

REPORT

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Report No.: 2008/411
Prepared for: Engineering and Hazards Committee
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Date: 27 August 2008

Subject: Shotover Delta Training Works

1. Précis

Council and the Queenstown-Lakes District Council have jointly prepared and adopted a strategy for managing the flooding risk affecting Lake Wakatipu communities. The strategy recognises that flood hazard due to temporary high lake levels can not be avoided, but can be mitigated to some degree through managing the communities' exposure to flooding. The component of the hazard associated with the Shotover River is likely to be increased whenever the river enters the Kawarau River at the true-right (western side) of the delta. Further, the three main islands on the delta are increasing in size, impacting adversely on the sediment storage characteristics of the delta.

Council has been considering ways of providing greater surety that the Shotover River will occupy the true-left side of the delta while maximising the sediment storage characteristics of the delta. This report outlines the proposed management initiatives and sets out a management and implementation framework for endorsement by Committee.

A design concept for a training line has been prepared and it is proposed that this be implemented subject to obtaining the necessary resource consents and funding. To complement the training line it is proposed that the delta surface be managed to a target delta profile, lower than the current surface of the delta and that the river is allowed to adopt a more natural braided pattern on the delta.

Council has commenced the preparation of resource consent applications for the proposed works. Council is best-placed to ensure that extraction to achieve the target delta profile is ongoing and to give effect to river management objectives over the long-term. Accordingly it is appropriate that Council holds the necessary resource consents for achieving river management objectives and coordinates the exercising of these consents and any consents held by other parties currently and into the future. It is proposed that Council would allow other parties to act as its agent and to exercise consents held by Council for gravel extraction under appropriate terms and conditions. Some parties may consider that their risks are better managed by holding their own consents rather than relying on those held by Council. This would be acceptable to Council provided the conditions of consent are essentially identical with those that will be held by Council.

2. Background

Council and the Queenstown-Lakes District Council have jointly prepared and adopted a strategy for managing the flooding risk of Lake Wakatipu communities¹. The strategy recognises that flood hazard due to temporary high lake levels can not be avoided, but can be mitigated to some degree through managing the communities' exposure to flooding. The strategy and its guiding principles draw heavily on the draft New Zealand Flood Protocol².

Investigations undertaken on behalf of Council and reported previously to Committee have shown that the component of the hazard associated with the Shotover River is increased when the river enters the Kawarau River at the true-right (western side) of the delta³. Further, the three main islands on the delta are increasing in size, impacting adversely on the sediment storage characteristics of the delta (Figure 1). Active management of these characteristics is necessary to avoid the Shotover River further exacerbating Lake Wakatipu flood hazard.

In accordance with the action plan set out in the joint Wakatipu strategy, Council has been investigating training options for the Shotover River⁴. In June 2007 Council endorsed management approaches and concepts involving training the Shotover River to the true-left of the delta and removing some or all of the willow islands on the delta, subject to an independent, expert peer review⁵. In conjunction with this Council identified an envelope of maximum permissible reclamation for the true-right of the delta (Figure 2). The peer review was conducted by Dr Murray Hicks of NIWA⁶ and his views were used to guide further development of the training concept (Attachment 1).

More recently Council has been liaising with Queenstown-Lakes District Council, Queenstown Airport Corporation and Transit NZ regarding their respective public utility developments planned for the delta (Figure 3) (Attachment 2).

3. Introduction

Council's Annual Plan 2008/09 includes the following activities relating to the Shotover River delta;

- Commence willow removal on the Shotover delta;
- Complete detailed investigations of possible training and public utility protection works for the Shotover delta;

¹ *Learning to Live with Flooding: A Flood Risk Management Strategy for the Communities of Lakes Wakatipu and Wanaka*, Otago Regional Council and Queenstown-Lakes District Council, October 2006.

² *Managing Flood Risk, Draft New Zealand Protocol*, Centre for Advanced Engineering, University of Canterbury, December 2005.

³ *Kawarau and Shotover Rivers Sedimentation Investigation*, prepared for Otago Regional Council by Barnett and MacMurray Ltd, Canterprise Ltd, Lincoln University and Hunziker, Zarn and Partner AG, January 2006.

⁴ *Shotover River Sediment Management: Microscale Modelling*, Final Report to Otago Regional Council, TR Davies, University of Canterbury, March 2007.

⁵ *Management of the Shotover River Delta*, report to Otago Regional Council Engineering and Hazards Committee, Report No. 2007/267, June 2007.

⁶ *Review of Report "Management of the Shotover River Delta"*, Prepared for Otago Regional Council, Dr D Murray Hicks, National Institute of Water and Atmospheric Research, August 2007.

- Publicly consult on funding options for the preferred Shotover delta training and public utility protection works.

These activities are being funded from a targeted rate applied to the recently established Wakatipu Special Rating District. At this stage Council has made no decision on how to fund works beyond the current financial year, including the construction and maintenance of river training works on the Shotover delta.

As reported previously to Committee, the removal of willows from the eastern island and the fairway on the true-left of the delta has been completed (Figure 4). Council has also progressed investigations of training options and has commenced the preparation of resource consent applications for a preferred option. This report outlines the proposed river management works and sets out a management and implementation framework for endorsement by Committee.

4. Proposed River Management Works

As noted above, Council has been investigating ways of training the Shotover River to the true-left side of the delta whilst not reducing the sediment deposition characteristics of the delta. A design concept has been prepared by David Hamilton and Associates⁷ (Attachment 3), having regard to effectiveness and affordability of the training structure (Figure 5). It is proposed that this be implemented subject to obtaining the necessary resource consents and funding. The alignment, length and form of the training line are being finalised.

The training structure is intended to encourage a positive alignment between the Shotover and Kawarau Rivers rather than to act as a barrier to flow. Accordingly, the structure can be overtopped. A more sophisticated alternative has been considered⁸ but is deemed to be not justified in the circumstances provided the higher maintenance requirements of the preferred structure are accepted.

To complement the training line it is proposed that the sedimentation characteristics of the delta be enhanced and that the Shotover River be allowed to adopt a more natural braided pattern on the delta. Modelling investigations undertaken for Council by Dr Tim Davies show that these characteristics are desirable in terms of reducing the future risk of the Shotover River adding to the flood hazard affecting Lake Wakatipu communities. It is proposed that the delta surface be managed to achieve a target profile (Figure 6), advanced initially through the large-scale gravel extraction requirements of other parties accompanied by removal of willow islands, and then ongoing gravel extraction and vegetation control. In addition the Kawarau River would be widened adjacent to the delta ideally so that the flood conveyance is no less than that which exists at the upstream (western) side of the delta.

Removing vegetation (predominantly crack willow) that has colonised the lower delta will enlarge the effective area of the delta and increase sediment storage capability. It will also return the delta to a more natural, braided state.

⁷ *Lower Shotover River Training Works, Proposed Alignment and Estimated Cost*. Prepared for Otago Regional Council. David Hamilton and Associates Ltd, May 2008.

⁸ *Shotover River Delta Training Works Concept Design Study*, Prepared for Otago Regional Council, Tonkin and Taylor Ltd, March 2008.

The delta profile has yet to be finalised based on a detailed topographic survey that will commence shortly. However, based on the two concept scenarios shown in Figure 6 and a survey conducted in 2006, approximately 700,000 to 1,000,000 cubic metres of gravel, sand and organic material would need to be removed initially to attain the target profile. Most of this extracted material is likely to have some commercial value. The amount and timing of excavation required on an ongoing basis to maintain the profile is difficult to predict, but the average annual rate of deposition on the delta has been estimated as 160,000 cubic metres per annum⁹. Currently consented extraction from the Shotover River equals 366,500 cubic metres per annum (Figure 7). All of the consents expire in less than five years.

Council staff have commenced consultation with local gravel extractors, adjacent landowners, commercial jet boat operators, Department of Conservation and Fish and Game. Consultation with Iwi will commence shortly.

5. Proposed Management and Implementation Framework

Council has developed a concept design for a training line that achieves river management objectives and which does not preclude other public utility developments on the true-right of the delta. These other public utility developments also require their own erosion protection or river training elements. The cost of Council's standalone proposal as described in Attachment 3 should set the upper limit on any cost-sharing arrangements Council enters into with other public utility developments where there are common works elements.

The deposition of sediment (gravel, sand, silt) on the delta is episodic and will continue into the foreseeable future. Although gravel is currently extracted by various parties on a commercial basis, this is in response to demand for the gravel resource rather than driven by river management objectives. Council is best-placed to ensure that extraction to achieve the target delta profile is ongoing and to give effect to river management objectives over the long-term. Accordingly it is appropriate that Council holds the necessary resource consents for achieving river management objectives and coordinates the exercising of these consents and any consents held by other parties currently and into the future. It is proposed that Council would allow other parties to act as its agent and to exercise consents held by Council for gravel extraction under appropriate terms and conditions.

Actual locations of extraction and the quantities extracted at particular locations on the delta will depend on deposition patterns in the future and the actual amounts that are extracted. These can not be predicted with any certainty. Accordingly this will require specific and ongoing monitoring and decisions by Council river management staff. It is anticipated that the details of this decision-making process and criteria would be set out in a Management Plan to be developed in consultation with stakeholders and approved by Council (as consent authority) as a condition of resource consent.

As noted above, resource consents are already held by some parties. None of these existing consents appear to contain conditions that are in conflict with this proposal.

⁹ *Clutha River Sediment Budget*, prepared for Contact Energy Ltd by National Institute of Water and Atmospheric Research, November 2000, page 10.

Accordingly there is no reason why these existing consents can not continue to be exercised. That is, gravel extraction activity on the Shotover River should continue but it should conform to the Management Plan, irrespective of who the consent holder is.

6. Discussion

The proposal requires a suite of resource and landuse consents from the Otago Regional Council and Queenstown-Lakes District Council under the Resource Management Act. At present Council does not hold resource consents for extraction of gravel or any physical works on the delta other than a global consent for bed disturbance associated with removal of vegetation (from rivers in general, anywhere in Otago). Council has therefore commenced the preparation of the necessary applications for construction of the training wall, removal of gravel islands, and extraction to attain and maintain the target profile, with a view to lodging these in October 2008.

The timeframe for obtaining consents is not certain, but an optimistic scenario assuming timely processing by the consent authorities and no appeal to the Environment Court would see consents granted in February 2009. This timeframe is acceptable from a river management point of view. However it may not suit parties who have more immediate demands for gravel and who wish to utilise the consents being applied for by Council (assuming these are granted and with conditions of consent that are acceptable to these other parties). Accordingly, it is for those parties to decide whether to await the outcome of Council's consent applications with a view to utilising Council's consents, or to pursue consent applications of their own. It is noted that Council will not hold consents for stockpiling or processing activities (i.e. associated land use activities outside of the river bed) – responsibility for holding the necessary consents for these activities will reside with the parties undertaking those activities.

The Shotover River, including the delta, is one of a number of rivers defined as “protected waters” in the Water Conservation (Kawarau) Order 1997. The Order identifies certain “outstanding characteristics” for each of these protected waters and restricts or prohibits certain functions and powers of Council under the Resource Management Act. Despite that, the Order contains exemptions for flood protection works.

Consents held by other parties to extract gravel on the delta and upstream of the delta do not conflict with this proposed approach to management of the delta, provided they do not impact adversely on attaining or maintaining the target profile and do not encourage the Shotover River to occupy the true-right of the delta. Some parties may consider that their risks are better managed by holding their own consents rather than relying on those held by Council. This would be acceptable to Council provided the conditions of consent are essentially identical with those that will be held by Council.

It is likely that commercial demand for gravel extracted from the river will continue into the foreseeable future. However if this is not sustained at a rate that enables the target profile to be maintained in the longer term then Council may need to undertake extraction works itself through an appropriate contracting arrangement.

As noted above, Council has not yet made a decision on how to fund the construction and maintenance of the proposed training works. Council will need to consider whether a targeted rate should be applied to a more specific area within the Wakatipu Special Rating District, to reflect the direct benefit that certain parts of the District will receive as a consequence of the proposed works.

It is Council policy that holders of consents for the extraction of gravel from rivers be charged a gravel extraction fee to cover part of the cost of monitoring the consent. For 2008/2009 this fee is set at \$0.65 per cubic metre. The fee for subsequent years will be set as part of the Annual Plan preparation process. In this particular case, Council will establish a specific monitoring programme as part of its river management activity which would likely be funded on the same basis as the river works themselves. Accordingly, it may be appropriate to reduce or waive the gravel extraction fee in this case. This is a policy matter that should be considered by Council.

7. Recommendations

That:

1. This report be noted;
2. The concept design for the proposed training line be endorsed, noting that the final alignment, length and form depend on the nature and timing of other public utility developments on the delta;
3. The target delta profile concept be endorsed noting that it is subject to further refinement;
4. Council apply for the necessary regulatory approvals to construct the proposed training line and to attain and maintain a target delta profile;
5. The proposed management and implementation framework for the target delta profile be endorsed, including appointing other parties to act as agents on Council's behalf for the exercising of resource consents held by Council where appropriate;
6. Council staff enter into negotiations with other parties on cost-sharing arrangements for parts of the proposed training line that are necessary as part of other public utility developments;
7. Council develop and publicly consult on funding options for the construction and maintenance of the proposed training line and associated river works in conjunction with the preparation and public consultation on the 2009/2019 Long Term Council Community Plan;
8. The matter relating to compliance monitoring charges is referred to the Finance and Corporate Committee for consideration.



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Director Environmental Engineering and Natural Hazards

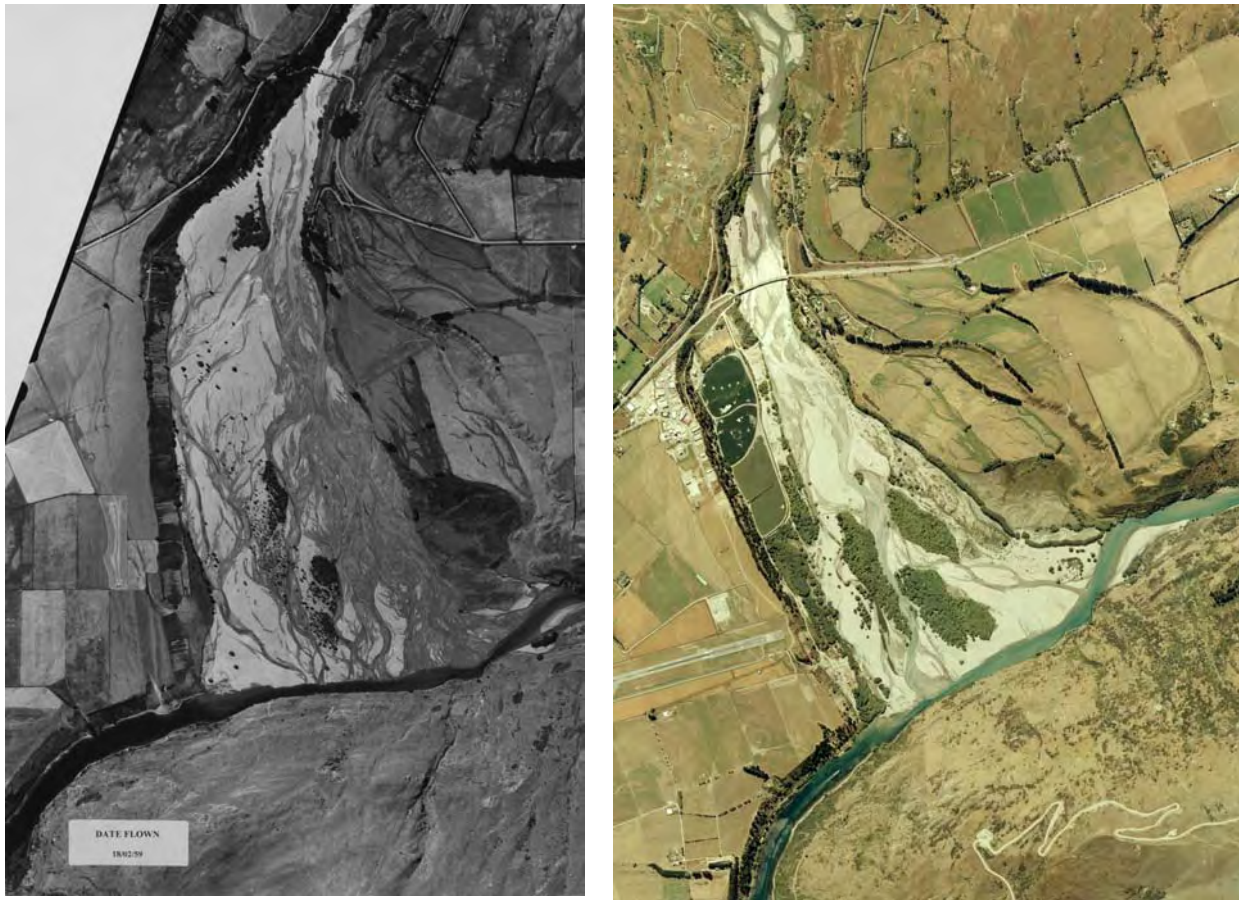


Figure 1. Shotover River delta in 1959 and 2006.

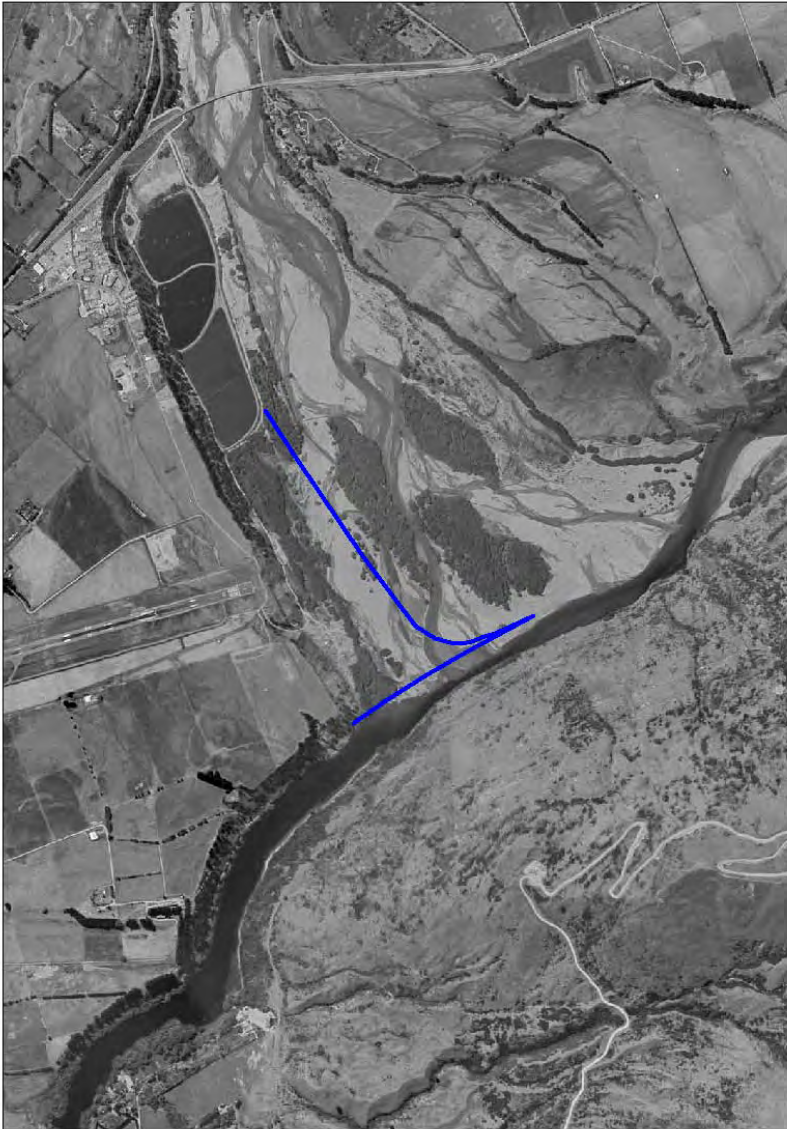


Figure 2. Maximum permissible reclamation of true-right (western) side of delta.

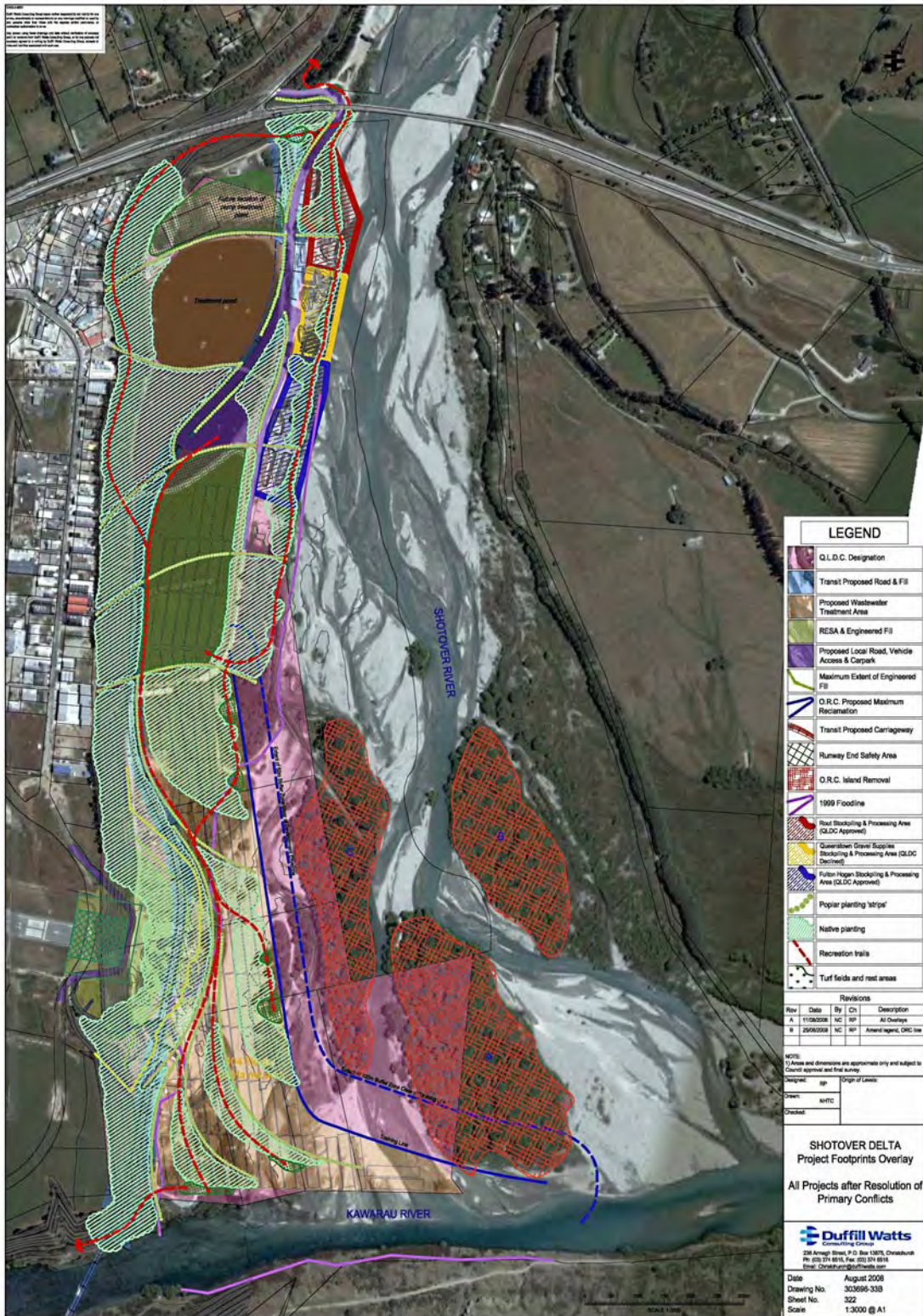


Figure 3. Final integrated overlay of infrastructure projects (as at 15 August 2008).



Figure 4. Willow removal from island and fairway at true-left of delta.



Figure 5. Concept design for river training line (stand alone element).

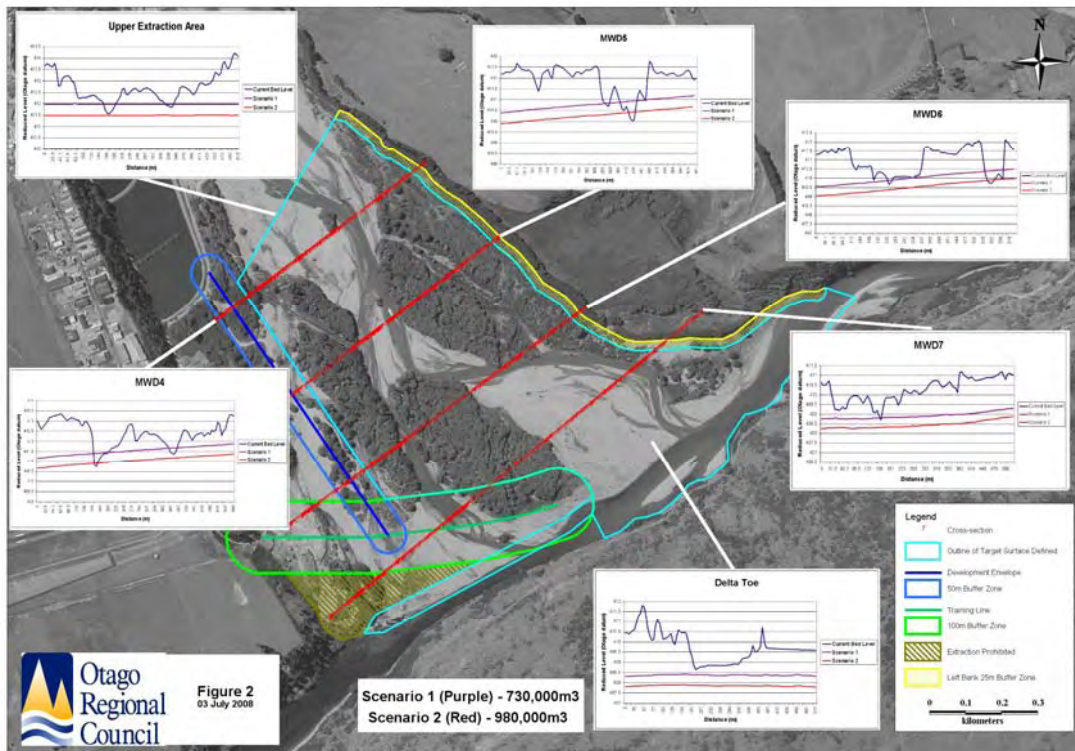


Figure 6. Target delta profile concepts (note cross-sections are looking downstream along delta toward Kawarau River).

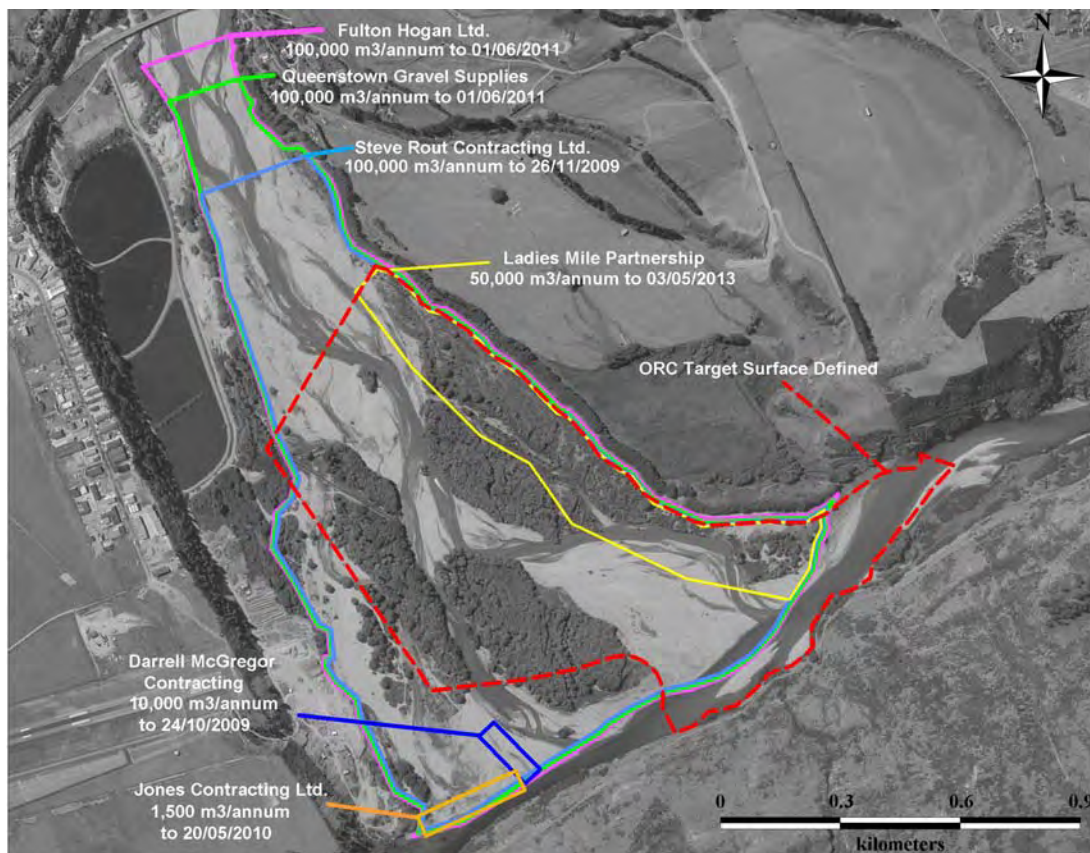


Figure 7. Currently consented gravel extraction.