what is actually occurring.
1045. However ECan have advised that the application is being treated as a new application, CRC073249. The applicant intends for the new application to just reflect the additional abstraction of 45 L/s, 1, 944m³/day rather than the total 3, 888m³/day. The existing resource consent CRC951084.3 will be retained as currently authorised for taking water the other 12 hour/day. Both consents when operated concurrently will not exceed a rate of 45 L/s and a volume not exceeding 3888 m³/day.
1046. On 22 December 2005, ECan queried the lack of minimum flow proposed. The previous owner, NZDF, advised that as the application was for a change of conditions a minimum flow was not proposed as it was anticipated that the consent would be subject to a minimum flow along with all other existing permit holders in the catchment when the existing permits were bought into line with WAP. It was understood this would occur within five years of the WAP becoming operative pursuant to Rule 25.
1047. As the application is now being treated as a new application, a minimum flow based on WAP Table 3 xxii has been proposed for this application and flow data and a report on this matter was provided to ECan on 3 June 2008, attached in Appendix O. Following discussions with the applicant's expert on this matter, ECan responded in a Memorandum, dated 26 June 2008, that a minimum flow of 200 L/s was considered acceptable, attached in Appendix O.

1048. On 12 October 2006, a request for further information was received from ECan asking the previous applicant, NZDF, to propose an annual volume for the take. An annual volume was provided in a letter dated 12 December 2006 and this was calculated as per WQN9v2 for an allocation of 626, 750 m³/year.
1049. We note that in a Memorandum from ECan (Simon Johnson) to Commissioner Peter Skelton, dated 19 April 2007, the annual volume had changed from 626, 750 m³/year to 490,500 m³/year. We have been unable to determine why the annual volume was reduced. Further we note that there is no correspondence on file specifying any discussions between ECan and the previous applicant, NZDF, relating to them amending the volume proposed to a new annual allocation of 490, 500 m³/year.
1050. It is also noted that the application was notified with an annual volume of 490, 500 m³/year. It is noted that ECan sent a copy of the notification notice to the applicants consultant (not RJ Hall at this time) prior to notification asking for the wording to be checked. There is nothing on ECan's file indicating that the applicant's consultant responded therefore a volume of 490,500m³/year was included in the notification. It should be noted that around this time the property was in the process of changing ownership from the previous applicant, NZDF, to the current applicant, Sunny Downs Limited. Also at this time the consultancy company engaged for this application also changed. It is assumed that that amended annual volume was overlooked in this process.
1051. Conversations with ECan Officer, David Just, during June-July 2008 have shed no light on how the annual volume of 490,500m³/year was derived.
1052. The applicant is now seeking to only take water at a rate of 45L/s, 1944 m³/day under this consent and continue operating their existing consent, CRC951084.3 for the authorized 45L/s, 1944m³/day bringing the combined total to 3888m³/day. The annual volume is being amended from 490,500 m³/year to 324,000m³/year.
1053. It is noted that this is option is suggested as a possible alternative for the application in the ECan Section 42A Officer's hearing report for this application.
1054. No other amendments have been made to the applications.

Comments on Submissions

1055. 18 submissions were received in total relating to this application. Of these, 13 were in opposition, 3 are in support and 2 neither support nor oppose.
1056. One submission relates specifically to this application as detailed below.
1057. Otekaieke Downs Trust (Mr. G Jarvis) is concerned that any new consent may impact on the existing community downstream of the take. He believes the waterway is over allocated and disputes the available flow in the river. He wants to be assured that the water taken can only be used for the use applied for and not for any other use. He does not object to existing renewal applications.
1058. It is noted that although this is a new application for additional irrigation water, the applicant has inadvertently been taking the volume applied for since the installation of the dam in 1999. To ensure that there are no effects on downstream users, the applicant has proposed a minimum flow condition based on WAP. Further, the applicant has specified the use for the water and proposed this as a condition of

consent if granted. It is also noted that there is no allocation limit under Table 5 of WAP for the Otekaieke River.

- 1059. Fish and Game in their generic submission for all applicants involved in this hearing make specific reference to the Otekaieke River and its value in contributing to the Waitaki River. It is identified as fitting within Table 3 xxii.
- 1060. In respect to the Fish and Game submission, it is noted that a minimum flow condition has been proposed for non-essential drinking water use and this is based on Table 3 xxii.

Assessment of Environmental Effects - to take and use water

Effects on other water users

Effects on other water users	Assessment criteria (based on)	Policy 14, 23 and 26 (WAP)
Comments	The waterhole is considered connected to the Otekaieke River and as such the Otekaieke River minimum flow as per Table 3 of WAP has been proposed.	

- 1061. There are no other takes from the man-made watercourse that flows from the water hole and on to the Otekaieke River.
- 1062. The only existing surface water users in the vicinity is a Certificate of Compliance consent to take up to 60m³/day of water, which is held by Pacific Basin Educational Foundation (operated by same company as Warnbro, of which the applicant has an understanding).
- 1063. There are no other current water permits to take water downstream of the confluence of the spring-fed man-made watercourse and the Otekaieke River, although there may be some who take for stock water or domestic use.
- 1064. Given that the applicant is proposing a minimum flow condition for this abstraction, based on WAP, the effect of the application on any downstream permitted users is considered to be negligible.
- 1065. The applicant intends to operate the system as it was intended when initially applied for by NZDF and hence water will be able to continue flowing down the water race when not being diverted into the dam. Currently the entire flow from the water hole is diverted into the dam. As such, there should be a more consistent flow of water down the race and into the Otekaieke River, which should also benefit any existing downstream users.
- 1066. It is noted that paragraph 60 of the ECan Section 42A Officer’s hearing report for this application advises that:

“Given the above I consider that the adverse effect on other users will likely be minor.”

Cumulative effects

1067. With respect to Rule 2, Table 3, the abstraction of 45 L/s from the waterhole is in the “all other stream” category of Table 3 of the WAP. Currently there is no allocation limit specified for such streams.
1068. The take sits within the area defined as “Downstream of Waitaki Dam, but Upstream of Black Point” in Table 5 of the WAP.
1069. ECan considers that the allocation limit of 150million m³/year for this area will be exceeded if all resource consents are granted.
1070. Further evidence on the subject of annual allocation will be presented by Mr. Ian McIndoe of Aqualinc and Ms Keri Johnston of Irricon Resource Solutions.

Effects of inefficient water use

Reasonable and Efficient Use Seasonal Volumes and Land use	Assessment criteria (based on)	Policy 15-21 (WAP)
	Land use	Crops, pasture and viticulture
	Area to be irrigated (hectares)	115
	Method of application	Spray irrigation
	Efficiency of application	80 %
	Application rate	3.6 mm
	Return period	10 days
	Return period application depth	36 mm
	Soil profile available water	100 mm
	Mean Annual Rainfall	512 mm
	Assessment criteria (based on)	Policy 10 – 14 (WAP)
	Seasonal volume required (m³/year)	324,000 m ³ /year
	Volume to be included in Table 5 (WAP) allocation	324,000 m ³ /year
Comments	The proposed annual volume has been determined using the methodology of Brown and McIndoe (2003).	

1071. The taking of water in excess of that required for the intended use may contribute to water levels being unnecessarily reduced. This lowering may have adverse effects on other groundwater users; particularly where water availability is an issue. In addition, it may result in elevated water levels down gradient of the area being irrigated, which may in turn cause a reduction in productivity and possibly surface flooding.
1072. Evidence on the methodology's used to determine annual allocation is being presented by Mr. Ian McIndoe of Aqualinc.
1073. The applicant is proposing to spray irrigate 115 ha within a 220 ha area for crops, pasture and viticulture. Water is currently applied at a rate of 0.42 L/s/ha, which allows for the irrigation of 54 ha on a 10-day rotation (3.6 mm/day). It is proposed to continue operating under this application rate as the pasture management practices of this mixed farm dictate the area to be irrigated at any one time. For example, some crops may only

require one watering per cut, and then irrigation may move to a different crop or pasture.

- 1074. The property is covered with medium soils, taken from the NZ Fundamentals Soil_s Layer (Landcare Research) with an average water holding capacity of 100mm. On a ten-day return period, 36 mm will be applied. This is less than 50% of the average water holding capacity of the soil and is considered to be an efficient use of water.
- 1075. It is noted that this varies based on weather (rainfall & wind), crops being grown (e.g. lucerne generally gets just one watering per cut), type and numbers of stock being run, and the percentage of crops versus pasture.
- 1076. While the proposed application rate will not make up for maximum evapo-transpiration losses during the peak of most seasons, the applicant is only seeking to supplement rainfall. During dry seasons the area being irrigated will be reduced accordingly to maintain an efficient application rate.
- 1077. The take for will be metered as required by Policy 21 of the WAP and the applicant has proposed a condition to ensure efficient use of water and avoid such things as leakages from pipes.
- 1078. Paragraph 79 of ECan Section 42A Officer's report for this application states that:

“...I consider that the proposed abstraction represents a technically and allocatively efficient use of water and that the adverse effect of an inefficient take will likely be minor.”

- 1079. It is considered that the effects of an inefficient water use will be minor.

Effects on in stream values

Minimum flow requirements	Assessment criteria (based on)	Policy 3-5, 23 and 26 (WAP)
	Proposed Environmental Flow Regime	Otekaieke River Table 3 WAP
	Comments	The Otekaieke River minimum flow as per Table 3 of WAP has been proposed for this activity.

- 1080. It is noted that in the AEE the previous applicant, NZDF, did not propose a minimum flow for this application as it was advised that the instream values of the man-made watercourse downstream of the dam are limited and the fact that the Otekaieke River naturally goes dry. Further, the abstraction had been occurring for over 20 years from the water race and inadvertently at the proposed rate since the construction of the dam in 1999.
- 1081. Since that time the current applicant has proposed the environmental flow regime for the Otekaieke River as described in Table 3 of the WAP. This minimum flow has been assessed by and considered appropriate by ECan, refer attached Appendix O.
- 1082. The environmental flow regime was set through the plan process and is considered to protect in stream values. It is also noted in various reports, including ECan report R05/16 “Seven day mean annual low flow mapping of the tributaries of the Waitaki

Rivera ” that the Otekaieke River, like several of the Lower Waitaki tributaries is ephemeral in its lower reaches.

1083. The applicant will install a fish screen on the pump intake suction pipe used to abstract water from the water race.

1084. It is noted that paragraph 55 of the ECan section 42A Officer’s hearing report for this application that:

“Given the advice received by Water Resources staff and subject to the minimum flow proposed, I consider that the adverse effect of the proposed take on ecosystems will likely be minor.”

Effects of the use of water on water quality

Water Quality	Assessment criteria (based on)	Policy 13 (WAP), Objective WQL2 (NRRP)
	Existing NO₃-N concentration (mg/L)	0.1
	Increase in NO₃-N (mg/L)	0.256
	Total NO₃-N (mg/L)	0.356
Comments	Water quality effects are not considered to be significant issue for this application given that that the land-use is not changing under the proposed application and that the land is currently irrigated.	

1085. Cumulative effects on water quality are being addressed by Ms Lynn Torgeson of Pattle Delamore and Partners. Her evidence concludes that, if all applications are granted, water quality effects will remain minor.

1086. A nitrates assessment for this property has been undertaken by the applicant. The assessment assumes the following:

- Nitrate Nitrogen of 0.1 mg/L from one reading taken from the only bore in the area with a reading, bore I30/0030, about 8 km away from the applicants proposed irrigation area. This is considered a conservative figure.
- Property length in direction of groundwater flow = 2, 000 metres.
- Property length perpendicular to groundwater flow = 1, 300 metres.
- Groundwater flows in a NW direction to the Otekaieke River.
- Transmissivity = 1, 500 m²/day used as a conservative default figure given the lack of data in the area. It is noted that an unpublished report prepared by Mrs. Aitchison-Earl (ECAN Hydro-geologist) in March 2007 entitled “Stream depletion assessment of the Waitaki Catchment” indicated that the transmissivity in bore I40/0217, located 4.5 km away was estimated to be 5, 000 m²/day therefore the use of 1, 500 m²/day is considered conservative.
- A hydraulic gradient of 0.040 m/m calculated from contours taken from ECAN online GIS, conservative figure.
- Concentration in drainage for pasture for sheep is 8 g/m³ and for crops is 23 g/m³.
- Vertical drainage on non-irrigated land is 200 mm.
- Vertical drainage on irrigated land is 350 mm.
- The model has assumed that the current irrigated land-use is all sheep and with additional irrigation the land is to be used for crops, this allows for a

conservative assessment. In reality the existing land-use is mixed farming incorporating crops, pasture for sheep, beef, deer.

- 1087. The model indicates that as a result of irrigating 115 ha of currently irrigated pasture for sheep, the potential increase in nitrate-nitrogen concentration for irrigated crops will be 0.256 mg/L. This is less than the allowable 2 mg/L increase specified in Objective WQL2 of the NRRP.
- 1088. The total nitrate-nitrogen concentration would be 0.356 mg/L, and this is less than the NZ drinking water standard value of 11.3 mg/L.
- 1089. It should be noted that the land is currently irrigated for a mixture of crops and pasture for grazing sheep, beef and deer and this land-use is not changing under additional irrigation.
- 1090. It is also noted that the applicant has deer-fenced off the dam to exclude stock from the area and thus protect water quality.
- 1091. Nitrate management conditions have been proposed to ensure that the applicant manages nitrate nitrogen effects from their property.

Nitrates Assessment							
	Activity	Land area (ha)	NO ₃ -N (g/m ³)	Vertical drainage (mm)	NO ₃ -N (kg/ha/yr)	NO ₃ -N (kg/g)	Total NO ₃ - N (kg/g)
Previous	Non-Irrigated sheep	115	8	200	16	1840	1840
	Non irrigated crops		23	200	46	0	
	Non-Irrigated cattle		12	200	24	0	
Proposed	Irrigated sheep	115	8	350	28	0	9257.5
	Irrigate crops		23	350	80.5	9257.5	
	Irrigated Dairy		12	350	42	0	
						change	7417.5
L-travel distance		536	m				
Propety length in direction of G/w flow		2000					
T		1500	m ² /day				
dispersivity		0.1	m				
gradient wrt sl		0.04					
width of property perpend to flow		1300	m				
initial NN levels measured		0.1	g/m ³				
B aquifer thickness		10	m				
Drainage		0.15	m/yr				
sigma		0.1					
U-pore velocity		60.0	m/day				
Q aquifer partial mixing		6570					
Q aquifer		21900	m ³ /yr				
Q drainage		300	m ³ /yr				
M N added		5706					
N after partial mix		0.926	g/m ³				
N after total mix		0.356	g/m ³				
N Increase (after total mixing)		0.256	g/m ³				

ABOVE BLACKS POINT– TOWN & COMMUNITY WATER SUPPLIES

OTEKAIEKE RIVER & TRIBUTARIES

Description of Environment

1092. A description of the environment for the Otekaieke River is provided in paragraphs 1024-1028 above.
1093. In addition it is noted that the bores from which this abstraction is sought are located on the edge of the elevated terrace immediately adjacent to the Otekaieke River floodplain.

APPLICANT: WARNBRO ENTERPRISES LIMITED

Resource consents being sought:

Consent ID	Description	Table 3 Location
CRC062308	To take and use water from bore I40/0155, 1.2 metres diameter, and 3 metres deep and proposed bore I40/0635, 300 mm diameter and 10 metres deep, at a rate of 4.53 L/s for community supply.	Otekaieke River

Other resource consents:

Consent ID	Description	Explanation
CRC062067	To divert water at a rate not exceeding 45 L/s, with a volume not exceeding 1944 m ³ /day and an annual volume not exceeding 266, 212 m ³ from waterhole I40/0548 via a water race into a dam.	This consent has been withdrawn as of 3 July 2008
CRC062068	To dam water in a 100, 000 cubic metres storage pond and to use water from the storage pond at a rate not exceeding 79 L/s, with a volume not exceeding 6, 826 m ³ /day and an annual volume not exceeding 166, 212 cubic metres for the irrigation of 190 ha of crops, pasture and vineyard.	This consent has been withdrawn as of 3 July 2008
CRC950552	To take 34 L/s of water from a pond for spray irrigate of up to 81 ha	This consent is active and expires on 15 December 2029.
CRC950551	To divert up to the total flow of the Otekaieke River for the prevention of cliff erosion and provision for irrigation	This consent is active and expires on 15 December 2029.
CRC030476	Certificate of Compliance to take up to 60 cubic metres of water per day.	Used for stock drinking water– no longer valid under operative plan in place - WAP

Background Information

1094. Warnbro Enterprises Ltd (hereon in referred to as “the applicant”) applied for CRC062308 on 22 December 2005 for community water supply for Campbell Park Estate
1095. The applicant owns a 440 ha property located on Special School Road, south of Otekaieke.
1096. The applicant currently holds consent (CRC950552) for irrigation of 81 ha of pasture and also a Certificate of Compliance for stock drinking water.
1097. The existing bore I40/0155 is located approximately 215 metres from the Otekaieke River, whilst proposed bore I40/0635 is about 150 metres away. Water will be pumped to on-site storage tanks and distributed to the Estate reticulated water system from the tanks.

Application Timeline and Summary of Amendments Made to the Applications

Timeline	CRC050940
Date of Lodging	22 Dec 2005
First Notifiable Date	22 Dec 2005
WAP Notifiable Date	19 Oct 2006
Public Notification	4 Aug 2007

1098. The application for resource consent lodged in December 2005 seeks the ability to take up to of 4.53 L/s from bores I40/0155 and proposed bore I40/0635. This rate of take is less than the 5 L/s threshold used by ECan when determining whether to impose a minimum flow. Therefore no minimum flow was offered at this time
1099. However, on 18 October 2006, the applicant provided a minimum flow condition based on Policy 24 of the WAP. This minimum flow was based on the Otekaieke River minimum flow as per Table 3 xxii. At this time an annual volume was also proposed based on the daily volume (as proposed in the AEE lodged on 22 Dec 2005) taken over 365 days per year.
1100. No other amendments have been made to the applications.

Comments on Submissions

1101. 18 submissions were received in total relating to this application. Of these, 13 were in opposition, 3 in support and 2 neither support nor oppose.
1102. Only one of the submissions relates specifically to this application.
1103. Otekaieke Downs Trust (Mr. G Jarvis) are concerned that new consents may impact on the existing community downstream of the take. However they do not object to existing renewal applications
1104. It is noted that although this is a new application for a community supply, the applicant has proposed a minimum flow condition based on WAP, this provides some protection to existing users. It is noted that under Policy 24 of WAP the provision for “essential” drinking water is not restricted at times of low flow.

- 1105. Fish and Game in their generic submission for all applicants involved in this hearing make specific reference to the Otekaieke River and its value in contributing to the Waitaki River. It is identified as fitting within Table 3 xxii.
- 1106. In respect to Fish and Game submission, it is noted that a minimum flow condition has been proposed for non-essential drinking water use and this is based on Table 3 xxii.
- 1107. It is also noted that the majority of the submissions received are related to land-use intensification, taking water for irrigation, efficient use of water etc and this application is for community water supply for domestic and garden water for the village, not for irrigation.

Assessment of Environmental Effects – to take and use water

Effects on other water users

Effects on other water users	Assessment criteria (based on)	Policy 14, 23, 24 and 26 (WAP)
Comments	The take is from two bores, which are considered hydraulically connected to the Otekaieke River based on the definition of “connected groundwater” in the WAP. The take is for community supply therefore the essential use component is not subject to minimum flows as per Policy 24 of WAP.	

- 1108. The only existing surface water users taking from the Otekaieke River itself, in the vicinity of this application, is the applicants Certificate of Compliance consent. There is one existing surface water abstractor, taken from a hydraulically connected spring, in the vicinity of the applicant’s take. However the applicant and that user, Sunny Downs Limited, have come to an understanding over water management and therefore it is not considered that this user is an affected party.
- 1109. There are ten bores and galleries within a 2 km radius of the applicant’s bores. Of these, five are the applicants or Sunny Downs, two are not drilled, and one is an observation bore. All of these bores have been excluded. Of the remaining two bores, one is over 100 metres deep, and the other is a domestic bore located 1,998 metres away. The 100 metre deep bore is unlikely to be connected to the applicants’ shallow bore and as such it has been excluded. Therefore, the only bore that could be affected by the proposed take is located 1, 998 metres away.
- 1110. Information on direct interference from taking water from the bores was provided to ECan in the application for resource consent. The applicant notes in the AEE that URS on behalf of Project Aqua pumped the existing well, I40/0155, and at 9 L/s less than 0.1 metres of drawdown is induced in the well and given the large diameter, water could be seen flowing into the well via holes from the side of the well to the river. At the proposed pump rate of 4.53 L/s, give the unconfined nature of the aquifer; it was determined in the AEE that effects of the take would not extend to the bore 1,998 metres away.
- 1111. While this take is considered a groundwater take, the majority of the water is likely to be sourced from the river and as such minimum flows are proposed based on WAP.
- 1112. The effect of this take on other water users is considered to be minor.
- 1113. Paragraphs 37 and 60 of the ECan Section 42A Officer’s hearing report for this application supports this and also concludes that effects on surrounding groundwater users and other users will likely be minor.

Cumulative effects

1114. It is noted that this application is for “*Town and Community water supplies*”, and falls within the area defined as “*Downstream of Waitaki Dam, but Upstream of Black Point*” in Table 5 of the WAP.
1115. ECan considers that the allocation limit of 3million m³/year for town and community water supplies in this area will not be exceeded if all resource consents are granted.
1116. It is noted that an email received from Gillian Ensor (ECan Consents Project Leader-Waitaki), on 30 May 2008 confirmed that, aside from determining an appropriate minimum flow, ECan were satisfied that all adverse effects of the activity would be acceptable, refer attached email in Appendix P.
1117. In addition, paragraph 41 of ECan’s Section 42A Officer’s hearing report for this application states that:

“Given the take is connected to the Otekaieke River, and the water taken therefore is sourced almost entirely from this, I consider the cumulative effects of the proposed abstraction on other water users will likely be minor.”

Effects of inefficient water use

Reasonable and Efficient Use Seasonal Volumes and Land use	Assessment criteria (based on)		Policy 15, 17-21 (WAP)	
	Essential use: 250 L/person/day x 670		167.5 m ³ /day	
	Non-essential use: 334 L/capita/day x 670		224 m ³ /day	
	TOTAL		391.5 m ³ /day	
	Assessment criteria (based on)		Policy 10 – 14 (WAP)	
	Seasonal volume required (m³/year)		142, 898 m ³ /year	
	Volume to be included in Table 5 (WAP) allocation		142, 898 m ³ /year	
	Comments	Non-essential use based on figures obtained in the Kapiti Coast Water Management Plan. It is noted that Policy 17 of WAP suggests a volume of 300 L/person/day and a “reasonable quantity” for other water uses (i.e. non-essential uses).		
		The proposed annual volume has been determined using the daily volume based on year round use (391.5 m ³ /day x 365 days).		

1118. It is noted that the population on the Estate varies throughout the year and therefore this application has allowed for the maximum capacity figure of 670 people. Water will be used for essential use such as drinking water and for non-essential use such as watering gardens, cleaning cars, cooking, supplying the conference centre facilities, which can include wedding parties and festivals.
1119. Water will only be taken at a rate required by on-site storage. Water will be pumped to on-site storage tanks and distributed to the Estate reticulated water system from the tanks. If the tanks are full, water will not be abstracted and water will be used efficiently.
1120. It is intended to use 250 L/person/day for essential human use which for 670 people equates to 167.5m³/day.

1121. Non-essential use figures are based on the Kapiti Coast Management Plan. This identifies that the average non-essential use per person over the five year period, 1996-2001 was 407 L/person/day. This is considered quite high given that the service centre and hostel comprise only about 18% of the 670 persons for which, water is to be provided and they are not likely to use much more than the essential water requirements of 250 L/person/day.
1122. As such the non-essential use component has been reduced, by the proportion that would not be required by the service centre and hostel staff, to 334 L/person/day, which equates to 224m³/day. This reduction was based on the proportion of water that would not be required by the service centre and hostel staff.
1123. The maximum daily volume of 391.5m³/day, when not restricted by minimum flow levels, is required every day of the year. Therefore the annual volume has been based on maximum capacity taken 365 days per year, equating to 142,898m³/year.
1124. The take will be metered as required by Policy 21 of the WAP. In addition an efficiency condition has been proposed to ensure practicable steps are taken to avoid leaks from the system
1125. A condition is proposed whereby only essential use based on Policy 24 can be taken during times of minimum flow restrictions on the Otekaieke River.
1126. Given the above, effects of the inefficient use of water are considered acceptable.
1127. It is also noted that in paragraph 81 of ECan's Section 42A Officer's hearing report for this application, the Officer concludes that the adverse effect of inefficient water use will likely be acceptable.

Effects on in stream values

Minimum flow requirements	Assessment criteria (based on)	Policy 3-5, 23, 24 and 26 (WAP)
	Proposed Environmental Flow Regime	Otekaieke River Table 3 WAP
	Comments	A minimum flow is proposed for this application based on WAP. It is noted that any water taken for essential drinking is exempt from a minimum flow under Rule 2(2).

1128. The applicant is proposing the environmental flow regime for the Otekaieke River as described in Table 3 of the WAP. This minimum flow has been assessed by and considered appropriate by ECan, refer attached memo from Adam Martin, Appendix P.
1129. The environmental flow regime was set through the plan process and is considered to protect in stream values.
1130. It is considered that given the low rate of take and the requirement to reduce the take when minimum flow requirements are reached, the effects of the proposed abstraction are acceptable.
1131. As this take is from two bores, a fish screen is not required.

1132. In paragraph 56 of ECan's Section 42A Officer's hearing report for this application it is stated that the adverse effects of the proposed abstraction will likely be acceptable.

Effects of the use of water on water quality

Water Quality	Assessment criteria (based on)	Policy 13 (WAP)
	Existing NO₃-N concentration (mg/L)	n/a
	Increase in NO₃-N (mg/L)	n/a
	Total NO₃-N (mg/L)	n/a
Comments	This Policy is not applicable for town and community water supplies such as this application.	

1133. Given the small rate of take and the proposed use being for community supply, it is not anticipated that there will be any adverse effects of the use of water on water quality.

1134. Paragraph 83 of the ECan's Section 42A Officer's hearing report for this application states that the adverse effects on the use on water quality will likely be minor.

Effects of the take on other users from seawater intrusion

1135. The bores are located a considerable distance from the coast, making saltwater intrusion unlikely.

Effect on aquifer stability

1136. The aquifer into which the bores are drilled is predominantly gravel based therefore aquifer subsidence is unlikely.

1137. Paragraph 52 of the ECan's Section 42A Officer's hearing report for this application states that the adverse effects on the take on aquifer stability will likely be minor.

Effect from cross-connection on groundwater quality

1138. The bores are shallow bores and as such are likely to be in the unconfined first aquifer and will only be screened in one aquifer.

1139. Paragraph 50 of the ECan's Section 42A Officer's hearing report for this application states that the adverse effects of cross connection on groundwater quality will be minor.

BELOW BLACKS POINT – AGRICULTURAL & HORTICULTURAL ACTIVITIES

WAITAKI RIVER MAIN STEM

Description of Environment

1140. A description of the environment for the Waitaki River is provided previously in this report.

APPLICANT: MR DD & MRS VJ CHALMERS

Resource consent being sought:

Consent ID	Description	Table 3 Location
CRC042124	To take and use water from bore J41/0124, 300 mm diameter and 34.4 metres deep, at a rate of 34 L /s for the irrigation of 90 ha of dairy pasture.	Waitaki River

Other resource consents:

Consent ID	Description	Explanation
CRC002085	To take and use water from bore J41/0106, 300 mm diameter, 35.5 metres deep, at a rate of 10.5 L/s for the irrigation of 28 ha.	This consent is active and expires on 18 July 2035. This consent supplies the applicants other farm, Rivercliff Farm, but irrigates about 10 ha of Seacliff Farm property.
CRC990250	To take and use surface water from Andrews Stream at a rate of 200 L/s for the irrigation of 200 ha.	This consent is active and expires on 16 September 2033.

Background Information

1141. Mr.DD & Mrs. VJ Chalmers (hereon in referred to as “the applicant”) applied for CRC042124 on 13 April 2004.
1142. The applicant owns a 210 ha dairy farm (Seacliff Farm) located on Andrews Road, just to the east of Glenavy, towards the coast, subject to this consent application. The applicant also owns the adjacent dairy farm, Rivercliff Farm, which is 247 ha.
1143. As well as CRC002085 and CRC990250, the applicant holds 198 shares in the Morven Glenavy & Ikawai Irrigation Scheme (the Scheme) for the irrigation of 198 ha using border dyke irrigation. The 90 ha applied for under this application is currently irrigated from the Scheme however this section of border-dyking is to be decommissioned as it is inefficient and the applicant is converting this area to spray irrigation using a centre pivot. The 90 ha under this application is part of the 200ha irrigated under resource consent CRC990250 however the taking of water under CRC990250 is intermittent as Andrews Stream is ephemeral. The applicant has advised that this consent has not been practical to use as all water dissipates to ground. The remaining 10 ha of this property is irrigated by CRC002085. This gives a total of 210 ha of this property currently under irrigation.

1144. To ensure an efficient use of water the applicant does not intend to operate this consent concurrently with resource consent CRC990250 or water from the Scheme.
1145. It is noted that the resource consents for the MGIS do not expire until 30 April 2028.
1146. The bore is located approximately 807 metres from the Waitaki River.

Application Timeline and Summary of Amendments Made to the Applications

Timeline	CRC042124
Date of Lodging	13 April 2004
First Notifiable Date	4 March 2005
WAP Notifiable Date	15 Dec 2006
Public Notification	4 Aug 2007

1147. It is noted that a request for further information was not sent from ECan until 3 March 2005 almost one year after the application was lodged. Once received, the request was answered in one day and information submitted to ECan on 4 March 2005.
1148. The application for resource consent lodged in April 2004 refers to the Waitaki River minimum flow as to be decided as part of the Waitaki Water Allocation and is offered as a condition of consent. The WAP sets a minimum flow of 150m³/s for the main-stem Waitaki River.
1149. The applicant fully supports the MRNAG alternative flow regime for the Waitaki River, and while the application has not been amended to seek a lower minimum flow, it is noted that a minimum flow in line with other applicants, if acceptable to the panel, is preferred by this applicant.
1150. On 15 December 2006, in response to the request for further information sought as a result of the WAP becoming operative, the applicant provided an annual volume of take based on Schedule WQN9v2.
1151. On 19 June 2008 it was noted that the plan attached to the original AEE only showed half of the proposed irrigation area and not the entire 90 ha applied for. ECan was advised at this time and an amended plan was submitted to include the additional area applied for. ECan advised via email on 25 June 2008 that given the application was clearly for the irrigation of 90 ha, the amended plan is acceptable.
1152. The annual volume of 522, 000 m³/year provided on 15 December 2006, based on WQN9v2, was amended to 464,141 m³/year following consultation with ECan over system capacity. This is now being amended to 488,800m³/year.
1153. No other amendments have been made to the applications.

Comments on Submissions

1154. 13 submissions were received in total relating to this application. Of these, 8 were in opposition, 3 in support and 2 neither support nor oppose.
1155. All of the submissions received are from submitters who made submissions on all applications in process, as detailed earlier in this report.

Assessment of Environmental Effects – to take and use water

Effects on other water users

Effects on other water users	Assessment criteria (based on)	Policy 14, 23 and 26 (WAP)
	Comments	The amount of water coming from the Waitaki River is approximately 24.9 L/s. This is greater than 5 L/s after pumping the average continuous rate for 150 days, and therefore is classified as “connected groundwater” in the WAP.

1156. There are no surface water abstractors in the direct vicinity of the applicants take and there are no surface water users downstream of the applicant. It is noted that the applicant’s take (moderately hydraulically connected as per WAP and Schedule WQN7 of the NRRP) is the last abstraction before the Waitaki River discharges into the sea. The applicant owns the land on the north side of the river from the abstraction point to the sea.
1157. There are 16 other bores and galleries within a 2 km radius of the applicants bore.
1158. Information on direct interference from taking water from the bore was provided to ECan in the application for resource consent and in an email dated 13 April 2005.
1159. A file note from Warwick Pascoe (ECan IO, sub consultant) dated 23 January 2007 indicates that if the applicant successfully obtains the written approvals from the owners of bores J41/0023 and J41/0022 then the application is one that should be considered for non-notification. Refer attached file note in Appendix Q.
1160. These approvals were obtained and effects on other groundwater users are considered to be acceptable.
1161. Paragraph 32 of ECan’s Section 42A Officer’s hearing report for this application states that the adverse effects of taking water on surrounding groundwater users would be minor.
1162. The WAP minimum flow for the Waitaki River was set with the aim of protecting other users, as well as leaving sufficient water in the river to protect instream values.
1163. MRNAG is proposing an alternative flow regime for the Waitaki River based on a minimum flow for the river of 100m³/s. Further evidence will be presented on this by Mr. Nick Ward of Pattle Delamore and Partners and Mr. David Stewart of Raineffects Limited.
1164. This low regime is aimed to ensure that existing water users are protected. The applicant fully supports this flow regime.
1165. Given this, effects on other water users are considered to be acceptable.

Cumulative effects

1166. The Waitaki River has an allocation limit of 90m³/s. If all resource consents are granted, including CRC02124, the total allocation for the river will be 77.6m³/s, less than the allocation limit.
1167. The take also sits within the area defined as “*Downstream of Waitaki Dam, but Downstream of Black Point*” in Table 5 of the WAP.

1168. ECan considers that the allocation limit of 1,100million m³/year for this area will not be exceeded if all resource consents are granted.
1169. It is noted that paragraph 36 of ECan's Section 42A Officer's hearing report for this application states that the cumulative effects of the proposed take on other groundwater users would be minor.

Effects of inefficient water use

Reasonable and Efficient Use Seasonal Volumes and Land use	Assessment criteria (based on)		Policy 15-21 (WAP)
	Land use		Dairy Pasture
	Area to be irrigated (hectares)		90
	Method of application		Spray
	Efficiency of application		80 %
	Daily application depth		3.26 mm
	Return period		7 days
	Return period application depth		22.82 mm
	Soil profile available water		60 mm
	Mean Annual Rainfall		498 mm
Assessment criteria (based on)		Policy 10 – 14 (WAP)	
Seasonal volume required (m³/year)		488,800 m ³ /year	
Volume to be included in Table 5 (WAP) allocation		488,800 m ³ /year	
Comments	The proposed annual volume has been determined using the methodology of Brown and McIndoe (2003).		

1170. The taking of water in excess of that required for the intended use may contribute to water levels being unnecessarily reduced. This lowering may have adverse effects on other groundwater users; particularly where water availability is an issue. In addition, it may result in elevated water levels down gradient of the area being irrigated, which may in turn cause a reduction in productivity and possibly surface flooding.
1171. The applicant is proposing to spray irrigate 90 ha of dairy pasture on a seven day rotation. The property is covered with light soils (Lismore shallow and stony silt loam and Templeton moderately deep silt loam) with an average water holding capacity of 80 mm, source ECan's GIS detailed soil layer. On a seven-day return period, 22.82 mm will be applied. This is less than 50 % of the average water holding capacity of the soil and is considered to be an efficient use of water.
1172. Evidence on the methodology's used to determine annual allocation is being presented by Mr. Ian McIndoe of Aqualinc.
1173. To ensure an efficient use of water the applicant does not intend to operate this consent concurrently with resource consent CRC990250 or water from the Scheme.
1174. The take will be metered as required by Policy 21 of the WAP.

1175. Given this, effects of inefficient water use will be less than minor.

Effects on in stream values

Minimum flow requirements	Assessment criteria (based on)	Policy 3-5, 23 and 26 (WAP)
	Proposed Environmental Flow Regime	Waitaki River - MRNAG Minimum Flow Proposal
	Comments	This moderately hydraulically connected bore is the last abstraction before the Waitaki River flows into the sea.

1176. The MRNAG alternative flow regime is based upon a minimum flow of 100m³/s for the Waitaki River, from the Waitaki Dam to the sea. MEL, for the HDIS applications, produced and presented evidence on effects on instream values from an alternative flow regime based on such a minimum flow. The applicant supports this evidence, and further evidence on this is being presented by Mr. Nick Boyes of RMG.

1177. As this take is from a bore, a fish screen is not required.

1178. For either minimum flow regime (WAP or MRNAG), it is considered that instream values will be protected. Given this, effects on instream values are considered to be minor.

Effects of the use of water on water quality

Water Quality	Assessment criteria (based on)	Policy 13 (WAP), Objective WQL2 (NRRP)
	Existing NO₃-N concentration (mg/L)	
	Increase in NO₃-N (mg/L)	
	Total NO₃-N (mg/L)	
Comments	Not considered necessary to carry out a nitrates assessment given that the proposed area to be irrigated under this consent is currently irrigated by border dyke irrigation from the local scheme. In addition, the existing land-use is for the grazing of pasture for dairy cows and this is not changing as a result of this application.	

1179. Cumulative effects on water quality are being addressed by Ms Lynn Torgeson of Pattle Delamore and Partners. Her evidence concludes that, if all applications are granted, water quality effects will remain minor.

1180. Given that this is an existing irrigated dairy farm and has been such for over 20 years, it is not considered necessary to carry out a nitrates assessment for the property as the land-use is not changing as a result of the proposed activity. The area to be irrigated under this consent is currently irrigated via border-dyke irrigation with water from the local scheme, with a small area of spray irrigation. This consent is being applied for, as the applicant would like to de-commission the existing borders and convert the entire area to spray irrigation, which is generally considered a more efficient use of water.

1181. So although the land will be used to irrigate pasture to graze dairy cows, this is the existing land-use therefore a significant increase in the level of contamination entering groundwater is not expected.

1182. A nitrate management condition has been proposed to ensure that the applicant manages nitrate nitrogen effects from their property. Effects of the proposed use of water on water quality are considered to be acceptable.

1183. Paragraph 70 of ECan’s Section 42A Officer’s report for this application states that:

“..., I consider that given the location of the use within the catchment, the current irrigation practices and proposed conversion to spray irrigation, and absence of any down-gradient users of groundwater, the effects on groundwater and surface water quality will be minor.”

Effects of the take on other users from seawater intrusion

Saltwater Intrusion and Cross Contamination	Assessment criteria (based on)	Policy 5 (WAP) and Policy WQN11		
	Bore Number	J41/0124		
	Screened in multiple aquifers	No		
	Location relative to coast (km)	1.69		
	1.5m amsl head retained at coast	Yes		
Notes	The Theis equation gives a drawdown of 0.092 metres.			

1184. The bore is located approximately 1,690 metres from the coast and the estimated drawdown at this distance is 0.092 metres. It is also noted that the applicant currently operates bore J41/0106 under consent CRC002085 and this bore is located 440 metres west of bore J41/0124. This consent was granted in 2000 and to date there has been no evidence of seawater intrusion in this bore.

1185. ECan have previously received advice from ECan Hydro-geologist Philippa Aitchison-Earl on the matter of saltwater intrusion.

1186. Biannual conductivity monitoring and monthly water level readings are proposed as mitigation measures as recommended by Mrs. Aitchison-Earl to ensure effects are minor.

1187. ECan’s Section 42A Officer’s hearing report for this application states in paragraph 40 that:

“I am satisfied that given the depth of abstraction, the volume of water discharging from the Waitaki River and the proposed monitoring conditions, that the adverse effects on other groundwater users from salt water intrusion would be minor.”

Effect on aquifer stability

1188. The aquifer into which the bore is drilled is predominantly gravel based therefore aquifer subsidence is unlikely.

1189. Paragraph 42 of the ECan’s Section 42A Officer’s hearing report for this application states that the adverse effects on the take on aquifer stability would be minor.

Effect from cross-connection on groundwater quality

1190. The bore is only screened in one aquifer and the applicant proposes to install a backflow preventer valve to ensure that no fertilizer that is distributed using the irrigation system can contaminate groundwater. Given this, cross connection between aquifers is unlikely.
1191. Paragraph 44 of the ECan's Section 42A Officer's hearing report for this application states that the adverse effects of cross connection on groundwater quality would be minor.

Consideration of Effects Relevant to All Applications

Effects on Tangata Whenua Values

1192. The Waitaki River and Hakataramea River have a statutory acknowledgment in the Ngai Tahu Claims Settlement Act 1998.
1193. The relevant runanga were served notice of the applications in August 2007 by ECan, and submissions were received in opposition from these parties on all applications in the catchment.
1194. It is acknowledged that these rivers are of significant cultural value, and mitigation measures (refer Appendix R) such as appropriate minimum flow conditions, and management of water quality effects, is proposed by the applicants to ensure that the potential effects on the environment, including tangata whenua values are minor.

Effects on People, Communities and Amenity Values

1195. The applicants have proposed appropriate minimum flow condition for the water body from which they have applied to take and use water.
1196. A minimum flow is considered to adequately protect people, community and amenity values within the rivers specific to each applicant.
1197. The activities all occur in a rural setting, where the dominant land use is pastoral farming.
1198. And, given that the proposed activities all occur on private farmland; as such the use of water is unlikely to adversely affect amenity values.
1199. The WAP sets an annual allocation "cap" for agricultural and horticultural activities within defined areas. Downstream of Waitaki Dam, there are two areas, with Black Point being the dividing line.
1200. Downstream of Black Point, ECan considers that there is water still available to be allocated; however, upstream of Black Point, if all resource consents in process are granted, the annual allocation "cap" set by the WAP will be exceeded.
1201. The applicant's have proposed an annual allocation limit for their own resource consents for the use of water, as well as implementing Farm Management Plans, which require existing irrigation systems to be audited and improved where possible, and new systems to be designed and installed by accredited personnel, and implementing initiatives to ensure that water is used wisely.

1202. The primary objective of an annual allocation is to ensure that the water is used efficiently and effectively for the land use, soil type and climatic conditions. There is still considerable debate surrounding the allocation (both in terms of the methodology used to determine the current allocation and whether the allocation is sufficient in the first place).
1203. It is also noted that each take is within the allocation limits set in Table 3 of the WAP. The allocation limit in Table 3 is set to protect instream values and effects on other users. It has an “environmental” focus.
1204. Therefore, given the applicant’s focus on efficient use of water on their properties, and that the takes are within allocation limits set to protect instream values and other users, it is considered that effects on people and communities will be minor.

Summary

1205. After giving consideration to the potential effects resulting from each of the activities, and the proposed mitigation measures, we are satisfied that the resource consents are able to be granted.

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