

IN THE MATTER OF the Resource Management Act 1991

IN THE MATTER OF applications by Central Plains Water Trust to:

Canterbury Regional Council for resource consents to take and use water from the Waimakariri and Rakaia Rivers for the Central Plains Water Enhancement Scheme and for associated consents required for the construction and operation of the Central Plains Water Enhancement Scheme

AND

IN THE MATTER OF applications by Central Plains Water Trust to:

Selwyn District Council for resource consents to construct and operate the Central Plains Water Enhancement Scheme

AND

IN THE MATTER OF a Notice of Requirement by Central Plains Water Limited to:

Selwyn District Council for the designation of land for works associated with the construction and operation of the Central Plains Water Enhancement Scheme

**JOINT DECISION AND RECOMMENDATION OF
INDEPENDENT COMMISSIONERS
28 MAY 2010**

PART 1

**Introduction, RMA Part II Assessment and Key Conclusions, Section 171
Assessment, Conclusions regarding Objectives and Policies, Decisions in
relation to Resource Consents and Recommendations in relation to the
Notice of Requirement**

GUIDE TO DECISION DOCUMENTS

- PART 1** – Introduction, Part II RMA, assessments, objectives and policy summary, conclusions, decisions and recommendations
- PART 2** – Disputed conditions
- PART 3** – Beneficial, economic, social and cultural effects of the scheme
- PART 4** – Intakes and headraces
- PART 5** – Distribution network
- PART 6** – Waimakariri and Rakaia takes
- PART 7** – Use of water
- PART 8** – Objectives and policies
- PART 9** – Regional Council consents and conditions
- PART 10** – Selwyn District Council consents and conditions
- PART 11** – Recommendations to Central Plains Irrigation Limited in respect of Notice of Requirement and Conditions
- PART 12** – List of hearing dates and appearances

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1. INTRODUCTION

Structure of our decision

- 1.1 The structure of our decision/recommendation is set out in the table of contents. We have decided for ease of reference to split the overall decision into 13 separate documents which will be loaded on to the ECan website and will be available in hard copy (limited numbers) and CD Rom from both Councils. **Part 1** is intended as an overall summary and conclusion and many readers may choose to go no further. **Part 2** deals with residual issues concerning conditions. There is further discussion of conditions in various Minutes. The subsequent parts provide the detail which sits behind **Part 1**. There are also two sets of consents and conditions each in their own document. (ECan consents, SDC consents, Recommendations in relation to the Notice of Requirement). The decision documents are as follows:

Part 1

Introduction

RMA Part II assessment and key conclusions

Section 171 assessment

Conclusions regarding objectives and policies

Decisions in relation to resource consents

Recommendations in relation to the Notice or Requirement

Informal recommendation to CPW

Part 2

Discussion of disputed conditions

Part 3

Beneficial effects of the scheme

Economic impacts of the scheme

Social impacts of the scheme

Effects of the scheme on the relationship of Maori to water, and other taonga

Part 4

The intakes and headraces and associated Notice of Requirement and consent applications

Part 5

The distribution network

Part 6

The Waimakariri take

The Rakaia take

Part 7

The use of water for irrigation

Discharges to water

Water Quality impacts

Land drainage impacts (mounding)

Part 8

Assessment against objectives and policies

Part 9

Regional Council consents and conditions

Part 10

Selwyn District Council consents and conditions

Part 11

Recommendations to Central Plains Water Limited in relation to its Notice of Requirement for the intakes, terrace canals, headrace and associated works, including recommended conditions

Part 12

List of hearing dates and appearances

Part 13

Appendices

1.2 Although we have already indicated what our decision will be, we have not until now recorded some aspects of our reasoning in any detail, nor had we finalised conditions and recommendations until recently. Notwithstanding our section by section approach to making and drafting the decision, we emphasise that we have adopted an overall balancing approach to the whole of the modified scheme. This decision report is where we draw together the interrelated threads of the proposal and our decision.

1.3 We are required to summarise key evidence, set out our conclusions and provide reasons for those. In relation to some issues we have already in effect satisfied that requirement through the sequential release of various Minutes. In this final decision we will set out further conclusions and reasons. To avoid an overly lengthy decision and delays, we will not be attempting to summarise all of the evidence we have heard.

1.4 After some context, we will discuss the overall potential benefits of the scheme and then focus on the potential adverse effects of each of the individual components of the scheme. There are additional statutory criteria which we will discuss in relation to the NoR.

1.5 Parts 1 to 8 of our decision have each had a primary author but reflect the consensus views of the panel. There are some obvious differences in style between the documents which is inevitable with different authors. There will also be repetition between this key decision document (Part 1) and other documents. That too is the product of multiple cooks.

The Commissioners and our role

1.6 The independent panel comprises:

Philip Milne chair (Environmental Lawyer)

Bob Nixon (Planner)

Andrew Fenemor (Engineer, Resource Manager and Environmental Scientist)

Ray O'Callaghan (Civil Engineer)

1.7 We have been appointed to hear and *decide* a raft of consent applications lodged by Central Plains Water Trust (CPWT) with Environment Canterbury, and land use consent applications to Selwyn District for the

distribution network. We have also been tasked with making a *recommendation* to Central Plains Water Limited (CPWL) in relation to its Notices of Requirement. (NoR) We will use the term "CPW" to refer to either or both the Trust and the Company.

- 1.8** Mr Nixon did not take part the separate hearing and decision in relation to ACWT and has not taken part in the writing up or deliberations in relation to issues raised by Christchurch International Airport Ltd. Except to that extent, our decision making has been by consensus of the whole panel. Various members of the panel have taken primary responsibility for writing up particular sections of the report and our earlier Minutes, but with the exception of the matters outlined above, all aspects have been agreed as a group. This decision and recommendation should be read alongside our decision in relation to ACWT and our Minutes 11 to 15.

Key decisions and recommendation

- 1.9** For the reasons summarised in **Minute 10** we indicated that we would not be able to recommend in favour of confirming the Notice of Requirement (NoR) for the Waianiwaniwa reservoir and dam, the upper Waimakariri intake and the tunnel. Central Plains has accepted that position and has now withdrawn those aspects of the proposal. We will not be discussing our reasoning further.
- 1.10** For the reasons summarised in **Minute 11** and amplified in this decision we have decided that we can recommend in favour of the balance of the remaining Notice of Requirement and grant the consents now sought. The NoR is addressed in **Parts 1, 3 and 4**.
- 1.11** For the reasons discussed in **Minute 12** and summarised in **Part 6** we have concluded that we can grant the consent to take water from the Waimakariri river for the lesser rates of take now proposed by CPW but subject to more restrictive conditions than were proposed by CPW. (The restrictions are summarised later in **Part 1**).
- 1.12** For the reasons discussed in **Part 6** we have decided to grant the consents to take and divert from the Rakaia. (The consents are not contrary to the Rakaia Water Conservation Order).

1.13 For the reasons discussed in **Parts 1 and 5** we have decided to grant the consents for the distribution network.

1.14 For the reasons discussed in **Parts 1 and 7** we have decided to grant the consent to use water for irrigation and associated discharge permits (by-wash and emergency discharge).

1.15 Following the resumed hearing on 25 and 26 March 2010, we have further considered the modified suite of conditions proposed by CPW and officers of both councils along with the comments from CPW witnesses, officers and submitters. Our preliminary views regarding conditions are set out in **Minutes 13 and 14**. Our conclusions in relation to some conditions are set out in **Minute 15** issued following the resumed hearing. Our conclusions regarding conditions which were still in dispute or where there had been significant dispute are set out in **Part 2**. The final set of conditions for the Regional consents is attached as **Part 9** for the District Consent as **Part 10** and the *recommended conditions* for the Notice of Requirement as **Part 11**.

Context

1.16 The Notice of Requirement for the tunnel and upper intake were withdrawn by CPW following our **Minute 10**. It has also modified its principal NoR to delete the originally proposed dam, reservoir and associated works. The remaining NoR relates to the lower intake on the Waimakariri River and the intake on the Rakaia river along with the downstream works, the terrace canals and the headrace canal.

1.17 We do not need to further discuss the aspects of the scheme that have been removed, nor do we need to speculate as to whether there may be further applications and/or Notices of Requirement in the future. For those who are interested, our reasoning for recommending against the components which have been withdrawn is set out in **Minute 10**. That Minute also discusses various legal issues which we will not re traverse here.

1.18 We have issued a separate decision in relation to the application by Ashburton Community Water Trust for its hydro scheme on the Rakaia River. This decision split off the joint application by ACWT and CPW for the taking of water from that river. The final ACWT decision has not been appealed and the

unimplemented consents now form part of the "existing environment" for the purposes of our consideration of the CPW take.

1.19 There has been a separate litigation process regarding issues of priority as between CPW and Ngai Tahu in relation to the Waimakariri take and CPW/ACWT and Synlait in relation to the Rakaia take. The former issues have now been resolved by agreement and that has been factored into our reasoning as set out in **Minute 12**. The latter issue was determined by the Court of Appeal late last year, but is still the subject of an appeal by Synlait to the Supreme Court. Accordingly in relation to that issue we have assumed that CPW has priority in relation to Rakaia water, but have also had regard to the possibility that this may change as a result of the separate litigation.

1.20 As required by the Resource Management Act, this is a *joint decision/recommendation* in relation to all remaining aspects of the scheme. (ie. Regional Council and District Council consent decisions and recommendation to CPW in relation to the NoR. Notwithstanding our separation of various aspects of the scheme for the purposes of our Minutes, we have approached the scheme holistically and have weighed the overall beneficial and potential adverse effects of the proposal against the purpose and principles of the Act and the objectives and policies of the relevant plans.

1.21 During the course of this hearing we heard from a very large number of expert witnesses and individuals. We have attempted to cover all of the relevant matters that have been raised before us. Nevertheless, in order to avoid repetition and an even lengthier document, there are some issues and concerns that have not been specifically attributed to persons who gave evidence before us, but rather addressed under topic headings. It is also likely that some particular submission points have not been discussed. We apologise if there are any submitters who consider that their specific concerns have not been directly acknowledged, however we are confident that we have addressed all issues which are material to our decisions and recommendations.

The hearing

1.22 The applications for the NoR and the resource consents to both Selwyn District Council and ECAN (and later modifications to these consents) were lodged between June 2005 and March 2007. CPW indicated that it would not be

ready for a hearing until early 2008. We were appointed on 10 August 2007. The hearing commenced on 25 February 2008.

1.23 The issues involved are complex, contentious and critically important both for the community as a whole, and for affected persons as well as shareholders. There were well over 3000 submissions in total. We heard in person from approximately 170 submitters and/or their representatives.

1.24 We held a pre hearing meeting on 18 December 2007 and then issued directions regarding filing of evidence in advance of the hearing and the conduct of the hearing. All evidence has been made available on the ECan web site. CPW's evidence was required in advance of the hearing and its further evidence has been required in advance of it being presented. Submitters have had an opportunity to respond to all evidence. We also required technical and in some cases other evidence from submitters to be lodged with ECan in advance.

1.25 The evidence has been voluminous and the process has been exhaustive. **Part 12** sets out a summary of those who we have heard from. We have many "Eastlight" folders and Gigabytes of evidence. In anticipation of this situation, we did not allow any witnesses to read their evidence or submitters to read their submissions. (This excludes the separate ACWT hearing).

1.26 We adopted an inquisitorial approach and asked a lot of questions. We make no apologies for this approach to these complex issues, nor for the time we spent hearing those who were directly affected or deeply concerned. In our view the time spent on "hearing" people was no more than that required in order to ensure they had been heard, and to ensure that we made a rational and fully informed decision.

Length of the hearing and timing of the decision

1.27 We set out a chronology of the application and hearing process below.

1.28 We appreciate that some have been frustrated by the time consuming process and for submitters the resultant continuing uncertainty, particularly for landowners. We regret that the process has taken so long but we consider the process we have adopted has given submitters a full opportunity to have their views heard and carefully considered. We are also aware that Central Plains has

been critical of the time the hearing has taken and in particular the time it has taken us to get to a final decision.

1.29 For reasons which we explained at the time and which were accepted by CPW, we shifted our focus to the ACWT component of the applications during late 2008 and early 2009. We turned our attention back to CPW in February 2009. However, we concluded that we did not have sufficient information before us from Central Plains, to satisfy us that we could grant consent and recommend in favor of both Notices of Requirement. We had also by then concluded that we would not be finding in favour of the reservoir. We had significant concerns as to whether there could be a viable project without the dam and reservoir since that was not the scheme which had been presented to us. We were not satisfied that the proposed Waimakariri take regime was sustainable and had significant issues around mounding and nutrient impacts.

1.30 We considered making a decision turning down the whole scheme. However, we eventually concluded that it was appropriate for us to advise CPW and the public of our preliminary views and allow CPW the opportunity to advise us as to whether it wished to revise its scheme and if so, to consider the basis on which it would continue. The timetable since that time has largely been dictated by CPW.

1.31 Whilst we were finalising the ACWT decision, we prepared Minute 6 which set out our views on the Waianiwaniwa reservoir and dam and the upper intake. That was issued in April 2009 and we then held a hearing in May in relation to whether we should consider a revised scheme from CPW (that being opposed by many submitters).

1.32 We heard arguments for and against us continuing with the hearing in May 2009 and on May 19 we issued **Minute 7** accepting CPW's proposal to continue with the hearing and explaining our reasoning for that. CPW requested that we delay the resumed hearing until October to allow it time to reconfigure its scheme and prepare revised evidence. During that time we issued **Minute 8** requesting the independent nutrient report for reasons explained that minute. On 7 July we issued **Minute 9** outlining some preliminary views on the Waimakariri take issues so as to assist CPW with preparing for the resumed hearing.

- 1.33** We appreciate that it took from September 12 2008 until 30 April 2009 for us to indicate our conclusions on the Waianiwaniwa issues. However, we note that during the last quarter of 2008 we heard and issued a preliminary decision in relation to the ACWT application. We considered that it was sensible to deal with that discrete matter first and both ACWT and CPW were supportive of that approach. We also observe that it was their choice to take the somewhat unorthodox approach of applying jointly for the taking of water for two quite separate schemes. That unnecessary (but understandable) approach made our task more complex and necessitated us spending time dealing with the ACWT matter first. ACWT was ready for a resumed hearing in February 2009 and we then issued our final decision on that project on May 25, 2009. (That decision was not appealed.)
- 1.34** The resumed hearing was held between 12 and 15 October 2009 as soon as CPW was ready. In the meantime, at CPW's request, we issued **Minute 10** on 14 July 2009 summarising our reasons for rejecting the dam and associated components of the scheme. It also set out our views on certain legal issues, some of which are also relevant to this final decision. That enabled CPW to confirm the withdrawal of these components of the proposed scheme.
- 1.35** We then proceeded to issue **Minute 11** on 30 October 2009 providing our preliminary conclusions on the revised scheme. We then moved to the quite complex issues associated with the Waimakariri take. Our views on that were set out in **Minute 12** on 24 November 2009. The aim of that Minute was to indicate the amount of water available to CPW.
- 1.36** As discussed below, we focused on endeavouring to provide certainty for those affected by the works proposed in the Waianiwaniwa Valley and adjoining Coalgate first. We adopted this approach because of the potential scale of effects on the people and communities affected and to minimise further uncertainty for these communities. We were also aware that our decision on these issues might dictate our decision on the balance of the scheme.
- 1.37** By adopting the approach outlined above, CPW has had numerous opportunities to modify its scheme to a form where we are now able to grant consent and make favourable recommendations. As noted above the quicker and simpler alternative would have been for a negative decision a year ago. We would not have approved the scheme as originally presented to us. There were

significant gaps in the evidence initially provided, which have now been addressed. By way of example, the impact of the proposal on the recreational amenity of the Waimakariri River had not in our view been adequately assessed, and until October 2009 we had no evidence before us to suggest that the scheme was workable without the reservoir. We also felt that we needed an independent assessment of the nutrient and mounding issues.

1.38 We note that the timing of the last stage of the hearing process – dealing with conditions - has been dictated by the time requested by CPW and (less so) the officers to redraft conditions and prepare evidence on any remaining matters in issue. We have endeavored to assist that process by issuing **Minute 13** on 28 January 2010 which outlined some issues which had been raised and/or which we considered would need to be addressed in relation to conditions. We provided further suggestions/directions in relation to conditions in **Minute 14** on 1 February. CPW was ready for a resumed one day hearing on conditions in late March. Following the resumed hearing, we issued **Minute 15** setting out our views on the few remaining disputed points. That resulted in a final set of draft conditions in April 2010 along with comments from officers and some submitters on changes. CPW filed its submissions in reply in relation to conditions on 30 April and some further submissions in relation to the 'Holiday rule' on 14 May. We finalised this decision over the following two weeks. As will be apparent the process of writing up the decision (which began last year) has been a massive task.

1.39 This is a multimillion dollar project affecting 60,000 ha of land and involving nearly 500 km of canals and races. Given this context, we think that it was appropriate, given the investment involved, that CPW be provided with the opportunity to revise its scheme, fill some evidential gaps and propose more adequate mitigation. It was essential that we gave other parties a full opportunity to be heard and considered both in relation to the original scheme and the revised scheme. We also consider that it was appropriate and beneficial to adopt a rather iterative approach to conditions. Hopefully this will minimize any residual disputes and technical issues.

1.40 In summary, we have endeavoured to move matters along as quickly as is practical, but our overriding goal has been to deal with this very complex matter in a thorough manner. The decision making process has taken as much time as required and many of the delays have either been at CPW's request, or at least have been to its benefit. We observe that the RMA requires us to summarise the

key evidence before us and provide our reasoning. That has been a time consuming and exhausting process. Finally, we note that all four of us are full time consultants. We had not planned on being involved in this process for two and a half years and have had to juggle other commitments with this one.

Relationship of this decision to Minutes and the decision in relation to Ashburton Community Water Trust

1.41 As outlined above, during the course of this hearing we have issued various Minutes relating to both procedural and substantive matters. We have also issued an interim and final decision in relation to the joint application by Ashburton Community Water Trust to take water from the Rakaia. We adopted this approach for a number of reasons. Firstly we concluded that the ACWT application could and should be dealt with as a discrete matter. Secondly, some matters logically followed from others. In particular we concluded that the issues associated with the dam and reservoir were potentially "show stoppers" and should be addressed first. We were also of the view that the community needed certainty on the dam and reservoir issues as soon as possible. We set out our reasoning in **Minute 6** and then in more detail in **Minute 10**. The latter also includes discussion of some key legal issues.

1.42 We also concluded that the scheme could not function without water from the Waimakariri River and that we should reach a preliminary conclusion as to whether further water could be taken from the river and if so, what limitations might be appropriate. We were well aware that the restrictions we had in mind for the Waimakariri take along with our decision in relation to the reservoir, might require CPW to assess the viability of the scheme. Our views on the Waimakariri take are set out in **Minute 12** and to some degree in **Minute 9**.

1.43 Finally, we concluded that given the complexity of the proposal, the large number submissions and the vast amount of evidence we have read and heard, that the issues were best approached in what might be described as "bite sized chunks". We make no apology for this somewhat iterative and drawn out approach.

1.44 Except to the extent that we indicate otherwise in this decision, the preliminary conclusions and reasons set out in **Minutes 10, 11 and 12** can now be taken as our final decision. We will not be repeating the details of those

Minutes nor the detail set out in the decision on ACWT. All of those documents are available on the ECan website. We will to the extent appropriate summarise from the earlier Minutes and ACWT decision, or simply cross reference to the relevant document. In particular we note that:

- **The ACWT decision** is applicable to the application to take from the Rakaia.
- **Minute 6** (April 2009) signalled our intentions in relation to the dam, reservoir, upper intake and tunnel.
- **Minute 7** (May 2009) set out our decision as to the appropriateness of our continuing to consider the modified scheme (following a hearing on that issue).
- **Minute 8** (19 June) sets out our direction for an independent report in relation to water quality issues and our reasons for that.
- **Minute 9** sets out some preliminary observations in relation to the Waimakariri take.
- **Minute 10** summarises our reasons for rejecting the dam and associated components of the scheme. It also sets out our views on some legal issues some of which are also relevant to this final decision.
- **Minute 11** summarises our conclusions and reasoning in relation to the balance of the scheme.
- **Minute 12** is in effect a preliminary decision in relation to the application to take water from the Waimakariri.
- **Minutes 13, 14 and 15** all deal with issues relating to conditions.

The application and hearing process

1.45 We have set out above an outline of the key steps of this proposal and our hearing and decision making process. Insofar as the hearing process is concerned the key dates and durations are as follows:

- 18 December 2007 Preliminary hearing to determine timing of the substantive hearing

- 21 December 2007 as to pre circulation of evidence and other matters
- 25 February 2008 Substantive hearing commenced
- 25 February 2008 to 12 September 2008 - 54 hearing days on Central Plains
- 26 February 2008 site visit 1
- 1 May 2008 site visit 2 (Opuha)
- 2 May 2008 site visit 3 (Waimakariri)
- 12 June 2008 site visit 4 (Malvern Hills)
- 19 September site visit 5 (Rakaia and ACWT intakes)
- September 2008 10 hearing days on ACWT application
- 28 November 2008 ACWT interim decision
- 22 April 2009 ACWT 1 day hearing on conditions
- 25 May 2009 ACWT final decision
- 18 May 2009 Minute 6
- 11 May and 12 May 2009 hearing as to whether we should continue and if so on what basis
- 19 May 2009 Minute 7 *Reasons for decision as to continuance of the hearing*
- 12 October to 15 October 2009 hearing days in relation to the modified scheme
- 22 June 2009 Minute 8

- 7 July 2009 Minute 9
- 14 July 2009 Minute 10
- 30 October 2009 Minute 11
- 24 November 2009 Minute 12
- 28 January 2010 Minute 13
- 1 February 2010 Minute 14
- 24 and 25 March 2010 hearing days to discuss proposed conditions
- 31 March Minute 15 in relation to disputed conditions
- Mid April redrafted conditions and comments from officers and relevant submitters
- 30 April submissions in reply from CPW
- 14 May 2010 further submission from CPW in relation to holiday rule.
- 14 May hearing formally closed
- 28 May decision issued.

1.46 In total we have sat for 63 hearing days in relation to the CPW proposal (ie excluding the ACWT specific hearing). We have spent 5 days on site visits by car, jet boat foot and helicopter.

1.47 We have heard from 34 witnesses for the applicant, 27 reporting officers or Council consultant witnesses, 18 witnesses as part of the Fish and Game/DoC presentation, 8 witnesses for Ngai Tahu, 8 witnesses for the Malvern Hills Protection Society and numerous other individual or group submissions. Expert witnesses were called on behalf of submitters, and some lay submitters were also experts in their own way. We have also heard from a bevy of legal counsel.

- 1.48** We have done our best to approach the submissions and evidence we have heard, objectively and comprehensively. We are grateful to those who have assisted us with complex legal, technical and human issues. As noted in our earlier Minutes we are well aware of the emotional energy and time that some submitters have put into this hearing. We are also aware of the not inconsiderable pressures on the applicant's key expert witnesses and Counsel.
- 1.49** In **Minute 1** we set out the process we intended to follow in relation to evidence for the hearing. We have modified that process as required during the hearing. In summary however, we have required all technical evidence to be made available to us and posted on the ECan web site in advance of it being "heard" by us. The only exception has been some technical evidence in reply.
- 1.50** We have not allowed experts to read from their material except in some limited cases where one or more of us had not had a chance to pre read particular material or where the material had not been pre circulated. We did allow all experts and submitters the opportunity to make oral comments in amplification of their written material and encouraged experts to present a written and oral summary and/ or power point presentation. We did not allow submitters to read their original submissions but did allow them to present to those. We discouraged the repetition of submissions.
- 1.51** We ran the process more in the nature of an inquiry than a conventional hearing. In particular we explored issues in detail via our question of witnesses and submitters. We appreciate that at times that was a slow process, but we found it a useful way for us (and we hope submitters) to understand complex issues. We consider that all parties have had a fair opportunity to make their points and we hope people feel they have been heard. We are appreciative of the well mannered and constructive approach adopted by all parties. As noted before, we appreciate that this has been a time consuming and exhausting process for some submitters and for some of the CPW's key experts and counsel. We also appreciate the stress which the project and the process has caused for some landowners.
- 1.52** During the course of the hearing, we were made aware that one landowner whose property was directly affected by the NoR for the headrace, either had not received notice, or that notice may have been served incorrectly. This landowner was Ms Cynthia McKenzie, the owner of a dwelling on the

smallholding in Cullens Road near Homebush. The Hearings Panel resolved pursuant to section 37A(2) to accept a late submission from the property owner, a course of action which was not opposed by CPW.

The applicant and requiring authority

1.53 Central Plains Water Trust has applied for various resource consents from the Regional Council and land use consents from the Selwyn District Council. CPW is a trust which was settled (set up) by the Selwyn District Council and the Christchurch City Council. The objects of the CPW Trust are:

- *to encourage, support and facilitate sustainable development of the water resources of the Regions for the benefit of the inhabitants;*
- *to provide and facilitate opportunities for agriculture and horticulture diversity in the Regions;*
- *to provide and facilitate education to the inhabitants of the regions in relation to water issues affecting the Regions; and*
- *to appropriately balance enhancement of economic benefits for the Regions with the enhancement of ecological, social and recreational values for the Regions.*

1.54 The Trust applied for the relevant resource consents for the purpose of achieving these objectives. In particular it wished to secure the requisite water for the scheme. It is also intended that the Trust will administer the proposed Environmental Fund and will oversee the implementation of the "On-farm protocol". It will also have a public education and environmental enhancement role. Our role is to make *decisions* on the applications lodged by CPWT.

1.55 Central Plains Water Limited was set up to construct and operate the scheme. The company structure also enabled its successful application to the Minister for the Environment for Requiring Authority status as a network utility operator. Our role is to make a *recommendation* to CPWL as to the Notice or Requirement for a designation and as to the conditions which should apply to that designation if (as now intended) we recommend in favour of the NoR.

1.56 The structure and objectives of CPWT are set out in the trust deed. The relationship between CPWT and CPWL is governed by a Memorandum of Understanding. We do not need to address these in any great detail. To a large degree the structure and objectives of an applicant for consent are irrelevant to our consideration of RMA matters. In particular we have not put any significant weight on the environmental or economic development objectives of the Trust. Nor have we assumed that the Trust structure will necessarily lead to any better management of the scheme and compliance than would a company structure. However the involvement of Selwyn District Council in the Trust and provision for and environmental trustee is a matter which is deserving of some weight.

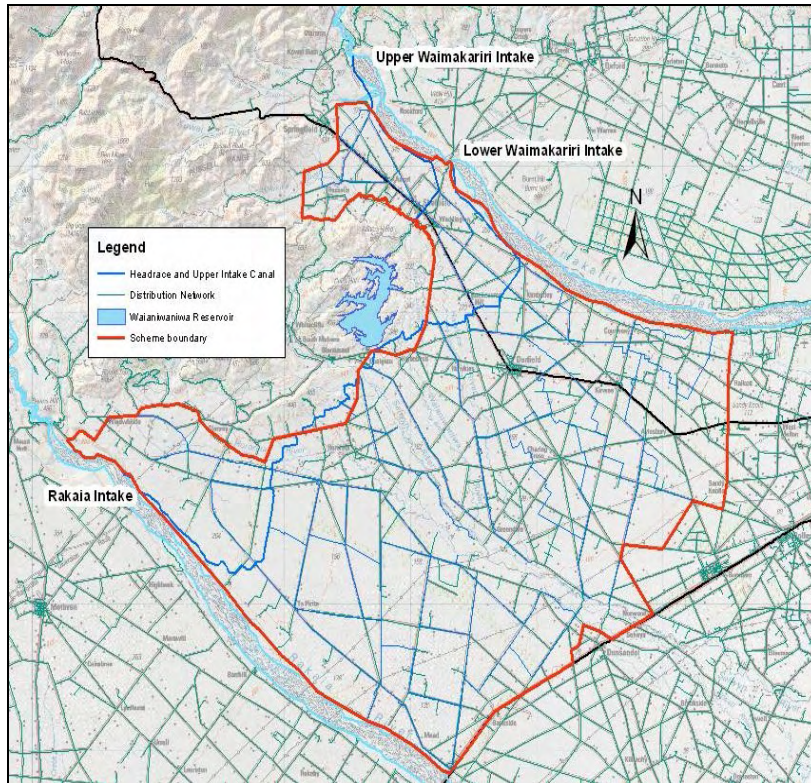
1.57 Whilst we have concluded that increased irrigation will bring economic benefits to the region we perceive that the initial if not primary goal of the scheme is to secure access to water to further the farming interests of the shareholders of CPWL. To a large degree, the fact that a Trust is behind that is irrelevant. The objectives of the Trust and the company are however relevant to our consideration of the NoR and we will come back to those later.

1.58 There was concern expressed by some of those landowners affected by the NoR as to whether CPWL should have been approved as a Requiring Authority with consequent access to the designation provisions of the RMA and the compulsory acquisition provisions of the Public Works Act. For reasons we have explained in **Minute 10**, that results from an entirely separate process, and is not an issue that we are able to consider.

The modified proposal

1.59 The scheme before us at the commencement of the hearing was to take water from both rivers via a headrace between the two, and use that water for irrigating a command area of 60000ha. The original proposal including the command area of the scheme and the proposed head race canal, distribution network are shown on **Figure 1** below. (There is larger scale plan of the headrace route in Part 4)

Figure 1 CPW command area, headrace route and distribution network



1.60 As a result of its decision to abandon the Waianiwaniwa reservoir, dam, upper Waimakariri intake and tunnel, CPW has scaled back its scheme and adjusted how it would work. The principal points of difference are as follows:

- The Waianiwaniwa reservoir, upper intake and linking tunnel have been withdrawn from the scheme;
- The lower Waimakariri intake, and the Rakaia intakes remain as originally proposed;
- The headrace remains as originally proposed both in terms of capacity and location;
- The command area remains as it was (60,000 ha). The estimated area of new irrigation (i.e., currently unirrigated and with no consents for irrigation is 30000ha);
- The proposed maximum take from the Waimakariri river has been reduced from 40 cumecs to 24 cumecs;

- In light of our **Minute 9**, CPW now proposes 1 to 1 flow sharing of B class water (one cumec of take for each cumec left in the river) as compared to its original proposal of no flow sharing and its later proposal of 5 to 5 flow sharing with the first 5 cumecs of B permit water going to the scheme;
- There will be a significantly reduced demand for Waimakariri River water as compared to the original proposal, because water is no longer required to top up storage in the reservoir. The maximum take for irrigation is reduced from 40 Cumecs to 24 Cumecs. Very little water will be required outside of the irrigation season;
- A further 2 cumecs will be required for the fish bypass but will be returned to the river. There will also be a few cumecs occasionally required for sediment flushing. Accordingly the intake will be sized for a maximum of 30 cumecs;
- The terrace canal capacity will be 25 cumecs for CPW but may be enlarged to 26 cumecs if merged with the SDC stockwater race;
- We note that the volume of water demand from the Waimakariri River will be less than would be available under the rate of take limits proposed by CPW, because water will be taken from the Rakaia rather than the Waimakariri where possible. (CPW is opposed to any annual or seasonal limit on the volume of take from the Waimakariri River);
- Another change to the Waimakariri take regime relates to an agreement between Ngai Tahu Properties Ltd and CPW, whereby NTPL has transferred 1 cumec of its A permit allocation to CPW. This in effect reduces to 24 cumecs, the maximum Waimakariri take that CPW seeks under the current application;
- The loss of the proposed reservoir will be compensated for to a limited degree by a combination of on farm storage and use of existing ground water consents at times when insufficient run of river water is available to meet demands. Those farms with existing groundwater irrigation supplies will enjoy relatively good reliability. There will however be some

farms within the scheme which will not have access to ground water and where overall reliability of supply will be relatively low;

- The net result is a scheme with the same command area but which will have considerably less reliability than was possible with the Waianiwaniwa dam storage. Ultimately, CPW may seek to add additional storage to the scheme based on Lake Coleridge, aquifer storage or some other options, however that is not relevant to our inquiry;
- The reduced reliability of the amended scheme will have the effect of considerably reducing the extent of additional dairying and other new highly water intensive activities from what would be the case if the reservoir remained;
- The net result of removal of the reservoir from the scheme, will be reduced economic benefits but also significantly reduced capital costs (no dam, reservoir, tunnel or upper intake);
- There will be less water applied to land with a resultant reduction in predicted mounding of groundwater and reductions in predicted contaminant loadings. The benefit to groundwater aquifers and lowland streams from increased recharge will also be less than with the original scheme;
- The projected benefits from reduction in reliance on existing ground water consents will not occur to the same degree under the amended scheme since shareholders are unlikely to give up their existing groundwater allocations;
- There will be reduced reliance by CPW shareholders on their existing ground water takes, but the spare capacity may well be transferred and accordingly when assessing effects we have not assumed any reduction in groundwater takes.

The applications to the Regional Council

1.61 Various applications have been amended, deleted or amalgamated as a result of the modifications to the scheme and some rationalisation of the

necessary consents. **Part 9** sets out the final set of regional consents and conditions. In summary the key activities requiring consent from the Regional Council are:

- Water permit for the taking and diversion of water from the Waimakariri;
- Water permit for the taking and diversion of water from the Rakaia;
- Water permit for the use of water from both rivers;
- Section 13 land use consents for activities within the beds of each river;
- Section 9 (2) land use consent for some earthworks;
- Discharge permits for various discharges in the vicinity of the intakes;
- Discharge permits for by-wash discharge to land;
- Discharge permits in relation to construction works.

The applications to Selwyn District Council

1.62 CPW applied to SDC for land use consents for the proposed distribution network. The location of that network is also shown on **Figure 1**. Unlike the headrace which is subject to the NoR, the location of the distribution network still requires the agreement of affected landowners. The final location of the network may need to be adjusted, and CPW will need to apply for variations to this consent or for additional consents where the variations differ markedly from what has been notified. (For example where another person's land is affected). **Part 10** contains the final set of conditions for the SDC consents.

1.63 Six individual resource consent applications (land use) were lodged with respect to six geographical components of the distribution race network as follows:

- *065214: The construction, use and maintenance of pipelines, open channels or waterways to convey water in the Coalgate/Hororata/Greendale (Central) area, including utility buildings*

and structures along and adjacent to the routes of the distribution network.

- *065215: The construction, use and maintenance of pipelines, open channels or waterways to convey water in the Darfield area, including utility buildings and structures along and adjacent to the routes of the distribution network.*
- *065216: The construction, use and maintenance of pipelines, open channels or waterways to convey water in the Sheffield area, including utility buildings and structures along and adjacent to the routes of the distribution network.*
- *065217: The construction, use and maintenance of pipelines, open channels or waterways to convey water in the Springfield area, including two secondary pump stations, as well as other utility buildings and structures along and adjacent to the routes of the distribution network.*
- *065218: The construction, use and maintenance of pipelines, open channels or waterways to convey water in the Te Pirita area, including utility buildings and structures along and adjacent to the routes of the distribution network.*
- *065219: The construction, use and maintenance of pipelines, open channels or waterways to convey water in the Windwhistle area, including a secondary pump station, as well as other utility buildings and structures along and adjacent to the routes of the distribution network.*

1.64 In addition, an application was made in respect to two by-wash discharge points as follows:

- *075156: To construct, operate and maintain a by-wash discharge point, consisting of a constructed wetland and discharge structures, and all associated excavation and disturbance of land, and removal and planting of vegetation, at the following sites:*

- *Adjacent to and within the Selwyn River at or about map reference NZMS 260 L35:289-421, near Hawkins Road. Wetland size will be approximately 0-1 – 0.2 hectares.*
- *Adjacent to and within the Hawkins River at or about map reference NZMS 260 L35:281–574, near Bluff Road. Wetland size will be approximately 0-1 hectare.*

The Notice of Requirement

1.65 CPWL has withdrawn its Notice of Requirement for the upper Waimakariri intake and tunnel. It has modified its primary Notice of Requirement by deleting the Waianiwaniwa Reservoir, the Coalgate Dam, and associated works. What remains is:

- The Waimakariri intake and associated works (sediment pond, fish diversion channel, canal intake etc)
- The Rakaia intake and associated works
- The Waimakariri and Rakaia escarpment or "terrace" canals
- The headrace between the two rivers (**Figure 1**)
- Associated works including siphons under various streams and rivers

1.66 The NoR does not set out the objectives of the Requiring Authority but does contain the following brief statement as to the necessity of the works:

"To achieve the objectives of the project including **improving the security of water supply and hence the prosperity of Central Canterbury through a water management scheme that enhances ecological and recreational values while providing opportunity for agricultural and horticultural diversity**".

1.67 We have set out the objectives of the Trust earlier. Although the position is a little unclear, we have assumed that the objective of the Requiring Authority is

to obtain the necessary designation to authorise those components of the scheme listed above, so as to achieve the objective quoted above.

- 1.68** As discussed earlier, our role in relation to the NoR is to make a recommendation to CPW. It may accept our recommendation or modify it. Submitters on the NoR and the Council then have the right to appeal that decision of CPW to the Environment Court. In contrast to the consent decision there is no direct right of appeal in relation to this part of our decision/recommendation. **Part 11** contains the final set of conditions which we recommend to CPW as the Requiring Authority. Again, the rights of appeal relate not to our *recommended conditions* but to the version of conditions which CPW ultimately adopts. (It must provide reasons for any modifications to the recommended conditions.)

Submissions

- 1.69** The number of submissions lodged was complicated by the fact that CPW modified its original 2005 applications in 2007, in order to incorporate a proposed tunnel from the upper Waimakariri intake site instead of a headrace adjacent to Sheffield. The additional submissions lodged are included in the totals set out below.

- 1.70** There were 1842 submissions lodged in relation to the applications to Environment Canterbury; 761 submissions in relation to the applications to Selwyn District and 766 submissions in relation to the first (and now only) Notice of Requirement. The vast majority of these submissions were in opposition to the proposal. There were however some submissions in support. Of the approximately 170 submitters or their representatives that we heard most were in opposition, however it must be remembered that the original scheme included a very contentious dam and reservoir proposal plus the upper Waimakariri intake which was also opposed by some.

- 1.71** We have focused on the content of submissions rather than the number of submissions in support and opposition and as we are required to do, have ultimately based our decision on the *evidence* we have read or heard on behalf of submitters, CPW and the two Councils.

- 1.72** The proposal (particularly in its original form) has of course been very controversial and some of the submissions in opposition have adopted what might

be termed a philosophical or emotional position. While that is understandable, we must base our decision on an objective analysis of competing evidence rather than on a 'numbers game' or upon what we perceive to be the 'mood' of the community. We also observe that it is not our role to make decisions on the merits or otherwise of dairy conversions or any other changes to farming practices.

2. THE DECISION MAKING FRAMEWORK

The statutory framework

2.1 Sections 102 and 103 of the Act require us to make a joint decision of the Regional Council and District Council applications together with our recommendation on the Notice of Requirement. It follows that we must approach the revised proposal before us holistically on the basis of its overall sustainability. However, there are also individual components which required specific consideration, since as noted earlier, some of them had the potential to be "show stoppers". In particular the sustainable rate of take from the Waimakariri is a matter which is critical to the whole of the scheme. For the reasons set out in Minute 7, we do not consider that the "holistic" approach required us to reject the whole scheme once we rejected the dam and reservoir, even though those elements were originally presented as a critical component of the initial proposal.

2.2 Section 104 sets out the matters we must consider in relation to the applications for resource consent. We must "*subject to Part 2*" have regard to:

- Any actual or potential effects on the environment of allowing the activity.
- Any relevant Policy statement, Plan or Proposed Plan.
- Any other matter we consider to be "*relevant and reasonably necessary to determine the application*".

2.3 There is no requirement to have regard to the content of every submission, but we must of course weigh all evidence put before us. The weight to be attached to evidence depends upon the relevance of the evidence, the expertise of the witness and/or their special or local knowledge along with issues of credibility and objectivity.

2.4 There are some additional requirements in relation to non complying activities. The non complying activities for which consent is sought relate to rules WQL 60 and WQL 61 under the Proposed Natural Resources Regional Plan which in summary concern discharges of water and contaminants to land where this might enter water, or any direct discharge to surface water or groundwater. Under Rule WQL 62, non-complying activity consent is also required for excavation associated with the headrace canal where this exceeds a depth of more than 5 m over an unconfined or semi-confined aquifer. However the rule does not apply the NoR. All of the consents required under the WRRP or the Selwyn District Plan are a restricted discretionary or discretionary activity.

2.5 In relation to the few non complying activities, section 104D provides that we may only grant consent if we are satisfied that **either** the adverse effects of the activity on the environment will be minor **or** (if such effects would be more than minor) the activity will not be contrary to the objectives and policies of the plan or proposed plan.

2.6 There are additional considerations in relation to the applications for discharge permits which are set out in sections 105 and some minimum standards such discharges must meet which are set out in section 107.

2.7 Section 108 provides us with a wide discretion as to conditions. However that discretion is modified by some case law principles which we appreciate and have applied.

The Notice of Requirement

2.8 Insofar as the Notice of Requirement is concerned, the governing section is section 171 which provides as follows:

(1) *When considering a requirement and any submissions received, a territorial authority must, **subject to Part 2, consider the effects on the environment of allowing the requirement**, having particular regard to -*

(a) *any relevant provisions of -*

(i) *a national policy statement:*

- (ii) *a New Zealand coastal policy statement:*
 - (iii) *a regional policy statement or proposed regional policy statement:*
 - (iv) *a plan or proposed plan; and*
- (b) ***whether adequate consideration has been given to alternative sites, routes, or methods of undertaking the work if-***
- (i) *the requiring authority does not have an interest in the land sufficient for undertaking the work; or*
 - (ii) *it is likely that the work will have a significant adverse effect on the environment; and*
- (c) ***whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought; and***
- (d) *any other matter the territorial authority considers reasonably necessary in order to make a recommendation on the requirement. (Our emphasis)*

2.9 Our consideration of the consent applications and the NoR are "*subject to Part 2*". We have already discussed relevant Part 2 considerations in relation to the overall scheme in **Minute 11**, in relation to the Waimakariri take in **Minute 12** and in relation to the Rakaia take in our decision in relation to the ACWT applications. We set out our key Part 2 conclusions in relation to the overall CPW scheme later. For the present purposes it is sufficient to note that we must endeavour to achieve "*sustainable management*" of the natural and physical resources which will be affected by the scheme.

2.10 Sustainable management means:

"..... managing the use, development, and protection of natural and physical resources in the way, or at a rate, which enables people and communities to

provide for their social, economic, and cultural wellbeing and for their health and safety while –

- (a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
- (b) Safeguarding the life - supporting capacity of air, water, soil, and ecosystems; and*
- (c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment.”*

The planning framework

2.11 We are required to have regard to the provisions of any relevant plan or proposed plan and the Regional Policy statement. We have set out in **Part 8** a summary of our analysis of the proposal against the provisions of relevant planning documents. Ultimately however, the primary basis of our decision has been the purpose and principles of the Resource Management Act. We did not derive great assistance from the planning documents.

Activity status and bundling

2.12 The rules in the Selwyn District Plan do not apply to the Notice of Requirement and accordingly the question of activity status does not directly arise in relation to the NoR.

2.13 We did not agree with submissions which suggested the whole proposal should be regarded as non complying because some of the discharges are non complying. We have treated the activity status in relation to the District Plan as separate from activity status of the applications for Regional consents.

2.14 So far as the applications to the Regional Council are concerned, there were some submissions that these applications should be "bundled" as non complying. For the reasons set out in **Minute 9** we did not accept that approach.

2.15 The applicant argued that the application to take from the Waimakariri should be regarded as restricted discretionary but we concluded that the relevant water permits should be bundled as fully discretionary which is consistent with the status of the take under Plan Change 1. (Accepting that this status is not applicable to the CPW take).

2.16 The only activities which are non complying are certain discharges to land and water and earthworks, both as a consequence of rules under the PNRRP. We concluded that these activities can be unbundled and considered on their own. Adopting that approach we are satisfied that the threshold requirements of section 104D are met in relation to these activities.

2.17 The other applications for Regional Council consent are all for restricted discretionary or discretionary activities.

2.18 Our consideration of the relevant objectives and policies in the applicable plans to set out in **Part 7**. We have also outlined our conclusions on key objectives and policies within each of the relevant parts of our decision.

The Selwyn District Plan

2.19 Farming is a permitted activity under the Plan. The only qualification to this is under Rule 9.11 in the rural zones which requires a 10 m setback from surface waterways for dairy farming, and requires that dairy farming be undertaken on the property containing the milking shed. If either of these requirements are not met the activity is discretionary. The District Council has not seen a need to limit intensification of farming activities including dairying. Indeed there is some encouragement of such activities by way of the permitted activity status and supportive policies.

Distribution races

2.20 While CPW has sought to rely on designation to establish the headrace, it is seeking to establish the 438 km distribution network by way of resource consent under the Selwyn District Plan. The provisions of the Transitional District Plan were no longer relevant at the time the application was lodged, so the application only requires consideration under the Proposed Plan. However it is noted that with

the reprinting of the plan, the rule numbers have changed from those set out in the officers report at the time of the hearing.

2.21 Under Volume 2, Part D. – "Definitions" in the District Plan, "Utility" is defined as including:

2.22 "the use of any structure, building or land for any of the following purposes:

.....
(d) *the conveyance, storage, treatment or distribution of water for supply, including (but not limited to) irrigation and stock water;*
....."

2.23 Under Part C, Rule 5.1.2.5 (b) of the Plan ("Utilities"), it provides for the "*construction of new channels for drainage or irrigation purposes on any individual property which serve only that property*". Because the distribution races are not designed to serve only one particular property, it was accepted that the distribution races should be considered as a discretionary activity.

Heritage items and trees

2.24 According to the officer's report (Mr Boyes) CPW indicated in a memo dated 8 September 2006, that "at that stage" the effect of the distribution network on any listed heritage sites or trees was "not known". The basis for this was that planning was not at such a detailed level as to enable the determination of compliance with the relevant rules with certainty. Noncompliance would result in activities affecting such structures or trees being discretionary (unrestricted).

Earthworks

2.25 The distribution race network is a discretionary activity (unrestricted) under Rural Volume 2, Part C, and Rule 1.6.1.2 which limits the maximum volume of earthworks to 5000 m³ "per project". The distribution race network is also discretionary because under Rule 1.6.1.3, the land will not be filled and recontoured to the same state as the surrounding land after earthworks have ceased. In addition, there are rules which trigger discretionary activity status if there is any removal of contaminated soil, disturbance of waahi taonga sites or management areas, earthworks within 20 m of the edge of any water body (except aquifers), if there is a vertical cut face of more than 5% with a total vertical cut of

more than 2 m, and if the site is not replanted with vegetation which is the same as or of a similar species to that which existed on the site prior to the earthworks taking place.

Hazardous substances

- 2.26** The officers' report notes that CPW confirmed by way of a memo dated 8 September 2006 that the storage and use of hazardous substances (diesel) would exceed the 5000 litre maximum quantum specified under Rural Volume 2, Rule 7.1.1.1 and Appendix 15. Although the establishment of a large construction base of the scale originally anticipated for the construction of the dam is no longer proposed, our understanding is that temporary construction sites could involve the use of fuel in amounts exceeding the rule threshold.

Noise and Vibration

- 2.27** The officers report noted that in a memo dated 8 September 2006, CPW confirmed that it would not comply with all rules in the Selwyn District Plan relating to noise and vibration, notably under Rural Volume 2, Rule 9.16.1 and Rule 9.16.2; and under the Township Volume 1, Section C, Rules 10.6.1. and 10.6.2.

Summary

- 2.28** Overall, the distribution race system, and its associated earthworks fall to be considered as a discretionary (unrestricted) activity. With respect to rules relating to the effect of utilities on listed heritage items, protected trees, and the possible presence of hazardous substances, we do not have enough information to know with certainty whether any of these rules will be triggered by parts of the proposed distribution race system. Even if they do however, the activity would still remain discretionary in status. Accordingly, given the lack of detail in relation to aspects of the proposed distribution race system, further separate resource consents may be required. We think the number of such sites and possible future consents, is likely to be small. However should any archaeological sites be disturbed or discovered in the course of work, a resource consent for disturbing such sites will be required, as well as separate consent under the Historic Places Act 1977.

River bed works

2.29 The works in the beds of the Waimakariri and Rakaia rivers require approval under the Selwyn District Plan. CPW seeks this approval by way of designation. These works also require consent under the Waimakariri River Regional Plan.

2.30 The Notice of Requirement applies to the centre lines of each of the rivers, which are the northern and southern boundaries of the District respectively. The Notices of Requirement do not extend beyond boundaries of the District and accordingly if CPW wishes to carry out river works beyond the centre line of either river it may require additional consents or designation from Waimakariri and/or Ashburton District Councils. We are unsure as to whether that will be necessary and do not see it as particularly relevant to our decision making.

The Transitional Regional Plan

2.31 The TRP comprises a variety of bylaws, general authorisations and regulations which were deemed to form a Transitional Regional Plan when the RMA came into force in October 1991. The proposed takes, diversions, and discharges of water do not meet all of the various standards under the TRP and two bylaws, and accordingly are discretionary activities. In addition, any activities not specifically authorised by rules under the TRP are deemed to be discretionary activities pursuant to Section 77C of the RMA.

2.32 We only gave very limited weight to the TRP, given that it was prepared before the RMA came into force, and also contains no objectives and policies.

The Proposed Natural Resources Regional Plan (PNRRP)

2.33 A number of non compliances were originally identified with respect to the dam, reservoir and tunnel, but do not apply to the scaled down proposal subject to these decisions.

2.34 The relevant chapters of the PNRRP and the ruled abbreviations are as follows:

AQL - Chapter 3: Air Quality
WQL - Chapter 4: Water Quality

WQN - Chapter 5: Water Quantity

BRL - Chapter 6: Beds and margins of rivers and lakes

2.35 Chapter 3 was publicly notified in June 2002 and Chapters 4 to 9 in July 2004. Chapter 3 has now reached an advanced stage, but the other chapters are still subject to decisions yet to be issued in relation to submissions.

The use of water

2.36 In terms of the use of water, Rules WQN 25 and WQN 26 of the PNRRP apply to the use of water in larger quantities, for irrigation. Table WQN 2 specifies that these rules apply throughout the region, and under Rule WQN 26 the use of water for the CPW scheme is a discretionary activity.

Air quality

2.37 AQL 57 - the project will involve various construction, operation and maintenance activities, potentially including fugitive dust emissions (AQL38); metal work processes (AQL41); the extraction, handling, processing, transporting or storage of bulk materials (AQL42); water blasting (AQL51); and spray painting (AQL53). These require consent as discretionary activities.

Water quality

2.38 WQL 34 - the scheme will result in the clearance of vegetation or soil disturbance in a riparian zone (WQN 32 and 33). This requires consent as a restricted discretionary activity.

2.39 WQL 56 - the scheme requires discharge of water or contaminants into a river, lake or artificial watercourse. Examples will be disposal of dewatering water, stormwater, discharges through by-washes, and discharge of diverted water back to water bodies. This requires consent as a discretionary activity.

2.40 WQL 57 - the scheme requires discharge of a contaminant onto or into land. This requires consent as a discretionary activity.

2.41 WQL 59 - this rule lists a number of land-use activities which require consent. With respect to this rule, CPW's activities may include the deposition of cleanfill material over unconfined or semi-confined aquifers which have previously been excavated to groundwater depths, and the storage of hazardous substances -for example diesel fuel - for the construction of the project. These activities may

not comply with related rules WQL 41 - 43, and hence consent is required as a discretionary activity.

2.42 WQL 60 and WQL 61 - the scheme will include discharge of water and contaminants to land where it might enter water, or directly to surface water or groundwater. This requires consent as a non complying activity under these rules.

2.43 WQL 62 -the scheme involves the excavation of land over an unconfined or semi- confined aquifer (WQL 40). This requires consent as a non complying activity.

Water quantity

2.44 WQN 18 -during construction of the CPW scheme, water may need to be taken from groundwater for site dewatering (WQN 17). This requires consent as a discretionary activity.

2.45 WQN 26 - the use of water from the Rakaia and Waimakariri rivers for irrigation (WQN 25) requires consent as a discretionary activity.

2.46 WQN 41 -activities associated with the construction, operation and maintenance of the scheme will involve the diversion of water. This requires consent as a discretionary activity.

Bed and margins of rivers and lakes

2.47 BRL 8 -the erection of structures and activities undertaken in river beds (BLR 1 – 7) requires consent as a discretionary activity.

The Waimakariri River Regional Plan (WRRP)

2.48 The operative WRRP provides under Rule 5.1 that a take of "B Permit" water is a restricted discretionary activity. No water can be taken if the "unmodified" flow at the Old Highway Bridge is less than 63 cumecs. Rule 5.2 states that any diversion of water is also a restricted discretionary activity.

2.49 The Plan is silent on the "use" of water taken from the river, and pursuant to Section 77C(1)(a) of the RMA the use of water falls to be considered as a fully discretionary activity.

2.50 We have set out our conclusions in relation to the WRRP in **Minutes 9 and 12**. We have concluded that although the proposed take from the Waimakariri is a restricted discretionary activity, we should adopt a bundling approach and treat it as a fully discretionary activity.

2.51 We did not accept that the take should be bundled and treated as a non complying activity simply because some of the discharges are non complying under the PNRRP. We have set our reasoning for that in **Minute 9**.

2.52 We are satisfied that the amended proposal in relation to the take along with the conditions we have adopted will ensure that the take and associated activities are not contrary to the objectives and policies of the WRRP. Whilst we have considered the take on a fully discretionary basis, we have paid particular attention to the assessment criteria under Rule 5.1 and Objective 5.1, Policy 5.1(b) and Policy 5.2.

Proposed Plan Change 1 to the WRRP

2.53 We have set out our conclusions in relation to Proposed Plan Change 1 and the weight to be given to it in **Minute 12**. We note that Plan Change 1 would change the activity status of the take from restricted discretionary to non complying. Although the activity status in Proposed Plan Change 1 cannot be applied to these applications (see section 88A of the RMA) we think that the change of status away from restricted discretionary is sensible and it is not for us to comment on the suggested non complying status. While we must treat the activity as discretionary, we can and have taken into account the policies behind the change. We have decided that we should not put any great weight on the proposed flow regime in that document. However, we have put weight on the objectives which the amended plan seeks to achieve (which under the proposed change are no longer artificially limited to effects in the vicinity of the intake point). We have concluded that these objectives will be achieved by the flow regime we have adopted.

The Rakaia Water Conservation Order

2.54 Section 217 prohibits us from granting any resource consent which would be contrary to any restriction, prohibition or other provision of the Rakaia Water Conservation Order. ("WCO") We are also required to impose such conditions as are necessary to ensure that the provisions of the WCO are maintained.

2.55 We discussed the interpretation of the relevant provisions of the WCO at some length in our decision in relation to the ACWT scheme and also summarised the relevant provisions in the Rakaia section of this decision. We adopt the same interpretations here as in ACWT and do not need to repeat our reasoning. While we do not accept that there is a presumption in favor of activities which comply with the WCO, we do accept that in this instance compliance with the WCO will achieve sustainable management and have not imposed conditions which are more restrictive than the WCO except in relation to fish screening.

2.56 We put some effort into ensuring that the conditions of the ACWT take and other consents were consistent with the WCO. We have transferred that approach to the CPW conditions which we have ensured are consistent with the ACWT conditions and the WCO (although we note that CPW sought and the officers recommended a slightly different approach to some of the conditions of take).

Other relevant planning documents

2.57 Evidence on behalf of Ngai Tahu referred to the Ngai Tahu Freshwater Policy (2000), the Te Taumutu Runanga Natural Resources Plan (2002), the Te Waihora Joint Management Plan (2005) and the Water Conservation Order for Lake Ellesmere. These documents make reference to water quality, the mixing of waters and the importance of Te Waihora for its wildlife and mahinga kai values. We do not understand the proposal to be contrary to the Water Conservation Order.

2.58 We have also considered the November 2009 *Canterbury Water Management Strategy* (CWMS). This document has no statutory force and has not been through any formal submission and appeal process and accordingly we do not put any great weight upon it. Nevertheless we have concluded that the CPW scheme is broadly consistent with the objectives which the Water Strategy seeks to achieve. A key component of the CWMS is integrated management of

the regions water resources, both across and with the proposed management zones. We have adopted the same approach within our decision. In particular we have had particular regard to the effects of the use of water on the wider environment.

2.59 Essentially the CWMS seeks to ensure more productive use of water whilst also ensuring sustainable management of both the water and the land resource. This scheme will achieve that objective. The possibility of eventual large scale storage being added to the scheme and the benefits of reduced reliability on ground water and increased groundwater recharge are all consistent with the strategy.

2.60 CPW submitted that its scheme would assist the strategy in the following ways and we agree:

- *Delivering surface water to the upper plains, where ground water is not readily available;*
- *Augmenting groundwater supplies so that groundwater in the lower plains is more reliable;*
- *Providing a network delivery system which can relocate water to where it is needed, whether that water is sourced from groundwater, run of river water or stored water (if the storage options proposed under the CWMS are realised).*

The existing environment and the permitted baseline

2.61 We are required to assess the effects of the proposal on the existing environment including existing resource consents whether or not implemented. We also have a discretion to disregard effects which are permitted by the relevant plans.

2.62 We have discussed the "*existing environment*" in our decision on the ACWT scheme and to some extent in Minutes 9 and 12 in relation to the proposed Waimakariri take. Insofar as the Rakaia take and associated works are concerned, our role is to consider the additional and cumulative effects of the CPW proposal above and beyond the effects of the existing consented takes including the unimplemented consents held by ACWT, Barrhill Chertsey Irrigation

and Electricity Ashburton Limited. As discussed later in this decision, we have concluded that in terms of hydrological and ecological effects, the CPW take will have little additional effect beyond what has already been consented and the effects that it will have will not be contrary to or inconsistent with the Rakaia Water Conservation Order.

2.63 Similarly, in relation to the Waimakariri take we must focus on the additional and cumulative effects of the CPW take beyond the effects of the existing takes. We cannot use this decision to address the effects of existing takes which are both consented and consistent with the minimum flow set by the WRRP. Unlike the Rakaia take, the additional take has the potential to have more than minor additional effects and cumulative effects. It is those effects which we have focused on in Minutes 9 and 12 and in this decision.

2.64 The existing environment is also of relevance in relation to the effects of using the water for irrigation. The existing state of Te Waihora and the lowland streams is part of the existing environment. This decision cannot resolve either problem. Our role is to ensure that the ecological impacts of further intensification of farming as a result of irrigation are not made significantly worse than they currently are, or made significantly more difficult to rectify. These comments apply in particular in relation to effects on water quality.

2.65 Another relevant component of the existing environment, is the existing irrigation which is occurring or has been consented, in the command area. Irrespective of whether the CPW scheme proceeds there has already been significant irrigation driven intensification and more has been consented. In particular the recent Rakaia Selwyn and Waimakariri Selwyn ground water consents and the Synlait take consents are relevant. With the exception of the Synlait decision, which is subject to an appeal, we have disregarded the effects of existing consented activities. We have focused on the additional and cumulative effects which would be caused by further intensification and run off as a result of CPW irrigation. Given the groundswell of opposition among many submitters to dairying, it is important to note that under the modified CPW scheme the additional scope for dairying is now very limited.

2.66 We note that approximately 30,000ha of the CPW command area is already irrigated using ground water. The CPW water will be used to supplement ground water or vice versa. (CPW water will usually be used in preference to ground water because of the pumping costs with the latter). There will of course

be significant new irrigation in the areas where the land owners do not have sufficient consents for irrigation. This will utilise CPW water and may potentially utilise groundwater which becomes surplus to CPW shareholders requirements. We have focused on the effects of the additional intensification which is likely to result and disregard effects which are already occurring or are likely to occur irrespective of CPW.

2.67 In this context, the so called *permitted baseline* is also relevant. Farming, including dairying, is a permitted activity. Discharges to land of non point source contaminants from farming is also permitted or at least not regulated by ECan. (for example fertiliser application and urine and faecal matter from stock).

2.68 We have a discretion as to the extent that we can take into account the effects of permitted activities. Indeed it could be argued that we should focus on the direct effects of using the water and ignore these indirect effects as coming within the permitted baseline. For reasons which we have discussed in Minutes 10 and 11 we have concluded that we should take into account the effects of land use intensification as a result of the component of irrigation which would not occur *but for* CPW.

2.69 We include within that, both positive economic effects and actual or potential adverse effects. In particular, this includes potential adverse effects on the ecology of lowland streams and Te Waihora, and effects of mounding of ground water in lowland areas. We draw the line at the social impacts of increased dairying and larger farm units. In our discretion in relation to permitted effects we have concluded that social changes enabled by increased irrigation are a matter for the District Plan and come within the permitted baseline. Put differently, if the Selwyn Community wishes to put a brake on further increases in dairying, then that is a matter for the District and/or Regional Plans. In any event, unlike the original scheme involving the dam and reservoir, the additional area of dairying possible under the modified scheme is limited.

2.70 Similarly, if ECan wishes to regulate nutrient and other discharges from farms it can do so. While we are entitled to consider the impacts of increased run off, as an inevitable consequential effect of irrigation, we must also have regard to the fact that the Regional Council has not put any direct limits on farming or farm run-off. Our decision and consent conditions can only go so far in that regard. We note that the issues raised by the District Health Board and others are more relevant to that debate than to this application.

3. LIST OF KEY ACTUAL AND POTENTIAL EFFECTS

3.1 The scheme if it proceeds will have a number of actual and potential adverse effects as well as some beneficial effects. We have discussed most of these in Minutes 9, 11 and 12 . For those effects which we have not be addressed in any detail to date, we will provide our conclusions and reasoning in this decision. For other effects we will only summarise our earlier conclusions in this document.

3.2 The following is a summary of the key actual and potential effects of the scheme which we have focused on. (See **Part 3** for a discussion of beneficial effects and economic, social and cultural effects.)

Potential beneficial effects

3.3 We accept that the scheme will result in economic benefits for people (particularly the shareholders and the farm service sector) and for the wider district and regional community. We will discuss this further later in this decision.

3.4 We accept that the proposed use of water is an efficient use of the resource and do not need to determine whether it is *the* most efficient use of the resource. (The question as to whether it would be a more efficient use of the water resource to incorporate large scale storage is not a matter for us.)

3.5 There will be some benefits from having most of the farms within the command area dependent upon scheme water to some extent and therefore "locked in" to the Sustainability Protocol. While this can largely be seen as mitigation of effects of the scheme, there will also be an element of benefit to the region as a whole since some of these farms are irrigating already, or would do so irrespective of CPW. It will be useful to have these farms within the ambit of the Protocol.

3.6 The increased recharge of ground water from the scheme will have beneficial effects in terms of flows of lowland stream and possibly in terms of more reliability of lowland groundwater takes.

Actual or potential adverse effects on the environment

3.7

We have discussed our approach to assessment of effects earlier. We have focused both on the effects of individual components of the scheme and the overall effects of the proposal. We have assessed these effects against the existing environment. We have also considered cumulative effects of the scheme in addition to the effects of existing activities. Those activities or potential adverse effects which were put before us and which might be affected or caused by the proposed scheme (whether or not to a minor or significant level) include the following:

*The Waimakariri and Rakaia takes (see **Part 6**)*

- Salmon and trout habitat.
- Salmon passage.
- Recreational uses other than those listed above.
- Ecological values including nuisance algal growths, macro-invertebrate communities, native fish and river bird life.
- The habitat of trout and salmon and fish passage.
- The habitat of birds and in particular endangered species.
- Sediment transport and river morphology (braided river characteristics).
- Water quality including assimilative capacity for existing pollutants.
- Recharge of the Christchurch and Kaiapoi aquifers.
- Effects on existing users including in particular Waimakariri Irrigation Ltd and those taking from gallery intakes downstream.
- Effects on Synlait in relation to the Rakaia if it is ultimately found to have priority.
- Maori cultural values.
- Water quality including any loss of assimilative capacity
- Compliance with the Rakaia Water Conservation Order

*The Waimakariri and Rakaia River works, intakes and associated structures (section 13 applications and Notice of Requirement) (see **Part 4**)*

*Natural character of the river environments (see **Parts 4 and 6**)*

- (Structures and river bed works).
- Landscape and visual amenity values.
- Safety of river users at the intakes.

- Loss of native fish and salmonids from the river system.
- Construction impacts (e.g., sediment control).
- Impact of river training and infrastructure maintenance works.
- Ensuring sediment releases comply with the Rakaia Water Conservation Order.
- Effects on Regional Council river engineering works.

*Escarpment (terrace) Canals (see **Part 4**)*

- Construction impacts including runoff.
- Stability.
- Landscape and natural character.
- Terrestrial ecology.
- Heritage values.
- Effects on private property (e.g., the Bulls property and others).

*Headrace (see **Part 4**)*

- Effects on directly affected landowners and occupiers (e.g., farming viability and impacts on amenity values).
- Effects on nearby owners and occupiers (e.g., the de Jong bed and breakfast facility at 'The Oaks', properties along the foot of the Homebush Ridge and others).
- Construction impacts including noise and dust.
- Stability.
- Safety/security.
- Landscape and visual amenity.
- Terrestrial ecology.
- Heritage values (including potential vibration issues at Homebush).
- The relationship of Maori to their taonga including any archeological sites or waahi tapu.
- Effects on roads, bridges etc.

*The distribution network (see **Part 5**)*

- Effects on landowners and occupiers (e.g., access issues).
- Construction impacts including noise and dust.
- Stability.

- Terrestrial ecology (subject to permitted baseline).
- Heritage values (including potential vibration issues at Homebush).
- The relationship of Maori to their taonga including any archeological sites or waahi tapu.

*The use of water (see **Part 7**)*

- Groundwater quality and health risk.
- Water quality in lowland streams and ecological impacts of that.
- Water quality impacts on Te Waihora and impacts of that.
- Mounding of lowland ground water.
- Impacts of mounding on land drainage and drainage schemes.
- Impacts on council infrastructure.
- Impacts on gravel extractors.
- Impact in term of fog generation.
- Social impacts of land use intensification as a result of irrigation (subject to permitted baseline).

*Emergency and by water discharges (see **Part 7**)*

- Spread of didymo from the Rakaia.
- Relationship of Maori to water (mixing of Rakaia and Waimakariri waters in receiving waters).
- Effects on water quality.

4. SUMMARY OF OUR DECISION AND CONCLUSIONS AS TO WHETHER THE MODIFIED PROPOSAL IS CONSISTENT WITH THE PURPOSE AND PRINCIPLES OF THE ACT

(Note: this section repeats parts of the discussion in Minutes 11 and 12.)

Sustainable management

4.1 We commence with our primary conclusion, which of necessity relates to the overall sustainability of the proposed scheme. This conclusion is based on our balancing of all of the environmental costs and benefits of the scheme. We have concluded that the revised proposal will promote the *sustainable management of natural and physical resources* so as "to enable people and the

community to provide for their social, economic and cultural well being and for their health and safety". We are satisfied that the scheme will sustain the potential of the resources in question, "to meet the reasonably foreseeable needs of future generations...".

4.2 In this context we have weighed the reasonable needs of the applicant to take and use the water from both rivers and to use other resources (including private property), against the needs of the community now and in the future to maintain sufficient flows in the rivers to provide for present and future recreational use, ecological requirements, and for other social, cultural and habitat requirements.

4.3 We have been particularly mindful of the need to protect the significant instream values of both rivers. We are conscious of the reasonably foreseeable needs of future generations who are likely to place even greater value on the natural and intrinsic characteristics of both rivers as recreational and environmental demands increase with population increases.

4.4 Similarly, in relation to the use of water we have weighed the reasonable needs of the farming community for irrigation water against the reasonable needs of the community to maintain or enhance ecological values in the lowland streams and Te Waihora. We accept that those values have already been degraded by existing farming activities and by increased irrigation.

4.5 With the removal of the dam and reservoir from the scheme, and appropriate conditions on the taking and use of water, we are satisfied that the scheme will not have any significant adverse effects on the social or cultural wellbeing of people or communities. We have heard much evidence about the degree of economic benefit which will result from the scheme. For current purposes it is sufficient to record our conclusion that the scheme will significantly enhance the economic wellbeing of the region albeit to a lesser degree than the original scheme. We will discuss this matter in more detail later in this decision.

4.6 The scaled back proposal with the conditions we intend to impose, will safeguard the *life-supporting capacity of water, soil and ecosystems* and will adequately *avoid remedy and mitigate adverse effects* of the proposal on the environment albeit that some adverse effects may be more than minor. We note that it is not a requirement that all adverse effects be reduced to the extent that they are minor, nor indeed is it a requirement that the total adverse effects of the

scheme be minor. The requirement is that the combined net effect of the scheme be *sustainable*.

4.7 In terms of *health effects*, we have concluded that with the conditions which we intend to impose, the proposal will not result in any more than a very minor increase in health risks for people or communities. The evidence was that there are unlikely to be any adverse effects on the water quality of Christchurch City bores, but there will be an increase in the amount of nitrate-nitrogen reaching shallow ground water particularly in the area to the south of Christchurch and east of SH1. We are satisfied that the question of health risk to bottle fed babies from an increase in overall nitrate loading can be largely avoided. The risk of increased pathogen levels in groundwater and lowland streams will be low.

4.8 To the extent that it might be relevant, we are satisfied that the scheme will not lead to social or economic inequalities which would be such as to lead to adverse health outcomes. (This responds to a submission from the District Health Board which we regarded as somewhat misguided.)

4.9 We are satisfied that potential impacts on the *safety* of kayakers in the vicinity of the Waimakariri intake can be addressed as a matter of final design. The applicant has agreed to a condition which requires a safety audit of the final design by a suitably qualified expert.

4.10 In terms of *social impacts*, we have concluded that with the removal of the dam and reservoir and the likely reduction of the dairying component in the scheme, any adverse social impacts will be sustainable in the context of the wider economic and social benefits which will be derived from the productive use of the water to produce more food and more exports. We consider that the headrace and distribution network are unlikely to have more than minor adverse social or economic impacts on communities.

4.11 We accept that there will be some adverse social and perhaps economic effects on individuals and families, in particular those directly affected by the headrace who have not agreed to it being on their land.

4.12 While we are sympathetic to the effects on these people, and to other landowners near to the headrace, we do not consider these effects to be such as should defeat the proposal. In contrast to our views in relation to the dam and

reservoir, we consider the social and economic impacts of the headrace can largely be addressed by negotiation and compensation. We also note that some of the affected landowners are shareholders and (at least in principle) supporters of the scheme.

4.13 In terms of *the life supporting capacity of water and ecosystems* we do have some concerns as to the effects of increased nutrient loadings on lowland streams and Te Waihora. We have considered a considerable body of original and additional evidence concerning effects on groundwater, surface waters and Te Waihora and commissioned an independent report. However as discussed below, we have concluded that with effective mitigation, current adverse effects are likely to increase only to a minor degree. There will also be some offsetting positive effects arising from increased flows to lowland streams, such that the overall adverse effects on aquatic ecosystems will in our view be acceptable, albeit more than minor.

4.14 We have given particular consideration to the proposed take regime as it affects the Waimakariri River which has very significant recreational amenity and ecological values.

4.15 In terms of both the Rakaia and Waimakariri Rivers, we have concluded that with the conditions we have included, the proposed takes and river works will not compromise the life supporting capacity of these waters and associated aquatic and terrestrial eco-systems. We have discussed the Waimakariri take in **Minutes 9** and **12** and the Rakaia take in our decision on the Ashburton Community Water Trust application and later in this decision.

4.16 We note that the original take regime proposed by CPW for the Waimakariri was in our view not sustainable (see our **Minute 9**) but the reduction in maximum take from 40 cumecs to 24 cumecs and the introduction of 1 to 1 flow sharing (one to the river one to CPW) for the B permit water, will result in a level of take which will be sustainable. Furthermore, we have included an additional "holiday rule" restricting takes during periods of major recreational use. We consider these measures will significantly mitigate the adverse effects of the take to the extent that the cumulative effects on life supporting capacity ecosystems will be largely avoided and effects on recreational amenity will be adequately avoided remedied or mitigated. (see the discussion in Minute 12 in relation to this

conclusion and in Minutes 12 and 15 and later in this Part in relation to the holiday rule).

4.17 Adopting an overall balancing approach, we have concluded that the take will allow people and communities to provide for their economic needs, while at the same time ensuring that ecological and other natural values are sustained and amenity values are not affected in any significant way.

4.18 We have concluded that the modified regime now proposed by CPW will, with some additional restrictions, adequately avoid, remedy or mitigate the potential adverse effects (including cumulative effects) of the take to the extent that it will be in accord with the purpose and principles of the Act.

4.19 We are satisfied that the overall adverse effects of the scheme will be adequately *avoided, remedied or mitigated* as a result of the amendments to the proposal and the suite of conditions which we intend to impose/recommend. There will also be some offsetting beneficial effects.

Section 6: Matters which we must recognise and provide for

4.20 Overall, we regard the proposal as consistent with the principles in sections 6, 7 and 8 of the Act. To the extent that any of those will not be fully achieved we are of the view that the economic and productive benefits of the proposal both for the region and the nation are sufficient to outweigh those matters. We now set out our conclusions in relation to these principles.

4.21 Section 6 sets out matters of national importance which we must *recognise and provide for*, subject to the overriding requirement of section 5. Unlike sections 7 and 8 which are matters for particular weight, we must not only consider section 6 matters, but must provide for them to the extent that is consistent with sustainable management. They are not absolute requirements, but must play a key role in our overall balancing. We now set out our conclusion in relation to each of these matters.

4.22 The proposed takes from both rivers will not entirely *preserve the natural character* (subsection (a)) of the two rivers and their margins, given the scale of the takes and the modified character of the river margins. However, we are satisfied that they are not *inappropriate developments*. We are also of the view

that the regional and national benefits which will be derived from use of the water will be such as to override the requirement to provide for absolute preservation of natural character (if there is such a requirement). We have concluded that the impacts of the proposal on natural character will not be significant either in terms of the intakes or the downstream works.

4.23 To the extent that the area in the vicinity of the Waimakariri Gorge Bridge is arguably an *outstanding natural feature* (subsection (b)) although not listed as such in the relevant planning documents, we do not regard the installation of an intake as inappropriate development. The fact that the intake works will be out of public view from the bridge and its approaches is a mitigating factor. We do however consider that the intake location should be placed as far as practicable upstream while still being within the designated corridor. This will limit the physical and visual impacts on the 'Pinnacles' area. This has been accepted by CPW and is reflected in our recommendations. There will also need to be appropriate mitigation of landscape impacts and we are confident that can be provided for by way of the *Landscape Rehabilitation Management Plan*.

4.24 We are satisfied that the sediment pond, and associated works except during the construction phase, will not have more than a minor impact on river environment and its margins.

4.25 The terrace canals adjacent to both rivers will however involve major earthworks which will be a significant and obvious physical feature for some years, but we do not consider these effects in the long term would be an *inappropriate development* in relation to either river. We do not consider that either of the river terraces in the affected locations to be outstanding landscapes, and they are located in a modified rural environment where there will be landscape planting which over time will soften the visual impact.

4.26 With the removal of the reservoir from the scheme, we consider that the proposal will not compromise the *protection of any areas of significant indigenous vegetation or significant habitats of indigenous fauna* (subsection (c)), although some small sites may be affected. There will however need to be a comprehensive ecological survey of areas of potential significance and a terrestrial ecological management plan to address any such effects by way of biodiversity offset or otherwise. We note that the ecological evidence we heard in relation to the ACWT scheme indicated that the ecological values of the northern terrace and escarpment of the Rakaia was less than the southern side impacted

by the ACWT scheme. We do not think that the same level of biodiversity offset is required on the northern side of that river or on the southern Waimakariri escarpment, however further survey work will be required prior to the Outline Plan being submitted. We have provided for that in conditions.

4.27 We are satisfied that the proposed take regimes for both rivers will be such that the scheme will not compromise the habitats of significant avifauna (bird) species. We are satisfied that significant adverse effects on bird populations can be avoided under the proposed take regime and its associated conditions (in particular the risks of increased predation during the breeding season).

4.28 We accept that the distribution network will have some effects on terrestrial ecological values, however we do not consider that those effects will be significant and we believe that they can be avoided, mitigated or offset to an appropriate degree once the final design is known, an ecological survey has been carried out and a mitigation plan prepared. Furthermore, those effects largely fall with the permitted baseline in that they are effects which the Selwyn District Plan allows for.

4.29 Insofar as changes to farming patterns may affect drainage systems, or reduce shelter belts and other areas of habitat, we note that this is permitted by the District Plan, as is removal of stock races. To the extent that there may be flow-on impacts on indigenous vegetation or indigenous fauna we are of the view that those impacts can be adequately mitigated. There is also scope for ecological offsets. For example there could be areas of plantings created in the corners not reached by irrigators, or alongside streams or irrigation races. All of these matters can be addressed by way of the Sustainability Protocol and Farm Plans, following final design and appropriate ecological assessments.

4.30 The proposed *Sustainable Farming Protocol* will in conjunction with conditions and Farm Plans, provide further mitigation of the ecological impacts of the scheme and resultant further intensification of farming activities.

4.31 The proposed *Environmental Management Fund* will also offset or mitigate any losses of biodiversity as a result of the scheme. Notwithstanding CPW's proposal to increase the levy, we still have some reservations as to whether the proposed contributions to the fund adequately reflect the scale of the scheme, the value of the water to shareholders, and the environmental objectives

of the Trust. We have no jurisdiction to require a higher levy. We have however suggested that the fund be seeded by CPW before irrigation commences and have suggested that the fund might be better administered by an independent Trust or committee.

4.32 We have included conditions to maintain the existing level of *public access* (subsection (d)) to both rivers.

4.33 In our view the scheme will not significantly compromise *the relationship of Maori and their cultures and traditions with their waters, waahi tapu, or other taonga* (subsection (e)), including Te Waihora. It was made abundantly clear to us, and we acknowledge, the importance of Te Waihora to Ngai Tahu. Our conclusions however took into account the reduced scale of the scheme, and mitigation measures proposed to address the impacts of land intensification. We do not pretend that there will be no effects on Te Waihora, but we consider that the magnitude of these effects will not be such as to significantly inhibit its future restoration. The evidence is that farm run-off is one cause, but not the primary cause of current problems with the lake. Although it is not clear whether restoration is realistic, it does seem that this is more likely to require additional lake openings and other measures.

4.34 Whilst we accept that intensification of land use will increase nitrate loadings in the lake, and in lowland streams, we are of the view that it will not significantly increase the current adverse ecological effects on these waterways beyond the existing impacts and those in train from existing and past farming activity and natural events, including in relation to Te Waihora, the significant impacts of the Waihine storm. We nevertheless recognise that the scheme will have impacts on the already degraded mauri of these waterways. There is a limit to the extent that this impact can be mitigated. However, we do not consider this impact to be sufficient to justify declining consent for use of water for irrigation. Nor is that envisaged by the relevant planning documents. We would observe in passing however, that there is a clear and apparent need for more effective management of the adverse effects of existing farming activity in the Ellesmere area on Te Waihora.

4.35 We have recognised and respect the views of Ngai Tahu regarding the mixing of waters. We accept that such mixing will impact on the relationship of Ngai Tahu to the water bodies which will potentially receive this mixed water, in particular the Selwyn River system from by-wash wetlands. It is not clear to us

how this impact could be avoided short of us declining consent for the taking and use of the waters of both rivers. We do not understand there to be the same level of concern regarding mixing of waters in the headrace. The key concern seemed to relate to the Selwyn and lowland waterways. However we believe that with an operating regime to prevent overflows of mixed waters into other surface water bodies, mixing of surface waters can be minimised.

4.36 Adopting an overall balancing approach and giving section 5 due weight ahead of section 6, we have concluded that this impact on the relationship of Maori to water is not such as to justify us rejecting a scheme which will provide significant economic benefits to the region and nation.

4.37 So far as the potential of the scheme to affect waahi tapu or other land based taonga is concerned, an archaeological survey of potential sites will be necessary along with a discovery protocol. There was no evidence that any sites of significance would necessarily be affected. It appears that the most likely sites of potential significance are along the base of the Homebush Ridge, and possibly at the location of the proposed Selwyn River siphon and other river crossing points. These locations, and the river terraces, will require further investigation.

4.38 In our view this proposal is not an *inappropriate development* in terms of *historic heritage* (subsection (f)) and will not cause any significant adverse effects on historic heritage. In particular the route chosen will not compromise the historic heritage buildings and features on the Homebush property, provided the vibration impacts of construction works are adequately addressed by way of assessment and management plan as we have required.

4.39 We do not agree with the NZHPT submission that a full archaeological survey of the entire route of the headrace (and to be consistent, potentially the distribution race system as well) is required. The distribution race system also involves substantial earthworks, and along with the headrace canal is in excess of 500 km in length, such that a full survey is impractical and unnecessary. The great majority of the route is no more likely to contain sites of archaeological significance than any land generally throughout the Canterbury plains. The few sites with known high potential for historic heritage will however require survey.

Section 7: Matters which we must have particular regard to

4.40 Section 7 sets out matters which we must give significant weight to, but which are not to be regarded as threshold requirements. Section 7 is subordinate to section 5.

4.41 We have had particular regard to *kaitiakitanga* (subsection (a)) and have carefully considered the issues raised by Ngai Tahu and have summarised our conclusions on these issues above. In addition to concerns regarding mixing of waters, Kaitiaki have serious concerns regarding the effects of further pollution of Te Waihora. We appreciate those concerns and the desire of Kaitiaki to rehabilitate their much damaged taonga.

4.42 We have concerns about the effects of further intensification of land use in the catchment and resulting increase in nutrients to the lake. However, the District and Regional Plans permit such development and we do not think that it would be consistent with sustainable management to limit further irrigation in the Te Waihora catchment unless that would make the situation in the lake significantly worse. In our view, this proposal will not do so. Restoration of the quality of the lake will never be achieved without addressing land-use practices in close proximity to the lake and its feeder waterways, and some changes to the operating regime for the lake to better flush it. We do not think that the CPW scheme would greatly affect (or inhibit) such initiatives if they come to pass.

4.43 We have had particular regard to *the ethic of stewardship* (subsection(aa)). The Regional Council is (alongside Ngai Tahu) the principal steward of the water resources. The waterways can be regarded as the commons which the regional council as steward must manage in the best interest of the whole of the community. That role has been particularly influential in terms of our views as to the proposed take regime. In short, both rivers and the lowland streams and Te Waihora are resources for the benefit of the whole community and future generations. These water bodies have significant amenity and ecological values which need to be maintained.

4.44 We are required to have particular regard to *maintaining amenity values* (subsection (c)). Both rivers have very high recreational and intrinsic amenity values. The Waimakariri provides very high recreational amenity for the following activities:

- Kayaking for the Coast to Coast event and generally for beginner and intermediate kayaking and training downstream of the Gorge and for intermediate kayaking in the Gorge.
- Jet boating (most highly used and accessible jet boating resource in the country and highly valued for its braided characteristics).
- Recreational salmon and trout fishing (highly valued salmon fishery with very high use, close to the City and readily accessible for much of its length below the Gorge. Along with the Rakaia, Rangitata and Waitaki, a nationally significant salmon fishery and also a valued trout fishery).
- Whitebaiting at the river mouth.

4.45 The Rakaia has very high amenity values for salmon angling and jet boating in particular. These and other values are recognised and protected by the Water Conservation Order. We are satisfied that the propose scheme will protect the outstanding characteristics identified in the Order as well as the other amenity values provided by the river.

4.46 The requirement to *have particular regard to maintaining and enhancing amenity values* and the *quality of the environment* (subsection (f)) are not standards which must be achieved at all costs. If they were, there would be little development of any infrastructure. We also remind ourselves that whilst the Waimakariri River is, in our view of national importance in terms of salmon angling, jet boating and of regional importance in terms of race kayaking, it is not subject to a Water Conservation Order. We are not required to *protect* these values from all impacts.

4.47 The proposal may not ***maintain amenity values*** of the Waimakariri River at their current level. However, we do not see this as an absolute requirement. We are now satisfied that with the changes to the scheme proposed by CPW and the conditions we have included, the take regime will maintain recreation and intrinsic amenity values of the Waimakariri River at a similar level to present. We are satisfied that the values of the river will not be significantly compromised by the scheme.

- 4.48** We have concluded that although the proposed take from the Waimakariri River with the conditions we have included, will slightly reduce the fishing amenity values of the river, those relatively minor impacts are sustainable when considered in the context of the benefits which will derive from the productive use of the water from the river.
- 4.49** We are satisfied that the applicant's revised proposed take regime along with the so called 'holiday rule' condition, will largely avoid adverse effects on boating amenity and will adequately mitigate the effects which might occur in some flow conditions.
- 4.50** We have concluded that the applicant's proposed take regime will not have any more than minor adverse effects on the *habitat of trout and salmon* (subsection (h)) in the Waimakariri or the Rakaia, and its proposed use of water will have some positive effects for the habitat of trout in the Selwyn river and lowland streams as a result of increased flows.
- 4.51** We have concluded that the proposal represents an *efficient use of natural and physical resources*.(subsection(b)) We have concluded that the Applicant's proposed taking of water from the Waimakariri river during winter is not efficient in the context of the revised scheme but would become so in the future if additional storage is provided. (We discuss the efficiency in more detail in the context of the economic evidence and in the section regarding the use of water.)
- 4.52** We have had particular regard to the *intrinsic value of ecosystems* (subsection (d)) in terms of aquatic and terrestrial systems. We discuss our conclusions on the take regimes, lowland streams and Te Waihora in more detail later in this decision.
- 4.53** We have considered the *finite characteristics of the natural and physical resources* (subsection (g)) in question and are satisfied that the scheme will not compromise these characteristics. We have had particular regard to the potential impacts of the scheme on ground water quality and the extent to which such effects may be cumulative and irreversible. We are satisfied that the scheme will not cause any significant irreversible adverse effects on this resource. However, there will be a need for ongoing monitoring of ground and surface water quality and for adaptive management.

4.54 We have, as best we can, had regard to *the effects of climate change* (subsection (i)). These effects are relevant to the benefits of the scheme which would increase if droughts become more common. They are also relevant to how much water will be available to CPW from the rivers. The limited evidence available to us suggested that there would be more rainfall in the western catchments of the river and less on the Canterbury Plains under current long-term climate projections. This is likely to increase river flows and increase the value of irrigation generally and this scheme to farmers and the wider community over time.

Section 8: Treaty of Waitangi

4.55 We have taken into account the *principles of the Treaty of Waitangi*. We do not see this proposal as being in conflict with those principles.

Overall conclusion and assessment against the purpose and principles of the Act

4.56 Adopting an overall balancing approach, we have concluded that with the changes to the scheme proposed by the Applicant and the conditions included or recommended in this decision, the scheme will provide for the sustainable use and development of natural and physical resources. We have recognised and provided for the matters set out in section 6. We have had particular regard to the matters set in section 7 and have taken into account the principles of the Treaty of Waitangi. We are satisfied that although the scheme will have some residual adverse effects, these are not of a magnitude to make it inconsistent with the principles of the Act.

4.57 We are of the view that the overall economic benefits of the scheme are such that sustainable management will be better served by approving the scheme (with the modifications that have arisen through the hearing process) than by declining it.

5. THE ADDITIONAL ASSESSMENT CRITERIA APPLYING TO THE NOTICE OF REQUIREMENT

5.1 Section 171 sets out some additional matters which we must *have particular regard to* in making our recommendation on the NoR. These matters are

not threshold criteria and are subject to Part 2 of the Act which we have already discussed.

5.2 Section 171 is now only relevant to the headrace and the intakes and associated works. We are satisfied that these works are all ..."*reasonably necessary for achieving the objectives of the Requiring Authority for which the designation is sought.*"

5.3 As discussed earlier, there is no clear statement of the objectives of CPW however we have assumed that the overall objective of the scheme is: **.....*improving the security of water supply and hence the prosperity of Central Canterbury through a water management scheme that enhances ecological and recreational values while providing opportunity for agricultural and horticultural diversity***".

5.4 Clearly, the works which are the subject of the NoR (the intakes, escarpment canals, headrace and associated works) are not necessary in terms of enhancing ecological and recreational values. However, we are satisfied that all of the works are *reasonably necessary* (albeit not essential) to the objective of improving water supply and reliability by way of a water management scheme (irrigation) so as to provide opportunities for agricultural and horticultural diversity.

5.5 We have assumed that the Requiring Authority's primary objective is to establish a viable and sustainable irrigation scheme serving the whole of the command area. It is not for us to go behind that objective and decide whether that is a desirable objective, or whether the size of the command area is appropriate. We accept that the opportunity for further irrigation from groundwater is very limited within the area of the plains between the two rivers. In that context we accept that some form of surface water scheme from the two rivers is necessary if there is to be further irrigation.

5.6 We are satisfied that all of the works are *reasonably necessary* to achieve the implicit objective of irrigating most or all of the CPW command area, with as high a level of reliability as can be achieved without a storage reservoir. There may well be other options which would achieve a significant increase in irrigation within the area but which would irrigate a lesser area, but we have to make a decision on the proposal before us.

- 5.7** We are satisfied that the Requiring Authority has given *adequate consideration to alternative sites routes and methods for undertaking the work*. We take the work as being the project as a whole and each of its component parts. We are not entitled to go behind CPWL's objectives and consider whether CPW has adequately considered alternatives to the scheme (works) in contrast to alternative routes or methods of achieving its objectives. Accordingly, we are not required to inquire as to whether CPWL has adequately considered alternatives to irrigation or a reduction in the size of the command area.
- 5.8** In terms of alternative methods for the project, given the restrictions on groundwater, there are no other options which would irrigate the whole of the command area. There are options for smaller unlinked schemes from either or both rivers, such as is proposed by Synlait. We accept that the CPW linked scheme has advantages because water may be available from one river when it is not available from the other. This option also has advantages in terms of the potential to add further storage in the future, as was originally proposed. In any event, smaller unlinked schemes would not be an alternative method of undertaking the project since they could not service the whole of the command area. It is at least arguable that a combination of smaller schemes would be less efficient in their use of the natural and physical resources, and generate cumulative effects which are greater than this scheme.
- 5.9** With the reservoir removed from the scheme, the issue for us is whether CPW has adequately considered alternatives routes and methods for the intakes, escarpment canals, headrace and associated *works*.
- 5.10** CPW did consider alternative reservoir locations and headrace configurations. It has recently had to consider alternatives to the reservoir and upper intake and the scheme now before us is the product of that. It has also considered slight modifications to the location of the lower intake.
- 5.11** CPW has considered various modifications to the headrace alignment. However if we take the size of the command area as being a matter for CPW, then the headrace must be as high as possible on the plains in order to service as much as possible of the network by gravity. There are obvious engineering advantages in having the Waimakariri intake at the Gorge Bridge location since below that point it would be difficult to install or operate an adequately sized intake within the braided river section. If that location is taken as a given, that largely

dictates the location of the escarpment canal and the headrace, which in turn largely dictates the location of the Rakaia intake.

5.12 In theory one could shift the headrace lower down the plain, but that would not meet CPW's objective of irrigating as much as possible of the command area by gravity. We also have no evidence to suggest that moving the headrace down gradient would have any lesser effects on the environment.

5.13 Malvern Hills Protection Society did suggest that CPW was required to reconsider the headrace location once it decided to remove the reservoir from the scheme. It is not clear to us that section 171 requires such a reassessment. However to the extent that this was required we are satisfied that moving the whole headrace to a lower contour would have significant consequences for the economics of the scheme and would simply shift adverse effects from one group of landowners to another. Accordingly we think that in these circumstances a very limited reconsideration was *adequate*. At the resumed hearing CPW explained the implications of shifting the headrace. It has clearly considered that possibility and rejected it.

5.14 In our view, the key question is whether CPW has adequately considered alternative routes for the headrace where it will impact significantly on landowners who have not agreed to it. In particular we heard from a number of landowners who sought changes to the location of the headrace. These are discussed in more detail in the section addressing effects of the headrace.

6. ASSESSMENT AGAINST OBJECTIVES AND POLICIES

6.1 A detailed analysis of the relevant objectives and policies is set out in **Part 7** of this decision. The following is a summary of our conclusions in relation to relevant objectives and policies. The relevant plan provisions are found in the Canterbury Regional Policy Statement (RPS); the Waimakariri River Regional Plan (WRRP); the Proposed Natural Resources Regional Plan (PNRRP); and the Selwyn District Plan (SDP). We have discussed the rule framework earlier.

6.2 In having regard to the objectives and policies, we have taken the assessment of objectives and policies 'in the round' with respect to the designation and the resource consents, such that any degree of inconsistency with one or more particular provisions does not necessarily result in the scheme

being contrary to the objectives and policies as a whole. We also observe however that the original scheme involving the dam and reservoir would have been contrary to a number objectives and policies, particularly those relating to amenity and ecology. While specific elements of the scaled-back scheme may not be consistent with, or promote, some objectives and policies, we consider that on balance the proposal is not contrary to the framework of the four relevant plans outlined above.

6.3 Although the RPS has now been operative for over 11 years, unlike the PNRRP it is now beyond challenge and significant weight can be placed upon it. Chapter 9 concerns the management of water, and taken with subchapter 20.4 effectively seeks a balanced approach whereby water resources can be used to achieve cultural, social, recreational, economic, and other benefits. This is subject to the protection of water quality and quantity and the protection of aquatic ecosystems, natural character, outstanding natural features and landscapes, amenity values, and matters of importance to Tangata Whenua. There are three overarching objectives in Chapter 9 of the RPS relating to water which are highly relevant to the CPW scheme (Objectives 1, 2 and 3) and we have concluded that with the mitigation measures proposed, the scheme is consistent with these objectives and related policies.

6.4 We considered the objectives and policies under a number of topic headings relevant to the project, and our findings are summarised below and discussed in Part 7.

Instream values

6.5 The WRRP is subject to a Plan Change (PPC1) which has not yet been heard. This change relates to the rules applicable to take from the Waimakariri River. In other respects the WRRP very closely mirrors the provisions of the RPS. We discussed the provisions of the WRRP and the Plan change in **Minute 12** and do not need to repeat that discussion here. Compared to the original scheme, the take from the Waimakariri River has been reduced by 40% and is subsidiary to that from the Rakaia. We have included a series of conditions on the right to take from the river, including one to one flow sharing and a 'holiday rule'. With these provisions we are satisfied that the proposal is not contrary to the relevant objectives and policies in the operative plan. While it is not consistent with the

proposed new rules in Plan Change 1 we remain satisfied that it is not contrary to the objectives and policies and so is not inconsistent with the Plan change.

Groundwater and effects on Te Waihora

6.6 We discuss these issues in more detail in **Part 6**. After hearing extensive evidence on the potential groundwater impacts of the proposed scheme, particularly on that part of the plains between the command area and Christchurch/Te Waihora, we arrived at the conclusion that there will be an increase in nitrates, but through the Sustainability Protocol and Farm Management Plans and through remedial works, effects on domestic water supplies and drainage issues can be adequately mitigated.

6.7 This process will be assisted by the establishment of a Technical Advisory Panel to monitor water quality and identify mitigation measures as the need for these arises over time. This recognises that there can be a significant lag time between land use change and consequential effects on water quality. The increase in nitrate load is partly offset through additional groundwater enhancement from by-wash and leakage, such that the concentration of nitrates under the reduced scheme is only expected to increase by a small margin overall.

6.8 On this basis we do not consider that overall these effects of the scheme will be contrary to the objectives and policies of the RPS and the PNRRP, except to the extent that any increase in the MAV is contrary to the PNRRP, in its current form.

6.9 There will be increases in nitrate levels in lowland streams entering Te Waihora, and to this extent there is a degree of conflict with the relevant objectives and policies, however we consider that the likely adverse effects will be minor.

6.10 There are beneficial effects in that the availability of irrigation water will reduce the level of stress on groundwater, and furthermore there is also a related benefit of the scheme through augmentation of groundwater and lowland stream flows. These effects are not only consistent with the objectives and policies on water quantity but assist in their implementation.

Terrestrial and aquatic ecology

6.11 There is some potential for a minor increase in aquatic plant growth in lowland streams, but there appears little likelihood of increased algal blooms in Te Waihora. We are of the view that a comprehensive approach to improving lake quality is required extending beyond CPW, and partially through financial resources from CPW's environmental enhancement fund.

6.12 The headrace and terrace canals and to a lesser extent the distribution races, will affect some sites containing indigenous terrestrial vegetation, and there is a very limited potential for impacts on the District Council's water race system, which in some locations has provided habitat for species such as Mudfish. Care with the final alignment of the headraces and distribution races will enable the small number of significant terrestrial sites to be avoided, and any loss of habitat can be replaced by areas of equal greater value or through enhancement works. We do not consider there is any significant conflict with the objectives and policies relating to terrestrial and aquatic ecology.

Landscape

6.13 The headrace canal will involve substantial earthworks, which will have a particular impact at the intake site from the Waimakariri River ('the Pinnacles'), where the headrace traverses the high river terraces the adjacent to the Rakaia and Waimakariri Rivers, and along the base of the Homebush. These impacts will be greatest during the construction period, and for some years after until revegetation can be successfully achieved.

6.14 The visual impacts of the intake on the 'Pinnacles' at the Waimakariri Gorge can be adequately mitigated by careful siting within the designation. There are no areas of outstanding landscape quality that are affected by the scheme. While the scale of the headrace canal means that long-term change to the environment is inevitable, such effects would occur under any alignment. Irrigation can be most effectively provided by a canal alignment as high as reasonably possible on the plains enabling gravity distribution. We do not consider there is any significant conflict with the objectives and policies related to landscape.

Recreation and access

6.15 Both the Rakaia and Waimakariri, and the particularly the latter, have very high recreational amenity values for activities such as fishing, kayaking, and jet boating. We consider that the flow regime included on the take consents will maintain a sufficient rate and variation in flows so as to ensure that recreational amenity values are largely maintained. There will be some enhancement of trout fishing amenity in Selwyn river and some other lowland streams.

6.16 Vehicular access to the river corridor has been protected by appropriate conditions. We do not consider that the proposed scheme as modified through conditions, would be contrary to the relevant objectives and policies relating to recreation access.

Heritage

6.17 The primary heritage values are associated with Homebush Estate along the central part of the headrace canal, and Maori archaeological sites. We consider that the headrace alignment chosen is preferable to other realistic alternatives, and avoids important heritage features at Homebush. There is some likelihood of a small number archaeological sites being disturbed and further detailed investigation will be required for those parts of the headrace corridor where such sites are more likely to be encountered. Overall we do not consider there is a conflict with the relevant objectives and policies on heritage.

Tangata Whenua

6.18 Particular issues of concern here include impacts on the *Mauri* of the rivers and Te Waihora, mixing of waters, and disturbance of archaeological sites. We acknowledge that there will be minor adverse effects on water quality in Te Waihora, but not to the extent that this would frustrate future restoration of the lake to the extent that this is possible, particularly if funding is made available through the proposed Environmental Fund.

6.19 Farm management proposed under the CPW scheme should also be extended to the Ellesmere area although this is not a matter we can directly influence. Water will not be transported from one water body to another, and will only directly discharge into other water bodies in the event of an emergency by-wash discharge. A small number of archaeological sites may be affected, and we consider that a detailed survey would be appropriate where these are likely to

occur, such along the Homebush Ridge and near river crossings. We do not consider that the scheme is contrary to the objectives and policies relating to Tangata Whenua, except to the extent indicated previously with respect to Te Waihora.

Earthworks and utilities

- 6.20** As noted before, there will be very substantial earthworks particularly on the river terraces. The district plan specifically anticipates farming activities and irrigation development and support of farming. With the imposition of conditions relating to the design, construction and safety of the canal system, we are satisfied that the proposed infrastructure will not be contrary to the objectives and policies of the plan and is to a large extent anticipated by it.

Dust, odour and noise

- 6.21** There will inevitably be some adverse effects associated with the construction of the headrace canal, and to a lesser extent parts of the distribution race network, which will however be temporary in nature. We consider that these effects can be addressed satisfactory through management plans, and through negotiation and compensation in terms of implementing the designation and obtaining consents for distribution canals across private land. We do not anticipate that there will be any significant adverse effects after the completion of the project. We do not consider there is any conflict with the objectives and policies relating to these effects.

Transport and energy

- 6.22** There will be substantial localised effects associated with traffic movements during the construction period. Most issues concerning property access are a matter for resolution by negotiation between the parties. Post-construction, the resultant farm intensification will result in additional traffic on the district roads, but this will be well within the capacity of the roading network. We consider the scheme is consistent with the objectives and policies on transport.

Social and economic

6.23 We are satisfied that there will be substantial economic and social benefits from the implementation of the proposed scheme, not simply to shareholders but to the wider community. As with any designation, there will be some adverse effects on directly affected parties, but these can be addressed through negotiation and compensation. Construction of the much longer distribution race system will require the consent of affected landowners. The RPS and the district plan both provide for the use of resources, including water, to provide for the social economic and cultural needs of people and communities..

6.24 The surface water take from the Rakaia River is not contrary to the provisions of the Water Conservation Order for the Rakaia River and is not governed by the PNRRP. Accordingly this take does not raise any conflict with objectives and policies.

6.25 The Selwyn District Plan has an emphasis on land use matters reflecting the functions of the District Council, and primarily concerns matters of amenity with a liberal framework for farming activities and the establishment of associated infrastructure including irrigation. We have concluded that the proposed scheme is consistent with the objective and policy framework in this plan, particularly with respect to the development of primary production.

Overall conclusion in relation to relevant objectives and policies

6.26 We are satisfied that the scheme and its component parts are not contrary to the objectives and policies of the relevant planning document.

7. DECISION IN RELATION TO APPLICATIONS FOR REGIONAL CONSENTS

7.1 Having considered the evidence we have heard and all relevant matters, we have concluded that the following regional consents should be granted for the terms specified below subject to the conditions set out in **Part 9** of this decision.

Land use

- CRC061814 To excavate and deposit material over an unconfined aquifer
- CRC102325 Disturb, excavate, deposit material, remove and plant vegetation in riparian margins: construct supply infrastructure
- CRC102326 Disturb, excavate, deposit material, remove and plant vegetation in riparian margins: operate and maintain supply works

- CRC102328 To disturb and excavate the bed of a river to place structures
- CRC102329 To disturb and excavate the bed of a river to operate, repair and maintain structures
- CRC102330 To disturb, excavate and deposit material, and to remove and plant vegetation within the bed and riparian margins of a river for the construction of intake structures
- CRC102331 To disturb, excavate and deposit, and to remove and plant vegetation within the bed and riparian margins of a river for the operation and maintenance of intake structures

Water permits

- CRC061768 Dam and divert water during construction
- CRC061940 Divert water from the Rakaia River for irrigation, sediment sluicing and fish passage
- CRC061943 Divert water from the Waimakariri River for irrigation, sediment sluicing and fish passage
- CRC061925 Take water for dewatering
- CRC061972 Take water from the Waimakariri River at a maximum rate of 24m³/s
- CRC061973 Use water from the Rakaia River and Waimakariri River at maximum rate of 65m³/s
- CRC021091 Take water from the Rakaia River at a maximum rate of 40m³/s

Discharge Permits

- CRC102332 Discharge contaminants and water during construction
- CRC102333 Discharge contaminants and water during scheme operation and maintenance
- CRC102334 Discharge stormwater which may contain contaminants onto or into land and into water
- CRC061928 Discharge water for dewatering purposes during construction
- CRC061949 Discharge water and contaminants as seepage from canals and distribution races to land where it may enter water
- CRC102335 Discharge surplus water and contaminants from canals and distribution network to water and to land
- CRC061980 Discharge diverted water into the Rakaia River
- CRC061982 Discharge diverted water into the Waimakariri River
- CRC102336 Discharge contaminants and dust to air during scheme construction
- CRC102337 Discharge contaminants and dust to air during scheme operation and maintenance

8. DECISION IN RELATION TO APPLICATIONS FOR CONSENT FROM SELWYN DISTRICT COUNCIL

8.1 Having considered the evidence we have heard and all relevant matters, we have concluded that the following consents should be granted for no fixed terms subject to the conditions set out in **Part 10** of this decision.

065214: The construction, use and maintenance of pipelines, open channels or waterways to convey water in the Coalgate/Hororata/Greendale (Central) area, including utility buildings and structures along and adjacent to the routes of the distribution network.

065215: The construction, use and maintenance of pipelines, open channels or waterways to convey water in the Darfield area, including utility buildings and structures along and adjacent to the routes of the distribution network.

065216: The construction, use and maintenance of pipelines, open channels or waterways to convey water in the Sheffield area, including utility buildings and structures along and adjacent to the routes of the distribution network.

065217: The construction, use and maintenance of pipelines, open channels or waterways to convey water in the Springfield area, including two secondary pump stations, as well as other utility buildings and structures along and adjacent to the routes of the distribution network.

065218: The construction, use and maintenance of pipelines, open channels or waterways to convey water in the Te Pirita area, including utility buildings and structures along and adjacent to the routes of the distribution network.

065219: The construction, use and maintenance of pipelines, open channels or waterways to convey water in the Windwhistle area, including a secondary pump station, as well as other utility buildings and structures along and adjacent to the routes of the distribution network.

075156: To construct, operate and maintain a by-wash discharge point, consisting of a constructed wetland and discharge structures, and all associated excavation and disturbance of land, and removal and planting of vegetation, at the following sites:

- Adjacent to and within the Selwyn River at or about map reference NZMS 260 L35:289-421, near Hawkins Road. Wetland size will be approximately 0-1 – 0.2 hectares.
- Adjacent to and within the Hawkins River at or about map reference NZMS 260 L35:281–574, near Bluff Road. Wetland size will be approximately 0-1 hectare.

9. RECOMMENDATIONS TO CENTRAL PLAINS WATER LIMITED IN RELATION TO ITS NOTICE OF REQUIREMENT

9.1

Having considered the evidence we have heard, and the matters in section 171 of the Resource Management Act 1991 we recommend that the Notice of Requirement by Central Plains Water Limited be confirmed by it as a Designation subject to the recommended conditions set out in **Part 11** of this decision.

D060001: The establishment, construction, operation, maintenance, repair, upgrading and works for or relating to:

- (a) Water diversion works, diversion channels, bypasses, overflow spillways, water intakes and headwork structures, stopbanks and associated flood protection works, sediment traps, sediment sluice gates and races, flow control gates and structures, fish screens, fish return pipes and channels, tunnels, canals, haul roads, structures and intake works for the:
 - (i) Rakaia Intake Area in the bed and on the true left (northern) bank of the Rakaia River approximately 8 to 10km downstream of the Rakaia Gorge Bridge.
 - (ii) Waimakariri Lower Intake Area in the bed and on the true right (southern) bank of the Waimakariri River at the Waimakariri Gorge Bridge and in an area approximately 1.5km downstream of the Waimakariri Gorge Bridge.

The intake areas described above are detailed in the maps included in Annexures C and D submitted with the Notice of Requirement.

- (b) Headrace and intake canals, pump stations, siphons, bridges, culverts and haul roads, between the Rakaia Intake area and the Waimakariri Lower Intake area up the Rakaia and Waimakariri River terrace respectively and thence for a distance of approximately 61.5km over the Canterbury Plains at or about the 235m above mean sea level contour. The route of the headrace and intake canals is detailed in the designation maps submitted with the Notice of Requirement.
- (c) The construction, operation, repair, maintenance, realignment and upgrading of parts of State Highways 73 and 77 and local roads where the intake and main headrace canals intersect or otherwise interfere with these existing roads.
- (d) Borrow sites, fill areas, excavation areas, construction sites (including buildings) stockpiling and storage areas, concrete batching plants, land disturbance activities and ancillary works (including vegetation clearance and planting, excavation, contouring, drilling, tunnelling, reclamation and filling for the river diversion and intake areas, intake canals and tunnel, headrace canals, access and haul roads, dam and reservoir) described in paragraphs (a) to (c) above.

- (e) Conveyors, tunnels, bridges, underpasses, overpasses, aqueducts, culverts, siphons, channels, pipes and similar works, all associated with the river intake areas, tunnels, intake and headrace canals and roads described in paragraphs (a) to (d) above.

10. INFORMAL RECOMMENDATIONS TO CPW

- 10.1** We make the following additional recommendations but note that these matters are not recommended as being conditions of the Designation but are for CPW and the District and City Councils to consider.

Environmental Management Fund

- 10.2** We accept CPW's concern that shareholders should not be expected to contribute before they get water. However, we suggest that the fund be seeded by CPW before irrigation commences and that CPW should ensure that fund balance is no less than \$300,000 at the time the first irrigation commences.

- 10.3** We make a strong recommendation to CPWT and the two settlor councils to ensure that a structure is put in place which provides assurance to the public that the fund will be managed in accordance with environmental objectives with appropriate expertise on the administering body. We also suggest that the fund might be better administered by an independent Trust or committee with community representation.

- 10.4** We also note that we still have some reservations as to whether the proposed contributions to the fund adequately reflect the scale of the scheme, the value of the water to shareholders, and the environmental objectives of the Trust. We have no jurisdiction to require a higher levy, but suggest that such be considered by CPW.

Community Fund

- 10.5** We recommend that CPW revive a Community Fund for the duration of the construction work. This would be to offset effects on amenity values during construction.

Most affected residents

10.6 We urge CPW to enter into arrangements with the most affected residents to minimise or offset impacts on those people in addition to what is required by conditions, including:

Bull Property

10.7 We would encourage CPW to work closely with the Bulls to come up with an option (including further investigation of tunnelling) which lessens the physical and economic impacts on the property, or alternatively undertake full purchase.

Rowallan and Homebush

10.8 We consider that severance issues raised by the headrace canal can be addressed through negotiations and the provision of alternative access by CPW. Apart from this, we consider this is a case of CPW paying compensation for the loss of land on the properties and the replacement of infrastructure. This should also involve compensation for loss of visitor revenue where applicable (namely Rowallan and Homebush).

Madeline de Jong

10.9 CPW should seek to achieve an agreement with Ms de Jong to compensate her for any loss of business during the construction period and to address landscaping and screening of the headrace in the vicinity of her property.

10.10 We recommend that CPW avoid destruction of the trees which would screen this property.

Westacre Farms

10.11 We consider that the concerns raised by Westacre Farms regarding interference with irrigation operations and severance of farming activities have considerable merit. In view of the economic value of this farming operation, and the availability of a potentially much less intrusive option, we recommend that CPW should further investigate the option of modifying this part of the NoR.

10.12 In view of the potential for effects on other properties (which we did not hear evidence about) it would not be appropriate for us to recommend this as a modification to the NoR. If CPW does have to resort to the option of purchasing the entire property and associated irrigation scheme, that would be a very costly option. We think that it should endeavour to adjust this part of the scheme to avoid that scenario.

Cynthia McKenzie

10.13 We suggest that CPW purchase Ms McKenzie's property as soon as possible. We are hopeful that this will have occurred by the time this decision is issued. We note that Ms McKenzie can (as a last resort) seek an order from the Environment Court requiring CPW to purchase the property, however we are of the view that this should not be required.

Independent Commissioners 28 May 2010



Philip Milne (chair)



Bob Nixon



Andrew Fenemor



Ray O'Callaghan

IN THE MATTER OF the Resource Management Act 1991

IN THE MATTER OF applications by Central Plains Water Trust to:

Canterbury Regional Council for resource consents to take and use water from the Waimakariri and Rakaia Rivers for the Central Plains Water Enhancement Scheme and for associated consents required for the construction and operation of the Central Plains Water Enhancement Scheme

AND

IN THE MATTER OF applications by Central Plains Water Trust to:

Selwyn District Council for resource consents to construct and operate the Central Plains Water Enhancement Scheme

AND

IN THE MATTER OF a Notice of Requirement by Central Plains Water Limited to:

Selwyn District Council for the designation of land for works associated with the construction and operation of the Central Plains Water Enhancement Scheme

**JOINT DECISION AND RECOMMENDATION OF
INDEPENDENT COMMISSIONERS
28 MAY 2010**

PART 2

Discussion of Disputed Conditions

GUIDE TO DECISION DOCUMENTS

- PART 1** – Introduction, Part II RMA, assessments, objectives and policy summary, conclusions, decisions and recommendations
- PART 2** – Disputed conditions
- PART 3** – Beneficial, economic, social and cultural effects of the scheme
- PART 4** – Intakes and headraces
- PART 5** – Distribution network
- PART 6** – Waimakariri and Rakaia takes
- PART 7** – Use of water
- PART 8** – Objectives and policies
- PART 9** – Regional Council consents and conditions
- PART 10** – Selwyn District Council consents and conditions
- PART 11** – Recommendations to Central Plains Irrigation Limited in respect of Notice of Requirement and Conditions
- PART 12** – List of hearing dates and appearances

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1. INTRODUCTION

1.1 This document sets out our views on conditions which remained in contention following the resumed hearing in March 2010. A more detailed discussion of Waimakariri take conditions can be found in **Minute 12**. There is also a discussion of contentious matters in **Minutes 14** and **15**. The **Parts 3** to **7** contain more general discussion of conditions in relation to key components of the scheme.

The process for finalising conditions

1.2 We were provided with draft conditions by the CPW at the beginning of the hearing. That draft was revised in 2009 for the resumed hearing. We asked the officers not to include draft conditions in their original reports since we considered that premature. We did however ask for the officers comments on CPW conditions in their reports and during the hearing.

1.3 We issue **Minute 11** on 30 October 2009 providing our preliminary conclusions on the revised scheme and signaling that officers and CPW should from that point, engage in finalising conditions and outlined a process for that. Our preliminary views on the Waimakariri take including associated conditions were set out in **Minute 12** on 24 November 2009.

1.4 We have discussed the Waimakariri take conditions in **Minutes 9**, and **12**. We issued **Minute 13** on 28 January 2010 which outlined some issues which had been raised and/or which we considered would need to be addressed in relation to conditions.

1.5 In **Minute 14** we provided some guidance to the Applicant and officers as to matters which we thought needed to be addressed in conditions or amendments required. The officers and CPW then prepared revised conditions and many issues were resolved. We resumed the hearing at the end of March to hear discussion regarding those conditions and residual issues including comments from relevant submitters. Following the hearing at the request of the Applicant, we issued **Minute 15** on 30 March to provide the Applicant and officers with further guidance on the very limited number of remaining issues. **Minutes 14** and **15** record our reasons for our views on a number of significant issues concerning

conditions and we will not repeat that discussion or the reasoning in earlier minutes here.

- 1.6 There were further discussions between the Applicant and officers in early April, which resulted in a final set of draft conditions in April 2010 along with comments from Regional Council officers and some submitters on changes. We had invited comments from those with a direct interest in the 'holiday rule' and had some brief submissions on that. We received the Applicant's reply regarding conditions on 30 May. This reply was brief and indicated that most residual issues had been resolved.
- 1.7 We sought comment from the Applicant in relation to the so called "holiday rule" in relation to the Waimakariri take and in particular a reply to the response on behalf of Whitewater New Zealand. We also sought a final response from officers in relation to some issues raised by the Applicant in its reply. We sought this latter response not to relitigate any issues but to see whether the officers agreed or disagreed with some of the suggestions made by the Applicant. The Applicant's further response was received on 14 May and the officers response on 6 May. We formally closed the hearing on 14 May.
- 1.8 We sought some clarification of some non contentious factual points from the officers and Applicant's experts during the following weeks. We also issued various drafting directions to the officers to accord with our final decision.
- 1.9 We record our gratitude to CPW's consultants and the reporting officers/consultants who have put considerable effort into redrafting the conditions to address issues which we had identified. We also acknowledge the effort put in by Fish and Game, Whitewater New Zealand and other submitters in relation to the Waimakariri take conditions and the fish screening condition amongst others. It is encouraging that after such a long and complex hearing most matters are now agreed.
- 1.10 We outlined the residual issues in **Minute 15** along with our preliminary thoughts. Most of these matters have been resolved with the exception of some points outlined in the Applicant's reply of 30 May.

Scope of this discussion of conditions

- 1.11 The discussion below largely relates to matters which were still in dispute. Those with a particular interest should refer to **Minute 14** in relation to the background to conditions and **Minute 15** in relation to our conclusions on various matters concerning conditions. So far as the Waimakariri take is concerned, readers should also refer to **Minutes 9** and **12** and in relation to the holiday rule, **Minute 15**.

2. WAIMAKARIRI TAKE CONSENT

- 2.1 The Waimakariri take will on average be around 27-30 % of the annual volume of take under the original scheme. This is in large part because there will now only be a limited take during winter (in the absence of a reservoir) and in part because of the one to one flow sharing and other restrictions now included in the consent which were not part of the original proposal.

- 2.2 The key elements of the final take regime as discussed and largely agreed at the hearing are as follows:

- *The take will be subject to the existing minimum flow regime and existing A and B permit takes. Accordingly it will not affect the frequency and duration of flows below the A/B permit transition.*
- *The maximum take diverted for irrigation purposes will now be 24 cumecs rather than the originally proposed 40 cumecs.*
- *There will be very little take outside of the irrigation season because CPW will be limited to only so much as is required to top up on farm storage.*
- *The take will be subject to one to one flow sharing from the commencement of take at 66.1 cumecs as measured at the Old Highway Bridge (CPW will only be able to take one cumec for each additional two cumecs of flow).*
- *In addition the take will be subject to the so called "holiday rule" which will limit its take to 6 hours per day (largely overnight) during summer weekends, public holidays and some weekdays during the peak recreation season. This is directed at maintaining adequate flows*

downstream of the Crossbank during high use periods for kayakers and jet boaters.

- *During these periods the take cannot commence until an unmodified flow of **around 75 cumecs as estimated at the old highway bridge**, thus maintaining a residual flow of **at least 55 cumecs**.*
- *No takes during the coast-to-coast event.*
- *After sustained periods of low flow (more than 21 days of flows less than 41 cumecs), CPW will be required to let the first fresh pass through unimpeded as a flushing flow.*
- *Rakaia water will be taken in preference to Waimakariri water and when sufficient water is available from the Rakaia no water will be taken from the Waimakariri. (An average rate of take for the Rakaia and Waimakariri rivers of 26.35 and 5.18 m³/s respectively).*

The one to one flow sharing rule

- 2.3** Following the close of the hearing it occurred to us that the one to one flow sharing may not need to apply at flows above about 100 cumecs. However given that we did not hear evidence on this point we have left the condition as it is for the time being.

The 'holiday rule'

- 2.4** This was the most substantive remaining issue. In **Minute 12**, we accepted that the 30 cumec gap approach proposed by ECan officers to reflect Plan Change 1 would mitigate the effect of the CPW take on recreation amenity at low flow. However, we concluded that 1:1 flow sharing proposed by CPW as a result of our comments in **Minute 12**, would provide a more sustainable outcome which balances both instream and out of stream needs.
- 2.5** We concluded that the CPW 1:1 flow share proposal would provide adequate mitigation if combined with additional restrictions at times of likely peak use for kayaking and jet boating. We noted that these additional restrictions would incidentally have mitigation benefits for river bird life and angling amenity. In

Minute 12 (at 8.7 and following) we outlined the rationale for the additional restriction and then outlined the objective as follows:

"The objective of the condition would be to reduce the occurrence of flows below 55 cumecs at OHB during the peak usage periods. We have concluded that with this additional mitigation measure or similar, the effects of the take regime on kayaking will be no more than minor. We also observe that this additional mitigation will also further reduce the potential for adverse effects on jet boating amenity, fishing amenity and other in stream values. Tables 2 and 3 suggest that this additional restriction would not in fact be applied very often and therefore should not be particularly onerous for CPW. However, it would be useful if CPW could model how often and how much this restriction (or whatever variations may be proposed) would apply.

These are our tentative views as to an adequate mitigation regime. We would like to hear from the kayaking and jet boating submitters and from CPW as to the merits of our suggestion. An alternative or additional approach may be to limit afternoon or early evening takes on say 2 out of 3 weekdays over summer."

- 2.6** At the resumed hearing CPW indicated that it had concluded that the holiday rule in the form suggested by us would have little benefit. Mr Duncan agreed. In **Minute 15** we noted that our conclusion that an additional restriction is needed remained unchanged, but we agreed that there was no point in a condition which is not effective.
- 2.7** The kayaking groups and Fish and Game were in favour of retaining the so called "holiday rule" and indeed extending the period when it applied. Ms Baker for the kayaking interests suggested that if we concluded that the rule would be ineffective we should revert to the 30 cumec gap approach, which we had concluded would provide better mitigation for those particular values.
- 2.8** We indicated that we did not think that it would be appropriate or consistent with our conclusions in **Minute 12** to entirely dispense with the holiday rule. However we accepted that there was no point in including a restriction which reduces the economic benefits of the take with little resultant benefit to in stream amenity. That would not be an efficient use of the resource or the scheme.

2.9 We indicated that we did not think that it was necessary to revert to the 30 cumec gap, because we have already concluded that the one to one flow sharing will provide adequate mitigation while maintaining greater flow variability than the 30 cumec gap (see para 12.27 of **Minute 12**). We had already concluded that this is a more sustainable approach than the 30 cumec gap which we consider to be unduly restrictive for little additional instream benefit.

2.10 Nevertheless we remain of the view that there needs to be an additional restriction which provides **effective** mitigation at times of potential high use. We accept that such a restriction will inevitably have some effects on reliability of scheme water and consequential impacts on the storage requirements of the scheme and/or on reliability of irrigation. However, given the very high amenity values provided by the river, we consider that it is essential that effects on these values be adequately mitigated at the times of highest potential use. The interests of irrigators and economic considerations must take second place.

2.11 We asked the officers in consultation with CPW, the kayakers, and Fish and Game, to draft a condition for specified high use periods which will provide adequate, albeit not complete mitigation of the effects of the CPW take at these times. The full details of what we sought and the reasons for that are in **Minute 15**.

2.12 We expressed the view that the broad objective should be to ensure that:

During the specified days and times the CPW take should not reduce downstream flows by more than 5 cumecs when flows would otherwise have been at or above 60 cumecs at OHB.

2.13 We indicated that the objective and the rule should be primarily directed at the area from Crossbank downstream. This is the area many kayakers get in to the river and where most novice jet boating occurs; it is also highly used by anglers. We also understand from Mr Duncan that upstream of this area the river is less braided and therefore riffles tend to be deeper, so the take will have less impact on the primary channels. We made the following comment:

Given the impacts of the restriction on CPW we think that there could be some reduction in the number of days on which the restriction applies.

The aim should be to focus the mitigation at times of highest recreational use, with greater mitigation (retained river flows) possible if applied at more limited high-use times. If an alternative focussed regime cannot be agreed by 16 April, we have tentatively decided that it should apply on all weekend days and public holidays between 1 November and 15 March (refer para 8.17 of Minute 12) but that it need only apply on week days during 21 December to 31 January. The latter will capture the summer holiday period and the peak salmon angling period in the Crossbank to SH1 section. We accept that this will not address effects at low flow periods on weekdays outside of the stated period. However, we think that potential usage is likely to be significantly lower outside of the stated period. Having said that, we note that kayaking interests did seek that the restriction apply on weekdays beyond this period and in particular during February leading up to the Coast to Coast. Accordingly we would prefer some arrangement which allowed for some weekday restrictions into February.

*We have concluded that the restriction does not need to apply on a 24 hour basis. That would have significant consequences for CPW and at times would achieve little or no benefit for river users. Whilst we accept that there will be some boating in the target reach during mornings, we think that the highest use will be in the afternoons. Accordingly we think that it will be sufficient albeit incomplete mitigation, **to target the noon to evening period at and downstream of the Crossbank area.** Accordingly the restrictions on take could apply from say 7am to 4pm or whatever start and finish times will result in the “wave” reaching Crossbank by noon and the effects of the CPW take reaching SH1 by 8 pm.*

We note that this approach would allow CPW to take on a normal (1:1) basis for the remaining 14 to 15 hours per day. Again, we accept that this is a compromise. That is, it is a value judgement as to whether the timing should be longer. We accept that this approach will provide no benefit to early morning anglers and boaties. However, the rule is not primarily directed at angling amenity, which we think will be less affected by the ‘normal’ take (see para 8.33, Minute 12) and we think that most kayakers will be able to target the afternoon periods.

2.14 Following our **Minute 15**, Mr Duncan (for ECan) calculated the average time for a small fresh to travel from the Waimakariri Gorge to SH1 as between 19 and 31 hours. After discussions with the Applicant and kayaking interests and further modelling Mr Duncan proposed the following:

4 For the periods including the days listed in Appendix 1, the following restrictions shall apply:

(a) whenever the unmodified mean flow in the Waimakariri River, as estimated by the Canterbury Regional Council from measurements at the Old Highway Bridge, at or about map reference NZMS 260 M35:818-547, for any 24 hour period ending at noon is:

(i) greater than 80 cubic metres per second and less than 95 cubic metres per second, then the take shall not exceed the difference between the unmodified flow and 80 cubic metres per second, or 5 cubic metres per second, which ever is the lesser. This restriction shall apply between the hours of 3pm and 3am, or a similar 12 hour period so that the unmodified flow at Crossbank (located between map references NZMS 260 M35:701511 and M35:701517) between 7am and 7pm is between 55 and 65 cubic metres per second (measured flow).

(ii) Greater than 95 cubic metres per second, then take shall not exceed half the difference between the unmodified mean daily flow and 95 cubic metres per second.

APPENDIX 1

The restrictions specified in condition (4) of CRC061972, shall occur starting the day prior to:

(a) all weekend days and public holidays between 1 November and 15 March; and

(b) all weekdays from 21 December to 15 February; and

(c) *the fourth Monday of October (Labour Day) and the Easter weekend starting Good Friday and ending on Easter Monday.*

2.15 We confirm that the wording set out above conforms to our expectations as discussed in **Minute 15**. In particular it should be noted that the condition is now directed only at the lower river from the Crossbank down and only applies for a 12 hour period. This allows the consent holder to take for the other 12 hours of the relevant days subject to the other restrictions including 1 to 1 flow sharing.

2.16 The Applicant has confirmed that it accepts this proposed wording. Fish and Game did not comment on the revised rule. Jetboating NZ agreed that the rule was beneficial:

The Rivers sub committee have agreed with the findings and recommendations of Whitewater NZ. Jet boaters generally do not need quite as much water as Kayakers to make safe passage but when there are kayakers and Jet boaters on the same stretch of water, (as often is the case) then we do need more water to navigate safely past with the minimum of disturbance to both parties.

By also having the holiday rule it may create a small regular imitation fresh that will then move the fines and possibly keep some of the smaller channels from closing out.

2.17 Whitewater New Zealand agreed with the nature of the rule but sought that the timeframe it applies to be extended. We reproduce parts of Ms Baker's submission below:

The Commissioners asked during the March 2010 hearing about the impact of incremental changes in flows, and whether such changes would be noticeable and beneficial to paddlers. We have consulted with three extremely experienced users of the lower Waimakariri, and they have all responded with similar comments. They confirm that at lower flows an increment of 2-3 cumecs is hardly noticeable, but that an extra 5-10 cumecs is both noticeable and beneficial.

2.18 Whitewater NZ commented on the rule as follows:

- *In essence, we understand that if the unmodified flows are at 80 cumecs above the CPW intake then 55 cumecs would remain instream at the Old Highway Bridge (OHB); at 85, 60; and at 95, 65 respectively.*
- *Based on information provided by Maurice Duncan of NIWA and Jenna Hutchinson of URS, we note that the impact of CPW unmitigated by the Holiday Rule is that days per annum in the marginal paddling band of 55 cumecs or below, as measured at the OHB, would increase in an average year by around 16 days, from 106 to 122. The Holiday Rule in a “typical year” would reduce this by 7 or 8 days – so there would still be a significant increase in days in the marginal range.*
- *Further, we note that the impact of CPW unmitigated by the Holiday Rule is that days per annum in the next flow band, 55 to 65 cumecs, as measured at the OHB, would increase in an average year by around 3 days, from 34 to 37. The Holiday Rule in a “typical year” would further increase days in this band by about 6 per annum.*
- *It is clear that even with the Holiday Rule in place in its present form kayaking amenity is negatively affected.*
- *One way to further reduce the impact is to increase the period that the Holiday Rule applies from that noted in Ms Dean’s memorandum.*
- *We submit that the period be extended at the start of the season to include all weekend days from 1 October, and two midweek days through the whole of the period [from 1 October to 20 December, and 15 February to 31 March] This will also support the use of the Waimakariri for training for the Arawa Classic race, which is usually held on the first weekend of December.*
- *We note that the Holiday Rule as now drafted specifically relates to flows as measured at Crossbank – this is near the put-in point for the commonly paddled section from where the pylons cross the Waimakariri River down to the OHB. This is a key section, and it is important that we achieve an outcome at that point without needing to specify when takes cease – whether that is 3pm to 3am, or whatever other time.*

- *Further, we submit that the hours need not be stated as 7am and 7pm at Crossbank – rather, it might be useful to state that the hours should be from 30 minutes before sunrise to 30 minutes after sunset.*
- *We note that the primary benefit from the Holiday Rule is intended to provide mitigation for the loss of kayaking amenity. We submit that from time to time that the needs of the Applicant and the needs of the Submitters may mean that the parties jointly agree to vary the Holiday Rule. For example, at present, Whitewater New Zealand has a working arrangement with Meridian Energy regarding releases from Lake Tekapo. Whitewater NZ have foregone releases required by resource consent conditions in exceptional years and had deferrals for when water is available. Any such similar temporary change in the Holiday Rule would need to be undertaken as a short term change to the resource consent condition, which would need to be approved in writing by Whitewater New Zealand as the national representative body.*

2.19 Ms Baker also provided revised wording to us to reflect that request. The Applicant responded by memorandum on 10 May indicating that it considered that the further extension of the condition was not warranted. Counsel noted that while CPW agreed to the package of restrictions in the draft conditions including the holiday rule, it saw this as a package and reserved its right to appeal any changes.

2.20 We now set out our conclusions on the requests above.

- We agree that the CPW will have some impact on kayaking amenity, however it seems that the combined restrictions on the take including the holiday rule will reduce those effects to a minor level for the periods of high kayaking use.
- We accept that during the period from 1 October to 20 December, there is a potential for effects on days when the holiday rule will not apply but where some kayaking of the lower river might occur.
- We have concluded that it would be appropriate and consistent with our earlier views to extend the rule to cover all weekends and public holidays

(Labour Day) in October, but do not think that it is necessary to extend this beyond 15 March.

- It seems to us that this limited extension will have little effect on CPW in most years. Even when it is applicable CPW will still be able to take for the remainder of the week (subject to flows). We also note that in general, nor west conditions and resultant inland rain, during November and often into December mean that flows are on average higher during this period than in March.
- We have decided that it is not necessary to include 2 midweek days from 1 October to 20 December, or from 15 February to 31 March. We base this on earlier evidence from Ken Livingston from Arawa Canoe Club that 98% of their members kayak on the weekends.
- At this stage we do not have any record of the level of weekday kayaking usage apart from Mr Livingston's comments, but we do have evidence as to the effect of additional restrictions on CPW and its shareholders. We have concluded that the costs to irrigators of the additional weekdays sought by Whitewater NZ, plus 2 weekends in late March, would greatly exceed any in stream benefits.
- In the event that significant weekday usage (and/or late March weekend usage) is documented in the future **and** if CPW is shown to be having a significant effect on amenity at these times, the conditions of consent could be reviewed to increase the restriction.
- We consider that the current wording as to the times of day when the flow applies at the Crossbank is adequate. Most kayakers are unlikely to be launching at the Pylons before 7am or after 7pm (just upstream of Crossbank). Furthermore, as users become used to the new regime they are likely to adapt to it.
- We do not agree that any additional voluntary restrictions by CPW would need to be the subject of a formal change to the condition in question. It is open to CPW to agree additional restrictions with any group. The conditions do not require it to take water.

- We think that it would be useful for a river users group to be formed to liaise with CPW. However, we do not see the need for that to be a requirement of the conditions. Angers, kayakers and jet boaters are all represented by well organised local and national bodies and it will be in CPW's interest to co operate with these bodies (such an approach is also implicit in the Trust's objectives).

2.21 In conclusion the condition remains as set out above. However, we have made the following minor change to Appendix 1.

APPENDIX 1

The restrictions specified in condition (4) of CRC061972, shall occur starting the day prior to:

*all weekend days and public holidays between **1 October** ~~November~~ and 15 March; and*

all weekdays from 21 December to 15 February;

Easter weekend starting Good Friday and including Easter Monday.

2.22 In **Minute 15** we observed that that the condition in question and indeed the overall take regime, involves a balance (value judgement) between **adequate** mitigation of effects on recreational amenity of national significance and increased costs (reduction of scheme reliability and storage costs and resulting reduced economic benefit). We have done the best we can, based on the evidence we have heard. Ultimately this is a condition that will be best tested in situ. If needs be, it can be adapted either by way of negotiation or by way of a section 127 application by CPW or a 128 review by the Regional Council.

Waimakariri Condition 3 (a) (iv)

2.23 We noted in **Minute 15**, that what was then Condition 3(a)(iv) did not reflect our views that the flat lining interval should be reduced from 21 to 14 days. The revised condition proposed by officers is as follows:

- (i) *at or below 41.0 cubic metres per second for a continuous period of **14 days**, the consent holder shall not take water in accordance with conditions 3(a)(i) until the flow rate is greater than 41 cubic metres per second for a period of two days or*

until the flow is greater than 130 cubic metres per second, whichever is the sooner. This clause shall not apply if water is being taken under clause 3(a)(iii).

2.24 In its reply CPW submitted that condition should remain as 21 days as originally proposed by it during the hearing. It noted that the proposed extension of the restriction to shorter periods of low flow would further affect reliability of the scheme and storage requirements. It relied on the evidence presented by Dr Burrell for the 21 days.

2.25 Counsel also noted that the original suggestion of 21 days was before the one to one flow sharing approach was developed.

2.26 The additional mitigation provided by one to one flow sharing and the holiday rule in terms of effects on flushing flows, has not been modelled because these changes were developed after the original evidence had been prepared. However we note Mr Duncan's evidence that flows of up to 130 m³/s were needed for flushing to be effective, so the holiday rule is unlikely to greatly improve flushing.

2.27 The original rationale for the 14 day flat lining interval was Dr Glova's comment in response to our questions that 21 days flat lining may be too long for migrating salmon to 'hole up' awaiting a flush to trigger movement upstream (refer our **Minute 9** paras 9.86-9.89 and **Minute 12** para 7.7). In terms of flushing flows we accept that Dr Meredith in WRRP Plan Change 1 has used 21 days, not 14. The issue is the potential benefit for salmon migration. Given Dr Glova's comment was simply an off-the-cuff albeit expert opinion, and ECan is using 21 days in its PC1 analysis, we have concluded that it is appropriate to revert to the 21 day cut off.

2.28 Again, this is a parameter which is amenable to adaptive management via the review condition or a section 127 change of conditions.

Waimakariri take CRC061972 condition 4 (a) (ii)

2.29 CPW submits that this clause has been inserted by mistake and seeks its deletion. We understand that the officers agree with this suggestion.

Winter allocation

2.30 In **Minute 15** we made the following comment:

*We are of the view the legal allocation under the take consents for both rivers needs to be clear. In the absence of an external storage scheme, CPW does not require water outside of the irrigation season except to refill on farm storage. Currently the officers have proposed to limit the combined winter allocation from both rivers by reference to the volume required to refill projected on farm storage. We think that it would be preferable to state a maximum winter volume **for each river**. That is to ensure that other potential applicants can ascertain the limits of the CPW allocation. We do not require an irrigation season limit because that can be defined by the rate of take in conjunction with other restrictions. However that maximum rate of take will not be required for either river in the winter.*

2.31 We also understand that the on farm storage requirement has assumed no holiday rule. We do not require any limit as to on farm storage. However the winter take should be sized to take into account any additions to storage required as a result of the holiday rule in its final form.

2.32 Ms Dean in her final response from the officers commented as follows:

I do not consider that a volumetric limit is necessary to determine the legal allocation of water as it is defined by the maximum rate of abstraction. For example, the WRRP defines the allocation limit for the A Permits for the Waimakariri River to be the “total flow rate of water to be allocated”. With regards to the Rakaia River, Policy WQN14 of the Proposed Natural Resources Regional Plan (PNRRP) states:

“(3) For surface water bodies:

(a) In the absence of storage in the system, the limit for each allocation block shall be set as a flow rate;

2.33 This does not address our concern, which was to ensure that CPW may only take water outside of the irrigation season for the purpose of filling whatever storage it or its shareholders have available. Our aim was to achieve certainty for other

potential applicants as to how much winter water has been allocated from the Waimakariri Reliance on potential rates of abstraction does not provide that certainty because those rates allow abstraction of water which is not needed for the scheme.

2.34 On reflection we think that this issue can be addressed by stipulating on both take consents wording to the effect that outside of the irrigation seasons the rate of take from each river is limited to only so much water as is required by the consent holder to supply water to replenish on farm storage and to maintain minimum levels in the Headrace.

2.35 Accordingly, we have included an addition to condition 2 of the Waimakariri take permit as follows and an equivalent addition to the Rakaia take permit.

2. The rate at which water may be taken from the Waimakariri River shall not exceed whatever rate is required in conjunction with the take from the Rakaia river and any other sources of water to the scheme to:

- supply the irrigation demand from users of the scheme to use the water in accordance with the conditions of resource **consent CRC061973** ; and to*
 - replenish on farm storage;*
- and shall not exceed 24 cubic metres per second.*

2.36 Our reason for this approach is to ensure that other potential users of winter water are not deprived of their right to apply for water which is not needed by CPW. That would not be an efficient use and development of the resource. We also think that it would be inefficient for CPW to be left with a tradable surplus. In any event, that is not the basis on which it advanced its proposal and as far as we are aware it is not its intention to use the water for anything but the needs of its shareholders.

2.37 We do not think that it is necessary to specify the volume of storage which may be serviced by the scheme because the details of that are unknown and we do not want to place any constraints on maximising storage opportunities. We observe that the wording above would not preclude CPW developing off scheme storage,

however it would need to apply to amend the condition above if it wished to take water from either or both rivers to service such storage.

Protection of existing takes

2.38 We need to be satisfied that the CPW take will not detract from the ability of any existing consent holders to take pursuant to their consent, even if the existing consents are not consistent with the Plan, either as it is now, or as it will be if Plan Change 1 is adopted.

2.39 In **Minute 15** we noted that Mr Callander's suggestion for the following clause seemed to have some merit:

The abstraction of water at "unmodified" river flows of greater than 66.1 cubic metres per second shall only occur at times when A permit holders are authorised to exercise their full allocation.

2.40 This has been incorporated into the draft conditions as condition 7. In its submission in reply CPW opposes this condition.

2.41 We accept that it is possible that this issue will be addressed via the Plan Change and a subsequent review of the conditions of existing consents, however we cannot speculate as to what the outcome of either process may be. We do not think the issue revolves around what the existing consent holders applied for. We must take their consents as they come. These are A permit consent holders and they have priority over CPW both in terms of being granted earlier and in terms of the fact that their consents and the plan provide them with priority.

2.42 Accordingly, we think that we are required to ensure that CPW does not cause any substantial derogation from these consents. There are legal issues involved which have not been fully argued before us and given that it is not for us to interpret other persons' consents, we have decided that the condition should remain. CPW of course has the right to challenge the condition. If that occurs then the interpretation of existing consents and the rights provided by those would be considered by the Court. Alternatively, it may be that the issue can be sorted out via the plan change and subsequent consent review process and/or by negotiation.

3. FISH SCREEN CONDITIONS

3.1 There was much debate as to whether the fish screening condition should specify mesh and slot sizes or specify an objective and a process for designing and certifying a screen or other system. CPW favoured the latter. Fish and Game and the Department of Conservation along with Dr Meredith for ECan favoured specification.

3.2 Having heard arguments for and against this approach, we concluded in our **Minute 15** as follows:

We have provisionally concluded that the fish screen condition should either be Mr Lewthwaite's Option A but with a design objective of excluding at least 95% of adult juvenile salmonids, adult longjawed galaxias and longfin eels, or his Option B but with the same design objective as above and mesh and slot sizes as proposed by Dr Meredith. Either option would potentially allow CPW to seek a variation of the objective if further studies establish that such an objective is too conservative. Under the second option, CPW could subsequently utilise section 127 to change the objective and/or the mesh or slot sizes. Neither option would preclude other design solutions being advanced at any time up until the final design of the screens.

Based on Figures 19-22 of the NIWA 2007 Fish Screening Guidelines, and to achieve an entrainment risk for salmonid and longjawed galaxias less than 'high', we would conclude that if a traditional fish screening approach is taken, it would need square mesh size of less than 4mm.

3.3 The parties have negotiated further and reached agreement on an objective and a process for designing and certifying a screen or other system, together with a fallback position as indicated by us of a 4mm mesh size. We left it to the officers to propose an amended condition after further discussions with CPW and Fish and Game.

3.4 The amended conditions are now in conditions 9 and 10 of consent CRC 061972. We have not had any further comment from Fish and Game regarding this proposal but assume that its experts were involved in the discussions. We are satisfied that the approach now adopted is consistent with what we outlined in **Minute 15** and is appropriate for the reasons set out in that document.

- 3.5 The Applicant has indicated only one issue with the draft condition. It has requested that condition 10 (g) (ii) be amended so as to read:

*the screen material voids shall be a mesh, **wedge wire, or similar material**, with a maximum width of 4 millimetres;*

- 3.6 CPW says this will allow some flexibility in terms of screen construction. Dr Meredith commented that: "...strictly according to the guidelines it should read 4mm side of square or diameter of material apertures, or 3mm slot width for slotted materials". They may however choose to state 4mm for both but that will introduce some additional leniency (lower efficiency and possibly <95%) if slotted materials are chosen."

- 3.7 We have concluded that the wording should be:

"the screen shall be a mesh, wedge wire, or similar material, the screen material voids shall be a maximum 3mm slot width for slotted materials or 4mm side of square, or diameter for other materials."

- 3.8 There is an opportunity for CPW to seek to modify the condition before final design if studies show that this approach is unnecessarily conservative.

4. **SAFETY OF BOATERS AT THE WAIMAKARIRI INTAKE (CRC 061972 CONDITION 14)**

- 4.1 We expressed some concerns regarding the lack of detail in relation to measures to minimise risk to kayakers at the Waimakariri intake. We heard extensive and useful evidence from Hugh Canard for the kayakers in this regard. Following the initial hearing CPW developed a condition in conjunction with Whitewater New Zealand and the wording has now been agreed. We are appreciative of the constructive approach which has been taken by both parties in relation to this important issue. We are now satisfied that the condition is appropriate and will ensure that risks to river users are minimised.

4.2 Whitewater New Zealand comments on the approach as follows:

The key objective is that the safety features are designed in order to achieve an overall International Grade 2 standard, suitable for racing kayaks.

Key aspects of the design include inclined trash racks with limited approach velocities to enable a person swept on to the rack to be able to self rescue, and that the rack must be cleared of accumulating debris to ensure its continual safe operation.

The intake structures must be certified by independent experts prior to construction and prior to commissioning, and both Whitewater New Zealand and the New Zealand Jet Boat Association will be invited to take part in a series of tests after commissioning.

4.3 We note the qualification:

Despite our involvement in trying to mitigate the effect of the intake structures, we continue to assert that any intake structure is inherently more dangerous than no intake structure, and further that an operating intake structure is inherently more dangerous than one which is not operational due to intake velocities.

4.4 Whilst both of those statements are clearly correct, the RMA is not a “no risk” statute and kayaking is an inherently risky activity. We are of the view that the condition as drafted will minimise the risk to kayakers albeit that the risk cannot be entirely avoided if the intake is installed and operational. There will be signage to warn of the residual risk.

4.5 Whitewater New Zealand suggests some minor changes as follows:

The main put in and take out locations at which signage should be placed are:

Mt White Bridge (put in)

Woodstock (put in)

At the Waimakariri Gorge Bridge (take out)

In addition it is requested that the signs need to be at least 2m x 1m, weatherproof and UV proof.

4.6 We agree that those changes should be incorporated into the condition; we also think that signage at the Gorge Bridge should be both at the intake and at the car park.

4.7 We note that Mr Judkins, the organiser of the Coast to Coast event, emphasised the importance of signage and was supportive of the approach which has been adopted in relation to this issue. He was also supportive of the modified take regime so far as it affects kayaking and the Coast to Coast race and training for that. We are appreciative of his input into the hearing and note that our understanding is that his concerns have now largely been addressed.

4.8 The Applicant has requested a minor modification to paragraph n of the condition as follows:

Within 40 working days, or such other timeframe as may be agreed by the Canterbury Regional Council, the consent holder shall adopt the modifications to the intake design as identified in the report required in condition 14(m).

4.9 We think that is a sensible suggestion and the officers agreed.

5. TELEMETRY

5.1 The Applicant has raised a minor issue with proposed condition 15 (d) of CRC 061972. It does not see the need for data to be collected and stored by "an independent network provider". We understand that the officers agree that this is not essential. We see no reason why CPW should not be able to collect and store data so long as ECan can access it and audit it.

5.2 The Applicant also has an issue with condition 17 of CRC021091. (Rakaia take). Counsel for CPW noted that the draft condition requires telemetry of other users. Ms Dean comments that ... *the proposed condition now only requires on/off telemetry as opposed to the rate of abstraction. This means CPW can only take water when the other abstractors aren't taking any water at all.*

5.3 We accept that for enforcement purposes it may be sufficient for there to be a secure data logger on each of the other takes. ECan could then retrospectively check compliance and take action if there is any non compliance. Nevertheless, given the complexity of the proposed system we have concluded that at least on/of telemetry should be provided by CPW except where access for that can not be agreed with the consent holder, in which case a secure data logger would be the minimum requirement. Ideally, we think that there should be real time telemetry for all takes. However, the cost of that should be borne by all consent holders. The same comments are applicable to the Waimakariri. As a minimum the WIL and Ngai Tahu take should have real time telemetry as well as CPW.

6. **LOSSES OF WATER FROM THE CANAL (CONDITION 3 OF CRC061949)**

6.1 CPW has proposed has suggested some rewording of this condition. Ms Dean has responded as follows:

I consider that the combined 20% losses from by-wash and leakage should be based on the total volume taken over the year, as the instantaneous rate would be difficult to monitor. If losses are based on a volume, CPW will already know how much water is taken over the year, how much is used for irrigation, how much is discharged at the by-wash points to have a reasonable understanding of how much is being lost into the groundwater system.

6.2 We have no difficulty with the changes proposed by CPW. However, we note that we do not require a 20% loss target as there are benefits for aquifer recharge. In any event there are adequate economic incentives for CPW to minimise losses.

7. **EFFECTS OF GROUND WATER MOUNDING ON GRAVEL EXTRACTION**

7.1 We discussed our views in relation to the concerns of gravel extractors in **Minutes 11, 14 and 15** and the mounding issue is discussed more generally in **Part 7**. CPW made submissions in reply to the gravel extractors in October 2009 as follows.

CPW's preferred position is that effects on the gravel resource are appropriate to take into account if and when they become manifest. An expert panel (constituted for other concerns) can be tasked with

assessing an increase in MRGL if and when it occurs, and attributing responsibility. This can then trigger a s127 review of conditions. The actual effects will be then ascertainable (and quantifiable), and the range of solutions also more identifiable.

The effects, even once an increase in MRGL is identified, will not be immediate and the response need not be instantaneous. Both the gravel extractors and CPW can (and have the incentive to) co-operate in resolving with ECan and CCC the problems of access to the gravel resource, which has already been identified (in the Road Metals case) as a priority.

7.2 Subsequently, Mr Chapman for the extractors made further brief submissions in March in relation to conditions. He indicated that no agreement had been reached with CPW in relation to conditions dealing with this issue. He sought the following changes to conditions.

22. *The GTRP shall comprise at a minimum the following:*

(b) A technical representative of potential effects on gravel pit operations in the Miners Road area,

23. *The role of the GTRP shall be to:*

To review the Groundwater and Drainage Plan described in condition 25, and

.....(inter alia)

(d) To determine the likely cause of reported problems with drainage or groundwater including using information gathered in accordance with condition 26, propose mitigation or remedial measures and determine the extent to which the consent holder must implement them, or contribute to the cost of implementing them, given the consent holder's degree of contribution to the problem identified in accordance with condition 28(f). Where effects cannot be addressed by mitigation or remedial measures they shall be addressed by way of financial compensation;

25. *Groundwater and Drainage Plan*

(a) Prior to the first exercise of this consent, the consent holder shall develop a Groundwater and Drainage Plan outlining the measures that will be undertaken to monitor and mitigate potential adverse effects that may arise in regard to the following issues:

(i) Loss of Waimakariri River seepage on the Christchurch-West Melton and Kaiapoi aquifer systems;

(ii) Increase in the concentrations of nitrate-nitrogen or other contaminants in the groundwater both beneath and downstream from the Scheme area; and

(iii) Raised groundwater levels both beneath and downstream from the Scheme area, including any effects on gravel pit operations.

25(c)(ii) At least one groundwater level monitoring bore shall be located in the area of the Miners Road gravel extraction pits.

28. *Response to Groundwater Complaints*

When the consent holder is notified by a “complainant” of an adverse environmental effect, then:

(d)The consent holder may, instead of undertaking any remedial work or completing the assessment process, with the agreement of the complainant choose to negotiate with the complainant to undertake or pay the cost of those remedial works directly to the complainant, or agree to provide financial compensation to the complainant for losses, or otherwise reach agreement with the complainant in respect of any damage.

(e)Any agreement for the consent holder to pay costs directly to the landowner shall include a written undertaking from the property owner, that on the sale of the property, the property owner will advise the purchaser that the holder of this consent is

no longer liable for any effects associated with the use of water that may occur on that property. [as suggested by ECan]

19. *The consent holder shall avoid, remedy or mitigate adverse effects on groundwater, gravel pit operations and lowland drainage which occur as a result of the exercise of this consent.*

7.3 The change to condition 19 has been agreed. We have concluded that there is not need for the change sought to condition 22 (b). The Groundwater Technical Review Panel will have an expert in hydrogeology and can if needs be consult with the gravel extractors. The panel is now to be appointed by ECan.

7.4 We have decided that the suggested amendments to 23 (d) and 28 (d) in relation to financial compensation are not appropriate and probably beyond our jurisdiction. The change to condition 25 (c) (iii) seems sensible and we understand is not contentious.

7.5 We discuss the mounding issue in more detail in **Part 7**. We have concluded that the evidence suggests that mounding as a result of increased irrigation is not likely to be as significant as predicted by CPW and will take years to emerge. In any event we think that the issues concerning effects on gravel extraction operations are more to do with the rules within relevant plans than environmental effects. To the extent that there needs to be any arrangement between CPW and the gravel extractors we see this as a matter for side agreements rather than conditions.

8. TERRESTRIAL ECOLOGY

8.1 We have included a general condition in relation to the distribution races and the Notice of Requirement works, that there be no net loss (by area) of vegetation – and that an equivalent area, preferably of indigenous species, be established and maintained to compensate for the loss of all vegetation removed as a result of scheme construction works. This would provide a scheme-wide offset mechanism, and address issues raised by terrestrial ecologists and others. We appreciate that it would not address the issue of habitat loss as a result of land use intensification, but we regard that as a matter for the District Plan and/or the Protocol/farm plans.

9. HOURS OF OPERATION FOR CONSTRUCTION OF NOR WORKS

9.1 Having regard to the scale and duration of the construction works we have recommended a condition on the Notice of Requirement as follows:

Hours of Work

Construction of the scheme shall be undertaken in accordance with the following restrictions:

- (a) Work on the designation works within 300m of any residential dwelling shall be limited to between 0730 - 1800 hours, Monday to Saturday inclusive, but excluding any public holiday, except with the written approval of the owner/s and occupier/s of any such dwelling.*
- (b) Work on the designation works within 500m of any residential dwelling shall be limited to between 0730 - 1800 hours, on Sunday and on any public holiday, except with the written approval of the owner/s and occupier/s of any such dwelling.*
- (c) There shall be no work on Easter Friday, Easter Sunday, Anzac Day, Christmas Day and Boxing Day.*
- (d) Movement of heavy construction vehicles through Coalgate within 200m of any residential dwelling shall be limited to between 0630 – 2000 hours, Monday to Saturday inclusive, but excluding any public holiday and 0730 – 1800 hours on Sundays, except with the written approval of the owner/s and occupier/s of any such dwelling.*
- (e) Notwithstanding the above restrictions (but subject to (b)), concrete pouring and associated activities can occur at any time, subject to compliance with all other conditions of consent, including noise restrictions.*

9.2 This recommended condition is slightly modified from what was agreed between SDC officers and CPW. We consider that the additional restrictions on the hours of work near dwellings is not unreasonable and will better protect residential amenity values than the original proposal.

9.3 There was no blanket restriction proposed on hours of operation associated with the construction of the headrace, with the exception of evenings. We propose that works within 300m of any residential dwelling be confined to the period between 7:30 AM and 6 PM Monday to Saturday, with more restrictive hours on weekends and public holidays. This restriction can be overcome if the Applicant is able to obtain the written consent of the affected party. We also consider that special

provision is required in the vicinity of Coalgate, as it is the only urban area adjoining the headrace, and construction noise effects could be exacerbated by the fact that the headrace canal will be elevated up to 5m above ground level in the vicinity of the township, as well as requiring more earthworks as a consequence.

9.4 While we appreciate that noise can be managed through monitoring sound levels to determine compliance, this does not provide any certainty for members of the public in circumstances where we have a long linear canal, the construction of which could affect a number of dwellings in the rural area along its length. We have decided that a condition needs to be imposed on Sundays and some public holidays that the 300 m buffer zone be extended to 500 m at those times (again with provision for the consent of affected parties), and that no work at all be undertaken on Good Friday, Easter Sunday, Anzac Day, Christmas Day and Boxing Day. We have confirmed CPW's suggested condition that less noisy concrete pouring and associated activities will be excluded from the application of these rules. With respect to Coalgate, we have incorporated further restrictions on heavy traffic movements associated with this project within 200 m of dwellings, again with additional restrictions on Sundays and public holidays.

9.5 We consider that the works required to establish the distribution race network are not likely to be as disruptive as those associated with the larger and wider headrace, and accordingly that condition allows for longer hours of work.

10. BOND

10.1 Two types of bond have been discussed. The most contentious aspect surrounding the matter of bonding is the SDC officer's proposal for an "*unexpected risk event*" bond to cover the risk of catastrophic events such as failure of one of the terrace canals.. The other aspect of bonding is the "performance bond" to cover rehabilitation should the consent holder and/or Requiring Authority walk away from the scheme for any reason during either the construction or operational period.

10.2 Although a provision for a bond was not originally included in the officer's recommendations except in relation to the dam it was requested by some submitters. CPW submitted we had no authority to recommend a bond on the NoR. We sought advice on this issue. Mr Rogers, (counsel for SDC) advised us that it is within our jurisdiction to recommend a bond on the designation. We

accept that advice. We also note that a bond was proposed by CPW in relation to the dam designation.

- 10.3** In **Minute 15** we expressed the view, that there should be provision for a bond in relation to the headrace, to cover the possibility of any significant failure of the canal and consequential damage and repair. We also suggested that the bond should cover damage from flooding if culverts prove inadequate.
- 10.4** CPW in its final reply on conditions, noted that the proposed bond deals with performance of conditions, post project remediation **and** “*unexpected risk*” (eg. the risk of canal or culvert failure and consequent flood damage). It was strongly opposed to the unexpected risk bond but did not appear to be so concerned regarding a bond ensuring performance of conditions in the event that that CPW became insolvent.
- 10.5** Counsel submitted that there is no jurisdiction to include a bond in relation to unexpected risk. They also submitted that in any event such a bond is unnecessary and therefore unreasonable. CPW argue that day to day risk is a matter for conditions and the question of *unexpected risk* is a matter for insurance rather than a bond.
- 10.6** CPW indicate that it would be agreeable to a consent condition which requires it to hold an adequate level of public liability insurance and for that to be in a form where it can be paid to Council if CPW were to fail for any reason. Counsel pointed out that if there is both public liability insurance and a bond for unexpected risk then there would be duplication. It was also pointed out that a bond is very costly and it was suggested that it could threaten the viability of the project.
- 10.7** In short, CPW proposes that the bond condition be modified to exclude unexpected risks and that this be addressed by a requirement for adequate public liability insurance.
- 10.8** In view of the significance and cost implications of this issue we sought further advice from Mr Rogers and also sought confirmation from SDC officers as to what their recommendation is in relation to this issue. We think that this is important because if there were a serious failure and if CPW was not in a position to meet the costs of addressing that, SDC may be left with the cost of remediation works. Accordingly, to a large degree this aspect of the bond/insurance is a matter in which SDC has a vital interest both as the relevant consent authority, the owner of potentially affected infrastructure and a settler/ underwriter of the scheme.

10.9 Mr Rogers' further advice can be summarised as follows:

- A bond covering unexpected risk is within jurisdiction and such a bond was included in the *Cypress* decision relied on by both parties in the present instance. In that case one of the bonds related to unexpected post mine closure risks.
- The costs of a bond and the potential implications for the project is a matter which is relevant to our decision as to whether to recommend such a bond and/or impose it as a consent condition.
- We have no evidence before us as to the costs and consequent implications of a bond.
- The use of insurance will reduce potential risks to the Council and the environment in relation to unexpected risks but not so effectively as a bond.
- Insurance is subject to the risk that CPW might (in theory) fail to meet its premiums or otherwise compromise the insurance.
- An event might occur which might cause the insurer to decline continued cover or increase the premium to levels which are prohibitive for CPW.

10.10 Selwyn District Council reporting officers indicated that their recommendation for such an unexpected risk event bond stands at least in relation to the NoR components. On the basis of the reduced consequence of failure of the distribution network (and hence consequence of the possible risk that insurance is compromised) SDC Officers indicated insurance would be appropriate for the resource consents. SDC Officers still seek that there be a bond on both the resource consents and the NoR covering competition or reinstatement in the event of CPW failure independent of any unexpected risk.

10.11 This is a difficult issue for us. There are merits in both arguments and the issue has not been fully argued by us nor have we heard evidence on the point. For example we do not know what approach has been adopted in relation to other similar projects. We observe that the *Cypress* mine situation and the *Kate Valley Landfill* are somewhat different situations. In both cases there are risks of

catastrophic failure which do not apply here to the same degree. In the present case the principal (but low) risk of catastrophic failure relate to the terrace/escarpment canals. Neither of those threaten buildings or infrastructure to any significant degree. However if there was a failure the costs of repair and environmental remediation could be prohibitive. There are some elevated portions of the canal but it seems likely that the risks of a catastrophic failure are very low and could at least in this instance be covered by insurance.

10.12 The other significant difference in the present instance is that in the present case we are not talking about a landfill or a mine with a limited life span and express post closure remediation requirements.

10.13 We consider that it is likely that we do have jurisdiction to recommend an “unexpected risk event” bond in relation to the designation and to require one in relation to the consents. However, it appears to us that section 108 requires this to be related back to the *performance of consent conditions*. Although section 108 does not apply to Notices of Requirement/designations, we think that the situation is likely to be the same for a designation. However, this is a legal issue which we are reluctant to engage in.

10.14 We accept that there is a significant element of duplication between public liability insurance and an unexpected risk event bond. However we also accept that there are some limitations to insurance.

10.15 Notwithstanding the lack of evidence on the point we accept that the combination of a performance bond, public liability insurance and an unexpected risk event bond may be prohibitively expensive and may jeopardise the project. However we are not in a position to assess this.

10.16 We also note that the current situation is rather unique. Selwyn District Council has a direct involvement in CPWT as one of the settlors. It also has a financial stake in the scheme. It was asserted at one point that CPWT is a *Council Controlled Organisation*. We are unsure whether or not that is the case.

10.17 In any event, in the present case **we have concluded that:**

- In relation to both the designation and the distribution network there should be a performance bond to ensure that any part completed works are properly completed or the site is adequately remediated in the event that CPW became insolvent.

- There is no need for an unexpected risk event bond in relation to the distribution race system because any failures would not have catastrophic consequences and can be addressed by a suitable condition requiring CPW to hold appropriate public liability insurance and to maintain it at all times. This shall be in a form which would be available to the Council. In addition to this, we also note the general duty to avoid, remedy or mitigate adverse environmental effects under section 17 of the Act.
- We think that an unexpected risk event bond may be desirable in relation to the NoR Headrace and terrace canals, but have concluded that it should only relate to the designation which would authorise those works rather than the associated regional consents.
- We think that such a bond relating to the risk of failure of some part of the infrastructure and consequential environmental damage would need to be linked to the performance of conditions of the Designation.
- We have recommended that there be a condition requiring that the Requiring Authority be responsible for the full costs of remediating any environmental damage, including damage to private property or public infrastructure in the event of any failure of the canal or any other part of the intake and headrace system.
- We think that there should be an unexpected risk event bond condition which is tied to the performance of this and any related conditions and have asked the officers to draft such a condition to be included amongst the recommended NoR conditions.

10.18 Notwithstanding the above, we do accept that there may be an element of duplication in this approach. We also accept that the costs of a bond may be prohibitive. However there are many things that CPWL can do in the design and construction of the scheme to further minimise this risk (increased use of control gates along the headrace etc). It can balance the design/bond to arrive at the most efficient outcome for them. The process of setting the Bond needs to allow for this.

10.19 We acknowledge the relationship between the Requiring Authority (CPWL) and the Trust and the public nature of the Trust. We also note that there will be a contractual relationship between CPWL and the Council in relation to parts of the headrace which cross Council owned or managed land and/or interfere with Council infrastructure. We accept that it is arguable that these factors mitigate against the need for an unexpected risk event bond and perhaps even the performance bond.

10.20 As will be apparent, we are not entirely convinced that an unexpected risk event bond is necessary in the present case. However, given that the issue has not been fully debated and adopting a precautionary approach, we have included it as a recommendation so that further thought can be given to the issue by both CPWL and the Council.

10.21 It will be up to CPWL as to whether it accepts our recommendation. In the event that it does not do so, SDC and submitters will have the opportunity to challenge its decision on appeal. If that point is reached, there will be further opportunities to refine the bond and/or associated conditions via mediation or as a last resort litigation.

10.22 Whilst somewhat unusual, we consider that this process of resolving this issue is appropriate, given the role of SDC in the scheme and given that the issue arose quite late in the hearing and was not fully debated.

10.23 In view of this process and the opportunities for further engagement, we have concluded that there is no need for us to seek further submissions or evidence on the point. We will review the amended draft recommended conditions proposed by SDC and will make any amendments we think fit and will include them in our recommendation to CPWL.

11. ENVIRONMENTAL MANAGEMENT FUND

11.1 We have suggested that the fund should be administered by a trust separate from CPW and the draft wording of the relevant condition requires that. CPW "strongly" opposes this on the basis that:

- It would add administrative costs which would deplete the fund.

- The Trust is a Controlled Organisation required to report annually to the Christchurch City Council and the Selwyn District Council (the Settlers of the Trust).
- The Trust is accountable to the public in any event (the beneficiaries being the regional community).
- The District Councils appoint some of the trustees.
- There is provision for representatives of Ngai Tahu and the environment on the trust.
- The trustees have obligations under the trust deed.
- The Trust was set up to carry out this function, that is one of its primary roles.

11.2 Ms Dean in her Memorandum sets out the ECan officer's position:

I note that majority of the current CPWT Trustees represent the agricultural sector and that there may not be a fair representation of environmental interest groups. Given the purpose of the Environment Management Fund is to fund mitigation and environmental management projects, I consider that it would be appropriate for representation from environmental or community interest groups to help manage and distribute the fund.

I have drafted a condition which requires an Environment Management Fund Committee to manage and distribute the fund. The conditions outline the membership requirements of that committee.

11.3 We remain of the view that the fund should be administered by an entity which is independent of CPW and whose members are predominantly representative of environmental interests. We agree that the current make up of the Trust is dominated by farming interests. Nevertheless, we have reservations as to whether we have jurisdiction to **require** a different structure for administration of the fund. Accordingly, we have concluded that we will not require that in the conditions, but do make a strong **recommendation** to CPW and the two settlor councils to

ensure a structure which provides assurance to the public that the fund will be managed in accordance with environmental objectives, with appropriate expertise on the administering body.

- 11.4** As noted in our Minute, we are of the view that the primary focus of the fund should be on riparian management, water quality, Te Waihora and maintaining or enhancing aquatic and terrestrial ecology and bird life within the scheme area. As identified in our **Minute 14**, the Schedule 2 Admin Condition currently numbered 9 should refer explicitly to a priority objective of minimising nutrient losses to lowland streams and Te Waihora. The conditions make it clear that the fund must not be utilised for measures required by conditions or the Sustainability Protocol or Farm Management Plans, nor for any administration or education associated with these.
- 11.5** CPW was also strongly opposed to our suggestion that the levies should commence 5 years before the projected commissioning of the scheme or at the time the outline plan is approved. We had noted that this will allow the fund to be built up in advance of the scheme. We noted that the proposed \$150,000 per annum is modest in comparison to the predicted increases in profits to shareholders. We are of the view that if levies commence in advance of the scheme, this will allow a reasonable base fund to be established and with that and the removal of the dam and reservoir, we think the scheme will provide adequate offsets of effects which can not be mitigated.
- 11.6** We accept CPW's concern that shareholders should not be expected to contribute before they get water. However, we remain of the view that the fund should be allowed to build up prior to the commissioning of the scheme. Again, we doubt that we can **require** this by way of condition, since we can not require what is in essence a financial contribution, since that is not provided for in the regional or District Plans. This difficulty is overcome if CPW agrees to the increase but it does not.
- 11.7** Accordingly, we simply make a recommendation that CPW should ensure that the fund balance is no less than \$300,000 at the time the first irrigation commences. How it sources that seeding would be a matter for it, if it accepts this recommendation.
- 11.8** In view of the jurisdictional issue, we have not included either of these points in the Regional Council conditions. However we have added these two

recommendations to our recommendations in relation to the Notice of Requirement. That leaves CPW with the option of accepting or rejecting those recommendations. If the recommendations are rejected Selwyn District Council and/or submitters **may** have a right of appeal. (we say “may” because of the jurisdictional issue).

11.9 We also noted in **Minute 15** that there needs to be an explicit means of inflation adjusting the levy commencing from 2011. This has now been included.

12. SUSTAINABILITY PROTOCOL (SCHEDULE 2 ADMIN CONDITIONS)

12.1 We have required that a condition be added to provide for reviews of the Protocol either 5 yearly or upon request by ECan. This would allow, among other things, for priorities to be changed as mitigation methods begin to have effect. The Protocol should also be reviewed the year before irrigation commences (by review, we do not mean a review of consent conditions, but rather an informal review. The following wording has now been included:

“At least one year prior to the commencement of the scheme, and at least once every five years after the commencement of the scheme, the sustainability protocol shall be reviewed and updated to reflect best practice.”

13. LAPSE DATE

13.1 We included a lapse period of 8 years on the Ashburton Community Water Trust consents. We consider that the same period is appropriate for the CPW scheme. We discussed this further in **Minute 15**. It seems to us that if CPW can not make "substantial progress" within 8 years then the scheme should not prevent consideration of other alternative options beyond that time. We have included a lapse date of 10 years on the distribution network consents since some of that network may not be put in until after the headrace is constructed.

13.2 Furthermore, we think that the land owners who are affected by the scheme, adjoining landowners and the community as a whole are entitled to have certainty around the scheme as soon as possible. Even with an 8 year lapse period, construction might not commence for at least 10 years and the scheme might not be commissioned for another 3 to 5 years. CPW is able to apply for an extension provided that it has made substantial progress.

14. TERM OF CONSENTS

14.1 With the exception of construction and Rakaia consents, we have accepted that given the investment involved, the adequacy of conditions and in particular the adequacy of adaptive management and review conditions, a term of 35 years (the maximum term) is appropriate.

14.2 In relation to the Rakaia water and discharge permits we have concluded that these should expire at the same time as the ACWT consents (2044). This will allow for an integrated approach at the time of renewal. We see no difficulty with having a slightly different timing for the two rivers since the effects on one are independent of the effects on the other. **We observe that we did not discuss this with CPW at the hearing but we understand that it has no difficulty with this approach.**

14.3 The distribution network consent is a land use consent which runs with the land and does not have a term on it. We can limit that consent to a fixed term but no party has sought that we do so and accordingly we will keep to the normal position of an indefinite consent. The question of access to private or public land and the narration, duration and terms of that access is a matter for negotiations between CPW and land owners.

15. FINALISATION OF THE DESIGNATION CORRIDOR

15.1 CPW has kept the corridor wider than would otherwise be "reasonably necessary" to achieve its objectives. It has done so because it did not wish to spend further funds on a final design until it had a final decision from the RMA process. If there are appeals, that would be some years away.

15.2 We think that this approach was reasonable, however, in our view it is essential that the final canal route be confirmed as soon as possible after the designation is confirmed (if it is confirmed). This will enable the corridor to be narrowed so that it encompasses only what is *reasonably necessary* to construct the headrace and other designation works. This is likely to be required in any event to enable CPW to purchase or acquire the necessary interests in land.

15.3 The Bulls, the three Deans families, Madeline de Jong, Farmers Group Southern Headrace and other landowners have now had the uncertainty of this Notice of

Requirement for many years. We consider that they are entitled to have some certainty in their lives if the designation is ultimately confirmed. Accordingly, we have recommended that CPW finalise the **general** location of the intake, head works, sediment ponds, fish screens, terrace canals, headrace and other components, sufficiently for it to be able to withdraw the designation over land which is not *reasonably necessary* for the purpose of constructing and maintaining the works and to do so within 3 years of the Notice of Requirement being confirmed. (which will not be until appeals if any have been resolved).

15.4 We accept that CPW will need to maintain some flexibility to subsequently make minor changes to the design by way of the Outline Plan process and/or non notified variations to the designation. However we consider that it is reasonable and appropriate to require CPW to finalise the designation corridor within 3 years of the designation being confirmed. We envisage that this would also include confirmation of its chosen option in relation to the Bull property and any other properties where there is currently uncertainty as to the location of the works.

15.5 In our view it is within our jurisdiction to make such a *recommendation*. It is then up to CPW as to whether to accept it. If it does not do so, then it may end up being be a matter for the Environment Court as to whether it has jurisdiction to put a time frame on the finalisation of the location of the works, and if so whether that is appropriate.

Independent Commissioners 28 May 2010



Philip Milne (chair)



Bob Nixon



Andrew Fenemor



Ray O'Callaghan

IN THE MATTER OF the Resource Management Act 1991

IN THE MATTER OF applications by Central Plains Water Trust to:

Canterbury Regional Council for resource consents to take and use water from the Waimakariri and Rakaia Rivers for the Central Plains Water Enhancement Scheme and for associated consents required for the construction and operation of the Central Plains Water Enhancement Scheme

AND

IN THE MATTER OF applications by Central Plains Water Trust to:

Selwyn District Council for resource consents to construct and operate the Central Plains Water Enhancement Scheme

AND

IN THE MATTER OF a Notice of Requirement by Central Plains Water Limited to:

Selwyn District Council for the designation of land for works associated with the construction and operation of the Central Plains Water Enhancement Scheme

**JOINT DECISION AND RECOMMENDATION OF
INDEPENDENT COMMISSIONERS
28 MAY 2010**

PART 3

Beneficial effects of the scheme, economic impacts, social impacts, effects of the scheme on the relationship of Maori to water and other taonga

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1. BENEFICIAL EFFECTS OF THE PROPOSED SCHEME

1.1 We have summarised our conclusions in relation to the effects of the scheme in Part 1 of the decision and in **Minutes 9, 11, and 12**. In this section of our decision and the following parts we will provide our reasoning. We will start by considering the beneficial effects of the scheme and then discuss the potential adverse effects of the scheme.

1.2 This document (Part 3) addresses the beneficial effects of the scheme, economics, social and cultural impacts. Part 4 then discussed the effects of the intakes, terrace canals, headrace, and other Notice of Requirement works. Part 5 addresses the distribution network. Part 6 discusses the taking of water from the Waimakariri, and Part 7 considers the use of water and discharges from the scheme, including water quality, mounding and efficiency issues. Part 8 is an assessment against relevant objectives and policies. Parts, 9, 10 and 11 contain consent conditions and recommended conditions in relation to the Notice of Requirement.

Economic benefits and economic efficiency

1.3 We have already summarised our views on the economics of the scheme in Part 1 of this decision. We also discuss efficiency issues in Part 7 (the use of water). This discussion below provides a little more detail for some of our conclusions.

1.4 To provide some context, we note that the economic wellbeing of people and communities is a key aspect of sustainable management. The economic conditions which affect people are included in the definition of environment. Economics is also relevant in the context of the requirement to have particular regard to the efficient use and development of natural and physical resources. Essentially the rationale for this scheme is to utilise water which is surplus to environmental requirements to enhance the economic wellbeing of the shareholders and the wider community. CPW argues that the benefits from the scheme will outweigh any residual adverse effects.

1.5 In 2008 we heard a substantial body of evidence from four economists, these being Mr Philip Donnelly for CPW; Mr Michael Copeland for Ngai Tahu; Prof. Timothy

Hazledine for the Malvern Hills Protection Society; and Mr Geoffrey Butcher for the Selwyn District Council. We also heard from two experts on farm economics, these being Mr Andrew McFarlane for CPW, and Mr Stuart Ford for the Selwyn District Council. We note however that nearly all of the economic evidence from submitters related to the original much more costly scheme.

- 1.6** Mr McFarlane and Mr Donnelly updated their evidence in 2009 to address the revised scheme. The only contrary evidence to that of Mr McFarlane and Mr Donnelly for the applicant, was that provided in a short written brief by Mr Butcher on behalf of the Selwyn District Council as part of its officers' report. However that evidence did not in our view seriously challenge the applicant's revised evidence. Accordingly, to a large degree, we are now faced with unchallenged economic evidence.
- 1.7** There was much debate about the scale of economic benefits from the original scheme. This revolved around debate as to whether CPW's assessment of increased production was an over estimate and whether its assessment of the costs of the scheme and increased on-farm costs were over-estimates. It was also pointed out that the economic assessment did not take into account costs to the environment of the scheme, or the value of water left in stream.
- 1.8** In the context of the original scheme, these issues were important. Given the scale of impacts from the dam and reservoir, we would have needed to be satisfied that there would be quite significant benefits to offset those impacts. In view of the reduced scale of the modified scheme, and the reduced extent of adverse impacts associated with it, we no longer think that the debate regarding the *scale* of benefits is critical. We think that it is sufficient that we be satisfied (as we are) that there will be significant economic benefits from the scheme. We now review the key evidence which supports that conclusion.
- 1.9** Mr Macfarlane emphasised that it was not simply a matter of irrigation increasing levels of production and income, but also farmer confidence and consequent decisions about land use. He said that reliability under the modified scheme would be poor, except for the farms where irrigation will be supplemented by groundwater. For those farms without their own groundwater bores, he considered 1500 m³ was a practical upper economic limit on farm storage. In his paragraph 7.4 he noted that

"such storage would bring reliability up to adequate levels for mixed arable land uses, but would still be limiting to dairy development, as a result of less predictable pasture growth in February/March".

1.10 A comparison of the existing and anticipated land uses pre-scheme, under the 2007 scheme, and under the current reduced scheme, was prepared by Mr Macfarlane, and is set out below in Figure 2. This shows substantial changes to anticipated land use, particularly in respect to its limited scope for further dairying.

	Pre scheme (ha)	2007 assumptions (ha)	2009 assumptions (ha)
Dryland livestock	55,250		9,250
Mixed livestock/arable (50% water)		20,500	32,000
Mixed livestock/arable (100% water)	8,000		
Finishing livestock/arable		3,000	-
Dairy (100% water)	22,000	46,500	25,000
Arable and process crop		15,250	5,000
Arable/winter finishing		-	14,000
	85,250	85,250	85,250
Less dryland			9,250
Total area affected by irrigation			76,000

1.11 He said the capital associated with projected on farm costs, and budgeted at \$6826/ha in December 2007 would reduce to \$2860/ha under the amended scheme. In conclusion, he stated in his paragraph 23 that:

"Despite the lack of reliability, farmers are just as likely to support this revised scheme initiative as the original concept. Offsetting the lack of reliability will be the huge cost savings, which will generate an easier debt component to service and gain banking approval."

- 1.12 Mr Donnelly prepared further evidence based on the modified scheme, and estimated (based on a range of assumptions) that direct and indirect per annum agricultural output would rise by \$263 million, and processing output by \$328 million, a total of \$592 million per annum. The additional jobs anticipated were 416, 714, and 1130 respectively.
- 1.13 His conclusion was that while the costs of the scheme would fall by 56% compared to the original proposal (which provided much higher reliability water), overall farm revenue would only drop by 51% as a result of the changes to the scheme, which meant that the modified scheme would still provide significant net benefits. In his opinion, sensitivity analysis showed that even with changing assumptions, his findings were robust and the project would remain economically efficient. Finally, he added that most of the additional production to be gained from irrigated agriculture would be exported, and noted that increased exports were vital not only to increase New Zealand's standard of living, but even to maintain it.
- 1.14 Mr Butcher remained critical of the applicant's case, firstly because he considered that Mr Macfarlane was relying on short-term price increases for dairy products rather than an analysis of longer-term prices. He drew attention to **Minute 10** of the Commissioners, noting that if CPW did not proceed, other schemes would proceed in its absence anyway. He said that the applicant had not taken account of the cost of land lost to on farm storage. He concluded that the applicant had still not demonstrated that the amended scheme would be an efficient use of resources.
- 1.15 We earlier heard arguments from opposing economists and others that there are other realistic alternatives available for using surplus water from the rivers and that some of these might be more efficient than the CPW scheme. However, we are not in a position to judge whether or not that is the case and in any event we must decide whether this scheme is efficient not whether other schemes might (or might not) be more efficient. It is not for us to make speculative comparisons.
- 1.16 We are satisfied that the amended scheme, albeit producing lower benefits than the original, is still viable and considerably more affordable for participants than the original scheme. We are satisfied that there are likely to be significant net benefits if the scheme is built. If the likely benefits are insignificant it is unlikely that the scheme will get built.

- 1.17** The revised scheme will have significantly less adverse environmental effects than the original dam proposal. The scheme will be similar in character to the long-established Rangitata Diversion Race (RDR) scheme in Ashburton District, where on farm storage is now becoming common. With the fullness of time additional storage and reliability might become available in association with the use of Lake Coleridge water for example. If the scheme is able to attract investment, this suggests that it will be an efficient use of resources. If it does not, the scheme will not proceed and might be replaced by another proposal. However, sooner rather than later surplus surface water is likely to be used for irrigation. Ideally that will be in conjunction with storage so as to harness water outside of the irrigation season.
- 1.18** We accept that it would have been more efficient, at least in terms of reliability, to have large scale storage in the scheme, however the environmental and construction costs of providing that storage may well have made the scheme inefficient. In any event that is not a matter which we now need to consider. Nor do we need to consider whether it would be more efficient to await a scheme that has large scale storage. It is speculative as to whether such storage will occur. Furthermore, the current scheme can potentially be connected to eventual storage from Coleridge or elsewhere if such storage is found to be sustainable. Finally, we note that the scheme is in effect using groundwater storage to supplement surface water and will be providing some on-farm storage.
- 1.19** We accept that the proposed use of water is an efficient use of the resource in terms of allocative efficiency. We do not need to determine whether it is the *most* efficient use of the resource, or more, or less efficient than other potential uses. In our view, provided that the taking of water from the rivers does not have any significant adverse effect on instream values, it is an efficient use of that resource to use it for irrigation. That will enable increases in productivity and economic activity far beyond what would occur if the scheme did not proceed at all. We prefer the evidence of Mr Macfarlane and Mr Donnelly on this point.
- 1.20** Over time, factors such as commodity prices, interest rates, availability of capital, the regulatory framework, exchange rates, the inflation rate, tariffs, access to overseas markets and other influences could increase or reduce the anticipated benefits of a scheme such as the CPW project. Any assessment by us can only be

a "snapshot" of scheme viability based on the information available to us at the time of the assessment. The volatility of the situation has been spectacularly demonstrated by international economic developments since the hearing took place, which has led to major fluctuations in the exchange rate and the returns for milk solids.

1.21 Despite some contradictory evidence on the subject, we do not consider the profitability or otherwise of the project for its shareholders as being a relevant matter for us. That is a matter of commercial risk for CPW shareholders. Even if we accepted some of the criticisms, we doubt that it could be established that the revised scheme will not result in some significant economic benefits. In the absence of Government subsidies, the scheme will only be built if the shareholder farmers are satisfied that they will increase profits after they have deducted off the costs of the water and the cost of irrigation infrastructure and other cost increases.

1.22 The benefits of the scheme are relevant in terms of arriving at a balance as to whether the *magnitude* of these benefits outweighs the environmental costs. We were doubtful as to whether the benefits of the dam proposal outweighed the associated environmental costs. In the event, we did not need to determine this since we concluded that the reservoir and the dam were not consistent with the purpose and principles of the Resource Management Act 1991 (RMA). We are now satisfied that the benefits of the revised proposal, without the reservoir and dam, will outweigh the much reduced environmental costs of the revised scheme. We are of the view that it is enough for us to be satisfied (as we are) that the scheme will have substantial economic benefits. We no longer need to weigh those benefits against the significant adverse effects which we considered likely with the scheme as originally proposed.

1.23 We accept the evidence for CPW that there is likely to be significant increase in profitability for shareholders and consequent flow on benefits for the regional and national economy. We also accept that it is government policy to increase export earnings and this scheme will result in a significant increase in farm exports.

1.24 A number of submitters voiced concerns about the fact the primary beneficiaries of the scheme will be CPW shareholders (the irrigators). We have concluded that although indirect benefits to others in the regional economy are more difficult to

define, they are likely to be significant. We heard evidence of the regional economic benefits of the Opuha scheme which we visited, and of the Waimakariri Irrigation Limited scheme north of the Waimakariri River.

- 1.25** We do not accept the submissions from the Medical Officer of Health on behalf of the District Health Board, that because the rural community will benefit it follows that the urban community will be relatively worse off and will suffer health inequalities as a result. In our view if there are significant benefits to the rural economy, as seems likely, those will flow through to the urban community. In any event, even if the rural economy benefits more than the urban economy, we do not accept that this will lead to social or health inequalities.

Benefits from the farm protocol

- 1.26** We accept that there will be some benefits from having most of the farms within the command area dependent upon scheme water to some extent and therefore "locked in" to the Sustainability Protocol and compulsory Farm Management Plans requiring best management practices (BMP). While this can largely be seen as mitigation of effects of the scheme, there will also be an element of benefit to the region as a whole since some of these farms are irrigating already, or would do so irrespective of CPW. It will be useful to have these farms within the ambit of the Protocol.
- 1.27** If CPW does not proceed it is almost inevitable that other schemes will proceed and there is no guarantee that these farmers will be subject to any (BMP) requirements, since there are no rules in the Proposed Natural Resources Regional Plan (PNRRP) or the District Plan requiring that. Furthermore there is an extensive area of land within the scheme area which is already irrigated by ground water or will be soon as a result of the Waimakariri Selwyn and Rakaia Selwyn groundwater consent decisions. None of these farms will be subject to a BMP requirement unless they are part of CPW. We are optimistic that CPW will provide a model which will spread either voluntarily or if necessary by regulation, to the remainder of the farming community.
- 1.28** We heard evidence from an irrigation scheme in North Otago where a similar approach has been taken. We heard that the voluntary approach has been

successful with respect to both compliance and outcomes. We agree that a voluntary approach to BMP is likely to be more effective than a regulatory approach. In the present case the approach is effectively voluntary, but is backed up by conditions which can if necessary be tightened if the semi-voluntary approach does not prove to be effective.

Benefits to lowland stream flows and groundwater supplies

- 1.29** We accept the evidence that the increased recharge of ground water from the scheme will have beneficial effects in terms of flows to lowland streams and possibly in terms of more reliability of lowland groundwater takes. The increase in flows to lowland streams will have some ecological benefits. Trout habitats should increase and angling opportunity may also increase in the Selwyn River and other streams. There will also be amenity benefits associated with increased flows.
- 1.30** The increased flows will of course be less than they would have been with the full scheme including the reservoir. However there will still be a significant increase in the amount of recharge to groundwater. This will to some extent replenish this zone which is deemed to be over allocated in the PNRRP.
- 1.31** We were told that the original scheme would result in significant reductions in groundwater usage as farmers swapped to cheaper CPW water. With the modified scheme, reliability of CPW water alone will not be very high. As a consequence it is unlikely that those with existing ground water consents will surrender them. However, CPW shareholders who currently have access to ground water will use CPW water when it is available. This may result in some reduction in groundwater usage which is likely to have beneficial effects in terms of lowland stream flows. We have not put much weight on this potential benefit because we think it is likely that spare capacity will be transferred to other persons at least in the absence of restrictions on that in the PNRRP or the relevant consents.
- 1.32** Nevertheless we think that there may well be some overall reduction in ground water use, which when coupled with increased recharge, will result in increase ground water levels and increased flows in the lowland streams. There may also be some increase in reliability for those reliant on ground water, particularly in the lowland areas east of State Highway 1.

1.33 We also note that there is potential for the scheme to be utilised to provide direct winter recharge to groundwater. This is not part of the current proposal but is something which is under consideration. Winter recharge could provide benefits in terms of higher ground water levels at the start of the irrigation season. If this eventuates, there may be even greater reliability for those who are reliant on groundwater and benefits in terms of lowland stream flows to the extent that these streams are partially supplied by deep groundwater as maintained by ECan officers (deeper groundwater being subject to time lags between recharge/extraction and effects on springs and streams).

The environmental enhancement fund

1.34 CPW proposes a levy amounting so around \$250,000 per year (inflation adjusted) will be put into a trust fund to be used for environmental education and enhancement. This money will not be used to provide the mitigation measures that are required by way of conditions, nor will it be used to implement the On-Farm Protocol. It is intended that this fund will be used for additional environmental enhancement. Given that the fund is not for mitigation of adverse effects it can be regarded as being a benefit deriving from the scheme. We think that such a fund is appropriate. It is probably not something which we could have required as a matter of condition but since it has been offered by CPW it can be incorporated into conditions.

1.35 In **Minute 11** we expressed some reservations as to the adequacy of the enhancement fund. We doubt that we have the power to require a fund at all, let alone to require an increase in the levy. We note however that this is a community scheme set up initially by the City and District Council and run by a trust which has environmental enhancement as one of its objectives. While the scheme will result in some benefits, which we have outlined above, its overall environmental effects will be negative. Accordingly, the main way that the Trust's objective of environmental enhancement can be achieved is via the fund.

1.36 We remain of the view that the proposed levy is low given the increases in profits which CPW predicts its shareholders will make. It must also be remembered that currently there is no charge for taking water from the rivers even though that water

clearly has a very significant value to farmers. It also has value when left in the rivers. In this context we **recommend** that CPW revisit the size of the levy before it commences taking water. We have also suggested that it makes the levy inflation adjusted and that it seed the fund with an initial \$300,000 before the first irrigation commences.

1.37 We also have some reservations about the means of administering the fund. As discussed in **Minute 15**, it seems to us that there would be some merit in a separate trust or committee being set up to administer the fund and that appropriately qualified trustees/members be appointed. The role of Central Plains Water Trust (CPWT) in terms of its primary objective of providing water for irrigation, appears to be in conflict with its administration of the fund. Furthermore, at the present time the trustees of CPWT are dominated by farming rather than environmental interests. We have **recommended** that CPWT and the two settler councils further consider this suggestion.

1.38 Notwithstanding these qualifications, we accept that the fund can be regarded as a reasonably significant benefit which will result from the scheme if it proceeds.

2. POTENTIAL ADVERSE EFFECTS FROM THE SCHEME

Adverse economic effects

2.1 Potential adverse economic impacts vary from area to area, but can be categorised as follows:

- Those shareholders affected by the headrace whose long-term loss of land to the scheme and farming disruption is such that it outweighs any benefits from irrigating the balance of their properties, for example the Bull, Judd, and Austin families, unless compensation makes up for such loss.
- Non-shareholders who lose land to the scheme unless the compensation exceeds the loss.

- Those whose tourist businesses and goodwill may be adversely affected by disruption caused during the construction period, for example the business of Ms. de Jong and two landowners along the base of the Homebush Ridge.
- Those who experience raised groundwater levels and/or surface drainage difficulties in areas where groundwater levels are already near the surface.
- Those whose water supplies may be affected by increased nitrate levels, or whose on-site effluent treatment systems may be compromised.
- Gravel extractors if they are affected by groundwater mounding.
- The Christchurch International Airport if it is adversely affected by increased bird strike and/or increased fog (both of which we think are unlikely).

2.2 There are also other potential adverse effects such as effects on landscape, heritage, and ecological values upon which one could potentially place an economic value.

2.3 It is also appropriate that positive economic and social effects can be taken into account. Those parties who may benefit from the scheme include:

- The 300 CPW shareholders.
- Those who indirectly benefit in the region as a whole from increased farmer income, in areas such as services and retail.
- Those who may gain employment directly in expanded agricultural production, or in downstream processing industries.
- Those who will temporarily benefit from employment or income derived from construction activity.

2.4 We have discussed the economic benefits of the scheme above. We have addressed the adverse economic impacts on landowners and nearby residents in

Part 3 of this decision. So far as adverse effects on land owners affected by the headrace or distribution races are concerned, we have concluded that those effects will be adequately addressed by the compensation package offered by CPW or compensation under the Public Works Act 1981. Residual issues such as loss of farming income can be addressed by way of negotiation, or if needs be litigation. Overall, we have concluded that economic benefits will far outweigh economic dis-benefits.

Social impacts

2.5 We have accepted that there will be social benefits deriving from the economic benefits which the scheme will bring. We also accept that the scheme will have some adverse social impacts. In particular:

- Detraction from the *wellbeing* of landowners and occupiers affected by the headrace in particular and less so the distribution network, particularly those who oppose the imposition on their land.
- Disruption from construction works.
- Detraction from amenity.
- Some (very limited) detraction from recreational amenity of the Waimakariri River.
- Claimed social inequity.

2.6 We also heard concerns relating to the social impact of increased dairying. We have decided that this is not a matter for us. Dairy conversions and farming generally are permitted activities under both regional and district plans.

2.7 In terms of 'social equity' Mr Taylor (paragraph 87) stated that:

"Those who stand to be significantly negatively affected will not necessarily be the same people who are likely to benefit directly from having improved access to irrigation water. The issue of the social equity of the scheme seems

especially to be foremost in the minds of those who stand to suffer negative impacts on their material well-being and livelihoods, quality of the physical living environment, and health and well-being, and among those who are concerned about the effects on local communities and their development".

- 2.8** Another factor raised in Mr Taylor's report was that the CPW scheme promoted divisions in the community. The withdrawal of the dam and reservoir and upper intake component of the proposed scheme significantly reduced, but did not eliminate, this issue. Controversy was exacerbated by the perceived powers that CPW as a private entity was seeking to exercise, notably the right of compulsory acquisition of private property. In contrast, a number of farming witnesses drew attention to the greater personal and financial security from the risk of drought that the proposed scheme would provide. Conversely, a number of farmers close to Lake Ellesmere were concerned that already high water tables in that area could rise further as the result of mounding, albeit delayed perhaps by 1 to 2 years.
- 2.9** We heard from Mr Charles Taylor for CPW, Ms. Diane Buchan for the Selwyn District Council and Dr. Alastair Humphrey for the Canterbury District Health Board (CDHB) in respect to social impacts. We also heard from Mr Jeffrey Canham on behalf of Fish and Game and the Department of Conservation, whose evidence addressed the social significance of recreation activities, particularly those related to the Waimakariri River. The significance of the Waimakariri River played an important part in our decision with respect to our determination of the flow regime.
- 2.10** Mr Taylor and Mr Macfarlane suggested that experience from other irrigation schemes in North Otago and in the Amuri basin showed that many "traditional" farmers would retire from the business (particularly sheep farmers) and that they would be replaced by younger farmers. In his opinion changing farming patterns were benefiting rural communities in the command area, and cited the example of Hororata village (his paragraph 151) which had lost population for some years, and was now seeing a reversal in its fortunes.
- 2.11** We were made aware that there had been some influx of overseas workers into the dairy industry in Canterbury, but it was uncertain in the absence of objective evidence whether the effects of CPW would substantially alter population growth in the command area, given already rapid residential growth in Selwyn District. There

has already been significant land-use intensification in the command area. Irrigation has the potential to bring about further social change within the command area, and to a lesser extent beyond. Quantifying the extent of this change is difficult, and overall effects are likely to be spread over the region as a whole. Overall however, we consider that diversification and strengthening of the rural economic base is likely to be positive for existing and future employment.

2.12 It was apparent throughout the hearing that the scheme had polarised opinion between 'plains' farming interests on one hand, and conservation/recreational interests on the other and to a certain extent between town and country. Some farmers whose land was adversely affected by the headrace canal found themselves as 'allies' of conservation/recreational interests opposed to the scheme. We were left with an impression that some scheme proponents saw rivers flowing to the sea as a 'wasted' resource and recreation as a luxury having little importance compared to production and economic growth, while some submitters did not appear to have an appreciation of the uncertainty and stress of farming in the absence of reliable water. However there was a reasonable level of acceptance that irrigation within the command area would be beneficial.

2.13 One of the strongest themes arising through submissions came from directly affected parties concerned about uncertainties and lack of detail associated with the effects of the headrace canal on their properties. There was widespread dissatisfaction with the consultation process undertaken by CPW and its response that details would be clarified after the designation was confirmed and through management plans. This resulted in a feeling that their lives were 'on hold' and it was not possible to make investment or personal decisions in such a context. There was also a feeling by some that if they simply relied on the good faith of CPW they would be in a very weak negotiating position once the designation was confirmed.

2.14 Many major designations have resulted in people's lives being placed "in limbo". While financial losses can be addressed through compensation, this cannot compensate for feelings of attachment to land, or to remove ongoing uncertainties and associated stress while attending meetings, finding out what is happening, or obtaining professional and legal advice. Although this is a factor that cannot be entirely mitigated, we have concluded that there is a need to require CPW to submit

outline plans within a specified time frame, in order to provide greater certainty for affected parties.

- 2.15** A more fundamental attack on the social, economic and health effects of the scheme was presented by Dr Humphrey for the District Health Board, both in respect to the original proposal and the modified scheme. In paragraph 43 of his evidence to the October 2009 hearing, Dr Humphrey stated:

"The CPW scheme is inherently inequitable, as it vests control of much of Canterbury's drinking water in the hands of a little over 300 investors. These investors stand to derive the most benefit from the scheme, while the employment opportunities conferred by the scheme are likely to be limited to people migrating to Canterbury from elsewhere in New Zealand or overseas".

- 2.16** He added that a more equitable approach was proposed through the Draft Canterbury Water Management Strategy, in which representatives of the District Health Board were participants. As indicated in **Minute 11**, we held considerable reservations about the nature of this 'evidence'. The 'Social Impact Assessment' he cited appeared to be a statement of advocacy opposing CPW rather than an objective assessment of social impacts and had little expert input.

- 2.17** While we accept that there is a correlation between deprivation and social inequality, there was no evidence that this particular scheme (as distinguished from others) would have this result. We found his opinion that job creation would simply benefit people from out of the region or 'immigrants', to be unrealistic and rather unfortunate. Further, our understanding was the Canterbury Water Management Strategy clearly anticipates further irrigation (as has happened throughout other parts of Canterbury) and we note that both land use intensification and irrigation are anticipated under the district plan.

- 2.18** Dr Humphrey insisted that further land intensification would inevitably increase the health risk to the wider community downstream of the scheme with associated social consequences. We have concluded that with conditions any increase in risk will be very small.

2.19 We also consider that CPW will be obligated, at least to the extent that monitoring reveals future issues relating to water supply and groundwater levels, to mitigate the effects of increased irrigation. These would require additional drainage works and providing alternative water supply in the event of increases in nitrate levels.

2.20 Our overall conclusion in relation to the social impacts of the scheme is that until constructed the scheme has and will continue to have adverse social impacts. After it has been constructed we consider that the scheme is likely to have positive social impacts in the medium to long term and is unlikely to have long lasting significant adverse social impacts.

The effect of the scheme on the relationship of Maori to their taonga

2.21 Ms Dyanna Jolly on behalf of CPW, Mr David O'Connell of Te Runanga o Ngai Tahu, Mr Paul White on behalf of Ngai Tahu, and Te Porohau Ruka Te Korako presented evidence on the potential cultural effects of the CPW scheme on Tangata Whenua. The primary concern was the potential effects on lowland streams and particularly on Te Waihora.

2.22 Ms Jolly began by saying that she was not providing expert evidence on Ngai Tahu cultural values, but rather "*the processes used to facilitate meaningful and effective participation of the iwi in impact assessment*" (paragraph 4). The preparation of the (CIA) in consultation with the Runanga revealed the following areas of concern (relating to the modified proposal):

- Concerns about the large-scale abstraction proposed from the Waimakariri, and the inadequacies of the Waimakariri River Regional Plan (WRRP) in protecting its values.
- The mixing of waters, particularly in terms of discharges to surface water bodies.
- Effects on archaeological sites and natural diversity affected by the headrace.
- Potential adverse effects of further land use intensification, with particular emphasis on lowland streams and Te Waihora.

- The possible need for additional lake openings, raised groundwater levels, and the impact of by-wash releases.
- Enhanced nitrate levels.

2.23 Following the preparation of a Cultural Impact Assessment (CIA) on behalf of Ngai Tahu, she said four hui were held between 6 March and 28 July 2006. She said this resulted in a number of outcomes including recommendations, some accepted by CPW, others not (e.g. the proposed take regime for the Waimakariri River) and other matters requiring further investigation/information (e.g. archaeological sites). There were also unresolved issues such as the unknown effects on Te Waihora.

2.24 According to Ms. Jolly, funding for her role ceased after the fourth hui. Her conclusions as to the success of the process were rather qualified and noncommittal, and she concluded by saying that *"only Ngai Tahu can offer conclusions with respect to the extent to which cultural issues were resolved"*.

2.25 Mr O'Connell stated that he was an active member of Te Taumutu Runanga, being of Ngai te Ruahikihiki descent. His evidence set out the background after the importance of Te Waihora to Ngai Tahu, and its traditional significance as a source of mahinga kai.

"Ko nga hau ki etahi waahi,ko nga kai ki Orariki"

"No matter from which way the wind blows, one can procure food at Te Waihora"

2.26 He reiterated the key points of concern expressed by Ngai Tahu as described above. Of particular concern was the deterioration in the quality of Te Waihora over the last 130 years as a result of farming activity, and Mr O'Connell cited comments made by the Environment Court in *Lynton Dairies Ltd v Canterbury Regional Council (C108/05)*. The significance of the lake was emphasised by its vesting by fee simple title in Ngai Tahu in 1998. His key point was Ngai Tahu's concern was that the CPW scheme would compound the already adverse impacts of dairying on water quality in the lake.

2.27 He considered that from 2006 there had been little meaningful attempt by CPW to address the concerns of Ngai Tahu, or to have regard to their own planning initiatives such as the Te Taumutu Natural Resources Plan (2002) and the Te Waihora Joint Management Plan (2005). His conclusion was (paragraph 41):

"I am forced to conclude that the consultation process, despite its initial potential, ended up being largely unsuccessful".

2.28 Te Porohau Ruka Te Korako, introduced himself as "the Tohanga Ahureikona of Waitaha (servant of the nation of Waitaha) and resident of Whitecliffs. From what we were able to ascertain, he was strongly opposed to interference with water resources generally. He described the abuse of land and water resources through European farming practices, particularly those associated with recent conversions to dairying. He was of the view that the scheme was being imposed by outsiders on the Waitaha people as well as the long-standing members of the local farming community, and represented a dangerous interference with the processes of nature.

2.29 Mr White said that Ngai Tahu consider that all natural resources had to be considered holistically, not separately. He said the preservation of the *mauri* of natural resources was paramount to Ngai Tahu, and was consistent with the outcomes sought by the RMA. He said:

"For Ngai Tahu, mauri is the life force that comes from wairua - the spirit, or source of existence and all life. Mauri is the life force in the physical world".

2.30 The modified scheme proposed by CPW did not allay the concerns expressed by Ngai Tahu, who were convinced that the scheme would exacerbate water quality issues within Te Waihora, and accordingly impede the ability of the iwi to restore the lake. The hearing raised difficult issues with respect to values fundamental to Ngai Tahu, and the *mauri* of Te Waihora and the affected waterways, particularly the Waimakariri. We acknowledge that the CPW project will not have a beneficial effect on Te Waihora, but we are satisfied that with the mitigation and land management measures proposed it should not adversely affect qualities of the lake. We consider, however, that regardless of the CPW scheme, there is a pressing need for action (including possible regulatory measures) to be taken on the management of existing land use practices in the environs of the lake.

2.31 There was criticism of the lack of investigation undertaken by CPW of the effects of the scheme on archaeological sites. Our conclusion in respect to this issue is that more detailed investigations are required only in locations where, based on previous findings, there is a greater likelihood of archaeological sites being discovered - for example, along the base of the Homebush Ridge. However, as identified in our comments on heritage matters generally, we did not consider that a full detailed archaeological survey was justified along the hundreds of kilometres of route traversed by the headrace canal or the distribution races, where these crossed terrain typical of the Canterbury Plains.

2.32 With respect to the issue of 'mixing of waters', this matter was not entirely resolved through the hearing. Unlike the much older RDR scheme however, the CPW proposal does not involve taking water from one river and transporting it to another. Neither does it involve taking water from the Rakaia or Waimakariri Rivers and discharging it directly to waterways entering Te Waihora. Irrigation water would enter indirectly through wetlands or groundwater. However it could directly enter these waters in the event of an emergency discharge. Although the matter was not entirely clarified, our tentative conclusion is that this scheme does not involve a mixing of waters except to the restricted extent set out above.

2.33 We are not in a position to judge the impact of the limited mixing which may occur, on the relation of Maori to water. We have concluded however that this is not a matter which would warrant declining consent for the scheme.

2.34 We have recognised the relationship of Maori to the waters, land and other taonga which will be affected by the scheme. We have provided for that relationship by way of conditions to the extent that this is practicable. We are hopeful that Ngai Tahu's representation on the Trust and on the Drainage Committee will recognise its status as kaitiaki. The scheme is not contrary to the principles of the Treaty of Waitangi.

3. CONCLUSION IN RELATION TO SOCIAL, ECONOMIC AND CULTURAL IMPACTS

3.1 We have concluded that the overall economic and social effects of the scheme will be positive. There will however be adverse social impacts on some directly

affected people. We deal with these in more detail in **Part 4**. We have concluded that these effects are not such as to justify rejection of the scheme.

3.2 To a large extent the effects on individual land owners are for processes beyond the Resource Management Act. We have done our best to address residual effects on "well being" and amenity through conditions. However we acknowledge that in some cases effects on people and properties will still be significant.

3.3 We have concluded that the scheme will not compromise the relationship of Maori to the land or water, has regard to kaitiātanga and is not contrary to the principles of the Treaty of Waitangi.

Independent Commissioners 28 May 2010



Philip Milne (chair)



Bob Nixon



Andrew Fenemor



Ray O'Callaghan

IN THE MATTER OF the Resource Management Act 1991

IN THE MATTER OF applications by Central Plains Water Trust to:

Canterbury Regional Council for resource consents to take and use water from the Waimakariri and Rakaia Rivers for the Central Plains Water Enhancement Scheme and for associated consents required for the construction and operation of the Central Plains Water Enhancement Scheme

AND

IN THE MATTER OF applications by Central Plains Water Trust to:

Selwyn District Council for resource consents to construct and operate the Central Plains Water Enhancement Scheme

AND

IN THE MATTER OF a Notice of Requirement by Central Plains Water Limited to:

Selwyn District Council for the designation of land for works associated with the construction and operation of the Central Plains Water Enhancement Scheme

**Joint decision and recommendation of Independent
Commissioners
28 May 2010**

PART 4

**The Intakes and Headraces and Associated Notice of Requirement and
Consent Applications**

GUIDE TO DECISION DOCUMENTS

- PART 1** – Introduction, Part II RMA, assessments, objectives and policy summary, conclusions, decisions and recommendations
- PART 2** – Disputed conditions
- PART 3** – Beneficial, economic, social and cultural effects of the scheme
- PART 4** – Intakes and headraces
- PART 5** – Distribution network
- PART 6** – Waimakariri and Rakaia takes
- PART 7** – Use of water
- PART 8** – Objectives and policies
- PART 9** – Regional Council consents and conditions
- PART 10** – Selwyn District Council consents and conditions
- PART 11** – Recommendations to Central Plains Irrigation Limited in respect of Notice of Requirement and Conditions
- PART 12** – List of hearing dates and appearances

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1. INTRODUCTION

Scope of this part of the decision/recommendation

- 1.1 We have already set out our preliminary conclusions in relation to this part of the scheme within **Minute 11** and there will be some overlap between that Minute and the present discussion. There will also be some matters in **Minute 11** which are relevant to this decision but which we need not repeat here.
- 1.2 The description and assessment of the intake and headrace systems set out below are based on proposed works to be undertaken between the Lower Waimakariri Gorge and the Rakaia River. The discussion does not include the Upper Waimakariri intake since CPW has now abandoned that proposal. This section of this report primarily relates to our *recommendations* in relation to the Notice of Requirement (NoR). However it also relates to our *decision* in respect of various associated resource consents required from the Regional Council for river bed works, earthworks, and sediment discharge.
- 1.3 As set out on **Minute 11** we are recommending that the Notice of Requirement for a Designation be confirmed with the recommended condition set out in **Part 11** and that the associated resource consents be granted. We have set out our assessment against Part 2 of the RMA and in relation to objectives and policies in **Part 1** of our decision/recommendation. We have also discussed the assessment criteria under section 171 of the RMA in relation to the Notice of Requirement in **Part 1**. The following discussion is the more detailed assessment of effects which sits behind those conclusions.
- 1.4 While we have concerns about the width of the corridor, we have concluded that this concern can be addressed by CPW if the project proceeds. We have recommended a condition requiring the designation to be narrowed as soon as is practicable. We understand that CPW accepts this condition.

Description of works associated with the Notice of Requirement

- 1.5 Our assessment begins with an overview of the environmental effects of this part of the scheme, followed by an assessment of the three distinct physical components of the headrace system from north to south, these being as follows:

- The Waimakariri Intake, associated works in the bed of the river and on the banks plus the terrace (escarpment) canal;
- The Plains section of the headrace between the top of the terrace at the Waimakariri River and the top of the terrace at the Rakaia River; and
- The Rakaia Intake and associated works in the bed of the river and on the banks plus the terrace (escarpment) canal.

1.6 The proposed Waimakariri Intake is at the Lower Waimakariri Gorge on the south side of the river just upstream of the Waimakariri Gorge Bridge and the existing stock race intake at a rock bluff feature known as ‘the Pinnacles’. There would be a submerged control inlet structure approximately 25m long at the foot of the bluff that would direct the flow into a rock tunnel approximately 500m long leading to the river flats on the downstream side of the bridge.

1.7 From the end of the tunnel an open race is proposed across the river bank flat, to a settlement pond and fish diversion channel. Downstream of the pond there would be a control structure leading to what we have termed the terrace canal. This canal would then make its way along the river terrace to eventually arrive at the top of the escarpment. The terrace canal would generally follow the same route as the existing stock race channel which CPW propose would be incorporated into the new canal. It arrives at the top of the escarpment on the Bull property.

1.8 The route of the headrace from north to south would follow the 235m contour from the Bull property at the top of the Waimakariri River escarpment across the Canterbury Plains to the foot of the Homebush Ridge, and then along the lower slopes of that ridge and across the Selwyn River adjacent to the township of Coalgate. The headrace then proceeds along the base of the Harper Hills and across the plains through the Te Pirita area, where it follows an escarpment to the other intake point on the Rakaia River.

1.9 As summarised in Mr Lewthwaite’s evidence, the segments of the terrace and headrace canal can be summarised as follows:

- Waimakariri terrace canal from intake to top of terrace (Waimakariri Terrace canal) -9km;

- Top of Waimakariri terrace across the plains to Homebush Ridge -10km;
- Route along the base of Homebush Ridge to Coalgate -5km;
- From Coalgate along base of Harper Hills -12km;
- From Harper Hills across the plains to top of Rakaia Terrace -11km;

(these four segments comprise the 'Plains' section of the headrace)

- Top of Rakaia Terrace to Rakaia intake -15km (Rakaia Terrace canal).

1.10 In summary, the total length of the proposed canal is approximately 62km, of which approximately 38 km is the headrace located on the Canterbury Plains.

1.11 As noted previously, the proposed canal has been designed to follow as closely as possible the 235m contour across the upper plains and the base of the foothills. However, in order to reduce significant earthworks, or to avoid dwellings and other sensitive locations, the proposed canal will be located above or below this contour at a number of locations. This will either require the canal to be sunk below ground level where it is above the contour, or elevated on an embankment where it is below the contour.

1.12 The intake locations will include diversion channels from the mainstem of each river, involving river training works and gravel removal as required within the designated area of the river bed, which extends to the mid point of each river. Below each diversion channel will be an intake structure, an overflow spillway, a sediment trap (similar in character to a small lake), flow control gates, a fish screen and fish diversion race back to the river. Apart from the diversion channels which will to some extent have to be mobile in accordance with changing river conditions, the other structures will be located along the banks of the rivers and protected by additional flood protection works. The engineering aspects of these features are described and assessed in detail elsewhere in this part of our decision.

1.13 The headrace canal has dimensions as follows:

- Flow capacity of 40 m³/second;

- Base width 5 m;
- Canal water surface width 30 m;
- Freeboard of 1 m;
- Depth 5 m;
- Total width including embankments 50 - 60m; and
- Designation width 100 to 120m.

1.14 These dimensions will vary considerably according to topography and location. For example where the canal climbs the escarpment along the Waimakariri and Rakaia Rivers, the designation width can range from 120 to 380m, and will necessitate substantial earthworks. Other significant features of the headrace route are described below, as these have a direct bearing on the effects of the proposed scheme on affected landowners, and the submissions received on the NoR.

Potential effects of the proposed intakes and headrace

1.15 So far as the works currently being discussed are concerned, the major issues raised in submissions were as follows:

- The impacts of the construction and maintenance works in the river beds;
- Issues associated with sediment flushing;
- Issues associated with fish loss and the design of fish screens;
- Possible adverse impacts of the sediment pond and inlet canal, the intake and the lower part of the terrace canal on the Canterbury Regional Council's Waimakariri River protection works;
- The adverse visual impacts of earthworks on the Waimakariri River escarpment;
- The loss of indigenous wetland and other vegetation at the Waimakariri River intake site and along the route of the canal between this point at the top of the terrace;

- Loss of land and/or severance of farms caused by the headrace canal dividing properties and disrupting farming operations (e.g., the Bull and Westacre farms properties among others);
- The effect of the northern component of the Plains headrace on the historic Oaks property (Ms de Jong);
- The scale of earthworks and their impact on the Homebush Ridge properties with regard to heritage, trees, amenity, landscape, archaeological sites and tourism values;
- Impacts on the heritage values of Homebush;
- The visual impact of the headrace canal on the landscape of the Canterbury Plains, especially where the canal is elevated on an embankment, as would be the case at Coalgate;
- Adverse visual impacts of the proposed works on the escarpment of the Rakaia River terraces;
- Potential damage or loss of indigenous vegetation and archaeological sites associated with the earthworks on the Rakaia escarpment, especially such as the 'Old Curiosity Shop' and other vegetation;
- Loss of the house on Ms McKenzie's property and impacts on her ability to sell the property;
- Uncertainty in respect to the detailed impacts on particular properties, and associated lack of certainty with future planning and farm management;
- Possible severance of access by anglers to the rivers, particularly to the north bank of the Rakaia River;
- Nuisance effects of dust and noise associated with construction;
- Concerns regarding safety of the canal in relation to access by children;
and

- Traffic and access impacts during construction.

1.16 We will focus the discussion below on the most significant potential impacts rather than discussing each matter in any great detail. We again note that we do not need to be satisfied that the effects of the proposal are “*no more than minor*” or “*not significant*”, but rather that the overall project is *sustainable* and adverse effects are adequately *avoided, remedied or mitigated*.

Consultation in relation to the headrace and the use of the Notice of Requirement and Public Works Act processes

1.17 As a preliminary matter we discuss some issues which are of peripheral relevance but which generated much heat. There was considerable criticism of the fact that the then Minister for the Environment, approved CPWL as a requiring authority. There was also a concern that this provides CPWL with powers under the Public Works Act to compulsorily acquire land.

1.18 Neither of these are matters for us. We observe however that the Notice of Requirement/Designation process is intended to deal with both public and private infrastructure and in particular linear project such as this, which encompass many properties. One of the purposes of a NoR and if confirmed a designation is to reflect the proposed infrastructure within the District Plan. We are satisfied that a designation is “reasonably necessary” and indeed the most appropriate method of authorising this part of the scheme. Similarly as discussed below, access to the Public Works Act is the norm for large infrastructure projects such as this.

1.19 There was criticism from some of the submitters (for example Malvern Hills Protection Society) regarding the adequacy of CPW’s consultation on the headrace route and other components. There was also a concern that the Notice of Requirement for the headrace is quite wide in some places and that fact that the final location of the headrace within the corridor has not been finalised. We come back to this issue later in this section.

1.20 It is not our role to assess the adequacy of consultation. We do however note that the number of affected landowners who are totally opposed to the headrace is relatively low, as set out below. Many of the affected landowners are

shareholders in the scheme and the majority have either not submitted or have not submitted in total opposition to the headrace.

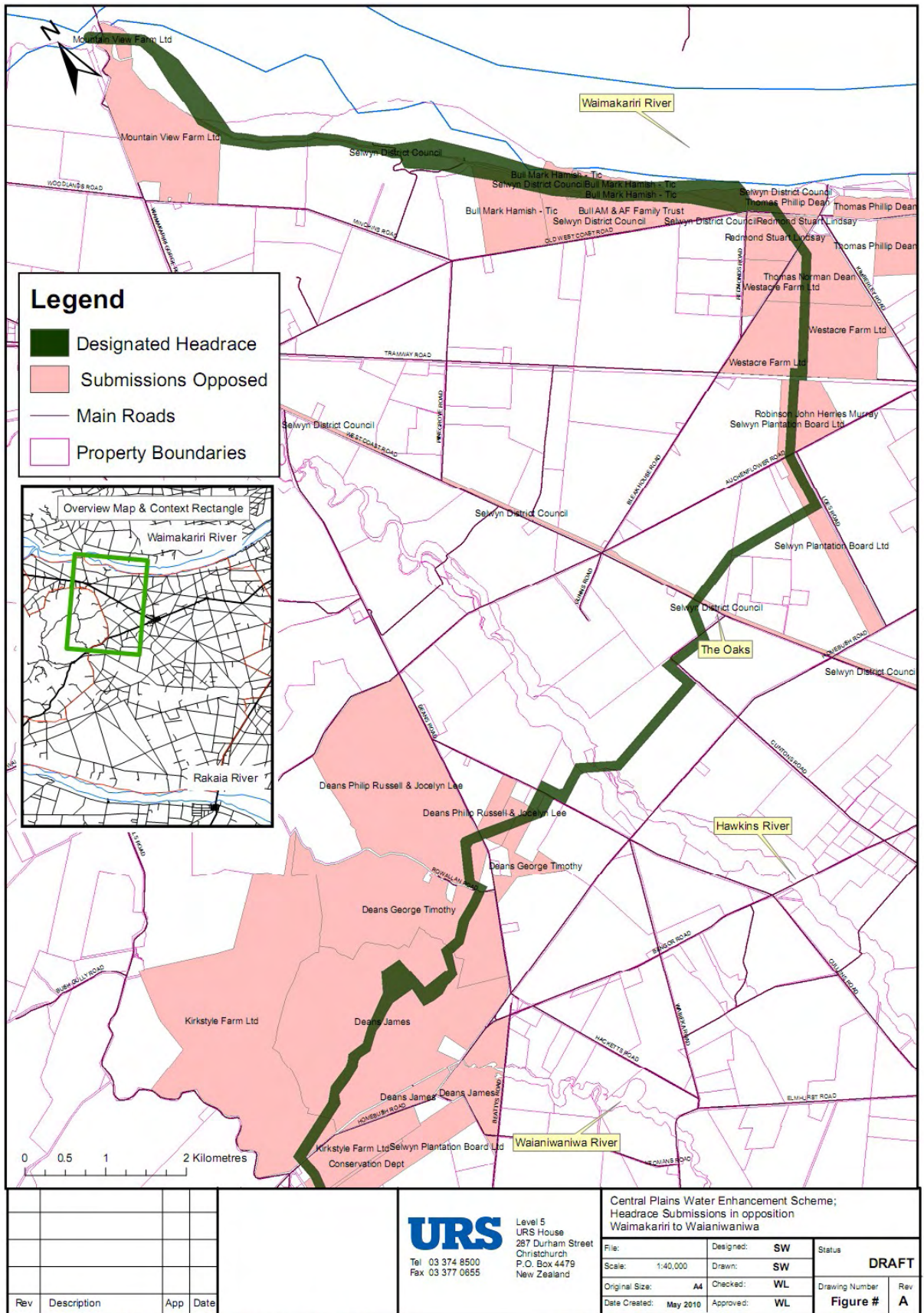
- 1.21** The general level of opposition or support is not relevant to our decision making, but the concerns of affected landowners clearly are within our ambit. As discussed in our **Minute 11**, although the Public Works Act and compensation will address direct economic impacts, we must still consider other impacts on landowners, including social impacts, disruption to farming operations, aesthetic impacts etc.
- 1.22** Evidence from the applicant in relation to ‘consultation’, was that the detailed alignment of the selected route, at least in part, reflected the results of a number of discussions with various landowners, and had been designed to minimise disruption to those parties. The applicant detailed the process of discussions with affected landowners and nearby residents. While there was some criticism of this process from submitters, we do not think that it is necessary for us to assess the adequacy of consultation except so far as that is relevant to considering the adequacy of consideration of alternatives.
- 1.23** So far as the latter is concerned and as set out in Part 1 of this decision, we have concluded that CPW has adequately considered alternative routes, including within individual properties. We accept that this process is not yet finalised but do not consider that to be inappropriate. There is room for further one on one consultation with individual land owners between now and when the route within the corridor is finalised as required by the recommended condition.
- 1.24** We are also conscious that whilst there are inevitably some upset landowners, there are also a great many of the affected landowners who have not submitted in opposition, or who chose not to appear at the hearing. There were also some landowners who supported the scheme but sought adjustments to the details of the headrace rather than the withdrawal of the Notice of Requirement.
- 1.25** It was apparent that a number of parties supported the scheme, but on the basis that there should be no interference with their private property rights. In other words they suggested that the project should only proceed on each property, if the landowner agreed that headraces or other infrastructure could be located on their property. We do not think that this is a realistic approach.

1.26 We also observe that whether it is CPW or any other major scheme (such as one relying on Lake Coleridge water for example) the scheme would inevitably require a headrace and distribution system passing across private land. Whether or not this project were constructed by a private organisation approved as a Requiring Authority (such as CPW) or the Crown (as was the case with the RDR project in the 1940s) the engineering realities of implementing a large irrigation scheme will inevitably result in loss of land for the construction of canals and/or land severance. Furthermore, some form of compulsory acquisition is required as a back up to negotiated settlements, in order for a large project such as this to be feasible.

Properties and people directly affected by the terrace canals and headrace.

1.27 A feature of this headrace scheme is its effects on a large number of properties over a wide area and over a considerable distance. Given CPW's Requiring Authority status, it can potentially resort to the Public Works Act to acquire the necessary interests in land associated with the headrace and terrace canals. This part of our assessment considers the effects which potentially go beyond individual landowner compensation issues under the Public Works Act, or those which can not readily be addressed through negotiation. **Figure 1, Figure 2, and Figure 3** below show properties along the line of the headrace which are the subject of submissions in opposition, or other properties mentioned in the text of this part of the decision.

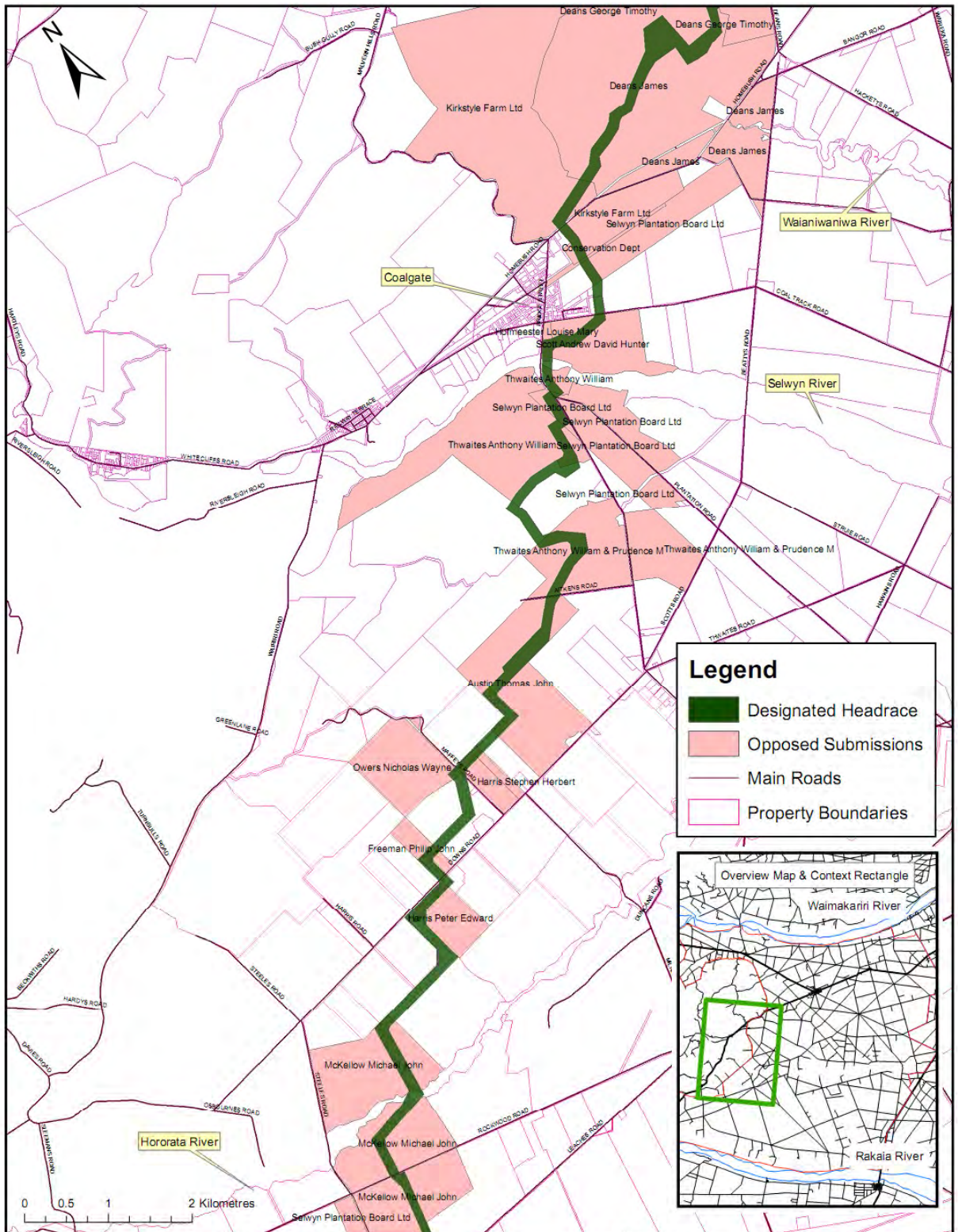
Figure 1



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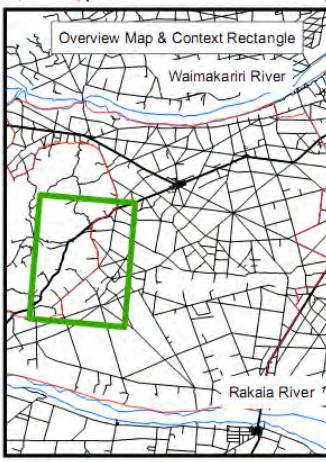
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Figure 2



Legend

- Designated Headrace
- Opposed Submissions
- Main Roads
- Property Boundaries



Rev	Description	App	Date

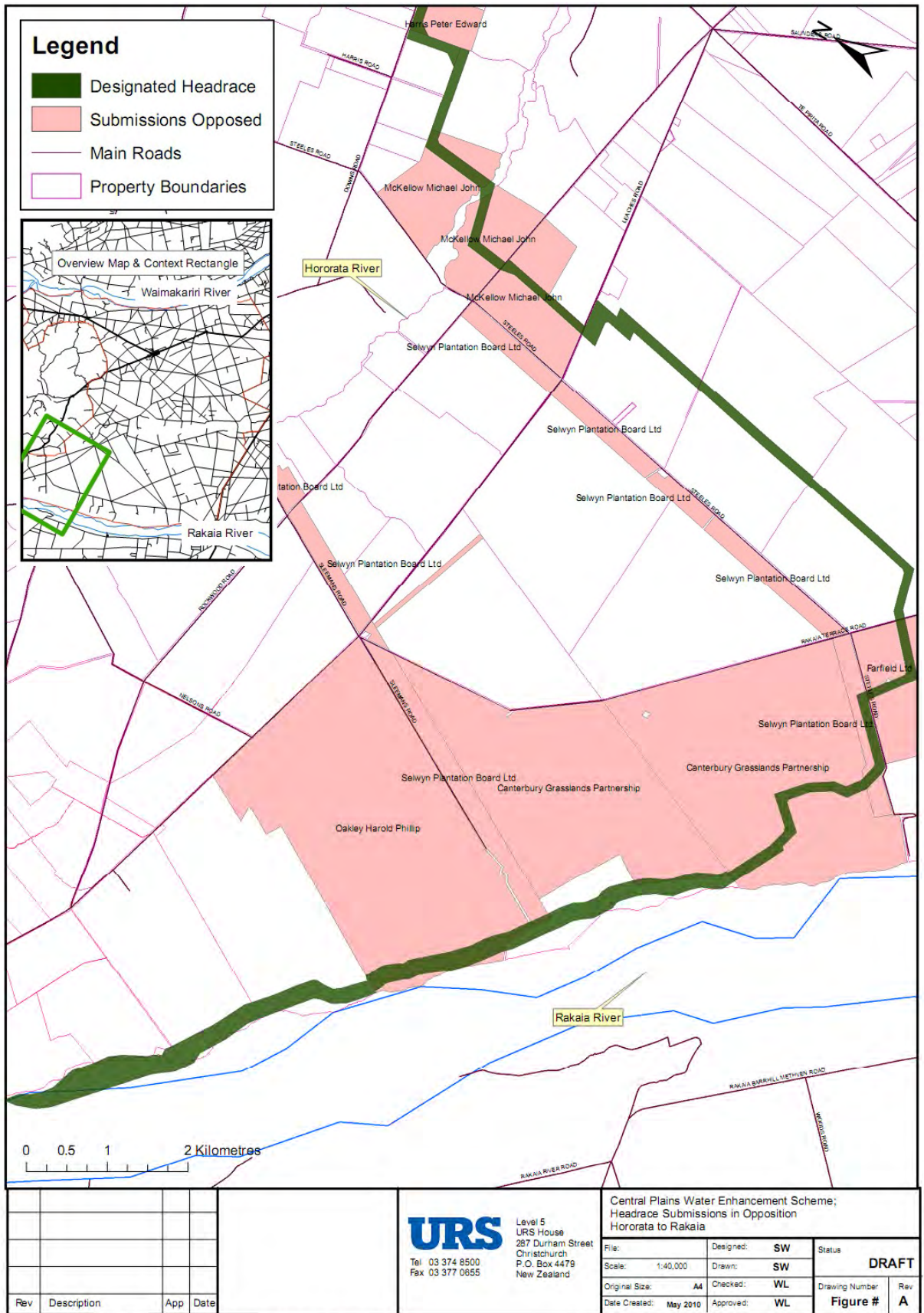
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 URS House
 287 Durham Street
 Christchurch
 P.O. Box 4479
 New Zealand
 Tel 03 374 8500
 Fax 03 377 0655

Central Plains Water Enhancement Scheme; Headrace Submissions in Opposition Waiariwaniwa to Hororata			
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Figure 3



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- 1.28** Given the engineering implications associated with the need for the headrace to follow a contour, it is inevitable that some landowners will be disadvantaged under the NoR. In the absence of totally redesigning the headrace route and lodging a new NoR, there are only small adjustments which can be made to the route.
- 1.29** In this context the scheme is not dissimilar to a road or transmission line which traverses private land against the landowner's wish. The only real difference is that such infrastructure is usually publically owned but we do not think that much turns on that. Both the designation and the Public Works Act powers are available to private network utility operators such as a lines company or in this case CPWL.
- 1.30** The effects on individual submitters and property owners are addressed in detail below in our assessment relating to each of the three sections of the proposed headrace canal. Most of these parties are landowners on the 'Plains' section of the headrace, which crosses the expanse of farmland between the two rivers.
- 1.31** As best we can tell (with some assistance from Mr Lewthwaite over recent weeks) the headrace between the river terraces traverses 59 private properties. Of these, 26 were submitters in opposition to the scheme. Of these 26, 19 were opposed to the headrace, although some of these were not necessarily opposed to the headrace per se but rather had concerns about details of its route or its engineering. It is not clear whether the remaining 7 were opposed to the headrace on their property or were opposed to the scheme for other reasons. Of particular note is the fact that there are (as best we can tell) 23 private properties who are affected by the Notice of Requirement and who are not shareholders, and 12 of these submitted in opposition. There are also a small number of submitters who supported the Notice of Requirement, but who raised questions about the details of the route or its engineering. There are 15 private landowners whose properties are traversed by the headrace and who did not lodge a submission, that is they expressed neither support nor opposition to the scheme or the headrace.
- 1.32** Approximately 55% of the length of the route is owned or part owned by persons who submitted in opposition to the scheme. Some of these however, such as the Selwyn Plantation Board and the Southern Headrace Farmers Group either

no longer oppose this part of the scheme or the scheme as modified. (We can not vouch for the accuracy of the figures above. Our analysis of the submissions is based on the evidence presented to us in 2008 and a subsequent analysis by Mr Lewthwaite. We also note that the ownership of properties or in some cases the owners views on the scheme may have changed since that time.)

- 1.33** The width of the corridor subject to the NoR has been designed on the basis that it provides a degree of flexibility in terms of the location of the headrace canal pending final design work. In the meantime however, we have to assume, unless we have been advised otherwise, that any adverse effects created by the proposed works could affect any part of the land within the NoR.
- 1.34** CPW has elected to leave the resolution of final location issues including some specific issues raised by landowners, until it is confirmed whether the NoR will be upheld. This is a strategy which although understandable, has subjected the affected landowners to considerable stress and uncertainty.
- 1.35** We did have some reservations as to whether in terms of section 171 of the RMA it was *reasonably necessary* for CPW to leave the NoR corridor as wide as it is. It could be argued that a final detailed design should have been prepared so as to narrow the corridor to only what is needed. That would have provided more certainty to landowners. However on balance we have decided that there is some merit in leaving a degree of flexibility around final design. Indeed that is one of the advantages of the designation process.
- 1.36** Mr Lewthwaite indicated that a process of looking at other alignments had been undertaken prior to the lodgement of the current NoR and we have no reason to believe that this assessment was cursory or inadequate.
- 1.37** During the course of the hearing, there were some suggestions made that the alignment of the contour should be changed from the 235m contour proposed to some lower contour. Even if this were practicable in engineering terms, it would likely disadvantage at least as many (different)landowners as will be disadvantaged by the current proposal. It would also necessitate CPW effectively starting all over with its design and assessment process and relodging the NoR. Another lengthy hearing would be required and another group of landowners would be put into a position of uncertainty.

- 1.38** We can see how some landowners may feel that shifting the headrace to a lower contour would be fairer since it may affect fewer non shareholder land owners. However, we do not have any clear evidence on that point and in any event we do not think that it is a consideration which we should put much weight upon. Our focus is on the environmental effects of the proposal rather than land ownership issues or the degree of support for the proposal.
- 1.39** In the course of the hearing, the possibility of minor realignments to the headrace was discussed, to the extent that this would be practicable within the 235 m contour constraint. In some cases this would require large-scale excavation or embankments. In other cases this could only be achieved by taking a short section of the headrace outside the corridor of the current NoR (the Westacre property was one mentioned in this context). This would require an amendment to the designation under section 181 of the RMA.
- 1.40** We are satisfied that CPW has *adequately considered* minor realignments to reduce effects on land owners and is still in the process of doing so. Of necessity that will involve a weighing of the costs and benefits of changes.
- 1.41** Clearly there are some landowners who have been particularly affected. The Bull property at Glenrowan is a particularly clear example of this. Ms Louise Deans raised similar concerns with respect to Homebush (she being opposed to the headrace being located on the property and her husband being in support). Tim and Gillie Dean's property at Auchenflower will also be impacted significantly by the headrace and as discussed later, there are others who will be affected to some extent.
- 1.42** CPW has given a commitment to pay market value plus 25% for any affected land. It has also indicated that it will, if requested, negotiate to purchase the whole of any directly affected property. Whilst compensation can largely address adverse economic impacts, we accept that adverse social impacts will still occur. Some landowners have had a long attachment to their properties over at least several generations and they will be impacted if they are left with an unwanted facility on their property whether or not that part of the property is acquired or leased to CPWL.
- 1.43** Those who are not shareholders and/or who oppose the route, will be the most affected if their land is "blotted" by the intrusion of an unwanted canal. There

will be effects on the *wellbeing* of people (which is a section 5 matter. We are acutely aware of these issues, having heard opposing submitters and visited some of the affected properties. As discussed in Appendix 1 to our **Minute 10** we do not accept that these effects on well being are beyond our jurisdiction, nor do we accept that they are minor (at least for the people involved).

1.44 We also acknowledge that all of the directly affected landowners have already been impacted by the NoR because of the uncertainty regarding whether the scheme will proceed, uncertainty around the precise location of some components of it, restrictions on what they may do with their properties in the meantime, and in the case of at least one landowner difficulty in selling her property.

1.45 In the case of the dam and reservoir we concluded that the social and amenity impacts were a step (or three) too far. In the case of the headrace we have (albeit with a high degree of sympathy for the landowners concerned) concluded that these social and private amenity effects are not sufficient to defeat this part of the project. Ultimately we have concluded that the benefits of the scheme are sufficient to outweigh the adverse effects on a relatively small number of opposing land owners, particularly given that the economic (but not the wellbeing) impacts on these people can be addressed via the compensation package offered by CPW.

1.46 As discussed in **Minute 14** we understand the concerns regarding the generous width of the NoR corridor. We also accept that this is necessary to allow CPWL some flexibility to make minor adjustments to address engineering or landowner issues. We have however **recommended** to CPW that it finalise the headrace route within 3 years, the reason for this is to provide certainty to land owners and to minimise the extent of "blighted" land.

Mitigation measures proposed

1.47 With a little encouragement from us, CPW has undertaken that it will offer landowners above the (unencumbered) market value for any interest in land which it seeks to acquire. This was set out in a memorandum dated 4 July 2008 in which CPWL undertook to pay a margin of 25% over market value subject to three pre-conditions. Firstly, compensation will not be paid until the designations and consents for the scheme are beyond appeal. Secondly, CPW must have

resolved to proceed with the construction of the scheme, and finally the purchase of the land concerned must proceed outside the compulsory acquisition process (that is the additional compensation will only apply if agreement is reached with the landowner).

1.48 We are of the view that this offer goes a long way towards addressing effects on affected land owners. We do not see this as being a proper matter for conditions. Nevertheless given that CPWL has given a clear and unequivocal commitment, which we have relied upon in making our recommendation to confirm the Requirement, this commitment will be binding on CPWL (the so called *Augier* principle). Counsel for CPWL have confirmed that this is also their view of the matter.

1.49 In addition to the compensation package outlined above, CPW proposes a suite of management plans within an overall '*Environmental Construction Management Plan*' to address particular features of the proposal, and in particular the following constituent plans:

- Hazardous substances management plan
- Noise and vibration management plan
- Dust management plan
- Traffic management plan
- Landscape and rehabilitation management plan
- Remediation action plan
- Weed management plan
- Erosion management plan
- Archaeological management plan

1.50 Minor realignment of the canal within the designation corridor is proposed to minimise disruption to particular farms or features, such as ecological or archaeological sites. This includes those farm properties discussed below.

1.51 We acknowledge at this point the efforts of Mr Lewthwaite and the CPW team to address the concerns raised by landowners at the hearing relating to effects on particular properties. However, given the contour requirement and the sheer scale and complexity of the scheme, it is inevitably impossible to satisfy all landowners. We also note that the process is ongoing. There is still room for

further discussions with landowners and it is in CPW's interests to endeavour to resolve concerns so far as that is practicable.

Effects on ecology

- 1.52** We have dealt with ecological effects for the whole headrace corridor under this section, rather than under the discussion of each of the three sections of the headrace, which follows later in this assessment.
- 1.53** During the course of the hearing, we heard evidence from a number of witnesses on this topic. These included Dr. Craig Bishop for CPW; Dr Colin Meurk for the Royal Forest and Bird Protection Society; Mr Mark Davis for the Selwyn District Council; Dr. Philip Grove for the Canterbury Regional Council; and Associate Professor Angus McIntosh for the Department of Conservation.
- 1.54** In many cases there were debates about how significant particular features were and/or whether or not these were actually threatened by the proposed alignment of the headrace.
- 1.55** By way of background to the 'significance' issue, it was pointed out that most of the vegetation described fell within two ecological districts being "Whitecliffs" and "High Plains". With the abandonment of the dam and reservoir component of the scheme, only a small proportion of the headrace canal is within the Whitecliffs ED, and the great majority is within the High Plains ED.
- 1.56** It was explained to us that these ecological districts are based on a long-standing classification system devised by the former DSIR. It was noted that the proportion of these ecological districts with plant cover of indigenous species was extremely low. Nearly 39% of the length of the headrace is located on the steep escarpments of the Waimakariri and Rakaia Rivers. Because these escarpments are unsuitable for intensive agriculture they contain the majority of the relatively undisturbed indigenous plant communities along the canal route area.
- 1.57** At the risk of oversimplification, Dr Bishop's view on behalf of CPW was that the areas containing indigenous vegetation were already substantially modified; could probably be avoided when later detailed design was known; and were limited in extent and importance. The contrasting view, particularly as expressed

by Dr Meurk, Dr Grove and Dr. Davis was that because these remnants were so rare in the CPW command area, this made their protection even more important. Dr Meurk (paragraph 59) said:

"When one has an abundance of riches it is easy to rank sites, lose some, and not seriously affect the integrity of the natural ecosystems remaining. When one has little, then one can't afford to lose more".

1.58 We asked Dr Bishop and other witnesses to liaise and produce a map of the key sites. This was undertaken (*Bishop/Grove, Meurk and Head (DOC)*) and provided to us in August 2008. The primary sites containing indigenous vegetation, as we understood it from this evidence, are listed below. This is not an exhaustive list of all indigenous remnants, nor does it imply that other possible sites or even individual specimens are necessarily unimportant.

- The 'Pinnacles' and associated vegetation at the Lower Waimakariri intake site. This was described as a highly rated site in the evidence of Mr Davis, who described the presence of prostrate kowhai and other indigenous plants on the gorge walls.
- A wetland area comprising approximately 30 ha on the flats downstream of the Waimakariri intake, of which 2.5 ha would be affected.
- A wetland at the foot of the Waimakariri escarpment downstream from the Gorge Bridge, known as the 'Westwood site'.
- The "Old Curiosity shop" on the Rakaia escarpment. This site does not appear to be affected at all, being above the designation corridor, although it is possible that small outliers of indigenous vegetation at the bottom of the site may be disturbed.
- Remnant sites of indigenous vegetation elsewhere on the Rakaia escarpment. A site 500m southeast of the lime quarry contains patches of Kowhai, Cabbage tree and other indigenous species part of which may be affected by the designation corridor.

- Some indigenous cushion and herbaceous plants within areas of dense broom at the Rakaia intake site would be affected by the diversion and intake works.
- Both the Rakaia and Waimakariri riverbeds are important sites for nesting bird life (however we did not hear any evidence of significant nesting areas within the proposed designation).
- Possible lizard and invertebrate habitat in areas of remnant of indigenous vegetation.
- The ecological values of the Selwyn District Council water race system, such as for mudfish habitat.

1.59 Indigenous species identified on the escarpments include kowhai, kanuka, porcupine scrub, mikimiki, prostrate kowhai, mingimingi, dry plains grasses, cabbage tree, matagouri, tutu, kohuhu, pohuehue, native jasmine, native bindweed, *coprosma crassifolia*, and *clematis quadibracteolata*. Concern was also raised about rare species that *may* be present – eg, *Melicytus flexuosus* or *Juncus Holoschoenus*.

1.60 The relative importance of the escarpments was underlined by the fact that they are one of the few areas on the Canterbury Plains where indigenous vegetation has survived the introduction of commercial agriculture. However we also heard that the Rakaia north bank escarpment was not of such high significance as the south escarpment and terraces affected by the ACWT scheme.

1.61 In the course of his evidence, Dr Bishop suggested that replanting or in some cases relocation of indigenous species, would be a practical proposition. He was of the view that this should be complemented by enhancement of sites containing indigenous plants adjoining the designation corridor – for example through such measures as weed clearance and removal of exotic plants. Dr Meurk was sceptical about the value of replacement planting, and insisted that it needed to be on a 10:1 replacement ratio, an opinion also supported by Dr Grove. He also queried the prospects for successful relocation of indigenous plant species, and cited examples where this technique had failed.

- 1.62** Dr Meurk and other witnesses were also of the view that protection was preferable to compensation, particularly in the context of an ecological district with very little remaining indigenous vegetation. His view was that if compensatory planting were to be considered, it could never, at least initially and in the medium term, create a “like for like” situation for vegetation that was destroyed.
- 1.63** In reply, the evidence for CPW was that a number of these sites would not in fact be destroyed by works associated with headrace construction, as it could avoid the sites concerned, and that at worst only the outer fringes and isolated outliers of significant sites would be impacted. Examples given of these were the Curiosity Shop on the Rakaia escarpment and the Westwood site at the foot of the Waimakariri escarpment. This still left potential risks that "spillover" activities associated with construction could still damage a number of these sites – or damage them more than was anticipated at the time works were planned.
- 1.64** Areas and sites containing indigenous vegetation are not listed for protection in the District Plan, although under Rule 9.21 of the ‘Rural Rules’, there is a somewhat complex ‘interim’ rule (containing various definitions and exceptions) which does require consent for the removal of indigenous vegetation. Notwithstanding the provisions of the District Plan, we must still have regard to any potential adverse effects on sites which have significance. However, we consider that the extent of any ‘total’ destruction of indigenous terrestrial and aquatic ecology in relation to the headrace and terrace canal will be quite limited.
- 1.65** We bear in mind that these sites are currently devoid of any statutory protection. Many of the sites containing significant indigenous vegetation are within a Rural Zone which provides for farming and forestry as a permitted activity, even though these activities can and have destroyed such sites. Within this context, we do not accept that any loss of sites containing indigenous vegetation should be fatal to the scheme.
- 1.66** A criticism levelled at CPW was its proposal for carrying out a full ecological survey only *after* consent had been granted, and a reliance on management plans - this mirrored similar criticisms in respect to matters such as assessment of archaeological sites. We have some reservations as to the level of ecological

investigation which has been carried out by CPW. However, we accept that in the context of a designation for such large proposal and with possible appeals, there is some argument for leaving more detailed investigation until the Outline Plan stage. We also note that we sought and obtained further information as to known areas of significance during the course of the hearing. (see above).

1.67 It does not appear that the sites and vegetation adjacent to the margins of either the Rakaia or Waimakariri Rivers is of comparable value to that along the south bank of the Rakaia River affected by the ACWT scheme. Accordingly, we do not consider that the same level of mitigation is required. Nevertheless, we have recommended a condition that CPWL should provide an adequate level of biodiversity offset, for any loss of significant indigenous vegetation and sites.

1.68 We appreciate the point made by a number of witnesses that the limited extent of remaining indigenous vegetation makes what remains more valuable. The issue we have to consider however, is whether the degree to which such sites are likely to be destroyed or disturbed by the proposed canal, is of such magnitude as to justify a recommendation that the scheme should not proceed. Given that any gravity-based water take from either the Waimakariri or Rakaia Rivers would inevitably involve disturbance to the river terraces we would be effectively placed in the position of concluding that irrigation from these rivers (and the economic and social benefits that it would confer) should not occur take place.

1.69 We consider that the extent and significance of such vegetation in the context of the headrace proposal (in contrast with the dam and reservoir) is not of such a magnitude as to defeat the scheme. We also consider that it would be a step too far to conclude that the removal of isolated individual or scattered specimens would give rise to a conflict with section 6 of the Act or give rise to significant cumulative ecological effects.

1.70 We are satisfied that any areas containing indigenous vegetation adversely affected by the headrace and terrace canals are not of significant extent, and the evidence was that the largest sites, and indeed some of the smaller ones, would not be directly affected except in a peripheral way by the proposed headrace and associated works. We have concluded that any adverse effects of the headrace and terrace canal on terrestrial ecology can be adequately avoided and mitigated through the refinement of the route, and compensatory

planting and restoration such that it will not be contrary to section 6(c) of the RMA or otherwise have significant adverse effects.

- 1.71** We have required an ecological survey of areas of potential significance, and the preparation of a terrestrial ecological management plan to address any adverse effects on sites containing **significant** remnants of indigenous vegetation. We have also required that there be no net loss of indigenous vegetation as a result of any of the scheme works (but not including farm intensification).

Effects on landscape

- 1.72** We received evidence on landscape effects from Mr Chris Glasson for the applicant, Mr Andrew Craig on behalf of the Selwyn District Council, and from Ms Diane Lucas on behalf of the Department of Conservation and the Malvern Hills Protection Society in relation to the dam and reservoir and on behalf of Environment Canterbury (as a submitter) in relation to the Rakaia and lower Waimakariri intakes and associated works.
- 1.73** There was a distinct difference in emphasis between the approaches taken by these three witnesses to the significance of the landscapes affected by the CPW project. While the greater part of their evidence addressed matters relating to the withdrawn proposal for the dam, reservoir and upper intake, there was also evidence presented in respect to the Rakaia and Waimakariri intakes, the terrace canals and the headrace.
- 1.74** Using the Selwyn District Plan as a starting point, we noted that only the upper reaches of the Rakaia and Waimakariri Rivers were identified as outstanding natural features, and similarly only the highest reaches of the Malvern Hills (e.g. the peak known as 'Flagpole' beyond Whitecliffs) and the high country. None of the areas subject to the NoR for the intakes and headrace have been identified as outstanding natural landscapes.
- 1.75** Mr Glasson was of the opinion that the Waimakariri River downstream of the Gorge Bridge, and the downlands landscape affected by the headrace, were "picturesque" but not outstanding landscapes. He emphasised that the environment now existing in this area was the result of ongoing land-use changes that have occurred since settlement, and was now highly modified. He

noted that they were not identified as outstanding landscapes under the District Plan. His evidence was that while features associated with engineering works will have a raw look initially, they would with time become integrated into the environment. He placed considerable emphasis on the efficacy of replanting as a mitigation measure.

- 1.76** Like Mr Glasson, Mr Craig considered that the rural landscape was an evolving one and he thought that some observers would welcome the landscape changes that occur as a result of the scheme. In his view the District Plan anticipated ongoing change to the rural environment, and he noted that the District Plan specifically provided for protection for identified features such as the exotic trees on the Homebush property.
- 1.77** Mr Craig's comments were qualified in his evidence in chief by a concern about the lack of detail apparent with parts of the proposal, and in particular the nature of replacement vegetation. He did not have any major concerns about the landscape impacts of other aspects of the intakes and headrace, although he felt that a relocation of the intake at the Waimakariri Gorge slightly further upstream would be beneficial in landscape terms.
- 1.78** Ms Lucas had a contrasting view, drawing attention to the fact that "naturalness" forms part of a continuum, rather than the landscape being either 'natural' or not. She noted that under the Regional Policy Statement, regionally significant landscapes can be recognised even if not specifically identified in the regional or district plans. She disagreed with Mr Glasson, and considered that the river corridors were an outstanding natural feature. She emphasised the importance of the Rakaia River in particular as an internationally significant example of a braided river.
- 1.79** She considered that both the Rakaia and Waimakariri intake works and terrace canals would compromise outstanding landscapes. Alternatively (if we do not accept that those landscapes are outstanding) she was of the view that the adverse effects on visual amenity and natural character will still be such as to require the scheme to be rejected. She expressed a particular concern regarding the effects of the Waimakariri intake on the Pinnacles area.
- 1.80** Insofar as the headrace was concerned she was of the view that the area in the vicinity of Homebush was a heritage landscape and although not outstanding,

deserved to be protected from inappropriate development in terms of the heritage provision in section 6.

1.81 We do not consider the river corridors and escarpments to be outstanding landscapes, however, we accept that the Waimakariri Gorge bridge area may be regarded as outstanding and accordingly is deserving of protection from *inappropriate development*. However we have concluded that the works will not be inappropriate. The Rakaia Gorge bridge area is in the same category but is not impacted by the scheme. We do not accept that the Homebush landscape requires protection as being part of a heritage landscape. We think that this confuse two separate though related matters.

1.82 It was apparent from our site visit and from the evidence, that the intake sites and the headrace canal parallel to the Waimakariri River, and even the Rakaia intake and headrace canal, will have a significant impact on the landscape. The works on the river terraces will total 24km in length (to which can be added the works on the south bank of the Rakaia associated with the ACWT project).

1.83 We address the landscape, natural character, heritage and amenity impacts of each part of the scheme later in this part of our decision. However, our overall conclusion is that while the 62km of works will have a significant visual impact in the short to medium term, the longer term effects after mitigation will be acceptable (sustainable). We consider that with the passage of a time, the disturbance created by the substantial earthworks involved will eventually "heal". This will however involve a major and expensive commitment to replanting in a harsh environment (particularly with respect to the terrace canals). We have included conditions requiring a landscape plan dealing with the mitigation works and maintenance of these.

Effects on heritage values

1.84 This part of our report addresses potential effects on heritage, which include archaeological sites with particular reference to early Maori habitation, heritage items relevant to early European history, and protected trees. Evidence was presented by Dr Habberfield-Short for CPW, Mr Chris Jacomb for the Selwyn District Council, Ms Bridget Mosley and Ms Joanne Easterbrook for the New Zealand Places Trust. In addition, relevant evidence was brought to bear by Mr David O'Connell, Paul Whyte, and Hoanna Bergman for Ngai Tahu. Ms Di

Lucas also presented evidence regarding what she described as a heritage landscape at Homebush. We also heard from Mrs Louise Deans regarding the heritage values of the Homebush buildings and property. Dr Habberfield-Short stated that there were 26 recorded archaeological sites within the scheme area, 10 of which could be affected in some way by the proposed scheme.

1.85 We note that under the Historic Places Act 1993, a section 18 authority is required to undertake works to establish boundaries of affected sites, while a section 12 application is required to modify, damage, or destroy an identified site. A designation does not overcome the need for HPA authorities. CPW has not yet sought authorities, nor is it required to do so at this early stage.

1.86 The list of known archaeological sites potentially affected by this part of the scheme were described as follows:

- L. 35/14 (raised rim ovens, Homebush) - would be destroyed - note similar sites L35/12/13/15 - 18 located in the same area;
- L. 35/22 (ditches and swamp near Minchins Road, downstream from the Waimakariri Gorge Bridge). Some of this area would be damaged or destroyed;
- L. 36/3 (oven, terrace riser, Sleeman's Road) - will be destroyed;
- L. 36/4 (oven, terrace riser near Sleeman's Road) - will be destroyed;
- M 35/146 (oven near Sleeman's Road) - can be avoided.

1.87 In addition, the possible presence of a pa site in the vicinity of the proposed siphon over the Selwyn River near Coalgate was mentioned, but we heard no additional information in relation to this from Iwi or submitters.

1.88 Mr Habberfield-Short stated that the documentation in the NoR was based on an archaeological survey of recorded sites undertaken in 2007. He stated that site investigations had been hampered by the refusal of some landowners to allow access to their properties. It was noted that some sites have not been found, or had been obliterated by farming activity.

1.89 Dr Habberfield-Short favoured the use of an 'accidental discovery protocol' and a targeted archaeological survey of areas believed to potentially contain heritage sites. He proposed that this be carried out prior to works commencing but not before we make our recommendations and decision. In relation to known sites, he proposed the involvement of a qualified archaeologist and representatives of Ngai Tahu.

1.90 Dr Jacomb and the NZHPT witnesses were adamant that a full archaeological survey of the entire scheme footprint should be carried out prior to our recommendation. He cited examples of this as standard practice, including the Pegasus new town development. Dr Jacomb commented as follows (page 3 paragraph 4):

"Accidental discovery protocols are not an alternative to carrying out a systematic archaeological site survey. They are also not an alternative to making all reasonable efforts to ascertain the nature, distribution and extent of archaeological sites in a particular development area ahead of the development. This condition should be modified to say that an accidental discovery protocol will be developed for any areas which, following a systematic archaeological survey and archaeological assessment, are deemed not to be likely to contain any archaeological sites. Those areas where sites are more likely to be affected will be the subject of archaeological authority applications under the Historic Places Act 1993."

1.91 He added that a larger buffer zone was also required around suspected sites, up to a distance of approximately 300m to ensure that an adequate investigation was undertaken. He also noted that there was no assessment of the effects of the scheme on European heritage values.

1.92 The view of Mr Jacomb and of Ms Mosley of the NZHPT was that the identification of many sites was based on ad hoc observations based on contributions from various parties, such as landowners, over the years. These only gave a rudimentary indication of the presence of sites, and more work was required to confirm their presence and significance. She said that adaptive management techniques could not avoid adverse effects.

- 1.93** CPW was criticised for failing to investigate sites where landowners refused permission for entry to their properties. We were reminded by NZHPT that there are powers under the Public Works Act for entry into properties without the owner's consent. Nevertheless, we are also aware that this project has raised very strong feelings on the part of some landowners and we have sympathy with CPW being reluctant to force the issue in these circumstances. We questioned witnesses, as to the necessity, and practicality of a full archaeological survey of the entire corridor subject to the NoR.
- 1.94** We observe that the corridor is 62km long and in our view it would be unreasonable to expect CPW to carry out a full heritage survey prior to our making a recommendation as had been proposed by NZHPT and others. The rural area traversed by the proposed canal has been highly modified by present and past farming activity. There is no suggestion that there is any greater likelihood of artefacts being found along the corridor than anywhere in a rural environment generally. On the face of the information available, it would appear that many of the known sites will not fall within the corridor subject to the NoR. Undoubtedly some suspected or reported sites which have not been adequately confirmed as to location, and which are close to the intakes and headraces, will elude discovery.
- 1.95** In conclusion, we think that the suggestion that there should be a full survey carried out before we make our recommendation is an impractical and unnecessary requirement. In locations such as the base of the river terraces, and in the Homebush area, we agree that further investigations will be required if the scheme proceeds. If discoveries are made it is possible that HPA approvals will be required. These requirements coupled with the accidental discovery protocol would in our view be a sufficient and reasonable approach for a project of this scale. We observe that because of its scale, this is a totally different type of project from Pegasus Township.
- 1.96** We also observe that the withdrawal of the dam and reservoir component of the scheme, with its associated heritage impacts, the heritage impacts of the proposal are now significantly less than those of the original scheme with the removal of the Waianiwaniwa Valley from the footprint.
- 1.97** The conditions now include the sites to be further investigated and the management processes to address any discoveries made. We accept that it is

inappropriate to specify hard and fast requirements before it is known what sites exist and what their values are. We think that the HPA processes are a better way of addressing this issue.

- 1.98** We are mindful of section 6(f) of the RMA, which provides that we must recognise and provide for the protection of historic heritage from inappropriate use and development. However, we have no evidence before us to suggest that any sites of significant heritage value will be affected in more than a minor and indirect manner.

Construction impacts – Dust

- 1.99** The effects of dust from construction works is relevant both to our recommendation in relation to the NoR and in relation to the resource consent applications for discharges to air being made by CPW to the Canterbury Regional Council. CRC 061762 (discharge to air from headrace) CRC 061763 (discharge to air from the Rakaia River intake site) and CRC 061765 (discharge to air from Upper and Lower Waimakariri intake sites).

- 1.100** The scale of earthworks associated with construction of the intakes and headrace canals and associated facilities such as siphons, has the potential to create dust nuisance during construction. Very large scale earthworks are involved in terms of the headrace canals across the escarpments adjacent to the Rakaia and Waimakariri rivers. While these particular locations are generally distant from residential dwellings, the construction of the headrace across the Canterbury Plains, particularly the northern end of the headrace across the plains, passes through a landscape dominated by more intensively developed farmland and associated rural dwellings.

- 1.101** A supplementary draft of evidence prepared by Dr Chiles with respect to noise issues (which are addressed below) is a useful indicator for potential dust sensitive locations. This evidence showed that (excluding Coalgate) there were 27 dwellings within 250m of the proposed headrace, of which 20 were located on the southern side of the headrace - and hence more vulnerable in terms of prevailing winds. There is also some potential for windblown dust to affect nearby crops. Concerns were expressed at a more general level about the indirect effects of dairy conversions and the removal of shelter plantings which would create an 'open' landscape more conducive to wind erosion.

- 1.102** Evidence was given on the effects of dust and possible mitigation measures in the evidence of Mr Andrew Curtis for CPW, and to a much lesser extent from Ms Keri Johnston for the Canterbury Regional Council. Potential dust issues were touched on briefly by Mr Boyes in his planning report on behalf of the District Council.
- 1.103** Mr Curtis and Ms Johnston noted that dust from earthmoving activities is not organic in nature, and is larger than 10 μ in size. Accordingly dust nuisance associated with these works is unlikely to generate respiratory health effects. Dust from exposed surfaces generally requires wind speeds of at least 5 m/s, and only becomes a significant nuisance effect with wind speeds in excess of 10 m/s.
- 1.104** Mr Curtis stated that data from the Darfield wind rose reveals that dominant winds are from the northwest to northeast quadrants, which accounts for about 70% of all wind. Wind in excess of 10 m/s is only experienced for 1.1% of the time each year, and is primarily associated with strong northwest wind conditions. Accordingly any adverse effects are likely to be greatest for dwellings located to the southeast side of any headrace canal worksites. He noted that winds tended to be dominated more by north easterlies further east towards the coast, and that there were local variations, for example in the valley around Coalgate.
- 1.105** There may be some variations between prevailing wind directions within different parts of the extensive command area where major earthworks were planned, as well as the time of year when construction work was undertaken. Mr Curtis said that most dust particles fell back to the ground within 100m of their source and that dust particles travelled no more than a maximum of 300m during very strong wind conditions.
- 1.106** Those locations involving the heaviest earthworks, particularly on the Rakaia River escarpment, are in locations where the density of rural dwellings is very low. Nevertheless, recognising that the large river corridors act as conduits for strong winds, dust management measures will still be required to address the potential effects associated with works along the river terraces, especially where shelterbelts are removed to enable construction to proceed.

1.107 Mr Curtis and Ms Johnston were generally in accord as to appropriate dust management measures which should be incorporated into management plan. Among the measures proposed (*Appendix C - Version B, Clause 9.2*) were:

- Identifying methods of dust suppression, including but not limited to the use of sprinklers, water carts, and revegetation of stockpiles;
- dust monitoring;
- nomination of an employee/contractor responsible for consulting with local residents during construction;
- identification of sensitive areas (e.g. houses and crops) within 100m of any construction site;
- regular public road maintenance;
- proposed methods of providing a cleaning service to residents or businesses affected by construction dust.

1.108 It was noted that construction effects would be temporary, and the evidence suggested that canals would be constructed in short individual sections each taking from 3 to 6 months to complete. Ms Johnson also proposed that a complaints register be maintained and made available to the Council. That has been included in the conditions.

1.109 The scale of earthworks involved in constructing the headrace (in addition to the linked distribution race network) can be expected to be substantial and the potential for large temporary expanses of exposed surfaces, disturbance by heavy earthmoving machinery and stockpiled soil is readily apparent. As with construction noise, construction dust is an inevitable effect of large scale projects such as this.

1.110 We are satisfied that with the imposition of the dust management plan, the (temporary) dust nuisance associated with the construction of the intake and headrace components of the CPW project can be controlled in such a way as to avoid any significant or prolonged adverse effects on occupants of nearby dwellings.

1.111 We acknowledge that the physical presence of large earthmoving operations on the Canterbury Plains in close proximity to rural dwellings will be unnerving for some nearby residents, and it is probable that even with the best management measures, during adverse weather conditions an element of dust nuisance effects may occur.

Noise effects

1.112 The Hearings Panel heard evidence from Dr Steven Chiles for the applicant, and Dr Jeremy Trevathan for the Selwyn District Council, with respect to potential noise effects and possible mitigation measures.

1.113 Both witnesses agreed that the appropriate management regime for addressing noise effects associated with the project would be "NZS 6803:1999: Acoustics - Construction Noise". Dr Chiles noted that the Selwyn District Plan did not specifically exclude construction noise from its general noise provisions. He went on to say that he considered that a noise and vibration management plan was preferable to imposing conditions on the designation, because the construction methodology would only be known with certainty when the contractor was appointed.

1.114 In relation to intake construction, there would no be dwellings within 1km of the intake sites, and any noise from these sites would comply with NZS 6803: 1999. There will be some temporary effects on amenity as a result of construction noise in the vicinity of the Waimakariri Gorge Bridge that can not be entirely avoided.

1.115 We heard no firm evidence as to whether the noise standards in the District Plan would be breached, but this appears likely at the notional boundary of some rural dwellings affected by headrace construction (60dBAL₁₀ and 85 dBAL_{max} between the hours of 7:30 AM and 8 PM). However we do accept that it is appropriate to assess the effects of likely noise effects beyond that permitted by the plan standards, by having regard to NZS6803:1999.

1.116 With respect to construction noise and its impact on nearby dwellings, Dr Chiles stated that construction noise was temporary, and while it may be undesirable, it was not necessarily *unreasonable*. In the Rural Zone, which is where almost all

of the headrace would be located, the primary difference between the District Plan and NZS 6803:1999 is the permitted daytime noise levels, which increase from 60 dBAL₁₀ to 70 dBAL₁₀.

- 1.117** Dr Chiles considered that the use of 'cut and fill' for the construction of the headraces will assist in minimising heavy vehicle movements and hence transport noise. In his view, a 150 m separation distance between the boundary of construction activity and a rural dwelling would normally satisfy the standard in NZS6803:1999, and for construction of bridges and siphons, a separation distance of 250 m.
- 1.118** Dr Trevathan considered specifying buffer distances was of little value and that reliance can be placed on NZS 6803:1999. This was on the basis that if the standard was not being met at a nearby dwelling for example, the operator would be forced to adopt mitigation measures which could include restrictions on hours of operation.
- 1.119** Three pump stations are proposed with the capacity of between 2 and 3.5 MW. These are to be located near the Lower Waimakariri Intake site; adjacent to the Rakaia River approximately 1km from Sleemans Road; and another near the corner of Rockwood and Leaches Road near Windwhistle. Dr Chiles was of the view that given these would be enclosed in a shed type structure they would not exceed a noise level of 45 dBAL₁₀ at 150m distance. There are no existing dwellings within 150 m of these proposed pumping stations.
- 1.120** It appeared common ground that there would be very little or no operational noise associated with the headrace structures once they were operational. In terms of noise associated with the operation of siphons (e.g., that proposed across the Selwyn River near Coalgate) indications from similar structures on the Rangitata Diversion Race is that these would not breach the noise standards in the District Plan.
- 1.121** There is no blanket restriction proposed on hours of operation associated with the construction of the headrace, except that no work would be undertaken within 200m of any residential dwelling between 8 PM and 6:30 AM Monday to Saturday, unless the written consent of the affected party is obtained. The applicants proposed condition (*Appendix C. -Revision B, Clause 1.3*) appeared somewhat unclear with respect to operational hours on a Sunday.

1.122 We also had a residual concern regarding early morning or night works in the vicinity of dwellings. We have addressed this issue in Part 2 of our decision with a revised condition. Rather than precluding night works, we have decided it would be appropriate to increase the buffer distance to 500 m from any night works between 8 PM and 6:30 AM and also to preclude works within 300 m of a dwelling between 6 PM and 7:30 AM unless the written consent of affected parties is obtained. We have imposed slightly more restrictive provisions apply on public holidays and weekends and have specified five public holiday days as not allowing work, as set out in the conditions on the NoR.

1.123 While we appreciate that noise impacts can be addressed through specified noise standards, we felt it was important to provide greater certainty for affected parties, rather than rely exclusively on measuring noise standards in the event of a dispute. Otherwise, we were satisfied on the evidence that noise associated with construction of the intake and headrace canal can be appropriately managed to meet the provisions of the NZS 6803: 1999, a standard which was designed to deal with construction projects characterised by significant but temporary noise impacts. Noise disturbance might last for a period of between three and six months at worst.

1.124 In conclusion, we are satisfied that noise impacts will be appropriately mitigated. However there will still be significant noise, and potentially dust impacts, during construction. For this reason that we have recommended that CPW revive its originally proposed Community fund for the duration of the construction work. We also urge it to enter into arrangements with the most affected residents to minimise or offset impacts on those people in addition to what is required by conditions (by way of example we note that Ms de Jong has raised concerns about the effect of the construction work on her bed and breakfast business).

Traffic and access issues including construction impacts

1.125 Evidence was presented on this aspect by Mr Andrew Whaley for CPW, and Mr Nigel Williams for the Selwyn District Council. The 38 km length of the headrace canal across the plains, and to an even greater extent the distribution network (discussed later), result in issues arising from the very large numbers of public road crossings required, for access across these waterways into private and public properties and in some cases, internal crossings within properties.

- 1.126** The evidence of both witnesses reinforced the conclusion that the highway network in the area had ample capacity to cope with short-term construction traffic, and in the longer term increased traffic resulting from land use intensification after completion of the scheme. The most heavily trafficked route affected is State Highway 73, which in the vicinity of Aylesbury carries an average of 3860 vehicles per day.
- 1.127** The witnesses added that they expected that the intensification of farming activity might result in an additional 6 to 8% traffic loading on the State Highway network, and perhaps somewhat more on particular minor roads. Given that farming is a permitted activity throughout the district, we doubt whether increased traffic resulting from more intensive land use could be a contributory reason for recommending against the project.
- 1.128** To avoid disruption to the road network and to protect private access to and from public roads, the applicant proposed building bridges over the headrace canal first, providing temporary access, and providing detours on to other roads where this was necessary. All work will be undertaken to *Austrroads* standards. The agreement of Ontrack will also be required to construct a rail bridge over the canal at Racecourse Hill, or to siphon beneath the line.
- 1.129** Access across the headrace canals within farms is a matter of negotiation between landowners and the applicant. That is not a matter of relevance to either Transit New Zealand or the District Council. The applicant noted that the majority of bridges required on public roads over the headrace would be two-lane structures, whereas internal farm crossings of the canal would be 4.8m wide.
- 1.130** Mr Williams was in agreement with the applicant on most matters, but expressed some qualifications. He said that the Council's roading system was not designed to accommodate bulk loads such as those associated with large-scale movement of aggregates for construction.
- 1.131** Mr Williams also noted that while discussions had been held by CPW with Transit New Zealand, no such discussions had been held with the Selwyn District Council relating to its road network. In his report, he set out a detailed assessment of effects on the Council's road network which revealed that there

would be 159 off-road worksites, and 229 road crossings associated with both the headrace canals and the distribution network, although only 20 of these crossings were across the headrace (*the implications of the distribution network are addressed separately in our decision on the application to SDC*).

- 1.132** He estimated that over the project area as a whole, there would be approximately 320 heavy vehicle trips per day, assuming an average construction period of three years. His understanding was that any structures over the canals constructed by CPW would remain its responsibility in terms of maintenance.
- 1.133** Two other matters also arose through evidence. The first of these concerned the effects of large water bodies such as a headrace adjacent to long sections of the district council's roading network, which Mr Williams considered had the potential to affect the substrate and stability of these roads. This possibility was accepted by CPW, but Mr Whaley was of the view that normal monitoring of the roading network was undertaken by the Council, and if a problem became apparent, the matter would be raised at that point with CPW.
- 1.134** The second matter concerned the potential for a breach in the canals and resultant flooding, an emergency situation which would adversely affect the Council's roading network (we note a similar issue was raised by the Farmers Southern Headrace Group). Mr Williams was adamant that it was the responsibility of the applicant to have a clearly defined plan for coping with such an emergency, including at least three discharge points along the length of the headrace system. The applicant (through Mr Lewthwaite) considered that there was adequate design capacity within the system to cope with any foreseeable emergency.
- 1.135** As noted before, we are satisfied that the road network in the command area (both State Highways and that of Selwyn District) has adequate capacity to cope with any additional traffic volumes arising from construction movements associated with the headrace canal construction, or in the longer term from intensified farming activity within the area to be irrigated. With respect to land intensification, this is provided for and expected under the District Plan. We note that CPW will have to enter into agreements with SDC in relation to impacts on its roading infrastructure and we are of the view that all issues relating to effects on SDC roads can be addressed in that context.

1.136 We appreciate that there will be a considerable amount of bridging work required to provide crossings of the headrace canal and access to any adjoining private properties. However we see no difficulty in this matter being addressed through negotiations and appropriate conditions between CPW and individual land owners. Continued legal access must be provided by CPW and it is in its own interests to ensure there are adequate internal farm crossings where property severance is an issue.

1.137 Without an intermediate step such as a national policy statement, and/ or the addition of appropriate regulatory mechanism through regional planning provisions, or through taxes, we do not believe that we have the authority to impose conditions or restrictions on the fuel economy, efficiency and emission standards of construction vehicles as had been suggested by Mr Williams.

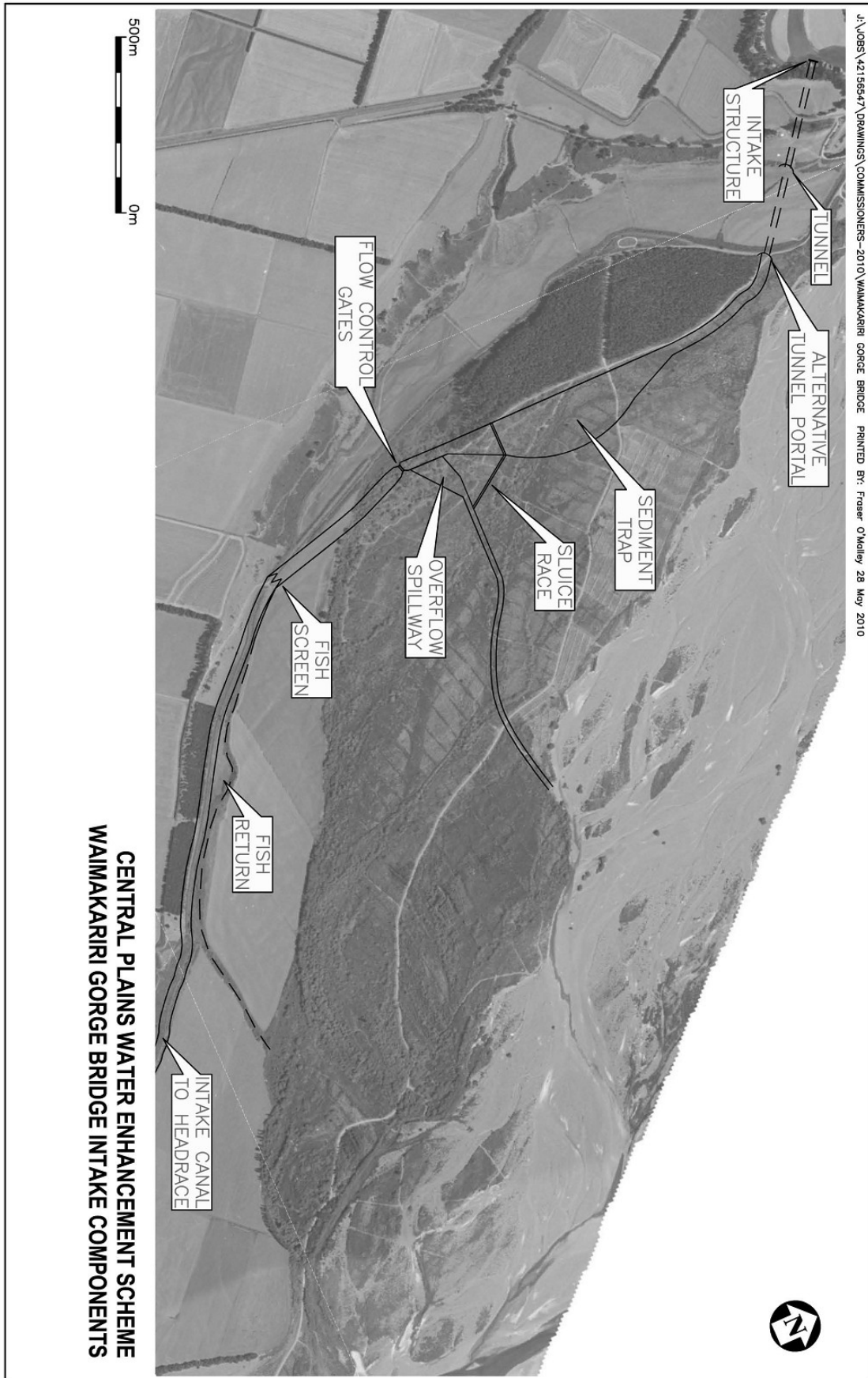
2. WAIMAKARIRI INTAKE AND TERRACE CANAL

2.1 We now move on to deal with each of the component parts of the scheme covered by the NoR.

Description

2.2 This part of our assessment relates to the headrace between the intake on the Waimakariri River to the point where it reaches the top of the escarpments on the southern side of the river before crossing the plains. The intake and associated downstream infrastructure proposed are shown in **Figure 4**.

Figure 4



- 2.3** The northern end of the headrace begins at an intake from the Waimakariri River through a solid rock bluff a short distance upstream from the Waimakariri Gorge Bridge. From the canal intake downstream of the sediment pond, the canal crosses river flats before 'ascending' the southern river terrace at grade of 1:1000 for a distance of approximately 5.5km. This escarpment or terrace is 40 m high at the upper end, and 30m high at the lower end. It follows the line of the existing SDC stock water channel to emerge on top of the terrace at the Bull property 9km downstream of the bridge. At that point the canal would be approximately 30 m above the river bed. The Bull property also extends to include the Notice of Requirement corridor on this part of the escarpment (we visited this property and drove along the track which follows the existing stock race along near the top of the terrace).
- 2.4** The canal and associated earthworks on the escarpment would appear as a highly visible feature from the river and the land on the north side of the river. There would be extensive cut and fill earthworks between 120m and 380m in width. There will also be rock protection and planting at the base of works to protect against river erosion (a similar issue does not appear to arise in the case of the Rakaia).
- 2.5** Mr Lewthwaite and Mr Glasson presented evidence outlining the indicative intake structure on the cliff face immediately upstream of the Gorge Bridge. Mr Lewthwaite presented further evidence in July 2008 on additional mitigation steps to meet kayaker safety issues raised by submissions from Mr Canard of NZ Recreational Canoeing Association. In addition, he presented supplementary information in an attempt to describe more accurately how the structure might be formed in the cliff structure. He described three options in his final evidence in October 2009– the original site (site 2), a downstream site (site 1) closer to the bridge but not visible from the bridge, and an upstream site (site 3) in the corner of the river more remote from the 'Pinnacles' feature.
- 2.6** The structure requires an intake structure at water level to direct flow into the tunnel and an upper structure near the top of the cliff to provide for operational requirements and access to the lower structure. The dimensions of the structure at water level are expected to be approximately 28m long and will project approximately 3m above the normal river level. The structure will be recessed into the base of the cliff to avoid a protrusion into the line of the river in order to achieve kayaker safety requirements. The intake structure will include an

inclined trash rack that is expected to be submerged. The intake facility also requires a high level concrete structure near the top of the cliff to support a crane that will service the intake gates and an access structure from the upper structure to the intake structure at water level. This is likely to be the most visually obtrusive part of intake works.

2.7 The key issues raised in relation to the intake were:

- Kayaker safety;
- Visual impact and change in natural character of the cliff face by the presence of the intake structure;
- The extent and frequency of river management works to maintain the river flow past the intake structure.

Kayak and recreational user safety

2.8 We heard evidence from Mr Canard of NZ Recreational Canoeing Association and other kayakers that expressed deep concern about the level of risk to kayakers created by the presence of the intake. The risk was, in their view, heightened in this case by the large volume of the flow offtake, the natural path taking kayakers (particularly inexperienced kayakers) close to the intake, and the likely velocities being such that it could pin boats or people who have fallen out of their kayak against the intake.

2.9 We too were concerned about the operation of a large offtake at a site along the base of the cliff, given that the majority of kayakers will be forced by the river alignment and strength to follow a path close to the intake structure. We felt that this issue had not been adequately addressed by CPW. We indicated to CPW that it was essential that it address this issue more thoroughly following consultation with kayaking interests.

2.10 Following further discussions between the applicant and the Association, Mr Lewthwaite presented evidence in July 2008 which outlined mitigation measures to satisfy safety concerns raised by recreational users. The key elements of these measures were:

- Orientate the structure to achieve good sweep velocities along the line of the structure and minimise velocities onto/through the intake grill to less than 1m/s;
- Ensure good exit past the structure to minimise entrapment;
- Recess the intake back into the rock face;
- Install a safety ledge, an inclined trash rack extending to the river bed and appropriate warning signage;
- Detailed design of the structure must be carried out in consultation with the Canoeing Association and to the approval of appropriate safety experts.

2.11 Mr Canard presented supplementary evidence on safety issues and concluded that the revised proposals for the intake were better but that the presence of the intake would still present a hazard. The Association proposed the use of performance based conditions that deal with navigation and safety issues such that the structure does not increase the objective danger of the natural river over a range of flows up to 250m³/s.

2.12 Further consultation and discussion on the conditions relating to this matter have taken place between the CPW and the Association, and both confirmed at the reconvened hearing in March 2010 that they are in general agreement that the proposed conditions now provide an appropriate safety management process. Whitewater New Zealand notes that there will be some residual increase in risk to kayakers. We accept that this will be the case, however we are now satisfied that the level of added risk will be minimal and are satisfied that the agreed condition is appropriate and effective (we have discussed the condition in a little more detail in Part 1 of the decision).

Landscape visual amenity and natural character effects of the intake

2.13 As noted earlier and discussed in **Minute 11**, we accept that the Waimakariri Gorge Bridge area and is at least a regionally significant and arguably an outstanding landscape. The proposed intake site will not be directly visible from the bridge or road approaches. Both the intake and the overhead structures will

be readily visible to people boating or kayaking on the river, but not from the beach area just downstream of the bridge.

Effects on Landscape

- 2.14** The Waimakariri Gorge intake site is located in a dramatic rock formation described by Ms Lucas as "the Pinnacles". The proposed intake site is not directly visible to road users, but the ancillary structures above the intake would be visible from the north side of the bridge. Both the intake and the overhead structures would be readily visible to people boating or kayaking on the river. Mr Glasson's initial report did not address this in any detail at all. We requested further information which was subsequently presented to us in a report and associated photographic representations.
- 2.15** This sought to demonstrate that the visual effect of an intake at this point could be adequately mitigated through careful siting and design, noting that there was also a district council water race intake further around on the same rock bluff slightly closer to the bridge.
- 2.16** The photo simulations presented by Mr Glasson failed to show the full extent of the likely construction elements as they did not show the crane, the access to the lower structure or how one would gain access to the upper structure. Unfortunately the visual representation of the proposed intake point was also incorrectly located and we requested that further information be provided by CPW at the resumed hearing in October 2009. Mr Lewthwaite presented additional information on three intake location options but an updated photographic simulation of what the structure might look like was not presented.
- 2.17** Ms Lucas (for Environment Canterbury) described "the Pinnacles" as a beautiful and highly significant landscape feature. She concluded:

"In my opinion the proposed offtake location is such that restoration is unlikely to be realistic. This exposed face will display all works on it. Whilst excavated bluff areas will eventually weather somewhat, design and/or management for a recessive and naturalistic aesthetic is unlikely to be achievable."

2.18 Mr Craig appeared to agree that the Gorge Bridge area, had picturesque qualities but was of the view that it was probably not outstanding. He stated in evidence:

“From a landscape point of view, a tunnel intake within the ‘Pinnacles’ formation may not be entirely out of the question. With more sensitive design, notwithstanding practical considerations, it might be possible to devise a structure that fits more sympathetically. For example, it would be desirable, if feasible, to recess the structure into the cliff face so that it resembles a natural cleft or cavern. Consequently the naturalness and scenic appeal of the ‘Pinnacles’ could be maintained to a higher level than what is proposed.”

2.19 He concluded that:

“The lower intake option as it is presented will generate significant adverse effects at the ‘Pinnacles’ tunnel intake portal. If the design of this can be made more sympathetic to the setting, a more acceptable outcome may result.”

2.20 Mr Glasson considered there would be moderate to high impact at the site with the impact lessening with distance from the site.

2.21 In our assessment, the Waimakariri Gorge Bridge and the ‘Pinnacles’ together comprise an iconic and regionally significant landscape and may well be an outstanding natural feature and or landscape for the purpose of section 6,. Clearly, this part of the river also has high natural character albeit that it is modified by the bridge and the existing intake. This site is regularly visited by sightseers, picnickers, jet boaters, kayakers and others.

2.22 This site is also the finish point for the kayaking section of the iconic Coast to Coast event. We heard evidence from the Coast to Coast organiser, Mr Judkins. He was deeply concerned that that the intake and associated downstream works would destroy the natural character of this part of the river and would damage the reputation of the event. He also had concerns regarding the safety of the intake structure which we have dealt with separately.

- 2.23** Our ability to assess the likely effects of this proposal on the undoubtedly impressive rock faces was limited by a lack of information as to how much disturbance would be required to these features in order to construct the intake, provide access for construction purposes, and an accurate representation of what the 'finished work' would look like.
- 2.24** We remain concerned that the information presented to us did not show a full or comprehensive picture of the structures including the likely impacts of access tracks, rock excavation for construction, crane details, re-vegetation establishment etc. Therefore we have included a condition in consent CRC061930 that requires the consent holder to submit detailed design plans to the Compliance and Enforcement Manager of Environment Canterbury for approval prior to construction works commencing.
- 2.25** We think that Mr Judkins and Ms Lucas expressed valid concerns. If the intake proceeds there will be some compromise to natural character and landscape values. However we think that the project is sufficiently important that it should not be frustrated purely on the basis of such effects.
- 2.26** This brings us to the location of the intake point. From the evidence made available in the later part of the hearing it was apparent that an intake point within the designation corridor at its upstream end would largely (albeit not entirely) avoid the most striking rock features. We consider that this would be the most appropriate site for the intake point in terms of effects on natural character and landscape values. It would still be visible from those in kayaks coming down the river and from jet boaters from either direction, however, the views would be transitory and would be seen in the context of the bridge.
- 2.27** We appreciate that this upstream location may still require additional greater river training works, and accordingly there is a trade-off between the costs and impacts of that and the visual and natural character effects of the proposed location.
- 2.28** We accept that this view for the last few minutes of the kayak leg of the Coast to Coast may slightly detract from the experience of those in the event or training for it, but we do not think that this will be a major detraction in the context of the

scenery through which they will have already passed. We certainly do not accept that the event will be threatened in any way.

2.29 We conclude that there will be some loss of natural character and some adverse effects on naturalness of the cliff environs and on visual impact of any intake site when viewed from the water immediately upstream of the Gorge Bridge. However, we also accept the applicant's view that there is no better alternative which would achieve its objectives. We have concluded that the proposed new intake and associated control works would not necessarily be an *inappropriate development*.

2.30 We have also recommended conditions requiring a landscape plan and the minimisation of landscape impacts in the vicinity of the Pinnacles. We have concluded that the overall landscape and visual amenity impacts at this location can be adequately mitigated and will not be an inappropriate development. We accept that there will be some detracting from natural character, particularly from the perspective of those who are on the river upstream of the bridge, however, that is unavoidable and is not a sufficient basis to recommend withdrawal of the Notice of Requirement.

Waimakariri Settlement Pond Facilities

2.31 The flow from the river will be diverted through the intake structure and tunnel to the proposed settlement pond and fish screen facilities which will be located approximately 1km downstream from the Gorge Bridge. A flow control structure on the outlet of the pond will direct flow into the canal system supplying the irrigation area. The purpose of these facilities is to manage flows into the irrigation area, settle out sediment to minimise sediment carryover into the irrigation system, and minimize the extent of fish passage into the irrigation system.

2.32 Key issues raised by the construction and operation of these facilities include:

- Sediment flushing
- Fish screening and bypass
- Visual impact and effects on natural character
- Potential impact on existing river protection elements

Sediment Flushing

- 2.33** Mr Lewthwaite described the proposed sediment settlement facilities as being designed to settle coarse suspended sediments comprising gravels, sands and a small proportion of silts in a large settling pond. He stated that the pond would have a capacity of about 80,000m³ and will be a widened canal section which would be about 100-150m wide and 400m long, sufficient in size to provide the necessary reduction in intake flow velocities and achieve the residence time required for settling. The sediment trap is expected to collect about 20,000m³ of sediment per year, in total from all sources, depending on the level at which the intake gates will be closed.
- 2.34** At intervals of approximately one month the sluice gates will be opened to allow a flow of up to 80m³/s to be released for the first few minutes to initiate flushing flows from the settlement pond. The flow is expected to drop once the flows in the sluicing channel stabilise and the sluicing operations are expected to take 1 to 2 hours to complete. It is likely that some of the sediment in the bottom of the settlement pond will need to be removed by mechanical excavator as it may be too coarse to be removed from the sluicing operation and some fine sediment bound up with the coarse sediment will also not be flushed.
- 2.35** Sediment-laden water that is returned to the river, from the sluice channel during a sluicing operation, is expected to have a high sediment content. Mr Lewthwaite stated that the sediment discharged to the river in the sluicing operation would be mainly the sand and gravel fractions as storage time in the sluicing race would be too short to settle much of the finer material. However, as the proposed sluicing canal outlet is at the downstream end of the pond, we anticipate that much of the gravel settling in the pond will be too coarse to be flushed and the silt settled in the pond is likely to be flushed out, leading to a high concentration of finer sediment particles. Mr Lewthwaite considered that the operation of the pond and sluicing operation would require some refinement once the quantities and particle size distribution of the sediment entering the pond were better known.
- 2.36** The flushing operation is expected to result in a pulse of higher flow with raised levels of suspended sediment. As this pulse moves downstream it is expected to dissipate and the sand and coarse particles are expected to settle on the bed of the river. Dr Mabin and Dr Glova were of the view that the sediment from the

flushing operation would settle within approximately 5km from the discharge point and this sediment would then be moved further downstream during subsequent natural flood flows.

2.37 Dr Glova concluded that, in his opinion, the impact of sediment flushing on salmon fishing in the river would be relatively short lived. However he told us that some mortality (around 10% for juvenile chinook salmon) can be expected to occur at present when suspended solids concentrations in large floods ($\geq 800 \text{ m}^3/\text{s}$) exceed $2,000 \text{ g m}^{-3}$ for more than 24 hours. It was his opinion that displacement of fish by high water velocity is likely to be a much greater source of mortality during large floods than high concentrations of suspended solids.

2.38 We heard evidence from Dr Olsen on behalf of DoC and Fish & Game who considered that there is an increased risk of periphyton proliferation and fine sediment inputs during construction and operation of the proposed scheme. In his opinion, fine sediment is known to cause changes in invertebrate community composition, and such changes are expected to reduce the quality and availability of invertebrate prey for insectivorous birds and drift-feeding fish (such as trout) in areas affected. Dr Olsen considered that the risks created by the sediment flushing could be reduced if sediment flushing was restricted to times of high flow. This has been incorporated into the proposed conditions.

2.39 Some of the fishermen who presented submissions expressed concern about the risks to fishermen from the increased flushing flow catching them unaware. This has been addressed by the proposed condition requiring the flushing to be restricted to times of river flow above $100 \text{ m}^3/\text{s}$ and to be avoided in weekends and public holidays. We have concluded that at these higher flows, the operation will pose no risk to river users.

2.40 We conclude that localised increases in suspended sediment and a short duration of increased flows from the sluicing and flushing of the sediment pond will have a less than minor effect on fisheries and recreational users.

Fish Screening

2.41 Fish screens are required on the inlet canal of the irrigation system to return fish that have followed the intake flow into the settlement pond, back to the river. The functionality of the screen is a balance between a sufficiently fine screen to

maximise safe interception of the fish versus a sufficiently coarse screen to minimise the size of the screen and cleaning requirements. There are several elements to a good solution which include:

- Fish species to be screened and their respective life cycles;
- Limit the approach velocity on to the screen to prevent impingement;
- Maximise sweep velocity past the screen;
- Fish bypass entry design to guide the fish to a safe exit;
- Connection of the bypass with the river;
- Screening materials to minimise damage to the fish if they are pushed onto the screen;
- Screen mesh sizes;
- Operation and maintenance of the screens and the exit channel;
- Optimum flow rate for the return flow to the river via the fish by-pass to ensure adequate flow for fish survival.

2.42 Mr Lewthwaite indicated that CPW proposes to develop the details of the fish screen during the detailed design stage, in consultation with stakeholders and experts in this field and to the approval of the Canterbury Regional Council as the consenting authority. He stated that a NIWA report on guidelines for fish screens presents a number of good practice elements which he considers to be applicable to CPW.

2.43 The one area of some divergence is in the area of screen aperture size. The report recommends sizes ranging from 2 mm to 5 mm, depending on the circumstances. Mr Lewthwaite expressed concern that the smaller sizes would be expensive to build and difficult or even impractical to maintain, particularly with the likelihood of having to manage the alga didymo.

- 2.44** Dr Glova stated that the guidelines given in NIWA report are intended for takes up to 10 m³/s and the report explicitly indicates that for larger takes extra design considerations are required. Notwithstanding this, Mr Lewthwaite considers that the principles contained in the guideline report will still be a useful framework for the CPW facilities.
- 2.45** Mr Bejakovitch presented evidence on behalf of Fish & Game that included detailed information on fish screens. He also quoted several other researchers findings and recommended specific parameters be adopted for the fish screen design.
- 2.46** Mr Bejakovitch considered that the design of the screen should be significantly progressed before the decision on the granting of the consents is made so that the potential effectiveness of the screen could be fully assessed.
- 2.47** As the guidelines provide a useful design framework and CPW have committed to working within the guidelines document, we are comfortable that a satisfactory detailed design can be developed if the scheme proceeds. The conditions of consent require the screen to be designed in accordance to NIWA publication Fish Screening: Good Practice Guidelines for Canterbury, October 2007.
- 2.48** The applicant presented further evidence at the reconvened hearing in March 2010 that essentially presented a view that the conditions should not specify a maximum aperture opening - firstly, because the Guideline does not cover intakes greater than 10m³/s and secondly, because they consider that the establishment of fish protection objectives (a process recommended in the Guideline document) has not yet been followed.
- 2.49** Mr Lewthwaite presented two options for managing the final approval process for fish screens, one of which retained his recommended maximum aperture size of 5mm. We do not accept an approach that leaves the selection of a final aperture size to final design processes and consider that the need for a high degree of screen effectiveness has been established. Based on Figures 19-22 of the NIWA 2007 Fish Screening Guidelines, and to achieve an entrainment risk for salmonid, eel and longjawed galaxias less than 'high', we conclude that if a traditional fish screening approach is taken, it would need square mesh size of less than 4mm.

2.50 For the reasons set out in **Minute 15** we have included a modified condition which specifies a maximum mesh or slot size. The conditions enable the consent holder to follow a process that is consistent with the Guidelines that also require a certification step to ensure that the effectiveness of the fish screens will ensure that the effects of the water take on fish abundance will, in our view, be no more than minor. In the event that CPW identifies another design which will achieve the NIWA objectives it can seek a variation of the relevant condition before final design (we discuss the proposed condition in more detail in **Minute 15**).

River Management

2.51 The operation of the intake structure will require the presence of a substantial portion of the river flow to be adjacent to the intake structure in order to provide the flow for the intake. The applicant considers this site to be favourable in terms of minimising the need for regular river training works. It was not able to give a detailed estimate of the likely frequency or duration of the work required but considered that river works would not be required more than 10 times per year. We accept that the frequency for such a scale is difficult to estimate as it is a function of river flow and nature. We also accept the applicant's view that river training work at this site will be significantly less than at the originally proposed upper Waimakariri site.

2.52 Ms Lucas presented a plan showing the general location of the river relative to the cliff face which she had developed from old aerial photographs. Her assessment showed that a substantial part of the river flow can and does, from time to time, follow a path on the northern side of the gorge and thus results in minor flow along the base of the cliff adjacent to the proposed intake structure.

2.53 We conclude that the presence and operation of the intake will inevitably require river training activity upstream of the intake from time to time. This activity will create some adverse effect on the naturalness of the river and create some release of sediment. However, we consider that the frequency and duration of the work required will be relatively minor in the context of the scale of the river. We have concluded that the conditions of consent for this activity will be sufficient to manage the adverse effects as much as is reasonably practicable.

In particular, the conditions require river works to be avoided at likely times of high river use.

3. WAIMAKARIRI TERRACE WORKS

3.1 In addition to five private owners and the Selwyn District Council, Environment Canterbury is affected with respect to construction works in and adjoining the Waimakariri River. The Regional Council sought that we recommend against the works and decline consent. The submission from the Operational wing of Council was however at odds with the Environment Canterbury officer's report which was neutral. We did express some surprise at the submission in opposition. We think that the issues raised would have been better addressed within the officers report rather than a separate and conflicting submission.

3.2 The ECan submission also raised landscape and natural character concerns in relation to the Waimakariri and Rakaia Intakes and downstream works. We have already discussed these issues in general terms above and will return to the landscape effects of the terrace works later. Suffice to say that we have concluded that the works will not have an undue effect on the “natural character” of this modified part of the river but will have moderate landscape impacts.

3.3 The principal concern raised by ECan, related to the potential impact of the proposed terrace headrace works on the integrity of the Regional Council 's flood protection works along the south bank of the Waimakariri River downstream from the gorge (the Waimakariri River Flood Protection Scheme – WRFPS). These works represent substantial public investment and depending on the section of river involved, include a mix of protection works and riparian planting. It was suggested by Mr Vessey (the Regional Engineer) that the sediment pond, intake works and terrace canal would affect ECan plantings adjacent to the river bank for river protection.

3.4 Ms Whyte, who provided planning evidence on behalf of ECan, began by raising a legal issue associated with the effect of the NOR, which she said did not provide for CPW to compulsorily acquire land held by the Regional Council for flood protection purposes under section 17 of the Waimakariri River Improvement Act 1922. She said that her legal advice was that CPW could not exercise its compulsory acquisition powers under section 186(4) of the RMA

without the agreement of the Regional Council. She said that the Regional Council was also prevented from carrying out its flood protection works without the consent of CPW if the land were designated.

- 3.5** If Ms Whyte is correct and if the NoR is ultimately upheld, then CPW will need to consult further with the Council in an endeavour to secure its approval. These are issues for negotiation between CPW and ECan, and do not need to concern us.
- 3.6** The Regional Council was concerned that the canal works, particularly on the steep river escarpment, would compromise river protection works including protective planting, result in a reduced berm width and buffer zone adjacent to the river, increased instability within the river bed, and obstruction of access to protection works by Regional Council vehicles and staff. We understood that particular concern was held by the Regional Council for a 2.5km section of the river margin between the 'Kimberley Cliffs' and Redmond's Road.
- 3.7** Regional Council staff were also concerned that the applicant was relying on detailed solutions being determined at the later stage following confirmation of the designation. It appeared that a key issue was the Regional Council's overall desire to ensure that the headrace was located as far as practicable from the edge of the river.
- 3.8** We agree with the CPW's contention that it is very much in its interests, to ensure that the Waimakariri River does not threaten the integrity of the terrace canal and by obvious implication the efficacy of the Council's flood protection works. We consider that there will be adequate scope within the width of the corridor in the NoR to address the issues raised by the Regional Engineer. This could be achieved by locating the headrace as far to the southern side of the requirement corridor as practicable and/or by CPW funding new river protection works.
- 3.9** Effectively the Regional Council has a right of veto over the nature and location of works undertaken along the south bank of the river for the reasons given by Ms Whyte. We see these issues as being matters for discussion with between CPW and ECan, and not ones that need to be resolved at this stage of the process. The NoR corridor in this vicinity is sufficiently wide that there is some

flexibility for the final position of the works. We do agree that it would be desirable for CPW to determine the position of these works as soon as possible.

3.10 In conclusion, we are satisfied that the works can be constructed in a manner that will not compromise the erosion protection systems managed by ECan. The requirement for approval from ECan under the WSCA 1967 will ensure that the Regional Engineer's concerns can be addressed.

3.11 The proposed headrace from the Lower Waimakariri intake site runs almost directly parallel to an existing stock water race maintained by the Selwyn District Council. It is inevitable that the juxtaposition of these two races is such that the stock water race would be significantly affected by the proposed northern headrace, especially along the escarpment above the Waimakariri River.

3.12 Again, we consider that this is a matter that can be resolved through negotiation and contractual arrangements. Mr Lewthwaite suggested that the stock water race be pumped to the terrace above as a temporary expedient, and that the two races be combined along the escarpment section of the headrace upon completion of the project. This is one technical solution and we are satisfied that an agreed solution can be reached between CPW and Selwyn District Council.

4. LANDSCAPE AND NATURAL CHARACTER EFFECTS OF THE SETTLEMENT PONDS AND TERRACE CANAL

4.1 The settlement pond facilities will be visible from the road and bridge, looking downstream. However from that perspective the viewer is looking towards farm land and the river terrace and the works are some distance from the vantage points. The natural character of this area has already been compromised to a degree, as this is effectively a 'rough' farming landscape with scattered vegetation and trees. It is not in our view an outstanding landscape.

4.2 When viewed from the water we consider that the settlement pond will be largely screened from view by the vegetation on the river margins. Even if view shafts open up, we do not consider that the pond and its associated structures would be highly visible from the river. The proposed works are some distance from the river channels. We have concluded that while the proposed works will detract a little from the natural character of the river environment, this detraction will be minor, at least in the longer term after vegetation is re-established. In

terms of natural character, we do not regard these works as being and inappropriate development.

- 4.3** Turning to the effects of the headrace canal as it climbs the escarpment, it is clear that even with the proposed landscaping the canal and the associated earthworks will be highly visible from the river parts of the north bank and looking downstream from the Gorge Bridge area. These works will be much more obtrusive than the current stock water channel and the farm track which traverse the escarpment. Mr Craig noted that the material and plans supplied with the application did not include any cross-sections showing the effects of earthworks and the extent of cut and filled involved (this was later the subject of further evidence from Mr Lewthwaite).
- 4.4** Ms Lucas was of the view that the proposed works and in particular the terrace canal would fail to preserve the natural character of this part of the river corridor and would compromise the landscape values.
- 4.5** Mr Glasson's opinion was that with time vegetation would re-establish on the cut and batter slopes. Ms Lucas doubted that replanting would be a successful mitigation measure, given the harsh conditions involved. She was also of the view that even if it were practical, it would be prohibitively expensive. She was also critical of the lack of information relating to how such replanting would be achieved.
- 4.6** The escarpment is visible from the Gorge Bridge area, but the terrace canal would be well downstream of the bridge at its nearest point, also at its closest point to the bridge, the canal will be at the bottom of the slope. The terrace works will be most visible from the north bank of the river and from the river bed opposite the works and for river users approaching the works from upstream or downstream. This section of the Waimakariri River receives considerably less use than the area below the Crossbank. While the river terrace itself is a prominent landscape feature, it is dominated by exotic vegetation.
- 4.7** Even with the passage of time and planting in place, the canal and earthworks will remain as a visually distinctive and 'artificial' feature. There is no doubt that this particular landscape (and that on the Rakaia) will be irreversibly changed, but we do not consider that the change to this particular landscape would be out

of character or inappropriate. There will however, be a need for careful landscape planting and maintenance of that. This is provided for in conditions.

Properties affected by the Waimakariri Terrace Canal

4.8 There are five private landholdings which are affected by the terrace canal. These are:

- Mountain View Farms Ltd;
- Stewart Skurr;
- Allen Shadbolt;
- Mark Bull;
- AM and AF Bull Family Trust.

4.9 All of these properties farm the flat land on the northern side of the Old West Coast Road. These landholdings also extend onto the Waimakariri River flats below the escarpment to the north, and on to the slope itself further downstream. The Bull properties are the only ones which would lose land on the plains adjacent to the Old West Coast Road. Skurr and Shadbolt have supported the scheme, the others have opposed it.

4.10 We heard from the Bull's at the hearing as is discussed under the next section. We did not hear from Mountain View Farms with respect to their particular concerns. We have concluded that the quality of the land which will be lost to the terrace headrace is not of any major significance in productive terms, and that disturbance to the land can be addressed through the conditions attached to this decision relating to engineering works. The effects on farmed land can be addressed through the compensation package offered by CPW or, if necessary, via the Public Works Act process.

5. THE PLAINS HEADRACE

Description

- 5.1** This part of the decision addresses the effects of the headrace across the Canterbury Plains (38km) between where it emerges from the terrace on the south bank of the Waimakariri River to the top of the terrace on the north bank of the Rakaia River.
- 5.2** After emerging from the Waimakariri River Terrace at the Bull property, the headrace then initially turns sharply to the south and then to the south west across the Canterbury Plains. This location is approximately where the old West Coast Road and Redmonds Road intersect.
- 5.3** The proposed headrace canal route passes through the Bull, Thomas, Redmond and Judd properties before crossing Tramway Road and proceeding past Racecourse Hill adjacent to the western edge of the historic "Oaks" property and nearby to Ms de Jong's bed and breakfast operation. It crosses the Hawkins River by way of a siphon and crosses Cullens Road and Deans Road, before reaching the base of the Homebush Ridge. It then passes along the base of this ridge with associated earthworks through Rowallan, Auchenflower, and Homebush stations before reaching the eastern end of Coalgate Township. The terrain in this area will necessitate significant cuts and embankments.
- 5.4** The Homebush property contains a number of significant trees, heritage buildings and archaeological sites which are listed in the District Plan. There will be seven small stream crossings along the base of the ridge with associated culverts. The headrace will also pass over the Waianiwaniwa River where it exits the valley north of Coalgate.
- 5.5** The headrace route then passes east of Coalgate Township on a 5m high embankment (to avoid the need to run through Coalgate itself on the 235m contour). It then crosses the Selwyn River by way of a siphon and passes adjacent to a plantation and traverses the foot of the Harper Hills.
- 5.6** As is the case of the Homebush Ridge, some substantial earthworks will be required along the base of these hills, including a cutting up to 20m deep to avoid homesteads at "the Bend" and "Bennelong". The canal then strikes out across the plains west of Hororata, crossing the Hororata River and passing through the Te Pirita area, eventually following an alignment approximately 1 km parallel to and east of Steeles Road to the edge of the river terrace on the south

bank of the Rakaia, where it becomes the terrace canal which traverses the Northern bank and escarpment of the river.

- 5.7** Along the headrace there would be 22 road crossings, mostly two-lane bridges. There will also be 20 crossings of existing water races, and a crossing of the Midland Railway line at Racecourse Hill. The distribution canal network supplied by the headrace is described later in this decision.

6. PROPERTIES AFFECTED BY THE 'PLAINS' SECTION OF THE HEADRACE

- 6.1** Given that the 'Plains' section of the headrace contains most of the farming properties subject to the NoR, it is not surprising that the majority of the submissions from concerned landowners fall within this section.

- 6.2** There will be a loss of productive farmland associated with constructing the headraces. The 38km section across the plains would displace approximately 400 ha of farmland. Some land within the corridor subject to the NoR will be returned to landowners as being surplus upon final confirmation of the position of the headrace canal. The value of lost production from land displaced by the headrace canal corridor will be greatly outweighed by potential productivity increases elsewhere as a result of irrigation. Although there will undoubtedly be wider benefits for the farming community resulting from land use intensification through irrigation, there will be no benefit to the non shareholder landowners.

- 6.3** The potential adverse economic and social impacts of the headrace are much less than for the original proposal including the dam and reservoir. Nevertheless, as suggested by Mr Hardie in his submissions, there may be costs to landowners beyond merely those associated with the acquisition of land and the loss of farming infrastructure within the corridor subject to the NoR. In some cases this may necessitate the total acquisition of badly affected properties.

- 6.4** CPW has committed to undertaking a full purchase where a landowner requests that. We think that this commitment along with the proposal outlined earlier to pay 25% over market value, does go along way to addressing potential economic effects.

6.5 Listed below are all of the landowners whose properties are directly affected by the designation to the extent that it occupies part of their land. These are generally listed in a north to south direction. Most of these are submissions in opposition to both the ECan consents and the designation, but some have only opposed one or the other. We have taken these submissions as opposing the NoR either in full, or with respect to its alignment. Submissions in opposition are identified with an (O).

Waimakariri - Coalgate

AM and AP Bull (O)
Norman Thomas (O)
Philip Thomas (O)
Stuart Redmond (O)
Westacre Farms Ltd (O)
John Robinson (O)
Lochinvar Farms Ltd.
P. and E Limited
Roderick Cameron
Charles Buttle
Malvern Farms Ltd
Peter Morrison
Alastair Cameron
James Le Comte
Cynthia MacKenzie (O)
John Hann
Philip and Jocelyn Deans (O)
Roger Knowles
Timothy and Gillie Deans (O)
James Deans
Louise Deans (O)
Kirkstyle Farm Ltd (O)
Coalgate Reserve Management Committee
Karst Holdings Ltd
Andrew Karst
Louise Hofmeester (O)
Andrew Scott (O)

Coalgate - Rakaia

Anthony and Prudence Thwaites (O)
Roger Taylor
Rendel Foster
Thomas Austin (O)
Corlett Farm Ltd
Nicholas Owers (O)
Stephen Harris (O)
Craig Blackburn
Philip Freeman (O)
Marilyn May
William Rigby
Peter Harris (O)
Stuart Lil
Alister Argyle

Gavin King
Michael McKellow (O)
Michael and Karen Groters
Katharine Foster
Peter Stewart
Ross Manson
Lynton Dairy Limited
Farfield Limited (O)

- 6.6** In addition, there were submissions in opposition from the Selwyn District Council, and the Selwyn Plantation Board. The latter owns a number of parcels of land along the route. There were also submissions in opposition from a few nearby landowners such as Ms de Jong and some residents near Coalgate.

Bull Family Trust - "Glenrowan"

- 6.7** Submissions were given on behalf of the submitter by Ms Jen Crawford, followed by evidence from Mrs Averill Bull. The family farms two properties, Glenrowan (since 1955) and another in the Sheffield area. We visited the affected Glenrowan property and were driven along and viewed the terrace canal route both along the escarpment and where the canal would emerge onto the productive flats which also contained various farm buildings. The submitter stated that the Sheffield property depends on infrastructure on the Glenrowan block for its management. The family's background in the district dates back to the 1860s.
- 6.8** The property is sited between the Old West Coast Road and the Waimakariri River. It is there that the northern headrace emerges from the escarpment up on to the Canterbury Plains. The corridor subject to the NoR affects approximately 100 ha of the Bull property. The property contains highly fertile soils and is managed for sheep and beef breeding with some cropping. Part of the property also includes the face of the river terrace below. The property is quite narrow, which accentuates the effect of the NoR.
- 6.9** The property would lose all or some of the following facilities - a large modern wool shed, sheep and cattle yards, workshops and sheds, haybarns, a grain silo, a cottage, fencing and importantly, a large shelter belt along the top of the terrace. The Bulls would prefer that the headrace be piped or tunnelled through their property from the upper part of the escarpment. In their opinion the current proposal would result in the farming operation on the property becoming uneconomic, even with irrigation from the scheme. We were told that these

ongoing concerns with the project had created a great deal of uncertainty and stress for the family.

- 6.10** According to Mr Lewthwaite, the generous width of the headrace corridor covered by the NoR allows for some flexibility in terms of minimising effects on the Bull property, i.e., by avoiding the location of certain buildings or providing for their relocation elsewhere on the property. He indicated that subject to final design work, it would be possible to reduce the width of the land subject to the designation, and that existing infrastructure on the property would either be replaced (for example by planting another shelter belt) or could be relocated to another part of the property outside the requirement corridor. In any event, the Bulls will be paid compensation for land lost to the scheme.
- 6.11** In our opinion the impacts on this property are such that despite the best efforts of CPW it is possible that the farm will no longer be a viable proposition, at least in its present form. CPW has indicated that it will purchase the whole of the property if requested and will in any event pay 25% over market value for any land which is purchased. It will also consider other options to allow the Bulls to continue farming the property. We appreciate that this does not meet all of the Bull's concerns, however, we think that in the circumstances this is the best that can be achieved.
- 6.12** It is unfortunate for the Bulls that their property is in a critical position for the project. We are satisfied that CPW has given adequate consideration to alternatives in relation to the imposition of the NoR on this property. CPW has no option but to come through this property if it is to maintain the headrace within the 235m contour and the NoR corridor. We think that CPW has given adequate consideration to the option of tunnelling the part of the canal which cuts through the area near the house and buildings, but we accept that this would be a very expensive option and is not one which we think we should require.
- 6.13** We would encourage CPW to work closely with the Bulls to come up with alternative options which lessen the physical and economic impacts on the property or alternatively undertake full purchase. Should the Bull's wish to move off the property, CPW should also offer to purchase their other property since the two are farmed together. However this is not a matter which we could require through conditions.

- 6.14** We appreciate that if the Bulls are in effect forced to give up the Glenrowan property that will have an adverse social impact on them. However, we do not think that this impact is sufficient for us to require CPW to adopt a very expensive tunnelling or cut and cover operation, nor is it a sufficient basis for us to recommend against the NoR.

Philip Thomas (also on behalf of N. Thomas)

- 6.15** Part of the Thomas property is sited between the Bull property along the river terrace, and Westacre Farms (Judd). The proposed northern headrace passes through the middle of this property, resulting in the loss of productive land and potentially affects the efficiency of farm management. Mr Lewthwaite commented that a realignment of the canal along Bleakhouse Road may reduce the impact on this property, but would require an amendment to the NoR.

- 6.16** Our conclusions in relation to this property are similar to those for the Bulls. We think that these are largely issues for negotiation between the parties. CPW might wish to consider the option of modifying the NoR to reduce the impact. However that will need to be weighed against any impact on other properties. Although we have considerable sympathy for the position of the Thomas' and others in a similar position, we do not think that these effects on these private properties are sufficient to recommend against the NoR. The economic impacts should be addressed by CPW's compensation offer or if necessary the Public Works Act process.

Westacre Farms

- 6.17** This property involves a number of titles and comprises a specialised and intensive agricultural operation with its own independent irrigation supply from the Waimakariri River, and accordingly the owners have no interest in connecting to the proposed CPW system. The submitters are concerned that the canal will fragment the property and make its management (and irrigation using rotorainers) difficult. This is an example where following the 235m contour would unavoidably result in serious severance of different parts of a property, as well as substantial land loss and adverse effects on farming operations. We consider that Mr Lewthwaite's suggestion of amending the NoR to follow the Bleakhouse Road boundary, while still reducing the land area available for

production, would substantially reduce the adverse effects on the economic management of this property.

- 6.18** We think that the submitter's concerns regarding interference with irrigation operations and severance of farming activities have considerable merit. In view of the economic value of this farming operation, and the availability of a potentially much less intrusive option, we recommend that CPW should further investigate the option of modifying this part of the NoR. However, in view of the potential for effects on other properties (which we did not hear evidence about) it would not be appropriate for us to recommend that as a modification to the NoR. If CPW does have to resort to the option of purchasing the entire property and associated irrigation scheme, that would be a very costly option. We think that it should endeavour to adjust this part of the scheme to avoid that scenario. However we are mindful that this may cause equally as disruptive effects on other properties and if that is the case, the option of modifying the NoR would potentially be contentious and require another hearing albeit one confined in scope.

Stuart and Laura Redmond

- 6.19** This property is located on the southwest corner of the Old West Coast Road and Bleakhouse Road. The submitters are concerned that the designation would result in the loss of 6 ha or 17% of their property's total area of approximately 36 ha. The headrace canal corridor passes diagonally across the north eastern half of the property, as does the parallel Selwyn District Council stockwater race. The NoR substantially impacts on a large portion of this property (perhaps more than the estimate given above by the landowner).
- 6.20** It may be possible to relocate the headrace further eastwards adjacent to the existing stock water race alignment which also passes across the Redmond's land, but this would involve going outside the designated corridor. This may however adversely impact on other properties such as the Bull's to the north and Westacre Farms to the south. Given this, and bearing in mind that the Redmond property is already a small landholding, this property is could be a candidate for full purchase by CPW. We also note that this property is also affected by a proposed distribution race.

The Oaks' – Madeleine de Jong

- 6.21** This is a small rural property on the southern side of State Highway 73 near Racecourse Hill, close to where the northern headrace would cross the Main West Coast Highway and railway. It contains a historic dwelling known as "the Oaks" which is used as a boutique bed and breakfast business and for private functions such as weddings. The building is listed for protection under the District Plan, although the adjoining oak tree plantation does not have any recognition under the District Plan. The NoR passes around the northern edge of the property on land owned by CPW shareholders who do not oppose this route.
- 6.22** Ms de Jong is vehemently opposed to the NoR, and like a number of other submitters was a severe critic of the alleged conduct of CPW. She explained that she had purchased and entirely renovated the 'The Oaks' in 2002. She said that her clientele were attracted to New Zealand's "clean green" image, which would be compromised by the construction of a large canal in close proximity to her business. She was also concerned with the impact of construction noise and dust on her business and with the potential loss of the trees on the neighbouring land which would screen the canal.
- 6.23** We visited the Oaks and saw inside the homestead. The Headrace would be approximately 250m from the homestead.
- 6.24** During the period of construction at least, there would likely be an adverse impact on her business. This would be a result of large-scale construction activity which will also involve a crossing of the main highway and railway where these intersect the headrace route nearby. Even allowing for the buffering effect of the intervening copse of oak trees on the southern side of the highway, the presence of construction activity will be readily apparent. We are of the view that CPW should as a matter of priority seek to achieve an agreement with Ms de Jong to compensate her for any loss of business during the construction period and to address landscaping and screening of the headrace in the vicinity of her property. We recommend that CPW avoid destruction of the trees which would screen this property.
- 6.25** We have concluded that in the longer term that the headrace would be unlikely to have any significant impact on the operation of the business or people's

perception of the surrounding environment, provided there is adequate screening and landscaping. Although we fully appreciate that the canal would be an anathema to Ms de Jong who moved to this location because of its unspoiled nature, this is a rural environment and most people including the visitors to her property are likely to accept irrigation canals as being a part of such environments.

Cynthia McKenzie

- 6.26** Ms McKenzie owns a smallholding in Cullens Road, between Racecourse Hill and Homebush, which is rented out. She was apparently unaware of the NoR which she claimed had either not been served on her or was served on the wrong address. Accordingly she had not lodged a submission. We suggested that she make a late submission directly to the hearing. At the hearing, CPW indicated that they it had no objection to her late submission being accepted and we granted a waiver.
- 6.27** During the hearing it was clarified by Mr Lewthwaite that the NoR affected the whole of her property and a parallel portion on the neighbour's land. Following further investigation, he confirmed that Ms McKenzie's property would be required in full for the headrace and that the requirement could be uplifted over the affected part of the neighbour's property.
- 6.28** The reason given for this was the preference of the Selwyn District Council (for traffic safety reasons) to have a level grade at the road crossing of the headrace canal. An alignment avoiding her property would require a 'hump' in the road to cross the canal which would restrict driver visibility. Ms McKenzie's house appears to be the only dwelling on either side of Cullens Road for some considerable distance.
- 6.29** Accordingly we wonder whether adherence to achieving an even road grade on a secondary road in this instance is sufficient to justify both the cost to CPW and the dislocation caused to the property owner. We understand that Ms McKenzie has had tried unsuccessfully to sell the property. Given that the property is an investment property, and that it will be difficult if not impossible to sell while the NoR is in place, we suggested that CPW purchase it as soon as possible. We are hopeful that this will have occurred by the time this decision is issued. We note that Ms McKenzie can as a last resort seek an order from the Environment

Court requiring CPW to purchase the property, however that should not be required.

Rowallan - Philip and Jocelyn Deans

- 6.30** This is the northernmost property along the Homebush Ridge section of the proposed northern headrace canal affected by the canal alignment. The property would also have been affected by loss of land to the reservoir, had the dam proceeded. Rowallan is a 440 hectare property, and the submitters stated that approximately 50 ha of their most productive land would be affected by the headrace which would include the air strip and sheepyards. The landowners are not CPW shareholders and are strongly opposed to the use of their property for the headrace. The submitters explained that they had been operating a farm tour experience for 21 years and that this generated between 6000 and 8000 international visitors per year.
- 6.31** The Deans also considered that the works required to establish the headrace would greatly diminish the scenic appeal of the property, and he drew our of the property on the basis that it had been used on a number of occasions for filming purposes. Damage to Black Stream, mudfish habitat and possible archaeological sites. They drew attention to a letter from "GT Locations" which supported the protection disturbance of Maori artefacts were also raised in the submission.
- 6.32** While it would appear that the headrace would not compromise the viability of this property as a farming unit, we do not doubt that it would have a significant adverse effect on the amenity of the property during the construction period, although probably to a lesser extent than the effects on Auchenflower and Homebush to the south. We consider however, that once landscaping had become established the headrace canal would become an acceptable part of a rural environment, although it will certainly change the character of the property.
- 6.33** We understand the Deans' dismay at this unwanted intrusion on their land and property rights. We have some considerable sympathy for their position, however, we do not consider the impacts on this particular property and on the Deans' wellbeing as being significant enough for us to recommend the withdrawal of the NoR. As we understand it, it is not possible to shift the headrace off the property without realigning the whole route.

6.34 We consider that severance issues raised by the headrace canal with respect to stock movement can be addressed through negotiations and the provision of alternative access by CPW. Apart from this, we consider this as a case of CPW paying compensation for the loss of land on the property and the replacement of infrastructure. As is the case with the de Jong and Homebush properties, we consider there is a case for compensation for loss of visitor revenue.

Auchenflower - Tim and Gillie Deans

6.35 The headrace would cross this property along the base of the Homebush Ridge. The owners considered that the headrace would detract from their well maintained property on the edge of the Malvern Hills, and would have an adverse effect on the amenity of the property itself. They were concerned about property severance and access for stock across the canal, and the appearance of exposed batters associated with earthworks. We visited the property and agree that the headrace would have an adverse effect on the amenity values of the property. Effectively, the headrace corridor runs across the 'foreground' of the property and in many respects the nature of the impact is similar to that experienced by Homebush to the south and Rowallan to the north, but the intensity of the impact on the three is different. The submitters dwelling will look down on the headrace and it will cross the access drive to the house. It is also likely that the works on Auchenflower will be more visible to users of the road between Sheffield and Coalgate than on Homebush.

6.36 This is another example of a property where the landowners are unsurprisingly strongly opposed to the NoR. Consistent with our comments in respect to other properties along the base of the Homebush Ridge, we are of the view that while the disruption to the property during the construction period will be severe, it will be relatively short-term. We consider that with time and revegetation, the canal will become part of the rural landscape albeit not one which is likely to be acceptable to the owners. We consider matters relating to access across the canal can be resolved through negotiation. Once again, we have some considerable sympathy for the position Tim and Gillie Deans find themselves in. We urge CPW to endeavour to reach a fair settlement in relation to Auchenflower and Rowallan as soon as possible after the NoR is confirmed.

Homebush (James and Louise Deans)

- 6.37** Homebush Estate, with its historic dwelling and historic farm buildings is the southernmost of the three “Deans’ properties. Mr Deans is a shareholder of CPW and is agreeable to the route chosen by CPW through the property. Mrs Deans is joint owner of the property and submitted in opposition.
- 6.38** The Homebush Estate is a historic property comprising 530 ha of land. In order to avoid the Homebush heritage buildings and frontage, the canal would be cut into the hillside behind Homebush homestead and largely if not wholly out of direct view from the homestead and other heritage buildings. The proposed earthworks are quite significant in scale.
- 6.39** We visited this location on foot and subsequently sought more details from the applicant. These were provided by Mr Lewthwaite. The length of the proposed cut is about 800m and would be up to 30m deep. Within an area to the north side of the homestead at Homebush where the cut would commence, a small area of mature exotic forest would be destroyed. We accept that these plantings, some of which are very old, have landscape and heritage values.
- 6.40** At the southern end of the proposed cut the canal would emerge from a small side valley and would slightly affect an area of mature exotic trees, as well as other established vegetation further to the north. There are no less than 13 listed "heritage trees" on the Homebush property, of which 5 appear to be in the general vicinity of the proposed headrace. Mr Lewthwaite claimed that none of the listed trees would need to be removed in order to construct the headrace.
- 6.41** The property has been in the Deans family since 1851. We heard evidence from Mrs Louise Deans who explained the property’s heritage values which include:
- the historic homestead and farm buildings;
 - the museum; and
 - the mature stands of European trees planted from the mid-19th century onwards.

- 6.42** Ms Deans stated that 23 people were employed on a casual basis in association with activities on the property. The museum on the site is open to the public and the grounds are used for weddings. Mrs Deans, who is an ordained minister, holds wedding ceremonies in a grove of large majestic trees to the north of the homestead. Our understanding is that the headrace canal will pass close to, but not through, this feature.
- 6.43** Mrs Deans is opposed to the headrace because of the effects which it would have on the heritage and amenity values of the property as well as its effects beyond the property. She is particularly concerned with the destruction of some of the mature trees and the expected visual impact of the earthworks. In particular, she holds serious concerns about the effects on the heritage buildings. We do however note that it appeared that Mrs Deans was not entirely clear as to the proposed location of the headrace. The route does not impact directly affect any buildings or heritage features on the property apart from a small area of the northern bush. CPW proposes costly and extensive works to avoid the homestead area and the bush to the south. We think that it is unlikely that visitor activities currently undertaken, will be adversely affected, except perhaps during the construction period.
- 6.44** The construction of the proposed headrace through the valley behind the homestead will be a costly exercise. An alternative option would be to bring the headrace out to the east on the flats on the front edge of the property north of the frontage road (State Highway 77). A variation on this was suggested by Mrs Deans in the form of an alignment on the southern side of State Highway 77. However, either option 'over the flats' would require an embankment between 7 and 17m high (with an accordingly wider footprint) which although avoiding the Homebush Ridge, would be far more visible to passing traffic or to visitors to Homebush. Such an alignment would also be outside of the current NoR corridor and would affect different landowners.
- 6.45** Mrs Dean's was also (understandably) concerned about the potential for vibration from construction works to adversely affect the structural integrity of the fragile heritage buildings on the property. However our understanding of the nature of the construction activity (which does not involve activities such as blasting or pile driving) will not create ground movement which would have a discernible effect on the heritage buildings.

6.46 Our overall conclusion in terms of Homebush is that the proposed route will not detract in any significant way from the heritage values of the property. Mrs Deans has been a driving force in developing the property as a visitor attraction and in ensuring that its heritage values are enhanced. Her concerns are understandable, however in the context of the scheme overall, we have concluded that the impacts on Homebush are not sufficient of themselves to require us to recommend against the Notice of Requirement or to recommend that the route be adjusted. We understand that the project will not compromise the viability of the property is a farming enterprise and indeed the property will benefit from irrigation water and a dam which will be built behind the headrace embankment. None of the heritage building will be affected and as far as we could tell the headrace will not be particularly visible from the drive used to access the homestead and heritage buildings.

Effects on heritage and landscape values in the Homebush area.

6.47 There is no doubt that the scale of the earthworks at Homebush and generally in the Coalgate area will be significant. The proposed works will be visible from part of the former State Highway 72 and from a section of State Highway 77. Mr Glasson was of the opinion that the visual impact of the headrace canal would be absorbed into the environment through revegetation, albeit visible as a distinct "line" in the landscape. However we note that he provided no visual simulation of this part of the route.

6.48 We also heard more detailed evidence from Ms Di Lucas, a landscape architect called by Malvern Hills Protection Society. In the conclusions to her evidence in chief (paragraph 2) she said "*the associated villages and rural landscape is a heritage landscape of significance that should be considered as a matter of national importance*" She was of the opinion that the "*greater Homebush landscape is a cherished place for its heritage landscape values....*".

6.49 She emphasised the association of the Deans family with the area over many generations. By way of example she cited the Rowallan, Kirkstyle and in particular Homebush Estates, as examples of what she considered to be landscapes having strong heritage and aesthetic values.

6.50 Ms Lucas drew attention to the existing and potential tourist value of this area, and was of the view that the headrace would be very disruptive, particularly in

terms of effects on the mature pastoral and treed landscape. This was strongly supported by a number of affected landowners, particularly Tim and Gillie Deans and Mrs Louise Deans.

6.51 Mr Craig agreed that this area had heritage significance, but he and Ms Lucas disagreed as to the importance of this. Mr Craig was of the view that other parts of the plains and foothills also had heritage significance, which formed part of an ever evolving landscape. Ms Lucas countered that this area of the Malvern Hills had quite unique qualities which set it apart from the rural farming environment generally.

6.52 While we appreciated the point Ms Lucas was making, we do not agree that this is a section 6 matter. Section 6 of the RMA requires us to recognise and provide for:

.....

"(f) the protection of historic heritage from inappropriate subdivision, use, and development".

6.53 We are not convinced that section 6(f) requires us to protect *heritage landscapes* as opposed to heritage buildings, sites and perhaps areas. Whilst we accept that the landscape provides context to heritage values, we do not think that this is a heritage landscape, or if it is, that section 6 (f) is applicable. In the alternative, we do not see the headrace as an "inappropriate development" given that it avoids the heritage buildings.

6.54 We also note that the area has not (with the exception of the listing of particular buildings and trees) been given any particular statutory recognition as a landscape under the regional or district planning provisions.

6.55 In any event, in our view the headrace canal of itself (allowing for the eventual maturity of landscaping) will not be perceived by most people to overly detract from the heritage values of the area. While during the construction phase and for an initial period following completion, the headrace canal will undoubtedly detract from amenity values of the landscape, we do not consider this to be sufficient in itself to recommend against the NoR.

- 6.56** We also note that much of what is currently valued (for example the highly modified "English" nature of the environment around Homebush) is of itself the result of substantial modification of the original natural environment. The proposed headrace and distribution race system would also represent another modification of the rural environment. The valued components of the landscape are those that have developed over time as a result of European settlement and farming activity. With the passage of time, landscaping and revegetation will soften what will undoubtedly be a changed environment as a result of the establishment of the headrace canal.
- 6.57** The presence of archaeological sites reflecting early Maori occupation in the area along the base of the Homebush Ridge was also raised in submissions. Five 'identified' sites on the Homebush property, and another four near Auchenflower Road towards the northern end of the Homebush Ridge (mostly remains of ovens) are notated under the District Plan, but again without any semblance of accuracy. It seems likely that one or more of these sites will be affected by the headrace canal, and we consider that a further detailed field survey of archaeological sites along the Homebush Ridge section of the headrace route will be necessary.

Farmers Group - Southern Headrace (Mr James Deans)

- 6.58** Mr James Deans was spokesman for this group, and is the co owner of Homebush. We understand that his own position in respect to the CPW project is one of qualified support. Some of the concerns of these parties (particularly Sheen/Broughton/Cridge - see below) were related to the proposed dam, and emergency discharges from it, which are no longer relevant given the withdrawal of that part of the scheme.
- 6.59** The other concerns of the group relate to the engineering details of the design and placement of the headrace between Homebush and Rowallan Roads, and also south of the Selwyn River. Matters raised in respect to the headrace include the need for close consultation over final design, attention to culvert design, limiting emergency discharges to the Selwyn and Hororata Rivers to prevent catastrophic damage to farms in the event of a canal breach, extending the coverage of the scheme to include land in Deans Road and the Homebush area, restricting public access along the headrace canal, and the need to have double sided impoundment structures where the headrace crosses streams or

gullies. We understood the latter issue was based on concern that the headrace canal structure must remain secure where it crosses side gullies during flood events in the Malvern Hills.

- 6.60** Mr Lewthwaite, with some minor qualifications, supported or accepted the contents of the submission, and was of the opinion that the design had the flexibility to address the concerns raised through negotiation and management plans. We were satisfied that the outside face of the canal can be protected through engineering design and practice, from erosion and scour from the streams crossing the canal.

S.J. Sheen (Hacketts Road)

A.K. Broughton (Waireka Road)

E.J. Cridge (Coaltrack Road)

- 6.61** This group of landowners made a joint submission in support of the CPW project, qualified only by measures to manage flood discharges to the Waianiwiwa River as a possible consequence of the now withdrawn scheme for the dam. The properties of these landowners adjoin this waterway. They sought that the mean annual flow of the river be maintained (or even augmented) provided it remains at less than 10 cumecs. This would require a modification of CPW's suggested conditions of consent, and Mr Lewthwaite was supportive of the proposals in their submission. As the dam will no longer interrupt the natural flows of the Waianiwiwa River, the flood flows in the river will not be modified by the scheme.

Bennelong Park - John and Rosalie Austin

- 6.62** This property is located near Hororata north of Downs Road, and adjacent to Aitkens Road at the base of the Harper Hills adjoining the proposed headrace. The submitters wanted a small triangular shaped portion of their land excluded from the NoR and other adjustments made to the route of the canal. In order to follow the 235m contour, the headrace would have the effect of virtually bisecting this property, which has been developed as a deer farming unit. Mr Austin also referred to an additional property he owns further north on the corner of Thwaites and Hawkins Roads which is affected by the northern headrace. He expressed dissatisfaction about the level of resourcing that CPW had provided for the consultation process, and stated that CPW had undertaken

no consultation at all relating to the Hawkins Road property. However matters relating to that particular property were not expanded upon further during the hearing.

- 6.63** His specific concerns were about the effect of the headrace canal in respect to deer fencing, farm severance and access across the proposed headrace canal, and ponding of water adjacent to the canal where it crosses gullies -a similar concern to that raised by the “Farmers Group -Southern Headrace” above.
- 6.64** Mr Austin stated that over time he had moved from a position of support for the project, to one of firm opposition. He complained that a lack of detail from CPW and their desire for the NOR to be confirmed prior to its physical details being finalised, had placed him in an invidious position in respect to negotiation and compensation.
- 6.65** Mr Lewthwaite responded that only minor changes could be made to the alignment of the canal in respect of the Austin's property because of engineering constraints resulting from topography and the need to maintain reasonable adherence to the 235 m contour. He added that CPW wished to avoid potential adverse effects on adjoining landowners resulting from a change to alignment, and that further discussions would have to follow detailed design. Mr Austin drew our attention to earlier correspondence with Mr Lewthwaite, which indicated that from an engineering perspective the Austin property was one of a small number of properties which raised significant challenges for CPW in terms of how to minimise the effects of the canal alignment. The contents of this correspondence, reproduced in the evidence submitted, indicated that a detailed analysis was not carried out because CPW's advisers were subject to severe time constraints.
- 6.66** The submission was another example of the conflict between the approach of CPW in not finalising details of the project prior to confirmation of the NoR, and on the other, the understandable frustration of landowners who suffered a lack of certainty in terms of the future management of their properties. Similar issues arise with other properties such as Westacre Farms. In our view it is essential that this uncertainty be put to rest as soon as possible after the confirmation of the NoR (assuming that it is confirmed by CPW or the Environment Court).

6.67 Unfortunately, in the case of this particular property, it seems clear that any canal alignment reasonably close to the 235m contour will have an adverse affect on this property. This is another instance where it comes down to a matter of compensation, provision of adequate access across the headrace canal, and replacement or compensation for infrastructure affected by the project - or conceivably even purchase of the entire property.

6.68 Ultimately if the landowners are not happy with what CPW finally proposes, then it will be bound by its commitment to, if requested, purchase the whole of the property at market value plus 25%. Again we have concluded that the likely adverse effects on this property though significant, do not require us to recommend the withdrawal of the NoR.

Manson Dunfield - Rodney Booth, Ross Manson, and Margaret

6.69 This is a large property which would be bisected by the southern headrace in the vicinity of Steeles Road between Hororata and the Rakaia River. The submitter's are strong supporters of the proposed scheme, but as a matter of detail wanted one or more crossings of the headrace canal to be bridges with a width of 20 m. Mr Lewthwaite stated that he considered that crossings of this width were unnecessary, and from previous experience a width of 4.8 m would be adequate.

6.70 We consider this is not a significant issue in the context of the NoR as a whole, and in the absence of evidence supporting the need for a very wide internal farm bridge crossing the canal, we concur with Mr Lewthwaite's view that while more than one crossing may be justified on a property of this size, the width sought by the submitters is unnecessary, unless there is some specific need, such as the use of overwidth machinery on the property, which might justify a wider crossing. We are of the view that this is a matter of final design which can be resolved as part of the inevitable negotiation process.

Christopher Dennis

6.71 Mr Dennis was not a directly affected landowner, but had lived in the district for many years. He was concerned about the fate of the "Church of the Open Door" at Te Pirita. At the hearing it was confirmed that the headrace canal will not pass through the church property.

Other properties

- 6.72** A number of other submitters whose properties are directly affected did not appear at the hearing. However, we have taken the original submissions of these parties into consideration.
- 6.73** Kirkstyle Farm on the northern edge of Coalgate strongly opposed the NoR, although the major effects on this property were caused by the proposed dam, which is no longer proceeding. In the absence of information to the contrary, we have assumed that their opposition to the headrace remains. Again we conclude that any effects are not sufficient to defeat the proposal.

7. THE COALGATE SECTION OF THE 'PLAINS' HEADRACE

- 7.1** We consider it is appropriate to address specific effects adjacent to the village of Coalgate, which is the only rural township in close proximity to the headrace. Coalgate is located at the throat of the Selwyn River Valley where it exits from the Malvern Hills. The canal would need to be elevated at this point where it crosses the valley between the Homebush Ridge and the Harper Hills, as a route following the contour would take the canal through the middle of the village. Instead, it passes along the edge of a reserve on the eastern side of the village. We understand that the embankment will be approximately 3m in height where the canal is crossed by State Highway 77 and approximately 5m in height where it is crossed by Coaltrack Road.
- 7.2** We heard evidence from the Coalgate Township Committee and at least four residents who specifically expressed concerns with respect to the canal and the visual effect of its height at this location. Generally, these concerns were expressed as a subsidiary point to the much greater degree of opposition to the now abandoned dam component of the scheme. Concerns about the headrace canal were at a lower level (at least in terms of the volume of evidence and the number of Coalgate submitters who appeared), but we still acknowledge that concerns were held by some residents. Landscape evidence relevant to the headrace at this point was also given by Ms Lucas and Mr Glasson, with the latter presenting photomontages of how the embankment might look as seen from Coaltrack Road and State Highway 77, through his evidence in reply.

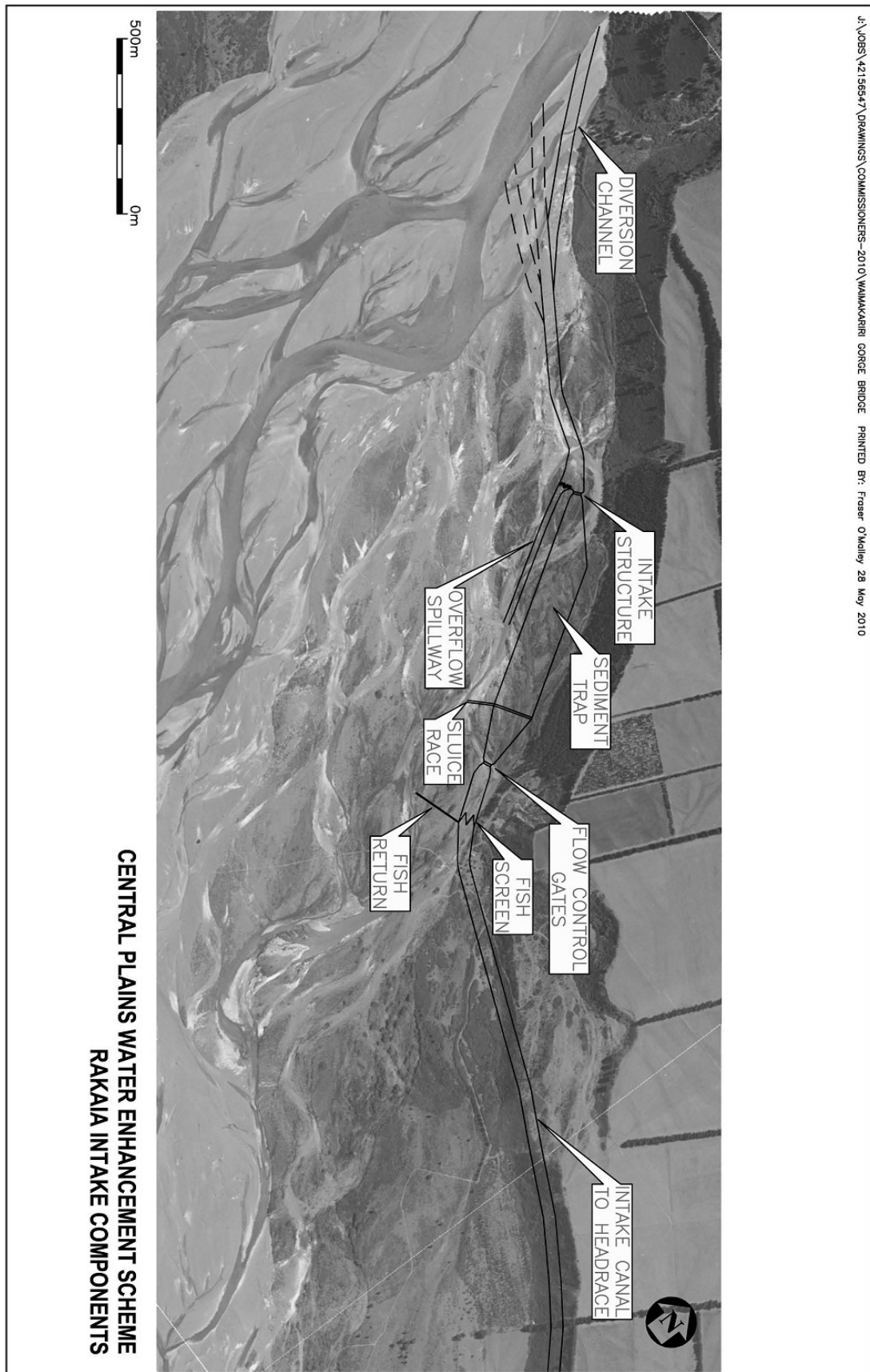
- 7.3** The primary concerns related to the visual impact of the embankment given its height, the effect on the use of the adjacent Coalgate reserve, public safety associated with possible breaches of the canal, hazards to children, and construction effects associated with dust and noise. One submitter, Ms Liz Weir, described the canal as forming part of the "Great Wall of Coalgate".
- 7.4** It seems clear to us that without changing the adopted contour of the entire headrace route, there would be no practical alternative which did not involve passing through the village itself or involving an even higher embankment. We considered whether these effects on Coalgate were enough, in combination with the other adverse effects along the headrace route such as those on Homebush, to justify a recommendation that the NoR be withdrawn.
- 7.5** While we accept that the canal will be a significant visual feature particularly as viewed from Coaltrack Road and the reserve, we concluded that this effect would not be unacceptable in a location peripheral to the township and dominated by a rural environment. We acknowledge Ms Lucas' observation that the canal would be wider than the RDR in Ashburton District, and that its elevation will result in the canal having an even larger footprint than elsewhere on the plains.
- 7.6** The primary adverse effects will undoubtedly occur during the construction period. We consider that in the longer term the visual impact of the canal with its grassed flanks will not be a detrimental intrusion into the rural environment. With respect to views from the village, its location on the eastern side of the village means that it does not interrupt the outlook of residents towards the foothills of the Southern Alps.
- 7.7** To the south of Coaltrack Road, the canal alignment moves westwards up to a point approximately 100m downstream of the road bridge on the southern edge of Coalgate. The Selwyn River normally has permanent flowing water at this point, and is flanked by tall stands of willow trees. The construction of the siphon will significantly disrupt the river environment, but once again the adverse visual impacts are expected to be only temporary.

8. THE RAKAIA INTAKE AND TERRACE CANAL

Description

- 8.1** This part of our discussion, concerns the Rakaia River intake and terrace headrace. Many of the issues arising with respect to the Waimakariri terrace headrace are common to the Rakaia, so this part of the assessment is brief.
- 8.2** The Rakaia intake works and terrace canal would be similar to the proposed Waimakariri head works downstream from its intake point, and the consented ACWT works which start at an intake approximately 1km diagonally upstream on the south bank of the Rakaia. The intake and associated downstream infrastructure are shown in **Figure 5**.

Figure 5



8.3 The diversion would take place from a bend in the Rakaia River on the northern bank, approximately 8km downstream from the Rakaia Gorge Bridge, with the associated sediment trap, overflow spillway, intake structure and fish return. After leaving the scrub vegetation alongside the river, the Rakaia terrace canal begins a long (11.5km) 'ascent' from the river flats up the river terraces. The Rakaia River is deeply incised at this point on the Canterbury Plains and is approximately 70m high at the upper end of the headrace, and 40 m high 8 km downstream. At this point, the high terrace breaks into a series of smaller terraces which are traversed in turn by the headrace for about 3.5km until it reaches the plains at Steeles Road.

8.4 This section of the headrace will initially involve significant earthworks and passes below the site of an old quarry called the "Curiosity Shop", which contains remnants of indigenous vegetation and fossilised remains. There are also other small patches and specimens of remnant indigenous vegetation along the escarpment and terraces with similar species to those found on the Waimakariri River terrace. Some quite old woody specimens are likely to be present, although there is not a great deal of information available as to the extent of indigenous vegetation.

8.5 The diversion of flow from the Rakaia River into the CPW scheme would take place from a bend in the Rakaia River on the northern bank. The flow would be diverted by the inlet channel into the sediment pond and the associated facilities comprising an overflow spillway, fish screen, fish return channel and the control intake structure into the headrace canal. Key related issues considered and described for the Waimakariri River intake also generally apply at this site, and are discussed below.

Properties affected by the Rakaia Terrace Canal

8.6 The property owners affected by the Rakaia Terrace canal are as follows:

- Canterbury Grasslands Partnership
- Thomas Abbott
- Harold Oakley
- Noel Penney
- Allan Richards

- Bruce MA Limited
- Selwyn Plantation Board

8.7 Canterbury Grasslands and Oakley opposed the NoR.

Tom Abbott

8.8 Mr Abbott lodged a submission in support of the scheme. He farms 115ha in Sleeman's Road adjacent to the Rakaia River, and stated that the canal will result in the loss of 21 ha of his property. Although his submission was in support, his presentation to the hearing focused on concerns relating to loss of land. This property appears to be located on that part of the Rakaia terraces where it splits into parallel sections towards the lower end of the terrace headrace. Physically, the configuration of this property bears some general similarities to that of the Bull's property along the Waimakariri River, but it does not appear to suffer such significant effects on farm infrastructure. This property is significantly smaller than most of the other very large farms that have historically developed on the light soils of the Te Pirita area, and is severed lengthwise by the proposed headrace canal where it passes along the terraced escarpments adjacent to the river. It would also result in the loss of 3.8km of shelter belt planting, and the submitter sought to have the NoR realigned onto a neighbour's property.

8.9 This is yet another example of where the NoR will result in a significant loss of land from a property, which could potentially call into question the viability of the farming operation upon severance and loss of land. This is essentially a matter of negotiation and compensation which may include a need for acquisition of the whole property. Given the position of the proposed headrace on the escarpment at this point, we doubt whether the alignment could be substantially changed, and certainly not outside the corridor onto adjoining land without a further statutory procedure being required.

Other effects

8.10 The effect on the very large Oakley property (a submitter in opposition) appears to be confined to the southern margin of the farm along and adjacent to a steep section of the river terrace, which was apparent to us during a site visit. The primary impact will be large-scale earthworks which will likely result in the loss

of some grazing land on the paddocks high above the river. There is a similar effect on the property of Canterbury Grasslands Partnership which adjoins the Oakley property to the east. On this property, the headrace canal begins its traverse of the parallel terraces. We doubt whether the land occupied by the headrace would have a significant long-term effect on the viability of either property, and we see this as a matter of compensation, and in the case of Canterbury Grasslands in particular, addressing the issue of land severance.

Kayaker and recreational user safety

8.11 This site has different issues associated with kayaker safety than the Waimakariri site due to the nature of the river near the intake point. At this site the major concern expressed by the kayakers was the potential for kayakers to be carried into the inlet channel by the river diversion, rather than the concerns at the Waimakariri site, which hinged around the implications of the intake being set in a rock face. It was accepted that currently there is relatively little use of this part of the river by kayakers.

8.12 The Rakaia site involves the operation of a channel diversion from the river and the nature and scale of the diversion will fluctuate during and after flood flows in the river. When the inlet diversion channel has increased flows, there is a risk that inexperienced kayakers may not be able to avoid the diversion channel. This would necessitate the inclusion of appropriate facilities for the kayaker to get out of their craft safely, probably within the settling pond where the velocities are lower, and return to the main river flow without undue difficulty. There was some acknowledgement that there was the potential to construct a purpose built return channel which might provide an “added kayaking experience” and CPW was not closed to exploring this with the kayakers during the detailed design stage. We are satisfied that the risk to kayakers can be managed sufficiently via conditions to ensure that kayaker safety is not compromised.

Fish Screening

8.13 The issues relating to fish screening at this site are almost identical to the Waimakariri Intake situation and do not need to be repeated in this section. The proposed conditions provide a management regime for ensuring that the extent of fish loss from the river is acceptable. This is backed up by a maximum slot/gap size specification.

Instream Works

- 8.14** The extent of in-stream maintenance work to maintain a flow at the entrance of the diversion channel will require occasional use of a bulldozer to reshape the channel in the river after a flood event. Mr Lewthwaite stated that he anticipated this work would be carried out 4 to 5 times a year but conceded that the frequency will not be really known until actual operation of the intake. This is because the frequency will depend on the nature of the flood events, the extent of natural tendency for the river to change course (which is a function of the particular site) and the specifics of the bed-load sediment movement and erosion forces in the river at the time of the flood. The duration of the river training work is only expected to be a few days and the work would not be obvious from the lookout above the Gorge Bridge some 8km upstream.
- 8.15** It is also anticipated that similar activity will be carried out further upstream as part of the operation of the ACWT/Barrhill water take.
- 8.16** On balance, we concluded that the scale and nature of the work required to maintain the channel inlet would not be significant and the conditions have been developed to manage additional adverse effects if the operation of the scheme demonstrates that the frequency of river maintenance work is significantly more than currently anticipated.

Sediment Flushing

- 8.17** The sediment flushing from the settlement pond will be similar to the Waimakariri site and will involve regular flushing of the pond to return settled sediment back to the river. Some of the settled sediment will be removed by mechanical excavator. The flushing activity has been restricted to times of high river flow in order to minimise increased turbidity in the river at times of flushing.

Effects on Landscape

- 8.18** One significant difference between the CPW works and the ACWT works on the south bank, is that the ACWT canal remains on the lower river terrace until downstream of Highbank, after which it begins to traverse the (by then significantly lower) escarpment. In contrast the CPW terrace canal begins to

"climb" the escarpment some 10.5km downstream of the Gorge Bridge. As noted earlier, the single high escarpment above the intake site eventually splits into a series of lower terraces further down the river which the terrace headrace traverses as it angles further away from the river itself. The scale of the escarpment downstream from the intake site is such that the earth works involved - and hence the visual impacts will be substantial.

8.19 We viewed the proposed site from the Rakaia Gorge viewpoint and from farmland at the top of the northern river terrace above the site of the intake and sediment pond. We also viewed the intake site and the river terraces downstream from a jetboat.

8.20 Mr Glasson provided a photo simulation from the Rakaia Gorge Road lookout on the north bank. Mr Glasson's opinion was that with time vegetation would re-establish on the cut and batter slopes. Mr Glasson noted that the view from this point would be very distant, and absorbed in the general vastness of the surrounds.

8.21 Ms Lucas was of the view that the river downstream of the Rakaia Gorge Bridge was an outstanding landscape with high natural character. Ms Lucas considered that the likely effect of the earthworks on features such as the "Old Curiosity Shop" had not been addressed. She was critical of the lack of detail regarding landscaping and was sceptical about the prospects of that being successful given the scale of earthworks and the hostile environment for plants to establish.

8.22 Mr Craig noted that the material and plans supplied did not include any cross-sections showing the effects of earthworks and the extent of cut and fill involved (this was later the subject of further evidence from Mr Lewthwaite). It appeared to be common ground among all three witnesses, albeit qualified in Ms Lucas' case, that the local impact of intake point itself and diversion at the Rakaia River site would not have a significant adverse effect on the landscape. The level of concern with the visual impacts of works on the Rakaia escarpment was less than those expressed about the Waimakariri escarpment.

8.23 Adopting a holistic approach one could regard the whole of the river from the mountains to the sea to be an outstanding environment. However, in our view, although the braided nature of the river is an outstanding feature recognised and protected by the Rakaia Water Conservation Order (although not from the

Selwyn District Plan), the adjoining escarpments are not of themselves outstanding until one approaches the gorge area. The northern escarpment upstream of the ACWT intake is particularly impressive and both escarpments near the bridge form part of the gorge feature.

8.24 By the time one reaches the proposed CPW intake site 8km downstream of the bridge, the escarpment is not quite so impressive and is more associated with the surrounding farmed landscape in contrast to the escarpments upstream which help frame the gorge. This section of the Rakaia River appears to receive much less use than the Waimakariri River, and is part of an environment which is not frequented by the public to the same extent. In this case we tend to agree with Mr Glasson that the terrace headrace, which in turn is downstream from the intake point itself, would be a very distant feature which would be largely absorbed into the expansive and distant landscape as seen from the Rakaia Gorge Road. This particular vista is of some significance because of its iconic status as a Canterbury mountain and river scenic viewpoint. The closest public viewpoint readily accessible by road would be from the Highbank power station opposite.

8.25 We conclude that the effect of the proposal on the river escarpment (in addition to possible works on the south bank of the Rakaia associated with the ACWT project) will have a significant visual impact. However we consider the landscape quality of the affected environments is not outstanding. We have concluded, that with the passage of an (albeit considerable) period of time, the disturbance created by the substantial earthworks involved will eventually "heal". This will however involve a major and expensive commitment to compensatory replanting in a harsh environment and this is included as a number of requirements of the management plans and the conditions of consent and recommended conditions of the NoR.

Effects on access by anglers

8.26 A further matter was raised by Fish and Game and witnesses for the New Zealand Salmon Anglers Association, who referred to the potential for construction works and the headrace canal to obstruct access to the north bank of the Rakaia River. This was raised as a particularly important issue in respect of vehicular access from Steeles Road and Sleeman's Road. Some anglers have access to jet boats to enable them to reach their preferred sites; but those

who rely on vehicle access were concerned that this could be cut off by the headrace canal.

- 8.27** In our view, this matter will be adequately addressed by condition requiring that a bridge capable of accommodating one-way vehicular traffic be provided at specified points, so that public vehicular access that is currently available from the end of any legal road to the Rakaia River would remain. We note however that there will be temporary interference during the construction period. We recommend that CPW work with the anger organisations to minimise any such impacts.

Conclusions in relation to the effects of works covered by the Notice of Requirement

- 8.28** There is no doubt that the works covered by the Notice of Requirement from the mid point of the Waimakariri River to the mid point of the Rakaia River as described above will be a massive undertaking. These works will have significant effects during construction. The works will also have more than minor adverse effects on landscape and amenity values at least in the medium term, and will permanently change the character of the receiving environment. Many properties are affected and in some cases there will be significant adverse effects on the amenity values enjoyed by the owners/ occupiers and visitors. There will also be significant disruption to farming operations on some properties.

- 8.29** Notwithstanding this, we have reached the conclusion that the overall benefits of the project are such as to outweigh these adverse impacts. We are satisfied that adverse effects can be adequately mitigated or remedied but in many cases not avoided. We have addressed the other section 171 assessment criteria in Part 1 of this decision. On balance, we have decided that we should recommend that CPW confirm the Notice of Requirement on the basis of the recommended conditions set out in **Part 11** In making this recommendation we specifically acknowledge the significant effect the NoR has had and will continue to have on some landowners. We appreciate and understand those concerns but in the final analysis in this case (unlike the dam and the reservoir) we do not consider that these effects are sufficient to warrant us recommending CPW withdraw the scheme.

Independent Commissioners 28 May 2010



Philip Milne (chair)



Bob Nixon



Andrew Fenemor



Ray O'Callaghan

IN THE MATTER OF the Resource Management Act 1991

IN THE MATTER OF applications by Central Plains Water Trust to:

Canterbury Regional Council for resource consents to take and use water from the Waimakariri and Rakaia Rivers for the Central Plains Water Enhancement Scheme and for associated consents required for the construction and operation of the Central Plains Water Enhancement Scheme

AND

IN THE MATTER OF applications by Central Plains Water Trust to:

Selwyn District Council for resource consents to construct and operate the Central Plains Water Enhancement Scheme

AND

IN THE MATTER OF a Notice of Requirement by Central Plains Water Limited to:

Selwyn District Council for the designation of land for works associated with the construction and operation of the Central Plains Water Enhancement Scheme

**JOINT DECISION AND RECOMMENDATION OF
INDEPENDENT COMMISSIONERS
28 MAY 2010**

PART 5

The Distribution Network

GUIDE TO DECISION DOCUMENTS

- PART 1** – Introduction, Part II RMA, assessments, objectives and policy summary, conclusions, decisions and recommendations
- PART 2** – Disputed conditions
- PART 3** – Beneficial, economic, social and cultural effects of the scheme
- PART 4** – Intakes and headraces
- PART 5** – Distribution network
- PART 6** – Waimakariri and Rakaia takes
- PART 7** – Use of water
- PART 8** – Objectives and policies
- PART 9** – Regional Council consents and conditions
- PART 10** – Selwyn District Council consents and conditions
- PART 11** – Recommendations to Central Plains Irrigation Limited in respect of Notice of Requirement and Conditions
- PART 12** – List of hearing dates and appearances

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1. DESCRIPTION OF THE DISTRIBUTION RACE SYSTEM

- 1.1** This part of our decision relates to the proposed distribution race system which fans out from the intended headrace, across the plains largely downgradient of the headrace.
- 1.2** CPW has sought resource consent from the Selwyn District Council (SDC) for 423 km of distribution races and 15 km of piping to distribute water from the headrace to 60,000 ha of land within the command area. This is in addition to the 62 km system of the terrace canals and headrace for which CPW has lodged a notice of requirement (NoR). In relation to the distribution system, CPW has not sought to designate and has indicated that it does not intend to utilise the Public Works Act (which is potentially available to it even without a designation since it is a Network Utility Operator).
- 1.3** CPW advised that it will only locate the system on land where it has an agreement with the landowner. Such agreements will not be sought until consents are finalised. This of necessity means that if there are changes to race location there will need to be further consent applications in relation to any other properties which become affected as a result. We record that we have assessed the social impacts of the race system on the basis of the assurance by CPW that it would not seek to utilise the Public Works Act to compel agreements with landowners.
- 1.4** The distribution race system was described in the evidence of Mr Walter Lewthwaite for CPW. For the purposes of this assessment, we have taken the distribution network as publicly notified, on plans prepared by URS New Zealand, entitled "*Distribution Network Overview Map, Revision B*". During the course of the hearing, it appeared that in some cases submitters were relying on earlier versions of the maps of the distribution races, which may have caused a degree of confusion. We also note that the distribution system we have considered is in most parts an open race system, but CPW wishes to keep open the option of piping some or all, of the system.

1.5 There are six basic components of the distribution race system. These are as follows:

- Springfield area: This comprises 32 km of races with water to be pumped from the headrace canal below Sheffield to 5000 ha of land.
- Sheffield area: This is bounded by the Waimakariri River and Homebush Ridge, and is located above the headrace. It comprises 5100 ha and 20 km of races. Water will be pumped from the headrace.
- Darfield area: This is a much larger area bounded by the Racecourse Hill/Hawkins River/Waimakariri River and by an irregular line extending from West Melton to Burnham. It comprises 32,500 ha with 150 km of races.
- Central area: This is a V-shaped area bounded by the headrace, the Hawkins River and the Hororata River. It comprises 12,000 ha with 56 km of races and 1.2 km of piping.
- Windwhistle area: This is bounded by the Rakaia River, the headrace canal and Washpen Creek. It comprises 9200 ha and will be served by 32 km of races and 14 km of pipeline. Water will be pumped from the southern part of the headrace network.
- Te Pirita area: This is another very large area bounded by the Hororata River, the headrace, the Rakaia River and State Highway 1. It comprises 33,900 ha with 153 km of races.

1.6 Although attracting much less attention than the works associated with the headrace designation, and being dispersed over a very wide area, the distribution network will be quite a substantial engineering undertaking. The distribution races will have a base width of between 1.2 and 3m, a surface width of between 6 m and 13 m, and an overall 'footprint' width of between 14 and 27 m, averaging 14 to 16 m.

1.7 Works associated with the distribution network include numerous bridges and culverts to provide access across the races into farms, or between different parts of farms; culverts and bridges under the road network within the area; drop

structures; farm turnouts; weirs; gates and pump stations. The downstream terminals of the distribution races will have 12 bywash points, two adjacent to the Waimakariri River, one adjacent to the Rakaia River, and the other nine adjacent to the Selwyn River and its tributaries. There will also be 14 emergency bywash points.

1.8 An initial process was undertaken by CPW involving consultation with farmers and the Ritso Society. The guidelines for the development of the network were circulated to shareholders in mid-2006 and comprised the following features, as further amended following consultation:

- *Races will be put in paper roads where possible.*
- *Races will be out of road reserves because they are generally too large to fit there (so will generally be on private land).*
- *A significant portion of the distribution network has been routed around the back boundaries of properties rather than along road frontages. As far as possible triangular corners have been eliminated as they are hard to farm.*
- *Most network races have been shifted away from areas with close subdivision, such as Darfield and Kirwee.*
- *Races will avoid houses, significant farm buildings and utility areas.*
- *Races will generally be on the south side of roads so properties can still obtain maximum benefits from southwest shelter belts (where a shelter belt exists on the northern side of the road, the race has been placed on the opposite side of the road so the shelter belt stays in place and stock can continue to benefit from it).*
- *Where possible, races will avoid very small properties because of a disproportionate effect on them (and particularly where small properties are unlikely to take water). Supply details have not been specified for some small properties, particularly in the closely subdivided areas around Darfield, as some landowners were unsure of their future needs.*

- *All properties should accept a fair proportion of races as all properties will benefit, either by taking water or by increased capital value by having access to water.*
- *A piped supply has been specified in a few locations where it was too difficult to fit in the open race.*

1.9 There are some additional points of particular relevance. Firstly, the applicant advised that some modification to the location of the distribution races was anticipated as part of detailed design and final negotiations with affected landowners.

1.10 Secondly, not all of the properties served by each of the six components of the network would in fact be served by the scheme.

1.11 Thirdly, the issue of piping the distribution race network was raised as an alternative in a number of submissions. The applicant's position was that piping would be prohibitively expensive, and that it was reluctant to pipe additional sections of the network (unless this was operationally necessary) on the grounds that this would set a precedent for large-scale demand for piping.

1.12 Related to the above point, Mr Lewthwaite explained that bywash points were needed because (paragraph 242):

....."it would be impossible to regulate the flow in a long supply canal sufficiently accurately to ensure that the final person on the supply race received exactly the right amount, no more and no less. Therefore all irrigated properties, including the last person on the line, have a surplus flow pass by the supply point".

2. NOTIFICATION AND SERVICE OF THE APPLICATIONS TO SELWYN DISTRICT COUNCIL

2.1 We expressed some concern, as to whether the District Council adequately served notification of the distribution race application on all persons affected by the proposed system and in particular on each of the directly affected landowners and occupiers. We understand that all ratepayers in the area were individually notified. That satisfies the statutory requirement, however it seems

that the notification did not indicate whether or not the race affected the land of the person concerned. Instead, potentially affected landowners needed to check the plans which in some cases had changed from what was originally proposed. We heard from a number of submitters that there was a degree of confusion around where this intended route of the distribution system was.

2.2 Given that the statutory requirements have been met, this is not a matter for us. We simply note that it is possible that there may be some directly affected landowners or occupiers who may not have submitted. They may not have been aware that their land is affected because they may not have appreciated the need to check the latest plans.

2.3 In any event, CPW has undertaken that it will only locate the race system on land where it has an agreement with the relevant land owner. Accordingly, if there are landowners who have not submitted, they still have the opportunity to decide whether or not the race should be on their land and if so on what conditions. We also assume that most affected landowners will be shareholders of the scheme.

Status under the district plan

2.4 Mr Nick Boyes, planning consultant, presented evidence on behalf of the Selwyn District Council.

2.5 The definition of "utility" under the district plan includes the following:

"(d) the conveyance, storage, treatment or distribution of water, including (but not limited to) irrigation and stock water."

2.6 A utility building is defined as including:

"Any building or part of any building which is a utility or which is used principally to house or support a utility; and that building is 10 m² or more gross floor area and 2.5 m or greater in height."

2.7 Utilities are also subject to a series of performance standards which further determine the status of the proposed distribution races as an activity, and these are set out in Part 3, Rule V.

2.8 Rule 5.1.6 provides that a utility is permitted if it is:

"...an open channel or water body used to convey water, provided that the use is

.....

"b) construction of new channels for drainage for irrigation purposes on any individual property which serve only that property."

2.9 Because the proposed distribution races serve more than one property, they do not meet this qualification in the rule and are therefore a discretionary activity.

2.10 The other relevant rules are:

- *"Rule 5.2: a utility building shall be set back 10 m from a strategic road and 5 m from any other road, and one metre from any property boundary."*
- *"Rule 5.10: any utility building shall be set back 20 m from the edge of the waterway listed in Appendix 17 of the plan and 10 m from the edge of any other waterway."*

2.11 Although not certain, it is possible that structures such as pumping stations may not comply with all of these rules, and will therefore fall to be considered as a discretionary activity.

2.12 Rules 1.2 and 1.3 apply to cultural sites affected by earthworks. The disturbance of such sites (eg waahi taonga sites) is a restricted discretionary activity. It is anticipated that works will affect several sites, and could potentially affect others.

2.13 Rules 1.9, 1.10 and 1.11 relate to the effects of earthworks.

- Rule 1.9 requires that earthworks are set back at least 20 m from the edge of a water body.
- Rule 1.10 requires that earthworks must not exceed a vertical cut face where more than 5% of the total vertical cut is over 2 m, or a maximum volume of 5000 m³ per project.

- Rule 1.11 requires that after earthworks are completed that the site be filled and re-contoured to the same state, and replanted with vegetation which is the same as or similar species to that which existed on the site prior to the earthworks taking place.

2.14 Some earthworks for the distribution races will be within 20 m of the edge of the water body, and will clearly involve a volume greatly in excess of that anticipated by the district plan. Given that the project involves the construction of races, re-contouring and restoration of the land to its original state is clearly not intended, and accordingly consent is needed in respect to this rule.

2.15 On the basis of the above, both the earthworks and structures associated with the construction of the distribution race system will be a *discretionary activity* under the Selwyn District Plan.

3. EFFECTS ASSOCIATED WITH THE CONSTRUCTION AND OPERATION OF THE DISTRIBUTION RACE SYSTEM

3.1 It was evident from the weight of evidence and submissions that concerns relating to the distribution race network were significantly less than those concerning the headrace. Notwithstanding this, the distribution race system will occupy approximately 700 ha of land, which is twice the area of productive farmland required for the main headrace canal. The routes taken by the various branches of the distribution race system however, allow greater flexibility in terms of location, being subject only to gravity feed.

3.2 In this part of the decision the potential adverse effects associated with the distribution races are considered and assessed together, along with any mitigation measures. Many of these are common to issues raised by the proposed headrace canal, so for the sake of brevity, some of the discussion associated with the headrace is not repeated in this part of the decision. Matters relating to the downstream effects of the CPW system, are addressed in the section of this decision relating to the *use of water* (Part 6). The applications for consent to discharge from the network are also covered in Part 6.

3.3 We need to emphasise that any grant of consent to CPW to construct a water race across a submitter's property only provides planning consent. The

submitter is not obliged to make any part of their property available for this purpose against their will. CPW can only install a distribution race across a submitters property through negotiation or in the alternative, to determine a route which avoids that property. We also note that the same is applicable to Council land. CPW will need to enter into an agreement with SDC to utilise road reserve and other land for the network. That provides SDC with an opportunity to ensure that its concerns relating to effects on road and other infrastructure are addressed.

An open race versus piped system

- 3.4** The application was put forward on the basis that either system would be consented. A piped system has a number of advantages, including delivery of pressurised water, thus reducing pumping costs; minimal leakage and no need for a bywash system; no visual effects with buried infrastructure; greater flexibility with respect to location, and enhanced public safety as there would be no exposed waterways.
- 3.5** The advantages of open race systems include much lower capital costs; replenishment of aquifers; some dilution of contaminants such as nitrates; possible environmental habitat associated with races.
- 3.6** We accept that piping all or most of the 438 km distribution race network would be prohibitively expensive, and note that the presence of distribution canal networks is commonplace elsewhere on the Canterbury Plains, such as in Ashburton District and in South Canterbury. The primary adverse environmental effects including loss of amenity and visual impacts will occur during the construction phase, and immediately thereafter. Accordingly, we see little difference in effects between a piped and open race systems in this respect.
- 3.7** We accept that a piped system would have much less impact on affected land owners, however that is a matter for negotiation with individual landowners. The options for CPW will be to pay compensation to the landowners for loss of land, to pipe portions of the system, or shift the route to another property.
- 3.8** Initially we were of the view that there was merit in requiring piping to avoid wastage of water, however we have concluded that the loss of water is something for CPW to manage. Without large scale storage every drop will be

precious. It is up to CPW to balance the costs of piping against the advantages. Furthermore there are some environmental advantages in an open race system. In particular there is a degree of aquifer recharge and some habitat values.

4. EFFECTS ON LANDSCAPE

4.1 Relatively little evidence was presented in respect to the landscape and amenity effects of the distribution races, despite the fact that they will have a major physical presence, owing to the geographical extent and surface width. They will be obvious as roadside features, and at crossings. Few places in the command area will be located more than 2 km from a distribution race. That said, such races are becoming increasingly common features in the Canterbury landscape in recent years, as the extent of irrigated land has rapidly increased. Distribution races are recognised as a utility under the Selwyn District Plan, and appear to be an anticipated feature in a rural landscape in terms of the plan.

4.2 In terms of visual and landscape impacts, we note that the distribution network does not affect any significant or outstanding landscapes. It will traverse an area which is highly modified and will not in our view be out of character with the environment. There will be some impacts on visual amenity during the construction period. However, earthworks will be revegetated once each stage is complete. Once revegetation has occurred we consider the races will be seen as a typical component of a rural farming landscape, and perhaps even one that will add a degree of visual relief and variety to the plains.

Potential effects on terrestrial and aquatic ecology and the council water race system.

4.3 Evidence from three ecologists (Dr Meurk, Dr Davis and Mr Grove) all questioned the evidence of Dr Bishop for the applicant with respect to the significance of indigenous vegetation in the command area. We note that the distribution races pass close to or even through a small number of the identified "Plains Category A - D sites", although we heard little evidence in respect to whether particular sites might be affected or destroyed by the proposed races.

4.4 During the course of the hearing, concern was expressed that the construction of the headrace and distribution raise system might disturb, or even replace, the SDC water race system, where there is evidence that species such as Mudfish

have become established. However, there is no statutory protection for the water race system, which can be subject to regular maintenance or alteration without any consents being required. In this context, we have not place any significant weight on this issue which we think is a matter to be addressed by the SDC if it considers that the ecological values of the race system need to be protected.

4.5 Dr Davis (Davis II, paragraphs 38 to 40) stated as follows:

"Many races support a diversity of aquatic invertebrates and fish. A recent thesis on the ecology of stock water races [Sinton 2008] showed that the diversity and density of aquatic invertebrates in the races was similar to that of natural streams on the plains. Threatened freshwater crayfish and freshwater mussels were present at a limited number of sites. Fish species found were trout, upland bully, threatened long fin eel, very occasional threatened Mudfish(in drains) and one torrentfish.

A related paper by Sinton and Harding(2007) describes the races as refugia for benthic invertebrates, which are threatened by habitat loss in natural streams caused by agricultural intensification. Of the 58 taxa collected, 10 were unique to water races and 9 were unique to natural streams. They note that the races provided the only permanently connected surface water habitat across the plains, in contrast to many streams which are ephemeral in their mid-reaches.

Not all races are of similar value but in my opinion, the combined value of indigenous vegetation and the habitat certainly make some of them important under section 6(a) and significant under section 6(c). Existing data would be improved by additional field survey, to help clarify which races are significant for the indigenous biota and connectivity."

4.6 We were left in little doubt that the existing water races were considered as potentially important aquatic habitats for the reasons set out by Dr Davis, who also noted that some of these races were up to 120 years old. Ecologists expressing opposition to the CPW scheme criticised CPW for not undertaking a full survey of the canals and headrace footprints, determining in detail how the scheme would adversely affect significant sites, and for not proposing any compensation or enhancement measures. Added to this was the observation of

Ms Sjaan Bowie on behalf of the Department of Conservation (paragraph 4.4) that:

"nearly a quarter of known Canterbury mudfish sites consist entirely of water race or drain habitat....."

4.7 The issues which we have to consider are firstly, the physical effect that the construction and operation of the distribution race network would have on the water race network of the SDC, and secondly the consequences of the scheme in terms of the retention of the water race system.

4.8 From the evidence presented by Mr Lewthwaite for CPW, it was made quite clear that for operational reasons, CPW wishes to keep its own distribution race network quite separate from that of the SDC, with the exception of the proposed headrace up the Waimakariri escarpment, where the two would otherwise be "entangled". Mr Nigel Williams, who presented traffic evidence of behalf of the SDC, estimated that the distribution race system would cross the council water race system in 150 places. This potentially creates a conflict. Mr Lewthwaite explained in his evidence of September 2008 (paragraph 50):

"CPWES has promoted as a base case the construction of new irrigation supply channels as a separate and independent network. That assumes a continuation of the SDC stock water races although the two race networks would often be in close proximity. This had initially been accepted by SDC".

4.9 He went on to say that the issue had been further investigated, particularly in respect to the Darfield - Kirwee area, and that from an engineering perspective, he was satisfied that intersections between the two systems could be managed satisfactorily.

4.10 Based on this assessment, we conclude that the proportion of the Council water race network that would be affected by the CPW scheme would not be such as to significantly threaten its integrity. In addition to this, only parts of the water race network are likely to have high ecological values.

4.11 Concerns were expressed that the installation of the CPW distribution races would render the council system redundant. This is apparently because of the

cost of operating the system, and we were aware that some landowners were also concerned about this. Mr Blake - Manson noted that the SDC had resolved to close the Selwyn water race system serving some 2000 ha. Nevertheless, we were left with a very clear impression that the great majority of the council's water race system was to be retained, and that neither the SDC nor the applicant was seeking to combine the two systems except where this was absolutely necessary.

4.12 We accept that there are likely to be sections of the water race system which have, by default, developed high ecological values over a long period of time. However it is less unclear whether the evidence establishes these are significant habitats for the purpose of section 6 of the RMA Act. We acknowledge the point made by Dr Davis that these provide permanently connected water habitat across the plains, something the degraded smaller river systems are no longer able to do. The CPW network may not provide such valuable habitat because the distribution races may not contain water outside of the irrigation season. We suggest that CPWT investigate the option of keeping water in the race system at all times apart from when maintenance is required. This may have benefits for recharge of the aquifer as well. However, we do not regard this as a matter for conditions.

4.13 Until this hearing, it appears that no statutory steps have been taken to have the existing artificial waterways recognised or protected in any way through the district plan, despite recent studies and as to their potential ecological values. Accordingly, there are no restrictions on the SDC abandoning or removing sections of its own race system, or for that matter undertaking what might be unsympathetic clearance practices as part of their maintenance programmes. We see the primary responsibility for the identification of the ecological values of this drainage system, and decisions as to how such values should be managed, as being as being for the SDC rather than a matter for this hearing.

4.14 In conclusion, we heard no evidence to suggest that the distribution system would, of itself, have any significant adverse effects on terrestrial or aquatic ecology. We have required further survey work to ensure that any significant indigenous vegetation, or areas of significant habitat are avoided or any damage is offset. We note that any such offsets are not a matter for the Environmental Management Fund, but are required mitigation.

5. EFFECTS ON HERITAGE

- 5.1** There did not appear to be any heritage buildings affected by the distribution race network. In terms of archaeological sites, it appears that Race D 2.1 passes close to an archaeological site identified as containing ovens and artefacts in the vicinity of Old West Coast Road/Intake Road (M 35/146). We consider that potential effects on this site should be further investigated prior to any works commencing. We have commented elsewhere in this decision (refer to section on *Intakes and Headrace Canal*) that detailed site investigations should be undertaken on known and suspected archaeological sites and areas prior to any approvals being granted. However, given the length of the distribution canal system as a whole, we consider that with the exception of this site, an accidental discovery protocol would be a more reasonable and practical approach. Our reasoning for this approach is set out as part of our consideration of the heritage effects of the headrace.

6. EFFECTS OF THE PROPOSED DISTRIBUTION RACE SYSTEM ON AFFECTED LANDOWNERS

- 6.1** Given the immense 438 km length of the proposed distribution race network, it is perhaps surprising that there were so few submissions from potentially affected land owners. CPW have advised that the distribution network affects 296 private properties, of which 34 submitted in opposition. Some of these properties are affected conditionally with respect to the precise route of the distribution race. Exactly half (148) of the private property owners affected are shareholders. Even allowing for the possibility that some affected land owners were unaware that their land is affected, it is apparent that the degree of opposition to the distribution race network is much smaller than that directed at the headrace canal, which of course is subject to a Notice of Requirement.
- 6.2** Many submitters sought changes to the alignment of the distribution system, in some cases piping through their properties, or in other cases, enhanced access arrangements. The primary concerns were expressed by parties in respect to the Darfield component of the distribution system, which has a considerably higher proportion of small holdings and intensive farmland than in most other areas affected by the scheme. The following part of this decision addresses the effects on properties of submitters who appeared before us.

6.3 Mr Hugh Blake-Manson of the SDC presented evidence, among other things, on matters relevant specifically to the establishment of the distribution network on that part of the SDC system within the command area.

6.4 Among the various matters raised in his evidence (paragraph 5.10) were concerns relating to:

- potential problems associated with the combination of the CPW distribution canal with the SDC stock water systems in certain places, and installation of pipes alongside side canals;
- lack of detail regarding mitigation measures to address the effects of construction works on the SDC water race intakes and water race network;
- lack of information on the design of water race crossing structures where the SDC and CPW systems intersect, thus ensuring the SDC water race system continues to provide a high level of service; and
- the implications of the CPW network where it is positioned above water race crossings with respect to ownership issues concerning maintenance and emergency works.

6.5 As noted above, Mr Lewthwaite explained that the CPW system would operate quite independently of the SDC system, except where this was not practical in engineering terms. He stated that CPW had identified in consultation with the SDC, potential conflict points which included crossings, canals along the same alignment, and CPW irrigation races that might obstruct access to stock water races. He stated that the solutions would include the use of siphons, piping from the stock water race to stock watering troughs, piping of sections of the stock water races, and slight realignments of the CPW races when necessary.

6.6 The consent of the Council as landowner and or requiring authority, will be required where Council land or assets are affected. Accordingly, there will be incentives for CPW to accommodate the Council's concerns. We see this as a matter of negotiation between the parties rather than as a matter for detailed

consent conditions. (We also note the Councils role as settlor and one of the guarantors of the scheme.)

Rodney Booth, Ross Manson, Margaret Manson

- 6.7** These submitters farm near Steeles Road, between the Hororata and the Rakaia River. As noted in Part 3 of the decision, they were submitters on the southern part of the headrace canal and expressed their general support for the CPW scheme. However, they also raised issues concerning specific effects on their own large property in relation to distribution race TP2, which would branch off the headrace within their property. They consider that because it bisects their land it should either be piped or realigned to their boundary.

Heather Thompson

- 6.8** Ms Thompson owns a small holding in Henderson's Road where Distribution Race D2.2 runs along the road en route to a bywash point on the Waimakariri River. She states that this proposed race passes through her property, including within 10 m of a future house site. She also stated that the race would require the removal of a shelter belt providing protection from north-westerly winds. She opposed the CPW scheme in general.

- 6.9** From what we could ascertain from the SDC's property records, and the plans of the distribution races as notified, the submitters property is on the western side of Hendersons Road and the race passes down the opposite side of this road.

Carol Garland, John Pilbrow

- 6.10** These submitters own a 10.02 ha property at Courtenay on the Old West Coast Road, between the road and the terrace above the south bank of the Waimakariri River. Distribution race D 2.1 is shown as passing along the northern boundary of their property and through a 400 m² shed, which Mr Pilbrow uses as a base for his ride-on lawnmower business. The property is also used for the farming of llamas. The submitters complained of a lack of consultation and information relating to the scheme, and were concerned in principle that the applicant was able to 'take' their land through resource consent procedures without their written approval. They stated that in addition to

the loss of the large shed, they would also lose a shelter belt, and llama fencing. They said they would be exposed to dust from construction activities and expressed serious concern about a potential water hazard to their grandchildren. They said that because the property was a small holding, the proportional effect on it of the distribution race was significantly greater than might otherwise be the case.

6.11 At the hearing Mr Lewthwaite's proposal was that the distribution race be placed directly adjoining the northern boundary, effectively in the form of a "dogleg", thus avoiding the shed, albeit still in close proximity to it. We also note that there would need to be fencing of the race to minimise risk to children.

6.12 We observe that it would seem difficult to reconcile the position of the submitter and the applicant in this case, however given that CPW does not seek to utilise any Public Works Act powers which it may have, we are confident that these issues can be sorted out by negotiation. That could lead to changes to this part of the system which are acceptable to the submitter along with compensation, or CPW may have to shift the distribution race off this property.

Ascot Park

6.13 A submission was made through Ms Jen Crawford of Anderson Lloyd relating to this property in Courtenay, which would be affected by distribution canal D2. The owners sought that the distribution race be constructed on land owned by the applicant, unless there is prior agreement with the submitter. As discussed above, it is our understanding that no parts of the distribution network will be imposed on landowners without prior agreement.

6.14 Kimberley residents (N. and J. Cameron, A. Cammock, G. and L. Hewitt, Julia Justice, Joyce McCausland, B. and J. Reed, I and C Reed, D. and J. Syme, I and A Syme), Drumnacott Farms, and John and David Syme also submitted in their own right.

6.15 This was a submission by a group of farmers in Auchenflower Road and Tramway Road north of Darfield. Again, the issue related to the alignment of distribution race D2, and an additional subsidiary Race D3.1 along Boulton's Road.

6.16 These submitters wanted Race D2 moved from Auchenflower Road to Tramway Road, which they contended would mean that the distribution race would not be sited in close proximity to six houses and the domain on Auchenflower Road. The comment was made that Tramway Road contained a large water race reserve parallel to the road reserve, which included a SDC water race. The submitters also wanted water race D3.1 in Boulton's Road to be eliminated, as they considered it was unnecessary, and resulted in two distribution canals being located on one farm, with consequent loss of productive land.

6.17 Mr Lewthwaite's response at the hearing and in his evidence of September 2008 (paragraph 102) included the following statement:

"The locations shown in CPWES's proposals were my best endeavour to service the needs of the area, as far as they had been explained to me and my team over the first half of 2006. During that period I met with people from the Kimberley area a number of times, and found it particularly difficult to obtain a consensus or even a clear majority view about race locations".

6.18 He went on to indicate that the desired route was effectively a compromise between maximising the benefits of providing CPW water to participant shareholders, and potential effects on properties traversed by the distribution race. He added that options such as boundary adjustments and piping were discussed, although he expressed concerns about the precedent effect of the latter. In terms of property effects, taking distribution race D2 directly down Tramway Road would be shorter and would have less physical effect on properties, but we had no evidence as to the implications of this option for supplying water efficiently to shareholders.

S.L and L.J. Redmond

6.19 The Redmonds are also submitters on the main headrace canal which crosses their property. In their submission they make mention (paragraph 10) of three canals affecting shelter belt trees and a number of buildings on the farm. However, the plans of the distribution canals as notified do not show any distribution canals affecting their property, as it appears these were re-routed following earlier consultation with affected parties.

7. OVERALL CONCLUSIONS IN RESPECT TO EFFECTS ON PROPERTIES

- 7.1** If CPW is unable to reach an agreement with any submitter relating to the positioning of the distribution race on their property (or indeed that of **any** property owner whether they were a submitter or not) then CPW will either have to find an alternative route, and/or invoke powers under the Public Works Act. We understand that it does not intend to do the latter.
- 7.2** We note that in some cases, such as with the Kimberley Road residents, discussions have taken place but CPW has not at this stage been able to reach a consensus. In other cases, it appears that the applicant has not approached some directly affected parties, instead it is relying on subsequent negotiations after the necessary consents have been granted and if there are appeals, confirmed.
- 7.3** As outlined above, there is still ample opportunity for CPW to consult with land owners over coming years, either in the context of resolving appeals and/or in the context of developing the final design of the network. We again emphasise that we have proceeded on the basis of an assurance, that Public Works Act powers will not be used by CPW in relation to the distribution network (or at least not without resorting to a further RMA process first). Accordingly CPW will have to negotiate solutions with every affected land owner. Where it can not negotiate a solution on the site it will need to apply for a new consent or variation of consent to shift the network off the site.
- 7.4** If the distribution network is shifted on to other properties then there will need to be an amendment to the resource consent and this will need to be notified to newly affected owners and occupiers unless their written approval has been obtained. Newly affected landowners will need to be consulted and if they do not approve, they will have rights of submission and appeal in relation to any proposed works on their properties.
- 7.5** Our focus is on the environmental effects of the distribution system rather than issues relating to property rights. We have concluded that (unlike the originally proposed dam and reservoir) the effects of the distribution system and the headrace on private property and farming operations are not such as to give rise to any significant adverse effects on the wellbeing of people or communities.

7.6 We consider that there is scope for realigning distribution races as necessary to avoid landowners who do not wish to have a distribution race across their property. Similarly, issues relating to the precise location of the system on individual properties, and the location and number of race crossings, is a matter which can be sorted out via the further consultation, negotiations and if necessary amendments to the consent. Issues regarding supply of water to shareholders are not for us.

7.7 Our overall conclusions with respect to the route of the proposed distribution network is that there are no issues relating to route selection that would justify us declining consent to all or part of the network as sought by the applicant. In relation to the Garland/Pilbrow property we consider that the route should avoid the shed and be fenced for safety reasons. However we see that as a matter for the access agreement rather than requiring a condition of consent.

Effects of dust and noise

7.8 The matters relevant to this issue are similar to those dealt with in the discussion in Part 3 relating to the proposed headrace system, so will not be repeated in detail here. Suffice to say that given the length and geographical distribution of the distribution race system, it is inevitable that there will be some dwellings in close proximity to the distribution races, which will be affected by noise and dust disturbance during the construction period. We understand that this period will be less than three months for each section of race. Essentially, such effects would be managed through a dust management plan, and if necessary, restrictions on hours of operation or other measures to ensure that the noise standards in terms of NZS 6803: 1999 are satisfied. We consider that these matters can be addressed through the proposed dust management plan, and the noise and vibration management plan.

Effects of traffic

7.9 Mr Williams undertook a detailed analysis on behalf of the SDC, and concluded that the distribution race system would involve 11 crossings of state highways, and 196 crossings of district roads. He estimated approximately 460 access bridges/culverts into private properties would be required, and as noted earlier, there would be approximately 150 crossings involving SDC stock water races. He estimated that a total of 325,000 heavy vehicle movements will be

associated with the construction of the headrace and distribution canal network. This works out at approximately 325 movements per day over a 1000 day assumed construction period.

7.10 While there is a substantial number of worksites and total vehicle movements, they would be dispersed over a very wide and lightly trafficked network. The primary effect would be felt in terms of deviations required around worksites adjacent to roads, which would be addressed through the proposed Traffic Management Plan which aims to minimise disruption to the travelling public and local residents.

8. OBJECTIVES AND POLICIES

8.1 The relevant objectives and policies are discussed separately in Part 8.

9. SECTION 104 OF THE RMA AND OVERALL CONCLUSION IN RELATION TO THE DISTRIBUTION NETWORK

9.1 In addition to and subject to Part 2 of the RMA, we are required to have regard to the following matters:

"(a) any actual and potential effects on the environment of allowing activity; and

(b) any relevant provisions of-

.....

(iii) a regional policy statement or proposed regional policy statement:

(iv) a plan or proposed plan; and

(c) any other matter the consent authority considers relevant and reasonably necessary to determine the application."

9.2 The construction of the distribution race network amounts to a very large engineering exercise, the impacts of which will be more than minor, but dispersed over a very wide area. These effects will be additional to those associated with the construction of the shorter but larger scale headrace system where it crosses the plains (38 km).

- 9.3** The distribution race network does not affect any outstanding landscape features, or have a significant impact on heritage values. Nor in our view will it have any significant adverse effects on ecological values. With respect to amenity values, the adverse effects are likely to be more than minor in some locations, but temporary.
- 9.4** We have concluded that once completed and established the irrigation network will be a typical feature of rural infrastructure and one which might even provide a degree of visual relief to parts of the plains. Given the great length of the proposed distribution race network, the number of submissions received in opposition are remarkably small. However, CPW will still have to negotiate access and purchase, even with those submitters who have not lodged submissions at all.
- 9.5** We note that both the Regional Policy Statement and the Selwyn District Plan provide for farming activity generally. At a more detailed level, the district plan anticipates the establishment of irrigation infrastructure. Such infrastructure is also integral to the Canterbury Water Management Strategy.
- 9.6** In conclusion, we are satisfied that the proposed distribution system will be sustainable and that all relevant adverse effects can be avoided, remedied or adequately mitigated.

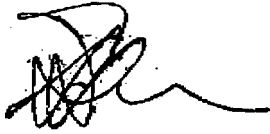
Independent Commissioners 28 May 2010



Philip Milne (chair)



Bob Nixon



Andrew Fenemor



Ray O'Callaghan

IN THE MATTER OF the Resource Management Act 1991

IN THE MATTER OF applications by Central Plains Water Trust to:

Canterbury Regional Council for resource consents to take and use water from the Waimakariri and Rakaia Rivers for the Central Plains Water Enhancement Scheme and for associated consents required for the construction and operation of the Central Plains Water Enhancement Scheme

AND

IN THE MATTER OF applications by Central Plains Water Trust to:

Selwyn District Council for resource consents to construct and operate the Central Plains Water Enhancement Scheme

AND

IN THE MATTER OF a Notice of Requirement by Central Plains Water Limited to:

Selwyn District Council for the designation of land for works associated with the construction and operation of the Central Plains Water Enhancement Scheme

**JOINT DECISION AND RECOMMENDATION OF
INDEPENDENT COMMISSIONERS
28 MAY 2010**

PART 6

**The Waimakariri Take
The Rakaia Take**

GUIDE TO DECISION DOCUMENTS

- PART 1** – Introduction, Part II RMA, assessments, objectives and policy summary, conclusions, decisions and recommendations
- PART 2** – Disputed conditions
- PART 3** – Beneficial, economic, social and cultural effects of the scheme
- PART 4** – Intakes and headraces
- PART 5** – Distribution network
- PART 6** – Waimakariri and Rakaia takes
- PART 7** – Use of water
- PART 8** – Objectives and policies
- PART 9** – Regional Council consents and conditions
- PART 10** – Selwyn District Council consents and conditions
- PART 11** – Recommendations to Central Plains Irrigation Limited in respect of Notice of Requirement and Conditions
- PART 12** – List of hearing dates and appearances

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1. THE TAKING OF WATER FROM THE WAIMAKARIRI RIVER

- 1.1 In **Minute 9** we set out our preliminary views as to a sustainable take by CPW from the Waimakariri River. Having heard further evidence relating to the amended take regime now proposed by CPW, we were satisfied that with some minor modifications the proposed taking of water from the Waimakariri River at the Gorge Bridge will achieve the sustainable management purpose of the Resource Management Act (the Act) and will accord with the principles of the Act as set out in Part 2. We set out our reasoning for that conclusion in **Minute 12**.
- 1.2 We have in effect through **Minute 12** issued an interim decision in relation to the application by CPW to take water from the Waimakariri river. In that Minute we discussed the potential effects of the proposed take. We set out our conclusions and indicated what we considered to be appropriate restrictions on the take. There was some further debate around some of these conditions at the resumed hearing in March. We further discussed the so called "holiday rule" in **Minute 15** and have outlined our final conclusions in relation to that in Part 2 of this decision.
- 1.3 There is no need for us to repeat the detailed discussions in these Minutes. We note that **Minute 9** does contains some additional discussion of flow requirements for instream purposes and accordingly, both **Minutes 9** and **12** set out the basis for our conclusions in relation to the take regimes for the Waimakariri River. For present purposes it will suffice to set out our key conclusions in relation to the Waimakariri take. These largely repeat the summary contained in **Minute 12**.

Summary of our key conclusions in relation to the proposed take from the Waimakariri River and assessment against Part 2 of the RMA

- 1.4 The issues regarding the taking of further water from the Waimakariri are complex. These issues are important to the Applicant in terms of how much water will be available to it. They are also critically important to the Regional Council as manager (steward) of the resource, submitters and the Community as a whole.
- 1.5 Section 5 of the Act requires us to ensure that the Waimakariri water resource is managed so as "to enable people and the community to provide for their social, economic and cultural well being"and to..... "sustain the potential of the resource to meet the reasonably foreseeable needs of future generations..... safeguard the life supporting capacity [of the river] and adequately avoid, remedy or mitigate adverse

effects on the environment". In this context we must consider the reasonable needs of the applicant to take and use the water and the needs of the community now and in the future to maintain sufficient flows in the river to provide for ecological needs, for present and future recreational use, and for other social and cultural needs.

1.6 Section 6 requires us to "preserve the natural character" of the river and to protect the river from inappropriate development. We must also protect significant habitats of indigenous fauna and recognise and provide for the relationship of Maori with the river.

1.7 Section 7 requires us to have particular regard to a number of matters including maintaining and enhancing amenity values (including recreation amenity) and the quality of the environment, protecting the habitat of trout and salmon, the intrinsic value of ecosystems, the ethic of stewardship, kaitiakitanga and the efficient use and development of the resource.

1.8 The recreational and intrinsic amenity provided by the river are components of social and cultural wellbeing. The Waimakariri provides very high recreational amenity for the following activities:

- Kayaking for the Coast to Coast event and generally for beginner and intermediate kayaking and training downstream of the gorge and for intermediate kayaking in the Gorge.
- Jet boating (most highly used and accessible jet boating resource in the country and highly valued for its braided characteristics).
- Recreational salmon and trout fishing (highly valued and most used salmon fishery, close to the City and readily accessible for much of its length below the Gorge. Along with the Rakaia, Rangitata and Waitaki, a nationally significant salmon fishery and also a valued trout fishery).
- Whitebaiting at the river mouth.

1.9 The river also has other recreational amenity values but those listed above are the most significant. Of these activities, the most sensitive to the take regime are kayaking, jet boating and salmon angling. All of these are addressed to some degree by the WRRP minimum flow, however the evidence we have heard leads us to conclude that the

minimum flow does not by itself provide full protection of amenity values or ecological values.

1.10 We will need to consider the impact of the proposed take regime in terms of any increase in the frequency and duration of sub optimal (low) flows for any of these activities. That impact will vary with the time of year. We will also need to consider the impact of any loss of variability in flows in terms of these activities.

1.11 We must also consider the impact of the proposed take regime on (in no particular order):

- Salmon and trout habitat.
- Salmon passage.
- Recreational uses other than those listed above.
- Ecological values including nuisance algal growths, macro-invertebrate communities, native fish and river bird life.
- Sediment transport and river morphology (braided river characteristics).
- Water quality including assimilative capacity for existing pollutants.
- Recharge of the Christchurch and Kaiapoi aquifers.
- Effects on existing users including in particular Waimakariri Irrigation Ltd and those taking from gallery intakes downstream.
- Maori cultural values.

1.12 In comparing the different mitigation proposals before us, we have been primarily guided primarily by Part 2 of the RMA and the relevant objectives, policies and assessment criteria in the WWRP. We have also had regard to the provisions in PPC1. The result is a list of matters we have taken into account grouped approximately in the following order according to the weight they must be given and their relevance to the issues before us.

Section 5

- Safeguarding the life supporting capacity of the resource
- Sustaining the potential of the resource to meet the reasonably foreseeable needs of future generations
- Enabling people and communities to provide for their social economic and cultural well being
- (adequately) avoiding remedying or mitigating the adverse effects of the take on the environment.

Section 6

- Preservation of the natural character of the river and its margins
- Protection of the significant habitat of indigenous fauna (in particular endangered indigenous bird populations)
- The relationship of Māori and their culture and traditions to their ancestral waters.

Section 7

- Maintenance and enhancement of amenity values (including in particular recreational amenity values) and the quality of the environment.
- The protection of the habitat of trout and salmon
- Kaitiakitanga
- The ethic of stewardship (The regional Council as steward of this public resource)
- The efficiency of the proposed use of the water resource.
- Intrinsic values of ecosystems
- The effects of climate change

1.13 Section 7 requires us to have particular regard to the ethic of stewardship and to kaitiakitanga. Ngai Tahu are kaitiaki of the river, and the Regional Council is the "steward" of the resource on behalf of the Crown and the community. Accordingly in the present hearing we exercise a stewardship role. The rivers can be regarded as the commons which the regional council as steward must manage in the best interest of the whole of the community.

1.14 We have undertaken a balancing exercise focussed on the sustainable management of the Waimakariri River resource. We have balanced the protection of in stream values and river users alongside the out-of-stream benefits of CPW's water take, including

consideration of efficiency and reliability of water use. Our starting point has necessarily been in stream needs rather than the Applicant's needs/preferences. CPW will not have access to as much water as it originally sought and indeed we will be imposing additional restrictions beyond those proposed by CPW at the resumed hearing.

- 1.15** Our role is to evaluate the potential effects of the revised CPW proposal (which is now essentially an irrigation season run-of-river water take), and in the case of this Minute, to decide what mitigation measures should be required through conditions. This is a matter of weighing the effects cumulatively in tandem with the effects of existing takes. Much of the analysis of effects which we have heard is based on the assumption of full exercising of all allocations. We note that even with increased transfers of allocations among users, this worst-case situation will occur only rarely, and that it is the river and its users which benefit from unused allocations.
- 1.16** While our decision will affect any future allocations of water from the Waimakariri in a major way, it is not our role to decide how future allocations should be made. We appreciate that this decision has consequences for the Waimakariri River Regional Proposed Plan Change 1 process (PPC1) decision process. However it is not our role to either decide the PPC1 outcome, nor to require the CPW take to mitigate the effects of other consented takes of water.
- 1.17** We have concluded on the basis of the evidence presented to this hearing, that a Waimakariri flow regime with 1:1 flow sharing for the B permit take of up to 24 cumecs beginning above an Old Highway Bridge (OHB) unmodified flow of around 65 cumecs (41+A+B1 allocations), with some additional mitigating conditions applied, will be sustainable.
- 1.18** Adopting an overall balancing approach, we have concluded that the take will allow people and communities to provide for their economic needs, while at the same time ensuring that ecological and other natural values are sustained and amenity values are not affected in any significant way.
- 1.19** We have concluded that the modified regime now proposed by CPW will, with some additional restrictions, adequately avoid, remedy or mitigate the potential adverse effects (including cumulative effects) of the take to the extent that it will be in accord with the purpose and principles of the Act.

- 1.20** We have concluded that the more restrictive take regime set out in PPC1 is not required in order to adequately (sustainable) mitigate the effects of the CPW take.
- 1.21** The take regime which we consider to be appropriate, will allow CPW during the irrigation season, to commence taking water when unmodified flows at the Old Highway Bridge are at approximately 65 cumecs (m³/second). CPW will be able to take 24 out of the next 48 cumecs of flow, up to approximately 103 cumecs on a one to one basis (out of every 2 cubic metres of B water 1 can be taken by CPW and 1 left in the river). We have also concluded that there should be additional provision for flushing flows to pass unimpeded after periods of 14 days or more of sustained low flow (CPW had proposed a 21 day flow trigger).
- 1.22** We have concluded that to further mitigate adverse effects on recreational amenity, there should be an additional restriction on the take during potential peak usage times in the summer, so that for some of that period, the take can not commence until an unmodified OHB flow of around 75 cumecs. The objective would be to so far as is possible, maintain a residual flow of at least 55 cumecs (when that would have occurred but for CPW). We have set out our conclusions in relation to this condition in **Part 2**.
- 1.23** We are not convinced that the PPC1 recommendation of a 30 cumec gap prior to exercising of B permits has adequately accounted for the effects on scheme reliability. Nor do we consider that it will necessarily achieve significantly better mitigation of potential adverse effects. However we do accept that in relation to recreational amenity that regime may achieve slightly better outcomes.
- 1.24** We heard from many submitters that maintaining variability of flow is important. The main hydrological benefit of the flow sharing now proposed by CPW is to maintain variability of flow when B permit takes begin. One effect of the 30 cumec gap before a B permit take could begin, as proposed under PPC1, would be to flatline flows at around 71 cumecs, in addition to the current 41 cumecs. We prefer to maintain flow variability above the current authorised flat lining.
- 1.25** We summarise here the effects of the proposed water take on uses and values of the river, and evaluate these in more detail below.
- 1.26** In evaluating the impacts of the revised CPW proposal on river ecology and water quality, we have concluded that there will be little detriment to salmon and trout habitat

beyond effects caused by pre-existing takes. Salmon passage will likewise not be further hindered provided provision is made for CPW to stop taking water when a fresh occurs following a sustained period of low flows, and that measure is consistent with the PPC1 proposals.

- 1.27** The objective of protecting river birdlife during the critical September to December nesting period depends primarily on maintaining islands to discourage predation within the braided river system. With the mitigation proposed, the CPW proposal will not significantly affect that.
- 1.28** The incidence of nuisance periphyton (excessive algal growths) can be managed by allowing the bypass of freshes after prolonged low flows 21 days or more of flows at or below 41 cumecs). We note that a condition to this effect needs to apply year-round as algal proliferation can occur any time.
- 1.29** The effects of the CPW take on the productivity of the river ecosystem (primarily macroinvertebrate production for feeding fish and birds) are likely to be minor, as are effects on native fish. Nor were we convinced that the CPW water take would affect downstream suspended sediment concentration, thereby impairing fishability. However a monitoring and review condition would allow adaptive management if this is found to be a valid concern. For the larger sediment fraction we conclude that river morphology and bedload will continue to be dominated by floods and the CPW water take will have no noticeable effect, nor will it materially affect the water quality and assimilative flow available to discharges including Silver Fern Farms (formerly PPCS).
- 1.30** Given the high recreational amenity provided by the river, we have given emphasis to adequate mitigation of the potential effects of the CPW take on recreational users of the Waimakariri. Large takes, such as by CPW, can at times benefit the river for recreation because they draw flows down into more preferred flow bands (below a residual flow of around 100 cumecs). Having said that, we are not convinced that the overall effects on recreational amenity would be an improvement on the current situation and we are of the view that some further mitigation is required.
- 1.31** For the 60-150 cumec flow range preferred by kayakers, CPW would reduce the number of suitable kayaking days between October and March by some 4 to 9%. However it would also significantly increase the number of days in the 40-60 cumec range when kayaking is more marginal. We are concerned about effects at these flows as this would likely coincide with greater usage by families and novices. The same

applies to jet boating. We have proposed an additional restriction on CPW's take during low flows, at weekends and other high use periods for kayaking and jet boating.

- 1.32** Fish and Game made a strong case for protection of angling amenity and given the outstanding reputation of the Waimakariri for salmon angling, we accept the importance of this. Salmon angling success depends not only on a suitable flow regime but water clarity (similar to turbidity) within the range 0.4 – 1.0 metres. Based on a suitable flow range for angling being 70-100 cumecs the CPW take would increase the time that December to April flows are within this range.
- 1.33** We have concluded that the CPW take would not change the duration that the river is suitable for angling in terms of flow and turbidity. The potential effect is on the amount of fishable water available at the lower flows. We are not aware that the amount of fishable water in the braided reaches is currently a limiting factor for angling opportunity. Nevertheless we accept that the increase in the duration of flows where turbidity would be suitable, but angling area and flows would be reduced is a potential adverse effect. The proposed additional low flow mitigation will moderate the impact of flows being drawn below a residual flow of 55 cumecs at the Old Highway Bridge during the peak of the angling season. This will further mitigate effects on anglers beyond the mitigation already provided by the proposed one to one flow sharing. One matter which remains to be considered is which days and months that additional restriction should apply. We invite further submissions on that.
- 1.34** With 1:1 flow sharing and passing of river freshes after prolonged low flows, effects on whitebaiting and remaining identified forms of river recreation are likely to be minor.
- 1.35** With regard to effects on other users of water, we will require conditions which mean the CPW B permit take does not impair the reliability of supply of existing A (and B1) takes. CPW has obtained 1 cumec of A permit allocation from Ngai Tahu Properties so is a member of the group of A permit water users who may choose to share their access to A block water in compliance with ECan's WRRP requirements.
- 1.36** We conclude that Christchurch City water users will not be affected by any reduction in aquifer recharge from the Waimakariri River, as the recharge is relatively insensitive to changes in flow, and we doubt that any change would be measurable. No specific concerns were expressed by iwi about effects of the water take from the Waimakariri, so we conclude that effects on Māori cultural values of the river take are also likely to be minor.

1.37 We are not at this stage convinced that CPW should have access to B class water outside of the irrigation season except so far as that it needed to top up storage. We have no difficulty with CPW having access to unutilised A class water during the irrigation season.

1.38 We have concluded that an appropriate lapse period would be 8 years as for the Ashburton Community Water Trust scheme. We are satisfied that a 35 year term of consent would be appropriate in conjunction with adequate monitoring and intervening review conditions.

1.39 We are satisfied that the flow regime we are proposing will be sustainable and is in accord with objectives and policies of the Waimakariri River Regional Plan. A full assessment against objectives and policies of the WRRP and the PPC1 is set out in **Minute 12**.

Conclusions in relation to the objectives and policies of the Waimakariri River Regional Plan

1.40 For the reasons set out in **Minute 9** we have concluded that the take should be "bundled" with the other water permits to divert and use and the overall water activities should be regarded on a fully discretionary rather than restricted discretionary basis. However while we have concluded that our discretion is not restricted, the activity classification does remain as restricted discretionary. PPC1 does lend support to our view that our discretion should not be limited to the effects of the proposal near the point of take, and to that extent we do give some weight to that part of PPC1 which (but for section 88A) would make the application fully discretionary.

1.41 In terms of the operative plan (WRRP) the starting point is Objective 5.1, which is not amended by PPC1 and rule 5.1 and which limits our discretion to:

The effects the take has on river flows, and consequential effects on those values identified in (a) to (h) of Objective 5.1, near the point of take.

1.42 For the reasons discussed in **Minute 9** and **12** we have concluded that we are not limited to considering effects "near the point of take". However, in case we are wrong in that view, we record that in the context of this plan, we regard the words "near the point

of take" as including the river between the Gorge Bridge and at least the Willows or more sensibly, all the way to the sea.

- 1.43** Accordingly under the operative plan, WRRP, the provision is objective 5.1. The subsequent policies including the amendments proposed in PPC1 are intended to serve that objective. We set out the key provisions below:

Objective 5.1

Enable present and future generations to gain cultural, social, recreational, economic, health and other benefits from the rivers, lakes and wetlands in the Waimakariri River Catchment, and from hydraulically connected groundwater while:

- (a) safeguarding their existing value for efficiently providing sources of drinking water for people and their animals;*
- (b) safeguarding the life-supporting capacity of the water, including its associated: aquatic ecosystems, significant habitats of indigenous fauna, and areas of significant indigenous vegetation;*
- (c) safeguarding their existing value for providing mahinga kai for Tangata Whenua;*
- (d) protecting wahi tapu and other wahi taonga of value to Tangata Whenua;*
- (e) preserving the natural character of rivers, lakes and wetlands and protecting them from inappropriate use and development;*
- (f) protecting outstanding natural features, and landscapes from inappropriate use and development;*
- (g) maintaining and enhancing amenity values; and*
- (h) protecting the significant habitat of trout and salmon.*

Policy 5.1

Set and maintain water flow, water level and water allocation regimes and control the taking, use, diversion, discharge and damming of surface water, and the taking of water from hydraulically connected groundwater, while achieving (a) to (h) of Objective 5.1, so that:

(b) below Woodstock (Figure 4 and Map 1):

(i) the braided character of the Waimakariri River, aquatic ecosystems and habitats, wetlands, amenity based on the river, and groundwater recharge from the river, are protected;

Matters restricting exercise of discretion

Environment Canterbury will restrict the exercise of its discretion when deciding to grant or refuse a resource consent, and in imposing any conditions, to the following matters:

(a) The reasonable need for the quantities of water sought, and the ability of the applicant

to abstract and apply those quantities.

(b) The availability and practicality of using alternative supplies of water including alternative public or community reticulated supplies.

(c) In the case of takes from hydraulically connected groundwater:

(i) the effects the take has on surface water flows including the cumulative effects of

the combined take from a person's bore field;

(ii) the effects the take has on neighbouring bores; and

(iii) the effects the take has on other authorised takes.

(d) For surface takes:

(i) the effects the take has on river flows, and consequential effects on those values

identified in (a) to (h) of Objective 5.1, near the point of take;

(ii) the effects the take has on other authorised takes.

(e) The collection, recording, monitoring and provision of information concerning the exercising of the consent in accordance with Section 108(4) of the RM Act

1.44 In essence the key assessment criteria under the WRRP remain unchanged under PPC1 which is focused on a particular method to achieve objective 5.1, rather than on changes to the objective or assessment criteria (except the removal of the words 'near the point of take'). We now discuss these key criteria.

Enable present and future generations to gain cultural, social, recreational, economic, health and other benefits from the rivers, lakes and wetlands in the Waimakariri River Catchment, and from hydraulically connected groundwater

- 1.45** We have concluded that the proposal will allow significant economic benefit to be derived from the use of water from the river by present and future generations without significantly compromising the ability of the river to provide for the cultural, social, recreational, health or other needs.

Safeguarding their existing value for efficiently providing sources of drinking water for people and their animals

- 1.46** The plan and existing consents provide for an allocation for these purposes. We are satisfied that the proposed take will not compromise the availability of ground water for drinking supply purposes in Christchurch or on the north side of the river.

Safeguarding the life-supporting capacity of the water, including its associated: aquatic ecosystems, significant habitats of indigenous fauna, and areas of significant indigenous vegetation

- 1.47** We are satisfied that the proposed take will safeguard the life supporting capacity of the water. In particular we are of the view that the proposed take regime is unlikely to increase the presence of nuisance algal growths, is unlikely to have any more than minor adverse effects on aquatic ecosystems and in particular native fish, trout and salmon and macro invertebrates. We also concluded that with the mitigations proposed it is unlikely to have any more than minor effects on the habitat of significant bird species.

Protecting wahi tapu and other wahi taonga of value to Tangata Whenua

- 1.48** We accept that the Waimakariri River is a taonga. We are satisfied that the proposed take regime will adequately protect that taonga and will not interfere with the relationship of Māori to the river.

Preserving the natural character of rivers, lakes and wetlands and protecting them from inappropriate use and development

- 1.49** We are satisfied that the proposed take will not of itself compromise the natural character of the river in any more than a minor way. In particular, the proposed one to one take regime allows for natural variability in flows to be maintained. We accept that the associated infrastructure will compromise the natural character of the river to a

limited degree, but on balance we do not consider this to require that the take be declined. We do not regard the take or associated infrastructure as being an inappropriate use or development of the resource. We are also satisfied that the take will not affect the braided characteristics of the river.

Protecting outstanding natural features, and landscapes from inappropriate use and development

1.50 We have set out our conclusions in relation to this matter in **Minute 11**.

Maintaining and enhancing amenity values

1.51 We are satisfied that the proposed take with the various mitigations proposed will not have any significant adverse effects (including cumulative effects) on recreational amenity values. The take will slightly reduce amenity values from current levels. In particular, there will be a slightly greater occurrence of lower flows at which the fishable area will be reduced in the middle reaches of the river. To that extent, fishing amenity values will not be maintained or enhanced but we have concluded that this relatively minor impact is sustainable when weighed against the economic benefits of irrigation.

Protecting the significant habitat of trout and salmon

1.52 We are satisfied that the proposed take regime will protect the significant habitat of trout and salmon in the river.

The braided character of the Waimakariri River, aquatic ecosystems and habitats, wetlands, amenity based on the river, and groundwater recharge from the river, are protected

1.53 We are satisfied that the proposed take regime will adequately protect all of these characteristics from harm.

Promote efficiency in the use of water

1.54 We are satisfied that the proposed use of the water which will be taken will be efficient. The proposed use is not wasteful and will be limited to efficient application rates. We also consider that the proposed use is efficient in terms of 'allocative efficiency' (using water where it has greatest value). The proposed take regime will protect instream

values and the water which can be taken will have high value for irrigation and food production. Whether that is the use which has greatest value is not something which we can determine.

The reasonable need for the quantities of water sought, and the ability of the Applicant to abstract and apply those quantities

1.55 We are satisfied that CPW has demonstrated a reasonable need for the quantities of water it has sought during the irrigation season and indeed would prefer have access to more water.

1.56 We are not satisfied that CPW has demonstrated a reasonable need for the same quantities outside of the irrigation season and will include a condition to limit the take to what is needed for the purposes of its currently proposed scheme.

The availability and practicality of using alternative supplies of water including alternative public or community reticulated supplies

1.57 We have considered the availability of alternative supplies of water for the scheme and have concluded that there are currently no such supplies available to the CPW scheme area other than those which CPW has targeted. In our view, the amended scheme makes more efficient use of existing groundwater supplies than the original scheme.

The effects the take has on river flows, and consequential effects on those values identified in (a) to (h) of Objective 5.1, near the point of take

1.58 We have addressed these effects in some detail in this Minute. We are satisfied that the proposed take regime will ensure that any adverse effects are sustainable.

The effects the take has on other authorised takes

1.59 Conditions have been imposed to ensure that the take will have no significant effect on the ability of other consent holders to take at the same rates and volumes as would be the case without CPW.

Proposed Plan Change 1 to the Waimakariri River Regional Plan

- 1.60** During the reconvened hearings in October 2009, we were made aware of by Regional Council officers of Proposed Change 1 to the WRRP, notified on 8 August 2009 (PPC1). This proposes to substantially amend the rules of the WRRP to impose a 30 m³ 'gap' between A band takes and B band takes from the Waimakariri River. Virtually all water available to CPW would come from B band takes, and this plan change would have major implications for the viability of the proposed scheme. Unsurprisingly, CPW was strongly opposed to the PPC1 take regime.
- 1.61** Less controversially, the plan change would also replace the point of measurement on the river from the Main North Road Bridge north of Christchurch, with a new point of measurement at Otarama in the Waimakariri Gorge above Kowai Bush.
- 1.62** Change 1 does not alter any of the objectives and policies in the WRRP or the RPS. Hearings on Plan Change 1 are expected to take place in mid-2010. Despite being at an early stage in the statutory hearings process, we were urged to place significant weight on the change. The applicant strongly contested the take regime proposed through the rules contained in Change 1, promoting instead a 1:1 sharing regime above the A band takes.
- 1.63** For the reasons set out in **Minute 12**, we decided we could not attach much weight to the new take regime in Proposed Plan Change 1. Firstly, section 88A freezes the activity status of the proposed take to what it was at the time the application was lodged. Secondly, submissions have not been heard on the PPC1 and it may change as a result of that process or appeals. Thirdly and perhaps most importantly, our decision must be based on the extensive evidence presented to us through the hearings process. However, as part of the consideration of the effects of the modified proposal, we did consider the costs and benefits in principle of both a "gap" regime and one based on 1:1 sharing.
- 1.64** The ECan officers recommended that we the CPW take regime be in accordance with the 30 cumec gap between A and B takes as set out in PPC1. However for reasons summarised below and dealt with in more detail in **Minutes 9** and **12** we have decided on a different regime. We concluded that on balance, a 1:1 sharing regime with some additional restrictions, would be sustainable and consistent with the purposes of the Act. Our rationale for this conclusion is set out in **Minute 12** and accordingly need not be repeated here.

- 1.65** We have discussed the weight to be given to PPC1 in **Minute 12**. PPC1 does not change Objective 5.1 or the first part of Policy 5.1 of the WRRP. The new Policy 5.1 (2) and resulting changes to rules is a method of achieving Objective 5.1. We consider that the take regime proposed by CPW, along with the minor adjustments which we have signalled, will achieve the same purpose and will also achieve the purpose of the first part of Policy 5.1 which has not changed.
- 1.66** We have focused on the objectives of the WRRP. We have considered the rationale for the proposed gap between the B1 and B blocks, and have concluded that the gap is not required to mitigate the effects of the CPW take. The first rationale is to avoid "flat lining" the river. The CPW proposal avoids this and maintains natural variability better than the PPC1 proposal. The PPC1 proposal would increase flat lining, albeit that the additional flat lining would be at a flow around 70 cumecs which is considered suitable for most recreational activities and instream needs. Such flat lining would be additional to that which currently occurs at 41 cumecs. We are not convinced that having flat lining of the river at 70 cumecs is desirable. The evidence we have heard suggests that maintaining natural variability above the minimum flow is desirable.
- 1.67** The second rationale for the PPC1 regime is to maintain flushing flows "that are important in washing algal growth and sediment from the river bed." As discussed above, we are satisfied that the proposed CPW take regime, including the more precautionary flushing condition, will maintain flushing flows at least as well as the PPC1 regime.
- 1.68** The third rationale for the gap, is to ensure variability for river users. The CPW regime will also do this and in our view, by avoiding flat lining at 70 cumecs may do so better than PPC1.
- 1.69** Another reason for the proposed gap, is to maintain flows for longer periods in preferred flow ranges. As discussed above, we have concluded that the CPW take regime with one modification, achieves this adequately. In our view, the slight reduction that the river will spend in some preferred ranges will not have any significant adverse effects on recreational amenity or ecological values. To the extent that the PPC1 regime would increase the time spent in preferred ranges, as compared to present, we note that CPW is not required to mitigate the effects of existing consented takes. However, we do accept that PPC1 may provide slightly "better" mitigation of effects on recreational amenity than the CPW proposal. We also acknowledge that our suggested additional

mitigation measure is in practice a B gap approach albeit that the gap would be rather smaller and would only apply for limited periods.

- 1.70** Finally, the proposed gap is said to provide some leeway for the existing minimum flow to be reviewed if required. We think that this is a matter for future changes to the Plan and for the review process rather than a rationale for a gap.
- 1.71** The documentation in support of the proposed gap does acknowledge that there would be costs in terms of reliability of supply for irrigation. We are not sure whether the Council has fully assessed these costs, in comparison to the benefits of the proposal. We have done so and have concluded that most of the benefits of the PPC1 can be achieved at significantly less lost opportunity cost by way of the proposed CPW 1:1 take regime with the addition of a reduced (10-15 cumec) B gap only applying at times of peak recreational use. In our view this is a more efficient and sustainable outcome.
- 1.72** We appreciate that if our decision is upheld, the proposed amendments to Policy 5.1 and resulting amendments to standards and rules will need to be revised. Whilst we value the work that has been put into PPC1 and understand and agree with the reasoning for the proposed changes, we have more information available to us to assess an appropriate take regime than the Council had when it proposed the change. We have concluded after a thorough review of the evidence provided, to this hearing, that Objective 5.1 of the WRRP can be adequately achieved with the conditions proposed and without the 30 cumec gap. The consequences of this in terms of the future of PPC1 is not a matter which we think we should put much weight on.

Conclusion in relation to the Waimakariri take

- 1.73** We have concluded that the revised take regime which we have required for CPW's Waimakariri take will be sustainable and will avoid, remedy or adequately mitigate adverse effects on recreation amenity, ecology and other parts of the environment. The take will be reduced by approximately 30% of the take proposed under the original scheme.
- 1.74** The key elements of the take regime are as follows:
- *The take will be subject to the existing minimum flow regime and existing A and B permit takes. Accordingly it will not affect the frequency and duration of flows below the A/B permit transition.*

- *The maximum take diverted for irrigation purposes will now be 24 cumecs rather than the originally proposed 40 cumecs.*
- *There will be very little take outside of the irrigation season because CPW will be limited to only so much as is required to top up on farm storage.*
- *The take will be subject to one to one flow sharing from the commencement of take at 66.1 cumecs as measured at the Old Highway Bridge (CPW will only be able to take one cumec for each additional two cumecs of flow).*
- *In addition the take will be subject to the so called "holiday rule" which will limit its take to 6 hours per day (largely overnight) during summer weekends, public holidays and some weekdays during the peak recreation season. This is directed at maintaining adequate flows downstream of the Crossbank during high use periods for kayakers and jet boaters.*
- *During these periods the take cannot commence until an unmodified flow of **around 75 cumecs as estimated at the old highway bridge**, thus maintaining a residual flow of **at least 55 cumecs**.*
- *No takes during the coast-to-coast event.*
- *After sustained periods of low flow (more than 21 days of flows less than 41 cumecs), CPW will be required to let the first fresh pass through unimpeded as a flushing flow.*
- *Rakaia water will be taken in preference to Waimakariri water and when sufficient water is available from the Rakaia no water will be taken from the Waimakariri. (An average rate of take for the Rakaia and Waimakariri rivers of 26.35 and 5.18 m³/s respectively).*

2. THE TAKING OF WATER FROM THE RAKAIA RIVER

Introduction and description of the application

- 2.1** The water permit application CRC021091 to take water from the Rakaia River is a joint application by the Ashburton Community Water Trust (ACWT) and CPW to take up to 40 m³/s (cumecs) from the river. The proposed CPWT take is on the north side of the river slightly downstream of the proposed ACWT take which is on the South bank some

5km downstream of the Gorge bridge. The CPWT take is for irrigation purposes whereas the ACWT take is for hydro-electricity generation purposes. The takes are at different locations, for different schemes which are not connected in any physical sense. However there is an agreement in place between the two applicants as to which party would be able to take at any time. In practice this means that during the irrigation season CPW will have priority over ACWT and outside of the irrigation season CPW will require very little water under its revised scheme. Accordingly in Winter ACWT will have priority.

Rationale for dealing with the ACWT and CPW takes separately

- 2.2** We ended up hearing and deciding the ACWT applications separately from the CPW applications. Our decision was released on 25 May 2009 and was not appealed by any party. This included granting ACWT a water permit to take water from the Rakaia on the south bank, separate from the consent which we are now granting to CPW to take on the north bank.
- 2.3** For the record, we set out below our reasoning for deciding to grant the ACWT water permit to take (CRC093683) separately from the CPW consent (CRC021091).
- 2.4** Section 103 is not applicable. That section requires that where there are two or more applications for consents being heard by the same consent authority in a joint hearing in relation to the same proposal then there must be a joint decision unless the authority is of the opinion that the applications are sufficiently unrelated so that it is unnecessary to decide the applications together.
- 2.5** The proposals by ACWT and CPW are for entirely different schemes. Even if one regards the joint application as being one proposal to take water by two different persons for different purposes, then section 103 still does not apply because there is only one application in that category. The rest of the ACWT applications relate to a different proposal from the CPW applications.
- 2.6** Nevertheless, in case we are wrong on this point, we record that we have concluded that the CPW and ACWT applications and the two parts of the joint application are sufficiently unrelated so that it is unnecessary to decide the applications (or both parts of the joint application) together. In particular:

- The two components of the joint application relate to different intake points on opposite sides of the river and there is no physical linkage beyond the fact that the takes would both be from the same river.
- The purpose of the two component takes is different: one is for irrigation and one is now for a hydro generation scheme.
- The ACWT scheme is totally unrelated to the remainder of the CPW applications and its Notice of Requirement.
- The effects of two takes for up to 40 cumecs authorised under two consents will be the same as the effect of two takes for up to 40 cumecs authorised under one consent.
- The effects of the ACWT take on the river and on other consent holders can be determined without knowing the outcome of the CPW scheme.
- The effects of the proposed CPW take on the river and on other consent holders can be determined without knowing the outcome of the ACWT scheme.
- Whilst the applicants have decided to apply together they could have (and normally would have) applied separately and been determined separately.
- For administrative efficiency and accountability it would be preferable that each has its own consent given that the takes are by different persons for different purposes at different locations.
- The combined hearing has allowed us to assess the effects of the total take applied for. Issuing a joint decision will not add to our understanding of those effects.
- The applicants intended to separate the consents in any event.
- If there are appeals against the ACWT decision (and there have been none), the Environment Court will still have the option of amalgamating those appeals with any appeals on the CPW proposal if it thinks fit.

- If the Court confirmed both consents it could grant them as one if it considers that to be necessary.
- In our view the applications would normally have been made separately and whilst we understand the strategic reasons for amalgamating them, we do not see that as being necessary for our decision making process.
- In our view no submitter or potential submitter will be prejudiced by us making a separate decision on either application.
- In particular, we do not see how Synlait will be prejudiced by this approach.

2.7 The only link between the two schemes is that the two applicants have decided to make only one application to take from the Rakaia. There is also an agreement between them as to how the allocation would be shared between the two takes. The applicants have signalled that they had intended eventually to separate any joint consent which might be granted. It seems that the sole reason for the joint application was to avoid any competition between ACWT and CPW, in terms of the first-in first-served system.

2.8 We accept that because there was a joint application it was appropriate and perhaps essential to hear evidence relating to each proposal concurrently so that we could understand the interrelationships between the two schemes. That is also what Synlait requested in its submission. However we do not agree that it was necessary for us to issue one decision on the joint application. That might have been the case if there had been a joint take point, but as it is, the schemes are physically unconnected beyond the fact that they take from the same river.

2.9 We accept that the instream impact of the joint application if granted and the impacts on Synlait will derive from the net effect of both takes. Accordingly the conditions of both consents are directed at the combined effects. Thus both consents need to ensure that the provisions of the Water Conservation Order are met and that the cumulative effects of both consents and other consents are sustainable.

2.10 Both also need to ensure that there is no substantial derogation of the Synlait consent or consents if such are confirmed on appeal. However, we cannot see any reason why all of this cannot be achieved by way of consecutive decisions granting separate consents. Indeed given that the intention has always been to separate the consent once granted, it would seem sensible that the panel which has heard the evidence does that now

rather than leaving it to be sorted out by officials later. Both applicants agreed to our suggestion that the consents be split and no party appealed our decision in relation to Synlait.

- 2.11** We of course need to ensure that both consents have consistent conditions and ensure that the single consents together can have no greater effect than a joint consent would have. The conditions of both will ensure that the requirements of the WCO are met and that the exercise of both consents separately or together, does not give rise to any significant derogation of the rights of other consent holders.
- 2.12** Separate consents will in total give rise to no greater or different effects than one combined consent. We cannot grant consent for more than what was applied for (a total of up to 40 m³/s whenever available and whenever that would not affect priority rights). In either event (joint consent or separate consents) the conditions of consent can and will constrain the effects to the same degree.

Interrelationship between the ACWT and CPW consents

- 2.13** The application is for CPW and/or ACWT to be able to utilise up to the full 40 m³/s at any time when the existing consents and the WCO would allow for that, but for the total from both takes (after bypass returns to the river) to never exceed 40 m³/s. Both applicants proposed that the water permit (or now permits) would not specify which party may take the water at any particular time; instead that is left to a side agreement between ACWT and CPW.
- 2.14** As we understand it, once both schemes are operating, CPW would have priority to the water during the irrigation season and ACWT would be able to take such of it as is not required by CPW. Outside of the irrigation season ACWT would have access to all of the available allocation, unless CPW requires some of that for storage. However it now only proposes 45MCM of storage.
- 2.15** Ms Appleyard acting for ACWT told us that the latest memorandum of agreement between CPW and ACWT provides that ACWT will receive 44% of the water available to be taken at any given time as granted under CRC093683 and CRC021091, plus the Glenroy consents which allocate up to 1.96 m³/s. This will give a 'first call' entitlement to ACWT of about 16 m³/s (based on all currently available water in the Rakaia).

2.16 The ACWT take consent included a condition which would limit the total take by CPWT and ACWT to a maximum of 40 m³/s, and we have proceeded on the same basis for the CPW Rakaia take.

2.17 In our **Minute 12** we suggested that CPW develop conditions for discussion among the parties, similar to those which we developed for granting the ACWT water permit, to ensure that both consents together comply with the minimum flow, one-to-one flow sharing and maximum allocation rules in the WCO. The final form of conditions proposed by CPW and the officers is somewhat different from the ACWT permit, but we are assured by the officers that the conditions proposed are not inconsistent with the approach adopted for ACWT. We have also been assured that the proposed conditions will ensure that the provisions of the WCO are met.

Decision making framework

2.18 The Rakaia River Water Conservation Order (WCO) is the primary instrument governing the taking of water for the ACWT and CPW schemes. The statutory assessment of the applications includes the legislative requirements of Part II (sections 5, 6, 7 and 8) and the more specific sections relevant to this application that are contained in Part VI of the Act (sections 104, 104B, 105 and 107). So far as the taking of water is concerned this is governed by the WCO and there is no take regime set out in the PNRRP. There are some relevant objectives and policies in the Regional Policy Statement but they really add little to what is already required in terms of Part 2 of the RMA and the WCO.

Consistency with Rakaia Water Conservation Order take regime

2.19 Section 217 of the RMA prohibits us from granting any water or discharge permit which would be contrary to any provision of the Water Conservation Order and requires us to include conditions adequate to ensure that the provisions of the Order are maintained.

2.20 Relevant provisions of the WCO in terms of water quality and natural character include:

Clause 3 that states the outstanding characteristics and features of the Rakaia River and its tributaries include:

(a) *an outstanding natural characteristic in the form of a braided river; and*

(b) *outstanding wildlife habitat above and below the Rakaia Gorge, outstanding fisheries, and outstanding recreational, angling and jet boating features.*

2.21 There is a specific minimum flow which varies from month to month. Once the flow as measured at the Rakaia Gorge bridge drops below the specified minimum flow all takes must cease, apart from some pre-existing stock water takes.

2.22 Clause 7(4) requires that "*while the gorge flow exceeds the minimum gorge flow by 140 cubic metres per second or more, the flow in the river shall not be reduced by abstraction or diversion by more than 70 cubic metres per second*".

2.23 In addition, the taking of water under the WCO is subject to a *one-to-one sharing rule* when the flow at the Gorge bridge exceeds a minimum flow which varies from month to month, up to 140 m³/s above that minimum flow. (i.e. for every cumec of water abstracted from the river, a cumec of water is left in the river for in-stream values/uses).

2.24 Clause 9 refers to water rights and general authorisations (now water and discharge permits, and permitted activity rules). It states in sub-clause (2) that water rights and general authorisations shall not be granted or made for any discharge into the Rakaia River downstream of its confluence with the Wilberforce River, if the effects of the discharge would be to breach the following provisions and standards [our emphases]:

(a) ***any discharge is to be substantially free from suspended solids, grease and oil;***

(b) ***after allowing for reasonable mixing of the discharge with the receiving water –***

(i) the natural water temperature shall not be changed by more than 3°C.

(ii) the acidity or alkalinity of the water as measured by the pH shall be within the ranges 6.5 to 8.3, except where due to natural causes.

(iii) the waters shall not be tainted so as to make them unpalatable, nor contain toxic substances to the extent that they are unsafe for consumption by humans or by farm animals, nor shall they emit objectionable odours.

(iv) there shall be no destruction of natural aquatic life by reason of a concentration of toxic substances.

(v) the natural colour and clarity of the water shall not be changed to a conspicuous extent.

(vi) the oxygen content in solution in the water shall not be reduced below 6mg/L.

(vii) based on not fewer than 5 samples taken over not more than a 30-day period, the median value of the faecal coliform bacteria content of the waters shall not exceed 200 per 100ml.

2.25 It is of note that (b) makes allowance for reasonable mixing whereas (a) does not. We discussed our interpretation of this provision in the ACWT decision.

What is the effect of the Rakaia Water Conservation Order

2.26 As noted above, section 217 requires us to ensure that the provisions of the Rakaia WCO will be met if we grant consent. There was some debate around whether the WCO also creates a presumption in favour of the grant of a conforming consent to take water from the river. Original senior counsel for CPW Dr (now Justice) Wylie submitted that the WCO has the purpose of protecting instream values and that accordingly, provided the provisions of the order will be met by any proposed take, the take should be granted. In other words, the submission was that the WCO takes care of instream values and we need not consider instream effects further and cannot impose more onerous restrictions (eg higher minimum flows). Fish and Game, the Department of Conservation and others strongly disagreed with that position and we expressed some reservations during the CPW opening as to whether that is the correct position.

2.27 Ms Appleyard for ACWT adopted a different position from Dr Wylie. She was of the view that the Order did not create any presumption in favour of the grant of a compliant consent and that there was no necessary barrier to imposing conditions more stringent than the WCO. However she was of the view that the terms of the order are a relevant matter under section 104.

2.28 Mr Burns, legal counsel for Malvern Hills Protection Society took a similar position:

The Rakaia River National Water Conservation Order does not provide a licence to take as much water as can be taken, and for whatever purpose an applicant chooses, as long as the minimum flows in them are maintained. Any water take proposal has to meet the sustainability test in the Act.

2.29 Neither the proposed Natural Resources Regional Plan (PNRRP) or the Transitional Regional Plan provide any more detailed rules for the taking of water from the Rakaia. The taking of water from the Rakaia is therefore a discretionary activity pursuant to section 77C(1)(a) of the Act. Accordingly we have discretion under section 104B to grant or refuse the application to take water from the Rakaia. The fact that the WCO allows takes up to an aggregate limit of 70 m³/s does not create a presumption that taking up to that limit and subject to the other flow limits is necessarily sustainable. There is no statutory or case law support for a positive presumption.

2.30 We also note that the WCO is directed at protection of certain listed *outstanding characteristics*. Whilst that includes the most important characteristics of the river it does not include them all. For example, the WCO does not address the protection of landscape values, macro-invertebrates, or the Mauri of the river. We appreciate that the WCO was determined in the context of the best evidence available at the time and there is now two decades of additional experience to draw upon.

2.31 We can and do put some considerable weight on the fact that the flow regime prescribed by the WCO was seen at that time (pre-1988) as being sufficient to protect the outstanding values identified in the order. We also note that there has been no application to vary the WCO. Nor has there been any decision by ECan to impose more restrictive provisions by way of Regional Rules. Accordingly, we are entitled to conclude that the community accepts that the WCO provisions provide adequate protection to instream values. We have nevertheless considered whether the proposed take subject to the suggested conditions (based on the WCO rules) will achieve the purpose and principles in Part 2 of the Act. For the reasons set out in our decision in relation to ACWT and in this decision we have concluded that it will. In particular we have heard no evidence which suggests to us that the WCO provisions do not provide adequate protection. That is perhaps unsurprising given that the objective of the WCO was conservation rather than sustainable management. Accordingly, if anything it is likely to be conservative in its approach to further abstractions.

The abstraction limits

2.32 The consent conditions must ensure that *'the flow in the river shall not be reduced by abstraction or diversion by more than 70 cubic metres per second'*. This could be interpreted as meaning that the total abstraction downstream of the Gorge must not exceed 70 m³/s. However, in our view the WCO is directed at ensuring that the residual flow is not reduced by abstraction at any point in the river by more than 70 m³/s below what it would otherwise have been. (We discuss this point in more detail in the ACWT decision.)

2.33 Determining the current total allocation and therefore the remaining available allocation has been a matter for some discussion. This issue was raised by Mrs Snoyink and Mr Wardell for Malvern Hills Protection Society, and by Mr Holland for Fish and Game. Mr Tipler based his modelling on 34.3 m³/s having already been allocated, Mr Borrie for ACWT advised that current (net) allocations within the river total 34.5 m³/s, and Mr Duncan for ECan cited January 2008 figures of 33.84 m³/s. Neither the 6 m³/s of Synlait's Band 2/3 allocations have been included in this figure, nor the further 6 m³/s of Band 5 which it has applied for and awaits a hearing. The 17 m³/s granted to Barrhill-Chertsey Irrigation (BCI) and available for use by ACWT has been taken account in these figures.

2.34 We noted as follows in our **Minute 12**, that CPW has a 10 year agreement with Barrhill Chertsey Irrigation Ltd (BCI):

In relation to the proposed water take from the Rakaia River, the only change from the original proposal is CPW's agreement with Barrhill-Chertsey Irrigation Ltd (BCI) to take up to 7 m³/s of its consented allocation. This agreement is for 10 years, and assuming CPW is in operation within that time, this would mean that more scheme water can be sourced from the Rakaia, resulting in less demand from the Waimakariri. However as the agreement is of limited duration and our role is in effect to identify an envelope of sustainable takes from each river, we have not put any weight on that agreement.

The CPW consent will allow for this agreement and others to operate provided the requirements of the WCO are met.

2.35 Mr Fietje in his supplementary evidence suggested that the current allocation figure should include *'groundwater takes which remove substantial additional water relatively quickly'*. We agree that is the intent of the WCO. We are also of the view that

diversions of water that remain within the riverbed for all but a short distance, such as bypass flows, should not be included for the purpose of calculating compliance with the WCO. Both Mr Tipler in his supplementary evidence for CPW and Mr de Joux for Fish and Game confirmed that ECan had updated the total existing allocation figure to 36.5 m³/s and we understand that figure to be based on those presumptions.

- 2.36** Mr Fietje advised that ECan proposes to 'tidy up' the Rakaia band allocations via a plan change, and we agree that this would be desirable to clarify the total allocations, including connected groundwater takes, because it is critical that all parties are clear on how the 1:1 sharing is being implemented, and when the 70 m³/s limit has been reached at any point along the river. We have found the current WCO take regime overlaid by the informal Band system to be somewhat confusing.
- 2.37** On our interpretation of the WCO, the *total allocation* of takes from the river (which is the basis of the Band approach) does not paint the full picture in terms of compliance with the allocation limit or minimum flows in the order. The critical figure is the amount of water actually being taken out of the river at any particular point at any particular time.
- 2.38** The consent conditions must be worded so as to ensure that exercise of the consent in conjunction with all other consents operating at a particular time does not cause *the flow in the river (at any point) to be reduced by abstraction or diversion by more than 70 cubic metres per second* from what would otherwise have been the case at that time. In calculating this, one must make allowance for whatever is being returned by ACWT or any other party to the river. We have however disregarded the Highbank discharge, since there is no obligation for that to occur.
- 2.39** For the purpose of consent conditions for ACWT, the critical figure to know was the amount of water already allocated for abstraction between the ACWT take and its discharge. The irrigation season and winter figures were provided to us for our ACWT decision and verified by ECan officers. During the irrigation season (September to April) up to 22.031 m³/s may be taken in this reach including the BCI take. In winter the figure decreases to 1.139 m³/s since BCI and other irrigators will not be taking.
- 2.40** These figures include the Synlait consent which is under appeal but exclude its application for band 5 water which has not yet been heard. The depletion figure used in the conditions will need to be adjusted if Synlait obtains priority band 5 water since its intake would be upstream of Barrhill. Correspondingly if it does not obtain a priority

consent for the application which is under appeal, the figure will also need to be adjusted.

- 2.41** These figures and ACWT consent conditions are also relevant to the CPW take since consent conditions for CPW must also ensure that the cumulative take at any point along the river does not exceed 70 m³/s and ensure that the one-to-one flow sharing requirements and minimum monthly flow requirements of the WCO are not breached.
- 2.42** The consent which has been granted to Synlait but which is under appeal relates to band 2/3 water. This has been accounted for in the total existing Rakaia allocation figure described above (36.5 m³/s). However, in determining the actual allocation above the ACWT outfall at Barrhill (i.e. 22031.14 l/s reducing to 1138.70 l/s in winter) it has been noted that the consents that Synlait intends to exercise in band 2 & 3 are located downstream of the ACWT scheme. This means that **if** Synlait gains priority for Band 2/3 water and is taking that water above the Barrhill discharge, ACWT and/or CPW will need to reduce their take rates accordingly (through a s127 review provided for in conditions). This has been provided for in the ACWT conditions, and will similarly be provided for in CPW conditions.
- 2.43** Both CPW and ACWT sought that their take consents allow for the possibility of them taking water which is currently within another person's 'allocation' when that allocation is not being utilised. In our view that approach is consistent with the WCO since as noted above that seems directed at maintaining instream flows rather than limiting a legal allocation. We do not consider that such an approach is contrary to the *Aoraki* decision provided that the subsequent consent cannot be exercised so as to limit the taking or diversion of water by existing consent holders at times when they are authorised to take and use the water.
- 2.44** The detailed discussion above illustrates to us that day-to-day exercising of all take consents affecting Rakaia flows in compliance with WCO rules and consent conditions will need some system within ECan to (a) track and preferably have publicly available the actual allocations on any particular day and (b) some form of monitoring preferably real-time and also publicly accessible to manage cumulative water takes on any particular day within the WCO limits at all take points along the Rakaia River.

Assessment of effects and the permitted and reasonably foreseeable environment

- 2.45** In assessing the effects of the proposed CPW take we have compared the effects of the take against the existing environment including existing operating consents. We have also included as a given, the effects of the ACWT and Barrhill Chertsey Irrigation (BCI) consents which have been granted but are not yet operating. Those consents form part of the reasonably foreseeable future environment and the effects of those consents have been approved and not appealed. Accordingly, we have concluded that when assessing the effects of the CPW proposal, we should exclude effects which have already been considered in relation to ACWT and focus on any additional effects from the CPW proposal plus any cumulative effects which CPW may have in conjunction with the effects of ACWT and BCI.
- 2.46** The ACWT take is for a maximum of 40 m³/s subject to the restrictions in the WCO. That consent allows ACWT to take up to the limits provided by those restrictions all year round. CPW is seeking to take no greater volume than ACWT and the combined rate of take by both parties at any time will not exceed 40 m³/s or such lesser amount as required by the WCO. Accordingly, it follows that the CPW take can not have any greater effect on flows or river ecology than the ACWT consent at least down as far as Barrhill.
- 2.47** Under the ACWT consent it will discharge all of its take back to the river at or upstream of Barrhill. However if the BCI scheme proceeds, only up to 23 m³/s will be returned over the irrigation season.
- 2.48** The key difference between the CPW take and the ACWT take, is that CPW will not be returning the water it takes to the river. The other difference is that CPW is seeking to take 40 cumecs **in addition** to BCI whereas ACWT only has consent to take 23 cumecs in addition to BCI.
- 2.49** In summary, the maximum combined effect of CPW and BCI on flows is 57 cumecs of which 17 cumecs has already been considered in relation to BCI and a further 17 considered and consented in relation to ACWT. (at least as far as Barrhill). Accordingly in relation to CPW we need only consider the effects of an additional maximum of 17 cumecs of depletion from its intake to Barrhill and 40 cumecs of depletion from there to the sea.

- 2.50** The effects of a maximum of 40 m³/s take between the ACWT intake and Barrhill have already been found to be sustainable in relation to the ACWT application and do not need to be further considered here.
- 2.51** Downstream of Barrhill 17 m³/s of the 40 m³/s going through the ACWT/BCI scheme does not need to be returned to the river. Accordingly, the additional effect of CPW downstream of Barrhill is a maximum of 23 m³/s (40 minus 17 already consented as a non return).

Assessment of effects of proposed water take on flows

- 2.52** We heard evidence from Mr Tipler on behalf of CPW regarding the effects of the proposed take on downstream flows. We also heard evidence from Mr Borrie for ACWT on the same matter. Regional Council officers discussed the administration of the WCO and the informal "banding" regime that has been developed to implement the order. Neither Mr Fietje nor Mr Duncan for ECan expressed any concerns regarding the hydrological or instream effects of the proposal.
- 2.53** What we have discussed above are **maximum** potential effects on river flows. However, the impact of such reductions is tempered significantly by the restrictions in the Water Conservation Order. In practice this means that CPW (and ACWT) could only commence their takes at relatively high flows and could only take at the maximum rate at even higher flows.
- 2.54** Mr Tipler presented modelling of the effects of a 40 m³/s CPW take on the frequency and duration of river flows. We had that information based on the scenario that Synlait has priority and has consent and on the alternative. The modelling proceeded on the basis that none of the 40 m³/s is being returned. However, in practice if ACWT proceeds most of the 23 m³/s will be returned except during the irrigation season when (subject to the WCO) all 40 m³/s could be taken by CPW for irrigation.
- 2.55** Hydrological analysis by Mr Duncan for ECan and Mr de Joux for Fish & Game confirmed that the WCO monthly minimum flows combined with 1:1 flow sharing mean that:
- flow variability is maintained in the Rakaia;
 - there is no flat lining of flows;

- the time the river will be at or below the 7-day MALF (94.8 m³/s) will not change

2.56 Mr de Joux’s analysis concluded that based on the conservative assumption that all take consents including ACWT/CPW are fully exercised, the median summer river flow would be reduced by 16% from the unmodified flow; the proposed abstraction reduces the median flows for October to January from their pre ACWT/CPW values by only 0.5%, 0.8%, 0.9% and 1.3% respectively.

2.57 Subsequent to the close of the ACWT hearing Mr Borrie at our request provided an amended table which shows the flows at which ACWT would be able to take water. This replaces a table he provided at the hearing which was based on a different interpretation of the WCO to the one we have adopted. This table is also applicable to the CPW take. It shows for the irrigation months (marked ‘A’) that the takes by ACWT can start after 1:1 flow sharing is provided for existing consented takes down to Barrhill (i.e. 2 x 22 m³/s, rounded) and similarly for outside the irrigation season (marked ‘B’) with 2 x 1.14 m³/s added to each minimum monthly flow.

Table 1: Rakaia River flow levels for each month

Month	NWCO minimum river flow (m ³ /s)	Minimum river flow for taking of water (m ³ /s)
January	124	168 A
February	108	152 A
March	105	149 A
April	97	141 A
May	95	97.3 B
June	96	98.3 B
July	91	93.3 B
August	92	94.3 B
September	90	134 A
October	106	150 A
November	129	173 A
December	139	183 A

2.58 During the B months the only take by CPW, based on its revised proposal without storage, would be for maintenance flows in the headrace and distribution canals, apart from provision for filling up to 45MCM of on-farm storage.

- 2.59** ACWT can take water that CPW doesn't want, so if CPW later wishes to add off-farm storage to their scheme, under this consent that would only change the balance between the ACWT and CPW takes, not the quantum of the total take.
- 2.60** We note that CPW has proposed a simpler application of this table in proposed conditions than we applied to the ACWT consent, and we return to this point when discussing conditions below.
- 2.61** The impact of the proposed ACWT and CPW abstractions on the Rakaia River will barely be noticeable in dry years because there is seldom sufficient flow available for the required abstractions to occur. The greatest impact of the abstractions is in the average years. Mr Duncan noted that largest changes in flow occur over the range of 180 m³/s to 250 m³/s.
- 2.62** This observation leads us into assessment of the effects of the take on instream values of the Rakaia.

Impacts of the take on instream values

- 2.63** We accept evidence from Dr Hughey on effects of the flow reduction on birds (particularly of black-fronted terns and wrybills), from Dr Olsen on flow effects on aquatic invertebrates, and from Dr Hayes on the 15 native fish species recorded in the Rakaia. All suggested only minor impact of the proposed take under the WCO rules. We also accept Dr Glova's evidence for CPW that the ACWT/CPW take will not significantly impact the availability of habitat for juvenile salmon and trout in the Rakaia, nor will it affect migration of adult salmon because the monthly minimum flows of the WCO provide adequate water depths.
- 2.64** Habitat and fish migration are less of an issue than salmon angling opportunity. Dr Hayes appearing for Fish & Game observed that salmon angling is the critical value for determining instream flow levels in the Rakaia River during November to April, when adult salmon are swimming from the sea up to their spawning areas. He cited angler survey figures of 21,460 – 68,000 visits per year, sufficient to confirm the Rakaia as a nationally important salmon fishery, a point also emphasised by Mr Canham for Fish & Game and DOC.
- 2.65** Dr Glova concluded that optimal flows for salmon angling in the Rakaia River occur at the tail end of floods at flows of 160 to 180 m³/s and good catches occur over the range

135 – 180 m³/s. These flows – as measured in the gorge - were supported by the evidence of Messrs Matravers (best angling at 150 m³/s), Goldie (180 m³/s), Barr (130-180 m³/s), van der Zwet (115 -180 m³/s) and Ellis for NZ Salmon Anglers (150 m³/s).

- 2.66** Dr Glova went so far as to suggest that the ACWT/CPW take could improve the number of angling days because it increases slightly the number of days that flows would be in the optimal angling range. However, as acknowledged for the Waimakariri, water clarity is also critical to angler amenity, and given that the reduction in flow is not accompanied by a change to water clarity we consider such an improvement in suitable angling days is unlikely. In any case, the effect of the ACWT/CPW take is likely to be small. Dr Hayes did suggest increasing the minimum flows for December-March to 160-180 m³/s to improve angler opportunity, but we had insufficient evidence before us of the benefits (if any) to warrant increasing the limits already provided for in the WCO.
- 2.67** One matter which we have considered is how to ensure that the cumulative takes from the Rakaia, as limited under the WCO, are both enforceable through conditions and in practice. This is especially important because ACWT and/or CPW wish to transfer and exercise portions of other people's take permits when those other consent holders are not using them. In our view, this calls for implementation of a comprehensive real-time telemetered water metering system, managed or audited by ECan for compliance, and preferably with cumulative takes accessible to the public via the Internet. Such a system should include monitoring of the discharges returned to the river from Highbank and Barrhill.
- 2.68** It is beyond the scope of this decision to prescribe such a system (other than prescribing conditions requiring compliance) but we raised this as a matter in the ACWT decision for consideration by ECan officers to achieve an integrated management system for Rakaia water takes below the Gorge, including connected groundwater takes, and note it again here.
- 2.69** The current system for managing cumulative takes along the Rakaia is cumbersome because of the varied conditions applying to all water take consents within the banding system. While it achieves the objectives of the WCO, the complexity does not make the operation of take consents transparent to the public (nor potentially the water users themselves). Some simplification through consent reviews and/or plan provisions is in our view desirable in the longer term.

2.70 In conclusion in relation to effects of the proposed take on Rakaia River flows, we have concluded that the *hydrological impacts* of the CPW take both above and below Barrhill will be minor, and within the constraints of the Rakaia WCO. We were not presented with any evidence which disputed the hydrological evidence or advanced a contrary view. Nor did the Regional Council officers express any concerns regarding the proposed take. We discuss potential secondary effects below.

Effects on sediment transport

2.71 Downstream of the proposed ACWT intake the Rakaia River flows some 56 km to the coast in a braided gravel bed channel. There are usually two to four larger braid channels, and four to ten smaller braids. The fairway is between 1.0 and 2.1 km across, and is typically about 1.3 km wide. It transports between 80,000 and 259,000 m³ of bed load (mainly gravel) to the coast per year. Dr Mabin reported that the Rakaia River has not shown clear trends of erosion or aggradation in its bed, and concluded that the river is well able to transport all the bed load supplied to it. We took from his analysis that the CPW and ACWT water takes would have effects on sediment transport only if the larger flood flows are measurably reduced.

2.72 Dr Mabin concluded that from an operational point of view, it would be prudent for both scheme operators to close intake gates at Rakaia River flows above about 800 m³/s as this corresponds to suspended sediment concentrations of about 1,500 – 2,000 g/m³ at which excessive sediment deposition is likely in sediment settling ponds. This is a moderate flood occurring about 5 times per year. Mr Lewthwaite confirmed that the CPW intake would be shut down during such floods.

2.73 Even if CPW or ACWT continued taking water at flows exceeding 800 m³/s, the reduction in bedload-transporting flows would only occur 1 day/year on average, and it would be insignificant in relation to the river flow. We concur with Dr Mabin that the effect on bedload transport capacity and on the landform characteristics of braid channels, bars and islands across the Rakaia River fairway will be no more than minor. In particular we are satisfied that the take will not compromise the braided characteristics of the river which the Water Conservation Order seeks to protect.

Effects of water take on Flooding at the River Mouth

2.74 Mr Southward, a witness for Malvern Hills Protection Society, described flooding at the Rakaia river mouth and was concerned that changes in the river flow may change the

frequency of flooding and the closing of the river mouth which exacerbates localised flooding (and we note from news reports that the river mouth has indeed closed temporarily since this part of the hearing, with very few abstractions occurring at that time).

- 2.75** Dr Mabin concluded that there will be no reduction in the volume of sediment transported to the coast, and that the additional take will not cause siltation of the river mouth lagoon system. Mr Borrie for ACWT noted that Rakaia river flows at the coast fluctuate by 30-35 m³/s because of variable discharges from Coleridge power station. He said that coastal processes and 'blow-outs' of the river mouth by flood flows are the dominant processes affecting flooding, and that neither will be affected by the proposed water take and discharge some 40km upstream.
- 2.76** On the basis of the evidence of Mr Borrie and Dr Mabin, we concluded that the reduction of up to 23 m³/s in flow between the ACWT intake and Barrhill will have no impact on the river mouth system. There would of course be no return flows to the Rakaia when CPW is taking their full allocation.
- 2.77** As deduced from Table 1, to ensure compliance with the WCO requirements, the full taking by CPW of 40 m³/s during summer would occur at moderate to high Rakaia river flows, i.e. when flows exceed the monthly minimum by 140 m³/s (70 m³/s, multiplied by 2 to implement 1:1 flow sharing). Worst case, in April, this would represent CPW taking no more than 17% of the natural flow. Cumulatively the net total take by all permit holders would be up to 27% taken from the natural river flow, which would occur at 216 m³/s, a slight fresh (97 minimum flow + (2 X (25CPW + 2 Glenroy + 17BHC = 36.5 existing – 23 returned by ACWT)). Total takes at any one time would be considerably less than this. Based on this evaluation, and the fact that flood flows will not be affected by the water takes, we consider any effects on the river mouth are unlikely.
- 2.78** Clearly, there is a problem at the river mouth, and we appreciate the significant efforts Mr Southward has gone to, to document the problem and draw it to the attention of the Regional Council. However, there is no evidence to suggest that his view that the changes are a result of current abstraction is correct. Nor is there any evidence to suggest that the CPW and ACWT takes are likely to have any measurable effect on deposition and flooding.

Effects of water take on other consent holders

- 2.79** On the true left (north) bank there are 22 water takes between 9 km and 46 km downstream of the proposed CPW intake. On the south bank there are six water takes, between 11.5 km and 40 km downstream of the consented ACWT intake. Some of these consent holders lodged submissions concerned that granting consent to ACWT and/or CPW could jeopardise their right to the water or their reliability of supply. As discussed above under Flow Effects, we believe that with an appropriate monitoring system to ensure compliance with the WCO minimum flows and 1:1 sharing, the granting of the CPW take, in conjunction with the already approved ACWT take, will have no effect on downstream water availability.
- 2.80** We also heard a submission from Synlait. It has been granted a consent to take 6 m³/s of unutilised Band 2/3 water. That consent is subject to appeal. It also has an application for Band 5 water for which a hearing has been deferred at Synlait's request. The High Court in *Synlait v Central Plains Water Trust*¹ has ruled that both applications have priority over the ACWT/CPW joint take application. This ruling has been reversed on appeal. The Court of Appeal has required that the issue of priority be referred back to the Environment Court. Synlait has since sought leave to appeal this decision to the Supreme Court.
- 2.81** The joint CPW/ACWT application to take water is for Band 5 water, i.e. water remaining available for abstraction under the provisions of the WCO after higher priority water takes have been exercised. On the basis of this "first in, first served" system, the proposed take would hold the lowest priority, with all existing abstractors holding priority ahead of the applicant. As pointed out by Synlait Ltd, the only exception would be if the applicant agreed with an existing consent holder to take their higher reliability water. Consent conditions for the ACWT take, which has been granted, recognise the higher priority to existing holders of water permits to take.
- 2.82** Assuming Synlait's band 2/3 consent is confirmed, the CPW and ACWT takes will not affect that consent because this is water which is already allocated to others and which is only available to whoever the existing consent holders agree may utilise that water (which is a matter for private agreement, not the consent).
- 2.83** In contrast the application for Band 5 water if successful (and subject to the outcome of Supreme Court and/or Environment Court hearings) may result in Synlait having priority

¹ *Synlait Limited v Central Plains Water Trust* High Court, Christchurch CIV-2007-409-1157, 11 March 2008

for that water ahead of ACWT and CPW at least during the irrigation season. In view of the continuing uncertainty regarding Synlait, we have included conditions in the consent to reflect the potential priority.

Effects on Water Quality and Instream Ecology

- 2.84** Because of the flow sharing and minimum monthly flow limits imposed by the WCO, there will be no flat lining of Rakaia river flows and nor will the 7-day Mean Annual Low Flow occur for longer. Dr Burrell's analysis showed that the maximum cumulative effect on the flow regime would be a 21% reduction of the FRE3 flow during summer (FRE3 being 3 times the median flow (477 m³/s), and the best predictor of various measures of periphyton and invertebrate biomass, and diversity of the flow).
- 2.85** Although Dr Burrell conceded there could be a minor increase in periphyton, invertebrate, and fish productivity associated with the minor increase in flow stability, he concluded this would be unlikely to result in nuisance algal growths or a major shift in invertebrate community composition because flushing by flood flows will continue, and nuisance growths of periphyton seldom occur in the Rakaia anyway.
- 2.86** Mr Kennedy stated that water abstraction effects on dissolved oxygen are not considered significant in the Rakaia River. The river has a naturally high capacity for re-aeration, cool temperatures, a low organic loading, and low biomass of periphyton and macrophytes.
- 2.87** We agree with Dr Burrell and Mr Kennedy and find overall that with management plans in place controlling construction effects and sediment sluicing limited to periods of high turbidity (above about 300 m³/s), the effects of the CPW (and ACWT) water takes on water quality, aquatic habitat and food resources of fish and wading birds will be minor.
- 2.88** The Rakaia is reportedly the sixth most fished river in NZ, and fishing amenity is recognised as an outstanding characteristic by the WCO, which it seeks to protect. Dr Glova considered that the WCO monthly minimum flows for the Rakaia River adequately provide for passage of adult salmon and trout and that the water take would not appreciably reduce the amount of useable habitat available for salmonids downstream of the intake.
- 2.89** However he also suggested that based on optimal flows for salmon fishing being between 160 and 180 m³/s, there could be a reduction in time that flows are optimal for

salmon fishing during dry years, but counteracted by a slight improvement in optimal fishing flows across all years. Dr Glova suggested there may be some slight benefits from sediment flushing for fishability because temporarily increased turbidity stimulates upstream movement of salmon. We don't believe this justifies sediment sluicing other than during higher flow periods, as the benefits of sediment discharge are outweighed by other effects such as proximity of fishing sites near the intake site, and potential hazards from sluicing discharges.

- 2.90** The evidence we heard did not suggest to us that the WCO provisions are inadequate to protect fishing amenity. Accordingly we are satisfied that the restrictions on take in the CPW consent, which reflect the WCO, will adequately avoid remedy or mitigate any adverse effects on fishing amenity. We also again note that of the 40 cumecs maximum take by CPW the effects of the first 23 cumecs has already been deemed to be acceptable in our decision on ACWT.
- 2.91** Mr Neville Ellis appearing for NZ Salmon Anglers was concerned about discharge by ACWT of dirty water from the scheme, and his same concern applies to CPW. However we were advised that water taking would be stopped during high flows. In any case most turbidity will be reduced by settling at the intake pond.
- 2.92** Regarding provision of fish screens at the scheme intake, Mr Lewthwaite for CPW suggested an alternative approach to that agreed by ACWT in their consents. Because of the potential costs of a prescribed 3mm mesh size, CPW sought an approach in which the objectives for the fisheries would be reviewed in conjunction with Fish & Game, DOC and ECan so that a more flexible approach to fish exclusion could be taken at the design stage.
- 2.93** Having heard arguments for and against this approach, we concluded in our **Minute 15** as follows:

We have provisionally concluded that the fish screen condition should either be Mr Lewthwaite's Option A but with a design objective of excluding at least 95% of adult juvenile salmonids, adult longjawed galaxias and longfin eels, or his Option B but with the same design objective as above and mesh and slot sizes as proposed by Dr Meredith. Either option would potentially allow CPW to seek a variation of the objective if further studies establish that such an objective is too conservative. Under the second option, CPW could subsequently utilise section 127 to change the objective and/or the mesh or slot sizes. Neither option would

preclude other design solutions being advanced at any time up until the final design of the screens.

Based on Figures 19-22 of the NIWA 2007 Fish Screening Guidelines, and to achieve an entrainment risk for salmonid, eel and longjawed galaxias less than 'high', we would conclude that if a traditional fish screening approach is taken, it would need square mesh size of less than 4mm.

- 2.94** The parties have negotiated further and we understand reached agreement on an objective and a process for designing and certifying a screen or other system, together with a fallback position as indicated by us of a 4mm mesh size. We agree with Dr Meredith's suggestion that to accord with the guidelines, the screen size should be specified in condition 8(g)(ii) as *"4mm side of square or diameter of material apertures, or 3mm slot width for slotted materials"*. (See Part 2 of our decision).
- 2.95** Finally, there were differences of opinion on the amount of the flow needed through the fish bypass at the intake. We discussed with Mr Borrie the reasons for ACWT's preference for 2 m³/s as opposed to Dr Glova's recommendation of 5 m³/s on behalf of CPW. For ACWT, we agreed that the depth and width of the bypass channel are the relevant considerations and that a 2 m³/s flow will be adequate for fish passage through and past the intake, given the proposed intake structure and degree of flow control possible through the use of radial gates. We can see no reason why the same provisions should not apply to CPW.

Conditions of take

- 2.96** For the CPW take consent for the Rakaia, the ACWT conditions have been the starting point so that the consent operates in conjunction with the existing ACWT take consent and also with the higher priority takes. However the approach to CPW take conditions is a simplification of those attached to the ACWT consent. The conditions have been negotiated among the parties and agreed by ECan technical staff and solicitors as enforceable and in compliance with clause 7 and other relevant provisions of the WCO. We have reviewed the draft conditions and after some further clarification from the officers and some minor amendments, we are now satisfied that the conditions are appropriate and consistent with the WCO. and comment on them below.
- 2.97** The maximum take of 40 cubic metres is set by condition 1 then further limited under conditions 2, 3, and 4. Condition 5 (a) provides for the taking of water allocated but not

taken by others. Condition 5 (b) provides for the taking of water which is governed by another consent but which has not been allocated. Together these conditions define the extent of the "allocation" or water available to CPW.

- 2.98** The discussion below is based on a similar evaluation contained in our ACWT decision:
- 2.99** Clause 7 (2) of the WCO provides that once the flow as measured at the Gorge bridge drops below the specified minimum flow for the month (the figures in the table above) flows downstream of the gorge must be retained in the river. For example in January, once the flow drops below 124 m³/s at the gorge bridge, all takes must cease. The aim is to protect downstream flows.
- 2.100** Clause 7 (3) of the WCO provides that at intermediate flows when the flows at the Gorge are above the specified minimum flows by less than 140 m³/s, total abstractions at any point must not exceed the Gorge flow minus the minimum flow divided by two. This is one to one flow sharing. At these intermediate flows the maximum total allowable abstraction ranges at any point downstream from 0 to 70 m³/s.
- 2.101** Clause 7 (4) of the WCO provides that when flows at the Gorge are above the minimum flow plus 140 m³/s the one to one flow sharing does not apply but total abstractions at any point must still not exceed 70 m³/s.
- 2.102** As discussed earlier, our interpretation is that the clause 7 of the WCO is directed at the total depletion at particular points in the river rather than at total abstraction. Accordingly, in calculating a total depletion we are of the view that diversions of water within the river channel should not be included, both because the water has not been taken from the river, and even if it were, the size of any of the currently proposed in-channel diversions in conjunction with upstream takes would not exceed 70 m³/s.
- 2.103** For the ACWT take consent, we concluded that the minimum flows above which water may be taken are in simple terms able to be based on:
- The minimum flows required under the WCO; plus
 - Any water that is required for abstraction upstream of the ACWT discharge point at Barrhill multiplied by two to allow for the one to one flow sharing.

- 2.104** What differs for the CPW take is that the water is not returned to the Rakaia. Therefore there are two reaches of river where higher priority (higher band) takes may limit how much water can be taken by CPW: above Barrhill, and below Barrhill.
- 2.105** Above Barrhill, net maximum takes including CPW will comprise (with all figures rounded to nearest 0.1 m³/s):
- ACWT 40 m³/s (returning 23 at Highbank and Barrhill if BCIL is taking its 17 for irrigation, otherwise returning 40)
 - Existing higher band takes 5.0 m³/s (from Attachment 1 of ACWT water permit)
- 2.106** Therefore with the WCO limiting total takes to 70 m³/s, the maximum potential take in this reach is 70-22, i.e. 48 m³/s. At 40 m³/s, the CPW maximum take is less than this.
- 2.107** Below Barrhill, net maximum takes upstream, including CPW, will comprise:
- BCIL 17 m³/s
 - Higher band takes above Barrhill 5.0 m³/s
 - Higher band takes below Barrhill 14.5 m³/s (i.e. 36.5-22, and this includes Synlait Band 2/3 use of other consent holders' allocations)
 - Potentially a Synlait Band 5 take of 6 m³/s
- 2.108** The maximum potential take above here is 70-36.5=33.5 m³/s, therefore at some times the maximum amount of water able to be taken by CPW (or ACWT) will be limited by the takes exercised by others downstream.
- 2.109** This analysis shows why conditions need to provide for the exercising of all consents in higher bands than CPW and ACWT, so that the allocation limits of the WCO are adhered to. Either we can assume - as we did in the ACWT consent - that higher banded consents are being used, and use those allocations as in ACWT condition 2(a) to specify the threshold flow before ACWT or CPW can begin taking water. Or there could be put in place a monitoring system (e.g. a real time telemetry system) from which ACWT, CPW and ECan as compliance auditor can determine how much water is being

taken under those higher priority consents, and use this information to set their take rates, preferably on a daily basis, rather than a continuously adjusted basis.

2.110 We have adopted the first option, as it has been agreed by the parties. Hence condition 2 of the CPW Rakaia take consent CRC021091 will limit the total Band 5 consumptive (non-returned) water take to a maximum of 33.5 m³/s (i.e. 70-36.5) and likewise the combined total take with ACWT to 33.5 as that is the amount of Band 5 water left for allocation.

2.111 CPW take condition 3 sets the monthly minimum flows above which their Rakaia take can commence. Because the CPW irrigation is substantially run-of-river, the increment of flow above the prescribed monthly minima set by the WCO is the same in condition 3 for every month of the year, rather than there being a lower increment during the winter months as set for ACWT. The difference between the WCO minimum flows and these numbers is calculated from the amount of water (36.5 m³/s) already allocated pre-CPW to give the increment above each monthly minimum flow of 73 m³/s, i.e. 36.5x2.

2.112 CPW condition 4 limits the combined water take by CPW, ACWT, BCIL and Glenroy to 67 m³/s to make clear the limits for exercise of a water sharing agreement among these parties. The 67 m³/s figure is calculated as the maximum allocation available to these consent holders taking into account higher priority allocations and return flows by ACWT. As shown in Table AA below from Mr Tipler, this calculation shows that CPW could take 25, Glenroy 2, ACWT and BCI 40 to total 67 m³/s, if one allows for the mid river irrigators to take their allocation of 3, provides for the WCO total depletion of 70, and provides for 14.5 m³/s to be returned by ACWT to allow that 14.5 to be taken by lower river irrigators. This condition has the effect of limiting CPW to 25 while others are taking their full allocations, without breaching the WCO. If CPW wants to take more water, then it can only do so if the others are taking less, hence limited by 67 in total for this group.

Table AA: Flow sharing for the Rakaia River

Water Available	Lower Users	Mid Users excl BHC	BHC	ACWT	ACWT + BHC	ACWT consumptive	Glenroy	CPWL	CPWL + Glenroy	ACWT total + CPWL	ACWT consumptive + CPWL	Total
70	14.5	3.0	17.0	23.0	40.0	8.5	2.0	25.0	27.0	48.0	33.5	70.0

- 2.113** Condition 5(a) allows CPW to take someone else's unused but **allocated** water pursuant to the rules in their consents, and pursuant to WCO minimum flows and maximum depletion of 70 m³/s, but only with that parties written approval.
- 2.114** Condition 5(b) specifically relates to the **unallocated** water in bands 2 and 3 (some of which Synlait is contesting). Because some band 2 and 3 water is unallocated, it does not need other consent holders' permission to use it, provided CPW is not taking at the same time as the specified group of consent holders.
- 2.115** In particular there are a number of consents where there is a volumetric limit on the take which does not reflect the WCO or instream needs, but relates to maximum rates of use of the water. At times when these consent holders have reached their volumetric limits, CPW may take the surplus water without that consent holder's permission, provided it still meets the requirements of the WCO and the minimum flows provided for in the relevant consent. This is advantageous to CPW because these consents being higher priority consents are subject to lower minimum flows.
- 2.116** Finally, CPW condition 6 limits the purpose of its water take to whatever is required for irrigation plus on-farm storage.
- 2.117** The final CPW conditions appeared to be fully accepted by the applicant, officers and those submitters who attended the final days of the CPW hearing at which conditions were discussed, and there have been no appeals of the final decision on ACWT which contains similar conditions. (We did not hear any submissions from Synlait regarding the CPW conditions.) We are satisfied that the proposed conditions will adequately avoid remedy or mitigate adverse effects on the environment and ensure that relevant Part 2 matters are addressed.

Consent Duration and Lapse


- 2.118** We have concluded that concurrent expiry with the ACWT take consent is appropriate to allow an integrated review of both schemes, accordingly we have set an expiry date of (insert ACWT date) for the water-related consents. We are conscious that this will be a slightly different expiry date from the Waimakariri consents but we do not see that as presenting a difficulty. The effects of the takes on each river can be assessed independently.

2.119 As for ACWT and as indicated in **Minutes 12** and **15**, a lapse date of 8 years from commencement is also provided for, because it achieves a balance between the time required for the applicants to get work under way, and the potential 'locking up' of the resource in the event that the scheme does not proceed.

Overall conclusion in relation to the taking of Water from the Rakaia river

2.120 We are satisfied that the proposed taking of water from the Rakaia river will be sustainable and in accordance with the principles set out in Part 2 of the RMA. We are also satisfied that the requirements of the Rakaia River Water Conservation Order will be achieved. These provisions afford a high degree of protection to instream values. The conditions which are required to reflect the WCO will similarly ensure that the outstanding characteristics of the river are protected and will also ensure that other characteristics not recognised by the order are sustained.

Independent Commissioners 28 May 2010



Philip Milne (chair)



Bob Nixon



Andrew Fenemor



Ray O'Callaghan

IN THE MATTER OF the Resource Management Act 1991

IN THE MATTER OF applications by Central Plains Water Trust to:

Canterbury Regional Council for resource consents to take and use water from the Waimakariri and Rakaia Rivers for the Central Plains Water Enhancement Scheme and for associated consents required for the construction and operation of the Central Plains Water Enhancement Scheme

AND

IN THE MATTER OF applications by Central Plains Water Trust to:

Selwyn District Council for resource consents to construct and operate the Central Plains Water Enhancement Scheme

AND

IN THE MATTER OF a Notice of Requirement by Central Plains Water Limited to:

Selwyn District Council for the designation of land for works associated with the construction and operation of the Central Plains Water Enhancement Scheme

**JOINT DECISION AND RECOMMENDATION OF
INDEPENDENT COMMISSIONERS
28 MAY 2010**

PART 7

**The Use of Water for Irrigation, Discharges to Water, Water Quality Impacts,
Land Drainage Impacts (Mounding)**

GUIDE TO DECISION DOCUMENTS

- PART 1** – Introduction, Part II RMA, assessments, objectives and policy summary, conclusions, decisions and recommendations
- PART 2** – Disputed conditions
- PART 3** – Beneficial, economic, social and cultural effects of the scheme
- PART 4** – Intakes and headraces
- PART 5** – Distribution network
- PART 6** – Waimakariri and Rakaia takes
- PART 7** – Use of water
- PART 8** – Objectives and policies
- PART 9** – Regional Council consents and conditions
- PART 10** – Selwyn District Council consents and conditions
- PART 11** – Recommendations to Central Plains Irrigation Limited in respect of Notice of Requirement and Conditions
- PART 12** – List of hearing dates and appearances

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1. USE OF WATER (INCLUDING DOWNSTREAM EFFECTS ON WATER QUALITY AND GROUND WATER LEVELS)

Context

- 1.1 CPW seeks consent for the use of water from both rivers for the purpose of irrigation. It is important to note that no consent is required for the land use activity of irrigation or for intensification of farming activity.
- 1.2 This section of our decision summarises the evidence presented and our conclusions regarding the potential effects of the use of water from the Rakaia and Waimakariri rivers. Those effects include increased groundwater recharge and consequential changes to the groundwater table ('mounding'), additional leaching of contaminants, and their movement to receiving waters including lowland streams, Te Waihora (Lake Ellesmere) and the coast. Some of those effects are positive and some negative. We have gone into more detail in this section of our decision than elsewhere, because our reasoning in relation to our conclusions has not previously been set out in our various Minutes.
- 1.3 These conclusions mainly relate to our decision on application CRC061973 'to use water from the Rakaia River and Waimakariri River at maximum rate of 65m³/s'. This consent is an amalgamation of CRC061973 and the "use" component of CRC061972 which originally applied to the use of water taken from the Waimakariri. We indicated in our **Minute 14** (Appendix 2) that it would be preferable to issue one consent because the waters from both rivers will be used. In **Minute 15** we suggested amendments to draft conditions which we record here have all been included in our decision.
- 1.4 This part of our decision also relates to the emergency and by-wash discharges.

Jurisdiction

- 1.5 The use of water for *irrigation is a discretionary activity under the proposed Natural Resources Regional Plan and under the Transitional Plan. Accordingly, we are required to consider all of the actual or potential effects of using water for irrigation both direct and indirect and including cumulative effects in conjunction with the impacts of existing and consented activities.*

- 1.6 We are mindful, of the fact that nutrient and other non point source contamination from farming activities are not directly regulated by the Proposed Natural Resources Regional Plan (PNRRP) and farming and irrigation is a permitted activity in terms of the Selwyn District Plan. At one point CPW submitted that we should not take into account the effects of farming activities. For reasons which we outlined in **Minute 11** we have concluded that we can and should take into account both the direct and indirect effects of using water for irrigation..... *to the extent that such effects would not occur **but for** the proposed scheme.*
- 1.7 In considering the use of water, we have excluded the effects of existing irrigation from ground water and surface water. We have also excluded the effects of *reasonably foreseeable* consented irrigation and permitted farming intensification that would occur irrespective of CPW. In terms of unimplemented consents we need to take into account recently granted ground water consents (Waimakariri Selwyn and Rakaia Selwyn zones) and have concluded that it is also reasonable to take into account the fact that the much smaller Synlait scheme is consented (subject to appeals) and would be likely to proceed if the CPW scheme does not proceed.
- 1.8 We have considered the effects of contaminant run off from newly irrigated land as a result of CPW and the effects of CPW irrigation on mounding. We have also considered the economic benefits of increased irrigation and resulting intensification. (discussed in Parts 1 and 2).
- 1.9 We do not think that we should consider the social impacts of potential land use changes, nor the impacts of land use change on terrestrial ecology, except so far as the scheme might affect significant indigenous vegetation or significant habitats. Beyond that, we think that both of these effects fall within the "permitted baseline". In our view these are matters for the District Council to regulate if it thinks fit.
- 1.10 Our role is to decide the applications currently before us, not to determine the best option for irrigation, let alone to dictate land use. We are however required to limit the scope of potential environmental effects through conditions and that may include limiting the scale or timing of water use, the method of distribution of water (canals or piping) and specifying the types of actions which we consider to be necessary to avoid, remedy or adequately mitigate adverse effects.

Applicable Planning documents

1.11 The planning documents relevant to water use effects are:

- Operative Regional Policy Statement (RPS) chapters 6 (tangata whenua), 7 (soils), 8 (natural features, landscape, indigenous vegetation), 9 (water levels, flows, quality), and 10 (beds of rivers and lakes);
- Proposed Natural Resources Regional Plan (PNRRP) chapters 4 (water quality – surface waters, groundwaters, soil), 5 (water body flows, levels, instream values, allocation, augmentation), 6 (activities in river and lake beds and margins), 7 (wetlands), and 8 (soils and land);
- Proposed Selwyn District Plan Part B1 (Natural Resources).

1.12 There are few planning constraints on the types of land use able to be undertaken on rural land within the CPW area. For example, under the proposed Selwyn District Plan, dairy farming (which has been suggested by some submitters as being inappropriate) is a permitted activity subject to two performance standards relating to separation of stock from any waterbody and a requirement that dairy grazing areas adjoin land containing the milking shed. There are restrictions on the clearance of significant indigenous vegetation and significant habitats, but there are no controls preventing the clearance of other vegetation.

1.13 Environment Canterbury's proposed Natural Resources Regional Plan does not directly restrict irrigation, dairying, or other intensification of farming use, but does have policies and standards relating to water quality which are of relevance to this part of our decision and which we have considered. We note that the provisions in question are subject to submissions. Decisions on policies and rules potentially affecting our decision are not expected before August. In view of the significant challenges to aspects of the PNRRP and the possibility of substantial changes to its provisions, we can not give any significant weight to PNRRP provisions which are under challenge. We have had particular regard to the objectives of the PNRRP but have placed lesser weight on more contentious water quality standards and guidelines in the plan.

1.14 The existing policy environment at the strategic planning level has changed as this hearing has progressed. The Canterbury Water Management Strategy (CWMS) although not a mandatory requirement is deserving of our consideration. We comment

later on consistency of our decision with the strategy and on the need for integrated management of the CPW scheme with other land and water uses in the planned Waihora/Ellesmere Water Management Zone.

The revised proposal

- 1.15** As discussed earlier, CPW's proposed scheme has changed from a storage-secured irrigation scheme with high reliability, to a run-of-river scheme, but still irrigating approximately 60000ha within the scheme boundaries. The consequence is a scheme with much lower water supply reliability and much less irrigation water applied to the same area.
- 1.16** The original scheme would have supplied up to 530 MCM to the scheme area each year to achieve the original 97% reliability target. We understand from Mr Tipler's October 2009 evidence that the revised scheme will provide about 360 MCM (about one third less water) with the lower levels of reliability discussed below.
- 1.17** The reduction in the volumes of irrigation water, and lesser increase in the intensity of farming, will significantly reduce mounding and nutrient effects from what they would have been under the original scheme. We note however that this is an incidental benefit and was not the basis of our views in relation to the reservoir or our decision in relation to the take regime for the Waimakariri river.
- 1.18** We have assessed the effects of water used in the run-of-river scheme and included consent conditions reflecting that situation. In the event that CPW decides later to add off farm storage to its scheme, that would result in additional water use effects, because storage would allow more water to be applied as irrigation with consequential increases in contamination and mounding. The scheme in its current form allows for the possibility of adding large scale storage later. We think that is appropriate and are encouraging of further investigations of Lake Coleridge and other options. We also observe that if CPW or others pursue such options this will now presumably be done within the context of the CWMS and a more advanced regional planning framework. We have no view on whether or not the Coleridge option is sustainable, that is not a matter for us.
- 1.19** An upgraded scheme with storage would require either an additional water use consent, or a review of conditions of the use consent granted as part of this decision, so as to assess the changed effects of the increased water use. Our assessment is limited to the run-of-river scheme that we now have before us. We accept that in efficiency terms,

there is likely to be considerable benefits from off farm storage however it is not for us to assess an option which is no longer before us.

- 1.20** The original CPW proposal was intended to provide water to irrigate 60000ha. Design reliability was 90% but original scheme capacity allowed irrigators to buy water to 'top up' their volumetric allocations to a reliability of 97-98%. We support the incentive for efficient use provided by this approach of charging extra for increased reliability beyond a particular agreed level. We are not sure whether this is still the intention with the revised scheme, but that is not a matter for us.
- 1.21** Design reliability is determined from aggregate water demand which is then compared with water available from the rivers. Irrigation water demand was calculated by an irrigation scheduling model described in evidence of Dr Bright for 15 zones, being combinations of three rainfall zones, three soil types and two land uses, the latter being pasture or cropping. The water demand model calculated an average annual irrigation demand of 513mm and peak of 625mm. It also calculates drainage through the soil profile to groundwater: corresponding average annual drainage was 543mm for irrigated land and 220mm for non-irrigated land, the implications of which we discuss later in relation to mounding.
- 1.22** For design of the CPW scheme, water demand is assumed to continue at similar levels to those calculated from climate records for the period 1967-2006. We do not recall hearing any evidence from CPW indicating specific increases in water demand as a consequence of climate change but would expect that to be the case as eastern NZ is projected to get drier. It follows, that the benefits of the scheme are likely to increase over time.
- 1.23** The CPW area is characterised by significant existing use of ground water supplies in its lower (eastern) half. However there are pressures on this resource and on occasions many abstractions are either restricted through consent conditions or physical reductions in bore yields. Several submitters (eg Dr Heiler for CPW and Mr Janson for Ngai Tahu Properties Ltd) advocated for a combined groundwater/river supplied scheme.
- 1.24** There were also suggestions that it may make sense to make more use of surface water on the upper plains and rely more on ground water on the lower plains. That would have potential benefits in terms of further reducing the potential for mounding and reducing the current depletion of shallow ground water, spring flows and lowland stream

flows. We note that the revised run-of-river proposal (refer Figure 7.1 below) in conjunction with existing groundwater bores goes some way towards this type of conjunctive scheme. We think that this is desirable in terms of efficient use of water resources although we do note that it may be less efficient than the dam proposal in terms of energy use as a result of groundwater pumping costs.

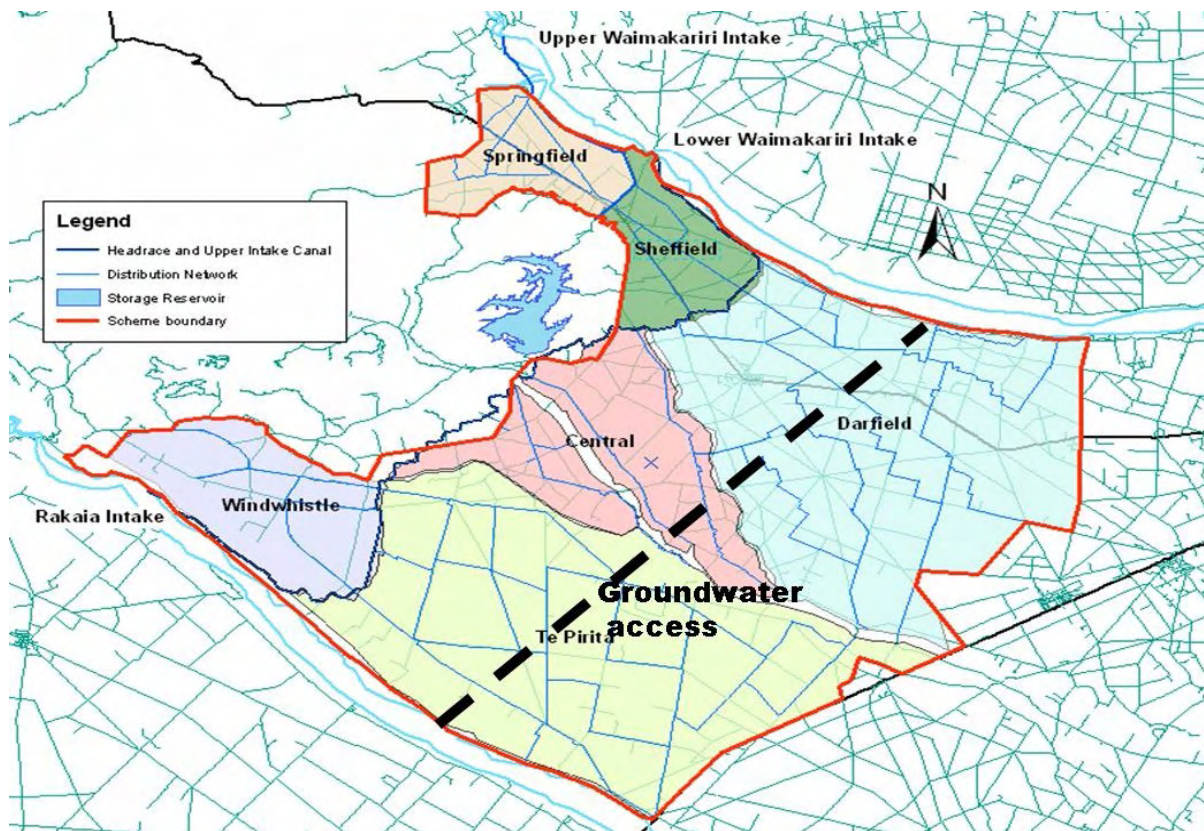


Figure 7.1: CPW revised scheme showing headrace and distribution network, and with indicative dashed boundary for access to groundwater

- 1.25** We had some concern that the original scheme sought to entirely substitute less costly surface water for ground water on some properties. In our view the revised scheme makes more efficient use of the overall water resource by using ground water to supplement surface water when it is not available.
- 1.26** We observe that although ground water is likely to be more expensive than CPW water because of the pumping and pump maintenance costs (at least in upland areas) surface water is not necessarily less costly in environmental terms. Water has a considerable but unquantified value in the rivers at times of low flow. In general terms the water will have the most value instream at times of lowest flows, but its value will also vary according to recreational and ecological demands at different times. The revised scheme in effect imposes the additional cost of water during times of lower flows on

irrigators. We think that this is a more sustainable approach than the original proposal which would have imposed more of those costs on the river environments. (accepting that winter water taken to re fill the reservoir does not have such a high value as summer low flow water).

- 1.27** Groundwater already allocated within the scheme area amounts to approximately 145 MCM/yr. Mr Tipler for CPW notes that the area shown in Figure 7.1 with good groundwater access will have very good reliability of supply because many shareholders in this area have permits to take groundwater and therefore have groundwater 'storage' to supplement CPW run-of-river water when it is not available.
- 1.28** The upper half of the scheme area has less access to groundwater. Those farms who have no or limited access to groundwater, will have reasonable reliability during the spring, but poor reliability during summer and autumn. We note that even in the upper half of the scheme a portion of farms do have ground water consents. The cost of utilising these consents is higher than for the lowland area because this water is sourced from deep aquifers with lower heads and the pumping costs are significant.
- 1.29** Under the run-of-river proposal, reliability of supply will fall from the original projected 98% to about 60% for those farms in the upper half of the area reliant only on run-of-river water (Figure 7.2). We note that it is not clear to us how much land is in that category since we are aware that some farms in the upland areas have consents for ground water (for example in the Te Pirita area).
- 1.30** We had earlier heard detailed evidence from farm consultant Mr Macfarlane that farmers need 97% reliability, therefore we expect that CPW upper area farmers (in particular) will need to consider options beyond this proposal, such as on-farm storage, or alternative off site storage such as Lake Coleridge.

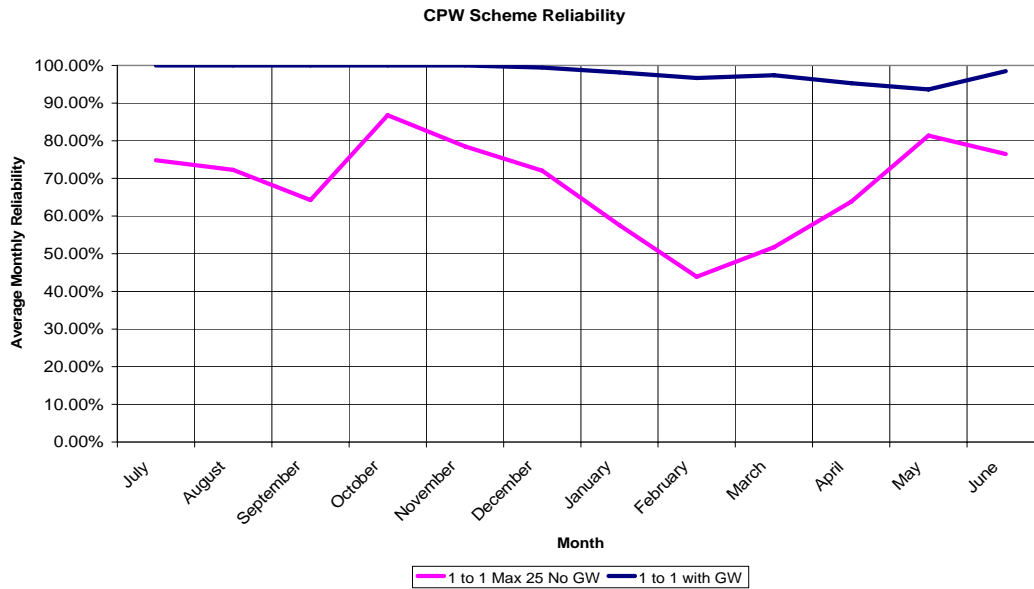


Figure 7.2: Projected average scheme reliability of supply for upper (pink) and lower (higher black line) sections of CPW scheme area (from Tipler)

- 1.31** While Mr Lewthwaite considered on-farm storage expensive, we observe that such storage is being built elsewhere in Canterbury. Based on his experience in Canterbury, Mr Macfarlane advised that at a \$1.50-\$5/m³ capital cost, CPW farmers could justify building up to 1500 m³ of storage for each hectare of irrigation. This storage would provide 37.5 days water at 4mm/day, making irrigated mixed and arable land uses viable but still limiting dairying expansion (see below).
- 1.32** We see potential for individual shareholders to further investigate on-farm storage options and for CPW and the Councils (presumably through the Canterbury Water Management Strategy) to further consider the Coleridge and other storage options which have been mooted. We again note that the assessment of the costs, benefits and environmental effects of such options is not for us.
- 1.33** The actual amount of additional irrigation that the revised CPW scheme will enable is central to determining the scale of its water use effects. There was considerable uncertainty about the area of land currently irrigated, and subject to irrigation consents within the CPW boundary and we sought further information from Dr Mabin on this. He presented the following summary table (Table 1) and said that the potentially irrigable land area within the CPW Scheme boundary is about 76,000 ha. The original proposal envisaged 60,000ha of CPW irrigation plus a net 15,000ha remaining supplied from groundwater.

1.34 Of the 76,000 irrigable hectares, CPW shareholders own about 59,000 ha of potentially irrigable land, of which 26,316 ha (>151 water permits) are currently irrigated from groundwater (or have been granted consents for that) and 2420ha from surface water. This includes the land which is subject to recent ground water consents many of which have not yet been implemented. It follows that the scheme will irrigate up to 30,264 ha of land which would not otherwise be irrigated under existing consents. There will also be benefits to the irrigated land in terms of increased reliability and lowered costs of obtaining water.

Table 1: Present land use in CPW Scheme area

LAND USE	AREA	% SCHEME AREA
Farming	86,543 ha	85.3 %
Roads	2,072 ha	2.0 %
Streams/rivers	7,218 ha	7.1 %
Commercial, industrial, transport, storage, utilities, parks and reserves	465 ha	0.5 %
Residential	442 ha	0.4 %
Other (railway, vacant, unclassified)	4,668 ha	4.6 %
TOTAL	101,406 ha	

1.35 In view of the low reliability of the revised scheme, we doubt that there will be any significant conversion from groundwater-sourced irrigation to CPW surface-water sourced (as compared to the 15,000ha of conversion to surface water that was originally projected). Rather, groundwater users are likely to supplement their supplies with CPW water, if the latter is more affordable. This will still lead to a significant reduction in demand from current groundwater users. However, although it is likely, we have not assumed that there will be any net reduction in groundwater use. That is because of the possibility that existing groundwater users will transfer or trade any surplus capacity unless prevented from doing so by the terms of their consent or by regional rules. This assumption is probably conservative.

1.36 We heard that based on a CPW shareholder survey (carried out prior to our interim decision not to grant consent for a Waianiwaniwa dam), 69% of the land currently irrigated from groundwater is affected by poorly performing bores. We conclude from these figures that CPW run-of-river water is likely to be attractive to **augment** groundwater supplies on about 18000 ha of the 26316ha of land currently irrigated or proposed to be irrigated from groundwater. We understand that the figures we have been provided with include both the Rakaia-Selwyn and Waimakariri-Selwyn ground

water consents. However we note that there is some uncertainty about the reliability of water supply under these consents, which contain quite restrictive adaptive management conditions which will apply at times when groundwater levels are low.

- 1.37** We deduce that the projected area supplied by the revised scheme in the medium term is more likely around 48000 (i.e. 59000-28736+18000) ha than the 60000 projected. We make these points simply to illustrate that use of scheme water and area of uptake may be slower than anticipated for the revised scheme. Uptake is of course dependent on scheme costs and charges, which are not our concern. It is also dependent upon the alternative cost and reliability of ground water. We have based our assessment on possible long-term outcomes for a 60000ha scheme as proposed, i.e. assuming full uptake. We simply note that this is to a degree a maximum case scenario.
- 1.38** There has been no change to the proposed layout or sizing of the headrace and distribution canal network for the revised scheme. Mr Donkers', a CPWL director, commented at the hearing that it may be better for CPW to use the reduced volumes of available water to irrigate a more limited area in order to achieve a better level of reliability. Clearly, CPW could achieve greater reliability by reducing the scheme size, but we can understand why it does not wish to do so, In particular there remains the possibility of adding further storage and there may be difficulties if existing shareholders are not provided with any water.) In any event these decisions are for CPW not for us.
- 1.39** The total length of the proposed distribution network is about 438 km, and CPW seeks consent for either open canals or piped distribution. As discussed later in relation to mounding and nutrient leaching, there are advantages and disadvantages of both options. We have concluded that there is no compelling basis to require piping and that we should leave decisions regarding this to CPW,
- 1.40** CPW proposes to empty distribution canals in winter but maintain water permanently in the headrace. In principle, leakage from the headrace and canals is a form of artificial aquifer recharge.
- 1.41** In passing we note that at least one submitter suggested that there might be merit in using winter water for aquifer recharge. This may provide some relief to the ground water resource which has been deemed by the Regional Council in the PNRRP, to be over allocated and which is certainly under considerable pressure. This in turn may have consequential benefits to lowland stream flow and possibly to reliability of groundwater supplies. However it might also potentially increase drainage requirements

for lowland areas. We agree that this option is worthy of further consideration as part of the Canterbury Water Management Strategy.

- 1.42** The revised scheme (which no longer requires significant volumes of winter water) certainly does not preclude such options. Indeed, it may be that there would be some advantages to CPW in providing winter water for aquifer recharge, since this may benefit those shareholders who are reliant on groundwater to supplement scheme water. Aquifer recharge may potentially increase reliability for existing groundwater takes and may free up water for additional supplementary groundwater takes that would currently be unlikely to obtain consent. This option is not currently part of the scheme and therefore we can not consider it as anything more than a *potential* benefit, but we do find that the fact that the scheme is compatible with such an option is a positive.
- 1.43** By-wash will be discharged from the end of distribution canals either during normal scheme operation or in an emergency shutdown such as a power cut or sudden heavy rain. There are 12 normal operational locations and 14 emergency locations proposed for by-wash discharges. Total flow in these by-washes under normal operating conditions will be 10% of the current instantaneous on-farm water demand in that canal, with a seasonal average of about 2 m³/s (additional to the 2 cumec seepage losses from headrace and distribution canals). However total by-wash discharge capacity is 68 cumecs to allow for emergency discharges.
- 1.44** In summary, Mr Tipler describes the revised scheme as 30-25-1:1 (up to 30 cumecs from the Rakaia, up to 25 cumecs from the Waimakariri Gorge bridge intake, and 1:1 sharing of the Waimakariri take). The maximum rate of take required for the scheme is approximately 44.2 m³/s, based on a peak application rate of 0.6 l/s/ha, a maximum irrigated area of 60,000 ha, canal seepage and by-wash of 20%, and a 1 m³/s loss from the headrace canal. As noted in our discussion of effects of the water takes, CPW has agreed to a priority of take regime, where any water required would be taken from the Rakaia River as first priority, with any deficit then being met by the Waimakariri River.
- 1.45** Mr Tipler calculates that the total inflows to the aquifers average 713 MCM/yr compared to 623 MCM/yr pre-CPW, an increase of 14%. These inflows comprise seepage of rainfall plus irrigation water (450MCM) plus stream, canal and by-wash losses (263MCM). Thus the clean water input (seepage of uncontaminated water from streams, headrace and distribution canals) is an average of 37% of the total water.

- 1.46** Mr Tipler's scheme modelling indicates that the actual maximum combined rate of take from both rivers is 43.06 m³/s, with an average take of 7.57 m³/s averaged over the whole year. We note however that the scheme will not be taking much at all over the winter so an annual average does not indicate the reduction during the irrigation season, which is of course less. In any event, the annual reduction from 51.35 m³/s and 11.91 m³/s respectively for the original proposal is quite significant. This represents a reduction of approximately 36% to the total volume taken compared to the original scheme concept.
- 1.47** During the irrigation season there will also be a significant reduction as a result of the additional restrictions we have imposed on the Waimakariri take, however we are unsure of what this reduction will be in percentage terms as compared to the original take. However the percentage reduction over the irrigation season while of interest is not of any great relevance.
- 1.48** There is some variability in CPW's calculations of likely actual water use, depending on the assumptions made, but we conclude that the revised scheme will deliver around 27-30% less water to land than the original proposal. That reduction is highly relevant to the assessment of effects from contamination and mounding.

Positive effects from the proposed use of water

- 1.49** We have already addressed the economic benefits from the use of water in Parts 1 and 2 of this decision and do not need to repeat that discussion here. Our conclusion is that the scheme is only likely to be built if it will deliver net benefits to the shareholder farmers over the longer term. In that event it is likely that there will be significant net economic benefits to the region as a whole.
- 1.50** There will be benefits from the increased recharge of ground water, however the extent of these benefits in terms of flows in lowland streams and increased reliability for ground water users can not be quantified clearly.
- 1.51** There are potential benefits from decreased reliance by shareholders on ground water and resultant reductions in groundwater take. These benefits will only fully materialise if there are restrictions on the transfer of surplus allocated ground water which is not a matter for us. However, even without such restrictions there is likely to be a reduction in demand for groundwater that may assist with increasing flows to lowland streams and increase reliability of groundwater supplies. We say "may" because we do not have

sufficient evidence before us to determine the degree of reduction, or the degree of benefit.

- 1.52** As discussed in Part 2 there will be benefits deriving from the required adoption of the Best Management Practices by CPW shareholders. We are reasonably confident that this will become a model for other irrigators whether on a voluntary or regulatory basis.

Potential adverse effects of the use of water for irrigation

- 1.53** In simple terms, the use of water in the CPW area for irrigation will have a series of linked effects from the headrace and distribution canals through irrigated farm paddocks down the plains to the sea. These are addressed in the remainder of this section of the decision and are:

- Raising of the groundwater table caused by increased drainage through the soil profile from the additional irrigation water and from headrace, distribution canal and by-wash seepage;
- Increased mass of contaminants leached via the increased drainage water, and increased contaminant inputs into groundwaters from more intensive farming, with nitrogen being a particular concern for drinking waters;
- Increased flows to lowland spring-fed streams down the plains beyond the CPW boundary, caused by the rise in the groundwater table, with the nutrients nitrogen and phosphorus being those of greatest concern;
- Increased mass loads of nutrients into those lowland spring-fed streams with potential eutrophication (enrichment) risks;
- Increased flows and mass loads of nutrients to Te Waihora (lake Ellesmere) via those lowland spring-fed streams, also with further eutrophication (enrichment) risks
- Increased drain flows in lowland farming areas and settlements, potentially affecting lowland farm productivity and operation of sewage, stormwater, and water supply systems plus potential effects on contaminated areas and gravel pits

- Mixing of waters from multiple sources potentially affecting spread of the invasive alga *Didymo* and the cultural values ascribed by Māori to the waters.

1.54 These effects are summarised and our conclusions and recommendations relevant to consent conditions presented below.

The existing and permitted environment

1.55 In making our decision, we are required to assess and avoid, remedy or mitigate adverse environmental effects of the CPW proposal in comparison with the existing and reasonably foreseeable future environment without CPW. In relation to water use effects, this means evaluating the additional and *cumulative effects* of the revised CPW proposal in comparison with the effects of current land uses. In particular we must take as a given, the effects of existing irrigation and farming intensification which has largely occurred during the last two decades..

1.56 We are also required to allow for the reasonably foreseeable effects of land and water consents which have not yet been exercised, and the effects of those which have been implemented but which have not yet become apparent. In particular, we note that a significant number of consents to take ground water have been granted for the Rakaia-Selwyn and Waimakariri-Selwyn ground water zones, both of which are in the Central Plains command area. We also note that if CPW does not proceed, it is more probable that the much smaller Synlait scheme(s) will proceed. According to Mr Chapman, Synlait could end up irrigating 5-15% of land within the CPW area if it succeeds in its priority arguments and obtains the consents it seeks. (neither of which we should speculate on).

1.57 In summary, we observe that a significant degree of intensification of farming, including dairy conversions has already occurred within the command area and further intensification is inevitable with or without the Central Plains scheme. We accept however that CPW will result in further intensification and increases in drainage, well beyond what would happen without such a large scale scheme.

1.58 Aquifers beneath and mainly coastwards of the dashed line in Figure 7.1 are already used for irrigation of parts of the CPW irrigation area. ECan has designated both the Rakaia-Selwyn and Waimakariri-Selwyn groundwater management zones as 'Red Zones' meaning those zones have been deemed by the Council (through the PNRRP) to be over-allocated, with the effect that further allocations of groundwater are

discouraged by way of non complying activity status. The allocation limits for these zones (currently *interim* limits) are calculated by ECan's assessment of half the average land surface recharge for each zone, plus an allowance for recharge from river and stream flow seepage losses.

- 1.59** The question of whether all parts of the zones are in fact over allocated and if so what the allocation limits should be, is a matter which is currently the subject of hearings into the Proposed Natural Resources Regional Plan. We cannot second guess the outcome of that process, but for present purposes it is a reasonable assumption that there will be few further consents granted for these zones. We note that the commissioners' decision in relation to the Rakaia Selwyn applications recommended that following the grant of those consents, no further consents should be granted in the short term at least for the shallow (Aquifer 1) and second aquifer (Aquifer 2).
- 1.60** The conclusion that further groundwater allocation is unlikely in the short term is reinforced by the fact Parliament has recently passed legislation allowing ECan to introduce a moratorium for further ground water takes if the newly appointed commissioners see fit to do so. We also note that recent groundwater consents have only been granted for a short term (10 years) and are subject to quite restrictive adaptive management conditions. These conditions may significantly restrict the ability to take water in some years. In addition ECan has recently reviewed existing consents and imposed some additional restrictions.
- 1.61** The existing restrictions on new groundwater takes and likely further restrictions, increase the demand for surface water for irrigation and the benefits from such irrigation. That demand also derives from the very high costs of pumping deep groundwater to the surface. There are corresponding benefits to farmers from decreasing reliance on increasingly unreliable and high cost groundwater supplies and allowing the irrigation of land which is otherwise unlikely to be irrigated.
- 1.62** The allocation status of the Rakaia-Selwyn and Waimakariri-Selwyn zones is also relevant to the CPW proposal because the implementation of CPW water use consents would have the effect of increasing land surface recharge beneath the irrigated portions of the CPW area thereby potentially allowing an increase in the allocation limits. As discussed earlier there is also the potential for the scheme to be used for winter recharge of groundwater. However the latter is not part of the current proposal.

- 1.63** We heard evidence that mean and minimum groundwater levels have declined between the Rakaia and Waimakariri rivers, due primarily to climate factors but exacerbated by increased groundwater abstraction. Lowland streams, which with the exception of the lower Selwyn River are perennial spring-fed streams dependent on the level of the groundwater table, have consequentially reduced flows. The Selwyn River has reaches where flows dry up intermittently and this has occurred more often and over broader reaches as groundwater levels have fallen, with consequent impacts on aquatic life including the formerly highly valued trout fishery.
- 1.64** In terms of groundwater quality, we heard that the contaminant of primary concern is nitrate-nitrogen which leaches from both animal wastes and fertilizers. Mr Tipler summarised ECan data on measured nitrate levels, showing that for the 682 nitrate sampling results from 152 bores within the CPW area, 90% of samples were less than 7.8 g/m^3 , however, about 3% of bores from time to time have nitrate levels already exceeding the NZ Drinking water Standard Maximum Acceptable Value (MAV) of 11.3 g/m^3 (note that g/m^3 are the same units as mg/l and the same as parts per million).
- 1.65** As Mr Hanson showed in his ECan evidence, highest nitrates come from shallower bores located away from the Waimak and Rakaia rivers and between about Aylesbury and Banks Peninsula. They reflect upstream land use but the picture is exceedingly complex. We agree with Mr Hanson that these ECan data are neither truly random nor likely to represent actual averages across the aquifers (mainly because bores are screened at varied depths, sampled intermittently and may be subject to 'down bore' contamination), but nevertheless they provide a picture of existing groundwater enrichment caused largely by overlying land uses.
- 1.66** For lowland streams and Te Waihora (Lake Ellesmere), nitrogen and phosphorus are the contaminants of greatest concern. We heard that these receiving waters are sensitive to sediment and nutrient inputs. The lowland streams are generally eutrophic with excess nitrogen concentrations, and faecal contamination. Dr Allibone for CPW reports low native fish diversity in lowland streams and attributes this to degraded stream habitat and poor access to and from the sea via Te Waihora. The lower Selwyn has a brown trout fishery and the L II, Halswell and Irwell Rivers less so, but all lowland stream trout fisheries are severely depleted in comparison with several decades ago.
- 1.67** ECan 'expert panel' assessments for setting of minimum flows on the lowland streams indicate low to moderate values in relation to indigenous vegetation, natural character and general amenity. The assessments indicate a positive relationship between stream

size and fishery values. There were also high scores for mahinga kai (mainly eels) for all lowland streams and for mauri (especially the lower Selwyn, Silverstream, Birdlings Brook and Harts Stream). We take from these assessments that increasing lowland stream flows will enhance trout, native fishery and Māori values, and that improving riparian management as a result of CPW will also provide benefits (particularly if best management practices spread beyond the CPW shareholders).

- 1.68** Dr Larned reported that of the lowland streams, Boggy Creek, Selwyn River and Harts Creek had the highest annual median dissolved inorganic nitrogen (DIN) concentrations while Harts Creek and LII River had highest DIN mass loads. Nitrogen loads are higher in winter (June-August). The evidence suggests that the high DIN loads in winter are mainly because of extra recharge from shallow groundwaters, and less uptake by aquatic vegetation in winter. Dissolved reactive phosphorus (DRP) is the opposite with higher levels in summer. DIN and DRP are the readily plant-available forms of these nutrients. In most streams, nitrogen and phosphorus concentrations often exceed guidelines for limiting the growth of nuisance algae.
- 1.69** Lowland streams and the Selwyn River drain into Te Waihora, as does some of the groundwater flowing beneath the CPW scheme area. Te Waihora is a large (189 km²), shallow (average depth 1.4 m), wind-swept, brackish, coastal lagoon, perhaps better described as a wetland. Because of the wind, it is well mixed and does not stratify, but has low water clarity (euphotic depth only 0.4m) mostly caused by wind and waves which re-suspend lake bottom sediments. It looks green because of high phytoplankton biomass, i.e. considerable floating algae.
- 1.70** We heard a range of evidence and data about the state of Te Waihora from Mr Kennedy, Dr Burrell, Ms Hayward, Prof Hamilton and others. There were differences in opinion on the sensitivity of the lake to additional nutrient inputs. In Te Waihora total nitrogen TN and total phosphorus TP are high, exceeding levels of other NZ lakes by at least a factor of 2. Thus chlorophyll-a (phytoplankton, i.e. microscopic algae) levels are also higher than in most other NZ lakes. Most of these nutrients are associated with suspended particles in the lake, making the lake 'hyper-eutrophic'.
- 1.71** The main sources of TN are the Selwyn River, Halswell River, LII River and Harts Creek; main sources of TP are Selwyn River, Halswell River, LII River, and Irwell River. We heard that much of the readily available N and P is taken up by phytoplankton or adsorbed to bed sediments 'in storage' or discharged to sea when the lake is open. In other words, nutrients still remain well in excess of biological demand.

- 1.72** The National Water Conservation (Lake Ellesmere) Order 1990 seeks to protect the outstanding wildlife habitat that Te Waihora provides, by limiting the timing of lake openings. The lake hosts about 30 significant plant species along its margins but these are being displaced by expansion of willows, so management of these is seen as a high priority by terrestrial ecologists. Lake Ellesmere is classified under the proposed NRRP water quality schedule as Class Coastal. As such, the lake is to be managed by ECan for natural character, amenity values, Ngai Tahu values and its aquatic ecosystem.
- 1.73** Te Waihora supports a major eel fishery of mainly shortfin eels as well as a flounder fishery of 5-250 tonnes per year, and a winter mullet fishery. Te Runanga o Ngai Tahu owns the bed of Te Waihora, and with DOC seeks to restore the lake as a treasured taonga as envisioned in the Taumutu Natural Resource Management Plan and the Te Waihora Joint Management Plan.
- 1.74** The Waihora Ellesmere Trust (WET) has a community led strategy with similar goals. Among its conclusions, WET's 2007 *Living Lake Symposium* commented that declining inflows over the last decade have influenced lake level management, that indigenous fisheries including the nationally important eel fishery are performing positively, its wildlife (especially birdlife) values are positive although concern is growing for swampbirds as freshwater wetlands reduce in area and quality, and that the brown trout fishery requires urgent management action if it is to be restored.
- 1.75** In making our decision, we must take into account the potential *cumulative effects* of the CPW proposal on Te Waihora, as a result of the further intensification of farming activity, but must also take into account the existing water quality and ecology of the lake. We note that the experts were in agreement that the primary cause of the detrimental changes to lake ecology was the 1968 'Wahine storm' which destroyed almost all the submerged aquatic plants and significantly reduced water clarity. However, we also accept that nutrient enrichment potentially hinders restoration efforts.
- 1.76** Turning to the existing and permitted terrestrial environment, we conclude that indigenous terrestrial species within the CPW area are sparse. We heard from Dr Grove, Mr Davis, Dr Meurk and Dr Bishop various proposals for biodiversity management and protection of significant indigenous habitats. Experience with other irrigation schemes in Canterbury, where kanuka shrublands have been lost, and shelter belts have been cleared for irrigation equipment, lead us to conclude that protection and

mitigation plantings are required where *ecologically significant sites* are affected by scheme works or farm development resulting from the scheme.

- 1.77** We encouraged the terrestrial ecologists appearing at the hearing to agree on an inventory of sites. The ecologically significant sites database and maps as prepared by Mr Davis can be used to identify *significant habitats* within the CPW command area. Restriction on development within these areas and within buffer zones surrounding these areas should be an obligation of participation in the CPW scheme. There is a condition on CPW only requiring the preparation of a TEPP. We have concluded that it should refer to the database and map, require field investigations of significant sites likely to be affected by the scheme, and have as an objective 'no net loss of indigenous woody/shrubby vegetation'.
- 1.78** We heard that the DOC threatened species database (2005) lists two threatened species from this area: *Juncus holoschoenus* var. *holoschoenus*, a nationally endangered wetland rush species associated with the Selwyn River near Dunsandel and *Melicytus flexuosus*, a shrub species in gradual decline (a variant of which was also identified in our ACWT decision) from fertile alluvial habitats near Springfield and Hororata. Apart from the margins of Te Waihora, freshwater wetland vegetation within CPW is largely absent with the exception of Haldon Pastures, along the Hororata River, which we also heard holds a distinct mudfish population deserving of protection.
- 1.79** Dr Bishop noted that certain indigenous dryland vegetation remnants could be affected by clearance or increased groundwater levels. Specific sites include the Rakaia Terrace Dry Shrublands, Wamakariri Dry Remnants and Waimakariri Bridge Dry Shrubland, plus the bankside kanuka shrublands at Bankside Scientific Reserve. We mention these examples to highlight the need for the CPW scheme to actively manage remnant indigenous biodiversity.
- 1.80** Forest and Bird and other submitters expressed a concern regarding the loss of biodiversity as a result of irrigation and intensification of farming, for example the loss of shelter belts. In our view it would be desirable that there be no net loss of woody/shrubby vegetation as a result of intensification by CPW shareholders. We think that this should be an aim of the Sustainability Protocol, discussed shortly. However this is not something we can **require** as a condition of consent since the District Plan does not require this of farmers. We simply note that given the environmental objectives of CPWT and the involvement of the Selwyn District Council with the Trust, in our view it

would be appropriate for this to be incorporated into the Sustainability Protocol and farm plans.

- 1.81** The existing environment in terms of **infrastructure** potentially affected by the use of water by CPW is mainly operated by Selwyn District Council. Mr Blake-Manson said that the projected population of SDC to 2041 will be 64,100 or 24,600 households, mostly in the SDC communities of West Melton, Rolleston, Lincoln, Springston, Tai Tapu and Prebbleton down-gradient of the CPW boundary.
- 1.82** The main effect of CPW development affecting infrastructure arises because the water table is closer to the land surface down-gradient towards Te Waihora and the coast. Drainage schemes in lowland areas keep the water table lower which in turn keeps farming viable in these areas. There are ten recognised drainage schemes; nine are administered by Selwyn District Council, and one (the Halswell Drainage District) by ECan.
- 1.83** Mr Blake-Manson said that the SDC drainage schemes contain 502.5 km of drains and rivers, and service about 36,900 ha of land on about 2530 properties. He also noted there are 12 SDC reticulated wastewater schemes including the Pines extension at Rolleston, currently in the consent process; 27 reticulated water and 3 rural water schemes supplying 24000 people; 3 water races (although one, the Selwyn stockwater scheme is being closed down) plus urban stormwater systems. There is a potential for rising water tables to affect the running costs and operation of some schemes.

Environmental self management: The Sustainability Protocol, Farm Plans and Best Management Practice

- 1.84** In addition to compliance with consent conditions, CPW is proposing to rely heavily on three primary mechanisms for managing adverse environmental effects of water and land use under the scheme:
- The proposed *Sustainability Protocol* prescribes operational and environmental standards which CPW intends to commit to, and which its shareholders (the water users) must meet.
 - An *Environmental Farm Plan for Irrigated Land Use* (referred to as a *Farm Management Plan* in consent conditions) must be prepared by every CPW scheme water user and prescribes *best management practices* (BMPs) for

management of irrigation, soils, nutrient, effluent, waterway riparian and biodiversity values.

- The proposed *Environmental Enhancement Fund* is for enhancements (or offsets) within and downstream of the CPW scheme boundaries which are beyond the mitigations required or volunteered by CPW under specific consent conditions.

1.85 A number of submitters were concerned that this 'self management' approach is not backed up with prescriptive requirements. We have carefully considered whether the alternative approach of prescriptive consent conditions would provide more certainty and better environmental outcomes. We have concluded that it is unlikely to do so for three reasons.

1.86 Firstly, consent conditions primarily bind the applicant CPW. While in theory the water users are also bound, in practice it may be difficult to enforce the consent conditions directly against water users. Ensuring compliance at farm level through CPW consent conditions would require some mechanism such as the farmer contracts proposed.

1.87 Secondly, the level of detail required in those prescriptions if included within consent conditions would be huge (and we note that council officers have not advanced any proposals for specific on-farm limits to include in such an approach).

1.88 Thirdly, the rigidity of some consent conditions may discourage innovation in improving resource use efficiencies which in our view will be better addressed through regular audited reviews of the protocol and farm plan. Finally we note that a self management approach is consistent with the fact that farming is a permitted activity. It is not for us to impose restrictions which the community has not envisaged through its plan.

1.89 We heard evidence from Mr Ian Brown as to the success of this type of approach in relation to the North Otago Irrigation Company, upon which the CPW approach is modelled. Mr Brown highlighted the importance of workshopping development of farm plans to encourage better farmer buy-in. He also saw benefits in having flexibility to tailor individual farm plans to the geography and circumstances of each farm. We also see this as a positive compared with the strictures of detailed consent conditions which cannot hope to operate effectively at the scale of individual paddocks within a 60,000ha scheme area. However the effectiveness of farm plans and the performance guarantees expected by submitters and the community can only be assured through a

regular and robust audit process, and with a contractual process between CPW and farmers which assures performance against those plans. We were advised that all of these elements will be incorporated into the scheme and should be incorporated into the Sustainability Protocol.

1.90 We consider that we can place considerable weight on these non prescriptive mechanisms for mitigating the effects of land use change likely to arise from the proposed use of water. We are of the view that buy-in from CPW shareholders will be likely to be more successful if:

- (a) the Best Practice environmental measures are being promoted by the farmer groups based on consultation (as has occurred) rather than just regulation by way of consent conditions;
- (b) the reasons for and objectives of the volunteered measures are clear, and
- (c) implementation at farm scale is managed and monitored locally, with shareholder contracts and audits providing external parties (including ECan) with the confidence that those measures are being delivered and complied with.

1.91 This approach is consistent with ECan's moves to support audited self-management underpinned by robust consent conditions, as discussed in Mr Fietje's supplementary evidence and by PNRRP policies such as WQN17(7). The officers of both Councils were supportive of the proposed approach.

1.92 As Mr Morrison and Ms Jamieson noted, work on the Protocol and Farm Plan concept came from the grass roots, having been initiated and agreed by a largely farmer group named the Ritso Society, and many of whose members became CPW shareholders. Mr Keeley of the Ritso Society said that the group supports a mandatory condition on the water supply contract that irrigators establish farm management plans that insist upon practices which safeguard the environment and which are subject to regular internal and external audits to ensure compliance. In the event of any sustained non-compliance, CPW would have powers under its contract of supply to terminate or restrict water supply until compliance is achieved. We are reassured by the level of commitment by farmers themselves to this approach to good environmental practice.

1.93 In terms of implementation, the Sustainability Protocol is referred to in the Schedule 2 Administrative Conditions and is to be attached to. Administrative condition 9 requires

CPW to comply with the Protocol. The Farm Management Plans are required for each property receiving water from CPW, and the process for implementing those plans is contained in the Protocol. Conditions of the water use consent additionally prescribe the requirements to prepare an individual property Farm Management Plan, particular best management practices it should address, and objectives for each plan. With both the Protocol, and the guidance for Farm Plans underpinned through conditions, we believe the requirements are clear. CPW must maintain the ability to restrict or withdraw supply from non compliant shareholders.

1.94 As a belts and braces measure we have also included a specific requirement in the consent conditions that requires CPWT (and CPWL as the manager of the scheme) to ensure that shareholders comply with the farm plans and which requires the users themselves to comply with the farm plans (conditions 4 and 5) . This will mean that as a last resort the Regional Council could take enforcement action against CPWT and/or CPWL and individual farmers who are using water pursuant to the CPW consent if there is non-compliance. In practice we think that it is unlikely that there would need to be resort to this, since there will be incentives for CPW to ensure compliance and incentives for farmers to comply.

1.95 Drafts of the Sustainability Protocol and the Farm Management Plan were provided to us, and updated with suggestions from us during the hearing. Ms Mulcock identified the following as focus areas for environmental management in the Sustainability Protocol:

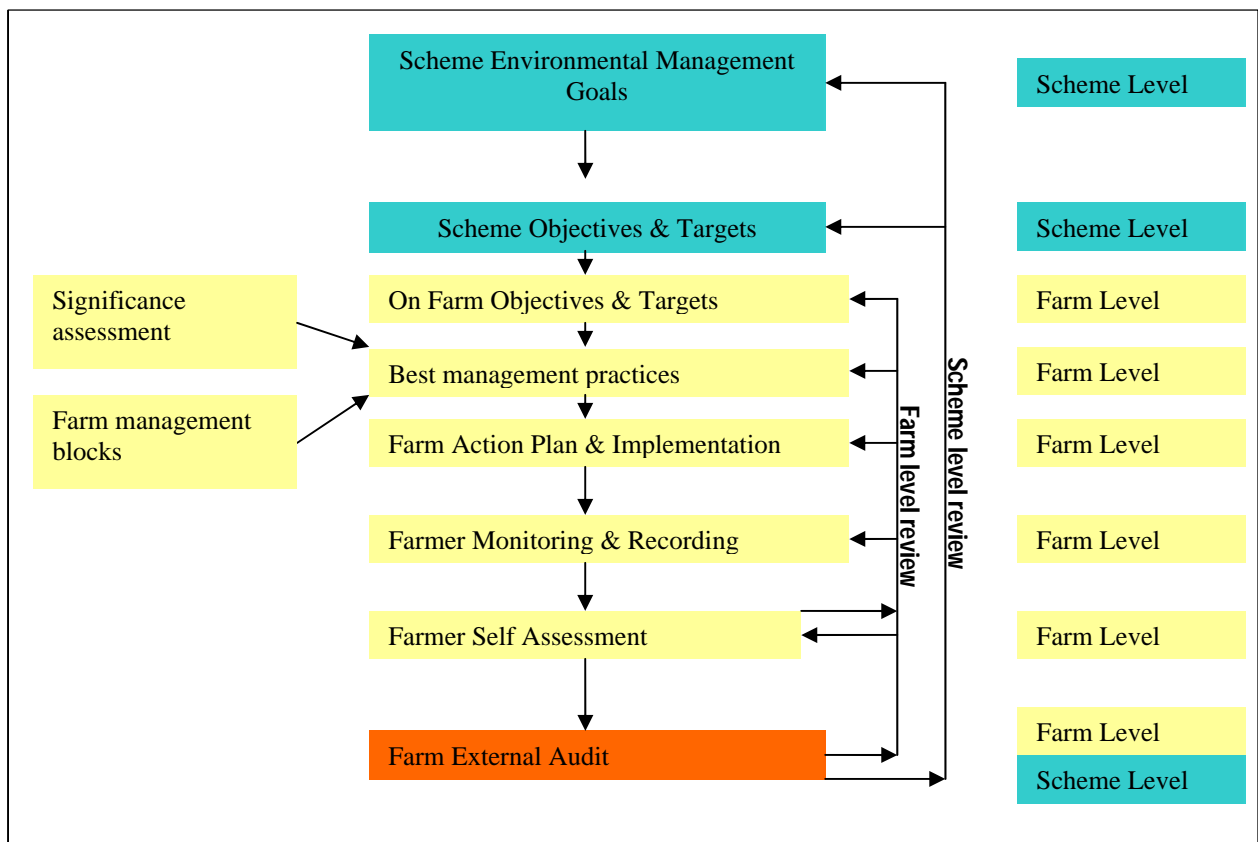
- Kaitiakitanga (guardianship);
- Biodiversity & ecosystem management;
- Efficient water use;
- Water quality: surface and groundwater;
- Water quantity: effects on levels and flows;
- Local communities;
- Resource use – energy and waste;
- Provisions for the Environmental Enhancement Fund.

1.96 Ms Mulcock also identified the following as major elements of the Environmental Farm Plans required of CPW shareholders (from the January 2010 draft):

- Irrigation management
- Soils management
- Nutrient management

- Collected animal effluent management
- Waterway and riparian management
- Biodiversity & ecosystem management

1.97 The Sustainability Protocol will be CPWL’s sustainability plan as scheme operator. The mandatory Farm Management Plans required of every CPW scheme water user will be the means to provide guidelines and prescribe environmental standards so as to allow auditing of compliance at farm level. We have additionally formalised the audit requirement through conditions 10 and 11 which require initially an annual audit annually for the first two years (while the landowner is getting used to the requirements) then every five years, including a site visit. Figure 2 from the draft Farm Management Plan template explains this process:



1.98 As outlined above, we have included underpinning consent conditions to support and monitor this. If non-compliance becomes problematic, the consent can be reviewed and prescriptive conditions imposed directly. However, we do not expect this will be necessary. We think this approach provides appropriate incentives to make the self-management approach workable.

- 1.99** As noted by Mr Fietje and Mr Hanson of ECan, the success of this approach is dependent on good record keeping to demonstrate performance against environmental standards, along with an emphasis on continual improvement. In our **Minute 15** we suggested 5-yearly reviews of the Protocol which would allow advances in monitoring, water use efficiency and other elements of good practice to be incorporated; the same would apply to individual Farm Plans. This has now been incorporated. There is also the back up of Regional Council monitoring, enforcement and review of conditions if required.
- 1.100** We note that whether environmental effects are managed solely through consent conditions, or as proposed here, it is important that there be a mechanism to modify farm and scheme management if monitoring shows that particular effects are worse than expected ('Adaptive Management')
- 1.101** As we will discuss shortly, there are long time frames for some parts of the environment to respond to new pressures - groundwater quality and nutrient saturation of soils, for example. Reversing trends which take decades to appear may take further decades. Therefore, in allowing such major land use intensification and associated water use the emphasis must be on continually upgraded Best Management Practice underpinned by explicit environmental outcome targets, rather than on waiting to see if problems develop.
- 1.102** There will always be effects from irrigation development and land use intensification, no matter how well managed. Drs Bidwell and Norton in the s41 report that we commissioned in relation to the water quality and ecological impacts of the proposed irrigation confirm for example, that even the most effective combination of best management practices (BMPs) will likely achieve no more than 50% reduction of pollutants in farm drainage and runoff. Similarly, Ms Mulcock states that BMP for irrigation water use would aim for an 80% annual irrigation application efficiency, i.e. 20% losses, as best practice (which we note is consistent with proposed policy WQN17 in ECan's PNRRP).
- 1.103** One reason we have supported the Protocol and Farm Plan proposals is that we are of the view that this is more likely to lead to best (or at least better) practice and environmental outcomes than the *ad hoc* irrigation development which has occurred to date. CPW has the potential to lead by example and to be the test bed for new BMP initiatives. None of the existing irrigation schemes in the area and none of the existing

groundwater takes are subject to the best practice requirements which will apply here. We note that this is something which the critics of CPW seem to overlook.

- 1.104** We also accept that it is likely that this approach will over time become a model for other farmers. With further demand for irrigation in Canterbury and apparent central government support for that, it is important that best management models become the norm. A similar approach could for example be applied to ground water use consents when they come up for renewal. However, to get to that point the approach adopted here will need to be reflected in the relevant regional or district plans. We observe that implementation of BMPs and adherence to the Protocol and Farm Plan requirements may also provide CPW shareholders a marketing opportunity, based on demonstrated best environmental practice.

The Environmental Enhancement Fund

- 1.105** Turning to the Environmental Enhancement Fund (also termed the Environmental Management Fund), we agree that it is appropriate that CPW provide this source of funds to implement environmental initiatives beyond those required for specific mitigation through consent conditions. The fund is necessary, because (as explained above) the mitigation measures proposed by CPW will not avoid all adverse effects. Accordingly it is desirable if not essential, that CPW also provide for an adequate degree of environmental offset. The Environmental Management Fund is provided for through administrative conditions (2-8) attached to the CPW consents.
- 1.106** We asked CPW in **Minute 14** to consider increasing the levy beyond what we considered a rather paltry contribution of \$2 per irrigated hectare per year. CPW has responded with an approximate 25% increase, expressed as '*at least 40 cents per share*'. This provision which is now reflected in conditions (Admin condition 5(b)) has been offered by CPW and is therefore enforceable. In the absence of such agreement, it is doubtful whether we have any jurisdiction to **require** CPW to increase that levy or indeed to require that it establish a fund. However, we record that in the absence of the fund our decision might potentially have been different at least in relation to the size of the scheme. We are still of the view that in terms of the predicted scale benefits to shareholders there would be merit in an even higher levy but we can not require that and simply recommend to CPW that it considers this in the context of the environmental objectives of the Trust.

- 1.107** In passing we observe, that in our view it would be preferable for all water users to be charged for use of this public resource for private purposes. The funds derived from that could then be applied to environmental management and offsets. Such charging would also be likely to encourage greater efficiency of use. For example some distortion is introduced to the market because ground water is expensive due to pumping costs and surface water is seen as a cheaper resource because *in situ* values such as ecological and recreational values are not easily quantified in dollar terms. However the question of charging for water is a matter for Parliament not us. We simply observe that if charging is introduced, there would be less of a need for a voluntary environmental fund. ECan also has the power to introduce targeted rates and monitoring charges to ensure that any costs of the scheme are internalised but that is a matter for it. We note that it has not chosen to use its powers under the RMA to introduce financial contributions in relation to the use of water but suggest that there may be some merit in doing so if charging is not introduced by the Government. Again we emphasise that these are personal views and any such moves would require careful consideration and public consultation.
- 1.108** For the reasons outlined in **Minute 15** and **Part 2**, we are **recommending** to CPW that the Fund be administered by a trust or committee separate from CPWT. We are of the view that the CPWT at least in its current form is seen and probably sees itself as primarily responsible for obtaining RMA approvals and funding for the scheme and for delivering water to shareholders of CPWL. Notwithstanding its objectives, we do not see the Trust as having a primary goal of sustainable resource management. It potentially has a conflict of interest in relation to its irrigation objectives and at least the current trustees do not appear to be well equipped to make choices about the best use of the fund (the Trust deed only requires one environmental trustee and as far as we are aware that role is currently vacant). This is not intended as a criticism but reflects our view as to the inherent conflict between the development and environmental objectives of the CPWT.
- 1.109** In its final reply on conditions CPW submitted that it was appropriate that the fund remain to be administered by the Trust. In particular it noted that the Trust was settled by the Councils and the Councils have a power to appoint trustees. We accept that this provides some safeguard but remain of the view that it would be preferable for the fund to be separately managed. We have concluded however that this is probably not something which we can require by way of conditions.

- 1.110** Accordingly we simply recommend that the environmental fund be administered either by a committee appointed by CPW or a separate Trust and that the members of this committee or trust be made up of people with appropriate environmental credentials. We think that this is an issue which Selwyn District Council and Christchurch City Council as settlors of the Trust and both having a financial interest in the Trust, should oversee.
- 1.111** For reasons we will come to, we have concluded that the primary focus of the fund should be on riparian management, water quality, maintaining or enhancing aquatic and terrestrial ecology and bird life within the scheme area, and moves towards ecological enhancement of Te Waihora.
- 1.112** The fund should not be utilised for measures required by conditions or the Sustainability Protocol or Farm Management Plans, nor for any administration or education associated with these. Education of non scheme farmers regarding best practice is something which could be covered by the fund but is more a matter for ECan and the District Council, the latter having responsibility for the effects of land use.
- 1.113** We also concluded in **Minute 15** that the levies commence 5 years before the projected commissioning of the scheme or at the time the outline plan is approved. This would allow the fund to be built up in advance of the scheme. That proposal was resisted by CPW.
- 1.114** We think that CPW should ensure that prior to the commencement of irrigation under the scheme, the fund be seeded with an initial \$300,000. As discussed, earlier, we still consider that this initial amount and the proposed levy is modest in comparison to the predicted increases in profits and the scale of the scheme and its potential effects.
- 1.115** With these measures and with the removal of the dam and reservoir, we think the fund will provide adequate offsets of effects which cannot be mitigated. Whilst we think there is a case for a higher levy we are constrained by the fact that we cannot **require** what is in essence a *financial contribution*, since that is not provided for in the Regional or District plans.
- 1.116** There also needs to be an explicit means of inflation adjusting the levy commencing from 2011 (\$150,000 in 2010 terms will be significantly less in 10 to 15 years time when the scheme may be commissioned). This is provided for in conditions.

Efficiency of Water Allocation and Use

1.117 Section 7b of the Act requires us to have particular regard to the *efficient use and development of natural and physical resources*. In the present case, efficiency comes into play in a number of ways including:

- *Allocative efficiency*: the water resource is allocated in a way that allows the maximum possible net benefit from its use, i.e. optimal allocation of uses for societal well being. In the present instance this encompasses the benefits of the proposed taking of water from the rivers in comparison to leaving that water for instream, or potentially more beneficial consumptive uses. This concept also encompasses maximising net benefit (after costs) from land uses.
- *Productive or technical efficiency*: (maximum output from a given set of inputs). In particular in relation to whether the water which is taken by CPW is put to the most productive use by shareholders, ensuring that no more water is used that is necessary and avoiding wastage, i.e. best practice.
- *dynamic efficiency* (achieving an efficient allocation of resources over time). In the present case this concept encompasses the ability of the project and farmers to adapt to changing circumstances.

1.118 We have addressed allocative efficiency in terms of the water take in **Minute 11** and in our summary in Part 1 of this decision. We have concluded that the proposed take and use by CPW is efficient in that regard. In particular CPW will not be permitted to take water at times when it would be more efficient to leave in the river for instream needs. It will be taking water at flows when the effects of the take are minimised. We are not in a position to speculate as to whether other potential schemes might be more efficient in terms of productive potential for the same volume of take.

1.119 We have no reason to consider that the CPWs proposal is inefficient in terms of allocative efficiency. It could be argued that it would be more efficient to leave the water available for a scheme which incorporates large scale storage, however the Waimakariri River Regional Plan does not include such a presumption. In any event CPW has indicated its intention to continue to pursue storage options.

1.120 Economic considerations will govern choices as to land use change by CPW shareholders. In theory that should lead to the most productive use of the water which CPW obtains. We do not see this as a matter for us.

1.121 *Technical efficiency* is also a matter for us to have particular regard to. We should ensure that water use by CPW shareholders will not be wasteful. We have concluded that there are a range of factors which will ensure that water is used efficiently. In summary these are as follows:

- The cost of CPW water to users will encourage efficient use.
- The alternative cost of using pumped water will provide an added incentive for those who are reliant on ground water to supplement scheme water.
- Scheme reliability without storage is low and so the water will have to be used as efficiently as possible to maximise productivity.
- The cost of providing on farm or off farm storage is very high and again will discourage inefficient use of water.
- The Farm Plans under the sustainability protocol will require efficient use.
- There are consent conditions which require monitoring of soil moisture and which specify maximum rates of irrigation.
- CPW will only be authorised to take as much water as demanded and will not be left with a surplus. This will also be required by the Farm Plans.

1.122 While there is no charge for taking water, the scheme will be costly and there is likely to be a charge by CPW for the use of water and additional charges for water beyond a core allocation. The original proposal was for water to be allocated at volumes sufficient to achieve 90% reliability, but to reserve sufficient water for irrigators to purchase additional water during dry years to achieve the target 97% reliability. Without storage (apart from groundwater 'storage') these reliability thresholds and the charging regime will need to be reconsidered, but that is a matter for CPW not for us. At times of high demand and/or restricted or nil supply of surface water, the marginal cost/value of CPW water will increase and there will be even greater incentives for efficient use of whatever is available.

- 1.123** We heard varied views about whether a low reliability water supply encourages efficient use of scarce water or not. Messrs Macfarlane and Donkers for CPW asserted that low reliability water simply encourages conservative land uses and risk aversion (i.e. ‘use as much water as you can whenever its available’). Mr Jansen for NTP held a contrary view that high reliability water supply encourages complacency and risk avoidance. We suspect that the latter is more likely.
- 1.124** We heard from Mr Tipler that the revised scheme will have a reliability from surface water sources of about 61% assuming CPW retains priority access to Rakaia River water over Synlait. PNRRP proposed policy WQN14 for surface water allocations indicates that ECan will allocate water with a reliability target of greater than 80%. Plainly that is not achievable for the revised scheme in those areas without a top-up groundwater source, i.e. for most irrigable land west of the dashed line in Figure 7.1, or without future addition of off-farm storage to the scheme. As discussed earlier, those farms with existing groundwater will achieve better reliability than those without.
- 1.125** As policy WQN14 is not operative, we are not required to give it any great weight. We also have some reservations as to whether the level of reliability is a matter for us. In our view it is up to CPW and the shareholders to determine whether to proceed with a scheme with much lower reliability than was originally proposed and lower than is envisaged by WQN14. We also note that in the longer term CPW may well achieve the policy objective if it can find an acceptable large scale storage option such as Coleridge.
- 1.126** It is also up to CPW whether it uses the lesser volumes of water now available to it, to achieve greater reliability, or maintain the scheme area. It could achieve greater reliability by reducing the area serviced (as noted by Mr Donkers) and/or by providing water only to less water intensive land uses. In its revised scheme, CPW has chosen to keep the scheme area constant at 60,000 irrigable hectares, presumably in the hope that it will get more storage eventually. This trade off between reliability and scheme area is not a matter for us.
- 1.127** We heard evidence that spray irrigation is more efficient than flood (border dyke) irrigation. CPW has proposed supply volumes which would support spray irrigation methods but not flood irrigation. ‘Spray’ could in the longer term include other even more efficient technologies such as dripper and micro-sprinkler methods. As discussed above there will be market incentives to use efficient application methods as well as consent conditions that encourage efficient water application through the Protocol and

Farm Plans are needed. This is consistent with proposed policy WQN17 of the PNRRP.

1.128 Alongside these technologies will be the use of irrigation scheduling models in which soil moisture measurements are used on a real-time basis to calibrate decision-making on when and how much to irrigate. Essentially this involves turning water balance models (such as that described by Dr Bright to calculate water demand) into a daily operational tool to meet the BMP requirements for irrigation efficiency. We think CPW as scheme manager can play a valuable role for their shareholders, and potentially a service to neighbouring irrigators, in operating such an irrigation scheduling advisory system and have incorporated this into the Sustainability Protocol requirements.

1.129 We have included a condition (5(b)) on the water use consent limiting the volume of water applied to any land - whether sourced from groundwater, scheme water or both – to 625mm/year (6250 m³/ha/year) based on the maximum water demand calculated from the irrigation scheduling model. We have also included a condition (5(a)) limiting application rates scheme-wide to no more than 0.6 l/s/ha (5.18mm/day) and this will be reinforced by the Protocol and farm plans. In particular, the requirements to use best irrigation practice and to monitor and report on irrigation water use efficiency.

1.130 We addressed the economic benefits of the scheme earlier in our decision. In conclusion we are satisfied that the revised scheme will be an efficient use and development of natural and physical resources.

Predicted increases in groundwater mounding, lowland streamflows, drainflows and inflows to Te Waihora (Lake Ellesmere)

1.131 The potential effects of increased recharge of groundwater from irrigation are:

- Increased flows in lowland streams;
- Increase in groundwater levels particularly in lowland areas and potential benefits in terms of reliability of existing groundwater takes;
- Decreased efficiency of lowland drainage systems;
- Possible implications for some infrastructure;

- Effects on gravel extraction;
- Effects on frequency of fog;
- Effects in terms of bird strike;
- Increased leaching from buried contaminants and effluent fields.

1.132 To assess the potential for such effects and the possible scale, intensity and timing of these we first summarise what we heard about the modelled predictions for changes in groundwater levels, streamflows and lake inflows.

1.133 Aquifer water levels between the Rakaia and Waimakariri rivers are driven primarily by recharge water originating from infiltration both from rainfall and irrigation seepage below the soil profile, and from seepage losses of water from the rivers. These recharge contributions vary depending on location and on the depth of the relevant aquifer. Thus aquifer recharge depends on (a) rainfalls across the plains from year to year (b) precipitation in the Alps creating the river flows across the plains (c) the amounts of additional drainage from irrigation water added to the land surface.

1.134 Aquifer levels can be depleted by irrigation abstraction and this in combination with years of low rainfall can cause adverse effects in terms of lowland stream flows. As discussed earlier, the Rakaia Selwyn and Waimakariri Selwyn groundwater zones which cover the CPW command area are considered to be over allocated by ECan. Many of the lowland streams suffer from depleted flows at times and irrigation abstraction is one of the causes of this. The CPW scheme will reduce these effects by increasing recharge.

1.135 The increase in drainage resulting from the revised CPW run-of-river irrigation is estimated by CPW to be about 90 MCM/yr of irrigated soil drainage plus an additional 70 MCM/yr of clean water from upper plains streams and seepage of Rakaia and Waimakariri water entering groundwater via the CPW races.

1.136 We heard extensive evidence from CPW about projected groundwater mounding as modelled by Mr Weir using Aqualinc's Canterbury Groundwater Model, the FEMWATER model. Spatial maps across the plains of changes in the water table and of the piezometric heads in deeper aquifers were derived from model simulations based on climate and river data for 1967-2006 for a Status Quo situation, in which drainage from

irrigated land as at 2006 is included, as if those land areas had been irrigated for that entire 40 year period.

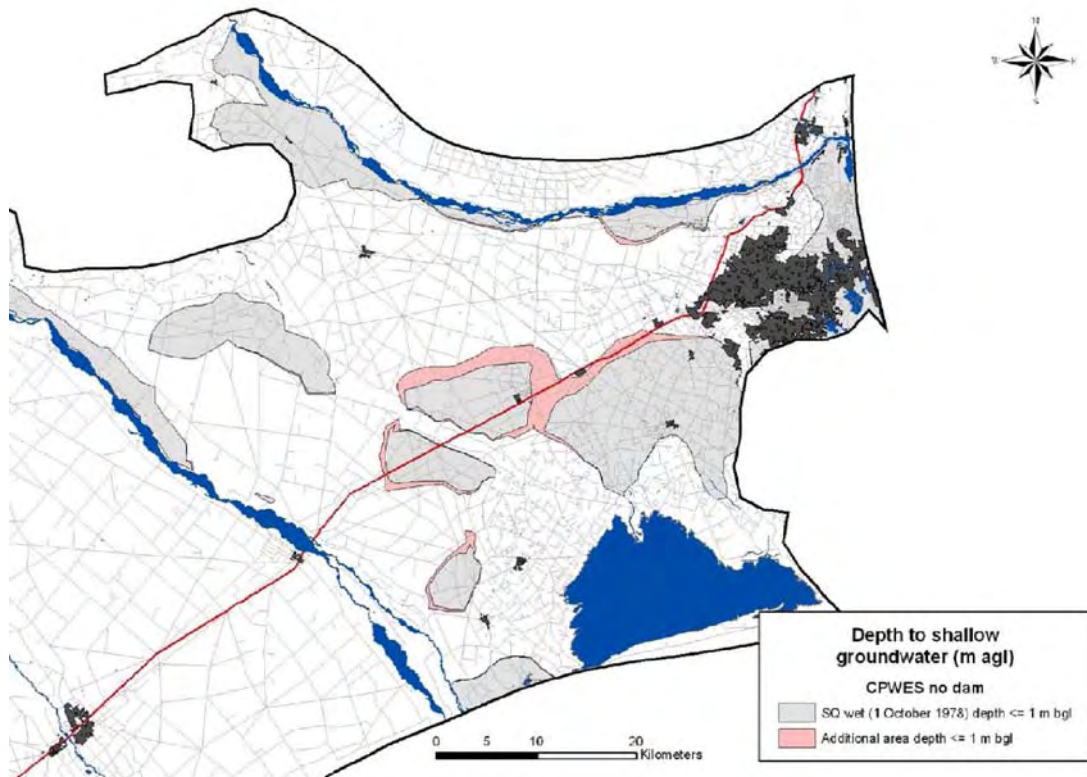
- 1.137** Projected groundwater heads and lowland streamflows from the Status Quo model simulations were then compared with model projections incorporating changes in irrigation drainage through the soil profile and changes in river recharge caused by the taking of Rakaia and Waimakariri river flows, as if CPW were operating over that 40 year historic climate period. Initially this was done for the original CPW proposal but revised projections were presented for a 12 year simulation period for the run-of-river revised CPW scheme at the reconvened hearing in October 2009, because of limited time to complete modelling over the full 40 year period.
- 1.138** There was considerable debate including from Messrs Scott, Williams, Hanson, Bidwell for ECan, Mr White for Ngai Tahu, Mr Callander for Waimak Irrigation and Waimakariri District Council, and submitter Mr English about whether the Aqualinc FEMWATER model adequately represents the hydrogeology and water balance of the Central Plains, and therefore whether its projected groundwater levels and stream flows are realistic or not. The degree of reliance we can place on modelled projections of course greatly influences our assessment of the significance of mounding and streamflow effects of the CPW proposal.
- 1.139** There appeared to be two main points of contention:
- (a) whether the Canterbury Plains gravels are better modelled hydraulically as stacked layers of aquifers separated by less permeable layers (aquitards) as in the FEMWATER model, or whether they function hydraulically essentially as a single leaky bucket of gravel as ECan scientists maintain; Mr Scott for example considered that the layered model underestimates vertical flows and overestimates horizontal flows with the result that it over predicts lowland streamflows and under predicts mounding (rises in water table) as a result of increased irrigation recharge.
 - (b) whether more reliance should be placed on projections from non-spatial eigenmodels such as those of Dr Bidwell or the calculated water balances of Mr White which were shown to better match actual water levels or flows respectively at locations for which results were presented to us.

- 1.140** In relation to (a) we conclude that the FEMWATER model provides reasonable regional scale projections of mounding and streamflows, but cannot be relied upon for specific local projections such as water levels in localised gravel pits or some lowland bores. For example, in some locations we note that calibrated bore water levels differ by several metres from actual measurements while in others the calibration was near perfect.
- 1.141** The FEMWATER model presents a regional view of potential outcomes and is most useful for comparing modelled scenarios rather than estimating the absolute projected heads and flows from a particular scenario. We were not convinced that the representation of the gravels as distinctly layered in the FEMWATER model grossly invalidates the projections of mounding and flows. Interpretation of model results is a matter of managing risk, the scale of which may ultimately vary from the model projections but the generic response to which is the same. We are satisfied that risks related to uncertainty of mounding effects can be adequately managed by conditions.
- 1.142** On (b) we agree that eigenmodel projections, within the range of historical groundwater levels upon which calibration is based, are likely to be more realistic than those from the FEMWATER model. However, where projected water level rises go beyond the calibration range of the eigenmodel, we believe those mounding projections may be overestimates because of the absence of surface water feedback controls (e.g. drains and streams) in the eigenmodel.
- 1.143** In relation to the White and Weir water balance calculations, we are unable to rely on either unilaterally but that is not necessarily fatal to model reliability. In particular, we note the large differences between Horrell's 1992 estimates of groundwater inflows to Te Waihora quoted by Mr White (which appear more justifiable), compared with much larger FEMWATER model projections of those inflows. What is important in this example are the nett discharges to Te Waihora and offshore, considered alongside the reasonable overall match across the FEMWATER models between Status Quo groundwater heads and streamflows.
- 1.144** We accept Mr Weir's explanations for the approximations in the way water balance components are calculated from the earlier FEMWATER outputs, including his observation that the model does not incorporate the web of lowland drainage systems, therefore predicted lowland mounding may be higher than would actually eventuate. We conclude that the FEMWATER projections of groundwater mounding and

streamflow change do provide a reasonable regional basis for assessing effects on streamflows, lowland drainage and Te Waihora.

- 1.145** Turning to the model results and their implications, the original CPW proposal was projected to raise groundwater levels by up to 10.5 metres inland from Burnham during a dry year. This maximum rise ('mounding') brings the water table up from about 20-30m deep to 10-20m below ground level. For the current (revised) proposal this maximum is a 6.5m rise rather than 10.5m.
- 1.146** Groundwater mounding is projected to be greatest in summer but with the highest groundwater levels occurring in late winter or early spring, 1-2 months earlier than currently. Mounding in a wet year is projected to be a maximum rise of 7 metres reflecting the greater irrigation water availability from limited river flows in wet years compared to dry ones. Despite the large sizes of these rises, the water table here would still be well below ground level.
- 1.147** It is the water level rises in the lower plains mostly beyond the CPW boundary which have more significant effects, both on spring flows and drainage. For the revised scheme, the model projects that up to 2.6% more land (7600ha) between the Rakaia and Waimakariri would have a water table within 1m of the land surface (Figure 3 and 2.8% more within 5m of land surface. These affected areas are 20-30% less than for the original CPW proposal involving storage.

Figure 3: Projected additional mounding within 1m of land surface with CPW revised scheme (pink areas) from Weir October 2009.



- 1.148** Groundwater flow directions are largely the same as at present, that is towards Te Waihora, and we note they may vary between aquifers of different depths. Mr Weir's Appendix D (Oct 2009) shows average streamflows are projected to increase by 30% ranging from 2% (Styx) to 77% (Selwyn). Mean annual low flows increase on average 50% during these times of greatest low flow stress, and this includes a projected more than tripling of low flow for the Selwyn at Coes Ford. For the original CPW proposal, Dr Mabin projects that these increased streamflows would increase the lake area of Te Waihora by less than 2%, requiring on average one extra lake opening per year. So for the revised scheme the increase in streamflows will be less.
- 1.149** While the flows in Christchurch City streams are projected to increase after CPW is fully operational (e.g. average flow increases for Styx 2%, Avon 4%, Heathcote 27%) the model indicates these are pressure responses caused by subtle changes in water table gradients. Based on this and Mr Weir's 3D particle tracking simulations (Appendices I, J, K of his January 2007 evidence) we conclude that any actual contribution of CPW-sourced land surface drainage water towards the Christchurch aquifers will be minimal.
- 1.150** None of these mounding or streamflow increases are instantaneous. If the CPW scheme were in place tomorrow, it would be 3-5 years for these changes to build up, so

if a staged scheme is built those changes will occur over a very long period, likely 10 years and more. The model indicates that variability in rainfalls (droughts vs wet years) is the dominant driver of groundwater and streamflow responses – we note that separating CPW impacts from climate effects can be done using a model like this, while recognising the error margins in model projections.

Predicted increases in contamination of ground water and surface water

- 1.151** Earlier we described how the revised run-of-river CPW scheme will now be highly reliant on top up supplies of groundwater which was not a feature of the original proposal. We heard from Mr Macfarlane for CPW that the reduced reliability of the revised scheme will change the future land use mix from that which was predicted under the original scheme to a mix with little further dairy or process crop development and much more mixed irrigation/dryland development (i.e. partial irrigation development of shareholder's blocks).
- 1.152** While this will only be the case until further storage is found for the scheme, it is positive from a nutrient loss perspective. Dairying and intensive cropping result in high nutrient inputs. In making this decision, we cannot speculate about the scale and additional effects of further water storage that may be added to the scheme later. Variations of these consents, plus new consents for the storage(s), will need to be applied for, and the effects of additional intensification of land use can be assessed at that time. The question of how much further dairying is sustainable can be addressed at that time, or preferably through the Regional or District planning process in conjunction with the CWMS.
- 1.153** Land use change in the much longer term is predicted by Mr Macfarlane to trend towards production of fresh produce and vegetable seed, with dairy farming confined soils with lower water holding capacity. In other words, land use will be governed by soil types. The predominance of dairy expansion in the more gravelly Te Pirita area supports his contention. From a nutrient loss perspective however, the gravelly soils are those where leaching of nutrients and other contaminants is most difficult to manage.

Water quality issues

1.154 The principal water quality matters for our consideration are:

- Changes to surface water quality caused by water use in the CPW scheme changing the hydrology.
- Increased sediment input and phosphorus (P) concentrations in surface waters in the irrigation area from overland runoff.
- Increased nitrogen (N) concentrations in lowland streams from increased nitrogen in groundwater beneath the irrigation area.
- Increased faecal (microbial) contamination in surface waters in the irrigation area from overland runoff and potentially in lowland streams from mounding of groundwater beneath the irrigation area.

1.155 Mr Tipler provided CPW's assessment of the risks and mitigation of nitrogen leaching from irrigation and rainfall drainage through the CPW area. He updated those calculations for the downscaled scheme at the reconvened hearing in October 2009. Also on behalf of CPW, Mr Close presented evidence on faecal and pesticide contamination risks, Dr Francis on N and P leaching rates from various types of land use, and Mr Kennedy on N and P losses to lowland streams. Commentary and additional water quality evidence was provided by ECan staff including Ms Hayward and by various submitters' witnesses including Dr Larned for DOC and Mr White for Ngai Tahu.

1.156 In view of the potential significance of this issue and the high degree of public interest in the issue we decided that we did not have sufficient independent information on the matter. Accordingly, in July 2009 we commissioned a report from Drs Bidwell and Norton pursuant to RMA s41A to provide us with further advice. This was presented at the reconvened hearing in October 2009 and summarised those experts' views about the effects of the revised (now run-of-river) CPW scheme. We found this report very useful, and many of the conclusions were reinforced by CPW's own evidence.

Nitrogen

- 1.157** Nitrogen is the contaminant of greatest concern. In surface waters, nitrogen in conjunction with phosphorus can cause excessive growth of algae and aquatic plants and there are risks of toxicity to aquatic life. In groundwater used for drinking water supply, nitrates pose health risks for bottle-fed infants under 6 months old through a condition called methaemoglobanaemia. We heard a submission from the District Health Board asking for the scheme to be declined because of the potential for it to cause a further increase in the number of bores exceeding the NZ Drinking Water limit of 11.3 g/m³ nitrate-nitrogen.
- 1.158** The Water Rights Trust submission sought limits on fertilizer application rates and on stock units per hectare, to protect water quality. There may well be a case for establishing caps on nutrient losses either zone by zone, or based on soil hydraulic characteristics. We note that it would be desirable for ECan and/or the Government to provide much needed guidance on the nutrient loss debate before CPW or others make further applications which if granted would lead to greater intensification.
- 1.159** Without doubt, irrigation of the CPW scheme area will raise nitrogen concentrations in both underlying and downgradient groundwaters, and in lowland streams and Te Waihora recharged by those groundwaters.
- 1.160** Mr Tipler for CPW used a Monte Carlo analysis of nitrogen leaching from the postulated range of combinations of likely land uses (pasture vs cropping) on soils with varied water holding capacity, and accounting for drainage variability with rainfall. This approach does not produce a spatial prediction of N contamination like the FEMWATER model does for groundwater mounding, but we note that level of detailed modelling of nitrogen concentrations has since been applied to the whole Canterbury region (a much coarser scale) in the work by Dr Bidwell supporting the Canterbury Water Management Strategy.
- 1.161** Nevertheless we have concluded that Mr Tipler's assessment is adequate for our purposes. His Monte Carlo statistical modelling approach produces a range of annual average CPW leaching rates to groundwater but does not show seasonal variability. We accept this as our concern is longer term response of the groundwater quality to CPW irrigation after mixing and attenuation. We are reassured that Mr Tipler's general conclusions about leaching rates are conservative, when compared with indicative

leaching losses from Dr Bidwell's new spatial model which shows lower leaching losses than Mr Tipler had calculated.

- 1.162** The additional nitrogen leached within the CPW area will primarily be coming from stock effluent and from fertilizers applied to intensified land uses. Best Management Practices need to aim to minimise application rates and maximise uptake by plants before it escapes the soil profile. Nitrate is the form of nitrogen of most concern but we note that transformations of nitrogen into its various forms are complex and nitrate may be reduced in anaerobic environments.
- 1.163** One potential place where nitrate concentrations may be reduced is the so-called *vadose zone*, the unsaturated zone between the bottom of the soil profile and the groundwater table, which under much of the CPW area could be 10 or more metres deep. However Mr Close concluded that the nitrate-reducing capacity in this gravelly type of environment is likely to be minimal. The main reduction in nitrate concentrations in the aquifers will be from mixing and dilution.
- 1.164** Many submissions to this hearing expressed concern that granting consents for the scheme to proceed is effectively a licence for unrestrained dairy expansion, the implication being that dairying is the only contaminating intensive land use. Expansion of particular land uses will depend on product prices primarily but also land suitability and water availability. Notwithstanding Mr Macfarlane's view that the revised run-of-river CPW scheme will not have sufficiently reliable water to justify much further dairy expansion without storage, we sought information on likely leaching rates from individual land uses.
- 1.165** Dr Francis summarised modelled leaching rates as follows: An irrigated CPW dairy farm is likely to generate 32 kgN/ha/yr reducing to 18 if cows are wintered off June-August. He said that minimal P would be leached unless excess irrigation occurs. In comparison, unirrigated sheep and beef farming averages 6 kgN/ha/yr. Irrigated wheat (an arable land use) leaches about the same as dairy at 34 kgN/ha/yr compared with 29 if not irrigated, while irrigated corn averages 23 and potatoes 39 kgN/ha/yr. Although not a broad-scale CPW land use, forestry in comparison generates 1-2 kgN/ha/yr.
- 1.166** Based on Mr Tipler's more conservative analysis of leaching rates which are higher for dairy (55 kgN/ha/yr) than those derived by Dr Francis from the Overseer model (32 kgN/ha/yr), we would conclude that the Overseer model underestimates leaching rates for Canterbury soils. We agree with Mr Tipler that this seems to be because it

underestimates drainage rates through Canterbury soils. So Dr Francis' dairy and sheep/beef leaching rates for nitrogen will be underestimates.

- 1.167** Annual average leaching rates are of course highly variable, depending on the crop cover and land management practices. We conclude that averaged over a full year, nitrogen leaching rates will be around 44 kgN/ha/yr for the crop mix likely within the CPW area and 55 kgN/ha/yr for pasture with dairying, but that some irrigated arable land uses are likely to leach as much or more nitrogen than dairying. This analysis simply highlights that best management practices are needed for irrigated CPW land uses regardless of the type of land use.
- 1.168** Mr Tipler concludes that leaching from CPW irrigation will overall lift existing lower N concentrations but make little change to those already at about the drinking water guideline value of 11.3 g/m³. His rationale is that CPW will add to the mass of N leached but this will be diluted by the extra irrigation and canal leakage, a 37% clean water input (we discuss later the implications of piped rather than open canal water distribution). For the revised CPW proposal his mass balance shows a projected increase in median nitrate concentrations in groundwater of 0.5 g/m³, compared to 1.2 for the original scheme proposal. Mr Hanson for ECan considered higher losses were likely, and Dr Bidwell addressed this question further in his s41 report with Dr Norton for us.
- 1.169** In their review of the evidence on contaminant losses, Bidwell & Norton note that there is no conclusively established difference in nitrate concentration in the soil drainage from irrigated vs dryland pasture (ie whether the N leaching is triggered from rainfall or from irrigation makes no difference). However, the quantity of soil drainage from irrigated pasture (500 mm/yr) is larger than for dryland pasture (200 mm/yr). The corresponding mass leaching rates for nitrate-nitrogen are: 17 kg/ha/y for dryland pasture; and 42 kg/ha/yr for irrigated pasture (we note Mr Tipler's more conservative figure of 55 versus 42 here). They conclude and we agree, that nitrate discharge to groundwater from implementation of an additional 30000 ha of (CPW) irrigation is projected to increase the mass of nitrate discharged by about 30%, or an additional 750 tonnes/year. This corresponds to an increase on groundwater flow from the scheme area of about 32%, approximately balancing the increased nitrate mass loss.
- 1.170** The picture we have before us is of an increased area of irrigated land within the CPW scheme area, but no change in the nitrate concentrations in the leachate (7-12 g/m³ by Bidwell's estimation) passing below the soil profile, simply an increase in the volume of

leachate reaching the surface of the shallow aquifer. Intuitively this leads us to the conclusion that more bores, and some bores on some occasions only, are likely over coming decades to have nitrate concentrations exceeding the MAV of 11.3 g/m³. We discuss shortly the implications and response to this conclusion.

1.171 In summary, in relation to nitrogen we conclude that:

- The revised CPW proposal will approximately double the annual losses of nitrate-nitrogen to groundwater from current irrigated land within the CPW scheme area;
- Including dryland nitrate losses, CPW irrigation will increase total nitrate losses by about 30% over current consented irrigation use;
- The median increase in nitrate-nitrogen concentrations in groundwaters will be at least 0.5 g/m³;
- These increases will cause some increased risks for enrichment of lowland streams and for breaches of drinking water standards for potable groundwater supplies from the CPW scheme towards Te Waihora/Lake Ellesmere, which will require careful management, as discussed later.

Phosphorus

1.172 Turning to phosphorus loss, there was less attention paid to this except in the Bidwell/Norton review. We were concerned that in light of the conclusion that lowland streams and Te Waihora are predominantly phosphorus limited (meaning in over-simplified terms that adding nitrogen will have little effect unless more phosphorus is added), **any** additional phosphorus loads could be damaging to the environment. As phosphorus is mostly carried bound to sediment, we conclude that avoiding sediment loss into lowland streams and then the lake must be a top priority for CPW and indeed for non CPW farmers.

1.173 So in summary for phosphorus, we agree that P loss has potential to be a more than minor effect but only if it is not being managed carefully. Reasons for this conclusion are:

- Phosphorus loss is predominantly associated with surface runoff and sediment transport, particularly from the hills beyond CPW and from floods;

- Phosphorus is retained within the soil profile and does not have the leaching potential of nitrate (this is supported by evidence showing low DRP in land surface recharge groundwater samples and by Mr Hanson in his s42A report from ECan);
- The Central Plains area contributes only a minor amount of phosphorus to Te Waihora (Lake Ellesmere) in relation to other sources;
- There is little evidence that current and past land use practices are affecting the DRP concentrations in Central Plains groundwater.

Pathogens

- 1.174** Some submissions were concerned about the potential for widespread microbial contamination of groundwater, and potentially greater incidence of disease, if intensive stocking with irrigated pastures (and most focussed on dairying) develops across the Central Plains.
- 1.175** Mr Close, an ESR expert in microbial fate in soils and groundwater, satisfied us that because of rapid microbe die-off in soils (but less die-off in the unsaturated (vadose) zone), the risk of harmful bacterial contamination being carried more than a few hundred metres in the aquifer is low. This is primarily because groundwater flow rates are slow, of the order of 10s to at most about 100 metres per day, and also because under much of the CPW area the water table is 10s of metres deep. These factors allow sufficient time for microbes to die off before either reaching the water table or being potentially pumped out via water bores.
- 1.176** Mr Close expects a ten thousand fold (4-log) reduction of bacteria from dairy shed effluent through a soil depth of 0.7 m as typical for the CPW area. Localised risks exist though where the soil is thin, the aquifer is shallow (and groundwater mounding would exacerbate this) and where sources such as septic tanks and dairy effluent reuse are not well managed. The picture we have before us is one of potential localised rather than widespread microbial contamination. Disease risk will similarly be localised; contact between farm staff and newborn calves for example does pose risks of cryptosporidiosis. We think disease risks are likely to be more prevalent where there is runoff into surface waters, rather than via groundwaters, and in the CPW area runoff into surface waters can be adequately managed under the Protocol and through stock

exclusion from riparian areas. Indeed this is likely to be better managed than on non CPW farms where there are no BMP requirements.

- 1.177** In summary therefore, we expect there will only be localised risks of increased pathogens migrating beyond properties within the CPW area, and low risk of microbes being carried for more than a few tens of metres in groundwaters.

Pesticides

- 1.178** Pesticides were also mentioned by some submitters as a leaching risk from intensified irrigated land uses. We have concluded that the risks of pesticides reaching groundwaters, lowland streams or Te Waihora are low.

- 1.179** As Mr Close described, leaching is determined primarily by the pesticides' soil adsorption properties, breakdown rate, dilution and dispersion. He expected little pesticide transport beyond about the top half metre of the soil profile and with groundwater velocities around 10-110m/day under the Central Plains, any pesticide reaching the water table would in any case be significantly diluted. We concur with that assessment and consider the risk less than minor.

The effects of nutrients on lowland streams

- 1.180** We earlier summarised the existing flows, water quality and ecological status of lowland streams down-gradient of the CPW scheme area. Then we outlined what the evidence led us to conclude on likely groundwater mounding and water quality changes when the revised CPW proposal is operational. In this section we draw together our conclusions about management and mitigation of increased nutrient loads into those lowland streams. In the following section we do the same for the consequential loads into Te Waihora (Lake Ellesmere).

- 1.181** We heard that the lowland streams are eutrophic, and mainly phosphorus (P) limited. In simple terms, this means that adding more nitrogen (N) would have little additional effect on algal and macrophyte growth but adding even small amounts of additional P could have a significant effect.

- 1.182** We accepted Mr Tipler's Monte Carlo approach to likely nutrient distributions as a reasonable projection of the range of likely leached nitrogen concentrations despite its lack of spatial simulation. That work suggests a median increase of 0.5g/m³ nitrate-

nitrogen leached from the revised CPW scheme, which as confirmed by Bidwell & Norton corresponds to a 30% increase in N leached to groundwater post-CPW.

- 1.183** In deciding what weight to give to Mr Tipler's 0.5 g/m³ median increase, we were cautioned by evidence from Bidwell & Norton that nutrients from post 1990 land use are only now arriving in lowland streams. So CPW effects are lagged by decades. They make this observation based on nitrate concentrations observed in lowland surface waters in Mid-Canterbury (Hinds-Ashburton area) where there has been a longer history of developed irrigated agriculture. Based on this empirical rather than modelled evidence, CPW irrigation could increase stream N concentrations by a worst case 2 g/m³ nitrate-nitrogen, more than Mr Tipler's modelled 0.5. We do regard these cumulative effects as significant but as noted later not outweighed by the overall benefits of the CPW proposal.
- 1.184** Lowland streams are mainly fed from shallow groundwater, but we accept from the groundwater evidence that leached nutrients from the CPW scheme will mix to a greater depth than at present. This will increase stream nutrients more than proportionately to increase nutrient mass loads (and to a lesser extent nutrient concentrations) in those streams, i.e. N concentrations affected by land use will extend deeper into and probably beyond 'Aquifer 1' and this may have an additional flow-on effect in springs feeding lowland streams.
- 1.185** We now address the sensitivity of the lowland streams to the projected increases. Mr Kennedy cites NIWA work showing that streams will be P-limited if DIN:DRP ratios exceed 7:1. Ratios for these lowland streams all exceed 40:1 and this convinces us that we should concentrate on evaluating the risk of additional P loss to streams (and Te Waihora) while requiring Best Management Practices (BMPs) that limit losses of all potential contaminants to lowland streams, either directly or via shallow groundwaters. In their s41 report for us, Bidwell & Norton point out that small increases in DRP (0.001 - 0.1 g/m³) can have ecological consequences whereas increases in nitrate-nitrogen of concern are an order of magnitude (10x) higher.
- 1.186** Alongside risks of algal and macrophyte growth, we heard varied views about the risks of N toxicity to aquatic life if nitrogen levels increase in lowland streams. Aquatic life in this context includes native fish, trout and invertebrates. Toxicity effects can either be chronic (long term, persistent) or acute (short term) and different guideline concentrations exist for each. In addition those guideline values have recently been revised downwards by Hickey and Martin (2009). Given the existing state of lowland

streams, we have used the 'Chronic – Highly Disturbed – 80% protection' guideline value of 3.6 g/m³ NO₃-N for chronic (previously 7.2 g/m³), and the acute value of 20 g/m³.

- 1.187** None of the lowland streams have levels approaching the acute value and even after full implementation of the CPW scheme, we conclude that the acute toxicity risk would remain low.
- 1.188** For assessing chronic toxicity risk, Ms Hayward's supplementary evidence showed that based on 2002-06 measurements, no lowland streams would have had a median nitrate+nitrite concentration exceeding the earlier chronic threshold of 7.2 g/m³, but if one uses the 3.6 g/m³ threshold, the Selwyn River, Boggy Creek, Doyleston Drain and Harts Creek median concentrations already exceed that limit. Dr Burrell's view was that the new limits are conservative and the additional toxicity risk low. He gave examples of mid-Canterbury streams exceeding the 3.6 g/m³ limit but with healthy aquatic life as evidenced by high QMCI values.
- 1.189** However, we agree with Bidwell & Norton that we cannot so easily dismiss peer reviewed and published national guidelines. We are not in a position to evaluate the basis for the recent change in N toxicity limits from 12 down to 3.6 g/m³ for an 80% level of protection. We do note that any comparison of monitoring data with guideline values should be of median data, not isolated samples, as this guideline is for chronic (long-term) exposure.
- 1.190** With a projected median increase in nitrate-nitrogen concentrations of 0.5 g/m³ and using the current chronic guideline value of 3.6 g/m³, we conclude there is a risk of increased chronic toxicity to aquatic life after the CPW revised scheme is fully operative, but no risk of acute toxicity. This conclusion reinforces the need for best practice scheme management to minimise nutrient losses, and for an integrated management approach through the Sustainability Protocol of remedial actions to reduce current nutrient losses, many of which will be from sources outside the CPW boundary or from non-CPW landowners.
- 1.191** For monitoring purposes, we note that the interaction of many water quality and flow attributes are what make a healthy or unhealthy stream and the N toxicity chronic guideline value of 3.6 g/m³ should be used as a monitoring indicator alongside other measures of stream health such as QMCI.

- 1.192** Moving to phosphorus impacts, we have concluded that given lowland streams are P-limited, minimising losses of P from both within and outside of the CPW boundary is critical. Primarily this will be achieved by avoiding losses of sediment to lowland streams. We felt that insufficient attention was given by the applicant to quantify this risk.
- 1.193** We do not accept the risk of P loss in the CPW area is as great as Dr Wilcock suggests (in the Bidwell & Norton review) from his experience of NZ dairy catchments. This is because the CPW area has low relief, more permeable soils and will use spray irrigation instead of flood irrigation. Based on the elevated P levels reported in some upland streams, we think stock access and bank erosion will likely be more significant sources of surface water contamination than overland flow. Therefore mitigation measures which exclude stock from surface waters and stabilise streambanks (including downstream of the CPW boundary) should be a priority. This priority is stated in conditions for the Environmental Management Fund.
- 1.194** We appreciate that the evidence has led us to take a somewhat simplistic approach to our conclusions about nutrient effects. We agree with Ms Hayward and Dr Larned (for example) that effects of changed streamflows and water quality on processes such as nutrient cycling, primary productivity, and dispersal and migration of invasive or native species are complex and not well understood. We have little evidence before us to judge the CPW impacts on those processes, but agree some may be more than minor effects.
- 1.195** Alongside some expected adverse effects of increased nutrient losses to lowland streams, we must consider the positive effects of the increased flows that CPW irrigation will bring. Without doubt there has been a loss of amenity (eg fishing) and ecological quality of lowland streams over the past decade and more. This is due to the combined effects of a period of drier climate, increased groundwater usage particularly from shallow aquifers, and leaching of nutrients from intensified land use.
- 1.196** We have concluded for lowland streams that the use of river water for CPW irrigation will on balance likely improve the aquatic habitat of lowland streams by reversing the decline in stream flows. This is consistent with ECan's 'Restorative Streams Consents Review programme'.
- 1.197** Increased streamflows will increase habitat for aquatic biota. We accept Dr Burrell's assessment that benefits will be greatest for smaller streams, and expect improved eel

and trout populations in the Selwyn, outweighing disbenefits like less efficient denitrification and N assimilation which were raised by Dr Larned. We also expect less intermittent flows (i.e. river reaches should dry up less often) in the Selwyn River which we think will improve net aquatic habitat, and offers potential to restore a previously highly valued trout spawning and fishing river.

- 1.198** We now discuss mitigation of increased nutrients in lowland streams. We have accepted that these mitigations are best managed through a combination of the Sustainability Protocol, Farm Management Plans and the Environmental Enhancement Fund underpinned by enforceable consent conditions.
- 1.199** Addressing P loss, Mr Kennedy cites research on these priority actions which we conclude must be implemented via the SP and Farm Plans: the most effective techniques for minimising loss of particulate P in overland flow were conservation tillage (75% removal of total P), grass riparian filter strips (50% removal), and nutrient management plans (45% removal).
- 1.200** One significant risk of P loss is that if drains are deepened as seems likely, care will be needed not to increase siltation. We accept Dr Mabin's logic that increased streamflows would not raise stream velocities to the extent that sediment is mobilised more than currently, but drainage excavation and maintenance works certainly do pose that risk.
- 1.201** Ms Mulcock identifies additional mitigations which must also be in the SP and Farm Plans – these include the use of nitrification inhibitors, winter cover crops, avoiding fertiliser use on saturated soils, and other appropriate technology or management practice, implemented to reduce the loss of nitrate nitrogen (and P) to soil drainage water. These are addressed in conditions.
- 1.202** Dr Glova considered buffer strips 5m wide would be sufficient to protect lowland waterways, but we note that their success at filtering nutrients depends more on avoiding having flow pathways and drains discharging directly to water bodies, and on establishing vegetation like grasses to trap and filter overland flow.
- 1.203** We suggest CPW have as an objective of the SP to so far as is practicable return the Selwyn River to its previous treasured trout spawning condition. Riparian planting and fencing, stock exclusion, and wetland establishment through the Environmental Enhancement Fund need to be a priority to make this happen. We have explicitly

required (condition 7) the exclusion of stock from all surface waters on or adjoining lands irrigated by CPW. Minimising of nutrient losses is also now a primary objective of the Environmental Management Fund, included in administrative condition 8.

- 1.204** Consent conditions reducing loss of nutrients to lowland streams should include Nutrient Management Planning (not just nutrient budgeting) for each farm receiving CPW water, and limits on annual N and P applications per hectare. These measures are built into the prescriptions for the Farm Management Plans contained in conditions 8 and 9.

The effects of nutrients on Te Waihora

- 1.205** We concluded above that Te Waihora is hyper-eutrophic. It has low water clarity and frequent wind-driven sediment disturbance giving it the green appearance described as 'in a serious ecological condition' by Judge Smith (Lynton Dairy Ltd v. Canterbury Regional Council, Environment Court C108/2005: at paragraph 101) in the Lynton Dairies case. In case one might conclude from this that the lake is 'dead', we note that the scientific consensus reported from the Living Lakes Symposium 2007 is that Te Waihora is 'a bit sick - parts of it are in reasonable to good health but many others need attention'.
- 1.206** We heard that many shallow lakes naturally alternate between a clear, macrophyte-dominated state and a turbid, phytoplankton-dominated state. The current 40-year turbid macrophyte-free period is the longest in recorded history for Te Waihora. We accept that high turbidity and low light penetration limit phytoplankton growths and this lake condition is likely to continue, even if upstream land use intensification stopped today.
- 1.207** We struggled to gain a clear picture of the increase in N and P loadings likely to reach Te Waihora after CPW is fully operational, and their likely effects. There is consensus that nitrogen loads will increase but, as for the lowland streams, debate about whether phosphorus loads would change much.
- 1.208** In our s41A report, Bidwell & Norton conclude that the additional nitrate-N mass load would be about 750 tonnes/year, about 30-40% of Mr White's estimates (for the original CPW proposal) which were used in Prof Hamilton's mass balance model for Te Waihora. Bidwell & Norton also suggested that the present state of the lake is not yet affected by the full nitrate mass loading from existing irrigation.

- 1.209** We heard that based on 1983-2005 data, the lake is nutrient limited less than 10% of the time (Larned & Schallenberg 2006) so while added N may occasionally exacerbate phytoplankton response, most of the time it simply adds to the store. We place more weight on that estimate than the 49% figure from Prof Hamilton based on a rough mass balance model. However, we do support the continued development of models such as Prof Hamilton's, informed by better local data such as Mr White's water balance data, measured denitrification rates, and ongoing comparison of N and P concentrations in tributary inflows vs in the lake.
- 1.210** We note that the draft conditions implementing the Technical Review Panel (discussed shortly) did not address mitigation of lowland or lake eutrophication; for completeness, we have added that (admin conditions 19 and 20).
- 1.211** In relation to potential harmful algal blooms, Dr Burrell noted that Te Waihora differs from the adjacent Lake Forsyth. He stated that because of its lower salinity and its exposed windy situation, Te Waihora has predominantly green algae species whereas Forsyth has more of the blue-green algae which can develop into toxic phytoplankton blooms. Such blooms are rare but do occasionally occur in Te Waihora.
- 1.212** Ms Hayward confirmed that N concentrations in the lake are well below toxicity thresholds and that CPW was unlikely to increase the risk of N toxicity. Thus we do not consider there would be significant increased risk of toxic phytoplankton blooms or N toxicity if the CPW scheme proceeded.
- 1.213** Drs Allibone and Glova both concluded that the CPW effects would be negligible for the fish fauna of Te Waihora with Dr Allibone predicting positive effects for migratory fish if there were more lake openings.
- 1.214** Ms Hayward and ECan staff have proposed that the PNRRP include what we would describe as an 'aspirational' goal for the eutrophic state of Te Waihora. They use the Trophic Level Index (TLI) which is an indicator of lake health calculated using average concentrations of total nitrogen (TN), total phosphorus (TP), chlorophyll *a*, and water clarity.
- 1.215** The target they propose is for a TLI of less than 4, which corresponds to the expected threshold between mesotrophic and eutrophic conditions. Based on 2003-08 data, Te Waihora has a TLI between 6.6 and 7.0. Dr Burrell calculated that effects of the revised

CPW proposal when fully implemented would raise this slightly from 7.0 to 7.2. Of more significance was Dr Burrell's assessment that reducing the TLI to 4 would require a reduction in Te Waihora's nitrogen inputs to **15% of current** and its phosphorus inputs to **8% of current**. These reductions in nutrient inputs are so significant as to be clearly unachievable.

- 1.216** Achieving the proposed TLI would essentially require substantial reforestation of much of the CPW area. That goal is clearly inconsistent with the Canterbury Water Management Strategy's goals of further irrigation development - broadly endorsed including by the region's mayors, the CDHB and now the government – even with best practice land and water management.
- 1.217** The reality is that irrigation development creates land use intensification and no amount of Best Management Practice will create zero detriment. That is the bald reality. Equally clear however, is the reality that every effort must be made by CPW and non-CPW land users alike from Te Waihora to the foothills to apply the best set of BMPs available, and to adopt a responsive process of continuous improvement in environmental management.
- 1.218** On balance the evidence convinced us that the additional N and P inputs (via lowland streams) are unlikely to have such significant effects on phytoplankton (including algal blooms and flow on to the fishery) to the extent that the CPW scheme should not proceed.
- 1.219** We were influenced by the fact that land use intensification will to some extent continue regardless, but likely without the stringent environmental prescriptions imposed through the Protocol and Farm Plan requirements. The CPW proposal offers an opportunity to demonstrate Best Practice self management in conjunction with improvements to existing irrigation practice on non-CPW farms, as envisaged under the Canterbury Water Management Strategy. We see excellent potential for the planned Waihora/Ellesmere Water Management Allocation Zone committee to implement and progressively improve upon the CPW Best Practice approach for all farms up-gradient of Te Waihora.
- 1.220** Changes in lake management are needed to even start to achieve Ngai Tahu's and WET's goals for Te Waihora. For example, we heard that more lake openings in spring and autumn would benefit diadromous (migratory) fish, but there will also be negative effects. Mr Bill Woods even went so far as to suggest the lake opening should be

permanent although we note this would cause major reductions to lake extent (which Mr Donald Brown of Ngai Tahu noted has already happened with the current lake size) and probably to riparian vegetation, and is in any case beyond the scope of this decision.

1.221 An integrated catchment management approach is clearly needed, including non-CPW farmers in the BMP efforts (but beyond the mandate of this panel except to recommend to ECan). This approach is supported by many submissions which sought a more holistic approach to land and water management, and one eloquently summarised by Te Korako Ruka Waitaha when they commented 'The world is looking for positive role models in sustainability' and suggested that 'farming takes a look at themselves as a whole and shift their emphasis from self to community'. We think that CPW's commitment to the SP and farm plan measures proposed will start to build the cohesive whole system community-based approach that is needed.

1.222 At the end of the evaluation of effects on lowland streams above, we indicated that we required some particular mitigation methods to be included in the SP and Farm Plans whichever was most appropriate. We describe here some specific suggestions for the SP and Farm BMPs which address lake impacts:

- riparian planting and fencing along tributary streams and lakeshore wetlands (an absolute priority as already described above);
- control of grey willow and crack willow along the lake shore but retaining indigenous vegetation (Dr Bishop saw willow control as the best mitigation option for terrestrial vegetation);
- detailed lake monitoring and modelling (such as suggested by Prof Hamilton);
- an investigation of the feasibility of constructing a permanent lake opening; and
- robust monitoring of inputs and the state of the lake which help link cause and effect to assist the Waihora/Ellesmere Zone Committee, and to apportion responsibility to CPW as necessary.

1.223 We think that further 'whole system' research is needed to understand the effects of land use intensification, and this is best done collaboratively between ECan, CPW, the zone committee and major stakeholders using the following type of logic model:

how land use and management practices affect nutrient and drainage losses at catchment scale

↓,

how these changes cumulatively affect groundwater quality spatially and as the contaminated waters flow down-gradient over decades,

↓,

how the consequential discharges to lowland streams via springs and seepage affect surface water quality and habitats, and then

↓,

how those stream discharges affect water quality, phytoplankton growth, fisheries and associated values and uses throughout this catchment chain.

- 1.224** This hearing has filled in parts of this picture but considerable uncertainty remains (especially around lake dynamics) and in light of the risks, a BMP approach is in our view essential. We recommend to Environment Canterbury that it consider including such an approach through the CWMS or if necessary via its plans.

The effects of nitrates and pathogens on ground water and potential health risks

- 1.225** As well as potential contamination effects on lowland streams and Te Waihora, the increased leaching from CPW irrigated lands will potentially affect the suitability of water pumped from bores for individual and reticulated water supplies.
- 1.226** We discussed earlier Mr Tipler's modelling which indicated that the revised CPW proposal some 3-5 years after full implementation could raise the median nitrate-nitrogen concentrations in shallow groundwaters by 0.5 g/m³. Based on Dr Bidwell's discussion of increases in mass loads (but not concentrations) of nitrate reaching the upper aquifer, we were however less optimistic than Mr Tipler that there would be limited increases in exceedances of the drinking water Maximum Acceptable Value (MAV) of 11.3 g/m³.
- 1.227** As Drs Bidwell & Norton point out, present water quality of lowland streams (derived from shallow groundwater) reflects upper plains land uses from about 20 years ago. Although Mr Tipler rightly asserts that with an average modelled N concentration in post-CPW drainage of 12 g/m³, groundwater quality after dilution would not exceed that average, we think that the time lags present a risk of higher nitrate concentrations in groundwater than Mr Tipler has modelled. Some of this risk derives from spatial and

seasonal variability which Mr Tipler has not modelled. Therefore a detailed monitoring and response strategy is required especially for drinking water supplies.

- 1.228** Submitters particularly concerned about specific risks to drinking water from bores included CCC in relation to Christchurch's water supply bores, CDHB in relation to health impacts, Dept of Corrections in relation to prison water supplies, Guardianz on behalf of the public, and SDC.
- 1.229** While we disagree with the socio-economic conclusions of the CDHB Health Impact Assessment, we support the mitigation measures identified and these are included in the Sustainability Protocol and monitoring proposed. The other submissions are addressed through conditions. For example, condition 6 requires Best Management Practices to be implemented to minimise the loss of nitrate-nitrogen to soil drainage water.
- 1.230** We note that the DWSNZ MAV for nitrate differs from other MAVs which are based on effects of lifetime consumption on human health. The nitrate MAV is based on short term exposure of infants up to 6 months old who are drinking formula mixed with water.
- 1.231** We agree with Bidwell & Norton that the risk can be avoided by sourcing alternative small quantities of water for the critical six-month period from deep community bores, for example. CPW has offered this and we have included a condition to this effect. Note that at para 7.3 of our **Minute 15** we said that 'Immediate provision by CPW of an alternative water supply (eg bottled water for the infant) should be required, pending resolution of any dispute over liability'.
- 1.232** Bidwell & Norton suggest that deepening affected bores a minimum of about 15m would be needed. Mr Hanson estimated that the depth of a nitrate plume may increase (after CPW effects flow through) by about 24m and Dr Bidwell estimates 30m. Deepening bores would also be a suitable mitigation in the event CPW opted for piped reticulation which Mr Tipler acknowledges brings a slightly higher risk of breaches of the 11.3 g/m³ guideline.
- 1.233** Regarding Christchurch City water, we conclude that there is a very low risk that irrigation of the CPW area will have any effect on CCC bores because:
- The principal source of the city's aquifers is from the Waimakariri River,

- Very little if any of the groundwater from beneath the scheme area passes under the city (Mr Weir was bold enough to suggest none, but like Mr White for Ngai Tahu we do not believe his particle track modelling can be interpreted that conclusively);
- Groundwater quality improves with bore depth and the deep aquifers are less likely to be affected by any land use activities;
- Only 6 of the 81 supply bores (those NW of the city) are even potentially at risk of contamination from land use activities, and in the unlikely event of a deterioration in groundwater quality, CCC has the ability to blend with deeper waters as they already do for pH correction. Having a CCC rep on the Groundwater Technical Review Panel would allow oversight and feedback on these risks, however low.

1.234 We conclude that irrigation within the CPW area is unlikely to have any measurable effect on contaminant levels in Christchurch City aquifers.

1.235 Early in this hearing we had before us proposals from both CPW and various submitters for establishment of a number of review panels and disputes resolution boards. These included a Groundwater Technical Review Panel, a Groundwater Disputes Resolution Board (Mr Tipler), an Environmental Technical Review Panel (Mr Callander), a Drainage Technical Review Panel and a Drainage Disputes Resolution Board (Mr Lewthwaite).

1.236 We think that because groundwater and drainage issues are so connected, there should be one expert panel covering all those issues. The Groundwater Technical Review Panel (GTRP) would have a role which includes signing off monitoring protocols (and any modifications) for groundwater quality and mounding effects, and to adjudicate whether CPW is likely to have caused groundwater in any bore to become unfit for potable use (in which case CPW provides an alternative supply that is potable). Mr Williams for ECan suggested that ECan expertise must be present on any technical panel, and we agree, not least because it will be important to integrate ECan monitoring networks and results, and to ensure consistency of management and consent monitoring between CPW and adjacent land and irrigation users.

1.237 In general, we think given the widespread predicted mounding and N impacts predicted, the onus should be on CPW to show it is not liable for mitigating effects on drainage

and drinking water supplies (as opposed to claimants having to prove CPW caused the effect) through the proposed GTRP.

- 1.238** Obviously monitoring of groundwater quality trends will be important to allow a timely response to exceedances of drinking water guidelines. It will also be needed to be able to link cause and effect. We have concluded that this is best done through a network of monitored multi-screened bores, as suggested by Mr Hanson, with the network design including as many bores as possible with long- term records and already a part of ECan's monitoring network.
- 1.239** Monitoring bore locations and numbers for monitoring need further consideration taking into account bore depths, notional aquifer depths, increased mixing depth projections post CPW (30m according to Bidwell & Norton), existing monitoring bore locations, and useful monitoring parameters. A collaborative monitoring approach involving at least ECan and CPW is called for, with design and operation of the monitoring network agreed by the Groundwater Technical Review Panel. Annual reporting of all monitoring results is also required.
- 1.240** To provide some warning of potential exceedances of the drinking water MAV, some prior thresholds need to be set, which prompt more detailed monitoring and warn of exceedance risk. We therefore suggest that increased groundwater monitoring should be triggered not when N-NO₃ exceeds the DWSNZ of 11.3 g/m³ MAV but when it reaches 75% which is 8.5ppm, which coincidentally is the expected mean concentration in soil drainage water. Based on ECan data cited by Mr Tipler, about 7% or 47 samples (many from the same bores) would currently have fallen in this category. This trigger would give time to ascertain cause, and identify remedial options and supply alternatives – we note CDHB suggested a trigger at half MAV but given the number of exceedances already, we consider that too conservative. We have not included this prescription in condition 24 relating to development of the Groundwater and Drainage Plan, as that would be too detailed, but we refer the GTRP to this suggestion when that Plan is drafted.
- 1.241** We consider that the FEMWATER groundwater model should be the basis for adjudicating effects of climate vs CPW but this is open to s128 review of conditions if better predictive or monitoring options arise later (we are certainly concerned by the long runtimes for the current model which preclude its routine use for localised management issues).

- 1.242** In addition we have included in conditions (Schedule 2: Administrative Conditions, condition 6) 3 levels of trigger for on-farm actions if the average annual concentration of nitrate-nitrogen in soil drainage water exceeds stated thresholds (8, 12 and 16 g/m³). These figures would be calculated from an accepted model such as OVERSEER or SPASMO, although we recommend that the OVERSEER model needs to be upgraded to better simulate Canterbury leaching conditions or that Dr Bidwell's new 2009 spatial model of N discharge be used, once proven.
- 1.243** Prof W Clark urged us to consider leachate effects on groundwater 'stygo fauna', the ~500 below-ground species (mainly tiny crustaceans) inhabiting gravel aquifers which cleanse our waters but which we know little about. Bidwell & Norton suggest comparing median groundwater nitrate concentrations with the upper limit chronic N toxicity value of 3.6 g/m³. Pending further research on stygo fauna sensitivity, we suggest monitoring reports note 2 trigger levels (1) 3.6 g/m³ for N toxicity to aquatic species (2) 8.5 g/m³ being 75% of the DWSNZ MAV of 11.3 as suggested above.

Effects of groundwater mounding on groundwater allocation, drainage, gravel pits and infrastructure

- 1.244** The groundwater mounding predicted to occur gradually as the CPW irrigation area expands will lead to a rise in the water table in some areas down-gradient of the CPW boundary. In this section we summarise our conclusions about management and mitigation of those mounding effects on groundwater allocations, lowland drainage, gravel pits and infrastructure including sewerage and stormwater disposal.

Groundwater Allocation

- 1.245** We were struck by the possibility that implementing the revised CPW scheme may help ECan to reduce the over-allocation (red zone) status of the Rakaia-Selwyn and Selwyn-Waimakariri allocation zones.
- 1.246** Based on Mr Tipler's calculations, on average CPW irrigation will generate 2.9 m³/sec (90MCM/yr) of extra groundwater inflow (drainage below the soil to the upper aquifer). The current allocation limits are based on half the land surface drainage as noted earlier. Based on the effective allocation figures provided to us by ECan (and updated on their website), if half the additional recharge could be allocated, then the new limit (10.7+1.4=12.1 m³/sec) would be close to the current level of Selwyn-Waimak and Rakaia-Selwyn groundwater allocations (13.0 m³/sec). Of course, changing the

allocation limits is beyond the jurisdiction of this hearing panel, but we take this as a positive for red zone groundwater allocations.

Drainage effects

- 1.247** We heard that some wastewater systems and reticulated drains are likely to suffer more infiltration as will shallow septic tanks, but it is likely that effects on microbial groundwater quality will remain localised.
- 1.248** CPW should not be expected to address the accepted limitations of the present drainage systems. Solutions include widening, deepening, clearing drains more regularly, and installing more secondary drains. Mr Fietje noted that the RDR scheme has led to drains east of SH1 requiring deepening and increased maintenance, and this suggests the same will be needed here.
- 1.249** We accept the dominance of climate over increased CPW drainage in dictating the variability in drain flows in lowland areas. Mr Weir's groundwater model showed that CPW drainage increases the area of shallow groundwater by about 11000ha compared to a wet year without CPW, increasing the affected area to about 48000ha. Based on Mr Weir's figures for a wet year, the modelled area with the water table less than 1m below ground will increase in an arc around Ellesmere linking Halswell, Lincoln, and Burnham to Leeston.
- 1.250** We have set conditions which make it clear that CPW must be responsible for the incremental increases in water table. We have some anxiety about the proposed adaptive management approach as effects are difficult to manage and there could be prolonged arguments about the extent to which CPW has exacerbated the drainage problem – therefore where there is disagreement, we think the FEMWATER model (or similar) must be used as the basis for apportioning effects. The model would be run with and without actual CPW irrigation and the groundwater level differences compared against groundwater levels, and their frequency in comparison with historic modelled levels.
- 1.251** Mr Lewthwaite's 8-step drainage mitigation process (described in his right of reply) is an approach which we support. He estimates drainage mitigation costs of \$2-6m. We support cost-effective monitoring targeting the most likely problem areas. As a minimum this must include water levels at the expanded SDC Pines wastewater plant serving

Prebbleton, Lincoln, Springston and West Melton, plus baseline surveys addressing the concerns raised by the Leeston Drainage Cmte, Mr Birkitt and others.

- 1.252** The complexity of the likely effects will place significant responsibility on the proposed Groundwater Technical Review Panel, whose role will include advising and adjudicating on CPW's liability to pay for remedial action. Conditions have been imposed to cover the GTRP responsibilities which include approving design of baseline surveys and ongoing monitoring, and initial arbitration. The GTRP would be appointed by ECan and as a minimum should have an ECan expert, at least one lowland landowner, a drainage committees' representative, a CPW representative and technical adviser
- 1.253** We note that piping the scheme would reduce recharge to groundwater and reduce drainage issues and costs. We discuss the piping option later.

Lake openings

- 1.254** Dr Mabin's evidence indicated that increased inflows into Te Waihora may necessitate extra lake openings which CPW has agreed they would pay for. The current average number of lake openings has been 3.3/year since 1948 ranging between 1 and 7 mainly during winter and spring. Based on Mr Horrell's water balance 1970-1991 for Te Waihora, Dr Mabin estimated that the original CPW proposal would require 1 extra opening per year, (and we infer the revised scheme would require slightly less), and the likely time would be either May or August. CPW has agreed a condition (14) requiring that it to pay 1/8 of the annual costs incurred by ECan to open Te Waihora to the sea.

Gravel Extractors

- 1.255** Gravel extractors (Isaac Construction Co Ltd, Winstone Aggregates Ltd, Fulton Hogan Canterbury Ltd and Road Metals Ltd) based at McLeans Island and Miners Road seek mitigation or compensation if CPW causes the water table to rise in their gravel pits. This is because consent conditions for the gravel pits generally require no excavation below the water table. Mr Callander cited Mr Weir's modelling figures predicting a 0-1.5m water table rise (and slightly lower with the revised scheme). He concluded that if CPW had been in full operation during the modelled period, then based on groundwater levels at bore M35/1080 there would have been 8 breaches of consent conditions since 1952.

- 1.256** We are inclined to accept Mr Lewthwaite's view that this issue is likely to have gone by the time any scheme effects occur. This is because it will be years before the CPW scheme is built and we heard there will likely be a 3-5 year delay in water table response. Put alongside CCC's estimate that current pits will be exhausted within 10 years, we do not believe this issue will at that time be any more than minor. However it is still open for CPW to assist the extractors with consent costs for new sources in the absence of a consent condition, if our inferred timeframes do not seem realistic.
- 1.257** Similarly we do not think the concerns expressed by Christchurch International Airport (CIAL) about increased fog, birdstrike or leachate from rising water tables in contaminated sites merit any mitigating consent conditions – we would even venture that the airport should instead be welcoming the additional freight turnover that the CPW scheme will bring if it proceeds.

By-wash & Mixing of Waters

- 1.258** The proposal includes by-wash discharges at the ends of distribution canals, which will release water which is excess to that ordered, and occasionally large flows during power cuts or other emergencies. Maximum by-wash discharges will be 1.5 cumecs into Rakaia, 0.8 into Selwyn, while others are have a capacity of 0.2-0.4 cumecs.
- 1.259** Originally Mr Lewthwaite proposed bypass races to nearby watercourses to route emergency by-wash discharges around wetlands. The Waitaha submitters (Te Korako presenters) lamented the loss of mauri if Rakaia and Waimakariri waters are mixed. TRONT are also concerned about loss of mauri if surface waters are mixed, as is Biosecurity NZ with didymo spread. Didymo was found in the Rakaia River in December 2007 and has since been found in the Waimakariri but to our knowledge has not been found in the Selwyn or other lowland streams. Of course didymo along with other algae may also pose a problem of clogging of screens for CPW, in which case brushing mechanisms would need to be built into the design.
- 1.260** To meet Māori concerns, minimise further spread of didymo, we have required that by-wash (other than emergency peak discharges to the Rakaia or Waimakariri rivers) be discharged in such a way that no mixing with surface waters occurs. This requirement will also meet the requirements of policy WQL1. Wetlands are required, although providing for surface flood disposal to land may also be required for larger discharges. Mr Lewthwaite considered this could be done with ponding areas to which flows in excess of what the wetlands can effectively take would be automatically diverted.

1.261 Mr Vesey for ECan suggested that consent conditions should limit canal leakage and by-wash, while Mr Lewthwaite suggested monitoring conditions were sufficient incentive for the scheme to minimise water losses. Because leakage, in particular, does have some beneficial aquifer recharge effects, we agree with Mr Lewthwaite. We also note that by generally not allowing CPW surface discharges of by-wash, there will be an operational incentive to minimise by-wash.

1.262 As noted by Dr Grove, wetland (and any pond) design also requires assessment of ecological values of those sites. We think there are opportunities in by-wash wetland design to enhance terrestrial and aquatic values within the CPW area.

Piped water distribution vs open canals

1.263 CPW want to keep open the option of piped distribution system and we support this while recognising that the benefits of lower water losses (as sought by the Green Party, WET and others) are counter-balanced by the additional groundwater recharge benefits (and detriments) for nutrient concentrations, and lowland streamflows.

1.264 A piped gravity supply would provide water at farm gate at 50m minimum head and would supply land 11km below the headrace, with pumping required within 11km of the headrace. Advantages of piped distribution include less pumping required on farm, lower water losses, improved safety, and more flexibility around the pipeline route. However we acknowledge that canals do cost less and can provide some artificial habitat.

1.265 Interestingly, analysis for the Ritso Society of costs of generic piped vs open canal systems over a 30 year analysis period indicates that a piped scheme has lower long-term costs. Although the piped system is about twice as expensive in terms of base capital costs (\$123million vs. \$64 million), operational costs are lower with the piped system because of the pressurised water delivery reducing on-farm pumping costs, and savings in water used. Their tabulated comparative benefits make a compelling case for piped reticulation. We strongly support CPW keeping the option of piped supply open.

1.266 One of the factors which has influenced our decision to approve the revised (run-of-river) CPW scheme is that there are benefits for lowland stream flows and only a small increase in groundwater nitrate concentrations because of dilution by clean water discharges from the canals. Mr Tipler calculated that piping scheme water would

reduce that dilution volume by about 23%. That would result in a larger increase in the median nitrate concentration (eg his figures showed an increase from 3.8 to 4.5 g/m³ (+0.7) for a piped scheme compared with +0.3 g/m³ for open distribution canals) and there would be some 2% more exceedances of the 11.3 g/m³ drinking water limit. Clearly piping has more than just cost, landowner impact and energy efficiency considerations. We do think however that the overall benefits of piping outweigh the costs.

Assessment against objectives, policies and rules

- 1.267** Elsewhere we discuss in overview whether the CPW proposal meets the requirements of planning objectives, policies and rules. Here we limit our review to compliance with proposed policies and rules in ECan's PNRRP, while noting that because the PNRRP is still in its hearing phase, we are not required to give much weight to provisions which are under contest.
- 1.268** PNRRP provisions relevant to water use include the water quality policies of Chapter 4 (WQL), and water quantity policies of Chapter 5 (WQN). Relevant policies were provided to us in summary by Mr Murray in 2008, and commentary on expected degree of compliance provided to us by Mr Fietje, among others.
- 1.269** Objective WQL1 sets water quality targets for rivers including the lowland streams. In relation to water use impacts, the main WQL1 outcomes of relevance to lowland streams are:
- Bed coverage with emergent macrophytes not to exceed 50%;
 - Bed coverage with thick algal mats (>3 mm) not to exceed 60%;
 - Bed coverage with filamentous algae (>2 cm) not to exceed 30%;
 - Maximum of 200 mg/m² of chlorophyll a (a measure of periphyton biomass).
- 1.270** Dr Burrell concluded that all the lowland streams would not currently comply with the latter periphyton guideline over 95% of the time and CPW will not change this nor significantly increase periphyton biomass. We accept this reasoning, and consider this target an aspirational goal unlikely to be achieved. Accordingly we do not regard CPW as being contrary to this objective.

1.271 Objective WQL2 sets water quality targets for groundwaters. Its (2)(b)(i) states that “for nitrate-nitrogen, the maximum concentration shall not increase by more than two milligrams per litre above the maximum concentration measured between 1996 and 2001, and reported in 2002, and the maximum concentration shall not exceed 11.3 milligrams per litre”. We have concluded that in conjunction with cumulative effects of existing and non-CPW land use, there is a risk of increased exceedances of the 11.3 limit but that these occurrences can be mitigated through conditions.

1.272 For lowland streams, PNRRP Schedule WQL1 Water Quality Classes identified in the Class 2.2 (Hill) Rule (g) that:

(g) The average annual concentration of:

- (i) soluble inorganic nitrogen shall not be increased by 0.02 milligrams per litre; or
- (ii) soluble reactive phosphorus shall not be increased by 0.002 milligram per litre.

i.e., discharges must not result in an increase in the annual concentration of DRP in receiving waters of $>0.002 \text{ g/m}^3$.

1.273 Mr Tipler indicated for the revised scheme proposal a median increase in nitrate concentrations of about 0.5 g/m^3 and considered that even for a piped scheme, compliance with the nitrate objective would be possible. Drs Bidwell & Norton agree.

1.274 Mr Kennedy considered the DRP target to be ‘lofty and probably unattainable’. Given the phosphorus limiting nature of the stream ecology and of the lake, we think a stringent limit is needed. The question is whether it should be set as a limit within a condition or a guideline target. The target is not an accrued limit as suggested by Dr Larned but a fixed cap. Nevertheless a target is essential as an indicator of the effectiveness of the SP and farm planning approach.

1.275 Policy WQL4 is relevant because it is designed for managing non-point source discharges so as to achieve Objective WQL1. Policy WQL4 does not contain any direct tests that could be used to assess the significance of nitrate-nitrogen increases. However Policy WQL4 (2) and (3) provide for the management and prioritisation of

rivers and lakes that do not currently meet Objective WQL1. Lowland streams affected by CPW are likely to fall into this category (see PNRRP Table WQL6). The mitigations identified in conditions and via the Protocol and Farm Plans will together achieve meet the intentions of WQL4.

- 1.276** We appreciate that the PNRRP is not yet operative and that submissions have been heard and revisions recommended by ECan Officers at hearings in May 2009. We think the Sustainability Protocol and Farm Plan template will address matters set out in Policy WQL4 and should be drafted so that they can be applied to determine compliance with Policy WQL4.
- 1.277** We appreciate that this has been a cursory review of what are very detailed objectives and policies. However the fact that decisions have not yet been made on the PNRRP limits our ability to give much consideration to those provisions.

The Canterbury Water Management Strategy

- 1.278** Some submissions sought that we put this hearing process on hold pending decisions on the Canterbury Strategic Water Study, which is carrying out a more regional scale assessment of irrigation needs and potential water sources. We must consider the applications before us, and in any case heard evidence from Dr Heiler, Dr Bright and others that the CPW proposal can be seen as a component part of that strategy.
- 1.279** The Canterbury Strategic Water Study led to the Canterbury Water Management Strategy CWMS and which establishes 10 water management zones to provide for more stakeholder involvement in water management and *integrated* and collaborative management within each zone. The relevant zone within which the CPW scheme sits is the Ellesmere/Te Waihora Zone covering the area between the Rakaia, Waimakariri and out to the coast at Te Waihora.
- 1.280** Among key findings of Stage3 were that before strategic water storage and water management decisions can be made, rigorous scientific and public consideration is required of:
- the impacts of land use intensification and its effects on water quality;
 - mitigation and management systems for water quality, and

- methods for maintaining or improving flow variability and low flows in major rivers.

1.281 For the CPW proposal, we have addressed all of these matters.

1.282 CSWS Stage3 investigated Lake Coleridge as a supply option for the CPW area and saw it as potentially improving short-term reliability of water for irrigation but that additional storage for dry year reliability would likely be required. Apart from issues around the Rakaia WCO and Trustpower rights to Coleridge water, Mr Tipler noted a Coleridge option would require a very large race to supply peak demand, and that lake level variation to supply CPW needs would be around 6metres. We did note one comment in the CSWS3 report: *“The Central Plains scheme could be confined to run of river until the dam in Lees Valley is operational”* . In the interim, until decisions are made on whether Lees Valley, lake Coleridge or other alternatives are the best storage options, this is the position CPW is now in. We see this as entirely consistent with the CWMS. In essence CPW leaves the option open for storage and/ or integration with other schemes.

1.283 We have to make decisions on the applications before us and have made determinations on all these matters insofar as they are affected by CPW. We enquired of Dr Heiler how CSWS might affect the future of CPW and he considered the CPW proposal the most realistic prospect for irrigating central Canterbury given potential consenting and lack of community agreement over other options.

Conclusions regarding the use of water for irrigation and discharges from the system

1.284 We have concluded that the proposed use of water by CPW for irrigation will be an efficient use of both the water and land resources of Canterbury. We find that the scheme is likely to provide significant economic benefits to the region and the nation.


1.285 We accept that the scheme (as with any land use intensification) will lead to further deterioration of water quality, particularly in lowland streams. However, we are of the view that these increases in nitrates and other contaminant are unlikely to exacerbate existing ecological effects and will not increase health risks to any significant degree. These effects can in our view be adequately managed by way of the Best Management Practices proposed by CPW along with the Regional Council’s ability to review the conditions of consent if necessary.

1.286 The use of water will lead to some increase in ground water mounding but we think that this is likely to be less than has been predicted. We consider that this issue can be addressed via compensation by CPW and through the GTRP.

1.287 There will also be some benefits in terms of increased lowland stream flows and increased ground water levels.

1.288 We see the Sustainability Protocol and the Farm Plans as becoming a model for other farms in the region. The Environmental Management Fund will also provide a benefit to the regional environment.

Independent Commissioners 28 May 2010



Philip Milne (chair)



Bob Nixon



Andrew Fenemor



Ray O'Callaghan

IN THE MATTER OF the Resource Management Act 1991

IN THE MATTER OF applications by Central Plains Water Trust to:

Canterbury Regional Council for resource consents to take and use water from the Waimakariri and Rakaia Rivers for the Central Plains Water Enhancement Scheme and for associated consents required for the construction and operation of the Central Plains Water Enhancement Scheme

AND

IN THE MATTER OF applications by Central Plains Water Trust to:

Selwyn District Council for resource consents to construct and operate the Central Plains Water Enhancement Scheme

AND

IN THE MATTER OF a Notice of Requirement by Central Plains Water Limited to:

Selwyn District Council for the designation of land for works associated with the construction and operation of the Central Plains Water Enhancement Scheme

**JOINT DECISION AND RECOMMENDATION OF
INDEPENDENT COMMISSIONERS
28 MAY 2010**

PART 8

Assessment against Objectives and Policies

GUIDE TO DECISION DOCUMENTS

- PART 1** – Introduction, Part II RMA, assessments, objectives and policy summary, conclusions, decisions and recommendations
- PART 2** – Disputed conditions
- PART 3** – Beneficial, economic, social and cultural effects of the scheme
- PART 4** – Intakes and headraces
- PART 5** – Distribution network
- PART 6** – Waimakariri and Rakaia takes
- PART 7** – Use of water
- PART 8** – Objectives and policies
- PART 9** – Regional Council consents and conditions
- PART 10** – Selwyn District Council consents and conditions
- PART 11** – Recommendations to Central Plains Irrigation Limited in respect of Notice of Requirement and Conditions
- PART 12** – List of hearing dates and appearances

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1. INTRODUCTION

1.1 This part of our decision addresses the objectives and policies relevant to the revised CPW Scheme. We have already discussed the relevant objectives and policies of the Waimakariri River Regional Plan and Proposed Plan Change 1 (PPC1) in Part 6 of this decision and in Minutes 9 and 12 and do not repeat that discussion here.

1.2 In the course of the hearing we heard analysis of the objective and policy frameworks under the relevant regional and district planning instruments from Mr Leo Fietje of the Regional Council, Ms. Sue Robson and Mr. Daniel Murray on behalf of CPW, Mr. Nick Boyes on behalf of the Selwyn District Council, and Mr David Newey for the Department of Conservation.

1.3 With respect to the resource consent applications to the Canterbury Regional Council and to the Selwyn District Council, Section 104 of the Act states:

*"(1) when considering an application for a resource consent and any submissions received, the consent authority must, subject of Part 2, have regard to -
(b) any relevant provisions of -
 (iii) a regional policy statement or proposed regional policy statement:
 (iv) a plan or proposed plan; and
....."*

1.4 With respect to the Notice of Requirement (NoR) served on the Selwyn District Council, under section 171 the Act states:

*"(1) when considering a requirement and any submissions received a territorial authority must, subject to Part 2, consider the effects on the environment of allowing the requirement, having particular regard to -
(a) any relevant provisions of -
 (iii) a regional policy statement or proposed regional policy statement:
 (iv) a plan or proposed plan; and
....."*

1.5 It is noted that the test in terms of plan provisions is slightly stronger in respect to a NoR where the Act under Section 171 uses the words "particular regard", whereas in respect to a resource consent under section 104 it uses the word "regard".

1.6 The relevant planning instruments are the **Canterbury Regional Policy Statement** (the RPS) which became operative in June 1998; the **Waimakariri River Regional Plan** (the WRRP) which became operative on 23 October 2004; and the **Proposed Natural Resources Regional Plan** (the PNRRP). Chapters 1 to 3 of this plan were notified on 1 July 2002, and were amended following decisions in September 2007. Chapters 4 to 9 were introduced by Variation 1 to the PNRRP and were notified in July

2004. Submissions on Chapters 4 to 9 are currently being heard. Since the substantive hearing of CPW's applications in 2008, the Regional Council have notified Change 1 to the WRRP, and this is discussed below. In addition, we must have regard to the relevant objectives and policies of the **Selwyn District Plan** (the SDP).

1.7 The applicable chapters of the RPS are listed below.

Chapter 6 -Provision for the relationship of Tangata Whenua with Resources
Chapter 7 -Soils and Land use
Chapter 8 -Landscape, Ecology and Heritage
Chapter 9 -Water
Chapter 10 -Beds of Rivers and Lakes and their Margins
Chapter 12 -Settlement and the Built Environment
Chapter 13 -Air
Chapter 14 –Energy
Chapter 15 -Transport
Chapter 16 -Natural Hazards
Chapter 17 -Hazardous Substances

1.8 Of the above, Chapters 6 - 10 have the greatest bearing on the CPW project.

1.9 The applicable chapters of the PNRRP are as follows. These chapters each have their own volume, and are much more expansive in terms of content and detail than the chapters in the RPS:

Chapter 3 -Air Quality ("AQL")
Chapter 4 -Water Quality ("WQL")
Chapter 5 - Water Quantity ("WQN")
Chapter 6 - Beds And Margins of Lakes and Rivers ("BLR")
Chapter 7 – Wetlands ("WTL")
Chapter 8 - Soil Conservation ("SCN")

1.10 In addition, abstractions from the Rakaia River are subject to the **National Water Conservation (Rakaia River) Order 1998**. We discussed those provisions in some detail in our decision in relation to the Ashburton Community Water Trust hydro electric scheme and do not need to repeat that discussion here.

1.11 The provisions of the Transitional Regional Plan relating to extractions, diversions, discharges to water and air, and excavation apply to the CPW scheme, but are not relevant to this part of our decision as the TDP does not include any objectives and policies.

1.12 The provisions of the RPS, the WRRP and the SDP have to be given full weight, as they are operative documents, or in the case of the SDP the relevant provisions are now beyond challenge. Proposed Change 1 to the RPS concerns Christchurch urban

growth matters, and is not relevant to the consideration of objectives and policies insofar as the CPW scheme is concerned.

- 1.13** Some weight can be afforded to the provisions of the PNRRP, but this is tempered by the fact that parts of it are subject to significant challenge through submissions and no decisions have yet been issued in relation to the parts of that plan which are relevant to the current proposal. We have given more weight to those provisions of the PNRRP (of which there are a significant number) which are consistent with the objectives and policies in the RPS.
- 1.14** During the hearing, concerns were expressed that the weight to be given to the WRRP was limited, as the work underpinning the plan was outdated and a take of the magnitude sought by CPW had not been anticipated when the plan was drafted. We noted that at the objective and policy level, the WRRP faithfully followed the matching provisions in the RPS. However the rules in the WRRP were more liberal than the objectives and policies in both the RPS and the WRRP would initially suggest.
- 1.15** The following assessment of the relevant objectives and policies, and the degree to which the modified proposal is consistent or otherwise with them is to a large extent dependent on the costs and benefits of the scheme having regard to Part 2 of the Act and arriving at a balanced judgment, taking into account the adequacy of any mitigation measures proposed.
- 1.16** The modified scheme resulting from the removal of the Coalgate dam, the Waianiwaniwa reservoir, the upper Waimakariri intake and tunnel and reductions in the Waimakariri take, significantly reduces the extent and intensity of effects compared to the original proposal.
- 1.17** At our request, towards the conclusion of the original hearings in 2008, we were presented with an agreed list of the relevant objectives and policies which totalled some 66 pages; however since then large part of the scheme involving the dam, reservoir and upper intake have been withdrawn, so not all of these objectives and policies have direct relevance. Nevertheless, there remain a substantial number of objectives and policies which, to a greater or lesser extent, have application to the CPW scheme. We have not attempted to assess the project in terms of all of these provisions. Instead we have focused on those provisions having the most direct relevance, including assessing (and citing from where appropriate) those which we consider are most important.

- 1.18** We have set out to consider the objectives and policies in each of the planning instruments by topic area, rather than on a plan by plan basis. This is consistent with our approach to assessing the effects of the proposed activity as set out in the applications and the notice of requirement.
- 1.19** The objectives and policies have been considered 'in the round'. Accordingly, if the project is contrary to one or more objectives and policies, this is not necessarily in itself fatal to the designation or the resource consents applied for, in the latter case also depending on the type of activity category (e.g. noncomplying or discretionary). There is no requirement that all aspects of this scheme, or indeed any similar large scale proposal be not contrary to the objectives and policies. In addition, any assessment of the objectives and policies is still subject to Part 2 of the Act.
- 1.20** As a final introductory point, brief comment needs to be made on the "Canterbury Water Management Strategy" (CWMS) released in November 2009. This was mentioned several times during the October 2009 hearings. It has no statutory status, but forms part of a proposed strategy for managing competition for both surface and groundwater in Canterbury. A key element of the strategy with respect to water management (page 7) is that:
- "There **is** capacity for further development but it will require **existing** users and new users to improve the way they use water".
(emphasis as stated in the report)*
- 1.21** The strategy makes it clear that environmental, cultural, stock water and community needs are to have first priority with respect to water resources, but that efficiency improvements and investment in infrastructure for irrigation is anticipated. The use of storage is also a key focus.
- 1.22** In April 2010, the government passed the Environment Canterbury (Temporary Commissioners and Improved Water Management) Act 2010. This requires those involved in plan preparation, changes or variations to have particular regard to the provisions of the CWMS. It does not affect the consideration of resource consent applications or designations. Nevertheless the CWMS is a relevant document which we have had regard to. A key focus of the strategy is *integrated management* of the region's water resources. We do not see the CPW scheme as being at odds with that. Certainly in reaching our decision we have been mindful of the need to adopt a holistic approach to the scheme. That should be particularly evident in our discussions around the use of water (Part 7 of this decision) which considers the downstream consequences of irrigation.

1.23 Another focus of the strategy is on decreasing reliance on ground water takes (particularly in the CPW command area) by increasing use of surface water supplemented by storage. The revised CPW scheme will achieve those goals. While it no longer contains large scale storage, that is still a component which can be added to the scheme at a later date, if sustainable options are developed. There is no doubt that the scheme will take the pressure off ground water resources. The use of ground water as a supplementary supply rather than a primary supply is in consistent with the goals of the strategy. The scheme also has the potential to be utilised to provide winter recharge of groundwater if that proves to be beneficial.

2. THE OVERALL FRAMEWORK FOR ASSESSING THE OBJECTIVES AND POLICIES

2.1 The centrepiece of the proposed scheme is the take and use of water for a project to irrigate 60,000 ha with nearly 500 km of headrace canal and distribution races. Even in its revised form, it is undoubtedly of regional scale and significance. For this reason, we consider it appropriate to set out the contents of Objectives 1 to 3 of Chapter 9 of the RPS, which provide an integrated framework for considering the effects of the take and use of water on the natural and physical resources of the affected area. Given the different but complementary functions of regional and district councils, matters such as the take and use of water at the level of the RPS are primarily given effect to through regional plans, while matters such as landscape and heritage are primarily given effect to through the District Plan.

Objective 1

Achieve sufficient quantities of water in the region's water bodies to enable present and future generations to gain cultural, social, recreational, economic and other benefits from those water bodies while:

Objective 2

Enable present and future generations to gain cultural, social, recreational, economic and other benefits from use of land where it affects the flows and levels of Canterbury's water bodies while:

Objective 3

Enable present and future generations to gain cultural, social, recreational, economic, health and other benefits from the water quality in Canterbury's water bodies and coastal waters, while:

- (a) safeguarding the existing value of water bodies for efficiently providing sources of drinking water for people;*
- (b) safeguarding the life-supporting capacity of the water, including its associated: aquatic ecosystems, significant habitats of indigenous fauna and areas of significant indigenous vegetation;*
- (c) safeguarding their existing value for providing mahinga kai for Tangata Whenua;*
- (d) protecting wahi tapu and other wahi taonga of value to Tangata Whenua;*
- (e) preserving the natural character of lakes and rivers and protecting them from inappropriate use and development;*

- (f) protecting outstanding natural features and landscapes from inappropriate use and development;*
- (g) protecting significant habitat of trout and salmon; and*
- (h) maintaining, and where appropriate, enhancing amenity values.*

- 2.2** Objectives 1 to 3 under Chapter 9 of the RPS are very broad in scope and address the great majority of the issues relevant to the potential effects of the CPW project on both surface and groundwater. These matters are central to the scheme, including the designation and the physical works associated with it. These objectives seek to enable cultural, social, recreational, economic and other benefits, which in turn are qualified by the need to *safeguard* drinking water and the life supporting capacity of water, ecological values, and provision of mahinga kai; *protecting* wahi tapu; *preserving* natural character; *protecting* natural features and landscapes and the habitat of trout and salmon; and *maintaining* amenity values. It can be noted that the format of these objectives closely follows the enabling principles in section 5(2) of the Act while recognising the qualifications under subsections (2) (a) – (c).
- 2.3** These matters encompass virtually all of the environmental effects requiring consideration as part of this decision, either directly or indirectly, and these three objectives also form the basis of the three key objectives in the WRRP.
- 2.4** Subchapter 20.4 of the RPS is also a helpful basis for introducing consideration of the objectives and policies, as it sets out matters of regional significance, and identifies regionally significant effects. It is referred to frequently in various objectives and policies set out under the RPS, and in the assessment below.
- 2.5** A consistent theme under the criteria contained in the subchapter are the importance of species, ecosystems, and habitats which are unique or endemic to Canterbury, and/or which are threatened; landscapes which are distinctive and unique to Canterbury; heritage sites and areas that contribute to understanding the human occupation of the Canterbury Region; and sites and places that are important for recreation and amenity.
- 2.6** The RPS and the other plans also provide for consideration of positive social and economic effects which might flow from the establishment of irrigation systems.
- 2.7** The following sections assess aspects of the CPW scheme by topic area. Obviously there is a degree of overlap, but the assessment below is undertaken with respect to the following headings:
- *Instream values and on the margins of the Waimakariri and Rakaia rivers*
 - *Groundwater and on Te Waihora/Lake Ellesmere*

- *Terrestrial and aquatic ecology*
- *Landscape values and amenity*
- *Recreation and access*
- *Heritage values*
- *Tangata Whenua*
- *Earthworks and utilities*
- *Dust, odour, noise and vibration*
- *Transport and energy*
- *Public safety and hazards*

3. EFFECTS ON INSTREAM VALUES AND ON THE MARGINS OF THE WAIMAKARIRI AND RAKAIA RIVERS

3.1 Chapter 9, Policy 6 of the RPS states as follows:

In considering a permit to take water, a consent authority should, as part of the requirements of section 104 of the RM Act, consider the need to:

- (a) specify maximum permitted water usage over specific time periods as well as maximum abstraction rates;*
- (b) be based on actual and reasonable water needs;*
- (c) provide for existing water permit holders to have priority for the term of their permits;*
- (d) specify the priority to be given to the permit in the event of restrictions being imposed; and*
- (e) provide mechanisms to reduce or suspend abstractions during periods of low water flows or levels.*

3.2 This policy addresses the need for appropriate restrictions on abstractions (takes); the efficient use of the water resource; the effects on both the rate of take and security of supply for other users; the effect of a take on the values of the (in this case) Rakaia and Waimakariri Rivers; and the effects of a take on water quality.

3.3 The proposed take from the Rakaia River is in full accordance with the provisions of the National Water Conservation Order, and by implication with the RPS. The maximum take of 40 cumecs represents the combined takes by both CPW and ACWT as a joint applicant, the latter take associated with proposed hydroelectric generation on the south bank of the river.

3.4 We did not simply assume that any take falling within the general parameters of the WCO with respect to the extraction volumes had no environmental effects. However we did not hear any evidence that the WCO was insufficient to protect the key environmental qualities of the Rakaia River. The proposed CPW take would retain flow variability and avoid flatlining, and not give rise to any increase in flows below the "minimum annual low flow (MALF).

3.5 With respect to the Waimakariri River, any take above that allocated to "A Permit" holders, is a restricted discretionary activity under the WRRP. An important point arising from this is that irrigation takes, are anticipated by the WRRP. Indeed prior to

PPC1 the plan was if anything, overly encouraging of additional takes, because it had no allocation cap and restricted discretion only to effects in the vicinity of the intake.

3.6 We recognised the fact that the WRRP provisions were inadequate to achieve the objectives and policies of the RPS and the plan itself. The Waimakariri River is more 'fragile' and under considerably more pressure than the Rakaia because of its much lower average flow and the intensity of recreational activity. Mr Fietje on behalf of the CRC noted that (somewhat surprisingly) it had not been anticipated that someone might apply for a significant "B"take at the time that the WRRP was promulgated. This is now being rectified by way of Proposed Plan Change 1 (PPC1) and we have been mindful of the objectives and policies behind that change.

3.7 Chapter 10, Objective 1 of the RPS calls for the protection of, and where appropriate enhancement, of natural character. Associated Policy 1 states:

(a) Areas within the beds of rivers and lakes and their margins containing important conservation values are to be identified. These include:

(i) areas of natural character;

(ii) significant habitats of indigenous flora and fauna;

(iii) significant natural features and landscapes;

(iv) areas of mahinga kai, wahi tapu or wahi taonga (including historical artefacts, urupa, skeletal remains) and Tangata Whenua needs for access to them;

(v) significant amenity and recreation values;

(vi) significant heritage values;

(vii) significant habitats of trout and salmon.

(b) Land use or development should avoid causing significant adverse effects on the conservation values contained in areas identified in Policy 1(a).

(c) Prior to identification of areas under Policy 1(a), land use activities on the beds and margins of lakes and rivers should be undertaken at such times or in such ways that their adverse effects on the following values are avoided or mitigated:

(i) habitats of indigenous fauna, including international migratory bird species, particularly threatened species, and species rare or endemic within Canterbury;

(ii) habitats or the unimpeded passage of indigenous fish;

(iii) areas of indigenous vegetation;

(iv) wetland areas;

(v) natural character or significant landscape values;

(vi) spawning habitats or the unimpeded passage of trout and salmon; it

(vii) amenity and recreation values;

(viii) heritage sites;

(ix) Tangata Whenua values.

3.8 Objectives 5.1, 6.1 and 7.1 in the WRRP contain almost identical wording to Objectives 1 - 3 of the RPS. The former is relevant to proposed takes from the Waimakariri River, and the latter, proposed takes from both rivers.

3.9 Objective 7.1 and Policy 7.1 in the WRRP are very similar in content to Chapter 10, Objective 1.

3.10 Objective BLR1 in Chapter 6 of the PNRRP "Activities within the beds and margins" states:

Activities in the beds and margins are able to be undertaken while:

- (a) protecting flood carrying capacity to avoid increased risk of flooding of surrounding lands;*
- (b) protecting the stability of lawfully established structures and the banks of lakes and rivers;*
- (c) minimising the spreading or colonising by pest or undesirable plants;*
- (d) preserving natural character;*
- (e) protecting outstanding natural features and landscapes;*
- (f) protecting areas of significant indigenous vegetation and significant habitat of indigenous fauna;*
- (g) promoting the maintenance and enhancement of amenity values;*
- (h) providing for the relationship of Ngāi Tahu and their culture and traditions with their ancestral lands, water, sites, wāhi tapu, and other taonga;*
- (i) avoiding, remedying or mitigating adverse effects of reductions in sediment transport to the coast where there is a crucial link to rates of coastal erosion; and*
- (j) protecting significant habitat of trout and salmon.*

3.11 There is clearly a strong element of overlap and consistency between these important objective and policy provisions, which are comprehensive and provide an overarching framework to the assessment of objectives and policies considered elsewhere in this assessment. They essentially call for a balance between the use of water for irrigation, activities affecting water quality, activities undertaken in the Rakaia and more particularly the Waimakariri River corridor including recreation, Maori values, and the other matters described in Part II of the RMA. This balance must be achieved in a manner whereby ecological, recreational and Tangata Whenua values are not significantly compromised.

3.12 Policy BLR 2 in Chapter 6 of the PNRRP "Land use activities within the bed and margins" calls for the avoidance of activities which result in disturbance of indigenous birds nesting in the bed.

3.13 Chapter 4, Objective WQL 1.1 in the PNRRP "Rivers" states as follows:

(3) Where the water quality of a river, or the physical and chemical characteristics of the riverbed substrate, have been or are likely to be affected by a change to the flow regime of a river as a result of; augmentation of flow, damming, diversion, or discharge of water or contaminants:

(a) the instream values in the river, which existed before a change to the flow regime, are provided for, by ensuring that:

- (i) any change to water quality, including changes to; clarity, natural water temperature, dissolved oxygen concentrations, or contaminants caused by reducing or low oxygen conditions;*
- (ii) sedimentation of the riverbed; or*
- (iii) excessive growth of periphyton, or aquatic plants; have no significant adverse effects on the instream values of the river; or*

(b) where the instream values have been adversely affected by a change to the flow regime, the water quality of the river and the physical and chemical characteristics

of the riverbed substrate, are improved to restore, as far as practicable, the instream values of the river that existed before the change to the flow regime; and
(c) the quality of river water recharging groundwater will not prevent the achievement of Objective WQL2.

- 3.14** Chapter 4, Policy WQL 5 of the PNRRP seeks to avoid disturbance to river margins, minimising sediment discharge, retaining riparian vegetation, and with an emphasis on restoration of indigenous flora.
- 3.15** The framework of objectives and policies above provide a comprehensive basis for assessing the impacts of the take from the Waimakariri River. We consider the amended take regime is not contrary to these objectives and policies. We concluded that a 30 cumec "gap" regime as proposed by the Regional Council through PPC1 to the WRRP, would significantly compromise the viability and benefits of the scheme and while arguably providing a limited degree of added protection, would also have had the effect of flatlining the river except during major flood events.
- 3.16** It is up to a different panel to decide the future of the 30 cumec gap but we have concluded that the 30 cumec gap is not required to achieve the objectives set out above or to achieve sustainable management of the resource. We have concluded, that in the context of the current proposal, the objectives and Part 2 of the RMA can be achieved by another mechanism which we consider to be sustainable and more balanced between use and protection.
- 3.17** We find that the proposed intake structure on the Waimakariri at "the Pinnacles", and the effect of constructing the headrace canal and the earthworks on the escarpments of the Rakaia and Waimakariri Rivers will have some adverse effect on amenity values , mainly from the perspective of river users but do not consider these works to be contrary to the relevant objectives and policies (see also Part 2).
- 3.18** We consider that any effects of works in both rivers on indigenous nesting birds and on vegetation in the vicinity of the takes would be very localised in extent and of no more than minor effect in the context of the braided river systems as a whole. A more important consideration is the effect on bird life and potential predation in the river fairway as a whole during the spring nesting period. This is dependent on maintaining braids within the river channel, which we consider will be achieved through the flow restrictions included in the consents. With respect to the Rakaia River, these values are also protected by the WCO.
- 3.19** Objective WQL 1.1 and Policy WQL5 are relevant to potential water quality effects which were raised in a number of submissions during the hearing. In particular,

submitters expressed concerns about the adverse effects on water quality potentially arising from sedimentation associated with works during construction and from vegetation disturbance along the margins of the Rakaia and Waimakariri Rivers; reduced river braids and shallower braids; discharges from settling ponds; the effect of training activities in the riverbed; sedimentation and periphyton growth resulting from reduced flows and/or warmer water temperatures.

- 3.20** We concluded that any loss of water clarity associated with construction work, river training, and discharges from the settling ponds would be temporary in nature and could be adequately mitigated by appropriate conditions. We also concluded that the potential effects of sedimentation, the protection of braided character and periphyton growth could be managed to achieve effects that were no more than minor, provided subject to a condition allowing the passage of freshes following prolonged low flow periods. There was no evidence that the reduced take would adversely affect the extent of suspended sediment concentration downstream.
- 3.21** The Waimakariri River is particularly important with respect to recreational values. We consider that an acceptable balance between recreational values and extraction of water for irrigation can be achieved provided there are additional restrictions on takes during low flows, weekends and other high use periods, as is proposed under our conditions. As noted before, the WCO provides for a flow regime that protects the high values of the Rakaia River as a salmon fishing resource. In the case of the Waimakariri, we have concluded that the proposed flow sharing regime and associated further conditions will achieve the ongoing protection of this river as a recreational fishing resource, and as a resource for kayaking and jet boating.
- 3.22** Our overall conclusion, is that the proposed Waimakariri and Rakaia takes will not be contrary to the objectives and policies of the RPS, or the WRRP with respect to instream values. This is in contrast to the original Waimakariri take proposal which we concluded would be unsustainable and contrary to the objectives and policies of the RPS and WRRP.
- 3.23** The proposed take regime and its associated conditions will have an effect on Waimakariri flows, but will in our view result in a sustainable use of the water resource and an acceptable balance between the use of the resource for irrigation (with its associated economic and social benefits) and the ecological, recreational and landscape values of the river. In our view the recreational amenity and ecological values of the river will be largely maintained. This is the balance that the objective and policy framework seeks to promote. It is also consistent with the CWMS.

4. GROUNDWATER IMPLICATIONS AND EFFECTS ON TE WAIHORA/LAKE ELLESMERE

4.1 Objectives 1, 2 and 3 in Chapter 9 of the RPS, reproduced above provide an overall framework for assessing effects on water resources, including groundwater, as set out earlier under the “Overall framework for assessing the Objectives and Policies”. The Objectives, policies and rules relating to both groundwater quality and quantity are developed in much more detail under the PNRRP, Chapter 4, "Water Quality". We are aware however, that these provisions are subject to challenge through submissions on the PNRRP, which has some implications for the weight that we can place on them.

4.2 In considering the effects of the CPW scheme, we were also careful to only take into account those effects which could be attributed to CPW, recognising for example, that they would still be effects from schemes such as Synlait, should CPW not proceed.

4.3 Considerable evidence, as described elsewhere in this decision, was brought to bear on the subject of the effects on both groundwater quality and quantity, and will not be repeated here. Issues raised included enhanced groundwater recharge and potential mounding effects "downstream" of the command area, and particularly areas with high water tables near the coast; possible effects on nitrate levels in groundwater wells and in lowland streams and Te Waihora/Lake Ellesmere; and potential effects on the quality and quantity of Christchurch groundwater. Other matters raised, included possible effects on accessing gravel in quarries near Christchurch if groundwater levels rose, and even concerns relating to increased fog effects on Christchurch International Airport.

4.4 Policy WQN 9 in the PNRRP “Prevent long-term decline in groundwater levels” concerns the issue of groundwater quantity, and states as follows:

Control the total amount of groundwater allocated for abstraction so that there is not a significant continuing long-term decline in mean annual groundwater levels and artesian pressures.

4.5 The Canterbury Plains between the Waimakariri and Rakaia Rivers has been classified as an over allocated zone by the Regional Council with restrictions limiting the grant of any further consents for extraction of water from groundwater sources. The Regional Council and others have longstanding concerns that groundwater levels have reduced and are likely to fall further as a result of increased groundwater abstraction. The proponents of the CPW scheme have strongly contended that surface water from irrigation, by-wash discharges and some leakage from the

proposed headrace canal and the water race distribution system, will have the effect of reversing or at least stabilising this trend.

- 4.6** In terms of the groundwater levels, the opinion of all witnesses was that groundwater levels both within much of the command area and downstream towards the coast, would rise as a consequence of irrigation associated with the CPW scheme. The debate focused on the extent to which this would occur. With the modified scheme groundwater recharge and mounding would still occur, although to not such an extent as previously projected, particularly as existing groundwater takes are expected to be augmented rather than supplanted, by irrigation water. This has positive benefits in terms of flows in the smaller waterways entering Te Waihora. The scheme is expected overall to at least arrest the decline in groundwater levels within the "red zone" applying to this part of the Canterbury Plains.
- 4.7** Conversely, some concerns were expressed that the take from the Waimakariri would result in reduced infiltration from the Lower Waimakariri River into the Christchurch - West Melton Groundwater Recharge Area. Related concerns were that The intensification of farming following irrigation might adversely affect the quality of the city's water supply. Based on the weight of evidence received, we concluded that it was unlikely that there would be a significant change in volume of groundwater available to the city given the reduced magnitude of CPW's proposed take, and the apparent lack of sensitivity of the recharge to changes in flow in the river. While increases to the flows of city waterways are expected, these will be attributed to changes in the water table gradient between groundwater flows towards the lake and the city respectively. Groundwater movement under the CPW command area is to the southeast away from the city aquifers.
- 4.8** Overall, we consider that the increase in groundwater levels would on balance be beneficial in reducing the decline in the level of the water table, but we acknowledge that this is a spatially variable effect with some additional drainage improvements needed near the coast and Te Waihora/Lake Ellesmere. It is probable that the scheme will actually promote the achievement of the policy, rather than merely being not contrary to it. Mr Fietje noted that the possibility of raised groundwater levels was not addressed by the objectives and policies in the RPS or the PNRRP.
- 4.9** Objective WQL2 in the PNRRP "Water quality outcomes for groundwater and contaminated land" specifies in some detail the outcomes expected for groundwater **quality** in the Canterbury Region.

In the Coastal Confined Gravel Aquifer System between the Ashley River/Rakahuri and the Rakaia River, the water quality in each aquifer is maintained at least in the state reported in July 2002, and the water is suitable for human consumption without treatment.

(2) In semi-confined, unconfined, and other confined aquifers or parts of these aquifers, where:

(a) the water quality is unaffected or largely unaffected by human activities, as reported in 2004, maintain the water quality in that state.

(b) the water quality is affected by human activities, the groundwater quality shall meet the following values:

(i) for nitrate-nitrogen, the maximum concentration shall not increase by more than two milligrams per litre above the maximum concentration measured between 1996 and 2001, and reported in 2002, and the maximum concentration shall not exceed 11.3 milligrams per litre;

(ii) the water quality shall remain within the Guideline Value for any aesthetic determinand listed in the Drinking Water Standards for New Zealand 200035, except for natural exceedances of the Guideline Value. If the water quality does not meet the Guideline Value, as a result of human activities, the water quality shall be improved so that the Guideline Value is achieved;

(iii) the median concentration of Escherichia coli shall be less than one organism per 100 millilitres of water; and

(iv) any other inorganic or organic determinand of health significance or pesticide (excluding nitrate nitrogen, or Escherichia coli,) listed in the Drinking Water Standards for New Zealand 2000 shall not be detected at a concentration greater than one tenth of the Maximum Acceptable Value for that determined, and.

(c) On land, where the concentration of a contaminant exceeds the naturally occurring background level and this concentration poses an unacceptable risk to human health or the environment, the land is managed in a way that reduces this risk, and the risk from any discharge from the land to groundwater, to a level that is acceptable for human health or the environment.

4.10 Objective WQL4 in the PNRRP: “The quality of Christchurch groundwater (as modified by Variation 6) states as follows:

(1) The quality of Christchurch groundwater is maintained or enhanced in its overall high quality state in the long term

(2) Christchurch groundwater subject to existing localised contamination will be improved to achieve the maintenance and enhancement of its overall high quality state.

4.11 With regard to nitrate loadings, the available evidence suggested that the recorded levels between different sites exhibit significant local variations, and predicting the likely future effects of CPW is difficult. However it can confidently be predicted that any scheme involving irrigation and land intensification will have effects on groundwater quality.

4.12 There is the probability of an increase in nitrate levels in domestic supply wells within and downstream of the command area. There may be additional circumstances where an increase in N-NO₃ concentrations in some shallow groundwater wells above the MAV of 11.3 mg/l is recorded as a result. Overall, it was expected that there would be

an increased volume of leached nitrates but that the concentration of nitrates would not increase significantly.

4.13 There will be some compensatory dilution effect from irrigation water, by-wash and leakage from irrigation canals and races. The proposed Sustainability Protocol and Farm Plans will provide a degree of mitigation. In addition, conditions are proposed whereby a Groundwater Technical Review Panel would be established to monitor effects on groundwater and CPW will be required to undertake mitigation measures where required. By way of an example, this may require that alternative water supplies be made available to properties which subsequently exceed the MAV.

4.14 With these measures in place, we consider that the impacts on groundwater can be managed such that the scheme would not be contrary to Chapter 9, Objective 3 in the RPS. We note that any increase in the number of bores with levels exceeding MAV would be contrary to Objective WQL 2, however this objective is subject to challenge through submissions on the PNRRP. The evidence we heard suggests to us that any irrigation scheme is likely to cause some increase in nitrate levels on bore water.

4.15 The potential adverse implications of increased nitrate concentrations will be greater for the water quality of lowland streams and Te Waihora/Lake Ellesmere, because of the lower levels at which nitrates move aquatic systems towards a eutrophic state. However this effect is phosphate limited, and subject to farm management ensuring that sediment runoff is controlled, the additional effects are likely to be only minor.

4.16 Policy WQL9 in the PNRRP is entitled “Non-point source discharges to land that may affect groundwater quality”.

(1) Minimise the leaching of nutrients, chemical and microbiological contaminants to groundwater by requiring:

(a) the use of best management practices to:

- (i) manage the input of nitrogen so that it matches plant requirements; and*
- (ii) prevent the accumulation of mineral nitrogen or other contaminants in the soil which have a high potential for leaching.*

(b) that the use of water for irrigation:

- i) is in accordance with Policy WQN17; and*
 - (ii) does not result in groundwater quality in any existing drinking water supply well, adjacent to, or down-gradient of the property being irrigated, being affected to the extent that the water in the well is no longer suitable for human consumption; and*
 - (iii) does not result in the maximum concentration of nitrate-nitrogen in any part of an unconfined or semi-confined aquifer at the downgradient boundary of a property:*
-

(2) In areas where groundwater quality has declined because of non-point source discharges and the concentrations of determinands in groundwater do not meet Objective WQL2, implement measures to reduce the concentration of determinands

in groundwater in accordance with the relevant provisions of Policy WQL4(2) and WQL4(3).

(3) Where groundwater enters rivers or lakes, the contaminant concentrations in the groundwater shall not result in the surface water quality being reduced below the values of; Objective WQL1, or any relevant water quality standard set in this plan or by a water conservation order.

- 4.17** Policy WQN 17 in the PNRRP “Reasonable and Efficient Use of Water”, subclause (5) states:

In addition to requiring the measuring and recording of water that is taken in accordance with Policy WQN16, encourage irrigators to monitor their water application rates, soil moisture, and production as a method for achieving more efficient use of irrigation water.

- 4.18** Policy 5.2 of the WRRP also seeks to promote efficiency in the use of water abstracted from the Waimakariri River.

- 4.19** The impacts on water quality resulting from land use intensification, and particularly dairying were a subject of much debate during the hearing. The modified CPW scheme now enables a substantially smaller increase in the dairying component of land intensification within the command area.

- 4.20** Overall, we consider that there is scope for mitigation through the implementation of the Sustainability Protocol by way of farm management plans as proposed by CPW. We observe that there is an absence of any measures to limit nutrient loss from existing farming activities both in the central plains area, and more importantly, the area to the east towards the coast and the lake, a point emphasised by the Environment Court in the *Lynton Dairies* case. We see significant benefits in the introduction of a farm management regime as proposed with the CPW scheme, noting that the Selwyn District Plan, in common with most district plans, simply provides for farming generally as a permitted activity.

- 4.21** Given the cost of delivering water to the farm gate, and the trend to much more efficient irrigation methods evident throughout Canterbury, we are satisfied that water will be applied and used efficiently. Overall, we are satisfied that the CPW scheme is not contrary to Policy WQL 9, Policy 5.2 or Policy WQL 17. (see the discussion of efficiency in Parts 1 and 6 of our decision.)

- 4.22** Objective WQN8 in the PNRRP “Augmentation of water bodies” provides as follows:

Enable the augmentation of water resources provided that:

(a) it is consistent with provisions (a) to (h) of Objective WQN1, Objective WQL1.1 (2) and Objective WQL1.2 (3);

(b) it will not adversely affect existing water permit holders’ reliability of supply and access to water; and

(c) it will result in long-term social, economic and environmental benefits to the regional community.

4.23 Our conclusion is that there will be increased recharge of ground water in zones which the PNRRP regards as over allocated and consequent increase in flows in lowland streams entering Te Waihora/Lake Ellesmere. This will be beneficial overall, and on balance consistent with Objective WQN 8. We note however, that some of these benefits will be qualified by likely higher nitrate loadings in these waterways.

4.24 Chapter 8 Objective SCN2 of the PNRRP: "Arable lands" provides as follows:

On all arable land:

(a) maintain the life-supporting capacity and productivity of the soil to meet the needs of both current and future generations by:

(i) maintaining or enhancing long-term soil quality; and

(ii) progressively reducing the loss of topsoil by wind or water erosion to as close as possible to zero. Over the next 25 years, progress towards this objective will be aimed at reducing the average erosion rate for any area of arable soils to less than 0.25 millimetres per year; and

(b) prevent, as far as practicable, the movement of soil into water bodies.

4.25 We consider that extended irrigation within the command area will be beneficial to soil quality and stability, and enhance the productive characteristics of versatile soils. Accordingly, we consider that the CPW scheme will assist in promoting Objective SCN 2.

4.26 Chapter 11 of the RPS concerns the coastal environment. Effects on the coastal environment did not figure prominently during the hearing, except to the extent that increased flows into Te Waihora may result in an additional lake opening being required each year. The lake is opened artificially on a number of occasions each year, the frequency of which depend on inflows into the lake. We did not consider the potential prospect of an additional lake opening as a result of additional inflows was an adverse effect of such magnitude as to significantly influence our decision on the scheme.

4.27 Our overall conclusion is that the effects of the use of water in the command area on groundwater and downstream surface waterways are not contrary to the objectives and policies of the relevant plans. Our conclusions are based on the likelihood that any adverse effects can be adequately mitigated, as discussed in Part 6 of this decision.

5. TERRESTRIAL AND AQUATIC ECOLOGY

5.1 This section concerns the effects of the designation associated with the headrace canal and distribution races. It includes areas adjacent to rivers, dryland sites, and the existing drainage systems in the command area.

5.2 Chapter 8, Policy 1 of the RPS addresses effects on wetlands:

(a) Adverse effects on the ecological integrity, functioning, natural character, cultural, amenity and recreational values of wetlands (including the effects of drainage, reclamation, clearance of vegetation, burning, grazing, cultivation, dumping, subdivision or building) should be avoided, remedied or mitigated. Where practicable these wetland areas should be enhanced. The particular sensitivity of wetlands to the effects of land use activities should be reflected in the provisions of regional and district plans.

(b) Significant adverse effects on the natural flows and water levels, or the natural quality of water in any wetland, resulting from an adjoining use of land, the discharge of contaminants, or the damming, use, taking or diversion of water, should be avoided, remedied or mitigated.

(c) Encourage restoration or enhancement of lost or degraded wetland areas.

5.3 Chapter 8, Objective 3 of the RPS reinforces this policy by calling for the protection or enhancement of indigenous biodiversity.

5.4 Policy 4 associated with this objective states:

Areas of indigenous vegetation and habitats of indigenous fauna that meet the relevant criteria of sub-chapter 20.4(1) should be protected from adverse effects of the use, development, or protection of natural and physical resources, and their enhancement should be promoted. In particular, indigenous species, communities and habitats that are threatened, unusual in, or characteristic of Canterbury should be identified, and their survival, and the survival of ecosystems on which they depend, safeguarded as far as practicable. The particular sensitivity of these areas of vegetation or habitats to regionally significant adverse effects in terms of sub-chapter 20.4(2) should be reflected in the provisions of district plans in the region.

5.5 Objective 2, in Chapter 9 of the RPS, set out above in the introductory section to the objectives and policies is complementary to the provisions in Chapter 8. The CPW project can be seen as supporting this objective in that it will result in augmentation of lowland stream flows and its attendant benefits. These include restoration of depleted surface waterways, such as the lower Selwyn River and the Irwell River for example. Chapter 9, Objectives 1-3, and Chapter 10, Objective 1 of the RPS also strongly promote the protection of ecological values of rivers and their margins.

5.6 Objective 3 in Chapter 9 seeks to enable present and future generations to gain cultural, social, recreational, economic, health and other benefits from the water quality in Canterbury's water bodies and coastal waters, while:

(b) safeguarding the life - supporting capacity of water, including its associated: aquatic ecosystems, significant habitats of indigenous format and areas of significant indigenous vegetation;
(e) preserving the natural character of lakes and rivers and protecting them from inappropriate use and development.

5.7 It can also be noted that in respect to Te Waihora/Lake Ellesmere that subclauses (c) and(d) emphasise the significance of water quality values of significance to Tangata Whenua as addressed later. The lake is identified in the District Plan as an outstanding natural feature.

5.8 Chapter 10, Objective 1, also calls for the protection of the ecological and natural values of lakes and rivers. Where development in the beds and margins of lakes and rivers is contemplated, “protection and where appropriate enhancement” is sought for:

(a) natural character
(b) significant habitats of indigenous flora and fauna
(c) significant natural features and landscapes
(d)mahinga kai area, wahi tapu, and wahi taonga, and Tangata Whenua access to these
(i) life supporting capacity (health) of aquatic and riparian ecosystems

5.9 Chapter 7 Objective WTL 1 of the PNRRP provides for the management of Canterbury's wetlands, subject to there being no overall reduction in the area of moderate or higher significant wetlands; no overall reduction in significant indigenous flora or fauna; no overall reduction in wetland significance to Ngai Tahu, and that the quality and quantity of wetlands be enhanced, especially where depleted.

5.10 There are a number of complementary objectives and policies under the Selwyn District Plan.

5.11 Objective B1.2.4, and Policies B1.3.5 and B1.3.10 respectively state as follows:

The potential adverse effects from activities on areas of indigenous vegetation, habitats of indigenous fauna, and indigenous biodiversity and functioning are avoided, remedied or mitigated.

Retain vegetation, in particular indigenous vegetation, along the riparian margins of the coast, rivers, lakes and wetlands. Where large quantities of indigenous vegetation are removed, ensure they are replaced with the same or similar species.

Protection or enhancement of wetlands, their ecological integrity and functioning, their cultural amenity and recreational values, and the preservation of their natural character.

5.12 Policy B1.2.2 states as follows:

Avoid irreversible damage to or destruction of significant ecological sites.

5.13 Policy WQN 17(8) of the PNRRP is addressed in passing, because it makes reference to the potential ecological values of the District Council's water race network. The subclause states:

Encourage and, where appropriate, require the progressive upgrade and piping of stock water races where there is an environmental or economic benefit for so doing, but recognise that some stockwater races may provide important habitats for indigenous species and may justify strategic continuance to protect these. (Refer to Policy WQN14(9)(f)).

5.14 We conclude that the framework of objectives and policies at regional and district level are consistent and coherent in terms of protection of terrestrial and aquatic ecology. As we observed earlier, the effects of this geographically broad ranging scheme may well be different for each component of it.

5.15 Construction of the proposed headrace canal system, and to lesser extent the distribution races, will have some adverse impacts on indigenous dry grassland sites, and the headrace will also have some impact on identified wetland areas, such as Westwood, although we are not convinced these sites would be badly damaged or lost, as was feared. A number of witnesses criticised the lack of detail in information provided by CPW, and concluded that consent should be denied for this reason, as well as for likely adverse effects. The evidence was that most sites are already severely modified by farming activities and other land uses, and that all or parts of the identified sites could either be avoided within the width of the designation corridor, or would not fall within the designated corridor. We have imposed a condition requiring a biological offset which could provide for rehabilitation of adjoining wetland sites or indigenous plant communities by measures such as removal of exotic weeds. We consider that with the imposition of appropriate conditions and compensatory wetland restoration and replanting, the effects of this component of the CPW scheme would be not be contrary to the relevant objectives and policies set out above.

5.16 A consistent theme throughout the objectives and policies is that the state of the environment should be at least maintained, and where possible enhanced. In contrast to the effects of the original scheme, we consider this can be achieved in a manner consistent with the framework of relevant objectives and policies. We also note that the environment includes the economic conditions which affect people and communities and CPW will have positive effects in this regard.

6. LANDSCAPE VALUES AND AMENITY

6.1 Chapter 8, Objective 2 of the RPS states:

Protection or enhancement of the natural features and landscapes that contribute to Canterbury's distinctive character and sense of identity, including their associated ecological, cultural, recreational and amenity values.

6.2 Policy 3 following on from this objective, is cross-referenced to Sub - Chapter 20.4, which was set out in the "Overall framework for assessing objectives and Policies" at the beginning of this part of the decision on objectives and policies. Policy 3 states:

Natural features and landscapes that meet the relevant criteria of sub-chapter 20.4(1) should be protected from adverse effects of the use, development, or protection of natural and physical resources, and their enhancement should be promoted. Activities that may have adverse effects include those involving the clearance or modification of areas of indigenous vegetation (particularly tall tussock), earthworks, alteration to landforms, tree planting, or the erection of structures. The particular sensitivity of these natural features and landscapes to regionally significant adverse effects in terms of sub-chapter 20.4(2) should be reflected in the provisions of district plans in the region. Assessments of effects should be made by considering:

- (i) aesthetic values;*
- (ii) expressiveness;*
- (iii) transitory value;*
- (iv) natural science factors.*

6.3 Landscape values and amenity are another example of an issue where the potential visual impacts are different in degree, depending on the sensitivities of particular parts of the command area, which because of its geographical extent, varies significantly in character.

6.4 It was common ground that the braided rivers are an outstanding landscape, although they are not identified as such in the SDP. However, with conditions on the Waimakariri River take, and compliance with the WCO on the Rakaia River, the scheme will not adversely affect the braided character of these rivers. It will affect the escarpments (river terraces) alongside the rivers, the central plains, and the foothills.

6.5 Where both the Rakaia and Waimakariri rivers traverse the upper plains, both rivers are characterised by steep escarpments or 'terrace risers' which the headrace canal has to surmount at grade before crossing the plains. Because of the height of the escarpments, both the length and extent of the earthworks are unavoidably extensive and will detract from these as natural features.

6.6 The escarpments are not identified as outstanding landscapes, and we doubt whether they can even be regarded as being of regional significance with respect to subchapter 20.4 (2), except in the case of the Rakaia River, in the immediate vicinity of its gorge. The works necessary to undertake this part of the scheme would not

promote the natural character of these parts of the river environment, but would not constitute "inappropriate" development.

6.7 Returning to subchapter 20.4(2) we consider that the effects of the headrace and its construction on landscape and amenity on the lower slopes of the Homebush Ridge are likely to be adverse. Although not an outstanding landscape in its own right, regionally significant effects are defined under this subchapter to include the following matters:

- (b) whether any effects are likely to be long-term;*
- (c) whether any short-term effects are likely to be widespread;*
- (d) whether ecological resilience is likely to be affected;*
- (e) whether, and to what extent, there is likely to be an increase or decrease in scientific or educational value to the regional or national community;*
- (h) whether any effects are of widespread concern to Tangata Whenua within the region.*

6.8 In addition, of particular relevance here is subclause (i):

- (i) whether any effect is likely to lead to irreversible changes (other than minor changes)*

6.9 The landscape and amenity effects on the Homebush Ridge are significant given its long-standing historic connections, and clearly recognised amenity values. However it appears that the most significant heritage features will be avoided, and there is some prospect of rehabilitation and restoration of the landscape in the longer term. Notwithstanding this, the scale of works involved here is potentially in conflict with the provisions of Chapter 8, Objective 2 which emphasises the historic and cultural identity of the area rather than its natural values. However we do not consider the effects to be of such a scale or intensity, or of a permanent nature, as to justify us recommending that the designation for entire headrace be declined.

6.10 The potential effects of the intake, associated structures and construction effects, on the "Pinnacles" site at the Lower Waimakariri Gorge are a similar issue. The Pinnacles consist of a somewhat striking series of rock formations, the views of which however, are largely confined to river users approaching from upstream. From the evidence available to us (primarily from Ms. Lucas) it appeared that adverse effects were significant, but may be able to be mitigated to some extent through realignment of the intake position to a point as far upstream as possible within the designation corridor.

6.11 We conclude that overall, that some elements of the project are not consistent with Objective 2 and Policy 3 in Chapter 8 of the RPS. However a gravity-based headrace canal would inevitably have some adverse effects regardless of its alignment and contour. Such infrastructure is anticipated by the planning instruments at both regional

and district level, we do not consider that these constitute adverse effects of such magnitude as to justify rejection in terms of the objectives and policies as a whole.

- 6.12** Policies B1.4.1, B1.4.2, and B1.4.3 in the Selwyn District Plan are of particular relevance to this project, and are set out respectively as follows:

Provide for the mix of physical and natural elements that are often contained in Outstanding Natural Features and Landscapes to continue.

Recognise that landscapes will change over time and allow changes to landscapes provided that they complement the landscape and retain its core values.

Control the effects of clearance of indigenous vegetation in the Outstanding Landscape Areas and encourage the restoration and enhancement of indigenous vegetation generally, and the mitigation of practices which are adversely impacting on indigenous vegetation cover.

- 6.13** The SDP clearly contemplates that there can be some change to the rural landscape over time, and that this landscape is an amalgam of natural features and human modification. However we consider its overall direction to be similar and consistent with the RPS, and our conclusions are the same in terms of these policies. As noted above, there will be other changes to the landscape which in the short term will undoubtedly be negative, particularly in areas where major earthworks will be undertaken. However we consider that in the longer term, this is the kind of 'acceptable change' that the District Plan recognises and provides for under Policies B1.4.1 and B1.4.2, a point emphasised by the regional and District Plan's recognition of the importance of utilities.

7. RECREATION AND ACCESS

- 7.1** As noted earlier, Objectives 1 to 3 of Chapter 9 of the RPS provide for present and future generations to gain "..... social and recreational benefits" from the region's water bodies. Subclause (g) seeks to protect the habitat of trout and salmon. Recreation issues figured prominently during the hearing, particularly in respect to angling, kayaking and jet boating.

- 7.2** Chapter 10, Objective 1 of the RPS contains the following relevant subclauses:

With respect to land use and development within the beds and margins of lakes and rivers, protection, and where appropriate, enhancement of:

- (e) habitat values of braided river beds;*
(f) significant amenity and recreation values;
.....
(h) significant habitats of trout and salmon;

- 7.3** Chapter 10, Policy 1 expands on this as follows:

(a) Areas within the beds of rivers and lakes and their margins containing important conservation values are to be identified. These include:

(i) areas of natural character;

.....

(v) significant amenity and recreation values;

.....

(vii) significant habitats of trout and salmon.

(b) Land use or development should avoid causing significant adverse effects on the conservation values contained in areas identified in Policy 1(a).

(c) Prior to identification of areas under Policy 1(a), land use activities on the beds and margins of lakes and rivers should be undertaken at such times or in such ways that their adverse effects on the following values are avoided or mitigated:

.....

(ii) habitats or the unimpeded passage of indigenous fish;

.....

(v) natural character or significant landscape values;

(vi) spawning habitats or the unimpeded passage of trout and salmon;

(vii) amenity and recreation values;

.....

7.4 Policy 7.1(f) (iii) in the WRRP seeks to avoid works in the bed of rivers that would disturb salmon spawning sites.

7.5 We consider that the primary effects on recreation concern the Rakaia and Waimakariri Rivers. We are satisfied that although there will be some impact on recreational values in the Rakaia River as a consequence of the proposed shared take with ACWT, this level of extraction has been anticipated through the Water Conservation Order, and we do not consider the effects on recreational values will be more than minor.

7.6 Concerns have been expressed particularly by Fish and Game and recreational fishermen that fish passage is not affected through entrapment in the intakes to the headrace canal, and this is to be subject to conditions on the design and size of mesh screens to avoid this outcome. To this extent, we consider that the above two policies will be satisfied.

7.7 Insofar as the Waimakariri River is concerned, we are of the view that the evidence demonstrated that the original flow regime sought by the applicant would have been contrary to Chapter 10, Objective 1 and Policy 1. However, with the maximum take reduced to 24 m³ per second and subject to a flow sharing regime, and seasonal restrictions, effects on recreational values will in our view be reduced to an acceptable level when regard is had to Chapter 10, Objective 1 and Policy 1.

7.8 We recognise that the Waimakariri is a very important river for salmon angling. The evidence indicated that the duration of flows with suitable turbidity conditions may well

increase, but that the salmon angling area available and suitable flow levels may be slightly reduced. We have concluded that any such effects will be minor.

7.9 We concluded that with additional conditions on the proposed take regime as described earlier the proposed take will not be contrary to the objectives and policies in Chapter 10.

7.10 Chapter 10, Objective 4 in the RPS is relevant to public access to recreation opportunities:

Achieve improved and safe public access to and along rivers and lakes and their margins, to enhance recreational opportunities and the ability of Tangata Whenua to exercise kaitiakitanga, where it will not lead to activities which could:

(a) adversely affect values identified in Objective 1;

(b) compromise the stability and performance of flood control and other essential structures;

(c) cause conflicts with activities of land owners or occupiers.

7.11 Chapter 10, Policy 7 supports this objective.

7.12 Policy B1.3.8 in the Selwyn District Plan is also relevant to recreational access:

Ensure any earthworks, flood protection works, structures or trees that must be located in riparian margins, or access by stock to riparian margins:

Allow legal public access along the waterbody where appropriate if such access exists, or is desirable for recreation or Mahinga Kai; and

7.13 The CPW scheme involves substantial earthworks adjacent to both the Waimakariri and Rakaia Rivers. This has the potential to affect general public access, and vehicular access for anglers and others to the river margins. We consider that public access for vehicles to the river margins can be achieved (possibly with restrictions during the construction period) through conditions particularly aimed at enabling at least 4 wheel drive vehicular access across the headrace canal.

7.14 With respect to kayaker safety, and to a lesser extent that of jet boats, we have concluded that this is another matter which can be addressed appropriately through detail design and conditions. In the case of kayaking, we acknowledge that there will still be an additional degree of risk, but as a result of discussions over conditions to be attached to the consent, we have concluded that a satisfactory safety environment for these users can be provided.

7.15 We do not consider that the CPW scheme is contrary to the objectives and policies relating to recreation. We accept that the Waimakariri take regime included in our decision will still result in some minor adverse effects on recreational amenity but we

consider that it represents a reasonable balance between the use of water for irrigation purposes and the importance of the river as a recreational asset.

8. HERITAGE VALUES

8.1 Chapter 8 of the RPS, Objective 4 states as follows:

Protection or enhancement of the historical and cultural heritage sites, buildings, places and areas, including their cultural, recreational and amenity values, that contribute to Canterbury's distinctive character and sense of identity.

8.2 Policy 5 supports this objective, which states that these matters are to be reflected in district plans where the heritage character meets the criteria of subchapter 20.4(1).

8.3 Policy 4 has an emphasis on archaeological values and states:

To promote the protection of any site or activity that yields evidence of koiwi tangata (human bones) or artefacts (taonga) from violation or desecration.

8.4 Policy B3.3.8 of the Selwyn District Plan seeks to:

Discourage the demolition or destruction of heritage sites or buildings listed in Appendix 3, or the removal of heritage trees as listed in Appendix 4, except where necessary to:

- Avoid danger to people or property; or*
- Allow reasonable use of the site; and*
 - There are no appropriate options to retain the site, building, or tree.*

8.5 A considerable amount of the evidence presented throughout the hearing on the topic of heritage focused on the adequacy or otherwise of the assessment undertaken by the applicant. Evidence was presented that in the absence of more detailed knowledge, such as that required for the headrace system at least, consent should be declined.

8.6 There seems little doubt that the amenity values of the Homebush area – at least in the short and medium term - will be adversely affected, notwithstanding that any buildings, archaeological sites, and protected trees may be "avoided" by the route selected and the consequent large-scale earthworks required. This area was described as having heritage landscape values, and its amenity and heritage qualities appear to be greater than those encountered elsewhere on the headrace corridor. We agreed that the Homebush area in particular contributes to the historic identity of Canterbury, but overall concluded that the character of this area was a section 7(c) and 7(f) matter, rather than outstanding in terms of section 6 of the Act.

8.7 If the project were to proceed, it is possible that additional archaeological sites would be found to be affected by the project either through prior detailed site investigations required in particular locations as a condition of consent, or during the course of construction in other areas. There is a strong and consistent theme at both regional and district levels for the protection of sites of significance to Tangata Whenua, but there is a dearth of information about these values throughout much of the district. It is perhaps ironic that proposals like CPW raise awareness, if only by default, of these values. We consider that further investigation of both archaeological sites and heritage items in the Homebush/Selwyn River area (but not the whole headrace/ distribution race network) would be desirable to provide greater certainty. However we did not consider that the project as a whole is contrary to the above objective and policies as the most significant heritage features will not be affected by the route of the headrace. For these reasons, we concluded that while the construction of the headrace would not promote the objectives and policies in Chapter 8 of the RPS and Policy B 3.3.8 of the District Plan, it was not contrary to them.

9. TANGATA WHENUA

9.1 Objective 1 and Policy 5 in Chapter 6 of the RPS provide a framework for matters of importance to Tangata Whenua.

To enable Tangata Whenua to exercise their relationship, their culture and their traditions with their ancestral lands, water, sites, wahi tapu, and other taonga and to take into account the Treaty principles of partnership and active protection of Tangata Whenua in the use of their lands and waters to the fullest extent practicable.

Policy 5

(a) Promote the provision of access for Tangata Whenua to their ancestral lands, water, sites, wahi tapu, and other taonga where appropriate.

(b) Promote where appropriate the protection of wahi tapu, wahi taonga and mahinga kai sites of Tangata Whenua from general access where this is required by Tikanga Maori.

9.2 Chapter 9, Objectives 1, 2 and 3 and Chapter 10, Policy 1 in the RPS, notably subclauses (c) mahinga kai and (d) waahi tapu and waahi taonga complement these matters.

9.3 Objectives 5.1 (c-d) 6.1 (c-d) and 7.1 (c-d) of the WRRP, repeats the wording of Chapter 9, Objectives 1-3.

9.4 Objective WQL 1.1 (Rivers) and 1.2 (Lakes) in the PNRRP seek that water quality be maintained so that it continues provide for Ngai Tahu cultural values including Mahinga Kai.

- 9.5** Policy WQN 4 under the PNRRP identifies 'Mauri' as a factor to be taken into account in setting flow regimes for various 'river types' in the region. The application of these values is not further expanded upon in the "explanation in principal reasons" for the policy.
- 9.6** Objective WQN 1 "Rivers and lakes" enables "present and future generations to access the region's surface and groundwater resources to gain cultural, social, recreational, economic and other benefits, while....." and includes the following two subclauses:
- (c) safeguarding their mauri and existing value for providing mahinga kai for Ngai Tahu;*
(d) protecting waahi tapu and other waahi taonga of value to Ngai Tahu
- 9.7** Ngai Tahu consider that resources have to be considered holistically and not in isolation from each other, and to some extent this approach is reflected in a framework of objectives and policies particularly at the regional level. The approach to the use of natural resources also has a distinct spiritual element to it, which can be contrasted with the more compartmentalised and 'scientific' analysis typically associated with planning assessments. This can make dealing with these issues quite challenging.
- 9.8** The concerns of Ngai Tahu were described during the hearing (D. O'Connell, paragraph 25) as effects related to water abstractions especially from the Waimakariri; effects related to the mixing of waters; effects related to the construction and use of canals; effects related to the use of water on the central plains, and access to resources.
- 9.9** Ngai Tahu place particular importance on the quality of surface waters in the catchment of Te Waihora which is a taonga of fundamental importance to the iwi, and especially as a source of mahinga kai. The lake is subject to the National Water Conservation (Lake Ellesmere) Order 1990, and its bed vested in Te Runanga o Ngai Tahu. Any decrease in water quality could impede the proposed restoration of the lake proposed by Ngai Tahu.
- 9.10** Relying on the evidence of Ms. Jolly on behalf of CPW, Mr. Murray stated in his paragraph 111 "Ngai Tahu were engaged throughout the consultation process, and one outcome was the preparation of a cultural impact assessment". Consultation was described as 'ongoing', but the adequacy of consultation was challenged by Ngai Tahu witnesses during the hearing. The applicant did concede (Murray paragraph 113) that in some locations and instances Ngai Tahu values could be "compromised".

9.11 We conclude that a reduced take regime that meets other plan objectives and policies would not breach the cultural elements of the objectives and policies listed above. We consider that for the Rakaia, the Water Conservation Order prescribes the flow regime that adequately protects those cultural values.

9.12 There is no doubt that the *mauri* of Te Waihora has been degraded by the encroachment of farming activities around its shoreline, by discharges primarily sourced from farming, and consequent effects on its contributory waterways. The CPW scheme, even under the best management regime possible, will have the effect of increasing nitrate discharges into the lake. The proposed scheme cannot be seen as promoting the objectives and policies above, but with appropriate conditions and management is not, in our view contrary to them.

9.13 Policy 14 in Chapter 9 of the RPS addresses the concept of the ‘mixing of waters’, specifically raised by Ngai Tahu. The policy states:

“Where a resource consent is for an activity which involves mixing of water from different water bodies, information on the effects of the activity on the environment should include effects of the mixing on the cultural values of Tangata Whenua”

9.14 Policy WQL 1 (b) in the PNRRP states as follows:

*“water, including water from one catchment being discharged into another part of the same catchment or into another catchment, ensure that:
(i) the mixing of the waters as a result of the discharge avoids significant adverse effects on Ngai Tahu cultural values; and
.....”*

9.15 The CPW scheme would of necessity involve a ‘degree’ of mixing because a continuous body of water would exist between the intakes on the Rakaia and Waimakariri Rivers, however the discharge of waters would be to land and into groundwater from by-wash discharges. The withdrawal of the upper intake, dam and reservoir option has to some extent reduced the potential scope for mixing of waters. Unlike the RDR scheme, the CPW project does not involve water being taken from one river and discharged into another, and the only other direct discharge from one water body to another is by way of emergency by-wash.

9.16 Evidence from Mr Murray on behalf of CPW (his paragraph 201) was that the discharge of by-wash water would be acceptable to Ngai Tahu, although this did not appear to be at all clear at the hearing. The proposal is that the overwhelming majority of the water taken for irrigation will be discharged to land, and even with the by-wash discharges, there would be no direct discharge into another waterway except in

emergency situations. This is a subject where it is difficult for the Hearings Panel to arrive at a conclusion with any certainty, but we have come to the view that there is not a significant policy conflict, as the waters from one river are not directly discharged into another. This matter is a difficult judgment, but we have tentatively concluded that the scheme is not contrary to the two policies above.

9.17 A further important issue for Tangata Whenua is access to resources.

9.18 Chapter 10 of the RPS, Objective 4 states as follows:

Achieve improved and safe public access to and along rivers and lakes and their margins, to enhance recreational opportunities and the ability of Tangata Whenua to exercise kaitiakitanga, where it will not lead to activities which could:

(a) adversely affect values identified in Objective 1;

(b) compromise the stability and performance of flood control and other essential structures;

(c) cause conflicts with activities of land owners or occupiers.

9.19 Chapter 10 Policy 7, supports this objective.

9.20 We consider that conditions can be imposed to ensure that access to resources can be maintained. With this qualification, we do not consider that the CPW scheme is contrary to the objectives and policies on access. This is a different issue to the environment of those resources, notably Te Waihora, as discussed above.

9.21 The Selwyn District Plan contains the two policies relating to sites of significance to Tangata Whenua.

9.22 Policy B3.3.3(a) and Policy B3.3.3(b) state respectively:

Protect sites within areas recognised in the Plan as Silent File areas, from inappropriate disturbance.

Protect areas identified in the Plan as Wāhi Taonga Sites, Wāhi Taonga Management Areas and Mahinga Kai sites, from damage or destruction, whenever practical.

9.23 The District Plan focuses on the protection of archaeological sites and areas, in accordance with the Regional Plan. We expect that at least one site, and potentially others which may arise through further investigation and construction works, will be affected by the scheme. However we do not consider that the scale of likely adverse effects on archaeological sites is such as to create a situation where the scheme is contrary to the two policies above. It is considered that further investigation and recording of any sites discovered in known areas of historic occupation should be undertaken in consultation with Ngai Tahu and NZHPT.

10. EARTHWORKS AND UTILITIES

10.1 The objectives and policies for the provision of utilities are found in Chapter 12 of the RPS, under the heading of "Urban Growth".

10.2 Objective 1 states:

*Enable urban development and the physical expansion of settlements **and the use and provision of network utilities** to occur while avoiding, remedying or mitigating adverse effects on the environment, including in particular effects on:*

(a) uses and values associated with water quality of water bodies.

(b) flow and level regimes of water bodies, including the flow regimes of spring-fed streams.

(c) air quality.

(d) natural character of coastal environments, wetlands, lake and river margins that meet the criteria of sub-chapter 20.4.

(e) natural features and landscapes that meet the criteria of sub-chapter 20.4.

(f) areas of significant indigenous and native vegetation and significant habitats of indigenous or native fauna including native fish, for example, inanga (whitebait), tuna (eel), including those that meet the criteria of subchapter 20.4.

(g) ancestral land, water, sites, wahi tapu, and wahi taonga of value to Tangata Whenua.

(h) amenity values that meet the criteria of sub-chapter 20.4.

(i) heritage values of sites, buildings, places and areas that meet the criteria of sub-chapter 20.4. (j) recreational resources that meet the criteria of subchapter 20.4.

(k) energy use.

(our emphasis)

10.3 In addition to utilities being enabled under the RPS, the establishment and operation of utilities is also specifically recognised under the Selwyn District Plan. The RPS refers to 'network utilities' which can be interpreted to include the supply of water by way of irrigation (Section 166(d) of the RMA) and irrigation infrastructure is defined as a utility under the District Plan.

10.4 Objective B2.2.1, Objective B 2.2.2, and Objective B2.2.10 in the Selwyn District Plan state as follows, respectively:

Utilities are recognised as essential tools for people's economic and social well-being, and to mitigate effects of other activities, on the environment.

The provision of utilities where any adverse effects on the environment and on people's health, safety and wellbeing is managed having regard to the scale, appearance, location and operational requirements of utilities.

Enable the provision of utility networks that serve extensive areas to be located in rural areas commensurate with operational requirements.

10.5 The provision of utilities is clearly subject to an assessment of the environmental effects. Nevertheless, it is abundantly clear that both the regional and District Plans anticipate the provision of utility infrastructure including irrigation canals and

distribution races. The promotion of irrigation infrastructure at regional and district levels is an important matter for us to weigh in the balance, particularly in respect to Section 5 of the Act.

10.6 The next matter to be considered is the physical impact of earthworks.

10.7 Policy SCN 5 of the PNRRP "Earthworks and vegetation clearance activities" is similar in content to objective BLR 1 above. It calls for the adoption of the best practicable method for reducing erosion where earthworks and vegetation clearance is carried out. Priority areas for establishing clear mitigation measures include situations where work is undertaken on land with a slope greater than 25°. This is significant as the headrace proposed to be established on the Waimakariri and Rakaia River escarpments, will be largely constructed on steeper slopes. The scale of the earthworks would be very substantial with large areas of exposed cut and fill.

10.8 Objective BLR 1 in the PNRRP contains a similar range of criteria to those considered earlier under the objectives and policies, notably those for the take and use of water under Chapter 9 of the RPS (objectives 1, 2 and 3), and those on the potential effects relating to in-stream values. This policy (subclauses (a) and (b)) concerns the effects of works in or adjoining rivers and requires that works do not result in other land being flooded, or other infrastructure damaged.

10.9 Policy B1.1.4 and Policy B1.1.5 in the Selwyn District Plan address issues relating to 'unstable land'.

Require earthworks on slopes to be carried out in ways that minimise the likelihood of land slipping or slumping.

Avoid adverse effects on people or their property from locating buildings or infrastructure on unstable land.

10.10 Policy B1.3.4 is similar in content to these two policies.

10.11 We were satisfied that with the imposition of appropriate conditions, and the implementation of management plans characteristic of projects of this nature, issues associated with erosion and sedimentation can be mitigated. We agree with the applicant's observation that there is a compelling incentive for them to ensure their own works do not exacerbate flood potential, erosion, or instability. This is a distinct issue from other adverse effects (for example landscape and amenity values) which may arise from earthworks of the scale proposed in sensitive locations. Our conclusion is that subject to normal prudent engineering practice and management plans for managing erosion and sedimentation, the proposed scheme can be conditioned such

that it would not be contrary to Chapter 12 Objective 1, Objective BLR 1 and Policy SNC 5 in the PNRRP, or policies B1.1.4 and B1.1.5 in the Selwyn District Plan.

10.12 This leads to the effects of the earthworks on landscape values and amenity. The scale of the earthworks proposed are such that there would be adverse effects on amenity and other values at "the Pinnacles", the river escarpments adjacent to both the Rakaia and Waimakariri, and the base of the Homebush Ridge (Objective BLR 1(g)). The river escarpments are not an outstanding landscape, but the earthworks, although not easily visible from major roads, will have a obvious visual impact for some years.

10.13 Chapter 7 of the RPS contains policies related to soils, including soil stability and soil versatility issues.

10.14 Policy 6 states:

(a) Where consideration is being given to the use, development or protection of land comprising versatile soils, in circumstances where such use development or protection is necessary to achieve the purpose of the RM Act, particular regard shall be had, in the circumstances of the case, to any need to protect such land from irreversible effects that may foreclose some future land use options that benefit from being located on such land.

(b) Provided that where a proposed activity will irreversibly affect land comprising versatile soils and there is a choice in the locality between such activity occurring on that land or on less versatile land, the preference shall be to protect versatile land from such activity, unless the proposed activity would better achieve the purpose of the RM Act.

10.15 The policy itself is somewhat ambiguous and circular in its logic. Nevertheless, in order to construct and operate the headrace canal and distribution network across the plains, a substantial area of versatile soils will be permanently lost from production. In most circumstances - for example if it were taken for urban expansion, this would be a substantial loss of versatile soils. In this case the benefits from additional productivity on land to be irrigated will substantially exceed that from land which will be permanently lost from production. However it has to be considered in the balance as one of a number of factors which reduce the overall gross benefit of the proposal. It also can be observed that any major irrigation scheme from any other source on the central plains, or which used on farm storage, could result in the loss of as much - or even more, of the versatile soil resource. Mr. Boyes on behalf of the Selwyn district Council (his paragraph 254) did not consider the loss of soils was significant in policy terms.

10.16 While the loss of versatile soils could be significant for some individual properties, we agree with his conclusions and do not consider the proposal to be contrary to Policy 6. It is also readily apparent to us that irrigation of would on balance reduce the potential for windblown soil erosion and would assist in the implementation of policies in the RPS on soil erosion and enhancing the life supporting capacity of soils.

10.17 Issues relating to the effect on particular properties are discussed elsewhere in this decision under the section on the effects of the intakes and headrace canals.

11. DUST, ODOUR, NOISE AND VIBRATION

11.1 Objective 1 in Chapter 13 of the RPS seeks to maintain or improve ambient air quality, including the reduction of nuisance effects. Policy 5 states:

(a) Activities which require resource consents to discharge contaminants into air should be encouraged to locate away from residential dwellings, educational facilities, hospitals, shops and other similar public buildings unless adverse effects can be avoided or mitigated.

(b) Avoid encroachment of new development on existing activities discharging to air, unless the adverse effects can be avoided or mitigated.

11.2 Chapter 3 of the PNRRP concerns discharges to air.

11.3 Policy AQL 6 “Avoid dust nuisance” states as follows:

(a) Any dust discharge shall not cause corrosion, be noxious or dangerous, or cause objectionable or offensive dispersal or deposition of particles beyond the boundary of the site where the discharge originates.

(b) Avoid the encroachment of sensitive activities on existing activities discharging dust into air, unless adverse effects of the discharge can be avoided or mitigated by the encroaching activity.

For the purposes of this policy existing activities are those activities which are lawfully established on or before 1 June 2002.

11.4 Policy B3.4.14 under the Selwyn District Plan reads as follows:

Mitigate nuisance effects on adjoining dwellings caused by dust from earthworks, or stockpiled material.

11.5 There can be little doubt that during the construction period there will be some potential for dust nuisance, particularly in the vicinity of Coalgate where there is a concentration of major earthworks associated with an elevated headrace canal east and south of the township -albeit in relative terms, quite minor compared to the likely impacts of the original dam proposal. From our understanding of the evidence, construction effects would be confined to any particular location for perhaps 3-6 months during the staged construction of the headrace, and correspondingly less for the smaller scale distribution canals. Nevertheless there will be significant adverse

effects on a temporary basis for those whose homes or businesses are in close proximity to the proposed canal or race networks - the Homebush area and the de Jong business immediately spring to mind in this respect.

11.6 It is considered that a dust management plan, and the cessation of works close to dwellings during periods of high wind, should be sufficient to mitigate all but short-term effects, which are an inevitable if temporary effect associated with construction of any substantial irrigation project. It is proposed that stockpiled material will be located distant from any dwellings. Again, we are of the view that the scheme will not be contrary to the objectives and policies on dust nuisance, in either the regional or district planning instruments. Potential dust nuisance following construction and grassing of berms of the canal and water race system, is expected to be negligible. Again, bearing in mind that irrigation infrastructure is anticipated by the District Plan in the rural area, and construction activity generally, we do not see the inevitable effects of implementing irrigation scheme is inherently contrary to the objectives and policies of the District Plan.

11.7 With the exception of objectives and policies dealing with amenity at a very broad level, control of noise and vibration is managed at the district level. Some district plans make specific provision for construction noise to be subject to New Zealand Standard 6803:1999, rather than 'typical' noise controls dealing with permanent site related activities. This is not the case with the Selwyn District Plan.

11.8 Policy B3.4.11 and Policy B3.4.13 in the Selwyn District Plan address noise and vibration respectively.

Recognise temporary noise associated with short-term, seasonal activities as part of the rural environment, but ensure continuous or regular noise is at a level which does not disturb people indoors on adjoining properties.

Avoid, remedy or mitigate adverse effects caused by excessive or prolonged vibration.

11.9 We consider that noise would only be an issue during the construction period, and that noise from pumping stations or drop structures can be adequately managed through conditions. A noise management plan would adequately address noise issues associated with all construction aspects of the scheme, and controlled by requiring compliance with NZS 6803:1999, including consequential restrictions on hours of operation near affected dwellings.

11.10 We consider that with conditions, any effects of noise and vibration associated with the construction and subsequent operation of the scheme will not be contrary to the two above policies.

12. TRANSPORT AND ENERGY

12.1 Objective 1 in Chapter 15 of the RPS seeks to enable the provision of a safe, efficient and cost-effective transport system.

12.2 Policy 1 supports this objective, in terms of focusing on the effects of new activities on the transport network.

Protect Canterbury's existing transport infrastructure and land transport corridors necessary for future strategic transport requirements by avoiding, remedying, or mitigating the adverse effects of the use, development or protection of land and associated natural and physical resources on the transport infrastructure.

12.3 Objective 1 in Chapter 14 of the RPS contains the following overall objective:

Reduce Canterbury's dependence on non-sustainable energy sources.

12.4 Objective B2 .1 .1 in the Selwyn District Plan contains the following relevant transport objective:

The safe and efficient operation of roads, railway lines and airfields is not compromised by effects of new land uses.

12.5 The matters raised during the hearing under the broad heading of transport included the effects of construction vehicles on the roading network, the construction of numerous bridges and culverts across canals and distribution races, the provision of new access points into properties, and energy efficiency. Long-term effects associated with consequent changes of land use following irrigation were also raised.

12.6 The objective and policy framework in the Regional and District Plans anticipate further intensification of farming activity, and there can be little doubt that as a consequence of irrigation that there will be greater traffic volumes generated as a result of increased farm production. We do not consider that the effects of short-term construction vehicle movements, and those expected in the longer-term as a result of land use change, will have more than a minor affect on the state highway and District Council roading network, as there is substantial capacity available. There will undoubtedly be some disruption to traffic while canals/races are built alongside roads and necessary bridges constructed. However these effects will only be temporary in

nature, and can be satisfactorily resolved through a traffic management plan in consultation with the District Council and the New Zealand Transport Agency.

12.7 We acknowledge concerns raised through Mr. Williams evidence about energy efficiency associated with transport, but consider that it would be inappropriate to conclude there would be a policy conflict, given that this matter would be logically tackled at the national level through measures such as taxation and vehicle testing standards.

12.8 Our overall conclusions are that the CPW scheme would not be contrary to the relevant objectives and policies on transport in either the RPS or the SDP.

13. PUBLIC SAFETY AND HAZARDS

13.1 Objective 1 and Policy 1 in Chapter 7 of the RPS concern issues of soil erosion. The construction of the headrace and distribution race system will involve (cumulatively) very extensive earthworks, although these are distributed over a very wide area. The relevant objective and policy framework in respect to hazards focuses on the establishment of infrastructure and the risk to public safety or of sites that may be subject to natural hazards, rather than hazards that may be created (or perceived) to be created as a result of the establishment of the headrace canal and distribution races.

13.2 Objective 1 in Chapter 16 of the RPS states as follows:

Avoid or mitigate the actual or potential costs of loss or damage to life, property, or other parts of the environment from natural hazards.

13.3 Objective B3.1.1 in the Selwyn District Plan states as follows:

Activities do not cause or exacerbate natural hazards.

13.4 Policies B3.1.6 and B3.1.7 state as follows

Avoid multi-storey buildings and critical facilities in the Malvern Hills or High Country

Ensure the risk of damage from avalanche, earthquakes or slips is minor when locating buildings, other structures or recreational facilities at high altitudes or on steep slopes.

13.5 An issue raised in submissions with respect to kayaking activities, and to a much lesser extent public access to artificial waterways, was safety for members of the public. With respect to these matters, we are satisfied that kayaker safety can be

satisfactorily addressed through conditions specific to the intake sites on each river. We do not consider the scheme is contrary to the relevant objectives and policies.

13.6 Objective 4 and Policy 7 in the RPS concern access to and along rivers. The relevant provision of the latter states as follows:

"Maintain and enhance public access to and along rivers and lakes and their margins for the enjoyment of their recreation and amenity values and for Tangata Whenua to exercise kaitiakitanga, except where restrictions are necessary to:
(a) safeguard the conservation values identified in Policy 1;
(b) protect the stability or performance of flood control and other essential structures;
(c) avoid conflicts with activities of land owners or occupiers;
(d) protect public safety".

13.7 There will be an artificial network of waterways of nearly 500 km in length associated with the headrace and distribution canals. Matters raised during the hearing also included the physical stability of the headrace canal structures particularly where the canal was elevated, such as in the vicinity of Coalgate where CPW seek to avoid a 'contour route' through the township.

13.8 The objective and policy framework in the RPS and the District Plan focus on both the extent to which works may exacerbate or create hazards, and secondly the risk to public safety during and following construction activities.

13.9 It would clearly be of concern if the establishment and operation of the scheme had the effect of restricting access or compromising the safety of those who wish to enjoy the river corridors for their recreational and amenity values. It is expected however that for reasons of public safety, access would need to be restricted at times during the construction period. We did not consider that any of these restrictions would, at least in the long term, be contrary to the objective and policy. It is also readily apparent that the implementation of the scheme would create hundreds of kilometres of additional artificial waterways ranging from the large headrace to smaller distribution races. The existence of these features would undeniably create a potential water hazard, primarily for children. However they are a feature characteristic of, and expected within a rural environment with Ashburton District being an example.

13.10 We are satisfied that construction activities can be managed such that they do not create an undue hazard to the public, and that any restrictions on access during this time would be temporary. We also satisfied that there is little likelihood that the activities proposed would exacerbate natural hazards, and indeed there is a very strong incentive for the applicant to avoid such an outcome. Finally, while we accept that the existence of an extensive waterway system could be argued to create a potential water hazard, such features are anticipated by the relevant plans and are not

an unexpected feature of a rural environment. We conclude that the scheme is not contrary to objectives and policies in the RPS or the SDP relating to hazards and public safety.

14. SOCIAL AND ECONOMIC IMPACTS

14.1 The RPS, and to an even greater extent the PNRRP focus on managing the **adverse** effects of activities on natural resources, particularly water, air and soil. The SDP focuses on managing **adverse** effects on natural and physical resources and on the operation of infrastructure. Both plans appear to reflect the 'permissive' character of the RMA and do not directly seek to promote particular land uses, or indeed activities that may result in higher levels of production from rural land, as might be expected as a result of irrigation.

14.2 Chapter 12 Objective 2 of the RPS seeks to achieve patterns of settlement that do not adversely affect the efficient operation, use and development of (among other infrastructure) network utilities.

14.3 Objective B3.4.2 in the SDP states:

"A variety of activities are provided for in the rural area, while maintaining rural character and avoiding reverse sensitivity effects".

14.4 In recognising that the rural zone policies and rules are not as stringent as those in living zones, the plan recognises the rural zone as an area where a variety of activities can take place and that it has a primary emphasis on business activities (farming and other activity) which are expected to diversify in the future.

14.5 In effect, any positive economic and social outcomes that might be expected from the irrigation of the central plains are largely reliant on section 5(2) of the Act in terms of enabling the people of the district to provide for their social and economic welfare. In terms of objectives and policies in the applicable Regional and District Plans, the scheme in itself is not contrary to the few objectives and policies of specific relevance.

15. OVERALL CONCLUSIONS ON OBJECTIVES AND POLICIES

15.1 There are a plethora of objectives and policies in a number of plans which have greater or lesser significance to the scheme or various components of it.

15.2 There is no doubt that there will be components of the modified scheme that to a varying degree, are contrary to some objectives and policies. It cannot be credibly

argued that the effect of the scheme is such that there will be no adverse effects on river recreation amenities, components of the central plains landscape, or on nitrate concentrations. In weighing up the objectives and policies however we have to take into account that the proposed scheme **holistically** and measure it against the objectives and policies as a whole, having regard to the nature and intensity of any adverse effects, the effectiveness of mitigation measures, and the ability of conditions to address such effects.

15.3 Finally we note, that whilst we have had regard to the relevant objectives and policies; our primary focus has been consistency with the purpose and principles of the RMA. We have concluded that the revised scheme is sustainable and in accord with the principles of the Act.

15.4 As stated at the beginning of this assessment, Objectives 1 - 3 in Chapter 9 of the RPS (and Objective 1 in Chapter 10) provide an overarching basis for considering the effects of virtually all the main aspects of the scheme and the potential effects that it generates. On this basis, we have concluded that on balance the modified scheme is not contrary to the objectives and policies as a whole, and particularly when regard to that the fact that irrigation infrastructure is anticipated under all planning instruments we were required to consider.


Independent Commissioners 28 May 2010



Philip Milne (chair)



Bob Nixon



Andrew Fenemor



Ray O'Callaghan

**JOINT DECISION AND RECOMMENDATION OF
INDEPENDENT COMMISSIONERS
28 MAY 2010**

PART 9

Regional Council consents and conditions

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Land Use Consents

CRC061814 To excavate and deposit material over an unconfined aquifer

To excavate land to a depth exceeding five metres, or deeper than the highest groundwater level at the site, and to deposit material into excavated land for the purposes of constructing an Inlet Canal, Headrace Canal and Water Distribution Network, along and adjacent to the route identified in Schedules A.1 and A.2. A consent with a duration of 15 years is sought.

Proposed conditions:

1. The works shall be limited to:
 - (a) The excavation of land exceeding five metres deep, and/or deeper than the highest groundwater level at that site; and
 - (b) The deposition of material into excavated landfor the purposes of constructing an Inlet Canal, Headrace Canal and Water Distribution Network
2. The works shall be undertaken in accordance with the conditions listed in Schedule 1: General Conditions, and Schedule 2: Administrative Conditions, attached to this consent.
3. Works shall be confined to the areas shown on the attached plans Central Plains Water Enhancement Scheme – Designation Maps 2 – 10, Distribution Network Maps 2 - 25.
4. The depth of excavation shall not exceed the maximum depth required to construct the Inlet Canal, Headrace Canal and Water Distribution Network. The depth required for the construction of the canals and network shall be specified in the Environmental Construction Management Plan (ECMP) as required in Schedule 1: General Conditions.
5. The material deposited shall comprise only:
 - (a) inert materials, being rock, stones, gravel, sand, silt, clay or soil, provided these are uncontaminated with any hazardous substance; or
 - (b) concrete or cured asphalt.
6. In the event that cured asphalt is deposited, it shall be placed in the land at least one metre above the highest groundwater level expected at the site.
7. The volume of vegetative material in any ten cubic metres of material deposited shall not exceed five percent.
8. Excavation and deposition of material shall not occur in standing water.
9. The consent holder shall prevent sediment and contaminants from flowing into groundwater
10. The consent holder shall prepare an Erosion and Sediment Control Plan (ESCP), and shall submit the ESCP to Canterbury Regional Council, Attention: RMA

Compliance and Enforcement Manager at least ten working days prior to the commencement of the works.

11. The ESCP shall include, but not be limited to:
 - (a) a map showing the location of all works;
 - (b) detailed plans showing the location of sediment control measures, onsite catchment boundaries, and sources of runoff;
 - (c) measures that shall be undertaken to minimise soil disturbance and prevent soil erosion;
 - (d) measures that shall be undertaken to prevent sediment and contaminants from flowing into groundwater;
 - (e) drawings and specifications of designated sediment control measures;
 - (f) a programme of works, which includes but is not limited to, a proposed timeframe for the works; and
 - (g) inspection and maintenance of the sediment control measures.
12. Erosion and sediment control measures shall be designed, constructed and maintained in accordance with the Canterbury Regional Council Erosion and Sediment Control Guidelines (2007).
13. Erosion and sediment control measures, as specified in the ESCP, shall be installed prior to the commencement of works.
14. Hazardous substances
 - (a) Prior to the first exercise of this consent, the consent holder shall develop a Hazardous Substances Management Plan.
 - (i) The plan shall include a spill response plan, and shall be communicated to all persons undertaking activities authorised by this consent.
 - (ii) A copy of the plan shall be kept on site at all times.
 - (b) The consent holder shall take all practicable measures to avoid spills of fuel or any other contaminant within the site, including the prevention of oil and fuel leaks from vehicles and machinery.
 - (c) There shall be no storage of fuel or refuelling of vehicles and machinery within 20 metres of excavated land.
 - (d) Fuel shall be stored securely or removed from site overnight.
 - (e) A spill kit, that is capable of absorbing the quantity of oil and petroleum products that may be spilled on site at any one time, shall be kept on site at all times.
 - (f) A written spill response plan shall be developed and communicated to all persons undertaking activities authorised by this consent and a copy kept on site at all times.
 - (g) In the event of a spill of fuel or any other contaminant, the consent holder shall clean up the spill as soon as practicable in accordance with the spill response plan detailed in Condition (14)(f) and take measures to prevent a recurrence.

- (h) The consent holder shall inform the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager within 24 hours of a spill event and shall provide the following information:
 - (i) date, time, location and estimated volume of the spill;
 - (ii) cause of the spill;
 - (iii) type of contaminant(s) spilled;
 - (iv) clean up procedures undertaken;
 - (v) details of the steps taken to control and remediate the effects of the spill on the receiving environment;
 - (vi) an assessment of any potential effects of the spill; and
 - (vii) measures to be undertaken to prevent a recurrence.

15. All spoil and excavated material from the works shall be removed from site on completion of works or used in development of the site.

16. Stock shall be excluded from all excavated areas.

CRC102325 Disturb, excavate, deposit material, remove and plant vegetation in riparian margins: construct supply infrastructure

This application is an amalgamation of applications CRC061820, CRC061822, CRC061843, CRC073034 and CRC073035 and is for construction works. Duration 15 years.

1. The works may only occur in the riparian margins of the surface waterbodies listed in Schedules B.1 and B.2 and at the locations listed in Schedules C.1 to C.4.
2. This consent shall be subject to the conditions listed in Schedule 1: General Conditions, and Schedule 2: Administrative Conditions.
3. Works shall be limited to:
 - (a) removal of vegetation within 7.5 metres of the watercourses;
 - (b) excavation of land within 7.5 metres of the watercourses;
 - (c) deposition of material within 7.5 metres of the watercourses;
 - (d) installation of structures and associated activities related to the Headrace, Inlet Canal and Water Distribution Network.
 - (e) stabilisation and revegetation of disturbed areas
4.
 - (a) At least 20 working days prior to the installation of any structures, the consent holder shall submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, final design plans for all structures to be installed.
 - (b) Final design plans shall be peer-reviewed by a chartered professional engineer on the New Zealand register to certify that the proposed structures comply with the conditions contained in Schedule 1: General Conditions. This peer-review shall not be undertaken by the person responsible for the design plans.

5. The structures shall be constructed in accordance with the peer-reviewed and certified final design plans.
6. A certificate signed by a chartered professional engineer on the New Zealand register, certifying that the structures have been constructed in accordance with the final design plans, shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within 20 working days of completion of the construction of each structure.
7. The consent holder shall prepare an Erosion and Sediment Control Plan (ESCP), and shall submit the ESCP to Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager at least ten working days prior to the commencement of the works.
8. The ESCP shall include, but not be limited to:
 - (a) a map showing the location of all works;
 - (b) detailed plans showing the location of sediment control measures, onsite catchment boundaries, and sources of runoff;
 - (c) measures that shall be undertaken to minimise soil disturbance and prevent soil erosion;
 - (d) measures that shall be undertaken to prevent sediment and contaminants from flowing into the watercourses;
 - (e) drawings and specifications of designated sediment control measures;
 - (f) a programme of works, which includes but is not limited to, a proposed timeframe for the works; and
 - (g) inspection and maintenance of the sediment control measures.
9. Erosion and sediment control measures shall be designed, constructed and maintained in accordance with the Canterbury Regional Council Erosion and Sediment Control Guidelines (2007).
10. Erosion and sediment control measures as specified by the ESCP shall be installed prior to the commencement of works..
11. Works shall not cause erosion of the banks and bed of drains and waterways.
12. Hazardous substances
 - (a) Prior to the first exercise of this consent, the consent holder shall develop a Hazardous Substances Management Plan.
 - (i) The plan shall include a spill response plan, and shall be communicated to all persons undertaking activities authorised by this consent.
 - (ii) A copy of the plan shall be kept on site at all times.
 - (b) The consent holder shall take all practicable measures to avoid spills of fuel or any other contaminant within the site, including the prevention of oil and fuel leaks from vehicles and machinery.
 - (c) There shall be no storage of fuel or refuelling of vehicles and machinery within 20 metres of the watercourse.
 - (d) Fuel shall be stored securely or removed from site overnight.

- (e) A spill kit, that is capable of absorbing the quantity of oil and petroleum products that may be spilled on site at any one time, shall be kept on site at all times.
 - (f) A written spill response plan shall be developed and communicated to all persons undertaking activities authorised by this consent and a copy kept on site at all times.
 - (g) In the event of a spill of fuel or any other contaminant, the consent holder shall clean up the spill as soon as practicable in accordance with the spill response plan detailed in Condition (12)(f) and take measures to prevent a recurrence.
 - (h) The consent holder shall inform the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager within 24 hours of a spill event and shall provide the following information:
 - (i) date, time, location and estimated volume of the spill;
 - (ii) cause of the spill;
 - (iii) type of contaminant(s) spilled;
 - (iv) clean up procedures undertaken;
 - (v) details of the steps taken to control and remediate the effects of the spill on the receiving environment;
 - (vi) an assessment of any potential effects of the spill; and
 - (vii) measures to be undertaken to prevent a recurrence.
13. All spoil and excavated material from the works shall be removed from site on completion of works or used in development of the site.

CRC102326 Disturb, excavate, deposit material, remove and plant vegetation in riparian margins: operate and maintain supply works

This application is an amalgamation of applications CRC061820, CRC061822, CRC061843, CRC073034 and CRC073035 and is for operation and maintenance phase works. Duration 35 years.

1. The works may only occur in the riparian margins of the surface waterbodies listed in Schedules B.1 and B.2 and at the locations listed in Schedules C.1 to C.4.
2. This consent shall be subject to the conditions listed in Schedule 1: General Conditions, and Schedule 2: Administrative Conditions.
3. Works shall be limited to:
 - (a) removal of vegetation within 7.5 metres of the watercourses;
 - (b) excavation of land within 7.5 metres of the watercourses;
 - (c) deposition of material within 7.5 metres of the watercourses;
 - (d) installation of replacement structures and operational or maintenance activities related to the Headrace, Inlet Canal and Water Distribution Network.
 - (e) stabilisation and revegetation of disturbed areas.

4. At least 20 working days prior to the installation of any replacement structures, the consent holder shall submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, final design plans for all replacement structures to be installed.
5. Final detailed design plans of replacement structures shall be peer-reviewed by a chartered professional engineer on the New Zealand register to certify that the proposed structures comply with the conditions contained in Schedule 1: General Conditions. This peer-review shall not be undertaken by the person responsible for the design plans.
6. The structures shall be constructed in accordance with the peer-reviewed and certified final design plans.
7. A certificate signed by a chartered professional engineer on the New Zealand register certifying that the replacement structures have been constructed in accordance with the certified final design plans, shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within one month of completion of construction of each structure.
8. The consent holder shall prepare an Erosion and Sediment Control Plan (ESCP), and shall submit the ESCP to Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager at least ten working days prior to the commencement of the works.
9. The ESCP shall include, but not be limited to:
 - (a) a map showing the location of all works;
 - (b) detailed plans showing the location of sediment control measures, onsite catchment boundaries, and sources of runoff;
 - (c) measures that shall be undertaken to minimise soil disturbance and prevent soil erosion;
 - (d) measures that shall be undertaken to prevent sediment and contaminants from flowing into the watercourses;
 - (e) drawings and specifications of designated sediment control measures;
 - (f) a programme of works, which includes but is not limited to, a proposed timeframe for the works; and
 - (g) inspection and maintenance of the sediment control measures.
10. Erosion and sediment control measures shall be designed, constructed and maintained in accordance with the Canterbury Regional Council Erosion and Sediment Control Guidelines (2007).
11. Erosion and sediment control measures as specified in the ESCP shall be installed prior to the commencement of works.
12. Works shall not cause erosion of the banks and bed of drains and waterways.
13. Hazardous substances
 - (a) Prior to the first exercise of this consent, the consent holder shall develop a Hazardous Substances Management Plan.

- (i) The plan shall include a spill response plan, and shall be communicated to all persons undertaking activities authorised by this consent.
 - (ii) A copy of the plan shall be kept on site at all times.
 - (b) The consent holder shall take all practicable measures to avoid spills of fuel or any other contaminant within the site, including the prevention of oil and fuel leaks from vehicles and machinery.
 - (c) There shall be no storage of fuel or refuelling of vehicles and machinery within 20 metres of the watercourse.
 - (d) Fuel shall be stored securely or removed from site overnight.
 - (e) A spill kit, that is capable of absorbing the quantity of oil and petroleum products that may be spilled on site at any one time, shall be kept on site at all times.
 - (f) A written spill response plan shall be developed and communicated to all persons undertaking activities authorised by this consent and a copy kept on site at all times.
 - (g) In the event of a spill of fuel or any other contaminant, the consent holder shall clean up the spill as soon as practicable in accordance with the spill response plan detailed in Condition (13)(f) and take measures to prevent a recurrence.
 - (h) The consent holder shall inform the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager within 24 hours of a spill event and shall provide the following information:
 - (i) date, time, location and estimated volume of the spill;
 - (ii) cause of the spill;
 - (iii) type of contaminant(s) spilled;
 - (iv) clean up procedures undertaken;
 - (v) details of the steps taken to control and remediate the effects of the spill on the receiving environment;
 - (vi) an assessment of any potential effects of the spill; and
 - (vii) measures to be undertaken to prevent a recurrence.
14. All spoil and excavated material from the works shall be removed from site on completion of works or used in development of the site.

CRC102328 To disturb and excavate the bed of a river to place structures

This application is an amalgamation of applications CRC061846 and CRC061847 and is for construction phase works. Duration 15 years.

To erect structures associated with the Inlet Canal, Headrace Canal, and Water Distribution Network, including siphons, pipes, and erosion protection structures, and associated bed excavation and disturbance, in, on, under, or over the beds of the surface waterbodies listed in Schedules B.1, B.2., C.1, C.2, C.3 and C.4

Proposed Conditions:

1. The works carried out in accordance with condition (2) shall be located at the surface waterbodies listed in Schedules B.1, B.2, C.1, C.2, C.3 and C.4 attached to this consent.
2. The works shall be limited to those necessary for the construction of the Inlet Canal, Headrace Canal and Water Distribution Network Structures, including:
 - (a) installation of erosion and sediment control measures;
 - (b) removal of vegetation;
 - (c) excavation of the bed and riparian margins;
 - (d) installation of siphons, culverts, pipes and erosion protection structures; and
 - (e) stabilisation and revegetation of disturbed areas.
3. This consent is subject to the conditions listed in Schedule 1: General Conditions, and Schedule 2: Administrative Conditions.
4. At least 20 working days prior to the installation of any structures, the consent holder shall submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, final design plans for all structures to be installed.
5. Final detailed design plans shall be peer-reviewed by a chartered professional engineer on the New Zealand register to certify that the proposed structures will comply with the conditions contained in Schedule 1. This peer-review shall not be undertaken by the person responsible for the design plans.
6. The structures shall be constructed in accordance with the peer-reviewed and final design plans.
7. A certificate signed by a chartered professional engineer on the New Zealand register certifying that the structures have been constructed in accordance with the certified final design plans, shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within 20 working days of completion of the construction of each structure.
8. In the event that vehicles or machinery enter water, the consent holder shall undertake all practicable measures to minimise disturbance of the bed.
9. The consent holder shall prepare an Erosion and Sediment Control Plan (ESCP), and shall submit the ESCP to Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager at least ten working days prior to the commencement of the works.
10. The ESCP shall include, but not be limited to:
 - (a) a map showing the location of all works;
 - (b) detailed plans showing the location of sediment control measures, onsite catchment boundaries, and sources of runoff;
 - (c) measures that shall be undertaken to minimise soil disturbance and prevent soil erosion;
 - (d) measures that shall be undertaken to prevent sediment and contaminants from flowing into the surface waterbodies;
 - (e) drawings and specifications of designated sediment control measures;

- (f) a programme of works, which includes but is not limited to, a proposed timeframe for the works; and
 - (g) inspection and maintenance of the sediment control measures.
11. Erosion and sediment control measures shall be designed, constructed and maintained in accordance with the Canterbury Regional Council Erosion and Sediment Control Guidelines (2007).
 12. Erosion and sediment control measures as specified in the ESCP shall be installed prior to the commencement of works.
 13.
 - (a) The consent holder shall take all practicable measures to ensure that the works do not cause erosion of the banks and bed of the watercourses, or deflect floodwaters into the berm.
 - (b) In the event of any erosion occurring to the bed or banks of the river as a result of the works or structure, the consent holder shall be responsible for rectifying the situation as soon as practicable.
 14. There shall be no storage or refuelling of vehicles and machinery within 20 metres of the bed of the river.
 15. Apart from structures constructed under this consent, work sites shall as far as practicable be left in a state consistent with the surrounding natural river bed on the completion of works.
 16.
 - (a) All structures shall be maintained in good working order.
 - (b) The structures shall be repaired if damaged, if the structure is damaged beyond repair, then the existing structure shall be removed and may be replaced.
 - (c) Any debris blocking pipes or culverts shall be removed from the watercourse.
 - (d) In the event of any damage to structures, the consent holder shall maintain the flood carrying capacity of the watercourse, and take all practicable measures to minimise erosion.

CRC102329 To disturb and excavate the bed of a river to operate, repair and maintain structures

This application is an amalgamation of applications CRC061846 and CRC061847 and is for operation and maintenance phase works. Duration 35 years.

To maintain, repair and/or replace discharge structures and erosion protection structures and to carry out associated excavation and disturbance, in, on, under, and over the bed of the surface waterbodies listed in Schedules B.1, B.2, C.1, C.2, C.3 and C.4. The structures and works will be associated with the operation and maintenance of the inlet Canal, Headrace Canal, and Water Distribution Race Network. A consent with a duration of 35 years is sought.

Proposed conditions:

1. The works carried out in accordance with condition (2) shall be located at the surface waterbodies listed in Schedules B.1, B.2, C.1, C.2, C.3 and C.4 attached to this consent, and shown on the attached Plans CRC102329.
2. The works shall be limited to those necessary for the operation and maintenance of the Inlet Canal, Headrace Canal and Water Distribution Network Structures, including:
 - (a) installation of erosion and sediment control measures;
 - (b) removal of vegetation;
 - (c) excavation of the bed and riparian margins;
 - (d) maintenance of siphons, culverts, pipes and erosions protection structures;
 - (e) stabilisation and revegetation of disturbed areas.
3. This consent is subject to the conditions listed in Schedule 1: General Conditions, and Schedule 2: Administrative Conditions.
4. At least 20 working days prior to the installation of any structures, the consent holder shall submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, final design plans for all structures to be installed.
5. Final detailed design plans shall be peer-reviewed by a chartered professional engineer on the New Zealand register to certify that the proposed structures will comply with the conditions contained in Schedule 1. This peer-review shall not be undertaken by the person responsible for the design plans.
6. The structures shall be constructed in accordance with the peer-reviewed and certified final design plans.
7. A certificate signed by a chartered professional engineer on the New Zealand register certifying that the structures have been constructed in accordance with the certified final design plans, shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within 20 working days of completion of the construction of each structure.
8. The consent holder shall provide a bond in favour of the Canterbury Regional Council to secure performance of this consent as outlined in Schedule 3 attached.
9. In the event that vehicles or machinery enter water, the consent holder shall undertake all practicable measures to minimise disturbance of the bed.
10. The consent holder shall prepare an Erosion and Sediment Control Plan (ESCP), and shall submit the ESCP to Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager at least ten working days prior to the commencement of the works.
11. The ESCP shall include, but not be limited to:
 - (a) a map showing the location of all works;
 - (b) detailed plans showing the location of sediment control measures, onsite catchment boundaries, and sources of runoff;
 - (c) measures that shall be undertaken to minimise soil disturbance and prevent soil erosion;

- (d) measures that shall be undertaken to prevent sediment and contaminants from flowing into the surface waterbodies;
 - (e) drawings and specifications of designated sediment control measures;
 - (f) a programme of works, which includes but is not limited to, a proposed timeframe for the works; and
 - (g) inspection and maintenance of the sediment control measures.
12. Erosion and sediment control measures shall be designed, constructed and maintained in accordance with the Canterbury Regional Council Erosion and Sediment Control Guidelines (2007).
13. Erosion and sediment control measures as specified in the ESCP shall be installed prior to the commencement of works.
- 14.
- (a) The consent holder shall take all practicable measures to ensure that the works do not cause erosion of the banks and bed of the watercourses, or deflect floodwaters into the berm.
 - (b) In the event of any erosion occurring to the bed or banks of the river as a result of the works or structure, the consent holder shall be responsible for rectifying the situation as soon as practicable.
15. There shall be no storage or refuelling of vehicles and machinery within 20 metres of the bed of the river.
16. Work sites shall as far as practicable be left in a state consistent with the surrounding natural river bed on the completion of works.
- 17.
- (a) All structures shall be maintained in good working order.
 - (b) The structures shall be replaced or repaired if damaged.
 - (c) Any debris blocking pipes or culverts shall be removed from the watercourse
 - (d) In the event of any damage to structures, the consent holder shall maintain the flood carrying capacity of the watercourse, and take all practicable measures to minimise erosion.

CRC102330 To disturb, excavate and deposit material, and to remove and plant vegetation within the bed and riparian margins of a river for the construction of intake structures.

This application is an amalgamation of CRC061868 and CRC061863 and is for construction phase works. Duration 15 years.

To place structures in the bed of the Rakaia River and Waimakariri River and to excavate, disturb and deposit bed material, remove and plant vegetation to facilitate the construction of the Rakaia water intake system and the Waimakariri water intake system.

Proposed conditions:

1. Locations

- (a) Works to disturb the bed of the Rakaia River shall only be undertaken at or about map reference NZMS 260 K36: 071-391.
 - (b) Works to disturb the bed of the Waimakariri River shall only be undertaken at or about map reference NZMS 260 L35: 252-678.
2. Works shall be confined to the area shown on the accompanying plan Central Plains Water Enhancement Scheme – Designation Maps 3, 4 and 10.
3. Works shall be limited to those which are necessary to construct the intake system required to facilitate the taking of water authorised by resource consents CRC061940 and CRC021091, including:
 - (a) erection of structures in the bed of the rivers;
 - (b) excavating, disturbing and depositing material in the bed of the rivers;
 - (c) removal of debris, removal or trimming trees within the footprint of the intake system as identified in final design plans to be provided in accordance with condition (8);
4. The activities authorised by this consent are subject to the conditions listed in Schedule 1: General Conditions, and Schedule 2: Administrative Conditions, attached to this consent.
5. The consent holder shall provide a bond in favour of the Canterbury Regional Council to secure performance of this consent as outlined in Schedule 3 attached.
6. The works shall not disturb existing river protection works in the Kimberley Cliff to Redmonds Road reach unless the consent holder has obtained the prior approval of the Regional Engineer at Canterbury Regional Council.
7. There shall be no activities undertaken by the consent holder in the bed of the Waimakariri River at the Intake Site that would adversely affect the ability of Waimakariri Irrigation Ltd to train the river towards its intake and the Waimakariri District Council stockwater scheme intake at Browns Rock.
8. At least 20 working days prior to the installation of any structures, the consent holder shall submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, final design plans for all structures to be installed.
9. Final detailed design plans shall be peer-reviewed by a chartered professional engineer on the New Zealand register to certify that the proposed structures will comply with the conditions contained in Schedule 1. This peer-review shall not be undertaken by the person responsible for the design plans
10. The structures shall be constructed in accordance with the peer-reviewed and certified final design plans.
11. A certificate signed by a chartered professional engineer on the New Zealand register certifying that the structures have been constructed in accordance with the certified final design plans, shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within one month of completion of construction of each structure.
12. The consent holder shall prepare an Erosion and Sediment Control Plan (ESCP), and shall submit the ESCP to Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager at least ten working days prior to the commencement of the works.

13. The ESCP shall include, but not be limited to:
 - (a) a map showing the location of all works;
 - (b) detailed plans showing the location of sediment control measures, onsite catchment boundaries, and sources of runoff;
 - (c) measures that will be undertaken to minimise soil disturbance and prevent soil erosion;
 - (d) measures that will be undertaken to prevent sediment and contaminants from flowing into the Rakaia and Waimakariri Rivers;
 - (e) drawings and specifications of designated sediment control measures;
 - (f) a programme of works, which includes but is not limited to, a proposed timeframe for the works; and
 - (g) inspection and maintenance of the sediment control measures.
14. Erosion and sediment control measures shall be designed, constructed and maintained in accordance with the Canterbury Regional Council Erosion and Sediment Control Guidelines (2007).
15. Erosion and sediment control measures as specified in the ESCP shall be installed prior to the commencement of works.
16.
 - (a) The consent holder shall take all practicable measures to ensure that the works do not cause erosion of the banks and bed of the watercourses, or deflect floodwaters into the berm.
 - (b) In the event of any erosion occurring to the bed or banks of the river as a result of the works or structure, the consent holder shall be responsible for rectifying the situation as soon as practicable.
17. There shall be no storage or refuelling of vehicles and machinery within 20 metres of the bed of the river.
18. Apart from structures constructed under this consent, work sites shall as far as practicable be left in a state consistent with the surrounding natural river bed on the completion of works.
19.
 - (a) Works and any planting undertaken shall not decrease the flood carrying capacity of the Rakaia River or the Waimakariri River, or encroach into any active channel.
 - (b) Works and planting in the riverbed shall not reduce or prevent the ability of existing river channels to be navigated by boats, or obstruct the passage of aquatic fauna.
20. Wherever access to the riverbed is gained across a stopbank, the consent holder shall ensure that whenever they use the access there is at least 200 millimetres of gravel on top of the crest of the stopbank, as indicated by plan CRC061863.

Note: This consent does not grant access to the construction areas. This must be arranged with the landowner.

21. Any gravel, sand and other natural material excavated during the construction of new channels shall occur as follows:
 - (a) Stockpiled material shall not exceed a height of 1.5 metres above the level of the adjacent riverbed.
 - (b) Stockpiles shall be positioned and aligned so as to not deflect the flow of the river onto adjoining land, river banks, stopbanks, flood protection works or structures.
 - (c) Stockpiles shall be removed within ten working days after the completion of the works.
22. Works within the river bed shall not result in an increase in turbidity or reduction in clarity of the river flow which, in the opinion of a suitably qualified expert, hinders the upstream passage of salmon in the Highbank salmon bypass channel.
23. Prior to the works in the river authorised by this consent, the consent holder shall commission a suitably qualified salmon fisheries expert, with a bachelors degree in biological sciences, or post graduate qualifications in freshwater fish, to develop a Diversion and Discharge Management Plan (the Plan). The purpose of the Plan is to ensure the works and discharges in the Rakaia River by the consent holder do not hinder upstream passage of salmon in the Highbank salmon bypass channel and to ensure compliance with condition 22 of this consent. The Plan shall be developed in consultation with the operator of the Highbank Power Station, which as a minimum shall require that the consent holder forward a copy of the Plan to the operator of the Highbank Power Station seeking their comment not less than 20 working days prior to submitting the Plan to the Canterbury Regional Council in accordance with condition 24 of this consent and any comments received shall be taken into account when preparing the Plan and forwarded to the Canterbury Regional Council along with the Plan. The Plan shall include the following:
 - (a) An outline of operational requirements of discharges back to the Rakaia River to ensure upstream passage of salmon in the Highbank salmon bypass channel is not hindered.
 - (b) A monitoring programme to determine whether or not salmon passage in the Highbank salmon bypass channel is affected, including monitoring methodology, who may be suitable to undertake the monitoring and the frequency of monitoring
 - (c) Methods that may be undertaken to reduce any effects on upstream passage of salmon in the Highbank salmon bypass channel if monitoring indicates that the diversion and/or discharge of water is affecting salmon passage
24. At least 20 working days prior to the consent holder undertaking the works authorised by this consent in the Rakaia River, the consent holder shall submit the Diversion and Discharge Management Plan to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager for their approval that the Plan meets the requirements set out in condition 23.
25. The consent holder shall adhere to the Diversion and Discharge Management Plan at all times.

26. In the event that the monitoring and reporting required in condition 23(b) indicates that the discharge is affecting upstream passage of salmon, then the consent holder shall ensure that the methods specified in 23(c) are implemented to mitigate the effects.

27.

- (a) The works in the bed of the Rakaia River authorised by this consent shall not result in a situation where there is not a significant, continuous braid reaching the upstream (inlet) end of the salmon bypass channel of the south bank of the Rakaia River at the Highbank power station tailrace. The amount of water in that river braid shall be sufficient to allow the upstream passage of salmon emerging from the Highbank salmon bypass channel.
- (b) If, as a result of the works authorised by this consent, works need to be undertaken to the Highbank salmon bypass channel to maintain an interconnection with a main flow of the Rakaia River to ensure the effective passage of salmon from the bypass back to the river, then the consent holder shall either:
 - (i) Reimburse the operator of the Highbank Power Station for the costs of the works no later than the 20th of the following month following the request for payment being made, if the operator of the Highbank Power Station has first rectified this situation, or
 - (ii) Undertake the works to rectify this situation, subject to the works being first approved by the operator of the Highbank Power Station.

28.

- (a) The consent holder shall, in consultation with the Regional Engineer at the Canterbury Regional Council, commission a suitably qualified Rivers Engineer to undertake an assessment to ensure that the river protection for the Waimakariri River and the Rakaia River is maintained at no less than the current standards both during construction activities and post commissioning of the Central Plains Water Enhancement Scheme.
- (b) The Rivers Engineer shall, no less than 24 months post commissioning, undertake a further investigation on the effects of the scheme on the works or activities that are under the control of the Canterbury Regional Council.
- (c) The Rivers Engineer shall submit a report to the Canterbury Regional Council: Attention: RMA Compliance and Enforcement Manager, and Attention: Regional Engineer, confirming that the works will not have an adverse effect on works or activities that are under the control of the Canterbury Regional Council, or recommending further river protection works that will need to be undertaken by the consent holder.
- (d) The consent holder shall undertake any further river protection works recommended by the River Engineers in the report submitted under condition 28(c).

29.

- (a) The works shall not prevent access to and along the Rakaia and Waimakariri Rivers.
 - (b) All practicable measures shall be undertaken to maintain existing access points, both vehicle and walking, to and along the Rakaia and Waimakariri Rivers.
 - (c) If existing access points to the Rakaia and Waimakariri Rivers are considered to be unsafe due to the exercise of this consent, the consent holder shall provide an alternative access point to and along the affected reaches of the rivers, near to the existing access point. Any new access points shall be suitable to be used by four-wheel drive vehicles.
30. Access to the river in the form of a bridge, culvert or ford suitable to allow access to the riverbed for construction and four-wheel-drive vehicles, shall be installed across the diversion and discharge channels, and shall be maintained at all times.
31. Plants in riverbeds
- (a) The consent holder shall not introduce any plants listed in Schedule BLR1 of the PNRRP: Pest Species (attached to this consent) to the bed or banks of the Rakaia River or Waimakariri River.
 - (b) Any plants introduced to the bed and banks of the Rakaia or Waimakariri Rivers as part of the Landscape and Rehabilitation Plan submitted in accordance with Schedule 1: General Conditions shall not spread beyond the landscaping zones defined in the Landscape and Rehabilitation Plan.
 - (c) The consent holder shall commission a suitably qualified terrestrial plant ecologist, with a tertiary degree in ecology to certify that the plants identified in the Landscape Plan are not listed in Schedule BLR1 of the Natural Resources Regional Plan, and will not spread beyond the landscaping zone defined in the Landscape and Rehabilitation Plan.
 - (d) The consent holder shall submit a certificate from the expert in condition 31(c), certifying that plants in the Landscape and Rehabilitation Plan will not spread beyond the landscaping zone, to the Canterbury Regional Council, Attention: Compliance and Enforcement Manager prior to any plants being planted in the bed of the Rakaia River or the Waimakariri River.
 - (e) The consent holder shall commission a suitably qualified terrestrial plant ecologist with a tertiary degree in ecology to undertake an annual survey by 31 August for at least five years after all plants planted in accordance with the Landscape and Rehabilitation Plan have reached seeding age, and thereafter at five yearly intervals, to identify any plants that may have spread beyond the landscaping zone and whether or not the plants have reached seeding age.
 - (f) The consent holder shall remove any plants that have spread beyond the landscaping zone, as identified in the survey within 10 working days on the completion of the plant survey.
 - (g) The consent holder shall, within 20 working days on the completion of the plant survey required by condition 31(e), submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, a report detailing the results of the survey and any removal of plants as required by condition 31(f).

CRC102331 To disturb, excavate and deposit, and to remove and plant vegetation within the bed and riparian margins of a river for the operation and maintenance of intake structures.

This application is an amalgamation of CRC061868 and CRC061863 and is for operation and maintenance phase works. Duration: 35 years

To place structures in the bed of the Waimakariri River and Rakaia River and to excavate, disturb and deposit bed material, remove and plant vegetation to facilitate the operation and maintenance of the Waimakariri water intake system and the Rakaia water intake system.

1.
 - (a) Works to disturb the bed of the Rakaia River shall only be undertaken at or about map reference NZMS 260 K36: 071-391.
 - (b) Works to disturb the bed of the Waimakariri River shall only be undertaken at or about map reference NZMS 260 L35: 252-678.
2. Works shall be confined to the area shown on the accompanying plan Central Plains Water Enhancement Scheme – Designation Maps 3, 4 and 10.
3. Works shall be limited to those which are necessary to operate and maintain the intake systems required to divert and take water as authorised by resource consents CRC061940 and CRC021091, including the:
 - (a) repair and replacement of structures in the bed of the rivers;
 - (b) excavating, disturbing and depositing material in the bed of the rivers; and/or
 - (c) removal of debris, removal or trimming trees within the footprint of the intake system.
4. The activities authorised by this consent are subject the conditions listed in Schedule 1: General Conditions, and Schedule 2: Administrative Conditions, which forms part of this consent.
5. The works shall not disturb existing river protection works in the Kimberley Cliff to Redmonds Road reach unless the consent holder has obtained the prior approval of the Regional Engineer at Canterbury Regional Council.
6. There shall be no activities undertaken by the consent holder in the bed of the Waimakariri River at the Intake Site that would adversely affect the ability of Waimakariri Irrigation Ltd to train the river towards its intake and the Waimakariri District Council stockwater scheme intake at Browns Rock.
7. The consent holder shall provide a bond in favour of the Canterbury Regional Council to secure performance of this consent as outlined in Schedule 3 attached.
8. The consent holder shall prepare an Erosion and Sediment Control Plan (ESCP), and shall submit the ESCP to Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager at least ten working days prior to the commencement of the works.
9. The ESCP shall include, but not be limited to:

- (a) a map showing the location of all works;
 - (b) detailed plans showing the location of sediment control measures, onsite catchment boundaries, and sources of runoff;
 - (c) measures that will be undertaken to minimise soil disturbance and prevent soil erosion;
 - (d) measures that will be undertaken to prevent sediment and contaminants from flowing into the Rakaia and Waimakariri Rivers;
 - (e) drawings and specifications of designated sediment control measures;
 - (f) a programme of works, which includes but is not limited to, a proposed timeframe for the works; and
 - (g) inspection and maintenance of the sediment control measures.
10. Erosion and sediment control measures shall be designed, constructed and maintained in accordance with the Canterbury Regional Council Erosion and Sediment Control Guidelines (2007).
11. Erosion and sediment control measures as specified in the ESCP shall be installed prior to the commencement of works.
- 12.
- (a) The consent holder shall take all practicable measures to ensure that the works do not cause erosion of the banks and bed of the watercourses, or deflect floodwaters into the berm.
 - (b) In the event of any erosion occurring to the bed or banks of the river as a result of the works or structure, the consent holder shall be responsible for rectifying the situation as soon as practicable.
13. Vehicles shall not enter river channels containing flowing water.
14. There shall be no storage or refuelling of vehicles and machinery within 20 metres of the bed of the river.
15. Apart from structures constructed under this consent work sites shall as far as practicable be left in a state consistent with the surrounding natural river bed on the completion of works.
16. Works shall not increase the potential for flooding on surrounding land
17. Works and any planting undertaken shall not decrease the flood carrying capacity of the Rakaia and Wamakariri Rivers or encroach into any active channel.
18. In-river works and plantings shall not reduce or prevent the ability of existing river channels to be navigated by boats, or obstruct the passage of aquatic fauna.
19. Wherever access to the riverbed is gained across a stopbank, the consent holder shall ensure that whenever they use the access there is at least 200 millimetres of gravel on top of the crest of the stopbank, as indicated by plan CRC061868.

Note: This consent does not grant access to the extraction area. This must be arranged with the landowner.

20. Any gravel, sand and other natural material excavated during the construction of new channels shall occur as follows:
- (a) Stockpiled material shall not exceed a height of 1.5 metres above the level of the adjacent riverbed.
 - (b) Stockpiles shall be positioned and aligned so as to not deflect the flow of the river onto adjoining land, river banks, stopbanks, flood protection works or structures.
 - (c) Stockpiles shall be removed by 10 working days after the date of completion of the operation or maintenance activity.
- 21.
- (a) The consent holder shall, in consultation with the Regional Engineer at the Canterbury Regional Council, commission a suitably qualified Rivers Engineer to undertake an assessment to ensure that the river protection for the Waimakariri River and the Rakaia River is maintained at no less than the current standards both during construction activities and post commissioning of the Central Plains Water Enhancement Scheme.
 - (b) The Rivers Engineer shall, no less than 24 months post commissioning, undertake a further investigation on the effects of the scheme on the works or activities that are under the control of the Canterbury Regional Council.
 - (c) The Rivers Engineer shall submit a report to the Canterbury Regional Council: Attention: RMA Compliance and Enforcement Manager, and Attention: Regional Engineer, confirming that the works will not have an adverse effect on works or activities that are under the control of the Canterbury Regional Council, or recommending further river protection works that will need to be undertaken by the consent holder.
 - (d) The consent holder shall undertake any further river protection works recommended by the River Engineers in the report submitted under condition 21(c).
- 22.
- (a) The works shall not impede existing access to and along the Rakaia River and the Waimakariri River.
 - (b) All practicable measures shall be undertaken to maintain existing access points, both vehicle and walking, to and along the Rakaia and Waimakariri Rivers
 - (c) If existing access points to the Rakaia and Waimakariri Rivers are considered to be unsafe due to the exercise of this consent, the consent holder shall provide an alternative access point to and along the affected reaches of the rivers, near to the existing access point. Any new access points shall be suitable to be used by four-wheel drive vehicles.
23. Access to the river in the form of a bridge, culvert or ford, suitable to allow access to the riverbed for construction vehicles and four-wheel-drive vehicles, shall be installed across the diversion and discharge channels, and shall be maintained at all times.
24. Works within the river bed shall not result in an increase in turbidity or reduction in clarity of the river flow which, in the opinion of a suitably qualified expert, hinders the upstream passage of salmon in the Highbank salmon bypass channel.

25. Prior to the works in the river authorised by this consent, the consent holder shall commission a suitably qualified salmon fisheries expert, with a bachelors degree in biological sciences, with post graduate qualifications in freshwater fish, to develop a Diversion and Discharge Management Plan (the Plan). The purpose of the Plan is to ensure the works and discharges in the Rakaia River by the consent holder do not hinder upstream passage of salmon in the Highbank salmon bypass channel and to ensure compliance with condition 24 of this consent. The Plan shall be developed in consultation with the operator of the Highbank Power Station, which as a minimum shall require that the consent holder forward a copy of the Plan to the operator of the Highbank Power Station seeking their comment not less than 20 working days prior to submitting the Plan to the Canterbury Regional Council in accordance with condition 26 of this consent and any comments received shall be taken into account when preparing the Plan and forwarded to the Canterbury Regional Council along with the Plan. The Plan shall include the following:
- (a) An outline of operational requirements of discharges back to the Rakaia River to ensure upstream passage of salmon in the Highbank salmon bypass channel is not hindered.
 - (b) A monitoring programme to determine whether or not salmon passage in the Highbank salmon bypass channel is affected, including monitoring methodology, who may be suitable to undertake the monitoring and the frequency of monitoring
 - (c) Methods that may be undertaken to reduce any effects on upstream passage of salmon in the Highbank salmon bypass channel if monitoring indicates that the diversion and/or discharge of water is affecting salmon passage
26. At least 20 working days prior to the consent holder undertaking the works authorised by this consent in the Rakaia River, the consent holder shall submit the Diversion and Discharge Management Plan to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager for their approval that the Plan meets the requirements set out in condition 25.
27. The consent holder shall adhere to the Diversion and Discharge Management Plan at all times.
28. In the event that the monitoring and reporting required in condition 25(b) indicates that the discharge is affecting upstream passage of salmon, then the consent holder shall ensure that the methods specified in 25(c) are implemented to mitigate the effects.
- 29.
- (a) The works in the bed of the Rakaia River authorised by this consent shall not result in a situation where there is not a significant, continuous braid reaching the upstream (inlet) end of the salmon bypass channel of the south bank of the Rakaia River at the Highbank power station tailrace. The amount of water in that river braid shall be sufficient to allow the upstream passage of salmon emerging from the Highbank salmon bypass channel.

- (b) If, as a result of the works authorised by this consent, works need to be undertaken to the Highbank salmon bypass channel to maintain an interconnection with a main flow of the Rakaia River to ensure the effective passage of salmon from the bypass back to the river, then the consent holder shall either:
- (i) Reimburse the operator of the Highbank Power Station for the costs of the works no later than the 20th of the following month following the request for payment being made, if the operator of the Highbank Power Station has first rectified this situation, or
 - (ii) Undertake the works to rectify this situation, subject to the works being first approved by the operator of the Highbank Power Station.

30. Plants in riverbeds

- (a) The consent holder shall not introduce any plants listed in Schedule BLR1 of the PNRRP: Pest Species (attached to this consent) to the bed or banks of the Rakaia River or Waimakariri River.
- (b) Any plants introduced to the bed and banks of the Rakaia or Waimakariri Rivers as part of the Landscape and Rehabilitation Plan submitted in accordance with Schedule 1: General Conditions shall not spread beyond the landscaping zones defined in the Landscape and Rehabilitation Plan.
- (c) The consent holder shall commission a suitably qualified terrestrial plant ecologist, with a tertiary degree in ecology to certify that the plants identified in the Landscape Plan are not listed in Schedule BLR1 of the PNRRP, and will not spread beyond the landscaping zone defined in the Landscape and Rehabilitation Plan.
- (d) The consent holder shall submit a certificate from the expert in condition 30(c), certifying that plants in the Landscape and Rehabilitation Plan will not spread beyond the landscaping zone, to the Canterbury Regional Council, Attention: Compliance and Enforcement Manager prior to any plants being planted in the bed of the Rakaia River or the Waimakariri River.
- (e) The consent holder shall commission a suitably qualified terrestrial plant ecologist with a tertiary degree in ecology to undertake an annual survey by 31 August for at least five years after all plants planted in accordance with the Landscape and Rehabilitation Plan have reached seeding age, and thereafter at five yearly intervals, to identify any plants that may have spread beyond the landscaping zone and whether or not the plants have reached seeding age.
- (f) The consent holder shall remove any plants that have spread beyond the landscaping zone, as identified in the survey within 10 working days on the completion of the plant survey.
- (g) The consent holder shall, within 20 working days on the completion of the plant survey required by condition 30(e), submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, a report detailing the results of the survey and any removal of plants as required by condition 30(f).

Water Consents

CRC061768 Dam and divert water during construction

To dam and divert water during construction of the Headrace and Water Distribution Network, including constructing siphons, pipes, and erosion protection structures or works, in the surface waterbodies identified in Schedules B.1 and B.2. A consent with a duration of 15 years is sought.

Proposed conditions:

1. The temporary damming and diversion of water shall only be located in the surface waterbodies listed in Schedules B.1 and B.2 attached to this consent and as shown on attached Plan CRC061768.
2. The temporary damming and diversion of water shall only occur during the construction of the Headrace and Water Distribution Network to create a dry working area for the purpose of exercising resource consents CRC102328 and CRC102330 .
3. The diversion and temporary damming of water shall be undertaken in accordance with the conditions listed in Schedule 1: General Conditions, and Schedule 2: Administrative Conditions.
4. The diversion shall not obstruct or alter the passage of water in a manner that causes:
 - (a) an increase in the risk or potential for flooding of surrounding lands;
 - (b) destabilisation of lawfully established flood control structures or any other lawfully established structures within the beds of rivers;
 - (c) an increase in erosion of river beds or banks
5. The diversion and temporary damming shall not prevent the passage of fish or cause the stranding of fish in pools or channels.

CRC061940 Divert water from the Rakaia River for irrigation, sediment sluicing and fish passage

To divert water within the Rakaia River towards the Rakaia water intake system to enable the taking of water from the Rakaia River for irrigation and ancillary purposes, and for sediment sluicing and fish pass purposes within the Rakaia water intake system and through the headrace canal and distribution network as described in Schedules A1 and A2. A consent with a duration of 35 years is sought.

Proposed conditions:

1. The diversion of water shall only be located in the Rakaia River between map references NZMS 260 K36:078-387 labelled "diversion point" on attached Plan CRC061940.
2. At the time of diversion works occurring in accordance with consent CRC102331, water may be diverted at a rate not exceeding 80 cubic metres per second.

3. The rate at which water is diverted shall be kept to the minimum practicable flow that is reasonably required for scheme operations including for irrigation, fish return and sediment flushing.
4. The diversion shall not prevent the passage of fish, or cause the stranding of fish in pools or channels
5. The diversion shall not obstruct or alter the passage of water in a manner that causes:
 - (a) an increase in the risk or potential for flooding of surrounding lands;
 - (b) destabilisation of lawfully established structures within the beds of rivers;
 - (c) a increase in erosion of river beds or banks;
6. The diversion of water shall be undertaken in accordance with the conditions in Schedule 2: Administrative Conditions attached to this consent.
7. The diversion of water shall not result in an increase in turbidity or reduction in clarity of the river flow which, in the opinion of a suitably qualified expert, hinders the upstream passage of salmon in the Highbank salmon bypass channel
8.
 - (a) Prior to the commencement of the diversion of water, the consent holder shall commission a suitably qualified salmonid fisheries expert, with post-graduate qualifications in aquatic sciences, or an expert with extensive experience in salmonid fishery science or management, to develop a Diversion and Discharge Management Plan (the Plan). The purpose of the Plan is to ensure the works and discharges in the Rakaia River by the consent holder do not hinder upstream passage of salmon in the Highbank salmon bypass channel and to ensure compliance with condition 7 of this consent.
 - (b) The Plan shall be developed in consultation with the operator of the Highbank Power Station, which as a minimum shall require that the consent holder forward a copy of the Plan to the operator of the Highbank Power Station seeking their comment not less than 20 working days prior to submitting the Plan to the Canterbury Regional Council in accordance with condition 9 of this consent and any comments received shall be taken into account when preparing the Plan and forwarded to the Canterbury Regional Council along with the Plan. The Plan shall include the following:
 - (i) an outline of operational requirements of discharges back to the Rakaia River to ensure upstream passage of salmon in the Highbank salmon bypass channel is not hindered;
 - (ii) a monitoring programme to determine whether or not salmon passage in the Highbank salmon bypass channel is affected, including monitoring methodology, who may be suitable to undertake the monitoring and the frequency of monitoring; and
 - (iii) methods that is required to reduce any effects on upstream passage of salmon in the Highbank salmon bypass channel if monitoring indicates that the diversion and/or discharge of water is affecting salmon passage..
9. Prior to the diversion of water in the Rakaia River, the consent holder shall submit the Plan to the Canterbury Regional Council, Attention: RMA Compliance and

Enforcement Manager for their approval that the Plan meets the requirements set out in condition 8.

10. The consent holder shall adhere to the Diversion and Discharge Management Plan at all times.
11. In the event that the monitoring and reporting required in condition 8(b) indicates that the discharge is affecting upstream passage of salmon, then the consent holder shall ensure that the methods specified in 8(c) are implemented to mitigate the effects.
12.
 - a. The diversion of water shall not result in a situation where there is not a significant, continuous braid reaching the upstream (inlet) end of the salmon bypass channel of the south bank of the Rakaia River at the Highbank power station tailrace. The amount of water in that river braid shall be sufficient to allow the upstream passage of salmon emerging from the Highbank salmon bypass channel.
 - b. If, as a result of the diversion of water authorised by this consent, works need to be undertaken to the Highbank salmon bypass channel to maintain an interconnection with a main flow of the Rakaia River to ensure the effective passage of salmon from the bypass back to the river, then the consent holder shall either:
 - i. Reimburse the operator of the Highbank Power Station for the costs of the works no later than the 20th of the following month following the request for payment being made, if the operator of the Highbank Power Station has first rectified this situation, or
 - ii. Undertake the works to rectify this situation, subject to the works being first approved by the operator of the Highbank Power Station.
13. The consent holder shall ensure that the freeboard of the headrace is a minimum of 0.75 metres.
14. A copy of this resource consent shall be given to every person involved in the construction, operation and maintenance of the headrace prior to their involvement.
15. The consent holder shall engage a Chartered Professional Engineer with experience in water retaining structures to certify that the design of the headrace and its construction are in accordance with good engineering practice including being consistent with the NZSOLD Dam Safety Guidelines and the requirements of the Building Act 2004. This certificate shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager prior to the first filling of the headrace.
16. Prior to first filling of the headrace, a headrace safety assurance plan (safety assurance plan) shall be produced by a recognised engineer, as defined by the Building Act 2004 (recognised engineer), outlining a program of inspections and quality assurance for the headrace. The safety assurance plan shall be developed consistent with the New Zealand Society on Large Dams, New Zealand Dam Safety

Guidelines (NZSOLD) dam safety guidelines and shall be certified by a recognised engineer. The safety assurance plan shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager prior to the first filling of the headrace. The safety assurance plan shall as a minimum:

- (a) be consistent with the principles of the NZSOLD dam safety guidelines and the requirements of the Building Act 2004;
 - (b) address the distinctive safety and structural requirements of both the headrace filling stage and the scheme operational stage;
 - (c) include a monitoring system (which may include piezometers and visual inspections) capable of detecting warning signs reliably and accurately;
 - (d) specify an efficient organisational approach that records, processes, evaluates and reports the observations;
 - (e) include trigger levels for observational results that are considered to require action; and
 - (f) include a strategy of mitigation and actions to be taken in the event of unacceptable observational results such as leakage or slope movements.
17. Certification documents and any reports required under the safety assurance plan shall be submitted to the Canterbury Regional Council, Attention RMA Compliance and Enforcement Manager annually or as required by the safety assurance plan.
18. The consent holder shall adhere to the safety assurance plan at all times.

CRC061943 Divert water from the Waimakariri River for irrigation, sediment sluicing and fish passage

To divert water in the Waimakariri River towards the Waimakariri water intake system to enable the taking of water for irrigation and ancillary purposes, and for sediment sluicing and fish passes within the Waimakariri water intake system and through the headrace canal and distribution network as described in Schedules A1 and A2. A consent with a duration of 35 years is sought.

Proposed conditions:

2. The diversion of water shall only be located in the Waimakariri River at about map reference NZMS 260 L35: 328-603, labelled "diversion point" on attached Plan CRC061943.
3. At the time of diversion works as authorised by consent CRC102331, water may be diverted at a rate not exceeding 40 cubic metres per second.
4. The rate at which water is diverted shall be kept to the minimum practicable flow that is reasonably required for scheme operations such as taking for irrigation, fish return and sediment flushing.
5. The diversion shall not prevent the passage of fish, or cause the stranding of fish in pools or channels

6. The diversion shall not obstruct or alter the passage of water in a manner that causes:
 - (a) an increase in the risk or potential for flooding of surrounding lands;
 - (b) destabilisation of lawfully established structures within the beds of rivers;
 - (c) an increase in erosion of river beds or banks.
7. The diversion of water shall be undertaken in accordance with the conditions in Schedule 2: Administrative Conditions attached to this consent
8. The consent holder shall ensure that the freeboard of the headrace is a minimum of 0.75 metres.
9. A copy of this resource consent shall be given to every person involved in the construction, operation and maintenance of the headrace prior to their involvement.
10. The consent holder shall engage a Chartered Professional Engineer with experience in water retaining structures to certify that the design of the headrace and its construction are in accordance with good engineering practice including being consistent with the NZSOLD Dam Safety Guidelines and the requirements of the Building Act 2004. This certificate shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager prior to the first filling of the headrace.
11. Prior to first filling of the headrace, a headrace safety assurance plan (safety assurance plan) shall be produced by a recognised engineer, as defined by the Building Act 2004 (recognised engineer), outlining a program of inspections and quality assurance for the headrace. The safety assurance plan shall be developed consistent with the New Zealand Society on Large Dams, New Zealand Dam Safety Guidelines (NZSOLD) dam safety guidelines and shall be certified as appropriate by a recognised engineer. The safety assurance plan shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager prior to the first filling of the headrace. The safety assurance plan shall as a minimum:
 - (a) be consistent with the principles of the NZSOLD dam safety guidelines and the requirements of the Building Act 2004;
 - (b) address the distinctive requirements of both the headrace filling stage and the scheme operational stage;
 - (c) include a monitoring system (which may include piezometers and visual inspections) capable of detecting warning signs reliably and accurately;
 - (d) specify an efficient organisational approach that records, processes, evaluates and reports the observations;
 - (e) include trigger levels for observational results that are considered to require action;
 - (f) include a strategy of mitigation and actions to be taken in the event of unacceptable observational results such as leakage or slope movements.
12. Certification documents and any reports required under the safety assurance plan shall be submitted to the Canterbury Regional Council, Attention RMA Compliance and Enforcement Manager annually or as required by the safety assurance plan.

13. The consent holder shall adhere to the safety assurance plan at all times.

CRC061925 Take water for dewatering

To take water for dewatering purposes during construction, operation and maintenance of the two intakes, the Inlet Canal, Headrace Canal, and Water Distribution Network, including for the purposes of constructing, operating and maintaining siphons, pipes, and erosion protection structures/works, in the surface waterbodies identified in Schedules A 3, A 4, B.1 and B.2. A consent with a duration of 35 years is sought.

Proposed conditions:

1. The taking of water for dewatering purposes shall only occur in and adjacent to the surface waterbodies identified in Schedules B.1 and B.2 attached to this consent, as shown on Plan CRC061925 and adjacent to excavated areas for the construction of the Inlet Canal, Headrace Canal and Water Distribution Network.
2. Water shall only be taken in association with the dewatering required to facilitate construction of the Inlet Canal, Headrace Canal, and Water Distribution Race Network (including for the purposes of constructing siphons, pipes, and erosion protection structures/works).
3. The taking of dewatering water shall be undertaken in accordance with the conditions in Schedule 1: General Conditions, and Schedule 2: Administrative Conditions, attached to this consent.
4.
 - (a) The taking of dewatering water as authorised by this consent in combination with all other groundwater takes authorised at the time this consent was granted, shall not cause the water level in any neighbouring bore within 2000 metres of the dewatering site to be lowered by more than 20% of the available drawdown in that bore. For the purposes of this condition, available drawdown is the water level in the bore that is exceeded 80% of the time.
 - (b) The consent holder shall appoint a suitably qualified person to assess the percentage of available drawdown remaining in the neighbouring bores within 2000 metres of the dewatering site. The assessment shall be undertaken in accordance with the methodology outlined in Schedule WQN10 of the PNRRP.

Note: For the purposes of this condition, a suitably qualified person is a person with experience in undertaking assessments in accordance with the methodology outlined in Schedule WQN10 of the Proposed Natural Resources Regional Plan as notified July 2004 (PNRRP),

5.
 - (a) The consent holder shall submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager at least one month prior to the exercise of this consent, a Dewatering Management Plan (DMP) outlining the construction and management practices and procedures to be adopted in order to comply with the conditions of this consent and to ensure potential adverse

effects that may arise from the dewatering activities are minimised to the greatest extent practicable.

- (b) The DMP shall include, but not be limited to:
 - (i) details of the construction activities where dewatering will be required, including the location of dewatering activities, the depth of excavation and groundwater levels in the excavated areas;
 - (ii) the types of dewatering methods to be adopted and details of where water will be discharged;
 - (iii) a construction management programme including the construction timetable, the sequence of construction and the duration of each construction phase;
 - (iv) a copy of the assessments undertaken in accordance with condition (4) to determine the available drawdown in bores within 2000 metres of the dewatering sites;
 - (v) the mitigation measures to be adopted if required to minimise the effects of dewatering on surrounding property and infrastructure, including but not limited to measures that will be undertaken to ensure the water levels in any bore within 2000 metres of the dewatering site are not lowered by more than 20% of the available drawdown in that bore and
 - (vi) contact details for the person in charge of the site works.
 - (c) The consent shall be exercised in accordance with the Dewatering Management Plan.
 - (d) The consent holder shall provide an annual report, by 31 August each year, to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, which shows how the consent holder has complied with the DMP.
6. The consent holder may at any time, submit to the Canterbury Regional Council, an amended Dewatering Management Plan for the purposes of improving the efficiency and or quality of the dewatering or to remove or reduce an adverse environmental effect or to relax mitigation requirements where these have been found to be unnecessarily stringent.
7. The Canterbury Regional Council may, once per year, serve notice of its intention to review the conditions of this consent for the purposes of dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage.

CRC061972 Take water from the Waimakariri River at a maximum rate of 24m³/s

This application has had the “use” portion of the application removed. The use of water has been combined with the use of water from the Rakaia River.

To take and use water from the Waimakariri River at a maximum rate of 24 cubic metres per second via the Waimakariri water intake system, for the purposes of irrigation of up to about 60,000 hectares of land within the Scheme Area, for water storage, and for

ancillary purposes associated with the operation of the Central Plains Water Enhancement Scheme. A consent with a duration of 35 years is sought.

Proposed conditions:

1. The intake shall be installed as as close as practicable to and within the upstream edge of the designated band as shown in Plan CRC061972.
2. The rate at which water may be taken from the Waimakariri River shall not exceed whatever rate is required in conjunction with the take from the Rakaia river and any other sources of water to the scheme to:
 - supply the irrigation demand from users of the scheme to use the water in accordance with the conditions of resource consent CRC061973 ; and to
 - replenish on farm storage;and shall not exceed 24 cubic metres per second.
3. For the periods excluding the days listed in Appendix 1, water shall only be taken subject to the following:
 - (a) Whenever the unmodified mean flow in the Waimakariri River, as estimated by the Canterbury Regional Council from measurements at the Old Highway Bridge, at or about map reference NZMS 260 M35:818-547, for any 24 hour period ending at noon is:
 - (i) greater than 66.1 cubic metres per second the maximum rate of take during the next 24 hours shall not exceed half the difference between the unmodified mean daily flow and 66.1 cubic metres per second;
 - (ii) at or below 66.1 cubic metres per second no water shall be taken during the next 24 hours, unless water can be taken under clause (a)(iii).
 - (iii) greater than 41.0 cubic metres per second and less than 63.0 cubic metres per second, the consent holder may take unused but allocated A permit water in agreement with water permit holders who are subject to A permit minimum flow restrictions and are adhering to a water sharing regime that restricts the total rate of abstraction from the Waimakariri River whenever the flow is at or above 41.0 cubic metres per second. The consent holder shall provide the Canterbury Regional Council, Attention: Compliance and Enforcement Manager, written agreement with the water permit holders giving permission for the consent holder to take its unused but allocated water.

NOTE: For the purpose of this consent, written agreement must be in the form of an email, fax or signed written document.
 - (iv) at or below 41.0 cubic metres per second for a continuous period of 21 days, the consent holder shall not take water in accordance with conditions 3(a)(i) until the flow rate is greater than 41 cubic metres per second for a period of two days or until the flow is greater than 130 cubic metres per second, whichever is the sooner. This clause shall not apply if water is being taken under clause 3(a)(iv).

4. For the periods including the days listed in Appendix 1, the following restrictions shall apply:
 - (a) whenever the unmodified mean flow in the Waimakariri River, as estimated by the Canterbury Regional Council from measurements at the Old Highway Bridge, at or about map reference NZMS 260 M35:818-547, for any 24 hour period ending at noon is greater than 80 cubic metres per second and less than 95 cubic metres per second, then the take shall not exceed the difference between the unmodified flow and 80 cubic metres per second, or 5 cubic metres per second, whichever ever is the lesser. This restriction shall apply between the hours of 3pm and 3am, or a similar 12 hour period so that the unmodified flow at Crossbank (located between map references NZMS 260 M35:701511 and M35:701517) between 7am and 7pm is between 55 and 65 cubic metres per second (measured flow).
5. No water shall be taken during the annual Coast to Coast multi-sport event.
6. This consent shall be exercised only when all the available water that can be taken by the consent holder under CRC021091 is being taken.
7. The abstraction of water at “unmodified” river flows of greater than 66.1 cubic metres per second shall only occur at times when A permit holders are authorised to exercise their full allocation.
8. Fish screens
 - (a) The consent holder shall install and maintain fish screens or deflection barriers on the intake works.
 - (b) The fish screens or deflection barriers shall be installed prior to the abstraction of water authorised by this consent.
9. The fish screens or deflection barriers shall be designed to ensure the adverse effects on all fishery components are no more than minor using best practice design principles of fish screening. In particular, the fish screen design shall achieve the following performance objectives:
 - (a) exclude all adult fish; and
 - (b) exclude at least 95% of juveniles of all fishery components that have entered the intake system; and
 - (c) all excluded fish shall be returned safely to the main stem of the Waimakariri River downstream from the intake; or
 - (d) any other objectives established in consultation with Fish and Game North Canterbury and Department of Conservation as outlined in condition 10(a).

For the purpose of this condition “fishery components” shall be defined as all species of sports fish and native fish that are present in the Waimakariri River or seasonally migrate past the intake.

10. Fish screen approval process

- (a)
 - (i) Prior to designing the fish screens the consent holder shall commission a suitably qualified expert/s to assess the fisheries of the river and provide a report that, in the expert’s opinion, confirms the appropriateness of the objectives in condition 9 or provides evidence for the need to amend those objectives.
 - (ii) The report shall identify opportunities where the consent holder may enhance the fisheries of the river in addition to the objectives in condition 9, or in partial or full compensation for any loss of fish that might occur as a result of the water take, or in lieu of the full achievement of the objectives in condition 9.
 - (iii) The consent holder shall consult with Fish and Game North Canterbury and Department of Conservation in preparation of this report;
 - (iv) The consent holder shall submit the report and records of consultation required by condition 10(a)(ii), to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager.
- (b) A person duly authorised by the Canterbury Regional Council shall give written notice to the consent holder stating whether or not it approves of any proposed amendment to the objectives within 20 working days of receipt of the report referred to in condition 10(a), and such approval shall not be unreasonably withheld.
- (c) Prior to the taking of water pursuant to this consent, the consent holder shall install a fish screen (“the Screen”) or deflection barrier across the intake designed in accordance with the certified plans approved by a person duly authorised by the Canterbury Regional Council in accordance with Condition 10(h).
- (d) The Screen or deflection barrier shall achieve the objectives of Condition 9 and for the purposes of this condition this shall be achieved by installing, operating and maintaining the Screen or deflection barrier in accordance with the certified design plans referred to in Condition 10(f).
- (e) The design plans for the Screen or deflection barrier shall be certified by:
 - (i) a suitably qualified engineer with experience in the design and operation of fish screens and deflection barriers; and
 - (ii) a fisheries biologist with knowledge of salmonid and native fisheries (“the Certifiers”).
- (f) Prior to the commencement of construction of the fish screen or deflection barrier, the consent holder shall provide to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager:
 - (i) the certified design plans including the proposed location of the screen or deflection barrier, screen or deflection barrier slot/aperture size, design

sweep velocity, design approach velocity, proposed screen material and an effective by-pass structure and flow which returns fish to an actively flowing braid of the river; and

- (ii) a report from the Certifiers which certifies the design and operation of the screen or deflection barrier:
 - (A) demonstrates best practice in achievement of Condition 10(d); and
 - (B) takes into consideration regional or national guidelines in relation to fish screen and/or deflection barrier design and/or any international guidelines that the Certifiers consider relevant.
 - (iii) The report required in condition f(ii) shall also specify any monitoring requirements for the fish screen.
 - (g) Unless the consent holder has obtained written agreement from the Canterbury Regional Council under condition 10(b), the fish screen shall have, as a minimum requirement, the following provisions:
 - (i) the fish screen shall cross the full width of the irrigation canal to prevent fish bypassing the screen into the canal;
 - (ii) the screen shall be a mesh, wedge wire, or similar material, the screen material voids shall be a maximum 3mm slot width for slotted materials or 4mm side of square, or diameter for other materials;
 - (iii) the screens shall have a design approach velocity perpendicular to the screen surface of no greater than 0.12 metres per second;
 - (iv) the design sweep velocity across the screens shall exceed the approach velocity;
 - (v) an effective bypass system shall be maintained at all times that water is diverted into the scheme, to ensure unrestricted passage is maintained to and from an active braid of the river; and
 - (vi) an effective operation and maintenance schedule.
 - (h) A person duly authorised by the Canterbury Regional Council shall give written notice to the consent holder stating whether or not it approves of the certified design plans within 20 working days of receipt of the plans and the certifiers' report referred to in Condition 10(f) and such approval shall not be unreasonably withheld.
 - (i) The consent holder shall, prior to commissioning, provide a certificate from a suitably qualified person confirming that construction of the screen or deflection barrier has occurred in accordance with the certified design plans approved in accordance with Condition 10(h).
11. Each fish screen shall be inspected at maximum intervals of two days for any damage causing openings greater than those specified in Condition 10(f)(i), or once every 24 hour period when the flow in the Waimakariri River is greater than 200 cubic metres per second, as estimated by Canterbury Regional Council, from measurements at the Old Highway Bridge (at or about map reference NZMS 260 M35:818-547).

12. In the event that a screen is damaged such that the screen mesh aperture is greater than those specified in Condition 10(f)(i), the screen shall be repaired or replaced as soon as practicable or the damaged screen shut down, and no water shall be taken. Any screen shut down shall not be opened again until a screen that complied with Condition 10(f)(i) is fitted.

13. The incidence of screen shutdowns shall be recorded and reported to the North Canterbury Fish and Game Council as soon as practicable. Records of screen failure shall be forwarded to Canterbury Regional Council by 31 May each year, or as requested

14. Safety at intake

- (a) Prior to the taking of water pursuant to this consent, the consent holder shall design an intake structure that shall, as far as practicable, prevent water users becoming pinned against or washed into the intake on the Waimakairiri River.
- (b) The safety features of the intake structure shall be designed in consultation with the White Water New Zealand and the New Zealand Jet Boat Association.
- (c) The intention of the safety features will be to achieve, if reasonably practicable, an overall International Grade 2 standard suitable for racing kayaks.

For the purpose of this clause, the International Grade 2 standard shall be consistent with the USA Grade 2 definition: "Straightforward rapids with wide, clear channels which are evident without scouting. Occasional manoeuvring may be required, but rocks and medium-sized waves are easily missed by trained paddlers. Swimmers are seldom injured and group assistance, while helpful, is seldom needed."

- (d) The intake design shall incorporate the following:
 - (i) the intake shall be recessed into the face of the rock cliff so that all gates, together with their supports, and at least the upper part of the trash rack are built behind the general natural line of the cliff face,
 - (ii) an inclined trash rack shall be constructed and maintained on the upstream face of the intake gate, leading to a safety ledge and exit point, with exit paths leading both back to the river, where a kayaker may re-enter his/her racing kayak, and away from the river, at the choice of the user. The exit paths shall be such that a person carrying a racing kayak can traverse the path safely. The dimensions of the trash rack shall be such that velocities approaching it do not exceed 1 metre per second. The trash rack shall extend to the bottom of the river bed, except that this condition shall not apply when the river is in flood,

- (iii) the surfaces presented to the water shall be free from sharp protrusions which could injure a person or snag clothing.
- (e) The design plans for the intake shall be certified by:
 - (i) a suitably qualified person with experience in the design and operation of intake structures (Certifier 1), and
 - (ii) a person with experience in water safety, particularly for recreational boating and kayaking on rivers (Certifier 2).
- (f) Prior to the commencement of construction of the intake structure, the consent holder shall provide to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager:
 - (i) The certified design plans;
 - (ii) A joint report from the Certifier 1 and Certifier 2 which certifies the design and operation of the safety features on the intake structures which demonstrates best practice in achievement of Condition 14(a) to 14(d);
- (g) A person duly authorised by the Canterbury Regional Council shall give written notice to the consent holder stating whether or not it approves of the certified design plans and the certifiers report referred to in Condition 14(f)(ii) within 20 working days of receipt of the plans and report. Such approval shall not be unreasonably withheld.
- (h) The consent holder shall, prior to commissioning, provide a certificate from a suitably qualified person confirming that construction of the intake structure has occurred in accordance with the certified design plans approved in accordance with Condition 14(g).
- (i) The consent holder shall install, operate and maintain an intake structure designed in accordance with the certified plans approved by a person duly authorised by the Canterbury Regional Council in accordance with Condition 14(g).
- (j)
 - (i) Prior to the first exercise of this consent, the consent holder shall erect and maintain one sign at the Mt White Bridge carpark, one sign at Woodstock and one sign at the Gorge Bridge carpark.
 - (ii) the signs shall be at least one metre by two metres, UV ray and weather resistant, and visible on the banks and by in-river users; and
 - (iii) the location and wording of the signs shall be developed in consultation with White Water New Zealand and to the approval of the Canterbury Regional Council.
- (k) The consent holder shall, as far as is practicable, inform all commercial users and recreational boat clubs of the position of the intake, within one month of the start of construction. A copy of the written notice and a list of those parties notified shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager at least 20 working days prior to the construction on the intake.

- (l) Within six months of commencement of operation the consent holder shall conduct live tests of the intake under a range of river flow conditions and intake flows, and
 - (i) shall invite Whitewater NZ and the New Zealand Jet Boat Association to observe and participate in those tests, and
 - (ii) shall invite Whitewater NZ and the New Zealand Jet Boat Association to comment on potential modifications to design and operation.
- (m) The consent holder shall report to Canterbury Regional Council on the tests required in condition 14(l), including the modifications to design and operation of the intake. In particular, the report shall include:
 - (i) comments made by Whitewater New Zealand and the New Zealand Jet Boat Association; and
 - (ii) a report from the certifiers (as set out in condition 14(e)) which certifies that the modifications to the intake safety features will increase the effectiveness of the safety features to prevent water users being pinned against or washed into the intake structure.
- (n) Within 40 working days or such other timeframe as may be agreed by the Canterbury Regional Council, the consent holder shall adopt the modifications to the intake design as identified in the report required in condition 14(m).

15. Measurement of water take.

The consent holder shall, prior to the commencement of this consent:

- (a) install a water measuring device in a location that will enable the determination of the continuous rate of flow and volume of water being diverted to within an accuracy of 10 percent.
- (b) the water measuring device shall, as far as is practicable, be installed at a site likely to retain a stable relationship between flow and water level. The measuring device shall be installed in accordance with the manufacturer's instructions.
- (c) install a tamper-proof electronic recording device such as a data logger(s), which is telemetered, as specified in clause (d).
- (d) The recording device(s) shall be connected to a telemetry system which collects and stores all of the data continuously with a network provider who will make that data available in a commonly used format at all times to the Canterbury Regional Council and the consent holder.
- (e) The water measuring and recording devices described in clauses (a) and (b) shall be available for inspection at all times by the Canterbury Regional Council, including access to the data recorded in accordance with clause (c).
- (f) All data from the recording device described in clause (b), and the corresponding relationship between the water measuring device (a(i)), shall be provided to the Canterbury Regional Council annually in the month of June.

16. Within six months of the installation of the water measuring or recording device(s), specified in condition 15, or any subsequent replacement water measuring or recording device(s), or at any time when requested by the Canterbury Regional Council, the consent holder shall provide an installation and commissioning form demonstrating by means of a clear diagram, that:

- (a) the water measuring and recording device(s) is installed in accordance with the manufacturers specifications; and
- (b) data from the recording device(s) can be readily accessed and/or retrieved in accordance with clauses (ii) and (iii) of condition 15(d) above.

17. This consent is subject to the conditions listed in Schedule 2: Administrative Conditions.

APPENDIX 1

The restrictions specified in condition (4) of CRC061972, shall occur starting the day prior to:

1. all weekend days and public holidays between 1 October and 15 March; and
2. all weekdays from 21 December to 15 February; and
3. Easter weekend starting Good Friday and including Easter Monday.

CRC061973 Use water from the Rakaia River and Waimakariri River at maximum rate of 65m³/s

This application is an amalgamation of CRC061973 and the “use” component of CRC061972.

A consent with a duration of 35 years is sought

1. Water shall only be used for the irrigation of up to approximately 60,000 hectares of land shown on attached Plan CRC061973. Water taken under CRC100581 may also be used under this consent on the same area of land shown on CRC061973.
2. The consent holder shall not authorise or permit any person to act under this resource consent unless that authorised person provides a written undertaking that they will comply with all the conditions of this resource consent, to the same extent as if the resource consent had been granted to that person as well as the consent holder.
3. The consent holder shall:
 - (a) measure bywash discharges and leakage from pipes and structures forming part of the reticulation system that delivers water from the Waimakariri and Rakaia Rivers to the farm supply points for comparison with the target of on average not more than 20% of water taken being lost by bywash discharges and leakage

- from the total reticulation system between 1 September and the following 30 April; and
- (b) ensure the implementation and auditing of the Farm Management Plans (FMPs) as described in conditions 8, 9, 10, 11 and 12, and
 - (c) keep a copy of each FMP, and supply any such FMP to the Canterbury Regional Council, on request.
4. The consent holder shall require all properties supplied with irrigation water under this consent to take all practicable steps to:
- (a) ensure that the volume of water used for irrigation does not exceed that required for the soil to reach field capacity; and
 - (b) avoid the application of water onto non-productive land such as impermeable surfaces and river or stream riparian strips, and
 - (c) avoid surface run-off from irrigation, and
 - (d) avoid leakage from pipes and structures.
- 5.
- (a) The maximum application rate shall not exceed 5.18 millimetres per day on a scheme-wide basis.
 - (b) In the event that water authorised for use under this consent is applied to land concurrently with water abstracted from groundwater, the combined volume of water used on that land shall not exceed 6,250 cubic metres per hectare between the 1st July and the following 30th June.
6. Best management practices shall be implemented on all properties receiving water from the scheme to minimise the loss of nitrate-nitrogen to soil drainage water. Best management practices shall be specified in individual farm management plans.
7. Cattle, pigs, and deer shall be excluded from waterways and wetlands (including drains and races) adjoining land being irrigated;
8. Prior to the use of water from the Central Plains Water Enhancement Scheme for irrigation on individual properties, the water users shall prepare an individual Farm Management Plan which shall include:
- (a) details of how the water users will comply with conditions 3 to 7 of this consent;
 - (b) the best management practices implemented on each property to minimise the loss of nitrate-nitrogen to soil drainage water and minimise any loss of sediment, phosphorus or nitrogen to surface waters. The best management practices may include, but not be limited to:
 - (i) split applications of fertiliser
 - (ii) timing of fertiliser application to match plant growth
 - (iii) avoiding application of fertiliser to saturated soil
 - (iv) avoiding applying fertilizer when the soil temperature at 10 cm depth is less than 6°C
 - (v) using nitrification inhibitors
 - (vi) planting winter cover crops

- (vii) limiting the average total nitrogen (fertiliser and effluent) application to that property.
 - (c) Each property, for each 12 month period ending 30 June shall either:
 - (i) demonstrate via a nutrient budget that the average total nitrogen (fertiliser and effluent) application has been less than 200 kgN/ha/yr; or
 - (ii) use approved methods to undertake calculations or measurements of the average annual concentration of nitrate nitrogen in the soil drainage below the plant root zone. For the purposes of this condition, approved methods shall be:
 - A Calculations using either the most recent version of the OVERSEER® model or the most recent version of the Soil Plant Atmosphere Model (SPASMO); or
 - B Any other method of calculation or measurement approved by the Canterbury Regional Council.
 - (d) where the average annual concentration of nitrate nitrogen in the soil drainage water below the plant root zone as calculated in accordance with clause 8 (c) (ii) or measured, for the property is between 8 grams per cubic metre and 16 grams per cubic metre, management practices shall be implemented to reduce the loss of nitrate nitrogen to soil drainage water;
 - (e) where the average annual concentration of nitrate nitrogen in the soil drainage water below the plant root zone calculated in accordance with clause 8 (c) (ii) or measured, exceeds 16 grams per cubic metre of nitrate nitrogen, the consent holder shall adopt management practices to reduce the loss of nitrate-nitrogen to soil drainage water, including but not limited to:
 - (i) A revision of the Farm Management Plan on that property to ensure best management practices are put in place
 - (ii) A review of the on-farm practices to ensure implementation of the FMP,
 - (iii) The management practices specified in condition 8(b); and
 - (iv) the average total nitrogen (fertiliser and effluent) application to that property shall be limited to 200 kgN/ha/yr.
9. The Farm Management Plan shall include the following objectives:
- (a) ensure that all irrigation systems on the property are capable of operating to meet industry and scheme standards for best practice irrigation;
 - (b) maximise water application effectiveness while minimising excess drainage and runoff;
 - (c) minimise the incidence of wind and/or water erosion caused as a result of farming practices;
 - (d) minimise nutrient losses to surface and ground water through the use of nutrient budgeting;
 - (e) minimise nitrate leaching and/or run-off losses to surface and ground water through careful fertiliser management, management of drains, planting of buffer zones around surfacewater bodies (including drains), and the exclusion of stock from all water bodies;

- (f) minimise phosphate run-off losses to surface water through careful fertiliser management, management of drains, planting of buffer zones around surfacewater bodies (including drains), and the exclusion of stock from all water bodies
- (g) apply nutrients where needed to maximise effectiveness and minimise losses to non target areas;
- (h) exclude all cattle, pigs and deer from waterways and wetlands (including drains and races);
- (i) minimise soil loss and contamination of waterways; and
- (j) avoid, remedy or mitigate effects on native plants and native animals and their habitats on individual farm properties.

10. Auditing

- (a) The Farm Management Plans shall be audited by a suitably qualified independent assessor appointed by the consent holder. The purpose of the review shall be to ensure that the Farm Management Plan demonstrates achievement of the objectives as set out in condition (9) and demonstrates compliance with conditions (3), (4), (5), (6) and (7) of this consent.
- (b) For the first two years of receiving scheme water each farm plan will be audited annually. After that time each plan will be independently audited, including a site visit, at least once every five years.
- (c) Following each independent audit, the consent holder shall identify any areas of non-compliance with conditions (3), (4), (5), (6) and (7).
- (d) In the event that the areas of non-compliance are identified, the consent holder shall take all practicable steps to ensure that the water users are fully compliant with conditions (3), (4), (5), (6) and (7) as soon as practicable and in any case prior to the next 31 August.

ADVICE NOTE: The Canterbury Regional Council may review any Farm Management Plan to check compliance with conditions (3), (4), (5), (6) and (7).

- 11. By 31 August each year, the consent holder shall provide the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager with a report that summarises the following:
 - (a) the results of the Farm Management Plan review by the independent auditor,
 - (b) any non-compliance with the individual Farm Management Plans and conditions (3), (4), (5), (6) and (7).
 - (c) any steps taken by the consent holder to ensure that corrective actions are put in place to address instances of non-compliance.
- 12. The consent holder shall supply to the Canterbury Regional Council, by 31 August each year, information on the previous irrigation season, including:
 - (a) List of all water users;
 - (b) Actual land areas irrigated from the scheme;
 - (c) Water supplied to each property;
 - (d) Land uses by property on the irrigated land;

13. This consent is subject to the conditions listed in Schedule 2: Administrative Conditions.
14. The consent holder shall pay 12.5% of the annual costs incurred by the Canterbury Regional Council to open Lake Ellesmere/Te Waihora.

CRC021091 Take water from the Rakaia River at a maximum rate of 40m³/s

Duration: 35 years

1. Water may only be taken from the Rakaia River at or about map reference NZMS 260 K36:072-391 at a maximum rate of 40 cubic metres per second.

2.

- (a) Except as provided for in condition 3, the maximum combined rate at which water may be taken under this consent and resource consent CRC093683 shall not exceed 33.5 cubic metres per second of Band 5 water.
- (b) For the purposes of this condition, 33.5 cubic metres per second is the rate at which water may be taken and not discharged back to the river (as required by consent CRC093683).

3. Low flow restrictions

- (a) Except as provided for in conditions 4 and 5, whenever the mean flow for the 24 hour period ending at noon on any one day (expressed in cubic metres per second) in the Rakaia River, as estimated by Canterbury Regional Council from measurements at either the gorge recorder site (at or about map reference NZMS 260 K35:015-424) or the recorder site at Fighting Hill (at or about map reference NZMS 260 K35:997-437), falls below the following flows (Y m³/s) , the taking of water in terms of this permit shall cease:

Month:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Flow: (Y m ³ /s)	197	181	178	170	168	169	164	165	163	179	202	212

Note: In the event that water in higher priority bands becomes available for allocation to other water users, then the minimum flows in this condition will require amendment to recognise the priority rights of the consent holder. The above minimum flows have been based upon the assumption that the consent holder has priority over Synlait that has applied to take 6 cubic metres per second, otherwise these minimum flows need to be amended.

- (b) Whenever the mean flow for the 24 hour period ending at noon on any one day (expressed as X cubic metres per second) in the Rakaia River, as estimated by Canterbury Regional Council from measurements at either the gorge recorder site (at or about map reference NZMS 260 K35:015-424) or the recorder site at Fighting Hill (at or about map reference NZMS 260 K35:997-437), exceeds the

minimum flow Y as contained in condition 2(a), then the combined abstraction under this consent and consent CRC093683 shall not exceed Z m³/s where:

$$1. Z = (X-Y)/2 \quad \text{and} \quad Z < 33.5 \text{ m}^3/\text{s}$$

ADVICE NOTE: the maximum rate at which water may be taken under this consent and consent CRC093683 above the minimum flows specified in condition (3)(a) shall not exceed 33.5 cubic metres.

4. The maximum combined rate at which water may be taken under this consent in combination with resource consents CRC093683, CRC051802.3, CRC051803.2 and CRC990088.3 (or any variations to these consents), including water that will be discharged back to the Rakaia River in accordance with consent CRC093683, shall not exceed 67 cubic metres per second, provided that the consent holder complies with the minimum flow requirements of those consents and water allocation rules in the National Water Conservation (Rakaia River) Order 1988.

5.

- (a) In the event that any water allocated to another water user is not being taken, the consent holder may take that water provided that the consent holder complies with the minimum flow requirements of that consent and water allocation rules in the National Water Conservation Order and provided written approval has been obtained from the existing consent holder, prior to the take being exercised, that allows the consent holder to take its unused allocated water. The consent holder shall provide the Canterbury Regional Council, Attention: Compliance and Enforcement Manager, written agreement with the water permit holders giving permission for the consent holder to take their unused but allocated water.

NOTE: For the purpose of this consent, written agreement may be in the form of an email, fax or signed written document

(b)

- (i) Water may also be taken at times when water is not being taken in accordance with one or more of the consents listed in Table 1.
- (ii) The rate at which water may be taken shall not exceed the sum of the individual rates of take for the consents listed in Table 1 not being exercised at that time.
- (iii) The consent holder shall meet the minimum flow requirements of each consent listed in Table 1, and shall comply with the National Water Conservation Order (Rakaia River) at all times.
- (iv) This consent shall not derogate from the rights of water of consent holders listed in Table 1.

Consent	Maximum rate (litres per second)
CRC940052	340
CRC940163	450
CRC990621.2	850
CRC990660	1800
CRC990983.1	2000
CRC940169.1	450
CRC930958B.1	320
CRC990851.1	550
CRC991102.2 and CRC 940486.3	450 (Maximum combined rate)
CRC941177.5	450
CRC941161.2	450
CRC072619	450
CRC941219	450
CRC952433.2	450

PROVIDED THAT if application CRC062685 has priority to be heard over this application CRC021091 and a consent is granted under application CRC062685 to take water from the Rakaia River, then water can not be taken under the provisions of clause 5(b).

Fish screens

6.

- (a) The consent holder shall install and maintain fish screens or deflection barriers on the intake works.
- (b) The fish screens or deflection barriers shall be installed prior to the abstraction of water authorised by this consent.

7. Objectives

The fish screens or deflection barriers shall be designed to ensure the adverse effects on all fishery components are minimised and no more than minor, using best

practice design principles of fish screening. In particular, the fish screen design shall achieve the following performance objectives:

- (a) exclude all adult fish; and
- (b) exclude at least 95% of juveniles of all fishery components that have entered the intake system; and
- (c) all excluded fish shall be returned safely to the main stem of the Rakaia River downstream from the intake; or
- (d) any other objectives established in consultation with Fish and Game North Canterbury and Department of Conservation as outlined in condition 8(a).

For the purpose of this condition “fishery components” shall be defined as all species of sports fish and native fish that are present in the Rakaia River or seasonally migrate past the intake.

8. Fish screen approval process

- (a)
 - (i) Prior to designing the fish screens the consent holder shall commission a suitably qualified expert/s to assess the fisheries of the river and provide a report that, in the expert’s opinion, confirms the appropriateness of the objectives in condition 7 or provides evidence for the need to amend those objectives.
 - (ii) The report shall identify opportunities where the consent holder may enhance the fisheries of the river in addition to the objectives in condition 7, or in partial or full compensation for any loss of fish that might occur as a result of the water take, or in lieu of the full achievement of the objectives in condition 7.
 - (iii) The consent holder shall consult with Fish and Game North Canterbury and Department of Conservation in preparation of this report;
 - (iv) The consent holder shall submit the report and records of consultation required by condition 8(a)(ii), to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager.
- (b) A person duly authorised by the Canterbury Regional Council shall give written notice to the consent holder stating whether or not it approves of any proposed amendment to the objectives within 20 working days of receipt of the report referred to in condition 8(a), and such approval shall not be unreasonably withheld.
- (c) Prior to the taking of water pursuant to this consent, the consent holder shall install a fish screen (“the Screen”) or deflection barrier across the intake designed in accordance with the certified plans approved by a person duly authorised by the Canterbury Regional Council in accordance with Condition 8(h).
- (d) The Screen or deflection barrier shall achieve the objectives of Condition 7 and for the purposes of this condition this shall be achieved by installing, operating and maintaining the Screen or deflection barrier in accordance with the certified design plans referred to in Condition 8(f).
- (e) The design plans for the Screen or deflection barrier shall be certified by:

- (i) a suitably qualified engineer with experience in the design and operation of fish screens and deflection barriers; and
 - (ii) a fisheries biologist with knowledge of salmonid and native fisheries (“the Certifiers”).
- (f) Prior to the commencement of construction of the fish screen or deflection barrier, the consent holder shall provide to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager:
- (i) the certified design plans including the proposed location of the screen or deflection barrier, screen or deflection barrier slot/aperture size, design sweep velocity, design approach velocity, proposed screen material and an effective by-pass structure and flow which returns fish to an actively flowing braid of the river; and
 - (ii) a report from the Certifiers which certifies the design and operation of the screen or deflection barrier:
 - (A) demonstrates best practice in achievement of Condition 8(d); and
 - (B) takes into consideration regional or national guidelines in relation to fish screen and/or deflection barrier design and/or any international guidelines that the Certifiers consider relevant.
 - (iii) The report required in condition f(ii) shall also specify any monitoring requirements for the fish screen.
- (g) Unless the consent holder has obtained written agreement from the Canterbury Regional Council under condition 8(b), the fish screen shall have, as a minimum requirement, the following provisions:
- (i) the fish screen shall cross the full width of the irrigation canal to prevent fish bypassing the screen into the canal;
 - (ii) the screen material voids shall be a mesh or with maximum width of 4 millimetres;
 - (iii) the screens shall have a design approach velocity perpendicular to the screen surface of no greater than 0.12 metres per second;
 - (iv) the design sweep velocity across the screens shall exceed the approach velocity;
 - (v) an effective bypass system shall be maintained at all times that water is diverted into the scheme, to ensure unrestricted passage is maintained to and from an active braid of the river; and
 - (vi) an effective operation and maintenance schedule.
- (h) A person duly authorised by the Canterbury Regional Council shall give written notice to the consent holder stating whether or not it approves of the certified design plans within 20 working days of receipt of the plans and the certifiers’ report referred to in Condition 8(f) and such approval shall not be unreasonably withheld.
- (i) The consent holder shall, prior to commissioning, provide a certificate from a suitably qualified person confirming that construction of the screen or deflection barrier has occurred in accordance with the certified design plans approved in accordance with Condition 8(h).

9. Each fish screen shall be inspected at maximum intervals of two days for any damage causing openings greater than those specified in Condition 8(f)(i), or once every 24 hour period when the flow in the Rakaia River is greater than 300 cubic metres per second, as estimated by Canterbury Regional Council, from measurements at either the gorge recorder site (at or about map reference NZMS 260 K35:015-424) or the recorder site at Fighting Hill (at or about map reference NZMS 260 K35:997-437).
10. In the event that a screen is damaged such that the screen mesh aperture is greater than those specified in Condition 8(f)(i), the screen shall be repaired or replaced as soon as practicable or the damaged screen shut down, and no water shall be taken. Any screen shut down shall not be opened again until a screen that complied with Condition 8(f)(i) is fitted.
11. The incidence of screen shutdowns shall be recorded and reported to the North Canterbury Fish and Game Council as soon as practicable. Records of screen failure shall be forwarded to Canterbury Regional Council by 31 May each year, or as requested
12. Safety at intake
 - (a) Prior to the taking of water pursuant to this consent, the consent holder shall design an intake structure that shall, as far as practicable, prevent water users becoming pinned against or washed into the intake on the Rakaia River.
 - (b) The safety features of the intake structure shall be designed in consultation with the White Water New Zealand and the New Zealand Jet boat Association.
 - (c) The intention of the safety features will be to achieve, if reasonably practicable, an overall International Grade 2 standard suitable for racing kayaks.

Advice note: for the purpose of this clause, the International Grade 2 standard shall be consistent with the USA Grade 2 definition: "Straightforward rapids with wide, clear channels which are evident without scouting. Occasional manoeuvring may be required, but rocks and medium-sized waves are easily missed by trained paddlers. Swimmers are seldom injured and group assistance, while helpful, is seldom needed."
 - (d) The design shall incorporate the following:
 - (i) provide and maintain, if practicable, a wide entrance to a diversion channel,
 - (ii) provide and maintain a widened forebay upstream from the intake gate, to lower the water velocity in the intake channel to about 0.5 cubic metre per second in median to low flow conditions when the full intake flow is operating,
 - (iii) trial a diagonal floating boom across the diversion channel upstream from the intake gate, and adopt this permanently if it proves successful in the opinion of a relevant officer of the Canterbury Regional Council,
 - (iv) provide and maintain an inclined trash rack on the upstream face of the intake gate, leading to a safety ledge and exit point: the size of the trash rack shall be such that velocities approaching it do not exceed 1 cubic metre per second,
 - (v) the surfaces presented to the water shall be free from sharp protrusions which could injure a person or snag clothing.

- (e) The design plans for the intake shall be certified by:
 - (i) a suitably qualified person with experience in the design and operation of intake structures, and
 - (ii) a person with experience in water safety, particularly for recreational boating and kayaking on rivers.
- (f) Prior to the commencement of construction of the intake structure, the consent holder shall provide to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager:
 - (i) The certified design plans;
 - (ii) A report from the certifiers which certifies the design and operation of the safety features on the intake structures which demonstrates best practice in achievement of Condition 12(a) to 12(d);
- (g) A person duly authorised by the Canterbury Regional Council shall give written notice to the consent holder stating whether or not it approves of the certified design plans within 20 working days of receipt of the plans and the certifiers report referred to in Condition 12(f)(ii) and such approval shall not be unreasonably withheld.
- (h) The consent holder shall, prior to commissioning, provide a certificate from a suitably qualified person confirming that construction of the intake structure has occurred in accordance with the certified design plans approved in accordance with Condition 12(g).
- (i) The consent holder shall install, operate and maintain an intake structure designed in accordance with the certified plans approved by a person duly authorised by the Canterbury Regional Council in accordance with Condition 12(g).
- (j)
 - (i) Prior to the first exercise of this consent, the consent holder shall erect and maintain two signs warning of the intake structure at two locations upstream from the intake.
 - (ii) the signs shall be at least one metre by two metres, UV ray and weather resistant, and visible on the banks and by in-river users; and
 - (iii) the location and wording of the signs shall be developed in consultation with White Water New Zealand and to the approval of the Canterbury Regional Council.
- (k) The consent holder shall, as far as is practicable, inform all commercial users and recreational boat clubs of the position of the intake, within one month of the start of construction. A copy of the written notice and a list of those parties notified shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager at least 20 working days prior to the construction on the intake.
- (l) Within six months of commencement of operation the consent holder shall conduct live tests of the intake under a range of river flow conditions and intake flows, and

- (i) shall invite Whitewater NZ and the New Zealand Jet Boat Association to observe and participate in those tests, and
 - (ii) shall invite Whitewater NZ and the New Zealand Jet Boat Association to comment on potential modifications to design and operation, and
- (m) Within 20 working days upon the completion of the live trials, the consent holder shall report to Canterbury Regional Council on the tests required in condition 12(l), including the modifications to design and operation of the intake. In particular, the report shall include:
- (i) comments made by Whitewater New Zealand and the New Zealand Jet Boat Association; and
 - (ii) a report from the certifiers (as set out in condition 12(e)) which includes the following:
 - A comments on the effectiveness of the trial floating boom required in condition 12(d)(iii) to aid in preventing water users becoming pinned against and/or washed into the intake; and
 - B certification that the modifications to the intake safety features will increase the effectiveness of the safety features to prevent water users being pinned against or washed into the intake structure.
- (n)
- (i) Within 40 working days or such other timeframe as may be agreed by the Canterbury Regional Council, the consent holder shall adopt the modifications to the intake design as identified in the report required in condition 12(m).
 - (ii) In the event that the report required under condition 12(m)(ii) indicates that the floating boom is an effective mechanism to aid in preventing water users becoming pinned against and/or washed into the intake, then the floating boom shall form a permanent part of the safety features of the intake structure.

13. The intake screen and trash rack shall be cleaned and maintained on a regular basis such that the performance objective and design requirements to which conditions 12(d) refer are achieved on a continual basis.

14. Measurement of water take.

The consent holder shall, prior to the commencement of this consent:

- (a) install a water measuring device in a location that will enable the determination of the continuous rate of flow and volume of water being diverted to within an accuracy of 10 percent.
 - (i) The water measuring device shall, as far as is practicable, be installed at a site likely to retain a stable relationship between flow and water level. The measuring device shall be installed in accordance with the manufacturer's instructions.
- (b) install a tamper-proof electronic recording device such as a data logger(s), which is telemetered, as specified in clause (c).

- (c) The recording device(s) shall be connected to a telemetry system which collects and stores all of the data continuously with an independent network provider who will make that data available in a commonly used format at all times to the Canterbury Regional Council and the consent holder.
- (d) The water measuring and recording devices described in clauses (a) and (b) shall be available for inspection at all times by the Canterbury Regional Council, including access to the data recorded in accordance with clause (c).
- (e) All data from the recording device described in clause (b), and the corresponding relationship between the water measuring device (a(i)), shall be provided to the Canterbury Regional Council annually in the month of June.

15. Within six months of the installation of the water measuring or recording device(s), specified in condition 14, or any subsequent replacement water measuring or recording device(s), or at any time when requested by the Canterbury Regional Council, the consent holder shall provide an installation and commissioning form demonstrating by means of a clear diagram, that:

- (c) the water measuring and recording device(s) is installed in accordance with the manufacturers specifications; and
- (d) data from the recording device(s) can be readily accessed and/or retrieved in accordance with clauses (ii) and (iii) of condition 14(d) above.

16. This consent is subject to the conditions listed in Schedule 2: Administrative Conditions.

17. If the consent holder takes water under condition 5(b), then prior to the abstraction of that water, the consent holder shall ensure that the abstraction authorised by the associated consent listed in Table 1 is connected to a telemetry system which determines whether or not water is being taken (“on/off telemetry”).

- (a) The telemetry system shall collect and store all of the data continuously with an independent network provider who will make that data available in a commonly used format at all times to the Canterbury Regional Council and the consent holder
- (a) By 31 July each year, the consent holder shall submit a report outlining compliance with conditions 5(b) of this consent for the previous 12 months, to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager.

Discharge Permits

CRC102332 Discharge contaminants and water during construction

This application is an amalgamation of applications CRC061871, CRC061873 and CRC061920 and covers construction phase discharges. Duration 15 years.

Limits

1. The discharge shall be only sediment laden water associated with the construction of the Inlet Canal, Headrace Canal and Water Distribution Network, located within the Scheme Area as shown on Plan CRC102332 which forms part of this consent.
2. Where practicable all discharges of sediment laden water shall be directed onto vegetated land.
3. Where it is not practicable to discharge sediment laden water onto land the discharge into surface water shall be only into the following water bodies:
 - (a) surface water bodies listed in schedules B.1 and B.2;
 - (b) the rakaia river; and
 - (c) the waimakariri river.
4. .This consent is subject to the general conditions listed in Schedule 1: General Conditions, and Schedule 2: Administrative Conditions which form part of this consent.

Pre-construction

5. The consent holder shall ensure that all personnel working on the site are made aware of and have access to the contents of this consent document and all associated erosion and sediment control plans and methodology.
6. The consent holder shall inform the Canterbury Regional Council in writing, Attention: RMA Compliance and Enforcement Manager, at least ten days prior to the commencement of work on each new stage of development.
7. Prior to commencement of works the consent holder or its agent shall arrange and conduct a pre-construction site meeting between the Canterbury Regional Council and all relevant parties, including the primary contractor. At a minimum, the following shall be covered at the meeting:
 - (a) scheduling and staging of the works;
 - (b) responsibilities of all relevant parties;
 - (c) contact details for all relevant parties;
 - (d) expectations regarding communication between all relevant parties;
 - (e) procedures for implementing any amendments;
 - (f) site inspection; and
 - (g) confirmation that all relevant parties have copies of the contents of this consent document and all associated erosion and sediment control plans and methodology.

Erosion and Sediment Control Plans (ESCP)

8. The consent holder shall prepare an Erosion and Sediment Control Plan (ESCP) which shall outline the measures which will be taken to ensure compliance with Condition (20). This ESCP shall include but not be limited to:

- (a) a map showing the location of all works;
 - (b) details of any work staging;
 - (c) an outline of the erosion and sediment control measures to be used including measures to treat water using chemicals;
 - (d) detailed plans showing the location of sediment control measures, onsite catchment boundaries, and sources of runoff for each work stage or sub-stage;
 - (e) a programme of works, which includes but is not limited to, a proposed timeframe for the works;
 - (f) a programme for the inspection and maintenance of the sediment control measures.
9. The ESCP shall be prepared in accordance with the Canterbury Regional Council, 2007 "Erosion and Sediment Control Guidelines for the Canterbury Region" Report No. CRC R06/23.

Certification

10. The ESCP and any amendments to the ESCP shall be certified by a suitably qualified and experienced engineer as being:
- (a) adequate to achieve the performance standards outlined in Condition (20); and
 - (b) consistent with the conditions of this consent;
- prior to any discharge authorised by this consent occurring.
- 11.
- (a) The ESCP, with the exception of the detailed plans required under condition (8)(d), along with any certification required under Condition (10), shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, at least one month prior to construction commencing.
 - (b) The plans for each stage required under condition (8)(d) shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, at least ten working days prior to work on that stage commencing
12. The ESCP may be amended at any time. Any amendments shall be:
- (a)
 - (i) for the purpose of improving the efficacy of the erosion and sediment control measures; or
 - (ii) for the purpose of adding details of a future work stage;and
 - (b) consistent with the conditions of this resource consent; and
 - (c) submitted in writing to the canterbury regional council, attention: rma compliance and enforcement manager, prior to any amendment being implemented.

General

13. During construction, all practicable measures shall be undertaken to minimise discharges of sediment-laden runoff off site.
14. No cut vegetation, debris, or any other excavated material, shall be placed in a position such that it may move into a surface water body.
15. All exposed surfaces within 100 metres of a surface waterway shall be stabilised once earthworks are complete. or if the exposed area is not to be earthworked for a period of 14 days or more. Stabilised: means an area inherently resistant to erosion such as rock (excluding sedimentary rocks), or rendered resistant to erosion by the application of aggregate, geotextile, vegetation or mulch. Where vegetation is to be used on a surface that is not otherwise resistant to erosion, the surface is considered stabilised once 80 percent vegetation cover has been established.
16. Erosion and sediment control measures implemented under the ESCP shall be constructed and maintained in accordance with the Canterbury Regional Council, "Erosion and Sediment Control Guidelines for the Canterbury Region" Report No. CRCR06/23, February 2007 (ESCG).
17. If the consent holder abandons work on-site, it shall first take adequate preventative and remedial measures to control sediment discharges, and shall thereafter maintain those measures for so long as necessary to prevent sediment discharges from the site.

Water Treatment Using Chemicals

18. Prior to the commissioning of chemical treatment, the consent holder shall provide the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager with a Chemical Treatment Plan (CTP). The CTP shall include, but not be limited, the following information:
 - (a) specific design details of the flocculation system;
 - (b) monitoring, maintenance (including post-storm) and contingency programme (including a record sheet);
 - (c) details of optimum dosage (including assumptions);
 - (d) results of the initial flocculation trial;
 - (e) a spill contingency plan;
 - (f) details of the person or bodies who will hold responsibility for long-term maintenance of the flocculation treatment system and the organisational structure which will support this structure. Any amendments to the CTP shall be provided to the Manager, in writing, prior to implementation.
19. Water treatment chemicals shall be applied in accordance with product specifications and the methods described in the Auckland Regional Council, Technical Publication #227 Flocculation Guideline.

Performance Standard

20. The discharge associated with this consent shall not be the cause a conspicuous increase in turbidity or a decrease in clarity in the receiving water body following reasonable mixing. For the purpose of this consent, reasonable mixing is confined to a mixing-zone that:
 - (a) is no longer than 10 times the wetted channel width; and

- (b) is no longer than 100 metres along the longest axis of the zone; and
- (c) does not occupy greater than one third of the wetted channel width.

Note: the wetted channel width is the width of water in the braid receiving the discharge.

Monitoring

21. The consent holder shall ensure that all erosion and sediment control measures are inspected each working day while any earth remains disturbed or otherwise unstabilised.
22. If any storm event results in water discharging from the sediment pond(s) or decanting earth bund(s) into any surface water body, with the exception of the Waimakariri River and the Rakaia River, the consent holder shall, within four hours, undertake water turbidity or water clarity measurements upstream and downstream of the zone of non-compliance to determine whether there has been a conspicuous increase in turbidity or a conspicuous decrease in clarity.
 - (a)
 - (i) Water turbidity shall be measured using a calibrated turbidity meter.
 - (ii) Water clarity shall be measured using a clarity tube or equivalent method.
 - (b) Water turbidity or water clarity measurements shall be undertaken by a suitably qualified person.
 - (c)
 - (i) A conspicuous increase shall be defined as an increase in turbidity of twenty percent or higher at the downstream monitoring site; or
 - (ii) a conspicuous decrease shall be defined as a decrease in clarity of twenty percent or higher at the downstream monitoring site.
23. In the event that there is a conspicuous increase in water turbidity or decrease in clarity measured in accordance with Condition (22) the applicant shall:
 - (a) identify the cause of the elevated suspended sediment concentrations; and
 - (b) identify and undertake mitigation and actions to prevent further exceedances.
24. Written records of all inspections and visual monitoring shall be kept, along with copies of all photographs taken. All records and photographs shall be provided to the Canterbury Regional Council upon request.

Spills

25. There shall be no refuelling within 50 metres of any surface water body.
26. The consent holder shall take all practicable measures to avoid spills of fuel or any other hazardous substance within the site.
 - (a) In the event of a spill of fuel or any other hazardous substance, the consent holder shall clean up the spill as soon as practicable, inspect and clean the stormwater system and take measures to prevent a recurrence.

- (b) The consent holder shall inform the Canterbury Regional Council within 24 hours of a spill event, and shall provide the following information:
- (i) the date, time, location and estimated volume of the spill;
 - (ii) the cause of the spill;
 - (iii) the type of hazardous substance(s) spilled;
 - (iv) clean up procedures undertaken;
 - (v) details of the steps taken to control and remediate the effects of the spill on the receiving environment;
 - (vi) an assessment of any potential effects of the spill; and
 - (vii) measures to be undertaken to prevent a recurrence.

Decommissioning

27. Erosion and sediment control measures shall not be decommissioned until the site is stabilised.
28. Decommissioning shall be only undertaken when dry weather is forecast for a period suitable to allow decommissioning to be carried out without rainfall occurring.

CRC102333 Discharge contaminants and water during scheme operation and maintenance

This application is an amalgamation of applications CRC061871, CRC061873 and CRC061920 and covers operation and maintenance phase discharges. Duration 35 years.

Limits

1. The discharge shall be only sediment laden water associated with the operation and maintenance of the Inlet Canal, Headrace Canal and Water Distribution Network, located within the Scheme Area as shown on Plan CRC102333 which forms part of this consent.
2. Where practicable all discharges of sediment laden water shall be directed onto vegetated land.
3. Where it is not practicable to discharge sediment laden water onto land the discharge into surface water shall be only into the following water bodies:
 - (a) surface water bodies listed in Schedules B.1 and B.2;
 - (b) the Rakaia River; and
 - (c) the Waimakariri River.
4. This consent is subject to the general conditions listed in Schedule 1: General Conditions, and Schedule 2: Administrative Conditions.

Pre-construction

5. The consent holder shall ensure that all personnel working on the site are made aware of and have access to the contents of this consent document and all associated erosion and sediment control plans and methodology.
6. The consent holder shall inform the Canterbury Regional Council in writing, Attention: RMA Compliance and Enforcement Manager, at least ten days prior to the commencement of work on each new stage of development.
7. Prior to commencement of works the consent holder or its agent shall arrange and conduct a pre-construction site meeting between the Canterbury Regional Council and all relevant parties, including the primary contractor. At a minimum, the following shall be covered at the meeting:
 - (a) scheduling and staging of the works;
 - (b) responsibilities of all relevant parties;
 - (c) contact details for all relevant parties;
 - (d) expectations regarding communication between all relevant parties;
 - (e) procedures for implementing any amendments;
 - (f) site inspection; and
 - (g) confirmation that all relevant parties have copies of the contents of this consent document and all associated erosion and sediment control plans and methodology.

Erosion and Sediment Control Plans

8. Prior to each maintenance operation the consent holder shall prepare an Erosion and Sediment Control Plan (ESCP) which shall outline the measures which will be taken to ensure compliance with Condition (20). This ESCP shall include but not be limited to:
 - (a) a map showing the location of all works;
 - (b) details of any work staging;
 - (c) an outline of the erosion and sediment control measures to be used;
 - (d) detailed plans showing the location of sediment control measures, onsite catchment boundaries, and sources of runoff for each work stage or sub-stage;
 - (e) a programme of works, which includes but is not limited to, a proposed timeframe for the works;
 - (f) a programme for the inspection and maintenance of the sediment control measures.
9. The ESCP shall be prepared in accordance with the Canterbury Regional Council, 2007 "Erosion and Sediment Control Guidelines for the Canterbury Region" Report No. CRC R06/23.

Certification

10. The ESCP and any amendments to the ESCP shall be certified by a suitably qualified and experienced engineer as being:
 - (a) adequate to achieve the performance standards outlined in Condition (20); and
 - (b) consistent with the conditions of this consent;prior to any discharge authorised by this consent occurring.
11.
 - (a) The ESCP, with the exception of the detailed plans required under Condition (8)(d), along with any certification required under Condition (12), shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, at least one month prior to works commencing.
 - (b) The plans for each stage required under condition (8)(d) shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, at least ten working days prior to work on that stage commencing
12. The ESCP may be amended at any time. Any amendments shall be:
 - (a)
 - (i) for the purpose of improving the efficacy of the erosion and sediment control measures; or
 - (ii) for the purpose of adding details of a future work stage;and
 - (b) consistent with the conditions of this resource consent; and
 - (c) submitted in writing to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, prior to any amendment being implemented.

General

13. During operation and maintenance, all practicable measures shall be undertaken to minimise discharges of sediment-laden runoff off site.
14. No cut vegetation, debris, or any other excavated material, shall be placed in a position such that it may move into a surface water body.
15. All exposed surfaces within 100 metres of a surface waterway shall be stabilised once earthworks are complete or if the exposed area is not to be earthworked for a period of fourteen days or more. Stabilised: means an area inherently resistant to erosion such as rock (excluding sedimentary rocks), or rendered resistant to erosion by the application of aggregate, geotextile, vegetation or mulch. Where vegetation is to be used on a surface that is not otherwise resistant to erosion, the surface is considered stabilised once 80 percent vegetation cover has been established.
16. Erosion and sediment control measures implemented under the ESCP shall be constructed and maintained in accordance with the Canterbury Regional Council, "Erosion and Sediment Control Guidelines for the Canterbury Region" Report No. CRCR06/23, February 2007 (ESCG).

17. If the consent holder abandons work on-site, it shall first take adequate preventative and remedial measures to control sediment discharges, and shall thereafter maintain those measures for so long as necessary to prevent sediment discharges from the site.

Water Treatment using Chemicals

18. Prior to use of chemical treatment, the consent holder shall provide the Canterbury Regional Council, Attention:RMA Compliance and Enforcement Manager with a Chemical Treatment Plan (CTP). The CTP shall include, but not be limited, the following information:
 - (a) specific design details of the flocculation system;
 - (b) monitoring, maintenance (including post-storm) and contingency programme (including a Record Sheet);
 - (c) details of optimum dosage (including assumptions);
 - (d) results of the initial flocculation trial;
 - (e) a spill contingency plan;
 - (f) details of the person or bodies who will hold responsibility for long-term maintenance of the flocculation treatment system and the organisational structure which will support this structure. Any amendments to the CTP shall be provided to the Manager, in writing, prior to implementation.
19. Water treatment chemicals shall be applied in accordance with product specifications and the methods described in the Auckland Regional Council, Technical Publication #227 Flocculation Guideline.

Performance Standard

20. The discharge associated with this consent shall not cause a conspicuous increase in turbidity or a decrease in clarity in the receiving surface water body following reasonable mixing. For the purpose of this consent, reasonable mixing is confined to a mixing-zone that:
 - (a) is no longer than 10 times the wetted channel width; and
 - (b) is no longer than 100 metres along the longest axis of the zone; and
 - (c) does not occupy greater than one third of the wetted channel width.

Note: the wetted channel width is the width of water in the braid receiving the discharge.

Monitoring

21. The consent holder shall ensure that all erosion and sediment control measures are inspected each working day while any earth remains disturbed or otherwise unstabilised.
22. If any storm event results in water discharging from the sediment pond(s) or decanting earth bund(s) into any surface water body, with the exception of the Waimakariri River and the Rakaia River,, the consent holder shall, within four hours, undertake water turbidity or water clarity measurements upstream and downstream

of the zone of non-compliance to determine whether there has been a conspicuous increase in turbidity, or a conspicuous decrease in clarity.

- (a)
 - (i) Water turbidity shall be measured using a calibrated turbidity meter.
 - (ii) Water clarity shall be measured using a clarity tube or equivalent method.
 - (b) Water turbidity or water clarity measurements shall be undertaken by a suitably qualified person.
 - (c)
 - (i) A conspicuous increase shall be defined as an increase in turbidity of twenty percent or higher at the downstream monitoring site; or
 - (ii) a conspicuous decrease shall be defined as a decrease in clarity of twenty percent or higher at the downstream monitoring site.
 - (d) A conspicuous increase shall be defined as an increase in turbidity of twenty percent or higher at the downstream monitoring site.
23. In the event that there is a conspicuous increase in water turbidity or decrease in water clarity measured in accordance with Condition (22) the applicant shall:
- (a) identify the cause of the elevated suspended sediment concentrations; and
 - (b) identify and undertake mitigation and actions to prevent further exceedances.
24. Written records of all inspections and visual monitoring shall be kept, along with copies of all photographs taken. All records and photographs shall be provided to the Canterbury Regional Council upon request.

Spills

25. There shall be no refuelling within 50 metres of any surface water body.
26. The consent holder shall take all practicable measures to avoid spills of fuel or any other hazardous substance within the site.
- (a) In the event of a spill of fuel or any other hazardous substance, the consent holder shall clean up the spill as soon as practicable, inspect and clean the stormwater system and take measures to prevent a recurrence.
 - (b) The consent holder shall inform the Canterbury Regional Council within 24 hours of a spill event, and shall provide the following information:
 - (i) the date, time, location and estimated volume of the spill;
 - (ii) the cause of the spill;
 - (iii) the type of hazardous substance(s) spilled;
 - (iv) clean up procedures undertaken;
 - (v) details of the steps taken to control and remediate the effects of the spill on the receiving environment;
 - (vi) an assessment of any potential effects of the spill; and

(vii) measures to be undertaken to prevent a recurrence.

Decommissioning

27. Erosion and sediment control measures shall not be decommissioned until the site is stabilised.

28. Decommissioning shall be only undertaken when dry weather is forecast for a period suitable to allow decommissioning to be carried out without rainfall occurring.

CRC102334 Discharge stormwater which may contain contaminants onto or into land and into water

This application is an amalgamation of CRC061922, CRC061945, CRC061924 and CRC061983. Duration 35 years.

Limits

(1) The discharge shall be only stormwater from all structures and impervious areas associated with the Central Plains Water Enhancement Scheme (the scheme), including but not limited to:

- (a) temporary and permanent access tracks;
- (b) the roofs of temporary and permanent buildings;
- (c) fuel storage areas; and
- (d) permanent and temporary hardstand areas.

located within the Scheme Area as shown on Plan CRC102334.

(2) The discharge shall be either:

- (a) onto or into land; or
- (b) into surface water

(3) All fuel shall be stored within on a sealed surface a sealed bund with a capacity of at least 110 percent of the volume of fuel stored.

Stormwater system

(4) All stormwater shall be treated as follows:

- (a) Stormwater from access tracks, permanent hardstand areas, temporary buildings, and temporary hardstand areas shall be either:
 - (i) discharged across vegetated land; or
 - (ii) discharged via a vegetated infiltration basin; or

- (iii) treated in a vegetated swale prior to discharge; or
 - (iv) treated in a detention basin prior to discharge.
- (b) Roof stormwater from permanent buildings shall either:
- (i) discharge into land via soak pits via a sealed system that excludes all other stormwater; or
 - (ii) discharge via any of the treatment measures listed in condition (4)(a).
- (c) Stormwater collected from within fuel storage bunds shall be trucked from the site and disposed of at a facility authorised to receive such materials.

Design criteria

- (5) Each soak pit shall:
- (a) be sized to dispose of all stormwater generated by the contributing catchment by a 10 percent Annual Exceedance Probability rainfall event of one hour duration;
 - (b) have at least one metre separation between the base and the highest seasonal groundwater level at the soak pit location; and
 - (c) have the base sunk into free-draining gravels.
- (6)
- (a) Any land which receives a discharge of stormwater shall be uniformly vegetated with grass or groundcover vegetation.
 - (b) Stormwater from permanent hardstand areas or access tracks that discharges onto vegetated land shall discharge over at least 30 metres of vegetated land before discharging into a surface water body.
- (7) All infiltration basins shall:
- (a) be designed and constructed to have sufficient capacity to contain and infiltrate stormwater runoff from the contributing catchment from all events up to and including a 20 percent annual exceedance probability (20% aep) event of any duration;
 - (b) be lined with a layer of sandy loam at least 150 millimetres thick;
 - (c) be uniformly vegetated with grass; and
 - (d) have at least one metre separation distance between the base and the highest seasonal groundwater level at the site.
- (8) All swales shall:

- (a) have a hydraulic residence time of at least nine minutes for the water quality volume from the contributing catchment;
 - (b) have a longitudinal slope no flatter than 1:100;
 - (c) have a maximum bottom width of between 0.5 and two metres;
 - (d) have side batters no steeper than one vertical to three horizontal;
 - (e) be uniformly vegetated with grass.
- (9) All detention basins shall:
- (a) have the capacity to contain stormwater runoff from the contributing catchment from all events up to and including a 20 percent Annual Exceedance Probability (20% AEP) event of any duration for at least an average of 24 hours; and
 - (b) have the inlet located as far as possible from the outlet.
- (10) Stormwater shall not pond in any component of the stormwater system for longer than three days after the cessation of any storm event.
- (11) The discharge shall not cause scour, erosion and/or instability to the bed or banks of any surface waterway.
- (12) Within 20 working days of the installation of any infiltration basin, a certificate signed by a Chartered Professional Engineer (CPEng) with stormwater system construction experience shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, to certify that the stormwater system complies with Conditions (4) to (9) of this consent. This CPEng shall also sign a statement confirming that they are competent to certify the engineering work

Inspections and Maintenance

- (13) An inspection of the stormwater system shall be carried out at least once every six months.
- (a) Any visible hydrocarbons, and debris or litter shall be removed within ten working days of the inspection.
 - (b) Any accumulated sediment in the stormwater system shall be removed within ten working days of the inspection.
 - (c) Any scour or erosion shall be repaired within ten working days of the inspection.
 - (d) Any blockage of inlets and/or outlets shall be removed immediately.

- (14) The infiltration basins, swales, and any vegetated land that receives stormwater discharge shall be:
- (a) Maintained so that vegetation or grass is in a healthy and uniform state. Seasonal brown-off is permitted.
 - (b) Replanted where erosion or die-off has resulted in bare or patchy soil cover.
- (15) The vegetation in the swales shall be maintained at a height of between 100 and 150 millimetres.
- (16) A management plan detailing the design, operation and maintenance of the stormwater system shall be developed for the site or stage of works within the scheme to which the stormwater system relates. The management plan shall be submitted to Canterbury Regional Council prior to the use of the system and a copy shall also be held by the consent holder, along with a copy of this consent. The management plan shall detail how compliance with conditions (13) to (15) will be achieved.

Performance Standards

- (17) The consent holder shall ensure that the discharges to surface water do not, at any time, result in:
- (a) The production of oil or grease films;
 - (b) The production of floatable or suspended materials; or
 - (c) A significant increase in the turbidity following reasonable mixing. A significant increase shall be defined as an increase greater than 20 percent as measured using a calibrated turbidity meter. For the purpose of this consent, reasonable mixing is confined to a mixing-zone that:
 - (i) is no longer than 10 times the wetted channel width; and
 - (ii) is no longer than 100 metres along the longest axis of the zone; and
 - (iii) does not occupy greater than one third of the wetted channel width.

Note: the wetted channel width is the width of water in the braid receiving the discharge.

Spills

- (18) The consent holder shall take all practicable measures to avoid spills of fuel or any other hazardous substances within the site.
- (a) In the event of a spill of fuel or any other hazardous substances, the consent holder shall clean up the spill as soon as practicable, inspect and clean the stormwater system and take measures to prevent a recurrence;

- (b) The consent holder shall inform the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within 24 hours of a spill event and shall provide the following information:
 - (i) The date, time, location and estimated volume of the spill;
 - (ii) The cause of the spill;
 - (iii) The type of hazardous substance(s) spilled;
 - (iv) Clean up procedures undertaken;
 - (v) Details of the steps taken to control and remediate the effects of the spill on the receiving environment;
 - (vi) An assessment of any potential effects of the spill; and
 - (vii) Measures to be undertaken to prevent a recurrence.

CRC061928 Discharge water for dewatering purposes during construction

To discharge water taken for dewatering purposes during construction or maintenance works to land in circumstances where it may enter water, and to water in the surface waterbodies identified in Schedules B.1 and B.2 and the sites identified in Schedules A.3 and A.4. A consent with a duration of 35 years is sought.

Proposed conditions:

1. The discharge of dewatering water shall only be water taken under resource consent CRC061925.
2. The discharge of dewatering water shall be undertaken in accordance with the conditions in Schedule 1: General Conditions, and Schedule 2: Administrative Conditions, attached to this consent.
3. The water taken for dewatering purposes during construction or maintenance works shall only be discharged onto land in circumstances where it may enter water, and/or to water in the surface waterbodies identified in Schedules B.1 and B.2.
4.
 - (a) The discharge of dewatering water shall not cause any adverse effects to surrounding property or infrastructure. For the purpose of this condition, adverse effects shall include but not be limited to:
 - (i) erosion and scour;
 - (ii) ponding and flooding; and
 - (iii) groundwater mounding.

- (b) In the event that the discharge adversely affects surrounding property or infrastructure, the consent holder shall immediately mitigate or remedy the situation.
5. The consent holder shall submit to the Canterbury Regional Council RMA Compliance and Enforcement Manager at least one month prior to the exercise of this consent, a Dewatering Management Plan outlining the construction and management practices and procedures to be adopted in order to comply with the conditions of this consent and ensure that the effects of the dewatering activities are minimised to the greatest extent practicable. The plan shall include, but not limited to:
- (a) The extent of the construction activities in relation to the areas where dewatering will be required.
 - (b) The types of dewatering methods to be adopted and details of where water will be directed to and disposed of.
 - (c) A construction management programme including timetable, sequence of events and duration.
 - (d) The mitigation measures to be adopted if required to minimise the effects of dewatering on surrounding property and infrastructure.
 - (e) Contact details for the person in charge of the site works.
6. The consent holder shall not commence discharge of dewatering water unless they have obtained written notice from a person duly authorised by the Canterbury Regional Council, stating that the Dewatering Management Plan meets the requirements set out in condition 5.
7. The consent holder may at any time, submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, an amended Dewatering Management Plan for the purposes of:
- (a) improving the efficiency and/or quality of the discharge; or
 - (b) to avoid, remedy or mitigate an adverse environmental effect.

CRC061949 Discharge water and contaminants as seepage from canals and distribution races to land where it may enter water

To discharge water and contaminants to land in circumstances where it may enter water, in the form of seepage from the length of the Inlet Canal, Headrace Canal, Water Distribution Network, and wetlands, as listed in Schedules A1 to A.4 and C3-C4. A consent with a duration of 35 years is sought.

Proposed conditions:

1. The consent holder may discharge water and contaminants to land in circumstances where it may enter water, in the form of seepage from the length of the Inlet Canal, Headrace Canal, Water Distribution Network, Intake and Headworks, as listed in Schedules A1 to A.4 and C3 to C4.

2. The consent shall be undertaken in accordance with the conditions in Schedule 1: General Conditions, and Schedule 2: Administrative Conditions, attached to this consent.
3. The combined leakage and discharge from the Inlet Canal, Headrace Canal and Water Distribution Network and the discharge to wetlands and surface water bodies as consented under CRC102335, shall not exceed 20 percent of the water taken for irrigation under resource consents CRC021091 and CRC061972 . .
4.
 - (a) The Inlet Canal, Headrace Canal and Water Distribution Network shall be designed and constructed to comply with condition 3.
 - (b) At least one month prior to the construction of each discharge site on the Inlet Canal, Headrace Canal and Water Distribution Network, the consent holder shall submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, final design plans for the Inlet Canal, Headrace Canal and Water Distribution Network.
 - (c) The final design plans shall be reviewed and signed by a chartered professional engineer, certifying that all plans comply with condition 3.
 - (d) The review and certification of the plans shall not be undertaken by the person responsible for preparing the design plans.
5. The structures shall be constructed in accordance with the reviewed and certified design plans.
6. A certificate signed by a chartered professional engineer certifying that the Inlet Canal, Headrace Canal and Water Distribution Network have been constructed in accordance with the certified design plans, shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within 20 working days of completion of the construction of each structure.

CRC102335 Discharge surplus water and contaminants from canals and distribution network to water and to land

This application is an amalgamation of CRC061950, CRC071916, CRC071917, CRC061977 and CRC061978.

To discharge surplus water and contaminants, from the Headrace and Water Distribution Network to land in circumstances where it may enter groundwater, and to water at the locations listed in Schedules B.1, B.2, C.1, C.2, C.3 and C.4. A consent with a duration of 35 years is sought.

Proposed conditions:

1. The discharge shall only be surplus water which may contain contaminants from the Headrace and Water Distribution Network.
2. The discharge shall only be:
 - (a) into water at the locations listed in Table 1 of condition 6; or

(b) into land at the locations listed in Table 2 of condition 11 and at the locations listed in Schedules B.1, B.2, C.1, C.2.

3. This consent is subject to the conditions listed in Schedule 1; General Conditions and Schedule 2: Administrative Conditions, which forms part of this consent.
4. The combined discharge of water under this consent and the leakage of water from the Inlet Canal, Headrace Canal and Water Distribution Network as consented under CRC061949, shall not exceed 20 percent of the water taken for irrigation under resource consents CRC021091 and CRC061972.
5. The consent holder shall ensure that at all times the discharge does not prevent the Canterbury Regional Council and its contractors and agents from accessing the Waimakariri riverbed for the purpose of operation and maintenance of the Waimakariri River Flood Protection Scheme.

Discharges into water

6. The rate of flow at any discharge point shall not exceed that shown in the following table.

Location	Site map reference	Maximum operational flow (m ³ /s)	Emergency peak flow (m ³ /s)
Waimakariri	NZMS260 L35:477-496	n/a	9.0
Waimakariri	NZMS260 M35:523-490	0.4	1.0
Waimakariri	NZMS260 M35:539-488	0.4	3.0
Rakaia	NZMS260 L36:329-184	1.5	16.5
Rakaia	NZMS260 L36:264-219	n/a	5.5
Table 1 – discharges to water			

For the purposes of this consent, emergency peak flow is the maximum rate at which bywash water is discharged in an emergency situation, such as a power failure.

7. The discharge shall not result in erosion of the bed or banks of any watercourse.
8. The discharges into the Waimakariri River authorised by this consent shall not result in any of the following:
 - (a) production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials.
 - (b) conspicuous change in the colour or decrease in visual clarity. A conspicuous change in colour shall be defined as a change greater than 10 points on the Munsell scale. A conspicuous decrease in visual clarity shall be defined as a change greater than 33 percent, as measured by black disc or clarity tube.
 - (c) emission of objectionable odour.

- (d) an increase in maximum cover of stream or river beds by periphyton as filamentous growths or mats greater than 3 millimetres thick, to greater than 25 percent cover.
 - (e) Visible plumose growth or mats of bacterial or fungal slime growths (also known as heterotrophic growths or sewage fungus).
 - (f) an exceedence of 2 grams per cubic metre of BOD₅ of GF/C filtered water.
 - (g) The concentration of dissolved oxygen falling below 80 percent of saturation concentration.
 - (h) Fish and other aquatic organisms shall not be rendered unsuitable for human consumption.
 - (i) a statistically measurable impairment of the reproductive ability of fish or of the food of fish. There shall be no toxic effect on fish or on the food of fish. For the purpose of this standard, fish, and the food of fish, do not include any organisms specified as a pest in a pest management strategy under the Biosecurity Act 1993.
 - (j) An increase in the natural temperature of the water by more than 3 degrees celsius, and the temperature of the water, as a result of the exercise of this consent, shall not adversely affect the spawning of trout or salmon during the spawning season.
 - (k) The median faecal coliform concentration of not less than five samples taken within any consecutive 30 day period, shall not exceed 200 faecal coliforms per 100 millilitres; furthermore, no more than 20% of samples within any consecutive 30 day period shall exceed 800 faecal coliforms per 100 millilitres.
 - (l) The quality of the water shall not be altered in those characteristics which have a direct bearing upon the objectionable nature to Tangata Whenua of contamination of surface waters by treated or untreated human sewage.
 - (m) The water shall not be rendered unsuitable for consumption by farm animals.
9. The discharges into the Rakaia River shall comply with the following standards:
- (a) The discharge shall be substantially free from suspended solids;
 - (b) After allowing for reasonable mixing of the discharge with the receiving water:
 - (i) the natural water temperature shall not be changed by more than three degrees Celsius
 - (ii) The waters shall not be tainted so as to make them unpalatable, nor contain toxic substances to the extent that they are unsafe for consumptions by humans or by farm animals, nor shall they emit objectionable odours;
 - (iii) There shall be no destruction of natural aquatic life by reason of a concentration of toxic substances;
 - (iv) The natural colour and clarity of the water shall not be changed to a conspicuous extent;
 - (v) The oxygen content in solution in the water shall not be reduced below 6 milligrams per litre

For the purpose of this consent, reasonable mixing is confined to a mixing-zone that:

(A) is no longer than 10 times the wetted channel width; and

(B) is no longer than 100 metres along the longest axis of the zone; and

(C) does not occupy greater than one third of the wetted channel width.

Note: the wetted channel width is the width of water in the braid receiving the discharge.

10. All practicable measures shall be undertaken to ensure that the discharged water is not deflected into the berm.

Discharges into land

11. The rate of flow at any discharge point shall not exceed that shown in the following table.

Location	Site map reference	Maximum operational flow (m ³ /s)	Emergency peak flow (m ³ /s)
Hawkins	NZMS260 L36:394-330	0.4	3.0
Hawkins	NZMS260 L35:281-574	0.3	2.5
Waianiwaniwa	NZMS260 L36:351-358	0.2	2.0
Selwyn	NZMS260 L36:456-301	0.8	7.0
Selwyn	NZMS260 L36:441-305	0.8	8.5
Selwyn	NZMS260 L36:350-345	0.4	2.5
Selwyn	NZMS260 L36:435-299	0.4	3.5
Selwyn	NZMS260 L35:289-421	0.4	3.0
Hororata	NZMS260 L36:337-334	n/a	1.0
Table 2 – discharges to land			

For the purposes of this consent, emergency peak flow is the maximum rate at which bywash water is discharged in emergency situations, such as a power failure.

12. The inlet(s) to the wetland shall be designed and constructed with appropriate protection to prevent erosion and scour.

13. Each wetland shall be designed and constructed to retain and infiltrate water discharged from the headrace and water distribution network.
14. The wetland shall:
 - (a) Be vegetated with water tolerant species;
 - (b) Have a base that extends into free draining gravels; and
 - (c) Have at least one metre separation distance between the base and the highest seasonal groundwater level at the site before the exercise of this consent.
15. At least one month prior to the construction of each wetland, the consent holder shall submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, design plans and supporting calculations for the wetland to be installed sufficient to demonstrate compliance with conditions 12, 13 and 14. The information submitted shall include, but not be limited to, the following:
 - (a) evidence of infiltration testing carried out at the wetland location, and the results of that testing;
 - (b) the infiltration area of the wetland;
 - (c) a minimum infiltration rate of the base of the wetland; and
 - (d) the volume of the wetland.
16. There shall be no ponding or flooding on surrounding land as a result of the discharge to the wetlands.
17. Within 20 working days of the installation of the stormwater system, a certificate signed by a Chartered Professional Engineer (CPEng) with stormwater system experience shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, to certify that the stormwater system complies with conditions 12, 13 and 14 of this consent.

Maintenance

18. The wetlands and discharge points into rivers shall be inspected at least once every six months.
19. The wetlands shall be maintained such that the infiltration rate is equal to or greater than the minimum rate required to dispose of the water discharged into the wetland without surface runoff.
20. The consent holder shall be responsible for rectifying as soon as practicable any erosion that occurs as a result of the discharge to:
 - (a) the bed or banks of any river; or
 - (b) any constructed wetland
21. The consent holder shall keep records of all inspections and maintenance undertaken in accordance with conditions 18 to 20. These records shall include, but not be limited to:
 - (a) date and details of inspections of the wetland; and
 - (b) date and details of any maintenance work, repairs and upgrades to the wetland, including removal of material and its disposal.
 - (c) these records shall be made available to the Canterbury Regional Council on request.

CRC061980 Discharge diverted water into the Rakaia River

To discharge water that has been diverted, but not taken, back into the Rakaia River, via sediment sluicing, fish pass and bypass channels that form part of the Rakaia water intake system. A consent with a duration of 35 years is sought.

Proposed conditions:

1. The discharge of water and sediment laden water shall only be water that has been diverted in accordance with resource consent CRC061940 via sediment sluicing, fish pass and bypass channels.
2. The discharge shall be into the Rakaia River, at about map reference NZMS 260 K36: 083-379 as shown on the attached plan CRC061980.
3. The discharge of water shall be into an active channel of the Rakaia River.
4. This consent is subject to the conditions listed in Schedule 1: General Conditions and Schedule 2: Administrative Conditions, which forms part of this consent.
5. Fish return flows diverted under consent CRC061940 shall where practicable be maintained continuously, at a rate of at least 2 cubic metres per second, from the time the scheme starts taking water at the start of the irrigation season in spring until it ceases taking water at the end of the same irrigation season in the following autumn, to facilitate the return of migrant fish to the main stem of the river.
6. The discharge of water shall not cause significant erosion of the bed or banks of any watercourse.
7. The discharge shall not prevent the passage of fish along the diversion and discharge channel and particular regard shall be given to avoiding the stranding of fish in pools or channels
8. Sediment sluicing shall only occur when the flow in the Rakaia River as estimated by Canterbury Regional Council from measurements at either the gorge recorder site (at or about map reference NZMS 260 K35:015-424) or the recorder site at Fighting Hill (at or about map reference NZMS 260 K35:997-437) exceeds 300 cubic metres per second.
1. [Numbering??] The discharge from sediment sluicing shall only occur during the mornings of weekdays that are not public holidays, at a time determined in consultation with the Regional Engineer at the Canterbury Regional Council.
9. Warning signs shall be erected in the riverbed downstream of the intake structures as directed by the Regional Engineer at the Canterbury Regional Council.
10. After allowing for reasonable mixing of the discharge with the receiving water, and as a result of the exercise of this consent:
 - (a) The discharge shall be substantially free from suspended solids;
 - (b) After allowing for reasonable mixing of the discharge with the receiving water:
 - (c) the natural water temperature shall not be changed by more than three degrees Celsius

- (d) The waters shall not be tainted so as to make them unpalatable, nor contain toxic substances to the extent that they are unsafe for consumptions by humans or by farm animals, nor shall they emit objectionable odours;
- (e) There shall be no destruction of natural aquatic life by reason of a concentration of toxic substances;
- (f) The natural colour and clarity of the water shall not be changed to a conspicuous extent;
- (g) The oxygen content in solution in the water shall not be reduced below 6 milligrams per litre

For the purpose of this consent, reasonable mixing is confined to a mixing-zone that:

- (A) is no longer than 10 times the wetted channel width; and
- (B) is no longer than 100 metres along the longest axis of the zone; and
- (C) does not occupy greater than one third of the wetted channel width.

Note: the wetted channel width is the width of water in the braid receiving the discharge.

11. The discharge of water shall not result in an increase in turbidity or reduction in clarity of the river flow which, in the opinion of a suitably qualified expert, hinders the upstream passage of salmon in the Highbank salmon bypass channel

12.

- (a) Prior to the exercise of this consent, the consent holder shall commission a suitably qualified salmonid fisheries expert, with post-graduate qualifications in aquatic sciences, or an expert with extensive experience in salmonid fishery science or management, to develop a Diversion and Discharge Management Plan (the Plan). The purpose of the Plan is to ensure the works and discharges in the Rakaia River by the consent holder do not hinder upstream passage of salmon in the Highbank salmon bypass channel and to ensure compliance with condition 11 of this consent.
- (b) The Plan shall be developed in consultation with the operator of the Highbank Power Station, which as a minimum shall require that the consent holder forward a copy of the Plan to the operator of the Highbank Power Station seeking their comment not less than 20 working days prior to submitting the Plan to the Canterbury Regional Council in accordance with condition 14 of this consent and any comments received shall be taken into account when preparing the Plan and forwarded to the Canterbury Regional Council along with the Plan. The Plan shall include the following:
 - (i) An outline of operational requirements of discharges back to the Rakaia River to ensure upstream passage of salmon in the Highbank salmon bypass channel is not hindered.
 - (ii) A monitoring programme to determine whether or not salmon passage in the Highbank salmon bypass channel is affected, including monitoring

methodology, who may be suitable to undertake the monitoring and the frequency of monitoring

(iii) Methods that may be undertaken to reduce any effects on upstream passage of salmon in the Highbank salmon bypass channel if monitoring indicates that the diversion and/or discharge of water is affecting salmon passage

13. Prior to the discharge of water in the Rakaia River, the consent holder shall submit the Diversion and Discharge Management Plan to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager for their approval that the Plan meets the requirements set out in condition 12.

14. The consent holder shall adhere to the Diversion and Discharge Management Plan at all times.

15. In the event that the monitoring and reporting required in condition 13(b) indicates that the discharge is affecting upstream passage of salmon, then the consent holder shall ensure that the methods specified in 13(b)(iii) are implemented to mitigate the effects.

16.

(a) The discharge of water shall not result in a situation where there is not a significant, continuous braid reaching the upstream (inlet) end of the salmon bypass channel of the south bank of the Rakaia River at the Highbank power station tailrace. The amount of water in that river braid shall be sufficient to allow the upstream passage of salmon emerging from the Highbank salmon bypass channel.

(b) If, as a result of the discharge of water authorised by this consent, works need to be undertaken to the Highbank salmon bypass channel to maintain an interconnection with a main flow of the Rakaia River to ensure the effective passage of salmon from the bypass back to the river, then the consent holder shall either:

(i) Reimburse the operator of the Highbank Power Station for the costs of the works no later than the 20th of the following month following the request for payment being made, if the operator of the Highbank Power Station has first rectified this situation, or

(ii) Undertake the works to rectify this situation, subject to the works being first approved by the operator of the Highbank Power Station.

CRC061982 Discharge diverted water into the Waimakariri River

To discharge water that has been diverted but not taken, back into the Waimakariri River, via sediment sluicing, fish pass and diversion channels that form part of the Waimakariri water intake system. A consent with a duration of 35 years is sought.

Proposed conditions:

2. The discharge of water and sediment laden water shall only be water that has been diverted in accordance with resource consent CRC061943 via sediment sluicing , fish pass and bypass channels
3. The discharge shall only be to the Waimakariri River, at about map reference NZMS 260 L35:336-583 as shown on the attached plan CRC061982.
4. The discharge of water shall be into an active channel of the Waimakariri River.
5. This consent is subject to the conditions listed in Schedule 1: General Conditions and Schedule 2: Administrative Conditions.
6. The rate at which water is discharged to the Waimakariri River from the fish pass shall be at least 2 cubic metres per second.
7. The discharge shall not prevent the passage of fish along the diversion and discharge channel and particular regard shall be given to avoiding the stranding of fish in pools or channels.
8. Fish return flows diverted under consent CRC061943 shall where practicable be maintained continuously, at a rate of at least 2 cubic metres per second, from the time the scheme starts taking water at the start of the irrigation season in spring until it ceases taking water at the end of the same irrigation season in the following autumn, to facilitate the return of migrant fish to the main stem of the river.
9. The discharge shall not cause erosion of the bed or banks of any watercourse.
10. The discharges into the Waimakariri River shall not result in any of the following:
 - (a) production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials.
 - (b) conspicuous change in the colour or decrease in visual clarity. A conspicuous change in colour shall be defined as a change greater than 10 points on the Munsell scale. A conspicuous decrease in visual clarity shall be defined as a change greater than 33 percent, as measured by black disc or clarity tube.
 - (c) emission of objectionable odour.
 - (d) an increase in maximum cover of stream or river beds by periphyton as filamentous growths or mats greater than 3 millimetres thick, to greater than 25 percent cover.
 - (e) Visible plumose growth or mats of bacterial or fungal slime growths (also known as heterotrophic growths or sewage fungus).
 - (f) an exceedence of 2 grams per cubic metre of BOD₅ of GF/C filtered water.
 - (g) The concentration of dissolved oxygen exceeding 80 percent of saturation concentration.
 - (h) Fish and other aquatic organisms shall not be rendered unsuitable for human consumption.
 - (i) a statistically measurable impairment of the reproductive ability of fish or of the food of fish. There shall be no toxic effect on fish or on the food of fish. For the purpose of this standard, fish, and the food of fish, do not include any organisms specified as a pest in a pest management strategy under the Biosecurity Act 1993.

- (j) An increase in the natural temperature of the water by more than 3 degrees celsius, and the temperature of the water, as a result of the exercise of this consent, shall not adversely affect the spawning of trout or salmon during the spawning season.
 - (k) The median faecal coliform concentration of not less than five samples taken within any consecutive 30 day period, shall not exceed 200 faecal coliforms per 100 millilitres; furthermore, no more than 20% of samples within any consecutive 30 day period shall exceed 800 faecal coliforms per 100 millilitres.
 - (l) The quality of the water shall not be altered in those characteristics which have a direct bearing upon the objectionable nature to Tangata Whenua of contamination of surface waters by treated or untreated human sewage.
 - (m) The water shall not be rendered unsuitable for consumption by farm animals.
11. Sediment sluicing shall only be undertaken when the unmodified flow in the Waimakariri River, as estimated by the Canterbury Regional Council from measurements at the Old Highway Bridge, at or about map reference NZMS 260 M35:818-547, exceeds 100 cubic metres per second.
 12. The discharge from sediment sluicing shall only occur during the mornings of weekdays that are not public holidays, at a time determined in consultation with the Regional Engineer at the Canterbury Regional Council.
 13. Warning signs shall be erected in the riverbed downstream of the intakes structures in locations determined in consultation with the Regional Engineer at the Canterbury Regional Council.
 14. The consent holder shall ensure that the discharge does not prevent the Canterbury Regional Council and its contractors and agents from accessing the Waimakariri riverbed for the purpose of operation and maintenance of the Waimakariri River Flood Protection Scheme.

CRC102336 Discharge contaminants and dust to air during scheme construction

This application is an amalgamation of 061762, CRC061763, CRC061765 and CRC061755 and addresses construction phase works. Duration: 15 years

1. The discharges to air shall only be fugitive dust from the construction activities and contaminants from welding, blasting and painting along the routes of the Intake Systems, Inlet Canal, Headrace Canal, Water Distribution at or about the map references listed in Schedules A.1 to A.4 which form part of this consent, and the water intake systems on the Rakaia River and Waimakariri River, located as shown on the attached plans CRC102336, which form part of this consent.
2. The activities shall be undertaken in accordance with the conditions listed in Schedule 1: General Conditions, and Schedule 2: Administrative Conditions, which forms part of this consent.
3. The consent holder shall submit to the Canterbury Regional Council at least one month prior to the commencement of works an Air Quality Management Plan outlining the construction practices and procedures to be adopted in order to:

- (a) ensure compliance with the conditions of this consent;
 - (b) ensure the adverse effects of construction activities are minimised to the greatest extent practicable; and
 - (c) ensure the adverse effects of discharges from welding blasting and painting activities are minimised to the greatest extent practicable.
4. The Air Quality Management Plan shall include, but not be limited to:
- (a) the identification of construction areas where dust and contaminants are likely to be generated;
 - (b) the types of construction methods to be adopted;
 - (c) the mitigation measures to be adopted to minimise the effects of dust and contaminants beyond the boundary of the construction site;
 - (d) the location of meteorological monitoring instruments as specified in condition (6); and
 - (e) the contact detail for the person in charge of the site works.
5. All practicable measures shall be taken to limit the duration and frequency that dust and contaminants associated with construction activities is discharged to air.
6. Wind Monitoring
- (a) The consent holder shall install meteorological monitoring instruments at three locations in the scheme area.
 - (b) The meteorological monitoring instruments shall to be located at sites likely to be representative of the metrological conditions at the construction sites.
 - (c) The meteorological monitoring instruments shall be installed at a height of at least three metres above ground level.
 - (d) The meteorological monitoring instruments shall continuously monitor and record wind speed and wind direction.
 - (e) The data shall be recorded as ten minute averages.
 - (f) The consent holder shall ensure that the monitoring system is fitted with appropriate systems that will trigger alarms when specified meteorological conditions are reached so that activities can be managed.
7. The consent holder shall adopt all practicable measures to minimise the emissions of fugitive dust. These will include, but are not limited to:
- (a) Regular cleaning of sealed surfaces to prevent accumulation of dust;
 - (b) Wetting down of unsealed surfaces with sufficient water to ensure dust discharge is minimised;
 - (c) Wetting unsealed surfaces at least hourly when wind speeds are greater than 18 kilometres per hour; and
 - (d) Ensuring material excavated from the river is wetted with sufficient water to ensure dust discharge is minimised.

8. The discharge shall not cause deposition of particulate matter to the extent that it is offensive or objectionable beyond the construction site on which the consent is exercised.
9. The consent holder shall take all practicable measures to prevent the discharge of dust from on-site transportation. This shall include, but not be limited to:
 - (a) Applying water to suppress dust on unsealed surfaces, as required;
 - (b) Restricting vehicle speeds;
 - (c) Preventing overloading to avoid spillages of transported material.
10. A record of any complaints relating to particulate matter shall be maintained and include:
 - (a) Location where particulate matter was detected;
 - (b) Date and time when particulate matter was detected;
 - (c) A description of the physical conditions including wind speed and direction;
 - (d) The most likely cause of the particulate matter detected;
 - (e) Any corrective action undertaken by the consent holder to avoid, remedy or mitigate suspension of the particulate matter.
11. The Canterbury Regional Council may, once per year, serve notice of its intention to review the conditions of this consent for the purposes of dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage.
12. The lapsing date for the purposes of section 125 of the Resource Management Act 1991 shall be 8 years from granting of consent.

CRC102337 Discharge contaminants and dust to air during scheme operation and maintenance

This application is an amalgamation of 061762, CRC061763, CRC061765 and CRC061755 and addresses operation and maintenance phase works. Duration: 35 years

1. The discharges to air shall only be fugitive dust from the operation and maintenance activities and contaminants from welding, blasting and painting along the routes of the Intake Systems, Inlet Canal, Headrace Canal, Water Distribution at or about the map references listed in Schedules A.1 to A.4 which forms part of this consent and the water intake systems on the Rakaia River and Waimakariri River, located as shown on the attached plan CRC102337, which form part of this consent
2. The activities shall be undertaken in accordance with the conditions listed in Schedule 1: General Conditions, and Schedule 2: Administrative Conditions, which forms part of this consent.
3. The consent holder shall submit to the Canterbury Regional Council at least one month prior to the commencement of works an Air Quality Management Plan outlining the operation and maintenance practices and procedures to be adopted in order to:

- (a) ensure compliance with the conditions of this consent;
 - (b) the effects of construction activities are minimised to the greatest extent practicable; and
 - (c) ensure the adverse effects of discharges from welding blasting and painting activities are minimised to the greatest extent practicable.
4. The Air Quality Management Plan shall include, but not be limited to:
- (a) the identification of operation and maintenance areas where dust and contaminants are likely to be generated;
 - (b) the mitigation measures to be adopted to minimise the effects of dust beyond the boundary of the construction site; and
 - (c) the contact details for the person in charge of the site works.
5. All practicable measures shall be taken to limit the duration and frequency that dust associated with construction activities is discharged to air.
6. The consent holder shall ensure that the monitoring system is fitted with appropriate systems that will trigger alarms when specified meteorological conditions are reached so that activities can be managed.
7. The consent holder shall adopt all practicable measures to minimise the emissions of fugitive dust. These will include, but are not limited to:
- (a) Regular cleaning of sealed surfaces to prevent accumulation of dust;
 - (b) Wetting down of unsealed surfaces with sufficient water to ensure dust discharge is minimised;
 - (c) Wetting unsealed surfaces at least hourly when wind speeds are greater than 18km/hour; and
 - (d) Ensuring material excavated from the river is wetted with sufficient water to ensure dust discharge is minimised.
8. The discharge shall not cause deposition of particulate matter to the extent that it is offensive or objectionable beyond the construction site on which the consent is exercised.
9. The consent holder shall take all practicable measures to prevent the discharge of dust from on-site transportation. This shall include, but not be limited to:
- (a) Applying water to suppress dust on unsealed surfaces, as required;
 - (b) Restricting vehicle speeds;
 - (c) Preventing overloading to avoid spillages of transported material.
10. A record of any complaints relating to particulate matter shall be maintained and include:
- (a) Location where particulate matter was detected;
 - (b) Date and time when particulate matter was detected;
 - (c) A description of the physical conditions including wind speed and direction;
 - (d) The most likely cause of the particulate matter detected;

(e) Any corrective action undertaken by the consent holder to avoid, remedy or mitigate suspension of the particulate matter.

Schedule 1: General Conditions

General Conditions

1. All practicable measures shall be undertaken to minimise and mitigate adverse effects on property, amenity values, wildlife, vegetation and ecological values.
2.
 - (a) The consent holder prepare an Environmental Construction Management Plan (ECMP) detailing the construction activities and the procedures that shall be undertaken to comply with the conditions of this consent and to minimise and mitigate effects of construction activities to the greatest extent practicable. .The matters to be addressed in the ECMP shall include the following:
 - (i) General
 - (A) Plan Purpose
 - (B) The practices and procedures to be adopted to achieve compliance with the conditions of the designation
 - (C) Plan Revision and Compliance Issue Resolution Processes
 - (D) ECMP/Management Plan Certification Process
 - (E) Roles and Responsibilities
 - (ii) Mitigation of Adverse Effects
 - (A) Environmental Objectives and Principles
 - (B) Environmental Management Approach and Methods
 - (iii) Plan Requirements and the annual environment report process
 - (b) ECMP there will be the following sub-plans to ensure compliance with specific conditions on each consent.
 - (i) Construction Phase Management Plan
 - (ii) Public Health and Safety Plan
 - (iii) Traffic Management Plan
 - (iv) Landscape and Rehabilitation Management Plan
 - (v) Noise and Vibration Management Plan
 - (vi) Terrestrial Ecology Protection Plan
 - (vii) Remediation Action Plan
 - (viii) Waste Management Plan
 - (ix) Hazardous Substances/Spill Contingency Management Plan
 - (x) Archaeological and Heritage Management Plan
 - (xi) Dust Control Management Plan
 - (xii) Mudfish management plan
 - (xiii) Diversion and discharge plan

Note: That the only Management Plans in conditions 2(b)(iv), (ix) and (x) to (xiii) relate to matters within the functions of the Canterbury Regional Council and not those of the Selwyn District Council.

3. The ECMP shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager at least 30 working days prior to the commencement of works.
4. The consent holder may, at any time, submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager an amended Environmental Construction Management Plan provided it is for the purpose of improving the efficiency and/or quality of the construction works, and/or better avoiding, mitigating or remedying adverse effects.
5. At least 20 working days prior to the start date of the works, the consent holder shall notify the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, in writing, of the proposed start date.

Mudfish Management Plan

6.
 - (a) Prior to exercising this consent, the consent holder shall commission a suitably qualified expert with knowledge and experience with assessments of Canterbury Mudfish populations to prepare a Mudfish Management Plan in consultation with the Department of Conservation.
 - (b) The purpose of the Mudfish Management Plan is to ensure that the scheme effects on Canterbury Mudfish (*Neochanna burrowsius*) populations and their habitat within the Central Plains Water Enhancement Scheme area are no more than minor.
 - (c) The expert as defined in condition 6(a) shall survey the scheme area for Canterbury Mudfish populations and habitats prior to preparing the Plan.
 - (d) The Mudfish Management Plan shall include the following:
 - (i) a map identifying Canterbury Mudfish populations and potential habitats within the scheme area and their current state; and
 - (ii) an assessment of the potential effects on the Canterbury Mudfish populations and their habitat from changes in flows and water levels in wetlands, ponds, water races, rivers and streams, and from works within the beds of rivers, water races and or streams, or in wetlands; and
 - (iii) mitigation or offset measures that the consent holder shall adopt to ensure that the effects on the Canterbury Mudfish and their habitat will be no more than minor. Mitigation and offset measures may include, but not be limited to, the following:
 - (A) mechanisms to exclude predators/competitors from mudfish habitat in areas where predators/competitors are currently unable to regularly access the habitat prior to the Scheme being commissioned;
 - (B) mechanisms to manage beneficial water levels in mudfish habitats;
 - (C) enhancements of mudfish habitats through fencing, planting, and pest control; and

- (D) proposed translocation or re-establishment of populations in suitable areas.
 - (iv) a strategy to make available and communicate the plan information and requirements to scheme landowners and operators; and
 - (v) recommended ongoing monitoring and reporting requirements to demonstrate that the plan implementation has been effective and that effects of the scheme on mudfish in the area are no more than minor.
- 7.
- (a) The consent holder shall submit the Mudfish Management Plan to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager to certify that the Plan meets the objectives set out in condition 6(b).
 - (b) The consent holder shall submit the name and qualifications of the author of the Mudfish Management Plan to the Canterbury Regional Council with the Mudfish Management Plan.
 - (c) The Canterbury Regional Council shall give written notice to the consent holder stating whether or not the Mudfish Management Plan complies with condition 6 within 20 working days of receiving the Mudfish Management Plan.
 - (d) Any amendments to the Mudfish Management Plan shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager. The amendments shall be certified by a suitably qualified person with experience and knowledge with assessments of Canterbury Mudfish populations, that the amended Mudfish Management Plan meets the objectives set out in condition 6(b).
 - (e) The consent holder shall report on the effectiveness of the plan, and effectiveness of any mitigation or offset measures implemented, at least at five yearly intervals (by 30 June each fifth year), or more frequently if recommended in the plan. The report shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager.
8. The consent holder shall adhere to the Mudfish Management Plan, or any amendments to the Mudfish Management Plan, at all times.
9. Where activities involve works in the beds and margins of rivers or water courses, the consent holder shall ensure:
- (a) Fish and Game New Zealand - Central South Island Region and The Department of Conservation are notified of the intention to carry out works, and their intended type, no less than two working days prior to their commencement.
 - (b) all practicable measures shall be undertaken to:
 - (i) keep to established tracks and stream crossings; and
 - (ii) prevent debris, soil and vegetation entering the watercourse; and
 - (c) the activity shall not restrict access to flood control structures and/or flood control vegetation for the purposes of their repair or maintenance.
 - (d) Birds

- (i) The consent holder shall ensure that prior to any mechanical works being carried out in the period 1 September to 1 February:
 - (A) a suitably qualified and independent person, with experience and expertise in the identification of avifauna that nest in riverbeds and their breeding sites, inspects the proposed area of works, no earlier than eight working days prior to any works being carried out, and locates any breeding sites of the bird species listed in Appendix A;
 - (B) the person carrying out the inspection prepares a written report that identifies all the located bird breeding or nesting sites and provides copies of that report to the consent holder and the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager;
 - (C) the name and qualifications of the person carrying out the inspection are provided to the Canterbury Regional Council with the report;
 - (D) any person carrying out works authorised by this consent are informed of any bird breeding or nesting sites located; and
 - (E) where work ceases for more than 10 days, the site will be re-inspected for bird breeding and nesting sites in accordance with parts (a) to (d) of this condition.
- (ii) As far as practicable, vehicles and/or machinery shall not operate within 100 metres of birds which are nesting or rearing their young in the bed of the river. Where this is not practicable the consent holder will arrange either relocation as recommended by and under the supervision of the expert as defined in condition 9(d)(i)(A), or alternatively offset mitigation of equivalent value to avifauna as recommended by that expert.

For the purposes of this condition birds are defined as those bird species listed in Appendix A.

(e) Fish

- (i) Prior to any works being carried out in the period 1 October to 30 March the consent holder shall:
 - (A) Commission a suitably qualified and independent person, with experience and expertise fish migration provides a report certifying that the effects from the proposed works on fish migration will be no more than minor; and
 - (B) submit the report to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, along with the name, qualifications and experience of the author of that report.
 - (ii) No works in flowing water shall take place in the Selwyn, Hororata and Hawkins River during the trout spawning period of 1 May to 30 September
- (f) The activities, structures and any associated equipment, materials, or debris, shall not obstruct or alter the passage of water in a manner that causes:
- (i) an increase in the risk or potential for flooding of surrounding land;

- (ii) destabilisation of lawfully established flood control vegetation , flood control structures or any other lawfully established structures within the beds of rivers;
 - (iii) an increase in erosion of river beds or banks;
 - (g) The works shall not prevent the passage of fish, and all practicable measures shall be undertaken to prevent the stranding of fish in pools or channels.
 - (h) Machinery shall be free of plants and plant seeds prior to use in the riverbed.
 - (i) No plant species listed in Schedule BLR1 of Chapter 6 “Beds and margins of lakes and rivers” of the Proposed Canterbury Natural Resources Regional Plan shall be planted.
 - (j) To prevent the spread of Didymo or any other aquatic pest, the consent holder shall ensure that activities authorised by this consent are undertaken in accordance with the Biosecurity New Zealand’s hygiene procedures.
- Note: You can access the most current version of these procedures from the Biosecurity New Zealand website <http://www.biosecurity.govt.nz> or Canterbury Regional Council Customer Services.
- (k) Within forty working days of the completion of the construction works, the consent holder shall supply the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, a complete set of “as-built” plans confirming the location of the works.
 - (l) Within forty working days of completion of the construction works, the consent holder shall report to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, certifying that all construction debris or other materials from the construction works has been removed.
 - (m) The consent holder shall maintain and keep a complaints register for all aspects of all operations in relation to construction activities. The register shall detail the date, time and type of complaint, cause of the complaint, and action taken by the consent holder in response to the complaint. The register shall be available to the Canterbury Regional Council upon their request.
 - (n) All disturbed areas shall be stabilised and/or revegetated following completion of the works.
 - (o) No structure and/or site works shall preclude existing access to the riverbed.

Accidental Discovery

10. This protocol shall cover archaeological sites, historic sites and historic buildings classified under the Historic Places Act 1993. Where appropriate, all contractors, project managers and stakeholders shall be inducted into the protocol and made aware of their individual responsibilities under the protocol.
- (a) In the event of any disturbance of Koiwi Tangata (human bones) or taonga (treasured artefacts), the Requiring Authority shall immediately:
 - (i) Advise the Te Rūnanga o Ngāi Tahu, Te Taumutu Rūnanga, or their representative, and the Canterbury Regional Council of the disturbance;

- (ii) Cease earthmoving operations in the affected area until the area containing the Koiwi Tangata or taonga has been clearly demarcated, and Kaumatua and archaeologists have certified that it is appropriate for earthmoving to recommence.
- (b) In the event of accidental discovery of archaeological remains, the following steps shall be taken:
 - (i) All activity affecting the immediate area shall cease and the Regional Archaeologist of the New Zealand Historic Places Trust shall be contacted;
 - (ii) The site shall be secured to ensure that the remains are not further disturbed;
 - (iii) Further works affecting the remains will not commence until either:
 - (A) The Regional Archaeologist of the New Zealand Historic Places Trust has confirmed in writing that the archaeological provisions of the Historic Places Act 1993 do not apply; or
 - (B) The requirements of the archaeological provisions of the Historic Places Act 1993 have been met, and if required, and archaeological authority has been granted by the New Zealand Historic Places Trust.
- (c) If human remains / koiwi tangata are located, in addition to the above steps, the Runanga representative for the area and the New Zealand Police must be contacted.
- (d) The above protocol shall only be amended in consultation with the New Zealand Historic Places Trust (NZHPT) Te Rūnanga o Ngāi Tahu and Te Taumutu Rūnanga. Once finalised, copies shall be lodged with those parties and the Canterbury Regional Council prior to any construction commencing.

Schedule 2: Administrative Conditions

1. The lapsing provisions of Section 125 of the Resource Management Act 1991 shall not apply until after the expiry of eight years from the commencement date of this consent.

Environmental Management Fund

2. Prior to the exercise of this consent, the consent holder shall establish an Environmental Management Fund (EMF) to be managed and distributed by an independent Environmental Management Fund Committee (EMFC) for the purpose of:
 - (a) environmental mitigation of the effects of the operation of the water enhancement scheme which is not otherwise required by the individual Farm Management Plan or specific consent conditions; and
 - (b) environmental management projects within the area affected by the operation of the scheme as shown on Plan CRC061973A.
3. Prior to the exercise of this consent, the consent holder shall establish an EMFC. There shall be at least six members on the EMFC and shall include representatives of:
 - (a) Central Plains Water Trust or Central Plains Water Limited;
 - (b) community interests; and
 - (c) the regional and district consent authorities.
4. The fund shall not be utilised for any of the following:
 - (a) measures required by conditions, the Sustainability Protocol or Farm Management Plans;
 - (b) any administration or education associated with consent conditions, the Sustainability Protocol or Farm Management Plans.
5. The consent holder shall submit a report to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Officer which details the following:
 - (a) fund structure and management;
 - (b) the level of levy (initially at least \$0.40 per share per annum);
 - (c) criteria for seeking, selecting and approving applications;
 - (d) criteria for a rebate of the levy to recompense water users for the capital costs of environmental enhancement work on water users' own properties, which is not otherwise required by their Farm Management Plan or the consent conditions (up to 50% rebate of the levy paid by any one water user in any one year).
6. By the time 10,000 hectares of land is irrigated under this scheme, the EMF shall have a minimum amount of \$300,000. Each water user that enters a Water Users Agreement with the consent holder shall commence paying the levy from the date which the Water Users Agreement is signed.
7. The levy shall increase annually based on the all groups consumer price index as published quarterly by Statistics NZ. The initial rate of 40 cents per share shall be

established as equivalent to the all groups consumer price index for 1 July 2010. The first annual adjustment of the levy shall take place on 1 July 2011.

8. The priority for the distribution and use of the scheme Environmental Management Fund, shall be the following environmental mitigation if it is not also required by the individual Farm Management Plans or consent conditions specified in CRC061973 and the Groundwater and Drainage Plan:
 - (e) Minimising nutrient losses to lowland streams and Lake Ellesmere/Te Waihora;
 - (f) Excluding stock from wetlands, riparian margins and beds of rivers and streams,
 - (g) Physical protection of indigenous vegetation planting along riparian margins;
 - (h) Wetland enhancement and wetland creation, including the development of wetlands along intermittent streams;
 - (i) Permanent protection of wetland areas that may contain mudfish.

Sustainability Protocol

9. The consent holder shall comply with the Sustainability Protocol attached to this consent, which provides details of the practices and procedures to be put into place to operate the Central Plains Water Enhancement Scheme.
10. The Sustainability Protocol shall be used to develop the Farm Management Plans as prescribed in accordance with resource consent CRC061973.
11. At least one year prior to the commencement of the scheme, and at least once every five years after the commencement of the scheme, the sustainability protocol shall be reviewed and updated to reflect best practice.

Community Liaison

12. The consent holder shall, prior to the exercise of this consent, undertake an open, public process to offer membership positions on a Community Liaison Group.
13. The Community Liaison Group shall consist of a maximum of six persons with a preference for representatives who can each demonstrate skills or knowledge in at least one of the following:
 - (a) Recreational uses of the Waimakariri River or Rakaia River;
 - (b) Sustainable irrigated agricultural practices;
 - (c) Water quality and sustainable land management;
 - (d) Community and/or business in Central Canterbury;
 - (e) Lowland drainage network operation;
 - (f) Management of indigenous biodiversity.
14. The members of the Community Liaison Group shall, at the consent holder's expense, be offered:
 - (a) the opportunity to meet every six months, or less frequently as determined by the Community Liaison Group,

- (b) an annual inspection of the Scheme area, and
 - (c) the provision of any information to which Canterbury Regional Council is entitled by virtue of this consent,
15. If the Community Liaison Group elects to hold a meeting in accordance with Condition 14, then the Scheme Manager or their nominated representative shall attend the meeting.
16. At least one representative from each of Canterbury Regional Council (in its resource consent regulatory capacity); Canterbury Regional Council (in its river and drainage management capacity); and Selwyn District Council shall be invited to attend meetings.
17. The main purposes of the meetings of the Community Liaison Group are to:
- (a) Provide input and feedback into the preparation, implementation, review and amendment of the Farm Management Plan templates as required by consent CRC061973;
 - (b) Be presented by, and discuss with, the consent holder the results of monitoring and reporting as required by the conditions of this consent, including the Annual Environmental Report and the annual overall audit report on compliance with the Farm Management Plans, prepared by the consent holder;
 - (c) Discuss, as far as practicable, any community concerns regarding the operation of the Central Plains Water Enhancement Scheme.
 - (d) Review and recommend to the consent holder projects for the distribution of funds from the environmental levy to environmental mitigation projects in accordance with Condition 2(b).
- 18.
- (a) The members of the Community Liaison Group shall be offered the opportunity to review and comment on:
 - (i) the initial Scheme Environmental Management Plan; and
 - (ii) the initial Farm Management Plan templates,
 - (iii) the reviews of and any amendments to the Scheme Environmental Management Plan and Farm Management Plan templates; and
 - (iv) the consent holder's Annual Environmental Report including the annual overall audit report on compliance with the Farm Management Plans.
 - (b) The Community Liaison Group shall be provided with the opportunity to submit information to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager annually in relation to the review of the Scheme Environmental Management Plan and the template for the Farm Management Plans.

Groundwater and Lowland Drainage

Groundwater and Lowland Drainage

19. The consent holder shall avoid, remedy or mitigate adverse effects on groundwater, gravel pit operations and lowland drainage which occur as a result of the exercise of this consent.

20. Groundwater Technical Review Panel

- (a) Prior to the commencement of any activities authorised by these consents (including the finalisation of the Groundwater and Drainage Plan listed in condition 20), the Canterbury Regional Council shall, in consultation with the consent holder, appoint a Groundwater Technical Review Panel (GTRP).
- (b) The GTRP shall comprise of five to seven people. The panel members shall be selected so that collectively they provide expertise in the following areas:
 - (i) The operation of the Central Plains Water Enhancement Scheme;
 - (ii) Lowland drainage network operations in Canterbury;
 - (iii) Hydrogeology;
 - (iv) Land drainage;
 - (v) Groundwater quality monitoring; and
 - (vi) Surface water monitoring.
- (c) The GTRP shall comprise at a minimum the following:
 - (i) a technical representative appointed by Central Plains Water Enhancement Scheme management;
 - (ii) a technical representative of drainage schemes management from the lower plains;
 - (iii) an engineer with expertise and experience in both large scale and localised solutions to land drainage needs;
 - (iv) an engineer or scientist with expertise and experience in Canterbury groundwater systems;
 - (v) a technical representative from the Canterbury Regional Council.
- (d) The role of the GTRP shall be to :
 - (i) review the Groundwater and Drainage Plan described in condition 20, and recommend any amendments as it considers appropriate;

- (ii) consult with Te Runanga O Ngai Tahu regarding the monitoring and mitigation measures related to effects on Lake Ellesmere/Te Waihora as proposed in the Groundwater and Drainage Plan;
 - (iii) receive and review reports on the environmental monitoring and mitigation undertaken by the consent holder and any other relevant monitoring results and reports prepared by the Canterbury Regional Council or other bodies;
 - (iv) review reports submitted by the consent holder and complaints referred to it in accordance with condition 31, and within two months of the receipt of these reports, convey recommendations to the consent holder regarding the validity of the interpretation of monitoring data and implementation of mitigation measures undertaken by the consent holder;
 - (v) determine the likely cause of reported problems with drainage or groundwater including using information gathered in accordance with conditions 24 and 25, propose mitigation or remedial measures and determine the extent to which the consent holder must implement them, or contribute to the cost of implementing them, given the consent holder's degree of contribution to the problem. Where effects cannot be addressed by mitigation or remedial measures they shall be addressed by way of financial compensation;
 - (vi) advise the Canterbury Regional Council if there are grounds to review conditions of consent in the event that an adverse effect arises which is not mitigated or remedied by the consent holder to the extent recommended by the GTRP; and
 - (vii) address other matters that may arise from the exercise of consent CRC061973.
- (e) The GTRP shall:
- (i) meet no less frequently than once a year; and
 - (ii) be funded by the consent holder; and
 - (iii) operate on a majority basis; and
 - (iv) report no less frequently than once a year on its conclusions and recommendations including any complaints referred to it to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Officer and the consent holder.

21. Groundwater and Drainage Plan

- (a) Prior to the first exercise of this consent, the consent holder shall develop a Groundwater and Drainage Plan outlining the measures undertaken to monitor and mitigate potential adverse effects that may arise in regard to the following issues:

- (i) Loss of Waimakariri River seepage on the Christchurch-West Melton and Kaiapoi aquifer systems; and
 - (ii) Increase in the concentrations of nitrate-nitrogen or other contaminants in the groundwater both beneath and downstream from the Scheme area; and
 - (iii) Raised groundwater levels both beneath and downstream from the Scheme area, including any effects on gravel pit operations; and
 - (iv) Increase in the concentrations of contaminants, including nitrate-nitrogen and phosphorus in surface water bodies and Lake Ellesmere/Te Waihora.
- (b) The key objectives of the Groundwater and Drainage Plan shall be to outline the groundwater and surface water monitoring and reporting programme and to describe how the consent holder will avoid, remedy or mitigate adverse effects on groundwater quantity, groundwater quality, surface water levels, surface water quality and lowland drainage which occur as a result of the exercise of this consent.
- (c) The Groundwater and Drainage Plan shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager in two parts:
- (i) Groundwater and Drainage Plan: Part 1 (location and monitoring); and
 - (ii) Groundwater and Drainage Plan: Part 2 (mitigation and trigger levels).
- (d) Part 1 of the Groundwater and Drainage Plan shall include:
- (i) The location of all farms using water from the Central Plains Water Enhancement Scheme and the associated land use.
 - (ii) The location of all surface water quality monitoring sites.
 - A There shall be at least two monitoring sites in each of the following eight lowland streams that flow into Lake Ellesmere/ Te Waihora: the Halswell River, LII River, Selwyn River, Irwell River, Boggy Creek, Hanmer Road Drain, Doyleston Drain, and Harts Creek. The monitoring sites on lowland stream shall include one site near the spring-fed source in the upper catchment and one site upstream of the discharge point to Lake Ellesmere/ Te Waihora.

Note that the lower stream sites are those currently monitored on a monthly basis by the Canterbury Regional Council.

 - B There shall be at least four monitoring sites in Lake Ellesmere/ Te Waihora.
 - C The consent holder may rely on data collected on Lake Ellesmere/ Te Waihora or lowland streams by the Canterbury Regional Council or any other entity in lieu of establishing new monitoring sites. In the event that this third party monitoring is reduced, then the consent holder shall

ensure that the sixteen lowland stream monitoring sites and the four Lake Ellesmere/Te Waihora monitoring sites are maintained.

- (iii) The location, depth and screened interval of specific monitoring bores for assessing effects of the scheme activities on groundwater: specifically groundwater levels, groundwater quality, surface water flow and surface water quality. The minimum requirements for monitoring bores shall be as follows:
- A There shall be at least twenty monitoring bore clusters within the scheme area. At least ten clusters shall be located at the down-gradient boundaries of ten different farms that are irrigated by the scheme. At least ten other clusters shall be located at the down-gradient boundaries of farms that are not irrigated by the scheme. The farms selected shall represent a variety of farm types.
 - B Individual monitoring bores within each cluster shall have a maximum screen length of three metres.
 - C Each monitoring bore cluster shall include a sufficient number of individual bores to cover the fluctuations of the water table at that site, ensuring that the water table is intercepted by at least one bore screen at all times.
 - D The diameters of individual bores shall be sufficient to allow the bores to be purged and sampled according to the sampling procedure specified in condition 26(c).
 - E If one of the scheme farms associated with a monitoring cluster no longer irrigates using water from the scheme, a new cluster shall be established immediately down-gradient of another scheme farm. Similarly, if one of the non-scheme farms associated with a monitoring cluster joins the scheme, a new cluster shall be established immediately down-gradient of another non-scheme farm.
 - F A monitoring bore shall be replaced by a deeper monitoring bore if a monitoring bore is dry for more than six months.

An alternative monitoring programme recommended by the GTRP may form part of the Groundwater and Drainage Plan, to obtain representative samples of groundwater levels and groundwater quality across and down gradient of the scheme area.

ADVICE NOTE: An alternative monitoring programme recommended by the GTRP may include additional monitoring related to the effects on groundwater quality from landfills and waste water systems as a result of increased water levels.

- (iv) The frequency of groundwater level sampling in the monitoring bores identified in the Groundwater and Drainage Plan, with measurements taken

at least once per month or any subsequent frequency agreed upon by the GTRP.

A Groundwater level measurements shall commence at least one year prior to the use of water under resource consent CRC061973.

B The frequency of the water level measurements may only be reviewed by the GTRP two years after the commencement of the use of water under resource consent CRC061973.

(v) The frequency of groundwater quality sampling in the monitoring bores identified in the Groundwater and Drainage Plan, and shall include the following as a minimum:

A For two years prior to, and ten years after the use of water under CRC061973 commences, groundwater quality samples shall be taken from the bores identified in the Groundwater and Drainage Plan in March, June, September and December each year.

B Ten years after the use of water under CRC061973 commences, the frequency of groundwater quality sampling shall reduce to twice per year, where each sample shall be taken during August-September and April-May each year.

(e) Part 2 of the Groundwater and Drainage Plan shall include:

(i) A description of the mitigation measures that may be implemented to address all the potential adverse effects related to groundwater level, groundwater quality and surface water flow and quality issues;

(ii) A description of the specific triggers that initiate the implementation of the mitigation measures in response to the monitoring outcomes for any effects that may arise related to groundwater levels, increased duration of high groundwater levels, groundwater quality, surface water flows and surface water quality;

(iii) A description of mitigation measures that may be implemented to address all the potential adverse effects related to lowland water quality and the reversal of the eutrophication of Te Waihora (Lake Ellesmere), within an integrated management approach;

(iv) The strategy for monitoring and reporting on the effectiveness of the mitigation measures to the Canterbury Regional Council, the GTRP and the affected land owners.

22. The consent holder shall submit Part 1 of the Groundwater and Drainage Plan to the GTRP for its review and recommendations in accordance with condition (20)(e)(i) to certify that the Plan meets the requirements set out in condition 20.

23. Prior to the implementation of the monitoring programme outlined in Part 1 of the Groundwater and Drainage Plan, the consent holder shall submit the Plan: Part 1 to

the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, including a report from the GTRP certifying that the Plan meets condition 20.

24. Surface water monitoring

Prior to the finalisation of the Groundwater and Drainage Plan: Part 2, the consent holder shall:

- (a) use the existing recent surface water quality data and data collected from the surface water monitoring prior to commencement of irrigation activity, to identify specific baseline nutrient and other contaminant concentration levels in the lowland streams, and annual average mass load of nutrients (Nitrate-N) from streams to Lake Ellesmere.
- (b) Identify trigger levels as a percentage increase or an absolute concentration increase in nutrient (Nitrate-N) concentration from the agreed mean baseline levels at individual sites, and as a percentage increase or absolute increase from the annual average annual mass load to Lake Ellesmere calculated from the standard monitoring sites and previously determined as the baseline.
- (c) The trigger levels shall be included in the Groundwater and Drainage Plan: Part 2, and shall be submitted to the GTRP for its review and agreement.

25. Groundwater levels

Prior to the finalisation of the Groundwater and Drainage Plan: Part 2, the consent holder shall:

- (a) Use existing groundwater level data and data collected from the groundwater level monitoring to identify specific groundwater levels that shall trigger a response from the consent holder to avoid, mitigate or remedy any adverse effects related to increased groundwater levels, as a result of exercising this consent, including increased groundwater levels or increased duration of high groundwater levels.
- (b) The trigger levels shall be included in the Groundwater and Drainage Plan: Part 2, and shall be submitted to the GTRP for its review and agreement.

26. Lowland Drainage

Prior to the finalisation of the Groundwater and Drainage Plan: Part 2, the consent holder shall:

- (a) undertake a baseline survey of the lowland drainage systems of the Central Plains taking into consideration historical data. The survey shall build on existing data, and include:
 - (i) An inventory of drains and streams, their location, size and capacity,
 - (ii) An inventory of sewerage systems (reticulated and individual septic tanks),

- (iii) The conditions of these facilities, their capacities, maintenance activities, dates of installation, histories of water-level related issues,
 - (iv) Records of stream and drain flows and groundwater levels,
 - (v) Existing management and administration arrangements for the drainage schemes,
 - (vi) Current costs of maintenance and operation of the drainage schemes.
- (b) Identify groundwater levels that would trigger the implementation of mitigation measures as specified in condition 24(a). The baseline survey and trigger levels shall be incorporated into the Groundwater and Drainage Plan.

27. Groundwater quality monitoring

- (a) For two years prior to, and ten years after the use of water under CRC061973 commences, groundwater quality samples shall be taken from the bores identified in the Groundwater and Drainage Plan in March, June, September and December each year.
- (b) Ten years after the use of water under CRC061973 commences, the frequency of groundwater quality sampling shall reduce to twice per year, where each sample shall be taken during August-September and April-May each year.
- (c) Water quality sampling shall be undertaken in accordance with the latest version of the Canterbury Regional Council guidelines for the collection of groundwater quality samples.
- (d) As a minimum, the water quality analyses shall include E.coli, pH, electric conductivity, alkalinity, chloride, ammonia-N, nitrate-nitrogen, total-N, dissolved reactive phosphorus and sulphate.

28. Results of Monitoring

- (a) The consent holder shall prepare a report describing the results of the environmental monitoring outlined in the Groundwater and Drainage Plan, for the period from 1 July to the following 30 June for each year.
- (b) The consent holder shall submit the report to the GTRP by the following 1 September. The groundwater report shall include all the monitoring data and an interpretation of background conditions and impacts arising from the consented activities.
- (c) The consent holder shall also submit the report to the Canterbury Regional Council, Attention: Compliance and Enforcement Manager, by 1 September each year.
- (d) Using the results from the environmental monitoring, the consent holder shall prepare Part 2 of the Groundwater and Drainage Plan as specified in condition 20(e).

29. The consent holder shall submit Part 2 of the Groundwater and Drainage Plan to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Officer prior to the use of water by the Scheme for irrigation. Written confirmation that the Groundwater and Drainage Plan complies with the requirements of this condition must be obtained from the Canterbury Regional Council prior to using water for irrigation. Confirmation shall not be unreasonably delayed or withheld.
30. Prior to 1 October each year, the GTRP shall review the monitoring report described in condition 20(e)(iii) and make recommendations to the consent holder regarding the validity of the interpretation of monitoring data and the implementation of mitigation measures undertaken by the consent holder. Within 20 working days of any meeting of the GTRP, the consent holder shall provide the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Officer, a copy of the recommendations made by the GTRP.
31. Exceedence of Trigger Levels:
- (a) If any bore within the area shown on the attached Plan CRC061973 exceeds a nitrate-nitrogen concentration of 11.3 grams per cubic metre and the bore supplies domestic water to a dwelling that has infants under the age of six months at the time of the exceedence, then the consent holder shall immediately supply an alternative drinking water supply to those dwellings until it can be demonstrated that the concentration of nitrate-nitrogen in the subject bore is below 11.3 grams per cubic metre, unless it can be demonstrated that the concentration of nitrate-nitrogen in the subject bore exceeded 11.3 grams per cubic metre on at least one occasion prior to the use of water by the consent holder or unless it is concluded at the use of water by the consent holder is not the likely cause of the exceedance.
 - (b) The Canterbury Regional Council may serve notice on the consent holder of its intention to review the conditions of this consent to deal with any exceedence of any surface water quality trigger level specified in the Groundwater and Drainage Plan, which is due to the exercise of this consent.
 - (c) In the event that the groundwater trigger levels specified in the Groundwater and Drainage Plan are reached, the consent holder shall undertake measures to avoid, mitigate or remedy any adverse effects related to groundwater levels that may arise as a result of exercising this consent. Mitigation measures may include but not be limited to;
 - (i) additional monitoring;
 - (ii) restricting the use of water for irrigation;
 - (iii) the widening and/or deepening of drains to increase their capacity;
 - (iv) the installation of more drains;
 - (v) providing pumped drainage for affected properties or facilities;

- (vi) upgrading sewerage reticulation systems to reduce groundwater infiltration into pipes;
- (vii) more frequent maintenance of existing drains, including cleaning
- (viii) financial compensation in lieu of remedial works.

32. Response to Groundwater Complaints

When the consent holder is notified by a “complainant” of an adverse environmental effect, then:

- (a) Within 10 working days of receipt of the complaint, the consent holder (or a suitably qualified nominee) shall commence an investigation of the complaint.
- (b) Within five working days of completion of its investigation, the consent holder shall notify the complainant of:
 - (i) the outcome of the investigation, including a description of the assessment process that the consent holder has undertaken regarding the issue raised by the complainant;
 - (ii) descriptions of mitigation options, including details of timing and cost sharing;
 - (iii) the complainant’s right to refer the complaint to the GTRP, and the contact details of the GTRP.
- (c) The consent holder may offer to mitigate or remedy the situation immediately subject to the complainant agreeing to reimburse the consent holder for the relevant portion of the cost of any such remedy as in condition 31(b)(ii). Such reimbursement will not extend to the consent holder’s cost in assessing the complaint or any costs of reviews of the complaint by the GTRP.
- (d) The consent holder may, instead of undertaking any remedial work or completing the assessment process, with the agreement of the complainant choose to negotiate with the complainant to undertake or pay the cost of those remedial works directly to the complainant, or agree to provide financial compensation to the complainant for losses, or otherwise reach agreement with the complainant in respect of any damage.
- (e) Any agreement for the consent holder to pay costs directly to the landowner shall include a written undertaking from the property owner, that on the sale of the property, the property owner will advise the purchaser that the holder of this consent is no longer liable for any effects associated with the use of water that may occur on that property.
- (f) For the purpose of this condition, mitigation or remedy shall include works to an extent that alleviates the significance of the adverse effects of the exercise of this consent.

- (g) The consent holder shall notify the Canterbury Regional Council, Attention: Compliance and Enforcement Manager of any complaints made, any recommendation made by the GTRP, whether or not the consent holder and the complainant are satisfied with the recommendation, and any actions undertaken to remedy the situation.

Bond

33. Prior to the commencement of the activity authorised by this consent, the consent holder shall provide a bond in accordance Schedule 3 attached to this consent.

Review

34. The Canterbury Regional Council may in the last five working days in June and December during the first five years from the date of the first exercise this consent, or until the completion of construction works and thereafter annually on the last five working days of June each year serve notice of its intention to review the conditions of this consent for the purpose of:
- (a) dealing with any adverse effects on the environment which may arise from the exercise of this consent, including on the operation of the Christchurch International Airport;
 - (b) ensuring the adequacy of sampling and/or monitoring programmes;
 - (c) dealing with any adverse effects or other issue identified in any report submitted as a condition of this consent;
 - (d) altering the rate of abstraction from the Rakaia and/or Waimakariri Rivers to correspond to the actual rate of water usage; and/or
 - (e) amending the minimum flow restrictions in the takes from the Rakaia and/or Waimakariri Rivers to reflect any changes in the abstraction rate of the other abstractors from the river;
 - (f) Altering the rate of abstraction from the Waimakariri River to protect the recharge into the Christchurch-West Melton and Kaiapoi aquifer systems.
35. Charges, set in accordance with section 36 of the Resource Management Act 1991, shall be paid to the Regional Council for the carrying out of its functions in relation to the administration, monitoring and supervision of resource consents and for the carrying out of its functions under section 35 of the Act.

Schedules of Locations referred to in Canterbury Regional Council Consents.

The following Schedules list the locations of the following:

- Schedule A.1: Headrace canal
- Schedule A.2: Water distribution race network
- Schedule A.3: Rakaia River intake and headworks
- Schedule A.4: Waimakariri River (Gorge Bridge) intake and headworks
- Schedules B.1 and B.2: Locations of the dam and divert, river and stream crossings
- Schedules C.1 – C.4: Locations of discharges

SCHEDULE A: Locations of the Proposed Major Facilities for the Central Plains Water Enhancement Scheme

Schedule A.1: Headrace

The proposed headrace will extend from the Rakaia River intake for approximately 61.4 kilometres across the upper Central Plains following approximately the 235 metre elevation contour line, to the Waimakariri River at the Gorge Bridge intake structure. The final location of the headrace will be within the designation zone, as shown on Maps 3 to 6 attached to this application.

The western end of the headrace will start in the bed of the Rakaia River at or about map reference NZMS K36: 071-392, and runs generally southeast for approximately 9 kilometres along the true left side of the Rakaia River, and traverses the terrace faces here to reach the main plains surface at about map reference NZMS L36: 141-328. The route then runs generally east for approximately 4.5 kilometres to cross Rakaia Terrace Road at about map reference NZMS L36: 176-328, and then turns to run generally north for approximately 6 km to cross Leaches Road at about map reference NZMS L36: 188-379, and the Hororata River at about map reference NZMS L36: 196-398. The route then turns to the northeast and follows the 235 m elevation contour along the lower slopes of the Harper Hills for approximately 10 kilometres to cross the Coalgate-Hororata Road at about map reference NZMS 260 L35: 257-457, the Selwyn River at about map reference NZMS 260 L35: 259-461, and State Highway 77 at about map reference NZMS L35: 270-474. The route then runs east-northeast along the lower

slopes of the Homebush Ridge for approximately 3.5 kilometres to about map reference NZMS 260 L35: 311-494, where it crosses Deans Road. The route then runs east for approximately 4 kilometres across the plains crossing the Hawkins River at about map reference NZMS 260 L35: 328-493, and State Highway 73 and the Midland Railway line at about map reference NZMS 260 L35: 350-502. It then runs northeast for approximately 5 kilometres to near Bleak House Corner where it crosses the Old West Coast Road at about map reference NZNS 260 L35: 385-535. It then turns to run generally northwest for approximately 8.5 kilometres, traversing the terrace on the true right bank of the Waimakariri River and finishing at the Waimakariri Gorge Bridge intake at about map reference NZMS 260 L35: 328-603.

Schedule A.2: Water distribution race network

The proposed water distribution race network will follow roads or run through private property in the rural areas of the inner Central Plains. The northern boundary runs along the Waimakariri River from about the Kowai River confluence downstream for approximately 35 kilometres, and the southwestern boundary runs along the Rakaia River from near the Gorge Bridge southeast to the Satate Highway 1 Bridge. The northwestern boundary follows the inner plains margin. The southeastern margin follows State Highway 1 generally northeast from Rakaia to the Selwyn River, and then trends more generally north and north-northeast to the Waimakariri River. Parts of the race network will pass near the settlements of Springfield, Sheffield, Darfield, Kirwee, Coalgate, Hororata, Windwhistle, Te Pirita, and Dunsandel.

Schedule A.3: Rakaia River intake and headworks

The proposed Rakaia River intake and headworks structures will form part of the headrace canal in and adjacent to the bed of the Rakaia River at the following locations.

1. Intake structure in the bed of the Rakaia River at about map reference NZMS 260 K36: 078-387
2. Sediment trap at about map reference NZMS 260 K36:081-384
3. Flow control gate at about map reference NZMS 260 K36:082-381
4. Fish screen and bypass channel at about map reference NZMS 260 K36: 083-379

Schedule A.4: Waimakariri River (Gorge Bridge) intake and headworks

The proposed Waimakariri River intake and headworks structures will form part of the headrace canal in and adjacent to the bed of the Waimakariri River at the following locations.

1. Intake structures in the bed of the Waimakariri River at about map reference NZMS 260 L35: 328-603
2. Sediment trap at about map reference NZMS 260 L35: 334-592
3. Flow control gate at about map reference NZMS 260 L35: 334-588
4. Fish screen and bypass channel at about map reference NZMS 260 L35:336-583

SCHEDULE B: Locations of proposed Dam and Divert, River and Stream Crossings

Schedule B.1: Headrace canal

The proposed route of the headrace canal will cross rivers and streams at the following locations.

1. Hororata River at about map reference NZMS 260 L36: 196-398
2. Selwyn River at about map reference NZMS 260 L35: 259-461
3. Hawkins River at about map reference NZMS 260 L35: 328-493
4. Cordys Stream at about map reference NZMS 260 L35: 215-421
5. Unnamed tributary of Hororata River at about map reference NZMS 260 L35: 198-408
6. Unnamed tributary of Hororata River at about map reference NZMS 260 L35: 204-409
7. Unnamed tributary of Hororata River at about map reference NZMS 260 L35: 205-409
8. Unnamed tributary of Hororata River at about map reference NZMS 260 L35: 209-414
9. Unnamed tributary of Hororata River at about map reference NZMS 260 L35: 211-417
10. Unnamed tributary of Hororata River at about map reference NZMS 260 L35: 220-422
11. Unnamed tributary of Hororata River at about map reference NZMS 260 L35: 223-428
12. Unnamed tributary of Hororata River at about map reference NZMS 260 L35: 226-428
13. Unnamed tributary of Hororata River at about map reference NZMS 260 L35: 227-428
14. Unnamed tributary of Hororata River at about map reference NZMS 260 L35: 233-433
15. Unnamed tributary of Hororata River at about map reference NZMS 260 L35: 237-434
16. Unnamed tributary of Selwyn River at about map reference NZMS 260 L35: 247-448

17. Unnamed tributary of Selwyn River at about map reference NZMS 260 L35: 247-250
18. Unnamed tributary of Selwyn River at about map reference NZMS 260 L35: 252-451
19. Unnamed tributary of Waianiwaniwa River at about map reference NZMS 260 L35: 283-480
20. Unnamed tributary of Waianiwaniwa River at about map reference NZMS 260 L35: 276-476
21. Unnamed tributary of Waianiwaniwa River at about map reference NZMS 260 L35: 294-486
22. Unnamed tributary of Waianiwaniwa River at about map reference NZMS 260 L35: 297-481
23. Unnamed tributary of Waianiwaniwa River at about map reference NZMS 260 L35: 306-488
24. Unnamed tributary of Waianiwaniwa River at about map reference NZMS 260 L35: 287-482
25. Blacks Stream at about map reference NZMS 260 L35: 309-494

Schedule B.2: Water distribution race network

The proposed routes of the water distribution race network will cross rivers and streams at the following locations.

1. Unnamed Tributary of the Hororata River at about map reference NZMS L35: 058-425
2. Unnamed Tributary of the Hororata River at about map reference NZMS L35: 074-429
3. Unnamed tributary of Hororata River at about map reference NZMS 260 L36: 141-378
4. Unnamed tributary of Hororata River at about map reference NZMS 260 L36: 154-383
5. Unnamed tributary of Hororata River at about map reference NZMS 260 K35: 096-399
6. Unnamed tributary of Hororata River at about map reference NZMS 260 L35: 105-401
7. Unnamed tributary of Hororata River at about map reference NZMS 260 L35: 122-409
8. Unnamed tributary of Selwyn River at about map reference NZMS 260 L35: 263-443
9. Unnamed tributary of Selwyn River at about map reference NZMS 260 L35: 260-456
10. Unnamed tributary of Rakaia River at about map reference NZMS 260 L36: 266-224

11. Unnamed tributary of Rakaia River at about map reference NZMS 260 L36: 271-236
12. Irwell River at about map reference NZMS 260 L36: 420-296
13. Irwell River at about map reference NZMS 260 L36: 423-296
14. Irwell River at about map reference NZMS 260 L36: 425-296
15. Irwell River at about map reference NZMS 260 L36: 426-296
16. Irwell River at about map reference NZMS 260 L36: 432-295
17. Hawkins River at about map reference NZMS 260 L35: 360-414
18. Unnamed Tributary of the Hawkins River at about map reference NZMS 26 L35: 229-599
19. Unnamed Tributary of the Hawkins River at about map reference NZMS 26 L35: 228-592
20. Unnamed Tributary of the Hawkins River at about map reference NZMS 26 L35: 230-601
21. Unnamed Tributary of the Hawkins River at about map reference NZMS 26 L35: 233-601
22. Unnamed Tributary of the Hawkins River at about map reference NZMS 26 L35: 244-598
23. Unnamed Tributary of the Hawkins River at about map reference NZMS 26 L35: 253-589
24. Unnamed Tributary of the Hawkins River at about map reference NZMS 26 L35: 260-606
25. Unnamed Tributary of the Hawkins River at about map reference NZMS 26 L35: 257-619
26. Unnamed Tributary of the Hawkins River at about map reference NZMS 26 L35: 248-627

SCHEDULE C: Location of Discharges

Schedule C.1: Rakaia River headworks discharges

1. Sediment sluice race discharge at about map reference NZMS 260 K36: 081-381
2. Fish bypass channel at about map reference NZMS 260 K36: 083-378

Schedule C.2: Waimakariri River headworks discharges

1. Gorge Bridge intake sediment sluice race discharge at about map reference NZMS 260 L35: 344-588
2. Gorge Bridge intake fish bypass channel at about map reference NZMS 260 L35: 344-588

Schedule C.3: Operational bywash discharges

Operational bywash discharges will occur from water distribution races at the following locations.

1. Race D 2 to a wetland adjacent to the Selwyn River at about map reference NZMS 260 L36: 456-301,
2. Race D 2.1 to a wetland adjacent to the Waimakariri River at about map reference NZMS 260 M35: 523-490
3. Race D 2.2 to a wetland adjacent to the Waimakariri River at about map reference NZMS 260 M35: 539-488
4. Race D 2.3 to a stockwater race at about map reference NZMS 260 M36: 524-371
5. Race D 3 to a wetland adjacent to the Selwyn River at about map reference NZMS 260 L36: 441-305
6. Race SP 2.5 to a wetland adjacent to the Hawkins River at about map reference NZMS 260 L35: 281-574
7. Race C 1 to a wetland adjacent to the Hawkins River at about map reference NZMS 260 L36: 394-330
8. Race C 2 to a wetland adjacent to the Waianiwaniwa River at about map reference NZMS 260 L36: 351-358
9. Race C 3 to a wetland adjacent to the Selwyn River at about map NZMS 260 L36: 350-345
10. Race C 3.1 to a wetland adjacent to the Selwyn River at about map NZMS 260 L35: 289-421
11. Race TP 1 to a wetland adjacent to the Selwyn River at about map NZMS 260 L36: 435-299
12. Race TP 2.6 to a wetland adjacent to the Rakaia River at about map NZMS 260 L36: 329-184

Schedule C.4: Emergency bywash discharges

Emergency bywash discharges will occur from water distribution races at the following locations.

1. Race D 2 to a wetland adjacent to the Selwyn River at about map reference NZMS 260 L36: 456-301,
2. Race D 2.1 to a wetland adjacent to the Waimakariri River at about map reference NZMS 260 M35: 523-490
3. Race D 2.1.1 to the Waimakariri River at about map reference NZMS 260 L35: 477-496
4. Race D 2.2 to a wetland adjacent to the Waimakariri River at about map reference NZMS 260 M35: 539-488

5. Race D 3 to a wetland adjacent to the Selwyn River at about map reference NZMS 260 L36: 441-305
6. Race C 1 to a wetland adjacent to the Hawkins River at about map reference NZMS 260 L36: 394-330
7. Race C 2 to a wetland adjacent to the Waianiwaniwa River at about map reference NZMS 260 L36: 351-358
8. Race C 3 to a wetland adjacent to the Selwyn River at about map NZMS 260 L36: 350-345
9. Race TP 1 to a wetland adjacent to the Selwyn River at about map NZMS 260 L36: 435-299
10. Race TP 1.1 to the Hororata River at about map NZMS 260 L36: 337-334
11. Race TP 2.6 to a wetland adjacent to the Rakaia River at about map NZMS 260 L36: 329-184
12. Race TP 3.2 to the Rakaia River at about map NZMS 260 L36: 264-219

Schedule 3: Bonding

Bonding of Construction, Operation and Maintenance

1 Scheme Construction, Operation and Maintenance

The Consent Holder shall maintain and repair the works authorised under these consents.

2 Environmental Bonding

To secure condition 14.1 the Consent Holder shall, during the construction phase, in relation to Resource Consents numbered CRC061814, CRC102328, CRC102329 and CRC102331, provide and maintain in favour of the Canterbury Regional Council a bond on terms and conditions satisfactory to it in all respects.

3 Form of Bond

The bond shall be in a form generally used by a bank or insurance company registered to conduct business in New Zealand and approved by the Canterbury Regional Council.

5 Content of Bond

The bond shall apply until all construction works relating to the Resource Consents numbered CRC061814, CRC102328, CRC102329 and CRC102331, granted by the Canterbury Regional Council and shall provide that Consent Holder shall be liable and remain liable for meeting the lesser cost of:

- (a) Completion; or
- (b) Reinstating land affected by the construction including making safe and mitigating any adverse effects arising from the work undertaken during construction.

6 Payment

The payment of the bond quantum by the Consent Holder shall be guaranteed by a guarantor acceptable to the Canterbury Regional Council.

The guarantor shall bind itself to pay up to the bond quantum for the carrying out and completion of all obligations of the Consent Holder under the bond.

7 Term

The bond shall be executed before the commencement of any construction works associated with the Resource Consents numbered CRC061814, CRC102328, CRC102329 and CRC102331, granted by the Canterbury Regional Council, and may be renewed from time to time in accordance with this condition and shall remain in place until construction is complete.

8 Amount

- (a) The bond may vary from time to time but at any given time shall be sufficient to cover the lesser of the estimated costs of completion (including any contingency), or compliance with all conditions, including:
 - (i) Demolition and removing of any buildings or other structures; and
 - (ii) Rehabilitation of land affected by the Scheme.

- (b) The bond shall be set prior to the commencement of construction by agreement between the Consent Holder and the Canterbury Regional Council, taking into account the estimated cost of meeting the obligations for which the bond is given as set out in condition 14.5 above.
- (c) In the event of the Consent Holder and the Canterbury Regional Council not reaching agreement on the initial bond amount it will be assessed by a suitably qualified and experienced independent bond assessor appointed by the Canterbury Regional Council, and the decision of that person shall be final and binding.
- (d) The amount of the bond will then be reviewed and reassessed by the Consent Holder and the Canterbury Regional Council every 12 months from the date the initial bond amount was lodged until construction works related to Resource Consents Numbered, CRC061814, CRC102328, CRC102329 and CRC102331, granted by the Canterbury Regional Council, is complete.
- (e) During the construction phase of the Scheme, a scope of works planned for the balance of the construction period will be provided by the Consent Holder to the Canterbury Regional Council, both prior to setting the initial bond amount, and again at each annual reassessment, to assist in setting the bond amount as outlined in condition 14.8(a) above.
- (f) In the event of the Consent Holder and the Canterbury Regional Council not reaching agreement on a bond amount within thirty (30) working days of the date the review and reassessment falls due, it will be assessed by a suitably qualified and experienced independent bond assessor appointed by the Canterbury Regional Council, and the decision of that person shall be final and binding.
- (g) If at any time the amount of the bond is varied pursuant to condition 14.8(d) then the Consent Holder and guarantor approved by the Canterbury Regional Council, shall within thirty (30) working days of notification to the Consent Holder of the varied bond amount, execute and lodge with the Canterbury Regional Council a new bond for the varied amount or the additional amount required in excess of the existing bond.
- (h) The Consent Holder shall not commence, or shall cease, any activity authorised under these consents until:
 - (i) The bond referred to in condition 14.5 above is executed by the Consent Holder and guarantor and deposited with the Canterbury Regional Council; and
 - (ii) In respect of any varied bond referred to in condition 14.8(g) above, after thirty (30) working days has expired from the date the Consent Holder was notified of the terms of the varied bond by the Canterbury Regional Council, unless the varied bond has been executed by the Consent Holder and guarantor, and has been deposited with the Canterbury Regional Council, or the varied bond decreases the bond amount required to be provided by the Consent Holder.

9 Section 109

The provisions of Section 109 of the Act shall apply to any bond required pursuant to this condition.

10 Costs

The Consent Holder shall meet the costs of providing any bond, including the costs of preparation of the bond and any substitute bond, and the costs of any professional bond assessor engaged to resolve the appropriate quantum of the initial bond to be provided or any varied bond on review and reassessment.

Insurance

11 Public Liability Insurance

The Consent Holder shall, all at times after construction has commenced, have in place public liability insurance on terms suitable in all respects to the Canterbury Regional Council, to cover the full costs of remediating any environmental damage, including damage to private property and public infrastructure in the event of any failure of the works authorised by these consents. The insurance shall be obtained on the following conditions:

- (a) The Canterbury Regional Council shall be the beneficiary of the insurance policy and shall be able to enforce its terms;
- (b) The Consent Holder shall ensure that the Canterbury Regional Council has, at all times after construction commences, written confirmation that the insurance required by this condition is in place.
- (c) The Consent Holder shall ensure that the insurer is required to copy all relevant information regarding the insurance to the Canterbury Regional Council. This obligation includes an express term that the insurer must immediately notify the Canterbury Regional Council of any non-performance of the terms of insurance by the Consent Holder.
- (d) In the event of non-performance of any term of the insurance, the Canterbury Regional Council shall be given the opportunity to rectify the non-performance before the insurance is cancelled.

New Zealand Dam Safety Guidelines 2000, New Zealand Society on Large Dams

Note: the headrace canal works are of of scale that the provisions under the Building Act applicable to dams also have application to the construction of the headrace. Consent is required under the Building Act from the Canterbury Regional Council for the construction of the headrace. This is a separate process to matters considered under these decisions and recommendations.

APPENDIX E

OPERATION, MAINTENANCE AND SURVEILLANCE

E.1 Introduction

This Appendix builds on the guidelines for operations, maintenance and surveillance contained in the main text, the focus remaining on matters related to dam safety. Operating and maintenance requirements from functional or asset management perspectives, which would also be included in a complete operating system, are not included. While the surveillance aspects of this Appendix have much in common with those outlined for Commissioning in Appendix D, this Appendix relates to ongoing operations once the dam has been commissioned.

The detail of this Appendix is mainly relevant for Medium and High Potential Impact category dams, but elements are also applicable to Low hazard category dams. Owners of Low Potential Impact dams and their Technical Advisers should assess the following recommendations and adapt appropriate parts for use on their dam. Large parts of these recommendations may be relevant where the asset represented by the dam is of high value and the commercial consequences of dam failure are significant.

It is worth noting that operations, maintenance and surveillance all contribute to the safe performance of the dam and its appurtenant structures.

E.2 Personnel and Training

Safe management of dams is a frame of mind and involves all the people concerned down from the Owner (or senior owner representative), through Managers to Operations Staff. Education and training must therefore be conceived along the lines of developing awareness of the need for ongoing vigilance, surveillance and maintenance in addition to giving instruction in the 'nuts and bolts' mechanics of the relevant and desirable procedures. The training and awareness raising must be related to the specific characteristics and Potential Impact category of the dam.

The Owner is responsible for operating the dam safely and also sets requirements from the viewpoint of protecting asset value. Generally, Owners will not be fully conversant with the technical requirements of operations, maintenance and surveillance to maintain safety. Thus they will rely on advice from the Designer in the case of a new dam or Technical Specialists in the case of existing dams which do not already have formalised procedures. It is important that the Owner ensures that the advice is given by appropriately qualified personnel, who will have received "training" through past experience.

Training will depend on the circumstances, ranging from the Designer training the Owner/Operator of a small Low Potential Impact dam, to Operators of major High Potential Impact dams being taken through structured training courses, seminars, audits and refresher courses. Techniques may embody:

- attendance at relevant seminars (including overseas, e.g. ANCOLD courses)
- membership of NZSOLD and attendance at their seminars
- development of 'in house' procedures and implementation of them in practice
- interaction with other dam owners and getting the benefit of their experience
- keeping up to date through acquisition of the latest guidelines and training materials. Training materials are available from NZSOLD.

Table E.1.
Proficiencies Required for Personnel Involved in Dam Safety Implementation.

GROUP	PRINCIPAL AREAS OF PROFICIENCY
Owner Manager Administrator	<ul style="list-style-type: none"> • Awareness of environmental and financial responsibilities relating to dam safety • Understanding significance of hazard and risk • Support of quality assurance principles
Technical Advisers	<ul style="list-style-type: none"> • Geotechnical principles • Design principles including structural, geotechnical, hydrologic and hydraulic • Construction techniques • Operation and maintenance procedures • Surveillance processes • Response to dam safety issues • Emergency planning • Emergency response
Operations and Maintenance Personnel *	<ul style="list-style-type: none"> • Safe operations procedures • Maintenance practices • Surveillance principles, particularly monitoring • Emergency planning • Need for vigilance
Technical Advisor, Dams Field Personnel *	<ul style="list-style-type: none"> • Awareness of visual signs of dam safety deficiencies • Procedures for operating mechanical items • Emergency response including alerting others • Surveillance principles, particularly monitoring • Need for vigilance
Key Emergency Personnel*/ Defence Civil	<ul style="list-style-type: none"> • Awareness of the potential impact • Emergency planning and response
Territorial Authorities/Regional Councils	<ul style="list-style-type: none"> • Awareness of planning, Resource and Building Consent implications
Public at Risk	<ul style="list-style-type: none"> • Emergency awareness and response • Awareness of the potential impact

E.3 Scope and Structure of Manual

The manual describing procedures for operations, maintenance and surveillance, is a vital document and is customarily referred to just as the “Operations (or Operating) and Maintenance” Manual or O & M Manual. The latter abbreviation will be adopted for the following discussion.

The scope of the O & M Manual will vary for each situation but a general scope can be outlined. Table E.2 which follows, sets out main contents which should be included in the manual from the dam safety perspective. Further detail on key aspects is contained in subsequent sections.

It is also important to note that the O & M Manual must be easy to understand and user-friendly for those who are to implement it on a routine basis, whether the medium is printed text, via computer software, or both. There is a risk otherwise that important aspects will be overlooked because of human reaction to complex instructions. It is recommended that basic instructions and forms be as brief and simple as possible, with background information and detail in well referenced appendices.

Table E.2.
O & M Manual Contents from Dam Safety Perspective.

ASPECT	NOTES
INTRODUCTION	<ul style="list-style-type: none"> • Sets out scope and objectives
DAM STRUCTURE AND PURPOSE	<ul style="list-style-type: none"> • Describes what the dam is and does referring to other documents as appropriate (e.g. Design and safety Evaluation reports, consent conditions etc.)
APPURTENANT STRUCTURES	<ul style="list-style-type: none"> • Describes the function of appurtenant structures, such as spillway, intake, penstocks, powerhouse etc. references to other documents as appropriate (e.g. Design and safety Evaluation reports, consent conditions etc.)
KEY ASPECTS RELATING TO SAFETY	<ul style="list-style-type: none"> • Sets out the particular aspects of importance on this particular dam related to reservoir safety. This includes not only those aspects relating directly to the dam (such as structural, geological and dam safety parameters) but also features of the appurtenant structures (such as gates, valves, electrical controls and communication systems). Part I includes the Health and safety Act requirements.
MANAGEMENT STRUCTURE AND PERSONNEL	<ul style="list-style-type: none"> • Describes how the dam is run and its appurtenant structures is run and who is responsible for what.
OPERATIONS AND MAINTENANCE REQUIREMENTS	<ul style="list-style-type: none"> • Describes how the dam and its appurtenant structures is to be operated and what is to be maintained and to what standards to maintain functional safety
LEGISLATIVE REQUIREMENTS	<ul style="list-style-type: none"> • Describes the procedures to be followed to meet operational and safety legislative requirements. This covers water use consent conditions, (under RMA), warrant of fitness, including compliance schedule, (under Building Act) and health and safety (under Health & Safety in Employment Act) issues.
SURVEILLANCE AND EVALUATION	<ul style="list-style-type: none"> • Sets out surveillance items, frequency, reporting requirements, acceptable limits for values measured and how data is to be evaluated and reacted to

	(including unusual events)
PLANT AND EQUIPMENT	<ul style="list-style-type: none"> • Details the maintenance and testing procedures and frequencies and documentation to meet the requirements of the building warrant of fitness under the Building Act.
EMERGENCY ACTION PLAN	<ul style="list-style-type: none"> • Sets out the plan and procedures to follow in the event of an emergency • Can be a stand alone document

E.4 Maintenance and Surveillance - Scope and Frequency

E.4.1 Operation

Features and equipment for the passage of water through the dam and its appurtenant structures must carry out their normal functions without leading to the uncontrolled release of the reservoir water. Uncontrolled release of the reservoir is interpreted as an event during which there is no control over the quantity of water and its rate of discharge from the reservoir.

It should be noted that in general the failure of a turbine or a penstock for example will not result in the uncontrolled release of reservoir water as the quantity and the size of the opening and the capacity of the inlet control rate of discharge. The Building Code covers the design and performance of these features. Normal operating circumstances, which may result in the uncontrolled release of reservoir water, include where discharge is likely to cause erosion, which puts the safety of the dam and therefore the reservoir in jeopardy. In this case procedures should be in place to meet the general requirements of these guidelines.

E.4.2 Maintenance

Maintenance can be separated into four areas:

- mechanical equipment impacting on operational safety (gates, pipelines, valves)
- electrical equipment to operate the same mechanical equipment or which telemeters data used in safety management or forms part of the emergency communications systems.
- the dam and its appurtenant structures
- the reservoir and its margins

Mechanical and electrical equipment require appropriate maintenance and testing. The aim of the testing programme is to demonstrate the equipment is in good working order and is capable of normal and emergency operation. In addition it is necessary for operators to be familiar with the performance of this equipment, especially if it otherwise infrequently used and if modifications or repairs have been carried out. During testing any associated issues of environmental concerns, and legal consents will have to be addressed by appropriate planning and consent processes.

The standard of maintenance and frequency and type of test will be according to the equipment function in terms of dam safety and normal operations. The Owner will decide his maintenance and testing regime for equipment controlling normal operations using usual commercial criteria. A typical testing programme for gates and valves involved in dam safety of medium and high potential impact dams is provided in Table E.3.

Table E.3.
Guideline Gate/Valve Testing Schedules.

GATE/VALVE FUNCTION	UNBALANCED HEAD TEST	BALANCED TEST	BACK-UP POWER SUPPLY TEST
Passage of floods	Annually 15% minimum opening. Initiated by back-up power supply	Six yearly. Full range. Initiated by back-up power supply	Monthly. Battery & motor start-up checks. 150mm min. opening
Reservoir evacuation only	Six yearly. 15% min. opening. Initiated by back-up power supply	Six yearly. Full range (in dry). Initiated by back-up power supply	Monthly Battery & motor start-up checks. Nil gate opening
Machine intake	Six yearly.	Annually	N/A
Bulkheads and stoplogs	Twelve Yearly	N/A	N/A

Back-up power supply tests also form part of the gate tests. They concentrate on confirming satisfactory field operation. Control room function tests should also be checked for satisfactory performance. These include the testing of local operation, remote operation, automatic operation, over velocity tripping of intake gates and automatic re-pumping to counter gate drift. Gate hoisting ropes should be visually inspected annually, for defects such as broken strands, corrosion, deformation and loss of lubricant. Specifically selected ropes, representative of each gate installation, shall receive a six yearly non-destructive test.

Communications equipment should be tested and maintained as part of the exercising of Emergency Action Plans.

Typical aspects addressed under routine maintenance and assurance of functionality, include:

- undertaking regular system checks
- operating equipment deliberately if it has not operated frequently in service
- lubricating moving parts and keeping oil levels topped up
- controlling or repairing corrosion
- repairing and replacing worn or damaged equipment
- operating ancillary equipment such as standby generators and ensuring batteries are charged and suitable fuel is always available

Maintenance of dam components and the reservoir, will generally be on an as-needs basis. Any specific issues will be included in the compliance schedule. Routine items which are commonly addressed as part of operational safety include:

- clearing dead timber from the reservoir margins and the dam face which might block spillways and dealing with weed islands if there is a likelihood of these impairing the spillway function
- repairing rip rap damage or surface erosion on the dam face
- keeping surface drains, and drainage systems generally, in good condition
- draining seeps and arresting or repairing significant reservoir slumps and slides
- ensuring that trees and like growth do not establish on the dam or designated abutment areas to prevent root penetration and obscuring of seepages and slumps
- repairing cracks and erosion damage in spillway concrete

E.5 Surveillance - Scope and Frequency

The following text refers to routine surveillance carried out by the Owner or the Owner's Operators, and excludes external inspections (refer E6). It is this routine inspection and

surveillance and its evaluation which is of greatest importance, as it can detect potential problems early and enable them to be dealt with more safely and cost effectively, giving the dam owner the opportunity to remedy, alleviate, or mitigate the problem. External inspections and major safety reviews are usually too infrequent to enable early detection. Refer to E7 and Appendix G.

The total surveillance requirements have provision for:

- regular surveillance (ongoing)
- intermediate inspections (annual)
- five-yearly reviews, or following an unusual event

Apart from evaluating the data and responding to it, as discussed in the next section, it is important that the data be logged systematically and in a form which makes it easy to utilise and record permanently. If the recording is not systematic, trends may be disguised and data may be difficult to interpret reliably.

Graphical presentation is important. The perception of significant trends or changes may be obscured by a mass of records of benign conditions. Monitoring schedules should be reviewed periodically (at least at Safety Reviews) to reduce them to essentials.

There is a need for quality assurance procedures with acceptable standards for the maintenance of instrument accuracy and measurement accuracy in data interpretation.

Tables E.4 and E.5 provide a list of typical inspection and surveillance items and indicative measurement frequencies for Medium and High Potential Impact dams. Designers or Technical Advisers will set actual requirements to suit the particular dam, in accordance with the compliance requirements.

E.6 Data Evaluation and Reactions

Surveillance will not serve its purpose unless the data gathered is evaluated against some acceptable criteria, warning signs are recognised promptly, and appropriate action is taken. In specific cases some may be detailed in the Compliance Schedule. In general for high and medium impact potential dams and their appurtenant structures the data is to be reviewed monthly for the determination of trends and detection of anomalies. There must be an adequate system for evaluation and action. Should a dam safety issue arise the Owner is likely to be required to demonstrate that all possible steps were taken in the analysis and response to the collected surveillance data.

Apart from reacting appropriately to visual signs, either on a common-sense basis or as more specifically laid out in the O & M Manual, the Manual should set maximum values (usually incorporating a margin of safety) for key parameters measured (such as seepages, uplift pressures, and pore pressures). The Manual should require the observer to compare the value measured against the limits set, and then state how to react if the value is exceeded. In some cases, the Manual may require some immediate preventative action such as lowering the reservoir, but generally there will be a referral system to the Technical Advisors nominated in the Manual as having responsibility for evaluation and advice.

E.7 Unusual Events

Surveillance and evaluation of performance should also be carried out following unusual events which may lead to emergencies and special procedures as covered under Emergency Action

Plans. In the normal course of operations, unusual events should be evaluated to determine whether there has been any damage requiring correction, special safety measures needing to be implemented, and to assess behaviour compared with design.

Unusual events customarily anticipated in surveillance schedules, include:

- large rainfalls or floods
- earthquakes
- landslides into the reservoir
- windstorms
- volcanic eruption

E.8 Intermediate Inspections

Dam safety inspections are required to verify throughout the operating life of the structure the structural integrity of the dam and appurtenant structures, assuring protection of human life and property. Inspection types and frequencies are developed to suit particular cases and may be varied according to conditions. In general these inspections are conducted annually and in the case of medium and high impact structures, carried out by someone outside the owner's staff. For low impact structures the owner may conduct them. Each inspection must be reported. Verification that

Table E.4.
Guideline Surveillance Schedules. (A) Inspection Guidelines.

FEATURE	INSPECT FOR:												
	Alignment	Animal Burrows	Cracks	Debris	Deterioration	Erosion	Human Activity	Leakage	Muddy Water	Seepage	Settlement & Slides	Vegetation	Weathering
EMBANKMENT DAMS													
Upstream Slope	M	M	M			M	M				A	A	
Downstream Slope	M	M	M			M	M	W	W	M	A	A	
Abutments		M	M					W		M	A	A	
Crest	M	M				A					A	A	
Seepage Areas								W	W	M			
Internal Drainage					A			W	W				
Relief Drains	M			M		A		W	W				
CONCRETE DAMS													
Upstream Face			M		A						A		A
Downstream Face			M		A			W		M	A		A
Abutments			M		A			W		M	A	A	A
Crests	M		M		A						A		A
SPILLWAYS													

Approach Channel				W									
Stilling Basin							M						
Discharge Channel				W	A						A	A	
Control Features				W	A								
Erosion Protection							M				M		
Side Slopes			M				M		M		A	A	
INLETS, OUTLETS AND DRAINS													
Inlet & Outlets	M			W	A			M				A	
Stilling Basin	M		M	W	A								
Discharge Channel			M	W								A	
Trashracks				W								A	
Emergency Systems					A		M						
GENERAL AREAS													
Reservoir Surface								A					
Shoreline											A	A	
Mechanical Systems					A								
Electrical Systems					A								
Upstream Systems								A					
Downstream Floodplains								A					
Lists features to be inspected at a dam and the problems or deficiencies to be looked for													

W = Weekly, M = Monthly, A = Annually

the inspection has been carried out and the report produced is part of the building warrant of fitness. Unless specifically required by the regional Authority the report is kept by the Owner but must be produced upon request.

The inspection report describes observations and interpretations and gives recommendations. The focus of the report is on matters relating to dam safety and actions required to be taken by the Owner to assure legal requirements are met. The Owner may take the opportunity to include in the report matters relating to asset management and health and safety. To accommodate

Table E.5.
Guideline Surveillance Schedule. (B) Instrumentation and Monitoring Guidelines.

FEATURE	INSPECT FOR:									
	Visual Observation	Movements	Uplift & Pore Pressure	Water Levels & Flow	Seepage Flows	Water Quality	Temp Meas	Crack & Joint Meas	Seismic Meas	Stress-Strain Meas
EMBANKMENT DAMS										
Upstream Slope	M	A	M	C					C	
Downstream Slope	M	A	M		W	A		A	C	
Left/Right Abutments	M	A	M		W	A			C	

Crest	M	A	M					A	C	
Internal Drainage System			M		W	A				
Relief Drains	M		M		W					
Reprap & Slope Protection	M									
Tailings dam drainage						C				
CONCRETE DAMS										
Upstream Face	M	A		C			M	A	C	A
Downstream Face	M	A	M				M	A	C	A
Left/Right Abutments	M	A	M		W				C	A
Crests	M	A	M				M	A	C	A
Internal Drainage System			M		W			A		
Relief Drains	M		M		W					
Galleries	M	A						A	C	A
Sluiceways/Controls	M			C						
SPILLWAYS										
Approach Channel	M	A		C						
Inlet/Outlet Structure	M	A	M	D	W					
Stilling Basin	M			D				A	C	
Discharge conduit/Channel	M		M	D				A		
Control Features	M									
Erosion Protection	M									
Side Slopes	M	A	M							
OUTLETS & DRAINS										
Inlet & Outlets	M	A	M	W				A	C	
Stilling Basin	M									
Discharge Channel	M	A	M	W				A		
Trashrack/Debris Control	M									
Emergency Systems	M									
GENERAL AREAS										
Reservoir Surface	M					W				
Mech/Elect Systems	M			W						
Shoreline	A					A				
Upstream Watershed	A					A				
Downstream Floodplains	A				M	A				
Lists features to be observed at a dam and the suggested instruments or observation Techniques to be used.										

W = Weekly, M = Monthly, A = Annually

recommendations, which are not essential to safety, a procedure sometimes adopted is to categorise recommendations into:

- urgent

- necessary
- desirable
- optional

or similar.

Inspections should be systematically organised so that the status of all critical aspects of the dam can be accurately recorded and evaluated. Field inspection checklists should be assembled as a part of the operation, maintenance and surveillance procedures. Reference to previous inspection reports should be made during or prior to the inspection. Generally, the intermediate inspection reports should include:

- observations during the inspection
- what has occurred since the previous inspection e.g. incidents, action arising from previous recommendations
- a review of monitored data and other information
- an evaluation and interpretation of the structural performance of the dam and related structures/equipment including a comparison of the conditions with those of the previous inspection
- appropriate photographs
- recommendations and action list

Dam safety inspections for low potential Impact structures should include:

- observations during the inspection;
- what has occurred since the previous inspection, e.g. incidents, action arising from previous recommendation;
- appropriate photographs; and
- recommendations and action list.

APPENDIX F

EMERGENCY ACTION PLAN

F.1 Requirement for an Emergency Action Plan (EAP)

An Emergency Action Plan (EAP) is integral with the Operations and Surveillance procedures, considers all the potential hazards, and puts in place actions to isolate, prevent, protect life, or, mitigate losses.

An Emergency Action Plan should also be prepared prior to the construction of Medium and High Potential Impact earth dams. The documentation should also be prepared for similar category concrete dams if there is a potential for abutment erosion as a result of overtopping during construction of a concrete dam. The documentation will assist in identifying how to handle flood volumes and peak discharges during construction.

Situations which could give rise to an emergency include:

- Volcanic eruption (lava flow, ash, etc.)
- Major earthquake
- Major flood
- Major landslide into the reservoir, or from abutments
- Inadequate spillway (or diversion in the case of a dam under construction)
- Spillway blockage or inoperable gates
- Dam structure progressively failing due to seepage forces or piping
- Accidental damage
- Sabotage

An EAP should exist for all High and Medium Potential Impact Dams.

The hazard and risks will vary depending on the status of the dam and the plan requirements will vary accordingly. Legislation requires emergency action plans for the following stages of the life of a dam:

- Construction above medium impact level
- Commissioning
- Operation
- Alteration or decommissioning

F.2 Development of an Emergency Action Plan

An EAP should describe the actions to be taken by the dam owner and operators (or contractors when a dam is under construction) and relevant agencies in an emergency. The EAP should assign responsibility for each action to an individual and/or backup. The dam owner is responsible for co-ordination of input to the EAP from other agencies and affected parties

The steps in developing an EAP are generally as follows:

- Identification of those situations or events that would require initiation of an emergency action. Identification of the performance or surveillance indicators which will lead to an emergency being initiated.
- F-2 Appendix F - Emergency Action Plan
- Specification of the actions to be taken, and by whom.
- Identification of all sources, agencies, and individuals who are able to supply information for input into the EAP.
- Identification of all jurisdictions, agencies, and individuals who will be involved in implementing the EAP.
- Identification of primary and auxiliary communications systems, both internal (between persons at the dam) and external between dam personnel and external agencies).
- Identification all persons and agencies involved in the notification process, and draft a notification flow chart. Include who should be notified, in what order, and what other actions are expected of downstream agencies.
- Assess if each territorial, Regional and Central Government agency involved and having its own general emergency plan requires amendments to their plan to include actions required as a result of a dam emergency.
- Develop a draft EAP.
- Discuss fully with all the parties included on the notification list, seeking review and comment.
- Make any revisions, obtain any necessary regulatory approval, and circulate the EAP to those who have responsibilities under the plan.

F.3 Contents of an Emergency Action Plan

The EAP should include the following procedures and information

- Purpose of the Emergency Action Plan
- Responsibilities
- Emergency identification and evaluation
- Preventative actions (where available)
- Notification procedure
- Notification flow chart
- Communication systems
- Access to site
- Response during periods of darkness
- Response during periods of adverse weather
- Sources of equipment
- Stockpiling supplies and material
- Emergency power sources
- Inundation maps
- Warning systems (if used)

Purpose of the Emergency Action Plan

The Plan is designed to limit damage to the dam and areas downstream, and prevent loss of life. It should take into account conceivable failure scenarios applicable to the dam, the potential downstream consequences, and what realistically may be achieved to safe guard lives at risk and generally minimise damage.

The outcomes are:

- The identification of emergency conditions which could endanger the integrity of the dam and which require immediate action.
- Prescription of procedures which should be followed by the dam owner and operating personnel to initiate emergency procedures at the dam.
- Provides timely warning to appropriate emergency management agencies for their implementation of protection measures for downstream communities.
-

Responsibilities

This section should specify the person(s) or organisation(s) responsible for the surveillance, maintenance and operation of the dam and the person(s) and or agencies responsible for implementing various stages of the EAP.

Emergency Identification and Evaluation

If detected early enough, potential emergencies can be evaluated and preventative or remedial actions taken. The EAP should contain clear procedures for taking action when a potential emergency is identified. Notification of emergency situations requires that a responsible contact person initiates the remedial action and decide if and when an emergency should be declared and the EAP executed. Clear guidance should be provided in the EAP on the conditions which require that an emergency be declared.

Once an emergency situation has been identified and evaluated, it should be classified as to its urgency so that the appropriate action can be taken.

Preventative Action

This section should detail preventative actions, taken both prior to and following the development of emergency situations, to prepare for any emergency. It should detail provisions for surveillance and detection of an emergency situation and should clearly indicate what can be implemented in a timely manner. An important factor in the effectiveness of the Emergency Action Plan is the prompt detection and evaluation of information obtained from instrumentation and/or physical inspection and surveillance procedures.

The time factor from the onset of an emergency to awareness of imminent damage and its effect on the workability of the EAP should be detailed. Timely implementation of the EPA is a crucial element in its effectiveness and appropriate effective warning systems are imperative for downstream emergency authorities to minimise loss of life and property damage.

The following factors should be outlined in this section of the EAP:

- Surveillance, Monitoring and Warning Systems
- Alert and alarm levels for surveillance and monitoring systems
- Adverse Time Response
- The nature of the material that may potentially be released in a failure
- Alternative Source of Power and Communication
- Emergency Supplies and Resources
- Co-ordinating Information (e.g. weather forecasts, stream flow)

- Actions to lower the reservoir or limit inflows and outflows
- Actions to remedy, alleviate or mitigate the potential impact
-

Notification Procedures

Notification procedures must be clear and easy to follow. The EAP should set out a list of all persons to be notified in the event that an emergency is declared, and their order of priority.

For each type of emergency situation, the EAP should clearly indicate who is to make a call, to whom it is to be made, and in what priority.

Early notification to the N.Z. Police allows them to prepare for a mobilisation of forces before the emergency is declared. They can then determine if they have sufficient resources, or will need to call in the Civil Defence

The number of persons to be notified by each responsible individual should be kept to a minimum, and briefing of the news-media should be pre-planned to the greatest possible extent.

Notification Flow Chart

A notification flow chart is a diagram showing the hierarchy of notification during an emergency. It is a pictorial representation of the notification procedure. The EAP should contain a notification flow chart clearly summarising the notification procedure for each of the emergency conditions considered. Included are: N.Z. Police, Civil Defence, Owner, Contractors, Technical advisers, Territorial Local Authorities and media. The flow chart should include individual names and position titles, office and home telephone numbers, with alternative contacts and means of communication.

Copies to be available to all individuals having responsibilities under the plan, and prominently posted at the dam, and local emergency operations centre.

Communications Systems

Full details of the internal and external communications systems as they apply to the EAP should be included.

Access to the Site

The description of access should focus on primary and secondary routes and means for reaching the site under various conditions (e.g. foot, boat, helicopter, bulldozer), and the expected response (travel) time.

Response during Periods of Darkness

The EAP should cover the response to potential or actual emergency conditions during periods of darkness including those caused by power failures.

Response during Periods of Adverse Weather

The EAP should address emergency response under adverse weather conditions including extremes of cold, snow, or storms.

Sources of Equipment

The location and availability of equipment and contractors that could be mobilised in case of an emergency should be included.

Stockpiling Supplies and Materials

The location and availability of stockpiled materials and equipment for emergency use should be addressed.

Emergency Power Sources

Details on the location and operation of emergency power sources should be included.

Inundation Maps

Inundation maps are needed for District Planning, Resource Consent Management, N.Z. Police, Civil Defence and Territorial Local Authorities to develop management and evacuation plans. Flood hazard maps may already exist for the affected flood plains. Where the EAP scenario gives a flood peak < 2% probability event (1 in 50 year return period), then the existing flood hazard maps may suffice. They should be prepared wherever communities or significant numbers of dwellings are located in the flood plain. These maps will outline the area inundated in sufficient detail to locate dwellings, services and other significant features. Indication of flood wave travel times will be noted on the maps.

Warning Systems

Warning systems are sometimes used to provide warnings to residents, camp grounds, and parks that are close to the dam. Full details should be contained in the E A P and cover N.Z. Police, Civil Defence, Territorial Local Authority, Own Company, Contractor, and media.

Appendices

Additional items may be covered in the appendices to the EAP:

- General site plans may be useful
- Drawings showing the potential breach location used in the inundation study
- Tables showing the variation in flood stage with time at key locations in the flooded area
- Recording of Emergency situations
- EAP training and Review

F.4 Maintenance and Testing of an Emergency Action Plan

The dam owner is responsible for issuing the EAP to those affected, as well as for maintaining and updating all registered copies of the EAP.

The dam owner should test the EAP.

As updates or amendments are produced, they should be forwarded to each holder (as listed in the EAP) and acknowledged by the recipient. Telephone numbers and names of contact persons should be updated on a regular basis, at least annually. It is helpful to place the EAP in a loose-leaf binder so that outdated pages can be easily removed and replaced with updated information, to ensure a complete, current and workable plan. A list of plan holders should appear in the EAP.

Testing is an integral part of the EAP to ensure that both the document and the training of involved parties are adequate. Tests can range from a limited table top exercise to a full scale simulation of an emergency and can include multiple failures (domino effect).

F.5 Training

The dam owner should provide training to ensure that dam personnel involved in the EAP are thoroughly familiar with all elements of the EAP, the availability of equipment, and their responsibilities and duties.

This familiarity should be extended to appropriate members of the N.Z. Police, and Civil Defence Officers.

Technically qualified personnel should be trained in problem detection and evaluation and appropriate remedial (emergency and non-emergency) measures.

This training is essential for proper evaluation of developing situations at all levels of responsibility which, initially, is usually based on observations on-site. A sufficient number of people should be trained to ensure adequate coverage at all times. Simulated exercises may prove useful in this training.

F.6 Inundation Studies

An inundation study should be carried out for all dams that clearly require EAP's, and for dams where it is not obvious whether or not an EAP is needed, or where the consequence of classification of dam is in doubt.

The inundation study should be based on assumptions that will indicate all areas that could be flooded for the most severe combination of reasonably possible conditions.

Various dam failure scenarios are normally studied; these cover rapid failure times, large breach sizes and conservative antecedent conditions. The potentially inundated area should be determined and the following conditions considered:

- Fair weather dam failure (piping, earthquake, volcano) at full supply level.
- Design flood with and without failure.
- Inundation maps showing the flooded areas should be prepared. A number of computer programmes are available which can be used successfully to provide the analysis.

Regional Councils have a responsibility for regional scale natural hazard information including flood hazard maps. Where an impact of failure is similar to flood sizes already mapped then existing information may suffice,

Key Emergency People

An easy to find section provided for key emergency contacts

Inspection

A special dam inspection together with appropriate monitoring needs to be carried out as quickly as possible with ongoing surveillance until the emergency is over. A schedule of appropriate inspectors for the dam should be attached as an appendice.

F.7 Risk Assessment

A risk assessment will assist in the development of the consequences of potential hazards associated with the structures, and the likelihood of their occurrence. The risk assessment will assist in the selection of options to remedy, alleviate or mitigate potential impacts as a result of a structural failure of a structure retaining a body of material. The production of a fault tree and an event tree is helpful in representing the effects of various hazards.

APPENDIX G - SAFETY REVIEWS

G.1 Introduction

This Appendix provides expanded guidelines for safety reviews. Almost by definition, safety reviews are applicable to dams with Medium or High Potential Impact, and the recommendations are more applicable to such dams. However, Low Potential Impact dams may warrant assessment to preserve the asset value or earning potential of the dam and require periodic review to assess whether their hazard may have moved into a higher category.

The Appendix focuses on key points but does not cover all details. Reference should be made to other documents as appropriate, using for example the reference list at the end of these Guidelines.

G.2 Personnel

The following lists the key personnel involved, outlines their roles or responsibilities and recommends

basic skill or experience requirements:

- Owner - Whether or not safety reviews are statutorily required (by consent conditions), the Owner must take steps to understand the requirements for safety reviews, plan and budget for their implementation and ensure that they take place. After taking advice as necessary, the Owner must draw up the brief, in accordance with the Compliance Schedule requirements facilitate the review, and most importantly, act on recommendations considered necessary to secure an appropriate level of public safety, avoidance of damage to other property, and protection of environmental security.
- Statutory - Under “warrant of fitness” conditions, Regional Councils will have a responsibility to confirm that safety reviews have been undertaken to satisfactory standards, then ensure that recommendations essential to safety are implemented
- Operators - On behalf of the Owner, Operators will be responsible for providing all available data and relevant information to the Safety Review Team, facilitating inspections including Health and Safety aspects, operating equipment as necessary, and responding fully and frankly to any questions put to them.
- Safety Review - The Technical Specialists making up the Team will carry out the review and report in accordance with the Owner’s brief, Compliance Schedule requirements, and to the highest standards of professional practice. Each specialist must be suitably experienced and senior in the area to be covered, and while “grey hairs” are of considerable value, it is important that each person is technologically up to date because a fundamental part of safety reviews is to assess the dam in the light of current technology. For more complex dams involving several facets, it may be necessary or advisable to involve more than one engineer to ensure adequate coverage of issues. There may also be a need for closely defined specialist inputs in areas such as seismology and earthquake risk. Owners and Regulators need to

appreciate that if the Team is not suitably qualified, the review may not disclose important issues. Members of the original design team may assist by clarifying matters, but should not be included in the Safety Review Team to ensure that an independent and unprotective evaluation is made.

- Peer Reviewers - While a safety review is a form of peer review, some organisations require peer review of the Safety Review Team's work. This applies particularly in the first round where there is a lack of original data. The need for such a review depends on circumstances and affordability, but such peer review is recognised as a sound concept. The Peer Reviewer (or reviewers) in this case needs to have suitably wide experience at least equal to that of the Team and generally will be drawn from the most senior practitioners available.

G.3 Scope of Review and Related Issues

G.3.1 General

The main text summarises the key areas typically considered in a review. Setting aside the difficulties which arise in an "initial" review as discussed in G3.2, the following outlines a more detailed typical scope and related issues:

- fundamentals - assessment of hazards and risk taking into account any existing or proposed catchment changes upstream or downstream
- appraisal of general design standards against modern practice, involving site specific assessment of seismotectonics, flood risk and volcanic risk
- assessment of the site condition of the existing structures
- evaluation of design data and construction methods
- hydrology and - appropriateness of design flood(s) spillway provisions - ability to pass design flood(s)
- spillway performance characteristics, risks of blockage or malfunction, and stability
- acceptability of freeboard
- consequences of no change to spillway
- structural aspects- appropriateness of dam design details for loadings and seepage conditions taking foundation features and performance data into account
- performance under design earthquake(s) and flood(s)
- structural integrity of ancillary structures impacting on safety under all design loading conditions
- equipment - structural adequacy
- functionality and security of operation
- reliability
- reservoir - slide potential
- seiche risk

- downstream - environmental changes affecting potential impact classification
- river bed changes affecting structural or spillway performance
- operational, - compliance with essential aspects of Appendix E guidemaintenance and lines and implementation of any previous safety review surveillance aspects recommendations
- reporting - see G.4
- emergency - prescribe procedures in an emergency planpreparedness - assign responsibility
- identify all parties involved
- identify cause, effect, and mitigation
- locate resources

The Safety Review Team will assess a finer level of detail within these areas.

As a matter of good practice, and to help achieve effective communication or understanding, it is recommended that the Owner or an appointed representative take part in the inspection, and/or that meetings be held during the course of the evaluation, or after supply of a draft review report.

Care is required in setting up the contractual relationship between the owner and the safety reviewer, to ensure the review is complete, and the report is without bias from the Owner, or manager of the facility. In appropriate or draconian liability provisions may unduly influence the judgment and candor of the reviewers to the extent that they may only take an ultra conservative approach and recommend unnecessary additional studies and investigation to cover the slightest uncertainties.

The brief needs to clearly separate the annual performance compliance from other asset management aspects the owner may wish examined.

G.3.2 Initial Reviews

This term applies to old or existing dams reviewed for the first time, which frequently have limited data available on their development history and may also have limited operational records. The key problem with such dams is the lack of data and “where to start”.

In principle, the first step should be to try to establish a data book (or books) which provide the best available knowledge of the dam. The extent to which the Owner does this as a prelude to the review or as part of it, is a matter of choice and circumstances.

An almost inevitable consequence of initial reviews, unless the situation is very straightforward, is that they will involve at least two stages. The first stage will be aimed at putting issues in perspective as can best be judged on available information, and determining areas of uncertainty for further examination. It may be that a potential safety deficiency is identified straight away, in which case appropriate action must be taken. The second stage will often require forensic investigation and monitoring to assess areas of uncertainty. In such cases a realistic lead time to the “Warrant of Fitness” date will be required.

It is important that Owners appreciate the probable need for forensic investigation and its associated cost, and that Consent Authorities appreciate that it may take some time to arrive at realistic conclusions in the case of initial reviews. . Notices to Rectify should reflect the practicality of achieving compliance from a time and cost basis balanced with risk exposure.

G.3.3 Low Potential Impact Dams

Brief and generalised recommendations are outlined in the main text for Low Potential Impact dams. Legislation may not require a “warrant of fitness” for a Low Potential Impact dam, but it is not in the Owner’s interests or society’s interests, to ignore dam safety on the basis of the Potential

Impact being low. Furthermore, environmental changes may cause a Low Potential Impact dam to be rated in the Medium Potential Impact classification. These Guidelines deal with issues of dam safety. For all classifications of dam, the owner will need to take particular precautionary measures to protect commercial and public relations interests.

There are many dams with a low risk to life or property, notably for community water supply or hydro generation, where the consequences of failure would have serious social or economic effects. Thorough safety reviews of these dams are definitely in the Owner’s interests and may well be required to maintain insurability. In such cases an appropriately scoped safety review should be undertaken, based on the foregoing and following advice. These dams are Medium Impact Dams by definition.

G.4 Review Conclusions and Reporting

The extent and standard of reporting should be such as to:

- confirm that the brief has been met fully or exceeded
- comprehensively describe the inspections, findings, forensic work, and related inferences or conclusions
- be easily understood by the Owner and subsequent Reviewers
- present conclusions and recommendations clearly
- confirm compliance requirements have been met and / or what is required to fulfil compliance.

Key conclusions and recommendations which require the most careful consideration are:

- the assessed condition of the dam and appurtenant structures to function satisfactorily in a safe manner according to recognised criteria
-
-
- determination of the most plausible modes of failure for the dam, or its appurtenant structures, and their potential dam safety impact
- an assessment of the dam's performance with respect to these potential modes of failure
- assessment of the Operations and Maintenance procedures (or equivalent documentation) for dam safety application
- areas of uncertainty requiring further assessment
- any areas requiring immediate action with accompanying advice
- prioritisation of recommended actions
-

G.5 Follow-up Action by Owner

The responsibility for acting on the recommendations of the safety review rests with the Owner. The Consent Authority will provide a level of external control and overview. The Owner should take advice as necessary on how best to implement the recommendations. Where the cost implications are high, it may be in the Owner's interests to undertake a higher level of investigation and review before implementing the full detail of recommended works. It may not be necessary to undertake significant works, where an acceptable level of reduction in the potential impact of the

issue can be brought about by softer options, such as increased surveillance, and improved emergency preparedness procedures. Where a high level of risk is perceived to apply while matters are being investigated or designed, the Owner should implement such reasonable temporary measures as can be effected to improve the situation after discussion with the Consent Authority (e.g. increasing the frequency of surveillance, lowering the water level or providing temporary auxiliary spillway capacity).

The Consent Authority may issue a Notice to Rectify. Such notice may be to decommission the dam. This would require consents to be sought under the Resource Management Act.

Independent Commissioners 28 May 2010

A handwritten signature in black ink, appearing to read 'Philip Milne', with a long horizontal flourish extending to the right.

Philip Milne (chair)

A handwritten signature in black ink, appearing to read 'Bob Nixon', with a long horizontal flourish extending to the right.

Bob Nixon

A handwritten signature in black ink, appearing to read 'Andrew Fenemor', with a long horizontal flourish extending to the right.

Andrew Fenemor

A handwritten signature in blue ink, appearing to read 'Ray O'Callaghan', with a long horizontal flourish extending to the right.

Ray O'Callaghan

JOINT DECISION AND RECOMMENDATION OF INDEPENDENT COMMISSIONERS 28 MAY 2010

PART 10

Selwyn District Council consents and conditions

Distribution network:	Central	065214
	Darfield	065215
	Sheffield	065216
	Springfield	065217
	Te Pirita	065218
	Windwhistle	065219
Additional by-wash discharges:	Selwyn River	
	Hawkins River	075156

1.0 General

1.1 Scope of Works

Except where modified by specific conditions set out below, or otherwise authorised by a change of consent condition or other resource consent, the scheme and all incidental work shall be constructed, operated and maintained generally in accordance with the details contained in each of the applications for resource consent and supporting material, including any changes supplied in evidence, including:

- Applications for Land Use Consent– Annexure A - Assessment of Effects on the Environment, Section 3 - Description of the Proposed Activities.
- Application for Land Use Consent– Annexure D – Plans of the Central Plains Water Distribution Network.
- Application for Land Use Consent– Annexure E – Images of Typical Ancillary Structures.

1.2 Term

In accordance with section 125 of the Resource Management Act 1991, the Consent Holder has a period of 10 years from the date of the decision in which to give effect to each of the above consents.

1.3 Other Approvals

Details of all necessary permissions required and or obtained under other legislation (e.g., Historic Places Act, Reserves Act) shall be supplied to the Selwyn District Council at least one month prior to the commencement of works.

1.4 Complaints Register

The Consent Holder shall maintain a complaint register for all aspects of all operations in relation to all activities. It shall include the complaints registers required for the specific management plans specified in the conditions below, as well as any other complaints

received and shall contain the date, time and type of complaint, cause of the complaint, and action taken by the Consent Holder in response. The register shall be available to the Selwyn District Council at all reasonable times.

1.5 Annual Environmental Report

An Annual Environmental Report is to be submitted on each anniversary of the date of commencement of these consents, until 5 years following the scheme being commissioned. The matters to be covered shall include:

- (a) A description of the works (including construction, mitigation, rehabilitation, monitoring and reporting) carried out in the preceding 12 months.
- (b) An explanation of any departure in the preceding 12 months from the previous Annual Environmental Report.
- (c) A description of all construction, mitigation, rehabilitation, monitoring and reporting intended to be carried out in the next 12 months with an approximate timetable of activities.
- (d) A description and analysis of any unexpected adverse effect on the environment that has arisen as a result of the works in the last 12 months, the steps taken in response to that effect, and the results of those steps.
- (e) A record of complaints received in the last 12 months and the mitigation measures adopted.

2.0 Community Liaison

2.1 Distribution Network Owners' Liaison

Before any works permitted under the resource consents are commenced, the Consent Holder must appoint a Distribution Network Owners' liaison person and notify all owners of land affected by the distribution network of the person appointed and his or her contact details.

The Distribution Network Owners' liaison person must:

- (a) Maintain a register of all property owners affected by the Distribution Race Network;
- (b) Ensure plans, and any amendment to those plans for the Distribution Race, on that owner's property are provided to the property owner as soon as reasonably practicable after they become available;
- (c) Ensure a representative of the Consent Holder undertakes a site visit of each affected property, unless the property owner advises in writing that is not required;
- (d) Act as a point of contact for all issues relating to the design, construction and operation of the Distribution Network.

3.0 Construction

3.1 Hours of Work

Construction of the distribution network shall be undertaken in accordance with the following restrictions:

- (a) Work on the distribution network within 300m of any residential dwelling shall be limited to between 0730 - 1800 hours, Monday to Saturday inclusive, but excluding any public holiday, except with the written approval of the owner/s and occupier/s of any such dwelling.
- (b) There shall be no work on Easter Friday, Easter Sunday, Anzac Day, Christmas Day and Boxing Day.
- (c) Movement of heavy construction vehicles through Coalgate within 200m of any residential dwelling shall be limited to between 0630 – 2000 hours, Monday to Saturday

inclusive, but excluding any public holiday, and 0730 – 1800 hours on Sundays, except with the written approval of the owner/s and occupier/s of any such dwelling.

- (d) Notwithstanding the above restrictions, concrete pouring and associated activities can occur at any time, subject to compliance with all other conditions of consent, including noise restrictions.

3.2 Environmental Construction Management Plan

- (a) The Consent Holder shall submit to the Selwyn District Council, at least one month prior to the commencement of works, an Environmental Construction Management Plan (ECMP) outlining the construction activities and all practices and procedures to be adopted in the construction and maintenance of the Central Plains Water Irrigation Scheme. The general purpose of this document is to achieve compliance with the conditions of the designation and resource consents and to ensure that the effects of construction activities are minimised to the greatest extent practicable. The ECMP will be the over-arching document for environmental compliance. The Consent Holder and its agents shall consult with the Selwyn District Council in the development of the ECMP.

- (b) The matters to be addressed in the ECMP shall include the following:

(i) General

- Plan Purpose
- The practices and procedures to be adopted to achieve compliance with the conditions of the designation and resource consents
- Plan Revision and Compliance Issue Resolution Processes
- ECMP/Management Plan Certification Process
- Roles and Responsibilities

(ii) Mitigation of Adverse Effects

- Environmental Objectives and Principles
- Environmental Management Approach and Methods

(iii) Plan Requirements

- Implementation of designation and resource consent conditions
- Annual Environment Report Process

(iv) The ECMP shall include the following Management Plans to address specific effects issues:

- a) Construction Phase Management Plan
- b) Public Health and Safety Plan
- c) Traffic Management Plan
- d) Landscape and Rehabilitation Management Plan
- e) Noise and Vibration Management Plan
- f) Terrestrial Ecology Protection Plan
- g) Remediation Action Plan
- h) Waste Management Plan
- i) Hazardous Substances/Spill Contingency Management Plan
- j) Archaeological and Heritage Management Plan
- k) Dust Control Management Plan

Note: That the Management Plans in conditions 3.2(b)(iv), g), i) and k) relate to matters within the functions of Environment Canterbury and not those of the Selwyn District Council.

- (c) Prior to the commencement of any works authorised by the resource consents, the Consent Holder shall submit to the Selwyn District Council the ECMP and a certificate

produced by an independent, suitably qualified and experienced person(s) (acknowledged by the Chief Executive Officer of the Selwyn District Council as being competent and suitable to provide such certification), to certify that the ECMP and the works and measures described in it are appropriately designed to:

- (i) Address the matters set out in condition 3.2(b)(iv) above (excluding g, i) and k); and
- (ii) Comply with the relevant conditions.

- (d) The Consent Holder shall submit to the Chief Executive Officer of the Selwyn District Council the relevant biographical information on the proposed independent, suitably qualified and experienced person(s) at least three weeks prior to submitting the certification. The Selwyn District Council should within 10 working days of receipt of that information inform the Consent Holder whether the person(s) is considered to be suitably experienced.

If the Selwyn District Council considers that the person is not suitably experienced, the Consent Holder shall propose another person.

Works shall not proceed until the Selwyn District Council confirms that the person is suitably experienced. However, if no response is provided by the Selwyn District Council within 10 working days of receipt of the biographical information, the person shall be deemed to be suitably experienced.

- (e) Works shall not proceed until the ECMP and certification described in condition 3.2(c) above have been received and acknowledged in writing by the Chief Executive Officer of the Selwyn District Council, who shall provide written acknowledgement within 10 working days, but in any case shall not unreasonably delay such notice. If such acknowledgement is not provided within ten working days the certification shall be deemed to be confirmed.
- (f) During scheme construction the Selwyn District Council may, by written notice within one month of the anniversary of the certification provided under condition 3.2(c), require that the Consent Holder undertake an assessment of the extent to which the ECMP and the works and measures described therein appropriately satisfy the requirements of condition 3.2(c) (i) and (ii).
 - (i) The assessment shall be carried out by an independent, suitably qualified and experienced person(s) appointed by the Requiring Authority, who may be the same person(s) accepted under condition 3.2(d).
 - (ii) The Consent Holder shall, within 15 working days of receiving notice of the assessment, provide the Selwyn District Council with relevant biographical information on the proposed independent, suitably qualified and experienced person(s) to undertake the assessment.
 - (iii) The Selwyn District Council should within 10 working days of receipt of that information inform the Consent Holder whether the person(s) is/are considered to be suitably experienced. If no response is provided by the Selwyn District Council within 10 working days of receipt of the biographical information, then that person shall be deemed to be suitably experienced.
 - (iv) If the Selwyn District Council does not accept the person(s) proposed by the Consent Holder, the Consent Holder shall propose another person within 15 working days of being informed under condition 3.2(f) (iii).
 - (v) The independent, suitably qualified and experienced persons(s) shall assess all elements of the ECMP and either:
 - Certify that the ECMP satisfies condition 3.2(c)(i) and (ii); or
 - Recommend changes to ensure the ECMP satisfies condition 3.2(c) (i) and (ii).
- (g) The Consent Holder may authorise amendments to the ECMP provided that any amendments made maintain or enhance the degree and/or extent to which adverse environmental effects attributable to the construction or maintenance of the scheme are

avoided or mitigated. The Consent Holder shall provide a copy of any such amendment to the ECMP to the Selwyn District Council for its review, consideration, and if necessary, amendment, prior to implementation.

- (h) All works shall be carried out in accordance with the ECMP certified in accordance with condition 3.2(e) or as amended under condition 3.2(f).

3.3 Construction Phase Management Plan

A Construction Phase Management Plan shall be submitted to the Selwyn District Council in accord with the ECMP certification process at least one month prior to the commencement of works. Works shall not proceed until the Plan has been certified by the Selwyn District Council. All works undertaken by the Consent Holder or their agents shall be subject to, and comply with the provisions of the Construction Phase Management Plan, which shall include but not be limited to, the following:

- (a) The phases in which work shall be undertaken for the purposes of constructing and maintaining the scheme;
- (b) The timing and duration for each phase; and
- (c) The disturbed area in square metres, associated with each phase of construction.

3.4 As Built Plans

Within two months of the completion of the construction works for any of the major components of the Central Plains Water Enhancement Scheme, the Consent Holder shall supply the Selwyn District Council with a complete set of "as built" plans confirming the location of the works.

4.0 Public Safety/Health and Safety

4.1 Health and Safety Management Plan

Prior to any construction the Consent Holder shall develop and implement a Health and Safety Management Plan for both construction and operation of the Central Plains Water Irrigation Scheme which shall be provided to the Selwyn District Council, and shall be complied with on an ongoing basis. The Plan shall include at least the following:

Construction

- (a) Ensuring contractors comply with relevant construction regulations, codes of practice and procedures set out in the ECMP in order to ensure compliance with all conditions.
- (b) Ensuring contractors assess hazards on site and develop appropriate control plans that incorporate public health and safety requirements and incorporate public risk mitigation prior to engagement/ commencement of construction. This includes the provision of fencing and warning signs where appropriate to keep the public safe from harm, and to prevent unauthorised access of people and stock into areas where hazards exist including, borrow areas, fill areas and haul roads.
- (c) Public and stakeholder consultation, education and information sharing.
- (d) Contractor and sub-contractor management.
- (e) Public notification of areas of any blasting activities.
- (f) Induction/training requirements.
- (g) Emergency protocols/requirements, including arrangements for 24 hour emergency vehicle access (e.g., Civil Defence, Ambulance, Fire Service and Police).
- (h) Incident reporting procedures.
- (i) Appropriate hazard warnings (e.g., signs, sirens).
- (j) Restricting river use within 500m in either direction of blasting.

Operation

- (a) Procedures to review and update the Plan as required.
- (b) How to deal with emergency events such as oil spills, earthquakes, fires and floods.

4.2 Emergency Response and Contingency

As part of implementing the Health and Safety Management Plan, the Consent Holder shall:

- (a) Identify contingency events/document associated emergency response plans.
- (b) Make the plan available to relevant parties (e.g., councils, employees, civil defence, residents, etc).

4.3 Access During Construction

During construction, public access will be restricted to all construction, cut, fill and borrow areas by the use of suitable fences/barriers, with warning signs erected and maintained at appropriate locations.

Note: Please see condition 6.1 regarding requirements to maintain alternative public access to riverbeds in such circumstances.

5.0 Traffic Management

5.1 Road/Rail Crossings

The Midland rail line (Rolleston – Greymouth) shall remain open at all times.

The design of any road/rail/distribution race crossing shall meet the relevant sight distances specified in Appendix 10 of the Rural Section of the Selwyn District Plan, New Zealand Transport Agency Standards and Guideline Manual (SP/M/021), Planning and Policy Manual (SP/M001) and State Highway Geometric Design Manual (SP/M024) for safe stopping distances, safe passing distances, intersection entry sight distances and clear zone distances to hazards.

5.2 Construction Traffic

Prior to construction, a Traffic Management Plan shall be prepared and a copy given to the Selwyn District Council and New Zealand Transport Agency. This management plan shall be complied with at all times and it shall include the following provisions:

- (a) On all public roads, signs shall be erected warning motorists of a haul road intersection giving rise to a hazard due to heavy trucks crossing.
- (b) Warning signs shall be erected at intersections of all haul roads and public roads prohibiting public access to the construction zone.
- (c) Stock crossing methods shall be established after consulting with local farmers.
- (d) Local emergency services shall be notified of all temporary local road closures.
- (e) All construction vehicles shall be fitted with and use flashing lights while operating in the construction zone and on haul roads.
- (f) All construction vehicles shall comply with the New Zealand Transport Agency rule for vehicle dimensions and mass on public roads, unless specific over dimension permits are obtained.
- (g) Movement of oversize vehicles and equipment on SH 1, SH73 and SH 77 shall comply with New Zealand Transport Agency requirements.
- (h) Road signs shall be erected on roads where necessary to warn motorists of the hazard caused by fog or frost. The design and location of such signs shall be approved by New Zealand Transport Agency for SH1, SH73 and SH77, or the Selwyn District Council for all other roads.
- (i) Road safety audits shall be carried out every six months of traffic signals/stop signs controlling the intersections of all public roads with haul roads. The results of those audits shall be reviewed and steps taken to ensure motorists do not suffer unreasonable delays. Regular monitoring of traffic signals to ensure any faults are identified and repaired.

- (j) No canal or distribution race cleanings shall be deposited on legal road or in a position where such material may be carried onto legal road by vehicle tyres, stormwater flows, wind or any other mechanism.
- (k) Traffic management measures shall consider the issue of residential amenity arising from the passage of traffic through any living zone (particularly in the vicinity of commercial areas, schools, hospitals, and accommodation for the elderly) and where practicable construction traffic shall be directed to take alternative roads where the impact on amenity will be less.
- (l) On State Highways and District roads Road Condition Surveys shall be carried out of all road sections where it is assessed that there is a reasonable possibility of the road being affected by the scheme. These shall record the 'before' condition of the road prior to the waterways being first flooded. The specific matters to be included in these surveys will be determined by the representative road controlling authorities but will be limited to aspects potentially affected by the scheme.
- (m) Where the Road Controlling Authority has demonstrable reason to believe that damage to the road network may have occurred as a result of the scheme identified by whatever means, they may request that the Consent Holder carries out a further Road Condition Survey of the affected section of the network covered by the 'before' survey. Where any defects are found to be attributable to water effects arising from the operation of the scheme then the Consent Holder shall make good the defects and take all reasonable measures to ensure that further damage does not arise.
- (n) On District roads the consent-holder and a representative of the Council shall carry out Road Condition Surveys in the vicinity of all on-road worksites and also near off-road worksites where on-road traffic management is required or access to the site is to be from a road. These surveys shall be completed at each worksite before any work commences, and the 'after' survey will be completed prior to commencement of the maintenance period. A copy of the record of the 'before' survey is to be lodged with the relevant road controlling authority prior to work commencing, and a copy of the 'after' survey with a description of any deficiencies observed arising from the works and remedial action proposed shall be lodged with the road controlling authority within one month of substantial completion at individual worksites.
- (o) All existing property accesses from legal roads onto property shall be maintained under terms satisfactory to the landowner or operator.
- (p) Access to parcels of land within properties that are divided by the works shall be provided under terms satisfactory to the land owner or operator.
- (q) Unless explicitly permitted by the relevant road controlling authority the horizontal and vertical profiles of all road carriageways shall be preserved at the existing lines, grades, crossfalls and levels at all road crossings.
- (r) Where a road is operating as a two way road then, regardless of the traffic flow on that road the bridge or culvert crossing will be built to at least the minimum standard in the Bridge Manual for a low volume two-lane bridge, with clearances meeting the Preferred Minimum Standard.
- (s) Unless explicitly permitted by the relevant road controlling authority all culverts will extend to a point at least 3.0m clear of the edge of the formed carriageway.
- (t) Where a new bridge is constructed, or an existing bridge with pedestrian facilities is modified to accommodate the works, within the road reserve within 500m of a living zone of a township or settlement or within such a living zone, then the bridge shall provide for a pedestrian foot path on at least one side. The footpath shall be at least 2.0m wide to provide for pedestrian and cycle traffic.
- (u) When planning the timing of any works on any one route, the applicant in preparing their Traffic Management Plans for approval for the Road Controlling Authority shall take into account other planned works on the project that will affect the route to ensure the overall

impact on the road user is minimised. This shall include making an assessment of the overall delays to the route upon which the specific Traffic Management Plan applies and submitting a programme of works affecting the route with the Traffic Management Plan.

- (v) For the duration of the project, including the full duration of all maintenance periods the applicant will pay all reasonable direct costs arising from the appointment of such staff or consultants necessary to address the Council's responsibilities on relation to the project (including but not necessarily limited to: Road Traffic Safety Auditors, Design Auditors and traffic Management Coordinators).
- (w) The applicant agrees to be party to the design checking and traffic safety processes outlined above and to provide reasonable lines of communication between the Road Controlling Authorities staff and its own designers and safety engineers to facilitate the process.
- (x) Measures for suppression to mitigate the effects of dust.
- (y) Measures to maintain vehicles and machinery to mitigate the effects of fumes.

5.3 Haul Roads – Intersection with State Highways 73 and 77

Where any haul road intersects with a State Highway, the construction and operation of the intersections shall comply with the following:

- (a) Prior to construction, a Traffic Management Plan dealing with State Highway intersections with haul roads shall be prepared which complies with the New Zealand Transport Agency Code of Practice for Temporary Traffic Management. A copy of this plan shall be provided to New Zealand Transport Agency prior to construction commencing.
- (b) Where any haul road intersects any State Highway, the haul road shall be constructed to a maximum width of 15m, with a speed limit imposed on Haul Road traffic of 30 km/hr.
- (c) Where any haul road intersects any State Highway, sight distances both ways shall comply with the requirements of E10.2 set out in Appendix 10 of the Selwyn District Plan (Rural Section).
- (d) Dust suppressant shall be applied to any haul road when required within 100 metres of an intersection with State Highway to ensure dust does not reduce the visibility for drivers approaching the intersection.

5.4 Hauls Roads – Intersection with Selwyn District Council Roads

Where any haul road intersects with any formed legal roads other than a State Highway, the construction and operation of the intersection shall comply with the following:

- (a) Prior to construction, a Traffic Management Plan shall be prepared which complies with the New Zealand Transport Agency Code of Practice for Temporary Traffic Management. A copy of this plan shall be provided to the Selwyn District Council prior to construction commencing.
- (b) Stop signs shall be erected and maintained to control intersections between all formed public roads any haul road.
- (c) Where any haul road intersects with any formed public road, the haul road shall be constructed to a maximum width of 15m, with a speed limit imposed on haul road traffic of 30 km/hr.
- (d) Where any project haul road intersects any formed public road, sight distances both ways shall comply with the requirements of E10.2 set out in Appendix 10 of the Selwyn District Plan (Rural Section).
- (e) Dust suppressant shall be applied to any haul roads when required within 100 metres of an intersection with any formed public road to ensure dust does not reduce the visibility of drivers approaching the intersection.

6.0 River Access

6.1 Maintenance of River Access

Where practicable all existing access points, both vehicular and pedestrian, to and along the Rakaia and Waimakariri Rivers shall be maintained to a standard not less than that existing prior to construction.

Where existing public access to or within a river is restricted as a result of either construction works or the finished scheme components subject to this application, the Consent Holder or its contractors shall, as far as practicable and subject to requirements of public safety, provide alternative access to the same or better standard in a location as near as practicable to the existing access point.

In such circumstances, the Consent Holder is to provide the Selwyn District Council with a photographic record of the existing access prior to works commencing, along with plans and details illustrating the alternative proposal for certification as part of the ECMP.

The Consent Holder shall ensure that at all times ECan and its contractors and agents shall have access along the Waimakariri Riverbed for the purpose of operation and maintenance of the Waimakariri River Flood Protection Scheme.

Key areas where such certification would be required include (but are not necessarily limited to) the following:

- Waimakariri River between Gorge Bridge and Bleakhouse corner;
- Hawkins River near Racecourse Hill;
- Hawkins River at Essendon Road;
- Hawkins River at Sheffield;
- Hororata River;
- Rakaia River at Steeles Road;
- Rakaia River at Sleemans Road; and
- Rakaia River between Sleemans Road and the gorge.

7.0 Landscape and Rehabilitation

7.1 Landscape and Rehabilitation Objectives

The Consent Holder shall undertake rehabilitation of the land surface, topsoil, drainage and vegetation in all areas disturbed in the construction and/or maintenance of the scheme to achieve the following objectives:

- (a) To reinstate vegetation cover on previously vegetated areas disturbed by construction or maintenance activities, where those areas do not contain components of scheme infrastructure or permanent access.
- (b) To visually integrate finished structures, landforms and vegetation into the surrounding landscape so that as far as practicable they appear to be naturally occurring features or features which are already present in the immediate area. In particular the race embankments and any excess cut stockpiles are to be shaped as naturalised landforms.
- (c) To ensure short and long term stability of disturbed land areas and their surrounding areas particularly on the terrace edges.
- (d) To minimise the loss of existing vegetation where possible, most notably riparian vegetation on the edge of any river terrace.
- (e) To compensate for the loss of any native vegetation removed during construction.

7.2 Landscape and Rehabilitation Management Plan

The Consent Holder shall prepare a Landscape and Rehabilitation Management Plan which shall be lodged with and certified by the Selwyn District Council in accordance with the ECMP process set out in condition 3.2. Land restoration following construction must adhere to the Landscape and Rehabilitation Management Plan which shall apply to all areas except

to the extent they are inconsistent with the conditions of any land use consents obtained from the Canterbury Regional Council.

The Landscape and Rehabilitation Management Plan shall be:

- Prepared, implemented and maintained in a manner that is consistent with the Terrestrial Ecology Management Plan for the duration of the construction period and a 24 month maintenance period following completion of all plantings required by conditions.
- Reviewed not less than annually and the revised Plan shall be submitted to the Selwyn District Council for certification as outlined above within one month of the review being completed.

The Landscape and Rehabilitation Management Plan shall contain:

- (a) Detail of how the above objectives are to be achieved.
- (b) Incorporation of the proposed concept planting plan and mitigation measures contained in the evidence entitled *Statement of Evidence of Chris Glasson*, and in particular the Enhancement Measures described in paragraphs 158 to 162 (but excluding that information related to the aspects of the scheme that have been withdrawn) and shown in the Sections 15.4 to 15.6 of the Graphic Supplement.
- (c) Details of all landforms, finishing, layouts, soiling, planting and grassing, roads, tracks, structures and maintenance programmes proposed for the scheme.
- (d) Specifications for the use of recessive colours for all structures (all colours shall have a reflectivity of less than 40%).
- (e) The final contours and finished heights of earthworks.
- (f) Methods for stripping, storing and re-use of topsoil.
- (g) Details of proposed planting – including species, location and timing.
- (h) Identification of specific ecological, heritage, cultural or geological features within or immediately adjoining the construction zone which are to be protected, the methods of such protection, and the identification of the features on a plan.
- (i) The staging of vegetation removal.
- (j) The rehabilitation of haul roads.
- (k) Methods and protocols for educating and training contracting personnel about the requirements of the Landscape and Rehabilitation Management Plan.
- (l) On-going pest and weed control measures for both exposed areas and stockpiles over the construction period and rehabilitated landscape planting areas over the operation of the scheme.
- (m) Methods for monitoring the success of re-vegetation plantings for at least 24 months following the planting.
- (n) Methods to enable the completion of all such works at the earliest opportunity, but no later than 1 season following completion of construction.
- (o) On-going methods to minimise fire risk (whether by grazing, mowing or other means) on the head race embankments.

7.3 Landscape and Rehabilitation Areas

The Landscape and Rehabilitation Management Plan shall cover the following areas:

- (a) Borrow areas within the designated land that will not ultimately be covered by the main headrace;
- (b) Fill areas;
- (c) Canal/race embankments – all of which shall be either re-grassed or otherwise covered with rehabilitative/amenity plantings;
- (d) Sediment traps;
- (e) Construction storage areas; and

(f) The construction zone generally where land has been disturbed.

7.4 Landscape and Rehabilitation Management Plan Content

Throughout the landscape, recessive colours will be used for storage tanks, pump stations and any other scheme utility components.

7.5 Rehabilitation Requirements

(a) Within two months of completion of any component of the construction works, the Consent Holder shall issue a notice to the Selwyn District Council certifying that all construction debris or other materials from the construction works other than rock stockpiled for the purpose of maintaining erosion protection works or for landscaping purposes has been removed.

(b) Within six months of completion of commissioning of the scheme, the Consent Holder shall remove all temporary buildings, plant and equipment associated with the scheme (whether attached to the land or not).

7.6 Landscape Reinstatement

(a) The reinstatement of all works areas and landscaping shall be completed within one season (12 months) of the finishing of construction in that area.

(b) All landscaping shall be maintained on an on-going basis. In the event of rehabilitation plantings not becoming successfully established they will be replanted and maintained until successful.

8.0 Noise and Vibration

8.1 Construction Noise Limits

All construction activity shall be conducted so that noise emissions do not exceed the noise limits contained in the following table. Sound levels shall be measured and assessed in accordance with the provisions of NZS 6803:1999 “Acoustics – Construction Noise”. These limits shall apply at all occupied residential units and schools. The Consent Holder shall liaise with all schools and avoid construction noise during any particularly sensitive times.

Time of week	Time period	Duration of work					
		Typical duration (dBA)		Short-term duration (dBA)		Long-term duration (dBA)	
		L _{eq}	L _{max}	L _{eq}	L _{max}	L _{eq}	L _{max}
Weekdays	0630-0730	60	75	65	75	55	75
	0730-1800	75	90	80	95	70	85
	1800-2000	70	85	75	90	65	80
	2000-0630	45	75	45	75	45	75
Saturdays	0630-0730	45	75	45	75	45	75
	0730-1800	75	90	80	95	70	85
	1800-2000	45	75	45	75	45	75
	2000-0630	45	75	45	75	45	75
Sundays and public holidays	0630-0730	45	75	45	75	45	75
	0730-1800	55	85	55	85	55	85
	1800-2000	45	75	45	75	45	75
	2000-0630	45	75	45	75	45	75

8.2 Noise and Vibration Management Plan

Prior to the commencement of any construction activity, the Consent Holder shall appoint an appropriately qualified acoustic engineer to prepare a Noise and Vibration Management Plan. That plan shall be lodged with the Selwyn District Council as part of the ECMP certification process and adhered to during construction

The Noise and Vibration Management Plan shall include:

- (a) Minimum buffer distances and attenuation measures for specific activities and areas in order to comply with the standards set out in condition 8.1 above.
- (b) All applicable noise limits.
- (c) Hours of operation, including times and days when construction work would occur.
- (d) Machinery and equipment to be used.
- (e) Mitigation options to be adopted as required in order to comply with the noise limits, such as temporary barriers and enclosures.
- (f) Description of the adoption of the best practicable option (BPO), in accordance with section 16 of the Resource Management Act.
- (g) Procedures for identifying dwellings within 150 metres of the headrace, 250 metres of bridges/siphons/piling, 75 metres of the distribution network, and 500 metres of any blasting.
- (h) Procedures for conducting pre and post construction structural checks for buildings within the vibration buffer distances in accord with (g).
- (i) Provision for independent certification, monitoring and technical review procedure to outline the Consent Holder's responsibility to undertake vibration checks and deformation surveys of any other potentially affected heritage building and/or structure before, during and no less than 24 months post the commissioning of the scheme.
- (j) Details of vibration testing of equipment to confirm that the vibration standards in DIN4150-Part 3 (1999) 'Structural vibration – Effects of vibration on structures' are not exceeded. In the event that other machinery is to be used, vibration testing is to occur prior to works commencing to ensure that the vibration standards will be met.
- (k) Development of alternative strategies where full compliance with DIN4150-Part 3 (1999) 'Structural vibration – Effects of vibration on structures' may not be achieved, including consultation with residents and other occupiers to achieve acceptable outcomes.
- (l) Detailed methods for monitoring and reporting on construction noise and vibration throughout the process, including the location of vibration and noise monitoring for construction activities that are adjacent to occupied dwellings.
- (m) Liaison and complaint procedures. The complaint procedure shall require investigation of complaints within twenty-four hours, with immediate cessation of any construction activity found to be breaching the noise limits.

Note: For the purpose of assessment under DIN4150-Part 3 (1999) 'Structural vibration – Effects of vibration on structures' historic buildings shall be classified as "sensitive structures".

8.3 Operational Noise Limits

All operational noise from the scheme shall comply with the following noise limits when measured in accordance with NZS 6801:1991 "Measurement of Sound" and assessed in accordance with NZS 6802:1991 "Assessment of Environmental Sound":

Within the notional boundary of any dwelling, rest home, hospital, or classroom in any educational facility, except where that dwelling, rest home, hospital or classroom is located within a Living Zone:

0730 to 2000 hrs	60 dBA L ₁₀
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2000 to 0730 hrs	45 dBA L ₁₀ , 70 dBA L _{max}
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Within any site boundary in a Living Zone:

0730 to 2000 hrs	55 dBA L ₁₀
2000 to 0730 hrs	40 dBA L ₁₀ , 70 dBA L _{max}

9.0 Affected Properties

9.1 Access to Canals and Races

The Consent Holder shall erect and maintain stock fences between the Central Plains Enhancement Scheme and adjacent farms to the same standard as that existing, or otherwise required to prevent cattle accessing the main headrace canal or any inlet canal.

9.2 Pest and Weed Control

All fenced scheme areas, including the canal and race embankments, shall be subject to pest and weed control so as to prevent the spread of pests and weeds on to adjoining properties.

9.3 Restoration Work – Private Property

Where the works constructed under the resource consents affects land or chattels, the Consent Holder shall reconfigure, relocate, or restore all existing:

- (a) Fences;
- (b) Irrigation facilities;
- (c) Water races;
- (d) Farm lanes/tracks;
- (e) Buildings;
- (f) Landscaping (including shelterbelts); and
- (g) Livestock drinking water;

to the same standard as that existing or otherwise at the satisfaction of the land/infrastructure owner. This includes providing bridges and/or alternative structures where necessary to maintain viable lanes/tracks or irrigation facilities to the affected property.

9.4 Restoration Work – Council Community Drinking Supplies, Stock Water and Water Race Schemes

As part of the ECMP the Consent Holder is to identify and outline procedures to manage any disruption to Community Water Supply, Stock Water and Water Race Schemes during the construction of the intakes and associated structures, the head race canal and the distribution network. As a minimum this is to achieve a continuity of supply in accordance with the Selwyn District Council 'levels of service' in place at the time of construction. This may involve the provision of an alternative supply at the cost of the Consent Holder if required.

The design of all crossing points is to be undertaken in conjunction with and be approved by the Selwyn District Council Asset Manager Utilities prior to the ECMP being submitted for certification in accord with condition 1.5.

10.0 Terrestrial Ecology

10.1 Terrestrial Ecology Protection Objectives

The Consent Holder shall undertake all scheme works in accordance with the following objectives:

- (a) Avoid the loss or disturbance of indigenous vegetation and habitats to the greatest extent practicable, and where that is not possible, to ensure there is a scheme wide 'no net loss' (by area) of significant indigenous vegetation.
- (b) Mitigate for the loss of any indigenous vegetation and habitats destroyed, removed or disturbed during construction and operation of the scheme.
- (c) Mitigate for the loss of any indigenous vegetation-landform associations destroyed, removed or disturbed during construction and operation of the scheme.

- (d) Ensure the successful establishment and long term viability of proposed mitigation plantings.
- (e) Minimise the potential for lizards and large ground-dwelling invertebrates to be significantly affected by construction.
- (f) Minimise the establishment or spread of noxious weeds within the scheme area and also on to neighbouring properties.

10.2 Terrestrial Ecology Protection Plan

Prior to any construction occurring, the Consent Holder shall, in consultation with Selwyn District Council and the Department of Conservation, prepare and certify a Terrestrial Ecology Protection Plan and adhere to this on an ongoing basis.

The Terrestrial Ecology Protection Plan shall:

- (a) Detail how the above objectives stated in condition 10.1 are to be achieved:
- (b) Include the attached map of all known significant indigenous vegetation within the scheme area and identify those sites/areas that have the potential to be destroyed or adversely affected by construction activities.
- (c) Require field investigations/survey of any such identified sites/areas in sufficient detail so as to achieve objectives (a) to (c) included in condition 10.1 above.
- (d) Detail a calculation of biodiversity 'no net loss' (by area) using international best practice approaches, including the valuation of the biodiversity costs associated with any destruction/damage and the benefits of mitigation and any proposed biodiversity offsets.
- (e) The Terrestrial Ecology Protection Plan shall be prepared and maintained for the duration of the construction period and a 24 month maintenance period following completion of all plantings. In accordance with the ECMP process the Plan shall be submitted to the Selwyn District Council for certification at least one month prior to construction commencing.
- (f) The Terrestrial Ecology Protection Plan shall be prepared, implemented and maintained in conjunction with, and in a manner that is consistent with, the Landscape and Rehabilitation Management Plan.
- (g) The Terrestrial Ecology Protection Plan shall be maintained as current at all times by the Consent Holder and be reviewed not less than annually. The review shall incorporate all monitoring results obtained during the preceding monitoring period. A copy of each annual Terrestrial Ecology Protection Plan review shall be forwarded to the Selwyn District Council and the Department of Conservation within one calendar month of its completion.

11.0 Waste Management and Hazardous Substances

11.1 Remediation Action Plan

A Remediation Action Plan for contaminated areas will be prepared, certified and lodged with the Selwyn District Council prior to any construction activity and adhered to where the construction of any works subject to the resource consents requires the disturbance or removal of any:

- (a) Landfill;
- (b) Farm dump;
- (c) Offal pit;
- (d) Septic tank;
- (e) Silage pits;
- (f) Dairy effluent disposal ponds; and
- (g) Coal mine or coal mine workings.

The Remediation Action Plan above shall address the matters set out in (a) - (f) below, with a level of detail appropriate to the degree of risk presented by the disturbance, removal or inundation of each specific contaminated area:

- (a) The earthworks and transport controls to minimise the off-site mitigation of contamination (via air or water during the remedial works).
- (b) Appropriate measures for the control of dust or odour;
- (c) The diversion of stormwater away from the remedial works;
- (d) The treatment of contaminated stormwater or groundwater in the remediation area;
- (e) Sampling and reporting;
- (f) The health and safety requirements for remediation workers.

11.2 Solid Waste

A Waste Management Plan shall be prepared and lodged with the Selwyn District Council prior to any construction activity and adhered to, for the management of domestic waste from site staff, construction waste and hazardous waste.

At each construction area, provision shall be made for the recycling of paper, plastic, glass, aluminium, cans, waste oil and solvents. Containers and appropriate storage arrangements shall be provided for all other classes of waste.

Clean-fill construction waste shall be disposed of within the area of the designation and/or subject to the resource consents.

All other construction waste shall be transported in enclosed containers to a Selwyn District or Christchurch City transfer station.

11.3 Hazardous Substances

All fuel, oil and hazardous substances shall be stored in accordance with a Hazardous Substances/Spill Contingency Management Plan to be prepared and submitted to the Selwyn District Council at least one month prior to construction.

The Hazardous Substances Management Plan shall address the following matters:

- (a) Hazardous chemical storage
- (b) Fuel and chemical spill control
- (c) Spill containment
- (d) Spill clean up
- (e) Incident reporting

That plan shall be kept on site and provided to the Selwyn District Council upon request.

Fuel, oil and hazardous substance storage areas shall be bunded with capacity to contain 120% of the volume of stored material in the event of a spill.

12.0 Cultural and Heritage Impacts

12.1 Archaeological and Heritage Management Plan

Prior to commencing any construction the Consent Holder shall commission an Archaeological and Heritage Management Plan prepared by a suitably qualified professional in conjunction with Te Rūnanga o Ngāi Tahu and the NZ Historic Places Trust and certified in accord with the ECMP process set out in condition 3.2. Once finalised, copies shall be lodged with the Selwyn District Council, Te Rūnanga o Ngāi Tahu, Te Taumutu Rūnanga and the NZ Historic Places Trust. This plan shall be complied with and shall cover any destruction, damage or modification to any archaeological site, or historic site or building classified under the NZ Historic Places Act 1993 and identify any conditions to be complied with in relation to heritage. The Archaeological and Heritage Management Plan shall include:

- (a) Methods for avoiding, remedying or mitigating adverse effects on known archaeological and cultural sites and heritage places.

- (b) The Consent Holder's other legal responsibilities when dealing with archaeological and cultural and heritage places, including Iwi Management Plans, the Ngai Tahu Claims Settlement Act 1998, the Protected Objects Act 1975 and the Historic Places Act 1993 (see condition 12.4).
- (c) Methods for identifying unrecorded archaeological and cultural sites and heritage places which are discovered during the construction of the scheme and appropriate accidental discovery protocols to deal with these (see condition 12.4).
- (d) The identification of areas where there are likely to be sites of significance that require the presence of a cultural monitor on site during construction.
- (e) Responsibilities of contractors and project managers.
- (f) Control of vegetation, stock and soil erosion.
- (g) Public access and vandalism.
- (h) Methods of excavation.
- (i) Sampling and analysis of archaeological materials.

Any taonga tuturu (artefacts of tangata whenua origin) that are recovered during the works are the property of the Crown and should be registered with the Ministry for Culture and Heritage. Such artefacts shall be stored in an appropriate repository either in a local or regional museum.

12.2 Site Survey

Before commencing any vegetation clearance or earthworks in any area listed in the Selwyn District Plan as a Wāhi Taonga site, Wāhi Taonga Management Area or Mahinga Kai site, the Consent Holder shall contact local rūnanga for advice as to the most appropriate methods for avoiding, remedying or mitigating adverse effects of the proposed activity.

Further survey/investigation of potential effects on the archaeological site identified as containing ovens and artefacts in the vicinity of Old West Coast Road and Intake Road (M 35/146) is required prior to any works commencing on Race D 2.1 in this area.

12.3 Historic Places Act Authority

Prior to commencing any construction, the Consent Holder shall obtain the appropriate Authority to destroy, damage or modify any archaeological site, historic site or historic building classified under the Historic Places Act 1993, from the NZ Historic Places Trust for the work required to complete that stage of the project (section 18 Authority).

Where practicable, all sites should be avoided, but where such sites cannot be avoided, full and appropriate recording and documentation of such sites should be undertaken before they are destroyed. Any mitigation of damage, modification or destruction of the sites shall be undertaken according to sections 10 and 12 of the Historic Places Act 1993.

12.4 Accidental Discovery Protocol

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

In the event of any disturbance of Koiwi Tangata (human bones) or taonga (treasured artefacts), the Consent Holder shall immediately:

- (a) Advise the Te Rūnanga o Ngāi Tahu, Te Taumutu Rūnanga, or their representative, and the Selwyn District Council of the disturbance;
- (b) Cease earthmoving operations in the affected area until the area containing the Koiwi Tangata or taonga has been clearly demarcated, and Kaumatua and archaeologists have certified that it is appropriate for earthmoving to recommence.

In the event of accidental discovery of archaeological remains, the following steps shall be taken:

- (a) All activity affecting the immediate area shall cease and the Regional Archaeologist of the New Zealand Historic Places Trust shall be contacted;
- (b) The site shall be secured to ensure that the remains are not further disturbed;
- (c) Further works affecting the remains will not commence until either:
 - i. The Regional Archaeologist of the New Zealand Historic Places Trust has confirmed in writing that the archaeological provisions of the Historic Places Act 1993 do not apply; or
 - ii. The requirements of the archaeological provisions of the Historic Places Act 1993 have been met, and if required, and archaeological authority has been granted by the New Zealand Historic Places Trust.

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

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

13.0 Utilities

13.1 Power Utilities

Where any part of a building or structure needs to be constructed/located within the restricted areas specified under Table 2 of the NZECP 34:2001, prior to that construction commencing, the Consent Holder must submit to the Selwyn District Council (and a copy to Transpower) a certificate from a suitably qualified electrical engineer confirming that any building or structure complies with the minimum safe distances from the Benmore – Haywards A Benmore – Islington A, Roxburgh – Islington A, Brackendale – Hororata A, and Hororata – Islington E lines as specified in Table 3 of the NZECP 34:2001.

Please note that the distances specified include an allowance for climatic conditions (i.e., conductor swing).

No buildings or structures (including temporary buildings) shall be located within 12 metres of the outer edge of the visible foundations of any transmission line tower.

No fences of conductive materials shall be located within 5 metres of the outer edge of the visible foundations of any transmission line tower.

All buildings and other structures constructed on site shall be located so as not to preclude existing 4-wheel drive access to any transmission line support structure.

All machinery and mobile plant operated on site must maintain a minimum clearance distance of 4 metres from all transmission line conductors at all times.

No person shall, in the case of any tower supporting any conductor, excavate or otherwise interfere with any land:

- (a) at a depth greater than 300mm within 6 metres of the outer edge of the visible foundations of the tower; or
- (b) at a depth greater than 3 metres, between 6 metres and 12 metres of the outer edge of the visible foundation of the tower; or
- (c) in such a way as to create an unstable batter.
- (d) When, in exceptional circumstances, the Consent Holder wishes to undertake works within the specified distances, Transpower shall be consulted with in order to provide the requisite approvals for encroachment, in accordance with the NZECP 34:2001.

Excavated or other material must not be deposited under or near the Benmore – Islington A, Roxburgh – Islington A, Brackendale – Hororata A, and Hororata – Islington E transmission lines so as to reduce the vertical distance from the ground to the conductors to a distance less than:

- (a) 6.5 metres vertically, across or along driveways or on any other land traversable by vehicles;
- (b) 5.5 metres vertically, on any land not traversable by vehicles due to inaccessibility; and
- (c) 3 metres in any distance other than vertical on all land.

Excavated or other material must not be deposited under or near the Benmore – Haywards A transmission line so as to reduce the vertical distance from the ground to the conductors to a distance less than:

- (a) 8 metres vertically, across or along driveways or any other land traversable by vehicles;
- (b) 6.5 metres vertically, on any land not traversable by vehicles due to inaccessibility;
- (c) 3 metres in any distance other than vertical on all land.

Please note that the distances specified include an allowance for mechanic creep (i.e., permanent elongation of the conductors).

The Consent Holder must ensure that the discharge of dust created by earthworks, transportation and construction activities does not create any dust hazard or nuisance to any high voltage transmission lines.

Prior to the commencement of any construction, the Consent Holder must submit a “Dust Control Management Plan” for the activity to the Consents Manager, Selwyn District Council (and a copy to Transpower). In particular, the Dust Management Control Plan shall specify the potential dust sources and the mitigation measures to be undertaken to minimize dust in order to protect the existing high voltage transmission lines and locations where ground levels may change in and around transmission lines.

All land use activities, including earthworks located on site must comply with the New Zealand Code of Practice for Electrical Safe Distances NZECP 34:2001 or any subsequent amendment to this code.

All trees and vegetation planted on site must comply with the Electricity (Hazards from Trees) Regulations 2003 or any subsequent amendment to these regulations.

Existing access arrangements to transmission line support structures shall be retained where practicable. Where the Consent Holder requires or causes a change in access arrangements, then alternative arrangements shall be made (to the satisfaction of Transpower) to provide safe 4-wheel drive, 24hr access to support structure bases (including during the construction period).

14.0 Bonding of Construction, Operation and Maintenance

14.1 Scheme Construction, Operation and Maintenance

The Consent Holder shall maintain and repair the works authorised under these consents including, but not limited to, the distribution channels, by washes, pump stations, and all other ancillary structures such as bridges, siphons and culverts.

14.2 Environmental Bonding

To secure condition 14.1 the Consent Holder shall provide and maintain in favour of the Selwyn District Council a bond on terms and conditions satisfactory to them in all respects.

14.3 Form of Bond

The bond shall be in a form generally used by a bank or insurance company registered to conduct business in New Zealand and approved by the Selwyn District Council.

14.5 Content of Bond

The bond shall apply until all construction works relating to the distribution network, by washes and any ancillary utility structures have been completed and shall provide that the Consent Holder shall be liable and remain liable for meeting the lesser cost of:

- (a) Completion; or

- (b) Reinstating land affected by the construction including making safe and mitigating any adverse effects arising from the work undertaken during construction.

14.6 Payment

The payment of the bond quantum by the Consent Holder shall be guaranteed by a guarantor acceptable to the Selwyn District Council.

The guarantor shall bind itself to pay up to the bond quantum for the carrying out and completion of all obligations of the Consent Holder under the bond.

14.7 Term

The bond shall be executed before the commencement of any construction works associated with the distribution network and may be renewed from time to time in accordance with this condition and shall remain in place until construction is complete.

14.8 Amount

- (a) The bond may vary from time to time but at any given time shall be sufficient to cover the lesser of the estimated costs of completion (including any contingency), or compliance with all conditions, including as required by condition 14.5:
- (i) Demolition and removing of any buildings or other structures; and
 - (ii) Rehabilitation of land affected by the Scheme.
- (b) The bond shall be set prior to the commencement of construction by agreement between the Consent Holder and the Selwyn District Council, taking into account the estimated cost of meeting the obligations for which the bond is given as set out in condition 14.5 above.
- (c) In the event of the Consent Holder and the Selwyn District Council not reaching agreement on the initial bond amount it will be assessed by a suitably qualified and experienced independent bond assessor appointed by the Selwyn District Council, and the decision of that person shall be final and binding.
- (d) The amount of the bond will then be reviewed and reassessed by the Consent Holder and the Selwyn District Council every 12 months from the date the initial bond amount was lodged until construction of the distribution network is complete.
- (e) During the construction phase of the Scheme, a scope of works planned for the balance of the construction period will be provided by the Consent Holder to the Selwyn District Council, both prior to setting the initial bond amount, and again at each annual reassessment, to assist in setting the bond amount as outlined in condition 14.8(a) above.
- (f) In the event of the Consent Holder and the Selwyn District Council not reaching agreement on a bond amount within thirty (30) working days of the date the review and reassessment falls due, it will be assessed by a suitably qualified and experienced independent bond assessor appointed by the Selwyn District Council, and the decision of that person shall be final and binding.
- (g) If at any time the amount of the bond is varied pursuant to condition 14.8(d) then the Consent Holder and guarantor approved by the Selwyn District Council, shall within thirty (30) working days of notification to the Consent Holder of the varied bond amount, execute and lodge with the Selwyn District Council a new bond for the varied amount or the additional amount required in excess of the existing bond.
- (h) The Consent Holder shall not commence, or shall cease to commence, any activity authorised under these consents until:
- (i) The bond referred to in condition 14.5 above is executed by the Consent Holder and guarantor and deposited with the Selwyn District Council; and

- (ii) In respect of any varied bond referred to in condition 14.8(g) above, after thirty (30) working days has expired from the date the Consent Holder was notified of the terms of the varied bond by the Selwyn District Council, unless the varied bond has been executed by the Consent Holder and guarantor, and has been deposited with the Selwyn District Council, or the varied bond decreases the bond amount required to be provided by the Consent Holder.

14.9 Section 109

The provisions of Section 109 of the Act shall apply to any bond required pursuant to this condition.

14.10 Costs

The Consent Holder shall meet the costs of providing any bond, including the costs of preparation of the bond and any substitute bond, and the costs of any professional bond assessor engaged to resolve the appropriate quantum of the initial bond to be provided or any varied bond on review and reassessment.

15.0 Insurance

15.1 Public Liability Insurance

The Consent Holder shall, all at times after construction has commenced, have in place public liability insurance on terms suitable in all respects to the Selwyn District Council, to cover the full costs of remediating any environmental damage, including damage to private property and public infrastructure in the event of any failure of the distribution network and/or by washes authorised by these consents. The insurance shall be obtained on the following conditions:

- (a) The Selwyn District Council shall be the beneficiary of the insurance policy and shall be able to enforce its terms;
- (b) The Consent Holder shall ensure that the Selwyn District Council has, at all times after construction commences, written confirmation that the insurance required by this condition is in place.
- (c) The Consent Holder shall ensure that the insurer is required to copy all relevant information regarding the insurance to the Selwyn District Council. This obligation includes an express term that the insurer must immediately notify the Selwyn District Council of any non-performance of the terms of insurance by the Consent Holder.
- (d) In the event of non-performance of any term of the insurance, the Selwyn District Council shall be given the opportunity to rectify the non-performance before the insurance is cancelled.

16.0 Review of Conditions

Pursuant to section 128(1) of the Act, the Consent Authority may review any of the conditions by serving notice either:

- (a) Within a period of two months of the date of commencement of these consents; or
- (b) Within a period of three months commencing on each anniversary of the date of issue of these consents for any of the following purposes:
 - i. To deal with any adverse effects on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; or
 - ii. To require the Consent Holder to adopt the best practicable option to mitigate any adverse effect upon the environment; or

- iii. To deal with any other adverse effect on the environment on which the exercise of the consent may have any influence;
- iv. To deal with inaccuracies contained in the consent application that materially influenced the decision made on the application and is such that it is necessary to apply more appropriate conditions.

ADVICE NOTES:

1. The Council will require payment of its administrative charges in relation to monitoring, as authorised by the provisions of section 36 of the Resource Management Act 1991.
2. Work affecting archaeological sites is subject to a consent process under the Historic Places Act 1993. An authority (consent) from the NZ Historic Places Trust must be obtained for the work prior to commencement. It is an offence to damage or destroy a site for any purpose without an authority. The Historic Places Act 1993 contains penalties for unauthorised site damage. The Consent Holder is advised to contact the NZ Historic Places Trust for further information.

Independent Commissioners 28 May 2010



Philip Milne (chair)



Bob Nixon



Andrew Fenemor



Ray O'Callaghan

RECOMMENDATIONS TO CENTRAL PLAINS IRRIGATION LIMITED IN RESPECT OF NOTICE OF REQUIREMENT AND CONDITIONS

PART 11

SDC Reference D060001

1.0 General

1.1 Designation

Except where modified by specific conditions set out below, all work shall be constructed, operated and maintained generally in accordance with the details contained in the Notice of Requirement for Designation and supporting material, including any changes supplied in evidence, including:

- Notice of Requirement for a Designation – Annexure A – Assessment of Effects on the Environment, Chapter 4, Project Description.
- Notice of Requirement for a Designation – Annexure C – Maps of Land Subject to Designation Requirement.
- Notice of Requirement for a Designation – Annexure D – Concept Plans of Intake Areas and Associated Structures.

But excluding all references to the Dam, Waianiwaniwa Reservoir and Upper Waimakariri River Intake and associated canal and tunnel, which have been withdrawn.

1.2 Term

Pursuant to section 184 of the Resource Management Act, 1991, the term of the designation is extended and shall not lapse for a period of eight years from the date it is included in the District Plan.

1.3 Finalisation of the Designation Corridor

Notwithstanding condition 1.2, the Requiring Authority shall, within 3 years of the designation being confirmed, complete sufficient design to:

- Determine the extent of designation “reasonably necessary” to construct the head race canal; and
- Remove the designation over the balance of the land which is no longer required in accordance with section 182 of the Resource Management Act 1991.

1.4 Outline Plan

Pursuant to section 176A of the Resource Management Act 1991, an Outline Plan shall be submitted by the Requiring Authority to the Selwyn District Council before any construction is commenced.

1.5 Other Approvals

Details of all necessary permissions required and or obtained under other legislation (e.g., Historic Places Act, Reserves Act) shall be supplied to the Selwyn District Council at least one month prior to the commencement of works.

1.6 Complaints Register

The Requiring Authority shall maintain a complaint register for all aspects of all operations in relation to all activities. It shall include the complaints registers required for the specific management plans specified in the conditions below, as well as any other complaints received and shall contain the date, time and type of complaint, cause of the complaint, and action taken by the Requiring Authority in response. The register shall be available to the Selwyn District Council at all reasonable times.

1.7 Annual Environmental Report

An Annual Environmental Report is to be submitted on each anniversary of the date of commencement of the scheme, until 5 years following the scheme being commissioned. The matters to be covered shall include:

- (a) A description of the works (including construction, mitigation, rehabilitation, monitoring and reporting) carried out in the preceding 12 months.
- (b) An explanation of any departure in the preceding 12 months from the previous Annual Environmental Report.
- (c) A description of all construction, mitigation, rehabilitation, monitoring and reporting intended to be carried out in the next 12 months with an approximate timetable of activities.
- (d) A description and analysis of any unexpected adverse effect on the environment that has arisen as a result of the works in the last 12 months, the steps taken in response to that effect, and the results of those steps.
- (e) A record of complaints received in the last 12 months and the mitigation measures adopted.

2.0 Community Liaison

2.1 Liaison with Head Race Owners

The Requiring Authority shall, prior to undertaking any works authorised by the Designation, appoint a Head Race Owners' liaison person and notify all landowners with property affected by the Designation ("the Head Race Owners") of this appointment.

The Head Race Owners' liaison person shall:

- (a) Provide all Head Race owners within the Designation with a copy of plans for that section of the designated works affecting their property, at each stage of the design process;
- (b) Convene meetings, to which all Head race Owners affected by the Designation are invited, at no less than 6 monthly intervals during the design and construction process;
- (c) Ensure that a representative of the company undertakes a site visit with each Head Race Owner at an early stage in the design process;
- (d) Serve as a point of contact for all Head Race Owners regarding any issue related to the design, construction or operation of the Head Race;
- (e) Maintain an up to date record of Head Race Owners for the purpose of undertaking the responsibilities outlined in (a) to (d) above, until construction of the designated works are completed.

3.0 Construction

3.1 Hours of Work

Construction of the scheme shall be undertaken in accordance with the following restrictions:

- (a) Work on the designation works within 300m of any residential dwelling shall be limited to between 0730 - 1800 hours, Monday to Saturday inclusive, but excluding any public holiday, except with the written approval of the owner/s and occupier/s of any such dwelling.
- (b) Work on the designation works within 500m of any residential dwelling shall be limited to between 0730 - 1800 hours, on Sunday and on any public holiday, except with the written approval of the owner/s and occupier/s of any such dwelling.
- (c) There shall be no work on Easter Friday, Easter Sunday, Anzac Day, Christmas Day and Boxing Day.
- (d) Movement of heavy construction vehicles through Coalgate within 200m of any residential dwelling shall be limited to between 0630 – 2000 hours, Monday to Saturday inclusive, but excluding any public holiday, and 0730 – 1800 hours on

Sundays, except with the written approval of the owner/s and occupier/s of any such dwelling.

- (e) Notwithstanding the above restrictions (but subject to (b)), concrete pouring and associated activities can occur at any time, subject to compliance with all other conditions of consent, including noise restrictions.

3.2 Environmental Construction Management Plan

- (a) The Requiring Authority shall submit to the Selwyn District Council, at least one month prior to the commencement of works, an Environmental Construction Management Plan (ECMP) outlining the construction activities and all practices and procedures to be adopted in the construction and maintenance of the Central Plains Water Irrigation Scheme. The general purpose of this document is to achieve compliance with the conditions of the designation and resource consents and to ensure that the effects of construction activities are minimised to the greatest extent practicable. The ECMP will be the over-arching document for environmental compliance. The Requiring Authority and its agents shall consult with the Selwyn District Council in the development of the ECMP.
- (b) The matters to be addressed in the ECMP shall include the following:
- (i) General
 - Plan Purpose
 - The practices and procedures to be adopted to achieve compliance with the conditions of the designation and resource consents
 - Plan Revision and Compliance Issue Resolution Processes
 - ECMP/Management Plan Certification Process
 - Roles and Responsibilities
 - (ii) Mitigation of Adverse Effects
 - Environmental Objectives and Principles
 - Environmental Management Approach and Methods
 - (iii) Plan Requirements
 - Implementation of designation and resource consent conditions
 - Annual Environment Report Process
 - (iv) The ECMP shall include the following Management Plans to address specific effects issues:
 - a) Construction Phase Management Plan
 - b) Public Health and Safety Plan
 - c) Traffic Management Plan
 - d) Landscape and Rehabilitation Management Plan
 - e) Noise and Vibration Management Plan
 - f) Terrestrial Ecology Protection Plan
 - g) Remediation Action Plan
 - h) Waste Management Plan
 - i) Hazardous Substances/Spill Contingency Management Plan
 - j) Archaeological and Heritage Management Plan
 - k) Dust Control Management Plan
- Note: That the Management Plans in conditions 3.2(b)(iv), g), i) and k) relate to matters within the functions of Environment Canterbury and not those of the Selwyn District Council.*
- (c) Prior to the commencement of any works authorised by the designation, the Requiring Authority shall submit to the Selwyn District Council the ECMP and a certificate produced by an independent, suitably qualified and experienced person(s) (acknowledged by the Chief Executive Officer of the Selwyn District Council as being competent and suitable to provide such certification), to certify that the ECMP and the works and measures described in it are appropriately designed to:
- (i) Address the matters set out in condition 3.2(b)(iv) above (excluding g), i) and k)); and

- (ii) Comply with the relevant conditions.
- (d) The Requiring Authority shall submit to the Chief Executive Officer of the Selwyn District Council the relevant biographical information on the proposed independent, suitably qualified and experienced person(s) at least three weeks prior to submitting the certification. The Selwyn District Council should within 10 working days of receipt of that information inform the Requiring Authority whether the person(s) is considered to be suitably experienced.
- If the Selwyn District Council considers that the person is not suitably experienced, the Requiring Authority shall propose another person.
- Works shall not proceed until the Selwyn District Council confirms that the person is suitably experienced. However, if no response is provided by the Selwyn District Council within 10 working days of receipt of the biographical information, the person shall be deemed to be suitably experienced.
- (e) Works shall not proceed until the ECMP and certification described in condition 3.2(c) above have been received and acknowledged in writing by the Chief Executive Officer of the Selwyn District Council, who shall provide written acknowledgement within 10 working days, but in any case shall not unreasonably delay such notice. If such acknowledgement is not provided within ten working days the certification shall be deemed to be confirmed.
- (f) During scheme construction the Selwyn District Council may, by written notice within one month of the anniversary of the certification provided under condition 3.2(c), require that the Requiring Authority undertake an assessment of the extent to which the ECMP and the works and measures described therein appropriately satisfy the requirements of condition 3.2(c) (i) and (ii).
- (i) The assessment shall be carried out by an independent, suitably qualified and experienced person(s) appointed by the Requiring Authority, who may be the same person(s) accepted under condition 3.2(d).
- (ii) The Requiring Authority shall, within 15 working days of receiving notice of the assessment, provide the Selwyn District Council with relevant biographical information on the proposed independent, suitably qualified and experienced person(s) to undertake the assessment.
- (iii) The Selwyn District Council should within 10 working days of receipt of that information inform the Requiring Authority whether the person(s) is/are considered to be suitably experienced. If no response is provided by the Selwyn District Council within 10 working days of receipt of the biographical information, then that person shall be deemed to be suitably experienced.
- (iv) If the Selwyn District Council does not accept the person(s) proposed by the Requiring Authority, the Requiring Authority shall propose another person within 15 working days of being informed under condition 3.2(f) (iii).
- (v) The independent, suitably qualified and experienced persons(s) shall assess all elements of the ECMP and either:
- Certify that the ECMP satisfies condition 3.2(c)(i) and (ii); or
 - Recommend changes to ensure the ECMP satisfies condition 3.2(c) (i) and (ii).
- (vi) If the independent, suitably qualified and experienced person(s) recommends changes to the ECMP, the Requiring Authority shall, as soon as practicable, and in any case within 30 days, amend the ECMP in accordance with the recommendation.
- (g) The Requiring Authority may authorise amendments to the ECMP provided that any amendments made maintain or enhance the degree and/or extent to which adverse environmental effects attributable to the construction or maintenance of the scheme are avoided or mitigated. The Requiring Authority shall provide a copy of any such amendment to the ECMP to the Selwyn District Council for its review, consideration, and if necessary amendment, prior to implementation.

- (h) All works shall be carried out in accordance with the ECMP certified in accordance with condition 3.2(e) or as amended under condition 3.2(f) or (g).

3.3 Construction Phase Management Plan

A Construction Phase Management Plan shall be submitted to the Selwyn District Council in accord with the ECMP certification process at least one month prior to the commencement of works. Works shall not proceed until the Plan has been certified by the Selwyn District Council. All works undertaken by the Requiring Authority or their agents shall be subject to, and comply with the provisions of the Construction Phase Management Plan, which shall include but not be limited to, the following:

- (a) The phases in which work shall be undertaken for the purposes of constructing and maintaining the scheme;
- (b) The timing and duration for each phase; and
- (c) The disturbed area in square metres, associated with each phase of construction.

3.4 As Built Plans

Within two months of the completion of the construction works for any of the major components of the Central Plains Water Enhancement Scheme, the Requiring Authority shall supply the Selwyn District Council with a complete set of “as built” plans confirming the location of the works.

4.0 Public Safety/Health and Safety

4.1 Health and Safety Management Plan

Prior to any construction the Requiring Authority shall develop and implement a Health and Safety Management Plan for both construction and operation of the Central Plains Water Irrigation Scheme which shall be provided to the Selwyn District Council, and shall be complied with on an ongoing basis. The Plan shall include at least the following:

Construction

- (a) Ensuring contractors comply with relevant construction regulations, codes of practice and procedures set out in the ECMP in order to ensure compliance with all conditions.
- (b) Ensuring contractors assess hazards on site and develop appropriate control plans that incorporate public health and safety requirements and incorporate public risk mitigation prior to engagement/ commencement of construction. This includes the provision of fencing and warning signs where appropriate to keep the public safe from harm, and to prevent unauthorised access of people and stock into areas where hazards exist including, borrow areas, fill areas and haul roads.
- (c) Public and stakeholder consultation, education and information sharing.
- (d) Contractor and sub-contractor management.
- (e) Public notification of areas of any blasting activities.
- (f) Induction/training requirements.
- (g) Emergency protocols/requirements, including arrangements for 24 hour emergency vehicle access (e.g., Civil Defence, Ambulance, Fire Service and Police).
- (h) Incident reporting procedures.
- (i) Appropriate hazard warnings (e.g., signs, sirens).
- (j) Restricting river use within 500m in either direction of blasting.

Operation

- (a) Procedures to review and update the Plan as required.
- (b) How to deal with emergency events such as oil spills, earthquakes, fires and floods.

4.2 Emergency Response and Contingency

As part of implementing the Health and Safety Management Plan, the Requiring Authority shall:

- (a) Prepare and implement a monitoring plan for the structural safety of intake structures, inlet canals and main headrace.
- (b) Identify contingency events/document associated emergency response plans.
- (c) Make the plan available to relevant parties (e.g., councils, employees, civil defence, residents, etc).

4.3 Access During Construction

During construction, public access will be restricted to all construction, cut, fill and borrow areas by the use of suitable fences/barriers, with warning signs erected and maintained at appropriate locations.

Note: Please see condition 6.1 regarding requirements to maintain alternative public access to riverbeds in such circumstances.

5.0 Traffic Management

5.1 Road/Rail Crossings

The Midland rail line (Rolleston – Greymouth) shall remain open at all times.

The design of any road/rail/headrace crossing shall meet the relevant sight distances specified in Appendix 10 of the Rural Section of the Selwyn District Plan, New Zealand Transport Agency Standards and Guideline Manual (SP/M/021), Planning and Policy Manual (SP/M001) and State Highway Geometric Design Manual (SP/M024) for safe stopping distances, safe passing distances, intersection entry sight distances and clear zone distances to hazards.

5.2 Construction Traffic

Prior to construction, a Traffic Management Plan shall be prepared and a copy given to the Selwyn District Council and New Zealand Transport Agency. This management plan shall be complied with at all times and it shall include the following provisions:

- (a) On all public roads, signs shall be erected warning motorists of a haul road intersection giving rise to a hazard due to heavy trucks crossing.
- (b) Warning signs shall be erected at intersections of all haul roads and public roads prohibiting public access to the construction zone.
- (c) Stock crossing methods shall be established after consulting with local farmers.
- (d) Local emergency services shall be notified of all temporary local road closures.
- (e) All construction vehicles shall be fitted with and use flashing lights while operating in the construction zone and on haul roads.
- (f) All construction vehicles shall comply with the New Zealand Transport Agency rule for vehicle dimensions and mass on public roads, unless specific over dimension permits are obtained.
- (g) Movement of oversize vehicles and equipment on SH 1, SH73 and SH 77 shall comply with New Zealand Transport Agency requirements.
- (h) Road signs shall be erected on roads where necessary to warn motorists of the hazard caused by fog or frost. The design and location of such signs shall be approved by New Zealand Transport Agency for SH1, SH73 and SH77, or the Selwyn District Council for all other roads.
- (i) Road safety audits shall be carried out every six months of traffic signals/stop signs controlling the intersections of all public roads with haul roads. The results of those audits shall be reviewed and steps taken to ensure motorists do not suffer unreasonable delays. Regular monitoring of traffic signals to ensure any faults are identified and repaired.
- (j) No canal or distribution race cleanings shall be deposited on legal road or in a position where such material may be carried onto legal road by vehicle tyres, stormwater flows, wind or any other mechanism.
- (k) Traffic management measures shall consider the issue of residential amenity arising from the passage of traffic through any living zone (particularly in the vicinity of

commercial areas, schools, hospitals, and accommodation for the elderly) and where practicable construction traffic shall be directed to take alternative roads where the impact on amenity will be less.

- (l) On State Highways and District roads Road Condition Surveys shall be carried out of all road sections where it is assessed that there is a reasonable possibility of the road being affected by the scheme. These shall record the 'before' condition of the road prior to the waterways being first flooded. The specific matters to be included in these surveys will be determined by the representative road controlling authorities but will be limited to aspects potentially affected by the scheme.
- (m) Where the Road Controlling Authority has demonstrable reason to believe that damage to the road network may have occurred as a result of the scheme identified by whatever means, they may request that the Requiring Authority carries out a further Road Condition Survey of the affected section of the network covered by the 'before' survey. Where any defects are found to be attributable to water effects arising from the operation of the scheme then the Requiring Authority shall make good the defects and take all reasonable measures to ensure that further damage does not arise.
- (n) On District roads the consent-holder and a representative of the Council shall carry out Road Condition Surveys in the vicinity of all on-road worksites and also near off-road worksites where on-road traffic management is required or access to the site is to be from a road. These surveys shall be completed at each worksite before any work commences, and the 'after' survey will be completed prior to commencement of the maintenance period. A copy of the record of the 'before' survey is to be lodged with the relevant road controlling authority prior to work commencing, and a copy of the 'after' survey with a description of any deficiencies observed arising from the works and remedial action proposed shall be lodged with the road controlling authority within one month of substantial completion at individual worksites.
- (o) All existing property accesses from legal roads onto property shall be maintained under terms satisfactory to the landowner or operator.
- (p) Access to parcels of land within properties that are divided by the works shall be provided under terms satisfactory to the land owner or operator.
- (q) Unless explicitly permitted by the relevant road controlling authority the horizontal and vertical profiles of all road carriageways shall be preserved at the existing lines, grades, crossfalls and levels at all road crossings.
- (r) Where a road is operating as a two way road then, regardless of the traffic flow on that road the bridge or culvert crossing will be built to at least the minimum standard in the Bridge Manual for a low volume two-lane bridge, with clearances meeting the Preferred Minimum Standard.
- (s) Unless explicitly permitted by the relevant road controlling authority all culverts will extend to a point at least 3.0m clear of the edge of the formed carriageway.
- (t) Where a new bridge is constructed, or an existing bridge with pedestrian facilities is modified to accommodate the works, within the road reserve within 500m of a living zone of a township or settlement or within such a living zone, then the bridge shall provide for a pedestrian foot path on at least one side. The footpath shall be at least 2.0m wide to provide for pedestrian and cycle traffic.
- (u) When planning the timing of any works on any one route, the applicant in preparing their Traffic Management Plans for approval for the Road Controlling Authority shall take into account other planned works on the project that will affect the route to ensure the overall impact on the road user is minimised. This shall include making an assessment of the overall delays to the route upon which the specific Traffic Management Plan applies and submitting a programme of works affecting the route with the Traffic Management Plan.
- (v) For the duration of the project, including the full duration of all maintenance periods the applicant will pay all reasonable direct costs arising from the appointment of such staff or consultants necessary to address the Council's responsibilities on relation to the

project (including but not necessarily limited to: Road Traffic Safety Auditors, Design Auditors and traffic Management Coordinators).

- (w) The applicant agrees to be party to the design checking and traffic safety processes outlined above and to provide reasonable lines of communication between the Road Controlling Authorities staff and its own designers and safety engineers to facilitate the process.
- (x) Measures for suppression to mitigate the effects of dust.
- (y) Measures to maintain vehicles and machinery to mitigate the effects of fumes.

5.3 Haul Roads – Intersection with State Highways 73 and 77

Where any haul road intersects with a State Highway, the construction and operation of the intersections shall comply with the following:

- (a) Prior to construction, a Traffic Management Plan dealing with State Highway intersections with haul roads shall be prepared which complies with the New Zealand Transport Agency Code of Practice for Temporary Traffic Management. A copy of this plan shall be provided to New Zealand Transport Agency prior to construction commencing.
- (b) Where any haul road intersects any State Highway, the haul road shall be constructed to a maximum width of 15m, with a speed limit imposed on Haul Road traffic of 30 km/hr.
- (c) Where any haul road intersects any State Highway, sight distances both ways shall comply with the requirements of E10.2 set out in Appendix 10 of the Selwyn District Plan (Rural Section).
- (d) Dust suppressant shall be applied to any haul road when required within 100 metres of an intersection with State Highway to ensure dust does not reduce the visibility for drivers approaching the intersection.

5.4 Hauls Roads – Intersection with Selwyn District Council Roads

Where any haul road intersects with any formed legal roads other than a State Highway, the construction and operation of the intersection shall comply with the following:

- (a) Prior to construction, a Traffic Management Plan shall be prepared which complies with the New Zealand Transport Agency Code of Practice for Temporary Traffic Management. A copy of this plan shall be provided to the Selwyn District Council prior to construction commencing.
- (b) Stop signs shall be erected and maintained to control intersections between all formed public roads any haul road.
- (c) Where any haul road intersects with any formed public road, the haul road shall be constructed to a maximum width of 15m, with a speed limit imposed on haul road traffic of 30 km/hr.
- (d) Where any project haul road intersects any formed public road, sight distances both ways shall comply with the requirements of E10.2 set out in Appendix 10 of the Selwyn District Plan (Rural Section).
- (e) Dust suppressant shall be applied to any haul roads when required within 100 metres of an intersection with any formed public road to ensure dust does not reduce the visibility of drivers approaching the intersection.

6.0 River Access

6.1 Maintenance of River Access

Where practicable all existing access points, both vehicular and pedestrian, to and along the Rakaia and Waimakariri Rivers shall be maintained to a standard not less than that existing prior to construction.

Where existing public access to or within a river is restricted as a result of either construction works or the finished scheme components subject to this application, the Requiring Authority or its contractors shall, as far as practicable and subject to

requirements of public safety, provide alternative access to the same or better standard in a location as near as practicable to the existing access point.

In such circumstances, the Requiring Authority is to provide the Selwyn District Council with a photographic record of the existing access prior to works commencing, along with plans and details illustrating the alternative proposal for certification as part of the ECMP.

The Requiring Authority shall ensure that at all times ECan and its contractors and agents shall have access along the Waimakariri Riverbed for the purpose of operation and maintenance of the Waimakariri River Flood Protection Scheme.

Key areas where such certification would be required include (but are not necessarily limited to) the following:

- Waimakariri River between Gorge Bridge and Bleakhouse corner;
- Hawkins River near Racecourse Hill;
- Hawkins River at Essendon Road;
- Hawkins River at Sheffield;
- Hororata River;
- Rakaia River at Steeles Road;
- Rakaia River at Sleemans Road; and
- Rakaia River between Sleemans Road and the gorge.

7.0 Landscape and Rehabilitation

7.1 Landscape and Rehabilitation Objectives

The Requiring Authority shall undertake rehabilitation of the land surface, topsoil, drainage and vegetation in all areas disturbed in the construction and/or maintenance of the scheme to achieve the following objectives:

- (a) To reinstate vegetation cover on previously vegetated areas disturbed by construction or maintenance activities, where those areas do not contain components of scheme infrastructure or permanent access.
- (b) To visually integrate finished structures, landforms and vegetation into the surrounding landscape so that as far as practicable they appear to be naturally occurring features or features which are already present in the immediate area. In particular the canal embankments and any excess cut stockpiles are to be shaped as naturalised landforms.
- (c) To ensure short and long term stability of disturbed land areas and their surrounding areas particularly on the terrace edges.
- (d) To minimise the loss of existing vegetation where possible, most notably riparian vegetation on the edge of any river terrace.
- (e) To compensate for the loss of any native vegetation removed during construction.

7.2 Landscape and Rehabilitation Management Plan

The Requiring Authority shall prepare a Landscape and Rehabilitation Management Plan which shall be lodged with and certified by the Selwyn District Council in accordance with the ECMP process set out in condition 3.2. Land restoration following construction must adhere to the Landscape and Rehabilitation Management Plan which shall apply to all areas within the designation except to the extent they are inconsistent with the conditions of any land use consents obtained from the Canterbury Regional Council.

The Landscape and Rehabilitation Management Plan shall be:

- Prepared, implemented and maintained in a manner that is consistent with the Terrestrial Ecology Management Plan for the duration of the construction period and a 24 month maintenance period following completion of all plantings required by conditions.

- Reviewed not less than annually and the revised Plan shall be submitted to the Selwyn District Council for certification as outlined above within one month of the review being completed.

The Landscape and Rehabilitation Management Plan shall contain:

- (a) Detail of how the above objectives are to be achieved.
- (b) Incorporation of the proposed concept planting plan and mitigation measures contained in the evidence entitled *Statement of Evidence of Chris Glasson*, and in particular the Enhancement Measures described in paragraphs 158 to 162 (but excluding that information related to the aspects of the scheme that have been withdrawn) and shown in the Sections 15.4 to 15.6 of the Graphic Supplement.
- (c) Details of all landforms, finishing, layouts, soiling, planting and grassing, roads, tracks, structures and maintenance programmes proposed for the scheme.
- (d) Specifications for the use of recessive colours for all structures (all colours shall have a reflectivity of less than 40%).
- (e) The final contours and finished heights of earthworks.
- (f) Methods for stripping, storing and re-use of topsoil.
- (g) Details of proposed planting – including species, location and timing.
- (h) Identification of specific ecological, heritage, cultural or geological features within or immediately adjoining the construction zone which are to be protected, the methods of such protection, and the identification of the features on a plan.
- (i) The staging of vegetation removal.
- (j) The rehabilitation of haul roads.
- (k) Methods and protocols for educating and training contracting personnel about the requirements of the Landscape and Rehabilitation Management Plan.
- (l) On-going pest and weed control measures for both exposed areas and stockpiles over the construction period and rehabilitated landscape planting areas over the operation of the scheme.
- (m) Methods for monitoring the success of re-vegetation plantings for at least 24 months following the planting.
- (n) Methods to enable the completion of all such works at the earliest opportunity, but no later than 1 season following completion of construction.
- (o) On-going methods to minimise fire risk (whether by grazing, mowing or other means) on the head race embankments.

7.3 Landscape and Rehabilitation Areas

The Landscape and Rehabilitation Management Plan shall cover the following areas:

- (a) Borrow areas within the designated land that will not ultimately be covered by the main headrace;
- (b) Fill areas;
- (c) Canal/race embankments – all of which shall be either re-grassed or otherwise covered with rehabilitative/amenity plantings;
- (d) Sediment traps;
- (e) Construction storage areas; and
- (f) The construction zone generally where land has been disturbed.

7.4 Landscape and Rehabilitation Management Plan Content

Landscape and rehabilitation shall be done in accordance with the following. These are design elements relating to specific elements associated with individual components of the scheme.

- 1) Waimakariri River Intake
 - The intake location shall be placed as far as practicable upstream while still remaining within the designated corridor.

- The intake structure shall be located out of sight of the view from the gorge bridge.
 - Concrete structures are to be left to weather naturally, or the intake structure designed and constructed to become more integrated (e.g., the exposed part of the structure being constructed of exposed aggregate).
 - Any timber or iron components of the structure shall be painted in recessive colours.
 - Any over mature pine trees in the vicinity of the intake shall be removed at the time of construction.
 - Investigation of the removal of the existing stockwater race intake structure if it is made obsolete by the new intake (requires approval of the Selwyn District Council).
- 2) Waimakariri Canal and Pond
- Restoration of the landforms adjacent to the pond and canal in order to relate to the existing landform.
 - The batter slopes of canal and pond shall be grassed.
 - Removal of the pine plantations on the terrace slopes on which the canal will be located.
 - The riverbed terrace batter slopes will be either grassed or planted in native vegetation.
 - For the successful re-vegetation of the terrace batter slopes, a planting and maintenance programme will be established. Colonising plants such as kohuhu, manuka, koromiko, cabbage tree, flax, coprosma, kowhai, red tussock and toi toi are appropriate plant species. However, no planting should be established on the downside embankment above the invert level of the canal.
- 3) Head Race Canal (Waimakariri River to Coalgate)
- The batter slopes of the canal will be shaped so that they relate to the surrounding landform, particularly at the junction between the canal bank and the natural ground. The batter slopes will be grassed.
 - In some places where the canal has been widened the public could gain access for recreational purposes. In these areas, parking, tree planting with shade trees and easy access to the waters edge will be catered for.
- 4) Head Race Canal (Coalgate to Rakaia River)
- Where the canal might impact on Coalgate, such as Coal Track Road, amenity planting adjacent to the road and canal will assist to reduce the impact of the canal embankments.
 - In areas where the canal passes through farmland and where trees have been removed, replacement planting with amenity trees will be undertaken.
 - In general terms the main canal embankments will be grassed.
- 5) Rakaia River Intake
- Concrete structures are to be left to weather naturally, or the intake structure designed and constructed to become more integrated (e.g., the exposed part of the structure being constructed of exposed aggregate).
 - Any timber or iron components of the structure shall be painted in recessive colours.
 - All earthworks will be completed so that they relate to the surrounding riverbed landscape and no stockpiles will be left.
- 6) Rakaia River Terrace Race
- The riverbed terrace batter slope will be either grassed or planted in native vegetation.

- For the successful re-vegetation of the terrace batter slopes, a planting and maintenance programme will be established. Colonising plants such as kohuhu, manuka, koromiko, cabbage tree, flax, coprosma, kowhai, red tussock and toi toi are appropriate plant species. However, no planting should be established on the downside embankment above the invert level of the canal.

7) Utilities buildings

- Throughout the landscape, recessive colours will be used for storage tanks, pump stations and any other scheme components.

7.5 Rehabilitation Requirements

- (a) Within two months of completion of any component of the construction works, the Requiring Authority shall issue a notice to the Selwyn District Council certifying that all construction debris or other materials from the construction works other than rock stockpiled for the purpose of maintaining erosion protection works or for landscaping purposes has been removed.
- (b) Within six months of completion of commissioning of the scheme, the Requiring Authority shall remove all temporary buildings, plant and equipment associated with the scheme (whether attached to the land or not).

7.6 Landscape Reinstatement

- (a) The reinstatement of all works areas and landscaping shall be completed within one season (12 months) of the finishing of construction in that area.
- (b) All landscaping shall be maintained on an on-going basis. In the event of rehabilitation plantings not becoming successfully established they will be replanted and maintained until successful.

8.0 Noise and Vibration

8.1 Construction Noise Limits

All construction activity shall be conducted so that noise emissions do not exceed the noise limits contained in the following table. Sound levels shall be measured and assessed in accordance with the provisions of NZS 6803:1999 "Acoustics – Construction Noise". These limits shall apply at all occupied residential units and schools. The Requiring Authority shall liaise with all schools and avoid construction noise during any particularly sensitive times.

Time of week	Time period	Duration of work					
		Typical duration (dBA)		Short-term duration (dBA)		Long-term duration (dBA)	
		L _{eq}	L _{max}	L _{eq}	L _{max}	L _{eq}	L _{max}
Weekdays	0630-0730	60	75	65	75	55	75
	0730-1800	75	90	80	95	70	85
	1800-2000	70	85	75	90	65	80
	2000-0630	45	75	45	75	45	75
Saturdays	0630-0730	45	75	45	75	45	75
	0730-1800	75	90	80	95	70	85
	1800-2000	45	75	45	75	45	75
	2000-0630	45	75	45	75	45	75
Sundays and public holidays	0630-0730	45	75	45	75	45	75
	0730-1800	55	85	55	85	55	85
	1800-2000	45	75	45	75	45	75

	2000-0630	45	75	45	75	45	75
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8.2 Noise and Vibration Management Plan

Prior to the commencement of any construction activity, the Requiring Authority shall appoint an appropriately qualified acoustic engineer to prepare a Noise and Vibration Management Plan. That plan shall be lodged with the Selwyn District Council as part of the ECMP certification process and adhered to during construction

The Noise and Vibration Management Plan shall include:

- (a) Minimum buffer distances and attenuation measures for specific activities and areas in order to comply with the standards set out in condition 8.1 above.
- (b) All applicable noise limits.
- (c) Hours of operation, including times and days when construction work would occur.
- (d) Machinery and equipment to be used.
- (e) Mitigation options to be adopted as required in order to comply with the noise limits, such as temporary barriers and enclosures.
- (f) Description of the adoption of the best practicable option (BPO), in accordance with section 16 of the Resource Management Act.
- (g) Procedures for identifying dwellings within 150 metres of the headrace, 250 metres of bridges/siphons/piling, 75 metres of the distribution network, and 500 metres of any blasting.
- (h) Procedures for conducting pre and post construction structural checks for buildings within the vibration buffer distances in accord with (g).
- (i) Provision for independent certification, monitoring and technical review procedure to outline the Requiring Authority's responsibility to undertake vibration checks and deformation surveys of any other potentially affected heritage building and/or structure before, during and no less than 24 months post the commissioning of the scheme.
- (j) Details of vibration testing of equipment to confirm that the vibration standards in DIN4150-Part 3 (1999) 'Structural vibration – Effects of vibration on structures' are not exceeded. In the event that other machinery is to be used, vibration testing is to occur prior to works commencing to ensure that the vibration standards will be met.
- (k) Development of alternative strategies where full compliance with DIN4150-Part 3 (1999) 'Structural vibration – Effects of vibration on structures' may not be achieved, including consultation with residents and other occupiers to achieve acceptable outcomes.
- (l) Detailed methods for monitoring and reporting on construction noise and vibration throughout the process, including the location of vibration and noise monitoring for construction activities that are adjacent to occupied dwellings.
- (m) Liaison and complaint procedures. The complaint procedure shall require investigation of complaints within twenty-four hours, with immediate cessation of any construction activity found to be breaching the noise limits.

Note: For the purpose of assessment under DIN4150-Part 3 (1999) 'Structural vibration – Effects of vibration on structures' historic buildings shall be classified as "sensitive structures".

8.3 Operational Noise Limits

All operational noise from the scheme shall comply with the following noise limits when measured in accordance with NZS 6801:1991 "Measurement of Sound" and assessed in accordance with NZS 6802:1991 "Assessment of Environmental Sound":

Within the notional boundary of any dwelling, rest home, hospital, or classroom in any educational facility, except where that dwelling, rest home, hospital or classroom is located within a Living Zone:

0730 to 2000 hrs	60 dBA L ₁₀
2000 to 0730 hrs	45 dBA L ₁₀ , 70 dBA L _{max}

Within any site boundary in a Living Zone:

0730 to 2000 hrs	55 dBA L ₁₀
2000 to 0730 hrs	40 dBA L ₁₀ , 70 dBA L _{max}

9.0 Affected Properties

9.1 Access to Canals and Races

The Requiring Authority shall erect and maintain stock fences between the Central Plains Enhancement Scheme and adjacent farms to the same standard as that existing, or otherwise required to prevent cattle accessing the main headrace canal or any inlet canal.

Fencing between the Coalgate Reserve and the headrace shall be erected and maintained by the Requiring Authority in consultation with the Coalgate Reserve Committee.

9.2 Pest and Weed Control

All fenced scheme areas, including the canal and race embankments, shall be subject to pest and weed control so as to prevent the spread of pests and weeds on to adjoining properties.

9.3 Restoration Work – Private Property

Where the works constructed under the designation affects land or chattels, the Requiring Authority shall reconfigure, relocate, or restore all existing:

- (a) Fences;
- (b) Irrigation facilities;
- (c) Water races;
- (d) Farm lanes/tracks;
- (e) Buildings;
- (f) Landscaping (including shelterbelts); and
- (g) Livestock drinking water;

to the same standard as that existing or otherwise at the satisfaction of the land/infrastructure owner. This includes providing bridges and/or alternative structures where necessary to maintain viable lanes/tracks or irrigation facilities to the affected property.

9.4 Restoration Work – Council Community Drinking Supplies, Stock Water and Water Race Schemes

As part of the ECMP the Consent Holder/Requiring Authority is to identify and outline procedures to manage any disruption to Community Water Supply, Stock Water and Water Race Schemes during the construction of the intakes and associated structures, the head race canal and the distribution network. As a minimum this is to achieve a continuity of supply in accordance with the Selwyn District Council 'levels of service' in place at the time of construction. This may involve the provision of an alternative supply at the cost of the Requiring Authority if required.

The design of all crossing points is to be undertaken in conjunction with and be approved by the Selwyn District Council Asset Manager Utilities prior to the ECMP being submitted for certification in accord with condition 1.5.

10.0 Terrestrial Ecology

10.1 Terrestrial Ecology Protection Objectives

The Requiring Authority shall undertake all scheme works in accordance with the following objectives:

- (a) Avoid the loss or disturbance of indigenous vegetation and habitats to the greatest extent practicable, and where that is not possible, to ensure there is a scheme wide 'no net loss' (by area) of significant indigenous vegetation.
- (b) Mitigate for the loss of any indigenous vegetation and habitats destroyed, removed or disturbed during construction and operation of the scheme.
- (c) Mitigate for the loss of any indigenous vegetation-landform associations destroyed, removed or disturbed during construction and operation of the scheme.
- (d) Ensure the successful establishment and long term viability of proposed mitigation plantings.
- (e) Minimise the potential for lizards and large ground-dwelling invertebrates to be significantly affected by construction.
- (f) Minimise the establishment or spread of noxious weeds within the scheme area and also on to neighbouring properties.

10.2 Terrestrial Ecology Protection Plan

Prior to any construction occurring, the Requiring Authority shall, in consultation with Selwyn District Council and the Department of Conservation, prepare and certify a Terrestrial Ecology Protection Plan and adhere to this on an ongoing basis.

The Terrestrial Ecology Protection Plan shall:

- (a) Detail how the above objectives stated in condition 10.1 are to be achieved:
- (b) Include the attached map of all known significant indigenous vegetation within the scheme area and identify those sites/areas that have the potential to be destroyed or adversely affected by construction activities.
- (c) Require field investigations/survey of any such identified sites/areas in sufficient detail so as to achieve objectives (a) to (c) included in condition 10.1 above.
- (d) Detail a calculation of biodiversity 'no net loss' (by area) using international best practice approaches, including the valuation of the biodiversity costs associated with any destruction/damage and the benefits of mitigation and any proposed biodiversity offsets.
- (e) The Terrestrial Ecology Protection Plan shall be prepared and maintained for the duration of the construction period and a 24 month maintenance period following completion of all plantings. In accordance with the ECMP process the Plan shall be submitted to the Selwyn District Council for certification at least one month prior to construction commencing.
- (f) The Terrestrial Ecology Protection Plan shall be prepared, implemented and maintained in conjunction with, and in a manner that is consistent with, the Landscape and Rehabilitation Management Plan.
- (g) The Terrestrial Ecology Protection Plan shall be maintained as current at all times by the Requiring Authority and be reviewed not less than annually. The review shall incorporate all monitoring results obtained during the preceding monitoring period. A copy of each annual Terrestrial Ecology Protection Plan review shall be forwarded to the Selwyn District Council and the Department of Conservation within one calendar month of its completion.

11.0 Waste Management and Hazardous Substances

11.1 Remediation Action Plan

A Remediation Action Plan for contaminated areas will be prepared, certified and lodged with the Selwyn District Council prior to any construction activity and adhered to where the construction of any works subject to the designation requires the disturbance on removal of any:

- (a) Landfill;
- (b) Farm dump;
- (c) Offal pit;

- (d) Septic tank;
- (e) Silage pits;
- (f) Dairy effluent disposal ponds; and
- (g) Coal mine or coal mine workings.

The Remediation Action Plan above shall address the matters set out in (a) - (f) below, with a level of detail appropriate to the degree of risk presented by the disturbance, removal or inundation of each specific contaminated area:

- (a) The earthworks and transport controls to minimise the off-site mitigation of contamination (via air or water during the remedial works).
- (b) Appropriate measures for the control of dust or odour;
- (c) The diversion of stormwater away from the remedial works;
- (d) The treatment of contaminated stormwater or groundwater in the remediation area;
- (e) Sampling and reporting;
- (f) The health and safety requirements for remediation workers.

11.2 Solid Waste

A Waste Management Plan shall be prepared and lodged with the Selwyn District Council prior to any construction activity and adhered to, for the management of domestic waste from site staff, construction waste and hazardous waste.

At each construction area, provision shall be made for the recycling of paper, plastic, glass, aluminium, cans, waste oil and solvents. Containers and appropriate storage arrangements shall be provided for all other classes of waste.

Clean-fill construction waste shall be disposed of within the area of the designation.

All other construction waste shall be transported in enclosed containers to a Selwyn District or Christchurch City transfer station.

11.3 Hazardous Substances

All fuel, oil and hazardous substances shall be stored in accordance with a Hazardous Substances/Spill Contingency Management Plan to be prepared and submitted to the Selwyn District Council at least one month prior to construction.

The Hazardous Substances Management Plan shall address the following matters:

- (a) Hazardous chemical storage
- (b) Fuel and chemical spill control
- (c) Spill containment
- (d) Spill clean up
- (e) Incident reporting

That plan shall be kept on site and provided to the Selwyn District Council upon request.

Fuel, oil and hazardous substance storage areas shall be bunded with capacity to contain 120% of the volume of stored material in the event of a spill.

12.0 Cultural and Heritage Impacts

12.1 Archaeological and Heritage Management Plan

Prior to commencing any construction the Requiring Authority shall commission an Archaeological and Heritage Management Plan prepared by a suitably qualified professional in conjunction with Te Rūnanga o Ngāi Tahu and the NZ Historic Places Trust and certified in accord with the ECMP process set out in condition 3.2. Once finalised, copies shall be lodged with the Selwyn District Council, Te Rūnanga o Ngāi Tahu, Te Taumutu Rūnanga and the NZ Historic Places Trust. This plan shall be complied with and shall cover any destruction, damage or modification to any archaeological site, or historic site or building classified under the NZ Historic Places Act 1993 and identify any conditions to be complied with in relation to heritage. The Archaeological and Heritage Management Plan shall include:

- (a) Methods for avoiding, remedying or mitigating adverse effects on known archaeological and cultural sites and heritage places.
- (b) The Requiring Authority's other legal responsibilities when dealing with archaeological and cultural and heritage places, including Iwi Management Plans, the Ngai Tahu Claims Settlement Act 1998, the Protected Objects Act 1975 and the Historic Places Act 1993 (see condition 12.4).
- (c) Methods for identifying unrecorded archaeological and cultural sites and heritage places which are discovered during the construction of the scheme and appropriate accidental discovery protocols to deal with these (see condition 12.5).
- (d) The identification of areas where there are likely to be sites of significance that require the presence of a cultural monitor on site during construction.
- (e) Responsibilities of contractors and project managers.
- (f) Control of vegetation, stock and soil erosion.
- (g) Public access and vandalism.
- (h) Methods of excavation.
- (i) Sampling and analysis of archaeological materials.

Any taonga tuturu (artefacts of tangata whenua origin) that are recovered during the works are the property of the Crown and should be registered with the Ministry for Culture and Heritage. Such artefacts shall be stored in an appropriate repository either in a local or regional museum.

12.2 Special Requirements for Homebush

In addition to the matters contained above, the Archaeological and Heritage Management Plan shall contain a section dealing specifically with the heritage buildings and other structures located on the Homebush property. In particular this shall contain the procedures to monitor and measures to address any potential effects from construction noise and vibration in accordance with condition 7.2, and in particular h), i), j), k), l) and m).

12.3 Site Survey

Before commencing any vegetation clearance or earthworks in any area listed in the Selwyn District Plan as a Wāhi Taonga site, Wāhi Taonga Management Area or Mahinga Kai site, the Requiring Authority shall contact local rūnanga for advice as to the most appropriate methods for avoiding, remedying or mitigating adverse effects of the proposed activity.

Before the commencement of earthworks in the scheme, the Requiring Authority shall conduct an archaeological survey (including mapping) of all known areas containing cultural sites within the footprint of the scheme works identified on the attached map to determine whether there are any further unrecorded cultural sites that could be affected by the construction works.

Following the completion of the survey and section 18 investigations under the Historic Places Act (1993) the Requiring Authority shall undertake a reappraisal of the Scheme's effects on archaeological sites and then follow the procedures required under the Historic Places Act.

12.4 Historic Places Act Authority

Prior to commencing any construction, the Requiring Authority shall obtain the appropriate Authority to destroy, damage or modify any archaeological site, historic site or historic building classified under the Historic Places Act 1993, from the NZ Historic Places Trust for the work required to complete that stage of the project (section 18 Authority).

Where practicable, all sites should be avoided, but where such sites cannot be avoided, full and appropriate recording and documentation of such sites should be undertaken before they are destroyed. Any mitigation of damage, modification or destruction of the sites shall be undertaken according to sections 10 and 12 of the Historic Places Act 1993.

12.5 Accidental Discovery Protocol

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

In the event of any disturbance of Koiwi Tangata (human bones) or taonga (treasured artefacts), the Requiring Authority shall immediately:

- (a) Advise the Te Rūnanga o Ngāi Tahu, Te Taumutu Rūnanga, or their representative, and the Selwyn District Council of the disturbance;
- (b) Cease earthmoving operations in the affected area until the area containing the Koiwi Tangata or taonga has been clearly demarcated, and Kaumatua and archaeologists have certified that it is appropriate for earthmoving to recommence.

In the event of accidental discovery of archaeological remains, the following steps shall be taken:

- (a) All activity affecting the immediate area shall cease and the Regional Archaeologist of the New Zealand Historic Places Trust shall be contacted;
- (b) The site shall be secured to ensure that the remains are not further disturbed;
- (c) Further works affecting the remains will not commence until either:
 - i. The Regional Archaeologist of the New Zealand Historic Places Trust has confirmed in writing that the archaeological provisions of the Historic Places Act 1993 do not apply; or
 - ii. The requirements of the archaeological provisions of the Historic Places Act 1993 have been met, and if required, and archaeological authority has been granted by the New Zealand Historic Places Trust.

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

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

13.0 Utilities

13.1 Power Utilities

Where any part of a building or structure needs to be constructed/located within the restricted areas specified under Table 2 of the NZECP 34:2001, prior to that construction commencing, the Requiring Authority must submit to the Selwyn District Council (and a copy to Transpower) a certificate from a suitably qualified electrical engineer confirming that any building or structure complies with the minimum safe distances from the Benmore – Haywards A Benmore – Islington A, Roxburgh – Islington A, Brackendale – Hororata A, and Hororata – Islington E lines as specified in Table 3 of the NZECP 34:2001.

Please note that the distances specified include an allowance for climatic conditions (i.e., conductor swing).

No buildings or structures (including temporary buildings) shall be located within 12 metres of the outer edge of the visible foundations of any transmission line tower.

No fences of conductive materials shall be located within 5 metres of the outer edge of the visible foundations of any transmission line tower.

All buildings and other structures constructed on site shall be located so as not to preclude existing 4-wheel drive access to any transmission line support structure.

All machinery and mobile plant operated on site must maintain a minimum clearance distance of 4 metres from all transmission line conductors at all times.

No person shall, in the case of any tower supporting any conductor, excavate or otherwise interfere with any land:

- (a) At a depth greater than 300mm within 6 metres of the outer edge of the visible foundations of the tower; or
- (b) At a depth greater than 3 metres, between 6 metres and 12 metres of the outer edge of the visible foundation of the tower; or
- (c) In such a way as to create an unstable batter.
- (d) When, in exceptional circumstances, the Requiring Authority wishes to undertake works within the specified distances, Transpower shall be consulted with in order to provide the requisite approvals for encroachment, in accordance with the NZECP 34:2001.

Excavated or other material must not be deposited under or near the Benmore – Islington A, Roxburgh – Islington A, Brackendale – Hororata A, and Hororata – Islington E transmission lines so as to reduce the vertical distance from the ground to the conductors to a distance less than:

- (a) 6.5 metres vertically, across or along driveways or on any other land traversable by vehicles;
- (b) 5.5 metres vertically, on any land not traversable by vehicles due to inaccessibility; and
- (c) 3 metres in any distance other than vertical on all land.

Excavated or other material must not be deposited under or near the Benmore – Haywards A transmission line so as to reduce the vertical distance from the ground to the conductors to a distance less than:

- (a) 8 metres vertically, across or along driveways or any other land traversable by vehicles;
- (b) 6.5 metres vertically, on any land not traversable by vehicles due to inaccessibility;
- (c) 3 metres in any distance other than vertical on all land.

Please note that the distances specified include an allowance for mechanic creep (i.e., permanent elongation of the conductors).

The Requiring Authority must ensure that the discharge of dust created by earthworks, transportation and construction activities does not create any dust hazard or nuisance to any high voltage transmission lines.

Prior to the commencement of any construction, the Requiring Authority must submit a “Dust Control Management Plan” for the activity to the Consents Manager, Selwyn District Council (and a copy to Transpower). In particular, the Dust Management Control Plan shall specify the potential dust sources and the mitigation measures to be undertaken to minimize dust in order to protect the existing high voltage transmission lines and locations where ground levels may change in and around transmission lines.

All land use activities, including earthworks located on site must comply with the New Zealand Code of Practice for Electrical Safe Distances NZECP 34:2001 or any subsequent amendment to this code.

All trees and vegetation planted on site must comply with the Electricity (Hazards from Trees) Regulations 2003 or any subsequent amendment to these regulations.

Existing access arrangements to transmission line support structures shall be retained where practicable. Where the Requiring Authority requires or causes a change in access arrangements, then alternative arrangements shall be made (to the satisfaction of Transpower) to provide safe 4-wheel drive, 24hr access to support structure bases (including during the construction period).

14.0 Bonding Construction, Operation, Maintenance and Failure

14.1 Scheme Construction, Operation and Maintenance

The Requiring Authority shall maintain and repair the scheme works, including but not limited to, the intakes, terrace canals and headrace, as well as all ancillary structures such as bridges, siphons and culverts.

14.2 Unexpected Failure

The Requiring Authority shall be responsible for the full costs of remediating any environmental damage, including damage to private property and public infrastructure in the event of any failure of the headrace canal or any other aspect of the scheme works.

14.3 Environmental Bonding

To secure conditions 14.1 and 14.2 the Requiring Authority shall provide and maintain in favour of the Selwyn District Council a bond on terms and conditions satisfactory to them in all respects.

14.4 Form of Bond

The bond shall be in a form generally used by a bank or insurance company registered to conduct business in New Zealand and approved by the Selwyn District Council.

14.5 Content of Bond

The bond and its discrete parts shall provide that the Requiring Authority shall be liable and remain liable for meeting:

- (a) If construction commences, but is not completed, **the construction performance bond** covering the lesser cost of:
 - (i) Completion; or
 - (ii) Reinstating land affected by the construction including making safe and mitigating any adverse effects arising from the work undertaken during construction; and
- (b) If construction is completed:
 - (i) **The operation performance bond** to cover the cost of remedying or mitigating any breach of the conditions of the designation including the obligations relating to rehabilitation, monitoring, maintenance and repair; and
 - (ii) **The unexpected risk event bond** to cover the costs of avoiding, remedying or mitigating any unexpected event relating to the activities authorised by the designation which may occur including, but not limited to, flooding, failure of the terrace canals, headrace, bridges, siphons and culverts authorised under the designation including consequential damage and repair.

For the purpose of condition 14.5, construction is completed when the headrace first conveys water.

14.6 Payment

The payment of the bond quantum by the Requiring Authority shall be guaranteed by a guarantor acceptable to the Selwyn District Council.

The guarantor shall bind itself to pay up to the bond quantum for the carrying out and completion of all obligations of the Requiring Authority under the bond.

14.7 Term

The bond shall be executed before the commencement of any construction works on the Scheme and may be renewed from time to time in accordance with this condition and shall remain in place for a period of 10 years after the surrender, expiry or lapsing of the designation.

14.8 Amount

- (a) The construction performance bond may vary from time to time but at any given time shall be sufficient to cover the lesser of the estimated costs of completion (including any contingency), or compliance with all conditions, including as required by condition 14.5(a):
 - (i) Demolition and removing of any buildings or other structures; and

- (ii) Rehabilitation of land affected by the Scheme.
- (b) The operation performance bond may vary from time to time but at any given time shall be sufficient to cover the estimated costs (including any contingency) of compliance with all conditions including, as required by condition 14.5(b)(i):
 - (i) Demolition and removing of any buildings or other structures;
 - (ii) Rehabilitation of land affected by the Scheme; and
 - (iii) Maintenance and repair of the headrace canal and ongoing maintenance of any bridges, siphons and culverts.
- (c) The unexpected risk events bond may vary from time to time but at any given time shall be sufficient to cover the estimated costs (including consequential damage and repair) of a significant failure related to any of the activities authorised by the designation which may occur during or within 10 years of the expiry, lapse or surrender of the designation.
- (d) The bond shall be set prior to the commencement of construction by agreement between the Requiring Authority and the Selwyn District Council, taking into account the estimated cost of meeting the obligations for which the bond is given as set out in condition 14.5 above.
- (e) In the event of the Requiring Authority and the Selwyn District Council not reaching agreement on the initial bond amount it will be assessed by a suitably qualified and experienced independent bond assessor appointed by the Selwyn District Council, and the decision of that person shall be final and binding.
- (f) The amount of the bond will then be reviewed and reassessed by the Requiring Authority and the Selwyn District Council every 12 months from the date the initial bond amount was lodged until a date two years after the date on which the designation has been given effect to. After that, it will be reviewed and reassessed by the Requiring Authority and the Selwyn District Council at five yearly intervals for the duration of the designation.
- (g) During the construction phase of the Scheme, a scope of works planned for the balance of the construction period will be provided by the Requiring Authority to the Selwyn District Council, both prior to setting the initial bond amount, and again at each annual reassessment, to assist in setting the bond amount as outlined in condition 14.8(a) above.
- (h) In the event of the Requiring Authority and the Selwyn District Council not reaching agreement on a bond amount within thirty (30) working days of the date the review and reassessment falls due, it will be assessed by a suitably qualified and experienced independent bond assessor appointed by the Selwyn District Council, and the decision of that person shall be final and binding.
- (i) If at any time the amount of the bond is varied pursuant to condition 14.8(f) then the Requiring Authority and guarantor approved by the Selwyn District Council, shall within thirty (30) working days of notification to the Requiring Authority of the varied bond amount, execute and lodge with the Selwyn District Council a new bond for the varied amount or the additional amount required in excess of the existing bond.
- (j) The Requiring Authority shall not exercise, or shall cease to exercise, any powers authorised by the designation until:
 - (i) The bonds referred to in condition 14.5 above are executed by the Requiring Authority and guarantor and deposited with the Selwyn District Council; and
 - (ii) In respect of any varied bond referred to in condition 14.8(i) above, after thirty (30) working days has expired from the date the Requiring Authority was notified of the terms of the varied bond by the Selwyn District Council, unless the varied bond has been executed by the Requiring Authority and guarantor, and has

been deposited with the Selwyn District Council, or the varied bond decreases the bond amount required to be provided by the Requiring Authority.

14.9 Section 109

The provisions of Section 109 of the Act shall apply to any bond required pursuant to this condition.

14.10 Costs

The Requiring Authority shall meet the costs of providing any bond, including the costs of preparation of the bond and any substitute bond, and the costs of any professional bond assessor engaged to resolve the appropriate quantum of the initial bond to be provided or any varied bond on review and reassessment.

15.0 Environmental Management Fund

15.1 Establishment

Prior to the exercise of this consent, the Consent Holder/Requiring Authority shall establish an Environmental Management Fund (EMF) to be managed and distributed by an independent Environmental Management Fund Committee (EMFC) for the purpose of:

- (a) Environmental mitigation of the effects of the operation of the scheme which are not otherwise required by consent conditions, the Sustainability Protocol, individual Farm Management Plans, nor for any administration or education associated with these; and
- (b) Environmental management projects within the area affected by the operation of the scheme.

15.2 Environmental Management Fund Committee

Prior to the exercise of the consents and designation, the Consent Holder/Requiring Authority shall establish an EMFC. There shall be at least six (6) members on the EMFC and shall include representatives of:

- (a) Central Plains Water Trust or Central Plains Water Limited;
- (b) Community interests; and
- (c) The regional and district consent authorities.

The fund shall not be utilised for any of the following:

- (a) Measures required by conditions, the Sustainability Protocol or Farm Management Plans;
- (b) Any administration or education associated with consent/designation conditions, the Sustainability Protocol or Farm Management Plans.

Please see the Canterbury Regional Council Consents Administrative Conditions for requirements relating to the Sustainability Protocol and Farm Management Plans.

15.3 Reporting and Levies

The Consent Holder/Requiring Authority shall submit an Environmental Management Fund Report to the Selwyn District Council and the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Officer, which details the following:

- (a) Fund structure and management;
- (b) The level of levy (initially at least \$0.40 per share per annum);
- (c) Criteria for seeking, selecting and approving applications; and
- (d) Criteria for a rebate of the levy to recompense water users for the capital costs of environmental enhancement work on water users' own properties, which is not

otherwise required by their Farm Management Plan or the consent conditions (up to 50% rebate of the levy paid by any one water user in any one year).

Each water user that enters a Water Users Agreement with the Consent Holder/Requiring Authority shall commence paying the levy from the date which the Water Users Agreement is signed.

The levy shall increase annually based on the all groups Consumer Price Index as published quarterly by Statistics NZ. The initial rate of forty (40) cents per share shall be established as equivalent to the all groups Consumer Price Index for 1 July 2010. The first annual adjustment of the levy shall take place on 1 July 2011.

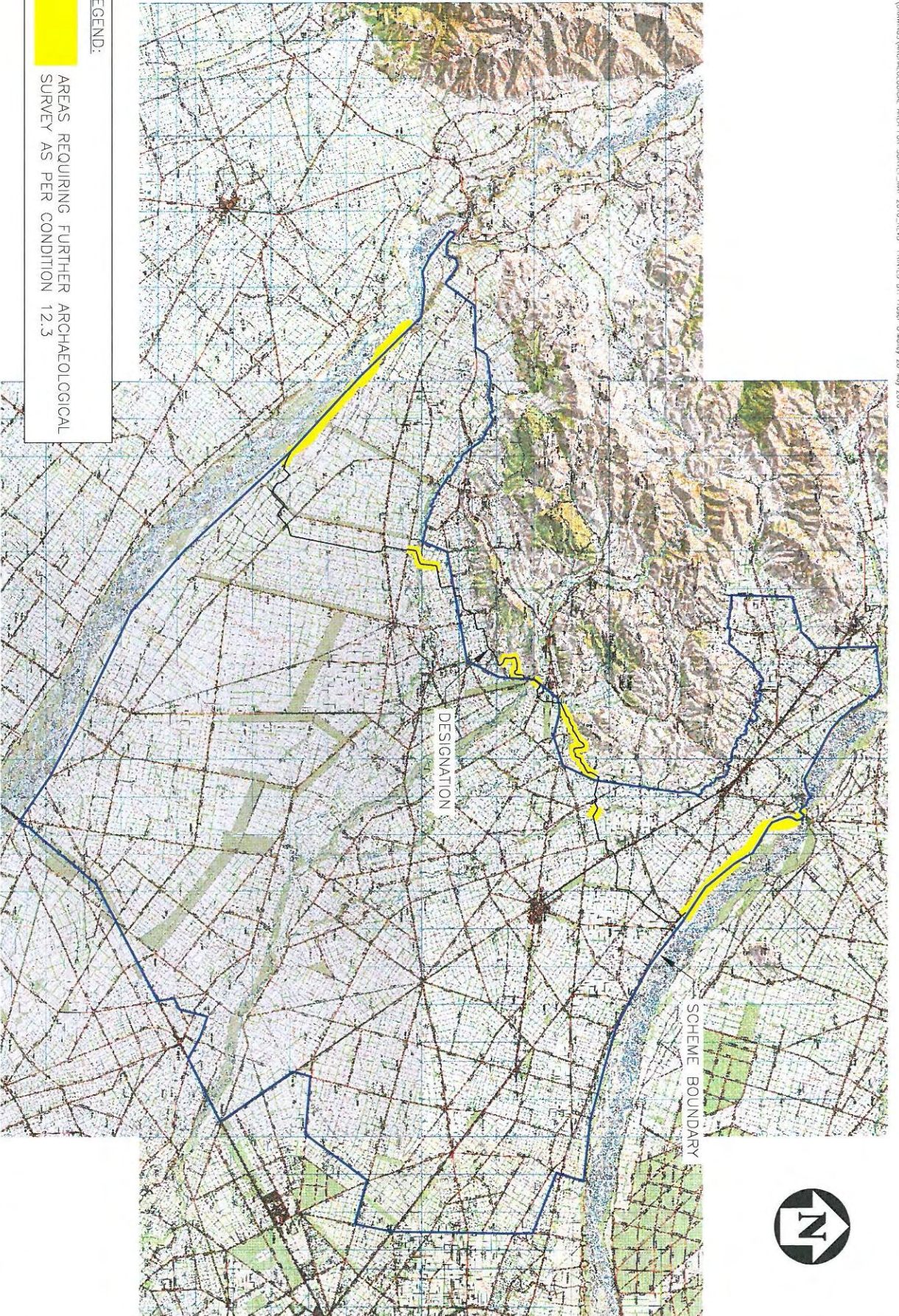
15.4 EMF Priorities

The priorities for the distribution and use of the scheme Environmental Management Fund shall be maintaining or enhancing aquatic and terrestrial ecology and bird life within the scheme area including (unless otherwise covered by the exception set out in condition 15.1(a) above):

- (a) Minimising nutrient losses to lowland streams and Lake Ellesmere/Te Waihora;
- (b) Excluding stock from wetlands, riparian margins and beds of rivers and streams,
- (c) Physical protection of indigenous vegetation planting along riparian margins;
- (d) Wetland enhancement and wetland creation, including the development of wetlands along intermittent streams;
- (e) Permanent protection of wetland areas that may contain mudfish.

ADVICE NOTES:

1. The Council will require payment of its administrative charges in relation to monitoring, as authorised by the provisions of section 36 of the Resource Management Act 1991.
2. Work affecting archaeological sites is subject to a consent process under the Historic Places Act 1993. An authority (consent) from the NZ Historic Places Trust must be obtained for the work prior to commencement. It is an offence to damage or destroy a site for any purpose without an authority. The Historic Places Act 1993 contains penalties for unauthorised site damage. The Requiring Authority is advised to contact the NZ Historic Places Trust for further information.



LEGEND:
AREAS REQUIRING FURTHER ARCHAEOLOGICAL SURVEY AS PER CONDITION 12.3



CENTRAL PLAINS WATER ENHANCEMENT SCHEME
ARCHAEOLOGICAL AREAS REQUIRING FURTHER SURVEY



Independent commissioners 28 May 2010



Philip Milne (chair)



Bob Nixon



Andrew Fenemor



Ray O'Callaghan

IN THE MATTER OF the Resource Management Act 1991

IN THE MATTER OF applications by Central Plains Water Trust to:

Canterbury Regional Council for resource consents to take and use water from the Waimakariri and Rakaia Rivers for the Central Plains Water Enhancement Scheme and for associated consents required for the construction and operation of the Central Plains Water Enhancement Scheme

AND

IN THE MATTER OF applications by Central Plains Water Trust to:

Selwyn District Council for resource consents to construct and operate the Central Plains Water Enhancement Scheme

AND

IN THE MATTER OF a Notice of Requirement by Central Plains Water Limited to:

Selwyn District Council for the designation of land for works associated with the construction and operation of the Central Plains Water Enhancement Scheme

**JOINT DECISION AND RECOMMENDATION OF
INDEPENDENT COMMISSIONERS
28 MAY 2010**

PART 12

List of Hearing Dates and Appearances

GUIDE TO DECISION DOCUMENTS

- PART 1** – Introduction, Part II RMA, assessments, objectives and policy summary, conclusions, decisions and recommendations
- PART 2** – Disputed conditions
- PART 3** – Beneficial, economic, social and cultural effects of the scheme
- PART 4** – Intakes and headraces
- PART 5** – Distribution network
- PART 6** – Waimakariri and Rakaia takes
- PART 7** – Use of water
- PART 8** – Objectives and policies
- PART 9** – Regional Council consents and conditions
- PART 10** – Selwyn District Council consents and conditions
- PART 11** – Recommendations to Central Plains Irrigation Limited in respect of Notice of Requirement and Conditions
- PART 12** – List of hearing dates and appearances

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1. APPEARANCES

The submitters who appeared at the hearing are listed below.

Central Plains Water

Matthew Casey Q.C. (Lead Counsel)
Mr. E.D. Wylie Q.C. (opening submissions)
Ms R. Dunningham (Counsel)

Mr. D. M. Marsh (CPWT Trustee and Director)
Mr. D.J. O'Rourke (CPWT Trustee)
Mr. R.W. Davison (CPWT Trustee)
Mr. P.G. Morrison (Chairman of CPWL)
Mr. J.W. Donkers (Director CPWL)
Dr. T.D. Heiler (Engineer – Water Resource Engineering)
Ms. E. Jamieson (Communication Advisor)
Ms. D. Jolly (Iwi Environmental Management Consultant)
Mr. C.J.M. Tipler (Environmental Engineer, URS)
Mr. W. J. Lewthwaite (Environmental Engineer, URS)
Mr. T.J. McMorran (Engineering Geologist)
Mr. R. R. Davidson (Geotechnical Engineer)
Mr. M. D. Gillon (Engineer)
Dr. J.C. Bright (Specialist Engineer and Director of Aqualinc Research Limited)
Mr. J. J. Weir (Hydrogeologist)
Mr. M. F. Close (Water quality research scientist specializing in groundwater quality)
Dr. G. Francis (Specialist Soil Scientist)
Ms. C.M. Mulcock (Resource Manager and Hydrologist)
Mr. I.C. Brown (Environmental Farm Plans)
Dr. M.C.G. Mabin (Environmental Scientist, URS)
Mr. P.C. Kennedy (Environmental Scientist – Botany and Zoology)
Dr. G.P. Burrell (Freshwater Ecologist)
Dr. R.M. Allibone (Freshwater Scientist)
Dr. G.J. Glova (Freshwater Fisheries)
Dr. C.D. Bishop (Ecologist)
Mr. C.R. Glasson (Landscape Architect)
Dr. N.C. Taylor (Social Researcher)
Dr. J. Habberfield-Short (Heritage Archaeologist)
Mr. A.M. Whaley (Civil Engineer)
Mr. A.W. McFarlane (Farm Management Consultant)
Mr. P.T. Donnelly (Economic Consultant)
Mr. D.J. Murray (Resource Management Planner)
Ms. S. Robson (Consultant Planner)
Mr. S.G. Chiles (Acoustic Engineer)
Mr. R. Budd (Consultation Facilitator for CPWT)
Mr. A. F. Curtis (Dust Control)
Mr. A. M. Whaley (Traffic)

Ashburton Community Water Trust

Ms J.M. Appleyard (Counsel)
Mr. D.N.H. Borrie (Engineer)
Mr. J. Dunning (Resource Management Planner)
R.I.C. Mackenzie (Chairman of ACWT)
Mr. S. Woods (Civil Engineer)

Environment Canterbury

V.J. Bidwell (Section 42A Report - Senior Research Engineer)
M.J. Duncan (Section 42A Report - Scientist – Surface Water Hydrologist)
Mr. L. Fietje (Section 42A Report)
Ms. A. Dean (Section 42A Report)
C.R. Hanson (Section 42A Report - Groundwater Quality Scientist)
S.A. Hayward (Section 42A Report - Groundwater Quality Scientist)
Mr. A.S. Meredith (Section 42A Report - Water Quality Scientist)
D.M. Scott (Section 42A Report - Groundwater Hydrologist)
H.R. Williams (Section 42A Report - Groundwater Resources Scientist)

Dr. P. Grove (Land Resources Scientist)
Ms. K.J. Johnston (Civil Engineer)
Ms. D. Lucas (Consultant Landscape Architect)
Mr. V.M. Smith (Planner)
Mr. R.J. Vesey (Engineer)
Ms. J. Whyte (Consultant Planner)

Selwyn District Council

Mr. H.M. Blake-Manson (Asset Manager Utilities)
Ms. D. Buchan (Social Scientist)
Mr. G.V. Butcher (Economics)
Mr. C. Jacomb (Archeologist)
Mr. J.W. Trevathan (Acoustic Engineer)
Mr. N.J. Williams (Consultant Transport Engineer)
Mr N.B. Boyes (Section 42A Officer's Report - Planner)
Mr W.A.N. Brown (Economist)
Nr. A. Craig (Consultant Landscape Architect)
M. Davis (Ecologist)
S.J. Ford (Agribusiness Consultant)
P. Grove (Land Resources Scientist – Ecology)

Christchurch City Council

A. Prebble (Counsel)
P.F.Callander (Hydrogeologist)
K.Davis-Miller (Planner)
E.M. O'Neill (Water Engineer)

Department of Conservation

P.N. Rutledge (Counsel)
S.C.C. Bowie (Terrestrial Ecology)
K.F.D. Hughey (Environmental Management)
A.R. McIntosh (Terrestrial Ecology)
D.M. Newey (Planning)

Fish & Game/Department of Conservation

G.P. Canham (Recreation)
T.R.H. Davies (Engineering Planning)
R. de Joux (Hydrogeologist)
J. Hay (Terrestrial Ecology)
J.W. Hayes (Terrestrial Ecology)
S.T. Larned (Scientist)
D.A. Olsen (Terrestrial Ecology)

North Canterbury Fish & Game Council

J.M. Crawford & S.J. Eveligh (Counsel)
D. Barr (Club President)
D. Bejakovich (Senior Fish & Game Officer)
N. Goldie (Angler)
J.M. Holland (Environmental Officer)
T. Isitt (Angler)
A.B. Matravers (Angler)
I. McCrory (Ranger)
R. van der Zwet (Angler)

New Zealand Salmon Anglers Association Incorporated

R.M. Stuart (President)
P. Robinson (Angler)
N.F. Ellis (Past President)

Christchurch International Airport

P.F. Callander (Hydrogeologist)
R.K. McAnergney (Manager Airport Planning)
J.A. Renwick (Scientist)

Royal New Zealand Forest and Bird Society

F. MacKenzie (Counsel)
C.D. Meurk (Scientist)

Ngai Tahu Property Limited

M. Christensen (Counsel)
E.N. Jansen (Property Management/Development)

Te Runanga o Ngai Tahu

M.J. Wallace (Counsel)
D. Brown (Fishery Protector)
H. Burgmann (Archeologist)
B.T. Coffey (Scientist)
M.C. Copeland (Economist)
D.P. Hamilton (Lake Ellesmere)
D.M. O'Connell (General Manager of Tribal Interests)
P.A. White (Scientist)
P.S. Whyte (Planner)

Canterbury District Health Board

A.G.H. Humphrey (Medical Officer of Health)

Department of Corrections

M.C. McGrath (Planner)

Canterbury Coal

D. Bell
K. Shearer

Gravel Extractors Group

E. Chapman (Counsel)
K. Bligh (Resource Management Advisor)
P. Callander (Hydrogeologist)
K.M. Seaton (Planner)
B. Warren (Chief Executive Officer)

New Zealand Recreational Canoeing Association

T. Ward-Holmes (Conservation Officer)
M. Baker (Counsel)
H.J.P. Canard (Conservation Officer)

Speight's Coast to Coast

R. Judkins (Race Coordinator)

Whitewater Canoe Club

M. Gill-Fox (Kayaker)
G. Wilson (Past President)
I. Huntsman (Race Coordinator)

Waimakariri Irrigation Limited, Waimakariri District Council & Kaiapoi Community Board

J.M. Appleyard (Counsel)
P.F. Callander (Hydrogeologist)
G.H. Clemens (Director/Chairman Waimakariri Irrigation Limited)
R.D. Keating (Mayor)
D. Young (Manager Utilities and Roading)

Paparua Water Race Irrigators Group

A. Nicol (Representative)

Mainpower

C.E. Robinson (Counsel)

Green Party Aotearoa New Zealand

R. Norman (Co-leader)

Farmers Group Southern Headrace

R. Austin & T. Austin (Representative)
J. Deans (Representative)

Lowland Farming Group

D.P. McEvedy (Representative)
R. Heslop (Representative)

Silver Fern Farms Limited (formerly PPCS)

G.M. Keeley (Technical Manager)

Selwyn Plantation Board Limited

C. Fowler (Counsel)
K. Ellem (Representative)

Waihora Ellesmere Trust

R.J. McPherson (Trustee)
H.G. Rennie (Chairperson)

Leeston Rural District Drainage Committee

J.E. Sunckell (Chairman)

GUARDIANZ

A.J. Cook (Representative)
G. Nelson (Representative)

Malvern Rifle Club

G.R. Smith (Representative)

Water Rights Trust

M. Rodgers (Chairman)

National Council of Women of New Zealand

S. Lukey (Representative)

Waimakariri Alpine Jet Limited

W.J.A. Raymond (Managing Director)

Jet Stream Tours

P. Vernel (Representative)

Homebush Stables Historic Society

L.M. Deans (Representative)

Oaks Historic Homestead

M. de Jong (Owner/Operator)

Ascot Park Limited

J. Crawford (Counsel)

South Canterbury Federated Farmers

T. Henderson (Vice President)

Hopefield Investments Limited

W.O. Harrington (Director)

Ritso Society

M.R. Keeley (Representative)

G. Stevenson (Representative)

R. Lawrence (Representative)

Rosendale Holdings

B. Rawstron (Owner/Operator)

Mr. H. Williams

Coalgate Township Committee

C. Morris (Representative)

Kimberley Residents Association

NE & JA Cameron

AG Cammock

GJ and LN Hewitt

J Justice

J McCausland

IH and CM Reed

DW & JI Syme

ID & AM Syme

BG & JA Reed

Prebbleton Community Association Incorporated

V.M. Challies (Representative)

Malvern Hills Protection Society

M. Parker (Counsel)
J.A. Burns & S. Schlaepfer (Counsel)
D.J. Lucas (Landscape Architect)
J.K. Campbell (Natural Hazards)
M. de Jong
T.J. Hazeldine
G. Horner
M. Lucas
B. Mathers
C. Morris
C. Robertson
M. Robertson
M. Robertson
R. Snoyink
B.I. Thompson
C. Thornton Owen & T. Owen
L. Weir

Taege Family

A.F.J. Gallen (Counsel)
T. Taege & H. Taege

Kirkstyle Farms Limited

D. Scott

Westacre Farms Limited

J.G. Hardie (Counsel)
G. Judd

Bull Family Trust

J.M. Crawford (Counsel)
A.F. Bull

Drumnacott Farm Limited

G. Hewitt & L. Hewitt

R & B Partnership & Hicken Family Trust

R. Hicken

New Zealand Historic Places Trust

Ms. J Easterbrook
Ms. B. Moseley

Synlait Limited

Mr. E. Chapman (Counsel)
Mr. A. Barton
Mr. D. W. Stewart

Trustpower Limited

Ms. L. C. R. Burkhardt (Counsel)
Ms. K. A. Joynt

Jetboating New Zealand

Mr. P. G. Kiesanowski

Mr. R. H. Adams

Individual Submitters

D. Catherwood

R. Freldman

G. Janson

P. Jarman

R. Manson

D.L. Summerfield

R.H. Williams

T. Abbott

T.J. Austin

K. Cookson

T. Cookson

A.H.M. Couper

J. & P. Deans

T. Deans

G. Deans

G.T. Deans

J. (Judy) Deans

J. (James) Deans

F. Denson

C. (Christine) Dennis

C. (Christopher) Dennis

G.P. Dennis

C.J. Garland & J. Pilbrow

C. Mackenzie

E. & I. McLeod

J.H. Robinson

Sheen & Broughton & Broughton

J. Snoyink

A.D. Stevens

P.D. Thomas

G. Thompson

H. Thompson

K.W. Briden

G. Brookland

M.R.T Brown

J. Campbell

M. Clarke

S. Clarke & L. Barlow

W.C. Clarke

R. Dougherty

R.S. English

W. Kolff

R. MacFarlane

K. McIlraith

G. Mackinnon
 S. Molloy
 F. Ogilvie
 A. Raizis
 L. Shand
 P. Sumpter
 T.J. Wardell
 E. & F. Williams
 B. Woods
 C.A. Bascand
 R. Deans
 J.B. Deans
 S.J. Dennis
 B.J. Douglas
 M.E. Hawke
 P. Heddell
 H. Heddell
 M. Mathers
 K.M. Oxley
 J.H. Thwaites
 G.E. Williams

Note for Submitters

As will be apparent, the Hearings Panel heard very large number of submissions throughout the hearing, and accumulated a substantial volume of evidence and notes. It is conceivable that our summary and commentary in the text of this recommendation and decision may not have captured all statements of evidence placed before us, or particular points raised in submissions. We apologise for any omissions that may occur in this regard.

2. CHRONOLOGY OF HEARINGS PROCESS

Date	Party
18 December 2007	Pre-hearing
25 - 27 February 2008	Applicant
3 – 13 March 2008	Applicant
21 – 24 April 2008	Applicant and ACWT
28 and 30 April 2008	ACWT Richard English Ritso Society Ross Manson Martin Bruce Applicant Christchurch City Council
12 – 16 May 2008	Community District Health Board ECan Fish and Game

Date	Party
19 – 23 May 2008	
20 & 21 May 2008	DoC/Fish and Game
22 May 2008	DoC/Fish and Game Malvern Hills Protection Society
23 May 2008	Selwyn District Council Historic Places Trust Ngai Tahu
3 – 6 June 2008	
3 June 2008	Ngai Tahu
4 June 2008	Malvern Hills Protection Society
5 June 2008	Malvern Hills Protection Society Farmers in support
6 June 2008	Malvern Hills Protection Society
10 – 13 June 2008	
10 June 2008	Forest and Bird Di Lucas Kayakers
11 June 2008	Kayakers Coast to Coast Jetboaters Association Trevor Tague
13 June 2008	Kayakers Water Rights Trust Gravel Extractors
24 – 26 June 2008	
24 June 2008	Gravel Extractors Trustpower Synlait
25 June 2008	Coalgate Township Committee Farmers in support
26 June 2008	Waimakariri District Council Mainpower Ngai Tahu Property Department of Corrections
24 – 25 July 2008	Directly affected submitters/landowners
5 – 8 August 2008	
5 August 2008	Individual submitters
6 August 2008	Applicant
7 August 2008	Lowland Farming Group Leeston Drainage Committee Prebbleton Community Association Waihora Ellesmere Trust Little Rakaia Boating Club Paparua Water Race Irrigator Group Canterbury Coal Limited
8 August 2008	Individual submitter Kirkstyle Farms Limited Christchurch International Airport Limited Green Party Godfrey Judd and Westacre Farms Ltd
11 – 14 August 2008	
11 August 2008	Individual submitters
12 August 2008	Individual submitters

Date	Party
13 August 2008	Individual submitters Selwyn Plantation Board Limited Farmers Group Southern Head race Jet Thrills Alpine Jets Silverfern Ltd Guardianz
14 August 2008	Fish and Game National Council for Women Malvern Hills Protection Society
25 – 29 August 2008	
25 August 2008	Individual Submitters Department of Conservation Fish & Game (incl Salmon Anglers) NZ Canoeing Association
26 August 2008	New Zealand Salmon Anglers Association Reporting Officers (SDC)
27 August 2008	Reporting Officers (SDC)
28 August 2008	Reporting Officers (ECan)
29 August 2008	Reporting Officers (ECan)
9 – 12 September 2008	Reporting Officers (ECan) and Applicant's Right of Reply
24 September 2008	
11 May 2009	Applicant Fish and Game Individual Submitters Department of Conservation Malvern Hills Protection Society Ashburton Community Water Trust Reporting Officers
12 - 15 October 2009	
12 October 2009	Applicant
13 October 2009	NIWA (Nitrate Report) Christchurch City Council Individual Submitters
14 October 2009	Gravel Extractors Fish and Game Ngai Tahu Community and Public Health Individual Submitters Reporting Officers
15 October 2009	Reporting Officers Applicant
24 – 25 March 2010	
24 March 2010	Applicant Christchurch City Council Waimakariri District Council/Waimak Irrigation Ltd NZ Historic Places Trust Fish and Game Department of Conservation Kayakers Gravel Extractors Individual Submitters

Date	Party
	Reporting Officers
25 March 2010	Ngai Tahu Reporting Officers