

**IN THE MATTER OF** the Resource Management Act 1991

**AND**

**IN THE MATTER OF** a joint application by Central Plains Water Trust and Ashburton Community Water Trust to:

Canterbury Regional Council for resource consent CRC021091 to take water from the Rakaia River for use by the Central Plains Water Enhancement Scheme and the Rakaia Terrace Hydro Scheme;

**IN THE MATTER OF** applications by the Ashburton Community Water Trust to:

Canterbury Regional Council for resource consents: - CRC072637, CRC072636, CRC073863, CRC072638, CRC072639, CRC072640, CRC072641, CRC072642, CRC073862, CRC073864, CRC072643, CRC072644, CRC072645, CRC072646, CRC072647, CRC072648, CRC072649

**AND** Ashburton District Council for land use consent: - LUC07/0030

to divert and use water from the Rakaia River for hydro electricity generation purposes and for the associated construction and operation of the Rakaia Terrace Hydro Scheme.

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**THIRD STATEMENT OF EVIDENCE OF STEVEN WOODS  
ON BEHALF OF ASHBURTON COMMUNITY WATER TRUST  
Reconvened Hearing 22 April 2009**

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## 1 QUALIFICATIONS AND EXPERIENCE

- 1.1 My name is Steven Woods. I am employed as a Civil Engineer in the Christchurch office of MWH New Zealand Limited, and have been engaged by the applicant to provide Engineering evidence. I have approximately eleven years of experience. I am a Chartered Professional Engineer in the Geotechnical and Civil practice areas and a member of the Institute of Professional Engineers New Zealand.
- 1.2 The evidence I will present today is within my area of expertise, except where I state that I am relying on information provided by another party. I have not knowingly omitted facts or information that might alter or detract from the opinions I express.

## 2 SCOPE OF EVIDENCE

- 2.1 I have been asked by the applicant to prepare evidence in relation to the potential for realigning the proposed Ashburton Community Water Trust (ACWT) terrace canal in order to avoid environmentally sensitive areas identified in the Ecological Survey and Assessment of the Proposed Rakaia Terrace Hydro Scheme prepared by Wildland Consultants (The Wildland Report). The Wildland report identified three areas of particular ecological value for which avoidance was the preferred approach.
- 2.2 For each of the three areas I will outline the implications to canal construction and explain the reasons why avoidance was considered impractical.
- 2.3 I will also address the commissioners suggestion that the applicant may wish to clarify the need for river bed disposal of sediment in the event that consent was granted on the basis of sluicing sediment back to the river.

### 3 IMPLICATIONS OF REALIGNMENT

- 3.1 Section 9.1 of the Wildland Report identifies the preference to re-route the canal to avoid as many indigenous habitats as possible. In particular three areas were identified for preferable avoidance, namely at Ch5100m, 8500m (Lowes Cutting) and 11400m.

#### ***CH5100m***

- 3.2 At Ch5100 the proposed canal is constructed at the base of the river terrace. Because of the unstable nature of the terrace above, it is proposed to cut back the terrace face to form a stable long term slope. It is proposed that this cut will extend from Ch4250 to 5250m.
- 3.3 The area identified for preferential protection is the “Kowhai Forest” marked as K on Figure 1, and located on the side of an existing drainage gully.
- 3.4 Instability in this area is caused by two influences. Firstly drainage from the plains above has created two gullies. As water runs down the terrace face it removes the natural gravel soils and deposits them to form a relatively loose deposit at the base of the terrace. Based on discussion with Mr Paul Bruce, the current landowner, this process is still active. Secondly the Rakaia River is flowing against the toe of the terrace which is eroding the looser material and reducing support for the terrace face above.
- 3.5 The proposed terrace cutting has been extended to Ch5250 so that it includes both of the erosion gullies and the extent of the area where there is little agricultural land protecting the base of the terrace from the river.
- 3.6 In order to avoid the area marked as K, it would be necessary to stop the cutting a few hundred metres before the currently proposed location. This would likely require the canal to be constructed further out towards the river, exposing it to greater river erosion risk. It would also be subject to potential erosion of material from the gully above.
- 3.7 Because of the additional risks to the canal I do not consider it viable to realign the canal in this area to avoid the identified vegetation.

#### ***CH8500***

- 3.8 At Ch8500 (Lowes Cutting) the proposed canal is constructed at the base of a large gravel fan. The two areas identified for preferential avoidance are shown as “Kowhai Treeland” and marked as KT on Figure 2 located on the gravel fan.

- 3.9 In order to avoid the identified areas it would be necessary to move the canal from the base of the fan out to the river flat. The revised layout is illustrated on drawing C050 appended.
- 3.10 Instead of one side of the canal being supported by the existing terrace, if the canal was built on the river flat both sides would need to be formed. This increases the footprint of the canal and increases the amount of gravel fill required by approximately 400,000 m<sup>3</sup> with an estimated cost in the order of \$2,000,000. The additional fill would need to be supplied from additional excavations throughout the scheme with associated issues of managing erosion, sediment and dust generation.
- 3.11 The realigned canal would take up the majority of the space between the fan and the edge of the river. This would expose the canal to risks from river erosion and effectively cuts the river flat (farmed by Mr Paul Bruce) into two sections reducing its efficiency for farming.
- 3.12 On the basis of the additional earthworks required, the impact on current farming operations and the increased risk of river erosion, I do not consider it viable to realign the canal in this area.

#### **CH11400**

- 3.13 At Ch 11400 the canal makes a change from being constructed at the base of the terrace to being constructed at the top of the terrace. The two areas identified for preferential avoidance are shown on figure 3.
- 3.14 In order to avoid the identified areas it would be necessary to make the transition from base of terrace to top of terrace approximately 300m further upstream.
- 3.15 This change would increase the amount of cut and reduce the amount of fill material, resulting in several hundred thousand cubic metres of spare fill which would need to be disposed of in spoil sites unless other changes to the alignment could be made to compensate.
- 3.16 A key requirement in our discussions with landowners has been to minimise the amount of highly productive farm land taken for the scheme. The change required to avoid the identified areas means that more highly productive farmland on top of the terrace would be taken with a reduction in the area of less productive land at the base of the terrace.

3.17 On the basis of unacceptable impact to directly affected landowners and the additional requirements for spoil sites should the change in the alignment be made, I do not consider it viable to realign the canal in this area.

#### 4 SEDIMENT DISPOSAL

- 4.1 Paragraph 46 of the Commissioners interim decisions notes that consent if granted will require the disposal of sediment utilising the sluicing methodology due to concerns over the natural character of the sediment disposal area. Paragraph 46 goes on to note that in the Commissioners view there was no need for the back-up option of spreading sediment on the river bed if sluicing was used but that ACWT may wish to provide comment on this view.
- 4.2 Section 6 of my second statement of evidence addressed sediment disposal by the scheme. In particular paragraphs 6.15 to 6.18 addressed the implications of sediment disposal by the sluice system. Paragraph 6.16 noted that between 3,000 and 15,000 tonnes per year of sediment was predicted to be deposited in the settling pond. This is approximately 10% of the total predicted flow of sediment through the scheme.
- 4.3 Sediment that is deposited in the settling pond cannot be sluiced back to the river. The pond must be cleaned out manually, most likely using excavators and trucks, after being emptied of water.
- 4.4 The preferred means of disposing of the pond sediment would be the sediment disposal area on the river bed as outlined in the application. However, because a much smaller volume of sediment requires disposal (ie only 10% of the total amount) the area required would be substantially reduced.
- 4.5 In paragraph 6.3 of my second statement of evidence I noted that the applicant would limit the area of disposal to 20 Ha. Drawing C001 Rev F, attached to my second statement of evidence shows the extent of 20 Ha on the river bed. For ease of reference this drawing is attached to this statement of evidence. In the event of consent being granted for the disposal of sediment by sluicing the applicant proposes to further limit the area of sediment disposal to 2 Ha on the basis that only 10% of the total sediment load will be disposed in this manner. A revised suggested condition has been appended to the evidence of Mr Dunning to address this point.

## 5 SUMMARY

- 5.1 Consideration has been given to realigning the Ashburton Community Water Trust canal to avoid environmentally sensitive areas.
- 5.2 Due to a combination of engineering and landowner issues, I am of the opinion that none of the identified areas can be reasonably avoided. In my opinion, therefore, measures should concentrate on mitigation and compensation for the lost indigenous vegetation and habitat.
- 5.3 Due to the need to dispose of settling pond sediment the applicant seeks consent to dispose of sediment to the river bed even if consent to sluice sediment back to the river is granted. However, due to the much smaller quantities of sediment requiring disposal on the riverbed the applicant has proposed to limit the area of disposal to 2 Ha which is 10% of the area originally sought. .